STATION SERVICE MANUAL

VOLUME I

Bell System

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STATION SERVICE MANUAL VOL I

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Introduction

This manual is a selected compilation of BSPs concerning basic station installation and repair. It provides a ready reference for the most common installations. Information not included in this manual is available in work centers or supervisors files.

The following BSP's have been eliminated from Volume I of the Station Service Manual. If you have a need for them retain your 1980 issue.

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502-521-401
502-521-405
502-521-411
502-531-408
502-531-409
502-580-403
502-727-402
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1. GENERAL

1.01 KNOW YOUR FIRST AID. Do not attempt to save time and effort by using second-best methods of First Aid. It is just as important to know the "don'ts" of First Aid as it is to know the "do's." Report all injuries to your supervisor as soon as possible.

1.02 First Aid is defined as the immediate and temporary care given to the victim of an accident or illness until the services of a physician can be obtained. It is not the First Aider's province to diagnose, evaluate, or predict.

1.03 In case of serious injury, act quickly as each second of delay is important.

1.04 If possible, stay with the victim and ask someone else to call a doctor. If necessary, call the police for this purpose. (Consult your List of Physicians and Hospitals, if available.)

1.05 When the doctor is called, give him the following information:

(a) Cause and description of the injury.

(b) Location of the victim.

(c) What First Aid is being given.

(d) What First Aid supplies are available.

(e) Whether an ambulance is needed.

1.06 ***General Directions:***

(a) Keep the victim lying down. Do not transport a seriously injured person unless it is necessary to do so.

(b) Treat in order listed:

(1) Severe bleeding (Part 2).

(2) Stoppage of breathing (Part 2).

(3) Poisoning by mouth (Part 6).

(4) Shock (Part 4).

(c) Check for other injuries and plan what to do.

(d) Obtain the services of a physician.

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2. WOUNDS AND BLEEDING

2.01 A wound is a break in the skin or mucous membrane. It is caused by force and usually extends into the underlying tissue. Control bleeding and protect wounds from contamination. The danger of tetanus (lockjaw) should be considered in ALL WOUNDS. Guard against infection. (If it occurs, refer to 11.12.)

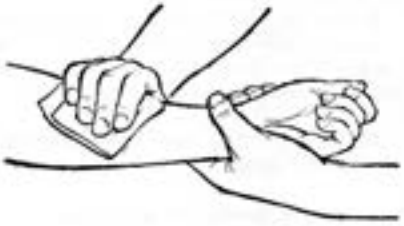

Fig. 1—Direct Pressure on Wound

2.02 ***Wounds with Severe Bleeding:***

(a) Severe bleeding must be stopped without delay. Apply direct pressure on the wound, using a cloth pad or even bare hand, if necessary. (Fig. 1).

(b) Elevate the bleeding part, if possible.

(c) If an arm or leg is involved, and direct pressure must be delayed or is not entirely effective apply digital pressure at pressure points. (Fig. 2 and 3).

Fig. 2—Finger Pressure on Brachial Artery

Pressure on the inner half of the arm, midway between the elbow and the armpit, compresses the brachial artery against the bone there, causing bleeding in the arm, beyond the point of pressure, to be controlled.

Pressure applied just below the groin on the front inner half of the thigh compresses the femoral artery against the underlying pelvic bone.

If considerable force is applied, bleeding below the point of pressure will be controlled.

Fig. 3—Hand Pressure on Femoral Artery

(d) Bandage the pad firmly into place on the wound. Do not remove it once it is in place. If blood saturates the dressing, bandage additional layers of cloth on top of original dressing.

(e) **THE TOURNIQUET SHOULD BE USED ONLY IN EXTREME CASES, WHERE IT IS NECESSARY TO RISK LOSING THE VICTIM'S LIMB IN ORDER TO SAVE HIS LIFE.** If it is to be used:

(1) Place it close above the wound, between the body and the wound.

(2) Make sure that it is applied tightly enough to stop bleeding.

(3) Wrap the material tightly twice around the limb if possible and tie a half knot (Fig. 4a).

(4) Place a short stick on the half knot and tie a full knot (Fig. 4b).

(5) Twist the stick to tighten the tourniquet until the flow of blood ceases (Fig. 4c).

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(6) Secure the stick in place with the loose ends of the tourniquet or another strip of cloth (Fig. 4d).

(7) A notation should always be made and attached to the victim, giving the time of application and location of the tourniquet.

(8) **DO NOT RELEASE THE TOURNIQUET ONCE IT HAS BEEN APPLIED. IT IS URGENT THAT SUCH CASES HAVE MEDICAL ATTENTION AS SOON AS POSSIBLE.**

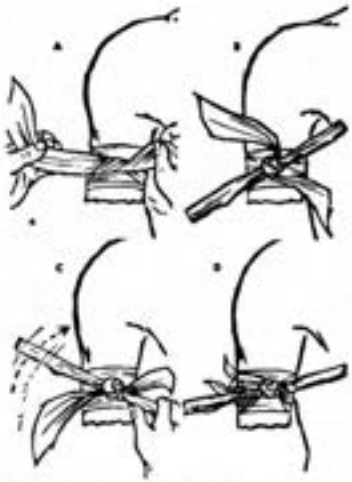

Fig. 4—Application of Tourniquet

2.03 ***Neck Wounds:*** These are most frequently made by knives, razors, and windshield glass. The large artery, vein, or both, may be cut.

(a) ***First Aid:***

(1) Apply hand pressure both above and below the cut and continue to hold until a doctor directs that pressure be released. One need not worry about getting the hand in the wound in such severe cases.

(2) A bulky compress of the cleanest material immediately available to maintain pressure may be a great help.

2.04 ***Minor Wounds in Which Bleeding Is Not Severe:***

(a) ***First Aid:***

(1) Wash your hands thoroughly with clean water and soap.

(2) Cleanse the injury thoroughly, using plain soap and boiled water or if not available, use first aid antiseptic on a sterile compress.

(3) Apply first aid antiseptic from First Aid Kit, if available. If not, cover with sterile or clean dressing and bandage snugly.

(4) Arrange to see a doctor promptly if evidence of infection appears.

2.05 ***Wounds with Internal Bleeding***

(a) Caused by head injury—refer to 7.02.

(b) Caused by other than head injury—may be indicated by appearance of blood at uninjured mouth or nose.

(1) ***First Aid:***

(a) Keep the victim lying on his back. Turn the head to one side.

(b) Raise the head and shoulders if breathing is difficult.

(c) If the patient is in shock or unconscious, turn him on his side with head and chest lower than hips to prevent blood from being drawn into the lungs.

(d) ***Give no stimulants.***

2.06 ***Gunshot Wounds and Other Deep Wounds:***

(a) ***First Aid:***

(1) Keep victim as quiet as possible. Moving may aggravate fractures or the existing damage to internal organs.

(2) ***Do not give stimulants.*** If wound is abdominal, do not give any food or water.

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(3) If air passes through a chest wound as the victim breathes, cover wound firmly with dressing material.

(4) If intestines protrude, do not force them back into the abdomen; cover with cloths wet with water at body temperature. Water and dressings should be as sterile as possible under the circumstances.

3. BITES AND STINGS

3.01 *Animal Bites:*

(a) ***First Aid:***

(1) Wash the wound thoroughly to remove all saliva. Use a gauze compress and a solution of soap and water to scrub the wound; kitchen or laundry soap is best, but any soap will do. Thorough washing of bite wound should be continued at least 10 to 15 minutes; then rinse with clean running water and apply a sterile dressing.

(2) If possible, steps should be taken to confine the animal so that it will be available for examination to determine whether its bite may have transmitted rabies or tetanus.

(3) Always consult a physician promptly.

3.02 *Snake Bites (Poisonous):*

(a) ***Prevention:*** Most snake bites can be prevented when working in snake-infested regions by wearing high-topped boots or heavy leggings, and by being extremely careful about putting the hands in places where they might be bitten.

(b) ***Symptoms:***

(1) Bite of a rattlesnake, copperhead, or cotton-mouth moccasin leaves one or two small puncture wounds. Since the coral snake chews rather than bites, it leaves no fang marks. Severe pain, swelling, and discoloration of the poisoned part occurs rapidly.

(2) General weakness, shortness of breath, nausea, vomiting, weak and rapid pulse, dimness of vision, possibly unconsciousness.

(c) ***First Aid:***

(1) Start at once. Have victim lie down and keep quiet, as muscular activity increases circulation resulting in more rapid absorption of the venom.

(2) If bite is on an extremity, tie a constricting band—***not a tourniquet***—firmly above the bite.

(3) Sterilize a knife or razor blade with a match flame, first aid antiseptic, or alcohol and make incisions. Try with one of them to get into the venom deposit point. Crosscuts, about one-fourth inch long, may be made at each fang mark and over the suspected deposit point. Make shallow cuts through the skin in the crossways direction; longitudinal cuts may be deeper. Muscles and nerves run in a longitudinal direction and a deep crosscut may sever them. Beware of cutting muscles and nerves of the fingers, hands or wrists, for they lie immediately below the skin, and their injury may cause much disability. Apply suction, using the mouth or suction cup. Continue suction for an hour or more.

3.03 *Snake Bites (Non-poisonous):*

(a) ***Symptoms:***

(1) Horseshoe-shaped row of teeth marks.

(2) Absence of symptoms other than those usually following minor wound.

(b) ***First Aid:***

(1) Cleanse wound thoroughly with clean water.

(2) Apply sterile dressing.

3.04 *Insect Bites and Stings:*

(a) ***First Aid:***

(1) Remove the "stinger" if still present.

(2) If possible, ice or ice water should always be applied.

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(3) Apply a paste made of baking soda and cold cream, or a compress moistened with ammonia water.

(4) Avoid scratching the bite.

3.05 ***Tick Bites:*** Rocky Mountain spotted fever is transmitted by tick bites, and despite its name, the disease can occur in any part of the country.

(a) ***First Aid:***

(1) First remove the tick by covering it with any kind of available oil. If the tick does not disengage at once, wait half an hour, then remove all parts of it with tweezers.

(2) Gently scrub the area thoroughly with soap and water.

3.06 ***Spider, Scorpion, and Tarantula Bites:***

(a) ***First Aid:***

(1) If on an extremity, apply a constricting band for 5 minutes only just above the bite (Fig. 4).

(2) Keep the affected part lower than the rest of the body and apply ice, ice water, or any cold application locally for two hours.

(3) Obtain medical attention.

4. SHOCK (DUE TO PHYSICAL INJURY)

4.01 ***All seriously injured persons should be given first aid for shock.***

4.02 ***Definition:*** Shock is a depressed condition of many of the body functions due to failure of enough blood to circulate through the body following serious injury. Causes low resistance, possibly death.

4.03 ***Factors which make shock worse:*** Pain, rough handling, improper transportation, continued bleeding, excessive cold or heat, stoppage of breathing, sight of blood. The effects of shock may be lessened by keeping the victim lying down and comfortable.

4.04 ***Symptoms:***

(a) Weakness of the victim.

(b) ***Skin:*** Pale, cool, moist—perspiration on forehead, lips, palms.

(c) ***Pulse:*** Rapid, sometimes weak or absent.

(d) ***Breathing:*** Fast, shallow, irregular, occasional deep breaths.

(e) ***Eyes:*** Vacant, lackluster.

(f) ***General:*** Thirst, nausea, indifference, restlessness.

4.05 ***First Aid:***

(a) Keep the victim lying down.

(b) Do not add heat; simply prevent a large loss of body heat by covering, if necessary, with blanket, overcoat, newspapers, etc. Do not cause sweating.

(c) ***Fluids:*** Water in small amounts, if victim is conscious, is helpful.

5. ARTIFICIAL RESPIRATION

5.01 Rescue is usually the first step. Electric shock, inhalation of gas, and drowning are the most common causes of stoppage of breathing. Every Plant man should be thoroughly familiar with the rescue techniques where electricity or gas is involved, including rescues from manholes, poles and power wires, as covered in Division 010. Some of the important points to remember in effecting rescues are listed below:

(a) ***Electricity:***

(1) Cut off current supply, if possible.

(2) Break the contact by separating the victim from the source of the electrical power, making sure that in the process you do not expose yourself to contact with the victim or the source of electricity. Use rubber gloves, long dry sticks, dry rope, dry folded cloths and stand on insulating material, if possible.

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(b) ***Gas:***

(1) Recognize the danger of explosion.

(2) If in a building, shut off both gas and electric supply.

(3) Ventilate the space thoroughly before attempting rescue.

(c) ***Drowning:*** Unless you are an expert swimmer and trained in life saving, keep out of the water when rescuing a drowning person. Instead, "Row or Throw."

5.02 ***General Directions:***

(a) ***START AT ONCE AND DO NOT GIVE UP.*** There are many cases on record wherein a person apparently dead, but with a pulse, has been revived after several hours of continuous artificial respiration.

(b) The purpose is to restore natural respiration by maintaining an alternating decrease and increase in the expansion of the chest and thereby an adequate air exchange.

(c) The mouth-to-mouth or mouth-to-nose rescue breathing method is the Bell System Standard for general use. However, in the rare case where it is impracticable to use this method, another means of ventilating the lungs should be used.

(d) The only equipment necessary to perform rescue breathing is carried with you at all item—your hands, your mouth, and your repetitive breathing.

5.03 ***Additional Related Directions*** (Regardless of method used.)

(a) Begin artificial respiration immediately.

(b) A mechanical resuscitator operated by a trained person should be used when available.

(c) If assistance is available, provide cover according to victims comfort.

(d) When breathing starts, keep the victim lying down and treat for shock (Part 4).

5.04 ***Mouth-to-Mouth (Rescue Breathing):*** If there is foreign matter visible in the mouth, wipe it out quickly with your fingers or cloth wrapped around your fingers.

(a) Tilt the head back so the chin is pointing upward (Fig. 5a). Pull or push the jaw into a jutting-out position (Fig. 5 b and c).

Fig. 5—Position of Head Mouth-to-Mouth Method

These maneuvers should relieve obstruction of the airway by moving the base of the tongue away from the back of the throat.

(b) Open your mouth wide and place it tightly over the mouth of the victim. At the same time pinch the nostrils shut (Fig. 5d) or close the nostrils with your cheek. An alternative is to close the mouth of the victim and place your mouth over the nose (Fig. 6). Blow into the mouth or nose. (Air may be blown through the teeth even though they may be clenched.) The first blowing efforts should determine whether or not obstruction exists. This will be apparent if there is resistance to your blowing effort and if the chest fails to rise.

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Fig. 6—Alternate Mouth-to-Mouth Method

(c) Remove your mouth, turn your head to the side, and listen for the return rush of air that indicates air exchange. Repeat the blowing effort. For an adult, blow vigorously at the rate of about 12 breaths per minute. For a child, take relatively shallow breaths appropriate for the childs size, at the rate of about 20 per minute.

(d) The rise and fall of the chest wall is the best indication that you are correctly administering Rescue Breathing. ***Keep your eye on the chest wall.***

(e) If you are not getting air exchange, recheck the head and jaw position (Fig. 5). If you still do not get air exchange, quickly turn the victim on his side and administer several sharp blows between the shoulder blades for the purpose of dislodging any obstructing matter (Fig. 7). Again sweep your fingers through the mouth to remove foreign matter.

Those who do not wish to come in contact with the person may hold a cloth over the mouth or nose and breathe through it. The cloth does not greatly affect the exchange of air.

Fig. 7—Dislodging Obstructions

5.05 ***Mouth-to-Mouth or Mouth-to-Nose (Rescue Breathing) Technique for Infants and Small Children:*** If foreign matter is visible in the mouth, clean it out quickly as described previously.

(a) Place the child on his back and use the fingers of both hands to lift the lower jaw from beneath and behind, so that it juts out (Fig. 8).

Fig. 8—Placing Child's Head

(b) Place your mouth over the mouth ***AND*** nose of the child (Fig. 9), making a relatively leakproof seal. Breathe into the child, ***using shallow puffs of air*** in order to prevent damage to his lungs. The breathing rate should be about 20 per minute. ***Keep your eye on the chest wall.***

Fig. 9—Breathing Position

If you meet resistance in your blowing efforts, recheck the position of the jaw. If the air passages are still blocked, the child should be suspended momentarily by the ankles (Fig. 10) or inverted over one arm (Fig. 11) and given two or three sharp pats between the shoulder blades, for the purpose of dislodging any obstructing matter. Check the mouth for foreign matter and remove it quickly.

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Fig. 10—Suspending Child—Dislodging Foreign Matter

Fig. 11—Inverting Child

5.06 ***Back Pressure-Arm Lift Method:*** It is possible that because of the nature of the injury or other circumstances, the manual method of artificial respiration should be used. It is reemphasized that mouth-to-mouth or mouth-to-nose (Rescue Breathing) is the preferred method because of: effectiveness, practicality, speed of application, and simplicity.

(a) Place the victim in the face-down, prone position. Bend his elbows and place his hands one upon the other. Turn his face to one side, placing the cheek upon the hands (Fig. 12).

Fig. 12—Position of Victim

(b) Position of the operator—Kneel on either the right or left knee at the head of the victim, facing him. Place your knee at the side of the head close to his forearm. Place your other foot near his elbow. If it is more comfortable, kneel on both knees, one on either side of the head. Place your hands upon the flat of the back in such a way that the palms lie just below an imaginary line running between the armpits. With the tips of your thumbs just touching, spread your fingers downward and outward (Fig. 13).

Fig. 13—Position of Operator

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Fig. 14—Compression Phase

Fig. 15—Position for Expansion Phase

(c) Take it easy! Rock forward until the arms are approximately vertical and allow the weight of the upper part of your body to exert slow, steady, even pressure downward upon the hands. This forces air out of the lungs. Your elbows should be kept straight and the pressure exerted almost directly downward on the back. You do not need much pressure (Fig. 14).

(d) Release the pressure, avoiding a final thrust, and commence to rock slowly backward. Place your hands upon the arm of the victim just above his elbows (Fig. 15).

(e) Draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the shoulders. Do not bend your elbows, and as you rock backward the arms of the victim will be drawn toward you. Then lower the arms to the ground. This completes the full cycle. The arm lift expands the chest by pulling on the chest muscles, arching the back, and relieving the weight on the chest.

The cycle should be repeated 12 times per minute at a steady rate. The compression and expansion phases should occupy about equal time with the release periods being of minimum duration (Fig. 16).

Fig. 16—Expansion Phase

6. POISONING BY MOUTH

6.01 ***HURRY*** is the word to associate with poisoning by mouth. Give First Aid without delay. If possible, have someone call a doctor, poison control center or hospital while you give First Aid.

6.02 ***Symptoms:*** These vary greatly according to the kind and amount of poison taken and the time elapsed. Many poisons cause no symptoms until absorbed into the system. Others cause burns in the mouth or abdominal pain. There may be nausea, vomiting, visual disturbances, convulsions, headache, or deep sleep.

6.03 ***First Aid:***

(a) ***When the poison is not an acid, alkali, strychnine, or kerosene:***

(1) Dilute the poison. Quickly administer fluid (milk and/or water) in large amounts.

(2) Induce vomiting—Strong baking soda solution or milk of magnesia. Repeat the dilution and induction of vomiting until fluid is returned clear. If fluid can not be administered, use fingers or spoon in mouth to induce gagging and vomiting.

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(3) If the antidote is given on the label, administer it as directed. If no specific antidote is known, administer a universal antidote of two parts by volume of crumbled burnt toast, one part strong tea, and one part milk of magnesia.

(b) ***When the poison is an acid:***

(1) Dilute the poison. Quickly administer fluid (milk and/or water).

(2) ***DO NOT INDUCE VOMITING.*** Neutralize with weak alkali (baking soda in water, or milk of magnesia); then give milk, olive oil, or egg white to protect the digestive tract lining.

(3) If the antidote is given on the label, administer it as directed.

(c) ***When the poison is an alkali:***

(1) Dilute the poison. Quickly administer fluid (milk and/or water).

(2) ***DO NOT INDUCE VOMITING.*** Neutralize with weak acid (vinegar, lemon juice). Follow with milk, olive oil or egg white.

(3) If the antidote is given on the label, administer it as directed.

(d) ***When the poison is a petroleum product such as kerosene, solvents or insecticides:***

(1) Dilute the poison. Quickly administer fluid (milk and/or water).

(2) ***VOMITING SHOULD NOT BE INDUCED.***

Note: When antidote is not give, take container label or specimen of vomit, (for medical analysis) with victim to medical center.

7. INJURIES TO BONES, JOINTS, AND MUSCLES

7.01 ***Fractures:***

(a) ***Definition:*** A break in a bone.

(1) Simple—closed fracture not associated with an open wound.

(2) Compound—open fracture has wound extending from the skin to the fracture area.

(3) Comminuted—bone is broken into small pieces. May be closed or open.

(b) ***Symptoms:*** Swelling, tenderness to touch, deformity, pain on motion, discoloration, bleeding.

(c) ***First Aid:***

(1) For all fractures:

(a) Keep broken ends quiet.

(b) Keep joints on each side quiet.

(c) Treat for shock (4.05).

(d) When in doubt, handle as fracture.

(e) If possible, apply ice bag over painful area.

(f) Do not move before immobilizing. Use splints, arm sling, newspapers, magazines, etc.

(g) Provide transportation if needed.

(h) Call a doctor.

(2) Additional measures for compound fracture:

(a) Control bleeding.

(b) Apply clean dressing to wound.

7.02 ***Head Injuries:*** Concussion and Fracture of Skull

(a) ***Important:*** A concussion is an injury to the brain caused by a blow to the head and may or may not involve a skull fracture. Concussion must be expected in ***any*** accident due to force. Whether or not the skull is fractured is not important compared to the possible injury to the brain. The primary treatment for both is the same, and ***in both***

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cases it is essential to keep the victim as quiet as possible.

(b) ***Symptoms***—Some or all of the following may be present:

(1) Evidence of a blow, head wound, or swelling.

(2) Unconsciousness—total or partial—even if only for a few seconds after an accident.

(3) Eye pupils unequal in size.

(4) Headache—dizziness.

(5) Paralysis of extremities.

(6) Bleeding from the nose, an ear canal, or the mouth.

(c) ***First Aid:***

(1) ***EXTREMELY IMPORTANT: KEEP THE VICTIM LYING DOWN AND QUIET:***

(2) ***DO NOT GIVE STIMULANTS.***

(3) If his face is flushed, elevate his head slightly.

(4) If the victim is unconscious, turn his head to one side.

(5) Loosen clothing about his neck.

(6) Merely lay a dressing on the wound.

(7) Reassure the victim, if conscious.

7.03 ***Fracture of Neck or Spine:***

(a) If at all possible, do not move the victim; summon a physician to the scene.

(b) Keep the victim flat on his back.

(c) Do not allow his head to tilt forward or sideways.

(d) If transportation is absolutely essential, even for a few feet, use a firm support such as a shutter, board, or door.

7.04 ***Dislocations:***

(a) ***Definitions:*** A dislocation is a displacement of a bone end from the joint. The surrounding ligaments and other soft tissue always suffer some injury.

(b) ***Symptoms:*** Swelling, tenderness to touch, deformity, pain on motion, discoloration.

(c) ***First Aid:***

(1) Keep the affected part quiet.

(2) Do not attempt to reposition the dislocated bone.

(3) Obtain medical attention.

(4) Treat for shock (4.05).

7.05 ***Strains and Sprains:***

(a) ***Definitions:***

(1) Strain: A strain is an injury to a tendon or muscle.

(2) Sprain: A sprain may be described as a stretching or tearing of the ligaments around a joint.

(b) ***Symptoms:***

(1) Strain: Pain and stiffness.

(2) Sprain: Pain, swelling, lack of use, discoloration.

(c) ***First Aid:***

(1) Strain:

(a) Rest and apply heat.

(b) Rubbing may help.

(c) In severe cases call a doctor.

(2) Sprain:

(a) Elevate the injured member and apply cold applications.

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(b) If ankle is sprained apply bandage over shoe. Immobilize if transported.

(c) If lower extremities are involved, avoid weight bearing.

(d) In severe cases see a doctor.

(e) Always have sprains X-rayed.

8. BURNS

8.01 ***Causes:*** Dry heat, flame, hot metal, hot liquid, steam, electricity, sunburn, and chemicals.

8.02 ***Effects:*** Shock, infection, permanent damage, death.

8.03 ***Degrees of Burns:***

(a) Skin merely reddened—(1st Degree).

(b) Skin blistered—(2nd Degree).

(c) Deeper tissue destroyed—(3rd Degree).

8.04 ***First Aid:***

(a) ***Thermal Burns:***

(1) Extensive area burns, such as those covering the back or chest area or a large portion of one or more extremities.

(a) Treat for shock.

(b) Exclude air from the burn by the application of a thick dressing; if the dressing is sterile it will assist in the prevention of further contamination. Use lint-free material.

(c) The dressing should be kept dry.

(d) Do not break blisters.

(e) Transport at once to a doctor or the hospital.

(2) Small area burns—apply a sterile dressing.

(3) ***Thermal burn of the eye.*** If pain can be tolerated, irrigate the eye gently to remove foreign material. Cover the eye with a dry sterile dressing or clean cloth, and immediately seek medical aid. Do not apply oil or ointments unless necessary to relieve pain pending medical care.

(b) ***Chemical Burns:***

(1) Wash away the chemical with large amounts of water. Then, if specific chemicals for treatment are indicated on the label, apply them if available. For creosote burns, wash with soap and hot water; apply Creosote Burn Wash (Part 14).

(2) ***Acid or alkali burn of the eye.*** Quickly irrigate the eye thoroughly with plain tap water for several minutes. Remove any particles of the chemical, have the patient close his eye, place a dressing over the lid and snugly bandage. Obtain immediate medical attention.

(c) ***Sunburn:***

(1) Mild sunburn—medicated ointment, cold cream, salad oil or shortening may be applied. Do not use butter or oleomargarine.

(2) Severe sunburn—obtain medical advice.

9. ILL EFFECTS OF EXCESSIVE HEAT

9.01 Exposure to excessive heat may result in heat exhaustion, heat stroke, and heat cramps, the first-named being most common. In exhaustion cases, the temperature is approximately normal; in stroke, it is high. Most likely to be affected are the aged, the obese, the very young, alcohol addicts, and those suffering from any disease that impairs the strength of the entire body.

9.02 ***Heat Exhaustion***

(a) ***Symptoms:*** Fatigue, headache, vomiting, nausea. Temperature remains near normal, and unconsciousness is rare. In severe cases, perspiration is profuse, weakness is extreme, and the skin is pale and clammy. Heat cramps may be present (refer to 9.04).

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(b) ***First Aid:***

(1) Provide bed rest.

(2) Every 15 or 20 minutes give a half glass of water in which a half teaspoonful of salt has been dissolved.

9.03 ***Heat Stroke***

(a) ***Symptoms:***

(1) Usually begins with a sharp pain in the head and dizziness, followed almost immediately by unconsciousness.

(2) Skin is dry and very hot, face flushed, breathing difficult.

(3) Temperature is very high. Pulse is rapid and full.

(b) ***First Aid:***

(1) Arrange for medical care without delay.

(2) Move victim to a cool place—indoors if possible—and provide bed rest.

(3) Remove clothing and sponge the body with alcohol or lukewarm water to reduce the body temperature to a more tolerable level, as indicated by a pulse rate of 110 per minute or less. Resume sponging if temperature rises again.

(4) When victim is fully conscious give a half glass of water in which a half teaspoon of salt has been dissolved. Cover victim for his comfort.

9.04 ***Heat Cramps:***

(a) ***Symptoms:*** Pain in abdominal muscles or limbs following profuse perspiration.

(b) ***First Aid:***

(1) Apply firm, steady pressure to painful part.

(2) Apply warm wet towels to painful part.

(3) Give a half glass of water in which a half teaspoon of salt has been dissolved. Repeat several times at 15-minute intervals.

10. ILL EFFECTS OF EXCESSIVE COLD

10.01 ***Frostbite:*** The freezing of a part of the body, usually the nose, ears, cheeks, fingers, or toes.

(a) ***Symptoms:***

(1) Condition may not be evident to victim.

(2) Feeling of intense coldness or numbness. Pain in early stages, later subsiding.

(3) Dead white, glossy skin, later changing to yellow.

(4) Blisters may appear.

(b) ***First Aid:***

(1) Handle a frozen or frostbitten part with the greatest care.

(2) Firm pressure against the part with the warm hand is helpful, but ***RUBBING IT WITH THE HAND OR SNOW IS DEFINITELY HARMFUL.***

(3) If out of doors, cover the frozen part with sterile lint-free material.

(4) Make the victim warm and remove him to a warm room as soon as possible.

(5) If the frozen part is still cold or numb, rewarm it by immersing it in ***lukewarm*** water, or by wrapping in lint free material. Do not rub or expose to extreme heat, such as a hot stove, hot water bottle, heat lamp, etc., because excessive heat may increase the damage.

(6) Once fingers or toes are rewarmed, encourage the victim to exercise them. Do not disturb blisters.

10.02 ***Prolonged Exposure to Cold***

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(a) ***Symptoms:***

(1) General numbness.

(2) Difficulty of movement or staggering.

(3) Drowsiness or failing eyesight.

(4) Unconsciousness in advanced cases.

(b) ***First Aid:***

(1) Give artificial respiration if breathing has stopped.

(2) Move the victim to warm room as soon as possible.

(3) Rewarm the victim as rapidly as possible by wrapping him in warm blankets or by immersing him in a tub of warm, ***but not hot,*** water.

(4) When the victim reacts to above First Aid, give him a hot drink and dry his body thoroughly if water was used to rewarm him.

11. COMMON EMERGENCIES (Listed alphabetically)

11.01 *Apoplexy* (Stroke)

(a) ***Symptoms:***

(1) Unconsciousness usually occurs.

(2) Loud, heavy breathing.

(3) Slow, strong pulse.

(4) Partial paralysis, indicated in an unconscious person by lack of muscular tension if one of the extremities is moved.

(b) ***First Aid:***

(1) Obtain medical care immediately.

(2) Place the victim on his back, or if breathing is difficult, place him on his side to allow saliva to drool from his mouth.

(3) Cover the victim sufficiently to prevent chill.

11.02 *Appendicitis*

(a) ***Symptoms:*** Abdominal pain, usually generalized in the beginning, later localized especially in lower right region; nausea, vomiting, mild fever, and constipation or diarrhea may be present.

(b) ***First Aid:***

(1) Obtain medical attention without delay.

(2) Do not administer laxatives, food, or water.

(3) An ice bag placed over the painful area may help relieve discomfort, but it should be understood that this merely removes a symptom, and does not correct the condition.

11.03 ***Blisters:*** This paragraph applies only to blood blisters and water blisters caused by pinching and chafing; see 8.04 and 10.01 for blisters due to burns and frostbite, respectively.

(a) ***First Aid:***

(1) Wash thoroughly with soap and warm water, dry, and apply a small amount of first aid antiseptic to edge of blister, puncture at this point with a sterilized needle, or other sharp sterile object and press out the fluid.

(2) Apply a sterile dressing held in place with a light bandage.

(3) If the blister has already burst, wash with soap and water and apply sterile dressing.

(4) Consult a doctor if the blister is very extensive, or if there is evidence of infection.

11.04 *Boils and Sties*

(a) ***First Aid:***

(1) Sties and boils in the facial region should be kept as free as possible of all pressure. Boils in other regions may be covered lightly with compresses saturated with the following solution:

1 tablespoon of Epsom salts

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1 pint of warm water

(2) ***Never squeeze a boil.*** If it breaks, however, wipe away the drainage with a sterile pad wet with rubbing alcohol.

11.05 *Bruises and Contusions*

(a) ***First Aid:***

(1) Usually no special care is required. Apply cold packs, use ice when available, and elevate the injured member to reduce swelling and relieve pain.

11.06 *Convulsions in Young Children*

(a) ***Symptoms:***

(1) Muscle spasms and twitching of various degrees.

(2) Stupor or sleep may follow spasms.

(b) ***First Aid:***

(1) Provide bed rest and quiet. Maintain calm demeanor in child's presence.

(2) Call a doctor.

(3) Unless directed by a doctor, do not give an enema, bath, or warm packs.

11.07 *Epileptic Fits*

(a) ***Symptoms:***

(1) An attack of epilepsy is generally preceded by a loud cry, and the victim generally falls. This is followed by unconsciousness accompanied by convulsive, jerking movements of the muscles.

(b) ***First Aid:***

(1) Prevent victim from harming himself by placing pillow, coat or blanket under his head.

(2) Place folded compress, clean handkerchief, piece of wood or pleated bandage between his teeth at one side of his mouth to prevent him from biting his tongue. Do not obstruct breathing.

(3) Remove all furniture and other objects with sharp corners or edges from immediate area to prevent victim from stricking and causing injury.

(4) Do not restrain convulsive movements or give stimulant.

(5) When jerking has ceased, loosen clothing about the neck, and keep the victim quiet.

11.08 *Eye Injuries*

(a) ***Types:*** Eye injuries are divided into three groups for first aid purposes:

(1) Group 1 cases—injury to the eyelids and soft tissue around the eye.

(2) Group 2 cases—injury to surface of the eyeball.

(3) Group 3 cases—injury that extends through the surface of the eye into deeper tissue.

(b) ***First Aid:***

(1) Group 1 cases: Open wound should be covered with a sterile dressing and snug bandage. Bruises or "black eyes" may be given cold applications immediately after injury, followed by warm applications after swelling has been controlled.

(2) Group 2 cases:

(a) If injury is due to entry of a chemical, flush the eye thoroughly and repeatedly with clean water. Obtain medical attention at once.

(b) If injury is due to entry of a foreign body:

(1) Pull down the lower lid and see if the body lies on the surface lining of the lid. If so, it can be lifted off gently with the corner of a clean handkerchief or a piece of moist cotton wrapped around a clean toothpick. (Never use dry cotton around the eye.)

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(2) Grasp the lashes of the upper lid gently between the thumb and forefinger while the victim looks upward. Pull the upper lid forward and down over the lower eyelid. A foreign body on the lining of the upper lid can be dislodged and swept away with the tears.

(3) Flush the eye with a cool solution. This can be done with an eyedropper or small bulb syringe, if available.

(3) Group 3 cases: Lay a sterile compress or clean cloth over eye, and make no attempt at further first aid. Obtain medical care as quickly as possible. If necessary to transport victim, keep him flat, using stretcher or substitute.

11.09 *Fainting*

(a) ***First Aid:***

(1) Often a person feels faint and can prevent fainting by lowering his head as though to tie his shoe. If further care is necessary, treat for shock (4.05).

11.10 *Heart Attack*

(a) ***Symptoms:***

(1) Chest pain.

(2) Shortness of breath.

(3) Bluish color of lips and fingernails.

(b) ***First Aid:***

(1) Keep the victim quiet and as comfortable as possible.

(2) If victim is a known heart patient search for medicine and administer.

(3) Obtain medical care at once.

11.11 *Hernia (Rupture)*

(a) ***Symptoms:*** A protrusion or bulge in any region of the abdomen from the navel to the crotch.

(b) ***First Aid:***

(1) Have the victim lie down and refrain from physical activity.

(2) If the bulge does not subside, apply cloths saturated with cold water.

(3) If the above measures fail, have the victim lie on his abdomen and bring his knees up under his chest.

(4) Do not attempt to reduce the bulge by pressure.

(5) Send for a doctor.

11.12 *Infection*

(a) ***Symptoms:*** Pain, swelling, redness, heat, pus, red streaks, tenderness.

(b) ***First Aid:***

(1) Apply hot solutions (2 level teaspoons of salt per quart of boiled water). Be sure applications do not burn the victim.

(2) Keep the victim at rest. Keep the affected part quiet. ***Get medical care as soon as possible.***

11.13 *Insulin Reaction*

(a) ***Symptoms:*** Confused, stuporous, mentally disturbed, or unconscious condition, with no other apparent reason for the condition. Diabetics should wear a tag or carry a readily accessible card to identify them; however, the first aider should search for such identification only in the presence of a witness.

(b) ***First Aid:***

(1) Administer any food or drink containing sugar.

(2) Send for a doctor.

11.14 *Nosebleed*

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(a) ***First Aid:***

(1) Have the victim sit up with his head thrown slightly back, breathing through his mouth. Loosen his collar and anything tight around his neck.

(2) Apply cold packs over his nose.

(3) Pressing the nostrils together firmly for 4 or 5 minutes often stops the bleeding and gives opportunity for a clot to form.

(4) Have the victim avoid blowing his nose for a few hours. If these measures do not stop the bleeding, a physician should be called at once.

11.15 *Plant Poisoning*

(a) ***Types:*** Ivy, oak, and sumac. (See Fig. 17, 18, and 19.)

(b) ***Prevention:*** Learn to recognize these plants in their various forms at all seasons of the year and avoid contact with them at all times. Even the smoke from burning plants may be harmful; avoid it wherever possible.

(c) ***Symptoms:*** After contact with these plants, the skin becomes red, swollen, and itches violently. Soon small blisters begin to form, which may unite into large blisters. Frequently these become infected. Fever and general discomfort may result.

(d) ***First Aid:***

(1) As soon as possible, wash the exposed part with soap and water, then sponge it with rubbing alcohol and apply calamine lotion.

(2) If discomfort continues, one part of Burow's solution diluted with 25 parts water may be applied with a compress for 20-minute periods.

Fig. 17—Poison Ivy

Fig. 18—Poison Oak

Fig. 19—Poison Sumac

(e) ***Recognition:***

(1) Poison ivy grows as a climbing plant and is found on fences, poles, and trees. Also, grows as a crawling plant and a low shrub. Leaves are green in spring and summer but turn to brown in fall. All of the plant,

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including the roots, is poisonous. The berries, when present, are white.

(2) Poison oak closely related to the ivy plant, is similar in appearance and habits of growth, but with the edges of the leaves more deeply notched. It is not a tree and is in no way related to the oak family.

(3) Poison sumac resembles a shrub or small tree which may grow 20 feet high. Distinguished from the nonpoisonous sumac by its loose, drooping clusters of berries, which are always white. Leaves are orange colored in spring, green in summer, and orange or russet in the fall.

11.16 ***Splinters***

(a) ***First Aid:***

(1) If the splinter is near the surface, it may be picked out. Apply first aid antiseptic to the skin and remove the splinter with a knife point, needle, or tweezers that have been sterilized. Induce bleeding.

(2) Apply first aid antiseptic to the wound and cover with clean compress.

(3) If the foreign body is buried deeply, or if the wound is of considerable size, apply first aid antiseptic and a proper dressing. Always see a doctor.

11.17 ***Unconsciousness***—Cause Unknown

(a) ***Possible Causes:***

(1) Asphyxia (Part 5).

(2) Shock (Part 4).

(3) Poisoning, including sleeping pills (Part 6).

(4) Head Injury (7.02).

(5) Heat Stroke (9.03).

(6) Heart Attack (11.10).

(7) Apoplexy (Stroke) (11.01).

(8) Epilepsy (11.07).

(9) Insulin Reaction (11.13).

(b) ***First Aid:***

(1) Give artificial respiration if the victim is not breathing.

(2) Send for a doctor without delay.

(3) Move the victim as little as possible until the cause of unconsciousness can be determined.

(4) If necessary to prevent the victim from choking or vomitus, blood, etc., place him on his abdomen, with his head turned to one side.

12. TRANSPORTATION

12.01 In rendering emergency assistance in serious accident or illness, there is no greater need for calmness than in the procedures associated with transportation.

12.02 The objective is to avoid subjecting the patient to unnecessary disturbance during planning, preparation, and transfer, to prevent injured body parts from twisting, bending, and shaking. ***TAKE THE NECESSARY TIME AND EFFORT TO PROVIDE GOOD TRANSPORTATION.*** (More harm is done through improper transportation than through any other measure associated with emergency assistance.)

12.03 If a person must be lifted to safety before a check for injuries can be made, the body should not be jackknifed. An attempt should be made to give adequate support to each extremity, the head and the back, keeping the entire body in a straight line and maintaining it immobile. One method for accomplishing this is:

(a) ***3-Man Hammock Carry***—Victim lying face up—supine

Step 1. All carriers kneel on the knee towards the feet of the victim (Fig. 20 and 21).

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Fig. 20—Hammock Carry—Position of Bearers

Fig. 21—Hammock Carry, Interlocking Grip

Step 2. No. 1 cradles the head and shoulders with his top arm. His other arm is placed under the lower back.

Step 3. No. 2 slides his top arm under the back above No. 1's bottom arm, and his other arm just below the buttocks.

Step 4. No. 3 slides his top arm under the thighs above No. 2's bottom arm. His other arm is placed under the legs below the knees.

Note: The hands of carriers No. 1 and No. 2 should be placed about halfway under the body at this stage (Fig. 22).

Fig. 22—Ready to Lift

Step 5. At a signal, the victim is lifted to the carriers' knees and rested there while the hands are slid far enough under the victim to allow rotation of the hands inward to secure an interlocking grip (Fig. 23).

Fig. 23—Lifting Victim to Knee Height

Step 6. At the next signal, all carriers stand erect with the victim (Fig. 24).

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Fig. 24—Carry Position

Step 7. To lower the victim to the ground, merely reverse the procedure.

12.04 If the victim must be pulled to safety, he should be pulled in the direction of the long axis of his body, not sideways. If available, a blanket or similar object placed beneath the victim will serve as a drag and lessen the danger of aggravating any injuries.

(a) ***Blanket Drag:***

(1) Place the blanket diagonally beneath the victim.

(2) Cross the arms of the victim over his chest, then fold the lower end and sides of the blanket over the victim.

(3) Drag the victim by grasping the end of the blanket near the head of the victim (Fig. 25).

Fig. 25—Blanket Drag

12.05 Persons who may have head injuries, fractures of such bones as those of the thigh, leg, arm, and pelvis, or possible back injuries should not be transported in a sitting position.

12.06 ***Methods of Transportation***

(a) ***Litter*** (Stretcher)

(1) If no litter is available, one may be improvised. Use a cot or door, or use two poles with a blanket as shown in Fig. 26; a strong sheet, rugs, or coats may be substituted for the blanket.

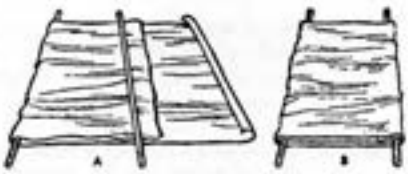

Fig. 26—Improvised Litter

(b) ***Traction Blanket Lift*** (5 Men and Victim)
Position of victim—supine

Step 1. Pleat a standard army blanket in folds about 1 foot long and place on the floor just above the head of the victim so that the pleated blanket will "feed out" from the bottom.

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Step 2. Fold back the top pleat so that the man at the head and the two men at the shoulders can kneel on the fold.

Step 3. No. 1 takes the position on one or both of his knees and grasps the head in the standard manner for applying traction (Fig. 27).

Fig. 27—Placing Blanket Under Victim

Step 4. Nos. 2 and 3 kneel on one or both knees at the shoulders, placing one hand flat under his shoulder blade and the other in his armpit (Fig. 28).

Fig. 28—Holding Victim—Pulling Blanket

Step 5. Nos. 4 and 5 grasp the bottom pleat of the blanket and pull the blanket under the victim while Nos. 1, 2, and 3 hold the upper portion of the body in place (Fig. 29).

Fig. 29—Blanket Pulled Through

Step 6. Roll the blanket tightly at the sides until it fits the contour of the body (Fig. 30).

Fig. 30—Rolling Blanket

Step 7. Nos. 2 and 3 (on opposite sides) grasp the blanket with the top hands at his shoulder and the bottom hands at his lower back. Nos. 4 and 5 grasp blanket with top hands at his hips and lower hands at his legs (below knees). No. 1 remains at his head, holding slight traction.

Step 8. At a signal, Nos. 2, 3, 4, and 5 lean back in opposite directions, using the back muscles and body weight. This will lift the victim 6 to 8 inches from the floor so that a litter can be slid underneath him. Use same procedure for victim in prone position.

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(c) ***Suspension Lift***

Step 1. The victim lies in a prone position with his hands under his chin, similar to the position assumed in artificial respiration (Fig. 31).

Fig. 31—Victim in Prone Position

Step 2. Carrier 1 kneels on one or both knees at the head. He carefully slides his hands under the mid-forearms of the victim until the upturned palms of his hands rest under the armpits (Fig. 32).

Fig. 32—Carrier No.1 Position

Step 3. Carriers 2 and 3 grasp the hipbone with their top hands and his knee cap with their lower hands (Fig. 33).

Fig. 33—Position of Carriers

Step 4. On signal, all lift together so that the victim is raised 5 or 6 inches from the floor [just high enough to slide a litter underneath (Fig. 34).]

Fig. 34—Lifting and Placing Litter

Note: Care should be taken so that the body is lifted as a unit. Also, carriers 2 and 3 should shift the weight toward carrier 1 when raising the victim.

12.07 ***Methods of Transfer***

(a) These include special methods for short-distance transfers, the walking assist, manual carries, transfer by supporting devices such as stretchers and cots, and transfer by vehicles. It is difficult for inexperienced people to lift and carry a person gently. Their efforts may not be well coordinated. They need careful explanations.

(b) The best device for short-distance transfers is the stretcher or cot. It is important to remember that the short-distance transfer is harmful unless the injured parts are immobilized. "Splint them where they lie" unless there is urgent danger in delay.

(c) Unless there is unusual urgency, it is best to wait until an ambulance is available. Aside from rare exceptions, the drive should be at moderate speeds, with gentle stops and starts, and with observance of all safety rules.

13. BELL SYSTEM FIRST AID KITS

13.01 ***Maintenance:*** The Bell System First Aid Kits contain standard materials with which first aid work is to be done on the job. It is, therefore, necessary to become familiar with their contents, to know where each article should be found, and to learn the best method of using it. The list of contents inside each kit shows the

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proper location of each article. It is very necessary that a complete supply be kept in the kit at all times and each article located where it can be found without delay or confusion. A used article should be replaced as soon as possible so that a supply will be available for the next emergency.

13.02 ***General Precautions:*** Use of the first aid kit should be in accordance with the precautions given during first aid instruction.

13.03 ***Use of Contents:*** Most of the articles included in the first aid kits are placed in individual packages. These packages have illustrated instructions on them which explain briefly the uses and methods of handling the articles they contain.

14. PREVENTION OF, AND FIRST AID FOR, SKIN IRRITATION FROM CREOSOTE

14.01 ***Cause of the Irritation:*** Creosote used for treating poles and crossarms for the Bell System, when brought directly into contact with the skin of those who are susceptible, produces skin irritations, unless preventive measures are adopted.

14.02 ***Preventive Measures:*** Employees climbing or handling creosoted poles or handling or working on creosoted crossarms where some of the creosote may be transferred to the skin should observe the following precautions:

(a) Do not roll up the shirt sleeves.

(b) Wear gloves and keep the neck well covered with collar or handkerchief.

(c) As far as practicable, keep the legs of the pants or overalls well down over the ankles.

(d) When direct contact of the skin with creosote is likely, rub the arms and face well, before starting the work, with petroleum jelly (vaseline). The carbolated petrolatum of the standard first aid kits is not suitable for this purpose and should ***NOT*** be used. Immediately after completing the work, wipe off the grease with a clean, dry cloth then wash thoroughly with soap and hot water.

(e) Never rub the eye or wipe perspiration from it with the hand or shirt sleeve if they have been exposed to creosote. This is an ***IMPORTANT*** precaution and should be borne in mind whenever working on or with creosoted wood products.

(f) When there has been direct contact of the skin with free creosote, thoroughly wash the part with hot water and soap, then pour the standard "Creosote Burn Wash" freely over the exposed skin area. This wash should ***NOT BE APPLIED*** in or near the eye.

(g) When possible before lunch and always after the day's work, when exposure to creosote has occurred, wash the hands, arms, face, and neck with plenty of soap and hot water. In washing the face, keep the hands away from the eyes.

(h) Overalls and other articles of clothing which have been in contact with creosote should be soaked in soapy hot water and washed as soon as practicable.

14.03 ***First Aid Practices:*** The following are first aid practices and should be followed if there are indications of skin irritation or an eye burn from creosote.

(a) ***Skin Irritations:***

(1) Apply the "Creosote Burn Wash" as suggested as a precautionary measure in 14.02(f).

(2) If the irritation continues for 24 hours or if a large skin area is affected, obtain the services of a doctor.

(b) ***Eye Burns:***

(1) Flush the eye with water. To do this, submerge the eye in a basin of water and open and close the eyelids.

(2) After flushing, drop two or three drops of castor oil into the eye, using a clean eye-dropper, or apply castor oil with an eye-cup.

(3) Apply an eye bandage and obtain the services of a doctor.

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15. RESCUE OF PERSON FROM LIVE WIRE ON GROUND

15.01 *General*

(a) This part specifies methods of rescuing a person who is in contact with a live wire that is on the ground or at any location other than on a pole.

(b) In an electric shock accident, quick rescue and the prompt application of artificial respiration, if normal breathing has stopped, are extremely important. In some cases the injured person may remain in contact with the wire because of his inability to let go of the live conductor or due to his being unconscious.

(c) An attempt to rescue a person from contact with a live wire is dangerous. Because of the fact that the electric current may be carried through the body of the victim to the rescuer, or the live wire may come in contact with the rescuer or other person and shock him, proper precautions must be taken.

(d) If an unconscious person is in contact with a wire and it is not definitely known that the wire has been de-energized, assume that it is a live circuit.

(e) In all cases where the victim is unconscious, call a physician to the location as soon as practicable, without delaying the rescue. After the victim has been removed from the contact, apply such first aid treatment as may be necessary in accordance with the recommendations of the American Red Cross First Aid Text Book and as previously outlined.

(f) Notify the power company as soon as practicable which operates the equipment involved in the accident.

(g) Review the rescue procedures and also the Red Cross First Aid Text Book at intervals, so that if it should become necessary to rescue a person in contact with a live wire on the ground, the rescue work will be handled promptly and safely.

(h) Men handling the rescue must keep cool, think clearly and avoid impulsive and unsafe operations. Keep in mind the fact that wet ropes, wet wood, and wet clothing are not good insulators and severe shocks can be transmitted by them. Avoid standing on wet ground and in water.

(i) Employees should become generally familiar with the types of construction used by the electric companies that operate in the localities where rescue work may be necessary, so that they may be able to estimate the voltages of different types of circuits.

15.02 *Planning the Rescue*

(a) Before starting the rescue, consider quickly but carefully, how the operation can best be carried out. The most important details to be considered are as follows:

(1) Position of the injured person with respect to the conductor. His position will influence the method to be employed in clearing the contact, that is, whether to cut the wire, pull the wire clear of the victim, roll him off the wire or lift him clear of the wire.

(2) Presence of a nearby switch by means of which the wire may be de-energized.

(3) Rescue equipment available, such as rubber gloves, rubber footwear, pliers, dry rope, tree pruner, long-handled shovel, dry board, dry ladder, triangular bandage, or other nonconducting material that could be used for cutting or moving the wire or moving the victim.

(4) Dependable assistants.

(5) Probable voltage of circuit (15.03).

(6) Presence of bystanders. It may be necessary to modify the rescue methods so that bystanders will not be injured by the energized wire while it is being handled.

15.03 *Freeing Person From Contact with Live Wire of Less than 15,000 Volts*

(a) In rescuing a person who is in contact with a live wire, always wear rubber gloves, if available. If rubber footwear is available, wear it, also.

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(b) If rubber gloves are available, with or without rubber footwear, proceed in accordance with one of the following methods which are listed in their order of preference:

(1) Pull the wire clear of the victim by means of a rope, or push it clear with a tree pruner, board, or ladder.

(2) Cut the live wire on both sides of the victim by means of pliers or a tree pruner, or on the remaining side if it is broken. In cutting the wire, close the eyes or turn the head away so that the eyes will not be exposed to the flash. Warn bystanders to keep clear so that they will not be injured by the ends of the wire after it has been cut. In many kinds of electric circuits, such as series street lighting circuits, voltage may remain on the wires after they have been cut at one place. If practicable, and if it will not delay the rescue operations, hold the wire down by means of a board or tool handle before it is cut so that the wire ends will be under control.

(3) Roll the victim off the wire. Observe the wire closely so as to avoid accidental contacts with it and prevent the ends from hitting bystanders.

(4) Lift the victim off the wire.

(c) If rubber gloves are not available, extreme care must be exercised to avoid direct contact with the body of the person or with the live circuit. Use one of the following methods which are listed in their order of preference:

(1) Pull the wire clear of the victim by means of a dry rope, provided that it appears that the wire can easily be freed. A dry tree pruner may also be used in pulling the wire or cutting it clear. Do not under any circumstances use a wet rope or other wet materials that may come in contact with the live wire or the body of the victim.

(2) If the live wire cannot be freed readily by pulling it clear, slip a dry rope or other dry material under the shoulder or other part of the body roll him or lift him off the wire. A dry board, ladder, or dry stick may be used to assist in pushing the rope under his body.

(3) If his clothing is wet, do not touch it under any circumstances unless rubber gloves are being worn. If his clothing is dry, it may be touched only if other dry insulating material is not available. Before grasping any portion of the clothing, touch it lightly to make sure there is no voltage in it. Preferably stand on a dry board or other insulating material while in contact with the clothing. Remember that under wet weather conditions extreme care must be used to avoid shocks unless rubber gloves and rubber footwear or the equivalent are used.

15.04 ***Freeing Person from Contact with Live Wire or More than 15,000 volts***

(a) If the victim is in contact with a live wire and in the best judgment of the rescuer, the voltage is in excess of 15,000 volts, the rescuer should, for his own protection, secure the assistance of a qualified employee of the power company to break the contact before proceeding with the rescue. This precaution is necessary since the rubber gloves are not designed to withstand these higher voltages and the rescuer cannot be sure that ropes, tree pruner handles, ladders and such equipment that might be used with rubber gloves are always dry enough to provide the degree of protection required.

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AUXILIARY SIGNALS
IDENTIFICATION, INSTALLATION, OPERATION, MAINTENANCE, AND CONNECTIONS

1. GENERAL

1.001 This addendum supplements Section 463-110-100, Issue 13. Place this pink sheet ahead of Page 1 of this section.

1.002 This addendum is issued to revise information in Table A.

2. CHANGES TO SECTION

2.001 On Page 7, Table A, on the line for the unit KS-16301, L4 in the column designated OPERATING VOLTAGE, remove the footnote symbol (§) as it does not apply (see Table A).

2.002 On Page 7, Table A, on the line for the unit KS-16301, L20 in the column designated OPERATING VOLTAGE, 48-volt ac should be 18-volt ac §. The footnote symbol (§) does apply on this line (see Table A).

2.003 On Page 7, Table A is obsolete. A new Table A is provided in this addendum.

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TABLE A

ORDERING GUIDE

UNIT	LOCATION	STROKE	OPERATING VOLTAGE	MAXIMUM CURRENT (AMPERES)	OUTPUT (dB)	MAXIMUM OUTPUT VOLTS	RELAY OPERATION†	SEE FIG. NO.
BELL								
KS-8547, L1	Hazardous-Indoor	Vibrating	115-volt ac	0.21				1
KS-8547, L2	Hazardous-Outdoor	Vibrating	115-volt ac	0.21				1
KS-8547, L3*	Hazardous-Indoor	Single	115-volt ac	0.12				1
KS-8547, L4*	Hazardous Indoor-Outdoor	Single	115-volt ac	0.12				1
KS-16301, L3	Indoor-Outdoor	Vibrating	115-volt ac	0.125	100.0		Table C	8
KS-16301, L4	Indoor-Outdoor	Single	115-volt ac	0.350	98.0		Table C	9
KS-16301, L20	Indoor-Outdoor	Vibrating	18-volt ac §	0.325	85.0		Table C	10
KS-20375, L1‡	Indoor	Vibrating	18-volt ac	0.325	101.6			2
CHIME								
KS-8229, L13 (MD)	Indoor	Single	115-volt ac	0.07			48-volt dc	3
KS-8229, L14 (MD)	Indoor	Single	115-volt ac	0.07			48-volt ac	3
KS-8229, L15 (MD)	Indoor	Single	115-volt ac	0.07			90 volt, 20 Hz	3
KS-8229, L23 (MD)	Indoor	Single	115-volt ac	0.07				3
KS-16301, L1	Indoor-Outdoor	Single	115-volt ac	0.400			Table C	11
KS-22001, L2	Indoor	Single	115-volt ac	0.07	75.0			4
KS-22001, L5	Indoor	Single	115-volt ac	0.07	75.0		48-volt dc	4
KS-22001, L6	Indoor	Single	115-volt ac	0.07	75.0		48-volt ac	4
KS-22001, L7	Indoor	Single	115-volt ac	0.07	75.0		90 volt, 20 Hz	4
HORN								
KS-16301, L2	Indoor-Outdoor		115-volt dc §	0.031	100.0		Table C	12
KS-16301, L5	Indoor-Outdoor		115-volt ac	0.450	105.0		Table C	12
KS-16301, L6	Indoor-Outdoor		48-volt ac §	1.30	100.0		Table C	12
KS-16301, L21	Indoor-Outdoor		48-volt dc §	1.30	86-96		Table C	
SWITCH, RELAY								
KS-20614, L1	Indoor			5A		40-130 volt, 20 Hz	90 volt, 20 Hz	20, 27
KS-20614, L2	Indoor			3.2A		40-130 volt, 20 Hz	90 volt, 20 Hz	27, 28

* May be ordered equipped for 115-volt dc operation.

† • 48-volt ac relays will operate on 9-volt minimum.

• 48-volt dc relays will operate on 17-volt minimum.

• Ringing current relays will operate on 53-volt minimum with wide airgap and 34-volt minimum with close airgap.

‡ A KS-2189 transformer or 215A power unit or power supply of local key system may be used to supply 18-volt ac as long as capacity of power supply is not exceeded.

§ Do not plug into 115 volts, 60 Hz.

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AUXILIARY SIGNALS
IDENTIFICATION, INSTALLATION, OPERATION, MAINTENANCE, AND CONNECTIONS

1. GENERAL

1.01 This section provides information on the KS-16301-, KS-8000-, KS-22001-type signals, the KS-20614 relay switch, and 687B subset.

1.02 This section is reissued to:

- Delete information on power relay sets (this information will be included in Section 463-120-100)
- Update changes in Table A
- Include information from Table C with Table B
- Remark Table D as Table C
- Add information on KS-16301, L21 horn
- Add information on 324A adapter.

Since this reissue is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 These signals may be obtained with or without control relays for use in indoor and outdoor locations. Signals which do not contain a control relay require an externally mounted power relay set. One relay may operate several signals.

1.04 When party line identification is required, it should be obtained through the ringer associated with each telephone set. Refer to the particular telephone set used for connections.

1.05 Certain signals are equipped with a 0.5- or 0.45-μf capacitor in series with a relay which operates on telephone ringing current. The relay and capacitor constitute a high impedance ringing bridge.

1.06 All signals operate on 115-volt 60-Hz power unless otherwise noted. The operating voltage is stamped on the unit.

1.07 ***All KS-16301, L2, L6, L20, and L21 series signaling devices are not intended for use with 115-volt ac power and will be provided by the manufacturer with two warning tags, one on the signal unit frame and one on the signal unit power cord near the plug. The tags will specify:***

> ***Warning: Do not use on 115 volt 60 Hz.***

See signal for proper voltage.

1.08 The KS-20614 relay switch is intended for use by handicapped persons. The List 1 is equipped with a power cord and switches 115 volt 60 Hz. The List 2 provides a contact closure for switching a customer low voltage supply not requiring Underwriter Approval.

1.09 Relays that operate on telephone ringing current have a 2-position sensitivity adjustment.

2. PURPOSE

2.01 The signals, relay switches, and subsets covered in this section are intended for use by handicapped persons, noisy locations, or for out-of-doors telephone signaling. They provide a number of distinctive loud or visual signals such as:

- Vibrating bells

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- Single-stroke bells
- Chimes
- Horns
- Lights (ON or OFF).

3. IDENTIFICATION

3.01 The KS-8547-type bell (Fig. 1) is intended for hazardous locations, either indoor or outdoor with a vibrating bell or a single-stroke bell depending on the list number ordered (Table A). Their normal operating voltage is 115-volt ac but the List 3 and 4 single stroke bells may be ordered equipped for 115-volt dc operation. The KS-8547-type bell must have a power set relay to operate.

3.02 The KS-20375, L1 bell (Fig. 2) is for use indoors, has a vibrating bell, operates on 18-volt ac, and must have a power relay set to operate.

3.03 The KS-8229-type (MD) chime (Fig. 3) is a single stroke, 115-volt ac chime intended for indoor operation. It has been superseded by the KS-22001-type chime (Table A).

3.04 The KS-22001-type chime (Fig. 4) replaces the KS-8229-type (MD) chime. It is a single stroke 115-volt ac indoor type chime. The List 5, 6, and 7 have their own relay and operate on relay voltages as shown in Table A. The List 2 must have a power relay set to operate.

3.05 The KS-16301 signals (Fig. 7, 8, 9, 10, 11, or 12) may be ordered as bells, chimes, or horns for indoor or outdoor use and with a variety of signal operating and relay operating voltages as shown in Tables A and C.

3.06 The KS-16301 signals, relays, and backboxes are interchangeable to meet almost any demand.

3.07 The KS-20614-type relay control (Fig. 20, 21, 27, and 28) is a ringing relay developed specifically for the handicapped. It provides a visual indication of a telephone ringing signal but may be used for other signaling forms beside visual.

3.08 The 687B subset is needed when installing auxiliary signals on 4-party selective or 8-party semiselective lines for line identification. They may be wired to have the auxiliary signal operated by the line ringing power (Fig. 25) or use low-voltage auxiliary power (Fig. 26).

3.09 The 324A adapter was developed for the 6B KTS but can be used in other applications to control loud ringing bells or other external signaling devices. The adapter consists of two relays and a terminal strip mounted on a base and equipped with a cover. The relays operate on 9-11 volts, 60 cycle ac and the contacts are rated at 125 volts at 5 amperes. Two separate signals can be controlled by the 324A adapter (Fig. 29).

Ordering Guide

3.10 Order as follows:

- Refer to Table A for auxiliary signals and relay switches
- Refer to Table B for associated apparatus which must be ordered separately.

4. INSTALLATION

A. Planning

4.01 Select a wall or column location for the signaling device in accordance with the following:

- Not hazardous to maintenance personnel—avoid stairways, areas of heavy traffic, and moving machinery
- Best sound distribution
- Safe from damage—remote from vehicular traffic, excessive heat, and flammable or corrosive fumes
- Accessible for maintenance or removal
- Near power receptacle or conduit, where required.

4.02 ***Customer-Provided Wiring:*** Prior to installation, a definite agreement must be made with the customer to provide any necessary

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power wiring (ac, dc, receptacle, conduit) in accordance with the following:

- Not controlled by a switch
- Separately fused, if possible
- Within access of power cord.

4.03 ***Line Ringer:***

Note: Any telephone station having auxiliary signals (except a PBX station) must be equipped with a ringer connected to the line at all times to ensure a ringing signal should commercial power fail.

4.04 ***Signals, KS-8547 (Fig. 1):*** The KS-8547 signal bells are conduit installed, wall mounted, and contactless with explosion proof cast iron housings, made specifically for hazardous atmospheres:

- List 1 and 3 for indoor use
- List 2 and 4 come equipped with a hood and guard for outdoor use
- List 3 and 4 may be ordered equipped for 115-volt dc operation.

The signals shall always be mounted so the signal and plunger are in a vertical position.

Caution: When the KS-8547 bell is used in an explosive atmosphere, extreme caution should be taken to assure the installation conforms to the requirements specified in Section 502-415-100.

4.05 ***Signals, KS-20375, L1 (Fig. 2):***

(a) The KS-20375, L1 bell mounts directly on a 4-inch square outlet box.

(b) The KS-20375, L2 adapter is used when mounting to a 2-inch octagonal outlet box or a single or double gang plaster ring. The KS-20375, L3 (olive-gray) outlet box is also available for use with the bell. These items must be ordered separately.

4.06 ***Signals KS-8229 (MD) (Fig. 3):***

- Has slotted mounting holes for easy removal from backboard
- Has 3-conductor cord for terminating on a 42-type connecting block or equivalent
- The signals are for indoor locations.

4.07 ***Signals, KS-22001, Chime (Fig. 4):***

- Mount on a vertical surface.
- Use four slotted holes for attaching chime to surface for permanent installation.
- Use KS-22001, L8 (Fig. 6) portable mounting plate for applications where mounting the chime directly or permanently is not desirable.
- The KS-22001, L2 L5, L6, and L7 replace KS-8229, L23, L13, L14, and L15, respectively.
- The KS-22001, L1, L3, and L4 replace KS-5594, L5, L9, and L10, respectively.
- The KS-22001, L5 and L6 are equipped with—

  (a) One plug ended 3-conductor power cord 4-foot long for connection to the power circuit.

  (b) One 2-conductor cord 9-inches long with spade terminals at one end.

- The KS-22001, L7 is equipped with a 623P4 jack (USOC RJ11C) to accept a modular plug and also has a plug ended 3-conductor power cord 4-foot long.
- The KS-22001, L9 (Fig. 5) backbox—consists of a 4-inch outlet box, screw-type terminal block with screws for mounting block and jumper leads for making connections to the chime signal.

4.08 ***Signals, KS-16301:***

(a) A typical signal (Fig. 7) includes a backbox, a signal premounted to a grilled cover, and a control relay.

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(b) The armature on relays associated with auxiliary signals restores to normal (open contacts) by gravity. Always mount signal on a vertical surface. A control relay, if used, must be in the horizontal position.

(c) Any KS-16301 bell, chime, or horn (Table A) may be used with any KS-16301 backbox (Table B) and any KS-16301 relay (Table B) or without a relay if signal is remotely driven with a power relay set.

(d) Fasten signal to backbox as follows:

- Engage the two pins on front cover to form a hinge with the two sockets which emerge from backbox (Fig. 7).
- Fasten the signal to the backbox with four machine screws which are furnished (Fig. 7).

4.09 ***Type of Installation:*** The type of installation determines the type of backbox (Table B). Backboards are not necessary.

B. Installing

Make sure power is disconnected before working on circuit. Under no circumstances should the cord provided for commercial power be passed through a hole in a wall or be fastened to a wall.

4.10 ***Backbox, KS-16301 (Fig. 14, 15, 16, 17, and 18):***

- Mount on a vertical surface
- Use two slotted holes and one regular hole for attaching backbox to surface
- Use rustproof fasteners
- Install backbox, List 9 or 11, so the customer may have the commercial power connected (Fig. 15)
- Terminate 3-conductor cord as shown in Fig. 18
- Do not fasten power cord to any surface
- Do not pass power cord through wall holes or partitions
- An entrance hole for the telephone wires is located in the bottom of each backbox (Fig. 14)
- Be sure the gasket on the backbox is in place (Fig. 18).

4.11 ***Control Relay, KS-16301 (Fig. 13):***

- Mount relay in the horizontal position on mounts provided in backbox (Fig. 7).
- Use a full cable pair for each signal circuit when signaling circuits are in the same cable.
- When no talking circuits are involved, low-voltage signal circuits may use half of a cable pair or inside wire.
- The List 15 units, manufactured after the 2nd quarter 1979, are provided with a 623P4 jack and connected to the wall jack via a standard D4BU cord (ordered separately). For long loop areas, move the lead from the LO to the HI terminal.

4.12 ***Rainhood, KS-16301, L11 and L19 (Fig. 16):***

- For protection against the weather and insects
- Attach to the signal unit with furnished screws (Fig. 7).

4.13 ***Weatherproof Power Outlet KS-16301, L18 (Fig. 19):***

- Provided to customer as required
- Used with KS-16301, L19 backbox (ordered separately).

4.14 ***KS-20614, L1 Relay Switch (Fig. 20 and 27):***

- Mount relay to a vertical surface with contacts at the bottom and within 12 inches of local power receptacle.

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- Units manufactured after the 2nd quarter 1977 are provided with a 623P4 jack and connected to the wall jack via a standard D4BU cord (ordered separately). For long loop areas, move the lead from the LO to the HI terminal.

- Set single-pole double-throw switch on nearby table or stand.

- Connect visual indicator to receptacle in relay housing.

4.15 ***KS-20614, L2 Relay Switch (Fig. 21 and 28):***

- Mount relay to a vertical surface with contacts at the bottom.

- Units manufactured after the 2nd quarter 1977 are provided with a 623P4 jack and connected to the wall jack via a standard D4BU cord (ordered separately). For long loop areas, move the lead from the LO to the HI terminal.

- Terminate 2-conductor cord on a 42A connecting block, or equivalent, as a junction point for the customer low-voltage circuit.

- Set single-pole double-throw switch on nearby table or stand.

5. OPERATION

5.01 ***Party Line Operation (Fig. 25 and 26):*** The 687B subscriber set has a cold cathode tube and relay in place of the ringer. When the relay is operated by rectified ringing voltage, the relay contacts may be used to control a signal energized from a local low-voltage source or bridged to CO ringing power.

5.02 ***KS-20614, L1 Relay Switch (Fig. 27):*** This relay is operated by station ringing voltage to control a 2-conductor 115-volt 60-Hz receptacle. The switch reverses function of the relay contacts so the 115-volt 60-Hz receptacle can be either normally on or off with reversal occurring during the ringing interval. Provides for control of any alerting device (visual, tactile, or audible) that operates on 115 volt 60 Hz and draws 5 amperes or less noninductive load.

5.03 ***KS-20614, L2 Relay Switch (Fig. 28):*** Operation of the List 2 is similar except the contacts are used to control a customer-provided low-voltage circuit (maximum 30 volts and 3.2 amperes) wired to the 12-inch 2-conductor cord provided.

6. MAINTENANCE

Danger: Before performing any work on equipment connected to commercial power, deenergize the power supply circuit. The customer shall arrange for power disconnection and reconnection on power circuits other than plug and outlet.

A. Signals, KS-16301

6.01 The KS-16301, L3 (vibrating bell) has a volume adjustment. On the Wheelock Signal Company type, the adjustment is a hexagonal nut on the rear of the signal (Fig. 8). The Sperti-Faraday Company type adjustment is on the back of the bell resonator. The direction of adjustment is stamped near the adjusting nut or screw. Table A shows operating currents.

6.02 The KS-16301, L4 (single-stroke bell) uses a cotter key volume adjustment. The signal is shipped with the key inserted through the lowest of the three holes in the sleeve that contains the plunger for maximum volume. To decrease volume, move cotter key to intermediate or top hole in the sleeve (Fig. 9).

6.03 Replace defective signals with complete list number.

B. Relays, KS-16301, KS-20614

6.04 The Lists 15, 16, and 17 relays should meet the following requirements: (Table C)

- The armature should not chatter when the relay is operated with the specified voltage.

- The armature should not bind or stick; gauge by feel.

- The armature airgap is adjusted on Wheelock Signal Company relays by moving a lever on the bottom of the relay.

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- In Sperti-Faraday Company relay, the armature airgap is adjusted by rotating the armature airgap adjusting screw 1/2 turn to the desired setting.

- Minimum contact pressure is 6 grams, measured with relay operated either electrically or manually; use 70H gauge.

- The contacts should make almost simultaneously; gauge by eye.

- The armature and pole piece should be free of dirt or metal filings. Clean with 1/2-inch relay cleaning strips or equivalent.

6.05 The KS-16301, L15 and KS-20614 relays used as a ringing bridge should not chatter during dial pulsing to the extent that contacts make. Check position of HI or LO sensitivity adjustment, ie, HI for long loop or LO for dial area. If relay meets all requirements but chatters on dial pulsing, replace in accordance with local instructions.

C. KS-8229 (MD) Signal Chime

6.06 The volume of the KS-8229 (MD) signal chime (Fig. 3) may be adjusted by a screw. No other adjustment should be made. Should the plunger stick in its guide, remove plunger and clean with mineral spirits. If this does not correct operation, replace signal device.

6.07 Some auxiliary signals can cause malfunctions in frequency counters at computer installations due to arcing of the ac contacts of the signal, inducing noise in the ac line, and radiating in the line cord of the computer. The problem can be alleviated by installing a 0.02-μf capacitor across the ac contacts of the auxiliary signal.

7. CONNECTIONS

7.01 Several signals may be connected as shown in Fig. 22. This has the advantage of only one ringing bridge on the telephone line for several auxiliary signals. The total number of auxiliary signals connected to a power relay set should not exceed the current carrying capacity of the relay contacts. Special commercial power wiring is not needed between relay set and signals.

7.02 Connections for KS-16301 signals and relays are shown in Fig. 23.

7.03 Connections for KS-22001 chimes are shown in Fig. 24.

7.04 Auxiliary signals may be installed on 4-party full selective or 8-party semiselective lines by connecting a 531C or 687B subscriber set as shown in Fig. 25 and 26.

7.05 The KS-20614 relay switch connections are shown in Fig. 27 and 28.

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TABLE A

ORDERING GUIDE

UNIT	LOCATION	STROKE	OPERATING VOLTAGE	MAXIMUM CURRENT (AMPERES)	OUTPUT (dB)	MAXIMUM OUTPUT VOLTS	RELAY OPERATION†	SEE FIG. NO.
BELL								
KS-8547, L1	Hazardous-Indoor	Vibrating	115-volt ac	0.21				1
KS-8547, L2	Hazardous-Outdoor	Vibrating	115-volt ac	0.21				1
KS-8547, L3*	Hazardous-Indoor	Single	115-volt ac	0.12				1
KS-8547, L4*	Hazardous Indoor-Outdoor	Single	115-volt ac	0.12				1
KS-16301, L3	Indoor-Outdoor	Vibrating	115-volt ac	0.125	100.0		Table C	8
KS-16301, L4	Indoor-Outdoor	Single	115-volt ac §	0.350	98.0		Table C	9
KS-16301, L20	Indoor-Outdoor	Vibrating	48-volt ac	0.325	85.0		Table C	10
KS-20375, L1‡	Indoor	Vibrating	18-volt ac	0.325	101.6			2
CHIME								
KS-8229, L13 (MD)	Indoor	Single	115-volt ac	0.07			48-volt dc	3
KS-8229, L14 (MD)	Indoor	Single	115-volt ac	0.07			48-volt ac	3
KS-8229, L15 (MD)	Indoor	Single	115-volt ac	0.07			90 volt, 20 Hz	3
KS-8229, L23 (MD)	Indoor	Single	115-volt ac	0.07				3
KS-16301, L1	Indoor-Outdoor	Single	115-volt ac	0.400			Table C	11
KS-22001, L2	Indoor	Single	115-volt ac	0.07	75.0			4
KS-22001, L5	Indoor	Single	115-volt ac	0.07	75.0		48-volt dc	4
KS-22001, L6	Indoor	Single	115-volt ac	0.07	75.0		48-volt ac	4
KS-22001, L7	Indoor	Single	115-volt ac	0.07	75.0		90 volt, 20 Hz	4
HORN								
KS-16301, L2	Indoor-Outdoor		115-volt dc §	0.031	100.0		Table C	12
KS-16301, L5	Indoor-Outdoor		115-volt ac	0.450	105.0		Table C	12
KS-16301, L6	Indoor-Outdoor		48-volt ac §	1.30	100.0		Table C	12
KS-16301, L21	Indoor-Outdoor		48-volt dc §	1.30	66-96		Table C	
SWITCH, RELAY								
KS-20614, L1	Indoor			5A		40-130 volt, 20 Hz	90 volt, 20 Hz	20, 27
KS-20614, L2	Indoor			3.2A		40-130 volt, 20 Hz	90 volt, 20 Hz	21, 28

* May be ordered equipped for 115-volt dc operation.

† • 48-volt ac relays will operate on 9-volt minimum.

• 48-volt dc relays will operate on 17-volt minimum.

• Ringing current relays will operate on 53-volt minimum with wide airgap and 34-volt minimum with close airgap.

‡ A KS-2189 transformer or 215A power unit or power supply of local key system may be used to supply 18-volt ac as long as capacity of power supply is not exceeded.

§ Do not plug into 115 volts, 60 Hz.

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TABLE B

ORDERING GUIDE

ASSOCIATED APPARATUS	TYPE OF INSTALLATION	USE WITH				FIGURE NUMBER
		BELL	HORN	CHIME	RELAY	
BACKBOX KS-16301, L8*	Indoor with Power Cord	•	•	•	•	14
KS-16301, L9*	Indoor with Conduit	•	•	•	• ‡	15
KS-16301, L11*	Outdoor with Conduit	•	•	•	• ‡	16
KS-16301, L19*	Outdoor with Power Cord	•	•	•	•	17
KS-22001, L9	Indoor with Conduit			•		5
MOUNTING PLATE KS-22001, L8	Indoor-Portable Mounting			•		6
OUTLET KS-16301, L18†	Outdoor-Weatherproof					19
RELAY KS-16301, L15	Indoor-Outdoor	•	•	•		13
KS-16301, L16	Indoor-Outdoor	•	•	•		13
KS-16301, L17	Indoor-Outdoor	•	•	•		13

* Mounting hardware not furnished

† Use with KS-16301, L19 backbox (ordered separately).

‡ List 9 and 11 may be used with or without a relay as needed.

TABLE C

RELAYS, KS-16301 OPERATING REQUIREMENTS

RELAY LIST NO.	OPERATING VOLTAGE	OPERATING CURRENT AT MAXIMUM VOLTAGE AMPERES	DC RESISTANCE OF RELAY COIL OHMS	IMPEDANCE OF RELAY COIL OHMS	RELAY CONTACT-CARRYING CAPACITY AMPERES
15	18- to 48-volts dc	0.011	4500	—	5
	30- to 48-volts 60-Hz ac	0.025	1000	1920	
	39- to 90-volts 20-Hz ac (ringing voltage)	0.012	4500	7550*	
16	9- to 48-volts 60-Hz ac	0.404	26.3	118	
17	12- to 78-volts dc	0.069	1130	—	

* Includes 0.45-μf series capacitor.

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Fig. 1—KS-8547, List 1 Bell

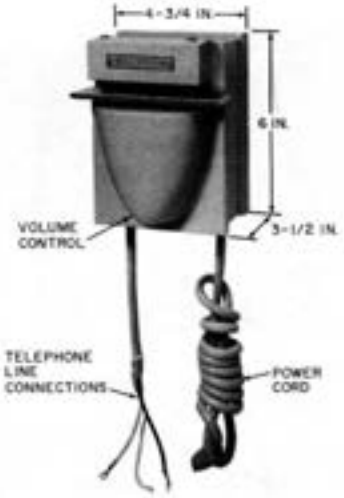

Fig. 3—KS-8229 Chime (MD)

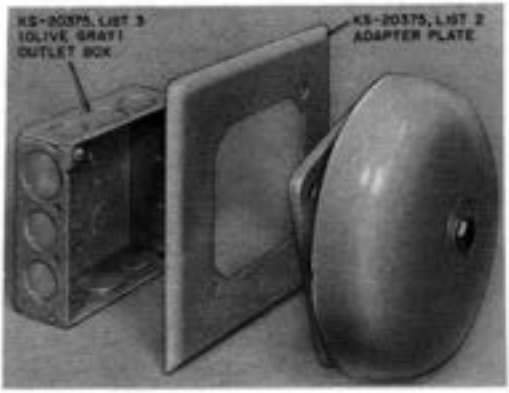

Fig. 2—KS-20375, List 1 Bell, List 2 Adapter Plate, List 3 or 4 (Olive Gray) Outlet Box

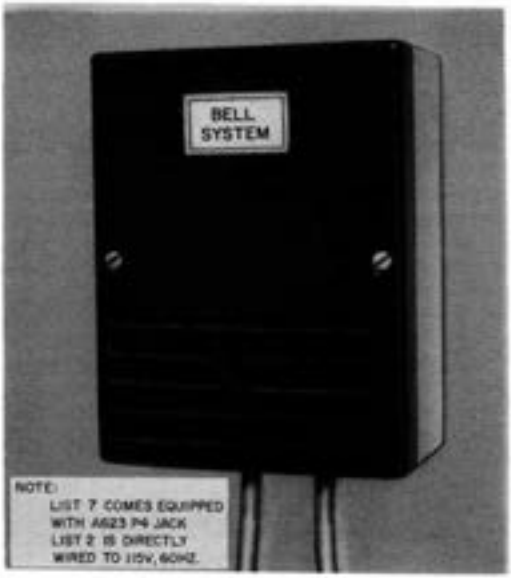

Fig. 4—KS-22001-Type Chime

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Fig. 5—KS-22001, List 9 4-Inch Backbox

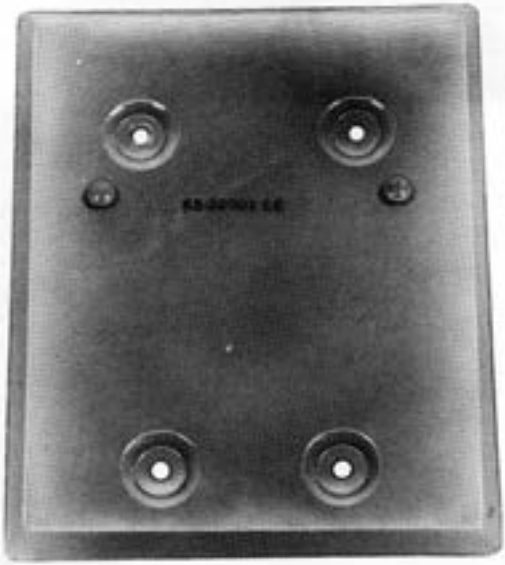

Fig. 6—KS-22001, List 8 Portable Mounting Plate

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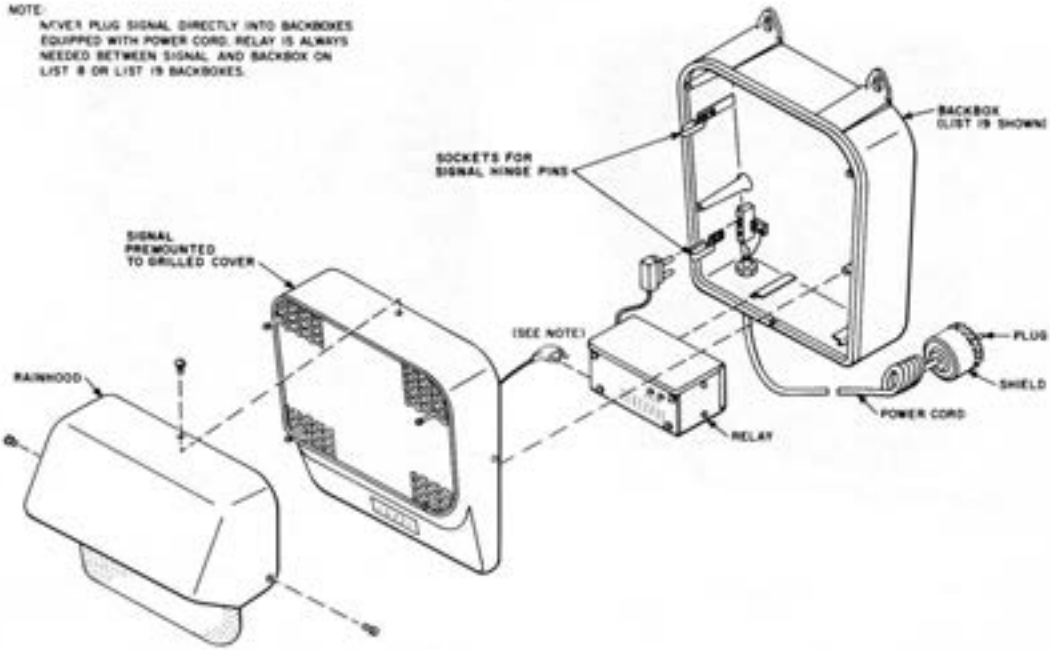

Fig. 7—KS-16301-Type Signal—Exploded Assembly

Fig. 8—KS-16301, List 3 Bell

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Fig. 9—KS-16301, List 4 Bell

Fig. 11—KS-16301, List 1 Chime

Fig. 10—KS-16301, List 20 Bell

Fig. 12—KS-16301-Type Horn (List 2 Shown)

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Fig. 13—KS-16301, Typical List 15, List 16, or List 17 Relay

Fig. 15—KS-16301, List 9 Backbox

Fig. 14—KS-16301, List 8 Backbox

Fig. 16—KS-16301-Type Signal With List 11 Backbox

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Fig. 17—KS-16301, List 19 Backbox

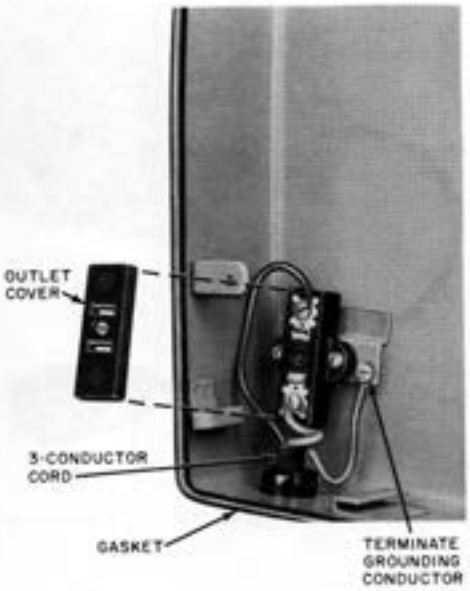

Fig. 18—KS-16301, Backbox, Power Cord Termination

Fig. 19—KS-16301, List 18 Weatherproof Outlet

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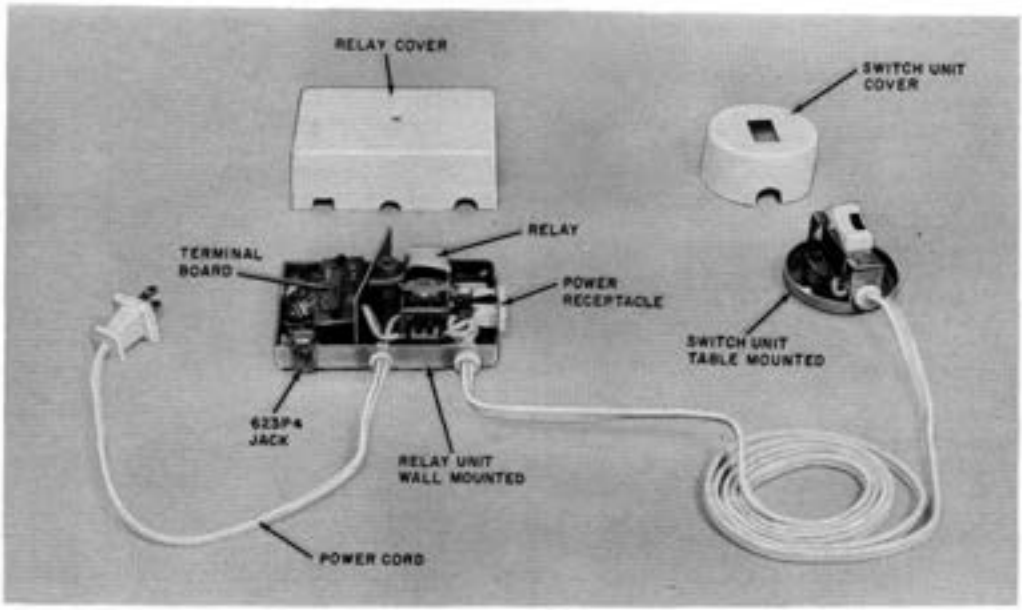

Fig. 20—KS-20614, List 1 Relay Switch

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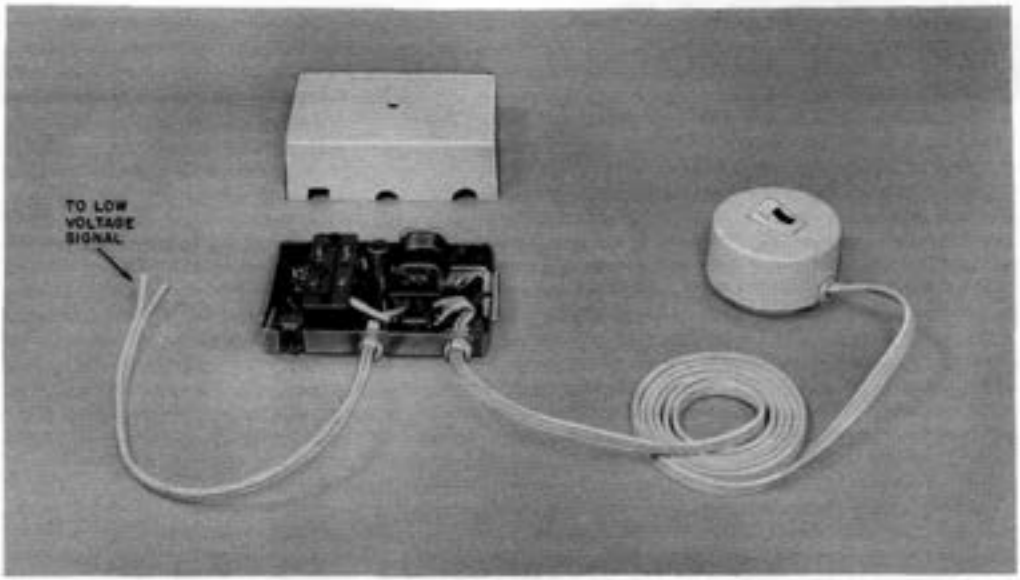

Fig. 21—KS-20614, List 2 Relay Switch

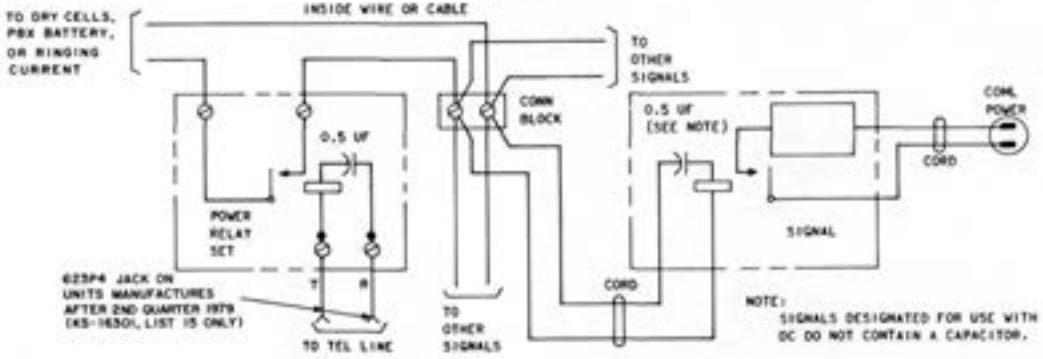

Fig. 22—Multiple Signal Connections

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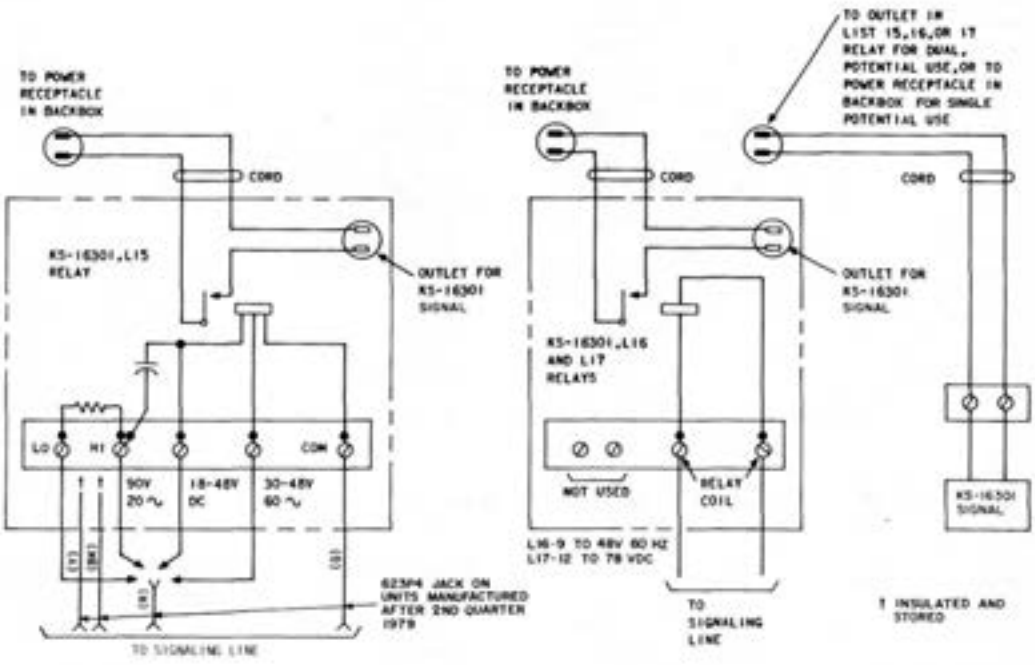

Fig. 23—KS-16301 Signal Connections

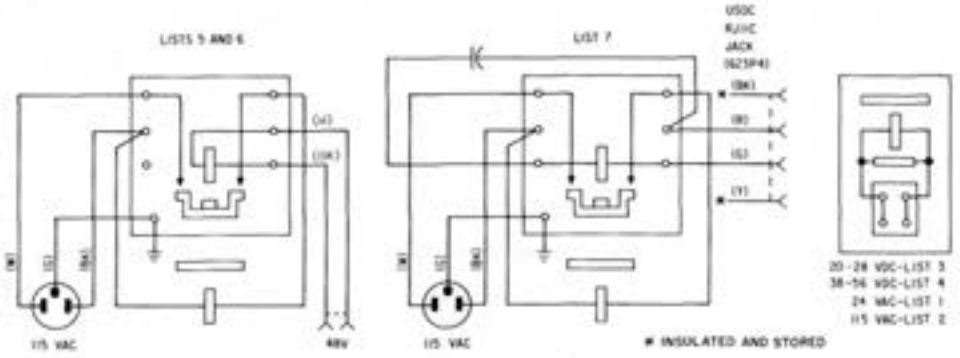

Fig. 24—Connections for KS-22001 Chimes

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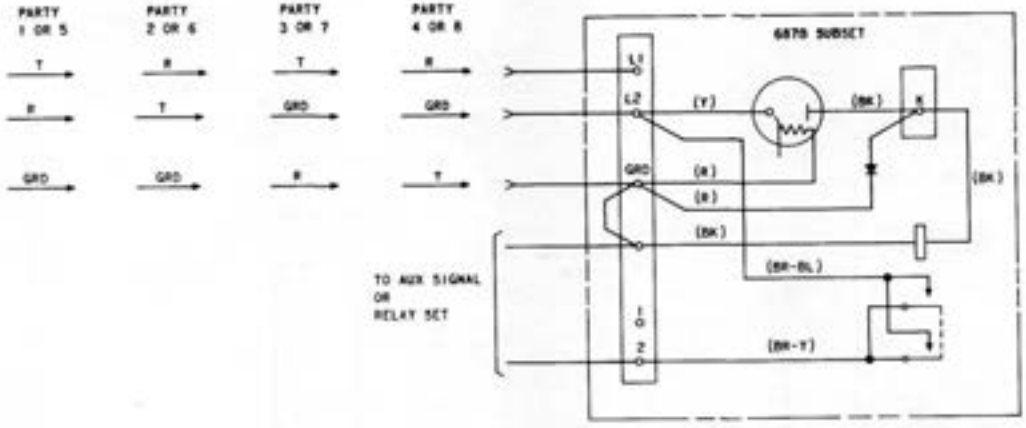

Fig. 25—Connections for Auxiliary Signals on Party Line Using CO Ringing Power

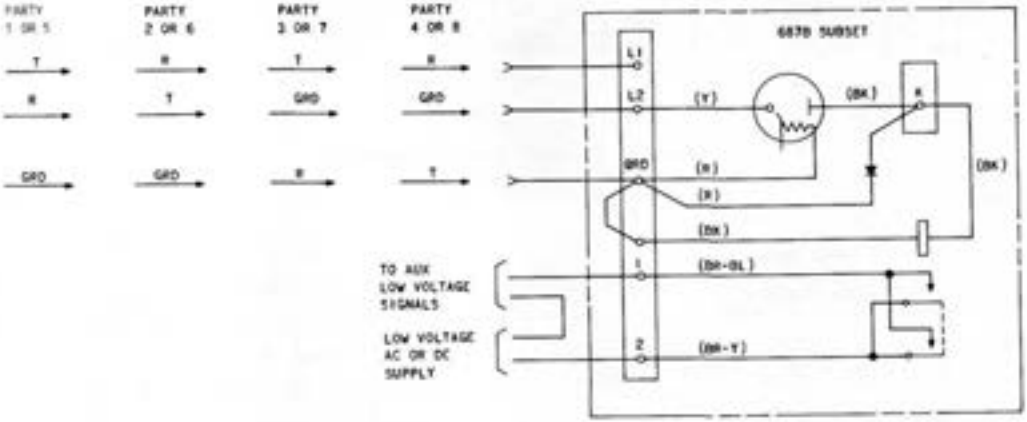

Fig. 26—Connections Party Line Low Voltage Auxiliary Signal Using Auxiliary Power

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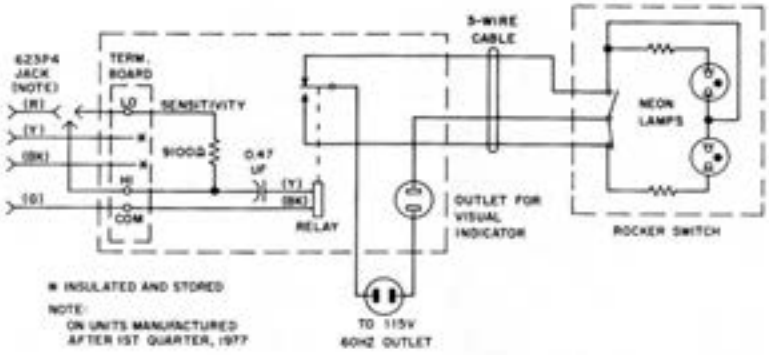

Fig. 27—KS-20614, List 1 Relay Switch—Schematic

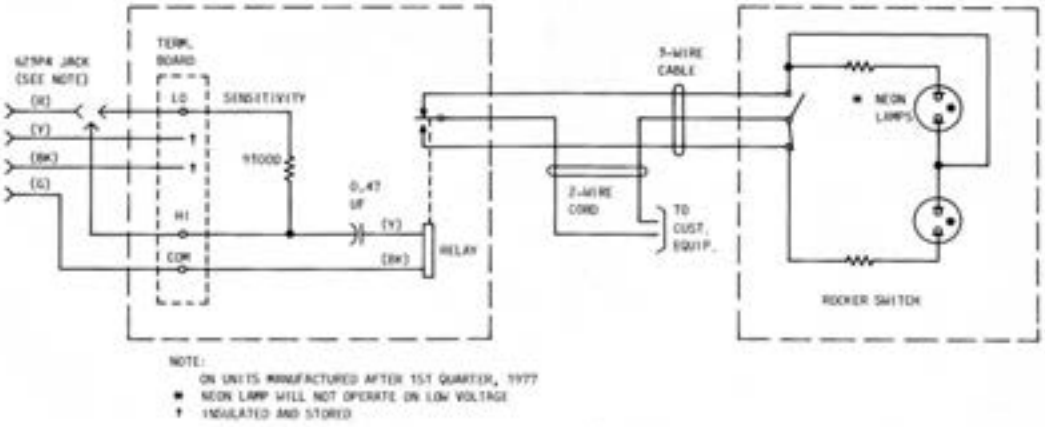

Fig. 28—KS-20614, List 2 Relay Switch—Schematic

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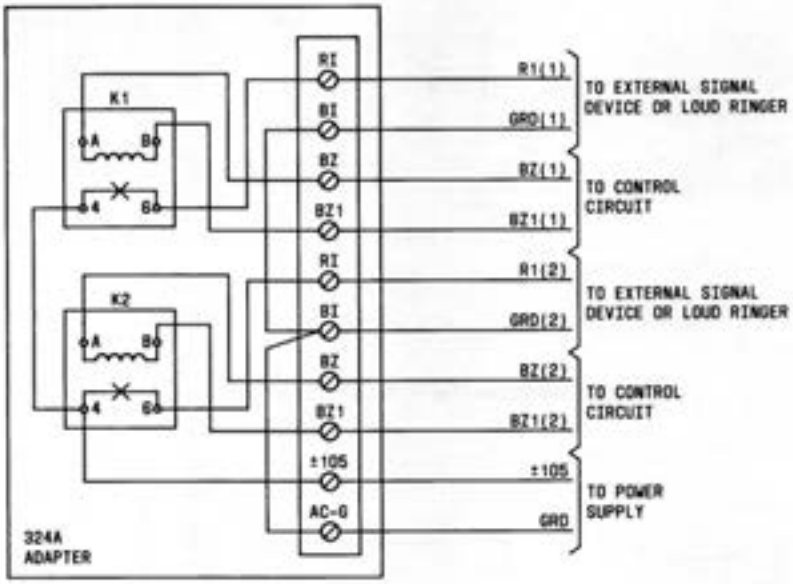

Fig. 29—Connections for 324A Adapter

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INDUCTIVE NOISE

1. GENERAL

1.01 This section contains information on causes and effects of inductive noise at subscriber station.

1.02 This section is reissued to:

- Delete all connection information. (This information has been incorporated into Division 501.)
- Incorporate information formerly contained in Section 500-112-400.

Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 Inductive noise, as used in this section, occurs when telephone stations are within the electromagnetic field of:

- Power circuits
- Transformers
- Neon lights
- Fluorescent lights
- Office machines.

Such fields create foreign voltages on the telephone circuit. Unbalance of the telephone circuit will result in noise and low frequency hum.

Station apparatus and associated wiring should not be located closer to possible sources of inductive noise than the separations specified in Division 461 sections covering wiring and clearances.

2. CONTROL OF INDUCTIVE NOISE

2.01 Poor insulation or resistance unbalance of the telephone circuit contributes to noise resulting from inductive interference. Locating and eliminating the cause of high leakage or resistance unbalance may adequately solve the problem.

2.02 The balance-to-ground of the customer station sets is often the controlling factor in the susceptibility to inductive noise.

> ***Note:*** The unbalance between the two sides of a line which has only the capacitance afforded by the air dielectric between the tip and ring shall not exceed three volts on the meter at the local test desk.

2.03 The unbalances due to nongrounded ringers are small and noise resulting from the action of induced voltages on these unbalances is usually negligible.

2.04 When noise is encountered, the steps required for the control of inductive noise (in order or practical application) are:

(a) Balance line.

(b) Isolate ringer.

(c) Install D-180489 Kit of Parts, if Automatic Number Identification (ANI) is provided.

Line Balance

2.05 Whatever other corrective measures may be taken to eliminate an inductive noise problem, it is essential that the line be balanced in order to be effective. Even the type of ringer being used affects the situation.

2.06 B-type ringers, which were manufactured with magnetic iron core ringer coils, have red-striped markings on both coil covers. These

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Fig. 1—D-180327 Kit of Parts

red-striped ringers are lower in impedance and increase the susceptibility to inductive noise when used for grounded ringing.

2.07 All low-impedance ringers on grounded ringing lines troubled with inductive noise should be replaced by high-impedance capacitor-type ringing bridges i.e. C4-type or equivalent.

Devices To Minimize Inductive Noise

2.08 Different electrical devices may be used to minimize the effect of inductive noise where encountered.

2.09 When the inductive noise is excessive on lines with high-impedance capacitor-type grounded ringing bridges, ringer isolators may be utilized to minimize the effects of the induced voltage.

2.10 From the standpoint of susceptibility to inductive noise, a grounded station ringer equipped with a ringer isolator is equivalent to a nongrounded ringer (if the induced voltage between the line and ground is not high enough to exceed the limits of the ringer isolator, and that tip party identification is not provided).

2.11 Refer to Section 500-114-100 for selection of coupling devices.

3. MULTISLOT COIN STATIONS

3.01 Multislot prepay coin collectors are susceptible to inductive noise in exposed areas. Older types of prepay coin collectors have a large shunt unbalance caused by the connection of the coin relay from one side of the line to ground. Later types correct this unbalance by use of center-tapped 101B induction coils or 425- or 4010-type networks with the coin relay connected from the center tap (balance point) to ground.

3.02 Where noise problems arise with older type coin collectors, it will be necessary to replace the coin collector with one employing a 425- or 4010-type network.

The single slot coin telephone sets are much less susceptible to inductive noise and should be used in place of multislot coin collectors since they use a ground-lifting relay (in DTF systems) to effectively reduce inductive interference.

3.03 The electromagnet associated with coin operation is connected in series with the line. In order to minimize the effect of the electromagnet on transmission, a 452A or 452B 4-uf capacitor is connected in parallel with it. In areas of low-frequency inductive interference it may be necessary to increase the size of this capacitor to keep the noise pickup within acceptable limits. A D-180327 Kit of Parts (Fig. 1) is available for this purpose and is intended for use in all 200-type coin collectors using a 425- or 4010-type network. It replaces the 452A or 452B capacitor.

3.04 The D-180327 Kit of Parts will not fit in the 3-slot panel, 235- and 1235-type coin collectors.

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STATION RINGING APPARATUS
SELECTION AND LIMITATIONS

1. GENERAL

1.01 This section contains information on the maximum number of ringers and also on the selection and capabilities of ringer coupling devices with recommendations as to their applications.

1.02 This section is reissued to:

- Delete all specific connection information which may be found in the appropriate section in Division 501
- Add information on 603A ringing extender
- Revise Fig. 1
- Add Fig. 2, 3, and 4
- Add new Table A

Since this reissue covers a general revision arrows ordinarily used to indicate changes have been omitted.

2. RINGERS

2.01 All ringers are provided with a mechanical bias spring. Ringers with the bias spring in the weak notch will ring on less voltage than if placed in the stiff notch. On two, four, and eight party lines, the bias spring may have to be placed in the stiff notch, as noted in Table A, to prevent cross ringing.

3. RINGER COUPLING DEVICES

3.01 Ringer coupling devices isolate the ringer(s) from ground, except during the ringing interval, thus preserving line balance and minimizing the effects of inductive noise.

3.02 The following is a list of ringer coupling devices and some of the advantages and/or disadvantages of each:

(a) 603A Ringing Extender (Section 501-380-102):

- Mounts near station protector
- Individual line only
- Provides extended ringing range for sets wired for bridged ringers

(b) ***28A Ringer Isolator (Section 501-375-101):***

- Mounts near station protector
- Provides party line selectivity
- Provides extended ringing range
- Provides high isolation from effects of inductive noise
- Uses either three- or four-conductor station wiring (four required with Automatic Number Identification)

(c) ***Ringer Isolator, D-180036 Kit of Parts (Section 501-375-100):***

- Mounts inside set (except AD1 telephone base or 2702-type sets when used with the D-180489 Kit of Parts for identification)
- Provides high isolation from effects of inductive noise
- No party line selectivity

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(d) ***426N Diode in series with ringer coil (Section 501-320-100):***

- Mounts inside set
- Provides party line selectivity
- Provides limited isolation from effects of inductive noise

(e) ***425A or 426A gas-filled cold-cathode electron tube (Section 501-320-100):***

- Mounts inside most sets
- Provides party line selectivity
- Provides limited isolation from effects of inductive noise

(f) ***687B Subscriber Set:***

- Mounts inside subscriber's premises
- Provides party line selectivity
- Provides relay activation to control a signal or other apparatus energized from a local low voltage source.

(g) ***11A/B Extender (MD) (Section 501-322-101)***

- Mounts near protector
- Provides party line selectivity
- Provides moderate isolation from effects of inductive noise
- Provides extended ringing range
- Requires four-conductor station wiring.

4. RINGING CLASS OF SERVICE

4.01 Individual line ringing is accomplished by connecting the ringer across the line in series with the capacitor, (Fig. 1A). In the past, ringers of individual lines have been wired directly to ground for extended ringing range or wired through coupling devices to provide isolation from inductive noise. The 603A ringing extender (Section 501-380-102) extends the ringing range of bridged ringers by grounding the tip of the line at the station protector during ringing (Fig. 1B).

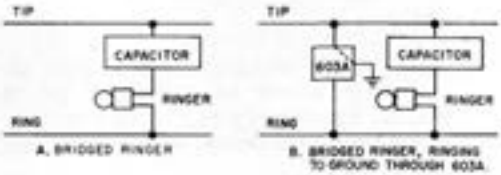

Fig. 1—Individual Line Ringing

4.02 Two-party full selective ringing is accomplished by connecting the ringers of one party from the ring side of line to ground, and the ringers of the other party from the tip side of the line to ground either directly, or through a coupling device (Fig. 2).

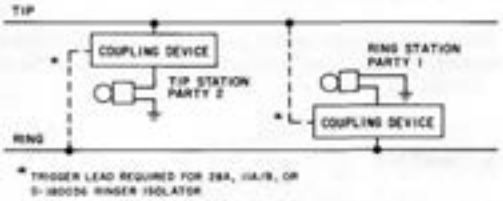

Fig. 2—Two-Party Full Selective Grounded Ringing

4.03 Four party semiselective ringing is accomplished by connecting the ringers of two parties from the ring side of the line to ground and the ringers of two other parties from the tip side of the line to ground either directly, or through a coupling device (Fig. 3). Coded ringing is used to differentiate between stations on the same side of the line.

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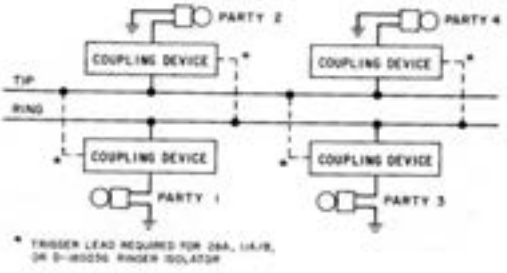

Fig. 3—Four-Party Semiselective Grounded Ringing

4.04 Four-party full selective ringing (Fig. 4) is accomplished by using telephones along with a polarity sensitive coupling device.

4.05 Eight-party semiselective ringing (Fig. 4) is also accomplished by using sets with a polarity sensitive coupling device in the ringing circuit. Coded ringing is used to differentiate between stations of the same polarity on the same side of the line.

4.06 Multiparty divided code ringing is accomplished the same as four-party semiselective ringing except extended to more than two parties on the same side of the line. On a full line, half of the parties have their ringers connected from the ring side of the line to ground and half from the tip side of the line to ground. All of the parties connected from one side of the line to ground will ring simultaneously and code ringing is used to differentiate between parties.

5. RINGING CAPABILITIES AND RECOMMENDATIONS

5.01 The resistance of long subscriber loops limits the number of ringers that can be connected to the loop. Range Extenders with Gain (REGs) are normally specified for such loops, however, they extend dialing and supervisory ranges and add gain, but do not aid ringing nor reduce the effects of inductive noise on lines with grounded ringers. In many applications it becomes necessary to add ringer coupling devices to reduce noise or to permit the proper numbers of ringers to operate. Table A provides recommendations on the maximum number of ringers permitted per party in each resistance zone. These numbers represent the "worse case" loop and ringer conditions for each ringer coupling device.

5.02 In order to provide a practical means of administrating ringers, a system of resistance zoning is employed. This system aids in defining what equipment is required at the central office and the station location in order to provide satisfactory telephone service.

5.03 For subscriber Long Route Design, the zones are identified as follows:

RZ 13—up to 1300 ohms from central office

RZ 16—1301 to 1600 ohms from central office

RZ 18—1601 to 2000 ohms from central office

RZ 28—2001 to 2800 ohms from central office

RZ 36—2801 to 3600 ohms from central office

5.04 Unigauge zoning is based on a different concept of cable plant and is primarily designed to be used with No. 5 Cross-bar and No. 2 ESS offices. It is divided into:

(a) ***Short Loop***—up to 1300 ohm loop.

(b) ***Unigauge or Loaded Unigauge Loop***—from 1301 to 2500 ohm loop.

5.05 Information as to the zone involved should appear on the service order. An absence of any zone information indicates that the order is in RZ 13, or short loop unigauge.

6. RINGING LIMITATIONS

6.01 The maximum number of capacitor-coupled ringers which can be connected to a line is determined by dialing considerations and/or the resistance zone. Dialing considerations limit the number of capacitor-coupled ringers used on any one line to five if bridged or to ten on each side of the line if connected to ground. Some dial long line circuits, however, impose additional limitations on the number of ringers because of dialing.

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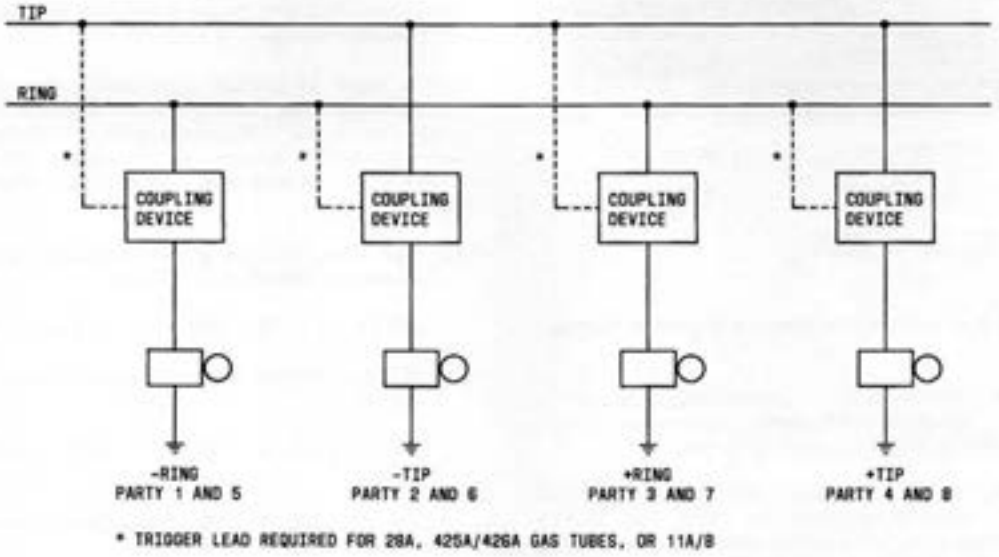

Fig. 4—Four-Party Full Selective and Eight-Party Seminselective Type Ringing

6.02 The maximum number of tube or diode-coupled ringers is not limited by dialing, but by the resistance zone and central office pretripping considerations. When using these devices, pretripping limits the maximum number of ringers of the same polarity on the same side of line to three. In addition, with tube or diode connected ringers the minimum loop must not be less than 300 ohms to prevent pretripping.

6.03 Ringer isolators or 11A/B extenders affect neither dialing nor tripping and the number of ringers is determined by the resistance zone.

7. SPECIAL RINGING BRIDGE LIMITATIONS

7.01 For each intercept line, neon lamp, or bell (3-, 4-, or 6-inch) used with other audible or visual line signals, deduct one ringer from the number of ringers shown in Table A.

7.02 For each automatic answering set used on individual or 2-party lines, deduct two ringers from the number allowed shown in Table A.

7.03 Each audible signal R relay associated with a 1A or 1A1 KTS is equivalent to two ringers. (With a 1A2 KTS, a signal R relay is equal to one ringer.)

7.04 Not more than three ringers may be connected in any combination across the line ahead of or behind the line circuit KTU in the 1A1 or 1A2 KTS.

8. COMPATIBILITY OF MIXED RINGER COUPLING DEVICES

8.01 On four and eight party semiselective and multiparty divided code ringing, two or more parties on the same side of the line ring simultaneously. It is important to remember that certain coupling devices may cause an appreciable loss in ringing voltage. Therefore, parties which ring simultaneously should be equipped with similar ringer coupling devices to assure proper triggering of each device.

8.02 For party line service, the 28A ringer isolator, the D-180036 ringer isolator, and capacitor couplers can be mixed without concern.

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The 11A/B extenders can be mixed with any of the above if the ringer capability of the 11A/B in Table A is reduced by one. The 425A, 426A gas tubes, 426N diode, and the 687B subscriber set (when used to repeat ringing as recommended) may be intermixed but should not be combined with any device in the first group above. In general, any combination of devices can be used on opposite sides of the line or at stations of opposite polarity. Administration may be a problem especially if field substitution is permitted.

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TABLE A

MAXIMUM NUMBER OF RINGERS PER PARTY FOR EACH RESISTANCE ZONE AND COUPLING DEVICE (NOTE 1)

COUPLING DEVICE (NOTE 3)	CLASS OF SERVICE						
	INDIVIDUAL (SINGLE-PARTY)		TWO PARTY	FOUR PARTY		EIGHT PARTY	
	BRIDGED	GROUNDED (NOTE 2)		SEMI-SELECTIVE	FULL SELECTIVE	SEMI-SELECTIVE	DIVIDED CODE
RZ 13							
None	5	8	4*	2*	—	—	1*
28A Ringer Isolator	—	8	8	4	4*	2*	2
D-180036 Ringer Isolator	—	7	4*	2*	—	—	1*
425A/426A Tube or 426N Diode	—	—	—	—	3	1	—
11-Type Extender	—	7	7	3	3*	1*	2
RZ 16							
None	4	7	3*	1*	—	—	—
603A Ringing Extender	5	—	—	—	—	—	—
28A Ringer Isolator	—	7	7	3	3*	1*	2
D-180036 Ringer Isolator	—	6	3*	1*	—	—	—
425A/426A Tube or 426N Diode	—	—	—	—	2	1	—
11-Type Extender	—	6	6	3	3*	1*	1
RZ 18							
None	3†	6	3*	1*	—	—	—
603A Ringing Extender	5	—	—	—	—	—	—
28A Ringer Isolator	—	6	6	3	3*	1*	1
D-180036 Ringer Isolator	—	5	3*	1*	—	—	—
425A/426A Tube or 426N Diode	—	—	—	—	2	1	—
11-Type Extender	—	5	5	2	2*	1*	1
RZ 28							
None	2†	5	2*	1*	—	—	—
603A Ringing Extender	5	—	—	—	—	—	—
28A Ringer Isolator	—	5	5	2	2*	1*	1
D-180036 Ringer Isolator	—	4	2*	1*	—	—	—
425A/426A Tube or 426N Diode	—	—	—	—	1	—	—
11-Type Extender	—	4	4	2	2*	1*	1
RZ 36							
None	2†	4	2*	1*	—	—	—
603A Ringing Extender	4	—	—	—	—	—	—
28A Ringer Isolator	—	4	4	2	2*	1*	1
D-180036 Ringer Isolator	—	4	2*	1*	—	—	—
11-Type Extender	—	3	3	1	1*	—	—
Unigauge (Loaded or Unloaded)							
None	3	5	2*	1*	—	—	—
603A Ringing Extender	5	—	—	—	—	—	—
28A Ringer Isolator	—	5	5	2	2*	1*	1
D-180036 Ringer Isolator	—	4	2*	1*	—	—	—
11-Type Extender	—	4	4	2	2*	1*	1

* Denotes cases when ringer biasing springs must be placed in high or stiff notch. All others are in weak notch.

† To avoid bell tap, ringers may have to be set in the stiff notch if 96 or 100 volt range extenders are used in the C O

Notes:

1. Number of ringers listed in table are for worse case loop and ringer conditions.
2. This application is not to be used with registered sets.
3. Another device, the 10A extender was rated MD in 1975 and is not recommended because it may cause pre-trip.

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RADIO SIGNAL SUPPRESSION
FOR TELEPHONE SETS
IDENTIFICATION, INSTALLATION, AND MAINTENANCE

1. GENERAL

1.01 This section contains information on the reduction of Radio Frequency Interference (RFI), also referred to as Electromagnetic Interference (EMI), in telephone sets.

1.02 This section is reissued to:

- Add information on D-180891 Kit of Parts
- Revise Fig. 6
- Update note in paragraph 2.02
- Add information on dial amplitude equalization leads.

1.03 The RFI frequently occurs where a radio station transmitter or citizens band (CB) radio equipment is located near telephone facilities. Generally the radio signal is picked up by the wire, which acts as an antenna, or the signal is radiated directly into the telephone set, and demodulated (changed to audio frequency) by nonlinear components, such as varistors, transistors, and diodes in the telephone set. ***However demodulation can also result from other sources. Refer to paragraph 1.04.***

1.04 Before ordering a telephone set modified for radio signal suppression, check for the following and correct as needed:

- Corroded connections (inside and outside plant)
- Loose wire terminations (including set wiring)
- Abandoned drop wire still connected to line
- Inside wire connected but not used
- Foreign attachments.

Installing a modified telephone set on the customers premises will not be effective if demodulation is caused by any of the above conditions.

1.05 Telephone set components that may act as demodulators are:

- Transistors in amplifiers of some networks and handsets
- Varistors and transistors in TOUCH-TONE* dials
- Diodes in polarity guards
- Light emitting diodes in TRIMLINE* hand telephone sets
- Click suppression varistors across receiver units
- Carbon transmitters
- Speech equalization varistors in networks.

1.06 With the introduction of the 4228D and 4228J networks, the cause of radio signal demodulation in networks other than those in the TRIMLINE sets has effectively been minimized. In these networks the speech equalization varistors have been replaced by resistors and a strapping option which provides speech (transmission) equalization for various loop lengths.

1.07 All telephone sets, including TRIMLINE sets but excluding coin, (refer to paragraph 1.08) will be available from the local distributing house or service center modified for radio signal suppression. Modification will include changing to new network, where applicable, and placing bypass capacitors

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across all other components that may act as demodulators as listed in paragraph 1.05.

Before ordering a modified telephone set make sure that demodulation is not occurring external to the telephone set (see paragraph 1.04).

1.08 Single slot coin telephones are not modified at the service center, and where RFI is a problem, it is recommended that a 40BA capacitor be added at the protector and/or a 1542A (MD) or 1542AM inductor be substituted in place of the connecting block.

1.09 Where demodulation is attributed to components in a telephone set, or associated voice coupler, in addition to changing to a modified set it is recommended that a 40BA capacitor be placed at the protector and a 1542A or 1542AM inductor be substituted in place of the connecting block. Refer to section in Division 463 for voice coupler modifications. The capacitor will bypass, to ground, radio signals picked up by the drop wire while the inductor will tend to attenuate radio signals picked up by the inside wire. These capacitors and inductors are ineffective above 10 Megahertz (MHz) and thus will not eliminate interference from citizens band and certain short wave radios.

1.10 Where an adjacent (TOUCH-TONE phone) dial forms a part of the customers equipment and a modified telephone set is installed for RFI reasons, the adjunct dial should also be replaced by one modified for RFI.

1.11 The MD telephone sets will not be modified for radio suppression. Where a telephone set rated MD is encountered, it should be replaced by an equivalent modular set in the current series, modified for radio suppression.

1.12 Arrange trouble visit during operation of the radio station in order that the effectiveness of corrective measures taken may be evaluated immediately.

2. IDENTIFICATION

A. Suppression Devices

2.01 ***Networks, 425J (MD) (Fig. 1), 4010E (MD) (Fig. 2), 4228D (Fig. 3), and 4228J (Fig. 4) have strapping options for loop equalization.***

- Can be used on rotary or TOUCH-TONE dial applications.
- The 4228J network has leads terminated on a connector.
- Refer to Section 501-135-100 for additional information on networks.

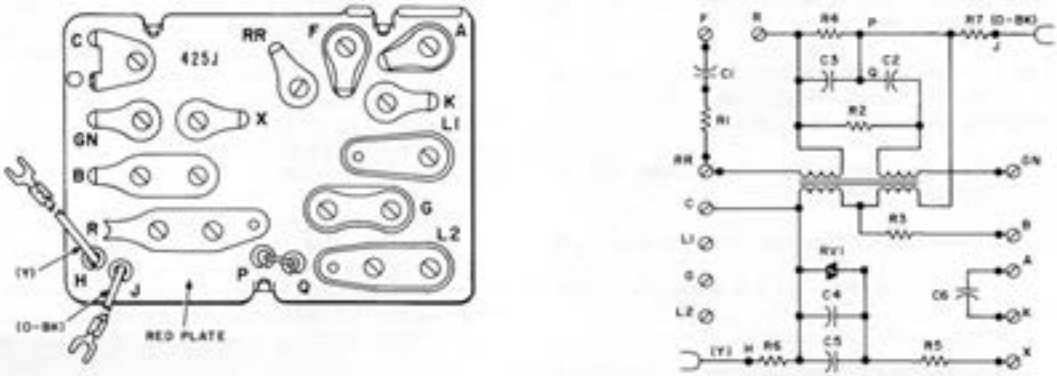

Fig. 1—425J (MD) Network, Terminal Layout, and Schematic

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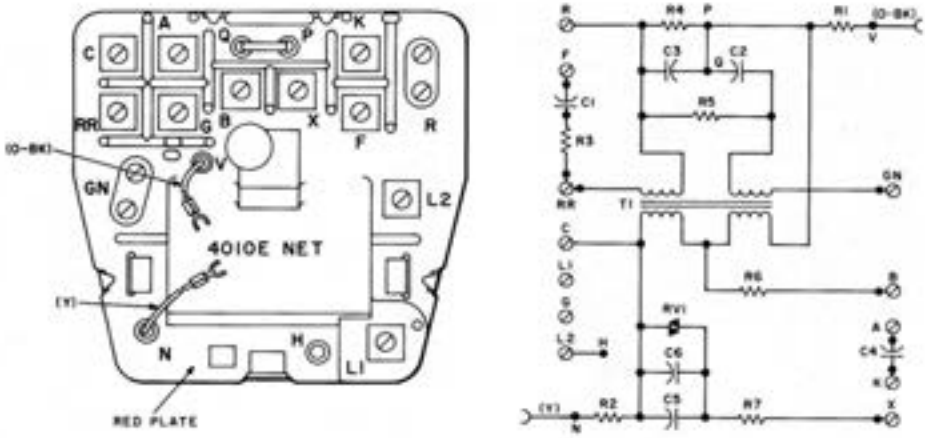

Fig. 2—4010E (MD) Network, Terminal Layout, and Schematic

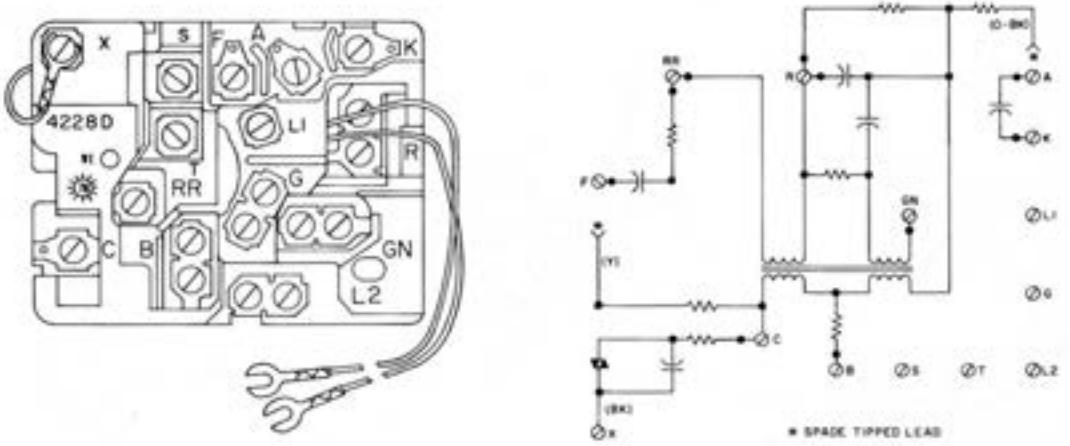

Fig. 3—4228D Network, Terminal Layout, and Schematic

2.02 *1542A (MD) Inductor (Fig. 5).*

- Used with nonmodular telephone sets.
- Attenuates RF line current for signals under 10 MHz.
- Can be substituted for the 42A connecting block.
- Removable link between terminals B and Y must be removed when used as connecting block for telephone sets with dial lamps or with 30A voice coupler.

Note: A 157A cover assembly may be ordered separately to convert existing nonmodular 1542A inductors to modular. The 157A cover

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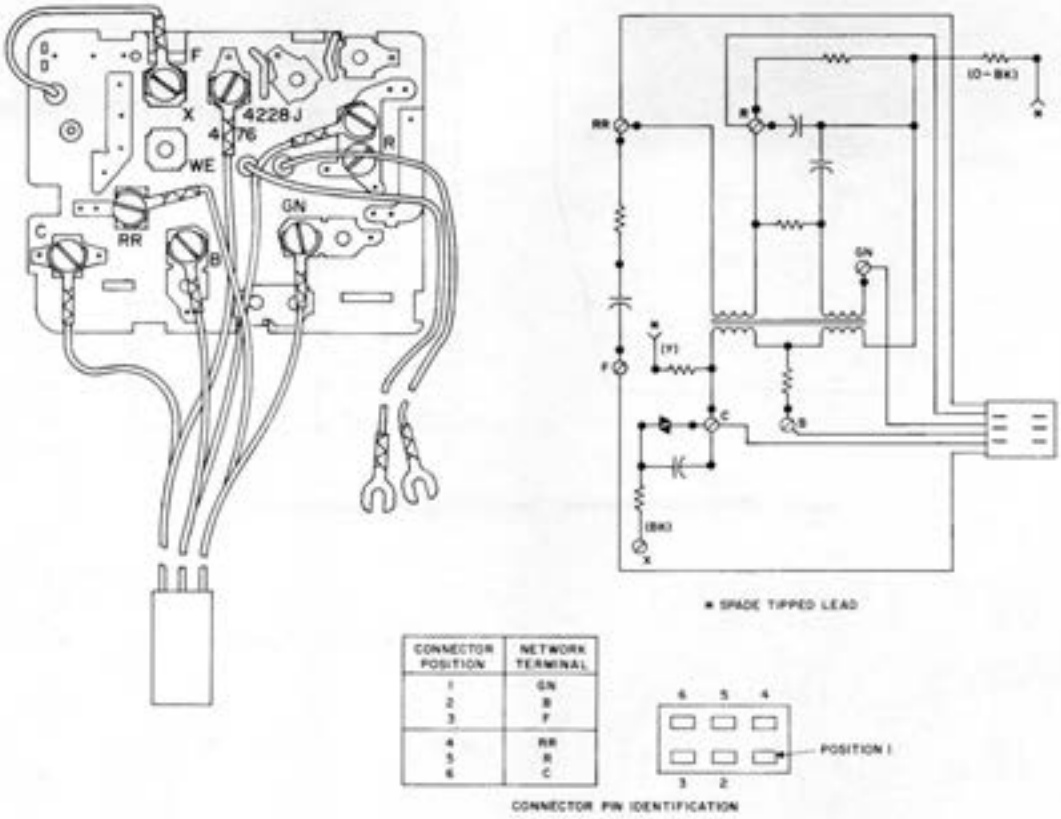

Fig. 4—4228J Network, Terminal Layout, and Schematic

assembly consists of a plastic cover assembly (Fig. 6) and a 652A4 jack.◀

2.03 ***1542AM Inductor (Fig. 6).***

- Used with modular telephone sets.
- Attenuates RF line current for signals under 10 MHz.
- Can be substituted for 625-type connecting block.
- Equipped with 157A cover assembly which includes a 652A4 (modular) jack. Jack mates with modular D4BU mounting cord (ordered separately).
- Removable link between terminals B and Y must be removed when used as connecting block for telephone sets with dial lamps or with 30A voice coupler.

2.04 ***40BA Capacitor (Fig. 7).***

- Located at protector to bypass RF signals under 10 MHz to ground.

2.05 ***▶D-180891 Kit of Parts:***

- Used on 2220C and 2226A hand telephone sets (TRIMLINE sets) when on-hook RFI is encountered

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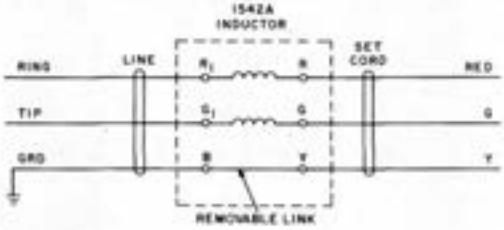
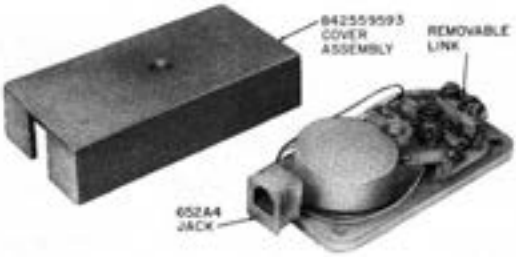
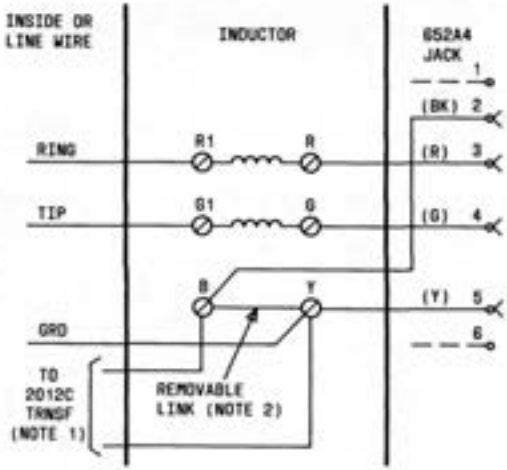


Fig. 5—1542A (MD) Inductor and Schematic





NOTES:
1. FOR TELEPHONE SETS WITH INCANDESCENT DIAL LIGHT.
2. DISCONNECT LINK WHEN INCANDESCENT DIAL LIGHT IS PROVIDED.

Fig. 6—1542AM Inductor and Schematic

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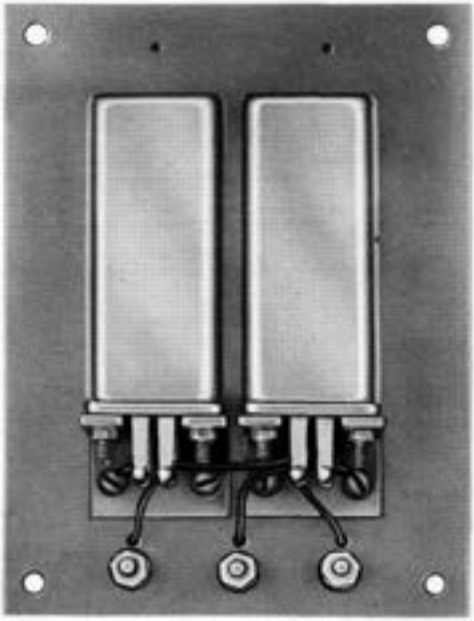

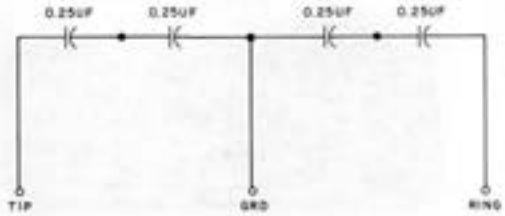

Fig. 7—40BA Capacitor and Schematic

- Not recommended for use with tip party stations on a two-party line when Automatic Number Identification is provided. Also not recommended when hand telephone set is used with any transaction telephone set base. Under these circumstances, order a modified 2220BM hand telephone set or a 226A hand telephone set if receiver amplification is required

- Refer to Section 502-303-101 for additional information.◀

B. Telephone Set Modification By Local Distributing House or Service Center

2.06 ***Telephone sets, except coin, currently using the 425-, 4010-, or 4228-type networks are modified as follows.***

- Existing network replaced by a 4228D or 4228J network, whichever is applicable.

- TOUCH-TONE dial will have bypass capacitors installed across the varistors and transistors and will also have a (R-S) lead. ▶The 35AR3A, 35AU3A, 35AY3A, and 35BA3A dials have an additional (BR-W) lead.◀

- Bypass capacitors installed across all other components of the telephone set that may act as demodulators, such as transmitter unit, receiver unit, transistors in amplifiers, polarity guards, etc.

2.07 The TRIMLINE hand telephone sets will be modified by having bypass capacitors placed across all the components in the set that may act as demodulators.

2.08 Modified sets will not be recoded but will be identified in some manner by the local distributing house or service center.

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C. Associate Apparatus Modification By Local Distributing House or Service Center

2.09 The TOUCH-TONE dials and all G-type handsets will be available from the local distributing house or service center modified for radio suppression. These will be used where an adjunct dial must be installed or where the dial or handset must be replaced for maintenance reasons.

2.10 Other modified telephone set components include 241B, 242B, and 277A amplifiers; D-180191 and D-180229 polarity guard assemblies; and 694A and 694B subsets. Modified versions of additional items will be made available in the future when they are needed.

3. ORDERING GUIDE

3.01 ***Associated Apparatus or Equipment (ordered separately):***

- Capacitor, 40BA
- Inductor, 1542AM-49 Gray (only)
- Set, Telephone, (add code) - RF modified
- Set, Telephone, Hand, 220AM, AL, or C and 226A — RF Modified
- Set, Telephone, Hand, 2220BM or C and 2226A — RF Modified
- ◗D-180891 Kit of Parts.◖

3.02 ***Replaceable Components:***

- Cover, 157A
- Dial - (TOUCH-TONE dial only) RF Modified
- Set, Hand, G - RF Modified.

4. INSTALLATION

4.01 ***Telephone Sets Equipped With 425J, 4010E, 4228D, or 4228J Networks.***

(a) Installed in usual manner.

(b) For connections, see connection section of type set modified.

◗***Note:*** The network terminal F of the 870-, 872-, 2870-, and 2872-type telephone sets is not to be used as a spare terminal or tie point.◖

(c) Sets are shipped with speech equalization option leads insulated and stored.

(1) For loops greater than 500 ohms leave insulated and stored.

(2) For loops 500 ohms or less connect (yellow) and (orange-black) leads to terminals RR and R, respectively, on the 425J, 4010E, 4228D, and 4228J network.

(d) ◗The (R-S) and (BR-W) dial leads.

(1) For sets with a 35AR3A, 35AU3A, 35AY3A, or 35BA3A dial, connect the (R-S) dial lead to network terminal X for loops greater than 500 ohms. For loops less than 500 ohms, connect the (BR-W) dial lead to network terminal X.

(2) For all other type dials, connect the (R-S) dial lead to network terminal X for all loops.◖

4.02 ***Modified TRIMLINE Telephones.***

(a) Install in usual manner.

(b) Refer to connection section in Division 502.

4.03 ***1542A (MD) Inductor (Fig. 8).***

(a) Use as connecting block for nonmodular telephone set cord or install as near to telephone set as possible.

(b) Locate as near as possible to wall-type sets.

4.04 ***1542AM Inductor (Fig. 6).***

(a) Use as connecting block to terminate inside or line wire. Modular mounting cord plugs into jack provided with inductor and the telephone set.

(b) Install as near as possible to wall-type sets.

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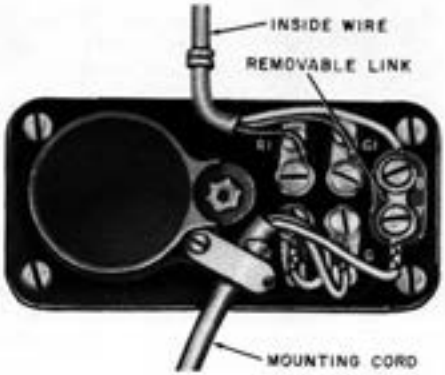

Fig. 8—Cording Diagram, 1542A (MD) Inductor

4.05 *40BA Capacitor (Fig. 9).*

(a) Install near and connect to protector with as short as possible piece of inside wire.

(b) Station wires must connect to the capacitor.

(c) Mounted inside when outside protector is used.

(d) ***Protector ground must be upgraded to the best possible ground available.***

4.06 ***D-180891 Kit of Parts.***

Note: When this kit of parts is installed in the 2220C or 2226A hand telephone set, the base also must be modified per Table A, B, C, or D of this section.

(a) Refer to Section 502-303-102 for connection information of kit of parts in the 2220C and 2226A hand telephone sets.

(b) If the 73B control unit of the 50A1 portable conference telephone set is subjected to RFI, refer to Section 512-630-111 for suppression information.

5. MAINTENANCE

5.01 Normal maintenance can be performed on modified telephone sets. Modified TOUCH-TONE dials and G-type handsets are available from the local distributing house or service center for maintenance.

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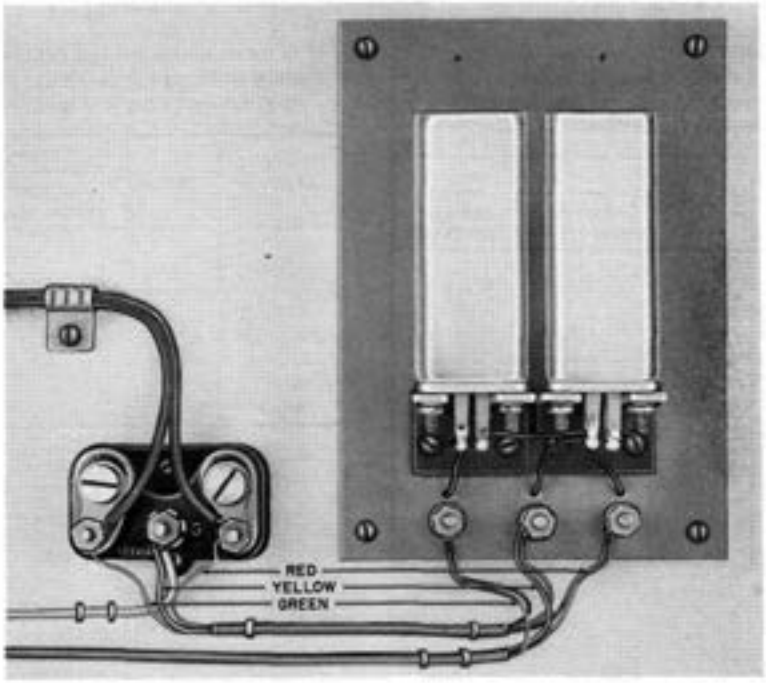

Fig. 9—123A1A Protector with 408A Capacitor Installed

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♦TABLE A♦

MODIFICATION OF AC- AND AD-TYPE TELEPHONE BASES WHEN D-180891 KIT OF PARTS IS INSTALLED IN 2220C OR 2226A HAND TELEPHONE SET

LEADS	COLOR	TERM. BOARD	
		REMOVE FROM TERM.	CONNECT TO TERM.
Handset Cord Jack	(Y) or (W)	3	1
Inside Wire, 523-Type Plug, Mtg. Cord Jack, or 623T4 Jack	(BK)	1	3

♦TABLE B♦

MODIFICATION OF 2950A-TYPE TELEPHONE SETS WHEN D-180891 KIT OF PARTS IS INSTALLED IN ASSOCIATED HAND TELEPHONE SET

LEADS	COLOR	TERM. BOARD	
		REMOVE FROM TERM.	CONNECT TO TERM.
Line Switch	(S)	L2	*
	(Y)	L2	4
	(BR)	L2	1

* Insulate and store.

♦TABLE C♦

MODIFICATION OF AL1 TELEPHONE BASE WHEN D-180891 KIT OF PARTS IS INSTALLED IN 2220C OR 2226A HAND TELEPHONE SET

LEADS	COLOR	TERM. BOARD ASSY.	
		REMOVE FROM TERM.	CONNECT TO TERM.
Line Switch	(BL)	2	10
Cord Jack (Mtg. Plate Assy.)	(Y)	10	2

♦TABLE D♦

MODIFICATION OF 50A1 CONFERENCE SET WHEN D-180891 KIT OF PARTS IS INSTALLED IN 2220C OR 2226A HAND TELEPHONE SET (NOTE)

LEADS	COLOR	TERM. BOARD ASSY.	
		REMOVE FROM TERM.	CONNECT TO TERM.
Hand Tel Set Cord Jack Leads	(W)	*	14
	(BK)	*	15

* Insulated and stored.

Note: This modification applies to sets with serial numbers 100,000 and higher preceded by the letter prefix A, only.

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REFERENCE

PACKAGING AND HANDLING

DISCONNECTED STATION APPARATUS

1. GENERAL

1.01 The condition of returned telephone equipment determines the cost of repair work.

1.02 This section is reissued to revise text.

1.03 A majority of the repair cost is built up due to damage inflicted on the set. This occurs between the time of disconnection and arrival at the repair shop.

1.04 Cartons of disconnected apparatus left on customer's premises for pickup should be sealed.

2. DISCONNECTION OF EQUIPMENT

2.01 All equipment when removed from service should be disconnected properly. Unnecessary repair costs result when cords are cut off and equipment is pried off wall or otherwise removed improperly.

2.02 After apparatus has been disconnected, backboards, mounting screws, wire clippings, etc. should be separated from apparatus.

3. PROTECTING TELEPHONE SETS

3.01 To give maximum protection to disconnected telephone sets, package them in containers similar to those in which they were delivered. Usually, corrugated cardboards cartons are available from new installations. These cartons should be held for packaging of returned apparatus instead of being discarded or otherwise destroyed.

3.02 Carboard cartons also may be obtained through normal supply channels. Table A gives carton and detail numbers required for different sets.

TABLE A

CARTON LISTING

CARTON NO.	DETAIL NO.	TYPE SET
8499	8499A 8499B	201, 211
21800	21800A 21800B 21800C	202, 300, 5300 500 500
RM 649508	RM 649708 RM 649945	500 Wall Set
RM 649522	None reqd RM 649722	400 Key Sets 500 Key Sets
RM 649600	RM 649610 RM 649620	600 (CALL DIRECTOR Set)
RM 649601	RM 649611 RM 649621	601 (CALL DIRECTOR Set)
RM 649530	None reqd	700 (PRINCESS Set)

3.03 If there are no suitable cartons available, paper or transparent plastic bags may be used for protecting telephone sets. The type bag used will depend on local supplies.

Caution: Plastic bags can be dangerous due to their suffocating characteristics if handled by small children. Do not leave these bags on the customer's premises or accessible to children.

3.04 Particular care should be given to handling disconnected CALL DIRECTOR® sets, PRINCESS® sets, and other colored telephone sets.

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(a) Considerable damage and costly repairs of CALL DIRECTOR sets can result if they are not protected properly when disconnected. Make certain CALL DIRECTOR sets are not handled as loose items. Protect them in such a way that handset, mounting cord, and especially the connectors cannot mark other parts of the set.

Caution: Tape should not be used to tie mounting cords (particularly CALL DIRECTOR sets) in coils. Tape stains the jacket and results in costly repairs.

(b) All disconnected colored telephone sets, in addition to being packed in suitable cartons, should be protected by plastic bags. These will remain on the sets until the Western Electric Company is ready to make repairs.

3.05 When telephone sets are packed in cartons, care should be taken to use the cardboard separators and details with which each carton is equipped. This will prevent loose handset or cords from damaging fingerwheel or other parts of the set.

3.06 When paper or plastic bags are used to package telephone sets:

(a) Coil mounting cord loosely around upper part of set.

(b) Place handset in a 5-pound paper bag or equivalent.

(c) Place handset across the instrument in a position 90 degrees from its normal position in the cradle. (Do not stretch retractile cords out of their natural shape or wrap them around the set.)

(d) Spade tips and stay hooks should be so positioned that they will not mark or scratch the handset or housing during transit.

(e) Place telephone set in bag and fold over end of bag, securing it with a rubber band; or place in trays for return to Western Electric Company.

Under no circumstances shall connecting blocks, plugs, jacks, screws, or other miscellaneous items be placed in cartons or bags with telephone instruments. These items should be transported separately.

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REFERENCE

BUZZERS AND BELLS

IDENTIFICATION, INSTALLATION, MAINTENANCE, LIMITATIONS, AND CONNECTIONS

1. GENERAL

1.01 This section contains information on low voltage buzzers and bells used in ac or dc signaling circuits and high resistance buzzers that may be used on ac ringing current circuits.

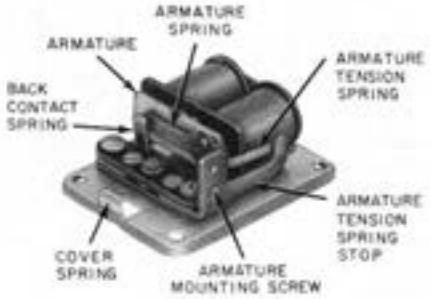

Fig. 1—7F Buzzer

1.02 The reason for reissuing this section is to include the KS-20419L2 buzzer. Revision arrows are used to emphasize the more significant changes.

1.03 The 7-type buzzers, except for 7F, are rated Manufactured Discontinued (MD) and are replaced by the KS-type buzzers.

2. IDENTIFICATION

A. Purpose

2.01 To provide low voltage audible signals for stations or key systems.

B. Ordering Guide

2.02 Refer to Table A for low voltage buzzers and bells.

2.03 Refer to Table B for high resistance buzzers.

C. Design Features

2.04 The 7F buzzer (A&M Only) (Fig. 1) and the 7-type bell (Fig. 2) have the same design features except the bell is equipped with a clapper and 3-inch gong.

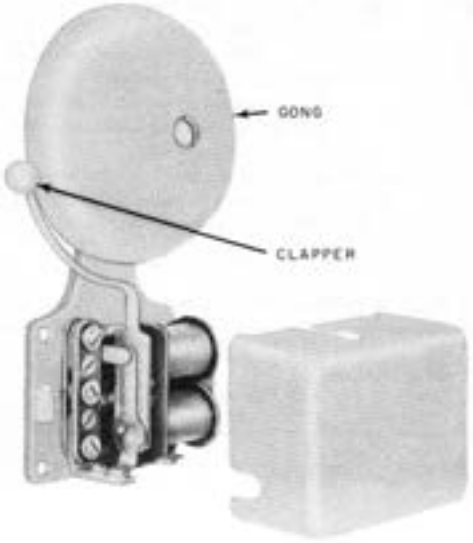

Fig. 2—7-Type Bell

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▶TABLE A◀

LOW VOLTAGE AC AND DC SIGNALS

ORDERING GUIDE			OPERATING FEATURES				
			VOLTAGE RANGE (NOTE 1)			APPROXIMATE AC CURRENT IN MA	
SIGNAL	CODE	REPLACED BY	DC (VOLTS)	50-60 CYCLES AC	APPROX DC RES (NOTE 2)	MIN	MAX
Bell	7A-49	—	14-40	25-50	270	32	75
	7C-49	—	2-5	4-9	2.6	135	200
	7D-49	—	3-10	6-18	15.8	80	185
	7E-49	—	10-20	18-30	105	85	125
	7F-49*	—	24-60	35-60	682	26	50
Buzzer	7F-49*	—	20-60	20-60	682	15	40
	KS-8108L2	—	3-4	3-4	.5	540	770
	KS-8109L2	—	14-30	14-30	55	150	400
	KS-8110L2	—	24-50	24-50	300	45	125
	KS-20419L1 KS-20419L2	—	—	6-10	60	70	125

Note 1: In compliance with Part 68 of the FCC rules, hazardous voltages shall not be routed through the same cables, connectors, or mounting cords as those containing the ring and tip pair or auxiliary interface leads. Accordingly when hazardous voltages used to power these devices, route power through a separate pair. (Hazardous voltages are defined as those which exceed 42 volts ac peak (30V RMS), 80 volts dc, or combined ac and dc voltages with the dc component between 21 and 80 volts, ac voltages less than (55-0.6XVdc) peak. Voltages used for network signaling and control (ringing, talk battery, etc.) are not classified as hazardous voltages.

Note 2: Multiply these values by 3 when computing dc current drain, except for 7F buzzer or bell.

*May also be operated with 16- to 20-cycle ringing current. Effective impedance is then 850 ohms and approximately 3500 ohms in series with 2-μf capacitor.

▶TABLE B◀

HIGH RESISTANCE BUZZERS

ORDERING GUIDE	OPERATING VOLTAGE	
	24 VOLT DC	AC RINGING CURRENT
9A		•
9B*		•
9C†		•
KS-8108L2, KS-8109L2, or KS-8110L2	•	•

* Consists of 9A buzzer plus 219B adapter and mounting screws (Fig. 4). This buzzer for ac operation only.

† Consists of 9A buzzer plus 220A adapter and mounting screws (Fig. 5).

2.05 The armature and contacts of the 7F buzzer and 7-type bell are protected by a snap-on cover. With this cover installed, the signaling unit protrudes 1-1/2 inches from the mounting surface.

2.06 The 7F buzzer and 7-type bell have three screw type terminals designated A, C, and D for conductor terminations.

2.07 The gong of the 7-type bell (Fig. 2) has its mounting hole drilled off-center. The eccentricity of the mounted gong provides for adjustment of the bell's volume by rotating the gong to increase or decrease the travel distance between the clapper and the gong.

2.08 The 9-type buzzer (Fig. 3, 4, and 5) is composed of a G1C ringer motor, P-type armature, and 64A plastic gong (cover).

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Fig. 3—9A Buzzer With Cover (64A Gong) Removed

Fig. 4—9B Buzzer (Includes Adapter, Buzzer, Connecting Block, and Screws)

2.09 The KS-8108L1, KS-8109L1, and KS-8110L1 buzzers have either a single or double coil and should be used for dc operation only. They are rated MD.

2.10 The KS-8108L2, KS-8109L2, and KS-8110L2 buzzers (Fig. 6) replace the List 1 buzzers. They have a single coil only and may be used for ac or dc operation (Fig. 24). With dc operation, the Lists 1 and 2 buzzers are interchangeable.

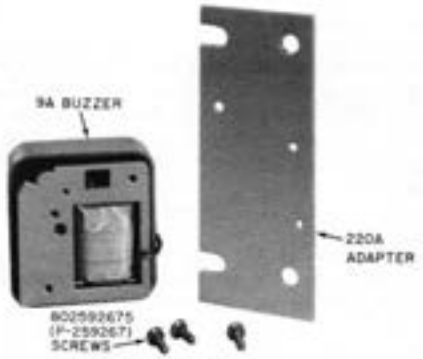

Fig. 5—9C Buzzer (Includes Adapter, Buzzer, and Screws)

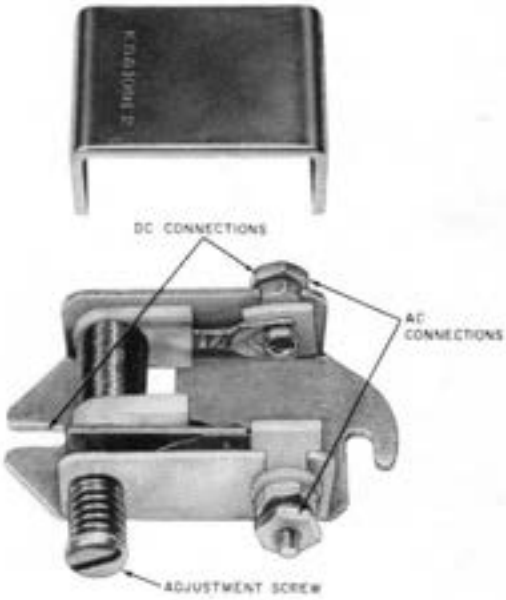

Fig. 6—KS-8108L2, KS-8109L2, or KS-8110L2 Buzzer

2.11 The volume on KS-8108, KS-8109, and KS-8110 type buzzers can be set with the adjusting screw (Fig. 6).

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2.12 The miniature KS-20419 type buzzers (Fig. 7 and 8) are 3/4-inch in diameter, 1/2-inch thick, and are equipped with two spade-tipped leads 7-1/2 inches long. ◊They have a mounting bracket secured to the buzzer housing. The bracket is slotted and 1-1/4 inch in length and can be mounted with a single screw at a suitable location inside the telephone set.

(a) The KS-20419L1 buzzer (Fig. 7) has only a screw in the center of the buzzer. The KS-20419L1 has no volume adjustment.

(b) The KS-20419L2 buzzer (Fig. 8) has a screw in the center as well as a plastic stud. The volume can be adjusted with the center screw.◊

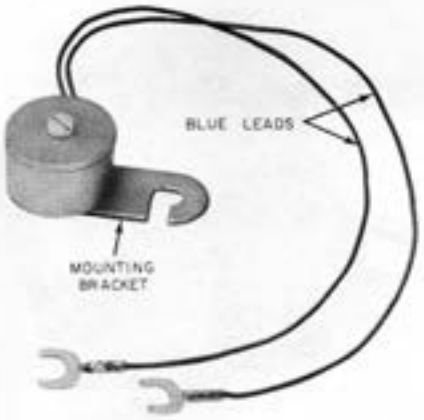

Fig. 7—KS-20419L1 Buzzer

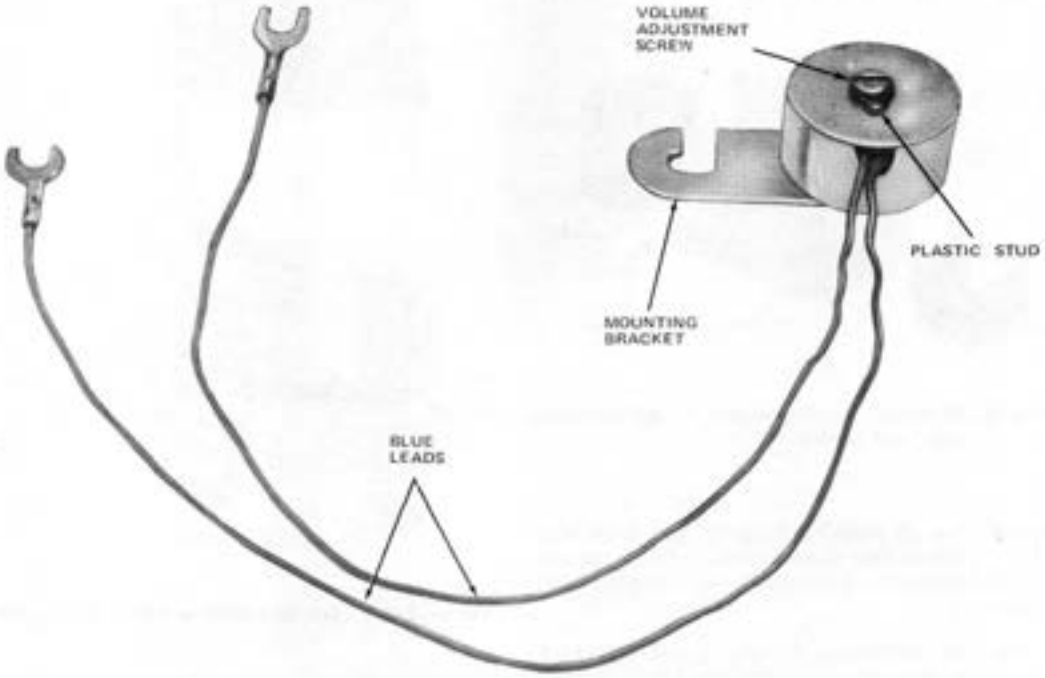

Fig. 8—◊KS-20419L2 Buzzer◊

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2.13 The KS-13783L1 (MD) bell has been manufactured in two different models.

(a) Earlier models have a square base with a groove which permitted entry of exposed wiring.

(b) Later models have a round base with a groove for entry of exposed wiring.

(c) The KS-13783L1 bell has a 4-inch gong and the KS-13783L2 bell has a 6-inch gong.

(d) The KS-13783L1 and L2 bell are rated MD and are replaced by KS-16301L20 and KS-20375L1 signals. For additional information refer to Section 463-110-100.

D. Application

2.14 The 7-type buzzer or bell may be used on 6A or ●6B● selective intercommunicating systems, common line intercommunicating system with button and buzzer signaling, or dial intercommunicating feature of the 1A2 key telephone system.

2.15 The 9-type buzzer can be used as a distinctive common signal for central office or PBX stations working behind key equipment.

Note: A 575E capacitor should be placed in series with the 9-type buzzer.

Except for 9-type buzzers, none of the bells or buzzers are to be connected directly across tip and ring leads.

E. Operating Features

2.16 When using a 7F buzzer, make dc connections to terminals D and C and ac connections to terminals A and C. When using a 7-type bell, make ac or dc connections to terminals D and C. This provides more positive clapper action.

2.17 When using KS-8108, KS-8109, and KS-8110 type buzzers for dc operation the case becomes part of the circuit and should be insulated from any metal mounting surfaces.

2.18 The KS-20419 type buzzers operate on 6-10 volt ac only.

3. INSTALLATION

A. Planning

3.01 Consider the following when locating buzzers and bells.

(a) Use appropriate bracket when placing buzzers in telephone set.

(b) Locate where signal will be clearly heard.

(c) The 7-type bells may be mounted on horizontal or vertical surfaces. On vertical surfaces mount bell with gong at top or bottom.

(d) Locate buzzers and secondary connecting blocks high in desk knee well to avoid disfiguring desks.

(e) The 7F buzzer (Fig. 1) may be mounted in any position. A preferable position for mounting on vertical surfaces is with armature hanging vertically from hinged end to reduce amount of dust settling on contacts.

(f) Locate a minimum of 1-foot from any equipment with an unshielded induction coil, to reduce magnetic pickup.

(g) Do not mount KS-8108, KS-8109, and KS-8110 type buzzers on metal surfaces unless a backboard is used, since metal base forms part of operating circuit. Countersink backboard mounting screws to prevent screwheads from contacting buzzer base.

(h) Place the KS-20419 type buzzer inside the telephone set where it will not interfere with electrical or mechanical operation of the telephone set (Fig. 9 and 10). The buzzer circuit is insulated from the case and bracket so that the buzzer can be attached to metal parts of the set.

(i) A 176A-49 backboard is suitable for use on metal desks or other surfaces requiring a backboard.

(j) Use a buzzer where fixed volume buzzer tone is required. Use a bell where a distinctive or louder signal is desired.

(k) The KS-type buzzers are more suitable in CALL DIRECTOR® telephone, as they have less induction than the 7-type buzzers.

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Fig. 9—KS-20419 Type Buzzer Mounted on Dial Mounting Screw

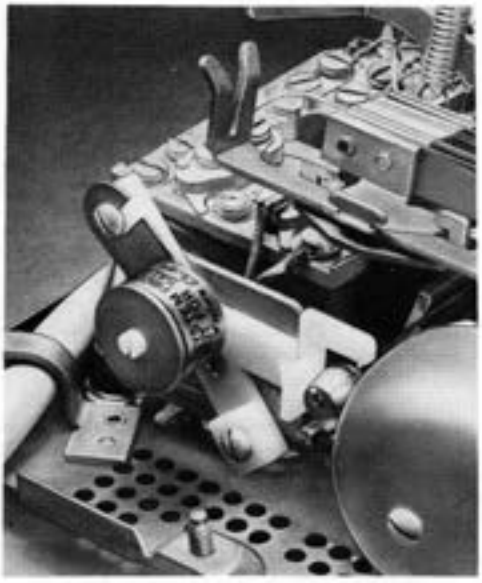

Fig. 10—KS-20419 Type Buzzer Mounted on Bracket of H1A Ringer

B. Mounting

3.02 When mounting buzzers directly to a surface use No. 8 pan-head type AB screws of suitable length.

3.03 Refer to Section 461-300-101 for information on mounting buzzers in floorduct.

3.04 See Table C for brackets associated with mounting buzzers in telephone sets and to 168-type backboards.

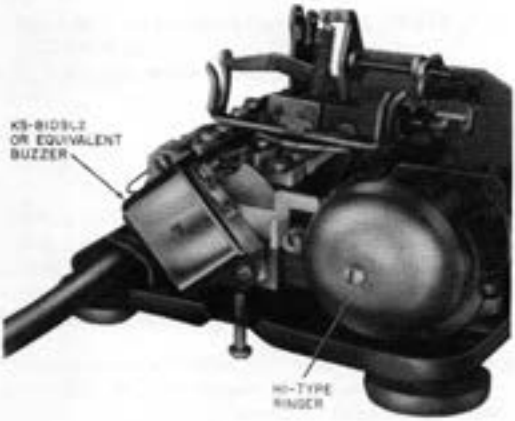

Fig. 11—KS-8109 Type Buzzer Mounted on Bracket of H1A Ringer

Fig. 12—70B Bracket

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TABLE C

MOUNTING BRACKETS OR ADAPTERS

BUZZER	BRACKET CODE	PARTS FURNISHED WITH BRACKET	INTENDED USE	RESTRICTED USE
7F and No. 152A Capacitor	44A (MD) or 44B (Fig. 14)	(2) Screws to mount buzzer and 152A cap. (2) Screws for mounting bracket	All 500 Series Tel Sets	44A (MD) bracket not for use with 540-, 560-, and 592-type tel. sets
7F	60A*	(2) Screws to mount buzzer to bracket	168-type Backboard	
7F, KS-8108L2, KS-8109L2, or KS-8110L2	65A †	(2) Buzzer mounting screws (2) Insulating washers	600 Series CALL DIRECTOR sets	Not for use in 636-, 637-, 638-, and 639-type
KS-8108L2, KS-8109L2, KS-8110L2, KS-20419L1, or KS-20419L2	70B ‡	(2) Buzzer mounting screws	500 or 2500 Series Tel Sets	Not for use in 500- or 2500-Series sets E/W exclusion switch §
7F, KS-8108L2, KS-8109L2, KS-8110L2, KS-20419L1, or KS-20419L2	71A †	(2) Nylon buzzer mounting screws (2) Insulating washers	636-, 637-, 638-, and 639-Type CALL DIRECTOR sets	Mount 7F buzzer (less cover)
9A	219B¶	(3) Screws to mount buzzer to adapter plate 11C conn blk	Create 9B buzzer for 322C-03 telephone set	
	220A ¶	(3) Screws to mount buzzer to adapter plate	Create 9C buzzer for No. 14 local test desk	

* The mounting screws used to secure the 168-type backboard also hold the 60A bracket (Fig. 16).

† The 65A (Fig. 14) and 71A (Fig. 15) mount on the dial mounting plate with a dial mounting screws.

‡ 70B bracket mounts astride ringer coil and is fastened with the same screws that hold core to ringer frame. The spade-tipped leads on F terminal contact with the buzzer case. Boss is also provided on the 70B bracket to ensure adequate clearance.

§ Where both ringer and buzzer signals are needed in these sets replace the C4A ringer with an H1A ringer. Mount KS-type buzzers per (Fig. 10 and 11).

¶ Adapters.

3.05 When mounting KS-8108, KS-8109, and KS-8110 type buzzers on a 70B bracket (Fig. 12) position the buzzer so that it will not interfere with the electrical or mechanical operation of the telephone set, and so the buzzer adjustment screw is accessible.

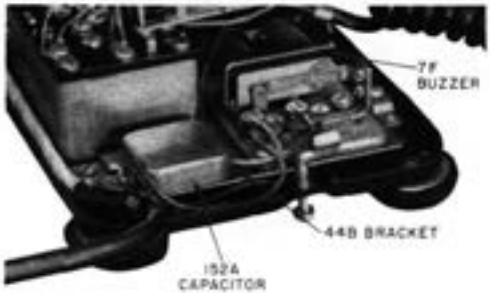

Fig. 13—7F Buzzer and 152A Capacitor Mounted on 44B Bracket

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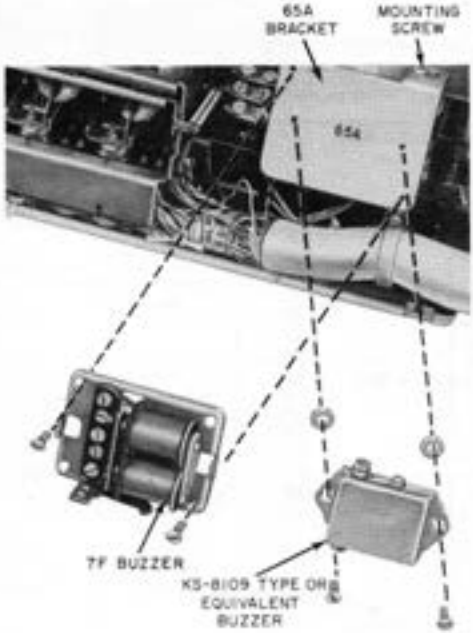

Fig. 14—65A Bracket

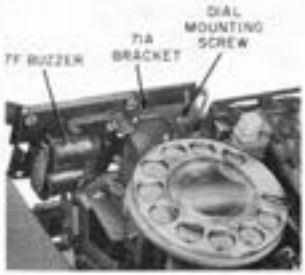

Fig. 15—71A Bracket

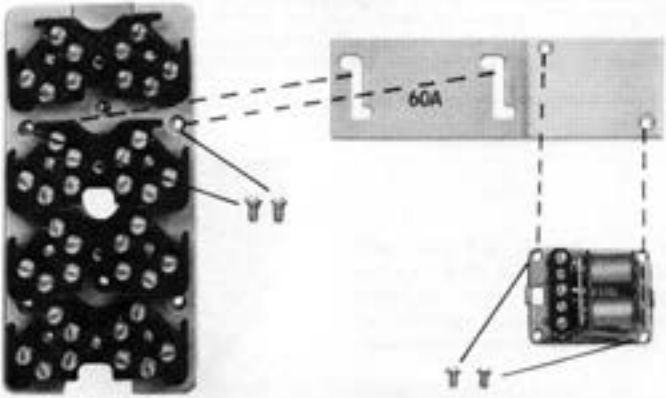

Fig. 16—60A Bracket

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4. MAINTENANCE

4.01 Buzzer and bell failure is usually due to one or more of the following:

- Dirty contacts or gummy parts
- Loose connections or poorly soldered terminals
- Insufficient airgap between armature and pole face at hinged end
- Excessive or insufficient armature spring tension
- Armature out of parallel with pole faces.

4.02 Clean buzzers and bells as follows.

(1) Brush out interior with No. 7 sash tool or equivalent.

(2) To clean point between armature tension spring and armature tension spring stop, insert strip of Bell Seal bond or other approved cleaning paper between points, and withdraw while pressing them together.

(3) Repeat operation until clean paper shows no sign of dirt.

(4) Burnish contacts with 265C tool.

4.03 Buzzers and bells are shop adjusted to operate within the voltage ranges as shown in Table A. Check circuit voltage and if necesary correct.

4.04 Inspect signal for loose connections or poorly soldered terminals.

4.05 There must be a perceptible airgap between armature and pole face at hinge end on 7-type buzzers and bells when the armature stop disc is against other pole face.

4.06 Insufficient armature airgap may be corrected on 7-type buzzer and bell as follows.

(1) Loosen armature mounting screws, when provided, and slightly shift armature away from pole faces.

(2) If necessary, turn armature until parallel, then tighten armature mounting screws securely. (Contact of spring must fall wholly within contact disc on armature.)

4.07 Buzzers and bells of later manufacture have armature fastened with rivets instead of screws. To adjust this type, grip armature spring at a point near rivets with long-nose pliers, and bend armature slightly away from pole face.

4.08 After adjusting armature, check armature travel and spring tension. Adjust as outlined in paragraphs 4.09 and 4.11.

4.09 Excessive armature travel may be checked by placing tip of long-nose pliers slightly against armature, moving armature nearer poles face. If this improves tone, reduce armature travel by adjusting back contact spring toward the armature with long-nose pliers. Check contact separation.

4.10 The contact separation of buzzer and bell operated on direct current is approximately 0.005-inch when armature is held manually against pole face. Adjust as required by applying a No. 363 spring adjuster close to base of the spring as shown in Fig. 18. Give adjuster a slight twist in direction desired. Take care not to kink spring.

Fig. 17—Adjusting Armature Tension Spring, 7-Type Buzzer

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Fig. 18—Adjusting Armature Spring, 7-Type Buzzer

4.11 Armature spring tension may be adjusted as follows.

(a) To increase tension, place long-nose pliers on armature tension spring as shown in Fig. 17 and adjust spring in direction away from coils. This will raise sound pitch of buzzer.

(b) To decrease tension, adjust spring in direction toward coils. This will lower sound pitch of buzzer.

(c) Retain airgap between armature and pole face near hinge.

Caution: Do not adjust armature spring stop, as this may adversely affect the buzzer or bell operation.

(d) After adjusting, see that armature tension spring rests against armature tension spring stop when armature is in unoperated position (Fig. 17).

Fig. 19—Adjusting Clapper Movement, 7-Type Bell

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4.12 When in place, the cover must not make contact with armature or its mounting bracket. If cover is not held snugly in place, adjust cover springs with long-nose pliers.

4.13 If 7-type bell armature vibrates satisfactorily, but the clapper does not strike gong or clapper arm strikes cover, adjust with long-nose pliers (Fig. 19).

4.14 Armature travel and contact separation of the KS-8108, KS-8109, and KS-8110 type buzzers are controlled by the adjustable contact screw which is provided.

4.15 The bias spring tension is a two position control on the 9-type buzzer. The bias spring is factory set in the high tension notch. Bias adjustment is made through opening in 64A gong.

4.16 Except for voltage adjustment the KS-20419L1 buzzer is maintenance free. ❮The KS-20419L2 needs only voltage and volume adjustment.❯

5. LIMITATIONS

5.01 The number of audible signals operated in multiple by a common pushbutton or 6021-type key is subject to limitations.

5.02 Relay equipment may be used to operate a number of audible signals in multiple. Do not exceed maximum load of relay contacts.

5.03 Buzzers or bells should be of the same type throughout a pushbutton and buzzer system.

2012A (MD), 2012C, or KS-16184 Transformer

5.04 Either a 2012A, 2012C, or KS-16184 transformer may be used for small pushbutton and buzzer systems requiring not more than 1/4 amp.

5.05 Where a common battery feeder is used for intercommunicating and signaling, connect a 23A KTU across the signal circuit (Fig. 20) for noise suppression.

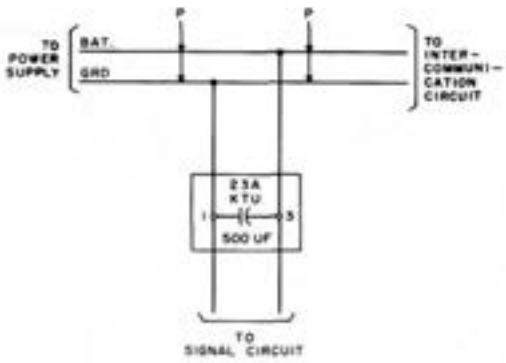

Fig. 20—Noise Suppression Filter Connections

6. CONNECTIONS

6.01 A simplified method of connecting buzzers, bells, and pushbutton keys is to be used on all systems. This method ensures the pairing of all key and buzzer leads throughout the system (Fig. 21 and 22).

6.02 Subsequent changes and additions may be made with a minimum of wiring changes.

6.03 Pairing of all leads will reduce the possibility of interference in adjacent talking circuits.

6.04 Where 7-type bells are connected to 60-cycle alternating current, bell operation may be more satisfactory if the dc terminals are used.

6.05 Connect 7-type buzzers or bells as shown in Fig. 23.

6.06 Where radio frequency induction is caused by a sparking buzzer or bell contact, operating power should be ac and connections should be to the ac terminals. A 152A capacitor should be used across buzzer contacts when power supply is dc (Fig. 23).

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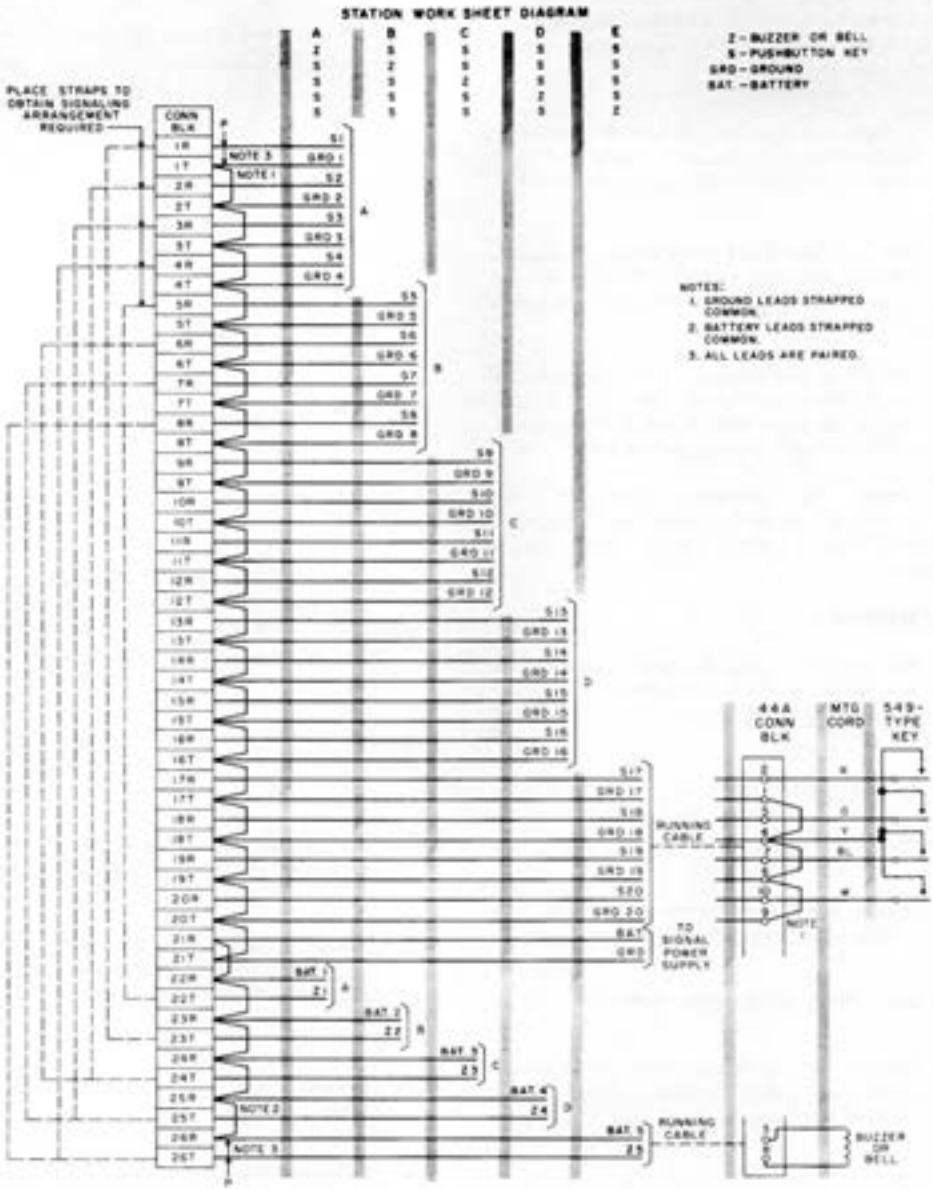

Fig. 21—Large Pushbutton and Buzzer System

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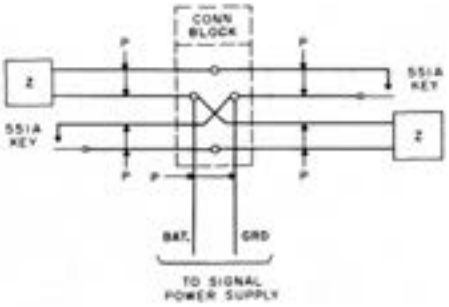

Fig. 22—Small Pushbutton and Buzzer System

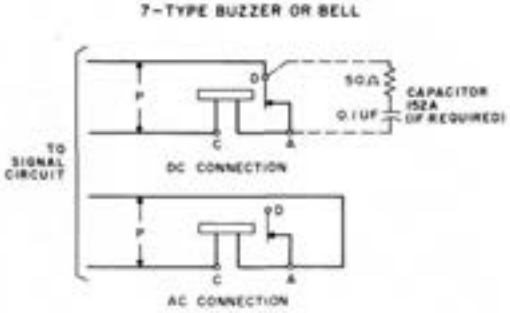

Fig. 23—AC and DC Connections

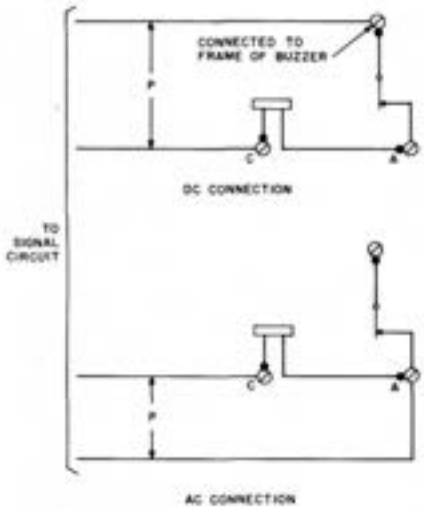

Fig. 24—KS-8108, KS-8109, and KS-8110 Type Buzzer Connections

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STATION TRANSFORMERS

IDENTIFICATION

1 GENERAL

1.01 This section contains information on station transformers.

1.02 This section is reissued to:

- Show KS-20426L3 transformer MD
- Revise Table A.

Danger: When providing power for illuminated station sets, two or more transformers should never feed the same inside wiring pair. If one transformer is unplugged while the secondary terminals of that transformer are being energized through the inside wiring, by another transformer, the exposed terminal blades of the unplugged transformer would be energized with 110 to 125 volts ac. Installations of multiple transformers connected to the same inside wiring pair should be avoided and corrected if encountered in the field.

Warning: Care should be taken to strip and dress leads connecting to low voltage output terminals of transformers and power unit to assure that inadvertent connection to conducting surfaces or other power source does not occur. If more than one transformer or power unit is plugged into a multiple receptacle power strip, there must be at least one inch separation between them. Only UL listed receptacle power strips with adequate power rating shall be used. Use of a continuous terminal power strip that allows the secondary output terminals of the transformer or power unit to be in close proximity to the ac line source is not recommended.

1.03 Locate transformers where they will be accessible for inspection and maintenance.

1.04 Transformers discussed in this section require a 110- to 125-volt ac power service outlet.

Make sure that power service outlet is not under control of a switch.

1.05 To prevent accidental removal, power cords may be fastened to the ac outlet with a power-cord plug-retainer assembly (Section 167-400-210) and plug-in transformers may be secured with a clamp. A clamp is furnished with some of the KS-20426L3 (MD) transformers, others have a molded mounting tab. A retaining clamp is available for the 85B1 and 95B1 power units. The 2012-type transformer may be secured with a 2A clamp.

1.06 The B cord clip (size 1) provides a means of attaching D station wire to station transformers to prevent the wire being accidentally pulled from the transformer screw terminals.

1.07 The B cord clips come 10 to a package and should be ordered as follows:

1 package (10 clips per package)—Clip, Cord, B1-61.

1.08 Remove protective paper from adhesive of B cord clip and stick clip to bottom of station transformers as shown in Fig. 3. Terminate D station wire on screw terminals of 2012-type transformer and hook station wire through B cord clip as shown in Fig. 3.

NOTICE
Not for use or disclosure outside the
Bell System except under written agreement

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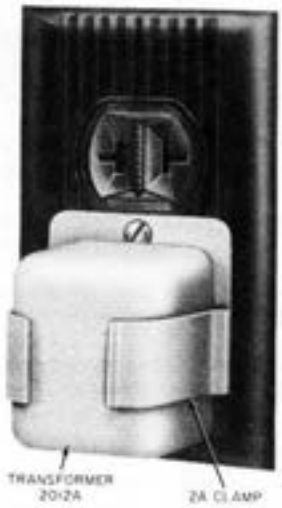

Fig. 1—2A Clamp

2A clamp with 2012-type transformers having folded blade type prongs will normally not be necessary.

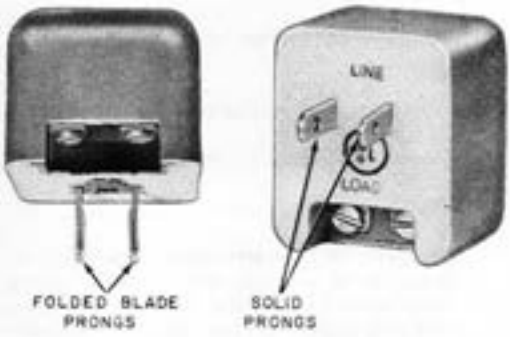

Fig. 2—2012-Type Transformer, Prongs

2. 2012-TYPE TRANSFORMER

Danger: For safety, securely attach retaining clamp to ac outlet using outlet cover screw BEFORE attempting to install 2012-type transformer. See Fig. 1. When removing 2012-type transformer always unplug unit completely from outlet BEFORE attempting to remove the retaining clamp. This will prevent the possibility of a loosened retainer clamp or metallic outlet cover making contact with the ac prongs of the 2012-type transformer when partially withdrawn from outlet. Do not use 2A clamp or similar retaining clamp on outlets where cover mounting screw holds the duplex outlet in the box.

2.01 A 2A clamp may be used to secure the 2012-type transformer to a standard electrical service outlet (Fig. 1) in those locations where the transformer is subject to being accidentally dislodged from the receptacle.

The 2012-type transformers manufactured after April 1969 have folded blade-type prongs (Fig. 2), which have improved retaining characteristics. Use of the

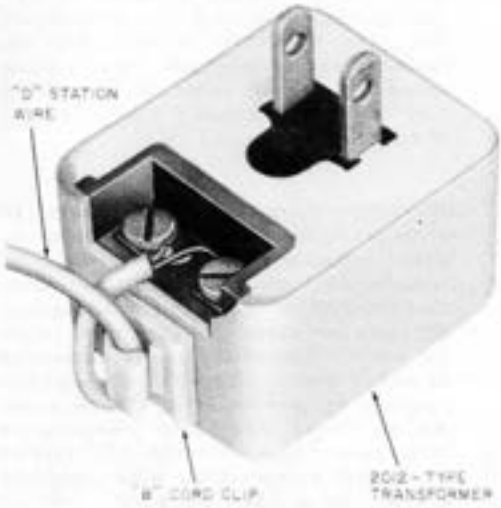

Fig. 3—Cord Clip Used to Secure Station Wire to Transformer

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2.02 The 2A clamp is available in Light Olive Gray (-49) and Ivory (-50).

A. 2012A (MD) or 2012C Transformer

Any number of TRIMLINE® telephone sets per residence along with one PRINCESS® telephone set may be powered from one 2012A or 2012C transformer. However, only one PRINCESS telephone set can be connected to a 2012A or 2012C transformer. When installing multiple PRINCESS sets use KS-20426L3 transformer or provide an additional 2012A or 2012C transformer for each telephone set.

2.03 The 2012C is equivalent to and a direct replacement for the 2012A (MD) transformer.

2.04 The 2012A or 2012C (Fig. 4 or 6) transformer supplies power for telephone sets with dial night light feature and is available in Light Olive Gray (-49) or Ivory (-50).

Do not use 2012A or 2012C transformer to power 3-type (MD) speakerphone systems or TOUCH-A-MATIC® 16 telephone sets.

2.05 Prongs for the primary terminals are provided so that transformer can be mounted in a standard parallel-blade convenience receptacle. Screw terminals are provided for secondary winding in a recess on the same side of apparatus as the prongs.

2.06 With 115-volts, 60 Hz applied to the primary winding, the secondary winding delivers approximately 7 volts at 0.250 amp.

2.07 A 25-foot telephone set mounting cord is not recommended because the added resistance of this cord results in decreased illumination.

B. 2012B (MD) or 2012D Transformer

2.08 The 2012D is equivalent to and a direct replacement for the 2012B transformer.

2.09 The 2012B or 2012D transformer (Fig. 5 or 7) is intended to supply power to TOUCH-A-MATIC 16 telephone sets, and the 55A or 55B control unit in 3-type (MD) speakerphone systems and is available in Light Olive Gray (-49) or Ivory (-50). The length of wire between the transformer and the control unit should not exceed 100 feet of standard inside wire.

Do not use 2012B or 2012D transformer in place of a 2012A or 2012C transformer.

2.10 Prongs for the primary terminals are provided so that the transformer can be mounted in a standard parallel-blade convenience receptacle. Screw terminals are provided for secondary winding in a recess on the same side of apparatus as the prongs.

2.11 With 115 volts, 60 Hz applied to the primary winding, the secondary delivers approximately 17 volts at 0.132 amp.

2.12 A sustained short circuit across the secondary of the 2012D for 10 to 15 minutes will cause the transformer to go open and remain that way. This is a self-protecting fail safe feature to prevent transformer overheating.

2.13 The 2012D transformer will be manufactured with back plates in a contrasting color from the case. The visual difference is provided to aid in preventing mixing and misuse with 2012A and 2012C transformers.

Fig. 4—2012A Transformer

3. KS-16886L2 TRANSFORMER

3.01 The KS-16886L2 transformer (Fig. 8) is primarily intended as the centralized power

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Fig. 5—2012B Transformer

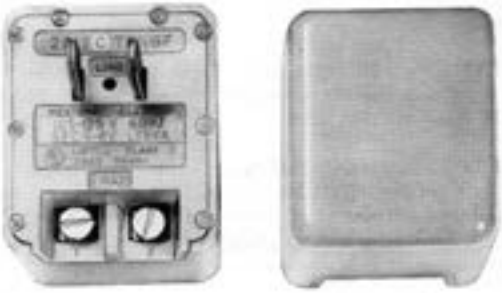

Fig. 6—2012C Transformer

supply for multiphone dial light installations and home interphone systems requiring approximately 6 volts. It is capable of handling up to ten dial light stations. Additional taps at 10.5, 24.0, and 25.5 volts are also provided for other possible uses. This transformer is self-protecting with an automatic reset thermo switch.

3.02 Overall dimensions of the transformer are 2-3/4 by 3-3/4 by 2-3/4 inches. Power cord is 18 inches long and terminates in a 2-pronged plug. Weight is approximately 1-1/2 pounds.

3.03 Keyhole slots provide easy installation. Use a suitable backboard when mounting on surfaces requiring backboards.

The exposed low-voltage terminals are not hazardous and short circuits across these terminals will not damage the KS-16886L2 transformer. However in instances where frequent customer contact may result in short circuits that will affect service, the transformer may be mounted in a 105C (plastic) apparatus box.

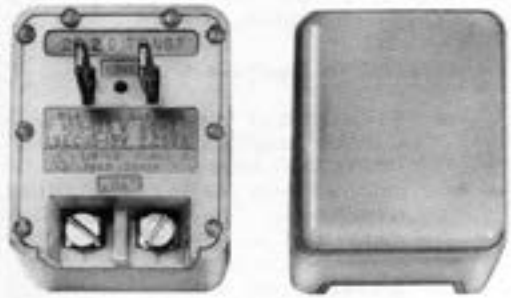

Fig. 7—2012D Transformer

4. KS-16940L1 VOLTAGE REGULATING (V.R.) TRANSFORMER

4.01 KS-16940L1 V.R. transformer (Fig. 9) is primarily for use as centralized dial light power source to provide regulated power for dial lights and night lights on telephones. It will power 30 dial light telephone sets.

4.02 Input is provided with a 2-foot 3-conductor power cord and plug. The ground prong of the plug is connected internally to the transformer case. The output is isolated from the input and the case and is terminated in two low voltage terminals on the case.

4.03 Output taps of 6.3 and 8.0 volts are located on back of cover as shown in Fig. 10. The transformer is shipped with movable lead connected to 6.3-volt tap.

4.04 The 8-volt tap should be used to provide illumination for PRINCESS telephone sets.

4.05 To change connection to 8.0-volt tap.

(1) Remove plug from power outlet, if connected.

(2) Remove two screws holding cover to case.

(3) Remove cover.

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TABLE A

TRANSFORMER APPLICATION (NOTE 1)

TRANSFORMER	APPLICATION	PARAGRAPH NO.
2012A (MD) or 2012C	For dial light in the TRIMLINE telephone set. For dial-night light in the PRINCESS telephone set.	2.03 thru 2.07
2012B (MD) or 2012D	Power supply for TOUCH-A-MATIC 16 telephone set, and for 55A or 55B control unit in 3-type (MD) speakerphone system	2.08 thru 2.13
KS-16886L2	For centralized power supply for multiphone dial light installations and home interphone systems requiring approximately 6 volts, capable of handling up to ten dial light stations	3.01 thru 3.03
KS-16940L1	For centralized regulated power supply for up to 30 dial and night lights in telephone sets	4.01 thru 4.07
KS-20426L3 (MD) (Note 2)	For centralized power supply mounted in a 2-wire receptacle, will power five dial light telephone sets	5.01 thru 5.04
2075A	Supplies power (15 to 18 volts) for the 41A dial in 660-, 662-, 663-, and 664-type telephone sets	8.01 thru 8.03
2186A (MD) or 2189A	Supplies power for the 700A and 700B subscriber sets	9.01 thru 9.06
KS-5714-Type (MD)	To operate bells, buzzers, and lamps on station systems when the circuits are arranged to supply this load separately	10.01 thru 10.03
KS-21239L6	To furnish power for the 24A-type line status indicator	11.01 thru 11.03
85B1 Power unit	To furnish ac power for the 4A speakerphone system	12.01 thru 12.03
95B1 Power unit	To furnish power for the TOUCH-A-MATIC 32 telephone set	13.01 thru 13.03

Note 1: These transformers are to be used only for the application indicated in this table. Do not substitute one transformer for another.

Note 2: Do not use the KS-20426L3 (MD) transformer manufactured by Ault Inc. Use only the KS-20426L3 (MD) manufactured by other suppliers.

(4) Change movable lead from 6.3-volt tap to 8.0-volt tap.

4.06 Overall dimensions of the transformer are 7-5/8 by 2-15/16 by 3-5/8 inches. The weight is approximately 5-1/2 pounds.

4.07 Four 1/4-inch holes are provided on the case for mounting. Use a suitable backboard for mounting on surfaces requiring backboards.

An adapter is needed to plug power cord into a parallel-blade ac outlet which does not have a grounded receptable to accommodate a three prong plug. The spade-tipped wire on the adapter should be connected to the outlet plate screw. Do not cut off the ground prong on plug.

5. KS-20426L3 (MD) (FIG. 12) TRANSFORMER

Danger: All KS-20426L3 (MD) transformers manufactured by AULT, INC., are being recovered from the field. The transformers should be located and recovered on any customer premises visit (installation, repair modular conversion activity, etc.) and returned without delay to the local Western Electric Service Center. When removing and replacing the KS-20426L3 (MD) (AULT) transformer, the unit SHOULD NOT be unplugged and then plugged back into the associated ac power outlet, since the stability of the transformer could be affected by such action. See Fig. 11 for the manufacturer's identification marking on the transformer. This recovery plan does not apply to AULT, INC.,

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Fig. 8—KS-16886L2 Transformer

Fig. 9—KS-16940L1 V.R. Transformer

KS-20426L1 (MD) transformer or the KS-20426L3 (MD) transformers manufactured by other suppliers.

5.01 The KS-20426L3 transformer (Fig. 12) (not manufactured by AULT, INC.) is intended for use in light systems and is mounted in a 2-wire receptacle. It will power five dial light telephone sets.

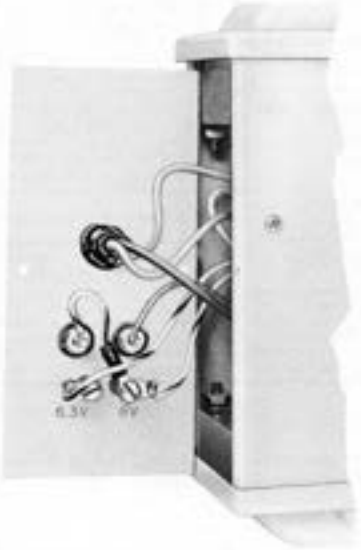

Fig. 10—Movable Lead Connected to 8-Volt Tap, KS-16940L1 V.R. Transformer With Cover Open

5.02 The transformer is self-protecting with an automatic thermo switch and is provided with primary terminals in the form of parallel blades which serve as the mounting device. If furnished, the clamp (Fig. 13) must be used to hold the transformer securely in the receptacle.

Danger: For safety, securely attach retaining clamp to ac outlet using outlet cover screw BEFORE attempting to install transformer. See Fig. 13. When removing transformer, always unplug the power unit completely from the outlet BEFORE attempting to

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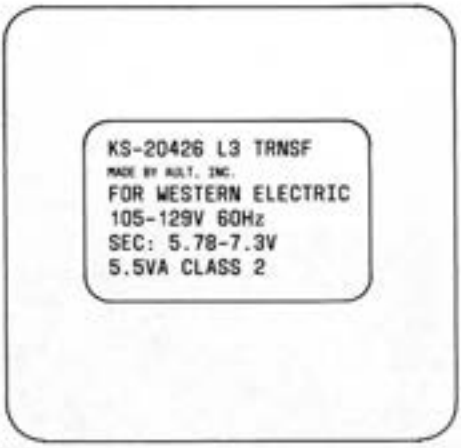

Fig. 11—KS-20426L3 (MD) Transformer Manufactured by AULT, INC.

Fig. 12—KS-20426L3 (MD) Transformer Not Manufactured by AULT, INC.

remove the retaining clamp. This will prevent the possibility of a loosened retainer clamp or metallic outlet cover making contact with the ac prongs of the transformer when partially withdrawn from outlet. Do not use transformer retaining clamps on outlets where the cover mounting screw holds the duplex outlet in the box.

5.03 Some transformers are provided with a mounting tab which is used to hold the transformer securely in the receptacle by using the outlet cover screw. See Fig. 14.

Danger: Do not use a KS-20426L3 (MD) transformer equipped with a mounting tab if ac outlet has a metal cover or if center cover mounting screw holds the duplex outlet in the box.

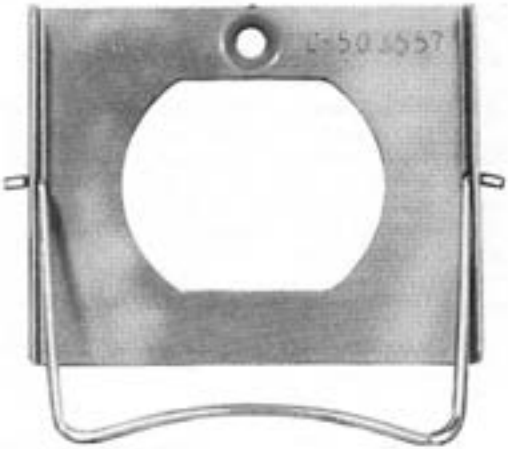

Fig. 13—Clamp for Mounting Early Version KS-20426L3 (MD) Transformer Not Equipped With Molded Mounting Tab

5.04 Recessed screw-type secondary terminals are provided on the same side of the apparatus as the primary terminals. With 115 volts, 60 Hz applied to the primary winding, the secondary winding delivers approximately 6.38 volts at 750 milliamperes.

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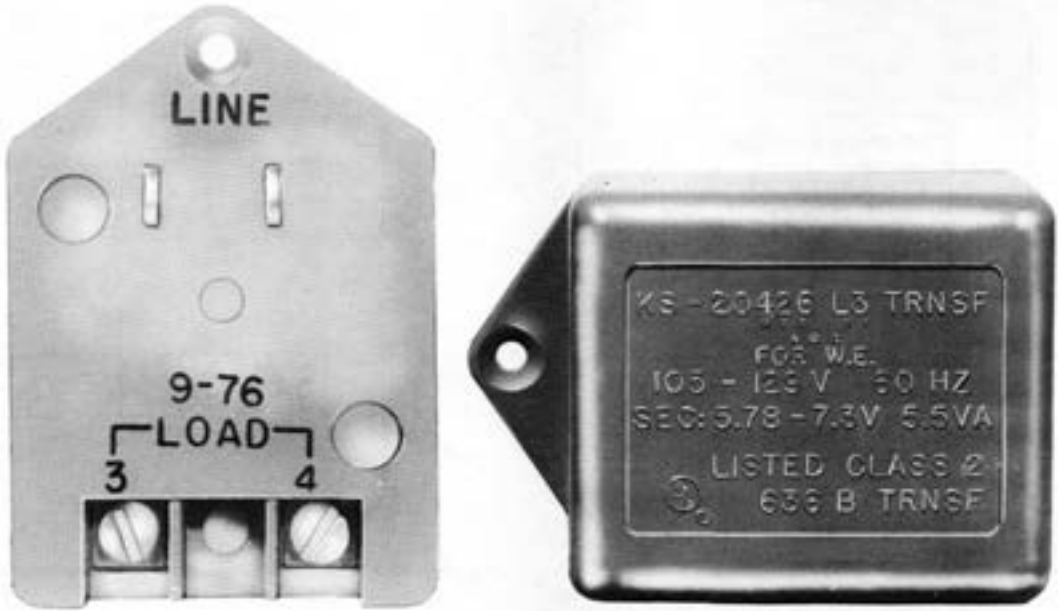

Fig. 14—KS-20426 Type (MD) Transformer Equipped With Molded Mounting Tab

6. LENGTHS OF FEEDER PAIRS

6.01 Table B is to be used as a guide only. After the installation of equipment is made, if illumination is reported as inadequate, then it must be assumed that the lengths of feeder pairs have been exceeded, or too many stations have been off-hook at one time. To remedy this situation do one of the following:

- Double up on the transformer feeder pairs
- Split the lamp load by adding a second transformer.

Danger: When providing power for illuminated station sets, two or more transformers should never feed the same inside wiring pair. Installations of multiple transformers connected to the same inside wiring pair should be avoided and corrected if encountered in the field.

Illumination should be to the customer's satisfaction.

7. MULTIPLE INSTALLATIONS

Caution: Do not exceed the rated lamp load of the transformer being installed (see Table B).

7.01 When a transformer is installed to illuminate more than one lamp, connecting blocks may be used to multiple the transformer feeder pairs. The number and type of connecting blocks required depends upon the number of lamps to be illuminated and their location relative to that of the transformer.

8. 2075A TRANSFORMER

8.01 The 2075A transformer (Fig. 15) supplies power (15 to 18 volts) for the 41A dial in the 660-, 662-, 663-, and 664-type telephone sets.

8.02 The transformer is equipped with an 18-inch power cord terminated in a 2-pronged plug.

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♦TABLE B♦

DIAL LIGHT
TRANSFORMER LIMITATION

TRANSFORMERS (NOTE 1)	MAXIMUM NUMBER OF DIAL LIGHT TEL SETS
2012A or 2012C	See Note 2 and Part 2
KS-20426L3(MD)	5
KS-16886L2*	10
KS-16940L1*	30

Note 1: Do not use common feeder where more than two sets may be dialed at the same time. Home runs from each set to the transformer provide best illumination. Illumination should be to customers satisfaction.

Note 2: Any number of incandescent TRIMLINE telephone sets per residence along with one PRINCESS telephone set may be powered from one 2012A or 2012C transformer. However, no more than one PRINCESS telephone set can be connected to a 2012A or 2012C transformer.

*Not recommended for single telephone installations.

Fig. 15—2075A Transformer

This plug fits a standard parallel-blade convenience receptacle.

8.03 Keyhole slots are provided at the rear of the transformer for each installation. Use a suitable backboard when mounting on surfaces requiring backboards.

9. 2186A (MD) OR 2189A TRANSFORMER

9.01 The 2189A is a recommended replacement for the 2186A (MD) transformer.

9.02 These transformers (Fig. 16 and 17) supply power for the 700A and 700B subscriber sets.

Fig. 16—2186A (MD) Transformer

9.03 These transformers are protected by an internal thermal overload safety switch which restores automatically. They are equipped with a 12-inch (2186A) or 11-inch (2189A) power cord connected to the primary winding. The secondary winding is terminated in screw terminals on the rear of the transformer.

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Fig. 17—2189A Transformer

9.04 With 117 volts, 60 Hz applied to the primary winding, the secondary delivers approximately 20 volts at 0.345 amp.

9.05 Keyhole slots are provided at the rear of the transformer for mounting purposes. Use the backboard furnished with the transformer on surfaces requiring backboards.

9.06 Attach backboard with appropriate fastening device depending on the type of mounting surface.

10. KS-5714 TYPE (MD) TRANSFORMER

10.01 The KS-5714 type transformer is used primarily to operate bells, buzzers, and lamps on station systems when the circuits are arranged to supply this load separately. It is furnished in a metal box with a removable cover. The box is approximately 8-3/4 inches long, 4-3/8 inches high, and 4 inches deep, and is arranged for wall mounting. This transformer is self-protecting and has no fuses.

10.02 The KS-5714L4 transformer supplies 15-volts at 2.2 amps.

10.03 The KS-5714L5 transformer supplies 15-volts at 1.1 amps.

11. KS-21239L6 TRANSFORMER

11.01 The KS-21239L6 transformer (Fig. 18) is used to furnish power for the 24A-type line status indicator.

11.02 The transformer is self-protecting with an automatic thermo switch and is provided with primary terminals in the form of parallel

Fig. 18—KS-21239L6 Transformer

blades which serve as the mounting means. Recessed screw-type secondary terminals are provided on the same side of the transformer as the primary terminals. Refer to Fig. 18 for electrical specifications.

11.03 Some transformers are provided with a mounting tab which is used to hold the transformer securely in the receptacle by using the outlet cover screw.

Danger: Do not use a KS-21239L6 transformer equipped with a mounting tab if ac outlet has a metal cover

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or if center cover mounting screw holds the duplex outlet in the box.

12. 85B1 POWER UNIT (FIG. 19)

Warning: Care should be taken to trim and dress leads connecting to low voltage output of 85B1 power unit to assure that inadvertent connections to conducting surfaces or other power source does not occur.

Warning: If more than one 85B1 and/or 95B1 power unit is plugged into a multiple receptacle power strip there must be at least one inch separation between the power units. Be sure the receptacle power strip is UL listed and rated sufficiently for the number of power units plugged in. Use of a continuous terminal power strip that allows the secondary output terminals of the transformer to be in close proximity to the ac line source is not recommended.

12.01 The 85B1 power unit is used to furnish ac power for the 4A speakerphone system. Available in Light Olive Gray (-49) only.

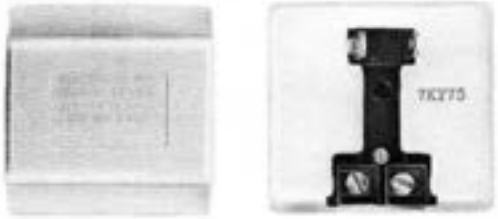

Fig. 19—85B1 Power Unit

12.02 The ac input to the unit is by means of two parallel blades for use in a standard two wire receptacle which serves as the mounting device. The ac output is available through screw terminals recessed in the plastic case. A retaining clamp (841050818) can be obtained for use with the 85B1 power unit where additional mounting strength is needed, see Fig. 20.

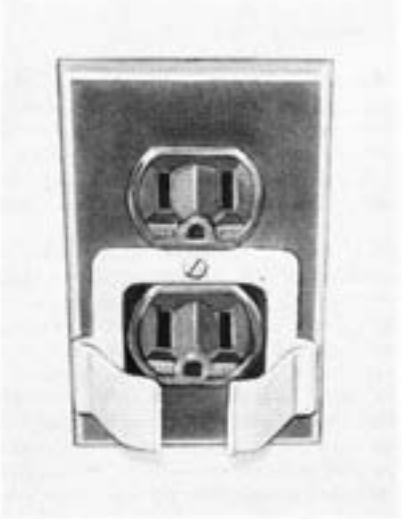

Fig. 20—841050818 Retaining Clamp Mounted on AC Outlet Box Using Outlet Cover Mounting Screw

12.03 With a line voltage of 105 to 129 volts, 60 Hz, the power unit provides an ac output of 17.5 volts minimum with a current load of 0.200 ampere. When used to power a system one 85B1 power unit is required with each 4A speakerphone.

Danger: For safety, securely attach retaining clamp to ac outlet using outlet cover screw BEFORE attempting to install 85B1 power unit. See Fig. 21. When removing 85B1 power unit, always unplug the power unit completely from the outlet BEFORE attempting to remove the retaining clamp. This will prevent the possibility of a loosened retainer clamp or metallic outlet cover making contact with the ac prongs of the 85B1 power unit when partially withdrawn from outlet. Do not use

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in 841050818 or similar retaining clamps on outlets where the cover mounting screw holds the duplex outlet in the box.

13. 95B1 POWER UNIT (FIG. 21)

Warning: Care should be taken to trim and dress leads connecting to low voltage output of 95B1 power unit to assure that inadverent connections to conducting surfaces or other power source does not occur.

Warning: If more than one 95B1 and/or 85B1 power unit is plugged into a multiple receptacle power strip there must be at least one inch separation between the power units. Be sure the receptacle power strip is UL listed and rated sufficiently for the number of power units plugged in. Use of a continuous terminal power strip that allows the secondary output terminals of the transformer to be in close proximity to the ac line source is not recommended.

13.01 The 95B1 power unit is used to furnish ac power for the TOUCH-A-MATIC 32 telephone set. Available in Light Olive Gray (-49) only.

13.02 The ac input to the unit is by means of two parallel blades for use in a standard two wire receptacle which serves as the mounting device. The ac output is available through screw terminals recessed in the plastic case. A retaining clamp (84105818) is available for use with the 95B1 power unit where additional mounting strength is needed, see Fig. 20.

13.03 With a line voltage of 105 to 129 volts, 60 Hz, the power unit provides an ac output of 13.0 volts minimum with a current load of 0.250 ampere. When used to power the TOUCH-A-MATIC 32 telephone set power supply one 95B1 power unit is required with each TOUCH-A-MATIC 32 telephone set.

Danger: For safety, securely attach retaining clamp to ac outlet using outlet cover screw BEFORE attempting to install 95B1 power unit. See Fig. 20. When removing 95B1 power unit, always unplug the power unit completely from the outlet BEFORE attempting to remove the retaining clamp. This will prevent the possibility of a loosened retainer clamp or metallic outlet cover making contact with the ac prongs of the 95B1 power unit when partially withdrawn from outlet. Do not use in 841050818 or similar retaining clamps on outlets where the cover mounting screw holds the duplex outlet in the box.

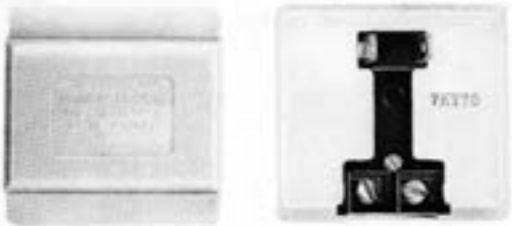

Fig. 21—95B1 Power Unit

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1200AR1 AND 1200AT1 "TOUCH-A-MATIC®" 12 AUTOMATIC DIALER IDENTIFICATION, INSTALLATION, CONNECTIONS, OPERATION, AND MAINTENANCE

1. GENERAL

1.01 This section contains information on the TOUCH-A-MATIC 12 automatic dialer (Fig. 1 and 2), coded 1200AR1 and 1200AT1 dials. Information on the 1200AR1 dial was formerly found in Section 501-164-204.

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits specified for Class B computing devices persuant to Subpart J of Part 15 of Federal Communications Commission (FCC) Rules, which are designed to provide reasonable protection against such interference when operated in a commerical environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at their own expense will be required to take whatever measures may be required to correct the interference.

1.02 The reasons for reissuing this section are listed below. Since this reissue is a general revision, no revision arrows have been used to denote significant changes.

- Add warning notice in compliance with FCC ruling, paragraph 1.01
- Include information on 1200AR1 dial.

1.03 These dialers are factory-wired to interface with a modular single line or two line (first line only) telephone set. The 1200AR1 dial is used for rotary or TOUCH-TONE® service, and the 1200AT1 dial is used only with TOUCH-TONE service. These dialers cannot be used where A lead control is required, but can be used on party-line service.

1.04 These dialers are available in the colors shown in Table A. The faceplate provided with each dialer is silver.

Fig. 1—1200AR1 Automatic Dialer and Associated Rotary Service Telephone Set

2. IDENTIFICATION

2.01 Each dialer provides automatic dialing of up to 12 numbers. A number up to 16 digits in length can be stored.

2.02 Design features are as follows:

- Modular unit.
- Solid-state circuit memory.
- Will automatically dial 12 stored numbers.

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Fig. 2—1200AT1 Automatic Dialer and Associated TOUCH-TONE Service Telephone Set

- Will store up to 16 digits per number.
- Capability to record, change, or delete numbers in memory.
- Single button dialing and directory space for each number.
- Has an internal S1 sounder unit which provides tones for dialing, indicating proper recording procedures, and for checking the battery.
- Battery powered (customer replaceable).
- Recording can be done with handset on- or off-hook. Off-hook recording does not interfere with conversation.
- Record button protected during normal use by faceplate to prevent inadvertent erasure of stored numbers.
- Can be used as a data input device for end-to-end signaling (1200AT1 only).

2.03 Operating features are as follows:

(a) 12-button memory field with low force, short travel, nonlocking buttons

(b) RECORD ON/OFF button (top button when faceplate is removed), when momentarily depressed places dialer in the record mode, subsequent operation terminates the recording mode.

2.04 Ordering guide is as follows:

(a) The 1200AR1 dial is a modular type dialer and may be ordered as follows:

(1) Dial, 1200AR1- (refer to Table A for color suffix) which includes the following:

(a) Faceplate, 1200A1-122 (silver)

(b) Customer Instruction Booklet, CIB-2502

(c) Battery, KS-21618L2 (9-volt)

(d) Cord, Mounting, D4BU-29 (2-foot)

(e) 841386352 Directory Marker (color dots and emergency symbols)

(f) 841397938 Directory Sheet (double-sided).

(b) The 1200AT1 dial is a modular type dialer and may be ordered as follows:

(1) Dial, 1200AT1- (refer to Table A for color suffix) which includes the following:

(a) Faceplate, 1200A1-122 (silver)

(b) Customer Instruction Booklet, CIB-2502

(c) Battery, KS-21618L2 (9-volt)

(d) Cord, Mounting, D4BU-29 (2-foot)

(e) 841386352 Directory Marker (color dots and emergency symbols)

(f) 841396559 Directory Sheet (double-sided).

(c) Replaceable components are as follows:

- Alkaline Battery, 9-volt (subscriber replacement only)
- Cord, Mounting, D4BU-29 (2-foot)
- Faceplate, 1200A1-122 (silver)
- 841397938 Directory Sheet (double-sided), 1200AT1

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- 841397559 Directory Sheet (double-sided), 1200AR1
- Cover, Battery (Table A).

TABLE A

COLOR ORDERING GUIDE

COLOR	SUFFIX	BATTERY COVER
Black	-03	841399264
Ivory	-50	841399272
Green	-51	841399280
Red	-53	841399298
Yellow	-56	841399306
White	-58	841399256
Beige	-60	841399314
Blue	-62	841399322
Brown	-104	841399330
Rust	-124	841399348

3. INSTALLATION AND CONNECTIONS

3.01 There are two types of installations: standard and special.

A. Standard Installation

3.02 Assure that the CO line is terminated into a connecting block which will accept a standard modular D4BU mounting cord.

3.03 These dialers are shipped with a 9-volt alkaline battery which is to be connected at the time of installation. Remove the battery cover located on bottom side of dial and make the necessary connection (Fig. 3). The battery should last a year under normal telephone usage.

> ***Note:*** All subsequent batteries will be provided and installed by the subscriber. If service is discontinued, disconnect and discard the battery.

> ***Caution: If the mounting cords are reversed at the dialer, you cannot break dial tone from the dialer.***

3.04 Plug one end of the standard D4BU mounting cord into LINE jack located under battery

Fig. 3—Location of Battery and Cords

cover of the dialer and other end into connecting block from central office (CO). Plug one end of the 2-foot D4BU telephone set mounting cord (furnished with the dial) into the PHONE jack on dialer and plug other end of the cord into the telephone set mounting cord jack (Fig. 4 or 5).

3.05 Dress the two (2) cords flatwise in the cord channel under the cord retaining tab and replace the battery cover (Fig. 3).

3.06 For proper illumination of incandescent dial lamp in associated telephone set, the total length of modular mounting cords may be limited. Refer to Section 502-303-101 for TRIMLINE* telephone sets and Section 502-703-101 for PRINCESS* telephone sets.

B. Special Installation

3.07 If an RJ32X USOC arrangement using a 635A manufacture discontinued (MD) or 635B connecting block is available, the dialer can be directly connected using a D8AA mounting cord from the con-

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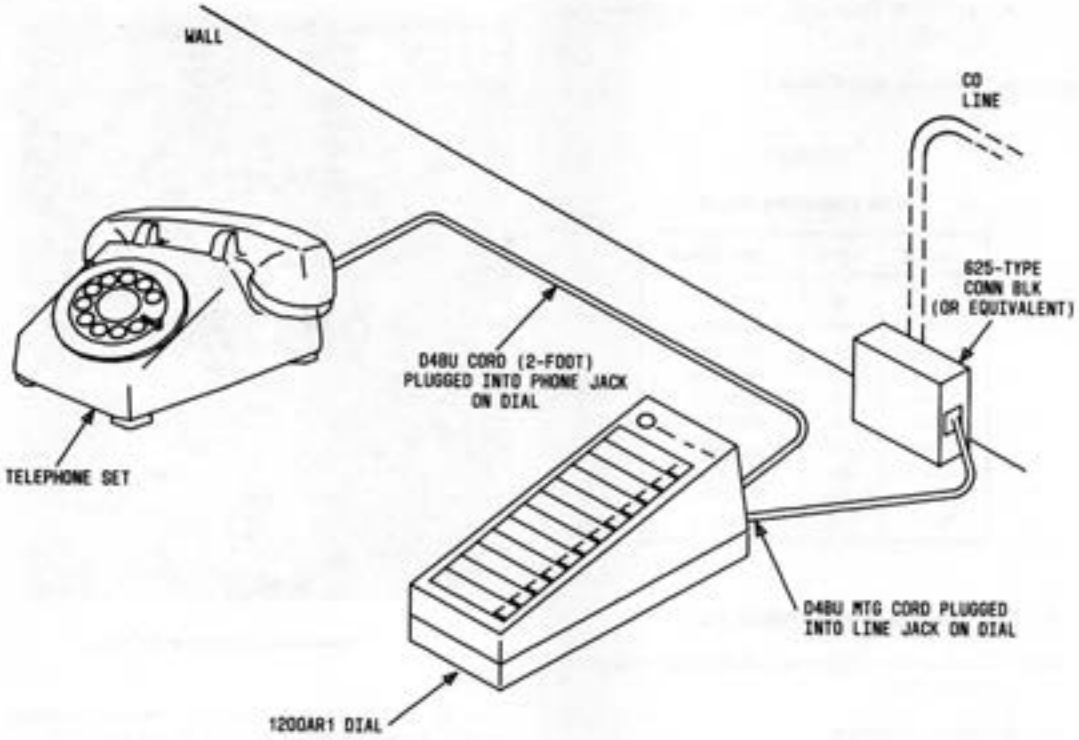

Fig. 4—Recommended Installation Using 1200AR1 Dial

necting block to the line jack on the dial. This arrangement provides a series tip and ring connection through the connecting block. Refer to Section 463-400-130 for additional information.

C. Installation Test

Associated Telephone Set

3.08 Manually dial the appropriate code for ringback to test the telephone set ringer and to check that the telephone operates properly.

Automatic Dialer (1200AR1)

3.09 To test the 1200AR1 dialer, proceed as follows.

(1) Record a known telephone number into each of the 12 memory locations (see paragraph 4.02).

(2) Dial a prerecorded number from memory by lifting the handset and listening for dial tone; then depress the desired memory button on the dialer. The dialer does not mute the handset receiver and the signals outpulsed should be heard in the receiver.

Automatic Dialer (1200AT1)

3.10 To test the 1200AT1 dialer, proceed as follows.

(1) Record digits 1 through 9, *, 0, and # into first memory location (see paragraph 4.02).

(2) From the subscribers telephone set, manually dial CO dial test and ringer circuit.

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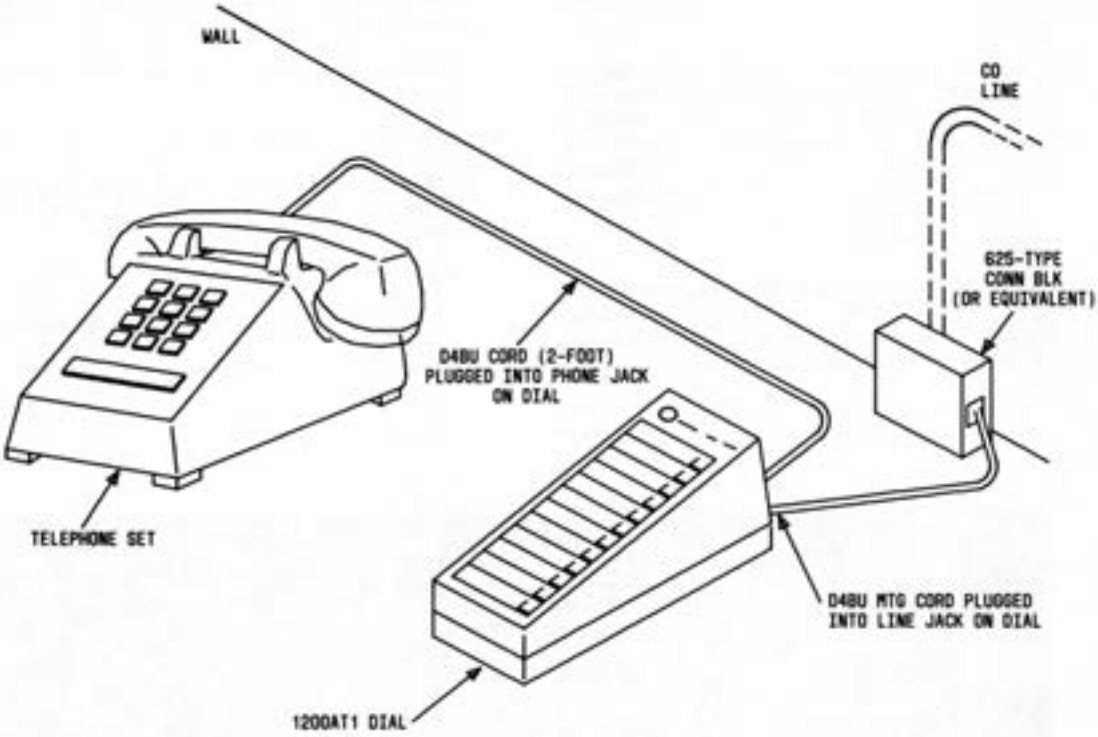

Fig. 5—Recommended Installation Using 1200AT1 Dial

(3) Depress the first memory button (where test information was recorded); verify that correct signal is returned from CO.

4. OPERATION

4.01 The buttons on the dialer serve a dual purpose as follows:

(1) To select memory locations

(2) To be used as specific digits when recording a telephone number.

A. To Record a Number Into Memory

4.02 Perform the following operations in sequence.

(1) Remove the dialer faceplate (Fig. 6 or 7) using fingernail in slot at top.

(2) Remove the directory sheet and write or type the desired name(s) and number(s). Replace the directory sheet on the dialer.

Note: The self-adhesive color dots and emergency symbols are furnished with the dialer so that the customer can place them on the directory sheet to emphasize or highlight important telephone numbers.

(3) Momentarily depress the RECORD ON/OFF button (Fig. 8 or 9). A constant tone will be heard.

(4) Momentarily depress the memory button adjacent to the desired name listed on the direc-

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tory sheet. (A double interrupt of the tone will be heard.)

(5) Manually dial the desired number using the digit designations to the right of the memory buttons on dialer, ***not*** the dial of the associated telephone set. (The tone will interrupt momentarily as each digit is recorded.) A total of 16 digits can be recorded. If 16 digits are recorded, the dialer will beep three (3) times and automatically end the recording procedure.

If the dialer is inadvertently left in the record mode it will time out after about 1 minute, give three (3) beeps, and automatically reset.

(6) Momentarily depress the RECORD ON/OFF button. (The tone will cease and the dialer will be ready either for automatic dialing or to record another number into memory.)

(7) Replace the faceplate after all numbers have been recorded.

B. To Change a Number in Memory

4.03 When a new number is recorded in a previously used memory position it will automatically replace the previously stored number.

C. To Delete a Number From Memory

4.04 Perform the following operations in sequence.

(1) Remove the dialer faceplate.

(2) Momentarily depress the RECORD ON/OFF button.

Fig. 6—1200AR1 Dial With Faceplate and Directory Sheet Removed

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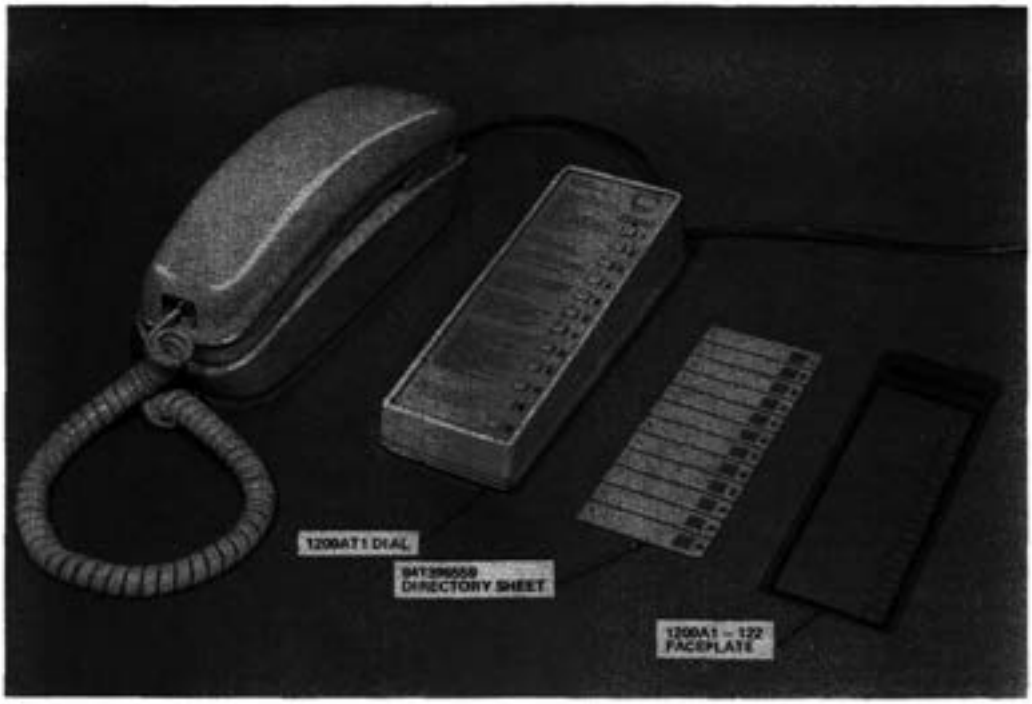

Fig. 7—1200AT1 Dial With Faceplate and Directory Sheet Removed

(3) Depress the memory button corresponding to the name and number to be deleted.

(4) Momentarily depress the RECORD ON/OFF button.

(5) Remove the name and number previously written or typed on the directory sheet.

(6) Replace the faceplate.

D. To Automatically Dial a Number From Memory

4.05 To automatically dial a number, perform the following.

(1) Lift the handset off-hook and listen for dial tone.

(2) Depress the desired memory button on the dialer.

5. MAINTENANCE

5.01 Maintenance is limited to replacement of mounting cord, faceplate, directory sheet, and battery cover.

Caution: Numbers stored in memory may be erased if battery is disconnected for longer than 1 minute during replacement.

5.02 The battery is to be replaced by the customer. Refer to instruction label (Fig. 8 or 9) or Customer Instruction Booklet (CIB) for detailed battery testing and replacement procedures.

5.03 If a dead battery is suspected, replace with a known good battery. If the new battery clears trouble, retrieve the test battery and inform the customer a new battery is required.

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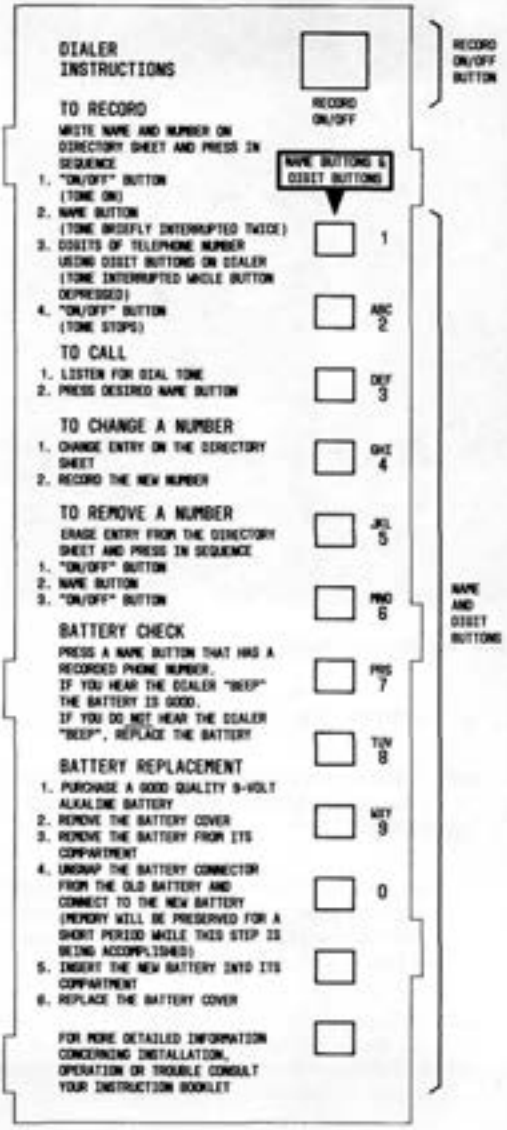

Fig. 8—Instruction Label (1200AR1 Dial)

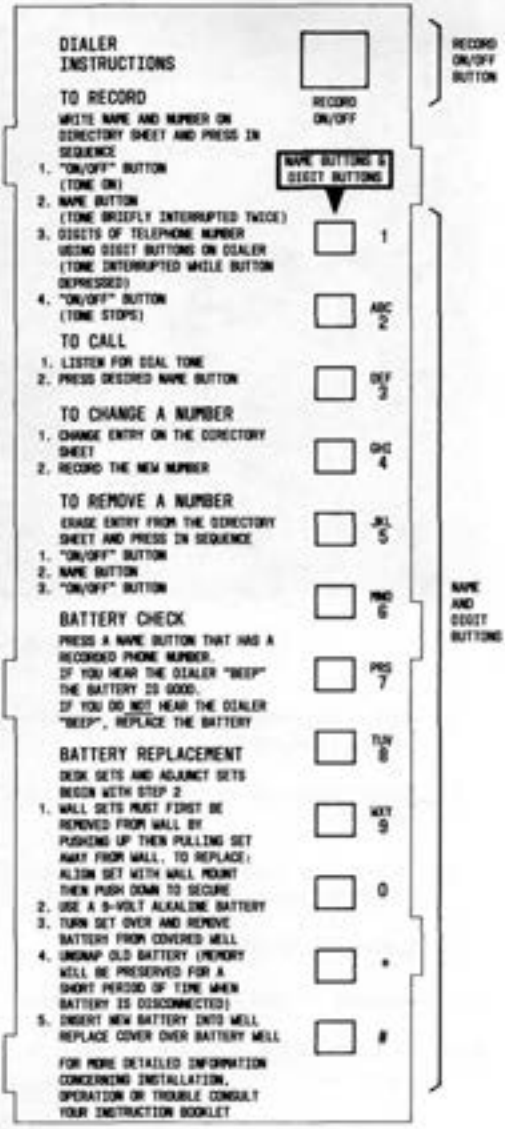

Fig. 9—Instruction Label (1200AT1 Dial)

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72-TYPE STATION DIALS

IDENTIFICATION, CONNECTIONS, AND MAINTENANCE

1. GENERAL

1.01 This section contains information on the 72C3A manufacture discontinued (MD), 72D3A (MD), and 72E3A (MD), 72H3A, 72J3A, and 72K3A dials (Fig. 1, 2, 3, and 4).

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add information on 72H3A, 72J3A, and 72K3A dials
- Show 72C3A, 72D3A, and 72E3A dials MD.

1.03 The 72C3A (MD) dial replaces the 35A3A, 35Y3A, and 35Y3D dials used in 2500- and 2554-type telephone sets. The 72D3A (MD) dial replaces the 35AH3D dial used in some DESIGN LINE* decorator telephones. The 72E3A (MD) dial replaces the 35BB3D dial used in TELSTAR* telephone (DESIGN LINE decorator telephone).

Before replacing a 35-type dial with a 72-type dial, determine if a polarity guard has been installed in conjunction with the 35-type dial. Where no polarity guard exists, remove the 35-type dial and refer to Table A for 72-type dial connections and handset cord jack lead connections. If a polarity guard exists, it must be removed and the telephone set wiring arranged to agree with the factory wiring before a polarity guard was installed. Refer to appropriate telephone set connection section in Division 502 for 2500- and 2554-type telephone sets and Division 503 for DESIGN LINE decorator telephone.

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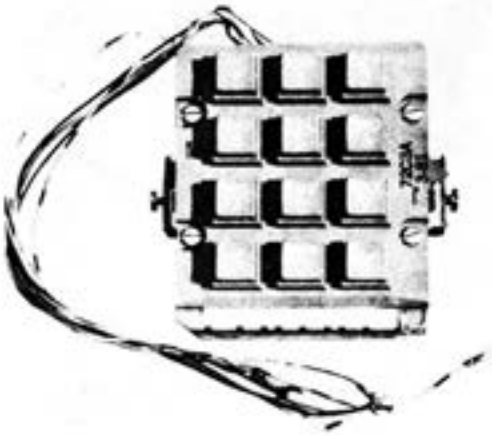

Fig. 1—▮72C3A (MD) Dial, Front View▮

1.04 ▮The 72H3A, 72J3A, and 72K3A dials replace the 72C3A (MD), 72D3A (MD), and 72E3A (MD) dials, respectively. These dials are similar except for the mounting brackets, switch plate, and printed circuit board materials used in manufacture.▮

2. IDENTIFICATION

A. Purpose

2.01 The 72-type dial is an electronically switched 12-button TOUCH-TONE† telephone dial. Ten of the pushbuttons are used for number or number and letter calling and two pushbuttons designated * and # are for special services.

B. Ordering Guide

2.02 Order dial as follows:

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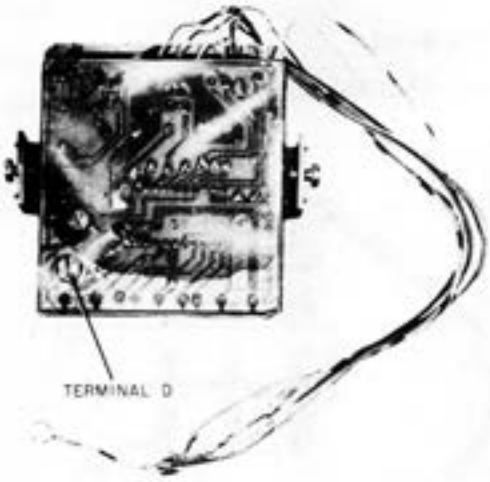

Fig. 2—◊72C3A (MD) Dial, Rear View◊

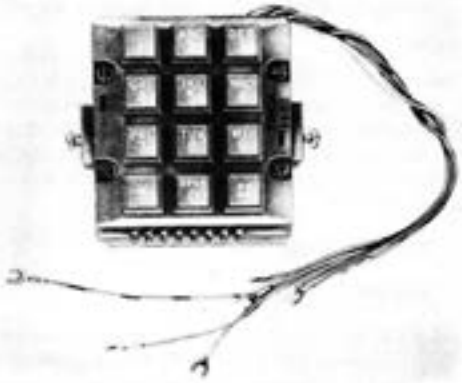

Fig. 3—◊72H3A Dial, Front View◊

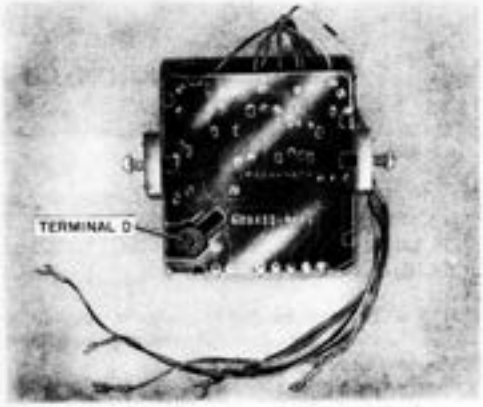

Fig. 4—◊72H3A Dial, Rear View◊

- Dial, ◊72H3A◊ (buttons and coverplate are gray, button graphics are white)
- Dial, ◊72J3A◊ (buttons and coverplate are white, button graphics are black)
- Dial, ◊72K3A◊ (buttons and coverplate are black, button graphics are white).

C. Design Features

2.03 Each of the pushbuttons, when operated, generates a dual tone multifrequency signal distinctive to that button. Figure 5 indicates the frequencies for each button. Both the signaling and common switch functions are provided by the 677F (Fig. 6) hybrid integrated circuit (HIC).

A feature that is recognizable to the user of this dial is the "feel" of the short travel button which operates a click dise switch similar to that used on many calculators.

2.04 The 72-type dial contains a polarity guard eliminating the possibility of improper operation due to line reversals.

2.05 Each dial has eight spade-tipped leads (Fig. 6) for connections to the telephone set network and one screw terminal (D) located on the back side

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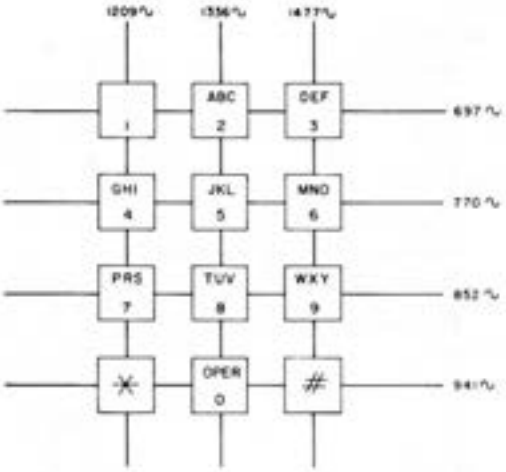

Fig. 5—72-Type Dial Frequencies

of the dial (Fig. 2) where a line switch lead terminates.

3. CONNECTIONS

3.01 Connect the 72-type dial and make the necessary telephone set wiring connections in accordance with Table A.

Note: Refer to READ in paragraph 1.03 before attempting to connect the 72-type dial.

4. MAINTENANCE

There are no field adjustments for the 72-type dial. Maintenance consists only of determining if the dial is defective.

4.01 To determine if a dial is defective, proceed as follows.

(1) Verify wiring for secure and correct connections.

(2) Check for presence of dial tone. If no dial tone is heard, make test with 1013A or equivalent hand test set across incoming CO line to telephone set. If dial tone is heard, make normal tests of telephone set components as described in appropriate sections.

(3) Break dial tone by dialing a digit as prescribed by local instructions. If unable to break dial tone, replace the dial.

(4) Check all buttons for tone feedback to the receiver. If feedback tones are not present, replace dial.

4.02 To test dial frequency and amplitude outputs, perform the following.

(1) Dial local number for testing TOUCH-TONE telephone dials, or dial local test desk and request access to the dial-test circuit.

(2) When second dial tone is heard, dial appropriate code for testing 12-button dials, dial digits 1 through 9, and then *, 0, and #.

4.03 Replace dial if it fails to meet the tests.

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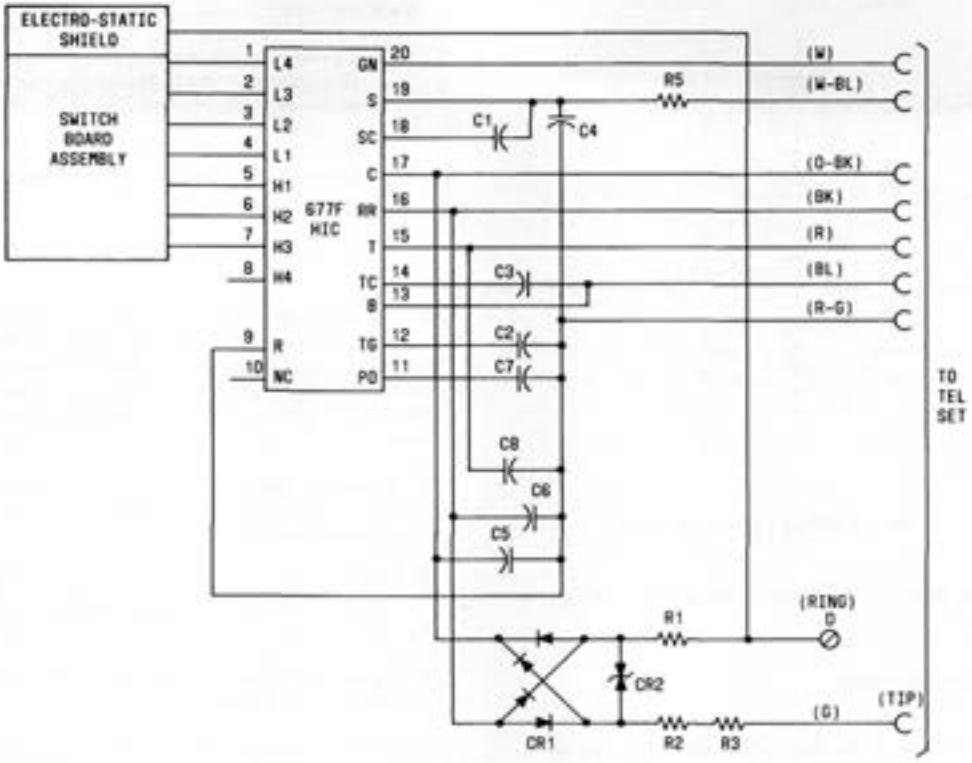

Fig. 6—◆72-Type Dial, Schematic◆

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TABLE A

72-TYPE DIAL CONNECTIONS

WIRE OR LEAD	COLOR	REMOVE FROM NET. TERM.	CONNECT TO NET. TERM.
72-Type Dial	(W)	–	GN
	(W-BL)	–	S
	(O-BK)	–	C
	(BK)	–	RR
	(R)	–	T
	(BL)	–	B
	(R-G)	–	R
	(G)	–	F
Line Switch*	(BR)	C	D†
616-Type Handset Cord Jack	(R)	T	R
	(BK)	B	T

* In some telephone sets where this dial is used, this line switch lead may be a different color.

† Dial terminal.

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M1A AND M2A HANDSETS

IDENTIFICATION, CONNECTIONS, AND MAINTENANCE

1. GENERAL

1.01 This section contains information on the M1A and M2A handsets (Fig. 1).

1.02 This section is reissued to remove information on the M6A handset (never manufactured). Since this reissue is a general revision, no revision arrows have been used to denote significant changes.

2. IDENTIFICATION

A. Application

2.01 The M1A and M2A handset are small, compact modular handsets intended for use with the 5001T01A and 5011T01A telephone sets.

The M-type handsets cannot be used as replacement for G- or K-type handsets, nor can the G- or K-type handsets be used as replacement for the M-type handsets.

B. Ordering Guide

2.02 Order as follows:

- Set, Hand, M1A-(see Note)
- Set, Hand, M2A-(see Note)
- Cord, Handset, H4DU-(see Note).

Note: Add color suffix: Ivory (-50), Yellow (-56), Brown (-104), and Rust (-124).

C. Design Features

2.03 The M1A handset uses a LB3 receiver unit and an EL2 electret microphone as the transmitter unit.

2.04 The M2A handset is the same as the M1A handset except for the addition of a magnetic field coil (Fig. 3) for use with inductive pickup hearing aids.

3. CONNECTIONS

3.01 Connect the M1A and M2A handset by plugging the handset cord into the jack located beneath the transmitter and plug the other cord end into the handset cord jack mounted in the telephone set base. Be sure the handset cord retaining clip locks into place.

3.02 To replace the M1A handset, depress cord retaining clip and remove the handset cord.

3.03 Refer to Fig. 2 for internal connections of the handset.

4. MAINTENANCE

4.01 Maintenance of these handsets is limited to cleaning with a water-dampened cloth.

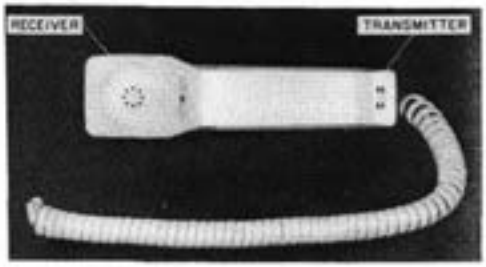

Fig. 1—M1A or M2A Handset With H4DU Handset Cord Connected

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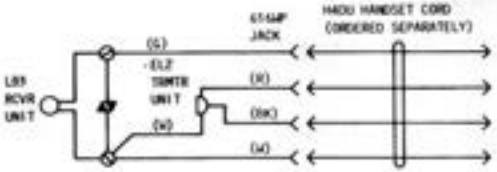

Fig. 2—M1A Handset, Internal Connection

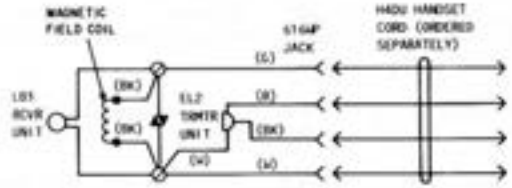

Fig. 3—M2A Handset, Internal Connection

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G6-, G7-, G8-, G13-, G66-, AND K6-TYPE HANDSETS (AMPLIFIER) IDENTIFICATION, CONNECTIONS, CONVERSION, AND MAINTENANCE

1. GENERAL

1.01 This section contains information for G- and K-type amplifier handsets. Also information on D-180413 (modified G8-type) handset is included. These handsets are intended to replace standard G- or K-type handsets for use by persons with impaired hearing or weak speech and for noisy locations.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add G13D-104
- Add G66AM-type handsets
- Add K6C handset.

1.03 Table A lists these handsets and their component parts.

2. IDENTIFICATION

A. G6-Type (Impaired Hearing)

2.01 The G6-type handset is equipped with an internal receiver amplifier unit. The volume control potentiometer in the center of the handle adjusts the loudness setting of the receiver so the handset may be used by persons with normal hearing as well as persons with impaired hearing.

2.02 The G6B (MD) handset assembly has two transistorized amplifiers and will operate on either polarity. The units are located on a printed circuit board in the receiver cavity. The amplifier, potentiometer assembly, and handset cord connect to a terminal board located in the transmitter cavity.

2.03 Three versions of G6B (MD) handsets have been produced and are referenced as ***early*** (before 1974), ***later*** (1974-1977), and ***last*** (1977-1979). The ***last*** version can be identified by a black plastic plate around the volume control assembly instead of the chrome metal plate on previous versions. The receiver amplifier board on the ***last*** version has three screw terminals. In the G6B ***last*** version, the yellow conductor in the handset cord is removed. This is a normal condition since the yellow lead is not used.

2.04 The G6BM handset is identical to the G6B (MD) ***last*** version handset except that it is equipped with a jack to receive the plug-ended H4DU handset cord which must be ordered separately.

B. G7-Type (Weak Speech)

2.05 The G7-type handsets are equipped with an internal transistorized transmitter amplifier intended for use by persons with weak speech. The potentiometer in the handle controls the level of the transmitter output. The transistorized transmitter amplifier is located on a printed circuit board at the receiver end of the handle. The polarity guard and one inductor are on a terminal board in the transmitter cavity. The potentiometer assembly, amplifier, and handset cord connect to a terminal board in the transmitter cavity. Internal connections are made by spade-tipped leads.

2.06 The G7BM handset is identical to the G7B (MD) handset except that it is equipped with a jack to receive the plug-ended H4DU handset cord which must be ordered separately.

C. G8-Type (Noisy Locations)

2.07 The G8-type handset is equipped with a transistorized receiver amplifier, a volume control potentiometer, and a push-to-listen switch and is intended for use in noisy locations. The volume control provides up to 10 db of additional receive gain. The push-to-listen switch, when operated, decreases the transmitter output and increases the gain of the receiver amplifier.

2.08 Two versions of G8B (MD) handsets have been produced and are referenced as ***early*** (before

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1977) and ***current*** (since 1977). The ***current*** version can be identified by a black plate around the switch assembly instead of the chrome metal plate on the previous version. Also, the receiver amplifier board in the ***current*** version has three screw terminals.

2.09 The G8BM handset is identical to the G8B (MD) handset except it is equipped with a jack to receive the plug-ended H4DU handset cord which must be ordered separately.

D. D-180413 Handset (Modified G8-Type; Impaired Hearing)

2.10 The D-180413 handset is a G8-type handset modified by the service-center. This handset is intended for use by customers that require more receiver gain than is available in the G6-type handset. Both modular and nonmodular versions of the G8-type handset can be modified.

2.11 The D-180413 handset is equipped with a receiver amplifier unit. The volume control potentiometer in the center of the handle adjusts the loudness setting of the receiver so the handset may be used by persons with normal hearing as well as persons with impaired hearing. It also has a pushbutton, which when operated, provides an additional 15 dB gain in the receiver circuit and 10 dB loss in the transmitter circuit.

◆***Note:*** The D-180413 handset is replaced by the G66 handset, paragraph 2.06.◆

2.12 Connect the D-180413 handset in the same manner as the modular or nonmodular G8-type handset.

E. G13-Type (Impaired Hearing)

2.13 The G13-type handset is equipped with an armored cord and a receiver amplifier unit. The volume control switch in the center of the handle controls the loudness setting of the receiver so the handset may be used by persons with normal hearing as well as persons with impaired hearing. Coin telephones are not assembled or coded with these handsets. The handset must be ordered separately and connected per Table C.

2.14 The G13A (MD) and G13B (MD) handsets furnish normal unamplified receiver output until the slide switch is moved to the center or extreme position. The center position furnishes 10 dB and the extreme position furnishes 20 dB of gain. When the slide switch is released a spring returns the switch to its normal position.

2.15 The G13D handset equipped with a H4EH handset cord replaces the G13B handset. The G13D handset equipped with a H4EG handset cord (specify cord on order) replaces the G13A handset. The G13D furnishes normal unamplified receiver output until at least one of the two buttons on the handset is depressed. With either button depressed the amplifier furnishes 10 dB of gain and with both buttons depressed 20 dB of gain.

◆F. G66AM (Impaired Hearing)

2.16 The G66AM handset is equipped with a receiver-amplifier unit and a polarity guard. The volume control potentiometer in the center of the handle adjusts the loudness setting of the receiver so the handset may be used by persons with normal hearing as well as persons with impaired hearing. It also has a pushbutton which when operated, provides an additional 10 dB gain in the receiver circuit and 10 dB loss in the transmitter circuit.

2.17 This handset is intended for use by customers who require more receiver gain than is available in the G6-type handset.

2.18 It is equipped with a jack to receive the plug-ended H4DU handset cord which must be ordered separately.

2.19 The G66AM is recommended for use in place of the D-180413 handset.◆

◆G. K6A or K6C (Impaired Hearing)

2.20 The K6A is a repairable modular handset which replaces the K1A (MD) nonrepairable handset. It is available in the colors listed in Table B.

2.21 The K6A has a screw located in the hanger indentation under the receiver which holds the handset shell to the chassis and deck assembly. Inside the handset is an inner chassis which holds the handset cord jack assembly, receiver, and transmitter. The amplifier printed circuit board is clipped to the inner chassis. The circuit board contains a volume control potentiometer and a transistorized amplifier.

2.22 This handset has a U-type receiver which is compatible with hearing aid pickups.

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2.23 The K6C is the same as the K6A, except it has a Bell System logo and is available only in ivory (-50) color.

2.24 For additional information, refer to Section 501-210-105.

H. D-180838 Kit of Parts (4-Wire Operation)

2.25 This kit of parts contains a terminal board (new) and a M1W strap (G), 616WG jack, and two screws which are used to convert the G6B (current), G6BM, G8B (current), and G8BM handsets from two- to four-wire operation per Table D. These handsets can be identified by a black plastic plate around the volume control assembly instead of the chrome metal plate on earlier models and the three screw terminals on the receiver terminal board.

2.26 Remove and discard the ***old*** terminal board (not in all handsets) and modular jack (if a modular handset) in the transmitter end of the handset. Connect the ***new*** terminal board and modular jack (if desired) or handset cord per Table E.

I. D-180851 Kit of Parts

2.27 This kit of parts contains modified transmitter and receiver caps, to enable G-type handsets to be used with 900-series desk telephone sets. The modified handsets cannot be used with 900-series wall telephone sets.

J. 226A and 2226A (TRIMLINE® Telephone Sets) Hand Telephone Sets

2.28 These hand telephone sets provide up to 20 dB of receive gain for customers with impaired hearing. For additional information refer to Section 502-303-102.

3. CONNECTIONS

3.01 Perform the following to connect amplifier-type handsets equipped with spade-tipped cords to rotary dial equipped telephone sets.

(1) Connect red and black leads to the terminals from which the red and black leads of the replaced handset were removed.

(2) Connect yellow and green leads to the terminals from which the white leads were removed so that the yellow lead is electrically wired to the ***R*** terminal on the network and the green lead is wired to the ***GN*** terminal on the network.

(3) Test the handset through the full range of volume control.

3.02 When connecting G6- and G8-type (nonmodular) handsets to telephone sets equipped with TOUCH-TONE® dialing, the dial must provide common switch contact arrangements which will prevent dial sidetone amplification by the handset amplifier. If the set contains a 25A3 (MD), 25B3 (MD), or 25H4 (MD) dial, install a 25W3, 25Y3, or 25P4 dial, respectively. If these dials are not available replace set.

3.03 The G6BM, G7BM, and G8BM handsets require a plug-ended H4DU handset cord to be connected between the handset and the telephone set base. The H4DU cord must be ordered separately.

3.04 ***Schematics:*** Internal connections of the amplifier type handsets are shown in Fig. 1 through 10.

4. HANDSET CONVERSION

MODULAR-TO-NONMODULAR

4.01 Modular G6-, G7-, and G8-type handsets may be used on nonmodular telephones equipped with spade-tipped cords as follows.

(1) Remove the transmitter cap, transmitter unit, and transmitter board assembly.

(2) Remove the jack from the transmitter cup.

(3) Install a H4CJ cord in accordance with 5.05.

(4) Reassemble the transmitter board transmitter unit and cup.

(5) Connect the handset leads in accordance with Part 3.

4.02 Modular G6-, G7-, and G8-type handsets may be used on consoles equipped with headset jacks by using a 478A adapter. This device plugs into the console jack and converts it to a modular jack. The 478A adapter contains the appropriate padding resistor to compensate for the use of a carbon transmitter.

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NONMODULAR-TO-MODULAR

4.03 Nonmodular G6-, G7-, and G8-type handsets manufactured since 1974 may be converted to modular type in the field. These handsets may be recognized by the shape of the handset cord entry hole in the handset handle. Only handles with the rectangular holes may be field modified. These handles are equipped with a special convertible transmitter cup so they can be converted to modular by the addition of a 616W-type jack. Convert the handset as follows.

(1) Remove the transmitter cup, transmitter unit, and transmitter board assembly.

(2) Remove the spade-tipped handset cord leads from the handset.

(3) Install a 616W-type jack (ordered separately) by snapping the jack into the cutout provided on the transmitter cup. On G6- and G8-type handsets the white jack lead is not required and may be clipped off.

(4) Connect and dress the leads from the 616W-type jack to the transmitter board terminals as shown in Fig. 3, 4, or 6.

(5) Reassemble the transmitter board in the handset and replace transmitter cup on handset.

5. MAINTENANCE

5.01 Maintenance of G6-, G7-, G8-, modified G8-, and G66-type handsets is limited to the following:

- Replacing cracked or broken receiver and transmitter caps
- Replacing defective transmitter units
- Replacing defective handset cords
- Cleaning with water-dampened cloth.

5.02 Maintenance of G13-type handsets is limited to cleaning with a water-dampened cloth, as the transmitter and receiver caps are bonded to the handset handle at the time of assembly.

Do not use cleaning fluids or antirust compounds on transmitter units, receiver units, or other component parts of handset. Discoloration or tarnish on the silver-plated contact surfaces is not objectionable and no attempt should be made to remove it.

5.03 ◗Maintenance of K6-type handsets is limited to replacing the T1 transmitter unit and U5 receiver unit.◖

5.04 The H4CT handset cord furnished with G6B, G7B, and G8B handsets is no longer available. If the original cord requires replacement or if a modular handset is to be modified for use on a nonmodular telephone, modify and install an H4CJ cord as follows.

(1) Tone-out and identify one white conductor. For identifying purposes, loose knots may be tied in each end of this conductor, designating it green. The other white conductor is designated as yellow.

(2) Loop and tie or tape the excess length of white conductors to approximate length of red and black conductors.

(3) Insert conductors in transmitter bowl carefully so as not to disrupt the printed circuit board.

(4) Connect to transmitter terminal board as shown in Fig. 1, 2, 3, 4, 5, or 6.

5.05 ***Radio Frequency Interference:*** If RFI problems, including Citizen Band Radio, are encountered the procedures of Section 500-150-100 should be followed. If it is found necessary to replace the telephone set with one modified for radio frequency suppression, the appropriate handset (modified for radio suppression) should be ordered at the same time.

5.06 ***872A1M and 2872A1M Telephone Sets:*** On some 872A1M and 2872A1M telephone sets (TOUCH-A-MATIC® telephone sets 32 number), the white or yellow and green leads from the modular handset jack may have been reversed. If a G6-type handset installed on these sets does not have a receive output, refer to Section 503-603-101 or 503-603-102 for handset jack wiring.

5.07 ***Modular Telephone Set:*** When G6BM or G8BM handsets are connected to some modular telephone sets, an insufficient receiver gain may

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result. Reverse the white and green handset jack leads on the network. For additional information refer to the appropriate telephone set service section.

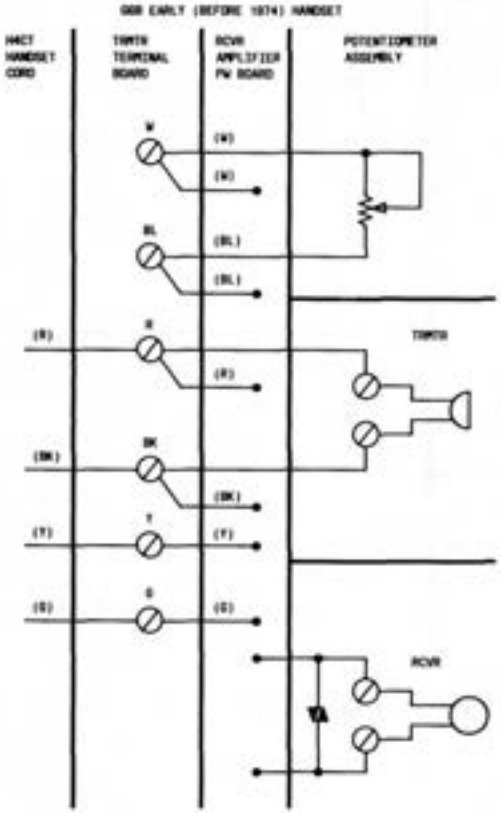

Fig. 1—G6B (MD) Early (Before 1974) Handset, Connections

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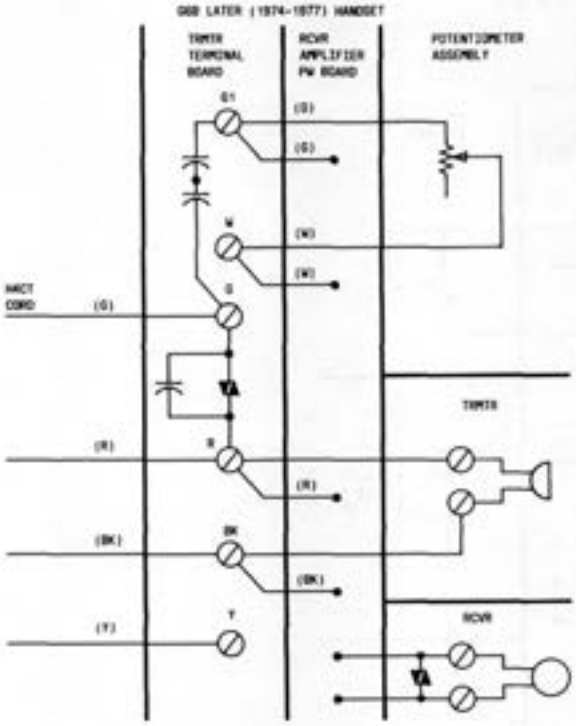

Fig. 2—G6B (MD) Later (1974-1977) Handset, Connections

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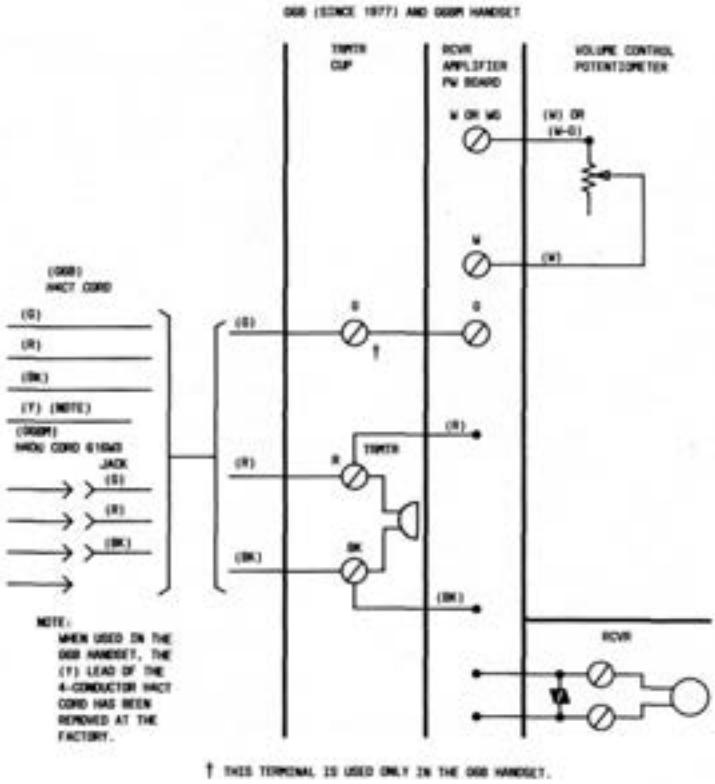

Fig. 3—G6B (MD) Last (1977-1979) and G6BM Handset, Connections

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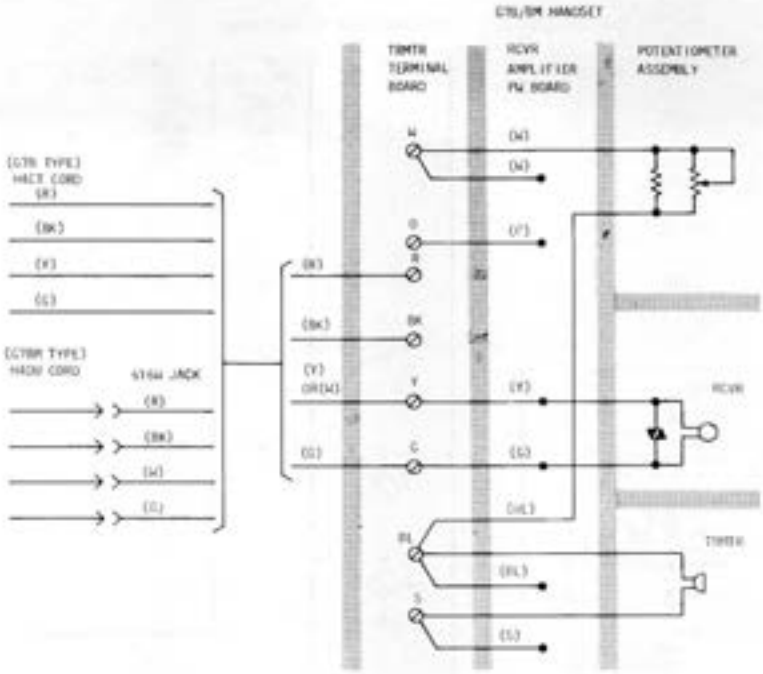

Fig. 4—G7B (MD) and G7BM Handset, Connections

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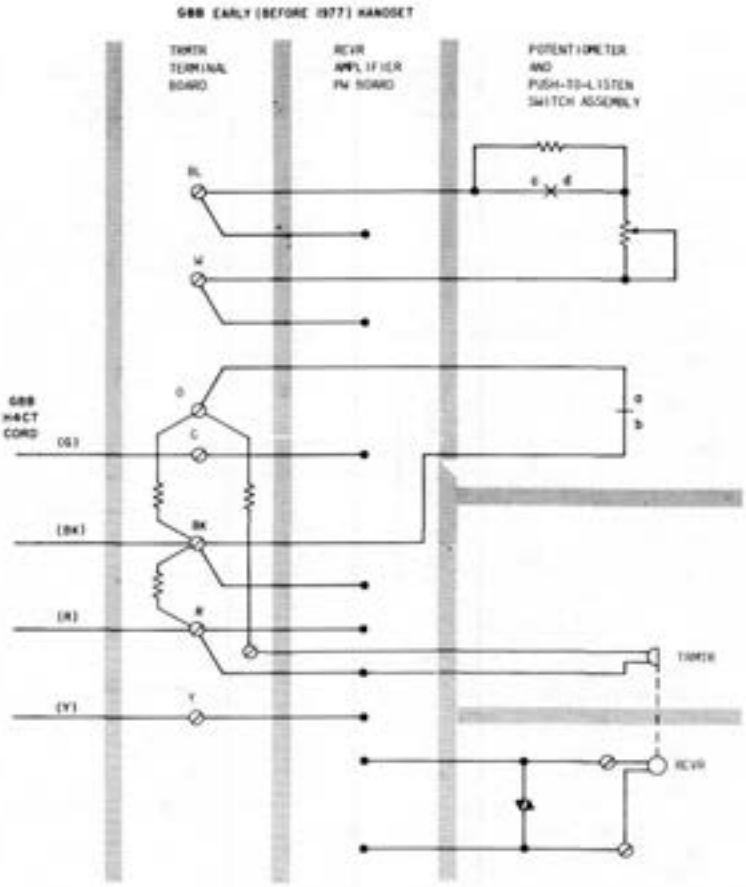

Fig. 5—G88 (MD) Early (Before 1977) or D-180413 Handset, Connections

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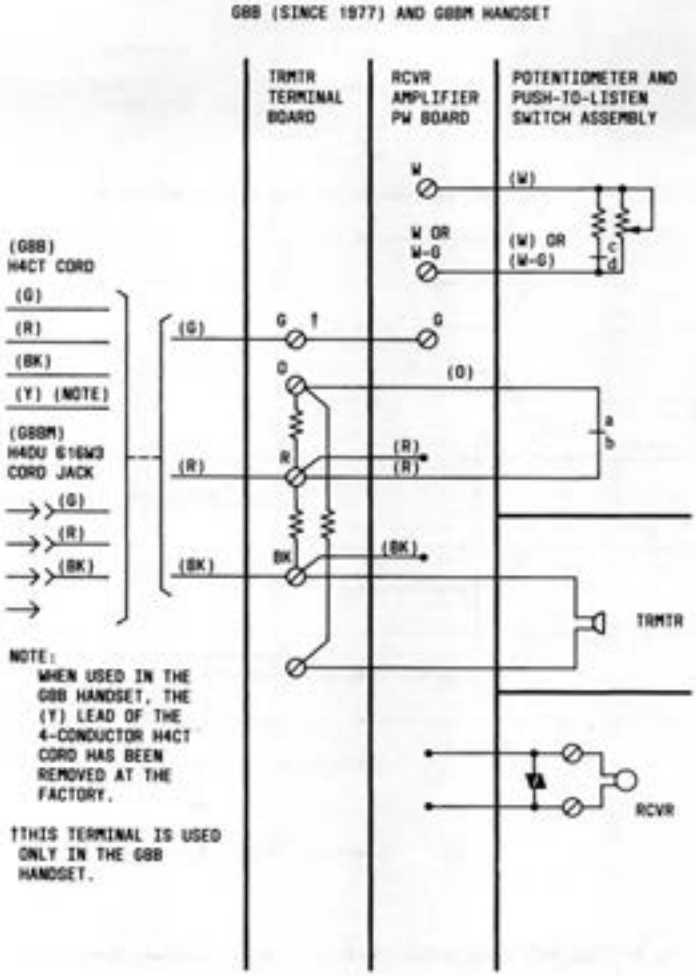

Fig. 6—G8B (MD) Last (Since 1977) and G8BM or D-180413 Handset, Connections

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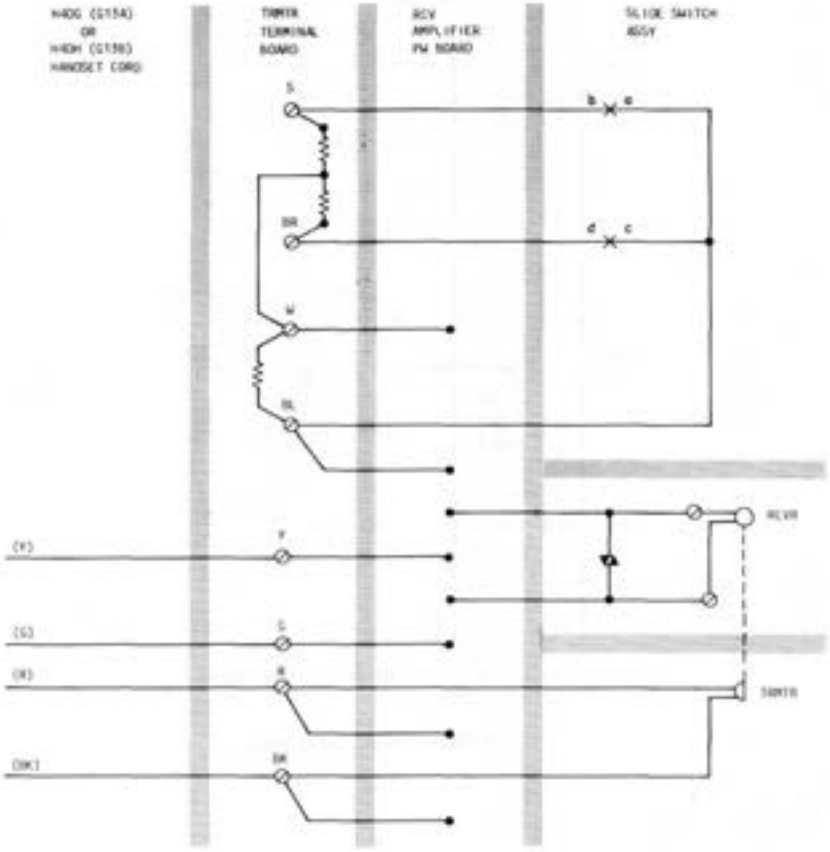

Fig. 7—G13A (MD) and G13B (MD) Handset, Connections

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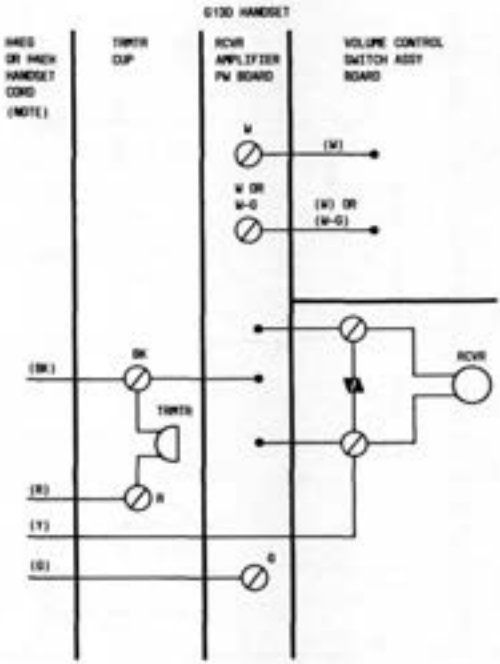

NOTE: WHEN G13D USED AS A REPLACEMENT FOR G13A, ORDER HANDSET WITH HAEG HANDSET CORD.

Fig. 8—G13D Handset, Connections

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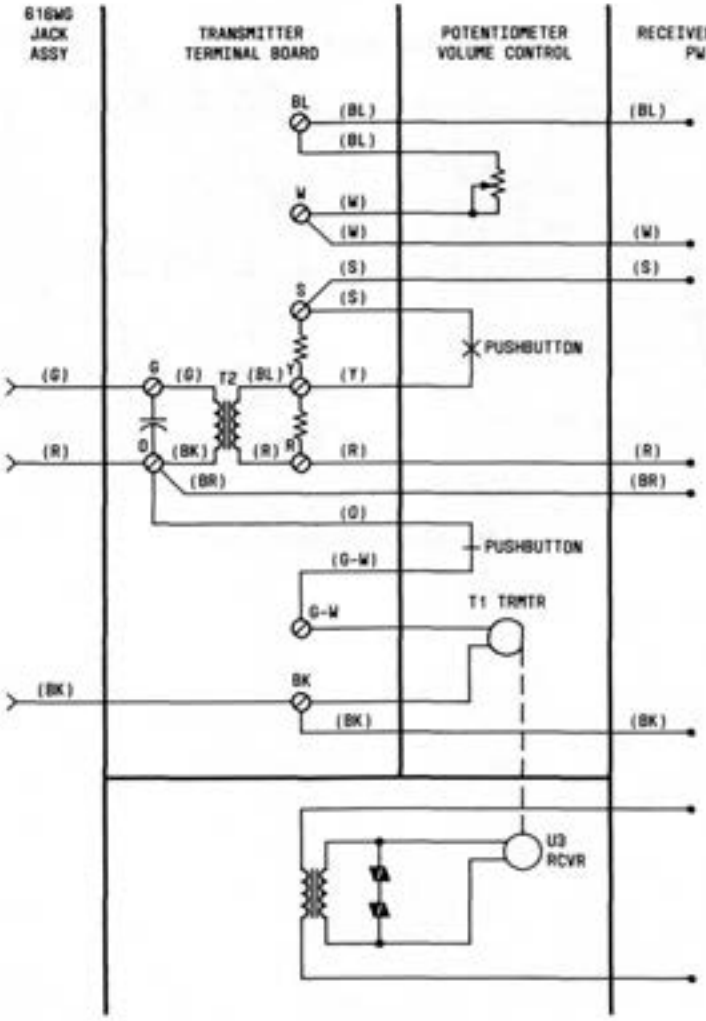

Fig. 9—G66AM Handset, Connections

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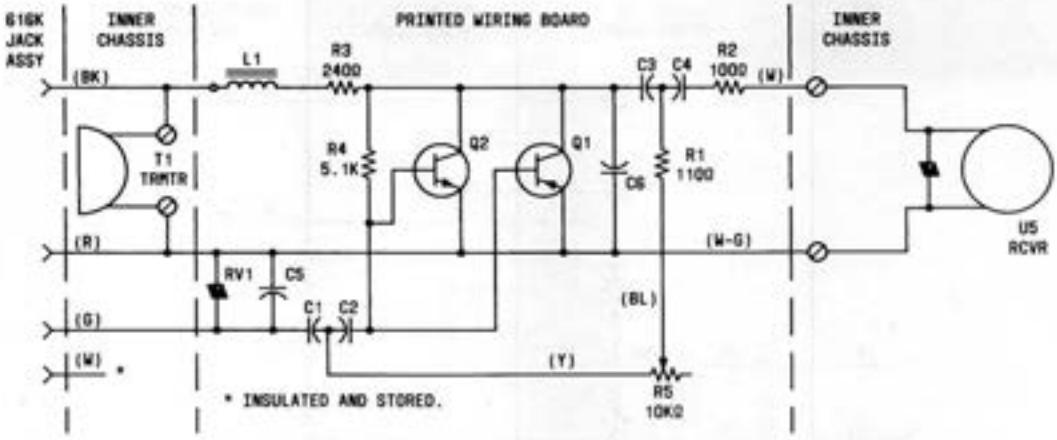

Fig. 10—♦K6-Type Handset, Connections♦

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TABLE A

G-SERIES HANDSETS

HANDSET	CONN. FIG. NO.	REPLACEABLE COMPONENTS				
		TRMTR UNIT	RCVR UNIT	TRMTR CAP	RCVR CAP	HANDLE
G6B (Early)*,†	1	T1	U-Type	Table B	Table B	Table B
G6B (Later)*,†	2					
G6B (Current) *,†	3					
G6BM†						
G7B*†	4					
G7BM†						
G8B (Early)*,†	5					
G8B (Current) *,† (D-180412)	6					
G8BM †						
G13A-52*	7	Receiver and transmitter caps are ultrasonically bonded to the handle, therefore, components cannot be replaced.				
G13B-52*						
G13D-52, -104	8					
G66AM‡	9	T1	U-Type	Table B		
K6A§	10		U3 or U5	None		
K6C ¶	10		U3 or U5	None		
D-180413 **	6		U-Type	Table B		

* MD.

† Add color suffix shown in Table B.

‡ Available in -03 (black), -50 (ivory), -51 (green), -53 (red), -56 (Yellow), -58 (White), -60 (Light Beige), -61 (Light Gray), and -62 (Aqua Blue).

§ Available in -03 (Black), -50 (Ivory), -58 (White), -93 (Yellow), -104 (Brown), -105 (Dark Green), -106 (Lime Green), and -115 (Blue)

¶ Available in -50 (Ivory) only.

** The D-180413 handset is a service-center modified G8-type handset. Specify modular or nonodular version on order.

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TABLE B

ORDERING GUIDE G6-, G7-, AND G8-TYPE TRANSMITTER CAP, RECEIVER CAP, AND HANDLE

COLOR	SUFFIX	TRANSMITTER CAP		RECEIVER CAP		HANDLE	
		COMCODE	P-NUMBER	COMCODE	P-NUMBER	COMCODE	P-NUMBER
Black	−03	818011033	P-80A103	818012031	P-80A203	818077034	P-80G703
Ivory	−50	818011504	P-80A150	818012502	P-80A250	818077505	P-80G750
Green	−51	818011512	P-80A151	818012510	P-80A251	818077513	P-80G751
Red	−53	818011538	P-80A153	818012536	P-80A253	818077539	P-80G753
Yellow	−56	818011561	P-80A156	818012569	P-80A256	818077562	P-80G756
White	−58	818011587	P-80A158	818012585	P-80A258	818077588	P-80G758
Rose Pink	−59	818011595	P-80A159	818012593	P-80A259	818077596	P-80G759
Lt. Beige	−60	818011603	P-80A160	818012601	P-80A260	818077604	P-80G760
Aqua Blue	−62	818011629	P-80A162	818012627	P-80A262	818077620	P-80G762

▶TABLE C◀

G13-TYPE HANDSET CONNECTIONS FOR COIN AND COINLESS PUBLIC TELEPHONE SETS (NOTES 1 AND 2)

	G13A AND G13D		G13B AND G13D		G13D			
	1234G TEL SET	1235G TEL SET	1A2, 2A2, 1C2 2C2, 2755 TYPE TEL SET	1A1, 2A1, 1C1, 2C1 TEL SET	1D1 2D1	1D2 2D2	10A OR 20A COINLESS TEL SET	F-60678 OR F-60761 TEL SET
HANDSET LEADS	CONNECT TO	CONNECT TO TB4 TERM.	CONNECT TO TB2 TERM.	CONNECT TO TB2 TERM.	CONNECT TO TB2 TERM.	CONNECT TO TB2 TERM.	CONNECT TO NET. TERM.	CONNECT TO TB2 TERM.
R	TR	R	3	3	3	3	R	6
BK	BR	BK	5	6	6	6	L2	5
Y*	BRX	W†	8	8	7	8	R	6
G*	W	W‡	7	2	4	7	F	11

Note 1: If G13D handset is used instead of the G13A, order a G13D equipped with a H4EG handset cord.

Note 2: Specify length of handset cord (2 feet 8 inches, 4 feet 6 inches, or 6 feet). H4EM handset cord is not available in 6-foot length.

* Early production G13D handsets have yellow and green wire marking tape to designate the yellow and green leads.

† Connect the (Y) handset lead to the W terminal with the (W) lead going to terminal 2 of TB2.

‡ Connect the (G) handset lead to the W terminal with the (W) lead going to terminal 10 of TB2.

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TABLE D

D-180838 KIT OF PARTS FOR 4-WIRE OPERATION

HANDSET	COMPONENT	LEAD COLOR	CONNECT TO NEW TERM. BOARD
G6B (Current) or G6BM *	616WG Jack Leads	BK	BK
		R	R
		G	G
		W	Y
	H4CT Cord	BK	BK
		R	R
		G	G
		Y	Y
	Amplifier Board	BK	BK
		R	R
		G†	G-W
	New Term. Board	W-BL	BL
G8B (Current) or G8BM *	616WG Jack Leads	BK	BK
		R	R
		G	G
		W	Y
	H4CT Cord	BK	BK
		R	R
		G	G
		Y	Y
	Amplifier Board	BK	BK
		R	R
		G†	G-W
	Potentiometer	R	R
		O	O
	New Term. Board	W-BL	W

* Remove terminal board on transmitter cup and replace with terminal board provided in D-kit of parts.

† Use (G) strap provided in kit of parts to connect G of amplifier board to G-W of terminal board in G6BM and G8BM handsets.

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G36-TYPE HANDSETS

INDENTIFICATION, CONNECTIONS, AND MAINTENANCE

1. GENERAL

1.01 The G36-type handset (Fig. 1 and 2) is used as a replacement handset on 500-, 600-, 700-, 2500-, 2600-, and 2700-type telephone sets when used with subscriber long route designs where 3.0db of transmission gain or low current operation is required. An information card giving basic installation instructions and an identification label to be attached to the telephone set base for identifiation of G36-type handset equipped sets is furnished with each handset.

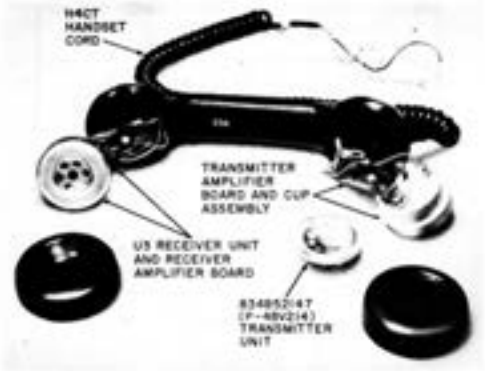

Fig. 1—G36A (MD) Handset

1.02 This section is reissued to:

- Show the G36A handset MD
- Add Table A.

2. IDENTIFICATION

2.01 The code G36 is imprinted in a contrasting color on the handset handle adjacent to the property marking on each handset for easy identification.

Ordering Guide

2.02 ***Basic Handsets:***

- Set, Hand, G36AM-* (modular).

2.03 ***Ordered Separately:***

- Cord, Handset, H4DU (G36AM modular)
- Jack, 616W (required for field conversion of a nonmodular handset to a modular handset).

2.04 ***Replaceable Components:***

- Transmitter Cap (Refer to Table A)
- Receiver Cap (Refer to Table A)
- 616W Jack
- Cord, Handset, H4CJ-* (used in place of H4CT handset cord for field replacement on the G36A handset),

3. CONNECTIONS

3.01 When connecting the G36A (MD) handset to a telephone set equipped with a TOUCH-TONE* dial, the dial must be equipped with a common switch contact arrangement to prevent dial sidetone amplification by the handset amplifier. If the set contains a 25A3 (MD), 25B3 (MD), or 25H4 (MD) dial, refer to Table B for recommended replacements. Refer to the appropriate telephone set connection figure in Division 502 to connect the dial leads, and Table C for handset cord lead connections.

3.02 Connect the G36A (MD) nonmodular handset to rotary dial equipped telephone sets as shown in Table D.

* Add color suffix for color desired as follows: Black (-03), Ivory (-50), Green (-51), Red (-53), Yellow (-56), White (-58), Rose Pink (-59), Light Beige (-60), and Aqua Blue (-62).

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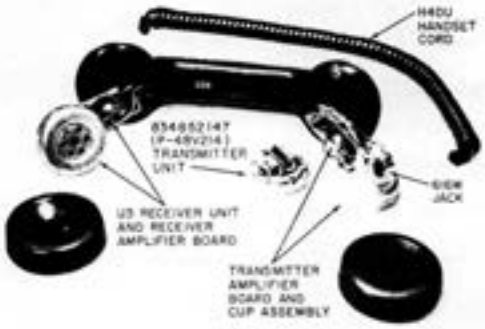

Fig. 2—G36AM Handset

◗TABLE A◖

G36 PIECE PART AND COMCODE INFORMATION

COLOR	TRANSMITTER CAP	RECEIVER CAP
Black (-03)	818011033 (P-80A103)	818012031 (P-80A203)
Ivory (-50)	818011504 (P-80A150)	818012502 (P-80A250)
Green (-51)	818011512 (P-80A151)	818012510 (P-80A251)
Red (-53)	818011538 (P-80A153)	818012536 (P-80A253)
Yellow (-56)	818011561 (P-80A156)	818012569 (P-80A256)
White (-58)	818011587 (P-80A158)	818012585 (P-80A258)
Rose Pink (-59)	818011595 (P-80A159)	818012593 (P-80A259)
Lt. Beige (-60)	818011603 (P-80A160)	818012601 (P-80A260)
Aqua Blue (-62)	818011629 (P-80A162)	818012627 (P-80A262)

◗TABLE B◖

DIAL REPLACEMENT

10-BUTTON MD DIALS	REPLACED BY 12-BUTTON
25A3(MD)	35A3A 35Y3A 35Y3D
25B3(MD)	35C3A 35AF3A
25H4(MD)	35E4A 35AD4A

◗TABLE C◖

G36A (MD) HANDSET CONNECTIONS FOR TOUCH-TONE DIAL EQUIPPED TELEPHONE SETS

HANDSET CORD	COLOR	NETWORK TERMINAL
H4CJ	W[Y] BK R W[G]	R B * †
H4CT	Y BK R G	R B * †

* Connect to same network terminal as (R) dial lead.

† Connect to same network terminal as (W-BL) dial lead.

[ ] Lead colors designated in paragraph 5.02 (2).

◗TABLE D◖

G36A (MD) HANDSET CONNECTIONS FOR ROTARY DIAL EQUIPPED TELEPHONE SETS

HANDSET CORD	COLOR	NETWORK TERMINAL
H4CT	R BK G Y	R B GN R

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3.03 When connecting the G36A (MD) handset to 1660-series (MD) card dialer telephone sets equipped with a 26B (MD) or 26D (MD) dial, install a 36D (12-button) dial. Refer to the appropriate telephone set connection figure to connect dial leads, and Table C for handset cord lead connections.

3.04 To connect the jack-equipped G36AM (modular) handset to a telephone set, install a H4DU handset cord (ordered separately) between the handset and jack-equipped telephone set.

The G36-type handset does not contain a polarity guard. Be sure that positive voltage (+) is connected to the red (R) handset cord lead, and negative voltage (-) to the black (BK) handset cord lead. Wrong polarity will not damage the handset but will prevent the handset from functioning properly and sidetone will not be heard.

3.05 Attach the identification label (furnished with information card) to desk telephone set baseplate at location shown in Fig. 3. On wall sets, peel off only one-half the label backing and attach the label (in a conspicuous area) inside the telephone set. When a wall set equipped with a G36-type handset is removed from service remove the label from the interior of the set peel off backing on unused half and attach the label to the outside of set to identify set as being equipped with a G36-type handset.

3.06 Test operation of the telephone set after installing a G36-type handset per local instructions.

4. FIELD CONVERSION TO MODULAR

4.01 The nonmodular G36A (MD) handsets are equipped with a special convertible transmitter cup so they can be converted to modular type (G36AM) by the addition of a 616W jack (ordered separately). Convert the handset as follows.

(1) Remove the transmitter cap, transmitter unit, and transmitter board assembly.

(2) Remove the four (4) spade-tipped handset cord leads from the handset.

(3) Install the 616W jack (ordered separately) by snapping the jack into the cutout provided on the transmitter cup at location shown in Fig. 2.

(4) Connect and dress the leads from the 616W jack to the transmitter board terminals as indicated in Fig. 4.

Note: Dress the jack leads through the wire retainer cutout on the transmitter board.

(5) Reassemble the transmitter board in the handset and replace transmitter cap on handset.

(6) Install a H4DU handset cord (ordered separately) between the handset cord jack and the jack-equipped telephone set.

Handsets are to be converted to the modular concept in the field only when specified by local instructions. Care should be taken when inserting the transmitter unit into the transmitter cup. To ensure proper transmitter connection, the slot on the frame of the transmitter unit must align with the tab inside the transmitter cup.

5. MAINTENANCE

5.01 Maintenance of the G36-type handset is limited to the following:

- Replacing cracked or broken receiver and transmitter caps
- Replacing 616W jack
- Replacing defective handset cords
- Cleaning with dampened cloth.

Caution: Do not use cleaning fluids or antirust compounds on transmitter, receiver units, or other component parts of the handset. Discoloration or tarnish on the silver-plated contact surfaces is not objectionable and no attempt should be made to remove it.

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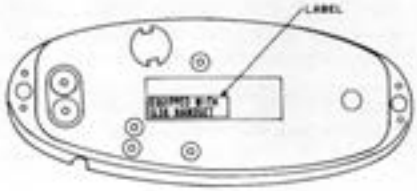
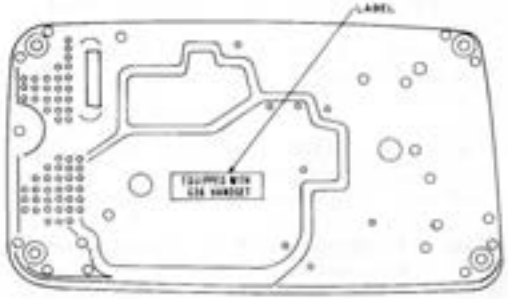


700-, 1700-, AND 2700-TYPE TELEPHONE, BASE PLATE



500-, 1500-, AND 2500-TYPE TELEPHONE, BASE PLATE

Fig. 3—Typical Baseplates with Label Attached

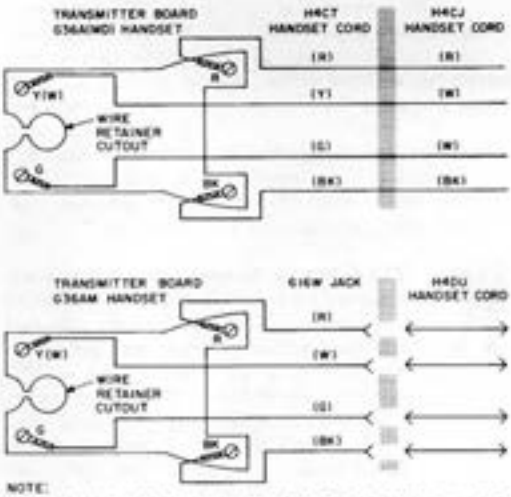


Fig. 4—Transmitter Board, Connections

5.02 The H4CT handset cord furnished with the G36A (MD) handset is not available for field replacement. If the origional cord requires replacement, modify and install a H4CJ handset cord (ordered separately) as follows.

(1) Carefully remove the outer plastic covering on the conductors (handset end of cord) to within 1-1/2 inch of the cord stay. ***Do not cut lead insulation.***

(2) Tone-out and identify one white (W) conductor, designate it yellow (Y). Loose knots may be tied in the conductor for identification purposes. The other (W) conductor then becomes the green (G) conductor.

(3) Connect the new cord conductors to the transmitter board terminals (Fig. 4). Dress the conductors together into the wire retainer cutout on the transmitter board.

Care should be taken when inserting the transmitter unit into the transmitter cup. To ensure proper transmitter connection, the slot on the frame of the transmitter unit must align with the tab inside the transmitter cup.

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AMPLIFIERS—238, 276, AND 277 TYPES
IDENTIFICATION AND INSTALLATION

1. GENERAL

1.01 This section contains information for the 238A (MD), 276A (MD), and 277A (MD) amplifiers which are single stage circuits. Each circuit consists of a transistor, an inductor, a capacitor, resistors, and in the case of the 277A (MD), a polarity guard all mounted on a printed circuit board and attached to a special transmitter cup (Fig. 1, 4, and 6). Information in this section is retained for existing installations only.

1.02 This section is reissued to show the 238A, 276A, and 277A amplifiers MD.

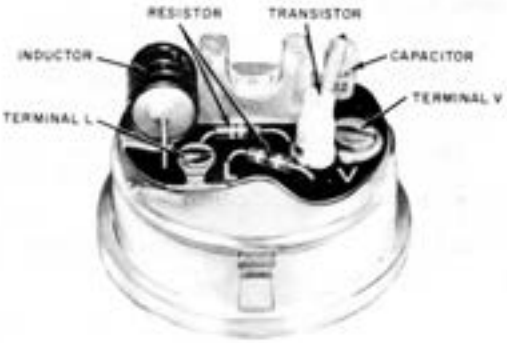

Fig. 1—▮238A (MD) Amplifier, Showing Terminal Locations▮

2. IDENTIFICATION

(a) ***Purpose:*** Amplifies station carbon transmitter output for long loops.

(b) ***Application:*** (See Table A.)

Note: An identification label is shipped with each amplifier and should be attached to the telephone set base as shown in Fig. 8. It reads for example: EQUIPPED WITH 238A AMPLIFIER.

Fig. 2—▮238A (MD) Amplifier, Showing Typical Terminal N Location▮

(c) ***Design Features:*** (See Table B.)

3. INSTALLATION

3.01 Connect telephone set according to appropriate connection section.

3.02 ***Installing Amplifier:***

- Measure the line current (transmitter current). If the current measures 15 to 24 ma use the 238A (MD) or 277A (MD) amplifier. If line is subject to polarity reversals, use the 277A (MD) amplifier. If current measures

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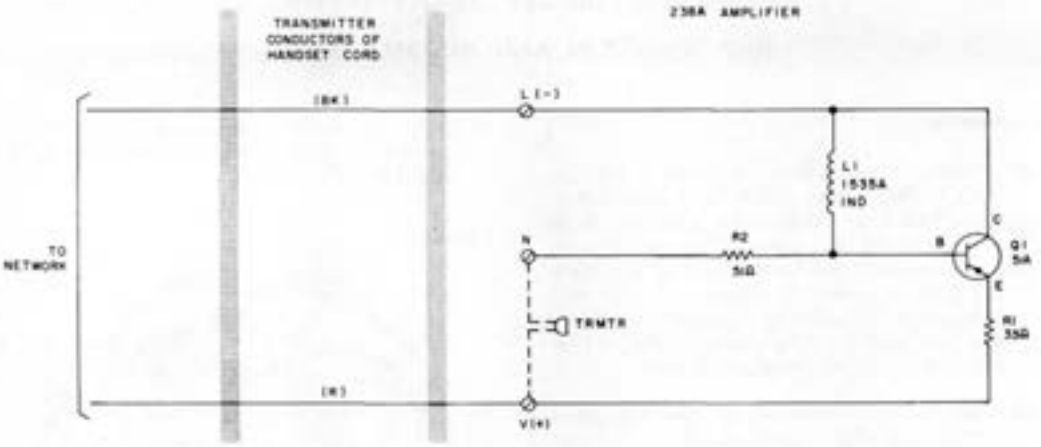

Fig. 3—♦238A (MD) Amplifier Schematic, Typical Connections♦

more than 24 ma use the 276A (MD) amplifier (see Table A).

- Remove transmitter cap and transmitter
- Remove and disconnect the plastic transmitter cup (white) and replace with the amplifier plastic transmitter cup (red).

Caution: 238A (MD) or 276A (MD) amplifier— Ensure that positive voltage (+) wire is connected to amplifier terminal V and negative voltage (-) wire is connected to amplifier terminal L. Wrong polarity will prevent the unit from functioning and may damage the amplifier. Sidetone will not be heard in handset if polarity is incorrect.

3.03 Connect transmitter leads to amplifier terminals (Fig. 1, 4, or 6) as follows:

For Long Line Circuit SD-26129-01 or SD-96588-01

- Tip party: (R) to V, (BK) to L (Fig. 3, 5, or 7)
- Individual, or ring party: (R) to L, (BK) to V.

For All Other Long Line Circuits

- Tip party: (R) to L, (BK) to V
- Individual, or ring party: (R) to V, (BK) to L.

3.04 Complete installation as follows:

- Be sure screw on terminal N is tight before replacing transmitter (Fig. 2)
- Place amplifier assembly cup in handset
- Replace transmitter and cap
- Attach identification adhesive label to telephone set base (Fig. 8).

Note: Surface must be clean before label is attached.

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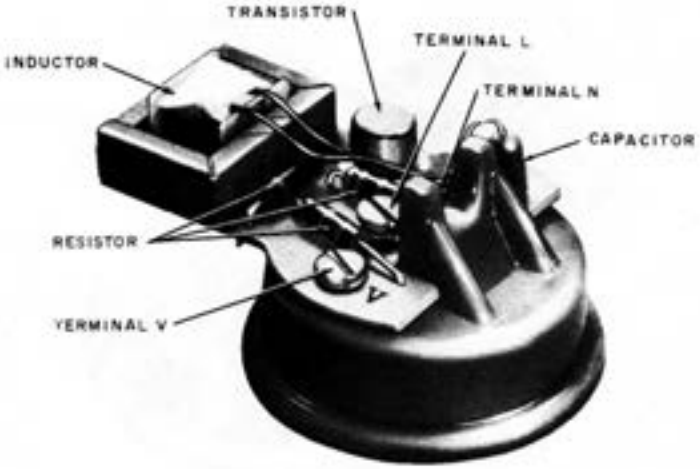

Fig. 4—#276A (MD) Amplifier, Showing Terminal Locations#

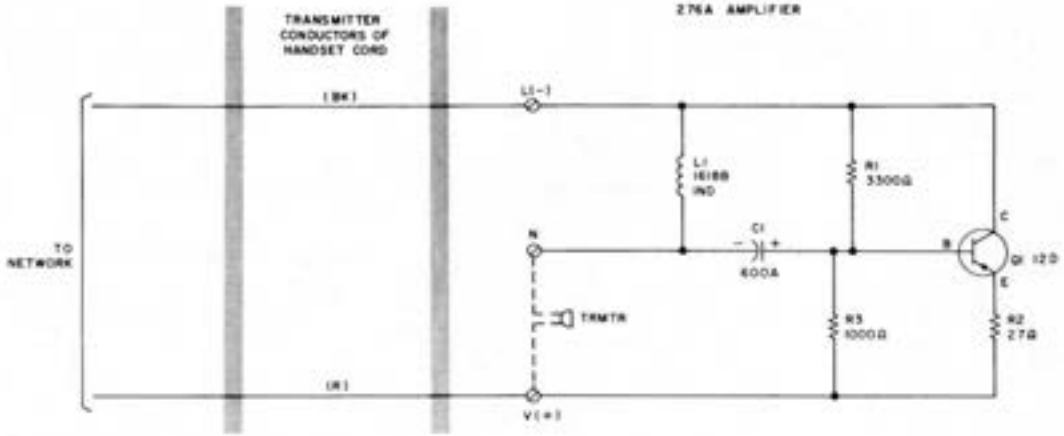

Fig. 5—#276A (MD) Amplifier Schematic, Typical Connections#

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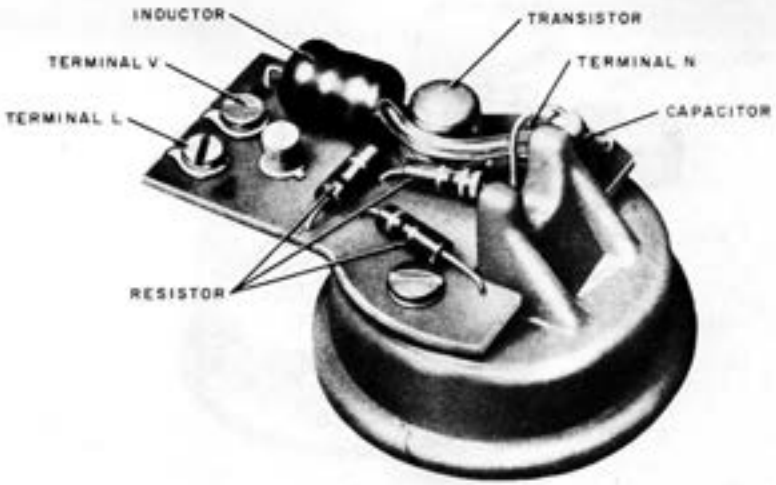

Fig. 6—▮277A (MD) Amplifier, Showing Terminal Locations▮

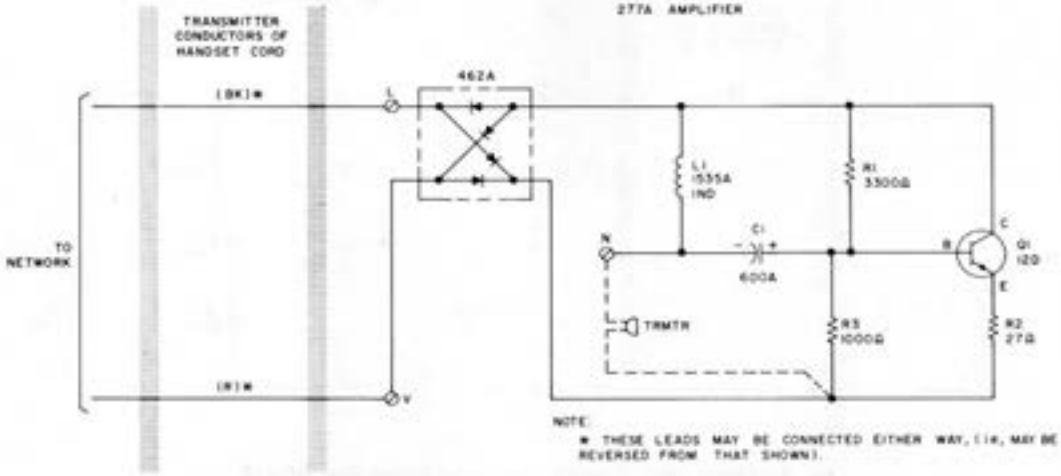

Fig. 7—▮277A (MD) Amplifier Schematic, Typical Connections▮

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700-AND 2700-TYPE TELEPHONE, BASE PLATE

500-AND 2500-TYPE TELEPHONE, BASE PLATE

Fig. 8—Typical Base Plates With Label Attached

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TABLE A
AMPLIFIER APPLICATIONS

APPLICATION	AMPLIFIER		
	238A*	276A*	277A*
Long Line Equipment loops where polarity of line voltage is maintained constant	√	√	
Long loops where line is subject to polarity reversals			√
Step-by-step areas where range extenders are used			√
Farm interphone service*		√	
G-type handsets except G3N3, G3P, G3R, G3S, G3T, G6AR, G7AR, G8A, and handles having molded cord retainer posts	√		
G-type handsets except G1, G3N3, G3P, G3R, G3S, G3T, G6AR, G7AR, G8A, and handles having molded cord retainer posts		√	√

*MD.

TABLE B
AMPLIFIER DESIGN FEATURES

DESIGN FEATURE	AMPLIFIER		
	238A*	276A*	277A*
Provides approximately 7 db gain	√	√	√
Input and output impedances approximately 500 and 1000 ohms, respectively	√	√	√
Has larger inductor and handles higher currents		√	
Has a polarity guard			√
Does not have a polarity guard	√	√	

*MD.

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AMPLIFIERS
151-, 241-, AND 242-TYPE
IDENTIFICATION

1. GENERAL

1.01 The 151-type, 241A (MD), and 242B amplifiers are single-stage transistor circuits (Fig. 1, 2, and 4). The 241B amplifier is a two-stage bipolar transistor circuit (Fig. 3). Circuits consist of inductors, diodes, transistors, capacitors, and resistors. The components are mounted on printed circuit boards. In the case of the 151-type amplifier the components are housed in a metal can. The 151D, 151E, 241A, 242A, and 242B amplifier circuits include polarity guards. The 241B amplifier is not polarity sensitive and does not require a polarity guard. The guard insures proper polarity of the supply voltage for the transistor portion of the amplifier. The 241B has a diode surge protector.

1.02 This section is reissued to:

- Show amplifiers 151B, D, and E rated A&M Only
- Add capacitor to amplifier 241B (Fig. 3).

1.03 The 241B amplifier is recommended. The 151A, 151C, 241A, and 242A amplifiers are rated MD. ▶The 151B, D, and E amplifiers are rated A&M Only.◀

2. IDENTIFICATION

Purpose

2.01 The 151-type amplifiers provide amplification for long loop operation, impaired hearing, and noisy locations. The 241- and 242-type are used in telephone sets designed for headset/handset operation to increase transmitter output when using an operator's headset.

Ordering Guide

2.02 Order as:

- Amplifier—151B, D, E, F
- Amplifier—241B
- Amplifier—242B

Design Features

2.03 Refer to Table A.

Application

2.04 Refer to Table B.

3. CONNECTIONS

3.01 ▶When the 241B amplifier is used in conjunction with the 425-type network, terminal 4 of the amplifier should always be connected to network terminal R, and terminal 1 of the amplifier should always be connected to network terminal B.◀

3.02 For other connection information refer to appropriate telephone set section.

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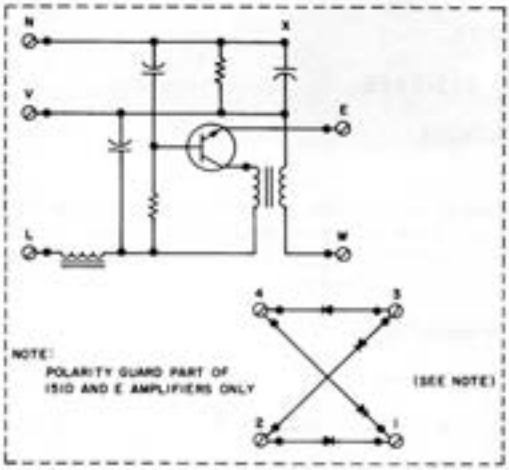

Fig. 1—151-Type Amplifier and Polarity Guard, Schematic

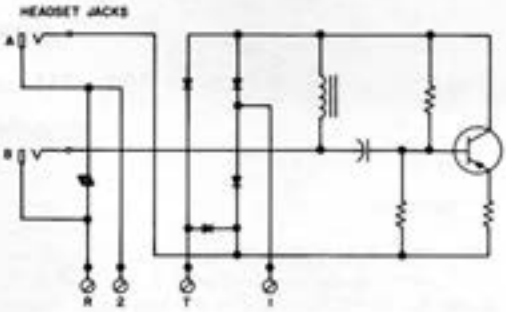

Fig. 4—242B Amplifier Schematic

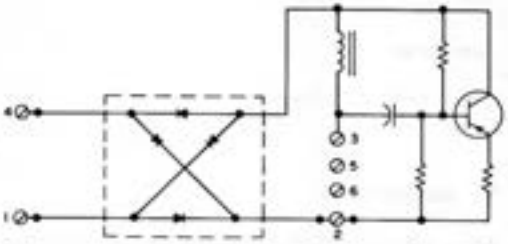

Fig. 2—241A (MD) Amplifier Schematic

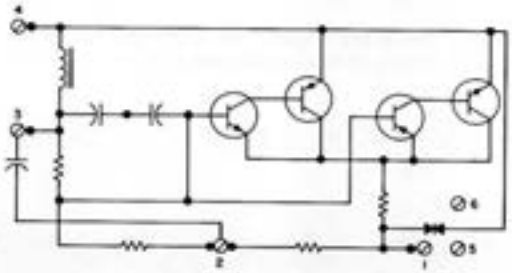

Fig. 3—241B Amplifier Schematic

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TABLE A

DESIGN FEATURES

DESIGN FEATURE	AMPLIFIER TYPE		
	151	241	242
Equipped with jacks arranged for 289-type, 396A or 464-type plugs			A, B
Equipped with polarity guard	D and E	A	A and B
Designed for use with 52-, 53-, 60-, 61-, or KS-type head telephone sets to amplify output of the transmitter unit		A* and B	A and B
Designed for use with the 292A operator's receive amplifier		B	
Designed for use with jack-equipped telephone sets except card dialers		A and B	

* Do not use the 241A with 60- or 61-type headsets on long loops (over 1200 ohms).

♦TABLE B♦

APPLICATION

APPLICATION	AMPLIFIER TYPE		
	151	241	242
500-, 560-, 650-, and 2600-type telephone sets		B	
532-, 533-, and 536-type telephone sets	B*	B	
636A1, 638A1, and 639A1 telephone sets	D*	B	
610B1 and 610B2 telephone sets	E*	B	
663-, 664-, 1663-, 1664-, 2663-, and 2664-type telephone sets			A and B
507-, 509-, 557-, and 559-type telephone sets	F		
636-, 637-, 638-, 639-, 1636-, 1637-, 1638-, and 1639-type telephone sets		A (MD), B	

* (A&M Only)

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AMPLIFIERS—315-TYPE

1. GENERAL

1.01 This section contains identification information for the 315A (Fig. 1) and 315B (Fig. 2) amplifiers for customers with imparied hearing.

1.02 Whenever this section is reissued the reason for reissue will appear in this paragraph.

2. IDENTIFICATION

2.01 The 315A and 315B amplifiers consist of component apparatus mounted on a printed circuit board supported by a plastic chassis. Mounting screws and a coverplate are included.

2.02 These amplifiers are components of 226A (315A) and 2226A (315B) hand telephone sets and provide up to 20dB of variable gain in the receive circuit.

2.03 These amplifiers are to be used primarily for customers with impaired hearing, although they can also be used in noisy locations. These amplifiers should ***not*** be used to correct transmission problems.

2.04 For installation and maintenance information on these amplifiers, refer to Section 502-303-102.

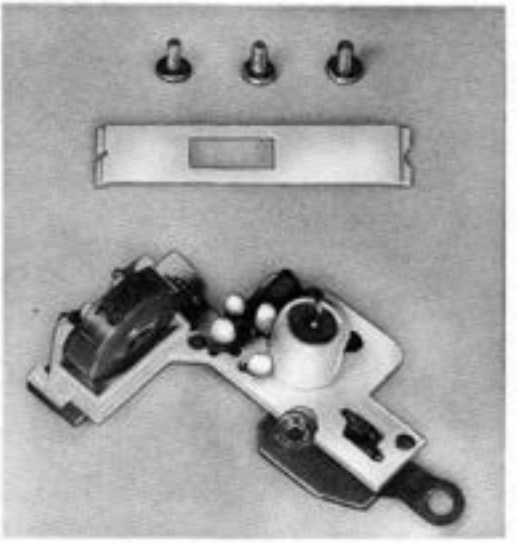

Fig. 1—315A Amplifier

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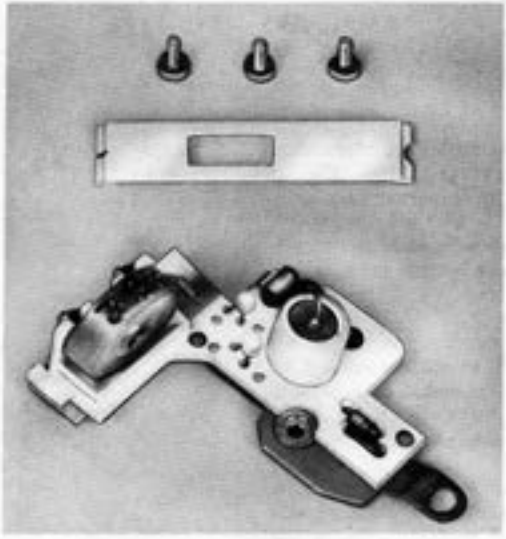

Fig. 2—315B Amplifier

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RINGERS—C-TYPE

MAINTENANCE

1. GENERAL

1.01 This section contains procedures, methods, and requirements recommended for maintenance of C-type ringers.

1.02 This section is reissued to:

- Update Fig. 1, 2, and 3 to show latest version of C4A ringer
- Add information on C4B, C5A, and C5B ringers

1.03 The C4A ringer has a straight armature hinge of phosphor bronze, a portion of which projects into the airgap to act as a stopplate; and the armature has a single stop pin located on opposite side. ◆The coil has two windings. The inner winding (1000 ohm tap) is connected between the slate and black leads and the outer winding (2650 ohm tap) between the red and slate-red leads. Four lead ringers are required for tip party identification installations.◆

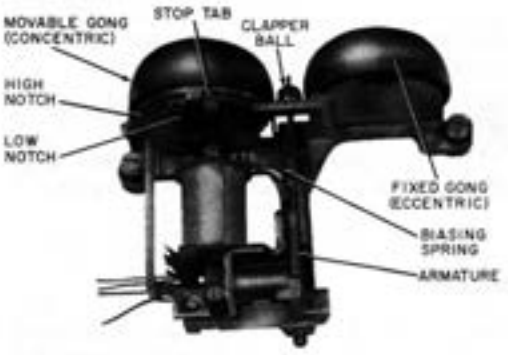

Fig. 1—C4A Ringer

1.04 Development of network-type wall telephone sets and network-type subscriber sets made it necessary to change the frame of C4A ringer. This change provides clearance for volume-adjusting arm.

1.05 ◆The C4B ringer is the same as the C4A except the coil is a single winding coil, and the slate and slate-red leads have been eliminated.

1.06 The C4B ringer can be used as a direct replacement for the C4A in all locations where tip party identification is not required.

1.07 Current model C4-type ringers are equipped with a handset cord retainer (boss) to hold the handset cord in place in nonmodular equipped telephone sets. These ringers are used in most 0- and 1-button 500- and 2500-series telephone sets.

1.08 The C5A ringer is a single coil, two winding, four lead ringer; similar to the C4A except it has longer leads for solder termination. Not furnished with gongs, resonators volume control wheel and cord tips. Has a movable cam which can be operated manually. Intended for use in PBX and central office installations for alarm and signaling purposes.

1.09 The C5B ringer is mechanically and electrically the same as the C5A ringer, except it has two lead coil and a plastic clapper ball. Intended for use in central office alarm only.◆

2. MAINTENANCE

2.01 Armature of C4- and C5-type ringers, when manualy operated shall restore to nonoperate position when bias spring is low notch and volume control wheel in high position. Should armature fail to restore, replace ringer.

Caution: Never bend bias spring or stop rod or adjust armature clearance.

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2.02 With ringer lying flat (as mounted in 500-type set) or mounted vertically (gongs down, as in 685-type subscriber set mounted on wall), armature in nonoperated position, and volume control wheel in low position, the clapper shall clear movable gong by a minimum 1/64 inch, maximum 1/32 inch. If this requirement is outside its limits, ringer should be replaced. Clearance between clapper and fixed gong shall be 1/64 inch. Fixed gong may be repositioned to meet this clearance. Both these clearances may be gauged visually.

Volume Control

2.03 Volume control wheel (Fig. 2) may be adjusted for ringer cutoff when requested by customer or in accordance with local instructions.

When ringer cutoff feature is requested, bend stop tab up and out to clear stop on ringer frame (Fig. 3) and rotate volume control wheel to maximum clockwise position.

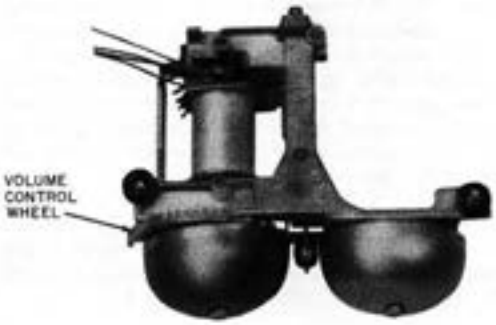

Fig. 2—C4A Ringer (Rear View)

2.04 Ringers manufactured prior to March, 1962 reportedly did not silence properly. A new cam design was developed to correct this situation. If trouble is encountered, replace ringer with newer type.

2.05 The volume control wheel shall operate smoothly over entire range. Detent spring shall have a positive detent action at each position of wheel. Lubricate detent spring by rubbing graphite from a soft lead pencil onto bearing surface.

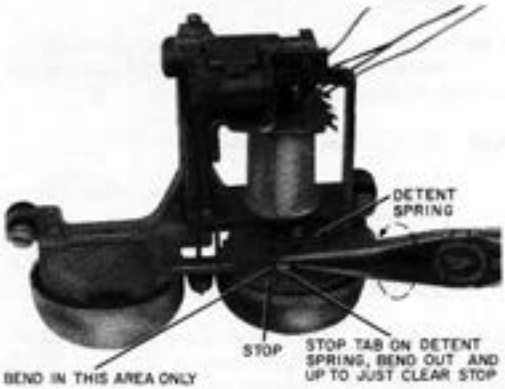

Fig. 3—Procedure for Ringer Cutoff

Bias Spring Position

2.06 Bias spring settings for class of service and number of ringing bridges are shown in Table A. High tension notch of bias bracket is adjacent to fixed gong. The low notch is adjacent to movable gong.

Correct bias spring tension has been set at factory. Do not bend bias spring. Use KS-6320 orange stick when relocating biasing spring.

Inspection

2.07 Table B is a guide for requirements, tests, and procedures for C-type ringers when they are placed in service and on maintenance visits.

2.08 After completing work, test ringer according to local instructions. Check for bell tap while dialing.

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2.09 If bell taps with bias spring in low notch and ringer ***properly poled,*** move bias spring to high notch. Repeat ringer test. If ringer fails to operate properly, change ringer.

2.10 When replacing C-type ringer, see that locating pin is inserted into rubber grommet before captive mounting screws are tightened. Check that ringer lead connections are tight.

2.11 When replacing ringer in wall telephone set or subscriber set, equipped with a network, a C4-type ringer equipped with later model frame ***must be used.***

Distinctive Tones

2.12 A series of different tone gongs are available for field use at installations involving customers with impaired hearing. ◆Also where telephone sets are closely spaced, it may be necessary to arrange for distinctive ringing signals. Refer to Section 500-128-180 for aids to customers with impaired hearing.◆

Even numbered gongs 52A, 54A, etc, have concentric mounting holes and are to be mounted on movable mounting post. The odd numbered gongs 53A, 55A, etc, have eccentric mounting holes and are installed on fixed mounting post.

2.13 Table C shows seven gong combinations that may be provided to obtain distinctive ringing signals.

2.14 Combination number 1 or 2 is recommended as first choice for customers with impaired hearing.

2.15 Combination number 5, 6, and 7 is recommended for locations where noise level is higher than average.

2.16 All gongs in this series may be mounted over resonator shells without mechanical interference, with exception of the 59A gong. The resonator shell must be removed from fixed post before 59A gong is installed. Should ringer have a staked resonator, insert screwdriver in post opening and pry resonator off.

2.17 When 59A gong is replaced by 55A gong, a removable resonator shall be installed. When replaced by 53A or 57A gong, installation of resonator is not necessary.

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♦ TABLE A ♦

BIAS SPRING POSITION
FOR C4- AND C5-TYPE RINGERS

CLASS OF SERVICE	BIAS SPRING NOTCH
Bridge Ringing Services	
Individual Line and PBX Stations*	High
Nonselective Party Lines	Low
Grounded Ringing Services	
2-party Flat and Message Rate	High
4-party Semiselective†	High
4-party Full Selective	Low
8-party Semiselective	Low
Divided Code	Low

*When three or more ringers are bridged across line and operation is not satisfactory, bias spring may be placed in low notch on all ringers. If condition is not corrected, change ringer.

†Where five ringers are connected between same side of line and ground and operation is not satisfactory, bias spring may be placed in low notch on all ringers on that side of line. If condition is not corrected, change ringer.

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♦ TABLE B ♦

C-TYPE RINGER TESTS AND REQUIREMENTS

SUBJECT	REMARKS
Volume Control Wheel	See 2.03, 2.04 and 2.05.
Bias Spring	See 2.06 and Table A.
Ringer	1. Leads dressed properly and connections tight. 2. Positioned properly; mounting screws tight. 3. Clean (see section entitled Ringers, General Maintenance and Ringing Tests). 4. Gong mounting screws tight and clapper to gong clearance in accordance with 2.02. 5. Ringer shall produce a steady ring on at least one gong when volume control wheel is in low notch and on both gongs as wheel is advanced to high notch.
Airgap	With volume control wheel in high notch, displace armature manually toward inner pole piece; check for stop pins and see that they make contact with adjacent pole pieces. If stop pins are missing, replace ringer (C4-type ringers have only one stop pin). If stop pins are present but fail to make contact, determine cause. Remove dirt if found (see section entitled Ringers, General Maintenance and Ringing Tests.) If stop rod is deformed, replace ringer.

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♦ TABLE C ♦

DISTINCTIVE GONGS

GONG PAIR COMBINATION NUMBER	MOUNTED ON			
	CAM		FIXED POST	
	CODE	FREQ*	CODE	FREQ*
1	52A	805	53A	1015
2	54A	1280	53A	1015
3†	54A	1280	55A	1610
4	56A	2025	55A	1610
5	56A	2025	57A	2555
6	58A	3220	57A	2555
7	58A	3220	59A	4060

*Nominal frequency in hertz.
†Standard gongs as furnished from factory.
Note: The 64A plastic gong may be used to replace the 54A and 55A gongs on a C4-type ringer that is mounted in a 687A subscriber set. When this substitution is made, clapper-to-gong clearance may need to be readjusted so as to permit the ringer to meet its operating requirements.

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RINGER—E1-TYPE

1. GENERAL

1.01 This section contains identification, installation, connections, and maintenance information on the E1-type ringer.

1.02 This section is reissued to:

- Add 1049A mounting plate
- Add 290A adapter

1.03 The E1-type ringer (Fig. 1) may be used on the following services:

- Individual lines
- 2-party flat and message rate
- 4-party semiselective
- Nonselective party line
- Divided code ringing
- Regular PBX station.

1.04 When controlled by a 531C or 687B subscriber set, the E1-type ringer may be used on the following services:

- 4-party full selective
- 8-party semiselective.

1.05 See appropriate section for subscriber set connections.

1.06 Obtain tip party identification, when required, through the ringer associated with each station. Refer to section covering connections for particular type of telephone set used.

2. IDENTIFICATION

2.01 The E1C and E1D (nonmodular) ringer (Fig. 2 and 3) consists of a 7- or 10-terminal connecting block and a single-gong ringing mechanism in series with an 0.40 μf capacitor.

2.02 The E1CM (modular) ringer (Fig. 7) is identical to the E1C except it has a 652A6 (***Phone***) jack and a 623P4 (***Line***) jack connected to an eight terminal connecting block.

2.03 The E1-type ringer is equipped with a volume control lever (Fig. 2). Volume is adjustable from *OFF* to *LOUD*. To adjust ringer to off position, refer to 3.06.

Be sure to acquaint customer with location and use of ringer volume control lever.

2.04 The ringing mechanism, capacitor, and connecting block are mounted on a gray metal base enclosed with a light olive gray or ivory plastic cover. Refer to Table A for color ordering information.

2.05 The E1A, E1B, E1C, and E1D ringers are rated MD and are replaced by the E1CM ringer. The E1C/CM and E1D ringers have a gong resonator to improve the audible characteristics.

2.06 The E1B (MD) an E1D (MD) ringers are used with the 2A farm interphone as an auxiliary ringer, connecting block, and remote signal control.

3. INSTALLATION

3.01 The E1-type ringer may be mounted to a 63-type, KS-19407L1 (MD), or KS-20602L2 bracket, or on an electrical outlet box using a 146B adapter. All necessary screws are provided with the adapter.

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Fig. 1—E1CM Ringer, External View

♦TABLE A♦

COLOR ORDERING GUIDE (COVER)

E1-TYPE	LIGHT OLIVE GRAY	IVORY
Nonmodular	818144495 (P-81D449)	818144503 (P-81D450)
Modular	841026552	841026560

3.02 Mounting holes in the ringer are fitted with rubber grommets. Unless using a 146B adapter, use screws of sufficient length to hold ringer to mounting surface securely.

3.03 For nonmodular type ringers, the inside wire can enter the ringer from the bottom or either end (Fig. 2 and 3). The mounting cord from the telephone set may be brought in from either end of ringer. The E1-type ringers have a stayhook holder on the left side which can be moved to the right side, if desired. Secure telephone set cord to ringer as shown in Fig. 4.

3.04 The modular styled ringer (E1CM) is equipped with a 623P4 (***Line***) jack and a 652A6 (***Phone***) jack. The D4BU mounting cords may be used to provide connections between the ringer and jack equipped connecting block, and between the ringer and telephone set.

3.05 ♦The E1CM ringer may be made portable by adding a 290A adapter to the ringer and the placement of a 1049A mounting plate at desired locations as follows.

Note: The cover must be removed ♦to secure ringer to 290A adapter.♦

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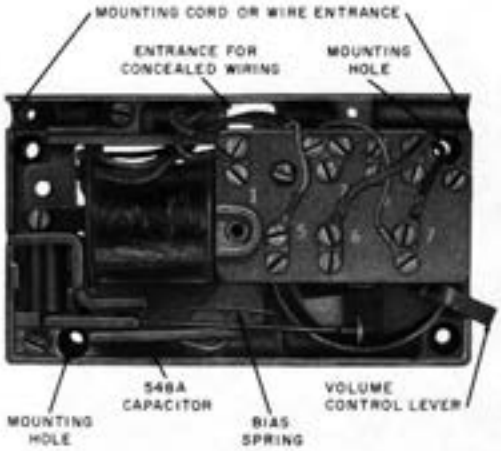

Fig. 2—E1C Ringer, Internal View

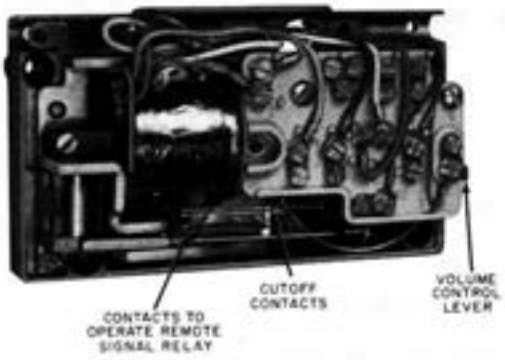

Fig. 3—E1D Ringer, Internal View

(a) Secure the 1049A mounting plate to mounting surface using appropriate fasteners for the type surface involved.

(b) Remove the rubber grommets from base of E1CM ringer and secure the 290A adapter to the ringer using the screws provided with the adapter.

Note: Two screws are placed through the adapter and into the ringer. One screw is placed through the ringer and into the adapter (Fig. 6).

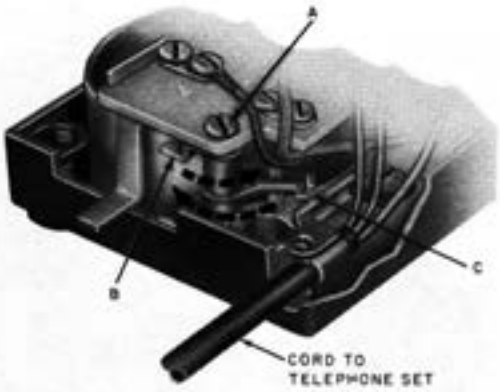

Fig. 4—E1C Ringer, End View

(c) Mount the ringer by placing the slotted holes in the 290A adapter onto the studs of the mounting plate and push down to secure.

3.06 To silence ringer.

(a) E1C ringer (Fig. 4).

(1) Loosen screw A.

(2) Move stop B to right.

(3) Move volume control to off.

(4) Move latch C to the left so that it falls in place over the volume control lever. This will lock ringer in off position.

(5) Tighten screw A.

(b) E1CM ringer (Fig. 5).

(1) Loosen screw A.

(2) Move stop B to position shown.

Note: Stop B should be under terminal board to prevent interference with jack, but not touching terminal 4.

(3) Move volume control to off.

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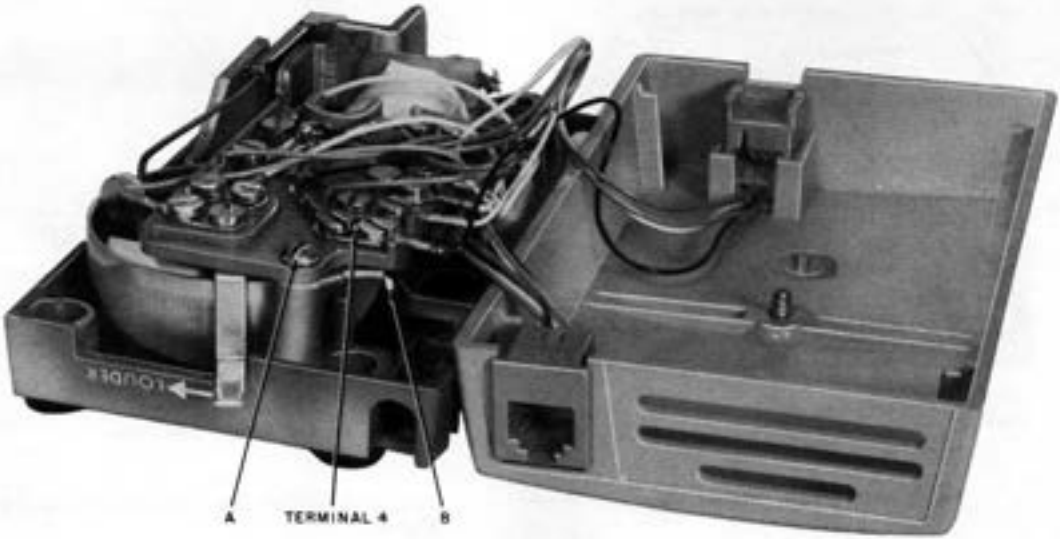

Fig. 5—E1CM Ringer, End View

(4) Tighten screw A.

4. CONNECTIONS

4.01 Connections for nonmodular type ringers are shown in Fig. 8 and modular type ringer in Fig. 9.

4.02 The E1D ringer is equipped with two sets of contacts (Fig. 3). One set, controlled by the clapper, operates a remote signal relay; the other set, operated by the volume control cam, cuts off remote signals. For connections, refer to section on farm interphone.

5. BIAS SPRING POSITION

5.01 The ringer is shipped with bias spring in the high (outside) notch. Table B indicates proper bias spring position for various classes of service.

Do not bend bias spring. Correct bias spring tension has been set at the factory.

5.02 Obtain a ringing test, after completing installation. Check for bell taps while dialing.

5.03 If bell does tap with bias spring in low notch, move bias spring to high notch. Repeat ringing test.

6. MAINTENANCE

6.01 If ringer fails to operate properly, check for the following:

(1) Airgap is clear of dirt or foreign material. Clean if necessary.

(2) All connections are tight and correct.

(3) Leads do not interfere with ringer operation.

(4) The 548A capacitor is not open or shorted. Replace if defective.

6.02 Replace ringer if it still fails to operate properly.

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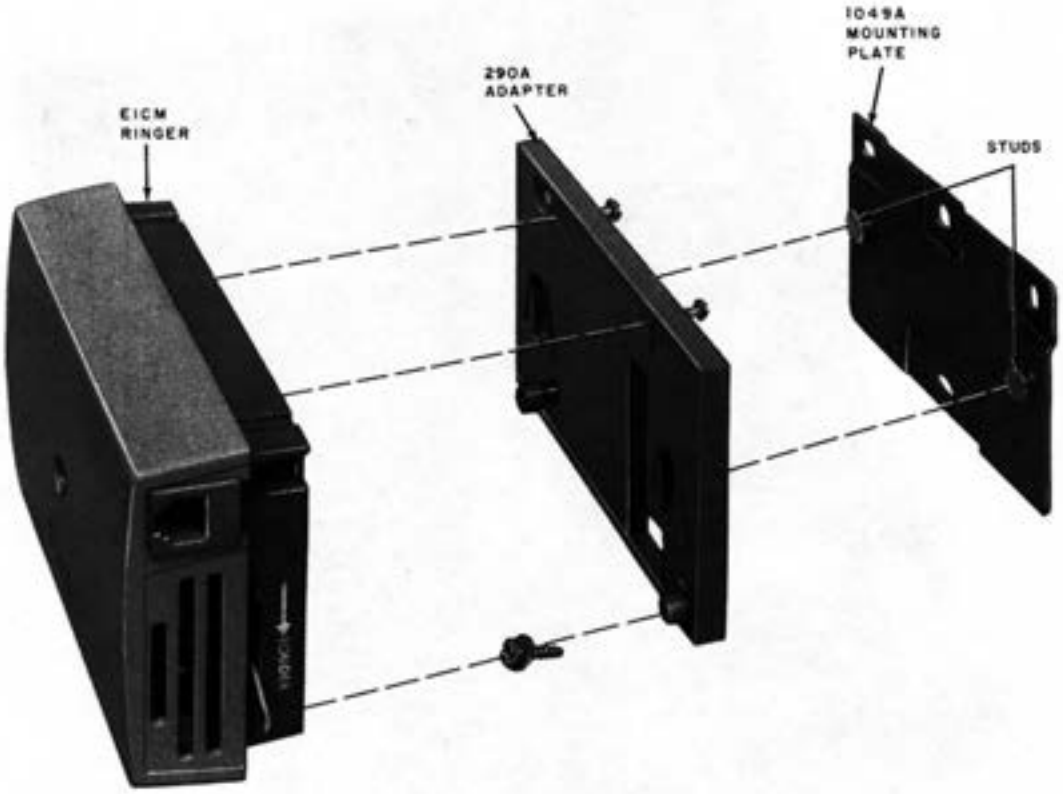

Fig. 6—E1CM Ringer, 290A Adapter, and 1049A Mounting Plate

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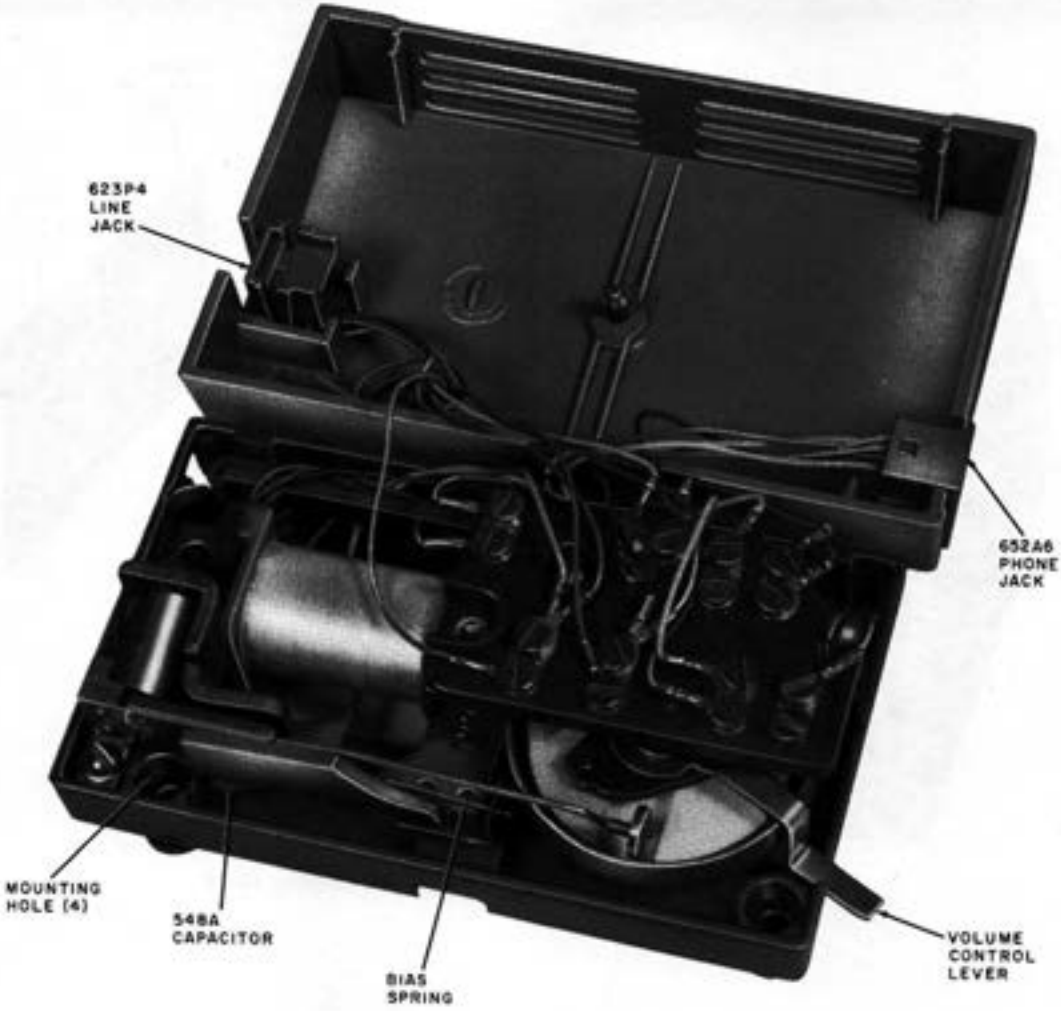

Fig. 7—E1CM Ringer, Interval View

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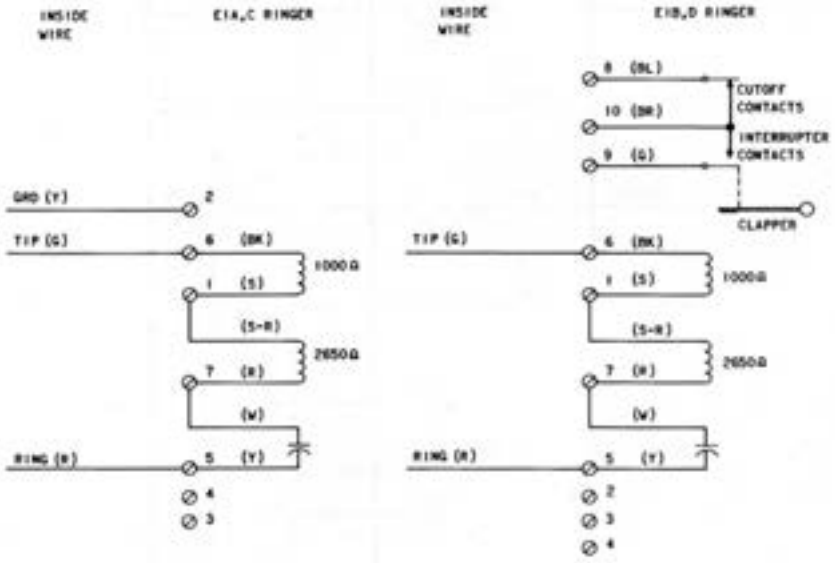

Fig. 8—E1-Type Ringer, Connections (Nonmodular)

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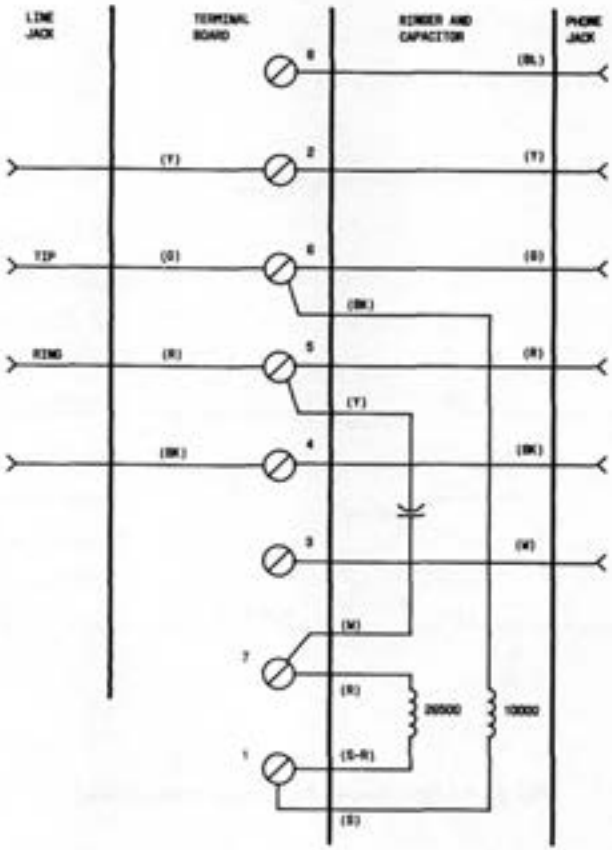

Fig. 9—E1CM Ringer, Connections (Modular)

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♦ TABLE B ♦

BIAS SPRING POSITION

CLASS OF SERVICE		BIAS SPRING NOTCH	REMARKS
Bridged Ringing Service	Individual Line and PBX Stations	High	If three or more ringers are bridged across line and operation is not satisfactory, place bias spring in low notch on all ringers. If condition still exists, replace ringer.
	Nonselective Party Lines	Low	
Grounded Ringing Service	2-party Flat and Message Rate	High	
	4-party Semiselective	High	If five ringers are connected between same side of line and ground, and operation is not satisfactory, place bias spring in low notch on all ringers on that side of line. If condition still exists, replace ringer.
	4-party Full Selective 8-party Semiselective Divided Code	Low	If ringer buzzes on short-loop installations when the party of opposite polarity on same side of line is being called, place bias spring in high-tension notch. If ringer still buzzes or fails to ring, replace ringer.

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SERVICE

F1A RINGER

1. GENERAL

1.01 The F1A (MD) ringer is a single coil, high impedance ringer with a 2 position bias spring adjustment.

1.02 Reissued to show F1A ringer rated MD.

1.03 This ringer may be connected with the following classes of service:

- Individual flat and message rate
- 2-party flat and message rate
- Regular PBX stations

1.04 The F1A ringer is not to be used for the following classes of service:

- 4-party selective
- 8-party semiselective
- Nonselective party lines
- Divided code ringing

1.05 In areas where inductive interference requires cold-cathode tube-type ringing bridges, the F1A ringer may be connected as shown in the connection practices on ringer and relay type subscriber sets-polarized ringing.

1.06 Standard ringing bridge limitations apply to the use of this high impedance ringer.

1.07 The ringer is shipped with bias spring in high (left) notch. The bias spring may be placed in low notch when double tap is experienced in CHIME position or when operation is not satisfactory with bias spring in high notch. If repositioning bias spring results in dial tap or poor operation, check connections.

TABLE A

LINE AND RINGER CONNECTIONS FOR F1A RINGER

WIRE OR LEAD		COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY (NOTE)
Inside Wire	Ring	R	6	6	1
	Tip	G	4	1	6
	GRD	Y		4	4
Ringer		R	7	7	7
		S-R	2	2	2
		S	2	2	2
		BK	4	4	4
Network Straps	G	BL	4	4*	4*
	A	R	7	7	7
	B	G	6	6	6

*Place BL strap on (1) whenever severe induction noise is encountered.

Note: For tip party with 10002 or 26502 identifying ground, connect F1A ringer for tip party service and modify all telephone sets associated with ringer for tip party identifying ground per appropriate Bell System Practice. The telephone set ringer may be permanently silenced per the Bell System Practice. Ringerless telephone sets may use a 1610A or 1635A inductor for tip party identifying ground.

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L1A-TYPE RINGERS

IDENTIFICATION, INSTALLATION, CONNECTIONS, AND MAINTENANCE

1. GENERAL

1.01 This section contains information on the L1A manufacture discontinued (MD), L1AM (MD), and L1AMP ringers. These are indoor/outdoor loud auxiliary ringers.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add procedure to remove D4CD mounting cord from L1AMP ringer
- Add 13A housing information
- Show 181A backboard MD.

1.03 The L1AMP ringer is the same as the L1AM ringer, except it has keyhole-type slots in the plastic base for mounting on a 1049A mounting plate. A 2-foot modular weatherproof mounting cord (D4CD) is provided with L1AMP ringer.

2. IDENTIFICATION

2.01 The L1A (MD), L1AM (MD), and L1AMP ringer is a single-coil, high impedance, loud ringing signal for indoor or outdoor use. The ringer has a 2-position bias spring and two concentric gongs. The volume can be adjusted by rotating the gongs (Fig. 1).

2.02 The ringer has mounting facilities provided for the installation of a 425A or 426A electron tube. The tubes are used for selective multiparty line ringing or when there is evidence of inductive interference (Table A). For the maintenance and mounting instructions of these tubes, refer to the section entitled Electron Tubes.

A. Ordering Guide

2.03 Order as follows: Ringer, L1AMP-49 (includes 2-foot D4CD mounting cord).

Fig. 1—▮L1AMP Ringer▮

(a) Order associated apparatus as follows:

(1) Plate, Mounting, 1049A (indoor locations)

(2) ▮Housing 13A (outdoor locations).▮

3. INSTALLATION

3.01 Select a location that will permit customer to hear ringer.

3.02 Mount ringer in a vertical position with gongs at top.

A. Indoor Locations

3.03 Indoor locations in most cases will require the use of a 1049A mounting plate. The mounting plate has four mounting holes and can be directly fastened to a wall surface as follows.

Note: Arrow indicates top of mounting plate.

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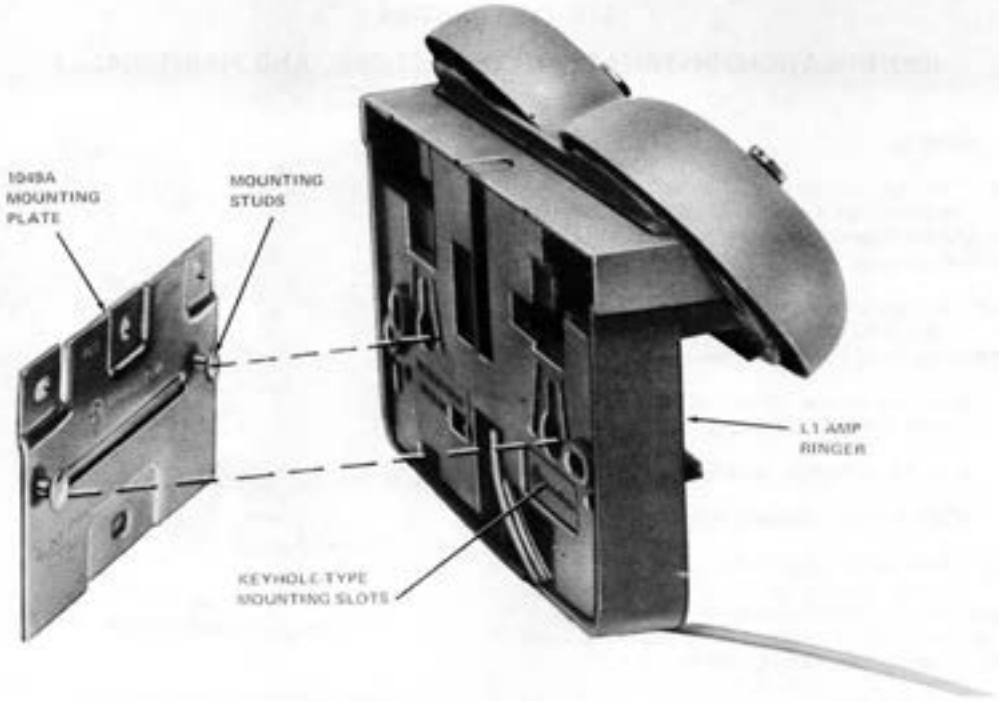

Fig. 2—L1AMP Ringer and Mounting Plate (Indoor Installation)

(a) For fastening to wood, use panhead self-tapping screws.

(b) For hollow wall construction, use toggle bolts or B wall screw anchors.

(c) For concrete and masonry surfaces, use D plastic anchors.

3.04 To mount ringer to mounting plate, align mounting plate studs with keyhole-type slots in ringer, press ringer down on mounting plate until mounting studs completely engage ringer (Fig. 2).

3.05 Remove ringer cover and connect as required per Table A and Fig. 3, using D4CD mounting cord for bridged ringing. D-station wire can be used for other ringing configurations.

B. Outdoor Installations

3.06 Outdoor installations require the use of a weatherproof 181A-49 (MD) backboard or 13A housing and 625WP4 connecting block when the D4CD mounting cord is used for individual bridged ringing configurations. Refer to paragraphs 3.07 and 3.08 for installation procedures.

3.07 Install the 181A-49 (MD) backboard and ringer as follows:

(1) Remove backboard cover.

(2) Fasten backboard to wall surface using the appropriate item per paragraph 3.03 (a), (b), or (c).

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(3) Mount ringer on backboard with mounting screws provided.

(4) Connect D4CD (see Note) mounting cord or D-station wire leads per Table A.

(5) Install backboard cover.

(6) Connect D4CD (see Note) mounting cord to 625WP4 connecting block or D-station wire to an indoor connecting block (Fig. 3).

Note: Individual bridged ringing for non tip and ring applications requires the D4CD cord be connected to 625WP4 connecting block.

3.08 ◗Install the 13A housing (Fig. 4) and ringer as follows.

(1) Partially fasten the base of the housing to wall surface using the appropriate item per paragraph 3.03 (a), (b), or (c).

(2) Slip the D4CD (see Note in paragraph 3.07) mounting cord or D-station wire through the mounting cord or wire hole of the housing base. Finish fastening the base to wall surface.

(3) Remove ringer cover and mount ringer to housing base using two screws provided with 13A housing.

(4) Connect D4CD (see Note in paragraph 3.07) mounting cord or D-station wire leads per Table A and install ringer cover.

(5) Install housing cover using two screws provided.

(6) Connect D4CD mounting cord to 625WP4 connecting block or D-station wire to an indoor connecting block (Fig. 3).◖

4. MAINTENANCE

4.01 If ringer fails to operate properly, check the following.

(a) Using hand test set or meter check for incoming signal across appropriate terminals shown in Table A.

(b) All leads should be dressed away from clapper and armature.

(c) Armature air gap should be free of dirt and foreign material.

(d) All terminal connections should be tight and correctly terminated.

(e) Biasing spring should not touch or rub pole piece and should be in correct notch.

Note: See section on maintenance of C-type ringers for proper bias spring position on a particular class of service.

(f) ◗To remove the hood (Fig. 1), perform the following:

(1) If the hood has a screw, remove it and swing the top of the hood outward.

(2) If the hood has no screw, press down on top of hood and simultaneously swing outward.◖

Correct biasing spring tension has been set at factory. Do not bend biasing spring. Spring can be moved to either notch as required.

(g) Clapper should have perceptible to 1/32-inch clearance from 26F gong when armature is nonoperated. With armature operated, clearance should be perceptible to 1/32-inch between clapper and 26E gong. Gongs are on an eccentric pivot and may be rotated to meet this requirement.

(h) If ringer still does not operate properly, replace ringer.

4.02 ◗When it is required to remove the D4CD mounting cord of the L1AMP ringer, use the following procedure.

(1) Remove the ringer cover.

(2) Using the right thumb, carefully flex back the small retainer tab while simultaneously lifting the terminal board with left index finger (Fig. 5A) until the right side of the board is released.

(3) Using the left thumb, carefully flex back the large retainer tab while simultaneously lifting the terminal board with right index finger until the board is completely released.

(4) Remove terminal board from ringer as far as lead lengths permit. Rotate the mounting cord

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downward until *J* hook is released (Fig. 5B). Disconnect mounting cord leads.

(5) Align terminal board over the two bosses and retainer tabs, then snap into place (Fig. 5C).

(6) Refer to Part 3 for installation information.◀

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TABLE A

LINE, RINGER, AND ELECTRON TUBE CONNECTION

WIRE OR LEAD		COLOR	D4CD CORD INDIV BRIDGED (NOTE 1)	2-PARTY		SELECTIVE RINGING AND AVERAGE INDUCTION (UP TO 30 VOLTS) (NOTE 2)				SEVERE INDUCTION (30 TO 80 VOLTS) (NOTE 2)			
				RING	TIP	(–) RING PARTIES (1-5)	(–) TIP PARTIES (2-6)	(+) RING PARTIES (3-7)	(+) TIP PARTIES (4-8)	(–) RING PARTIES (1-5)	(–) TIP PARTIES (2-6)	(+) RING PARTIES (3-7)	(+) TIP PARTIES (4-8)
D-Station Wire or D4CD Mtg Cord	Ring	R	4	4	3	4	3	4	3	4	3	4	3
	Tip	G	3	3	4	3	4	3	4	3	4	3	4
	GRD	Y	†	6	6	6	6	6	6	6	6	6	6
	Spare	BK	†	†	†	†	†	†	†	†	†	†	†
Ringer		R	4	4	4	6	6	4	4	1	1	4	4
		S-R	1	1	1	1	1	1	1	4	4	1	1
		S	2	2	2	2	2	2	2	4	4	2	2
		BK	3	6	6	6	6	4	4	2	2	4	4
Capacitor		W	1	1	1	1	1	1	1	1	1	1	1
		Y	2	2	2	2	2	2	2	2	2	2	2
426A Electron Tube		R				6	6	4	4				
		BK				1	1	1	1				
		Y				4	4	6	6				
426A Electron Tube (Severe Induction)*		R								3	3		
		BK								1	1		
		Y								4	4		
425A Electron Tube (Severe Induction)		R								3	3	4	4
		BK								6	6	1	1
		Y								1	1	6	6
		G								4	4	3	3

Note 1: Individual bridged ringing requires the D4CD cord and modular jack to be used.

Note 2: Use negative party connections when capacitor type grounded ringing must be replaced with tube type ringing due to inductive noise.

* The three elements 426A tube can be used to combat severe inductive noise (30 to 80 volts) on negative parties only. It cannot be used on positive parties.

† Insulate and store.

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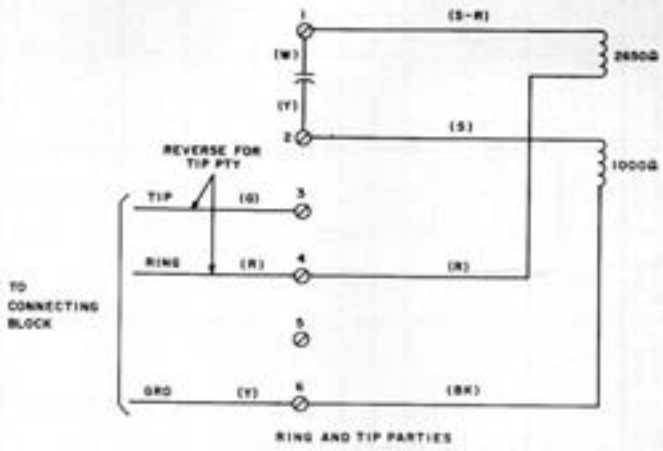

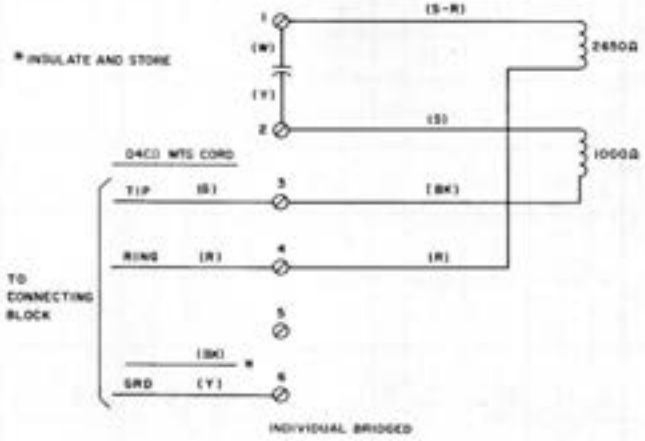

Fig. 3—L1A-Type Ringer, Connections (Sheet 1 of 3)

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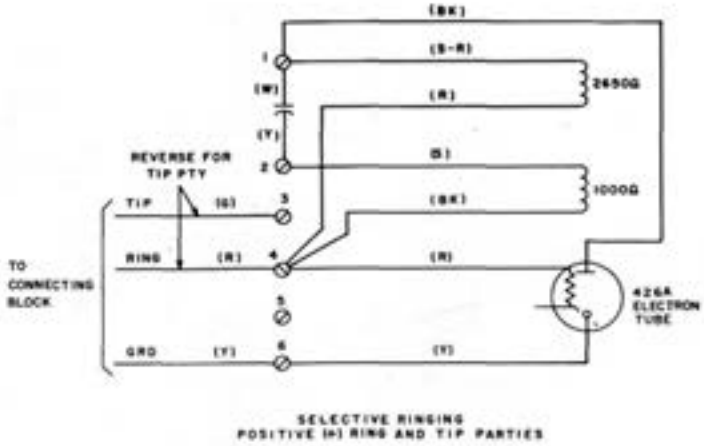

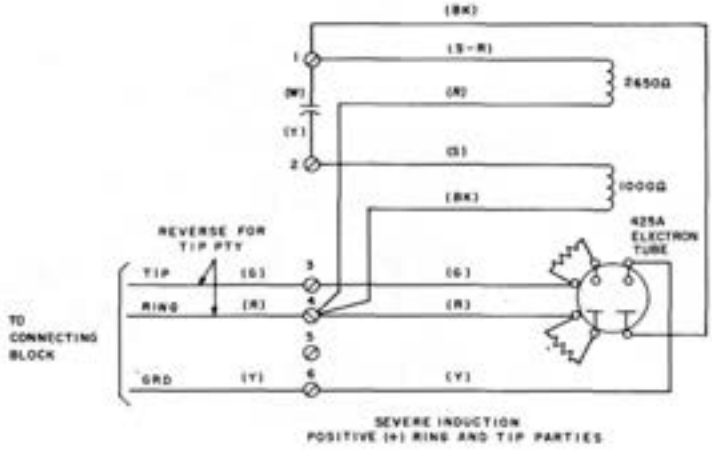

Fig. 3—L1A-Type Ringer, Connections (Sheet 2 of 3)

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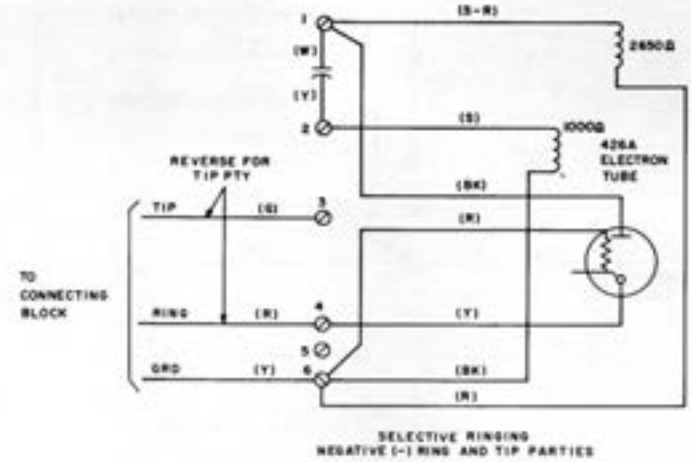

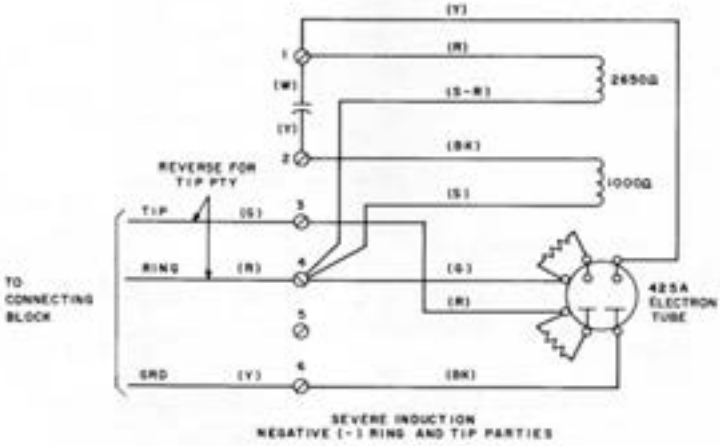

Fig. 3—L1A-Type Ringer, Connections (Sheet 3 of 3)

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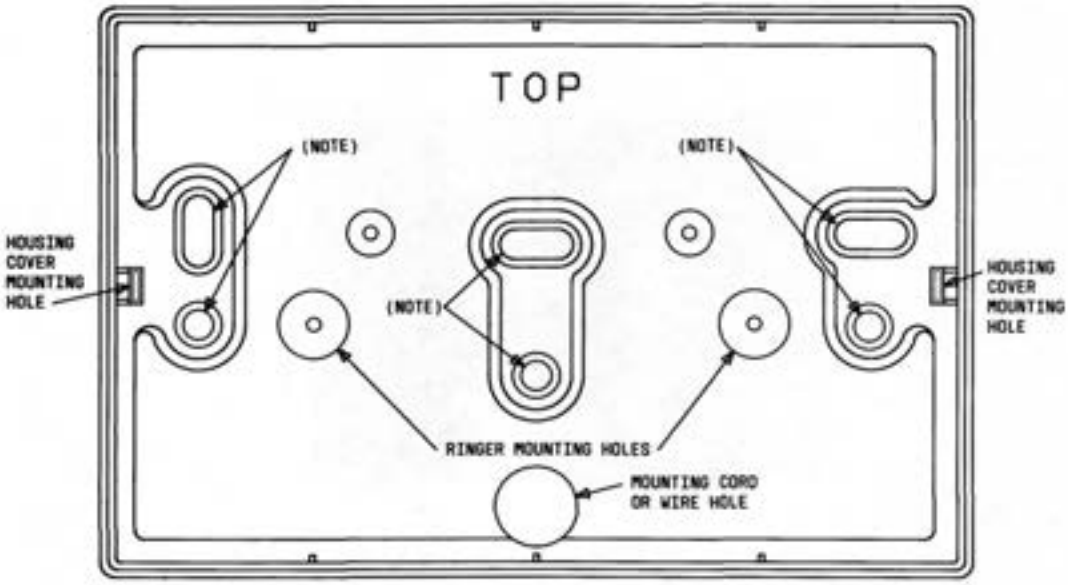

NOTE: BASE MOUNTING HOLES

Fig. 4—◆13A Housing Base Mounting Hole Arrangement (Outdoor Installation)◆

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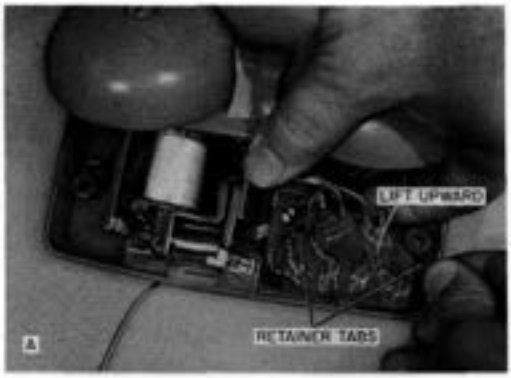

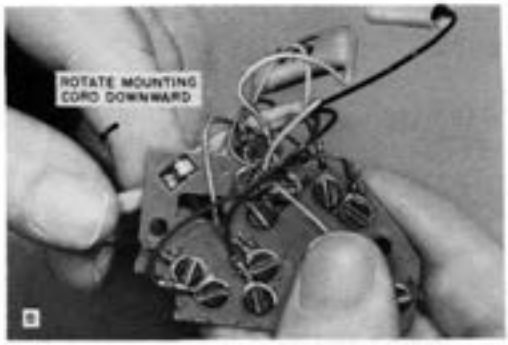

Fig. 5—#D4CD Mounting Cord Removal#

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P-TYPE RINGERS

IDENTIFICATION AND MAINTENANCE

1. GENERAL

1.02 This section contains information for the P1A (MD), P1B (MD), P2B (MD), P3A, P3B, and P3C ringers (Fig. 1).

1.02 This section is reissued to:

- Add P3A, P3B, and P3C ringers
- Show P1A, P1B, and P2B ringers MD.

1.03 ◆The P3A, P3B, and P3C ringers are electrically identical and replace the P1A, P1B, and P2B ringers, respectively.◆

2. IDENTIFICATION

2.01 The P-type ringer is a single-coil, high impedance ringer mounted directly in a telephone set or by means of a 165- or 166-type adapter (Fig. 2). The 165-type adapter is equipped with a resonator (Fig. 3).

2.02 The P-type ringer has a variable mechanical volume control permitting adjustment from loud to low volume (Fig. 4).

Note: When the volume control is set in LOW position only ringer motor noise may be heard because clapper might not strike gong. If bell sound is desired, move control to slightly higher volume position.

2.03 The volume control can be moved to the cutoff position by rotating the dust cover until the openings line up with the access holes in the top of the gong and removing the factory placed stop screw (Fig. 3).

To avoid breaking the volume control arm when replacing stop screw, be sure volume control is in high volume position.

2.04 The coil of the P3A (Fig. 5) ringer has four spade-tipped leads and the early production models of the P1A have five spade-tipped leads to provide tip party identification. The P1B and P3B ringer coil is not tapped and has only two leads (Fig. 5). It can be used in any application not requiring tip-party identification.

2.05 ◆The P2B and P3C ringers are the same as the P1B and P3B ringers, respectively, except the leads are 16 inches long.◆

3. MAINTENANCE

3.01 The bias spring tension is a two-position control on the P-type ringer. The high tension notch or high bias position is with the bias spring engaged over the hooked end of the drive arm (Fig. 7). The low tension notch or low bias position is with the spring disengaged. The ringer is shipped from the factory with the bias spring in the low bias position. The correct bias spring tension for the high bias position has been factory-set to meet specific requirements.

Both ends of the drive arm (Fig. 7) are adjusted at the factory to meet correct clapper to gong spacing (drive end) and high bias spring tension (hooked end). Engagement and disengagement of the bias spring is the only recommended field change to this ringer. Do not use pliers or screwdriver to change bias spring position.

3.02 The correct procedure for changing bias spring position is as follows.

(1) Bend a hook on the end of the paper clip or equivalent (Fig. 6).

(2) Rotate dust cover until openings line up.

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(3) Place hook under bias spring as shown in Fig. 6. Lift spring up and release it for low bias setting or engage bias spring over hook on drive arm for high bias setting.

(4) Remove paper clip and rotate dust cover to its original position covering all openings.

3.03 Table A shows bias spring settings for class of service and number of ringing bridges required.

3.04 After positioning the bias spring, test ringer according to local instructions.

Note: When ring-back circuits are provided by the local central office, these facilities must be used instead of ring back from local test desk. The ringing voltage supplied from the local test desk may be higher and give false indications of proper operation.

3.05 If bell taps during dialing and bias spring is in low bias position.

(a) Check ringer and set for proper wiring.

(b) If wiring is correct, change bias spring to high bias position per paragraph 3.02.

(c) Repeat ringer test.

3.06 If the ringer fails to operate, check that.

- Volume control is not in off position
- Gong is free of obstruction or foreign material.

3.07 If ringer continues to fail, replace ringer telephone set according to local instructions. If the ringer is replaced, a P3A ringer must be used if tip party identification or multiparty ringing is required. In all other applications either the P3A or P3B may be used.

3.08 For information on the maximum number of ringers that can be used for various services and loop lengths, refer to Section 500-114-100. For information relating to inductive noise associated with grounded ringing, refer to Section 500-112-100.

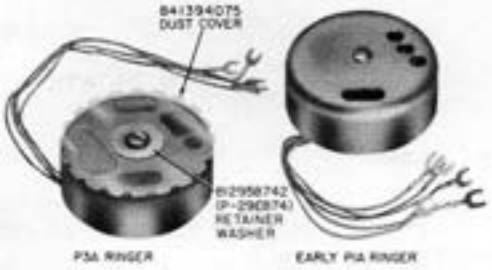

Fig. 1—P-Type Ringer

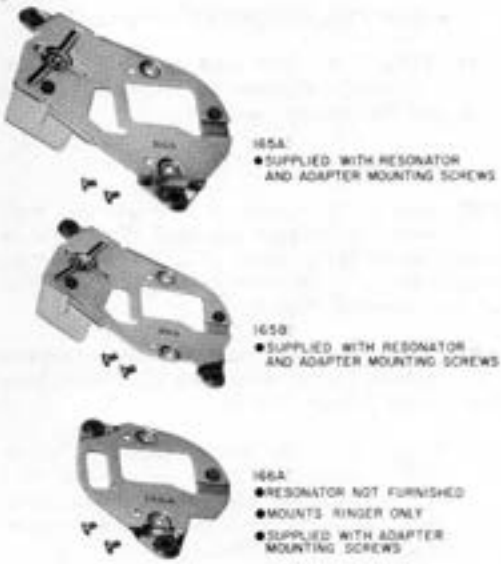

Fig. 2—P-Type Ringer Adapter Plates

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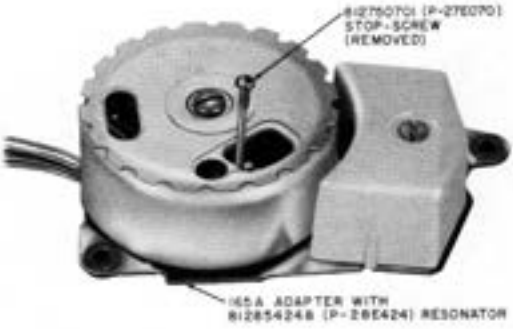
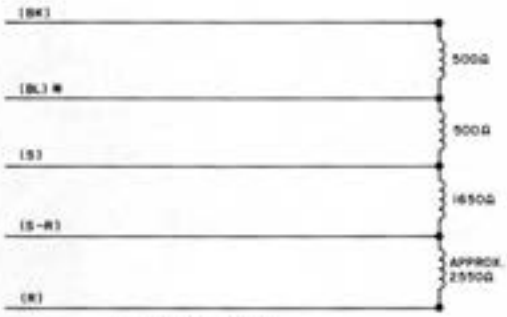


Fig. 3—P-Type Ringer Mounted on 165A Adapter



A. P1A AND P3A RINGER

* (BL) LEAD WAS USED IN EARLY PRODUCTION P1A RINGERS

B. P1B P2B, P3B, AND P3C RINGER

Fig. 5—P-Type Ringer—Schematic

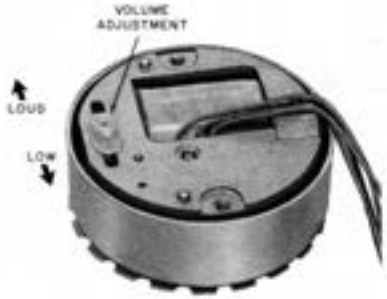


Fig. 4—P-Type Ringer (Bottom View)

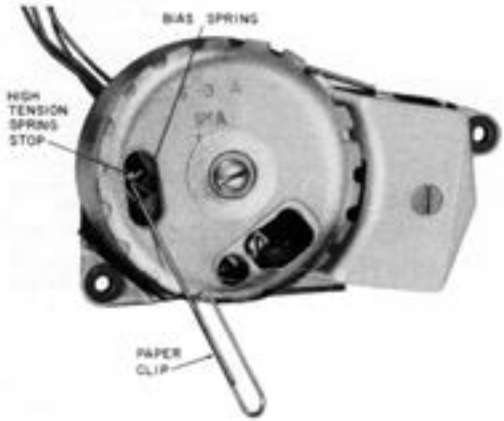


Fig. 6—Positioning Bias Spring

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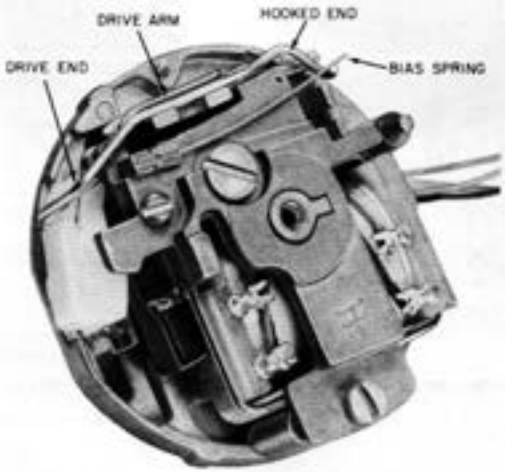

Fig. 7—Cover Removed to Show Drive Arm and Bias Spring

TABLE A

BIAS SPRING POSITION

SERVICE	BIAS POSITION
Bridge Ringing	
Individual Line (Note 1)	Low
Nonselective Party Lines	Low
PBX Stations	High
Grounded Ringing	
2-party Flat and Message Rate (Note 2)	High
4-party Semiselective (Notes 2 and 3)	High
4-party Selective	Low
8-party Semiselective	Low
Divided Code	Low

Notes:

1. When only a few (one or two) ringers are bridged across the line or the loop is short, bell tap may occur. To correct bell tap, change bias spring to high bias position.
2. Bias spring must be in high bias position on all two-party flat and message rate service and most four-party semiselective service (see Note 3) to prevent cross ringing (ringing of uncalled party when called party answers).
3. When five ringers are connected between same side of line and ground and operation is not satisfactory, bias spring may be placed in low bias position on all ringers on the same side of line. If condition is not corrected, change ringer.

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S1A AND S1AM TONE RINGERS

1. GENERAL

1.01 This section contains identification, installation, connections, and maintenance information on the ◗S1A (MD) and S1AM (modular)◖ tone ringers.

1.02 This section is reissued to:

- Add information on S1AM (modular) tone ringer
- Show S1A tone ringer MD

2. IDENTIFICATION

2.01 ***Purpose:*** The S1A and S1AM tone ringers (Fig. 1 and 2) are extension ringers for people with impaired hearing.

2.02 ***Ordering Guide:***

- ◗Ringer, S1AM-*◖

*Available in Ivory (-50) and Gold (-63) only.

2.03 ◗***Associated Equipment or Apparatus (ordered separately):***

- Cord, Mounting, D4BU-29
- Plate, Mounting, 1049A
- Adapter, 285A.◖

2.04 ***Design Features:***

- To be mounted on a vertical wall surface
- Volume control switch provides LOW-OFF-LOUD positions
- Alerting signal consists of two equal amplitude frequency components at approximately 750 and 1500 Hz
- Higher frequencies are attenuated by a side branch resonator to reduce annoyance to persons with normal hearing
- ◗S1AM modular mounting cord.◖

2.05 ***Application:***

- Individual lines
- 2-party flat rate
- PBX stations.

Note: When tip party identification is required, it should be obtained through the ringer associated with each telephone set. Refer to particular telephone set used for connections.

3. INSTALLATION

3.01 Select a central location about 5 feet above the floor so that the customer can hear the ringer in LOW volume position in largest area of residence.

3.02 Install both ringers with volume control switch down. Allow space on top of ringer to remove cover.

3.03 ◗The S1AM (modular) tone ringer (Fig. 2) requires a 285A adapter and a 1049A mounting plate which must be ordered separately. Install the ringer as follows:

(a) Using hardware provided with 285A adapter, attach adapter to back side of ringer.

(b) Mount the 1049A mounting plate on wall surface using appropriate hardware for the particular wall material.

(c) Place ringer over studs on mounting plate and move downward to snap into detented slots.

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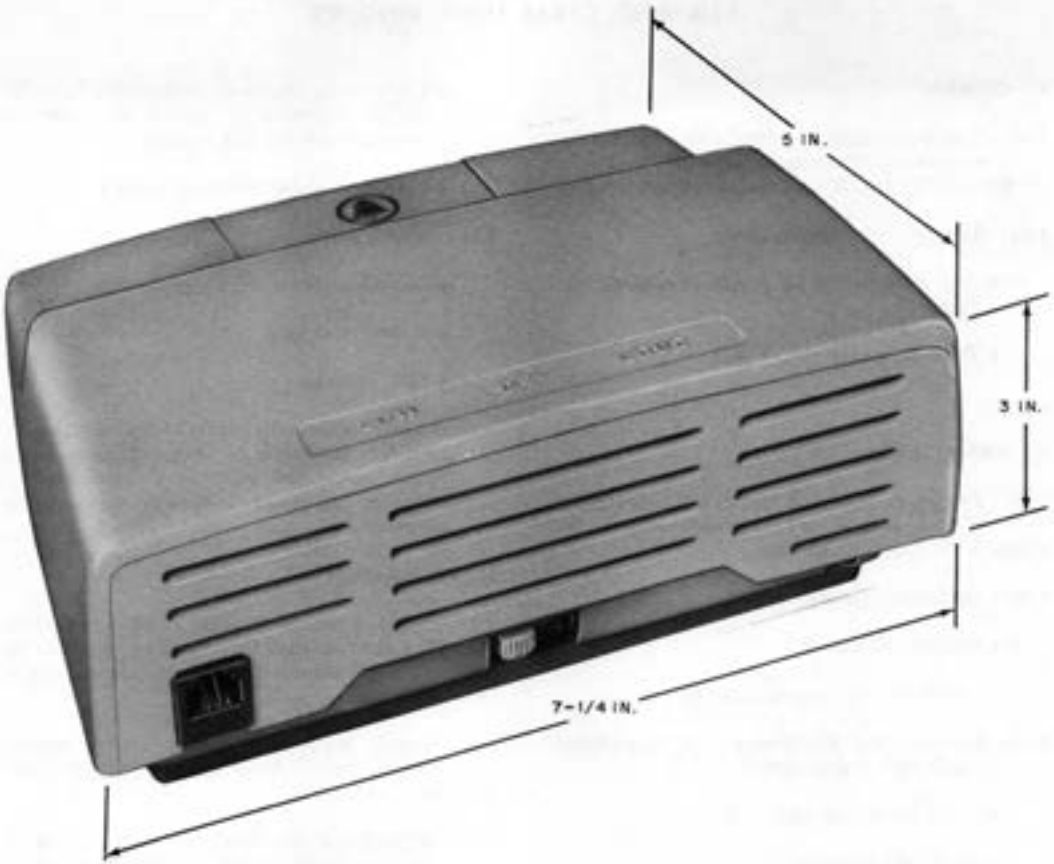

Fig. 1—S1AM Tone Ringer

(d) Connect the D4BU mounting cord between the connecting block and ringer jack.

3.04 The S1A (MD) ringer is designed to be mounted on a wall surface with two fasteners. Select length of fastener to provide secure mounting for the particular wall material.

3.05 To remove the louvered cover from either tone ringer, release the two captive screws which fasten cover to the base (Fig. 3).

3.06 Inside wire may enter tone ringer from back, bottom, or either side (S1A only).

3.07 The ringer voltage margin test should be made at time of installation and on maintenance visits where trouble is indicated in the ringer.

4. CONNECTIONS

4.01 ***Ringer Voltage Margin Test:***

Note: The ringer is furnished from the factory wired in the high-bias condition with

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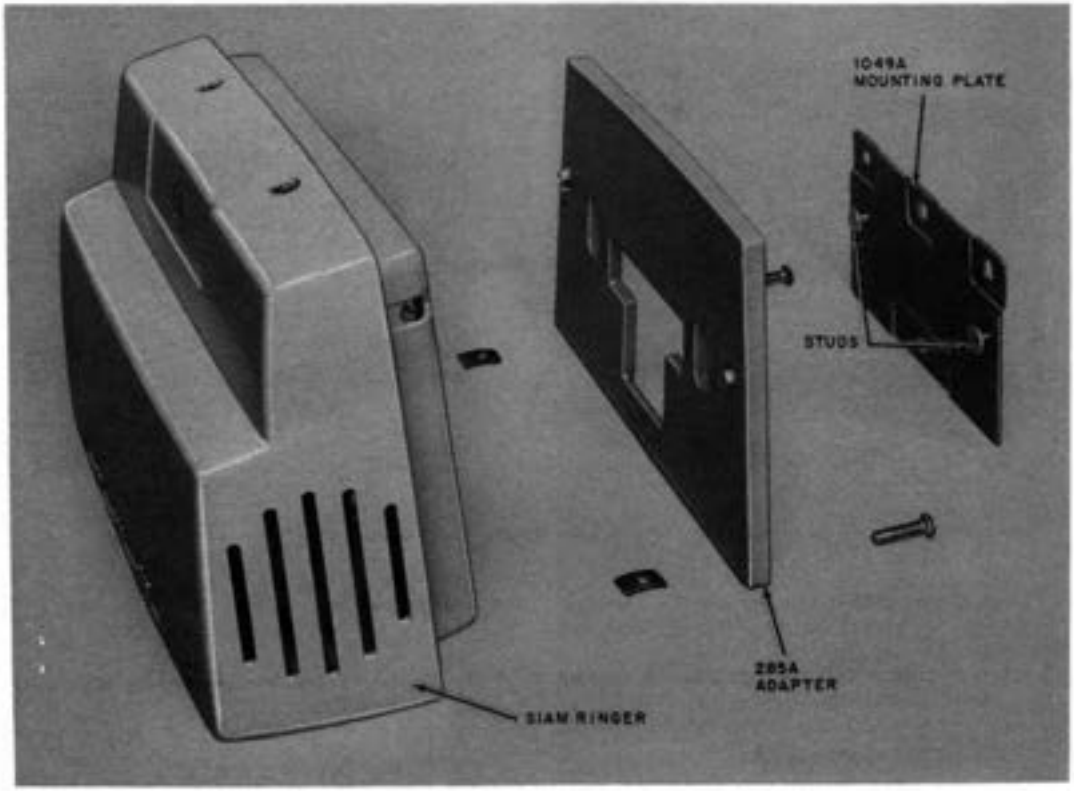

Fig. 2—◆S1AM Tone Ringer With Adapter and Mounting Plate◆

the WHITE lead connected between HB1 terminal and R4 resistor terminal (Fig. 5).◆

(a) Move line wire from terminal 4 to terminal 5 of the ringer terminal board (Fig. 4 and 5).

(b) Obtain ringing test according to local instructions. Check ringer in LOW and LOUD volume positions.

(c) If ringer operates properly, move line wire from terminal 5 back to terminal 4 and replace cover.

Note: In no case should the line wire be left on terminal 5 after the test is completed.

(d) If in step (b) the ringer does not operate properly, disconnect WHITE bias lead at HB1 terminal of the ringer terminal board, insulate and store for low bias condition.

(e) Repeat steps (a) and (b).

(f) If ringer does not operate properly, replace tone ringer and repeat test.

4.02 ***Voltage Margin for Multiple S1A or ◆S1AM◆ Ringers:*** When more than one ringer is connected to a line, observe the following:

(a) When it is necessary to connect one S1A or ◆S1AM◆ ringer in the low-bias condition, all

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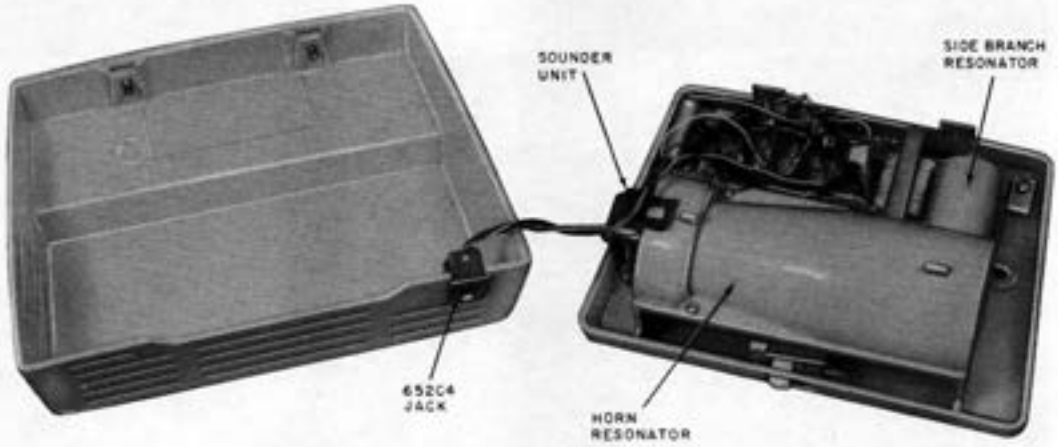

Fig. 3—◆S1AM Tone Ringer, Cover Removed◆

other ringers on the same line must be connected for low-bias even if they pass the high-bias test.

(b) If all ringers meet the high-bias test, connect for high-bias condition.

◆TABLE A◆

LINE (S1A) AND JACK (S1AM) TONE RINGER CONNECTIONS

WIRE OR LEAD (See Note)		COLOR	TERMINAL BOARD IN RINGER		
			INDIV OR BRDG	RING PARTY	TIP PARTY
Inside Wire or 652C4 Jack	Ring	R	4	4	6
	Tip	G	3	6	3
	GRD	Y	6	3	4
	Spare	BK	*	*	*

* Insulated and stored.

Note: For connecting other classes of service, see section for the particular telephone set used.

5. MAINTENANCE

5.01 If ringer fails to operate properly, check the following:

(a) See that all connections are tight and correct.

(b) Make ringer voltage margin test per 4.01.

(c) Verify that ringing bridge limitations are not exceeded.

(d) If tone ringer still fails to operate properly, replace ringer.

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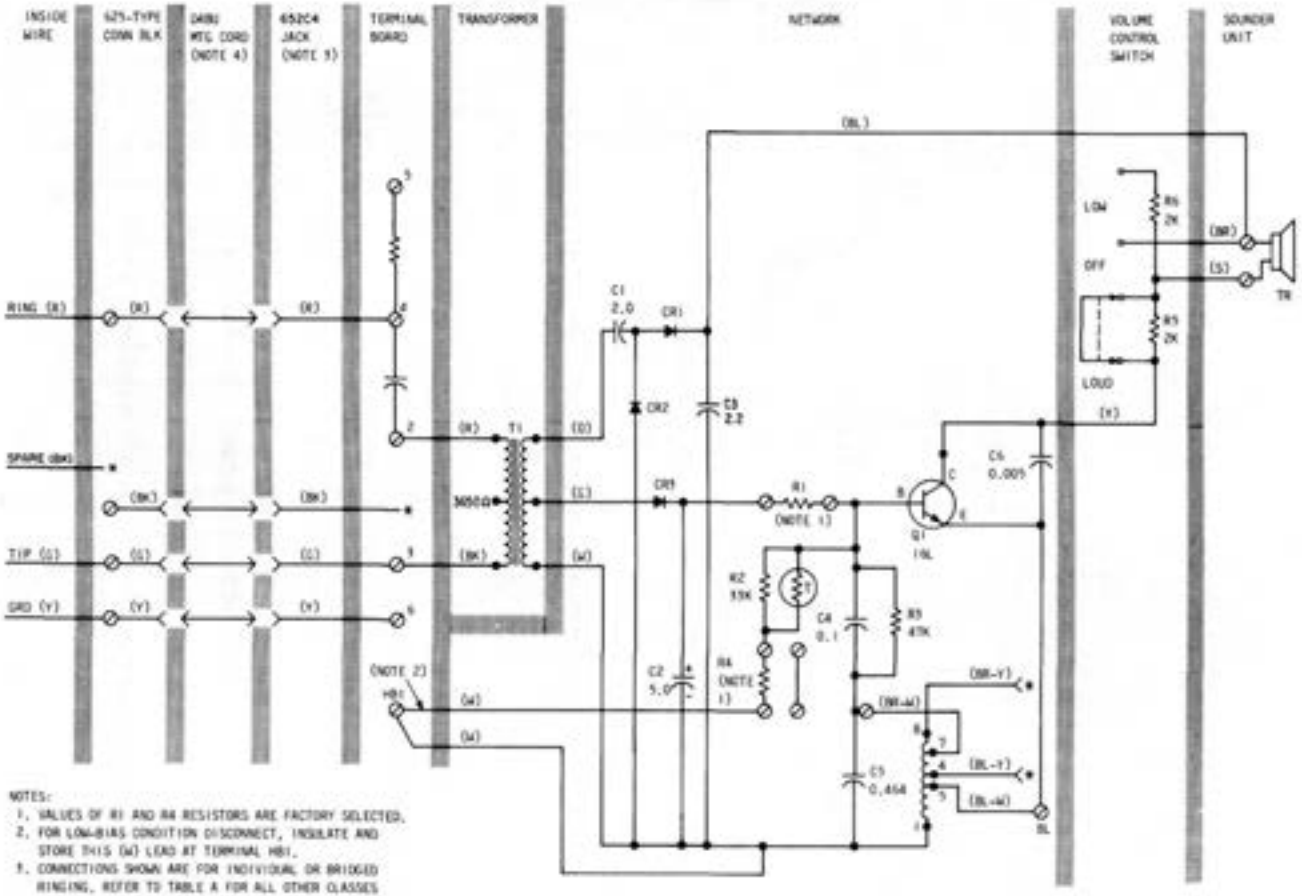

NOTES:
1. VALUES OF R1 AND R4 RESISTORS ARE FACTORY SELECTED.
2. FOR LOW-BIAS CONDITION DISCONNECT, INSULATE AND STORE THIS (W) LEAD AT TERMINAL HB1.
3. CONNECTIONS SHOWN ARE FOR INDIVIDUAL OR BRIDGED RINGING. REFER TO TABLE A FOR ALL OTHER CLASSES OF SERVICE.
4. MUST BE ORDERED SEPARATELY.
* INSULATED AND STORED.

Fig. 4—#31AM Tone Ringer, Connections

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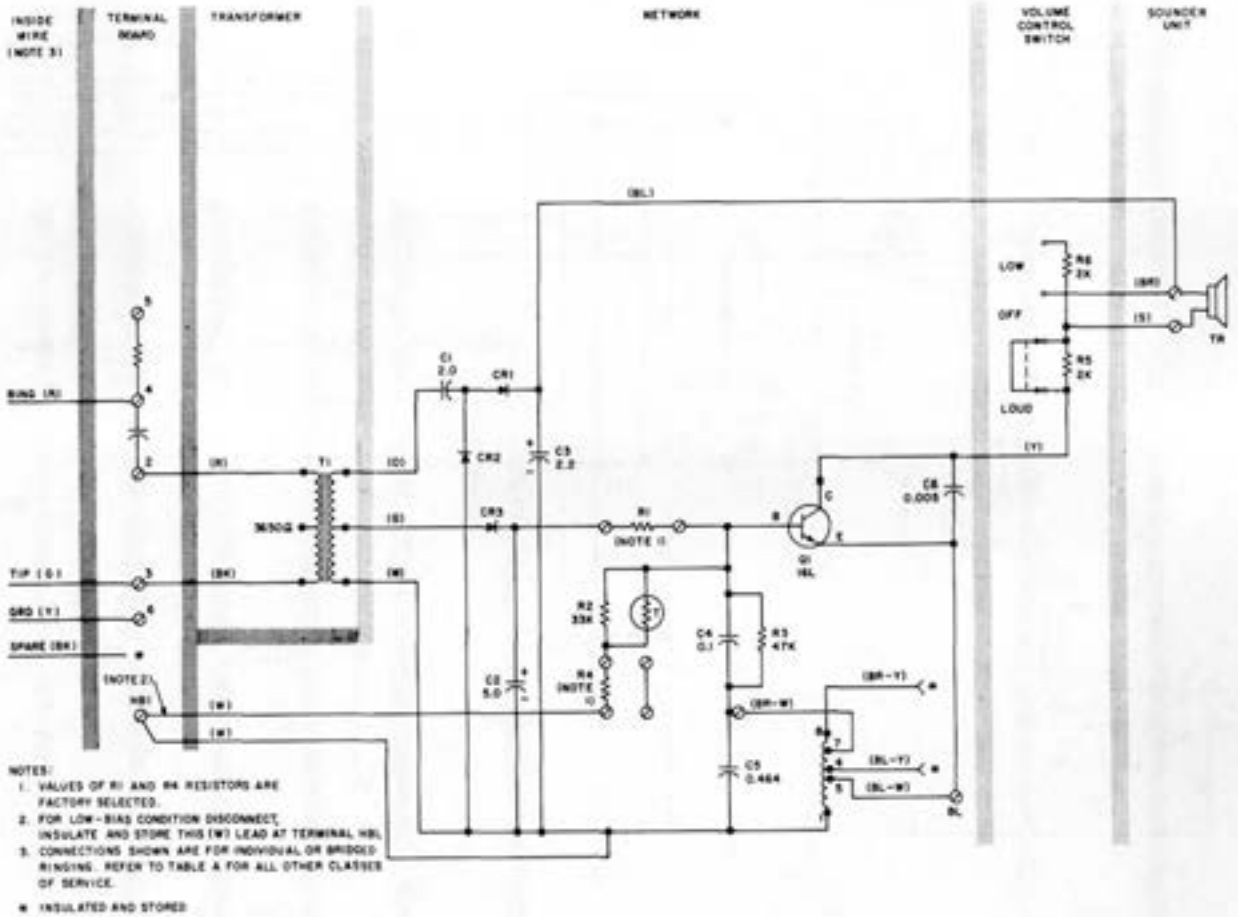

Fig. 5 E1A (MD) Tone Ringer Connections

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W1A TONE RINGER

IDENTIFICATION, INSTALLATION, CONNECTIONS, AND MAINTENANCE

1. GENERAL

1.01 This section contains information on the W1A tone ringer (Fig. 1, 2, and 3) which is a loud ringing extension ringer for people with impaired hearing or those people desiring a pleasant sounding ringer.

Fig. 1—W1A Ringer

1.02 Whenever this section is reissued the reasons for reissue will be listed in this paragraph.

2. IDENTIFICATION

A. Ordering Guide

2.01 Order as follows:

Ringer, W1A-*.

* Available in Ivory (-50) and Dark Brown (-104).

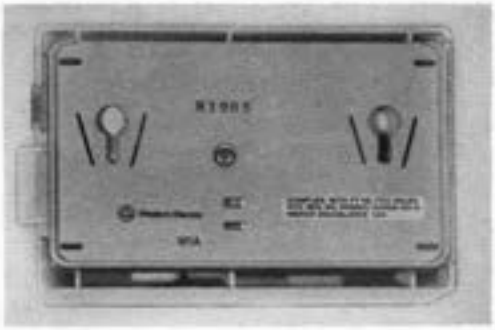

Fig. 2—W1A Ringer, Rear View

B. Associated Equipment or Apparatus

2.02 The following is associated equipment or apparatus:

- T-adapter, 267A (ordered separately)
- Cord, Mounting, D4BU-29 (ordered separately)
- Plate, Mounting, 1049A (provided)
- Desk Mounting Friction Pad (provided).

C. Design Features

2.03 The following are design features:

- To be mounted on a vertical wall surface or a desk (with provided friction pad feet).
- Volume control switch (HI ⟷ OFF) provides high-medium-low-off.

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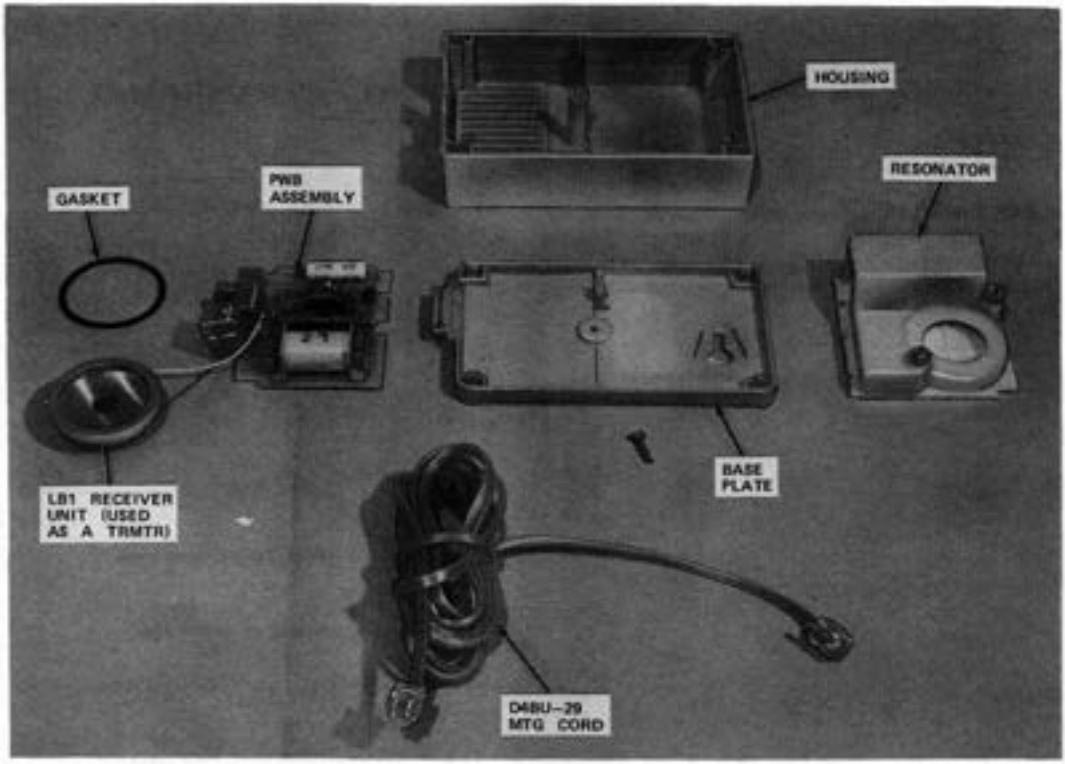

Fig. 3—W1A Ringer, Component Parts

- Alerting signal consists of two equal amplitude frequency components at approximately 750 and 1500 Hz.

2.04 The W1A tone ringer can only be used on bridged ringing.

3. INSTALLATION

A. Impaired Hearing

3.01 Select a central location about 5 feet above the floor so that the customer can hear the ringer in the largest area of residence. Install using 1049A mounting plate.

B. Extension Ringer

3.02 Install on wall base board using 1049A mounting plate or on desk using friction pads.

4. CONNECTIONS

4.01 Refer to Fig. 4.

5. MAINTENANCE

5.01 If ringer fails to operate properly, check to see that volume control is not in OFF position. If not check the following:

(a) Open ringer by removing single mounting screw.

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(b) Check the four leads (two from jack and two from transmitter) for opens.

(c) If tone ringer still fails to operate properly after reconnecting opens, replace ringer.

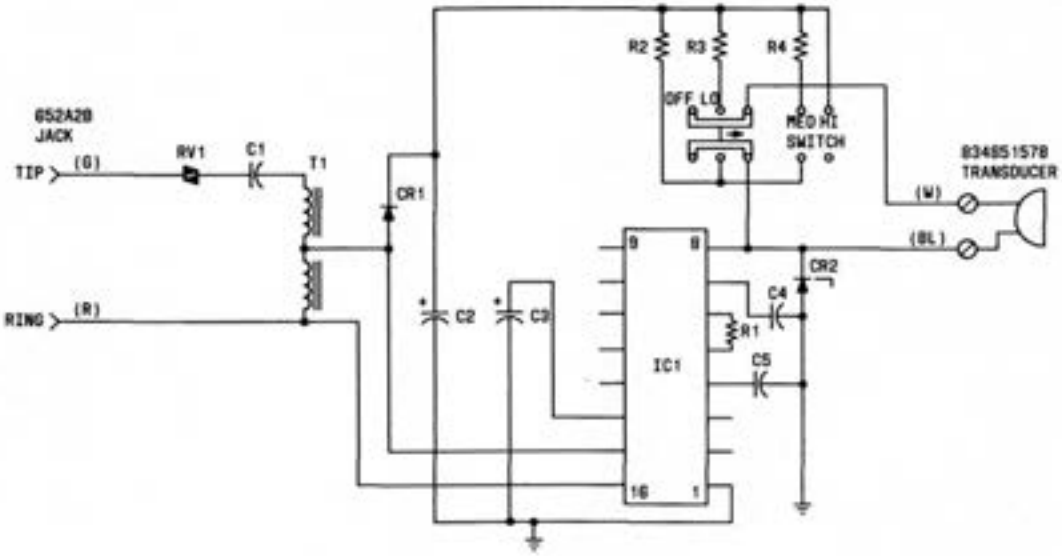

Fig. 4—W1A Ringer, Schematic

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28A RINGER ISOLATOR

1. GENERAL

1.01 This section contains identification, installation, connection, and testing information of the 28A ringer isolator.

> ***Note:*** Customers can not connect their own telephone sets to party lines under registration rules.

1.02 This section is reissued to:

- Revise Table B
- Add additional information to Table O.

1.03 The 28A ringer isolator is a solid state device used to extend and provide ringer isolation on all lines using grounded ringers. It is a replacement for the 10A, 11A, and 11B extenders which are rated MD. The 28A is a high performance, centrally mounted device for use in ringer coupling for all multiparty lines. It can also be used for nonregistered single party service where capacitor coupled bridged ringer range is inadequate.

1.04 The 28A (Fig. 1) is a small weatherproof unit with a four conductor pigtail and should be mounted near the station protector on the premises of the subscriber. One isolator is required at the protector for each customer line containing grounded ringer(s) (Fig. 1).

1.05 The 28A is compatible with both ac-dc and superimposed ringing for single party, two-party [including automatic number identification (ANI)], four-party semiselective, four-party full selective, eight-party semiselective, or divided code service. It may be used with 97-volt ringing provided by most dial long line circuits.

2. IDENTIFICATION

2.01 The 28A is a solid state, polarity sensitive, voltage controlled switch which connects the ringer(s) in the subscriber's station set(s) into the circuit when the proper polarity and level of ringing voltage is applied. The circuit triggers on the voltage differential between tip and ring and, once triggered, connects the ringer between the ringing lead and ground (see Fig. 2).

The 28A isolator will not work with some revertive call selectors or trunk circuits without modification. Revertive call selectors, SD-31831-01 (4-party, semiselective) and SD-31762-01 (10-party, divided code) in some 355A step-by-step offices apply the same ringing voltage to the tip and ring simultaneously and therefore do not provide a voltage difference between tip and ring to trigger the isolator. Reverting call trunk circuits SD-26068-01 in No. 5 crossbar offices and SD-26068-05 in No. 5A crossbar offices require option S to ground the called party side of the line while the calling party phone is ringing.

2.02 The 28A provides isolation for all grounded ringers without causing radio or TV interference, or reduction of ringing current. It can be used effectively on lines having high inductive noise. Since the ringer capacitance is normally isolated from the loop, dial pulsing ranges are not significantly affected by the number of ringers.

2.03 There is no significant reduction in ringing range when the isolator is added to the ringing circuit since only 2 volts of ringing voltage is absorbed by the circuit.

2.04 The polarity sensitivity feature of the 28A trigger circuit allows ringers to be set in the weak notch for all two-party, four-party semiselective and divided code ringing without cross ring when a party answers. With superimposed ringing, cross-ringing on answer may sometimes

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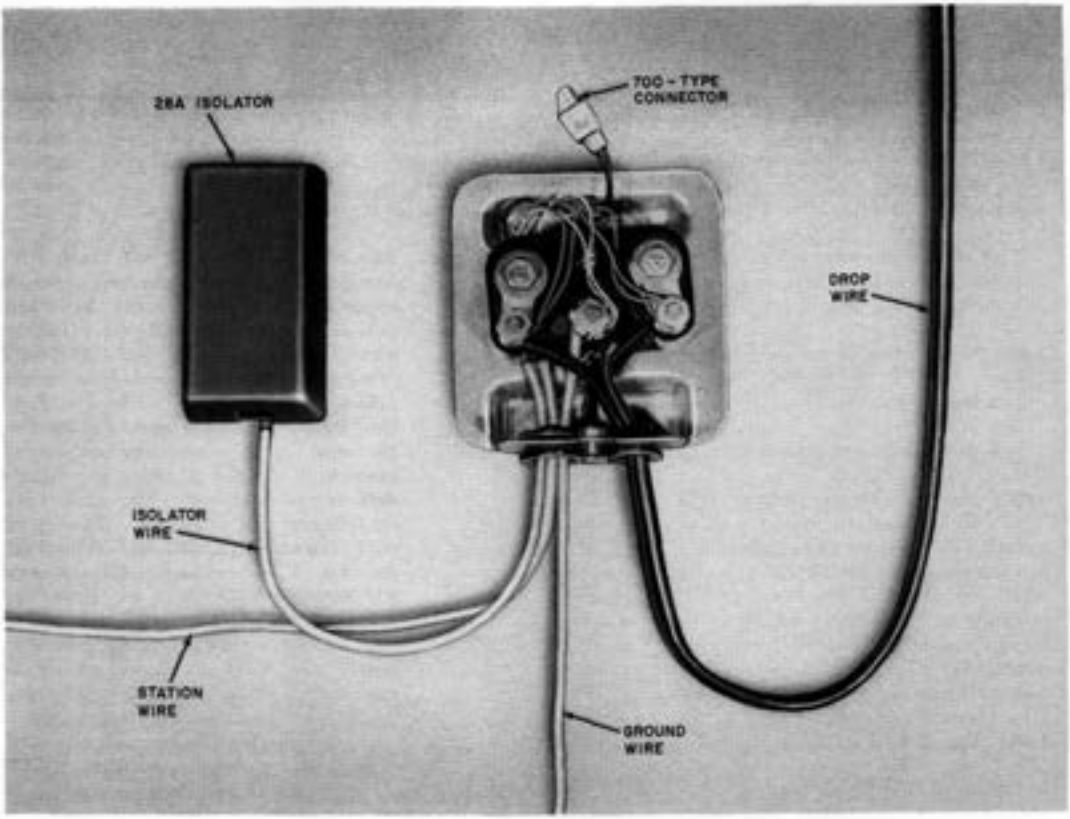

Fig. 1—28A Ringer Isolator, Typical Installation

occur with ringers in the weak notch. Use of the stiff notch may be necessary, see Table A.

2.05 When the 28A is used to improve line balance for noise abatement purposes, all grounded ringers at each party must be wired through an isolator normally located at the protector. Different types of ringer isolators can be used on the same subscriber pair if they operate independently, that is, if they are on opposite sides of the line or wired for different polarities. Simultaneous operation of the 28A and 11A/B, 425A, or 426A is not recommended because it can significantly reduce the number of ringers that can be operated. The 28A and the D-180036 ringer isolator kit, however, can operate simultaneously. If a 28A is to be installed, it is not necessary to remove the D-180036 Kit from other parties that may be on the same side of the line and of the same polarity.

2.06 The 28A is compatible with all standard Bell System ringing where 86 or 97 volts, 20 Hz is applied with a 38-, 48-, or 72-volt trip battery, and where the loop idle voltage is 48 volts. These conditions exist for all nonrange extended loops, for loops with REGs, and with 48-volt dial long line circuits in single-party, two-party (including ANI), four-party semiselective and fullselective, eight-party semiselective, and divided code service.

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TABLE A

MAXIMUM NUMBER OF RINGERS THAT CAN BE RUNG SIMULTANEOUSLY USING 28A ISOLATOR (SEE NOTE)

LONG ROUTE DESIGNED TRANSMISSION ZONES	RINGER BIAS SPRING	
	WEAK NOTCH	STIFF NOTCH
13	8	4
16	7	3
18	6	3
28	5	2
36	4	2
UNIGAUGE	5	2

Note: These ringer loads are based on a minimum of 40 volts across the ringers in the weak notch and 55 volt in the stiff notch.

2.07 Brief crossring can occur during superimposed ringing when the 28A is used with dial long line circuits SD-95435 or SD-96591 that have been modified for 72 or 96 volts.

2.08 Brief crossring sometimes occurs with revertive superimposed ringing in step-by-step and crossbar offices because there is insufficient spacing between ringing codes. The maximum crossring duration is only about 0.1 second so it should not be confused with a normal ring. Some existing No. 1 and No. 2 ESS offices also exhibit this crossring, however, corrective program changes are available. The No. 3 ESS has sufficient spacing between ringing codes to prevent crossring.

3. INSTALLATION AND CONNECTIONS

3.01 Install the 28A near the station protector using the stainless steel mounting screws furnished with the isolator. The four conductor pigtail lead should come out of the bottom of the isolator and connect to the protector and inside wire (Fig. 1).

3.02 The wiring arrangements for connecting an isolator for various ringing applications are shown by Table B with some examples shown by Fig. 3 and 4.

3.03 Tables C through P show telephone set connections when using a 28A isolator.

3.04 Table Q shows connections for the D-180489 ANI Kit of Parts which may be used, to maintain a better balance, when ANI ground is required. Some sets use both the 1742-type inductor and the 840398168 printed wiring board (PWB). Other sets use only the PWB portion of the kit.

3.05 Make isolator connections as follows.

(1) Check service order or work order to verify party and polarity of station.

The isolator is turned on by the application of negative (-) or positive (+) ringing voltage. It is imperative that the installer know what the polarity of the line is, even with nonregistered one- or two-party service. Proper polarity must be observed at the isolator as well as at the telephone set by using the proper figure and appropriate column of the connection tables. (Since polarity is not shown on service order for one- or two-party service, the installer must be familiar with ringing polarity or obtain information locally.)

(2) Choose column in Table B that fits the application for station involved.

(3) Make connections to protector and inside wire as shown by Table B or Fig. 3 and 4.

(4) Refer to proper table(s) (C through P) for telephone set(s) being used and connect according to appropriate column.

Note: Any previously installed isolator devices mounted either inside the phone or at the protector must be removed when installing the 28A isolator.

(5) If ANI ground is required, and a D-180489 Kit of Parts is needed for noise balance, refer to Table Q for connection information.

3.06 To prevent crossring on answer on four-party fullselective and eight-party semiselective service, place ringers in the stiff notch if a proper

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ring can be obtained (see Table A). Also use the stiff notch with C4A ringers in two-party, four-party semiselective and divided code service with SD-95590 and SD-96591 96-volt dial long line circuits to prevent bell tap. Use the weak notch in all other two-party, four-party, and divided code service. Disconnect unused ringers for best ringing performance.

4. TESTING

A. Testing From Station

4.01 Operation can be checked by reverting calls, automatic call back, or test desk call back. Ringing should occur on the proper number. There should not be any crossring or bell tap when other parties on the line receive calls.

4.02 If the telephone set does not ring, short the (BK) and (Y) isolator leads. If the set rings with the leads shorted, the trouble is in the isolator. If the set still does not ring (use hand test set to verify that ringing voltage actually reaches the protector) the problem is with the inside wire or telephone set.

4.03 If the telephone set rings on the wrong number, insure that the line is correct at the protector, i.e., battery on the ring and ground on the tip. If line is correct, but polarity is reversed, reverse (R) and (G) isolator leads. Repeat ringing test.

B. Testing From Test Desk

4.04 A simple dc test may be made to verify loop continuity of the line and the isolator without any test desk modification. When tested with 50-volt test battery the isolator will appear open and only cable leakage will be indicated. When 100-volt test battery of proper polarity is applied, it will trigger the 28A isolator and cause a deflection (on the MA scale) of the meter at the test desk.

4.05 Loop continuity normally cannot be verified by the local test desk by testing for ringer capacitance because the 28A isolates this capacitance. There is a wiring option available for No. 14 and No. 16 test desks which will enable them to test through 28A.

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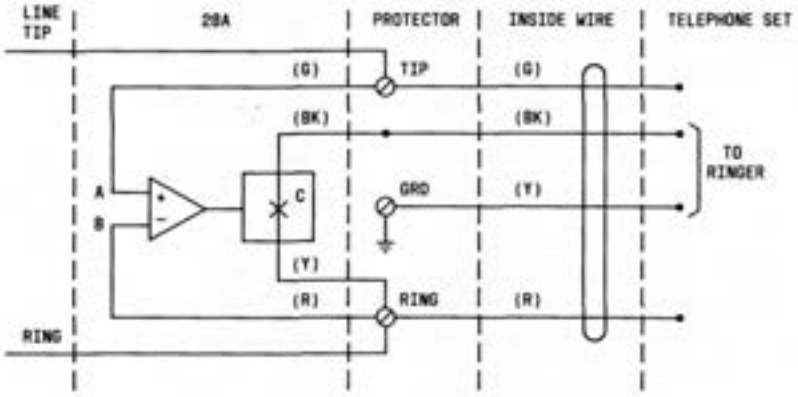

Fig. 2—Typical Ringing Circuit for Negative Ring Party

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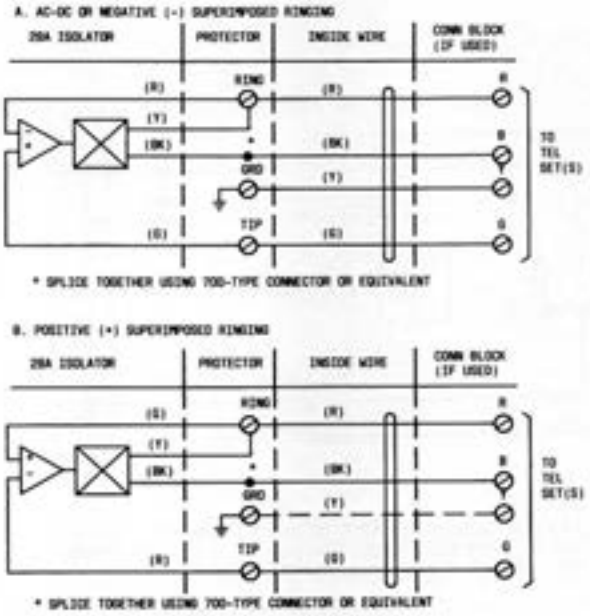

Fig. 3—28A Isolator Connections for Ring Parties (4-Conductor Wiring)

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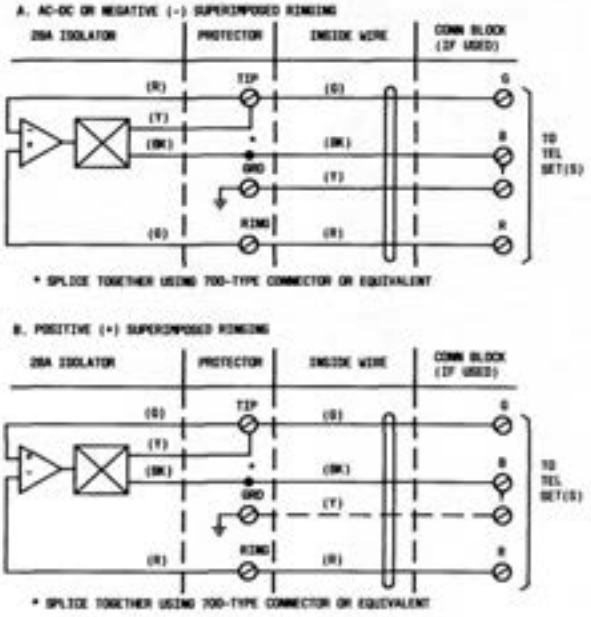

Fig. 4—28A Isolator Connections for Tip Party (4-Conductor Wiring)

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♦ TABLE B ♦

28A ISOLATOR AND INSIDE WIRE CONNECTIONS (NOTE 1)

WIRE OR LEAD	COLOR	(–) RING PARTY 1 OR 5 (NOTE 2)		(–) TIP PARTY 2 OR 6		(+) RING PARTY 3 OR 7		(+) TIP PARTY 4 OR 8	
		4-COND	3-COND	4-COND	3-COND	4-COND	3-COND	4-COND	3-COND
Isolator Leads at Protector	R G Y BK	Ring Tip Ring *	Ring Tip GRD *	Tip Ring Tip *	Tip Ring GRD *	Tip Ring Ring *	Tip Ring GRD *	Ring Tip Tip *	Ring Tip GRD *
Inside Wire at Protector	R G Y BK	Ring Tip GRD *	Ring Tip * —	Ring Tip GRD *	Ring Tip * —	Ring Tip GRD *	Ring Tip * —	Ring Tip GRD *	Ring Tip * —
Inside Wire at Conn. Blk (If Used)	R G Y BK	R (2) G (1) Y (3) B (4)	R (2) G (1) Y (3) —	R (2) G (1) Y (3) B (4)	R (2) G (1) Y (3) —	R (2) G (1) Y (3) B (4)	R (2) G (1) Y (3) —	R (2) G (1) Y (3) B (4)	R (2) G (1) Y (3) —

* Splice isolator lead and inside wire using 700-type connector or equivalent.
( ) Indicates terminal of 630A4, 71B, or 74D connecting blocks.

Notes: 1. The 4-conductor connections are recommended for general use and must be used for tip party with identification ground. The 3-conductor connections should be used when only 3-conductor inside wire is available.

2. These connections are also used for ac-de ringing of single parties with grounded ringers.

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◗ TABLE C ◖

500- AND 2500-TYPE TELEPHONE SETS
28A RINGER ISOLATOR – LINE AND RINGER CONNECTIONS

WIRE OR LEADS (SEE NOTE)	COLOR	RING PTY (+) OR (–)		TIP PTY (+) OR (–)		TIP PTY WITH IDENT GRD		
						THRU RINGER †		THRU ANI KIT†
		4-COND	3-COND	4-COND	3-COND	1000Ω	2650Ω	
Mtg Cord or Jack Leads at Conn. Blk	R G Y BK	R G Y B	R G Y —	R G Y B	R G Y —	R G Y B		R G Y B
Mtg Cord or Jack Leads in Set	R G Y BK	L2 L1 G *	L2 L1 G —	L2 L1 G *	L1 L2 G —	L1 L2 G A		L1 L2 G *
Line Switch Leads	W S BR	F L2 C	F L2 C	F L2 C	F (C) L2 C (F)	F (C) L2 C (F)		F (C) L2 C (F)
Ringer Leads	R BK S S-R	* G K A	L2 G K A	* G K A	L2 G K A	K G B B	B B K G	* G K A

* Connect (BK) cord on jack lead to (R) ringer lead using D-161488 connector.

† If bell taps when connected to long line equipment, reverse (R) – (S-R) and (BK) – (S) ringer leads.

‡ See Table Q for connection of D-180489 Kit of Parts

◯ Indicates connections for TOUCH-TONE equipped sets or when G36 handset is provided.

Note: For 4-conductor connections, it is necessary to have 623D4 jack in set.

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♦ TABLE D ♦

554-TYPE TELEPHONE SET
28A RINGER ISOLATOR-LINE AND RINGER CONNECTIONS

WIRE OR LEADS (SEE NOTE)	COLOR	RING PTY (+) OR (−)		TIP PTY (+) OR (−)		TIP PTY WITH IDENT GRD		
						THRU RINGER †		THRU ANI KIT ‡
		4-COND	3-COND	4-COND	3-COND	1000Ω	2650Ω	
Inside Wire or 523 Plug Leads in Set	R	L2	L2	L2	L1	L1		L1
	G	L1	L1	L1	L2	L2		L2
	Y	G	G	G	G	G		G
	BK	*	—	*	—	A		*
Line SW Lead	S	L2	L2	L2	L2	L2		L2
C4A Ringer Leads	R	*	L2	*	L2	K	B	*
	BK	G	G	G	G	G	B	G
	S	K	K	K	K	B	K	K
	S-R	A	A	A	A	B	G	A

* Connect (BK) wire or plug lead to (R) ringer lead using D-161488 connector.

† If bell taps when connected to long line equipment, reverse (R) — (S-R) and (BK) — (S) ringer leads.

‡ See Table Q for connection of D-160489 Kit of Parts.

Note: For 4-conductor connections, it is necessary to have 523A4 plug in set.

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♦ TABLE E ♦

2554-TYPE TELEPHONE SET USING 4010D NETWORK
28A RINGER ISOLATOR – LINE AND RINGER CONNECTIONS

WIRE OR LEADS IN SET (SEE NOTE)	COLOR	RING PTY (+) OR (–)		TIP PTY (+) OR (–)		TIP PTY WITH IDENT GRD		
						THRU RINGER		THRU ANI KIT ‡
		4-COND	3-COND	4-COND	3-COND	1000Ω	2650Ω	
Inside Wire or 523 Plug Leads in Set	R	2	2	2	1	2		2
	G	1	1	1	2	1		1
	Y	3	3	3	3	3		3
	BK	A	—	A	—	A		A
Line Switch Leads	W	F	F	F	C	F		F
	S	L2	A	L2	A	L2		L2
	BR	C	C	C	F	C		C
Strap	BK	*	2-A	*	2-A	*		*
P1A Ringer Leads †	R	K	K	K	K	K	K	K
	BK	3	3	3	3	3	3	3
	S	*	*	*	*	B	*	*
	S-R	*	*	*	*	*	B	*

* Insulate and store.

† Early production models had a (BL) ringer lead which should be insulated and stored for all applications.

‡ See Table Q for connection of D-180489 Kit of Parts.

Note: For 4-conductor connections, it is necessary to have 523A4 plug in set.

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◆ TABLE F ◆

2554-TYPE TELEPHONE SET USING 4228K NETWORK
28A RINGER ISOLATOR — LINE AND RINGER CONNECTIONS

WIRE OR LEADS IN SET (SEE NOTE)	COLOR	RING PTY (+) OR (−)		TIP PTY (+) OR (−)		TIP PTY WITH IDENT GRD		
						THRU RINGER		THRU ANI KIT †
		4-COND	3-COND	4-COND	3-COND	1000Ω	2650Ω	
Inside Wire or 523 Plug Leads in Set	R	L2	L2	L2	L1	L2		L2
	G	L1	L1	L1	L2	L1		L1
	Y	G	G	G	G	G		G
	BK	A	—	A	—	A		A
Line Switch Leads	W	F	F	F	C	F		F
	S	L2	A	L2	A	L2		L2
	BR	C	C	C	F	C		C
Strap	BK	*	L2-A	*	L2-A	*		*
P1A Ringer Leads	R	K	K	K	K	K	K	K
	BK	G	G	G	G	G	G	G
	S	*	*	*	*	B	*	*
	S-R	*	*	*	*	*	B	*

* Insulate and store.

† See Table Q for connection of D-180489 Kit of Parts.

Note: For 4-conductor connections it is necessary to have 523A4 plug in set.

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◗ TABLE G ◖

750- AND 2750-TYPE TELEPHONE SETS (CURRENT MODELS)
28A RINGER ISOLATOR — LINE AND RINGER CONNECTIONS

WIRE OR LEADS	COLOR	RING PTY (+) OR (−)		TIP PTY (+) OR (−)		TIP PTY WITH IDENT GRD		
						THRU RINGER‡		THRU ANI KIT§
		4-COND	3-COND	4-COND	3-COND	1000Ω	2650Ω	
Cord and Plug Assy or 652A4 Jack at 71B Conn. Blk	R G Y BK	2 1 3 4	2 1 3 4	2 1 3 4	1 2 3 4	1 2 3 4		1 2 3 4
623P4 Jack Leads at TB1† (750- or 2750-AM/BM	R G Y BK	R G Y BK	R G Y BK	R G Y BK	R G Y BK	R G Y BK		R G Y BK
Line Switch Leads	W S BR	F * C	F L1 C	F * C	F (C) L C (F)	F (C) * C (F)		F (C) * C (F)
Straps	Y BK	L2 L1	L2 *	L2 L1	L2 *	L2 A		L2 L1
DIE Ringer Leads	R BK S S-R	L1 L2 K A	R L2 K A	L1 L2 K A	R L2 K A	K Y B B	B B K Y	L1 L2 K A

* Insulate and store.

† Terminals R, G, Y, and BK are on 841390735 terminal board (modular sets) or 814313946 (nonmodular sets).

‡ If bell taps when connected to long line equipment, reverse (R) — (S-R) and (BK) — (S) ringer leads.

§ To mount inductor of ANI Kit, loosen two right most screws from switchhook bracket, slide inductor bracket under switchhook bracket and retighten screws. For connection of D-180489 Kit of Parts, see Table Q.

(C) Indicates connections for TOUCH-TONE equipped sets.

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♦ TABLE H ♦

7028M AND 2702BM TELEPHONE SETS (SEE NOTE)
28A RINGER ISOLATOR – LINE AND RINGER CONNECTIONS

WIRE OR LEADS IN SET‡	COLOR	RING PTY (+) OR (–)		TIP PTY (+) OR (–)		TIP PTY WITH IDENT GRD		
						THRU RINGER		THRU ANI KIT
		4-COND	3-COND	4-COND	3-COND	1000Ω	2650Ω	
623P6 Jack Leads in Set	R	L2	L2	L2	L1	L1		L1
	G	L1	L1	L1	L2	L2		L2
	Y	3	3	3	3	3		3
	BK	4	4	4	4	4		4
	W	A	G	A	G	A		A
	BL	G	*	G	*	G		G
Line Switch Leads	W	F	F	F	F (C)	F (C)		F (C)
	SL	*	A	*	A	*		*
	BR	C	C	C	C (F)	C (F)		C (F)
Strap	BK	*	A-H	*	A-H	*		*
Ringer Leads	R	K	K	K	K	K	K	K
	BK	3	G	3	G	3	3	3
	S	*	*	*	*	B	*	†
	S-R	*	*	*	*	*	B	*

* Insulate and store.

† See Table Q for connection of D-180489 Kit of Parts.

‡ Terminals 3 and 4 in telephone set are on lamp terminal block.

(C) Indicates connections for TOUCH-TONE equipped sets.

Note: When a 28A is used with modular PRINCESS* telephone sets, the 623P4 jack must be replaced with a 623P6 jack in the set and a 281A adapter provided. Two D4BU mounting cords are required for connecting the 281A adapter to a 248A adapter for dial light power and to a 625-type connecting block.

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TABLE H

AD1, AD2, OR AD3 BASES WITH 220A HAND TELEPHONE SET 28A RINGER ISOLATOR – LINE AND RINGER CONNECTIONS

WIRE OR LEADS	COLOR	RING PTY - (+) OR (–)				TIP PTY - (+) OR (–)				TIP PTY WITH IDENT GRD APP 2000Ω	
		4-COND		3-COND		4-COND		3-COND			
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Trnsf Leads at Conn. Blk	Y	3	Y	4	†	3	Y	4	†	3	Y
	BK	5	†	5	B	5	†	5	B	5	†
Mtg. Cord at Conn. Blk, or 652A6 Jack in 74D Conn. Blk.	R	2	R	2	R	2	R	2	R	2	R
	G	1	G	1	G	1	G	1	G	1	G
	Y	3	Y	4	†	3	Y	4	†	3	Y
	BK	5	†	5	B	5	†	5	B	5	†
	W	4	B	3	Y	4	B	3	Y	4	B
	BL	6	—	6	—	6	—	6	—	6	—
Mtg. Cord or 623T6 Jack Leads in Set ‡	R	L2	L2	L2	L2	L2	L2	L1	L1	L1	L1
	G	L1	L1	L1	L1	L1	L1	L2	L2	L2	L2
	Y	3	3	3	3	3	3	3	3	3	3
	BK	1	1	1	1	1	1	1	1	1	1
	W	G	G	G	G	G	G	G	G	G	G
	BL	*	—	*	—	*	—	*	—	*	—
Handset Cord Jack	R	C		C		C		C	(F)	C	(F)
	G	F		F		F		F	(C)	F	(C)
Line SW	S	*		A		*		A		*	
Strap From A	BK	G		L2		G		L2		G	
P1A Ringer Leads	R	K		K		K		K		K	
	BK	3		G		3		G		3	
	S	B §		B §		B §		B §		B	
	S-R	*		*		*		*		*	

(1) Connections for AD2 and AD3 requiring 74D connecting block, D6AM or D6AP mounting cord, and a 623T6 jack in base.

(2) Connections for AD1 require 5-conductor mounting cord (D5AL or D5AN).

* Insulate and store.

† Connect transformer lead to cord or jack lead using D-161488 connector.

‡ All bases manufactured prior to 10-1-72 or any base which has been opened should be wired per Section 502-322-400, Table A, before installing.

§ If H5AA handset cord is used, insulate and store (S) lead.

(F) Indicates connections for 2220B hand telephone set.

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TABLE J

AD2 OR AD3 BASE WITH 220B, 220C, 220AL, 226A, 2220C, OR 2226A HAND TELEPHONE SET 28A RINGER ISOLATOR—LINE AND RINGER CONNECTIONS

WIRE OR LEADS	COLOR	RING PTY (+) OR (–)		TIP PTY (+) OR (–)		TIP PTY WITH IDENT GRD APP 2000Ω (SEE NOTE)
		4-COND	3-COND	4-COND	3-COND	
Jack Leads at Conn. Blk.	R	R	R	R	R	R
	G	G	G	G	G	G
	Y	Y	Y	Y	Y	Y
	BK	B	B	B	B	B
623T4 Jack Leads in set §	R	L2	L2	L2	L1	L1
	G	L1	L1	L1	L2	L2
	Y	3	G	3	G	3
	BK	G	1	G	1	G
Line Switch	S	*	A	*	A	*
	BR	C	C	C	C	C or (1) †
Strap From A	BK	G	L2	G	L2	G
P1A Ringer Leads	R	K	K	K	K	K
	BK	3	G	3	G	3
	S	B	B	B	B	3†
	S-R	*	*	*	*	*
Handset Jack Leads in Base	R	C	C	C	C	C or (2) †
	G	F	F	F	F	F
	Y	3	3	3	3	5†
	BK	4	4	4	4	4†
Jack Leads in Handset	R	—	—	—	—	—
	G	—	—	—	—	—
	Y	*	*	*	*	A‡
	BK	*	*	*	*	4‡

* Insulate and store.

† Terminals on 840362776 terminal board.

‡ Handset Terminals.

§ All bases manufactured prior to 10-1-72 or any base which has been opened should be wired per Section 502-322-400, Table A, before installing.

(1) (2) Indicates connections for 2220C and 2226A hand telephone set.

Note: Handset must be opened to wire for tip party with identification ground. 220AL handsets use the D-180824 Kit of Parts (ordered separately) and the 220C, 226A, 2226A, and later versions of the 2220C use the D-180825 Kit of Parts (ordered separately). The 220B(MD) and early version 2220C handsets use only the 840362776 terminal board of the D-180825 Kit of Parts.

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TABLE K

AC1 BASE WITH 220A, 220AM, 2220B, OR 2220BM HAND TELEPHONE SET 28A RINGER ISOLATOR – LINE AND RINGER CONNECTIONS

WIRE OR LEADS	COLOR	RING PTY (+) OR (–)		TIP PTY (+) OR (–)		TIP PTY WITH IDENT GRD APP 2000Ω
		4-COND	3-COND	4-COND	3-COND	
Inside Wire in Set‡	R	L2	L2	L2	L1	L1
	G	L1	L1	L1	L2	L2
	Y	3	G	3	G	3
	BK	G	—	G	—	G
Dial LGT TRNSF	Y	3	3	3	3	3
	BK	1	1	1	1	1
Line SW	S	*	A	*	A	*
Strap From A	BK	G	L2	G	L2	G
Handset Cord Jack	R	C	C	C	C (F)	C (F)
	G	F	F	F	F (C)	F (C)
P1A Ringer Leads	R	K	K	K	K	K
	BK	3	G	3	G	3
	S	B†	B†	B†	B†	B
	S-R	*	*	*	*	*

* Insulate and store.

† If H5AA handset cord is used, insulate and store (S) lead.

‡ All bases manufactured prior to 10-1-72 or any base which has been opened should be wired per Section 502-322-400, Table A, before installing.

(F) (C) Indicates connections for 2220B hand telephone set.

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TABLE L

AC1P OR AC2P BASE WITH 220B, 220C, 220AL, 226A, 2220C, OR 2226A HAND TELEPHONE SET – 28A RINGER ISOLATOR—LINE AND RINGER CONNECTIONS

WIRE OR LEADS	COLOR	RING PTY (+) OR (–)		TIP PTY (+) OR (–)		TIP PTY WITH IDENT GRD APP 2000Ω (SEE NOTE)
		4-COND	3-COND	4-COND	3-COND	
523A4 Plug Leads in Set§	R	L2	L2	L2	L1	L1
	G	L1	L1	L1	L2	L2
	Y	3	G	3	G	3
	BK	G	1	G	1	G
Line Switch	S	*	A	*	A	*
	BR	C	C	C	C	C or (1)†
Strap From A	BK	G	L2	G	L2	G
P1A Ringer Leads	R	K	K	K	K	K
	BK	3	G	3	G	3
	S	B	B	B	B	3†
	S-R	*	*	*	*	*
Handset Jack Leads in Base	R	C	C	C	C	C or (2)†
	G	F	F	F	F	F
	Y	3	3	3	3	5†
	BK	4	4	4	4	4†
Jack Leads in Handset	R	—	—	—	—	—
	G	—	—	—	—	—
	Y	*	*	*	*	A‡
	BK	*	*	*	*	4‡

* Insulate and store.

† Terminals on terminal board.

‡ Handset terminals.

§ All bases manufactured prior to 10-1-72 or any base which has been opened should be wired per Section 502-322-400, Table A, before installing.

(1) (2) Indicates connections for 2220C and 2226A hand telephone set.

Note: Handset must be opened to wire for tip party with identification ground. The 220AL handsets use the D-180824 Kit of Parts (ordered separately), and the 220C, 226A, 2226A, and later versions of the 2220C use the D-180825 Kit of Parts (ordered separately). The 220B(MD) and early version 2220C handsets use only the 840362776 terminal board of the D-180825 Kit of Parts.

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♦ TABLE M ♦

960A01M OR 2960A01M TELEPHONE SETS
28A RINGER ISOLATOR – LINE AND RINGER CONNECTIONS

LEADS IN TEL SET	COLOR	RING PTY (+) OR (–)		TIP PTY (+) OR (–)		TIP PTY WITH IDENT GRD APP 2600Ω †
		4-COND †	3-COND †	4-COND †	3-COND †	
Mtg. Cord Jack Leads (Phone)	R	5	5	5	7	6
	G	7	7	7	5	7
	Y	1	1	1	1	1
	BK	19	*	19	*	19
Pigtail Strap Leads‡	BL	19	10	19	10	19
	BK	9	9	9	9	11
	G	*	*	*	*	9
P1A Ringer Leads	R	4	4	4	4	4
	BK	1	1	1	1	1
	S	*	*	*	*	5
	S-R	*	*	*	*	*

* Insulate and store.

† Terminals are on power supply board (PSB).

‡ Pigtail strap leads have a spade tip on one end and are connected to the printed wiring board by a Berg terminal on the other end.

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◆ TABLE N (SEE NOTE) ◆

*DESIGN LINE** SERIES TELEPHONE SETS
28A RINGER ISOLATOR – LINE AND RINGER CONNECTIONS

USED WITH THESE SETS	LEADS IN TEL SET	COLOR	RING PARTY (+) OR (–)		TIP PARTY (+) OR (–)		TIP PARTY WITH IDENT GRD		
							THRU RINGER		THRU ANI KIT
			4-COND	3-COND	4-COND	3-COND	1000Ω	2650Ω	
900A, 2900A 910A, 2910A 920A, 2920A 921A, 2921A§ 921B, 2921B 930A, 2930A 930B, 2930B 931A, 2931B 940-Type	Mtg. Cord or Jack Leads	R	L2‡	A	L2‡	L1	F Ⓒ		F Ⓒ
		G	L1	L1	L1	A	L2‡		L2‡
		Y	G	G	G	G	G		G
		BK	A	L2‡	A	L2‡	A		A
	Line Switch Leads	Y	L2‡	A	L2‡	A	L2‡		L2‡
		W	F	F	F	C	B		¶
		BR	C	C	C	F	C Ⓕ		C Ⓕ
		S	L2‡	A	L2‡	A	L2‡		L2‡
881A100, 2881A100 881B100, 2881B100 881A101, 2881A101 881B101, 2881B101 881B110, 2881B110 881A102, 881B102 881A104, 881B104 881A105, 881B105 881A108, 881B108 881B109, 2881B109 882A200	F1A Ringer Leads	R	K	K	K	K	K	K	K
		BK	G	G	G	G	G	G	G
		S	†	†	†	†	L1	†	L1
		S-R	†	†	†	†	†	L1	†

* Trademark of AT&T Co.

† Insulate and store.

‡ Terminal S in 2930A telephone set.

§ In 921A and 2921A telephone sets, terminals A, L1, G, and L2 are replaced by 1, 2, 3, and 4, respectively.

¶ See Table Q for connection of 840398168 printed wiring board.

Ⓒ Ⓕ Indicates connections for TOUCH-TONE equipped sets.

Note: For other DESIGN LINE sets, see Tables O and P.

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♦ TABLE O (SEE NOTE) ♦

*DESIGN LINE** SERIES TELEPHONE SETS
28A RINGER ISOLATOR – LINE AND RINGER CONNECTIONS

USED WITH THESE SETS	LEADS IN TEL SET	COLOR	RING PARTY (+) OR (–)		TIP PARTY (+) OR (–)		TIP PARTY WITH IDENT GRD		
							THRU RINGER		THRU ANI KIT
			4-COND	3-COND	4-COND	3-COND	1000Ω	2650Ω	
900B, 2900B 902A, 2902A 911A, 2911A 881C100, 2881C100 881C101, 2881C101 881C110, 2881C110 881C102 881C103 881C104 881C105 881C107 881C108	Mtg. Cord or Jack Leads	R	L2	A	L2	L1	F Ⓒ		F Ⓒ
		G	L1	L1	L1	A	L2		L2
		Y	G	G	G	G	G		G
		BK	A	L2	A	L2	A		A
	Line Switch Leads	Y	†	†	†	†	†		†
		BK	†	†	†	†	†		†
		S	†	†	†	†	†		†
		W	F	F	F	C	B		‡
		BL/W	L2	A	L2	A	L2		L2
		BL	C	C	C	F	C Ⓕ		C Ⓕ
881C109, 2881C109 881C111, 2881C111 882B200 951A103; 962A103	P1A Ringer Leads	R	K	K	K	K	K	K	K
		BK	G	G	G	G	G	G	G
		S	†	†	†	†	L1	†	L1
		S-R	†	†	†	†	†	L1	†

* Trademark of AT&T Co.

† Insulate and store.

‡ See Table Q for connection of 840398168 printed wiring board.

Ⓒ Ⓕ Indicates connections for TOUCH-TONE equipped sets.

Note: For other DESIGN LINE sets, see Tables N and P.

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♦ TABLE P ♦

950A AND 2950A TELEPHONE SETS
28A RINGER ISOLATOR – LINE AND RINGER CONNECTIONS

LEADS IN TEL SET	COLOR	RING PARTY (+) OR (–)		TIP PARTY (+) OR (–)		TIP PARTY WITH IDENT GRD		
		4-COND	3-COND	4-COND	3-COND	BASE TERM. BOARD	D-180825 TERM. BOARD	HANDSET TERM. (NOTE 1)
Mtg Cord Jack Leads	R	L2	A	L2	L1	F	—	—
	G	L1	L1	L1	A	L2	—	—
	Y	G	G	G	G	G	—	—
	BK	A	L2	A	L2	A	—	—
Line Switch Leads	Y	*	*	*	*	*	—	—
	BR	*	*	*	*	*	—	—
	S	*	*	*	*	*	—	—
	W	F	F	F	C	—	3	—
	O	L2	A	L2	A	L2	—	—
	BL	C	C	C	F	C†	1‡	—
P1A Ringer	S	B	B	B	B	L1	—	—
Handset Jack Leads in Base	G	F	F	F	F	F	—	—
	R	C	C	C	C	C†	2‡	—
	W	1	1	1	1	—	4	—
	BK	4	4	4	4	—	5	—
Handset Jack Leads in Handset (Note 2)	G	—	—	—	—	—	—	—
	R	—	—	—	—	—	—	—
	Y	—	—	—	—	—	—	A
	BK	—	—	—	—	—	—	4

* Insulate and store.

† Rotary dial equipped sets.

‡ TOUCH-TONE dial equipped sets.

Notes:

1. Handsets must be opened to wire for tip party with identifying ground.
2. Leads for these connections are provided by the 282A adapter furnished as part of the D-180825 Kit of Parts.

Caution: Do not store spade-tipped leads under terminal board mounting screws.

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TABLE Q

CONNECTIONS FOR D-180489 KIT OF PARTS (ANI)
(SEE NOTE)

SETS USING BOTH 1728-TYPE INDUCTOR AND 840398168 PWB						
TYPE TEL SET	(R) HANDSET JACK OR HANDSET LEAD		INDUCTOR		PWB	
	REMOVE FROM	CONNECT TO	COLOR	CONNECT TO	COLOR	CONNECT TO NET. TERM.
500- and 554-	R of Net.	R on PWB	S BK	S of PWB G of Net.	Y G	R B
2500- and 2554- E/W 4228K Network	T of Net.	R on PWB	S BK	S of PWB G of Net.	Y G	T B
2554- E/W 4010D Network	11 of Term. Strip	R on PWB	S BK	S of PWB 3 of Term. Strip	Y G	11 of Term. Strip B
750- and 2750-	R of Net.	R of PWB	S BK	S of PWB Y†	Y G	R (Rotary) G (TOUCH-TONE) B
SETS WHICH USE 840398168 PWB ONLY						
TYPE TEL SET	(R) HANDSET JACK OR HANDSET LEAD		RINGER LEAD		PWB	
	REMOVE FROM	CONNECT TO	COLOR	CONNECT TO	COLOR	CONNECT TO NET. TERM.
702-	R of Net.	R of PWB	S	S of PWB	Y G	R B
2702-	6 of Term. Strip	R of PWB	S	S of PWB	Y G	6 of Term. Strip B
DESIGN LINE* Series	R of Net. (Rotary) T of Net. (TOUCH-TONE)	R of PWB	W‡	S of PWB	Y G	R (Rotary) T (TOUCH-TONE) B

* Trademark AT&TCo.
† This terminal is found on the 81413946 (P-43A394) mounting block inside set.
‡ Line switch lead on DESIGN LINE sets.

Note: See Section 501-376-100 for mounting instructions.

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1A TERMINATION UNIT

1. GENERAL

1.01 This section contains identification and installation information.

1.02 This section is reissued to add the 8200 ohm series resistor, Fig. 2.

1.03 The 1A termination unit (Fig. 1) is a telephone line termination device that simulates the electrical characteristics of a station set ringer.

2. IDENTIFICATION

2.01 The 1A termination unit is intended for use on any telephone line where a ringer is not permanently connected.

2.02 The termination unit enables the central office test desk to perform any test of the telephone line that may be performed with a station set installed. Use of the unit, however, reduces by one the number of ringers that may be connected to the line.

3. INSTALLATION

3.01 The 1A termintion unit is suitable for indoor or outdoor mounting adjacent to the 123A1A protector block or may be mounted in an AT-8732 B Outlet Box. The unit is equipped with weatherproof pigtail leads for connection to the protector block.

3.02 The 1A termination unit is connected across the line as shown in Fig. 2.

Fig. 1—1A Termination Unit

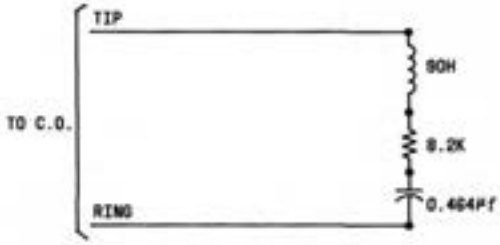

Fig. 2—1A Termination Unit, Connections

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603A RINGING EXTENDER

1. GENERAL

1.01 This section contains identification, installation, and testing information on the 603A ringing range extender.

Fig. 1—603A Ringing Extender

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The 603A is only to be used on individual lines if satisfactory station ringing cannot be obtained by placing ringers in the weak notch (Bell System sets only, do not adjust customer provided equipment).

Note: The 603A can not be used with party-line service.

1.04 The 603A is intended for use on individual lines with long loops (1300-3600 ohm) and range extender Unigauge Loops (1200-2500 ohm) with a 2-wire station set interface (bridged ringing) which will be required where registered sets are installed. It allows 5 bridged ringers to be operated through zone 28 by grounding the tip conductor at the station during ringing.

1.05 The 603A is compatible with Lists 2 and 3 range extenders (J-98625AA-2) and 5A REGs in all central offices. Under certain conditions, occassional pretrips may occur with List 1 REGs (J-98625AA-1). If this problem does occur, the L1 REG should be replaced with an L2, L3, or 5A REG.

1.06 The 603A is compatible with Western Electric subscriber carrier systems, such as SLM* and SLC* -40, in all central offices. It is not compatible and should not be used with dial long line circuits and loop extenders which apply dc voltage to the tip conductor (such as 96-volt dial long line circuits).

2. IDENTIFICATION

2.01 The 603A ringing extender is approximtely 3-1/4 inches long by 1-3/4 inches wide by 1-7/8 inches high. It is a potted weatherproof unit with a 3-conductor, 18-inch pigtail (Fig. 1). The operating temperature range is -40° to +60°C.

2.02 The 603A is a solid state device consisting of a ringing detector and a switch. The detector responds to ringing but not to dial pulsing or 60 Hz induction. The switch provides a low impedance path from the tip conductor to ground during ringing and a very high impedance at other times. The switch includes protective circuitry which enables it to withstand lightning and induced or foreign voltage surges.

2.03 The extender should be ordered as:

- Extender, Ringing, 603A

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3. INSTALLATION

3.01 The 603A ringing extender is normally connected at the station protector in order to obtain an adequate ground (Fig. 2), using appropriate mounting methods.

When a 603A is connected to a line on an installation visit, it must be reported to the service order completion clerk. If placed on a repair visit, it must be reported to the repair service bureau.

3.02 A 603A ringing extender is identified on a service order by the field identifier (FID) ***RIS*** 603A. This FID will be located after the last facility segment in the assignment section.

3.03 The 603A has two mounting holes on 2-1/8 inch centers for mounting to wood, in basements, or in pedestal enclosures using the No. 10 self-tapping screws provided with each unit.

3.04 The 603A may also be mounted as follows by.

- Using the AT-8853C mounting bracket attached to a variety of protectors or a 305-type housing to avoid drilling additional holes (Fig. 3).
- Using the AT-8853B magnetic mounting bracket inside a steel enclosure or pedestal (Fig. 4).
- Using the AT-8813C or AT-8813D customer service closures which will be available in 1978.

3.05 The 603A is connected to the line by the red (R) and green (G) pigtail leads and to ground by the yellow (Y) pigtail lead. Insure that ringers have been placed in the weak notch (Bell Systems sets only, do not adjust customer provided equipment). Unused ringers should be disconnected rather than cut-off with the volume control.

3.06 Connect the yellow lead of the 603A to the protector ground lug (Fig. 2). Connect a hand test set across the TIP and RING and initiate ring back. With ringing present, touch the red and green leads of the 603A to the ring and tip of the protector. If the polarity is correct, ringing will continue, if the polarity is incorrect, ring trip will occur. Assuming that the polarity is correct and ringing continued, reverse the red and green leads of the 603A to obtain ring trip. If ring trip occurs, the 603A is operating properly and can be installed as previously connected. If ring trip does not occur, replace the 603A ringing extender and repeat the above procedure.

Note: For proper operation, it is imperative that an adequate ground is provided at the station protector.

4. TESTING

4.01 Test ring back at all stations. All stations should give satisfactory ringing performance.

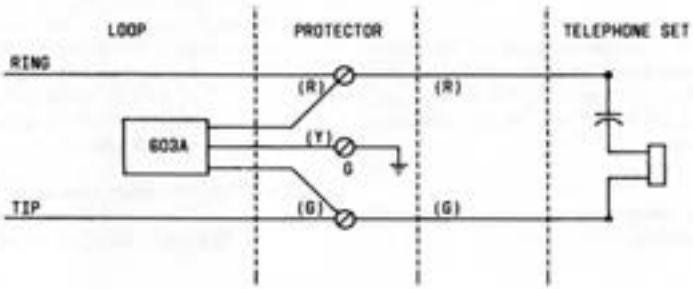

Fig. 2—603A Ringer Extender, Connections

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1. Attach 603A to bracket using screws furnished.
2. Slide bracket behind loosely installed protector using indicated slots, and tighten screws.

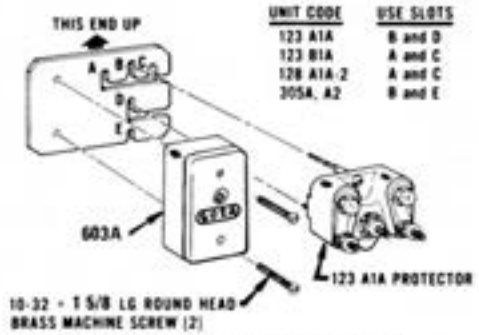

Fig. 3—Installation of 603A Ringing Extender Using AT-8853C Mounting Bracket

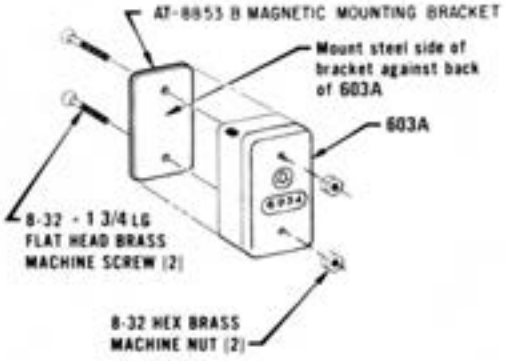

Fig. 4—Installation of 603A Ringing Extender Using AT-8853B Magnetic Mounting Bracket

Caution: Tip and ring reversal of the 603A wiring to the station protector will cause ring trip.

4.02 If ringing problems occur, check that all ringers are in the weak notch and unused ringers are disconnected. If the station sets still do not ring satisfactorily, initiate ring back at the station protector, use a hand test set to verify that ringing is present. If ringing is not present, the trouble is toward the central office.

Note: If an incompatible dial long line circuit has been used in the central office (see 1.06), pretrip may occur. An adequate ground is essential for proper operation of the 603A ringing extender, and for ringing and testing purposes.

4.03 With ringing present, reverse the red and green leads of the 603A. If the 603A is operating properly, ring trip will occur during the ringing interval and the problem is with the inside wiring or station set(s). Reconnect the leads from the 603A to their proper terminals and check wiring and set(s). If ringing is not tripped, the 603A is defective and should be replaced.

Note: If an incompatible dial long line circuit has been used in the central office (see 1.06), ring trip will not occur with the leads reversed but ringing may be intermittent.

4.04 The 603A can not be used with party-line service and if one is left on a line which might be used for party-line service, it would cause ring trip.

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TELEPHONE SETS AND ASSOCIATED STATION APPARATUS

SELECTION OF INDOOR LOCATIONS

1. GENERAL

1.01 This section serves as a guide in planning the location of connecting blocks and associated station apparatus under the following conditions.

- For general indoor use
- At normal temperatures
- In a non-explosive atmosphere
- At dry locations.

1.02 This section is reissued to:

- Update figures
- Add additional information and guidelines to follow when placing telephone set and associated station apparatus
- Update to modular connecting blocks.

1.03 Whenever service is provided in other than the above locations, refer to the appropriate sections in Bell System Practices covering special installation.

2. PLANNING

2.01 The location for telephone apparatus suggested by the subscriber should be given prime consideration, pointing out to the customer any safety hazard, maintenance, or appearance problem.

2.02 ◗***Bathrooms*** are not a preferred location for telephone sets. If the customer insists on placing a telephone there, it should be located so that the telephone and/or handset cannot be used while in the bathtub or shower. Provide only standard length mounting cords and handset cords on telephone sets located in the bathrooms. If the size of the bathroom is such that the tub or shower can be reached no matter where the telephone is located the customer should be cautioned of the possibility of electric shock if the telephone is used while in the tub or shower.◖

2.03 ◗Telephone equipment can be damaged by water and moisture. Locations near windows and sinks where rain or moisture could cause an OUT OF SERVICE condition should be discouraged. In high humidity areas or locations where moisture can cause corrosion in connecting blocks, mount all connecting blocks 12 inches or more above the floor (electrical outlet height). Also special connecting blocks with spring loaded covers (example: 625S) should be used.◖

2.04 Perimeter space around wall telephone connecting blocks should be considered to insure that future substitutions to possibly larger sets (example: repertory dialers, etc.) can be accomplished by unplugging and plugging on the new telephone without the necessity of moving the connecting block.

2.05 ◗The temperature range for normal operation of most telephone sets is from zero degrees F to 120 degrees F. Except as noted below, exposure to temperatures outside this range should not result in permanent damage but may cause malfunctioning. Some telephones such as the TOUCH-A-MATIC* 16 telephone set may not function properly below 32 degrees F.◖

> ***Note:*** ◗Telephone equipment should not be subjected to temperatures above 145 degrees F. At temperatures above this, plastic parts such as spacers or covers will melt causing permanent damage to the equipment.◖

2.06 Locations should be avoided where the room noise is likely to cause customer complaints of "Can't hear" or "Can't be heard." However, if no quieter location is available, review the section on apparatus for use at noisy locations. In addition,

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apparatus should be accessible for maintenance and free from accidental mechanical damage or receiver-off-hook trouble.

2.07 ◗Placing telephone apparatus near fluorescent light unit may result in inductive noise.◖

2.08 Where the appearance of the completed installations may have a bearing on customer choice of location, inform the customer as to where it may be necessary to have holes drilled, also where and how wire or cable will be placed and exposed.

2.09 Discourage locations on finely finished surfaces such as:

- Marble
- Expensive wood paneling
- Caramic or glass tile
- ◗Plastic laminate.◖

2.10 If the location selected for the station apparatus ◗is in an area where conventional stapled wire installations are not permitted or are not desirable◖ (ceramic or glass tile, etc.), consider using adhesive backed B Station Wire and a 625C connecting block mounted on a 723 terminal base which has adhesive backing and does not require holes for mounting. ◗Refer to Section 461-200-206 for station wire installation.◖

2.11 Consider the use of available conduit or prewired facilities when planning station apparatus locations.

2.12 When the customer desires a telephone in a dimly lighted location or where security and safety may warrant the use of the telephone during the night, a set with dial night-light such as the PRINCESS* telephone (700-type) or a set with an illuminating dial such as the TRIMLINE* telephone (Fig. 2) should be recommended to the subscriber.

3. LOCATING

◗***Note:*** Inside walls are considered primary locations for connecting blocks and telephones. Whenever possible and with the concurrence of the customer, they should be used instead of outside walls.◖

3.01 ◗***Wall Sets:*** Connecting blocks for wall mounted telephone sets should be at approximately 54 inches in height unless the customer and/or conditions require different heights.◖

3.02 ***Desk-Type Telephone Sets.***

(a) Consider which hand the customer uses to hold the handset before selecting a location on the desk for the telephone set. An improperly placed telephone instrument could create a nuisance by causing the handset cord to pass across papers or other items in front of the subscriber.

(b) ◗Discourage connecting block locations where a telephone instrument is to be used between two tables or desks by stretching the mounting cord across an aisle or passageway.◖

(c) Before attaching any telephone apparatus to a desk, inspect for special wiring facilities which may be provided by the manufacturer, such as knock-out discs or rubber grommets for the telephone set's mounting cord (see Fig. 6).

3.03 ***Connecting Blocks.***

(a) ◗Whenever a desk is against a wall, the telephone connecting blocks and wire should be fastened to the wall, not the desk. If a desk is not near a wall, the connecting block should be fastened to the desk using nondamaging magnetic or adhesive backed type fastenings and blocks.◖ A connecting block placed on a desk should be located high enough to hold the cord off the floor. A convenient mounting area is usually on the upper part of the outer panel (Fig. 5).

◗***Note:*** Connecting blocks may be installed with the modular opening facing either left, right or down, but never with the opening up.◖

(b) Connecting blocks attached to walls or baseboard should be high enough to remain moisture free during normal floor cleaning and scrubbing.

3.04 ***Ringers or Signals.***

(a) External ringers or signals should be placed in locations where they can be easily heard,

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and if they have an adjustable volume control the customer should have easy access to this control.

(b) The mounting surface can have an effect on the volume output of a ringer or signal. Some ◗hard◖ materials may serve as a sounding board and amplify the sound while other ◗soft materials (example cloth)◖ may tend to deaden the sound.

3.05 ***Keys or Switches:*** External keys and switches should be located where they are convenient to operate and still meet all safety, maintenance, and appearance restrictions.

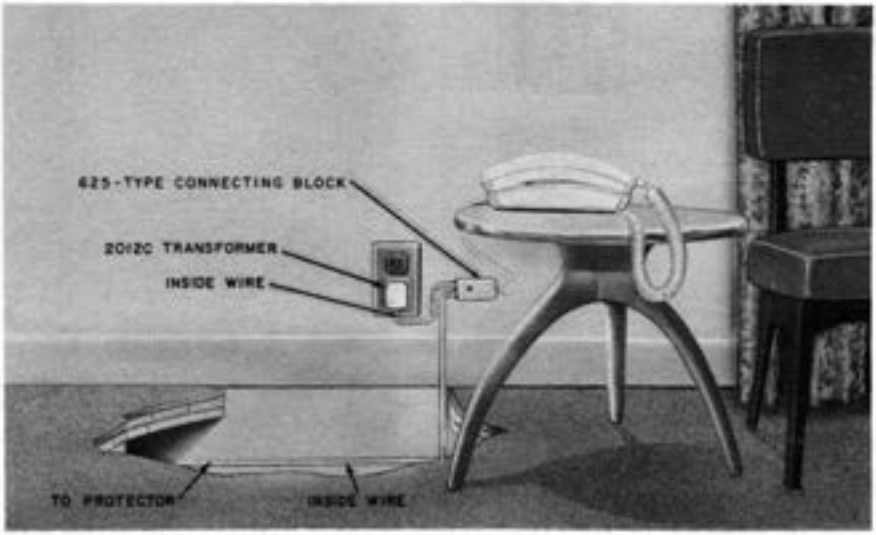

Fig. 1—◗Typical Installation of a TRIMLINE Desk Telephone Set◖

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Fig. 2—TRIMLINE Handsets and PRINCESS Telephone With Illuminated Dial Feature

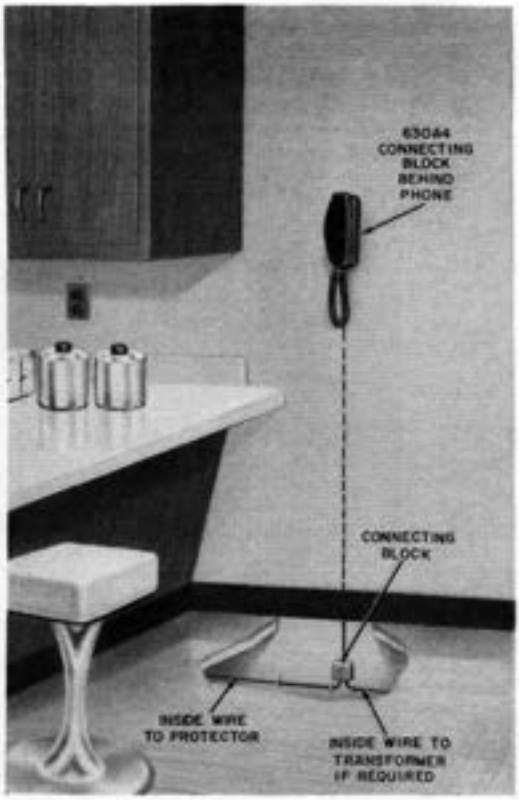

Fig. 3—Typical Installation of a Wall TRIMLINE Telephone

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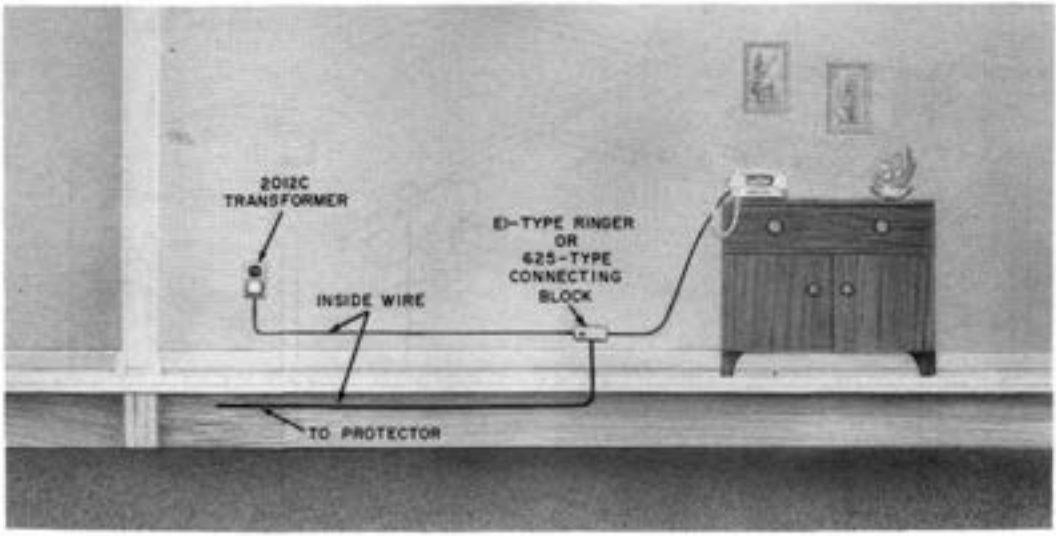

Fig. 4—Typical Installation of 700-Type Telephone Set

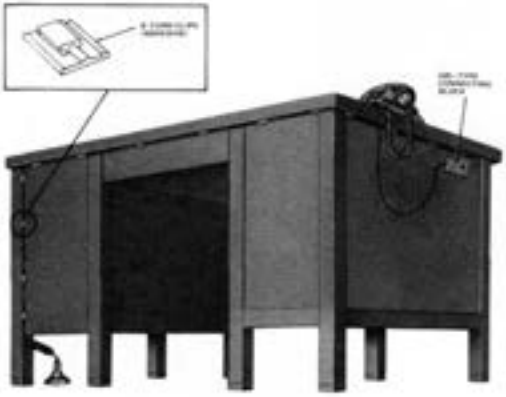

Fig. 5—Typical Station Installation on Desk Having No Wiring Facilities

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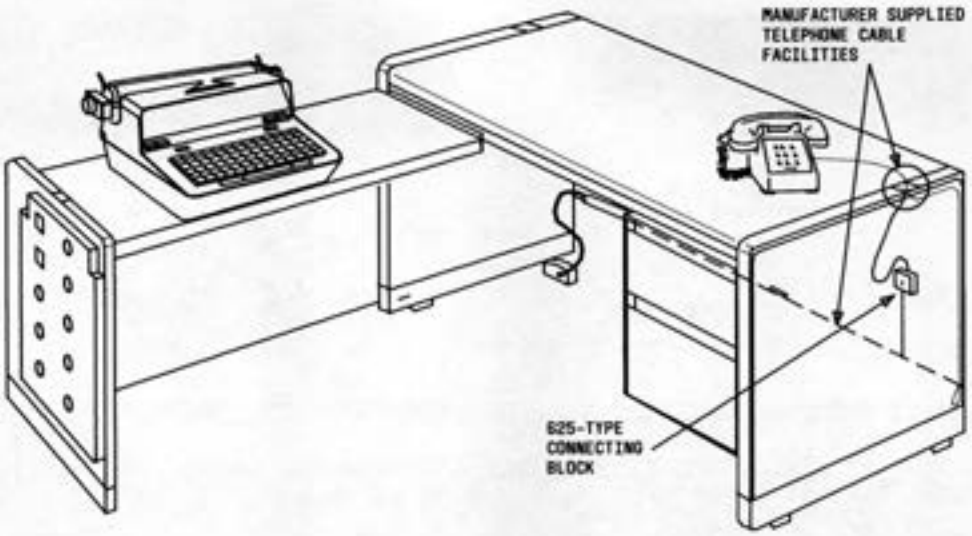

Fig. 6—Desk With Built-in Wire Channel and Desk Top Opening for Telephone Wire

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SELECTING OUTDOOR LOCATIONS

1. GENERAL

1.01 This section is reissued to add caution on operating temperatures of the TOUCH-TONE® telephone sets.

1.02 Placing wire, cable, and protectors for telephone apparatus at patios and swimming pools should be on the same basis as for permanent buildings.

Avoid placing wires over swimming pools or diving boards.

1.03 Conduit or ditch for underground wire or cable distribution will be provided by the customer. The same separations between telephone and power should be observed as is required for ordinary buried service.

Proper grounding procedures are very important. See the section entitled Protectors and Signaling Grounds in Division 460.

2. INSTALLATION

2.01 Telephone apparatus shall only be installed in a weatherproof box or enclosed area. A suitable location or box shall be provided by the customer and approved prior to installation.

Caution: Under no circumstances shall telephone apparatus cords be long enough to reach a swimming pool. The customer should be so advised preceding the installation. Trench or conduit runs to telephone locations can then be planned accordingly.

2.02 Weatherproof telephone sets are available to the customer, not desiring to supply a waterproof box or enclosure, under special arrangement covered by local instructions.

2.03 Weatherproof jacks and covers shall be used at all outdoor locations. See the section entitled Jacks and Plugs.

Customer must be cautioned to bring portable telephone apparatus indoors at night or during inclement weather. Moisture may damage telephone apparatus, and may also cause service failure on the entire line.

Caution: On TOUCH-TONE telephone sets, temperatures below −20° F (30° C) and above 130° F (55° C) may effect operation of the dial.

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220-, 226-, 2220-, AND 2226-TYPE TELEPHONE SETS
IDENTIFICATION, INSTALLATION, CONNECTIONS, AND MAINTENANCE

1. GENERAL

1.001 This addendum supplements Section 502-303-102, Issue 3. Place this pink sheet ahead of Page 1 of this section.

1.002 This addendum is issued to show the 220-, 226-, 2220-, and 2226-type telephone set bases manufactured after 6-1-82 will be marked (under or near the date code) "1-PTY". This marking indicates that the base cannot be used for multiparty service connections or A-lead control.

2. CHANGES TO SECTION

2.001 On Page 1, add the following note after paragraph 2.01:

Note: Telephone set bases ***not*** marked "1-PTY" are adaptable for all classes of line and ringer connections and for A-lead control. Bases marked "1-PTY" cannot be used for multiparty service connections or wired for A-lead control. If service other than individual or bridged ringing is required, an AC2MP or AD3M base, housing, and handset must be ordered separately.

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220-, 226-, 2220-, AND 2226-TYPE HAND TELEPHONE SETS
IDENTIFICATION, INSTALLATION, CONNECTIONS, AND MAINTENANCE

1. GENERAL

1.01 This section contains information for the 220-, 226-, 2220-, and 2226-type hand telephone sets (Fig. 1, 2, and 3).

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add the 315B amplifier for 226A hand telephone set
- Show the 315A amplifier (MD) for 226A hand telephone sets
- Change Fig. 25 and 26.

2. IDENTIFICATION

2.01 The 220A (MD), 220C, 220AL, 220AM, and 226A rotary dial and 2220B (MD), 2220C, 2220BM, and 2226A TOUCH-TONE* dialing hand telephone sets are intended for use with other components and apparatus to make up a complete telephone set. Refer to Table A for identification of associated apparatus.

2.02 These handsets are presently used with the TRIMLINE* telephone, Transaction, Elevator, Conference, and some DESIGN LINE† decorator telephones.

2.03 They consist primarily of a plastic deck and shell, a dial, flexible circuit board (network), handset cord jack, transmitter, and receiver units.

2.04 The 220A (MD) and 2220B handsets are equipped with jacks which accept the large

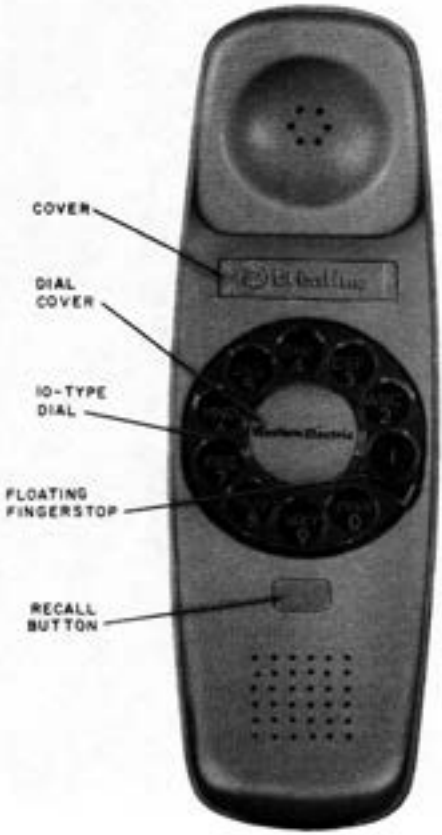

Fig. 1—220-Type Hand Telephone Set

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Fig. 2—2220C Hand Telephone Set

Fig. 3—2226A Hand Telephone Set

(maxi) plug of the H4DB, H5AA, or H5AD handset cord. The 220C, 220AL, 220AM, 226A, 2220C, 2220BM, and 2226A handsets are equipped with jacks and/or adapters which accept the small (mini) plug of the H4DU (modular) handset cord (Fig. 4).

2.05 The 220A (MD), 220AM, 2220B (MD), and 2220BM handsets are equipped with a dial light which requires an external power source (2012A (MD) or 2012C transformer) or equivalent 6-volt supply. The 220C, 220AL, 226A, 2220C, and 2226A handsets are equipped with light emitting diodes (LED) for dial illumination. Power to light these dials is supplied by CO battery over the incoming line

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Fig. 4—H4DU Handset Cord Installed in Hand Telephone Set

and no local power is required. The 220C, 220AL, and 226A rotary dial handsets are stamped LED at location shown in Fig. 5. The LED equipped TOUCH-TONE† telephone dial handsets can be identified by the square dial buttons.

2.06 The 226A and 2226A handsets contain an amplifier which provides up to 20dB of receiver gain for customer's with impaired hearing or use in noisy locations.

2.07 When an LED-type hand telephone set is provided, instruct the customer that during the time a TOUCH-TONE telephone dial button is depressed the dial light will be extinguished, and with the rotary-type dial, light will flicker during the run down operation of the dial.

2.08 For tip party with identifying ground when the LED-type hand telephone sets are provided, it will be necessary to open the handset and make connections as indicated in paragraphs 3.04 and 3.05.

Ordering Guide

2.09 ***Basic Handsets:***

- Set, Telephone, Hand, 220C-‡

‡ Refer to Table B for color suffix.

Fig. 5—220C, 220AL, and 226A Hand Telephone Set Identification Stamping (LED)

- Set, Telephone, Hand, 220AL-‡
- Set, Telephone, Hand, 220AM-‡
- Set, Telephone, Hand, 226A-‡ (for persons with impaired hearing or noisy location)
- ◗Set, Telephone, Hand, 2220C-‡ (includes polarity guard)◖
- Set, Telephone, Hand, 2220BM-‡
- Set, Telephone, Hand, 2226A-‡ (for persons with impaired hearing or noisy location)
- ◗Set, Telephone, Hand, 2220BMG-‡ (includes polarity guard)◖

2.10 ***Replaceable Components:***

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TABLE A

IDENTIFICATION OF "TRIMLINE" TELEPHONE COMPONENTS AND ASSOCIATED APPARATUS (Note 1)

HAND TEL SET CODE	METHOD OF IDENT.	TEL BASE CODE	WALL JACK OR MTG CORD CODE	HANDSET CORD CODE	BASE HANDSET JACK ADAPTER CODE	HAND TEL SET JACK ADAPTER CODE	METHOD OF PROVIDING TIP PARTY IDENT. GRD
220A or 2220B	Large Handset Cord Jack With Code Stenciled Inside on Shell	AC1, AC1P	630A (AC1P)	H4DB	None	None	H5AA Cord
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	231B (AD2)	227D	None Note 3
		AD2, AD3	D4BU				
220AM or 2220BM	227D Adapter in Handset Jack of a 220A or 2220B	AC1, AC1P	630A (AC1P)	H4DU	231B	227D†	Note 4
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	None	227D†	None Note 3
		AD2, AD3	D4BU				
220AL	LED Printed Under Finger-stop. 227D Adapter in Handset Jack	AC1, AC1P	630A (AC1P)	H4DU	231B	227D*	D-180824 Kit of Parts
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	231B (AD2)		
		AD2, AD3	D4BU				
2220C (Early Version)	(4) Wire Springs in Handset Jack. Square Buttons (2220C) (Minimodular)	AC1, AC1P	630A (AC1P)	H4DU	231B	None	D-180825 Kit of Parts Note 2
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	231B (AD2)		
		AD2, AD3	D4BU				
220C, 226A, 2220C (Late Version) or 2226A	LED Printed under Finger-stop (220C and 226A) Square Buttons on Dial (2220C and 2226A) (Minimodular)	AC1, AC1P	630A (AC1P)	H4DU	231B	None	
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	231A (AD2)		
		AD2, AD3	D4BU				

Note 1. All components and apparatus are ordered separately.

Note 2. The 2220C (early versions) do not require the 282B adapter.

Note 3. This combination of components can not be wired for tip party identification.

Note 4. 227D and 231B adapters must be removed for tip party identification and H5AA handset cord provided.

* Factory Installed.

† Field or service center installed.

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♦ TABLE B ♦

COLOR SELECTION

COLOR	SUFFIX	COVER 226A, 2226A	COVER 220A, 220C, 220AL, 220AM, 2220B, 2220C, 2220BM	DIAL COVER 220A, 220C, 220AL, 220AM, 226A	DECK 220C, 226A (SEE NOTE)	SHELL 220C, 226A (SEE NOTE)	DECK 2220C, 2226A (SEE NOTE)	SHELL 2220C, 2226A (SEE NOTE)
Black	-03	841376759	840431035	818850034 (P-88E003)	841375504	841375256	841356751	841356504
Ivory	-50	841376767	840431506	818850505 (P-88E050)	841375520	841375272	841356777	841356520
Green	-51	841376775	840431514	818850513 (P-88E051)	841375538	841375280	841356785	841356538
Red	-53	841376783	840431530	818850539 (P-88E053)	841375546	841375298	841356793	841356546
Yellow	-56	841376791	840431563	818850562 (P-88E056)	841375553	841375306	841356801	841356553
White	-58	841376809	840431589	818850588 (P-88E058)	841375561	841375314	841356819	841356561
Lt. Beige	-60	841376817	840431605	818850604 (P-88E060)	841375579	841375322	841356827	841356579
Aqua Blue	-62	841376825	840431621	818850620 (P-88E062)	841375587	841375330	841356835	841356587
Brown	-104	841376833	840431100	818850109 (P-88E010)	841375595	841375348	841356876	841356629
Rust	-124	841376882	840431126	818850125 (P-88E012)	841375603	841375355	841356918	841356660

Note: These are the only recommended deck and shells to be replaced in field.

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- Lamp, 51B or 53B (use 53A for replacement)
- Cover, Dial (Fig 1 and Table B)
- Cover (Fig. 1, 3 and Table B)
- 812362382 (P-23F238) Light Seal Plate (220A [MD], 220AM, 2220B [MD], and 2220BM only)
- Deck (220C and 2220C), Table B
- Shell (220C and 2220C), Table B
- ❵Amplifier, 315A (MD) (226A only)❴
- Amplifier, 315B ❵(226A and 2226A only)❴
- Unit, Transmitter, T1 §
- Unit, Receiver, LB-Type §
- Adapter, 227D-29 (220AL, 220AM, and 2220BM only).

2.11 ***Optional Apparatus (ordered separately):***

- D-180719 Kit of Parts (220C, 226A, 2220C, and 2226A only) provides inductive hearing aid pickup
- ❵D-180984❴ Kit of Parts (2220B (MD) and 2220BM only) polarity guard, install in associated hand telephone set when indicated on service order
- D-180824 Kit of Parts (220AL only) tip party identification
- D-180825 Kit of Parts (220C, 226A, 2220C, and 2226A only) tip party identification
- D-180891 Kit of Parts (2220C and 2226A only) Radio Frequency Interference (RFI) only if RFI is received when hand telephone set is on-hook. Refer to Section 500-150-100 for additional information on RFI.

2.12 ***Design Features:***

- Dial located in handset (rotary or TOUCH-TONE telephone dial)
- Illuminated dial
- Plug-ended handset cord
- Equipped with a recall switch to make repeated calls without hanging up handset
- Polarity Guard (factory provided, 2220C, ❵2220BMG,❴ and 2226A only).

§ 220C, 226A, 2220C, and 2226A only.

3. INSTALLATION

3.01 The plastic deck and shell of these handsets are held together by two screws located under the cover above the dial (Fig. 6). If necessary to open hand telephone set, refer to paragraphs 3.02 and 3.03.

3.02 ***Removal of Hand Telephone Set Cover (Shell).***

Caution: Be careful not to insert tip of the releaser too deep or mar the handset housing. Under no circumstances should a screwdriver be used.

(1) Use a KS-21107L1 tool or equivalent to remove the cover located above the dial.

(2) Carefully back out the two exposed screws with a 3/16-inch blade screwdriver.

(3) Remove handset cover (shell).

Note: If the D-180719 Kit of Parts is required, the chassis can be removed from the desk on the 220C, 226A, 2220C, and 2226A handsets by removing four (4) mounting screws (Fig. 7).

3.03 ***Replacement of Hand Telephone Set Cover.***

(1) Hook the opening in the cover (shell) under the lip of the deck (located below the handset cord jack).

(2) Gently push the shell and deck together.

(3) Tighten the two captive screws.

(4) Replace cover above dial.

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Fig. 6—Location of Housing Screws

Fig. 7—2220C Hand Telephone Set With Chassis Assembly Removed from Deck

A. Tip Party Identification (D-Kits of Parts)

D-180824 (220AL)

3.04 If tip party identification is required, install a D-180824 Kit of Parts in the 220AL hand telephone set as follows.

(1) Remove shell from handset, paragraphs 3.01 and 3.02

(2) Remove the existing 227D adapter from the handset cord jack by grasping adapter on both sides and pulling outwards.

(3) Install the 227C adapter from the kit of parts into the handset cord jack (Fig. 8).

(4) Connect the (Y) and (BK) spade-tipped leads to terminals A and 4, respectively, of the network (Fig. 8).

(5) The 840362776 terminal board, furnished in the kit, mounts in the associated telephone base, refer to Section 502-303-101 or 502-322-400 for installation and connection information.

(6) Replace the handset shell, paragraph 3.03.

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Fig. 8—D-180824 Kit of Parts Installed in 220AL Hand Telephone Set

D-180825 (220C, 226A, 2220C, and 2226A)

3.05 Install D-180825 Kit of Parts in 220C, 226A, 2226A, and later version 2220C hand telephone set as follows.

(1) Remove shell from handset, paragraphs 3.01 and 3.02.

(2) Install the 282A (MD) or 282B adapter onto the existing handset cord jack by positioning the adapter on the handset cord jack body as shown in Fig. 9. Slide the adapter into the jack body until locked into place. When correctly assembled, the two gold wire contact springs of the adapter will be positioned in the formerly vacant slots of the jack paralleling the existing gold contact springs (Fig. 9).

(3) Connect the (Y) and (BK) spade-tipped leads of the adapter to terminals A and 4, respectively, of the network.

Note: The 282-type adapter is not required in early version 2220C handsets since the handset cord jacks are equipped with (W) or (Y) and (BK) spade-tipped leads which should be removed from their stored locations and connected to terminals A and B or 4, respectively.

(4) The 840362776 terminal board, furnished in the kit, mounts in the associated telephone base, refer to Section 502-303-101 or 502-322-400 for installation and connection information.

(5) Replace the handset shell, paragraph 3.03.

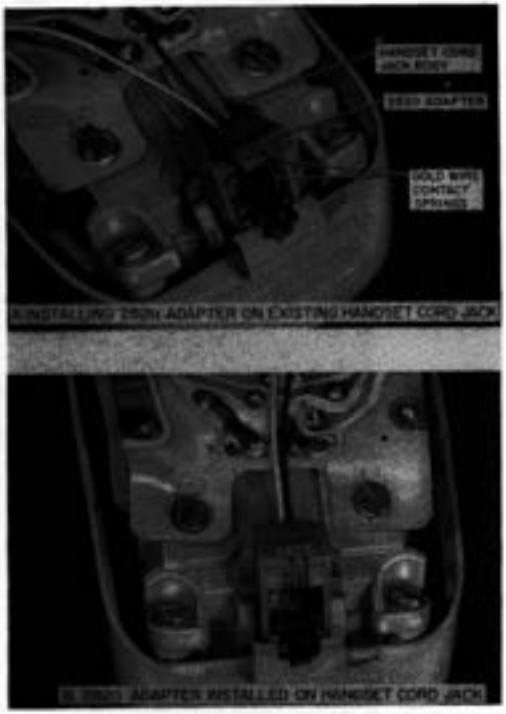

Fig. 9—D-180825 Kit of Parts Installed in 220C, 226A, 2220C, or 2226A Hand Telephone Set

B. D-180891 Kit of Parts (2220C and 2226A only) RFI Modification (Fig. 10)

3.06 To prevent RFI in the on-hook position when the early version 2220C handset (identified by four contact springs in the handset cord jack) is provided, install kit of parts as follows.

(1) Remove the shell from handset, paragraphs 3.01 and 3.02.

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(2) Connect the insulated and stored (Y) handset cord jack lead and one end of the (Y) 824612527 (P-46J252) lead assembly furnished in the kit together using a D-161488 connector (ordered separately). Insulate the connector.

(3) Remove the screw from the flexible circuit tab (network) at receiver terminal C and insulate the tab.

(4) Insulate the shank portion of the other end of the (Y) spade-tipped lead assembly and connect to the receiver terminal vacated by the flexible circuit tab.

(5) Connect the insulated and stored (BK) handset cord jack lead to terminal 5 on the flexible circuit board (network) and insulate the shank portion of the spade tip.

(6) Replace the handset shell, paragraph 3.03.

Note: The 282B adapter furnished with the kit of parts is not required to convert the (early version) 2220C hand telephone set.

To complete the modification of a TRIMLINE telephone set for RFI, it is necessary to open the AC- or AD-type telephone base and make certain wiring changes. Refer to Section 500-150-100 for wiring connections and Section 502-303-101 for information on removing the base housing.

3.07 To prevent RFI in the on-hook position when the later version 2220C and 2226A handsets (identified by the two contact springs in the handset cord jack) are provided, install kit of parts as follows.

(1) Remove the shell from handset, paragraphs 3.01 and 3.02.

(2) Position the 282B adapter furnished in the kit on the existing handset cord jack body as shown in Fig. 9.

(3) Slide the adapter into the body until locked into place. When correctly assembled, the two gold wire contact springs of the adapter will be positioned in the formerly vacant slots of the jack paralleling the existing gold contact spring (Fig. 9).

(4) Remove the screw from the flexible circuit tab (network) at receiver terminal C. Insulate the tab.

(5) Insulate the shank portion of the (BK) adapter spade-tipped lead and connect to the receiver terminal vacated by the flexible circuit tab.

(6) Connect the (Y) adapter lead to terminal 5 on the flexible circuit board (network). Insulate the shank portion of the spade tip.

(7) Replace the handset shell, paragraph 3.03.

Note: The (Y) 824612527 (P-46J252) lead assembly furnished with the kit of parts is not required to convert the (late version) 2220C hand telephone set.

To complete the modification of a TRIMLINE telephone set for RFI, it is necessary to open the AC- or AD-type telephone base and make certain wiring changes. Refer to Section 500-150-100 for wiring connections and Section 502-303-101 for information on removing the base housing.

C. Inductive Hearing Aid Pickup (D-180719 Kit of Parts)

3.08 For customer's with telephone pickup type hearing aids, a D-180719 Kit of Parts may be installed in the 220C, 226A, 2220C, and 2226A handsets as follows.

(1) Remove the shell and deck from the molded plastic chassis assembly (paragraphs 3.01, 3.02 and Fig. 7).

(2) Twist and lift off the receiver retainer, receiver unit, and receiver grommet from the receiver cup on the chassis assembly.

(3) Remove the receiver retainer and grommet from the receiver unit and ***discard only the retainer and grommet.***

(4) From the kit of parts (Fig. 11) install the receiver grommet in the field coil assembly with the lip of the grommet protruding outside the assembly.

(5) Place the receiver unit in the coil assembly (Fig. 12).

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(6) With the receiver unit in place in the coil assembly, install the gasket on top of the receiver unit (Fig. 13). Place complete assembly in the chassis assembly receiver cup.

In order to properly insert the receiver unit with the receiver coil into the receiver cup, hold handset in an upright vertical position with the varistor across the receiver unit at the top. Carefully place unit in the receiver cup and snap retainer to the chassis assembly receiver cup (Fig. 14).

(7) Loosen the two (2) network receiver cup mounting screws (Fig. 15) on back side of the receiver cup. Terminate one (1) of the black (BK) coil leads under each screw (Fig. 16).

(8) Reassemble the handset.

(9) Install the card (Fig. 11) which identifies a coil equipped handset in location where the cover above the dial was removed. Place the (clear) card retainer over the card.

3.09 ♦If a 2220B (MD) or 2220BM hand telephone set is provided and a polarity guard is required, a D-180984 Kit of Parts must be ordered separately and installed in the hand telephone set as follows.

(1) Remove the shell from the hand telephone set as described in paragraph 3.02.

(2) Remove the 227D adapter (if provided) from the handset cord jack.

(3) Plug the polarity guard adapter into vacated jack (Fig. 16).

(4) Dress the adapter leads as shown in Fig. 16 and replace the hand telephone set shell as described in paragraph 3.03.

Note: If the installation requires tip party identification on a two-party line with automatic number identification, a 2220C hand telephone set must be provided.♦

4. MAINTENANCE

4.01 Field maintenance of these hand telephone sets is limited to the replaceable components listed in the ordering guide, paragraph 2.10.

Danger: Exercise caution to prevent the lamp from flying out of the socket in a dangerous manner.

4.02 To replace a dial lamp in the 220A (MD), 220AM, 2220B (MD), or 2220BM hand telephone set, remove the cover (Fig. 1). A KS-6320 orange stick can be used to remove the lamp (Fig. 18). In early production handsets use a 553A tool to remove the lamp from its vertical position (Fig. 19).

Note: Lamps carried for maintenance reasons should be 53A since both early and current production handsets accommodate this type.

4.03 To replace the 315-type amplifier in 226A or 2226A handsets, proceed as follows.

(1) Remove shell from handset, paragraphs 3.01 and 3.02.

(2) Remove the network receiver cup mounting screw and the three (3) 315-type amplifier network connecting screws (Fig. 20). Carefully raise the flexible circuit board (network) and remove the amplifier receiver cup mounting screw (Fig. 21). Release the amplifier spring catch by depressing with a KS-21107L1 or equivalent releaser as shown in Fig. 22, and lift amplifier out.

(3) Install replacement amplifier in reverse order used in removal and reassemble of handset.

4.04 To replace a transmitter or receiver unit in 220C, 226A, 2220C, or 2226A handset, proceed as follows.

(1) Remove shell and chassis from handset paragraphs 3.01, 3.02 and Fig. 7.

(2) Twist and lift off the transmitter and/or receiver unit, retainer, and grommet from the cup on the chassis.

(3) Separate the defective unit from the grommet and retainer.

(4) Install replacement unit in reverse order used in removal and reassemble of handset.

In order to properly insert the receiver unit into the receiver cup, hold handset in an upright vertical position with the varistor across the

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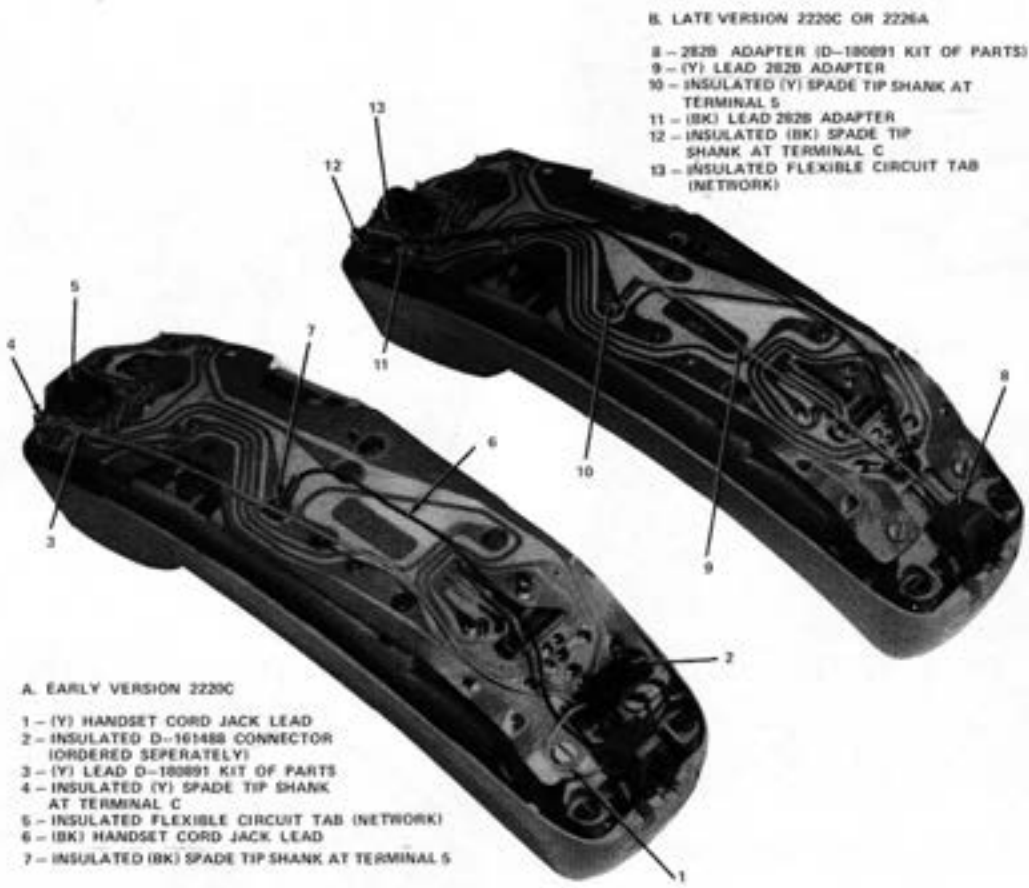

Fig. 10—2220C or 2226A Hand Telephone Set Modified for RFI

receiver unit at the top. Carefully place unit in the receiver cup and snap retainer to the chassis assembly.

5. CONNECTIONS

5.01 To restrict the dial on the 220A (MD), 220AL (early version), or 220AM hand telephone set, place a strap between the pulsing contacts as shown in Fig. 23. On the 220AL (current version) place a strap between the two (2) screws located on the flexible circuit board above the dial. In the 220C or 226A place an insulated strap between terminals 1 and 2 on the network. The dial will remain in the handset after being restricted in all cases.

5.02 For dial restriction of a TOUCH-TONE telephone dial equipped hand telephone set with-

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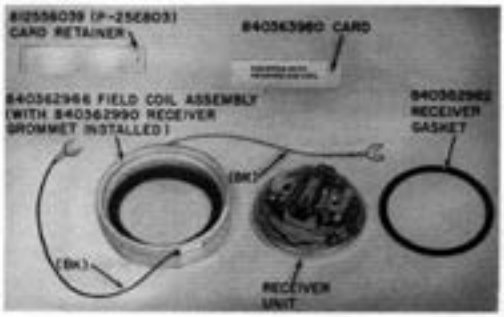

Fig. 11—D-180719 Kit of Parts and Receiver Unit

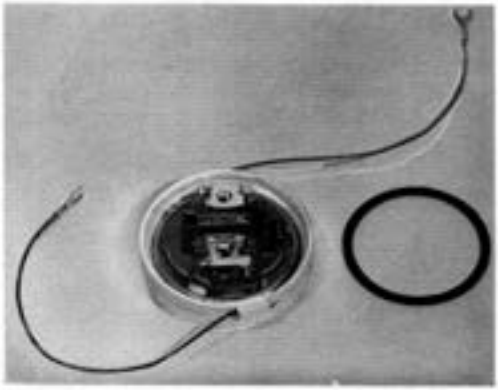

Fig. 12—Receiver Unit Installed in Coil Assembly

out a polarity guard, reverse tip and ring in telephone base and leave dial in handset.

Note: Any handset with a polarity guard installed cannot be restricted.

5.03 Internal connections for the 220-, 226-, 2220-, and 2226-type hand telephone sets are shown in Fig. 24 through 31.

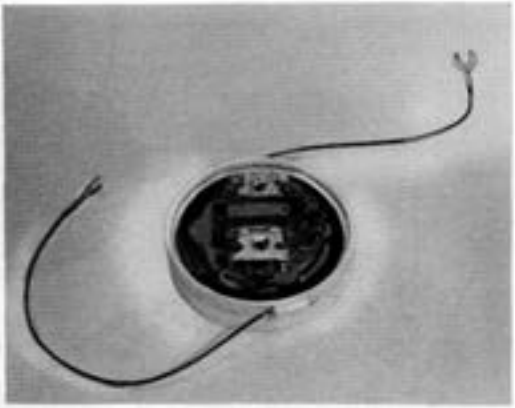

Fig. 13—Receiver Unit and Gasket Installed in Coil Assembly

Fig. 14—Field Coil Installed in Receiver Cup of Chassis Assembly

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Fig. 15—2220C Hand Telephone Set Showing Location of Network Mounting Screws

A. D-180984 KIT OF PARTS

B. D-180984 KIT OF PARTS, INSTALLED IN HAND TELEPHONE SET

Fig. 16—D-180984 Kit of Parts (Polarity Guard) Installed in 2220B (MD) or 2220BM Hand Telephone Set

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Fig. 17—Terminating Field Coil Leads to Receiver Cup Mounting Screws

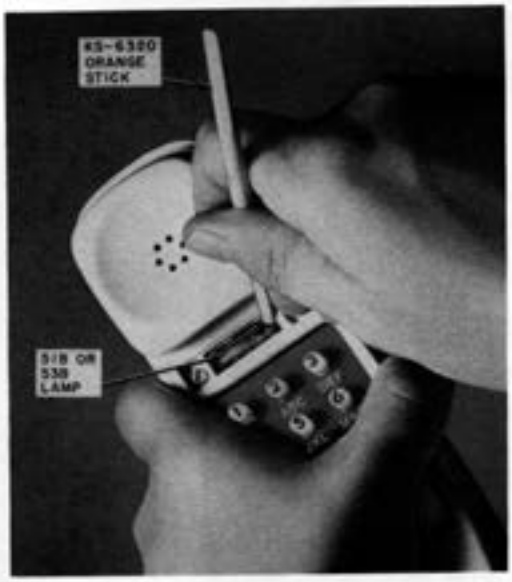

Fig. 18—Removing Dial Lamp From 2220BM Hand Telephone Set

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Fig. 19—Removing Dial Lamp Using 553A Tool

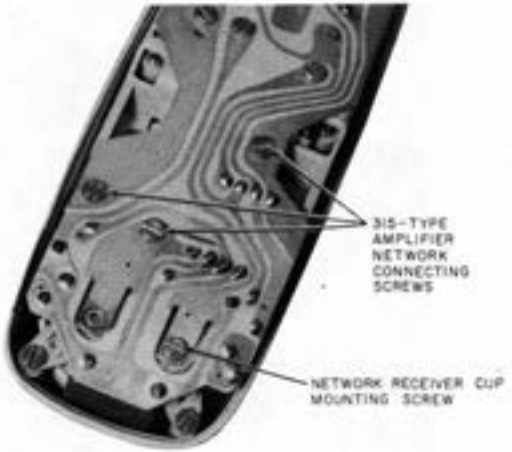

Fig. 20—Location of Mounting Screws Used to Connect Amplifier in Hand Telephone Set

Fig. 21—Fastening Amplifier to Receiver Unit Cup of Hand Telephone Set

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Fig. 22—Releasing Spring Catch on 315-Type Amplifier

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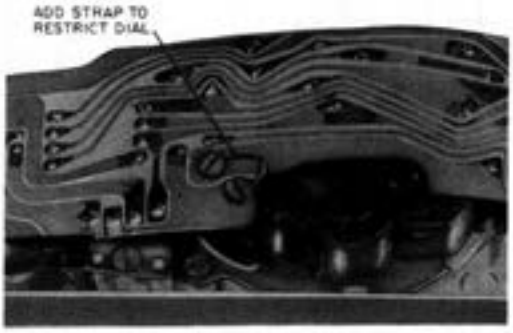
A. 220A (MD), 220 AL (EARLY VERSION) AND 220 AM HAND TELEPHONE SETS



B. 220AL (CURRENT VERSION) HAND TELEPHONE SET

Fig. 23—Restricting Dial of 220A (MD), 220AL (Early Version), or 220AM Hand Telephone Set

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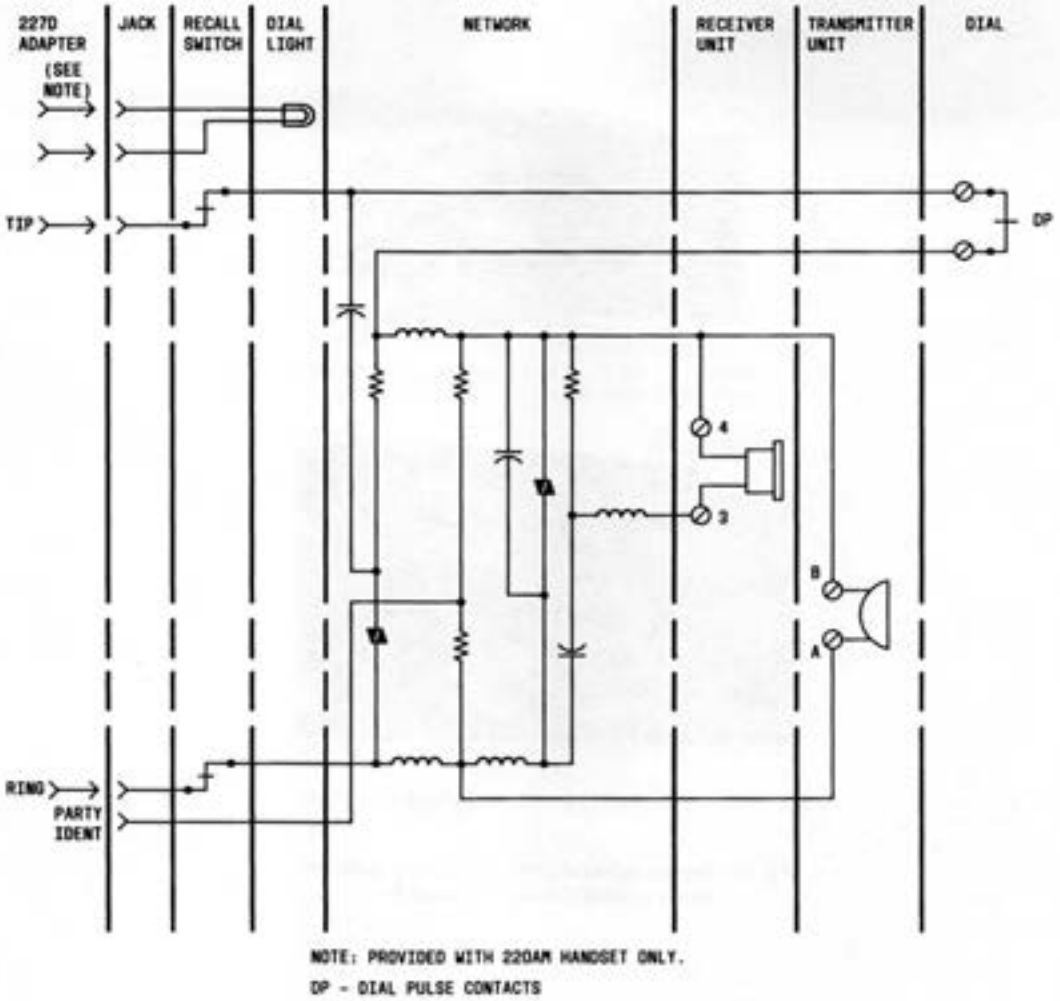

NOTE: PROVIDED WITH 220AM HANDSET ONLY.

DP - DIAL PULSE CONTACTS

Fig. 24—Schematic of 220A (MD) and 220AM Hand Telephone Set

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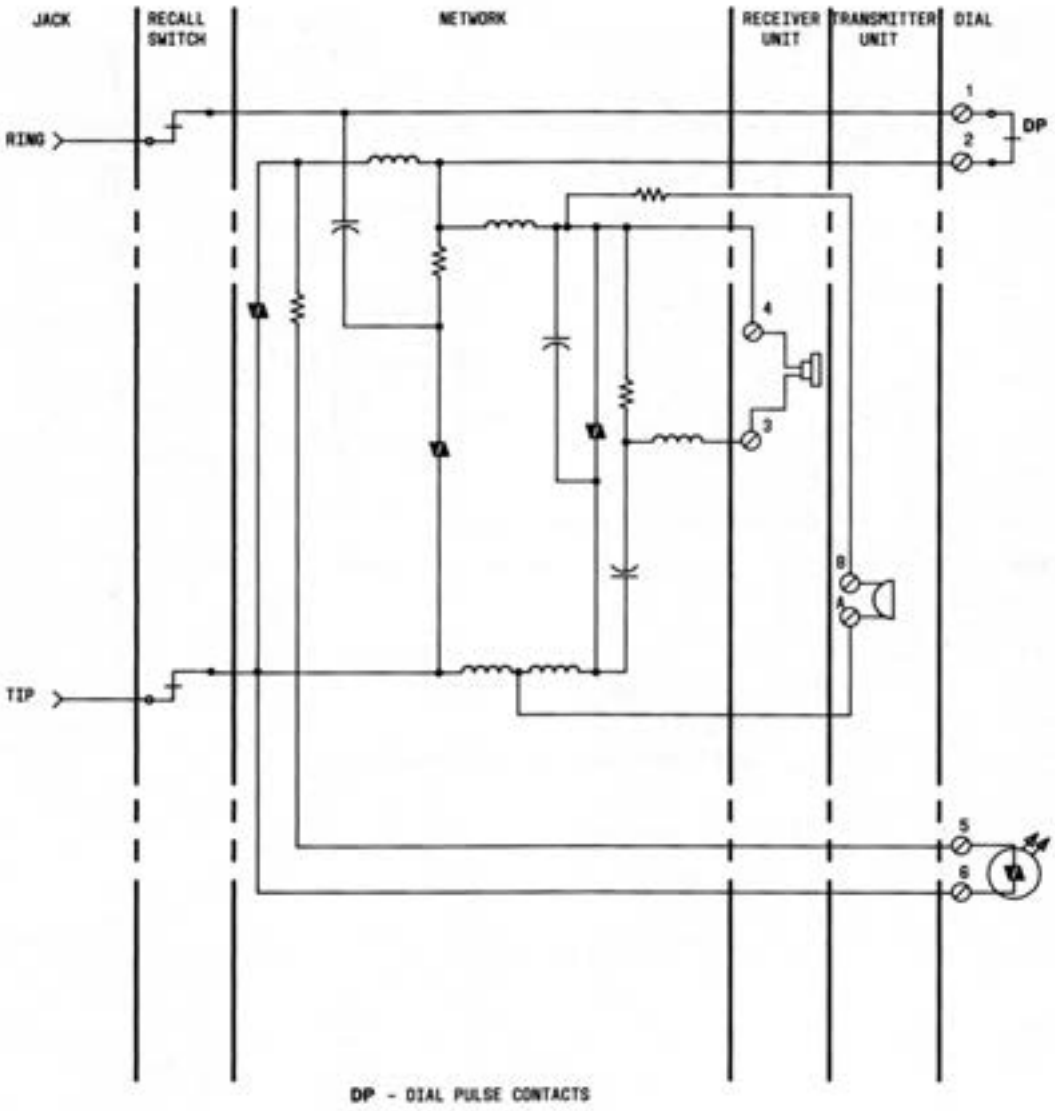

Fig. 25—Schematic of 220C Hand Telephone Set

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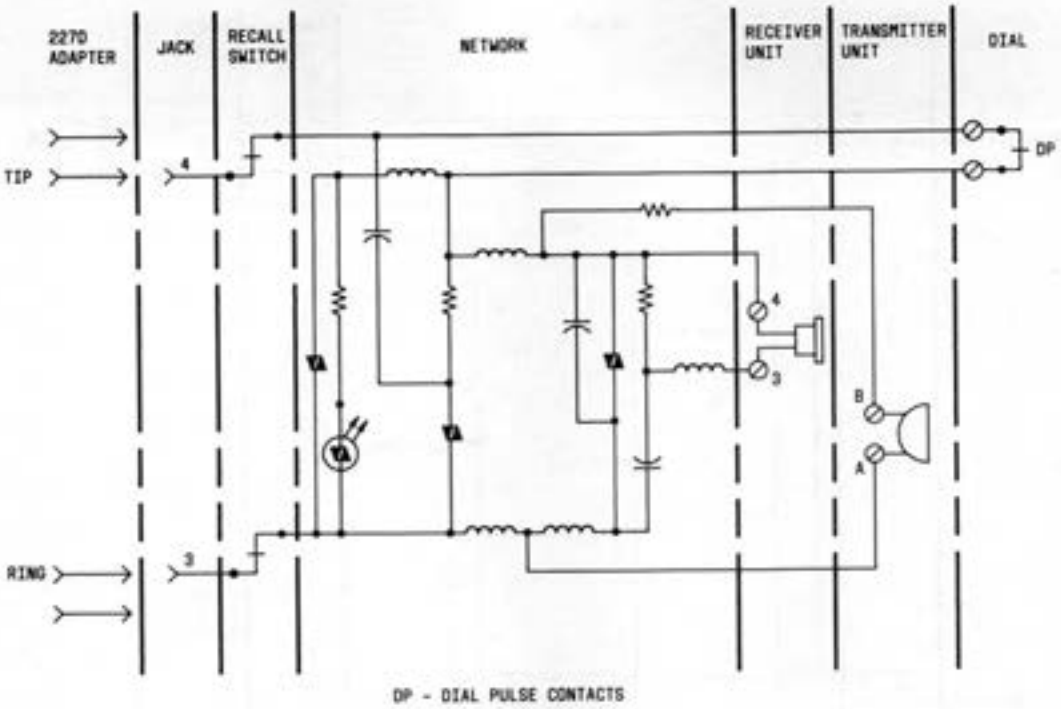

Fig. 26—Schematic of 220AL Hand Telephone Set

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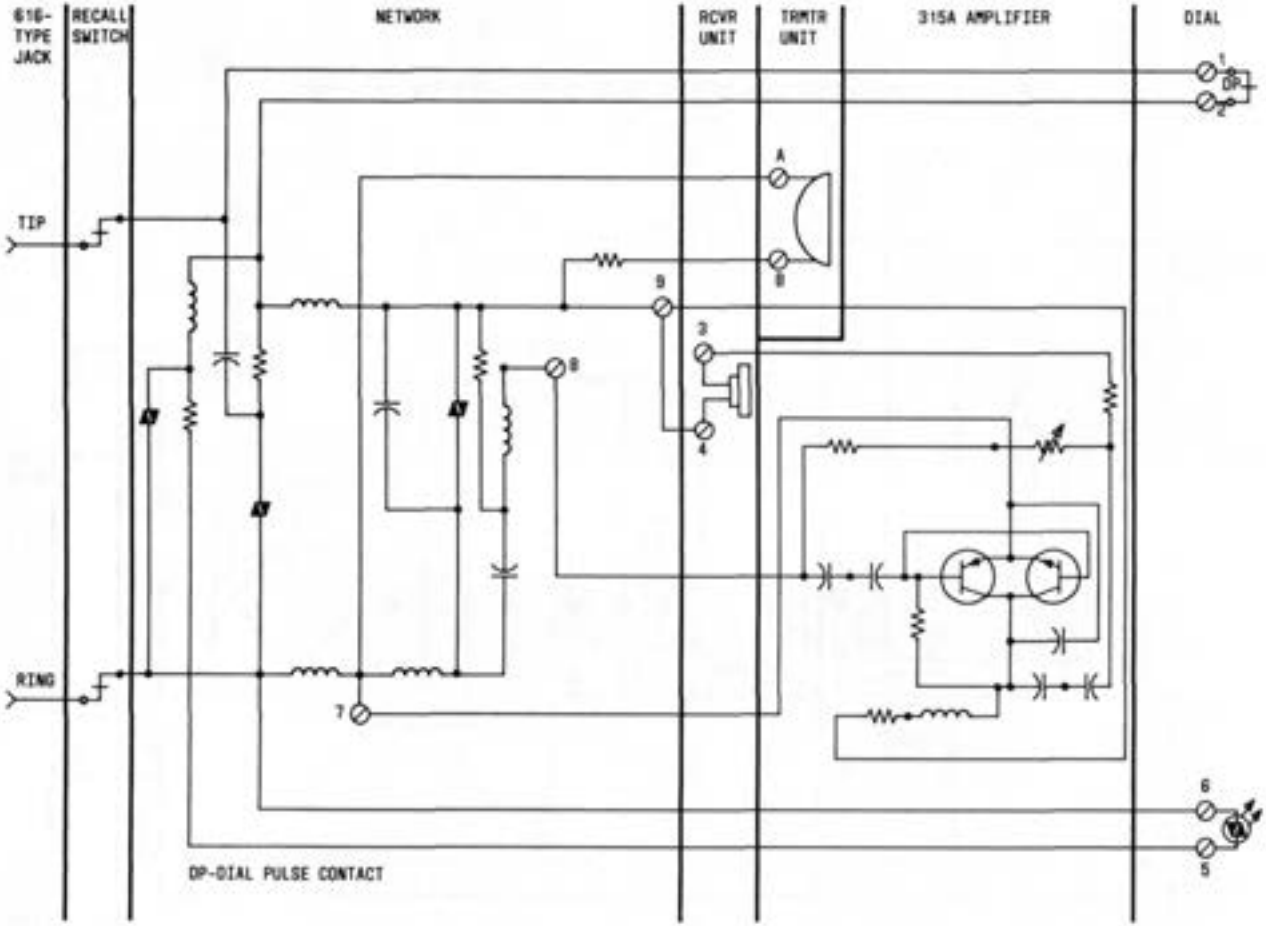

Fig. 27—Schematic of 226A Hand Telephone Set With 315A (MD) Amplifier

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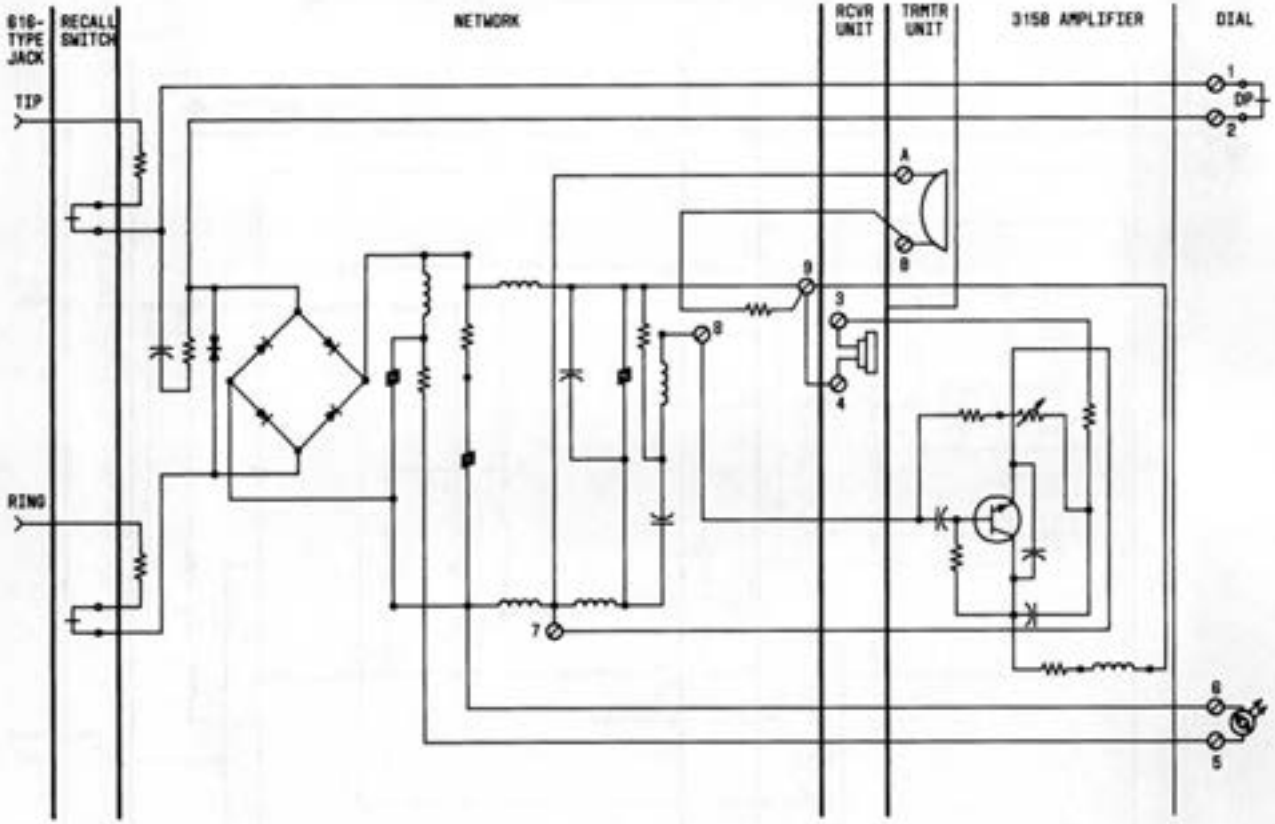

Fig. 28—Schematic of 226A Hand Telephone Set With 315B Amplifier

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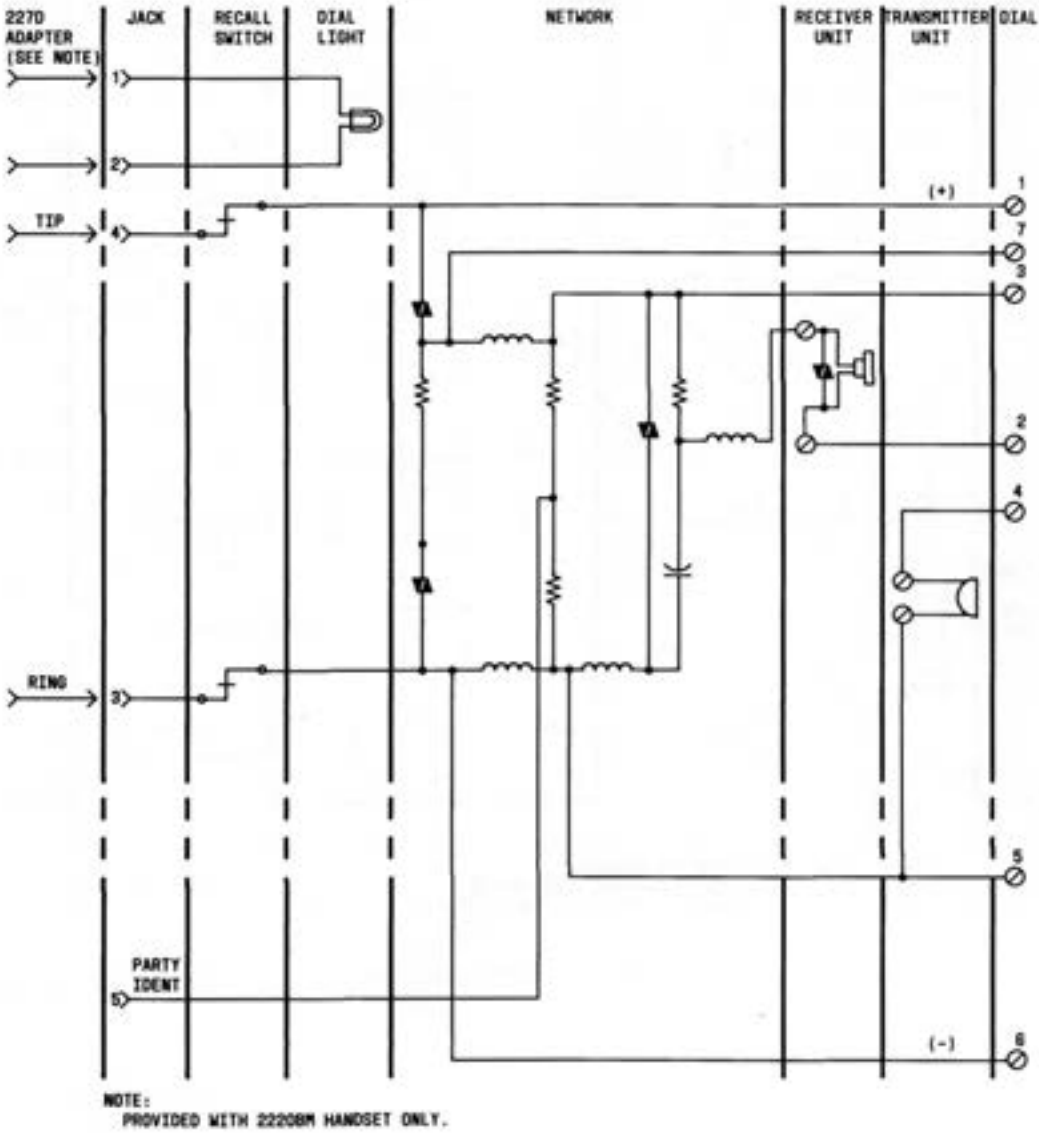

Fig. 29—Schematic of 2220B (MD) and 2220BM Hand Telephone Set

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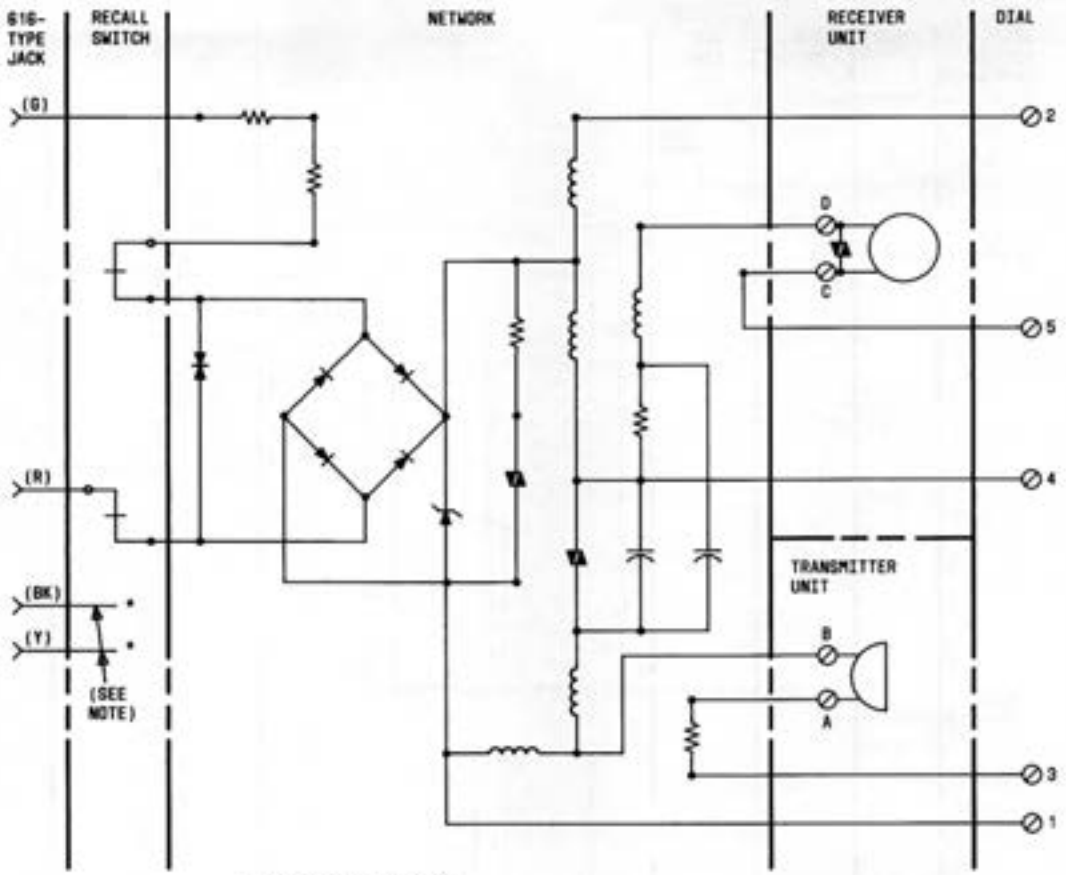

*INSULATED AND STORED
NOTE: THESE LEADS ARE FURNISHED IN EARLY VERSION 2220C HANDSETS ONLY.

Fig. 30—Schematic of 2220C Hand Telephone Set

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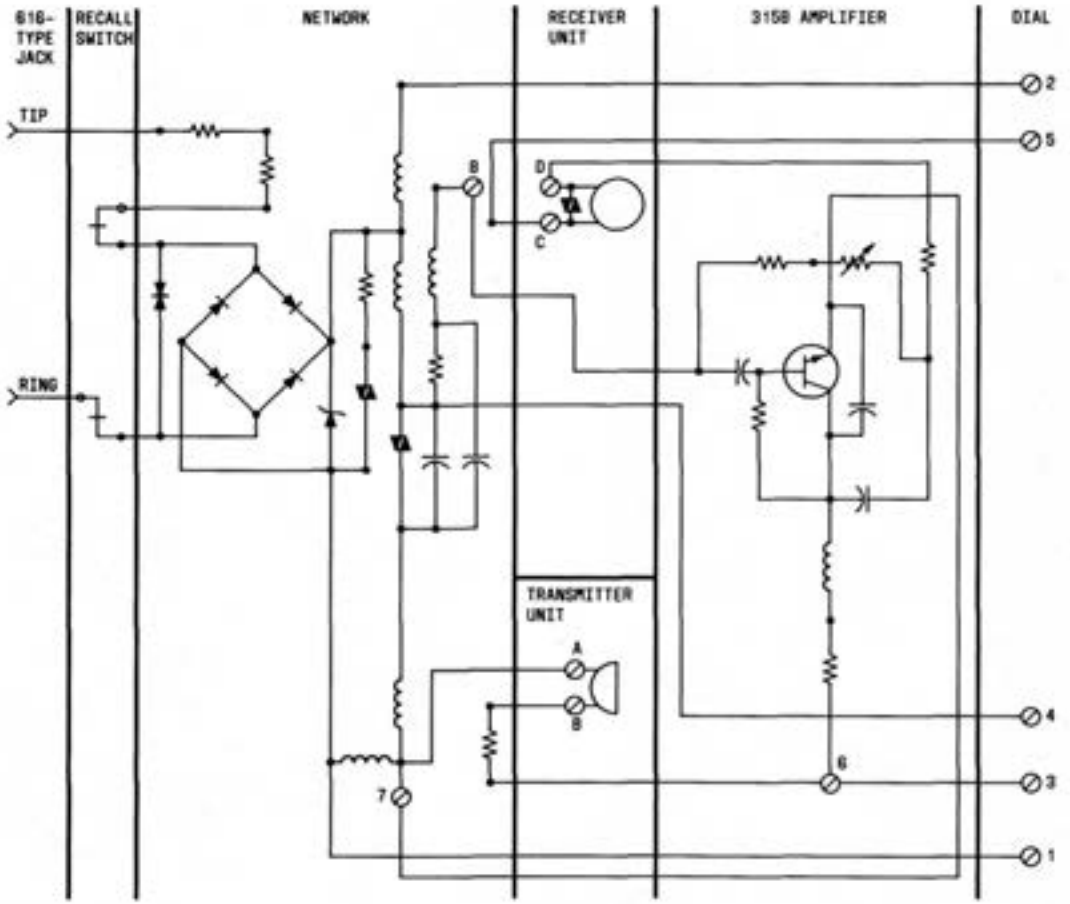

Fig. 31—Schematic of 2226A Hand Telephone Set

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SERVICE

212L HAND TELEPHONE SETS

1. GENERAL

1.01 Reissued to add nontechnical changes to Fig. 1 and Table A.

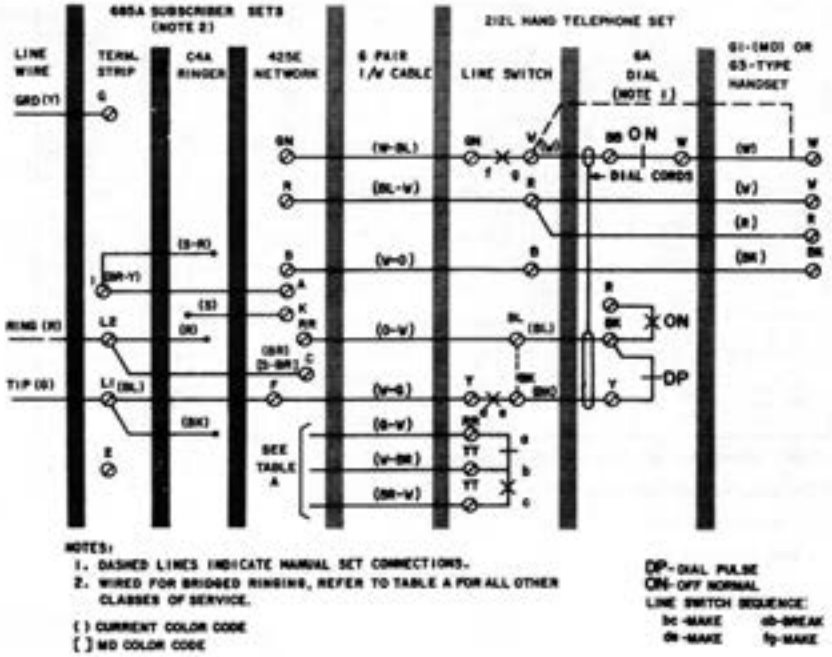

Fig. 1—ϕ212L Hand Telephone Set Connections Used With 685A Subscriber Setϕ

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◆ TABLE A ◆

LINE AND RINGER CONNECTIONS, 685A OR 686A SUB SET USED WITH 212L HAND TELEPHONE SET

WIRE OR LEAD		COLOR	INDIV OR BRIDGED	RING PARTY (NOTE)	TIP PARTY IDENT		NEG	POS
					NORMAL CONNECTIONS		RING STATION (NOTE)	
					1000Ω	3650Ω	1 AND 5	3 AND 7
6 Pair 1/W Cable		(O-W)	RR	RR	RR	RR	RR	RR
		(W-G)	F	F	F	F	F	F
		(G-W)			1	1		
		(W-BR)			L2	L2		
		(BR-W)			2	2		
Ringer		(R)	L2	L2	K*	B*	G	L2
		(BK)	L1	G	G	B*	G	L2
		(S)	K*	K*	B*	K*	A*	A*
		(S-R)	1	1	B*	G	K*	K*
Strap Term. Strip To Net.		(BL)	L1-F*	L1-F*	L1-F*	L1-F*	L1-F*	L1-F*
		(BR) [S-BR]	L2-C*	L2-C*	2-C*	2-C*	L2-C*	L2-C*
425A Tube (686A Set)		(Y)					L2	G
		(R)					G	L2
		(BK)					K	K
Line Wire	Tip	(G)	L1	L1	L2	L2	L1	L1
	Ring	(R)	L2	L2	L1	L1	L2	L2
	Grd	(Y)	G	G	G	G	G	G

Note: Reverse tip and ring for tip party service.

* Terminal on 425E network.

( ) Current color code

[ ] MD color code

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TABLE B

61M FILTER CONNECTIONS

FILTER LEADS (NOTE)	FILTER LEAD TERMINATIONS
	212L HAND TELEPHONE SET
BK	BK of Dial
Y	Y of Dial
R	BK of Line Switch

Note: The 212L set is arranged for, but not equipped with a 61M filter, for radio frequency suppression. When this filter is required, remove the dial cord between (Y) of the dial and (BK) of the line switch and make connections in Table B.

TABLE C

ASSOCIATED APPARATUS

CLASS OF SERVICE	SUB SET
2-Party Flat Rate 2-Party Message Rate Where message rate or tip party identification is required for party-on-tip stations, both 1000- and 2650-ohm tip-to-ground resistance can be provided, ie, MR — All offices AMA — Mod X-bar ZR — All offices AMA — 8xS AMA — Std X-bar AT — 8xS	685A
May also be used for these classes of service: • Individual Lines • 4-Party Semiselective • Multiparty Divided Code • Regular PBX Stations • 750A and 755A Keyless Stations	
4-Party Full Selective 8-Party Semiselective	686A

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SERVICE

AC- AND AD-TYPE TELEPHONE BASES WITH 220-, 226-, 2220-, AND 2226-TYPE HAND TELEPHONE SETS CONNECTIONS

1. GENERAL

1.001 This addendum supplements Section 502-322-400, Issue 10. Place this pink sheet ahead of Page 1 of this section.

1.002 This addendum is issued to show some AC- and AD-type telephone set bases manufactured after 6-1-82 will be marked (under or near date code) "1-PTY". This marking indicates that the base cannot be used for multiparty service connections or wired for A-lead control.

2. CHANGES TO SECTION

2.001 On Page 2, add paragraph 1.20 as follows:

1.20 Telephone set bases ***not*** marked "1-PTY" are adaptable for all classes of line and ringer connections and for A-lead control. Bases marked "1-PTY" cannot be used for multiparty service connections or wired for A-lead control. If service other than individual or bridged ringing is required, an AC2MP or AD3M base, housing, and handset must be ordered separately.

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SERVICE

AC- AND AD-TYPE TELEPHONE BASES WITH 220-, 226-, 2220-, AND 2226-TYPE HAND TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information for the AC1 (MD), AC1P, AC2 (MD), AC2P, AC2PH, AD1 (MD), AD2, AD3, and AD3H telephone bases and associated 220A (MD), 220C, 220AL, 220AM, 226A, 2220B (MD), 2220C, 2220BM, 2220BMG, and 2226A hand telephone sets. For additional information on hand telephone sets, refer to Section 502-303-102.

All AC1 and AD1 telephone bases manufactured prior to 10-1-72 and any base which is opened for any reason should be rewired as shown in Table A before proceeding with connections shown in other tables.

1.02 This section is reissued to:

- Delete D6AP mounting cord from Fig. 11
- Revise Table B.

The 220C, 220AL, 226A, 2220C, and 2226A hand telephone sets are equipped with light emitting diodes (LED) for dial illumination. This type of illumination may not be visible in normal light.

Power for all the LED-type hand telephone sets is supplied from the central office battery over the incoming line. No external ac power is required for dial illumination.

When an LED-type hand telephone set is provided, instruct the customer that during the time a TOUCH-TONE® button is depressed the dial light will be extinguished and that the rotary-type dial light will flicker during the run down operation of the dial.

For tip party with identifying ground when the LED-type hand telephone sets are provided, it will be necessary to open the handset refer to Section 502-303-102. Make connections as shown in Table D.

If AC2, AC2P, or AD3 bases are provided and tip party with identifying ground is required, 220A, 220AM, 2220B, 2220BM, and 2220BMG hand telephone set cannot be used.

1.03 Refer to Table B for identification of TRIMLINE® components and associated apparatus.

1.04 If a 2220B or 2220BM hand telephone set is provided and a polarity guard is required, a D-180984 Kit of Parts must be ordered separately and installed. The 2220BMG hand telephone set has a polarity guard installed from the factory. The 2220C and 2226A has a built-in polarity guard.

1.05 The 220AL, 220AM, and 2220BM hand telephone sets are furnished with a 227D adapter for the H4DU (modular) handset cord.

1.06 The D-180824 Kit of Parts (for tip party identification) contains a terminal board and 227C adapter. The 227C adapter replaces the 227D adapter in the 220AL hand telephone set. The 227C adapter extends the tip and ring into the hand telephone set and provides two (2) spade-tipped leads to be connected to the network inside the hand telephone set.

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The terminal board mounts inside the telephone base. Refer to Fig. 7 and Table D for connection information. For additional information, refer to Section 502-303-102.

1.07 The D-180825 Kit of Parts (for tip party identification) contains a terminal board and a 282A (MD) or 282B adapter. The adapter is required in the 220C, 226A, 2226A, and later version of the 2220C hand telephone sets. This adapter provides two (2) additional wire spring contacts which are connected to two (2) spade-tipped leads to be connected to the network inside the hand telephone set. For additional information, refer to Section 502-303-102. The adapter is not required in the early version 2220C hand telephone sets only the terminal board is required. The terminal board is positioned inside the base over the handset cord jack inside the telephone base. Refer to Fig. 6 and Table D for connection information.

> ***Note:*** In the early version 2220C handsets, remove the (W) or (Y) and (BK) spade-tipped leads from their stored location and connect to terminals A and B or 4, respectively.

1.08 A D-180891 Kit of Parts is available to modify 2220C and 2226A hand telephone sets and associated AC- and AD-type telephone bases for RFI in the on-hook position. Refer to Section 502-303-102 for handset wiring changes and Section 500-150-100 for wiring changes to the bases. Also refer to Section 500-150-100 for RFI in off-hook position.

1.09 If a D-180036 or 28A ringer isolator is used for ringer isolation or to extend the ringing range of these sets, refer to Sections 501-375-100 and 501-375-101, respectively for connection information.

1.10 A 603A ringing extender can be used when only the ringing range is to be extended. Refer to Section 501-380-102 for connections.

1.11 If a dial light transformer is required (220A, 220AM, 2220B, or 2220BM only), use a 2012A or C transformer or equivalent 6-volt supply. For additional transformer information, refer to Section 501-136-100.

1.12 To silence ringer, rotate dust cover until openings line up with access holes in top of gong and remove stopscrew.

1.13 To provide dial light (220A, 220AM, 2220B, 2220BM, or 2220BMG only) with 1A1, 1A2, 6A, or 6B KTS, a 623T6 jack and D6AM mounting cord must be ordered separately. Only the AD2 and AD3 bases can be wired for this type service. Refer to Fig. 10 and Table G for connections.

1.14 To provide message waiting and dial light features without KTS (AC1, AC1P, AD1, and AD2 bases only) and 220A or 2220B hand telephone set, refer to Table I.

1.15 The 226A and 2226A hand telephone sets are for customer's with impaired hearing. These handsets provide up to 20 dB of receiver gain in the receiver circuit. For additional information, refer to Section 502-303-102.

1.16 A D-180719 Kit of Parts is available for use by customers with hearing aids which are equipped with telephone pickup features. The kit of parts provides a supplementary field used by the pickup feature of the hearing aid. This kit is intended for use only with the 220C, 226A, 2220C, and 2226A handsets. For additional information, refer to Section 502-303-102.

1.17 A D-180697 Kit of Parts [426N (MD) or 813BH diode] is required for 4-party full selective and 8-party semiselective ringing for all type bases. Refer to Table E for connections.

1.18 Special hospital telephone bases, coded AC2PH (wall) and AD3H (desk) are available for use in critical care areas. These bases are manufactured to meet National Electrical code and National Fire Protection Association Part 76B requirements for hospital sets. For additional information, refer to Section 502-303-101.

1.19 Refer to Fig. 11 for AC2PH or AD3H telephone base connections.

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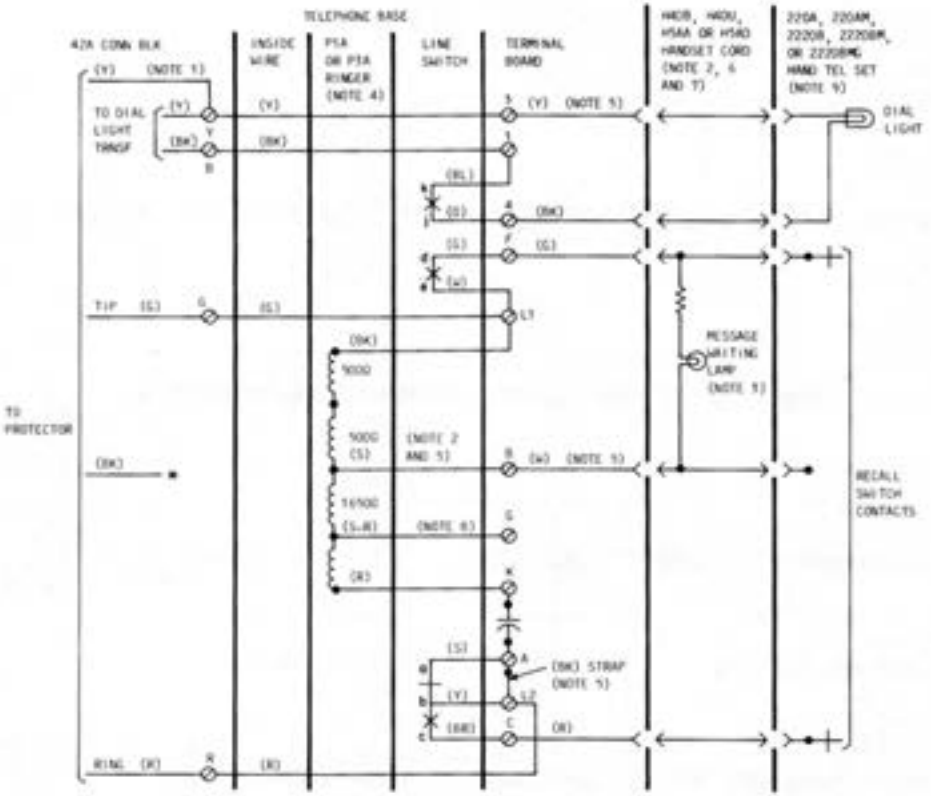

NOTES:

1. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR THE SERVICE BEING INSTALLED.
2. DISCONNECT (S) LEAD FROM TERMINAL B WHEN HSAR HANDSET CORD IS USED AND TIP PARTY IDENTIFYING GROUND IS NOT PROVIDED, INSULATE AND STORE.
3. LAMP AND RESISTOR ARE PART OF HSAD HANDSET CORD REQUIRED FOR MESSAGE WAITING FEATURE ON AC1 BASE ONLY. IF 220AM OR 2220BM HAND TELEPHONE SET IS PROVIDED, THE 22T-TYPE ADAPTER MUST BE REMOVED.
4. SET WIRED FOR INDIVIDUAL OR BRIDGED SERVICE, FOR ALL CLASSES OF SERVICE REFER TO TABLE C.
5. REFER TO READ IN 5.01 AND TABLE A FOR ADDITIONAL INFORMATION ON WIRING ARRANGEMENT AND LEAD COLORS OF AC1 BASES MANUFACTURED PRIOR TO 10-1-72.
6. HADB OR HADU HANDSET CORD SHALL BE USED FOR INDIV. OR BRIDGED RINGING, RING PARTY, AND TIP PARTY WITHOUT IDENT. LRD.
7. WHEN HADU CORD IS PROVIDED A 22TD AND 25TD ADAPTER IS REQUIRED ON AC1 BUT 22TD ADAPTER ONLY IS REQUIRED ON AC2.
8. INSULATED AND STORED ON EARLY VERSION AC1 ONLY.
9. 220AM, 2220BM, AND 2220BMG ARE EQUIPPED FOR HADU HANDSET CORD.
- INSULATED AND STORED

Fig. 1—AC1 (MD) or AC2 (MD) Telephone Base, Connections, With 220A (MD), 220AM, 222OB (MD), 2220BM, or 2220BMG Hand Telephone Set

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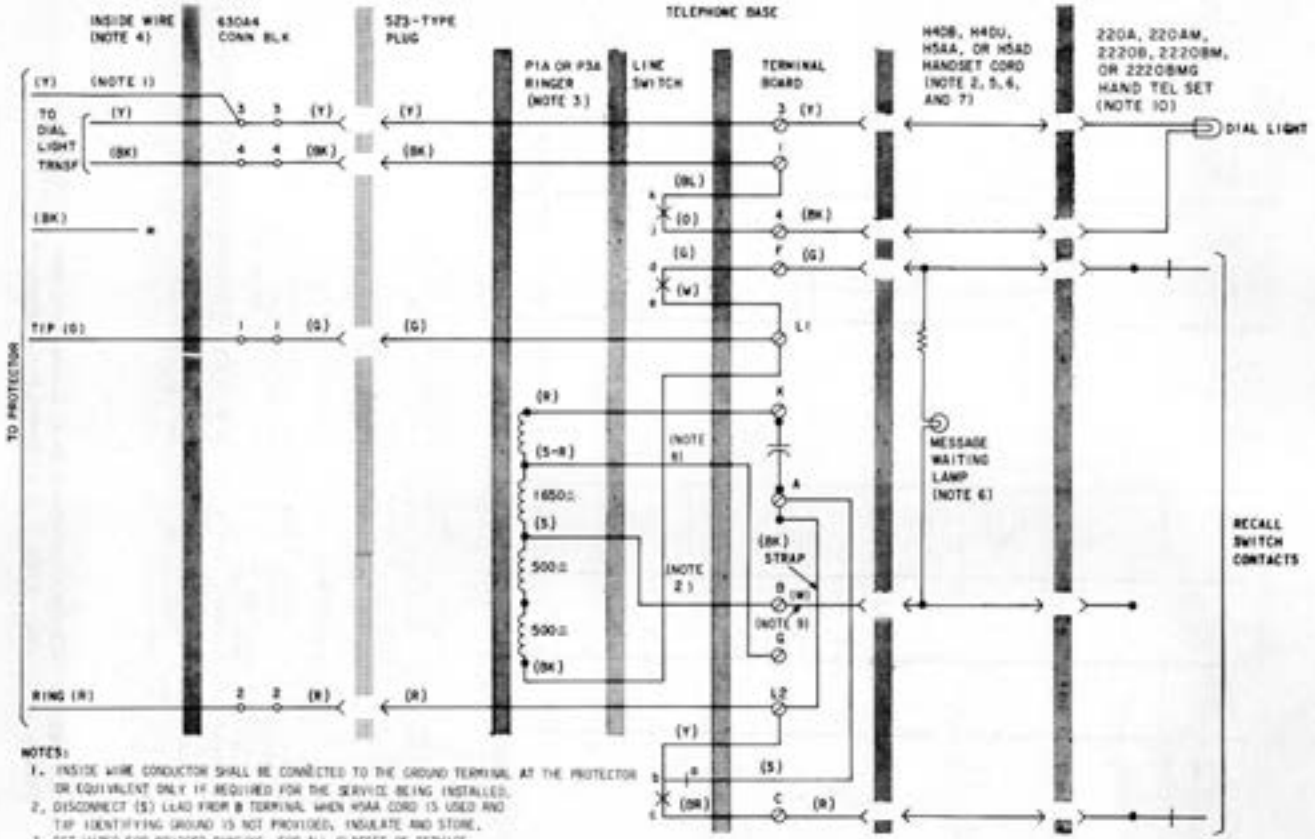

NOTES:

1. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR THE SERVICE BEING INSTALLED.
2. DISCONNECT (S) LEAD FROM B TERMINAL WHEN H5AA CORD IS USED AND TIP IDENTIFYING GROUND IS NOT PROVIDED. INSULATE AND STORE.
3. SET WIRED FOR BRIDGED RINGING, FOR ALL CLASSES OF SERVICE REFER TO TABLE C.
4. INSIDE WIRING CABLE MAY BE USED IN PLACE OF "J" STATION WIRE.
5. H40B OR H40U HANDSET CORD SHALL BE USED FOR PRIVY, OR BRIDGED RINGING, 2YNG PARTY, AND TIP PARTY WITHOUT IDENT. GRD.
6. LAMP AND RESISTOR ARE PART OF H5AD HANDSET CORD REQUIRED FOR MESSAGE WAITING FEATURE ON AC1P BASE ONLY. IF 220AM OR 2220BM HAND TELEPHONE SET IS PROVIDED, THE 227-TYPE ADAPTER MUST BE REMOVED.
7. WHEN H40U CORD IS PROVIDED A 2270 AND 2318 ADAPTER IS REQUIRED FOR AC1P BUT ONLY 2270 ADAPTER IS REQUIRED FOR AC2P.
8. INSULATED AND STORED ON EARLY VERSION AC1P ONLY.
9. (W) LEAD PROVIDED IN AC1P BASE ONLY.
10. 220AM, 2220BM, AND 2220BMG ARE EQUIPPED FOR H40U HANDSET CORD.

* INSULATED AND STORED.

Fig. 2—AC1P or AC2P Telephone Base, Connections With 220A (MD), 220AM, 2220B (MD), 2220BM, or 2220BMG Hand Telephone Sets

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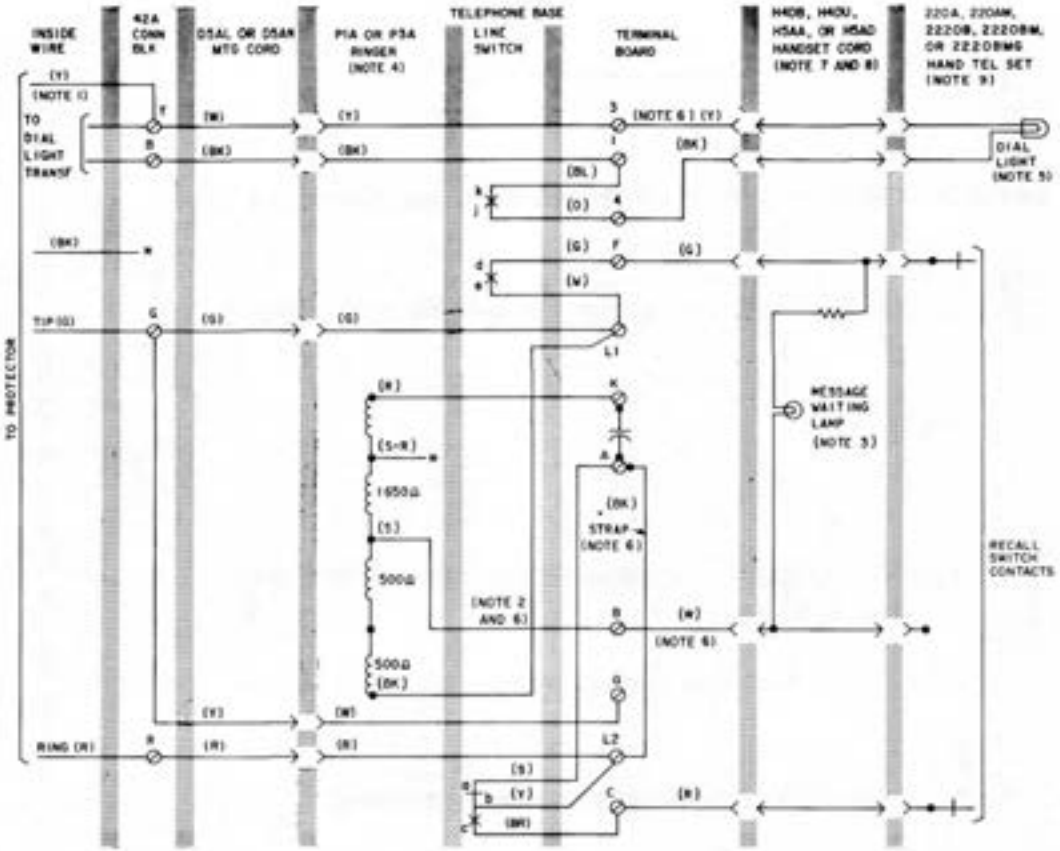

NOTES:

1. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR THE SERVICE BEING INSTALLED.
2. DISCONNECT (Y) LEAD FROM TERMINAL B WHEN H5AA HANDSET CORD IS USED AND TIP PARTY IDENTIFYING GROUND IS NOT PROVIDED, INSULATE AND STORE.
3. LAMP AND RESISTOR ARE PART OF H1AJ HANDSET CORD REQUIRED FOR MESSAGE WAITING FEATURE. IF 220AM OR 2220 OR HAND TELEPHONE SET IS PROVIDED, THE 227-TYPE ADAPTER MUST BE REMOVED.
4. SET WIRED FOR INDIVIDUAL OR BRIDGED SERVICE. FOR ALL CLASSES OF SERVICE REFER TO TABLE C.
5. CHANGE TO 51A LAMP IF COMBINED LENGTH OF H4DJ TELEPHONE SET CORD AND (ADJ BASE) MOUNTING CORD EXCEEDS 15 FEET.
6. REFER TO READ IN 4.01 AND TABLE A FOR ADDITIONAL INFORMATION ON WIRING ARRANGEMENT AND LEAD COLORS OF ADJ BASES MANUFACTURED PRIOR TO 10-1-77.
7. H4DB OR H4DJ CORD SHALL BE USED FOR INDIVIDUAL OR BRIDGED RINGING, RING PARTY AND TIP PARTY WITHOUT (GND, GR).
8. WHEN H4DJ CORD IS PROVIDED A 2210 AND 2518 ADAPTOR IS REQUIRED.
9. 220AM, 22208M, AND 22208MG ARE EQUIPPED FOR H4DJ HANDSET CORD.

* INSULATED AND STORED

Fig. 3—AD1 (MD) Telephone Base, Connections With 220A (MD), 220AM, 22208 (MD), 22208M, or 22208MG Hand Telephone Set

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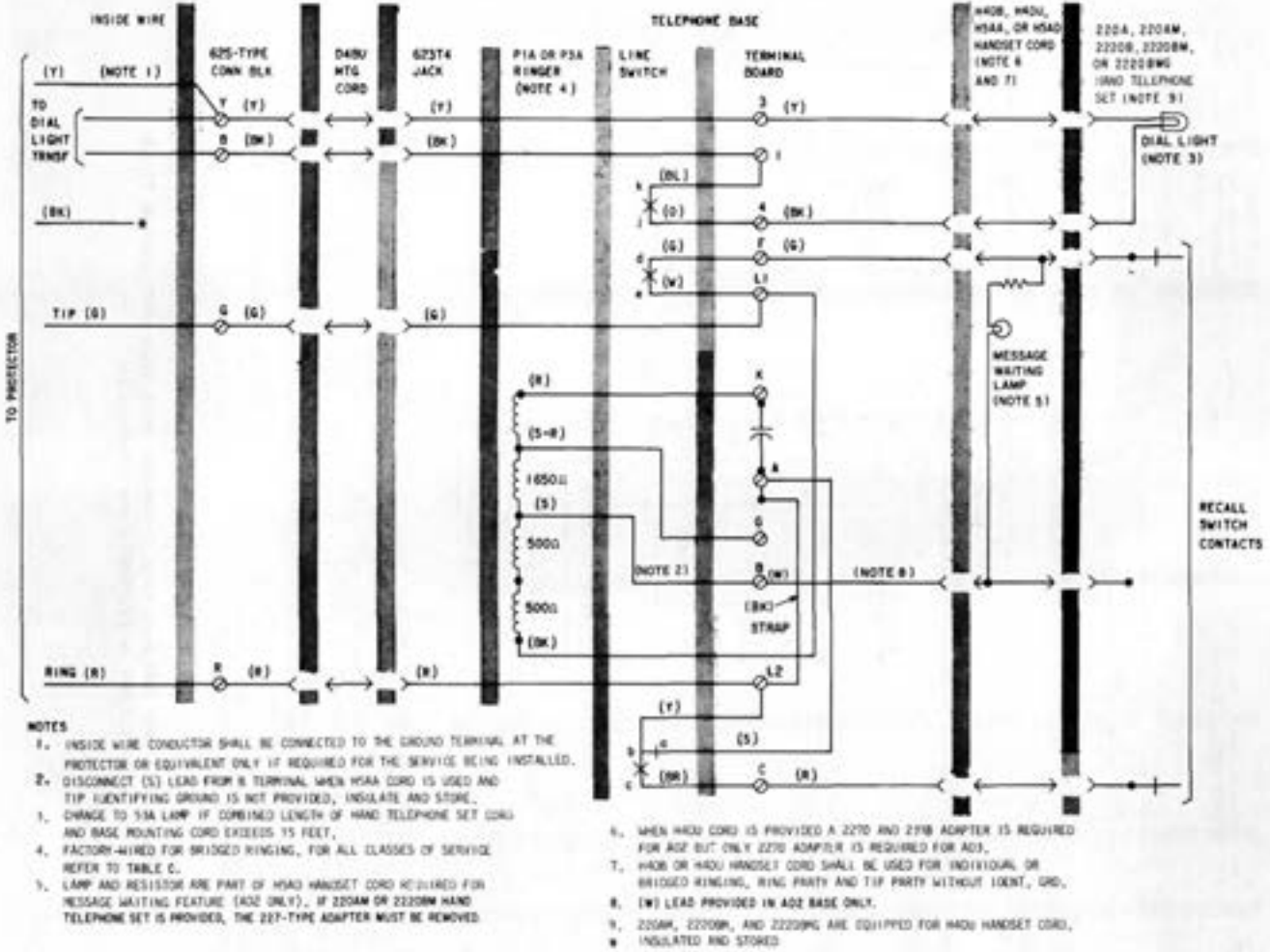

NOTES

1. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR THE SERVICE BEING INSTALLED.
2. DISCONNECT (S) LEAD FROM 6 TERMINAL WHEN H54A CORD IS USED AND TIP IDENTIFYING GROUND IS NOT PROVIDED, INSULATE AND STORE.
3. CHANGE TO 55A LAMP IF COMBINED LENGTH OF HAND TELEPHONE SET CORD AND BASE MOUNTING CORD EXCEEDS 15 FEET.
4. FACTORY-WIRED FOR BRIDGED RINGING. FOR ALL CLASSES OF SERVICE REFER TO TABLE C.
5. LAMP AND RESISTOR ARE PART OF H54D HANDSET CORD REQUIRED FOR MESSAGE WAITING FEATURE (AD2 ONLY). IF 220AM OR 2220BM HAND TELEPHONE SET IS PROVIDED, THE 227-TYPE ADAPTER MUST BE REMOVED.
6. WHEN H40U CORD IS PROVIDED A 227D AND 279B ADAPTER IS REQUIRED FOR AD2 BUT ONLY 227D ADAPTER IS REQUIRED FOR AD3.
7. H40B OR H40U HANDSET CORD SHALL BE USED FOR INDIVIDUAL OR BRIDGED RINGING, RING PARTY AND TIP PARTY WITHOUT IDENT, GRD.
8. (W) LEAD PROVIDED IN AD2 BASE ONLY.
9. 220AM, 2220BM, AND 2220BMG ARE EQUIPPED FOR H40U HANDSET CORD.
- INSULATED AND STORED.

Fig. 4 — AD2 or AD3 Telephone Base, Connections With 220A (MD), 220AM, 2220B (MD), 2220BM, or 2220BMG Hand Telephone Set

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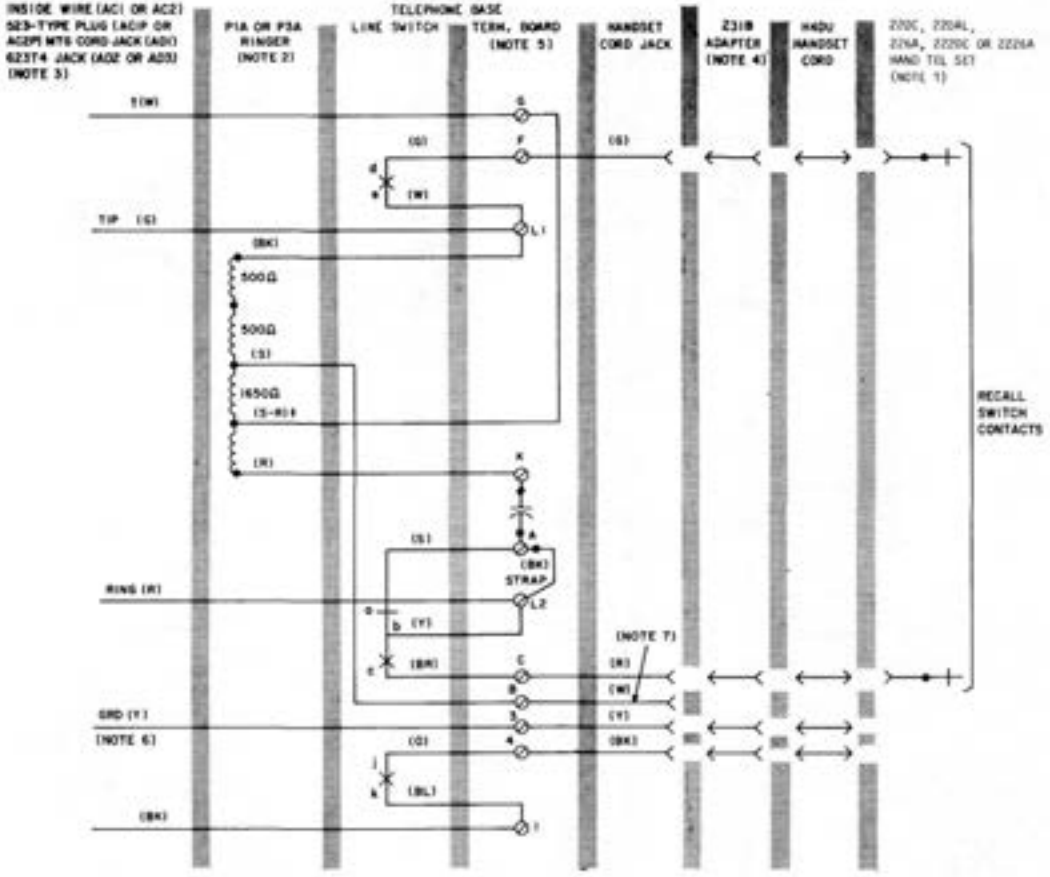

NOTES:

1. DIAL LIGHT LEAD NOT REQUIRED. DIAL LIGHTING IS PROVIDED BY LIGHT EMITTING DIODES (LED) IN THE HAND TEL SET WHICH IS POWERED BY CO BATTERY OVER THE INCOMING LINE.
2. WIRED FOR INDIVIDUAL OR BRIDGED RINGING. FOR ALL CLASSES OF SERVICE REFER TO TABLE D.
3. FOR CONNECTING BLOCK INFORMATION REFER TO APPROPRIATE TABLE.
4. Z31B ADAPTER NOT REQUIRED ON AC2, AC2P, OR AD1 BASES.
5. REFER TO READ IN 1.01 AND TABLE A FOR ADDITIONAL INFORMATION ON WIRING ARRANGEMENT AND LEAD COLORS OF AC1 AND AD1 BASES MANUFACTURED PRIOR TO 10-1-72.
6. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR THE SERVICE BEING INSTALLED.
7. (W) LEAD PROVIDED IN AC1(MD), AC2(MD), AC1P, AD1(MD), AND AD2 BASES ONLY.

† AD1 BASE ONLY.

‡ INSULATE AND STORE ON AD1 ONLY.

Fig. 5— AC1 (MD), AC2 (MD), AC1P, AC2P, AD1 (MD), AD2, or AD3 Telephone Base, Connections With 220C, 220AL, 226A, 2220C, or 2226A Hand Telephone Set, Wired for Individual or Bridged Ringing

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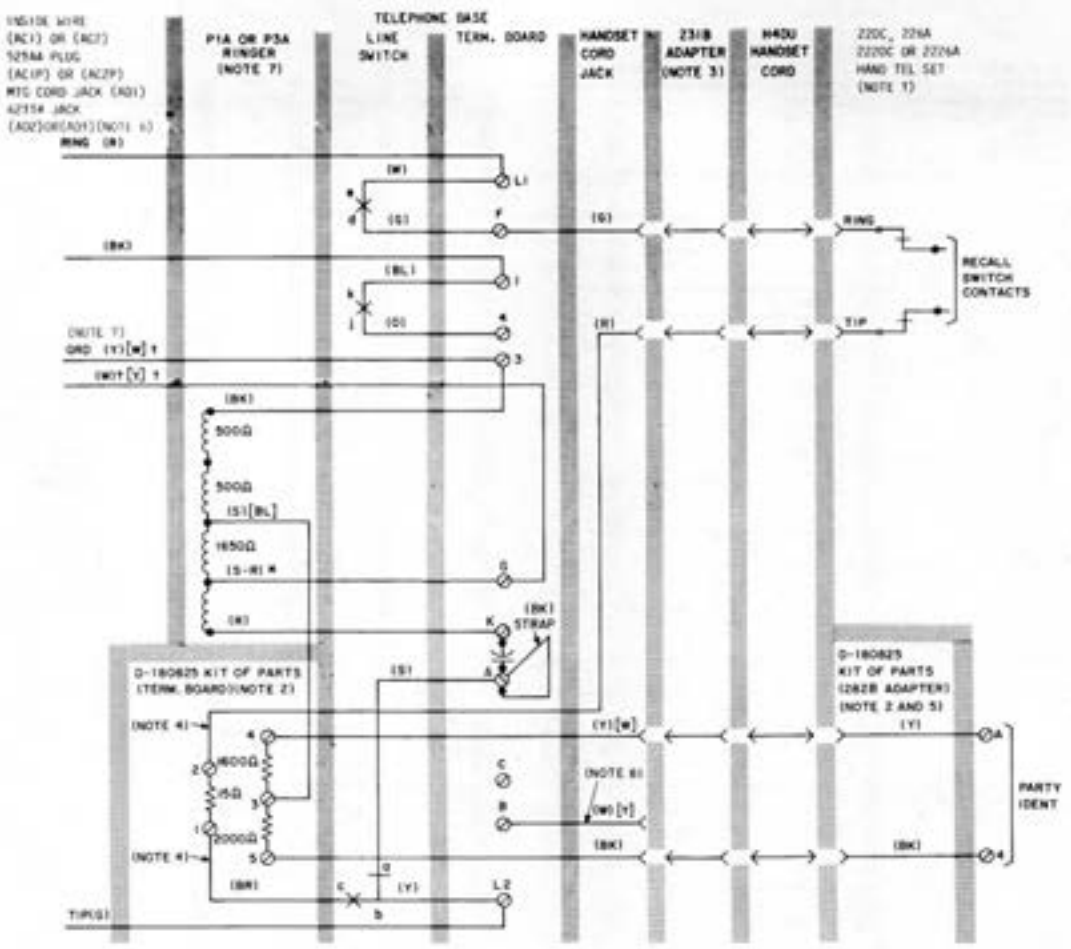

[ ] CURRENT COLOR CODE
[ ] EARLY COLOR CODE
* INSULATED AND STORED (AD1 ONLY)
† AD1 ONLY

NOTES:
1. DIAL LIGHT TRNSF NOT REQUIRED. DIAL LIGHTING IS PROVIDED BY LIGHT EMITTING DIODES (LED) IN THE HAND TEL SET WHICH IS POWERED BY CO BATTERY OVER THE INCOMING LINE.
2. REQUIRES OPENING HANDSET AND BRGE TO ADD D-180825 KIT OF PARTS.
3. 231B ADAPTER NOT REQUIRED WHEN AC2, AC2P OR AD1 BASES ARE PROVIDED.
4. THESE CONNECTIONS ARE REQUIRED ONLY WHEN THE 2220C OR 2226A HAND TELEPHONE SET IS PROVIDED.
5. IF A 2220C (EARLY VERSION) IS PROVIDED THE TERMINAL BOARD ONLY OF THE D-180825 KIT OF PARTS IS REQUIRED.
6. REFER TO TABLE D FOR CONNECTING BLOCK AND OTHER CLASSES OF SERVICE CONNECTIONS.
7. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR THE SERVICE BEING INSTALLED.
8. (G) [Y] LEAD NOT PROVIDED IN AC2P AND AD1 BASES.

Fig. 6—AC1 (MD), AC2 (MD), AC1P, AC2P, AD1 (MD), AD2, or AD3 Telephone Base With 220C, 226A, 2220C, or 2226A Hand Telephone Set and D-180825 Kit of Parts (Tip Party Identification)

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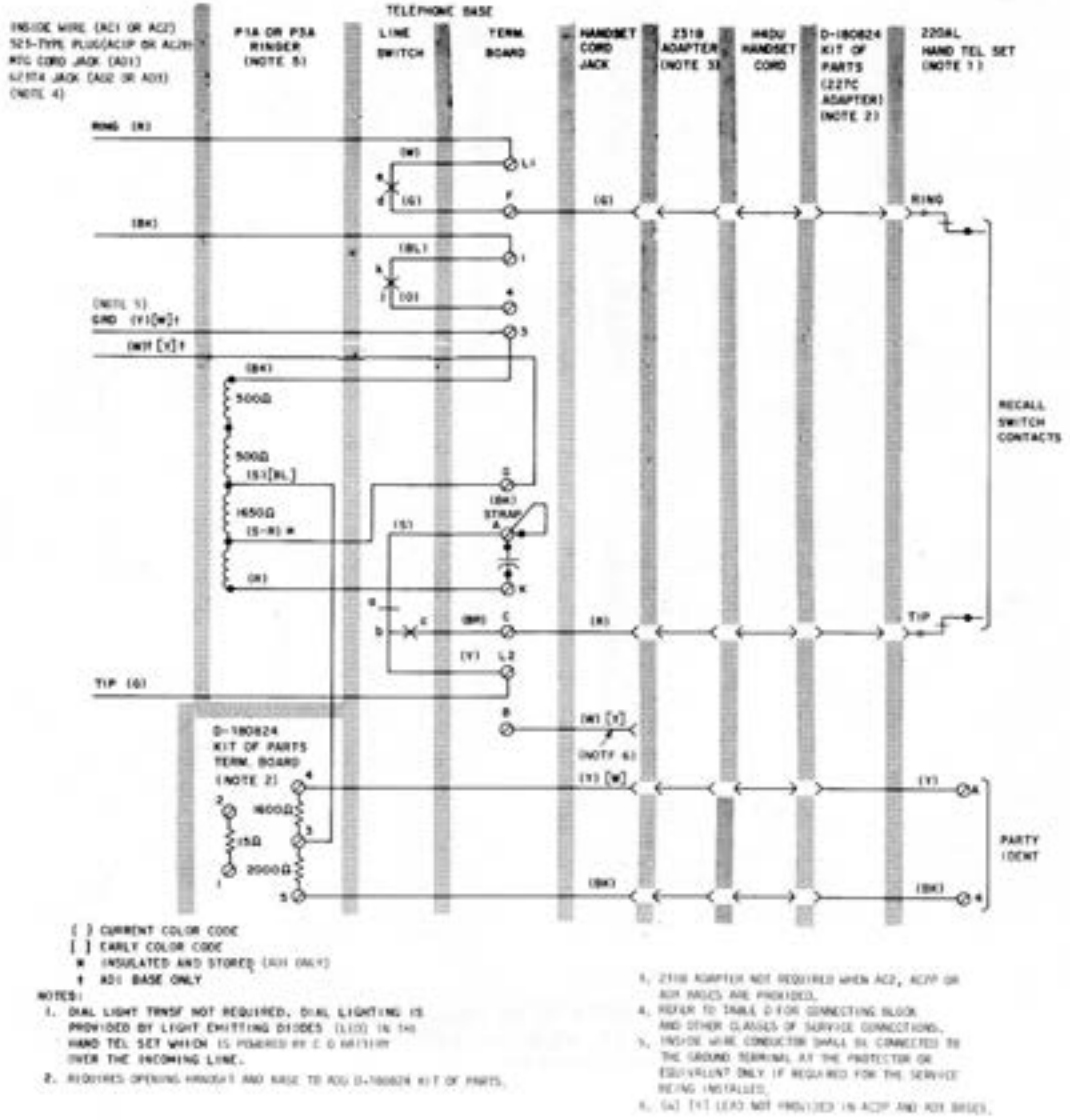

( ) CURRENT COLOR CODE
[ ] EARLY COLOR CODE
* INSULATED AND STORED (AD1 ONLY)
† AD1 BASE ONLY

NOTES:
1. DIAL LIGHT TRNSF NOT REQUIRED. DIAL LIGHTING IS PROVIDED BY LIGHT EMITTING DIODES (LED) IN THE HAND TEL SET WHICH IS POWERED BY C.O. BATTERY OVER THE INCOMING LINE.
2. REQUIRES OPENING HANDSET AND WIRE TO ADD D-180824 KIT OF PARTS.
3. 2310 ADAPTER NOT REQUIRED WHEN AC2, AC2P OR AD2 BASES ARE PROVIDED.
4. REFER TO TABLE D FOR CONNECTING BLOCK AND OTHER CLASSES OF SERVICE CONNECTIONS.
5. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR THE SERVICE BEING INSTALLED.
6. (W) [X] LEAD NOT PROVIDED ON AC2P AND AD2 BASES.

Fig. 7—AC1 (MD), AC2 (MD), AC1P, AC2P, AD1 (MD), AD2, or AD3 Telephone Base With 220AL Hand Telephone Set and D-180824 Kit of Parts (Tip Party Identification)

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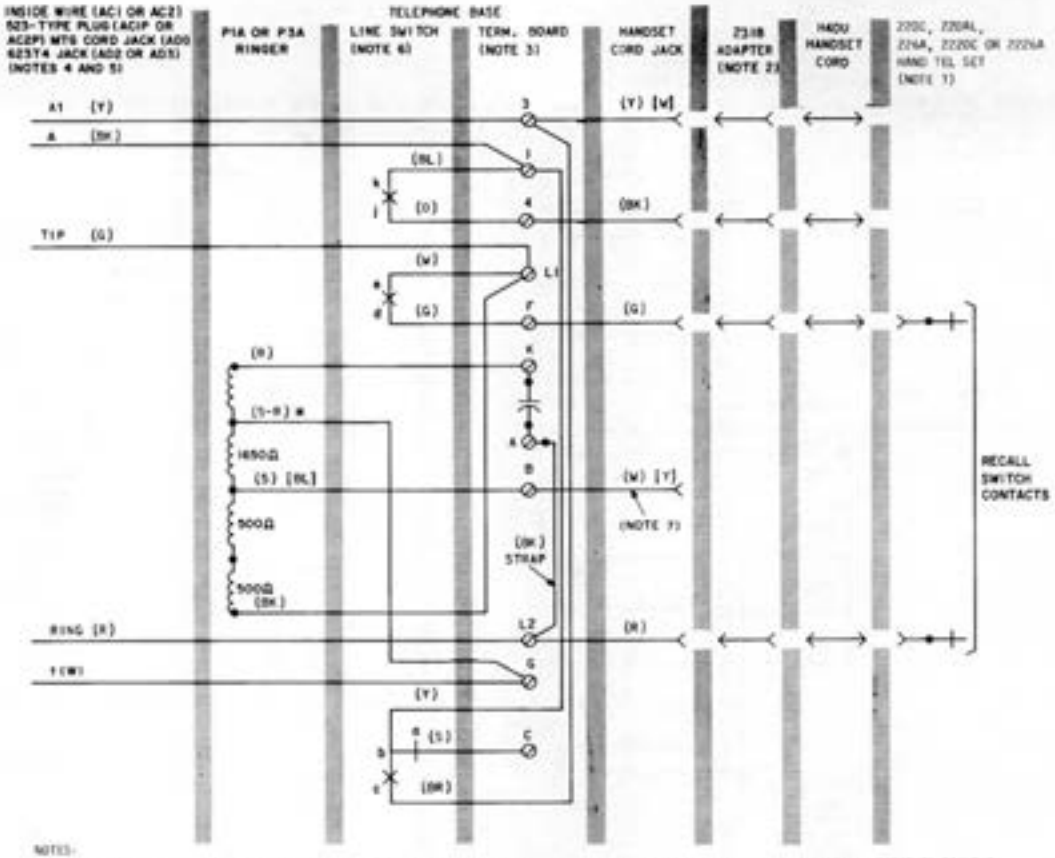

NOTES:

1. DIAL LIGHT TRANSFORMER NOT REQUIRED. DIAL LIGHTING IS PROVIDED BY LIGHT EMITTING DIODES (LED) IN THE HAND TELEPHONE SET WHICH IS POWERED BY C.O BATTERY OVER THE INCOMING LINE.
2. THE 231B ADAPTER NOT REQUIRED ON AC2, AC2P, OR AD3 BASE.
3. SET FACTORY WIRED FOR INDIVIDUAL OR BRIDGED SERVICE. FOR KTS SERVICE REFER TO TABLE M.
4. REFER TO READ IN 1,01 AND TABLE A FOR ADDITIONAL INFORMATION ON WIRING ARRANGEMENT AND LEAD COLORS OF AC1 AND AD1 BASES MANUFACTURED PRIOR TO 10-1-72.
5. FOR CONNECTING BLOCK INFORMATION, REFER TO TABLE D.
6. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE "A" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH NOT RECOMMENDED).
7. (W) (Y) LEAD NOT PROVIDED IN AC2P AND AD1 BASES.

( ) CURRENT COLOR CODE
[ ] EARLY COLOR CODE
* INSULATED AND STORED (AD1 ONLY).
† AD1 BASE ONLY

Fig. 8—AC1 (MD), AC2 (MD), AC1P, AC2P, AD1 (MD), AD2, or AD3 Telephone Base, Connections Wired for 1A1, 1A2, 6A, or 6B KTS With 220C, 220AL, 226A, 2220C, or 2226A Hand Telephone Set

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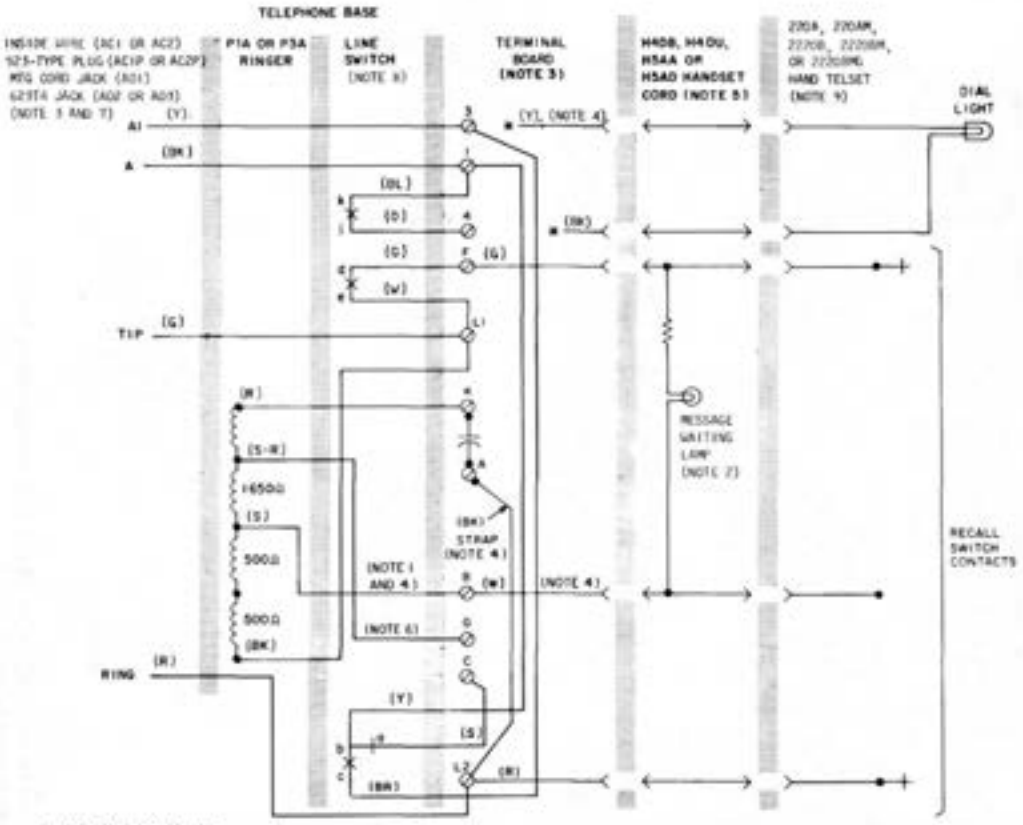

NOTES:

1. WHEN H54A HANDSET CORD IS PROVIDED, DISCONNECT (S) LEAD FROM TERMINAL D, INSULATE AND STORE.
2. LAMP AND RESISTOR ARE PART OF H54D HANDSET CORD REQUIRED FOR MESSAGE WAITING FEATURE ON AC1 BASE ONLY.
3. SET FACTORY WIRED FOR INDIVIDUAL OR GROUPED SERVICE. FOR KTS SERVICE REFER TO TABLE F.
4. REFER TO READ IN 1.01 AND TABLE A FOR ADDITIONAL INFORMATION ON WIRING ARRANGEMENT AND LEAD COLORS OF AC1 AND AD1 BASES MANUFACTURED PRIOR TO 10-1-72. (W) LEAD NOT PROVIDED IN AC1P AND AD1 BASES.
5. WHEN H40U CORD IS PROVIDED A 2270 AND 2518 ADAPTER IS REQUIRED ON AC1 BUT 2270 ADAPTER ONLY IS REQUIRED ON AC2.
6. INSULATED AND STORED ON EARLY VERSION AC1 AND AL, AD1 BASES.
7. FOR CONNECTING BLOCK INFORMATION, REFER TO TABLE C.
8. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE "R" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH NOT RECOMMENDED).
9. 220AM, 2220BM, AND 2220BMG ARE EQUIPPED FOR H40U HANDSET CORD.

Fig. 9—AC1 (MD), AC2 (MD), AC1P, AC2P, AD1 (MD), AD2, or AD3 Telephone Base Wired for 1A1, 1A2, 6A, or 6B KTS Without Dial Light Using 220A (MD), 220AM, 2220B (MD), 2220BM, or 2220BMG Hand Telephone Set

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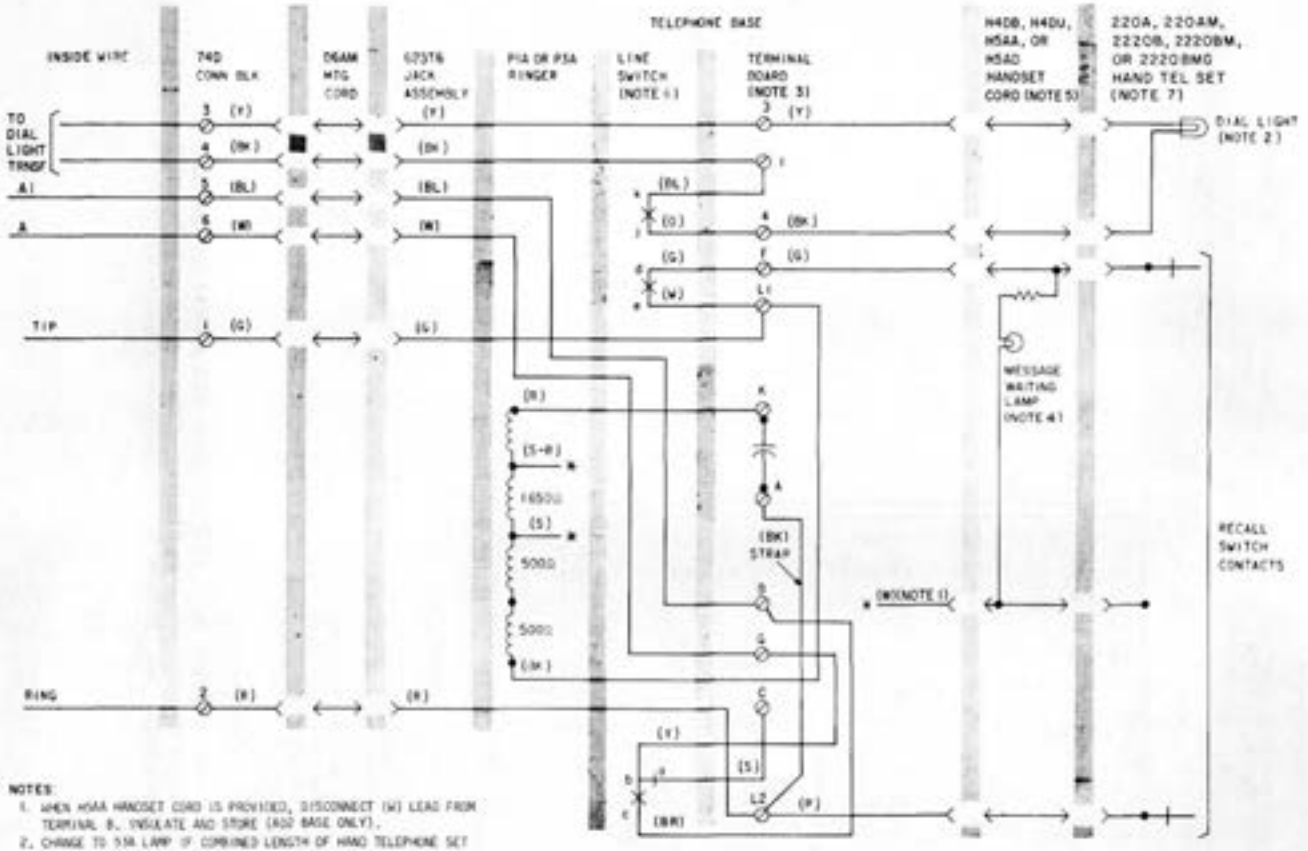

NOTES:

1. WHEN H5AA HANDSET CORD IS PROVIDED, DISCONNECT (W) LEAD FROM TERMINAL 8, INSULATE AND STORE (AD2 BASE ONLY).
2. CHANGE TO 55R LAMP IF COMBINED LENGTH OF HAND TELEPHONE SET CORD AND BASE MOUNTING CORD EXCEEDS 75 FEET.
3. FACTORY-WIRED FOR INDIVIDUAL OR BRIDGED RINGING. FOR KTS SERVICE REFER TO TABLE S.
4. LAMP AND RESISTOR ARE PART OF H5AD HANDSET CORD REQUIRED FOR MESSAGE WAITING FEATURE ON AD2 BASE ONLY.
5. WHEN H4DU CORD IS PROVIDED A 227D 310 2S1B ADAPTER IS REQUIRED ON AD2 BUT 227D ADAPTER ONLY IS REQUIRED ON AD3.
6. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE "A" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH IS NOT RECOMMENDED.)
7. 220AM, 220BM, AND 220BMG ARE EQUIPPED FOR H4DU HANDSET CORD.
* INSULATED AND STORED.

Fig. 10—AD2 or AD3 Telephone Base Wired for 1A1, 1A2, 6A, or 6B KTS With Dial Light Using 220A (MD), 220AM, 220B (MD), 220BM, or 220BMG Hand Telephone Set

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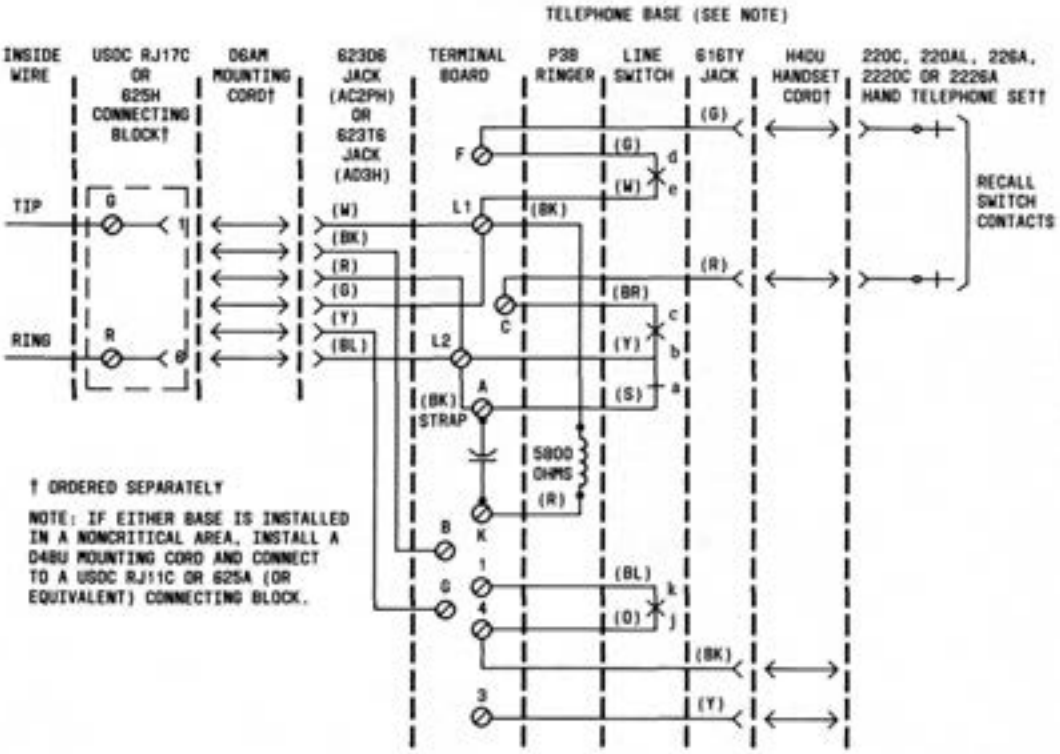

Fig. 11—AC2PH or AD3H Telephone Base, Connections With 220C, 220AL, 226A, 222DC, or 2226A Hand Telephone Set

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TABLE A

CONVERSION OF EARLY AC1 AND AD1
TELEPHONE BASES
MANUFACTURED PRIOR TO 10-1-72
(SEE READ IN PARAGRAPH 1.01)

WIRE OR LEAD (SEE NOTE)	COLOR	REMOVE FROM	CONNECT TO
Ringer Lead	BL	B	*
	S	*	B
	BK†	G	L1
Strap from A	BK	A	L2

Note: Early model AC1 and AD1 bases, the leads from pins 1 and 5 of the mounting and handset cord jacks are (W) and (Y), respectively. In current model, the leads from pins 1 and 5 are (Y) and (W), respectively.

* Insulate and store.

† AD1 base only.

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TABLE B

IDENTIFICATION OF TRIMLINE COMPONENTS AND ASSOCIATED APPARATUS (NOTE 1)

HAND TEL SET CODE	METHOD OF IDENT	TEL BASE CODE	WALL JACK OR MTG CORD CODE	HANDSET CORD CODE	BASE HANDSET JACK ADAPTER CODE	HAND TEL SET JACK ADAPTER CODE	METHOD OF PROVIDING TIP PARTY IDENT. GRD
220A or 2220B	Large Handset Cord Jack With Code Stenciled Inside on Shell	AC1, AC1P	630A (AC1P)	H4DB	None	None	H5AA Cord
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	231B (AD2)	227D	None (Note 3)
		AD2, AD3	D4BU				
220AM or 2220BM	227D Adapter in Handset Jack of a 220A or 2220B	AC1, AC1P	630A (AC1P)	H4DU	231B	227D†	(Note 4)
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)		None	227D†	None (Note 3)
		AD2, AD3	D4BU				
2220BMG	The Adapter for the Handset Cord is Stamped With a "G"	AC1, AC1P	630A (AC1P)	H4DU	None	None (Note 5)	None (Note 3)
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)				
		AD2, AD3	D4BU				
220AL	LED Printed Under Fingerstop, 227D Adapter in Handset Jack	AC1, AC1P	630A (AC1P)	H4DU	231B	227D*	D-180824 Kit of Parts
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)		231B (AD2)		
		AD2, AD3	D4BU				
		AC2P1, AD3H	D6AM		None		None (Note 3)
2220C (Early Version)	(4) Wire Springs in Handset Jack Square Buttons (2220C) (Mini-modular)	AC1, AC1P	630A (AC1P)	H4DU	231B	None	D-180825 Kit of Parts (Note 2)
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)		231B (AD2)		
		AD2, AD3	D4BU				
		AC2P1, AD3H	D6AM		None		None (Note 3)
220C, 226A, 2220C (Late Version) or 2226A	LED Printed under Fingerstop (220C and 226A) Square Buttons on Dial (2220C and 2226A) Mini-modular	AC1, AC1P	630A (AC1P)	H4DU	231B	None	D-180825 Kit of Parts (Note 2)
		AD1	D5AL				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)		231A (AD2)		
		AD2, AD3	D4BU				
		AC2P1, AD3H	D6AM		None		None (Note 3)

Note 1. All TRIMLINE components and apparatus are ordered separately.

Note 2. The 2220C (early version) does not require the 282B adapter provided in the D-180825 Kit of Parts.

Note 3. This combination of components can not be wired for tip party identification.

Note 4. 227D and 231B adapters must be removed for tip party identification and H5AA handset cord provided.

Note 5. This adapter is part of polarity guard assembly.

* Factory installed.

† Field or service center installed.

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TABLE C
CONNECTIONS FOR INDIVIDUAL AND 2-PARTY SERVICE WITH 220A, 220AM, 2220B, 2220BM, AND 2220BMG HAND TELEPHONE SETS (SEE READ PARAGRAPH 1.01) (NOTE 2) (SEE TABLE B)

WIRE OR LEAD	LEAD DESIG	COLOR	INDIV OR BRIDGED (NOTE 1)	RING PARTY (NOTE 1)	TIP PARTY	
					NO IDENT GRD (NOTE 1)	WITH IDENT GRD*
Inside Wire at 42A or 623-Type Conn. Block (AD1, AD2, or AD3)	Tip	G	G	G	G	G
	Ring	R	R	R	R	R
	STA GRD and TRNSF	Y	Y	Y	Y	Y
	TRNSF	BK	B	B	B	B
Inside Wire at 630A Conn. Block (AC1P or AC2P)	Tip	G	1	1	1	1
	Ring	R	2	2	2	2
	STA GRD and TRNSF	Y	3	3	3	3
	TRNSF	BK	4	4	4	4
Inside Wire at Term. Board (AC1 or AC2)	Tip	G	L1	L1	L2	L2
	Ring	R	L2	L2	L1	L1
	STA GRD and TRNSF	Y	3	3	3	3
	TRNSF	BK	1	1	1	1
Mtg Cord Jack or 523-Type Plug Leads at Term. Board (AD1, AD2, AD3, AC1P, or AC2P)	Tip	G	L1	L1	L2	L2
	Ring	R	L2	L2	L1	L1
	TRNSF	Y	3	3	3	3
	TRNSF	BK	1	1	1	1
Ringer (Note 1)	—	BK	L1	3	3	3
Strap from A of Term. Bd.	—	BK	L2	L2	L2	A
Handset Cord Jack Leads in Base (2220B and 2220BM only)	Tip	G	F	F	C	C
	Ring	R	C	C	F	F
	TRNSF	Y	3	3	3	3
	TRNSF	BK	4	4	4	4

Note 1: Disconnect, insulate and store (S) lead from terminal B when H5AA handset cord is used and tip party identifying ground is not provided.

Note 2: AC2, AC2P, and AD3 telephone bases can not be used with 220A, 220AM, 2220B, 2220BM, and 2220BMG hand telephone sets for this service.

Caution: Do not store spade-tipped leads under terminal board mounting screws.

* 220AM, 2220BM, and 2220BMG handsets cannot be used for tip party with identifying ground.

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TABLE D

CONNECTIONS FOR INDIVIDUAL AND 2-PARTY SERVICE WITH 220C, 220AL, 226A, 2220C, AND 2226A HAND TELEPHONE SETS (SEE READ PARAGRAPH 1.01) (SEE TABLE B)

WIRE OR LEAD (NOTE 1)	LEAD DESIG	COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY			
					NO IDENT GRD	WITH IDENT GRD		
						BASE TERM BD.	TERM. BD. D-180824 (FIG. 7) D-180825 (FIG. 6)	HANDSET TERM. (NOTES 2, 4, 5 AND 6)
Inside Wire at 42A or 625-Type Conn. Blk. (AD1, AD2, or AD3)	Tip	G	G	G	G	G†	—	—
	Ring	R	R	R	R	R†	—	—
	GRD	Y	Y	Y	Y	Y†	—	—
	—	BK	B	B	B	B†	—	—
Inside Wire at 630A Conn Blk (AC1P or AC2P)	Tip	G	1	1	1	1†	—	—
	Ring	R	2	2	2	2†	—	—
	GRD	Y	3	3	3	3†	—	—
	—	BK	4	4	4	4†	—	—
Inside Wire at Term. Board (AC1 or AC2)	Tip	G	L1	L1	L2	L2	—	—
	Ring	R	L2	L2	L1	L1	—	—
	GRD	Y	3	3	3	3	—	—
	—	BK	1	1	1	1	—	—
Mtg Cord Jack or 523-Type Plug Leads at Term. Board (AD1, AD2, AD3, AC1P, AC2P)	Tip	G	L1	L1	L2	L2	—	—
	Ring	R	L2	L2	L1	L1	—	—
	GRD	Y	3	3	3	3	—	—
	—	BK	1	1	1	1	—	—
Ringer	—	S or BL (Note 2)	B	B	B	—	3	—
		BK	L1	3	3	3	—	—
Line Switch	—	BR	C	C	C	C (220C) (220AL) (226A)	1 (2220C) (2226A)	—
Handset Cord, Jack Leads in Base	Tip	G	F	F	F	F	—	—
	Ring	R	C	C	C	C (220C) (220AL) (226A)	2 (2220C) (2226A)	—
	PTY Ident	Y or W (Note 2)	3	3	3	—	4	—
	PTY Ident	BK	4	4	4	—	5	—
Strap From A of Term. Bd.	Strap	BK	L2	L2	L2	A	—	—

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TABLE D (Contd)

CONNECTIONS FOR INDIVIDUAL AND 2-PARTY SERVICE WITH 220C, 220AL, 226A, 2220C, AND 2226A HAND TELEPHONE SETS (SEE READ PARAGRAPH 1.01) (SEE TABLE B)

WIRE OR LEAD (NOTE 1)	LEAD DESIG	COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY			
					NO IDENT GRD	WITH IDENT GRD		
						BASE TERM BD.	TERM. BD. D-180824 (FIG. 7) D-180825 (FIG. 6)	HANDSET TERM. (NOTES 2, 4, 5 AND 6)
Handset Cord Jack Leads in Handset (Note 2)	Tip	G	—	—	—	—	—	—
	Ring	R	—	—	—	—	—	—
	PTY Ident	Y or W	*	*	*	—	—	A
	PTY Ident	BK	*	*	*	—	—	B or 4

Note 1. If AC1, AC1P, AD1 or AD2 bases are provided, a 231B adapter is required (ordered separately).

Note 2. Handsets must be opened to wire for tip party with identifying ground, refer to Section 502-303-102.

Note 3. For bases dated prior to 10-1-72 see READ in 1.01 and note under Table A.

Note 4. The D-180824 Kit of Parts (ordered separately) is used with the 220AL hand telephone set only.

Note 5. The terminal board only of the D-180825 Kit of Parts (ordered separately) is used with the early version 2220C hand telephone sets.

Note 6. The 282B adapter and terminal board of the D-180825 Kit of Parts is required for the 220C, 226A, 2226A, and later version of 2220C hand telephone sets.

Caution: ***Do not store spade-tipped leads under terminal board mounting screw.***

* Insulated and stored, 2220C (early version only).

† Connecting block terminals.

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TABLE E

CONNECTIONS FOR 4-PARTY FULL SELECTIVE OR 8-PARTY SEMISELECTIVE RINGING USING D-180697 KIT OF PARTS (SEE READ IN PARAGRAPH 1.01)

WIRE OR LEAD		LEAD DESIG	COLOR	–RING	–TIP	+RING	+TIP
Inside Wire at 42A or 625-Type Conn Blk (AD1, AD2, AD3)		Tip	G	G	G	G	G
		Ring	R	R	R	R	R
		STA GRD and/or TRNSF	Y	Y	Y	Y	Y
		TRNSF or Spare	BK	B	B	B	B
Inside Wire at 630A Conn Blk (AC1P, AC2P)		Tip	G	1	1	1	1
		Ring	R	2	2	2	2
		STA GRD and/or TRNSF	Y	3	3	3	3
		TRNSF or Spare	BK	4	4	4	4
Inside Wire at Term. Board (AC1, AC2)		Tip	G	L1	L1	L1	L1
		Ring	R	L2	L2	L2	L2
		TRNSF or STA GRD	Y [W]	3	3	3	3
		TRNSF or Spare	BK	1	1	1	1
Mtg Cord Jack or 523-Type Plug Leads at Term. Board (AD1, AD2, AD3, AC1P, AC2P)		Tip	G	L1	L1	L1	L1
		Ring	R	L2	L2	L2	L2
		TRNSF or STA GRD	Y [W]	3	3	3	3
		TRNSF or Spare	BK	1	1	1	1
Ringer			R	3	3	L2	L1
			BK	K	K	K	K
			S	B	B	B	B
			S-R	G	G	G	G
D-180697 Kit of Parts	426N Diode (MD)	†		L2	L1	3	3
		‡		G	G	G	G
	813BH Diode	Unstriped End		L2	L1	3	3
		Striped End		G	G	G	G
Strap From A			BK	3	3	L2	L1
Line Switch			S	*	*	*	*

Caution: Do not store spade tipped leads under terminal board mounting screws

[ ] early model bases (Dated prior to 10-1-72)

* Insulate and store.

† Lead on Flanged (Gold) base end.

‡ Lead on Knob end (housing tip).

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TABLE F
CONVERSION FOR 1A1, 1A2, 6A, AND 6B KTS WITHOUT DIAL LIGHT USING 220A, 220AM, 2220B, 2220BM OR 2220BMG HAND TELEPHONE SET (FIG. 9) (SEE READ IN PARAGRAPH 1.01)

WIRE OR LEAD	COLOR	TERMINAL BOARD	
		REMOVE FROM	CONNECT TO
Line Switch	BR	C	3
	S	A	C
	Y	L2	1
Hand Tel Set Cord Jack in Base	R	C	L2
	Y	3	*
	BK	4	*

* Insulate and store.

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TABLE G

CONVERSION OF AD2 OR AD3 BASES FOR 1A1, 1A2, 6A OR 6B KTS WITH DIAL LIGHT USING 220A, 220AM, 2220B, 2220BM OR 2220BMG HAND TELEPHONE SET (FIG. 10) (SEE READ IN PARAGRAPH 1.01)

WIRE OR LEAD	LEAD DESIG	COLOR	74D CONN BLK TERM. BD	BASE TERM. BOARD	
				REMOVE FROM	CONNECT TO
Inside Wire at 74D Conn Blk	Tip		1		
	Ring		2		
	TRNSF		3		
	TRNSF		4		
	A		6		
	A1		5		
623T6 Jack (Note)		R			L2
		G			L1
		Y			3
		BK			1
		BL			B
		W			G
Line Switch	A1	BR		C	B
	A	Y		L2	G
		S		A	C
Ringer		S		B	*
		S-R		G	*
Strap		BK		A	L2
Handset Cord Jack in Base		R		C	L2
		W		B	†

Note: The 623T6 jack and D6AM mounting cord must be ordered separately.

* Insulate and store.

† Insulate and store (AD2 only).

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TABLE H

CONVERSION FOR 1A1, 1A2, 6A AND 6B KTS USING 220C, 220AL, 226A, 2220C, OR 2226A HAND TELEPHONE SET (FIG. 8)

(SEE READ IN PARAGRAPH 1.01)

WIRE OR LEAD	COLOR	TERMINAL BOARD	
		REMOVE FROM	CONNECT TO
Line Switch	BR	C	3
	S	A	C
	Y	L2	1
Handset Cord Jack in Base	R	C	L2

TABLE I

CONNECTIONS FOR MESSAGE WAITING LAMP AND DIAL LIGHT FEATURES FOR NONKEY SYSTEM APPLICATION (220A AND 2220B ONLY)

(SEE READ IN PARAGRAPH 1.01)

WIRE OR LEAD	COLOR	TERMINAL BOARD	
		REMOVE FROM	CONNECT TO
Handset Cord Jack Leads (Note)	G	F	L1
	W	B	L2

Note: Install H5AD handset cord in AC1, AC1P, AD1, or AD2.

TABLE J

CONVERSION FOR DATA APPLICATIONS FOR 220A, 220AM, 2220B, 2220BM, AND 2220BMG HAND TELEPHONE SETS

(SEE READ IN PARAGRAPH 1.01)

WIRE OR LEAD	COLOR	TERMINAL BOARD	
		REMOVE FROM	CONNECT TO
Handset Cord Jack Leads	Y	3	*
	BK	4	*

* Insulate and store.

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REFERENCE

503B, 503C, 503CM, AND 513B TELEPHONE SETS

1. GENERAL

1.01 This section provides identification and connection information for the 503B (MD), 503C (MD), 503CM, and 513B (MD) telephone sets.

1.02 This section is reissued to:

- Revise Fig. 4

2. IDENTIFICATION

2.01 These telephone sets are desk sets intended for use in conjunction with other equipment to provide DATA-PHONE* data communications service.

2.02 With the exclusion key operated (up position), the 503B telephone set can be used with the J1D402B data set to provide data service. With the exclusion key nonoperated (normal position) the set provides regular telephone service. Fig. 2 provides connection information on the 503B telephone set.

2.03 The 503C and 503CM telephone set is used in Data Access Arrangements (DAA) where cutomer-owned equipment is connected to the DDD network through a coupler. With the exclusion key nonoperated (normal position) the 503CM telephone set may be used with the J1D402B data set to provide data service with monitoring of computer-generated voice replies. With the exclusion key operated (up position), the set provides regular telephone service. To deactivate monitoring feature, see Fig. 4. The 503C telephone set may be used with the J1D402B data set with the exclusion key operated (up position). With the exclusion key nonoperated (normal position) the set provides regular telephone service.

Note: The relationship of features to exclusion key differs in the 503C and 503CM telephone sets.

2.04 Fig. 3 and 4 provide connection information on the 503C and 503CM telephone sets. The 503CM is a modular set which is shipped with a G15A handset but without H4DU handset cord and the D8AA mounting cord, ***which must be ordered separately.***

2.05 The mounting cord of the 513B telephone set plugs directly into the J1D401F data set. Operation of the exclusion key (left plunger) transfers the set from the voice mode to the data mode. It is also equipped with a test key which converts the set to the test mode and test lamp which illuminates when the test mode is operating. Fig. 5 provides connection information on the 513B telephone set.

2.06 For application of these telephone sets, refer to Division 590.

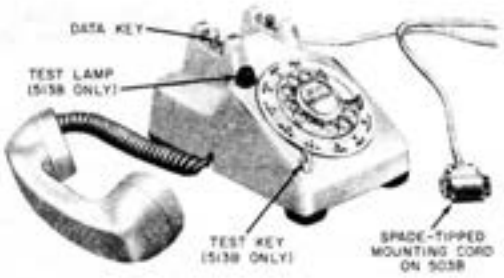

Fig. 1—503B (MD), 503C (MD), or 513B (MD) Telephone Set

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TABLE A

REPLACEABLE COMPONENTS (NOTE)

TEL SET	HANDSET	DIAL	RINGER	HOUSING ASSY	MTG CORD	HANDSET CORD	LAMP	MTG CORD SET JACK	HANDSET CORD SET JACK
503B-61 (MD)	G3A6-61	9C-61 or 9CA-61	C4A	818049611 (P-80D961)	D6AA-8T	H4CJ or H4CL	52A		
503C-61 (MD)	G3A6-61	9C-61 or 9CA-61	H1B	818049611 (P-80D961)		H4CJ or H4CL			
503CM-61	G15A-61	9CA-61		841023823	D8AA-8T	H4DU-61		641D	616D
513B-61 (MD)	G3A6-61	9C-61 or 9CA-61	C4A	818815615 (P-88A561)	D10H-8T	H4CJ or H4CL			

Note: These sets are available in light gray (−61) only.

♦TABLE B♦

TO PROVIDE DATA SET CONTROL WITH EXCLUSION KEY OPERATED (503CM ONLY)

LEAD	COLOR	REMOVE FROM		CONNECT TO	
		TERM. BOARD	NET.	TERM. BOARD	NET.
Exclusion Key	R		L2	E2	
	S	E2			L2
	BR	1			GN
	O		GN	1	
641D Jack	O-W	8		7	

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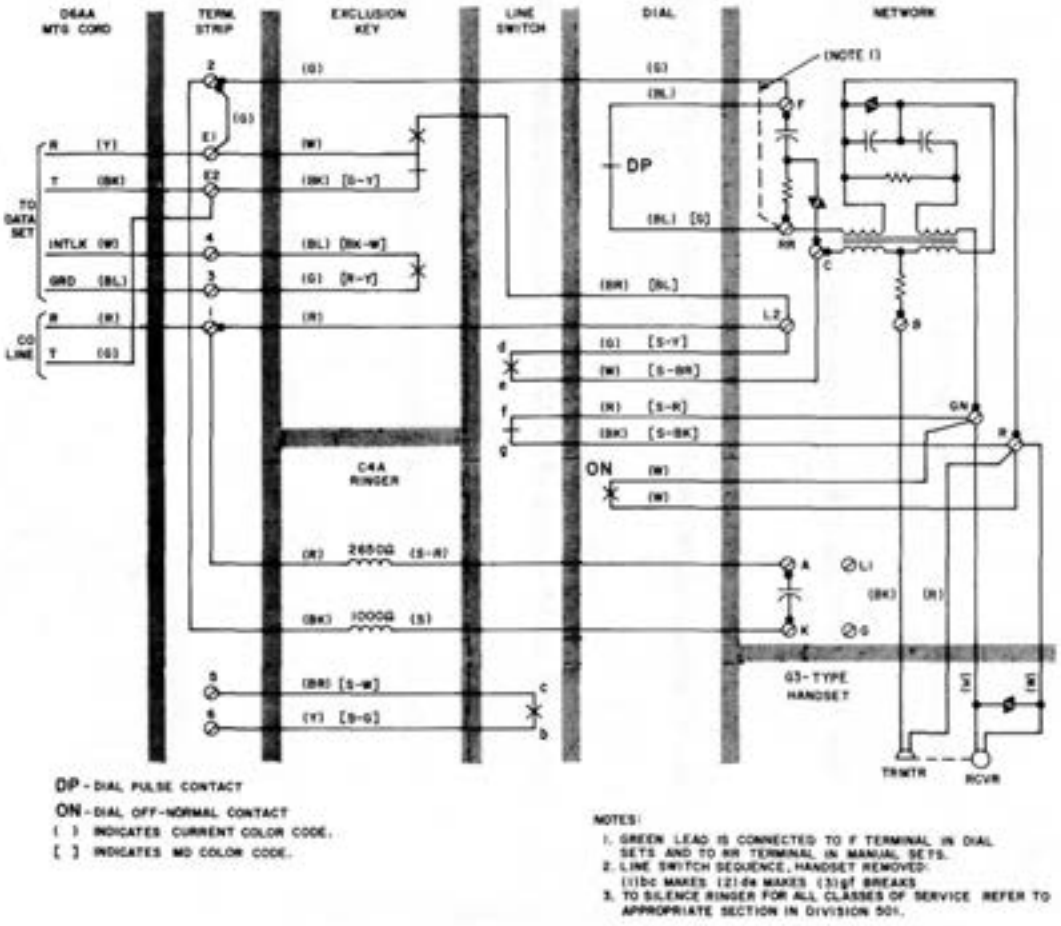

DP - DIAL PULSE CONTACT
ON - DIAL OFF-NORMAL CONTACT
( ) INDICATES CURRENT COLOR CODE.
[ ] INDICATES MD COLOR CODE.

NOTES:
1. GREEN LEAD IS CONNECTED TO F TERMINAL IN DIAL SETS AND TO RR TERMINAL IN MANUAL SETS.
2. LINE SWITCH SEQUENCE, HANDSET REMOVED:
   (1)bc MAKES (2)da MAKES (3)gf BREAKS
3. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.

Fig. 2—503B (MD) Telephone Set, Connections

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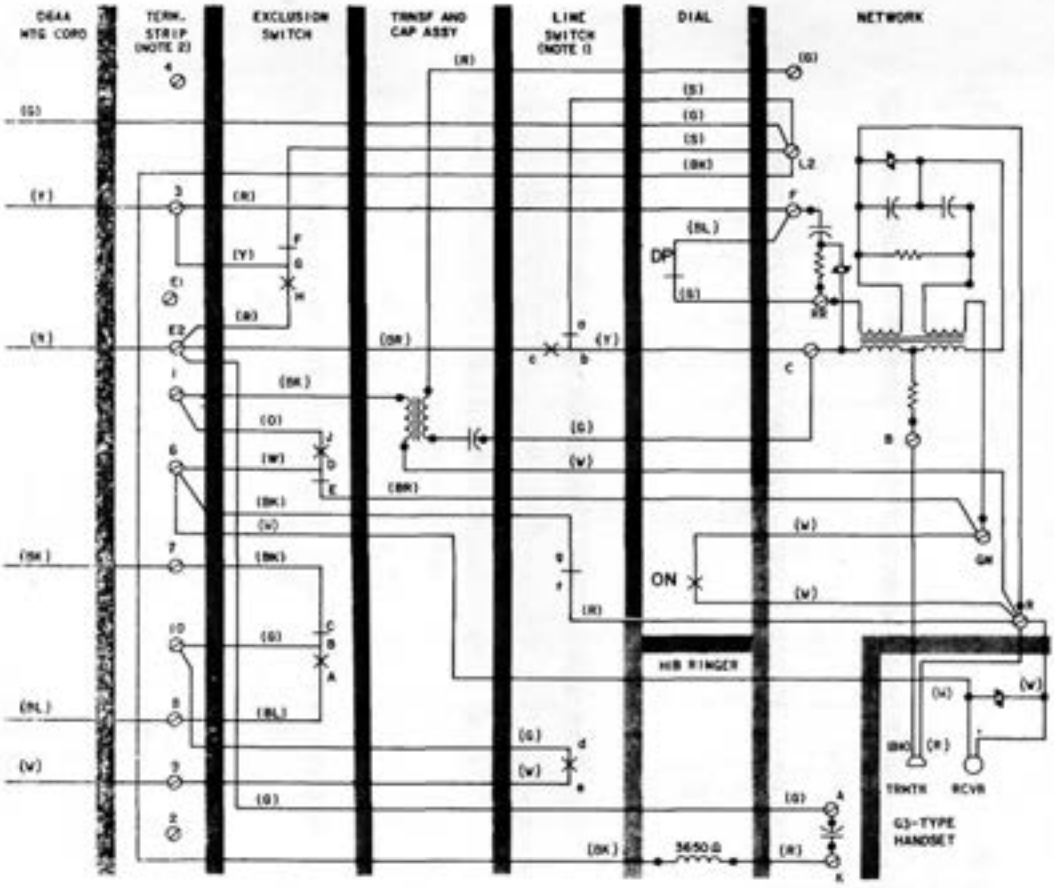

DP-DIAL PULSE CONTACTS
ON-DIAL OFF NORMAL CONTACTS

NOTES:

1. LINE SWITCH SEQUENCE, OFF-HOOK:
   - bc MAKES
   - de MAKES
   - ab BREAKS
   - fg BREAKS

2. FOR MONITORING WITH EXCLUSION SWITCH OPERATED, MOVE (R) LEAD FROM TERMINAL G TO TERMINAL L2.

Fig. 3—503C (MD) Telephone Set, Connections

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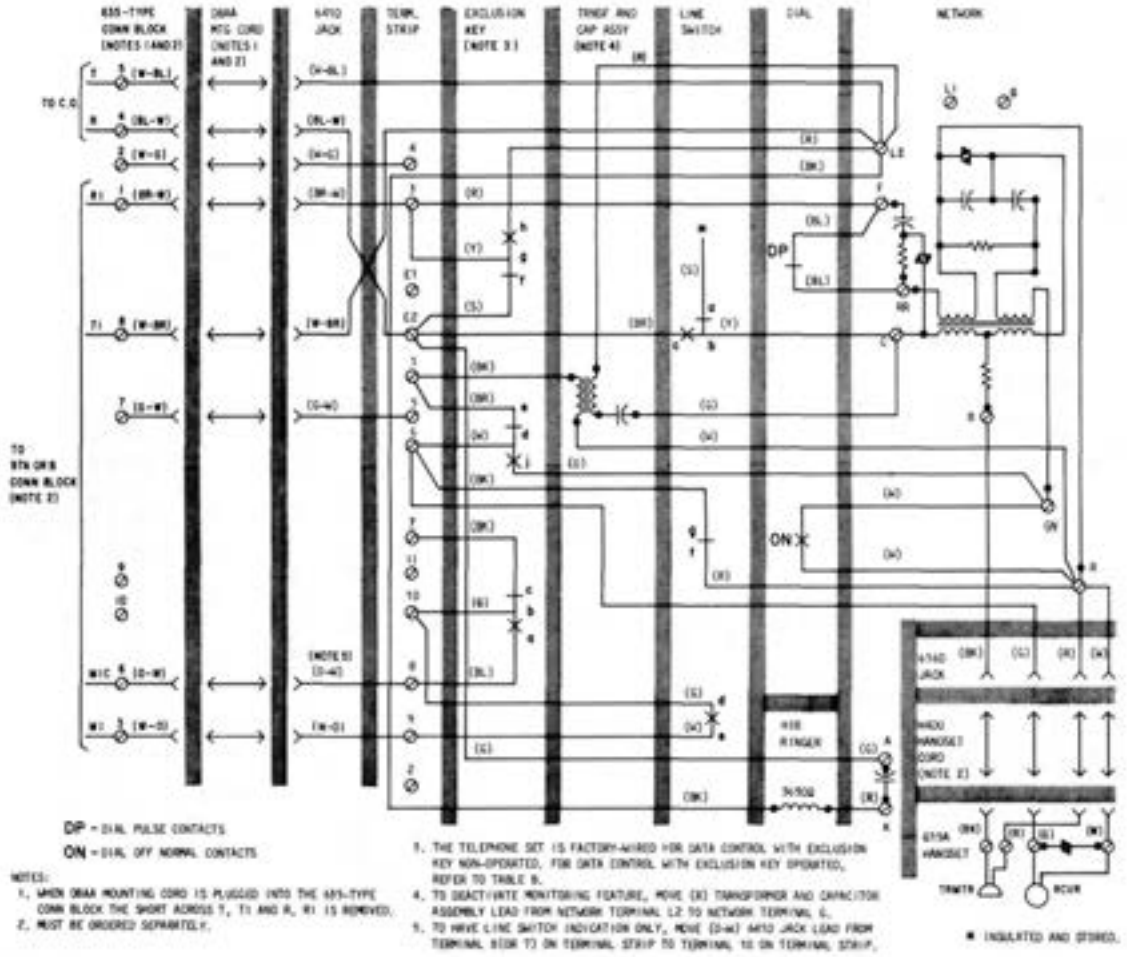

NOTES:

1. WHEN D8AA MOUNTING CORD IS PLUGGED INTO THE 635-TYPE CONN BLOCK THE SHORT ACROSS T, T1 AND R, R1 IS REMOVED.
2. MUST BE ORDERED SEPARATELY.
3. THE TELEPHONE SET IS FACTORY-WIRED FOR DATA CONTROL WITH EXCLUSION KEY NON-OPERATED. FOR DATA CONTROL WITH EXCLUSION KEY OPERATED, REFER TO TABLE B.
4. TO DEACTIVATE MONITORING FEATURE, MOVE (R) TRANSFORMER AND CAPACITOR ASSEMBLY LEAD FROM NETWORK TERMINAL L2 TO NETWORK TERMINAL G.
5. TO HAVE LINE SWITCH INDICATION ONLY, MOVE (S-W) 6A1Q JACK LEAD FROM TERMINAL SIDE T1 ON TERMINAL STRIP TO TERMINAL 10 ON TERMINAL STRIP.

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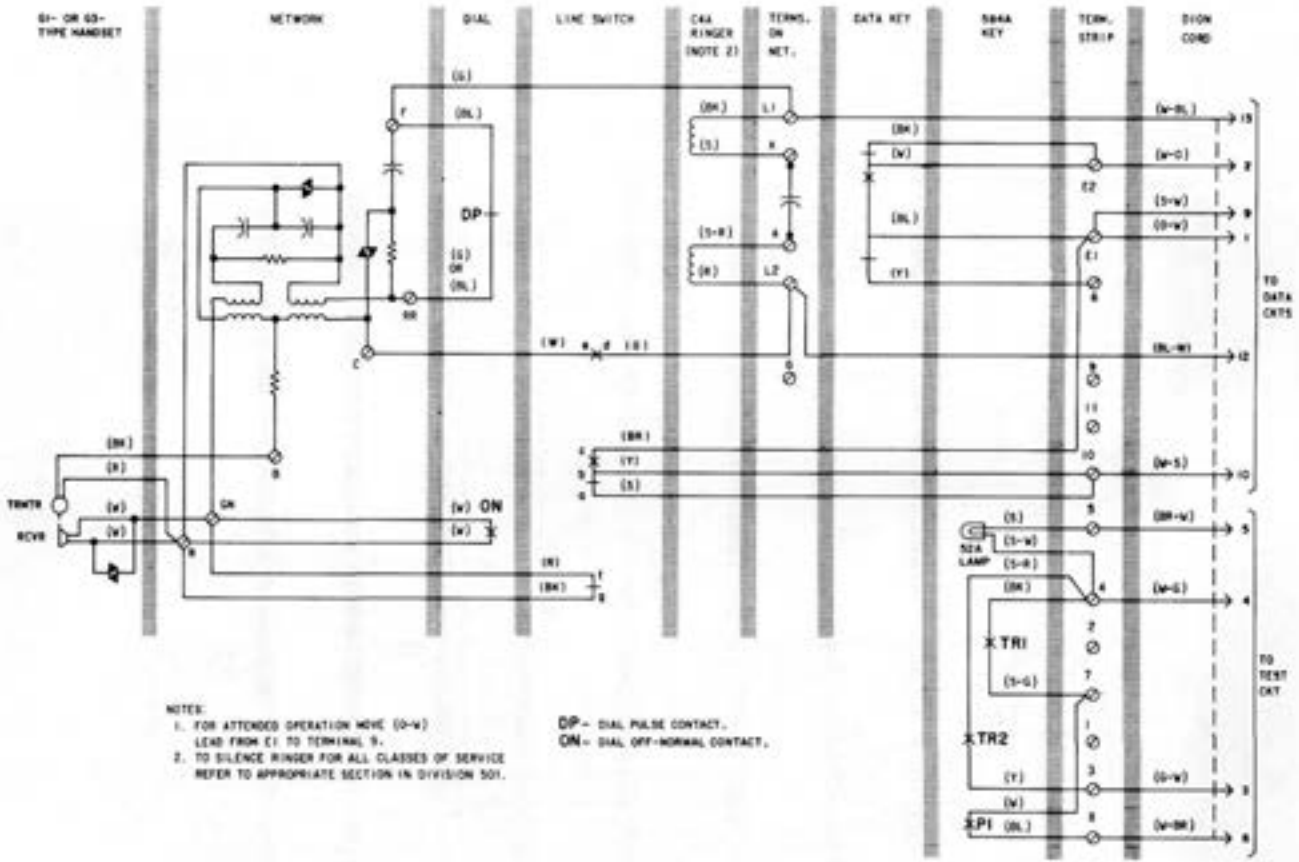

Fig. 5—5138 (MD) Telephone Set, Connections

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REFERENCE

2503-TYPE TELEPHONE SETS

IDENTIFICATION AND CONNECTIONS

1. GENERAL

1.01 This section contains information for the 2503C manufacture discontinued (MD) and 2503CM (modular) (Fig. 1) telephone sets. Refer to Section 502-500-110 for common maintenance information for 0- and 1-button telephone sets.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add the 641E jack
- Add the D-180896 Kit of Parts (polarity guard)
- Show the 819040528 (P-90D052) guard assembly MD.

2. IDENTIFICATION

2.01 The 2503-type telephone sets are desk sets intended for use in conjunction with other equipment to provide DATAPHONE® data communications service.

2.02 ***The 2503CM:*** With the exclusion key nonoperated (normal position) this telephone set may be used with the J1D402B data set to provide data service with monitoring of computer-generated voice replies. With the exclusion key operated (up position) the set provides regular telephone service. To deactivate monitoring feature, refer to Fig. 3, Note 4. To use the telephone set to provide data set control with the exclusion key operated, refer to Table A.

2.03 ***The 2503C (MD):*** With the exclusion key operated (up position) this telephone set may be used with the J1D402B data set to provide data service. With the exclusion key nonoperated (normal position) the set provides regular telephone service.

> ***Note:*** The relationship of features to exclusion key differs in the 2503C (MD) and 2503CM telephone sets.

2.04 These telephone sets are used in Data Access Arrangements (DAA) where the customer-owned equipment is connected to the DDD network through a coupler. Figure 2 and 3 provide connection information on the 2503C (MD) and 2503CM telephone sets. The 2503CM is a modular set which is shipped with a G15A handset but without the H4DU handset cord or the D8AA mounting cord, ***which must be ordered separately.***

2.05 For application of these telephone sets, refer to Division 590.

2.06 Table B lists replaceable components for these sets.

2.07 When a polarity guard is required with these sets, install the D-180896 Kit of Parts (guard assembly) or the 819040528 guard assembly (MD) as shown in Table C. Polarity guards should be installed only when authorized by local instructions to prevent battery and ground reversals encountered in end-to-end signaling installations.

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Fig. 1—2503CM Telephone Set

▮TABLE A▮

TO PROVIDE DATA SET CONTROL WITH EXCLUSION KEY OPERATED (2503CM ONLY)

LEAD	COLOR	REMOVE FROM		CONNECT TO	
		TERM. STRIP	NET.	TERM. STRIP	NET.
Exclusion Key	S	E2			L2
	R		L2	E2	
	BR	1			R
	O		R	1	
641E or 641D (MD) Jack	O-W	8		7	

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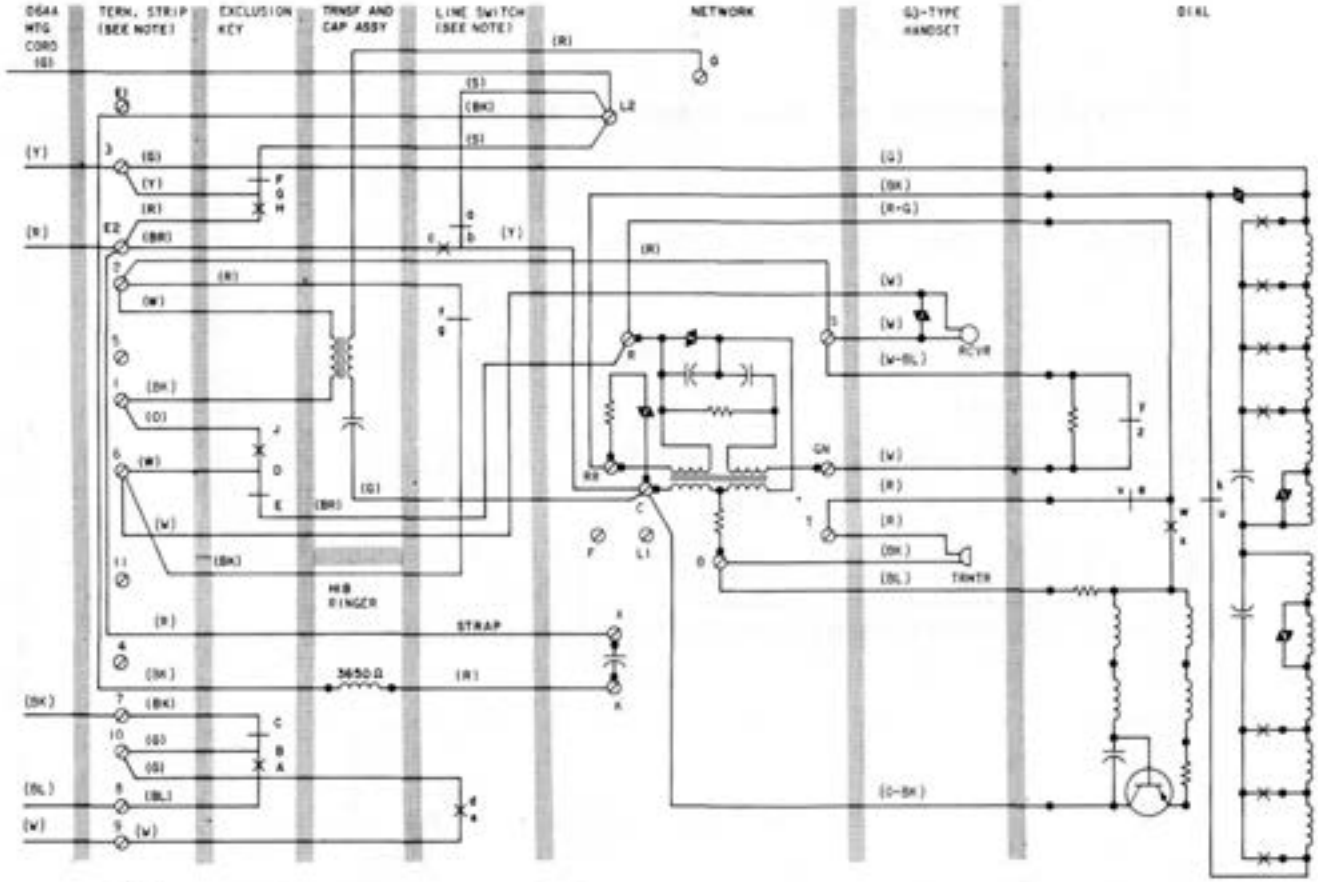

Fig. 3 - 2500-Type Telephone Set, Connections

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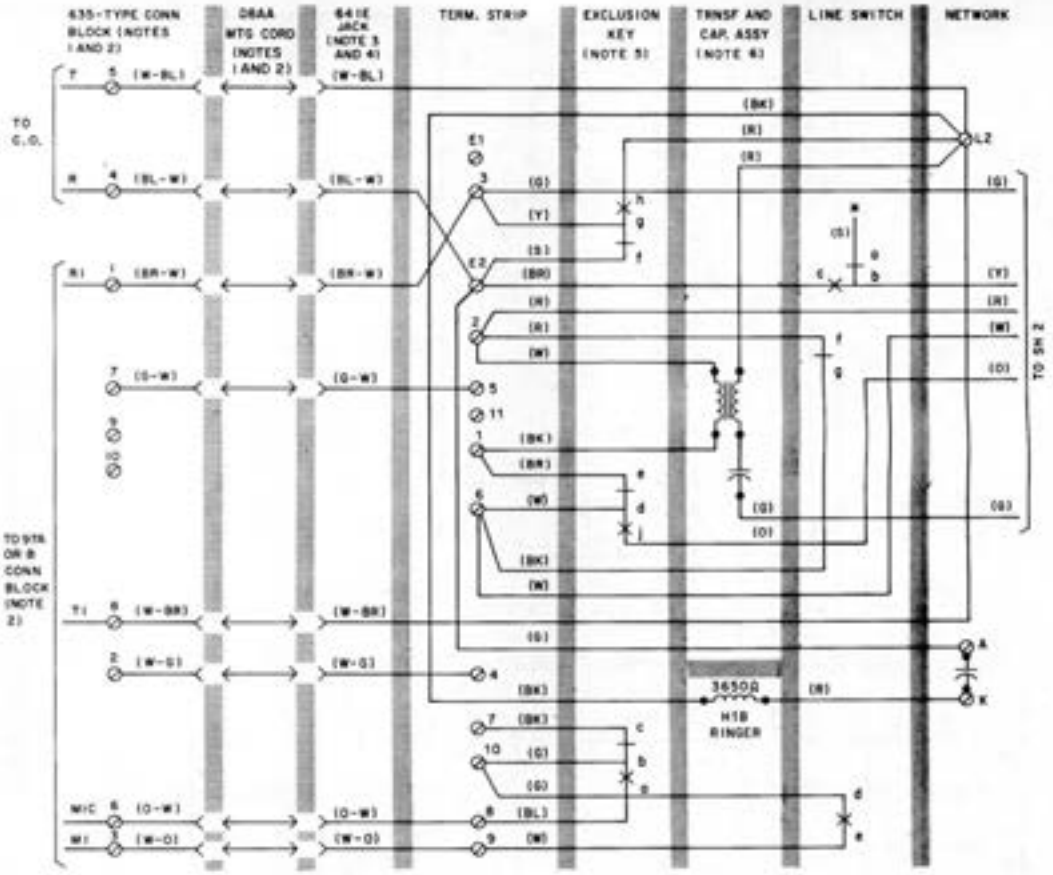

NOTES:

1. WHEN DBAA MOUNTING CORD IS PLUGGED INTO THE 635-TYPE CONN BLOCK THE SHUNT ACROSS T, T1, AND R, R1 IS REMOVED.
2. MUST BE ORDERED SEPARATELY.
3. THE 641E JACK MAY APPEAR AS A 641D(MD) JACK ON OLDER VERSIONS OF THE TELEPHONE SET.
4. TO HAVE LINE SWITCH INDICATION ONLY, MOVE (O-W) 641E OR 641D(MD) JACK LEAD FROM TERMINAL 8 (OR 7) ON TERMINAL STRIP TO TERMINAL 10 ON TERMINAL STRIP.
5. THE TELEPHONE SET IS FACTORY-WIRED FOR DATA CONTROL WITH EXCLUSION KEY NON-OPERATED. FOR DATA CONTROL WITH EXCLUSION KEY OPERATED REFER TO TABLE C.
6. TO DEACTIVATE MONITORING FEATURE MOVE (R) TRANSFORMER AND CAPACITOR ASSEMBLY LEAD FROM NETWORK TERMINAL L2 TO NETWORK TERMINAL G.

Fig. 3—2503CM Telephone Set, Connections (Sheet 1 of 2)

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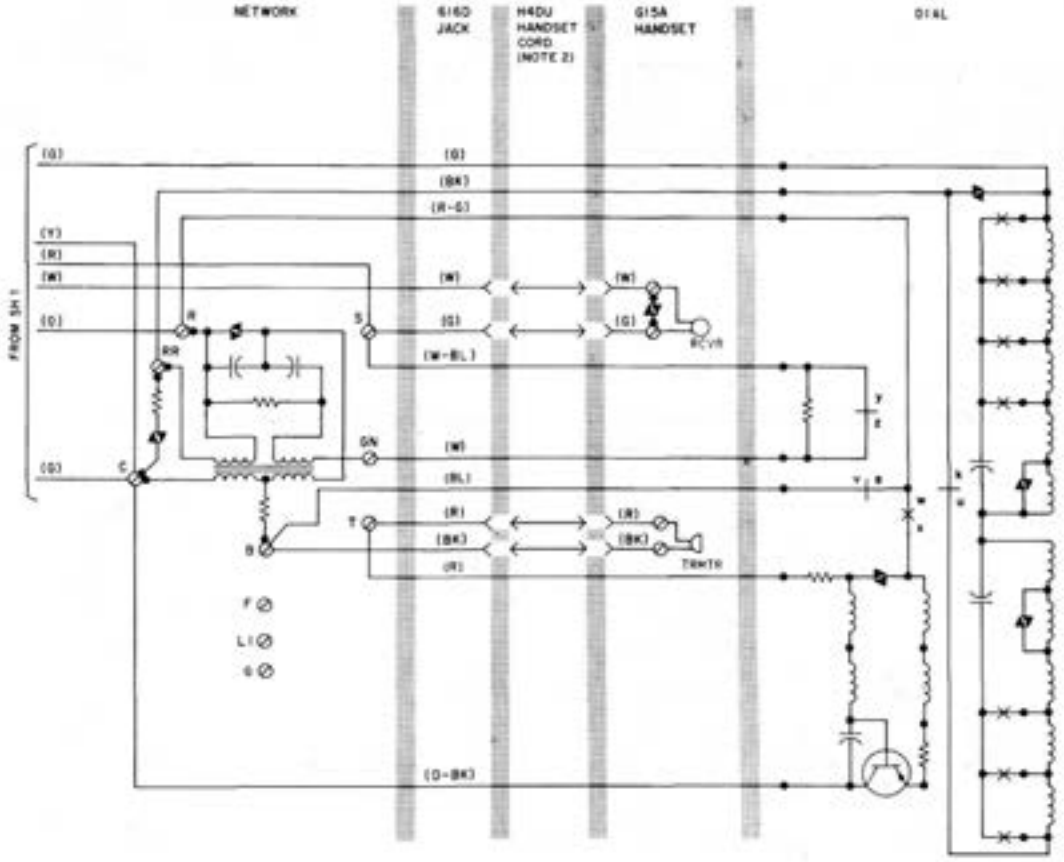

Fig. 3—2503CM Telephone Set, Connections (Sheet 2 of 2)

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TABLE B

REPLACEABLE COMPONENTS

TEL SET (NOTE 1)	HANDSET	DIAL	RINGER	HOUSING ASSY	MTG CORD	HANDSET	MTG CORD JACK	HANDSET CORD JACK	FACEPLATE ASSY (NOTE 2)
2503CM-61	G15A-61	35Y3D	H1B	840039088	D8AA-87	H4DU	641E	616D	818645707 (P-86D570)
2503C-61 (MD)	G3A6-61			818639615 (P-86C661)	D6AA-29	H4CJ or H4CL	—	—	

Note 1: These sets are available in Light Gray (-61) only.

Note 2: Includes 812558039 (P-25E803) cord retainer.

♦TABLE C♦

POLARITY GUARD CONNECTIONS FOR 2503CM AND 2503C (MD) TELEPHONE SETS (SEE NOTE)

TYPE GUARD	LEAD	COLOR	REMOVE FROM NET.	CONNECT TO	
				NET.	POLARITY GUARD
840364202 Guard Part of D-180896 Kit of Parts	Line Cord	W-BL (G)*	L2		T
	Line Switch	Y	C		S
	Ringer	BK	L2		T
	Polarity Guard	G W		L2 C	
819040528 (P-90D052) Guard Assembly (MD)	Dial	BK	RR		T
	Line Switch	Y	C		S
	Polarity Guard	G W		RR C	

Note: For use when specified by local instructions for end-to-end signaling installations.

* The W-BL lead is used when the 2503CM telephone set is modified and the G lead is used when the 2503C (MD) set is modified.

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SERVICE

500C/D AND 500D/M TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.001 This addendum supplements Section 502-521-402, Issue 4. Place this pink sheet ahead of Page 1 of this section.

1.002 This addendum is issued to show 500DM telephone sets manufactured after 6-1-82 will be marked (under or near the date code) "1-PTY". This marking indicates the set cannot be used for multiparty service connections.

2. CHANGES TO SECTION

2.001 On Page 1, add paragraph 1.03 as follows:

1.03 Telephone sets ***not*** marked "1-PTY" are adaptable for all classes of line and ringer connections. Sets marked "1-PTY" cannot be used for multiparty service connections. If service other than individual or bridged ringing is required, a 500D2M base, housing and handset must be ordered separately.

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SERVICE

500C/D AND 500DM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 500C/D (MD) and 500DM telephone sets.

1.02 This section is reissued to:

- Show 500C and D telephone sets MD
- Remove information on 500CM telephone set, never manufactured
- Revise Fig. 2 to update information.

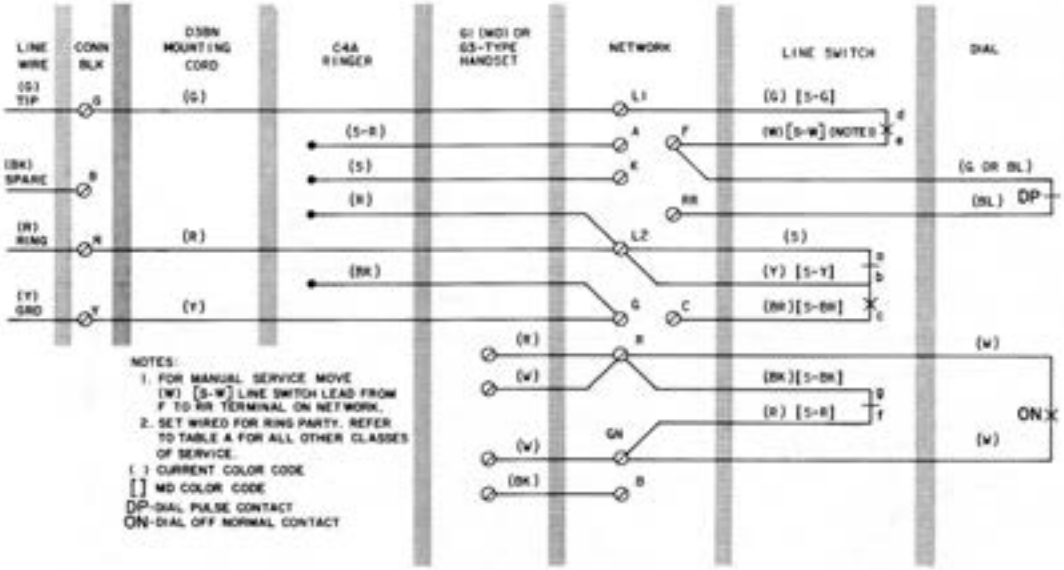

Fig. 1—500C/D (MD) Telephone Set, Connections

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♦ TABLE A ♦

500C/D (MD) TELEPHONE SET, CONNECTIONS

WIRE OR LEAD	COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY NO IDENT GRD	TIP PARTY IDENT	
					1000Ω	2650Ω
Ringer Leads (See Note)	R BK S S-R	L2 G K A	L2 G K A	L2 G K A	K G B B	B B K G
Line Switch	S	L2	L2	L2	A	A
Mounting Cord at Conn Block	R G Y	R G G	R G Y	G R Y	G R Y	G R Y

Note: To silence ringer for all classes of service, refer to Section 501-250-303.

♦ TABLE B ♦

500DM TELEPHONE SET LINE AND RINGER CONNECTIONS

WIRE OR LEAD	COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY NO IDENT GRD	TIP PARTY IDENT GRD			
					NORMAL CONN		WHEN CONN TO L.L. EQUIP	
					1000Ω	2650Ω	1000Ω	2650Ω
Ringer Leads (See Note)	R BK S S-R	L2 L1 K A	L2 G K A	L1 G K A	K G B B	B B K G	B B G K	G K B B
Line Switch Lead	S	L2	L2	L2	A	A	A	A
623D3 Jack Assembly in Set	R G Y	L2 L1 G	L2 L1 G	L2 L1 G	L1 L2 G	L1 L2 G	L1 L2 G	L1 L2 G

Note: To silence ringer for all classes of service, refer to Section 501-250-303.

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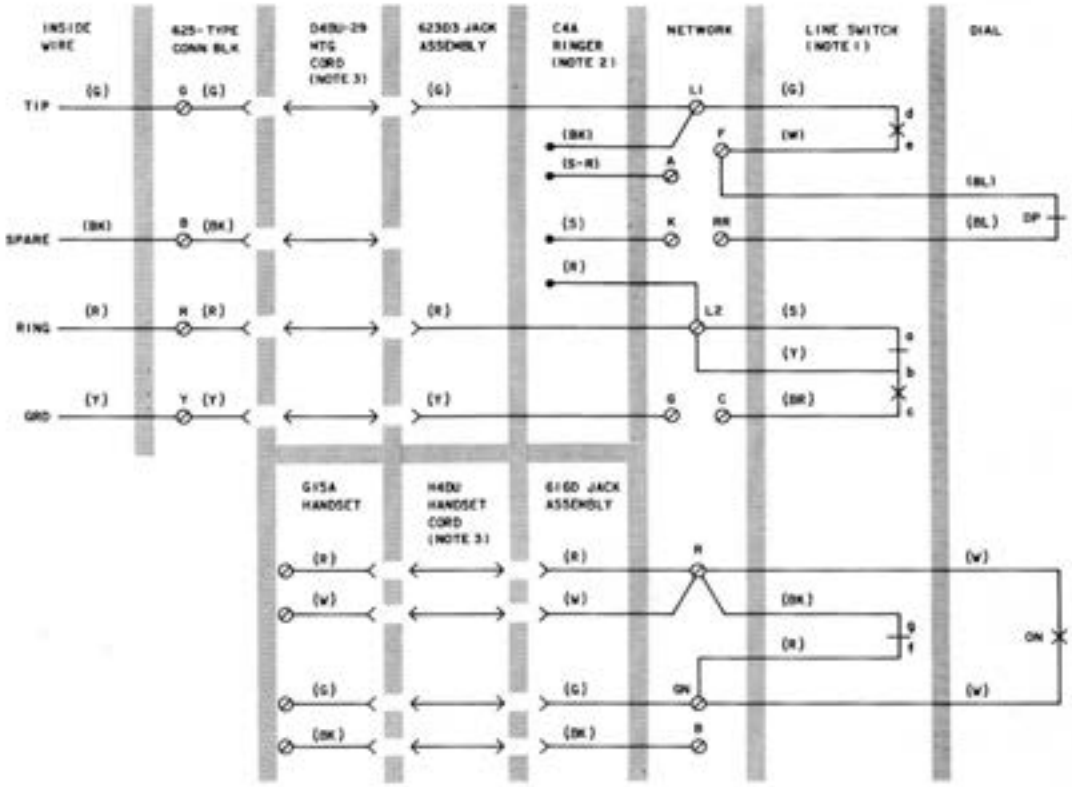

NOTES:
1. FOR MANUAL SERVICE, MOVE (W) LINE SWITCH LEAD FROM F TO RR TERMINAL ON NETWORK.
2. SET FACTORY WIRED FOR INDIVIDUAL OR BRIDGED RINGING. SEE TABLE B FOR OTHER CLASSES OF SERVICE.
3. MUST BE ORDERED SEPARATELY.

DP - DIAL PULSE CONTACT
ON - DIAL OFF-NORMAL CONTACT

Fig. 2—®500DM Telephone Set, Connections®

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SERVICE

554A/B, 554F, 554AM, 554BM, 554AMP, AND 554BMP TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information for the 554A/B (MD) (Fig. 1), 554F (MD) (Fig. 1), 554AM (MD) (Fig. 2), 554BM (MD) (Fig. 3), 554AMP (MD) (Fig. 4), and 554BMP (Fig. 5) telephone sets.

1.02 Reissued to:

- Show 554A/B, 554F, 554AM, 554BM, and 554AMP telephone sets rated MD
- Add information on modifying 554BMP set for A Lead control
- Revise Table A.

1.03 Refer to Table A for line and ringer connections.

1.04 Refer to Fig. 6 for set modifications when used with a key telephone system.

1.05 If a 28A ringer isolator is required, refer to the appropriate table in Section 501-375-101 for connection information. If a 603A ringing extender is required, refer to Section 501-380-102 for connection information. Whenever four party full selective or eight party semiselective ringing is required, refer to Section 501-320-100 for D-180697 Kit of Parts information.

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♦ TABLE A ♦

554A/B, 554F, 554AM, 554BM, 554AMP, AND 554BMP TELEPHONE SET LINE AND RINGER CONNECTIONS

WIRE OR LEAD		COLOR	TERMINAL						
			INDIV OR BRIDGED	RING PARTY	TIP PARTY NO IDENT GRD	TIP PARTY IDENT GROUND			
						NORMAL CONNECTIONS		CONN TO L.L. EQUIP (NOTE 2)	
						1000Ω	2650Ω	1000Ω	2650Ω
Inside Wire or 523A Plug Lead in Set	Ring	R	L2	L2	L1	L1	L1	L1	L1
	Tip	G	L1	L1	L2	L2	L2	L2	L2
	Grd	Y	G	G	G	G	G	G	G
	Spare	BK	*	*	*	*	*	*	*
Line Switch		S	L2	L2	L2	A	A	A	A
Ringer Leads (Notes 1 And 3		R	L2	L2	L2	K	B	B	G
		BK	L1	G	G	G	B	B	K
		S	K	K	K	B	K	G	B
		S-R	A	A	A	B	G	K	B

Note 1. To silence ringer for all classes of service, refer to appropriate section in Division 501.

Note 2. If bell taps on stations connected to long line equipment, use these connections to retain tip party ground identification.

Note 3. When grounded ringer arrangments are used on 96 volt long line circuits, a D-180036 ringer isolator must be used.

* Insulate and store

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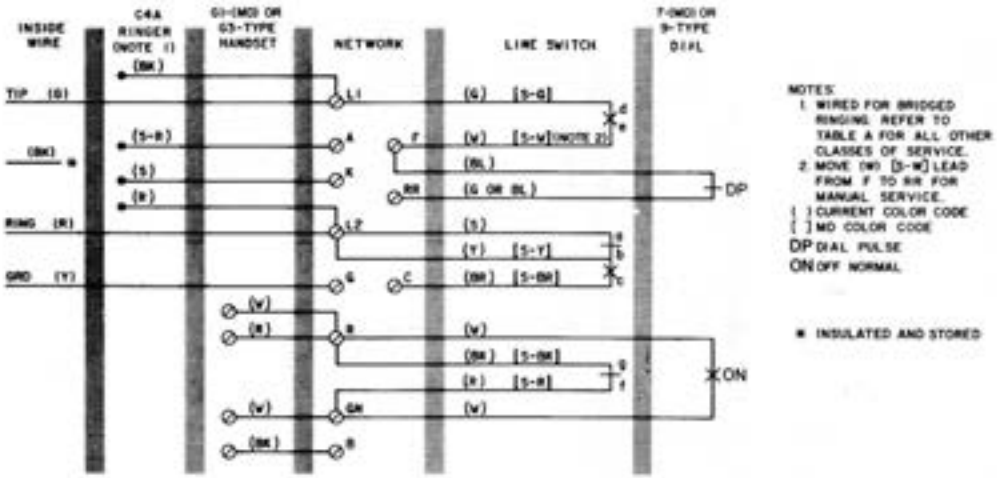

Fig. 1—8554A/B (MD) and 554F (MD) Telephone Sets, Connections

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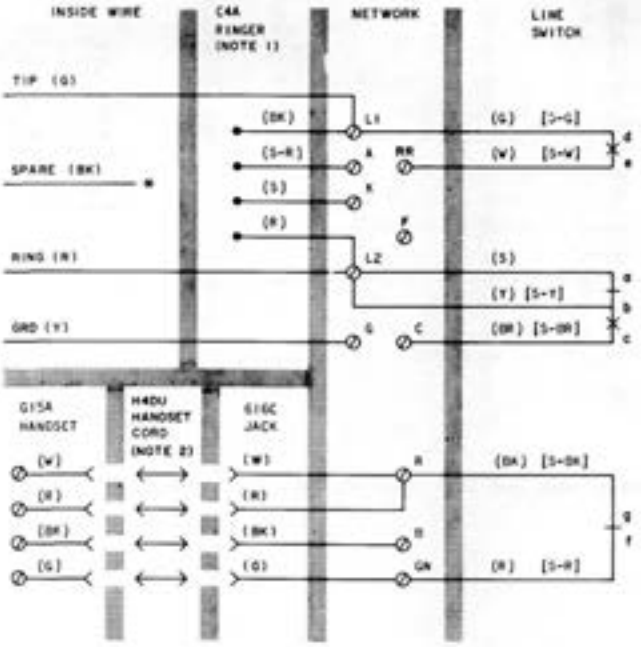

NOTES:
1. WIRED FOR BRIDGED RINGING. REFER TO TABLE A FOR ALL OTHER CLASSES OF SERVICE.
2. H4DU HANDSET CORD MUST BE ORDERED SEPARATELY.
W INSULATED AND STORED

( ) CURRENT COLOR CODE
[ ] MD COLOR CODE

Fig. 2—▮554AM (MD) Telephone Set, Connections▮

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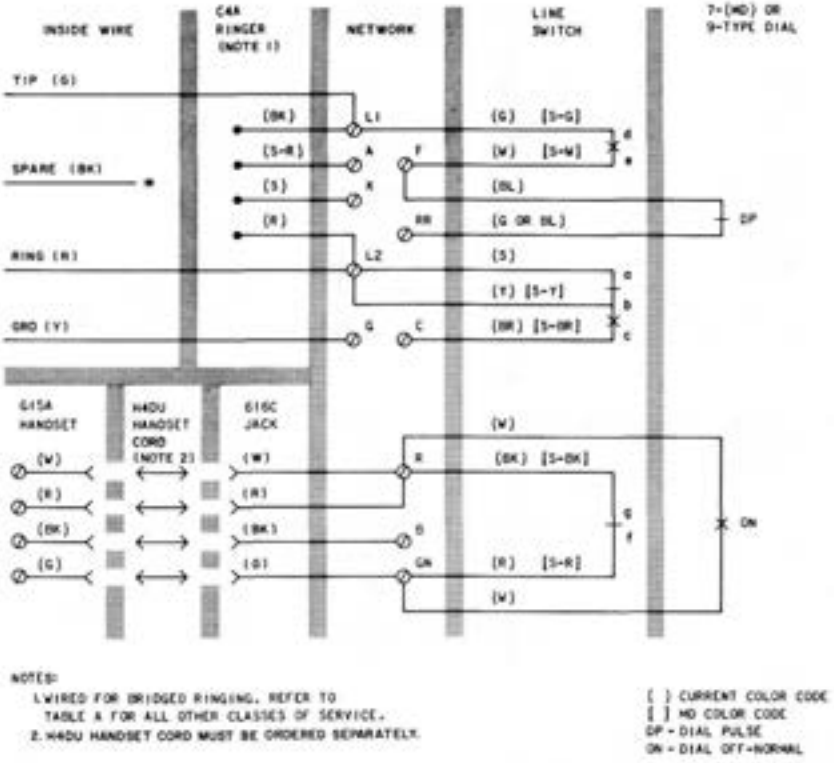

NOTES:
1. WIRED FOR BRIDGED RINGING. REFER TO TABLE A FOR ALL OTHER CLASSES OF SERVICE.
2. H4DU HANDSET CORD MUST BE ORDERED SEPARATELY.

( ) CURRENT COLOR CODE
[ ] MD COLOR CODE
DP - DIAL PULSE
ON - DIAL OFF-NORMAL

Fig. 3—▶554BM (MD) Telephone Set, Connections◀

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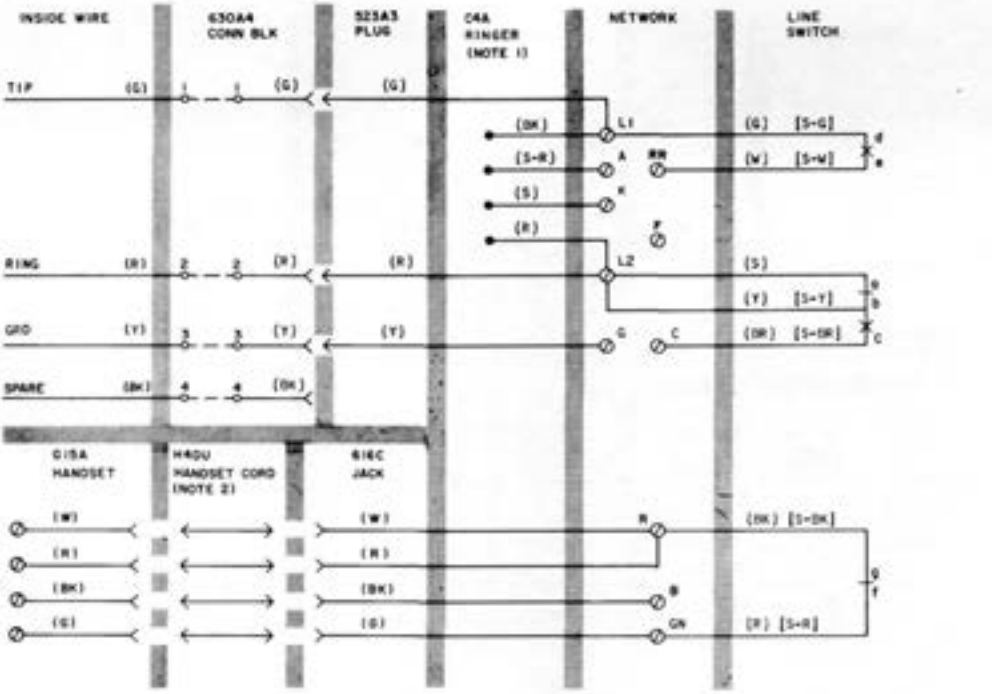

NOTES:
1. WIRED FOR BRIDGED RINGING. REFER TO TABLE A FOR ALL OTHER CLASSES OF SERVICE.
2. H4DU HANDSET CORD MUST BE ORDERED SEPARATELY.

[ ] CURRENT COLOR CODE
[ ] HD COLOR CODE

Fig. 4—2554AMP (MD) Telephone Set, Connections

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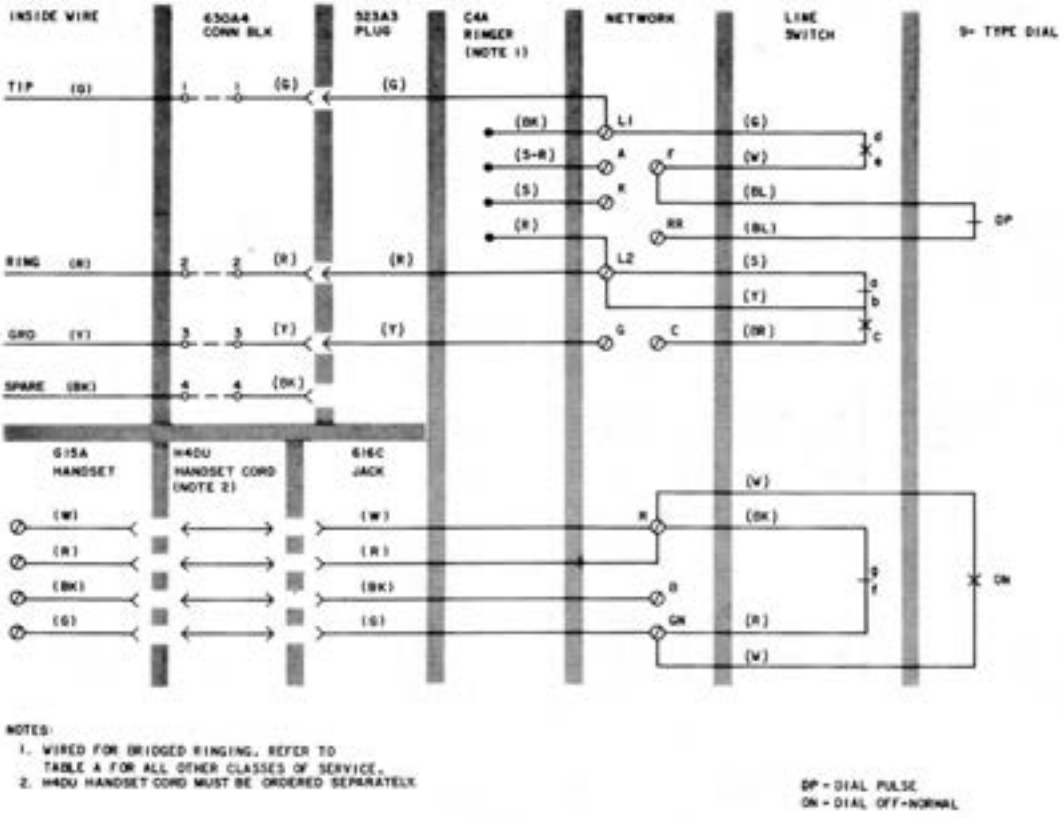

Fig. 5—8554BMP Telephone Set, Connections

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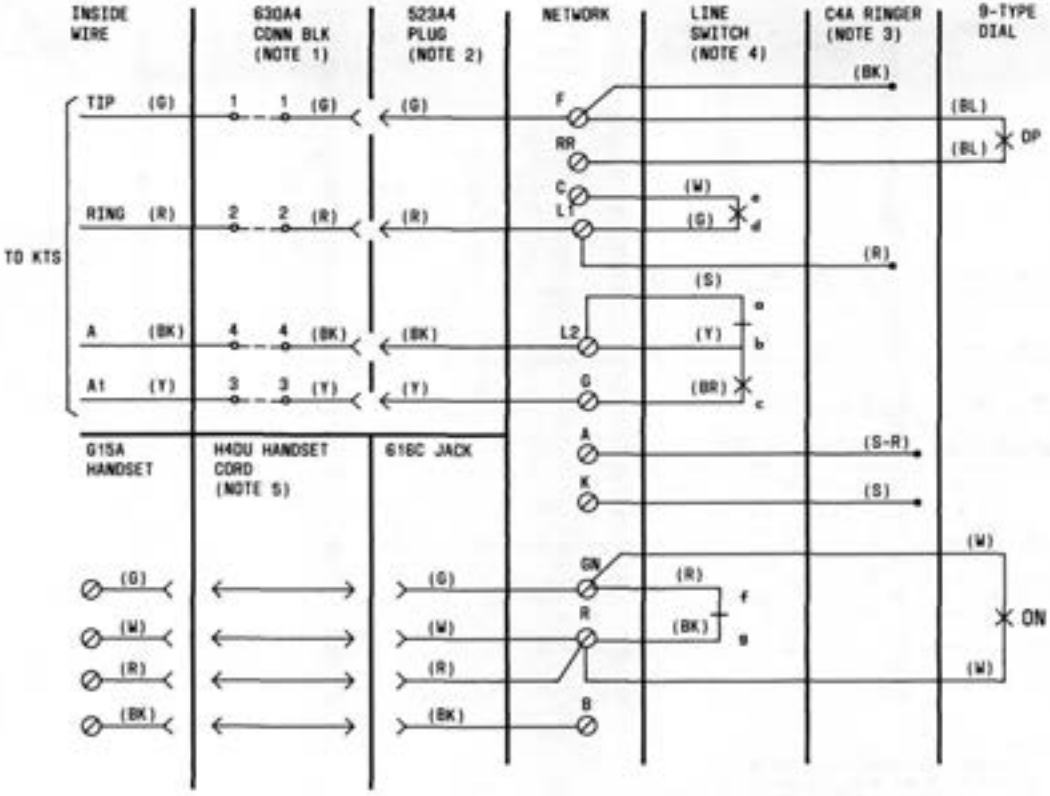

SET MODIFICATION

LEAD	COLOR	FROM	TO
523A4 PLUG	G		F
	R		L1
	Y		G
	BK		L2
LINE SWITCH	W	F	C
	BR	C	G
RINGER	R	L2	L1
	BK	L1	F

NOTES:
1. QUICK CONNECT TERMINALS ON 630A4 CONNECTING BLOCK.
2. REPLACE 523A3 PLUG WITH 523A4 PLUG. ORDERED SEPERATELY.
3. WIRED FOR INDIVIDUAL OR BRIDGED RINGING.
4. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE "A" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH NOT RECOMMENDED).
5. H40U CORD MUST BE ORDERED SEPARATELY.

DP-DIAL PULSE
ON-OFF NORMAL

Fig. 6—#554BMP Telephone Set Modified for A-Lead Control

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SERVICE

2500D, 2500DM, AND 2500DMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.001 This addendum supplements Section 502-523-401, Issue 8. Place this pink sheet ahead of Page 1 of this section.

1.002 This addendum is issued to show that 2500DM and 2500DMG telephone sets manufactured after 6-1-82 will be marked (under or near the date code) "1-PTY". This marking indicates the set cannot be used for multiparty service connections.

2. CHANGES TO SECTION

2.001 On Page 1, add paragraph 1.08 as follows:

1.08 Telephone set bases ***not*** marked "1-PTY" are adaptable for all classes of line and ringer connection. Sets marked "1-PTY" cannot be used for multiparty service connections. If service other than individual or bridged ringing is required, a 2500D2M or 2500D2MG base, housing and handset must be ordered separately.

NOTICE
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SERVICE

2500D, 2500DM, AND 2500DMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2500D (MD), 2500DM, and 2500DMG telephone sets (Fig. 1, 2, 3, or 4 and Table A).

1.02 This section is being reissued to add information on 2500DMG telephone set equipped with 72-type dial Fig. 4. Revision arrows are used to emphasize the more significant changes.

1.03 ♦Early version 2500DMG telephone sets are equipped with a 35-type dial plus a separate polarity guard, later version 2500DMG telephone sets will be equipped with a 72-type dial which has a built-in polarity guard. Refer to Table C for modifications when replacing 35-type dial with a 72-type dial. Refer to Section 502-503-101 for additional information on 72-type dial when used with 2500-type telephone sets.♦

1.04 If 28A ringer isolator is used for ringing range extension or ringer isolation, refer to Section 501-375-101.

1.05 For 4-party full selective or 8-party semiselective ringing using the 425A electron tube, refer to Section 501-320-100.

1.06 If the 603A ringing extender is required, refer to Section 501-380-102.

1.07 When end-to-end signaling is provided, install a 2500DMG set or add the D-180896 Kit of Parts (polarity guard) to a 2500D or 2500DM set. Refer to Table B for polarity guard connection information and Section 502-503-101 for installation information.

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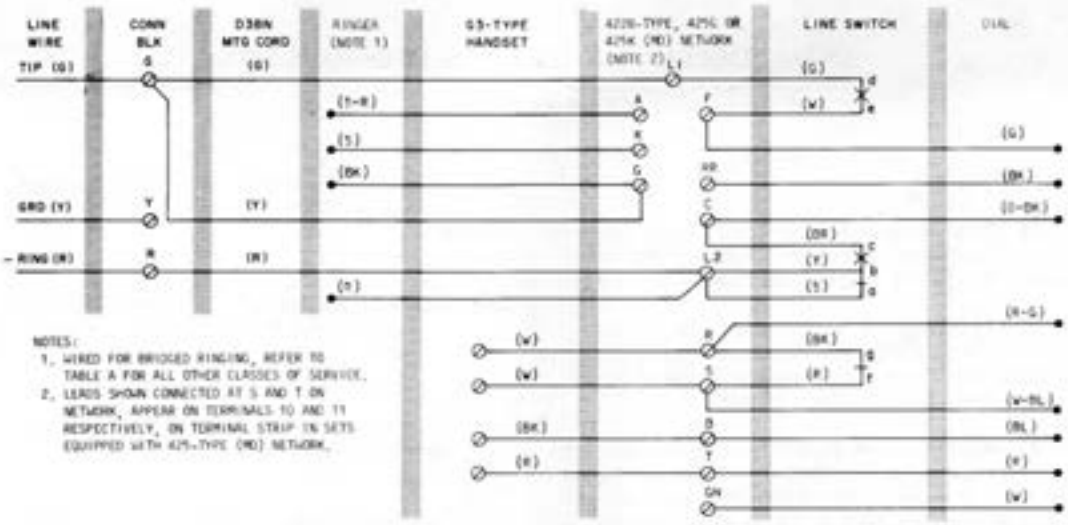

Fig. 1—2500D (MD) Telephone Set, Connections

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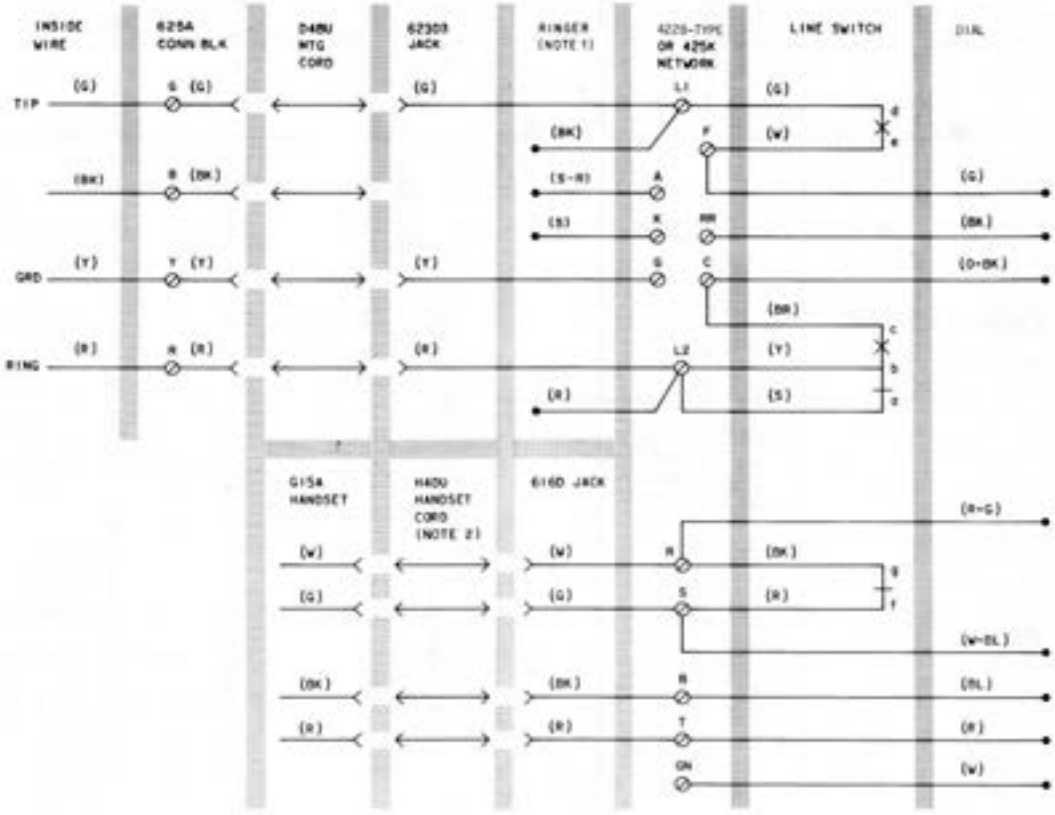

NOTES:
1. SET FACTORY WIRED FOR INDIVIDUAL OR BRIDGED RINGING. SEE TABLE A FOR ALL CLASSES OF SERVICE.
2. MUST BE ORDERED SEPARATELY

Fig. 2—2500DM Telephone Set, Connections

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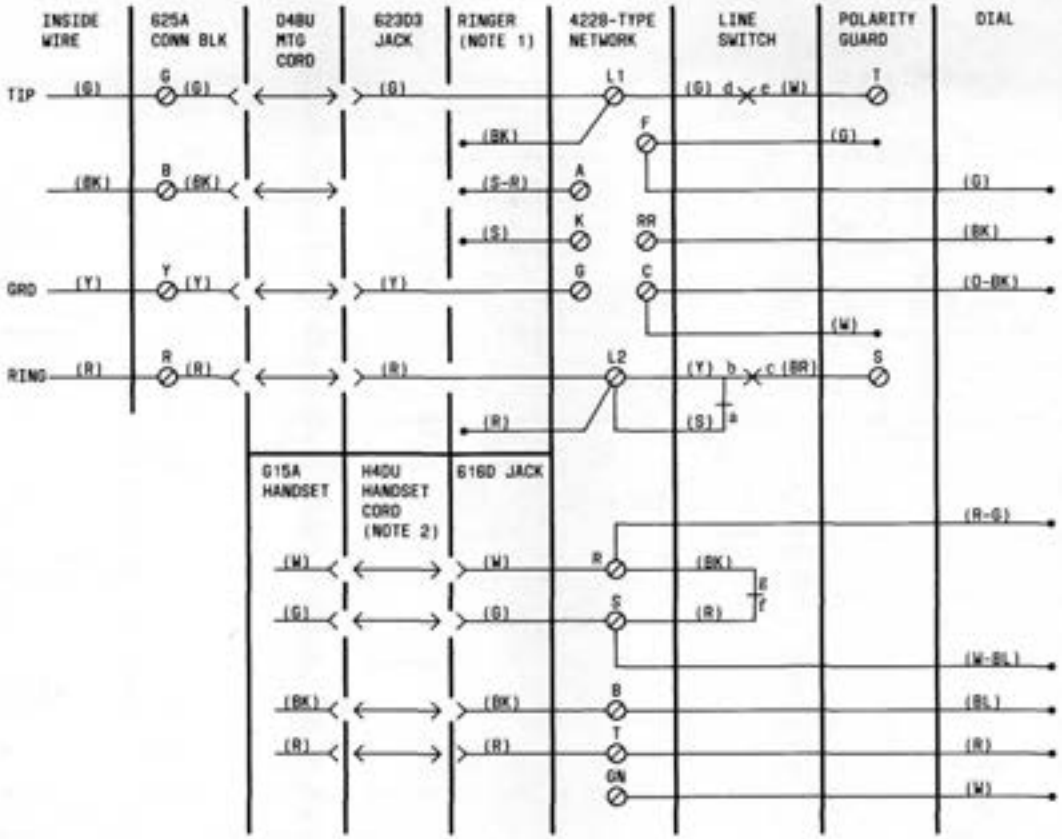

NOTES:
1. SET FACTORY WIRED FOR INDIVIDUAL OR BRIDGED RINGING. SEE TABLE A FOR ALL CLASSES OF SERVICE.
2. MUST BE ORDERED SEPARATELY

Fig. 3—2500DMG Telephone Set Equipped With 35-Type Dial and Polarity Guard, Connections

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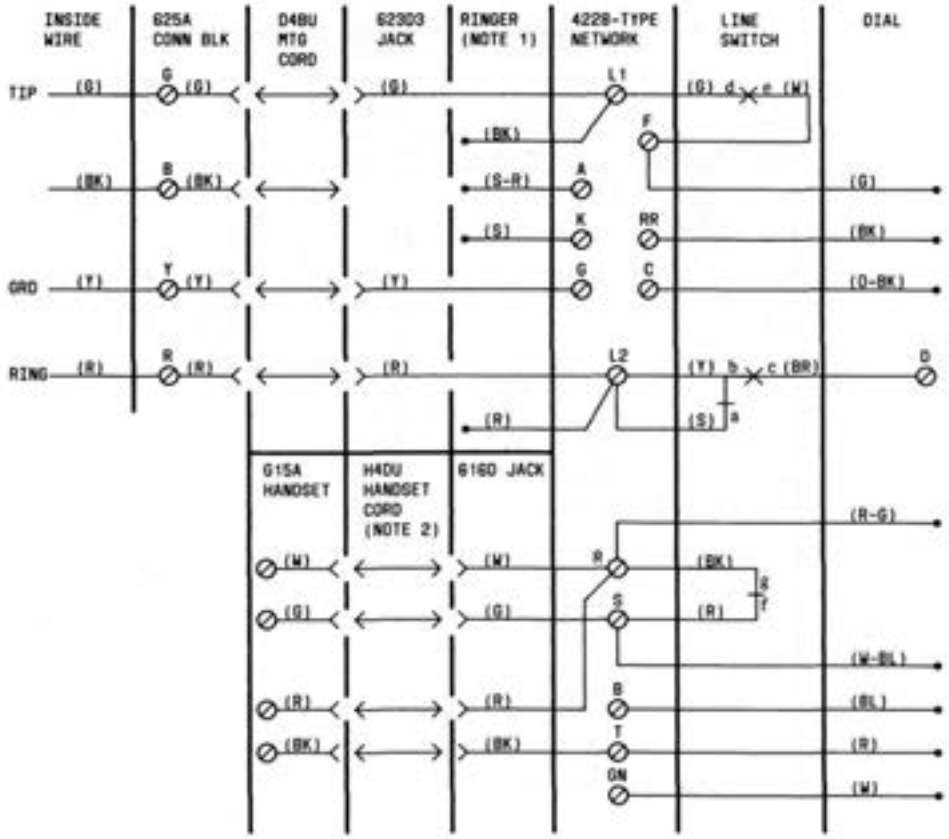

NOTES:
1. SET FACTORY WIRED FOR INDIVIDUAL OR BRIDGED RINGING. SEE TABLE A FOR ALL CLASSES OF SERVICE.
2. MUST BE ORDERED SEPARATELY

Fig. 4—▮2500DMG Telephone Set Equipped With 72-Type Dial, Connections▮

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TABLE A

LINE AND RINGER CONNECTIONS FOR 2500D (MD) 2500DM, OR 2500DMG TELEPHONE SET

WIRE OR LEAD		INDIV OR BRIDGED	RING PARTY	TIP PARTY		
				NO ID GROUND	ID GROUND	
					1000Ω	2650Ω
Line Wire at Conn Block	R	R	R	R	R	R
	G	G	G	G	G	G
	Y	Y	Y	Y	Y	Y
	BK	B	B	B	B	B
Mtg Cord at Conn Block (2500D)	R	R	R	R	R	R
	G	G	G	G	G	G
	Y	G	Y	Y	Y	Y
Mtg Cord in Set (2500D)	R	L2	L2	L2	L1	L1
	G	L1	L1	L1	L2	L2
	Y	G	G	G	G	G
Jack Conductors in Modular Set, 2500DM or 2500DMG only	R	L2	L2	L2	L1	L1
	G	L1	L1	L1	L2	L2
	Y	G	G	G	G	G
Line Switch Leads	S	L2	L2	L2	A	A
	W†	F	F	F	C	C
	BR†	C	C	C	F	F
Ringer Leads*	R	L2	L2	L1	K	B
	BK	‡	G	G	G	B
	S	K	K	K	B	K
	S-R	A	A	A	B	G

* To silence ringer permanently for all classes of service, refer to the appropriate ringer section in Division 501.

† This change for tip party does not apply to sets equipped with a 35-type dial and polarity guard or 72-type dial (2500DMG telephone sets).

‡ Terminal G for 2500D or terminal L1 for 2500DM or 2500DMG

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◆TABLE B◆

POLARITY GUARD CONNECTIONS (SEE NOTE)

POLARITY GUARD	WIRE OR LEAD	COLOR	REMOVE FROM	CONNECT TO	
			NET.	NET.	POLARITY GUARD
D-180896 Kit of Parts	Line Switch	W	F		T
		BR	C		S
	Guard Assembly	G		F	
		W		C	
819040528 (P-90D052) (MD)	Line Switch	W	F		T
		BR	C		S
	Polarity Guard	G		F	
		W		C	

Note: For use with a 35-type dial when specified by local instructions for end-to-end signaling installations.

◆TABLE C◆

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL, IN 2500-TYPE TELEPHONE SETS

WIRE OR LEAD	COLOR	REMOVE FROM NET. TERM. OR TERM. STRIP (35-TYPE DIAL)	CONNECT TO NET. TERM. OR TERM. STRIP (72-TYPE DIAL)
Dial	W	GN	GN
	W-BL	S	S
	O-BK	C	C
	BK	RR	RR
	R	T	T
	BL	B	B
	R-G	R	R
	G	F	F
Line Switch	BR	C or S†	D‡
	W	F or T†	F
616-Type Handset Cord Jack	R	T	R
	BK	B	T
Polarity Guard*	G	F	—
	W	C	—

* Polarity guard should be removed from telephone set.

† Polarity guard terminal.

‡ 72-type dial terminal.

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SERVICE

2554B, 2554BM, 2554BMP, AND 2554BMPG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.001 This addendum supplements Section 502-523-402, Issue 10. Place this pink sheet ahead of Page 1 of the Section.

1.002 This addendum is issued for the following reasons:

(a) To change the rating of the 2554BMP telephone set to manufacture discontinued (MD).

(b) To show 2554BMPG telephone sets manufactured after 6-1-82 will be marked (under or near the date code) "1-PTY". This marking indicates that the set cannot be used for multiparty service connections or wired for A-lead control.

2. CHANGES TO SECTION

2.001 On Page 1, add paragraph 1.08 as follows:

1.08 The 2554BMPG telephone sets ***not*** marked "1-PTY" are adaptable for all classes of line and ringer connections and for A-lead control. The 2554BMPG telephone sets marked "1-PTY" cannot be used for multiparty service connections or wired for A-lead control; if service other than individual or bridge ringing is required, a 2554B2PG telephone set base, housing, and handset must be ordered separately.

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SERVICE

2554B, 2554BM, 2554BMP, AND 2554BMPG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information for the 2554B (MD) (Fig. 1 and 2), 2554BM (MD) (Fig. 3 and 4), 2554BMP (Fig. 5, 6, 7, 8, 13, 14, 15, and 16), and 2554BMPG (Fig. 9, 10, 11, 12, 13, 14, 15, and 16) telephone sets.

1.02 This section is being reissued to add information on the 2554BMPG telephone set equipped with 72-type dial, Fig. 13, 14, 15, and 16. Revision arrows are used to emphasize the more significant changes.

1.03 When end-to-end signaling is provided, install a 2554BMPG set or add a D-180896 Kit of Parts (polarity guard) to a 2554B, 2554BM, or 2554BMP set. Refer to Table A for polarity guard connection information and Section 502-503-101 for installation information.

1.04 ♦Early version 2554BMPG telephone sets are equipped with a 35-type dial plus a polarity guard, later version 2554BMPG telephone sets will be equipped with a 72-type dial with a built-in polarity guard. Refer to Table D modifications when replacing 35-type dial with a 72-type dial. Refer to Section 502-503-101 for additional information on 72-type dial when used with 2554-type telephone sets.♦

1.05 Refer to Tables B or C for line and ringer connections for sets equipped with 4010D or 4228-type network.

1.06 Refer to Fig. 6, 8, 10, or 12 for set modifications when set is equipped with 35-type dial and modified for A-lead control.

1.07 If a 28A ringer isolator is required, refer to the appropriate table in Section 501-375-101 for connection information. If a 603A ringing extender is required, refer to Section 501-380-102 for connection information. Whenever four party full selective or eight party semiselective ringing is required, refer to Section 501-320-100 for D-180697 Kit of Parts information.

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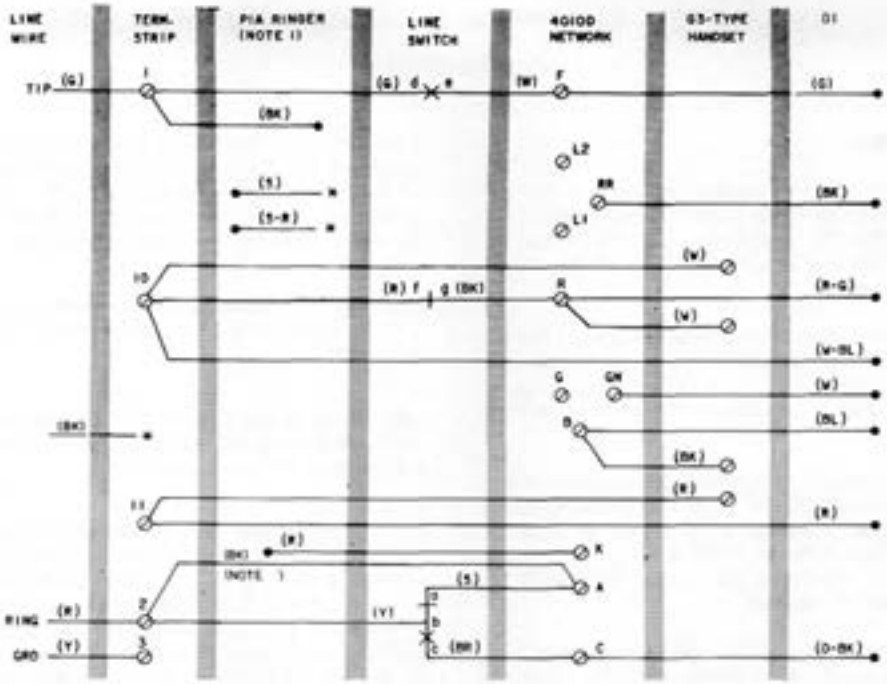

Fig. 1—2554B (MD) Telephone Set Equipped With 4010D Network and 35-Type Dial, Connections

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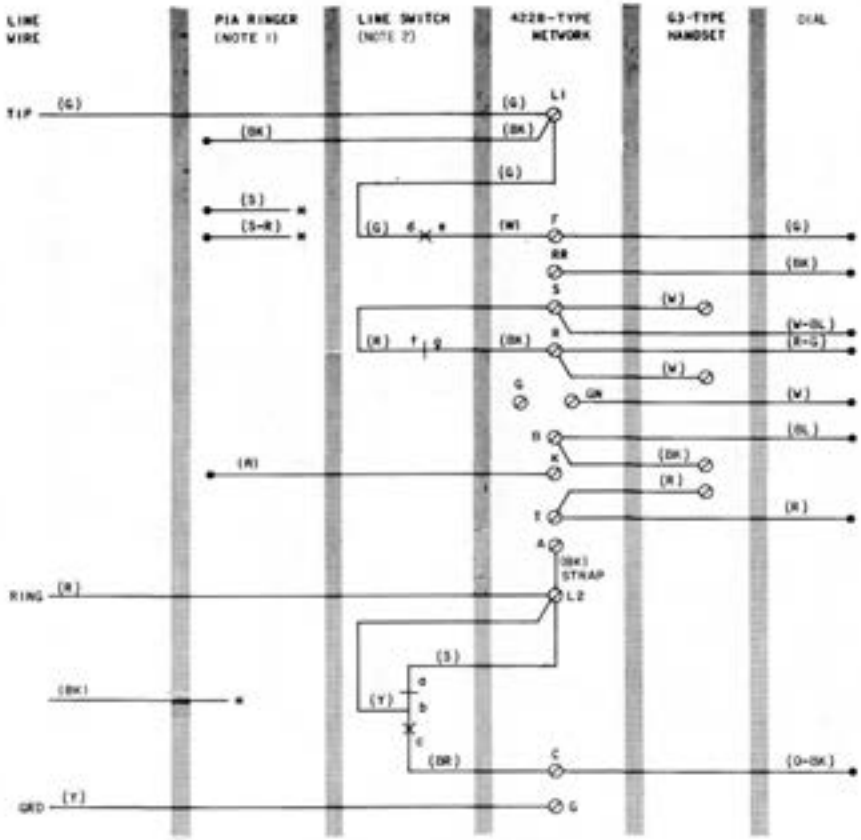

Fig. 2—2554B (MD) Telephone Set Equipped With 4228K Network and 35-Type Dial, Connections

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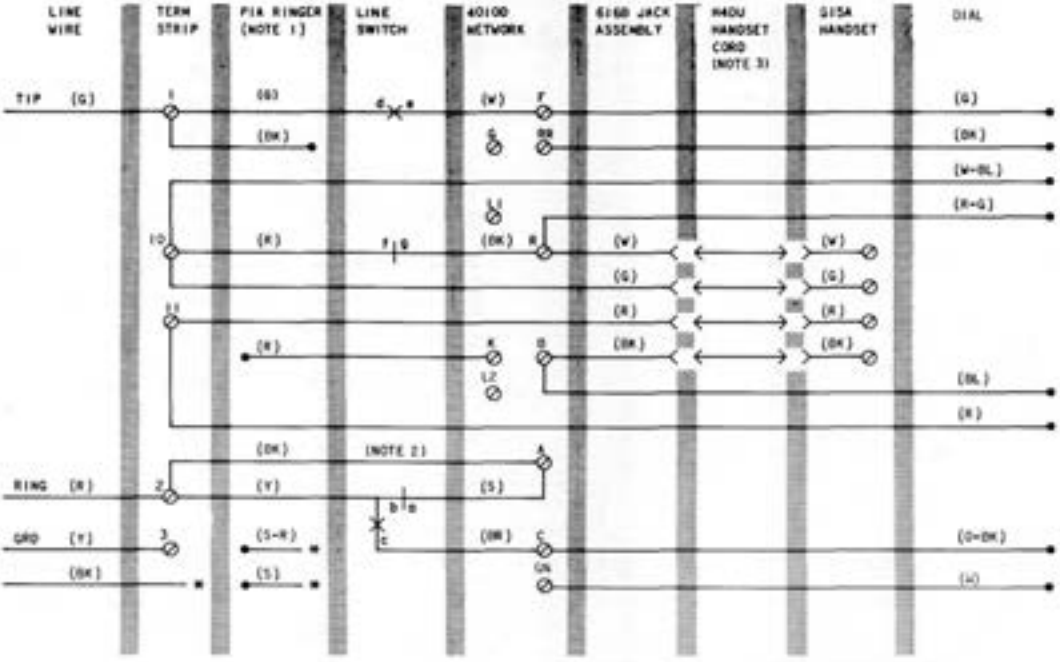

NOTES:
1. WIRED FOR BRIDGED RINGING. REFER TO TABLE D FOR ALL OTHER CLASSES OF SERVICE.
2. STRAP ON LATER VERSION ONLY.
3. H4DU CORD MUST BE ORDERED SEPARATELY.
* INSULATED AND STORED

Fig. 3—2554BM (MD) Telephone Set Equipped With 4010D Network and 35-Type Dial, Connections

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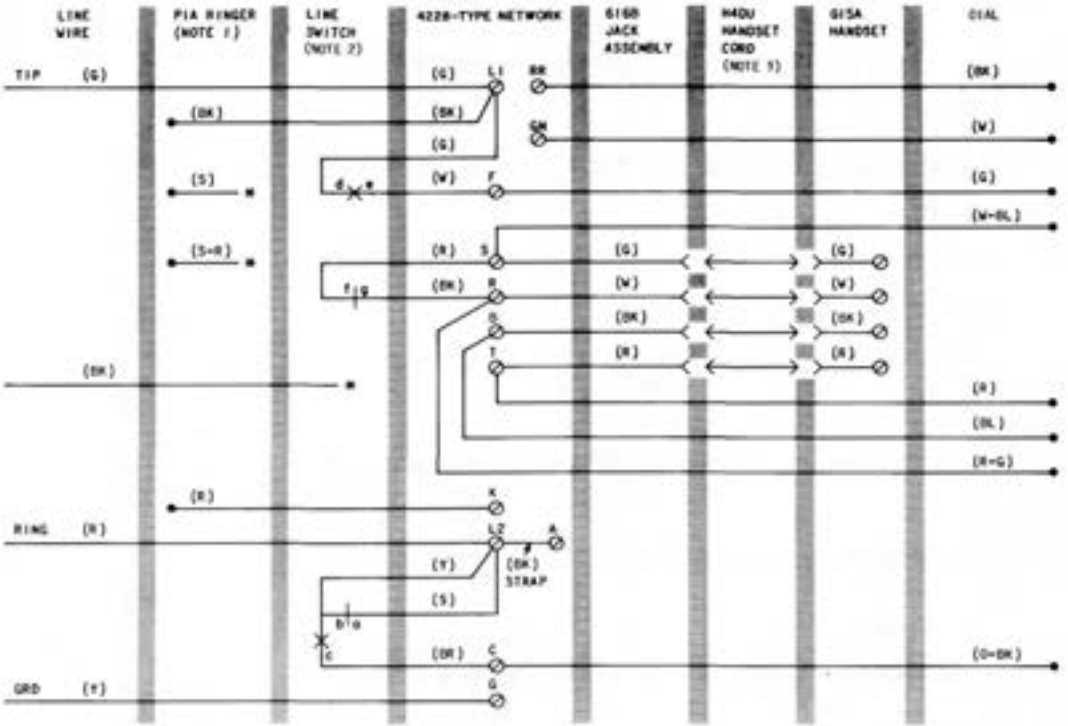

NOTES:
1. WIRED FOR BRIDGED RINGING, REFER TO TABLE C FOR ALL OTHER CLASSES OF SERVICE.
2. ON SOME SETS (S) LINE SWITCH LEAD IS CONNECTED TO A OF NETWORK.
3. H4DU CORD MUST BE ORDERED SEPARATELY.
* INSULATED AND STORED.

Fig. 4—2554BM (MD) Telephone Set Equipped With 4228K Network and 35-Type Dial, Connections

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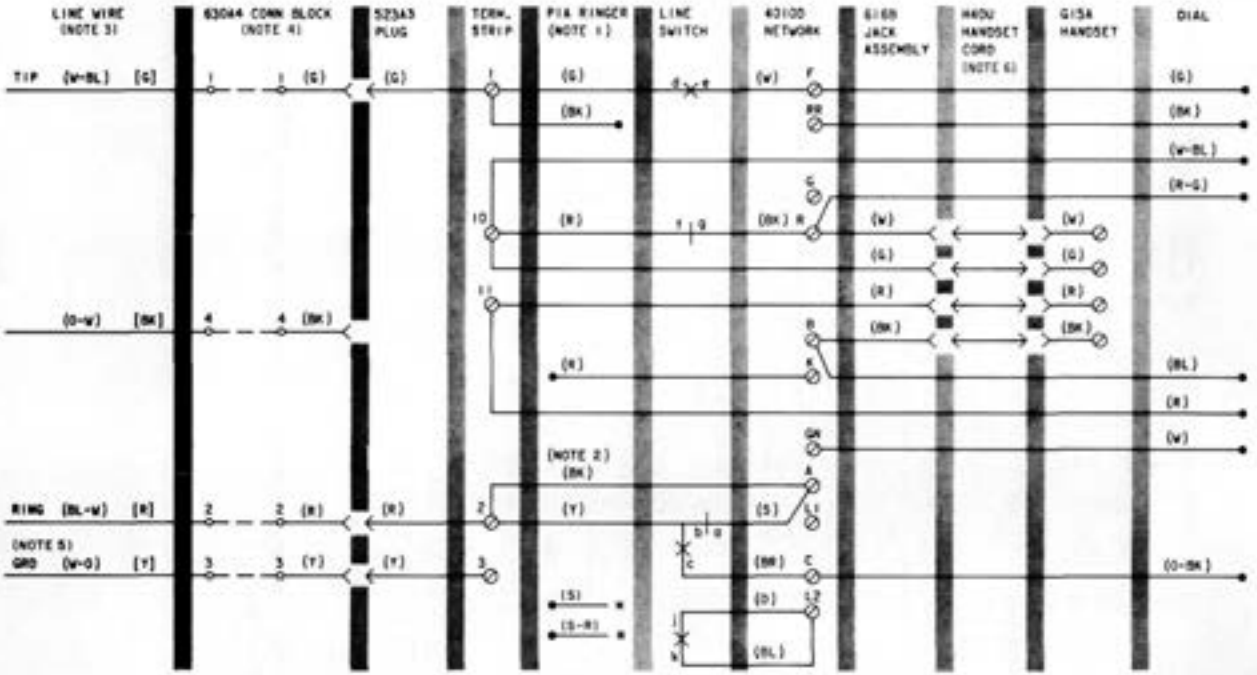

Fig. 5—2554BMP Telephone Set Equipped With 4010D Network and 35-Type Dial, Connections

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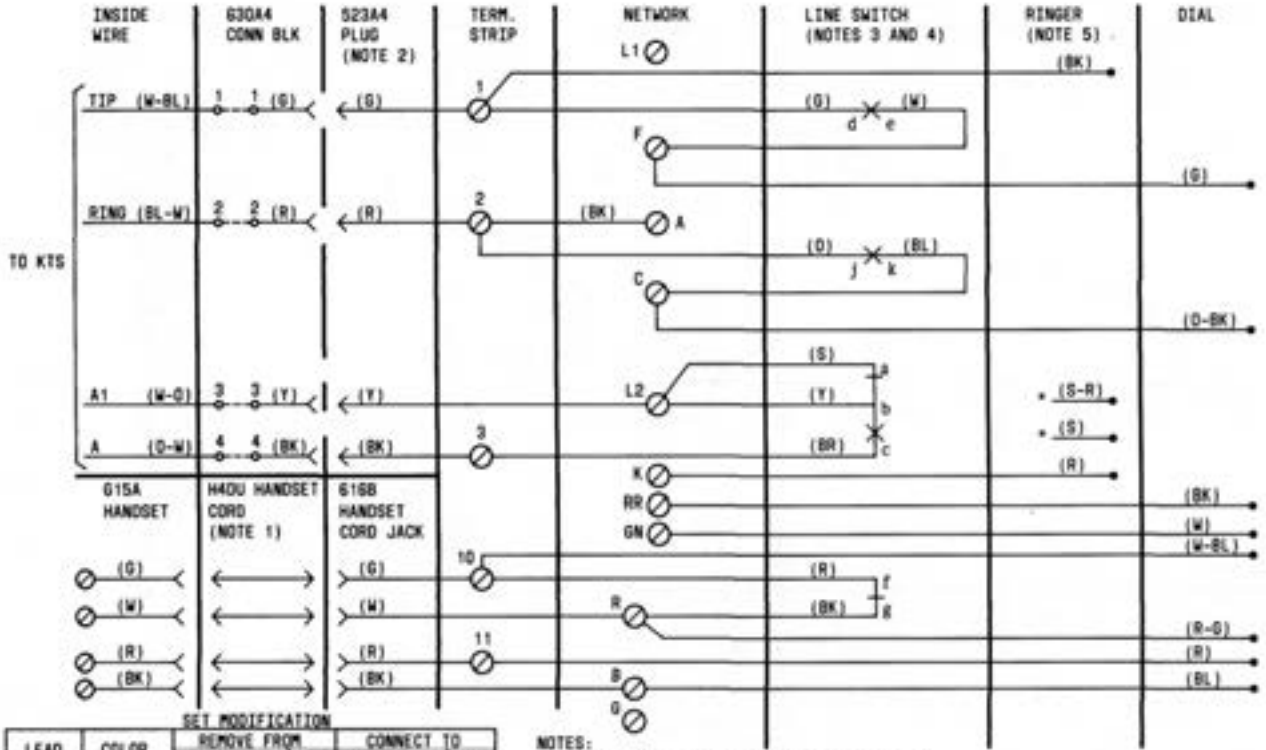

SET MODIFICATION

LEAD	COLOR	REMOVE FROM TERM. STRIP	REMOVE FROM NET.	CONNECT TO TERM. STRIP	CONNECT TO NET.
523A4 PLUG (NOTE 2)	G (TIP)			1	
	R (RING)			2	
	Y (A1)				L2
	BK (A)			3	
LINE SWITCH (NOTE 4)	S		A		L2
	Y	2			L2
	BR		C	3	
	O		L2	2	
	BL		L2		C

NOTES:
1. H4DU CORD MUST BE ORDERED SEPARATELY.
2. REPLACE 523A3 PLUG WITH 523A4 PLUG, ORDERED SEPARATELY.
3. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE "A" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH NOT RECOMMENDED).
4. IF SET DOES NOT HAVE (O) AND (BL) LINE SWITCH LEADS, CONNECT A (BK) STRAP BETWEEN C ON NETWORK AND TERMINAL 2.
5. WIRED FOR INDIVIDUAL OR BRIDGED RINGING.

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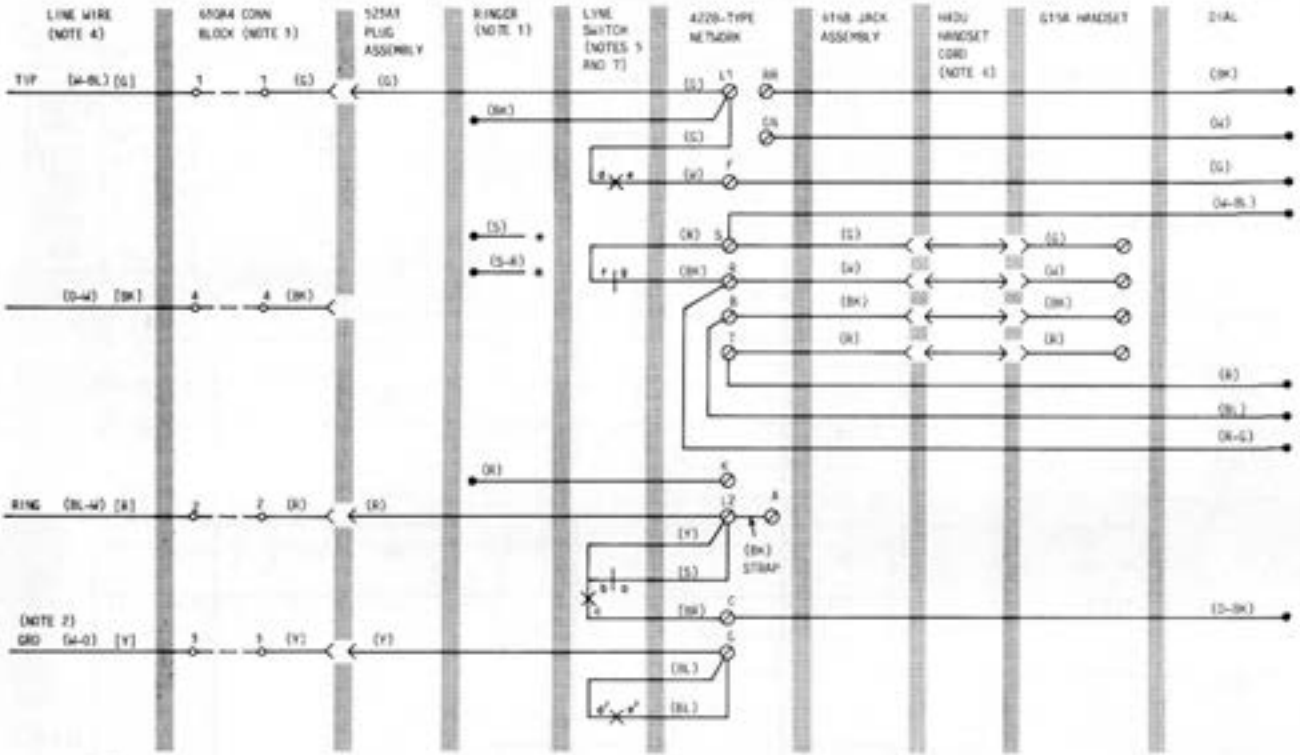
Fig. 6—#2554BMP Telephone Set Equipped With 4010D Network and 35-Type Modified for A-Lead Control



NOTES:
1. WIRED FOR BRIDGED RINGING, REFER TO TABLE C FOR ALL OTHER CLASSES OF SERVICE.
2. LINE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
3. QUICK CONNECT TERMINALS ON 605B4 CONN BLOCK.
4. ( ) INSIDE WIRE COLOR CODE
   [ ] O-STATION WIRE COLOR CODE
5. ON SOME SETS (S) LINE SWITCH LEAD IS CONNECTED TO A OF NETWORK.
6. H82U CORD MUST BE ORDERED SEPARATELY.
7. CURRENT PRODUCTION SETS HAVE CONTACTS a' - a' AND ASSOCIATED (BL) LEADS.
* INSULATED AND STORED

Fig. 7—2554BMP Telephone Set Equipped With 4228K Network and 35-Type Dial, Connections

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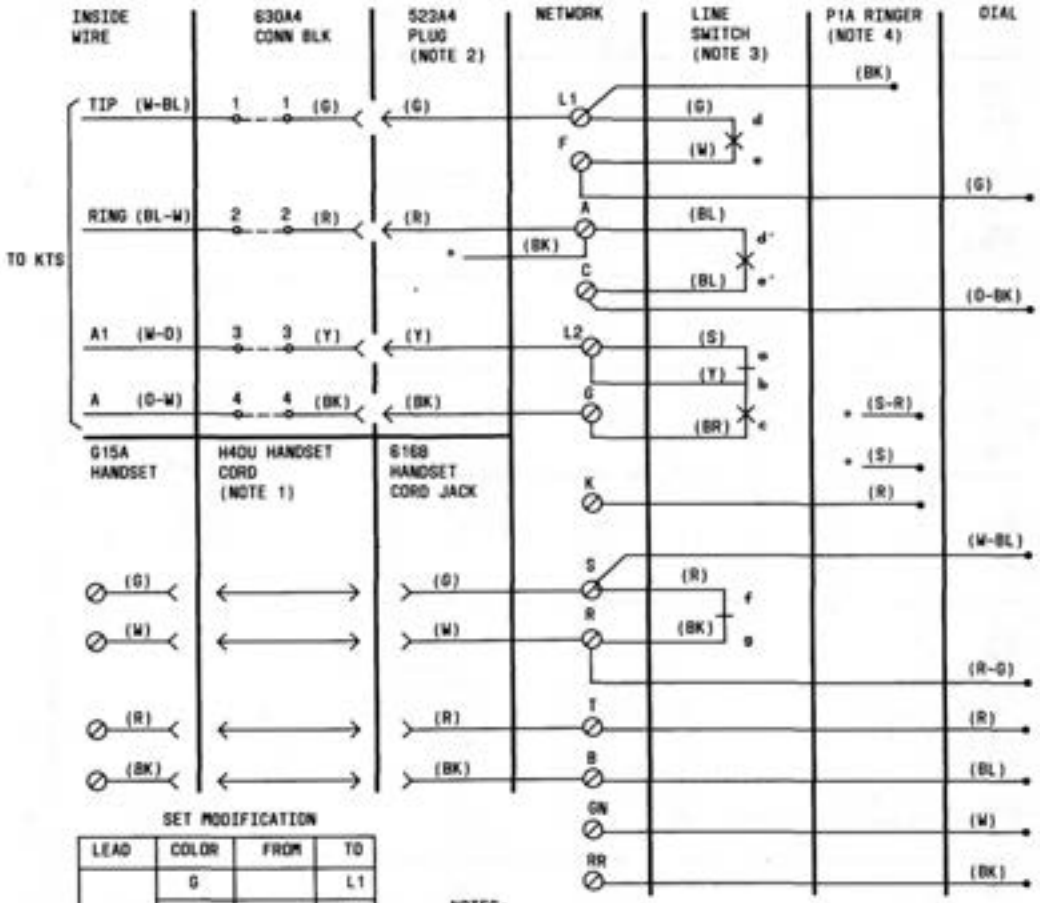

SET MODIFICATION

LEAD	COLOR	FROM	TO
523A4 PLUG	G		L1
	R		A
	Y		L2
	BK		G
LINE SWITCH	BR	C	G
	BL	G	A
	BL	G	C
STRAP	BK	L2	*

NOTES:
1. H4DU CORD MUST BE ORDERED SEPARATELY.
2. REPLACE 523A3 PLUG WITH 523AA PLUG, ORDERED SEPARATELY.
3. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE "A" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH NOT RECOMMENDED).
4. WIRED FOR INDIVIDUAL OR BRIDGED RINGING.

* INSULATE AND STORE

Fig. 8—2554BMP Telephone Set Equipped With 4228K Network and 35-Type Dial, Modified for A-Lead Control

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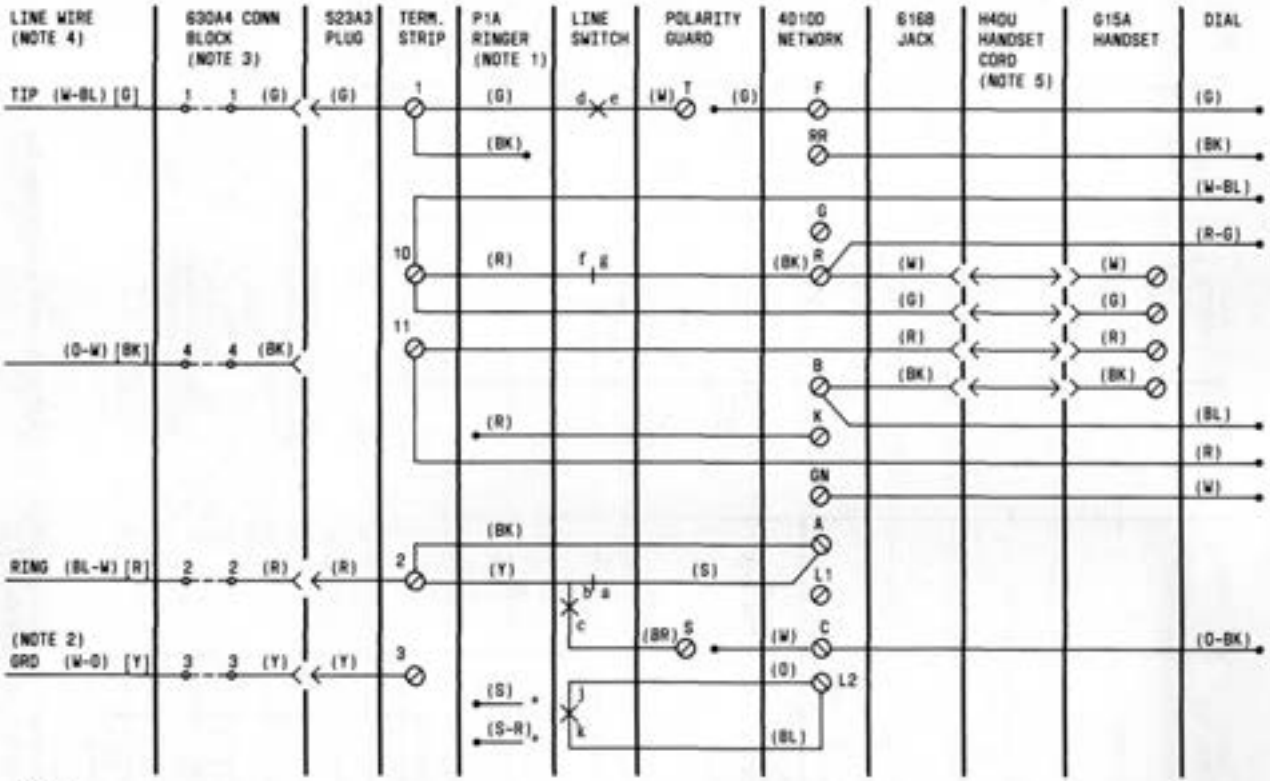

NOTES:
1. WIRED FOR BRIDGED RINGING. REFER TO TABLE B FOR ALL OTHER CLASSES OF SERVICE.
2. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
3. QUICK CONNECT TERMINALS ON 630A4 CONN BLOCK.
4. ( ) INSIDE WIRE COLOR CODE
   [ ] D-STATION WIRE COLOR CODE
5. H40U CORD MUST BE ORDERED SEPARATELY.

* INSULATED AND STORED

Fig. 9—2554BMPG Telephone Set Equipped With 4010D Network, and 35-Type Dial, Connections

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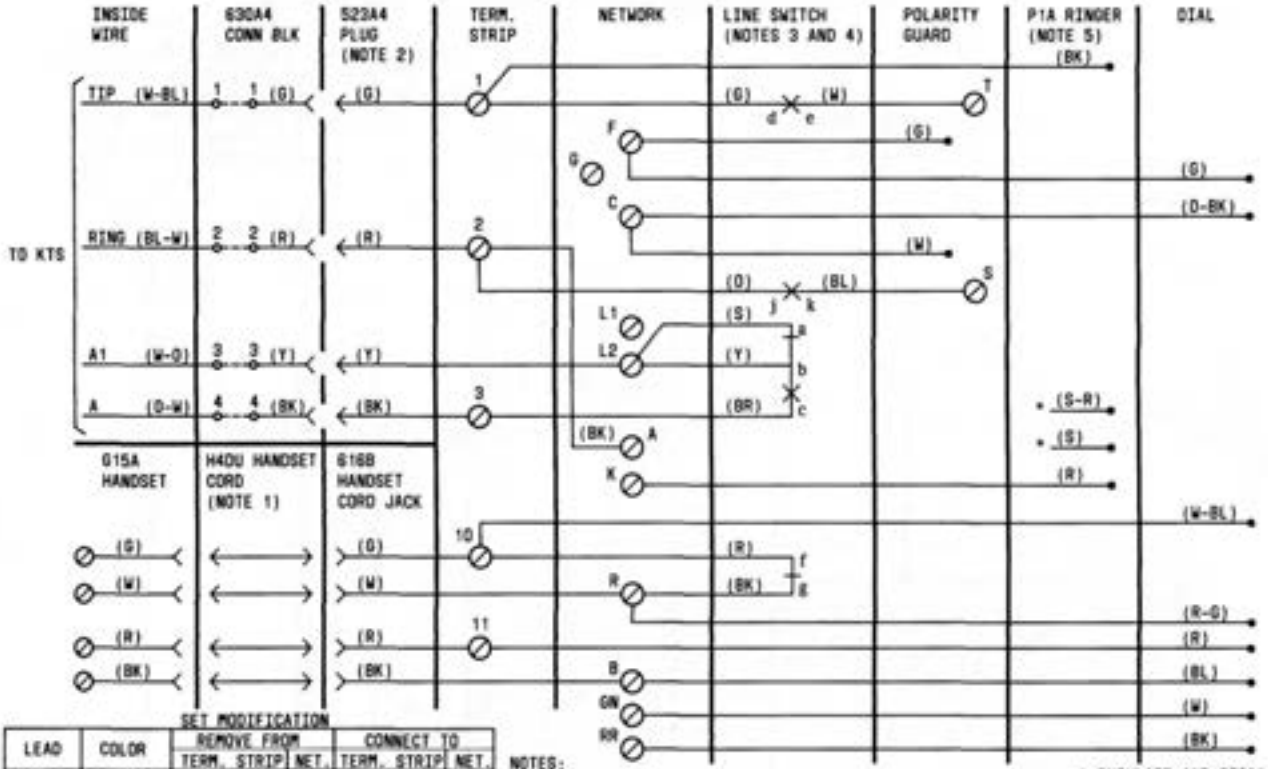

SET MODIFICATION

LEAD	COLOR	REMOVE FROM TERM. STRIP	REMOVE FROM NET.	CONNECT TO TERM. STRIP	CONNECT TO NET.
523A4 PLUG (NOTE 2)	G (TIP)			1	
	R (RING)			2	
	Y (A1)	3			L2
	BK (A)			3	
LINE SWITCH (NOTE 4)	S		A		L2
	Y	2			L2
	O		L2	2	
	BL		L2	S†	
	BR	S†		3	

NOTES:
1. H4DU CORD MUST BE ORDERED SEPARATELY.
2. REPLACE 523A3 PLUG WITH 523A4 PLUG, ORDERED SEPARATELY.
3. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE "A" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH NOT RECOMMENDED).
4. IF SET DOES NOT HAVE (O) AND (BL) LINE SWITCH LEADS, PLACE A (BK) STRAP BETWEEN TERMINAL 2 AND TERMINAL S ON POLARITY GUARD.
5. WIRED FOR INDIVIDUAL OR BRIDGED RINGING.

* INSULATE AND STORE
† POLARITY GUARD TERMINAL

Fig. 10—▶2554BMPG Telephone Set Equipped With 4010D Network and 33-Type Dial Modified for A-Lead Control◀

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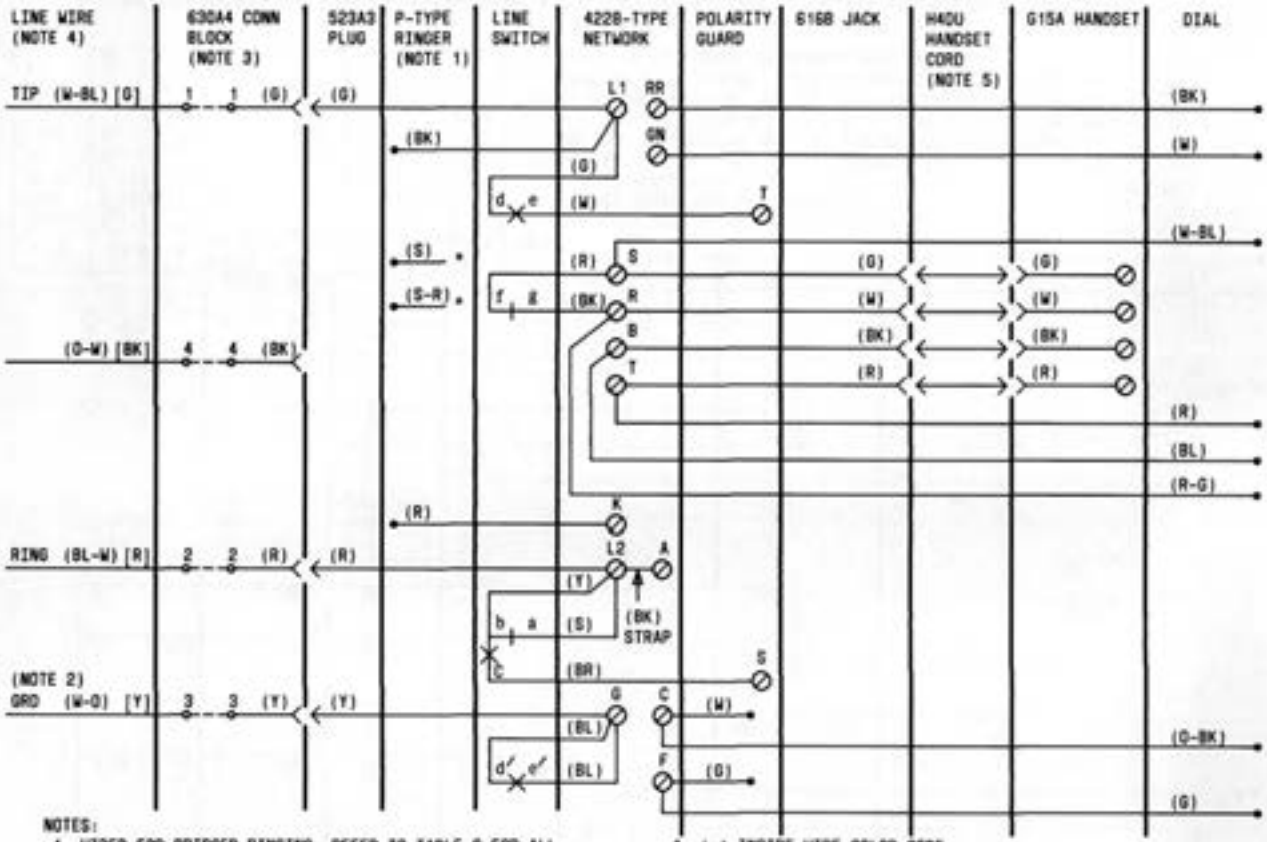

NOTES:
1. WIRED FOR BRIDGED RINGING. REFER TO TABLE C FOR ALL OTHER CLASSES OF SERVICE.
2. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
3. QUICK CONNECT TERMINALS ON 630A4 CONN BLOCK.
4. ( ) INSIDE WIRE COLOR CODE
   [ ] D-STATION WIRE COLOR CODE
5. H4DU CORD MUST BE ORDERED SEPARATELY.

*INSULATED AND STORED

Fig. 11—2554BMPG Telephone Set Equipped With 4228K Network, Connections

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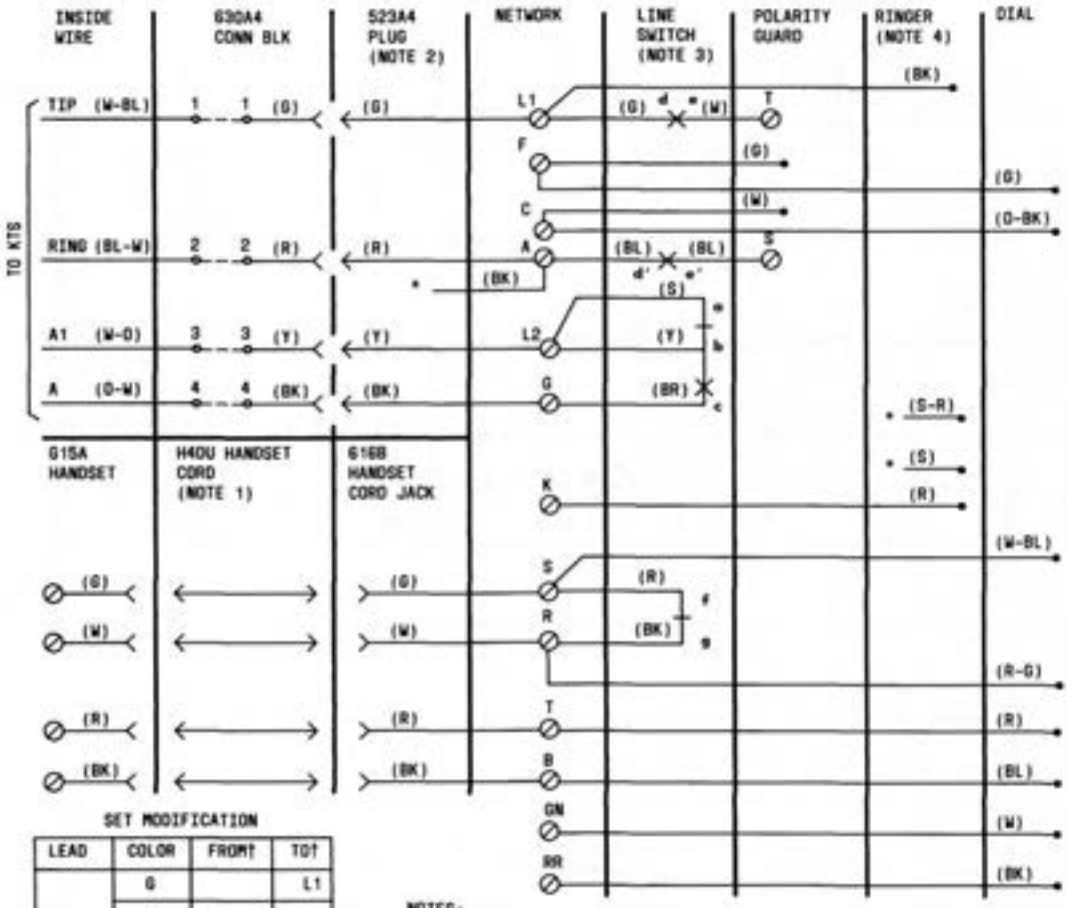

SET MODIFICATION

LEAD	COLOR	FROM†	TO†
523A4 PLUG	G		L1
	R		A
	Y		L2
	BK		G
LINE SWITCH	BR	S‡	G
	BL	G	A
	BL	G	S‡
STRAP	BK	L2	*

NOTES:
1. H4DU CORD MUST BE ORDERED SEPARATELY.
2. REPLACE 523A3 PLUG WITH 523AA PLUG, ORDERED SEPARATELY.
3. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE TIP AND RING CONTACT OF THE LINE SWITCH MUST BREAK BEFORE "A" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH NOT RECOMMENDED).
4. WIRED FOR INDIVIDUAL OR BRIDGED RINGING.

* INSULATE AND STORE
† NETWORK TERMINALS UNLESS OTHERWISE INDICATED.
‡ POLARITY GUARD TERMINAL.

Fig. 12—2554BMPG Telephone Set Equipped With 4228K Network and 35-Type Dial Modified for A-Lead Control

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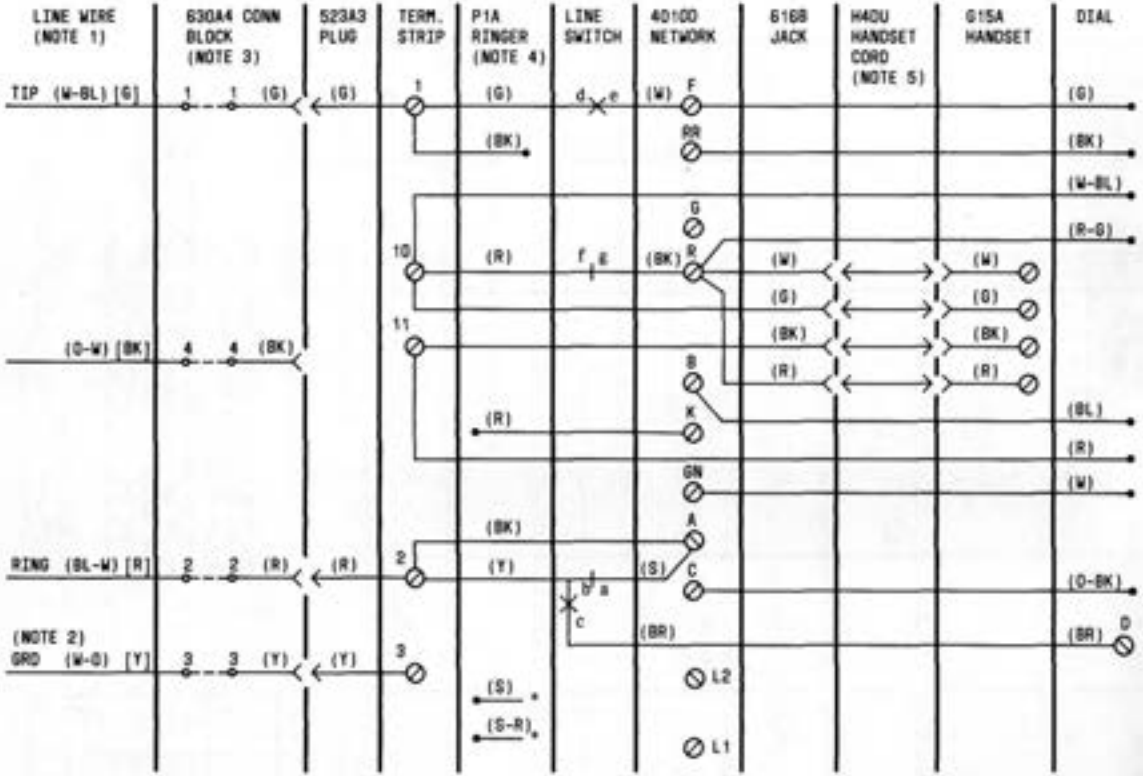

NOTES:
1. ( ) INSIDE WIRE COLOR CODE
   [ ] O-STATION WIRE COLOR CODE
2. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
3. QUICK CONNECT TERMINALS ON 630A4 CONN BLOCK.
4. WIRED FOR BRIDGED RINGING, REFER TO TABLE B FOR ALL OTHER CLASSES OF SERVICE.
5. H4DU CORD MUST BE ORDERED SEPARATELY.

* INSULATED AND STORED

Fig. 13—▶2554BMP or 2554BMPG Telephone Set Equipped With 4010D Network and 72-Type Dial, Connections◀

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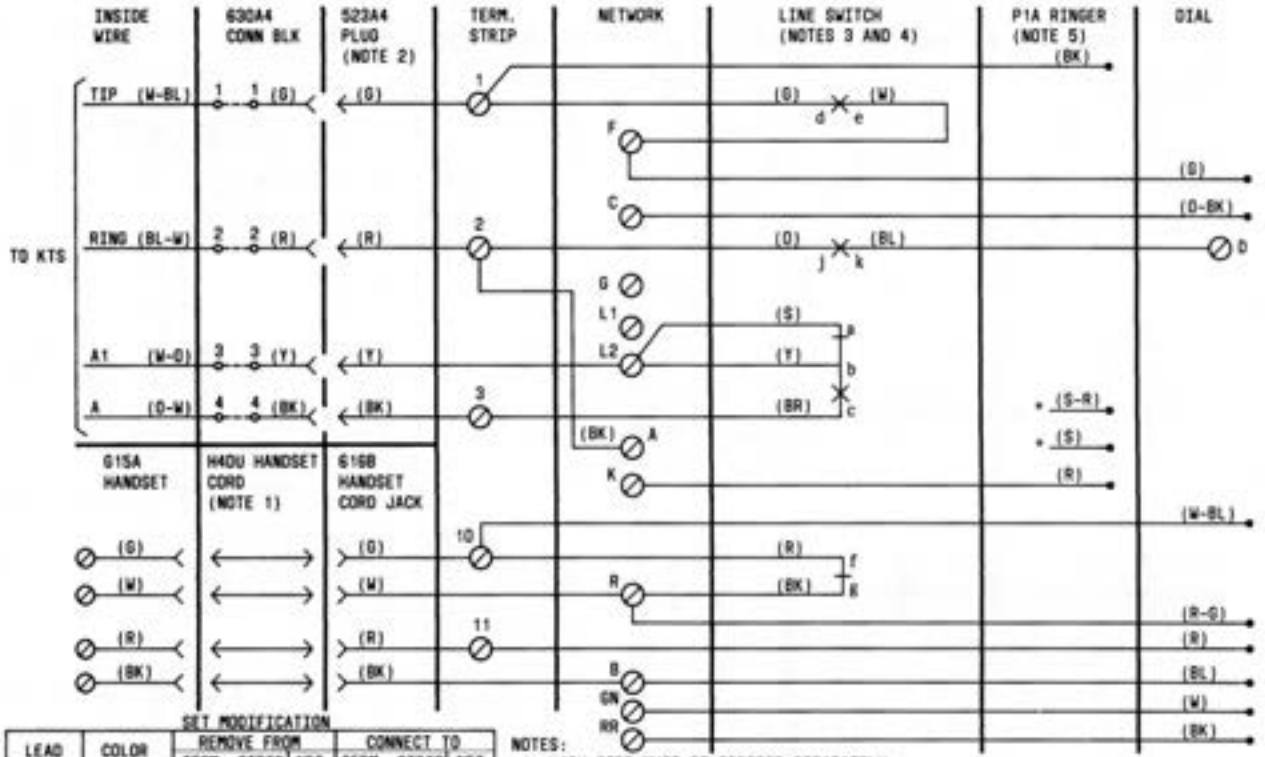

SET MODIFICATION

LEAD	COLOR	REMOVE FROM TERM. STRIP	REMOVE FROM NET.	CONNECT TO TERM. STRIP	CONNECT TO NET.
523A4 PLUG (NOTE 2)	G (TIP)			1	
	R (RING)			2	
	Y (A1)	3			L2
	BK (A)			3	
LINE SWITCH (NOTE 4)	S		A		L2
	Y	2			L2
	O		L2	2	
	BL		L2	D‡	
	BR	ST		3	

NOTES:
1. H4DU CORD MUST BE ORDERED SEPARATELY.
2. REPLACE 523A3 PLUG WITH 523A4 PLUG, ORDERED SEPARATELY.
3. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE "A" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH NOT RECOMMENDED).
4. IF SET DOES NOT HAVE (O) AND (BL) LINE SWITCH LEADS, CONNECT STRAP FROM TERMINAL 2 TO TERMINAL D ON DIAL.
5. WIRED FOR INDIVIDUAL OR BRIDGED RINGING.

* INSULATE AND STORE
† POLARITY GUARD TERMINAL
‡ DIAL TERMINAL

Fig. 14—▮2554BMP or 2554BMP-C Telephone Set Equipped With 401C Network and 72-Type Dial Modified for A-Lead Control▮

TCIU library: www.telephonecollectors.info

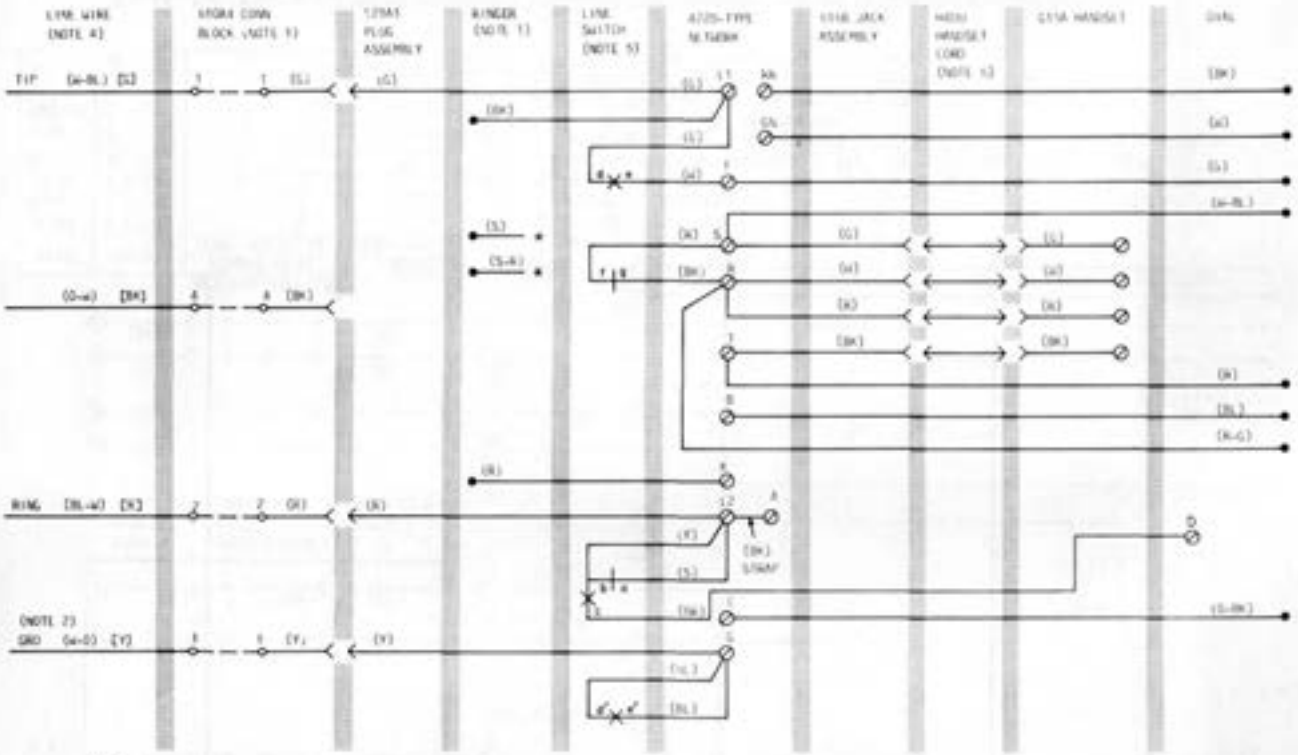

Fig. 15—2554BMP or 2554BMPG Telephone Set Equipped With 4228K Network, 72-Type Dial, and Connections

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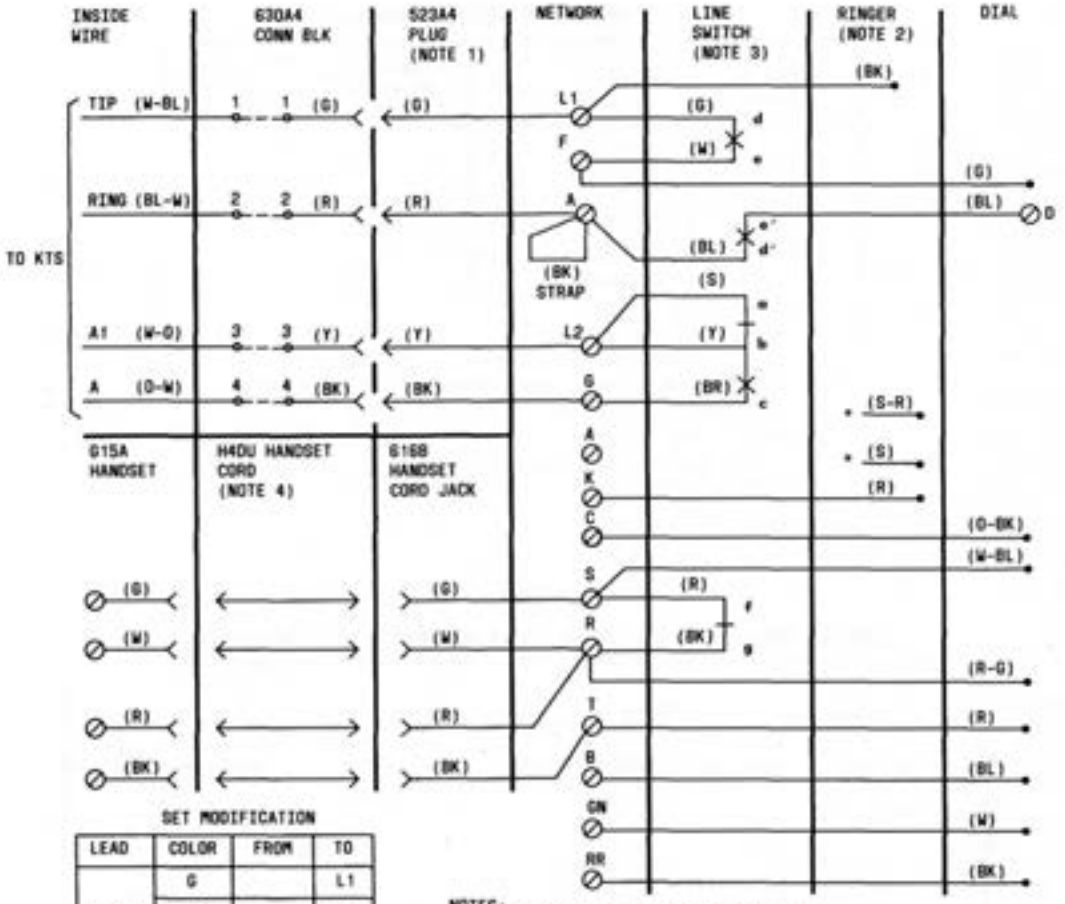

SET MODIFICATION

LEAD	COLOR	FROM	TO
523A4 PLUG	G		L1
	R		A
	Y		L2
	BK		G
LINE SWITCH	BR	D†	G
	BL	G	A
	BL	G	D†
STRAP	BK	L2	A

NOTES:
1. REPLACE 523A3 PLUG WITH 523A4 PLUG, ORDERED SEPARATELY.
2. WIRED FOR INDIVIDUAL OR BRIDGED RINGING.
3. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON-HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE "A" LEAD CONTACTS. (FIELD ADJUSTMENT OF LINE SWITCH NOT RECOMMENDED).
4. H4DU CORD MUST BE ORDERED SEPARATELY.

* INSULATE AND STORE
† DIAL TERMINAL

Fig. 16—▮2554BMP or 254BMPG Telephone Set Equipped 4228K Network and 72-Type Dial Modified for A-Lead Control▮

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TABLE A

POLARITY GUARD CONNECTIONS (SEE NOTE)

POLARITY GUARD	WIRE LEAD	COLOR	REMOVE FROM NET.	CONNECT TO	
				NET.	POLARITY GUARD
D-180190 (MD) and D-180547 (MD) Kit of Parts*	Line Switch	W	F		T
		BR	C		S
	Polarity Guard	G		F	
		W		C	
D-180896 Kit of Parts	Line Switch	W	F		T
		BR	C		S
	Polarity Guard	G		F	
		W		C	

Note: For use with 35-type dial when specified by local instructions for end-to-end signaling installation.

* D-180547 guard assembly is used only on sets with plug-in type baseplates. D-180190 guard assembly may be used on early version sets only.

TABLE B

LINE AND RINGER CONNECTIONS FOR SETS EQUIPPED WITH 4010D NETWORK

WIRE OR LEAD		COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY		
					NO. ID GROUND	ID GRD.	
						1000Ω	2650Ω
Line Wire or 523A3 Plug Assy Leads*	Tip	G	1	1	2	2	2
	Ring	R	2	2	1	1	1
	Grd	Y	3	3	3	3	3
Ringer Leads†		BK	1	3	3	3	3
		S	§	§	§	B	§
		S-R	§	§	§	§	B
Line Switch		W‡	F	F	C	C	C
		BR‡	C	C	F	F	F
BK Strap			2-A	2-A	2-A	A-A	A-A

* 523A3 plug assembly does not have a (BK) lead, if equipped, insulate and store lead.

† To silence ringer for all classes of service, refer to appropriate ringer section in Division 501.

‡ This change does not apply to sets equipped with a 35-type dial and polarity guard or 72-type dial (2554BMPG) sets.

§ Insulate and store.

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TABLE C

LINE AND RINGER CONNECTIONS FOR SETS EQUIPPED WITH 4228-TYPE NETWORK

WIRE OR LEAD		COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY		
					NO. ID GROUND	ID GRD.	
						1000Ω	2650Ω
Line Wire or 523A3 Plug Assy Leads*	Tip	G	L1	L1	L2	L2	L2
	Ring	R	L2	L2	L1	L1	L1
	Grd	Y	G	G	G	G	G
Ringer Leads†		BK	L1	G	G	G	G
		S	§	§	§	B	§
		S-R	§	§	§	§	B
Line Switch		W‡	F	F	C	C	C
		S	L2¶	L2¶	L2¶	A	A
		BR‡	C	C	F	F	F
BK Strap			L2-A	L2-A	L2-A	A-A	A-A

* 523A3 plug assembly does not have a (BK) lead.

† To silence ringer for all classes of service, refer to appropriate ringer section in Division 501.

‡ This change does not apply to sets equipped with a 35-type dial and polarity guard or 72-type dial (2554BMPG) sets.

§ Insulate and store.

¶ On early version sets (S) line switch lead is connected to A of network.

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♦TABLE D♦

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL IN 2554BMP OR 2554BMPG TELEPHONE SET NON-KTS

WIRE OR LEAD	COLOR	REMOVE FROM NET. TERM. OR TERM. STRIP (35-TYPE DIAL)	CONNECT TO NET. TERM. OR TERM. STRIP (72-TYPE DIAL)
Dial	W	GN	GN
	W-BL	10 or S	10 or S
	O-BK	C	C
	BK	RR	RR
	R	11 or T	11 or T
	BL	B	B
	R-G	R	R
	G	F	F
Line Switch	BR	C or S†	D‡
	W	F or T†	F
616-Type Handset Cord Jack	R	T or 11	R
	BK	B	T
Polarity Guard*	G	F	—
	W	C	—

* Polarity guard should be removed from telephone set.

† Polarity guard terminal.

‡ 72-type dial terminal.

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SERVICE

502A/B AND 502BM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 502A/B (MD) and 502BM telephone sets.

1.02 Reissued to:

- Show 502A/B (MD)
- Revise Fig. 2, Note 6.

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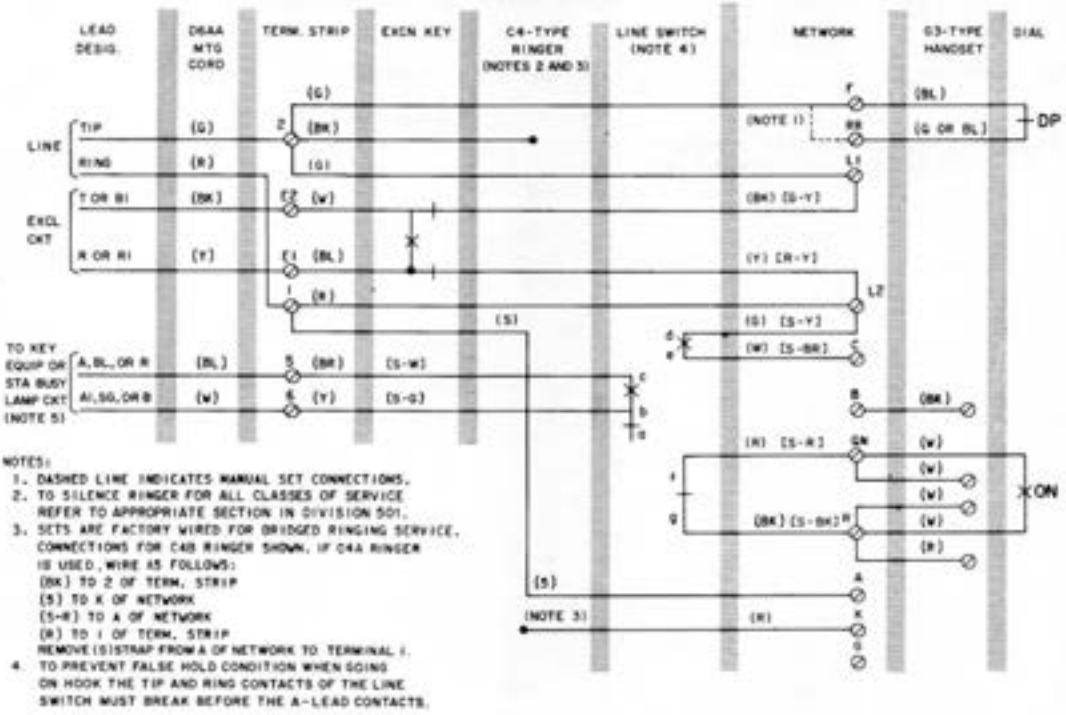

NOTES:
1. DASHED LINE INDICATES MANUAL SET CONNECTIONS.
2. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
3. SETS ARE FACTORY WIRED FOR BRIDGED RINGING SERVICE. CONNECTIONS FOR C4B RINGER SHOWN. IF C4A RINGER IS USED, WIRE AS FOLLOWS:
   (BK) TO 2 OF TERM. STRIP
   (S) TO K OF NETWORK
   (S-R) TO A OF NETWORK
   (R) TO 1 OF TERM. STRIP
   REMOVE (S) STRAP FROM A OF NETWORK TO TERMINAL 1.
4. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON HOOK THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE THE A-LEAD CONTACTS.

DP - DIAL PULSE CONTACTS
ON - DIAL OFF-NORMAL CONTACTS
{ } - CURRENT COLOR CODE
[ ] - NO COLOR CODE

Fig. 1—▮502A/B (MD) Telephone Set, Connections▮

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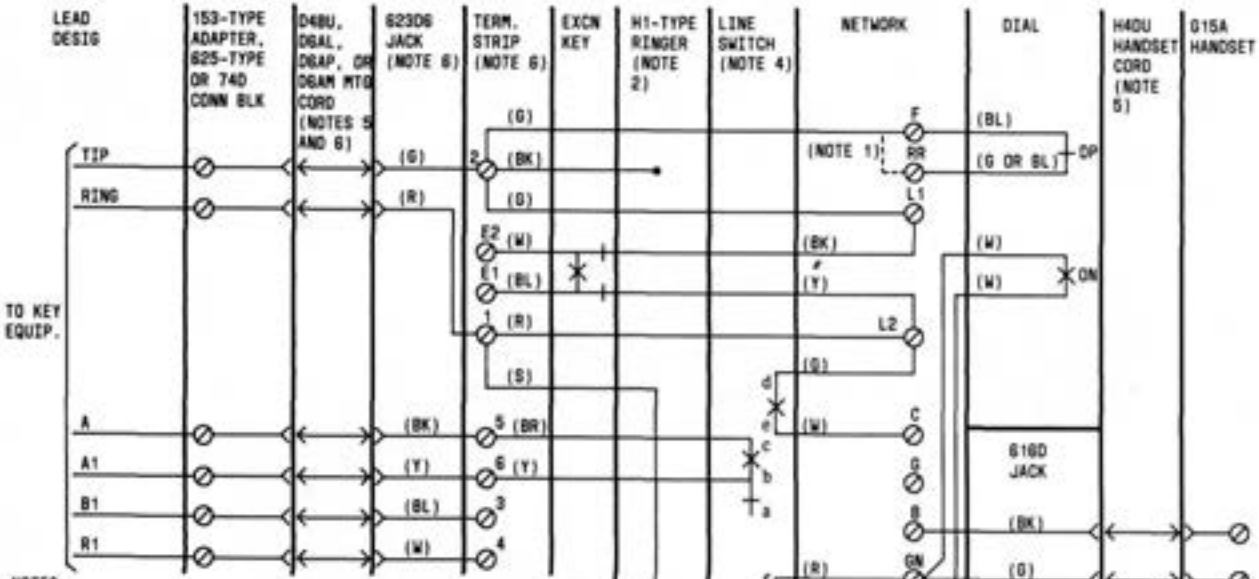

NOTES:
1. DASHED LINE INDICATES MANUAL SET CONNECTIONS.
2. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
3. SETS ARE FACTORY WIRED FOR BRIDGED RINGING SERVICE.
4. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON HOOK THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE A-LEAD CONTACTS BREAK.
5. MUST BE ORDERED SEPARATELY.
6. TO PROVIDE EXCLUSION A D-180B1D KIT OF PARTS (641D JACK AND MOUNTING BRACKET) MUST BE INSTALLED TO ALLOW USE OF A D8AA MOUNTING CORD WITH A 635-TYPE CONNECTING BLOCK. THE 641D JACK CONNECTIONS ARE SHOWN IN TABLE.

DP - DIAL PULSE CONTACTS
ON - DIAL OFF-NORMAL CONTACTS
* - INSULATED AND STORED

COLOR	SET TERMINAL
BL-W	1
W-BL	2
O-W	3
W-G	4
W-O	5
O-W	6
BR-W	E1
W-BR	E2

Fig. 3 - 665DBN Telephone Set Connections

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SERVICE

510A, B, E, F, AND FM TELEPHONE SETS

1. GENERAL

1.01 Reissued to:

- Show 510A, B, E, and F telephone sets MD
- Delete information on 510AM, BM, and EM telephone sets (never manufactured)

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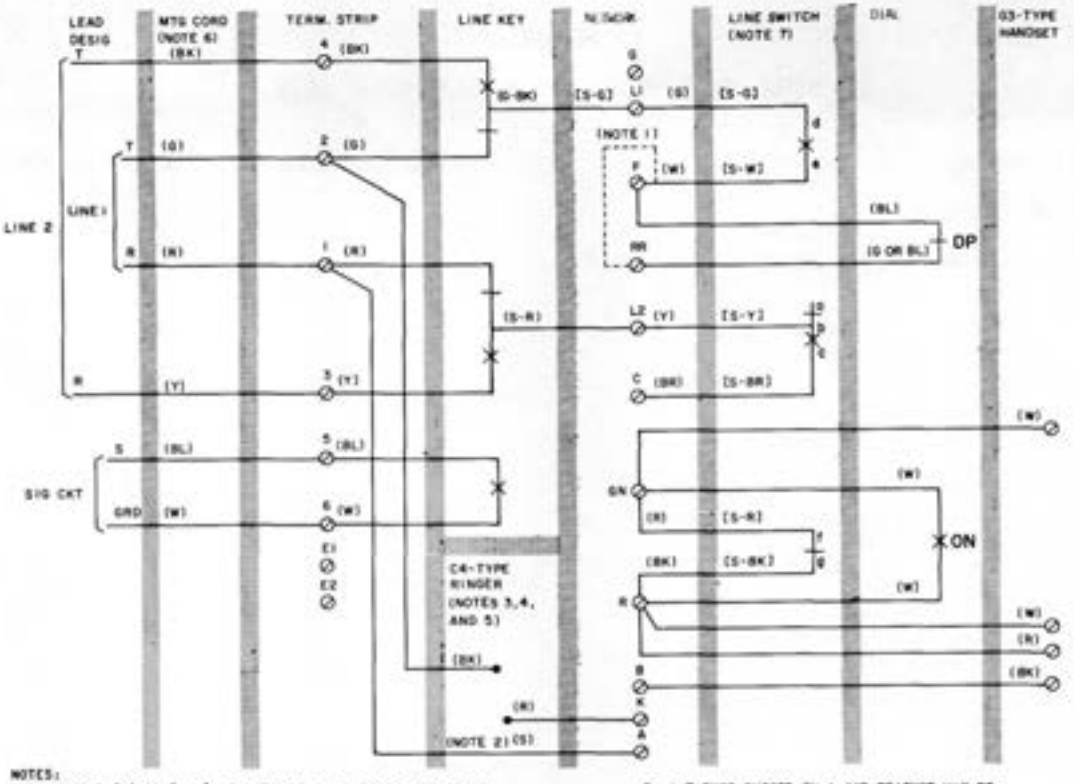

NOTES:

1. CONNECT (W) OR [S-W] LEAD TO TERMINAL RR OF NETWORK IN MANUAL SETS.
2. SETS ARE FACTORY WIRED FOR BRIDGED RINGING SERVICE. CONNECTIONS FOR C4B RINGER SHOWN. CONNECTIONS FOR C4A RINGER (USED ON 510 A/B) AS FOLLOWS:
   (BK) TO 2 OF TERM. STRIP
   (S) TO K OF NETWORK
   (S-R) TO A OF NETWORK
   (R) TO 1 OF TERM. STRIP
   REMOVE (S) STRAP FROM A OF NETWORK AND 1 OF TERM. STRIP.
3. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
4. RINGER CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, CONNECT (BK) RINGER LEAD AND (S) STRAP LEAD TO TERMINALS 4 AND 3 RESPECTIVELY.
5. A 7-TYPE BUZZER ON A 44B BRACKET MAY BE SUBSTITUTED FOR THE RINGER AS A COMMON OR PRIVATE LINE AUDIBLE SIGNAL.
6. 510A AND B SETS ARE EQUIPPED WITH D4BJ OR D4BK MTG CORD WHICH DOES NOT PROVIDE SIGNAL CKT LEADS. 510E AND F SETS ARE EQUIPPED WITH D6AA MTG CORD.
7. LINE SWITCH SEQUENCE, HANDSET REMOVED:
   bc - MAKES
   de - MAKES
   ab - BREAKS
   fg - BREAKS

DP - DIAL PULSE CONTACTS
ON - DIAL OFF-NORMAL CONTACTS
( ) - CURRENT COLOR CODE
[ ] - MD COLOR CODE

Fig. 1—510A (MD), B (MD), E (MD), and F (MD) Telephone Sets, Connections

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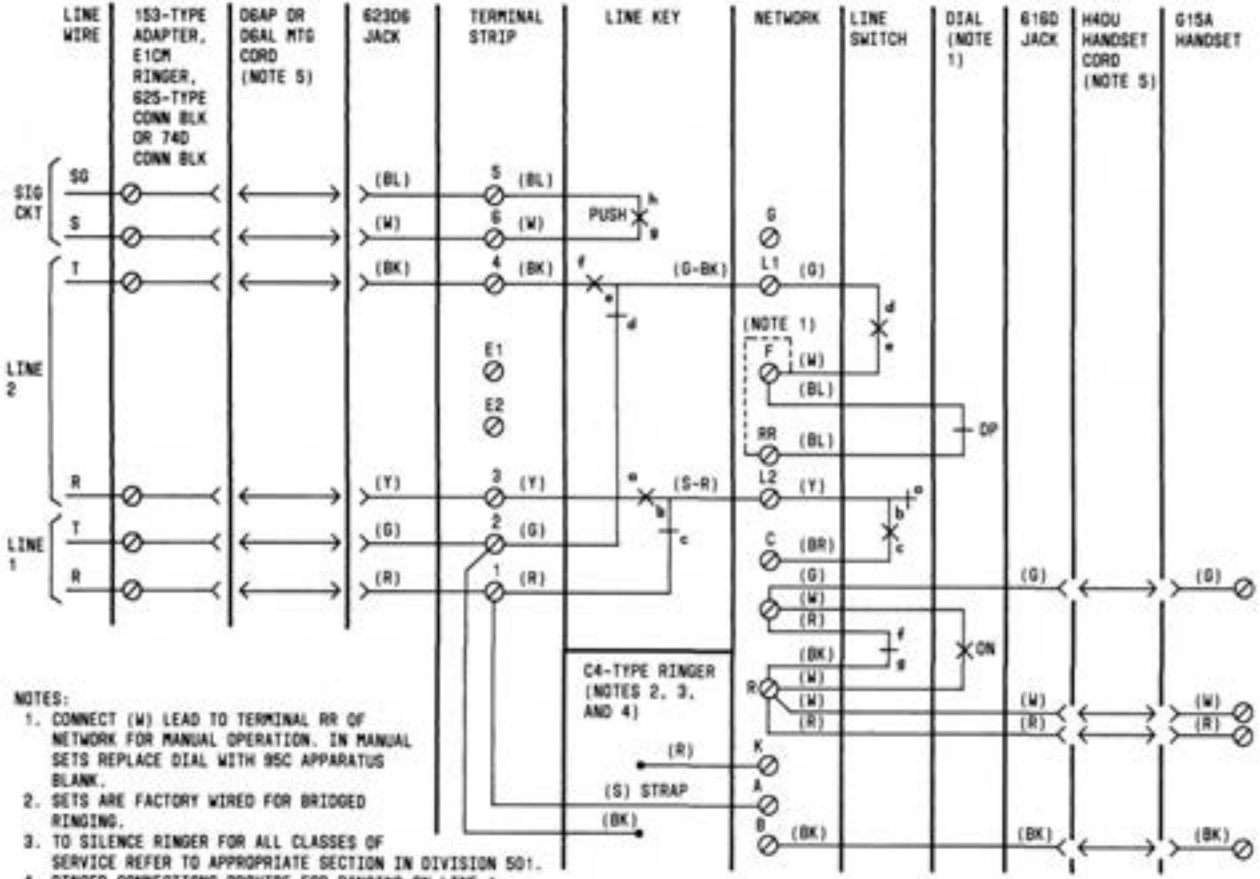

Fig. 3 - 2500-Type Telephone Set, Connections

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SERVICE

511F, 511H, AND 511HM TELEPHONE SETS

1. GENERAL

1.01 Reissued to:

- Show 511F and 511H telephone sets MD
- Delete 511FM telephone set information (never manufactured)
- Change mounting cord on 511HM telephone set, Fig. 2.

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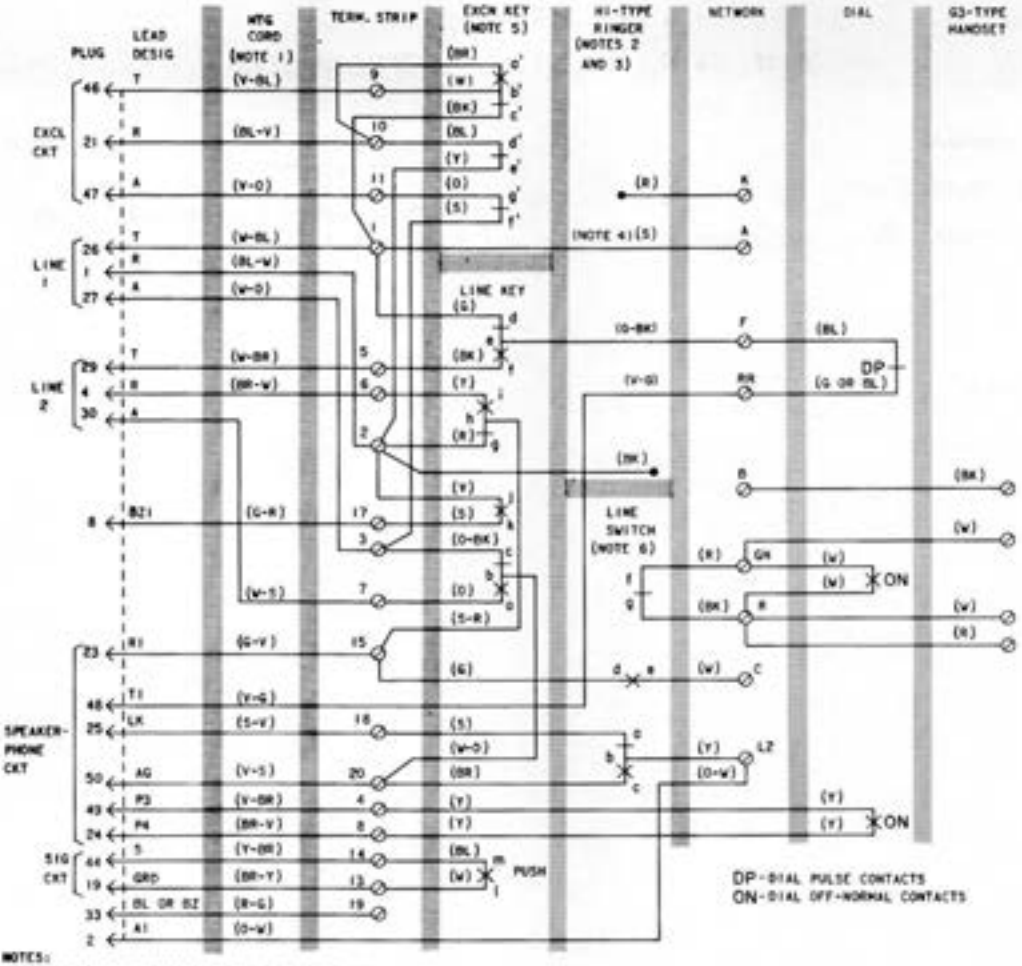

NOTES:

1. D20K MOUNTING CORD FOR 511H TELEPHONE SET SHOWN. 511F TELEPHONE SET IS IDENTICAL EXCEPT EQUIPPED WITH D20J SPADE-TIPPED MOUNTING CORD.
2. CONNECTIONS SHOWN PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, MOVE (S) STRAP LEAD FROM TERMINAL 1 TO TERMINAL 5 AND (BK) RINGER LEAD FROM TERMINAL 2 TO TERMINAL 6.
3. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
4. SETS ARE FACTORY WIRED FOR BRIDGED RINGING SERVICE.

CONNECTIONS FOR H1B RINGER SHOWN. IF H1A RINGER IS USED WIRE AS FOLLOWS: (BK) TO 2 OF TERMINAL STRIP, (S) TO K OF NETWORK, (S-R) TO A OF NETWORK, (R) TO 1 OF TERMINAL STRIP. REMOVE (S) STRAP BETWEEN A OF NETWORK AND 1 OF TERM STRIP.

5. CONNECTIONS SHOWN PROVIDE FOR EXCLUSION ON LINE 1. FOR EXCLUSION ON LINE 2, CONNECT (BK), (Y), AND (S) EXCLUSION SWITCH LEADS TO TERMINALS 5, 6, AND 7, RESPECTIVELY.
6. LINE SWITCH SEQUENCE, HANDSET REMOVED:
   bc- MAKES ab- BREAKS
   de- MAKES fg- BREAKS

Fig. 1—511F (MD) and H (MD) Telephone Sets, Connections

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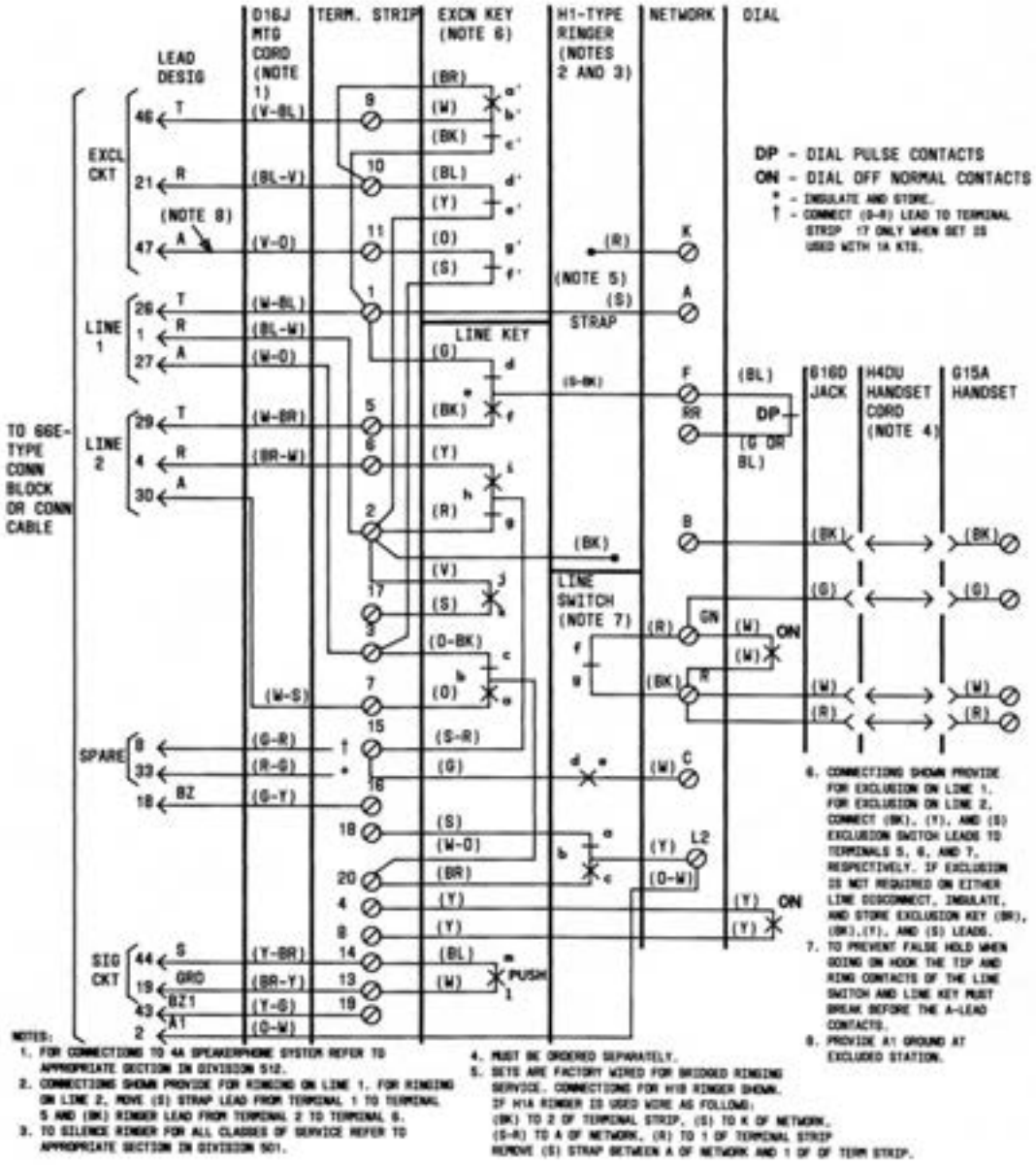

Fig. 2—1511HM Telephone Set, Connections

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SERVICE

515B AND 515BM TELEPHONE SETS

1. GENERAL

1.01 Reissued to:

- Show 515B telephone set MD
- Add modular mounting cord and jack to 515BM telephone set

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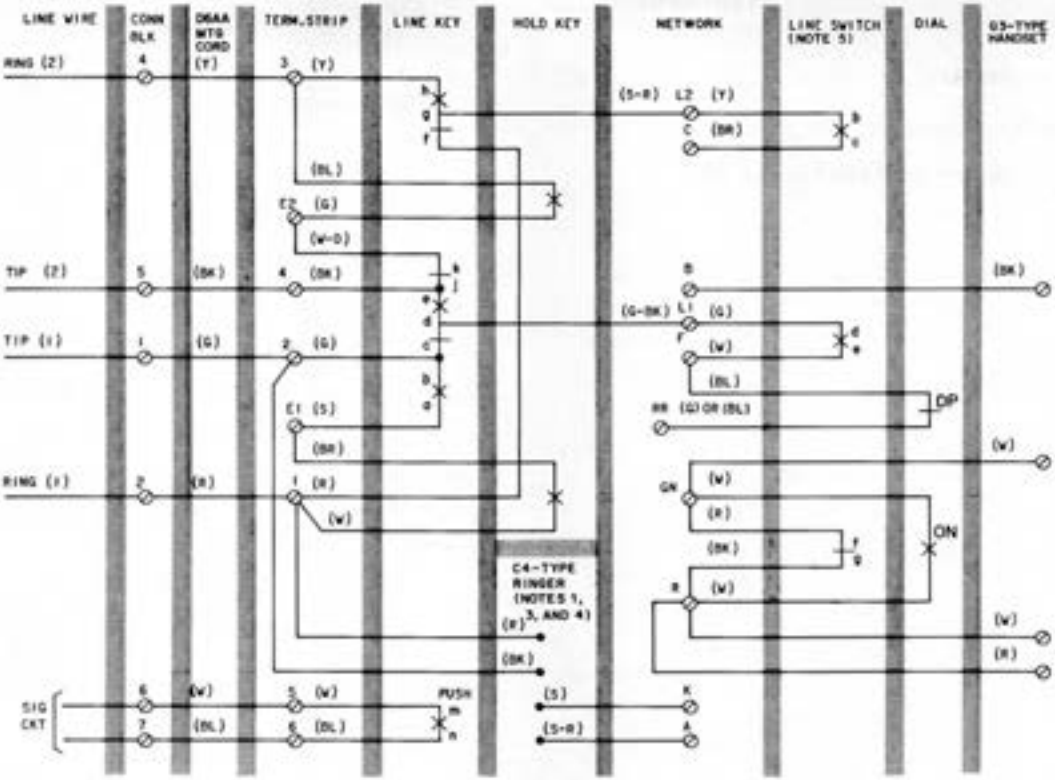

NOTES:

1. RINGER CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE Z, CONNECT (R) AND (BK) RINGER LEADS TO TERMINALS 3 AND 4 RESPECTIVELY.
2. SUBSCRIBER INSTRUCTION BOOKLET SIB-2430 SHIPPED LOOSE WITH SET SHOULD BE EXPLAINED AND LEFT WITH CUSTOMER FOR PROPER OPERATION OF LINE AND HOLD KEY.
3. SETS ARE FACTORY WIRED TO PROVIDE BRIDGED RINGING SERVICE.
4. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
5. LINE SWITCH SEQUENCE, HANDSET REMOVED:
   bc-MAKES de-MAKES fg-BREAKS
   DP- DIAL PULSE CONTACTS ON- DIAL OFF-NORMAL CONTACTS

Fig. 1—515B (MD) Telephone Set, Connections

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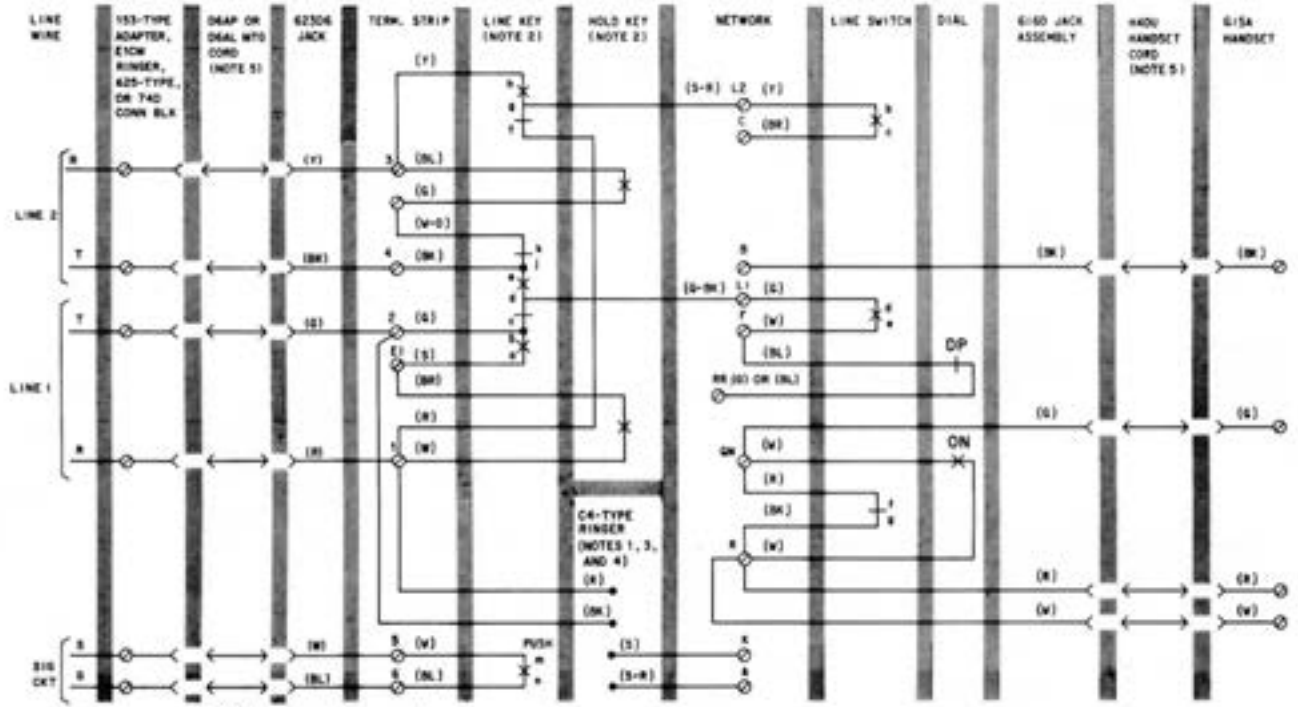

Fig. 2—▮515BM Telephone Set, Connections▮

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SERVICE

555B, 555BM, AND 555BMP TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 555B (MD), 555BM (MD), and 555BMP telephone sets.

1.02 Reissued to:

- Show 555B and 555BM telephone sets MD
- Update connection information, Fig. 1, 2, and 3.

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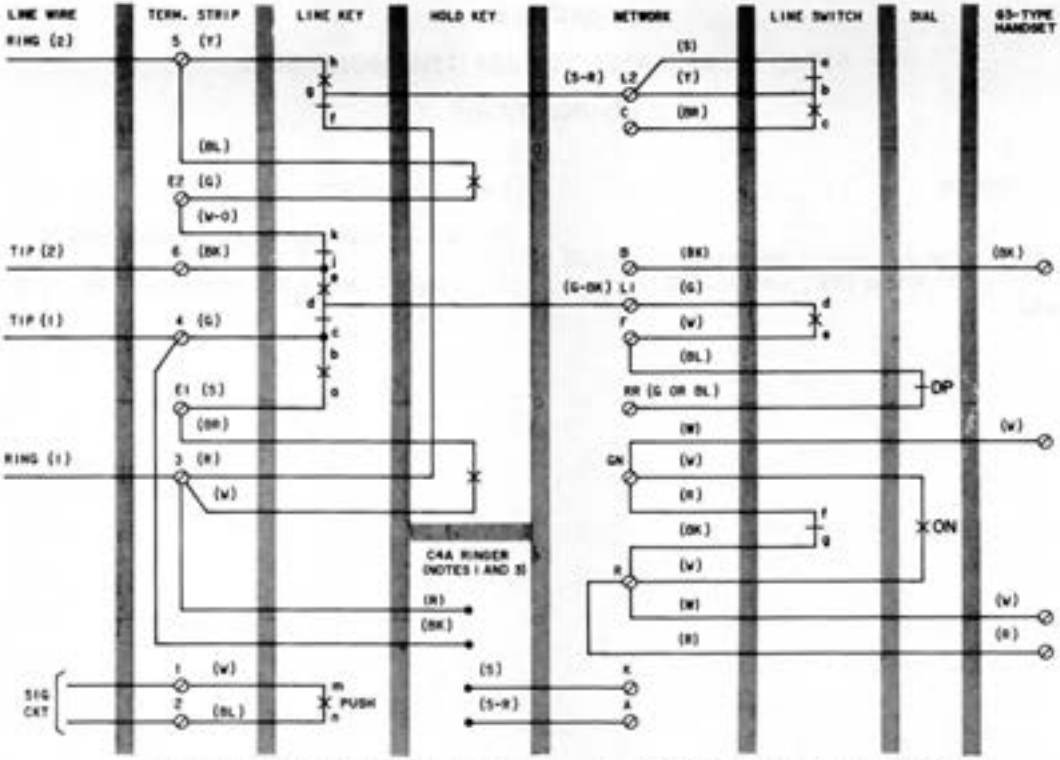

1. SETS ARE FACTORY WIRED TO PROVIDE BRIDGED RINGING SERVICE. RINGER CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, CONNECT (R) AND (BK) RINGER LEADS TO TERMINALS 5 AND 6 RESPECTIVELY.
2. SUBSCRIBER INSTRUCTION BOOKLET SIB-2430 SHIPPED LOOSE WITH SET SHOULD BE EXPLAINED AND LEFT WITH CUSTOMER FOR PROPER OPERATION OF LINE AND HOLD KEY.
3. TO SILENCE RINGER PERMANENTLY, REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.

DP - DIAL PULSE CONTACTS
ON - DIAL OFF-NORMAL CONTACTS

Fig. 1—Ø555B (MD) Telephone Set, ConnectionsØ

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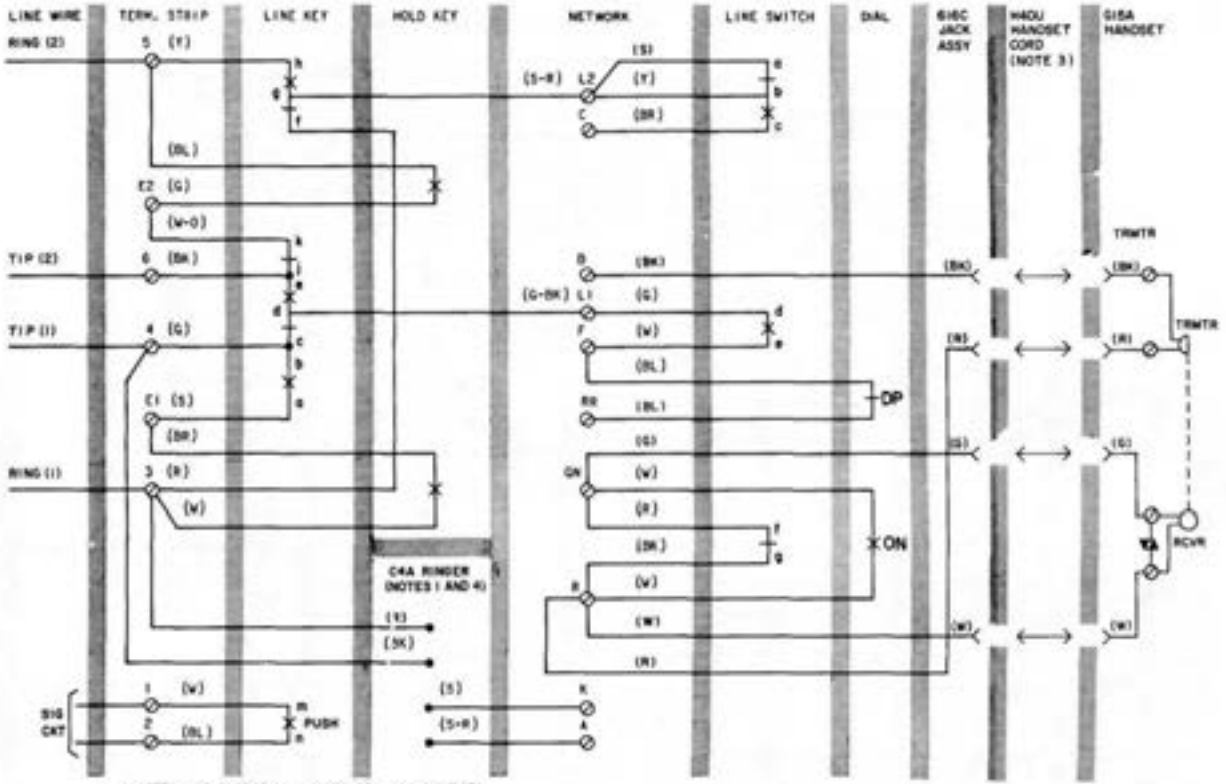

1. SETS ARE FACTORY WIRED TO PROVIDE BRIDGED RINGING SERVICE. RINGER CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, CONNECT (R) AND (BK) RINGER LEADS TO TERMINALS 5 AND 6 RESPECTIVELY.
2. SUBSCRIBER INSTRUCTION BOOKLET SIB-2430 SHIPPED LOOSE WITH SET SHOULD BE EXPLAINED AND LEFT WITH CUSTOMER FOR PROPER OPERATION OF LINE AND HOLD KEY.
3. H40U CORD MUST BE ORDERED SEPARATELY.
4. TO SILENCE RINGER PERMANENTLY, REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.

DP – DIAL PULSE CONTACTS
ON – DIAL OFF-NORMAL CONTACTS

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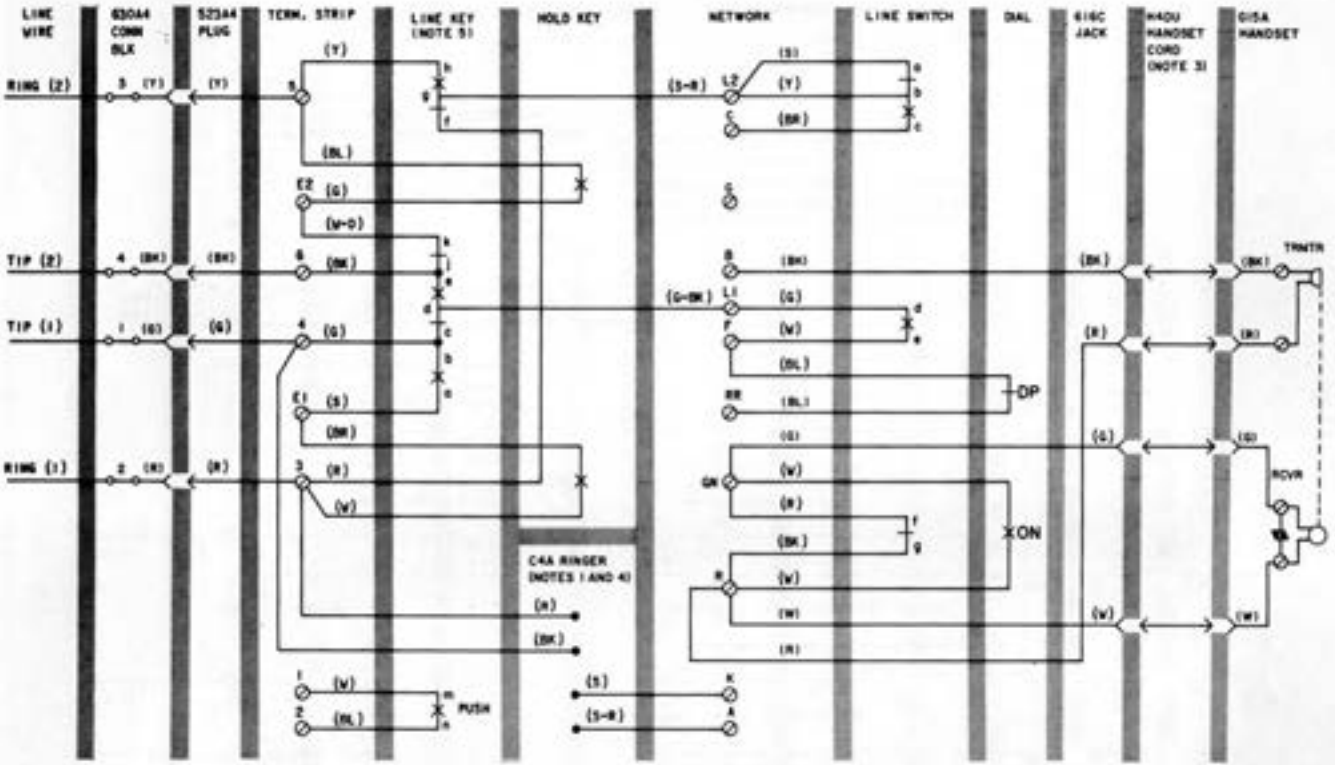
Fig. 2—#555BM (MD) Telephone Set, Connections



NOTES:
1. SETS ARE FACTORY WIRED TO PROVIDE BRIDGED RINGING SERVICE. RINGER CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, CONNECT (R) AND (BK) RINGER LEAD TO TERMINALS 5 AND 6 RESPECTIVELY.
2. SUBSCRIBER INSTRUCTION BOOKLET SIB-2430 SHIPPED LOOSE WITH SET SHOULD BE EXPLAINED AND LEFT WITH CUSTOMER FOR PROPER OPERATION OF LINE AND HOLD KEY.
3. H4DU CORD MUST BE ORDERED SEPARATELY.
4. TO SILENCE RINGER PERMANENTLY, REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.
5. LOCAL SIGNALING THROUGH m-n CONTACTS OF LINE KEY NOT AVAILABLE DUE TO INSUFFICIENT LINE WIRE CONDUCTORS.

DP DIAL PULSE CONTACTS.
ON DIAL OFF-NORMAL CONTACTS

Fig. 3—▮555BMP Telephone Set, Connections▮

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SERVICE

558F AND 558FM TELEPHONE SETS

1. GENERAL

1.01 Reissued to:

- Show 558F telephone set MD
- Add Tables A and B
- Add D16J-87 mounting cord, Fig. 2

♦TABLE A♦

558F(MD) OR 558FM MODIFICATIONS FOR 1-LINE PICKUP, HOLD, AND SECRETARIAL SERVICE

WIRE OR LEAD	COLOR	REMOVE FROM TERM. STRIP	CONNECT TO TERM. STRIP
Line Key	W-O	20	1
Exclusion Key (Hold)	BR	10	2
	W	9	1
	Y	2	*
D16J Mounting Cord	Y-BL	9	7
	BL-V	10	17
	Y-O	11	*
	W-O	3	*
	W-S	7	*
	O-W	4	*

* Insulate and store.

♦TABLE B♦

558F(MD) OR 558FM MODIFICATIONS FOR 1-LINE PICKUP AND CUTOFF OF EXTENSION STATION OR EXTENSION LINE RINGER

WIRE OR LEAD	COLOR	REMOVE FROM TERM. STRIP	CONNECT TO TERM. STRIP
Line Key	R	2	*
	S-R	15	2
	O-BK	3	*
	W-O	20	3
Exclusion Key	Y	2	*
Line Switch	G	15	2
Strap M1W Cord or Equivalent			1 to F on Net.
			3 to 20
D16J Mounting Cord	Y-BL	9	*
	BL-V	10	*
	V-O	11	*

* Insulate and store.

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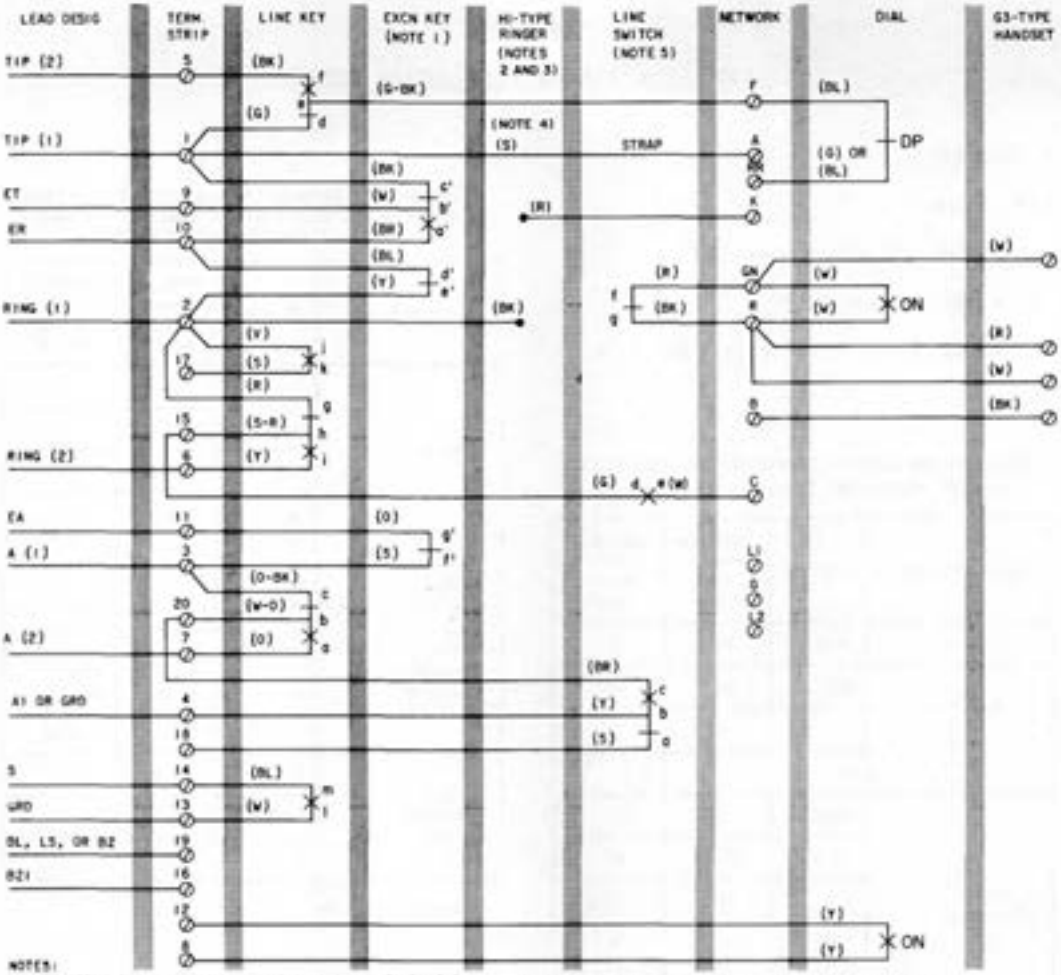

NOTES:

1. TO PROVIDE EXCLUSION FOR LINE 2, CONNECT (BK), (Y), AND (S) EXCLUSION KEY LEADS TO TERMINALS 5, 6, AND 7 RESPECTIVELY.
2. FOR RINGING ON LINE 2, TRANSFER (S) STRAP LEAD AND (BK) RINGER LEADS TO TERMINALS 5 AND 6 RESPECTIVELY.
3. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
4. SET IS FACTORY WIRED FOR BRIDGED RINGING SERVICE. CONNECTIONS FOR HIB RINGER SHOWN IF HIA RINGER IS USED WIRE AS FOLLOWS:
   (BK) TO 2 OF TERM. STRIP — (S-R) TO A OF NETWORK
   (S) TO K OF NETWORK — (R) TO 1 OF TERM STRIP
   REMOVE (S) STRAP FROM A OF NETWORK AND 1 OF TERM STRIP
5. TO PREVENT FALSE HOLD WHEN GOING ON HOOK THE TIP AND RING CONTACTS OF THE LINE SWITCH AND LINE KEY MUST BREAK BEFORE THE A-LEAD CONTACTS.

DP- DIAL PULSE CONTACTS

ON- DIAL OFF-NORMAL CONTACTS

Fig. 1—558F Telephone Set Connections Wired for 2-Line Pickup With Exclusion on Line 1, Signaling, and Speakerphone (Factory Wired)

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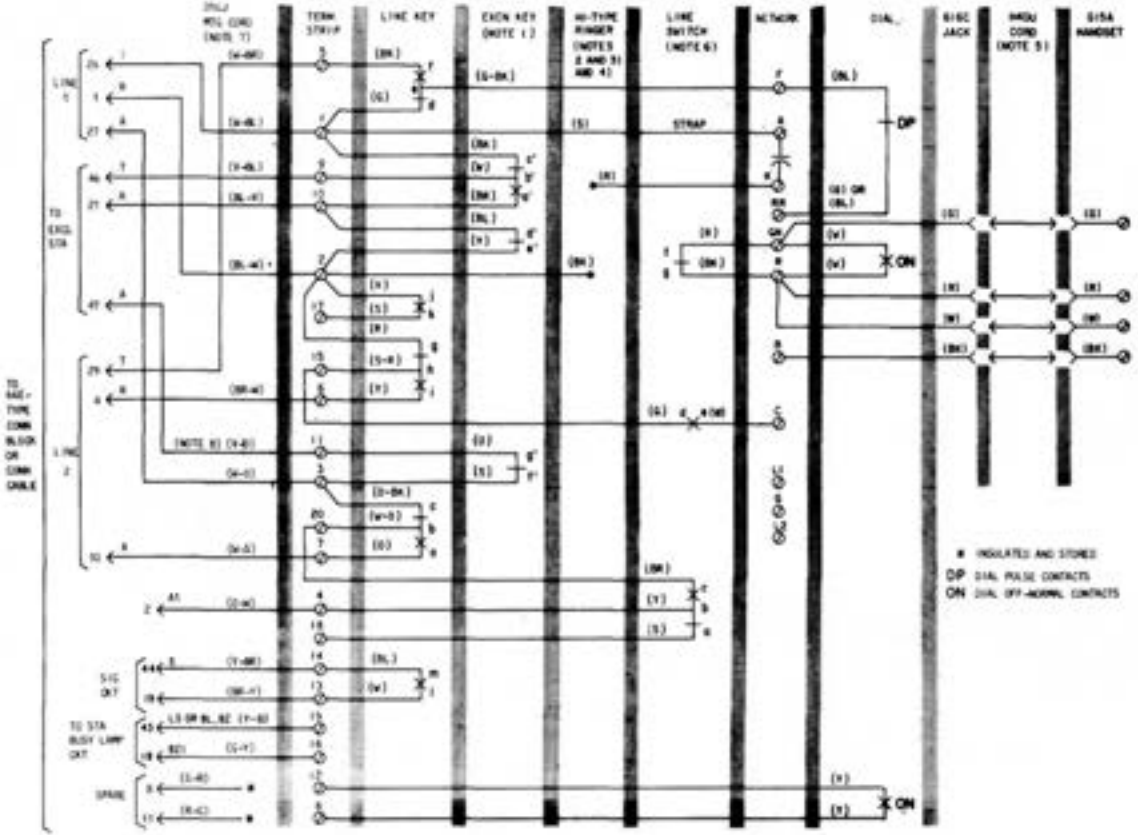

NOTES:

1. TO PROVIDE EXCLUSION FOR LINE 2, CONNECT (BK), (Y), AND (S) EXCLUSION KEY LEADS TO TERMINALS 9, 6 AND 7 RESPECTIVELY. IF EXCLUSION IS NOT REQUIRED ON EITHER LINE DISCONNECT, INSULATE, AND STORE EXCLUSION KEY (BK), (BK), (Y), AND (S) LEADS.
2. FOR RINGING ON LINE 2, TRANSFER (S) STRAP LEAD AND (BK) RINGER LEADS TO TERMINAL 9 AND 6 RESPECTIVELY.
3. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
4. SET IS FACTORY WIRED FOR BRIDGED RINGING SERVICE CONNECTIONS FOR 418 RINGER SHOWN.
5. MUST BE ORDERED SEPARATELY.
6. TO PREVENT FALSE HOLD CONDITION WHEN GOING ON HOOK THE TIP AND RING CONTACTS OF THE LINE SWITCH AND LINE KEY MUST BREAK BEFORE THE 6-LEAD CONTACTS.
7. FOR SET CONNECTIONS TO 4A SPEAKERPHONE SYSTEM REFER TO APPROPRIATE SECTION IN DIVISION 512.
8. PROVIDE 81 GROUND AT EXCLUDED STATION.

Fig. 2—558FM Telephone Set Connections Wired for Exclusion on Line 1, Signaling, and Speakerphone (Factory Wired)

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SERVICE

2502B, 2502BM, AND 2502BMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2502B (MD), 2502BM, and 2502BMG telephone sets (Fig. 1, 2, and 3). These sets are factory wired for exclusion and A-lead control.

1.02 This section is being reissued to add information on the 2502BMG telephone set equipped with 72-type dial. Revision arrows are used to emphasize the more significant changes.

2. CONNECTIONS

2.01 ◗When a polarity guard is required in the 2502B (MD) or 2502BM telephone set, install a D-180896 Kit of Parts as shown in Table A. This polarity guard kit is a direct replacement for the 819040528 (P-90D052) (MD) guard assembly.

2.02 The 2502BMG telephone set is furnished equipped with a 72-type dial which contains a polarity guard eliminating the possibility of improper operations due to line reversals.

2.03 Refer to Table B or C for modifications when replacing 35-type dial with a 72-type dial in 2502BM telephone set.◖

◗TABLE A◖

POLARITY GUARD CONNECTIONS
[819040528 (P-90D052) GUARD ASSEMBLY OR 840364202 (D-180896) KIT OF PARTS POLARITY GUARD , SEE NOTE]

LEAD	COLOR	FROM REMOVE	CONNECT TO	
		NET.	POLARITY GUARD	NET.
Strap*	G	F	T	
Line Switch	W	C	S	
Polarity Guard	W			C
	G			F

Note: For use only with 35-type dial when specified by local instructions for end-to-end signaling installations.
*This strap is connected between terminal 2 and terminal F on network.

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TABLE B

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL IN 2502BM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	W	C	D*
616D Jack (Handset)	R	T	R
	BK	B	T

*72-type dial terminal.

TABLE C

MODIFICATION TO REPLACE 35-TYPE DIAL AND POLARITY GUARD WIH 72-TYPE DIAL IN 2502BM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
Strap*	G	T‡	F
Line Switch	W	S‡	D‡
616D Jack	R	T	R
	BK	B	T
Polarity Guard†	G	F	—
	W	C	—

*This strap is connected between terminal 2 and terminal F on network.
†Polarity guard should be removed from telephone set.
‡Polarity guard terminal.
§72-type dial terminal.

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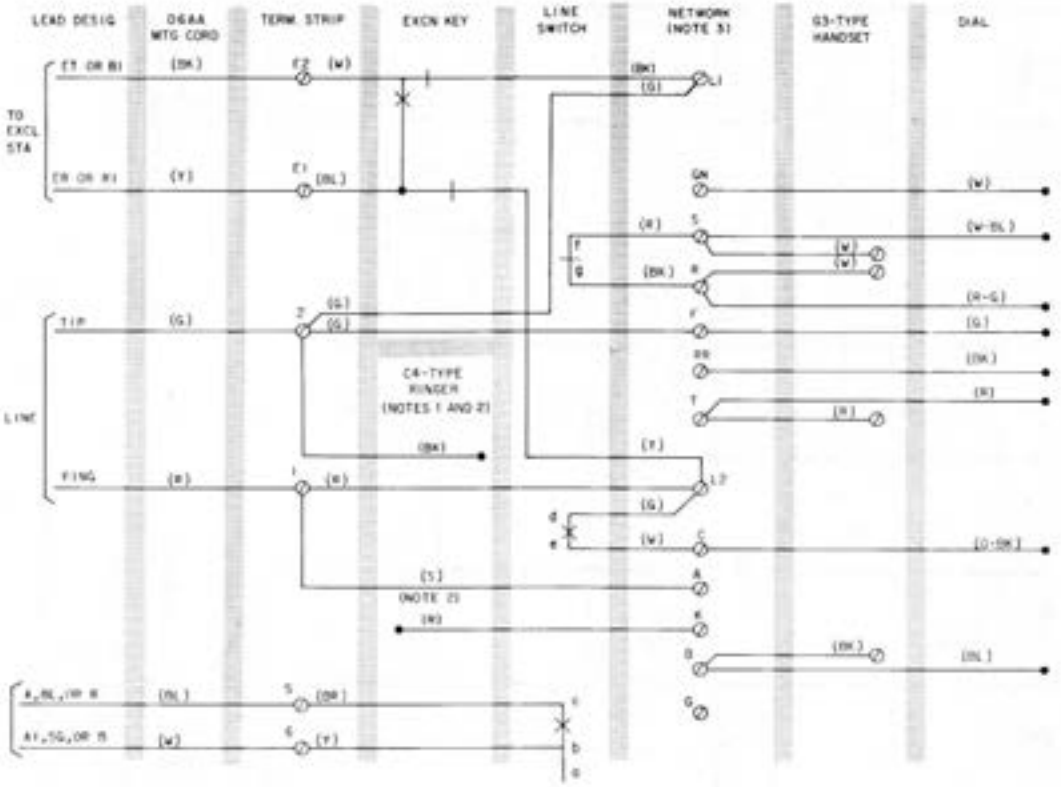

NOTES:

1. SETS ARE FACTORY WIRED FOR BRIDGED RINGING SERVICE. CONNECTIONS FOR C4B RINGER SHOWN. IF C4A RINGER IS USED WIRE AS FOLLOWS
   (BK) TO 2 OF TERM. STRIP (S-R) TO A OF NETWORK
   (S) TO K OF NETWORK (R) TO 1 OF TERM. STRIP
   REMOVE (S) STRAP FROM A OF NETWORK TO TERMINAL 1.
2. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
3. ON SETS EQUIPPED WITH A 425G NETWORK, THE LEADS SHOWN CONNECTED TO THE S AND T TERMINALS SHOULD BE CONNECTED TO TERMINALS 3 AND 4 RESPECTIVELY ON THE TERMINAL STRIP.

Fig. 1—2502B (MD) Telephone Set, Connections (Factory-Wired)

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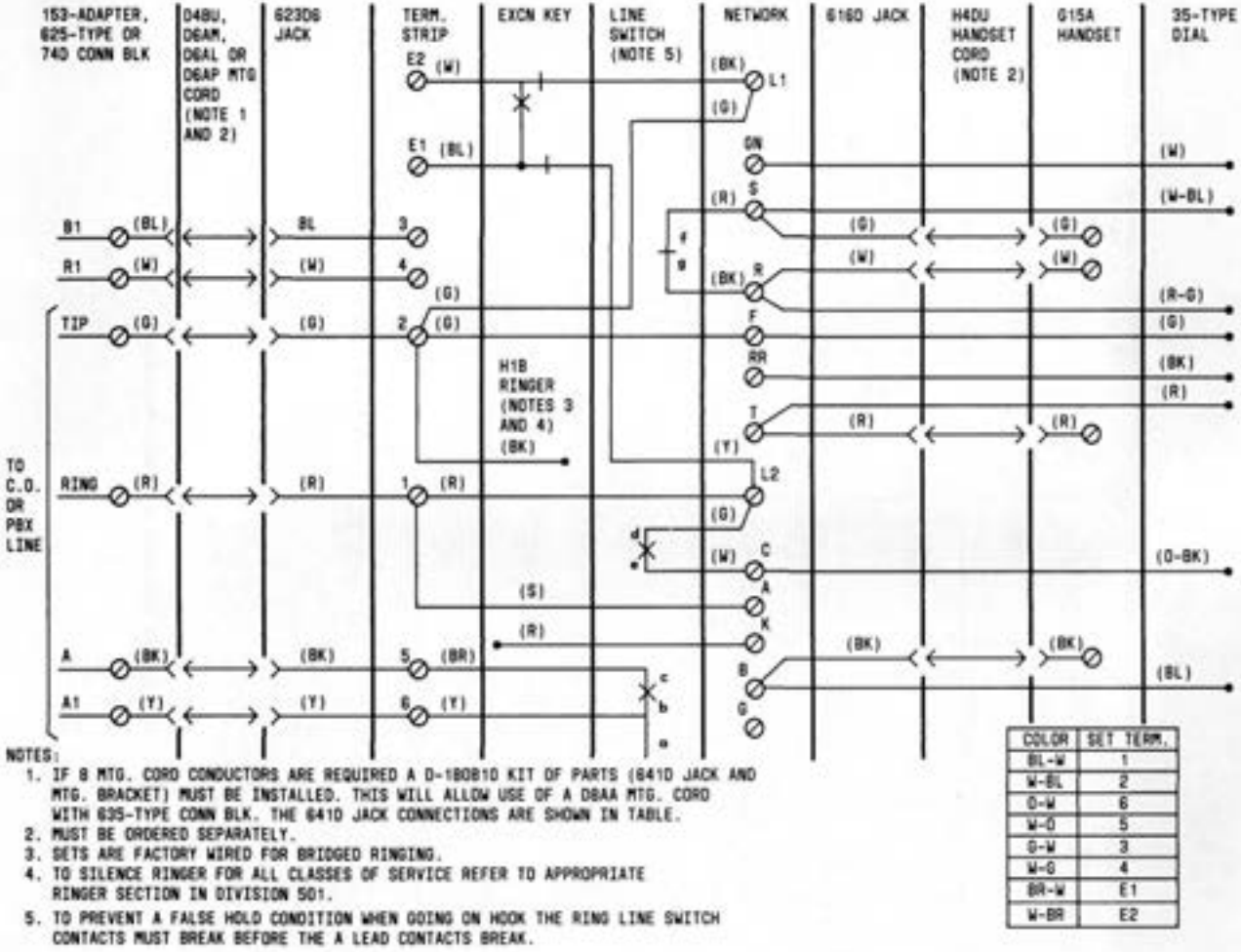

Fig. 2—▶2502BM Telephone Set, Connections (Factory Wired)◀

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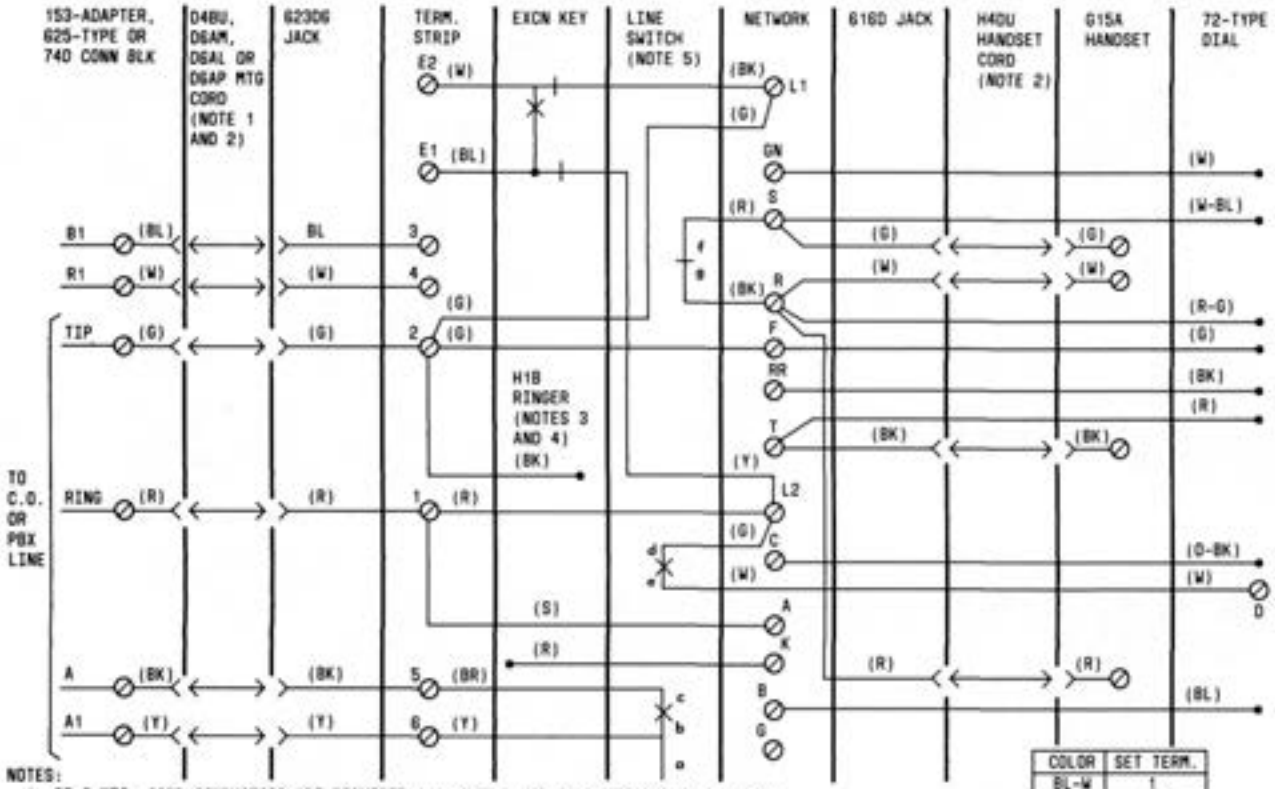

NOTES:

1. IF 8 MTG. CORD CONDUCTORS ARE REQUIRED A D-180810 KIT OF PARTS (641D JACK AND MTG. BRACKET) MUST BE INSTALLED. THIS WILL ALLOW USE OF A D8AA MTG. CORD WITH 635-TYPE CONN BLK. THE 641D JACK CONNECTIONS ARE SHOWN IN TABLE.
2. MUST BE ORDERED SEPARATELY.
3. SETS ARE FACTORY WIRED FOR BRIDGED RINGING.
4. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.
5. TO PREVENT A FALSE HOLD CONDITION WHEN GOING ON HOOK THE RING LINE SWITCH CONTACTS MUST BREAK BEFORE THE A LEAD CONTACTS BREAK.

COLOR	SET TERM.
BL-W	1
W-BL	2
O-W	6
W-O	5
O-W	3
W-G	4
BR-W	E1
W-BR	E2

Fig. 3—[illegible] Telephone Set, Connections (Factory Wired)

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SERVICE

2510F, 2510FM, AND 2510FMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2510F (MD), 2510FM, and 2510FMG telephone sets (Fig. 1, 2, and 3). These sets are factory wired for two line pickup and signaling.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add information on 2510FMG telephone set
- Show D-180896 Kit of Parts (polarity guard) replaces P-90D052 (819040528) guard assembly.

2. CONNECTIONS

2.01 ❱When a polarity guard is required in the 2510F (MD) or 2510FM telephone set, install a D-180896 Kit of Parts as shown in Table A. This polarity guard kit is a direct replacement for the 819040528 (P-90D052) (MD) guard assembly.

2.02 The 2510FMG telephone set is furnished equipped with a 72-type dial which contains a polarity guard eliminating the possibility of improper operation due to line reversals.

2.03 Refer to Table B or C for modifications when replacing 35-type dial with a 72-type dial in the 2510FM telephone set.❰

❱TABLE A❰

POLARITY GUARD CONNECTIONS [819040528 (P-90D052) GUARD ASSEMBLY OR D-180896 KIT OF PARTS POLARITY GUARD, SEE NOTE]

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	POLARITY GUARD	NET.
Line Switch	W	F	T	
	BR	C	S	
Polarity Guard	W			C
	G			F

Note: For use only with 35-type dial when specified by local instructions for end-to-end signaling installations.

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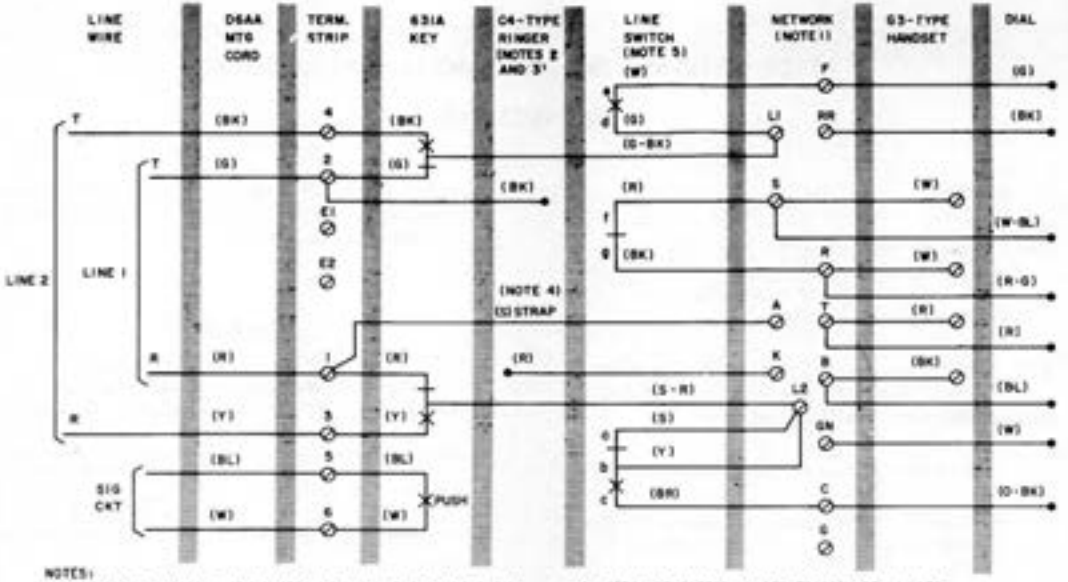

NOTES:

1. ON SETS EQUIPPED WITH A 425G NETWORK, THE LEADS SHOWN CONNECTED TO THE S AND T TERMINALS SHOULD BE CONNECTED TO TERMINALS 9 AND 10 RESPECTIVELY ON THE TERM. STRIP.
2. CONNECTIONS SHOWN ARE FOR RINGING ON LINE 1. TO RING ON LINE 2, MOVE (S) STRAP LEAD FROM TERM. 1 TO TERM. 3 AND (BK) RINGER LEAD FROM TERM. 2 TO TERM. 4.
3. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
4. SETS ARE FACTORY WIRED TO PROVIDE BRIDGED RINGING CONNECTIONS FOR C4B RINGER SHOWN. IF C4A RINGER IS USED WIRE AS FOLLOWS:
   (BK) TO 2 OF TERM. STRIP (S-R) TO A OF NETWORK
   (S) TO K OF NETWORK (R) TO 1 OF TERM. STRIP.
   REMOVE (S) STRAP BETWEEN A OF NETWORK AND 1 OF TERM STRIP.
5. LINE SWITCH SEQUENCE, HANDSET REMOVED:
   bc - MAKES ab - BREAKS
   de - MAKES fg - BREAKS

Fig. 1—2510F (MD) Telephone Set Connections, 2-Line Pickup and Signaling

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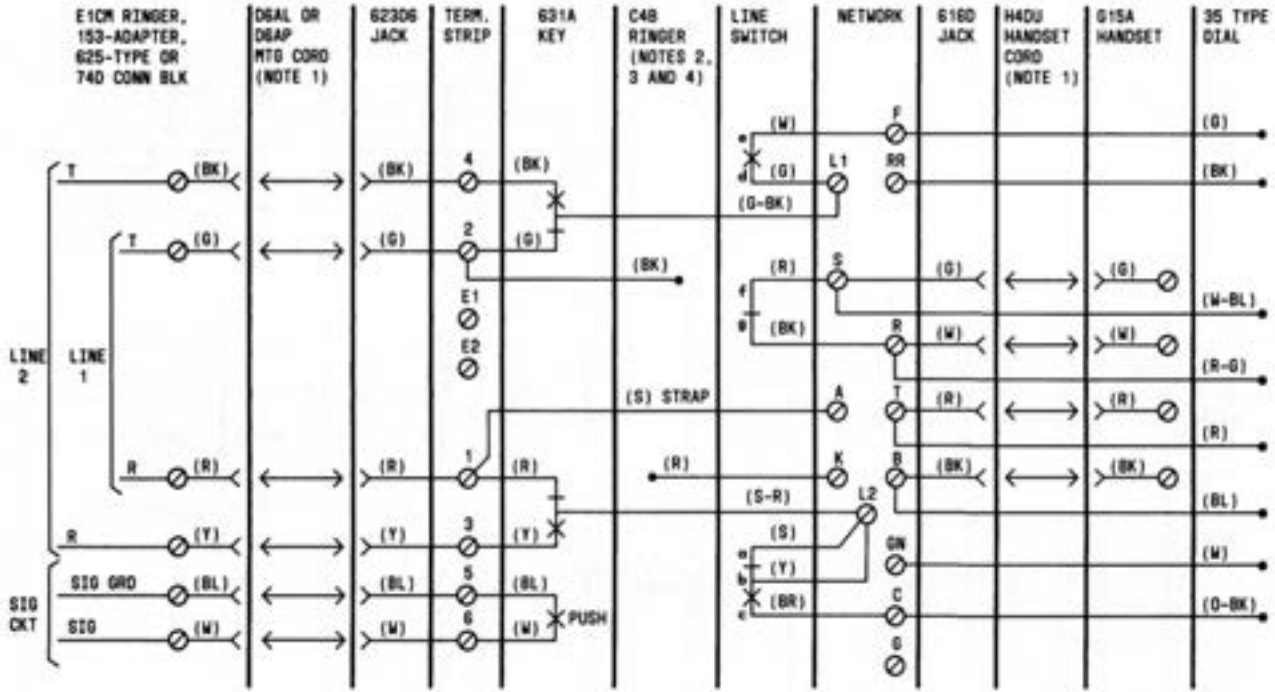

NOTES:
1. MUST BE ORDERED SEPARATELY.
2. SETS ARE FACTORY WIRED FOR BRIDGED RINGING.
3. CONNECTIONS SHOWN ARE FOR RINGING ON LINE 1. TO RING ON LINE 2, MOVE (S) STRAP LEAD FROM TERM. 1 TO TERM. 3 AND (BK) RINGER LEAD FROM TERM. 2 TO TERM. 4.
4. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.

Fig. 2—2510FM Telephone Set Connections, 2-Line Pickup and Signaling

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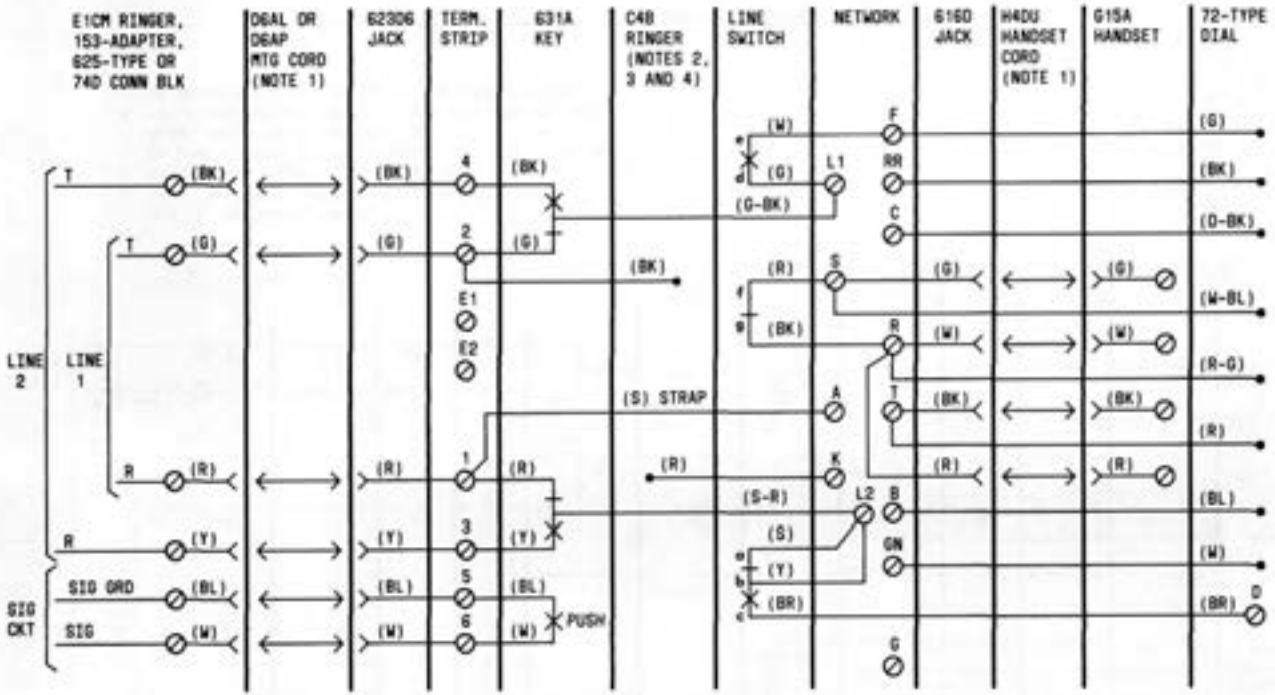

NOTES:
1. MUST BE ORDERED SEPARATELY.
2. SETS ARE FACTORY WIRED FOR BRIDGED RINGING.
3. CONNECTIONS SHOWN ARE FOR RINGING ON LINE 1. TO RING ON LINE 2, MOVE (S) STRAP LEAD FROM TERM. 1 TO TERM. 3 AND (BK) RINGER LEAD FROM TERM. 2 TO TERM. 4.
4. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.

Fig. 3—®2510FMG Telephone Set Connections, 2-Line Pickup and Signaling®

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◆TABLE B◆

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL IN 2510FM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	BR	C	D*
616D Jack (Handset)	R	T	R
	BK	B	T

* 72-type dial terminal.

◆TABLE C◆

MODIFICATION TO REPLACE 35-TYPE DIAL AND POLARITY GUARD WITH 72-TYPE DIAL IN 2510FM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	W	T†	F
	BR	S†	D‡
616D Jack (Handset)	R	T	R
	BK	B	T
Polarity Guard*	G	F	—
	W	C	—

* Polarity guard should be removed from telephone set.

† Polarity guard terminal.

‡ 72-type dial terminal.

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SERVICE

2511F, 2511H, AND 2511HM TELEPHONE SETS

1. GENERAL

1.01 Reissued to:

- Show 2511F and H telephone sets MD, Fig. 1
- Add D16J mounting cord, Fig. 2
- Delete 2511FM telephone set information (never manufactured).

TABLE A

POLARITY GUARD CONNECTIONS

[819040528 (P-90D052) GUARD ASSEMBLY]

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	POLARITY GUARD	NET.
Dial	BK G-W	RR C	T S	
Line Switch	W	C	S	
Polarity Guard	G W			RR C

Note: For use when specified by local instructions for end-to-end signaling installations.

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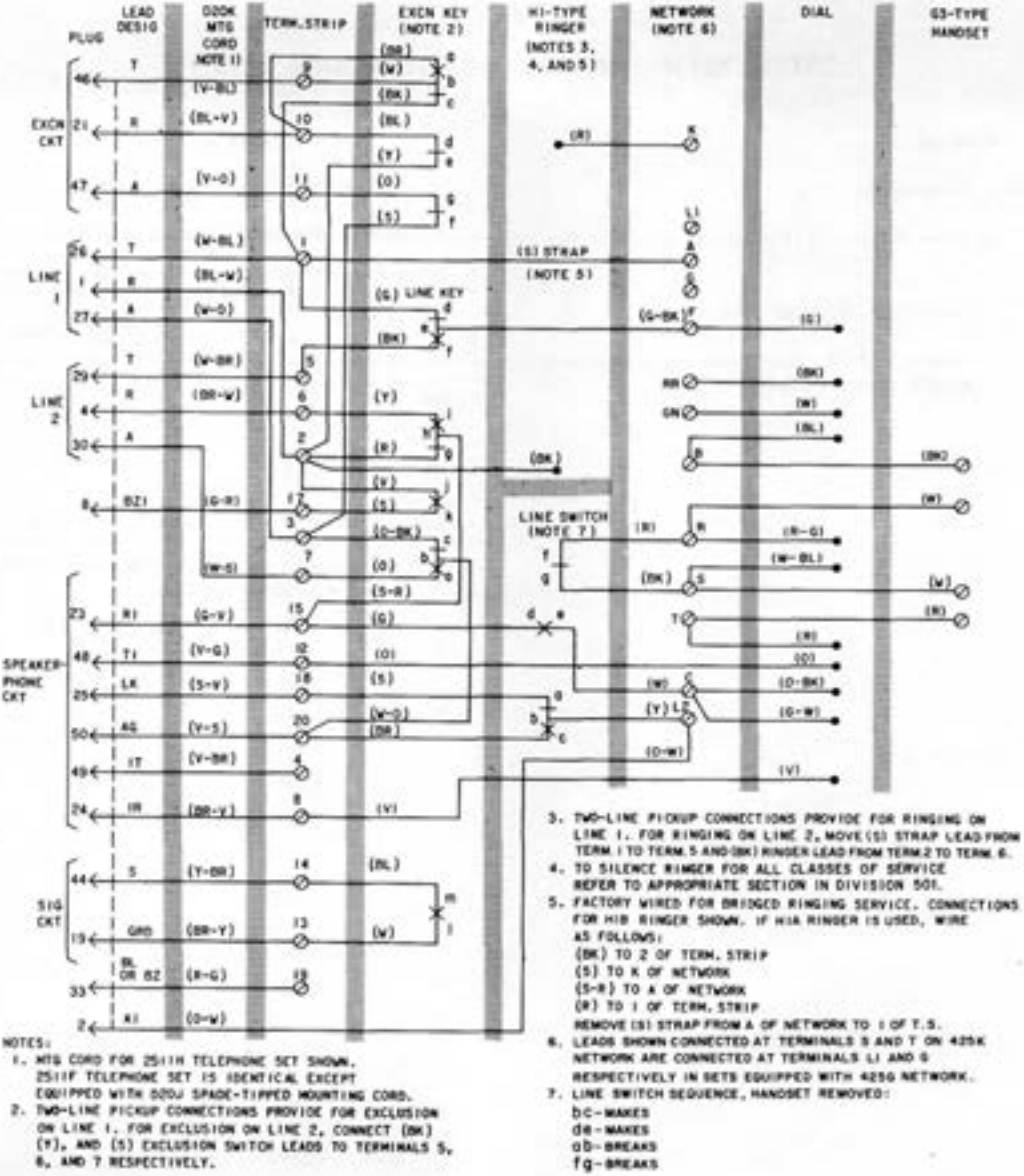

NOTES:
1. MTG CORD FOR 2511H TELEPHONE SET SHOWN. 2511F TELEPHONE SET IS IDENTICAL EXCEPT EQUIPPED WITH 520J SPADE-TIPPED MOUNTING CORD.
2. TWO-LINE PICKUP CONNECTIONS PROVIDE FOR EXCLUSION ON LINE 1. FOR EXCLUSION ON LINE 2, CONNECT (BK) (Y), AND (S) EXCLUSION SWITCH LEADS TO TERMINALS 5, 6, AND 7 RESPECTIVELY.
3. TWO-LINE PICKUP CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, MOVE (S) STRAP LEAD FROM TERM. 1 TO TERM. 5 AND (BK) RINGER LEAD FROM TERM. 2 TO TERM. 6.
4. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE SECTION IN DIVISION 501.
5. FACTORY WIRED FOR BRIDGED RINGING SERVICE. CONNECTIONS FOR H1B RINGER SHOWN. IF H1A RINGER IS USED, WIRE AS FOLLOWS:
   (BK) TO 2 OF TERM. STRIP
   (S) TO K OF NETWORK
   (S-R) TO A OF NETWORK
   (R) TO 1 OF TERM. STRIP
   REMOVE (S) STRAP FROM A OF NETWORK TO 1 OF T.S.
6. LEADS SHOWN CONNECTED AT TERMINALS S AND T ON 425K NETWORK ARE CONNECTED AT TERMINALS L1 AND G RESPECTIVELY IN SETS EQUIPPED WITH 425G NETWORK.
7. LINE SWITCH SEQUENCE, HANDSET REMOVED:
   bc-MAKES
   de-MAKES
   ab-BREAKS
   fg-BREAKS

Fig. 1—2511F (MD) and H (MD) Telephone Sets, Connections (Factory Wired)

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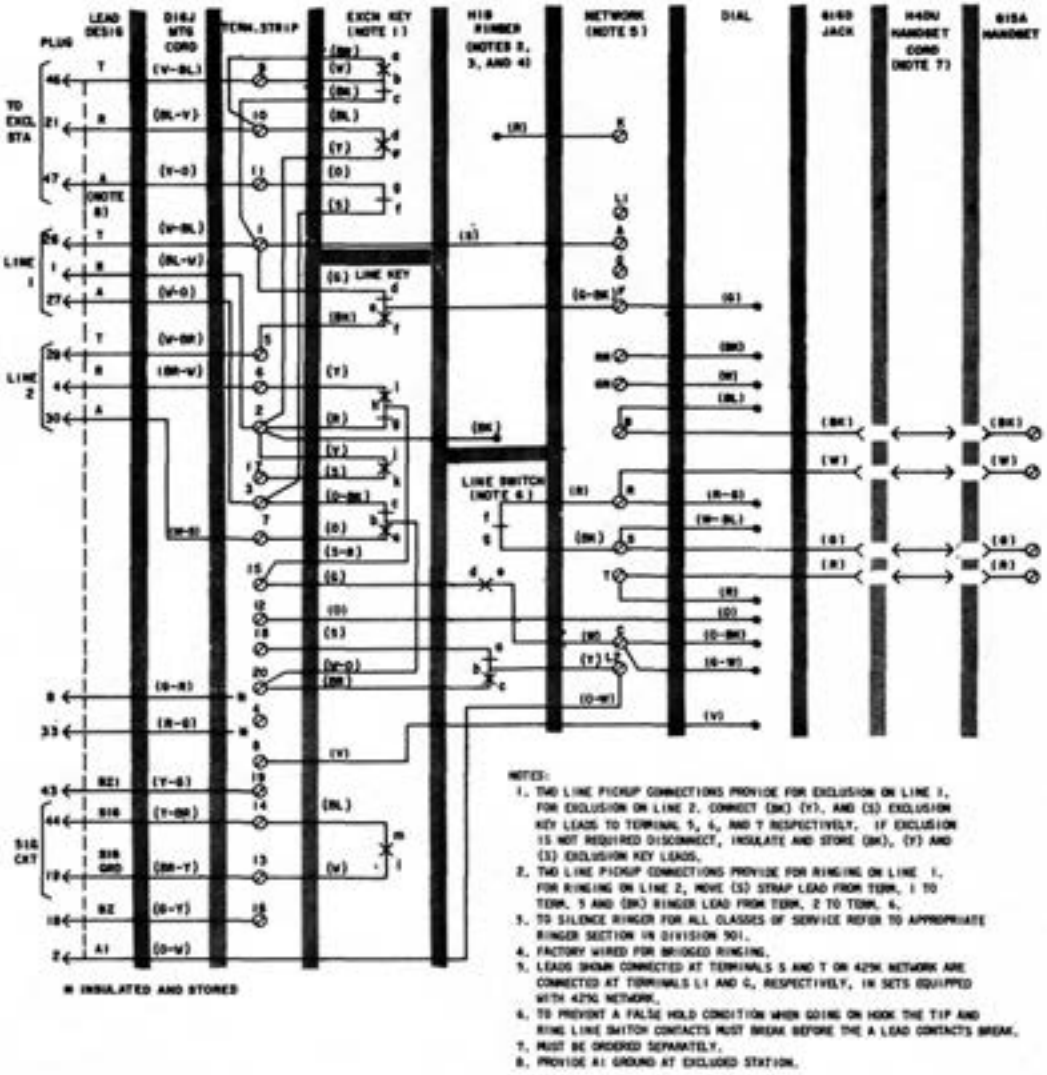

NOTES:
1. TWO LINE PICKUP CONNECTIONS PROVIDE FOR EXCLUSION ON LINE 1. FOR EXCLUSION ON LINE 2, CONNECT (BK) (Y), AND (S) EXCLUSION KEY LEADS TO TERMINAL 5, 6, AND 7 RESPECTIVELY. IF EXCLUSION IS NOT REQUIRED DISCONNECT, INSULATE AND STORE (BK), (Y) AND (S) EXCLUSION KEY LEADS.
2. TWO LINE PICKUP CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, MOVE (S) STRAP LEAD FROM TERM. 1 TO TERM. 5 AND (BK) RINGER LEAD FROM TERM. 2 TO TERM. 6.
3. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.
4. FACTORY WIRED FOR BRIDGED RINGING.
5. LEADS SHOWN CONNECTED AT TERMINALS 5 AND 7 ON 425K NETWORK ARE CONNECTED AT TERMINALS L1 AND G, RESPECTIVELY, IN SETS EQUIPPED WITH 427G NETWORK.
6. TO PREVENT A FALSE HOLD CONDITION WHEN GOING ON HOOK THE TIP AND RING LINE SWITCH CONTACTS MUST BREAK BEFORE THE A LEAD CONTACTS BREAK.
7. MUST BE ORDERED SEPARATELY.
8. PROVIDE A1 GROUND AT EXCLUDED STATION.

Fig. 2—2511HM Telephone Set, Connections (Factory Wired)

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SERVICE

2515B, 2515BM, AND 2515BMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2515B (MD), 2515BM, and 2515BMG telephone sets (Fig. 1, 2, and 3). These sets are factory wired for two line pickup and signaling.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add information on 2515BMG telephone set
- Show D-180896 Kit of Parts (polarity guard) replaces P-90D052 (819040528) guard assembly.

2. CONNECTIONS

2.01 ◗When a polarity guard is required in the 2515B (MD) or 2515BM telephone set, install a D-180896 Kit of Parts as shown in Table A. This polarity guard kit is a direct replacement for the 819040528 (P-90D052) (MD) guard assembly.

2.02 The 2515BMG telephone set is furnished equipped with a 72-type dial which contains a polarity guard eliminating the possibility of improper operation due to line reversals.

2.03 Refer to Table B or C for modifications when replacing 35-type dial with a 72-type dial in the 2515BM telephone set.◖

◗TABLE A◖

POLARITY GUARD CONNECTIONS [819040528 (P-90D052) GUARD ASSEMBLY (MD) OR 840364202 (D-180896) KIT OF PARTS POLARITY GUARD, SEE NOTE]

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	NET.	POLARITY GUARD
Line Switch	W	F		T
	BR	C		S
Polarity Guard	G		F	
	W		C	

Note: For use only with 35-type dial when specified by local instructions for end-to-end signaling installation.

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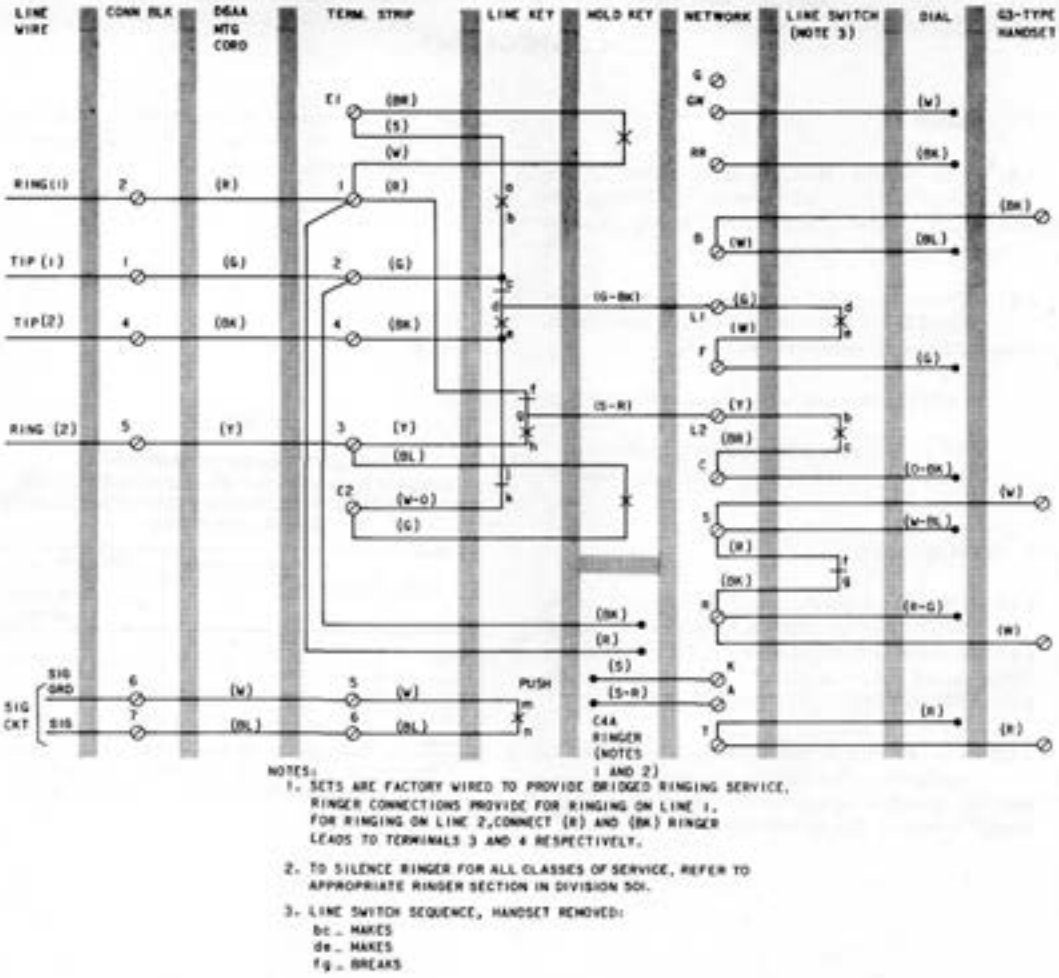

Fig. 1—2515B (MD) Telephone Set Connections, 2-Line Pickup, Hold, and Signaling (Factory Wired)

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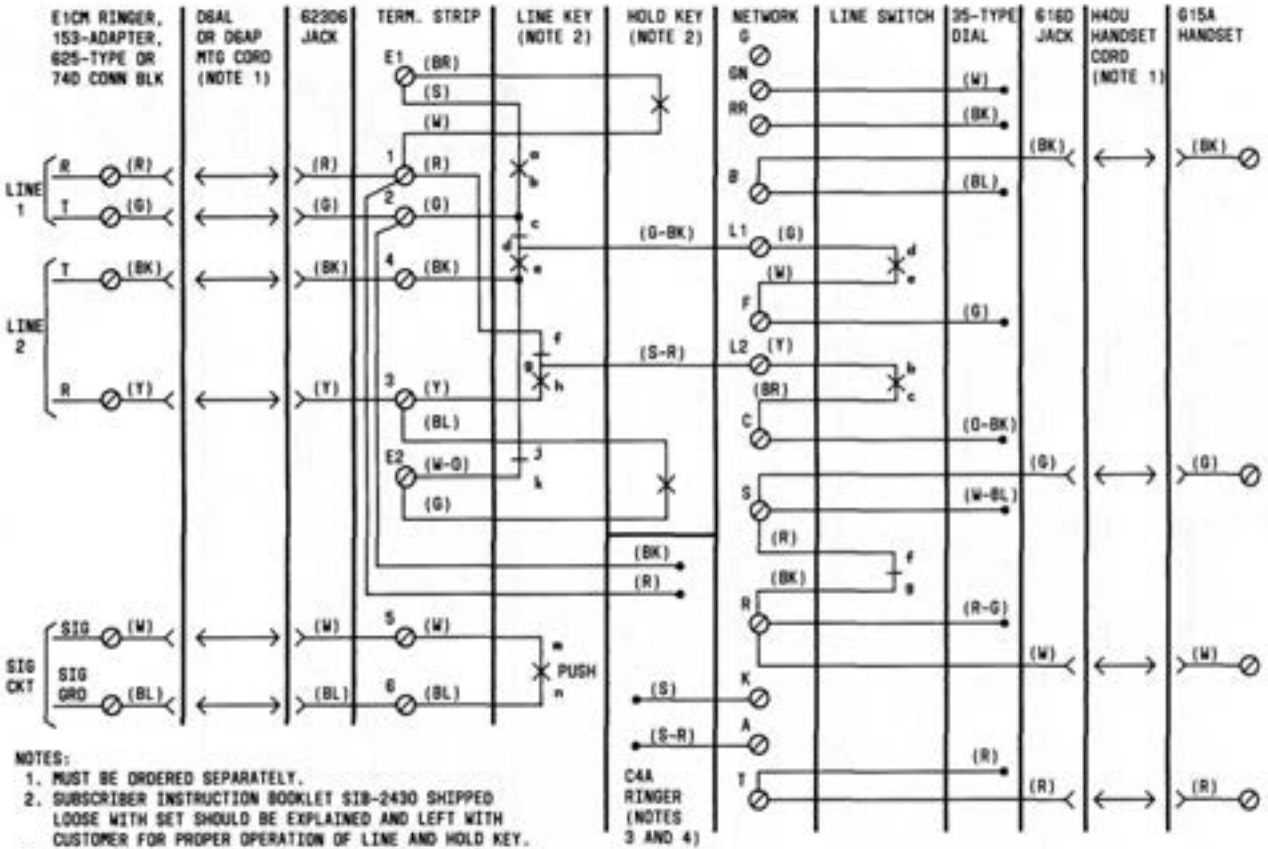

NOTES:
1. MUST BE ORDERED SEPARATELY.
2. SUBSCRIBER INSTRUCTION BOOKLET SIB-2430 SHIPPED LOOSE WITH SET SHOULD BE EXPLAINED AND LEFT WITH CUSTOMER FOR PROPER OPERATION OF LINE AND HOLD KEY.
3. SETS ARE FACTORY WIRED FOR BRIDGED RINGING. RINGER CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, CONNECT (R) AND (BK) RINGER LEADS TO TERMINALS 3 AND 4 RESPECTIVELY.
4. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.

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Fig. 2—▮2515BM Telephone Set Connections, 2-Line Pickup, Hold, and Signaling (Factory Wired)▮

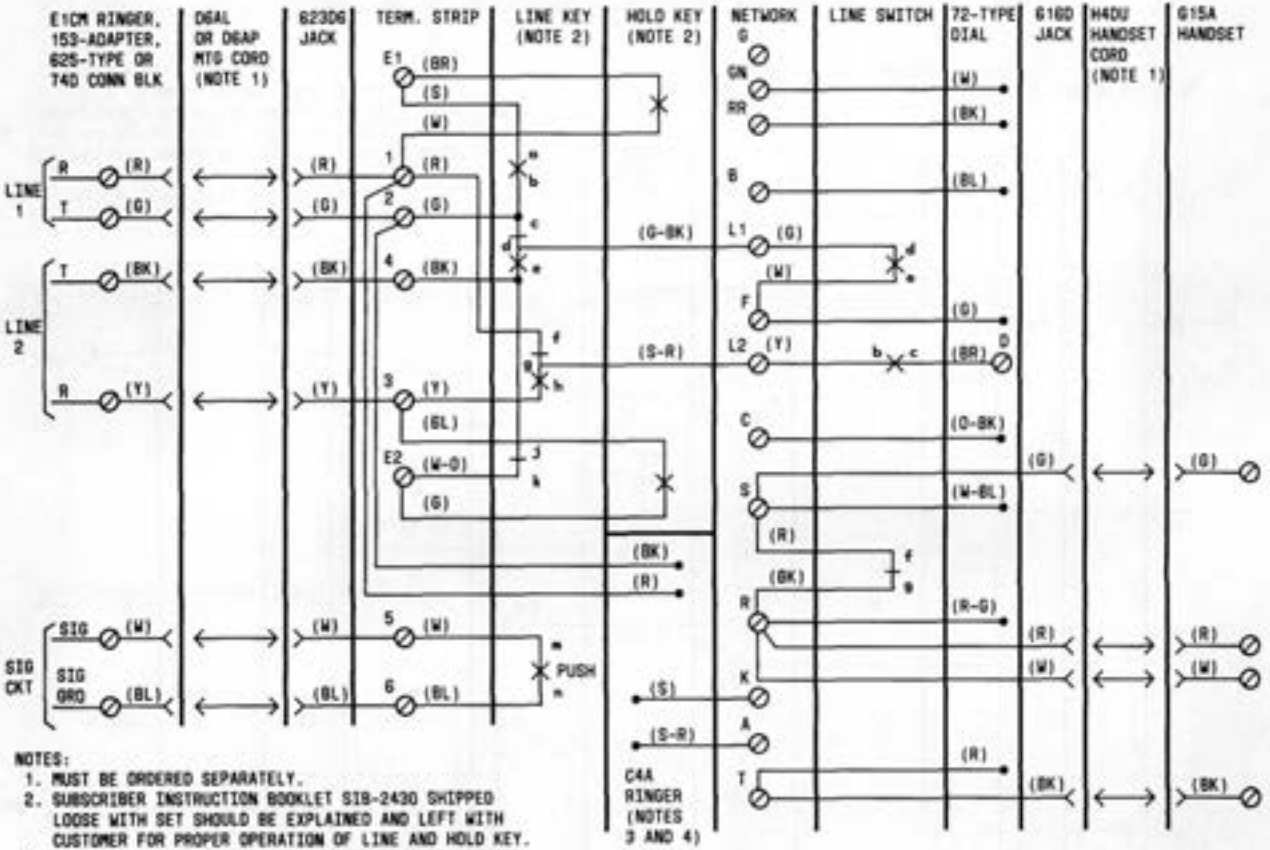

Fig. 3—▼2515BMG Telephone Set Connections, 2-Line Pickup, Hold, and Signaling (Factory-Wired)▲

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TABLE B

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL IN 2515BM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	BR	C	D*
616D Jack (Handset)	R	T	R
	BK	B	T

* 72-type dial terminal.

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♦TABLE C♦

MODIFICATION TO REPLACE 35-TYPE DIAL AND POLARITY GUARD WITH 72-TYPE DIAL IN 2515BM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	W	T†	F
	BR	S†	D‡
616D Jack (Handset)	R	T	R
	BK	B	T
Polarity Guard*	G	F	—
	W	C	—

* Polarity guard should be removed from telephone set.

† Polarity guard terminal.

‡ 72-type dial terminal.

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SERVICE

2555B, 2555BM, 2555BMP, AND 2555BMPG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2555B manufacture discontinued (MD), 2555BM (MD), 2556BMP, and 2555BMPG telephone sets (Fig. 1, 2, 3, and 4). These wall telephone sets are factory-wired for two-line pickup and signaling with hold.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add information on 2555BMPG telephone set
- Show D-180896 (840364202) Kit of Parts (polarity guard) replaces P-90D053 (819040536) (MD) guard assembly.

2. CONNECTIONS

2.01 ▮When a polarity guard is required in the 2555B (MD), 2555BM (MD), or 2555BMP telephone set, install a D-180896 Kit of Parts as shown in Table A. This polarity guard kit is a direct replacement for the 819040536 (P-90D053, MD) guard assembly.

Note: When a separate polarity guard is added in the field to a telephone set equipped with a 35-type dial, a "G" should be added to the set code.

2.02 The 2555BMPG telephone set is furnished equipped with a 72-type dial which contains a polarity guard eliminating the possibility of improper operation due to line reversals.

2.03 Refer to Table B or C for modifications when replacing 35-type dial with a 72-type dial in the 2555BMP telephone set.▮

▮TABLE A▮

POLARITY GUARD CONNECTIONS [819040536 (P-90D053) (MD) GUARD ASSEMBLY OR D-180896 KIT OF PARTS POLARITY GUARD, SEE NOTE]

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	NET.	POLARITY GUARD
Line Switch	W	C		S
	BR	F		T
Polarity Guard	W		C	
	G		F	

Note: For use only with 35-type dial when specified by local instructions for end-to-end signaling installations.

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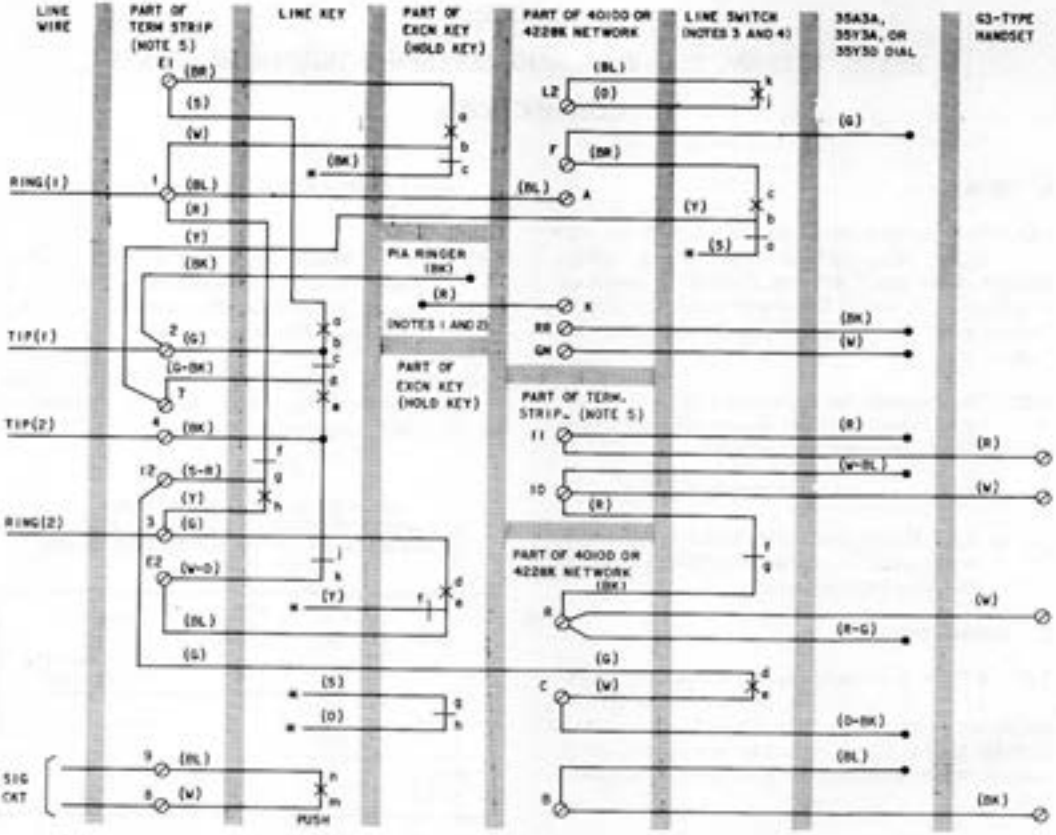

NOTES:

1. SETS ARE FACTORY WIRED FOR BRIDGED RINGING SERVICE. RINGER CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, CONNECT (BL) STRAP FROM A OF NETWORK AND (BK) RINGER LEAD TO TERMINALS 3 AND 4 RESPECTIVELY.
2. TO SILENCE RINGER PERMANENTLY, CONNECT (BK) RINGER LEAD TO R OF NETWORK.
3. CURRENT PRODUCTION SETS DO NOT HAVE CONTACTS j-k AND ASSOCIATED (O) AND (BL) LEADS.
4. LINE SWITCH SEQUENCE, HANDSET REMOVED:
   - bc - MAKES
   - cb - MAKES
   - eg - BREAKS
   - fg - BREAKS
   - * INSULATE AND STORE
5. WHEN 4228K NETWORK IS PROVIDED, TERMINALS 10, 11, AND 12 ON THE TERMINAL STRIP SHALL BE REPLACED BY TERMINALS L2, O, AND L1, RESPECTIVELY ON THE NETWORK. (SEE NOTE 3)

Fig. 1—2555B (MD) Telephone Set, Connections

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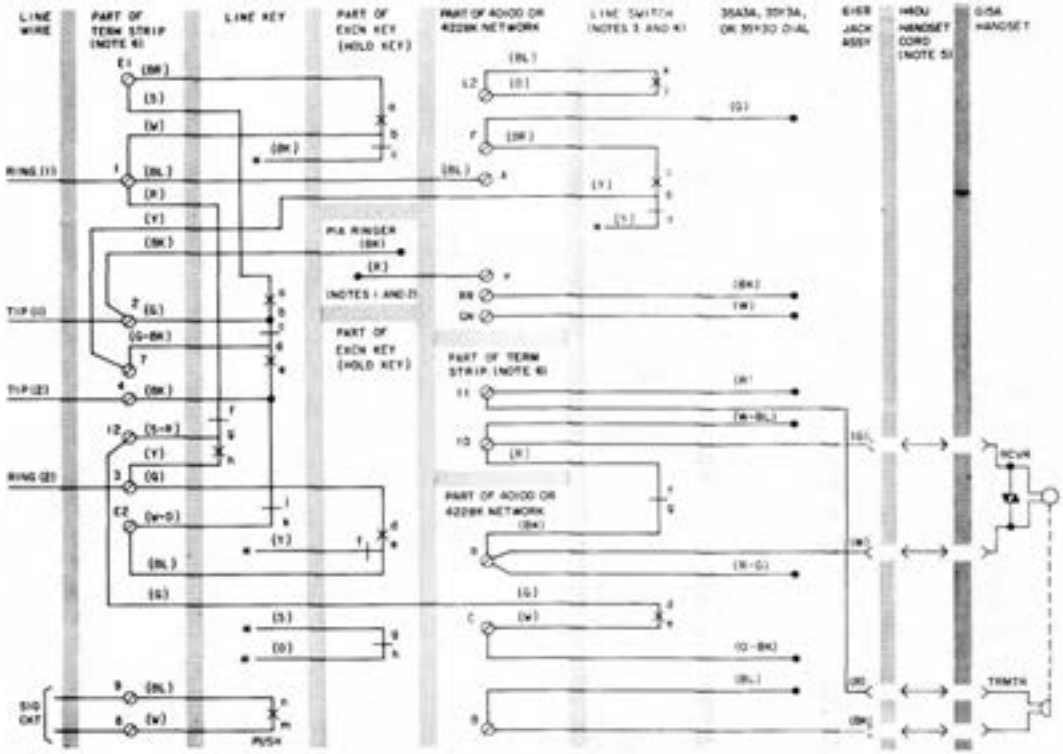

NOTES:
1. SETS ARE FACTORY WIRED FOR BRIDGED RINGING SERVICE. RINGER CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, CONNECT (BL) STRAP FROM X OF NETWORK AND (BK) RINGER LEAD TO TERMINALS 3 AND 4 RESPECTIVELY.
2. TO SILENCE RINGER PERMANENTLY, CONNECT (BK) RINGER LEAD TO X OF NETWORK.
3. CURRENT PRODUCTION SETS DO NOT HAVE CONTACTS j-k AND ASSOCIATED (G) AND (BL) LEADS.
4. LINE SWITCH SEQUENCE, HANDSET REMOVED:
   bc - MAKES cb - BREAKS
   de - MAKES fg - BREAKS
5. H4DU CORD MUST BE ORDERED SEPARATELY
6. WHEN 422BK NETWORK IS PROVIDED, TERMINALS 10, 11 AND 12 ON THE TERMINAL STRIP SHALL BE REPLACED BY TERMINALS L2, 5 AND L1, RESPECTIVELY ON THE NETWORK. (SEE NOTE 5).
* INSULATE AND STORE

Fig. 2—2555BM (MD) Telephone Set, Connections

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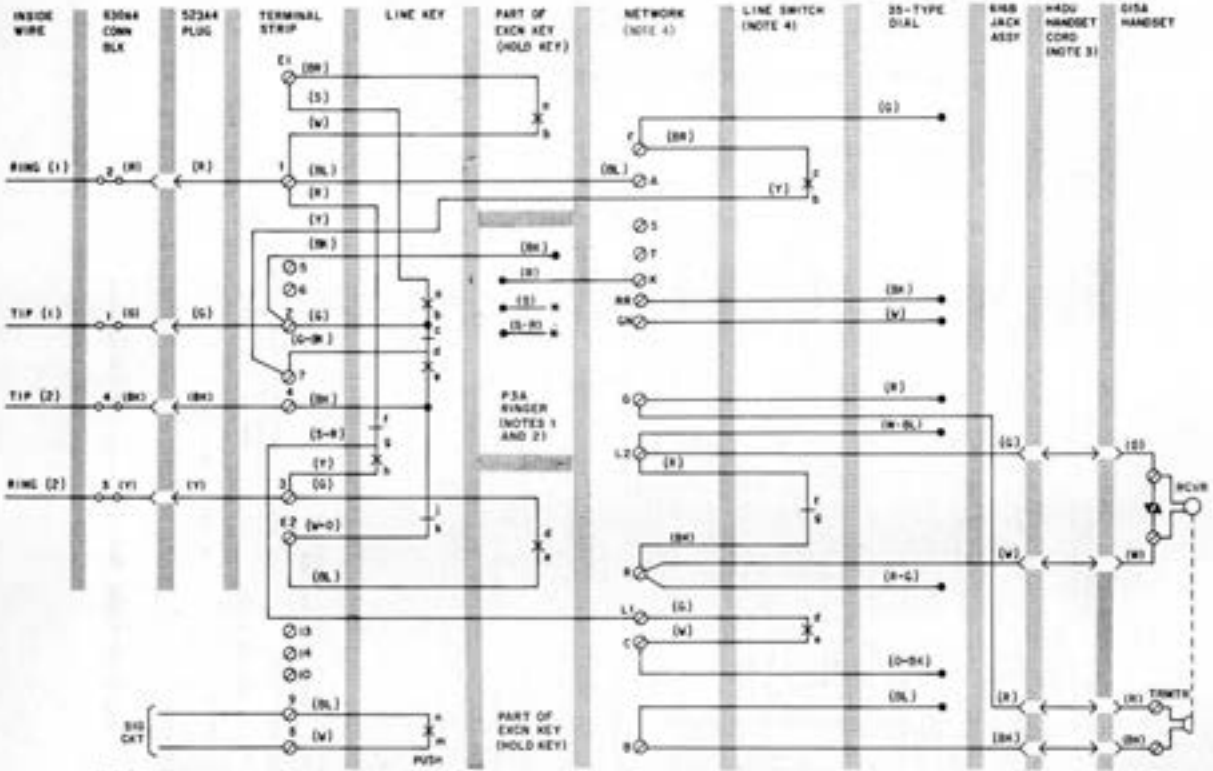

Fig. 3—▮2555BMP Telephone Set, Connections▮

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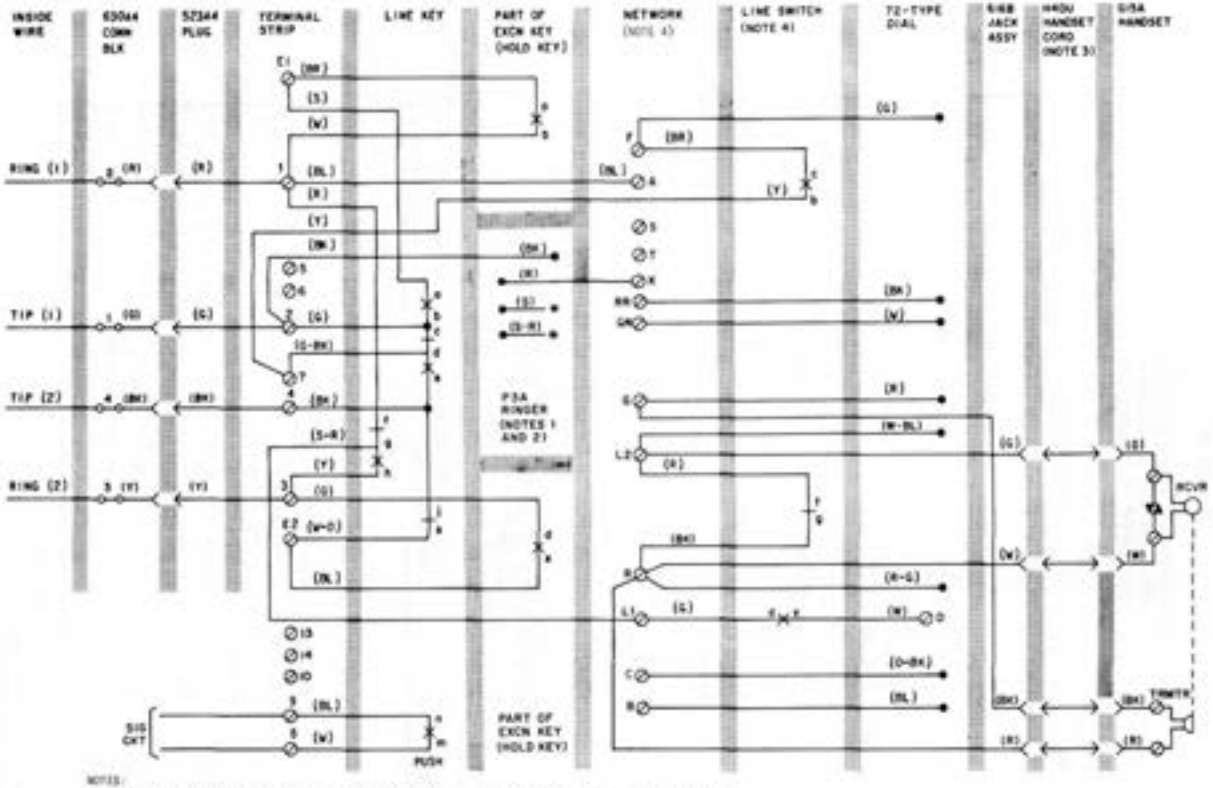

Fig. 4—®2555BMPG Telephone Set, Connections®

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▮TABLE B▮

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL IN 2555BMP TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	G	G
	W-BL	L2	L2
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	W	C	D*
616D Jack (Handset)	R	G	R
	BK	B	G

* 72-type dial terminal.

▮TABLE C▮

MODIFICATION TO REPLACE 35-TYPE DIAL AND POLARITY GUARD WITH 72-TYPE DIAL IN 2555BMP TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	G	G
	W-BL	L2	L2
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	BR	T†	F
	W	S†	D‡
616D Jack (Handset)	R	G	R
	BK	B	G
Polarity* Guard	G	F	—
	W	C	—

* Polarity guard should be removed from telephone set.
† Polarity guard terminal.
‡ 72-type dial terminal.

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SERVICE

2558D, 2558DM, AND 2558DMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2558D manufacture discontinued (MD), 2558DM, and 2558DMG telephone sets (Fig. 1, 2, and 3). These wall telephone sets are factory-wired for two-line pickup and signaling with exclusion.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add information on 2558DMG telephone set
- Show D-180896 (840364202) Kit of Parts (polarity guard) replaces D-180190 (MD) and D-180547 (MD) guard assemblies.

2. CONNECTIONS

2.01 ♦When a polarity guard is required in the 2558D (MD) or 2558DM telephone set, install a D-180896 Kit of Parts as shown in Table A. This polarity guard kit is a direct replacement for the D-180190 (MD) and D-180547 (MD) guard assemblies.

Note: When a separate polarity guard is added in the field to a telephone set equipped with a 35-type dial, a "G" should be added to the set code.

2.02 The 2558DMG telephone set is furnished equipped with a 72-type dial which contains a polarity guard eliminating the possibility of improper operation due to line reversals.

2.03 Refer to Table B or C for modifications when replacing 35-type dial with a 72-type dial in the 2558DM telephone set.♦

♦TABLE A♦

POLARITY GUARD CONNECTIONS [D-180190 (MD), D-180547 (MD) GUARD ASSEMBLY OR 840364202 (D-180896) KIT OF PARTS POLARITY GUARD SEE NOTES 1, 2, AND 3]

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	NET.	POLARITY GUARD
Line Switch	W	C	—	S
	BL*	F	—	T
Line Key	G-BK†	F	—	T
Polarity Guard	W	—	C	—
	G	—	F	—

Note 1: For use only with 35-type dial when specified by local instructions for end-to-end signaling installations.

Note 2: Telephone sets with baseplates having rectangular punched holes in the side flanges use the D-180547 or D-180190 guard assembly.

Note 3: Telephone sets whose baseplates have open-topped cutouts in the side flanges require use of the D-180547 guard assembly.

*2558DM telephone set only.
†2558D (MD) and early version 2558DM telephone set only.

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†TABLE B†

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL IN 2558DM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	L2	L2
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	W	C	D*
616D Jack (Handset)	R	T	R
	BK	B	T

* 72-type dial terminal.

†TABLE C†

MODIFICATION TO REPLACE 35-TYPE DIAL AND POLARITY GUARD WITH 72-TYPE DIAL IN 2558DM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	L2	L2
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	BL	T†	F
	W	S†	D‡
616D Jack (Handset)	R	T	R
	BK	B	T
Polarity Guard*	G	F	—
	W	C	—

* Polarity guard should be removed from telephone set.
† Polarity guard terminal.
‡ 72-type dial terminal.

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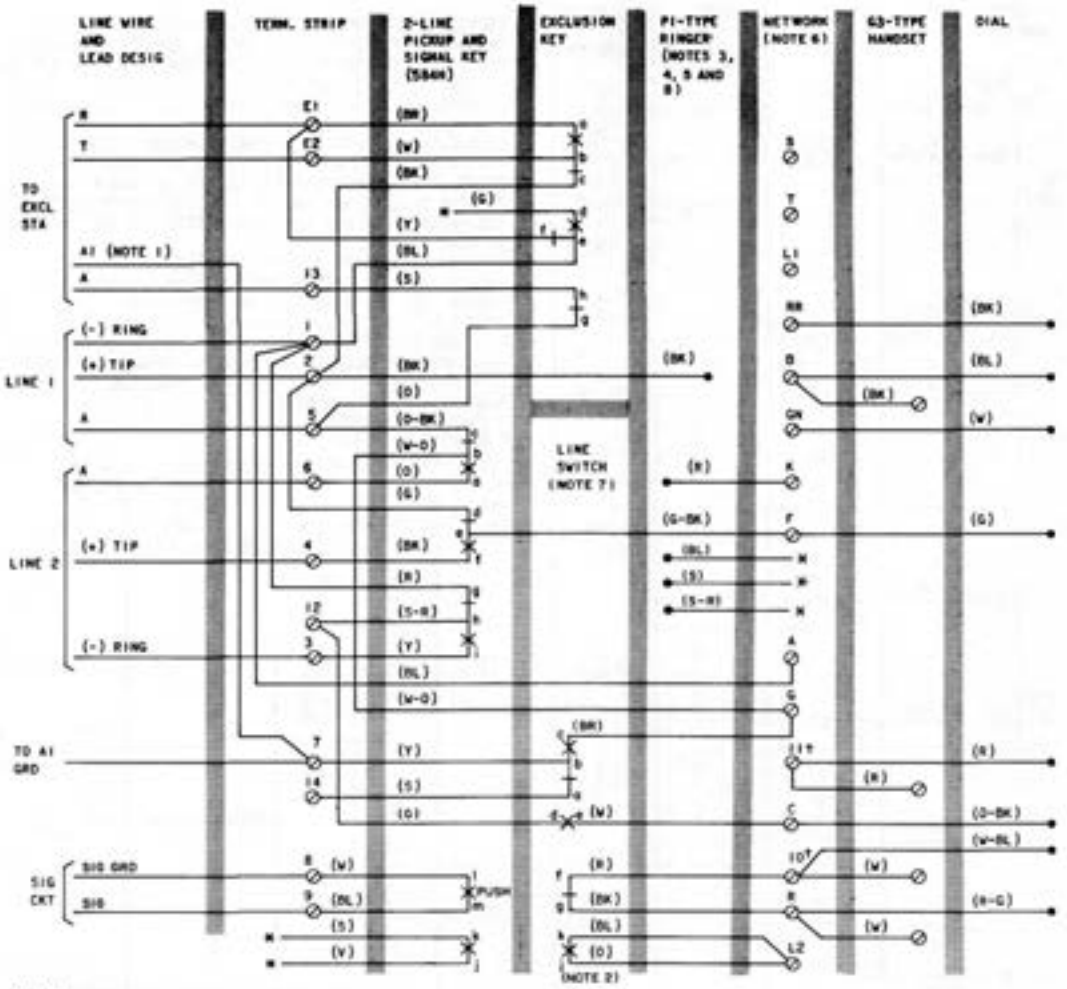

NOTES:
1. PROVIDE A1 GROUND AT EXCLUDED STATION OR CONNECT AS SHOWN.
2. CURRENT PRODUCTION SETS DO NOT HAVE CONTACTS j-k AND ASSOCIATED (O) AND (BL) LEADS.
3. RINGER CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, CONNECT (BK) RINGER LEAD TO TERMINAL 4 AND (BL) STRAP FROM A OF NETWORK TO TERMINAL 3.
4. SETS ARE FACTORY WIRED FOR BRIDGED RINGING SERVICE. CONNECTIONS FOR P1B SAME AS P1A RINGER. (BL), (S), AND (S-R) LEADS SHOWN INSULATED AND STORED ARE ON P1A ONLY.
5. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE, REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.
6. WHEN 4228K NETWORK IS PROVIDED TERMINALS 10, 11, AND 12 ON TERMINAL STRIP WILL APPEAR AS TERMINALS L2, T, AND L1 ON NETWORK, RESPECTIVELY.
7. LINE SWITCH SEQUENCE, TO PREVENT FALSE HOLD:
   bc-MAKES ab-BREAKS
   de-MAKES fg-BREAKS
8. (BL) LEAD HAS BEEN REMOVED FROM LATER MODEL RINGERS.
* INSULATED AND STORED
† TERM. STRIP TERMINAL

Fig. 1—2558D (MD) Telephone Set, Connections

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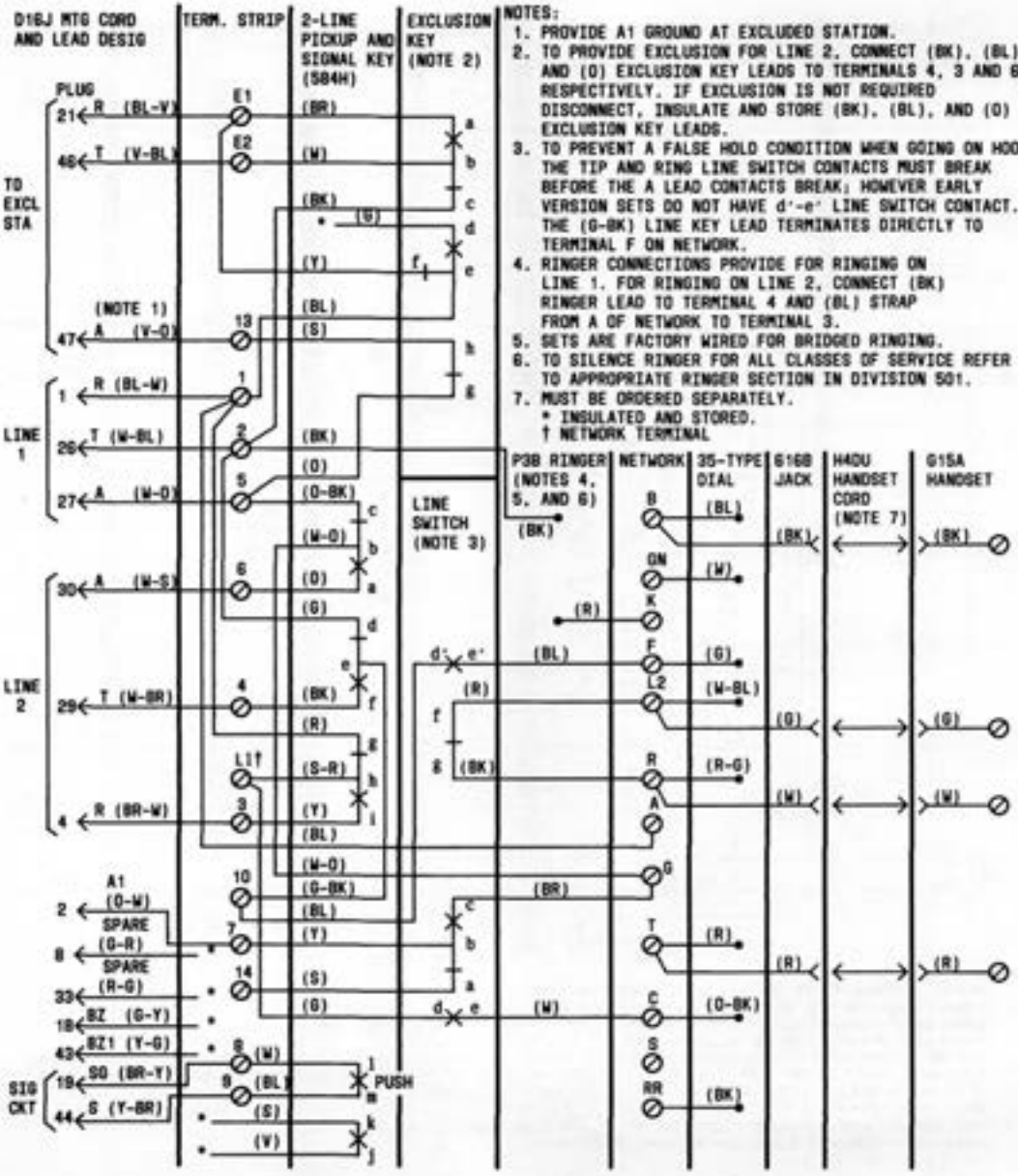

Fig. 2—#2558DM Telephone Set, Connections

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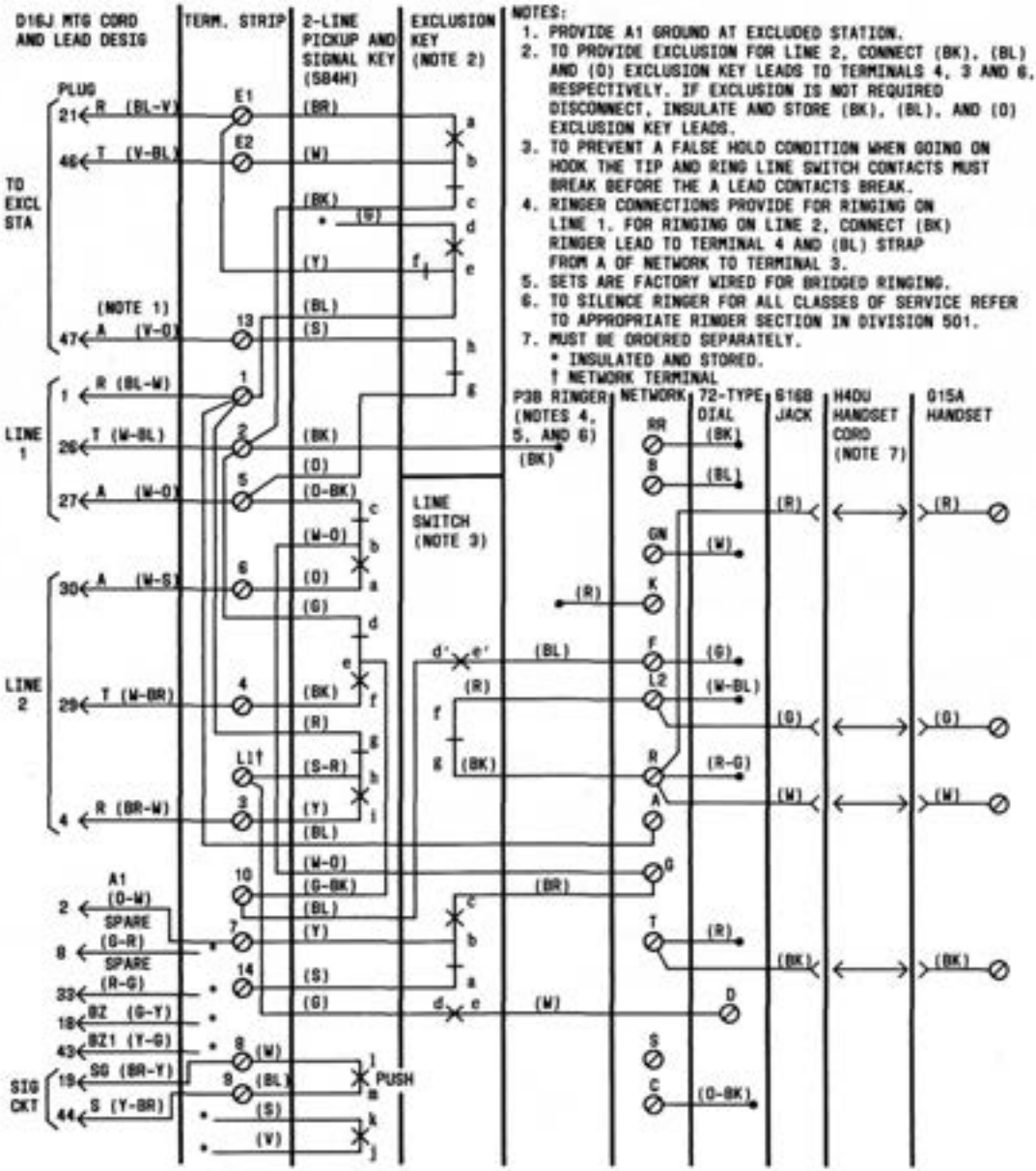

Fig. 3—▮2558DMG Telephone Set, Connections▮

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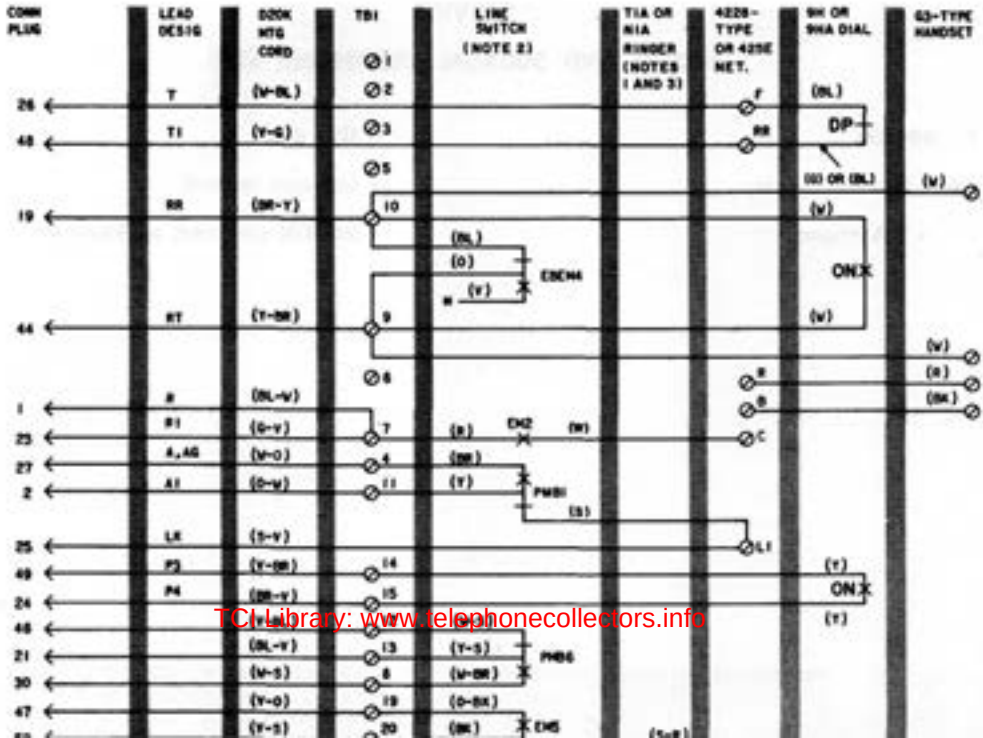
SECTION 502-580-401



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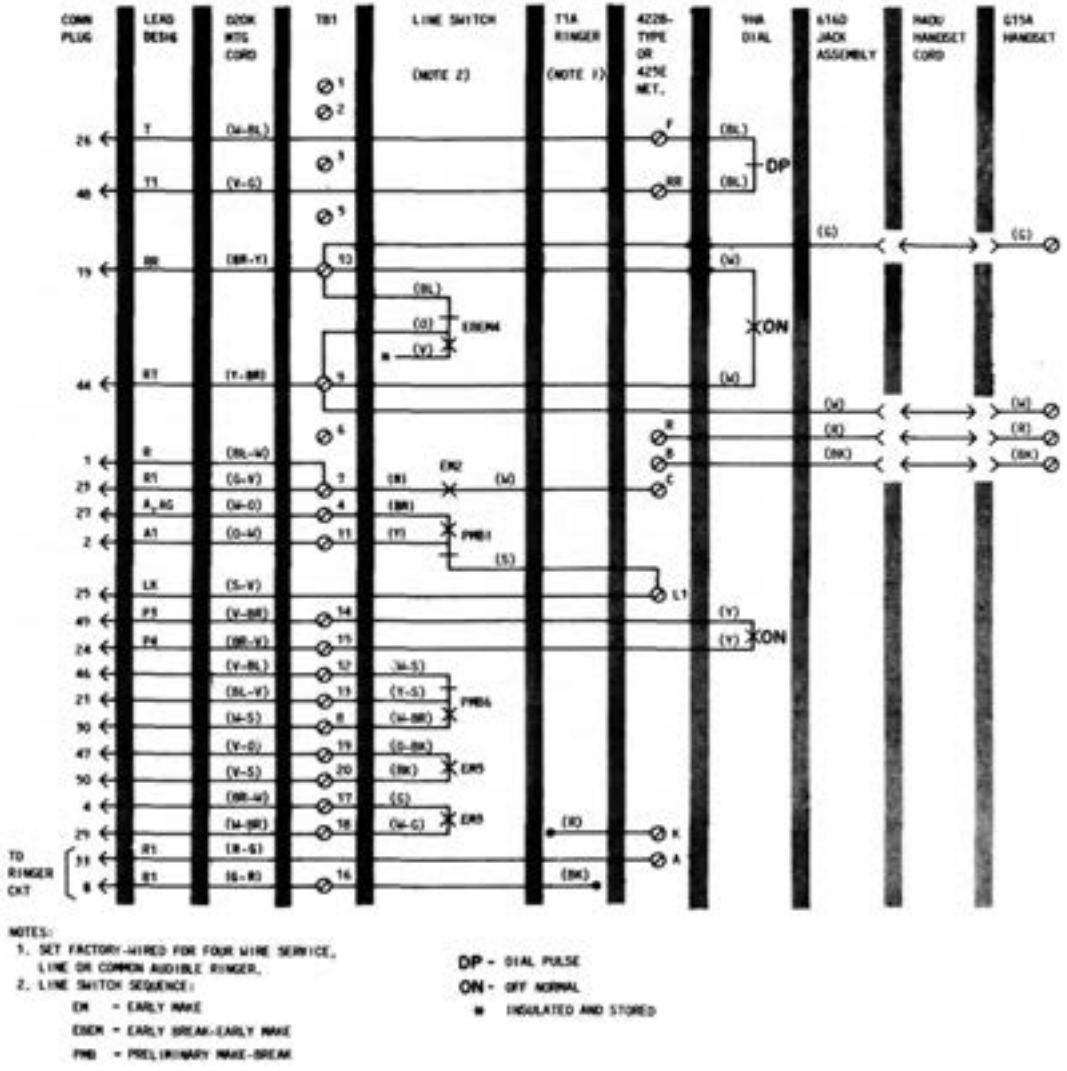

Fig. 2—500ADM Telephone Set, Connections

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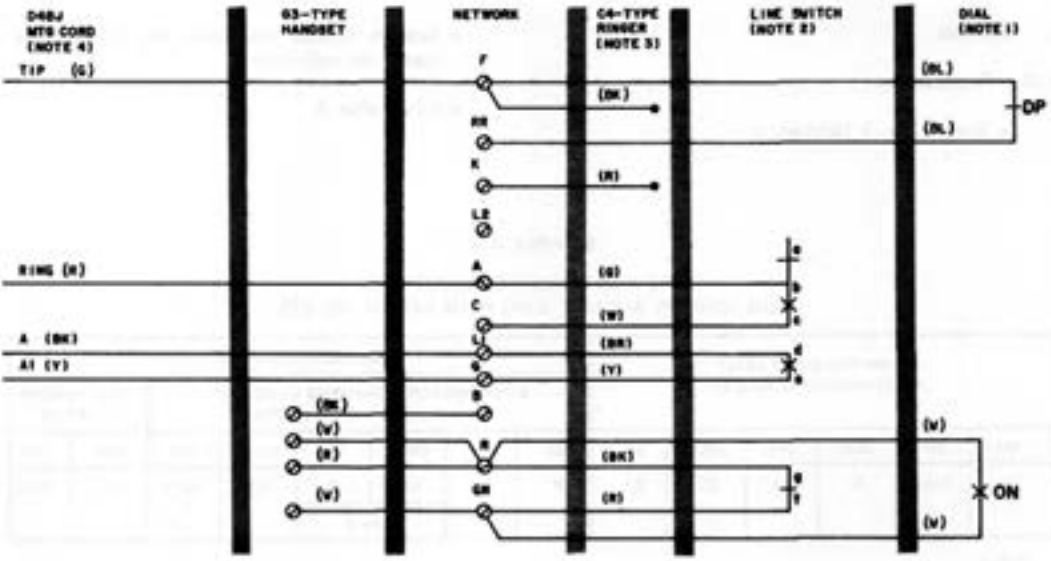

NOTES:

1. FOR MANUAL SERVICE ON 1A1 AND 1A2 KTS, MOVE (G) MOUNTING CORD LEAD AND (BK) RINGER LEAD FROM TERMINAL F TO RR ON NETWORK. REPLACE DIAL WITH APPROPRIATE APPARATUS BLANK.
2. TO PREVENT A FALSE HOLD CONDITION WHEN GOING ON HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE A-LEAD CONTACTS BREAK.
3. TO SILENCE RINGER PERMANENTLY, REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.
4. IF COMMON AUDIBLE RINGING IS REQUIRED, A 6-CONDUCTOR MOUNTING CORD IS REQUIRED. REFER TO TABLE A.

DP – DIAL PULSE CONTACT
ON – DIAL OFF-NORMAL CONTACT

Fig. 1—Early 500L/M Telephone Set, Connections With MD Line Switch and Lead Colors

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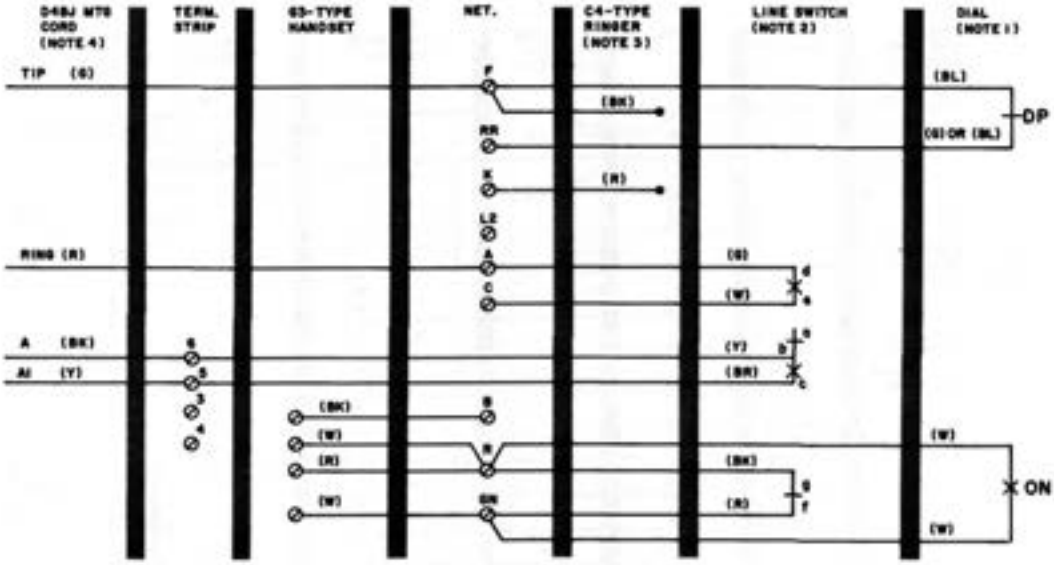

Fig. 2—Later 500L/M Telephone Set, Connections With Current Line Switch Lead Colors, and Terminal Strip

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SERVICE

500R/S AND 500SM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 500R/S (MD) and 500SM telephone sets.

1.02 This section is reissued to:

- Show 500R/S telephone sets MD
- Revise Fig. 2 to update information.

◆TABLE A◆

LINE AND C4B RINGER CONNECTIONS
500R/S AND 500SM

WIRE OR LEAD (NOTE 1)	COLOR	RING PARTY	TIP PARTY NO IDENT GROUND
Mtg Cord in Set 500R/S	(W-BL) [G]	F	F
623D4 Jack 500SM	(G)	F	F
Move Strap from F Term on Net. to	(G)	E1	
Move Strap from Term. 3 to	(S)		E1
C4B Ringer (Note 2)	(R) (BK)	K G	K G
Mtg Cord at Conn Block (Line Only) 500R/S	(G-W) [R] (W-BL) [G] (BL-W) [BR-G]	Ring Tip Ring	Tip Ring Tip
Line Wire at Conn Block 500SM	(R) (G)	Ring Tip	Ring Tip

Note 1: Only the optional leads are shown in the table. Connections for the remaining leads are shown in Fig. 1 and 2.

Note 2: To permanently silence ringer, refer to Section 501-250-303.

( ) Current color code.

[ ] MD color code.

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TABLE B
LINE AND C4A RINGER CONNECTIONS 500R/S

WIRE OR LEAD	COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY NO IDENT GROUND	TIP PARTY IDENT GRD	
					1000Ω	2650Ω
Mtg Cord in Set	(W-BL) [G]	G	F	F	F	F
Strap from G Term. on Net. to	(G)	F	E1	E1	E1	E1
C4A Ringer	(R) (BK) (S) (S-R)	L2 G K A	L2 G K A	L2 G K A	K G B B	B B K G
Line Switch	(W-S) [S-BR]	Term. 2	Term. 2	Term. 2	A of Net.	A of Net.
Mtg Cord at Conn. Block (Line Only)	(G-W) [R] (W-BL) [G] (BL-W) [BR-G]	Ring Tip Ring	Ring Tip Ring	Tip Ring Tip	Tip Ring Tip	Tip Ring Tip
Strap from A To L2 on Net,	(S)	*	*	*	*	*
44A Conn Block Strap		1 to 6	1 to 6	2 to 6	2 to 6	2 to 6

Note: To permanently silence ringer, refer to Section 501-250-303.

* Remove strap, if in place, when using C4A ringer.

( ) Current color code

[ ] MD color code

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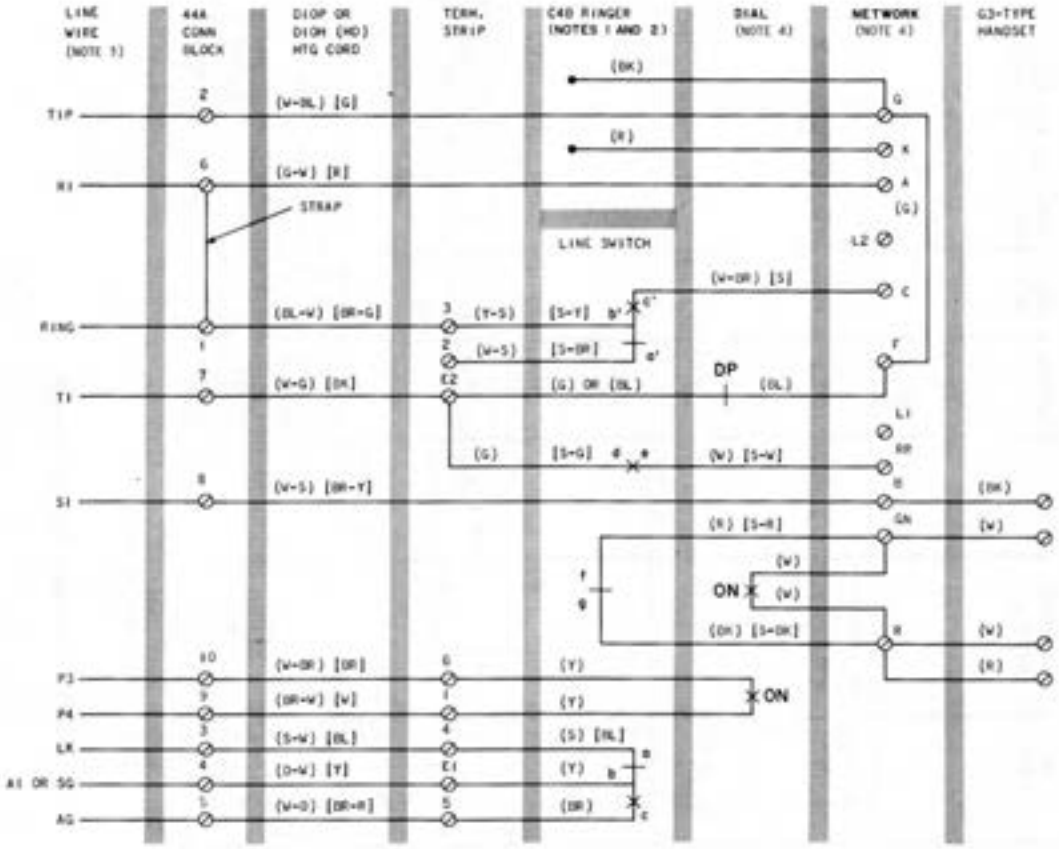

NOTES:
1. SET WIRED FOR BRIDGED SERVICE. REFER TO TABLE A FOR OTHER CLASSES OF SERVICE AND TO SILENCE RINGER.
2. IF C4A RINGER IS USED, REFER TO TABLE B FOR ALL CLASSES OF SERVICE.
3. FOR CONNECTIONS TO SPEAKERPHONE REFER TO APPROPRIATE SECTION IN DIVISION 582.
4. FOR MANUAL SERVICE, REPLACE DIAL WITH #W APPARATUS BLANK AND TRANSFER (G) STRAP FROM F TERMINAL ON NETWORK TO E2 TERMINAL ON TERMINAL STRIP.

LEGEND:
( ) CURRENT COLOR CODE
[ ] MD COLOR CODE
DP - DIAL PULSE CONTACT
ON - DIAL OFF-NORMAL CONTACT

Fig. 1—#500R/S (MD) Telephone Set, Connections#

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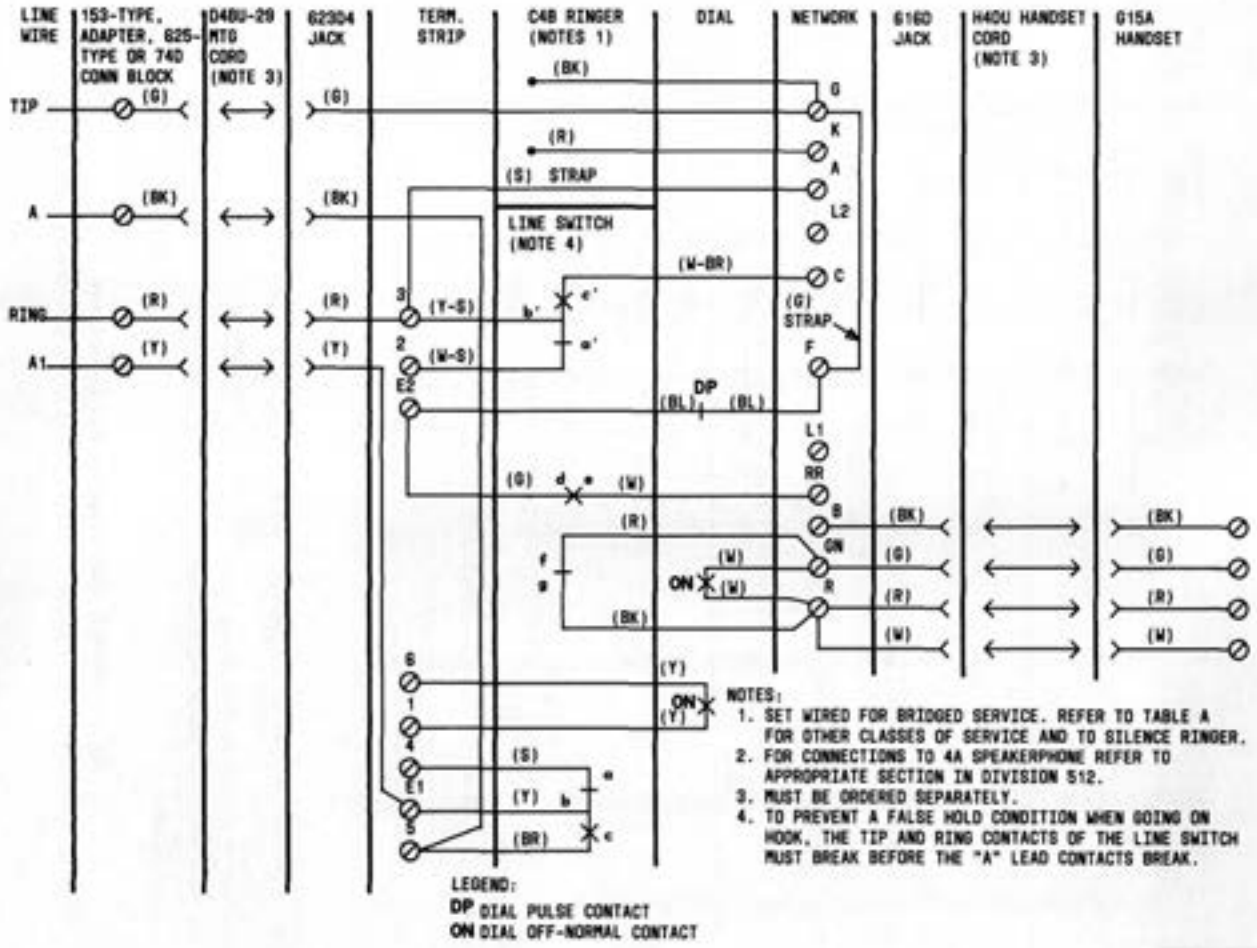

Fig. 2—▮500SM Telephone Set—Connections▮

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SERVICE

500W/Y AND 500YM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on 500W/Y (MD) and 500YM telephone sets.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Show 500W/Y (MD), Fig. 1
- Change information on the 500YM (modular) telephone set, Fig. 2.

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SERVICE

514B AND 514BM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information for the 514B (MD) and 514BM telephone sets.

1.02 This section is reissued to revise the 241B amplifier connections, Fig. 1 and 2.

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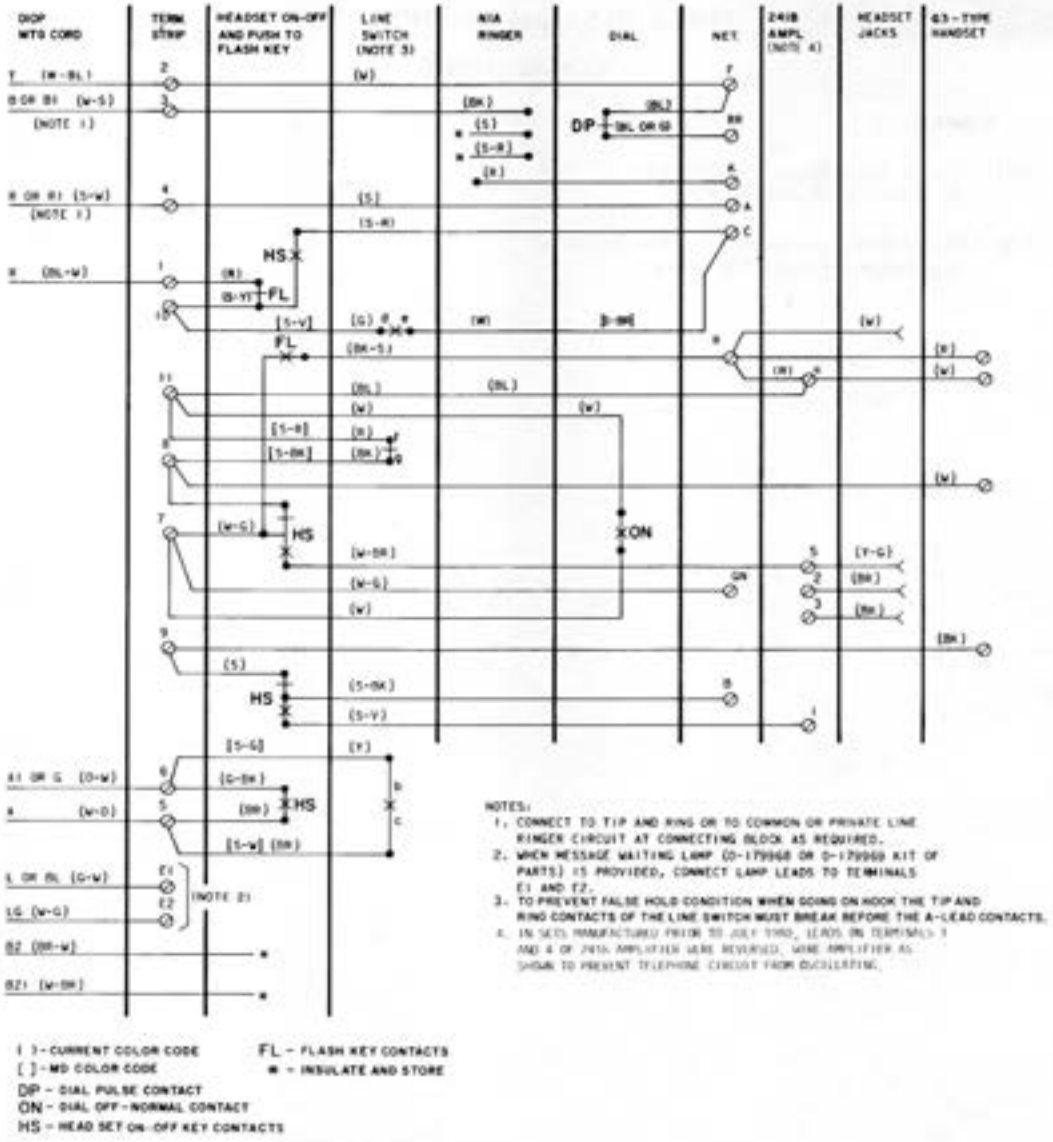

Fig. 1—♦514B (MD) Telephone Set, Connections♦

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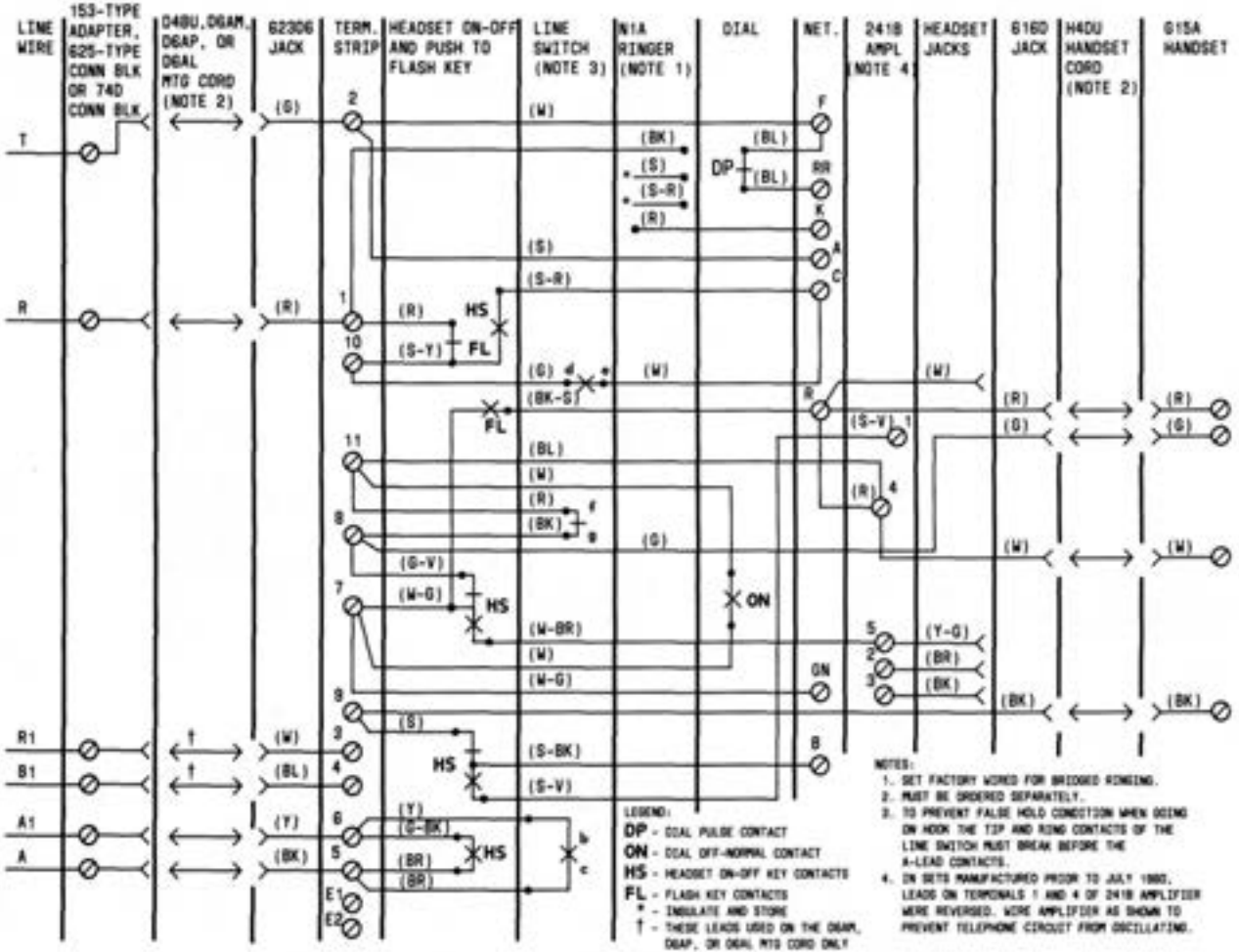

Fig. 2—#514BM Telephone Set, Connections

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SERVICE

526A/B AND 526AM/BM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information for the 526A (MD), 526B (MD), 526AM, and 526BM weatherproof telephone sets.

1.02 Reissued to:

- Add D-181051 Kit of Parts
- Add Fig. 9
- Revise Table D.

TABLE A

FACEPLATES FOR 526-TYPE TELEPHONE SETS

FACEPLATE CODE NUMBER	INTENDED USE	
	TELEPHONE SET	OPTIONAL (KIT TYPE) FEATURES
253A1	526A (MD) and AM (Manual)	None
253A2		Microswitch
253B1	526B (MD) and BM (Rotary Dial)	Single Line Service with or without Exclusion
253B2		Two Line Pick-Up Switch
253B3		Circuit Lock
253B4		Circuit Lock and Two Line Pick-Up Switch

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TABLE B

KITS FOR 526-TYPE TELEPHONE SETS

KIT OF PARTS NUMBER	KIT COMPONENTS	INTENDED USE
D-180382	834854564 (P-48V456) Lock Assembly (Includes Key) 834854209 (P-48V420) Strike Plate	Mechanical lock for 526A housing door
D-180383	812750537 (P-27E053) Exclusion Switch Arm 801809500 (P-180950) Screws (two) 812750578 (P-27E057) Hook and Plunger Assembly	Provide exclusion feature in sets with old-type line switch
D-180385	834854580 (P-48V458) Circuit Lock Assembly 814313763 (P-43A376) Screws (two)	Disables dial on telephone set base
D-180386	834854598 (P-48V459) Microswitch Assembly 829250331 (P-92N033) Terminal Assembly 814313763 (P-43A376) Screws (four)	526A telephone set base for TD2 radio towers
D-180490	834854697 (P-48V469) Plug Assembly 834854382 (P-48V438) Magnet Holder 997028493 (RM-702849) Magnetic Catch 840166763 Screws (four)	Magnetic catch for 526A housing door
D-180849	840363932 Bracket 840363840 Box 801812504 (P-181250) Screws (five) 804703361 (P-470836) Washer (two) 811713619 (P-17A361) Terminal Board Assembly Screws, Phillips Head No. 8-1/2 in. (two) Cover Cable Connector Union Pipe Nipple Galvanized 1/2 in. by 3 in. Protector 123A Jack 652A4	Provide for single line pickup
D-180850	840363832 Bracket 840363840 Box 801812504 (P-181250) Screws (five) 804703361 (P-470336) Washers (two) 811713619 (P-17A361) Terminal Board Assembly Screws, Phillips Head No. 8-1/2 in. (two) Cover Cable Connector Union Pipe Nipple Galvanized 1/2 in. by 3 in. Protector 128A Jack 652A6 Jack 623P6 834854572 (P-48V457) Switch and Arm Bracket 814454211 (P-44E421) Screws (two)	Provide for two line pickup and signaling
D-181051	841388432 Hook and Plunger Assembly 842620700 Pile-up and Lead Assembly 840705891 Hex. H.M. Screw 842620296 Exclusion Drive Arm 842620304 Exclusion Slide - 115	Provide exclusion feature in sets with new slide-type line switch

Note: Extra keys for 834854564 (P-48V456) lock assembly may be ordered from Western Electric Co. as their (840164545) part number.

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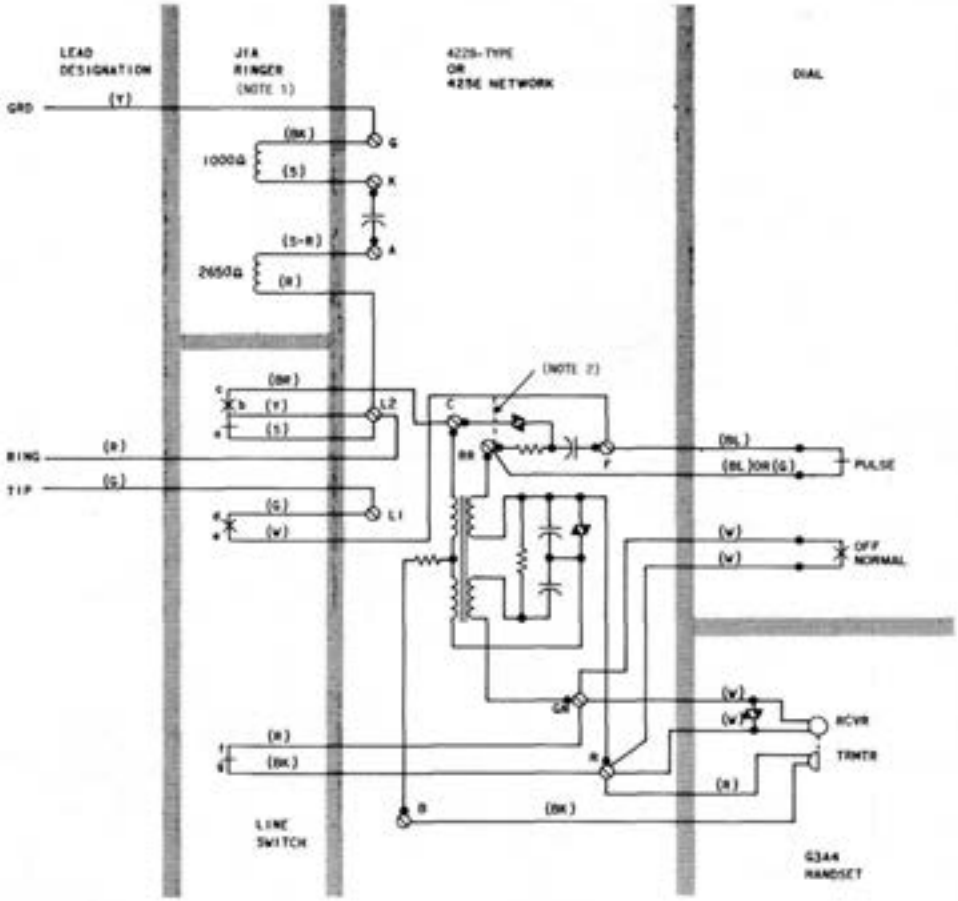

NOTES:
1. SET WIRED FOR RING PARTY SERVICE. FOR OTHER PARTY SERVICE REFER TO LINE AND RINGER CONNECTION TABLE FOR THE 526-TYPE SETS.
2. DASH LINE INDICATES CONNECTION FOR (a) LINE SWITCH LEAD ON MANUAL 526A, OR 526B TELEPHONE SET WHEN DIAL IS DISCONNECTED.

Fig. 1—526A (MD) or 526B (MD) Telephone Set, Connections

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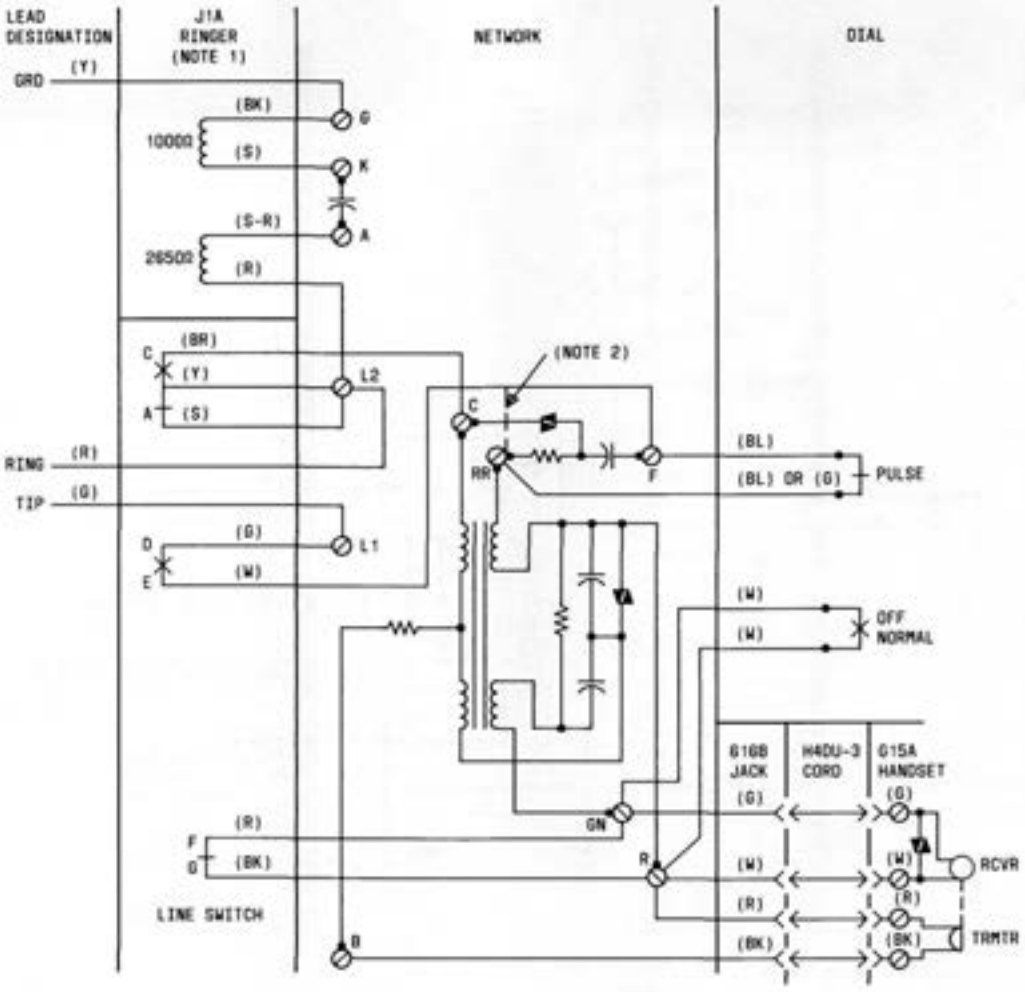

NOTES:
1. SET WIRED FOR RING PARTY SERVICE. FOR OTHER PARTY SERVICE REFER TO LINE AND RINGER CONNECTION TABLE FOR THE 526-TYPE SETS.
2. DASH LINE INDICATES CONNECTION FOR (W) LINE SWITCH LEAD ON MANUAL 526AM OR 526BM TELEPHONE SET WHEN DIAL IS DISCONNECTED

Fig. 2— 526AM or 526BM Telephone Set, Connections (Early Version)

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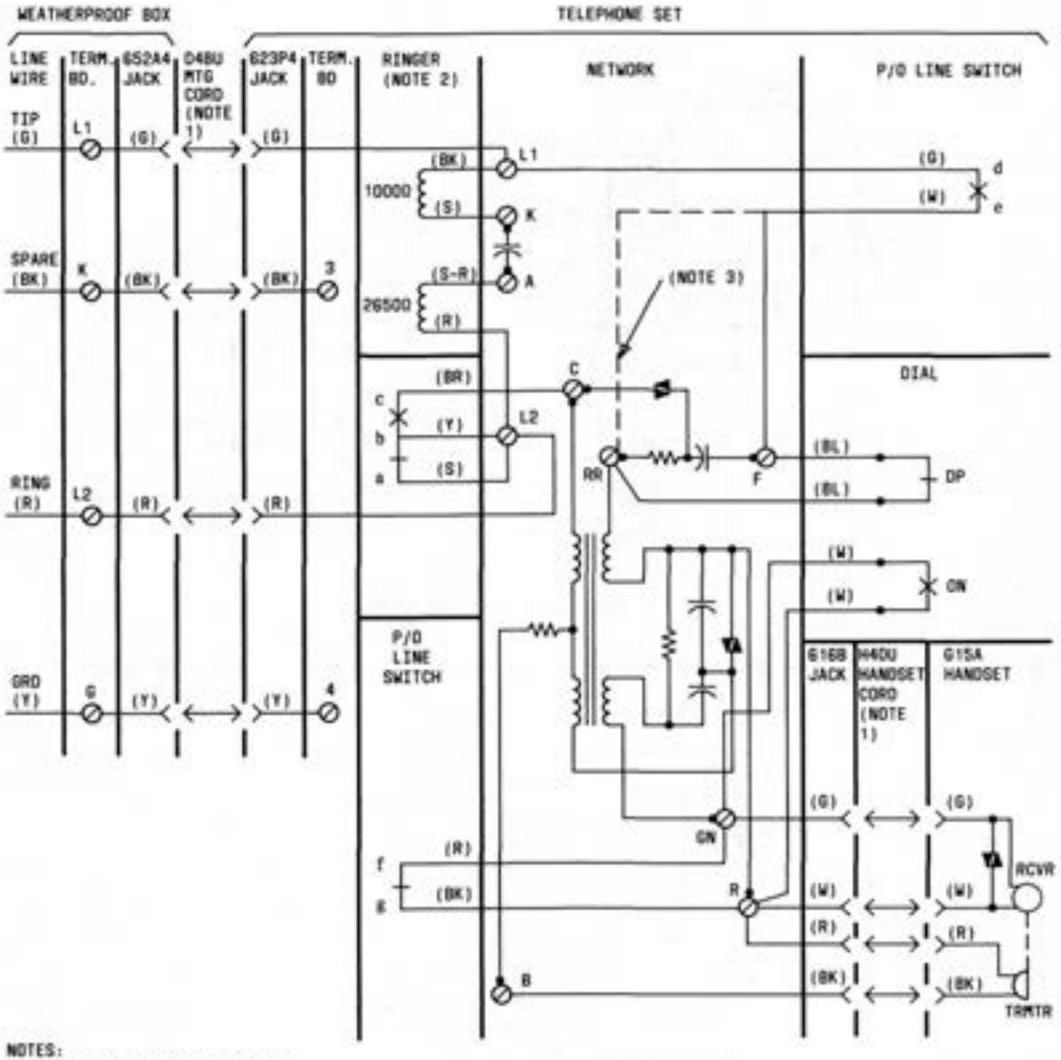

NOTES:
1. MUST BE ORDERED SEPARATELY.
2. SET WIRED FOR BRIDGED RINGING. FOR OTHER CONNECTIONS AND TO SILENCE RINGER REFER TO LINE AND RINGER CONNECTION TABLE FOR THE 625-TYPE SETS.
3. DASH LINE INDICATES CONNECTION FOR (W) LINE SWITCH LEAD ON MANUAL 526AM TELEPHONE SET WHEN DIAL IS REPLACED BY APARATUS BLANK.

Fig. 3— 526AM or 526BM Telephone Set, Connections (Current Version Using a D-180849 Kit of Parts)

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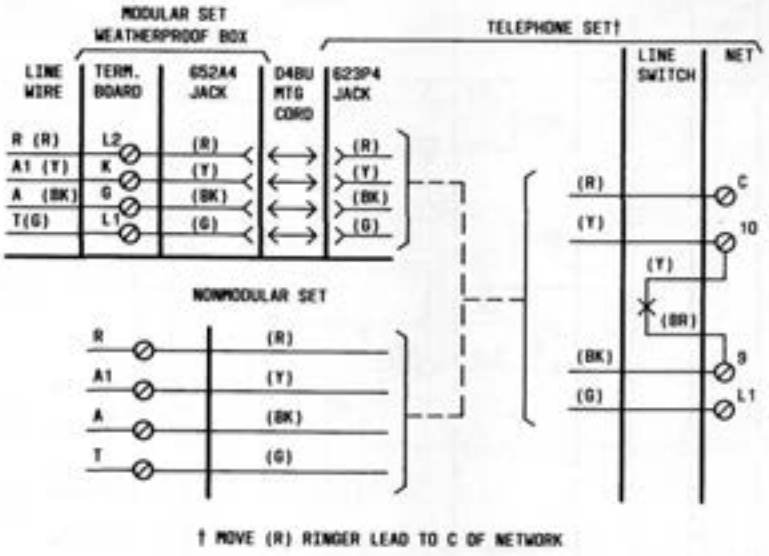
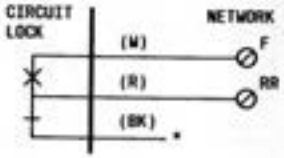


Fig. 4—Ø526-Type Telephone Set Wired for 1A1 or 1A2 Key Telephone System (Using a D-180849 Kit of Parts)Ø



NOTE:
CIRCUIT LOCK DISABLES DIAL AND RESTRICTS TELEPHONE SET TO INCOMING CALLS.

* INSULATE AND STORE

Fig. 5—Ø526-Type Telephone Set, Electric Circuit Lock (Using a D-180385 Kit of Parts)Ø

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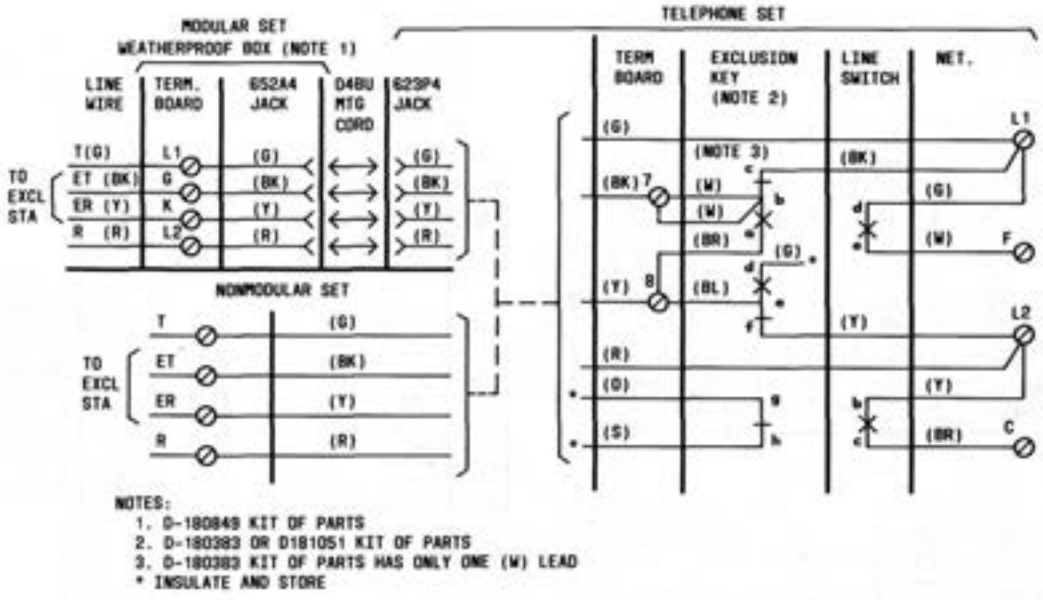

Fig. 6—#526-Type Telephone Set, Wired for Exclusion (Using a D-180383 or D-181051 and a D-180849 Kit of Parts)¢

TCI Library: www.telephonecollectors.info

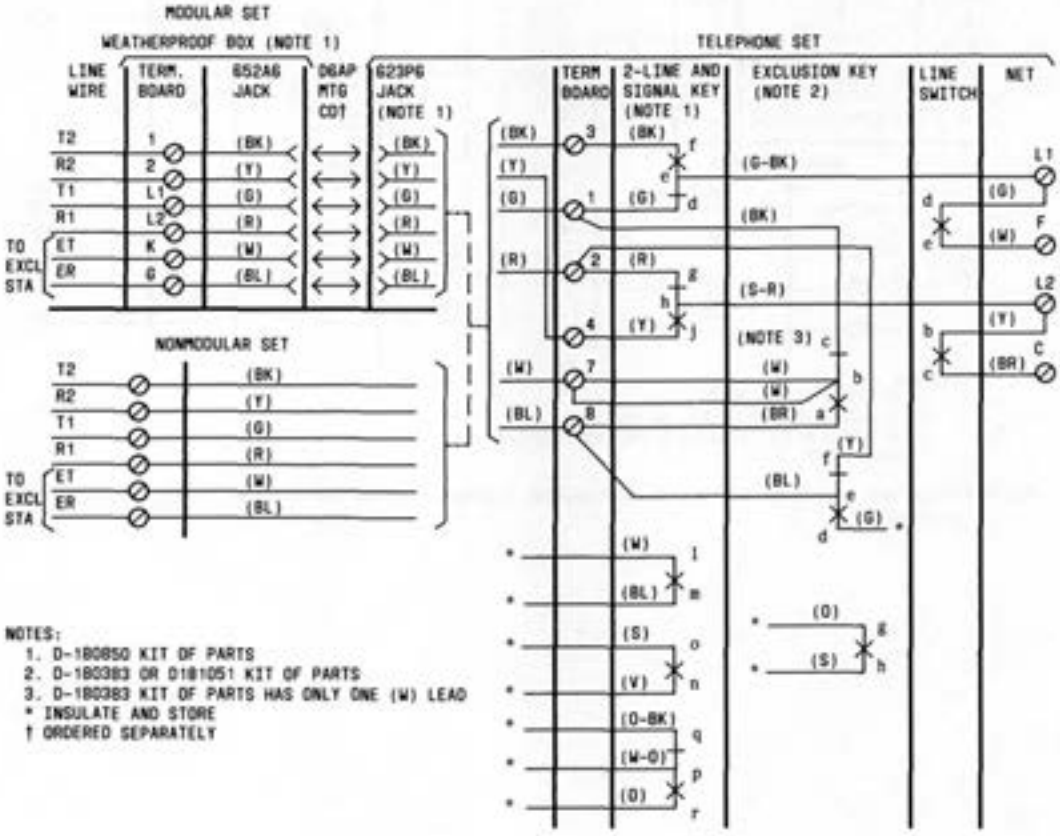

Fig. 7—#526-Type Telephone Set, 2 Line Pickup and Exclusion (Using a D-180383 or D-181051 and a D-180850 Kit of Parts)#

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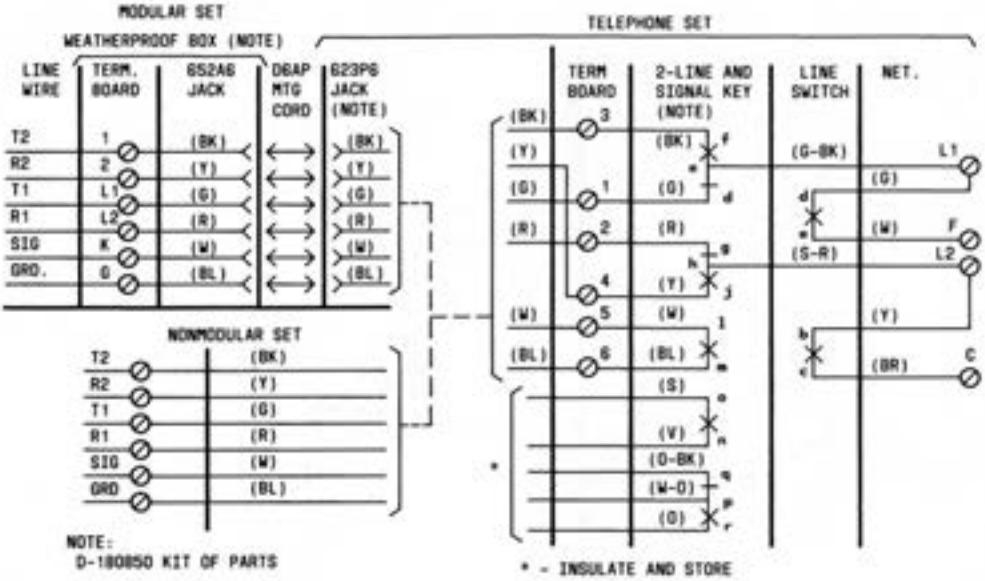

Fig. 8—#526-Type Telephone Set, 2 Line Pickup and Signaling (Using a D-180850 Kit of Parts)#

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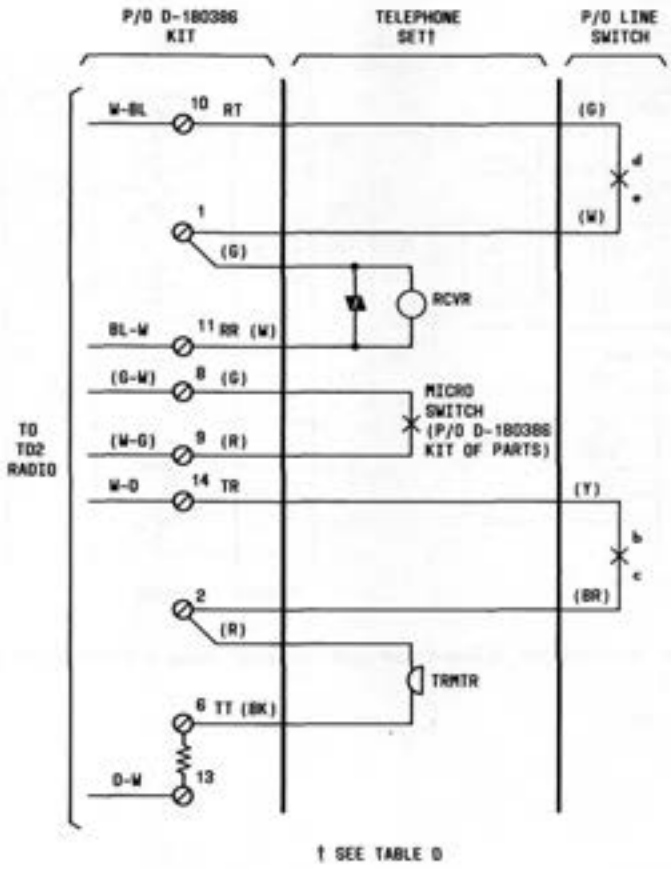

† SEE TABLE D

Fig. 9—#526-Type Telephone Set Connections After D-180386 Kit of Parts Modification#

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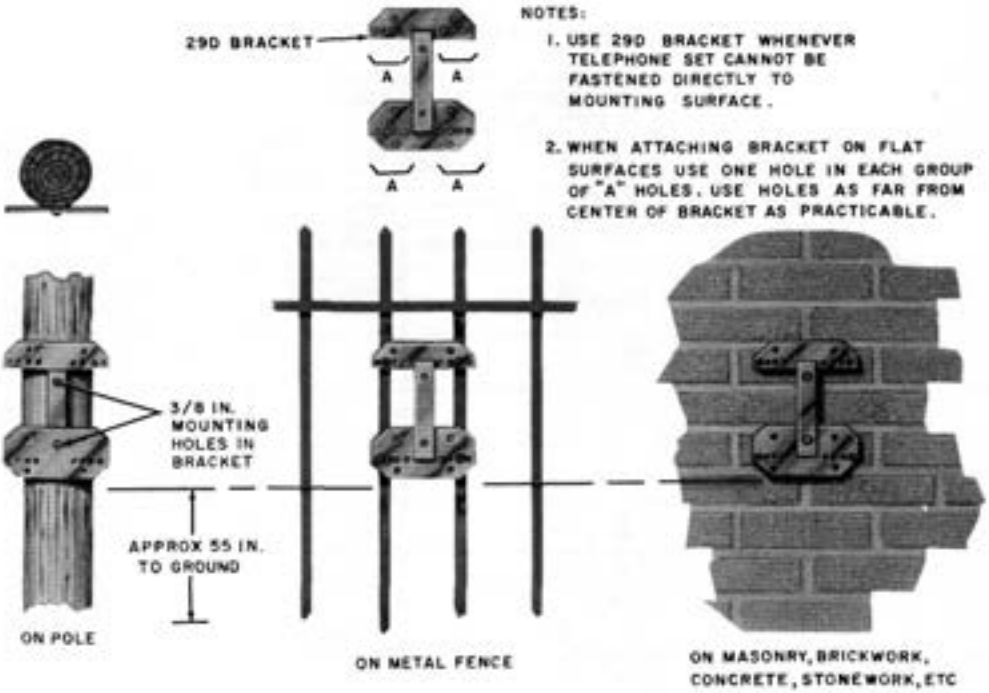

Fig. 10—29D Bracket Mounted on Various Surfaces

TABLE C

FASTENERS FOR 29D BRACKET

SURFACE	QUAN	FASTENERS
Wood	4	1-1/2 in. No. 14 RH galvanized wood screws
Wood poles	4	2-1/2 in. or longer No. 14 RH galvanized wood screws
Wood poles (where diameter of pole is 8 inches or less)	2	5/16 x 3 in. coach screws or 2-1/2 in. or longer No. 14 RH galvanized wood screws
Finished masonry, brickwork, concrete, etc	4	5/16 x 2-1/4 in. hammer drive anchors, or approved equivalent
Solid metal — metal fences, columns, etc*	4	5/16 × 1 in. cadium plated, self-tapping screws. Drill mounting holes using 9/32 in. drill
Masonry block corrugated metal, etc.	4	1/4 x 4 in. RH toggle bolts

* Iron straps, bolts, etc may be used where local instructions permit. Attach telephone set securely.

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♦TABLE D♦

526-TYPE TELEPHONE SET CONNECTION MODIFICATION FOR USE WITH TD2 RADIO (D-180386 Kit of Parts) †

COMPONENT OR LEAD (NOTE 1)	LEAD OR WIRE	TELEPHONE SET	
		526-TYPE (NOTE 2)	
		REMOVE FROM	CONN. TO
	COLOR	NET.	REPLACEMENT TERM. STRIP
Receive Ckt	W-BL‡ BL-W‡		10 11
Transmit Ckt	W-O‡ O-W‡		14 6
Receiver Unit	W G or W	R GN	11 1
Trmtr Unit	R BK	R B	2 6
Line Switch	W Y BR S G	F L2 C L2 L1	1 14 2 * 10
Signal Ckt	W-G‡ G-W‡		9 8
Microswitch	R G		9 8

Note 1: Disconnect from terminal board in telephone set and connect to proper terminal on replacement terminal strip which is part of the D-180386 Kit of Parts.

Note 2: The dial should be removed on 526B/BM telephone sets (use 253A2 faceplate).

* Insulate and store.

† See Fig. 9.

‡ 6 pair inside wiring cable.

§ If circuit does not require the resistor between terminal 6 and 13, connect the (BK) transmitter lead to terminal 13.

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TABLE E

526A (MD), AM AND 526B (MD), BM TELEPHONE SET LINE AND RINGER CONNECTIONS

WIRE OR LEAD		COLOR	INDIV. OR BRIDGED	RING PARTY	TIP PARTY	TIP PARTY IDENT. GROUND	
						1000Ω	2650Ω
Line Wire	Tip	G	L1	L1	L2	L2	L2
	Ring	R	L2	L2	L1	L1	L1
	GRD	Y*	G	G	G	G	G
	GRD	Y†	4‡	4‡	4‡	4‡	4‡
Ringer Leads (NOTE)		R	L2	L2	L1	K	B
		S-R*	A	A	A	B	G
		S-R†	A	A	A	B	4‡
		S	K	K	K	B	K
		BK*	L1	G	G	G	B
		BK†	L1	4‡	4‡	4‡	B
Line Switch		S	L2	L2	L2	A	A

Note: To silence ringer, adjust the four-step volume control to cutoff by bending the stop tab and moving the volume control wheel to a fifth position (Section 501-256-100).

* 526B (MD) set (526BM early version).

† 526BM set (current version).

‡ Terminal board.

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♦TABLE F♦

CONNECTIONS FOR 526AM OR 526BM TELEPHONE SET FOR 1A1 OR 1A2 KEY TELEPHONE SYSTEM

APPARATUS		LEAD COLOR	CONNECT TO		
			WEATHERPROOF BOX TERM. BD	TEL SET	
				TERM. BD	NET.
Line Wire	T		L1		
	R		L2		
	A		G		
	A1		K		
652A4 Jack in Weatherproof Box		G	L1		
		R	L2		
		BK	G		
		Y	K		
623P4 Jack in Tel Set		G			L1
		R			C
		BK		9	
		Y		10	
Line Switch		Y		10	
		BR		9	
Ringer		R			C

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♦TABLE G♦

526AM OR 526BM TELEPHONE SET WITH SINGLE LINE PICKUP (D-180849 KIT OF PARTS) AND EXCLUSION (D-180383 OR D-181051 KIT OF PARTS)

APPARATUS		LEAD COLOR	CONNECT TO		
			WEATHERPROOF BOX TERM. BD	TEL SET	
				TERM. BD	NET.
Line Wire	T		L1		
	R		L2		
	ET		G		
	ER		K		
652A4 Jack in Weatherproof Box		G	L1		
		R	L2		
		BK	G		
		Y	K		
623P4 Jack in Tel Set		G			L1
		R			L2
		BK		7	
		Y		8	
Exclusion Key (Note)		BK			L1
		Y			L2
		W		7	
		W		7	
		BR		8	
		BL		8	
Line Switch		G			L1
		W			F
		Y			L2
		BR			C

Note: D-180383 Kit of Parts has only one (W) lead.

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♦TABLE H♦

526AM OR 526BM TELEPHONE SET WITH TWO-LINE PICKUP (D-180880 KIT OF PARTS) AND EXCLUSION (D-180383 OR D-181051 KIT OF PARTS)

APPARATUS		LEAD COLOR	CONNECT TO		
			WEATHERPROOF BOX TERM. BD.	TEL SET	
				TERM. BD	NET.
Line Wire	T2		1		
	R2		2		
	T1		L1		
	R1		L2		
	ET		K		
	ER		G		
652A6 in Weatherproof Box		BK	1		
		Y	2		
		G	L1		
		R	L2		
		W	K		
		BL	G		
623P6 Jack in Tel Set		BK		3	
		Y		4	
		G		1	
		R		2	
		W		7	
		BL		8	
Two-line Pickup and Signal Key in Tel Set		G-BK			L1
		BK		3	
		S-R			L2
		G		1	
		R		2	
		Y		4	
Exclusion Key (Note)		BK		1	
		W		7	
		W		7	
		BR		8	
		BL		8	
		Y		2	

Note: D-180383 Kit of Parts has only one (W) lead.

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♦TABLE I♦

526AM OR 526BM TELEPHONE SET WITH TWO-LINE PICKUP AND SIGNALING (D-180850 KIT OF PARTS)

APPARATUS		LEAD COLOR	CONNECT TO		
			WEATHERPROOF BOX TERM. BD	TEL SET	
				TERM. BD	NET.
Line Wire	T2		1		
	R2		2		
	T1		L1		
	R1		L2		
	GRD		G		
	SIG		K		
652A6 Jack in Weatherproof Box		BK	1		
		Y	2		
		G	L1		
		R	L2		
		BL	G		
		W	K		
623P6 Jack in Tel Set		BK		3	
		Y		4	
		G		1	
		R		2	
		BL		6	
		W		5	
Two-Line Pickup and Signal Key		BK		3	
		G-BK			L1
		G		1	
		S-R			L2
		R		2	
		Y		4	
		W		5	
		BL		6	

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SERVICE

2500M, 2500MM, AND 2500MMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2500M (MD), 2500MM, and 2500MMG telephone sets (Fig. 1, 2, and 3). These sets are factory-wired for A-lead control.

1.02 This section is being reissued to add information on the 2500MMG telephone set equipped with a 72-type dial. Revision arrows are used to emphasize the more significant changes.

2. CONNECTIONS

2.01 An optional common audible ringing feature is available with these sets. When this feature is desired, two additional line conductors are required. Refer to Table A for connection information.

2.02 ▮When a polarity guard is required in the 2500M (MD) or 2500MM telephone set, install a D-180896 Kit of Parts as shown in Table B. This polarity guard kit is a direct replacement for the 819040528 (P-90D052) (MD) guard assembly.

2.03 The 2500MMG telephone set is furnished equipped with a 72-type dial which contains a polarity guard eliminating the possibility of improper operation due to line reversals.

2.04 Refer to Table C or D for modifications when replacing 35-type dial with a 72-type dial in the 2500MM telephone set.▮

TABLE A

LINE AND RINGER CONNECTIONS FOR COMMON AUDIBLE RING WITH 1A1 OR 1A2 KTS

LINE WIRE LEAD DESIGNATION AT CONNECTING BLOCK (NOTE 1)						CONNECTIONS IN SET							
						6-CONDUCTOR MOUNTING CORD OR 6-CONDUCTOR JACK LEADS (NOTE 2)						C48 RINGER LEADS	
(G)	(R)	(BK)	(Y)	(BL)	(W)	(G)	(R)	(BK)	(Y)	(BL)	(W)	(BK)	(R)
Tip	Ring	A	A1	B1	R1	F	A	L1	G	L2	*	L2	*

Note 1: Sets are furnished wired for 1A1 or 1A2 KTS with bridged ringing.

Note 2: If set is equipped with a 4-conductor mounting cord (Fig. 1, 2, and 3) replace with a 6-conductor mounting cord.

*Use D-161488 connector to connect the (R) ringer lead to the (W) mounting cord or jack lead.

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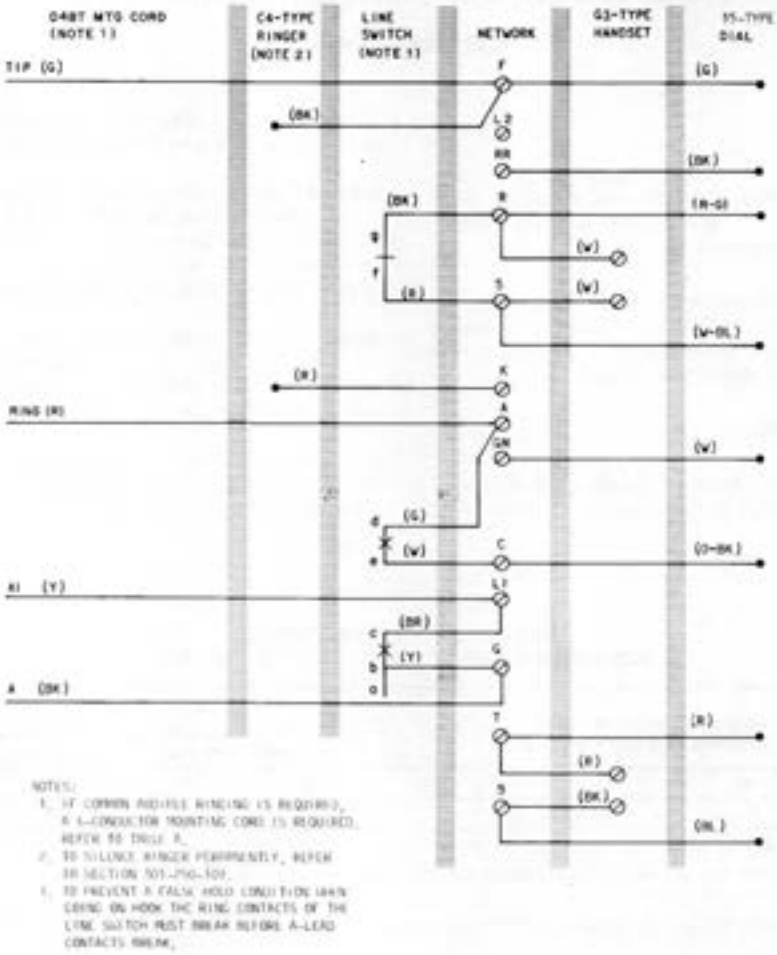

Fig. 1—2500M (MD) Telephone Set, Connections

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◆ TABLE B ◆

POLARITY GUARD CONNECTIONS
[819040528 (P-90D052) (MD) GUARD ASSEMBLY OR D-180896 KIT OF PARTS POLARITY GUARD, SEE NOTE]

LEAD	COLOR	REMOVE FROM NET.	CONNECT TO	
			POLARITY GUARD	NET.
Line Switch	W	C	S	
D4BT Mtg Cord or 623-Type Jack	G	F	T	
Ringer	BK			
Polarity Guard	W			C
	G			F

Note: For use only with 35-type dial when specified by local instructions for end-to-end signaling installations.

◆TABLE C◆

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL IN 2500MM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	W	C	D*
616D Jack (Handset)	R	T	R
	BK	B	T

*72-type dial terminal.

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♦TABLE D♦

MODIFICATION TO REPLACE 35-TYPE DIAL AND POLARITY GUARD WITH 72-TYPE DIAL IN 2500MM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
623D6 Jack	G	T†	F
Ringer	BK	T†	F
Line Switch	W	S†	D‡
616D Jack	R	T	R
	BK	B	T
Polarity Guard*	G	F	—
	W	C	—

*Polarity guard should be removed from telephone set.

†Polarity guard terminal.

‡72-type dial terminal.

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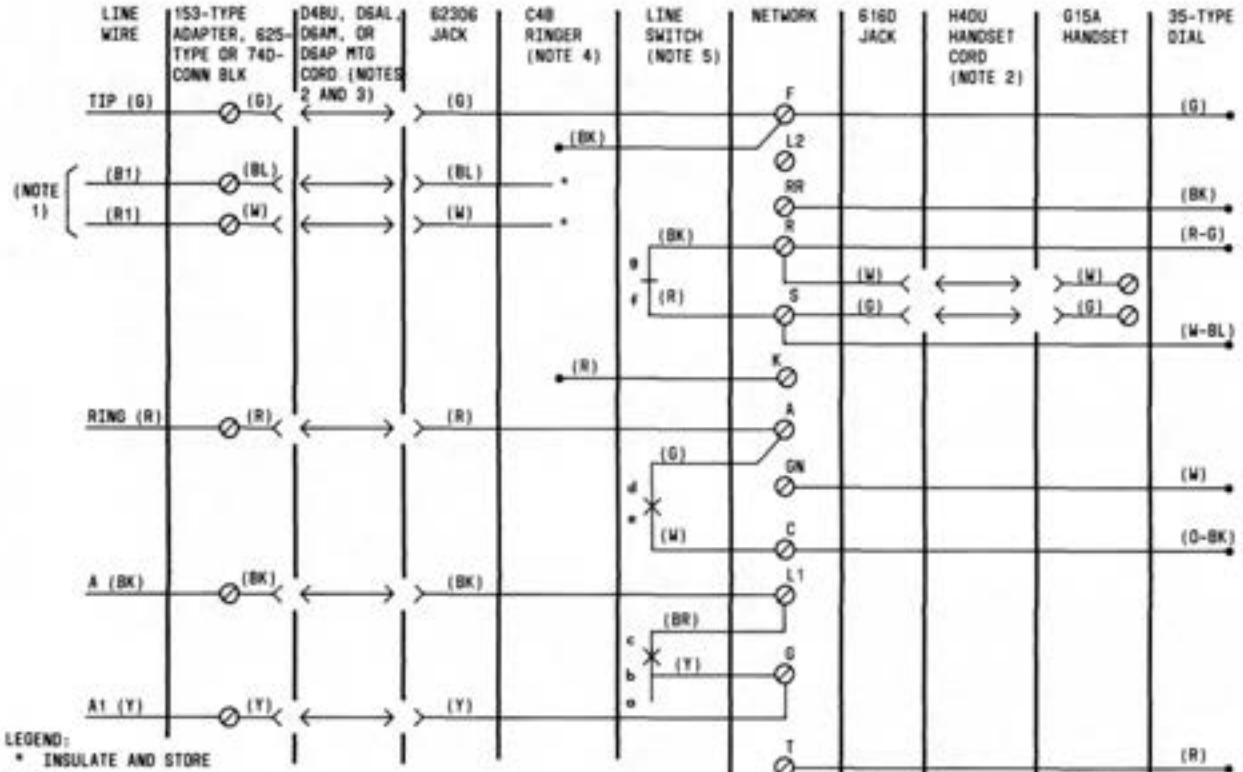

NOTES:

1. IF COMMON AUDIBLE RINGING IS DESIRED, USE OF THESE TWO LINE CONDUCTORS IS REQUIRED. REFER TO TABLE A.
2. MUST BE ORDERED SEPARATELY.
3. IF COMMON AUDIBLE RINGING IS DESIRED A 6-CONDUCTOR MTG CORD IS REQUIRED. REFER TO TABLE A.
4. TO SILENCE RINGER PERMANENTLY, REFER TO SECTION 501-250-303.
5. TO PREVENT A FALSE HOLD CONDITION WHEN GOING ON HOOK, THE RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE A-LEAD CONTACTS BREAK.

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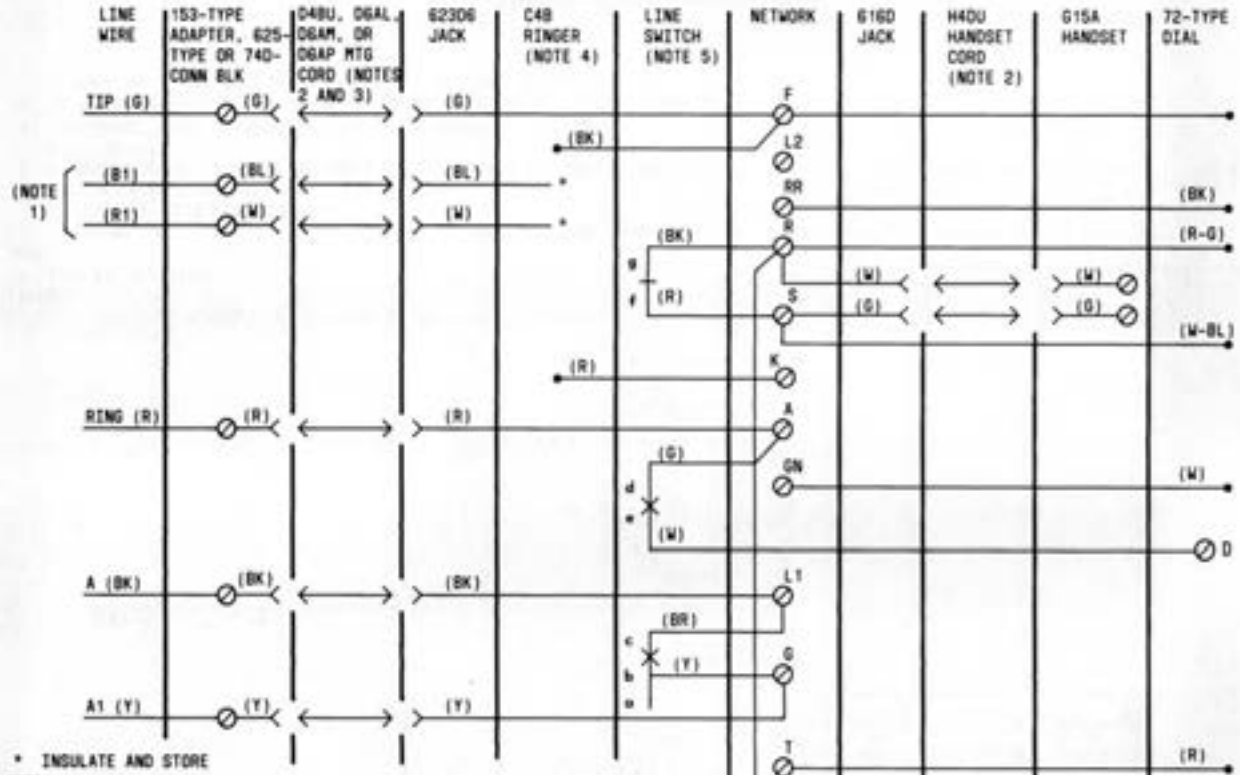
Fig. 2—2500MM Telephone Set, Connections



* INSULATE AND STORE

NOTES:
1. IF COMMON AUDIBLE RINGING IS DESIRED, USE OF THESE TWO LINE CONDUCTORS IS REQUIRED. REFER TO TABLE A.
2. MUST BE ORDERED SEPARATELY.
3. IF COMMON AUDIBLE RINGING IS DESIRED A 6-CONDUCTOR MTG CORD IS REQUIRED. REFER TO TABLE A.
4. TO SILENCE RINGER PERMANENTLY, REFER TO SECTION 501-250-303.
5. TO PREVENT A FALSE HOLD CONDITION WHEN GOING ON HOOK, THE RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE A-LEAD CONTACTS BREAK.

Fig. 3—▶2500MMG Telephone Set, Connections◀

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SERVICE

2500S AND 2500SM TELEPHONE SETS

1. GENERAL

1.01 Reissued to add 623D4 jack and D4BU mounting cord to 2500SM telephone set (Fig. 2).

TABLE A

POLARITY GUARD CONNECTIONS
[819040528 (P-900052) GUARD ASSEMBLY]

LEAD	COLOR	REMOVE FROM NETWORK	CONNECT TO	
			NETWORK	POLARITY GUARD
Line Switch	W	C		S
Dial	G-W BK	C RR		S T
Polarity Guard	W G		C RR	

Note: For use when specificed by local instructions for end-to-end signaling installation.

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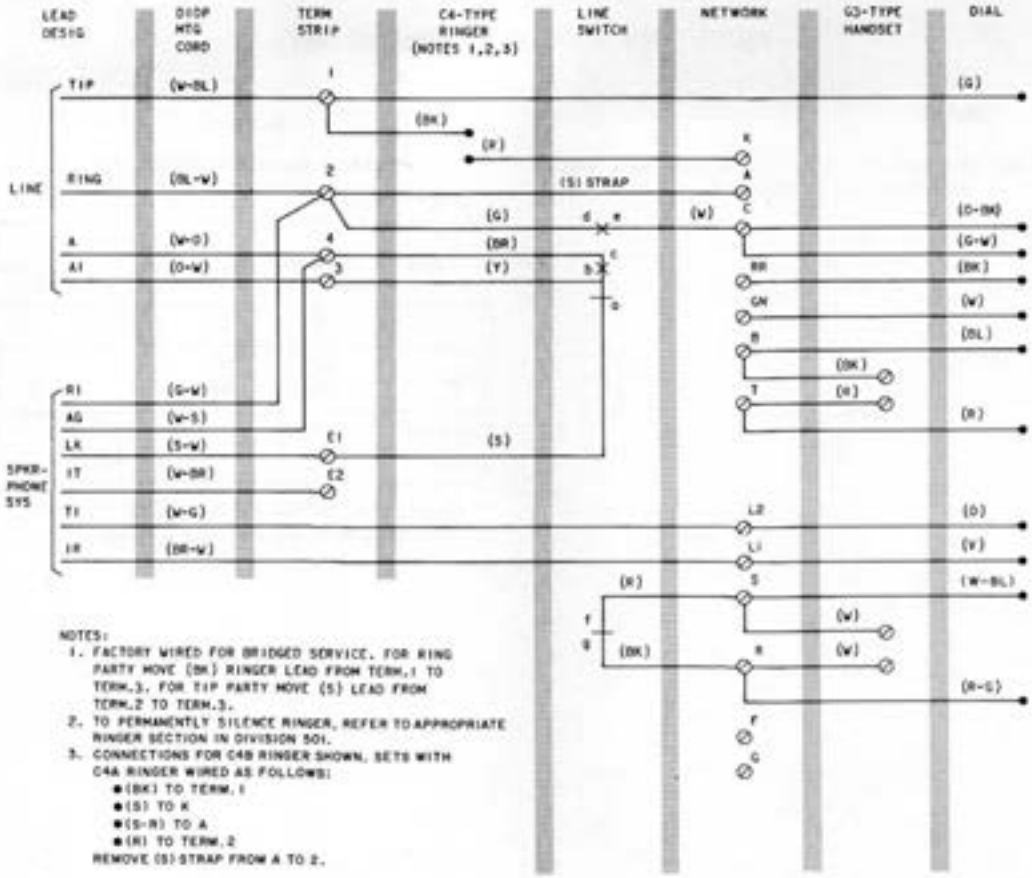

Fig. 1—2500S Telephone Set, Connections

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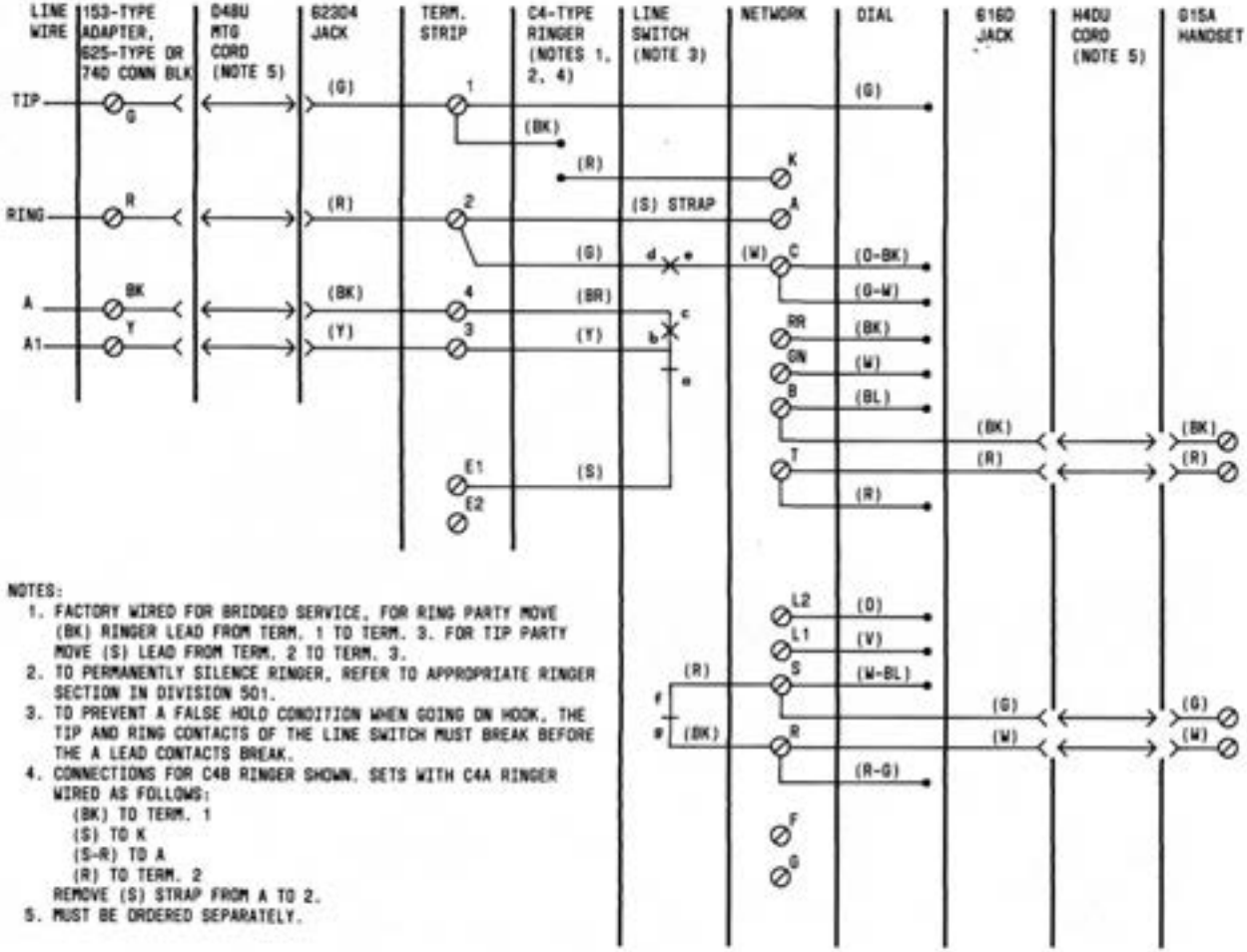

NOTES:

1. FACTORY WIRED FOR BRIDGED SERVICE. FOR RING PARTY MOVE (BK) RINGER LEAD FROM TERM. 1 TO TERM. 3. FOR TIP PARTY MOVE (S) LEAD FROM TERM. 2 TO TERM. 3.
2. TO PERMANENTLY SILENCE RINGER, REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.
3. TO PREVENT A FALSE HOLD CONDITION WHEN GOING ON HOOK, THE TIP AND RING CONTACTS OF THE LINE SWITCH MUST BREAK BEFORE THE A LEAD CONTACTS BREAK.
4. CONNECTIONS FOR C4B RINGER SHOWN. SETS WITH C4A RINGER WIRED AS FOLLOWS:
   (BK) TO TERM. 1
   (S) TO K
   (S-R) TO A
   (R) TO TERM. 2
   REMOVE (S) STRAP FROM A TO 2.
5. MUST BE ORDERED SEPARATELY.

Fig. 2 - 82500SM Telephone Set Connections

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SERVICE

2500Y, 2500YM, AND 2500YMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2500Y manufacture discontinued (MD), 2500YM, and 2500YMG telephone sets (Fig. 1, 2, and 3). These sets are factory wired with message waiting lamp feature.

1.02 This section is being reissued to add information on the 2500YMG telephone set equipped with a 72-type dial. Revision arrows are used to emphasized the more significant changes.

2. CONNECTIONS

2.01 ◗When a polarity guard is required in the 2500Y (MD) or 2500YM telephone set, install a D-180896 Kit of Parts as shown in Table A. This polarity guard kit is a direct replacement for the 819040528 (P-90D052) (MD) guard assembly.

2.02 The 2500YMG telephone set is furnished equipped with a 72-type dial which contains a polarity guard eliminating the possibilty of improper operation due to line reversals.

2.03 Refer to Table B or C for modifications when replacing 35-type dial with a 72-type dial in the 2500YM telephone set.◖

◗ TABLE A ◖

POLARITY GUARD CONNECTIONS [819040528 (P-90D052) (MD) GUARD ASSEMBLY OR D-180896 KIT OF PARTS POLARITY GUARD, SEE NOTE]

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	POLARITY GUARD	NET.
Line Switch	W	F	T	
	BR	C	S	
Polarity Guard	W			C
	G			F

Note: For use only with 35-type dial when specified by local instructions for end-to-end signaling installations.

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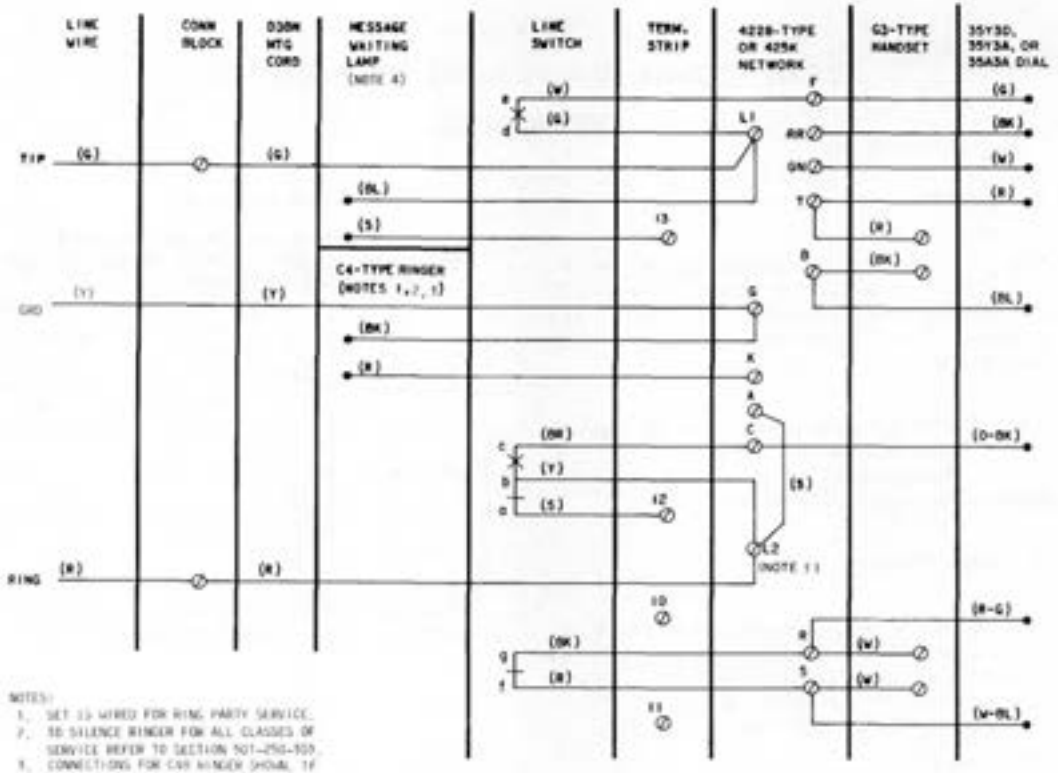

Fig. 1—2500Y (MD) Telephone Set, Connections

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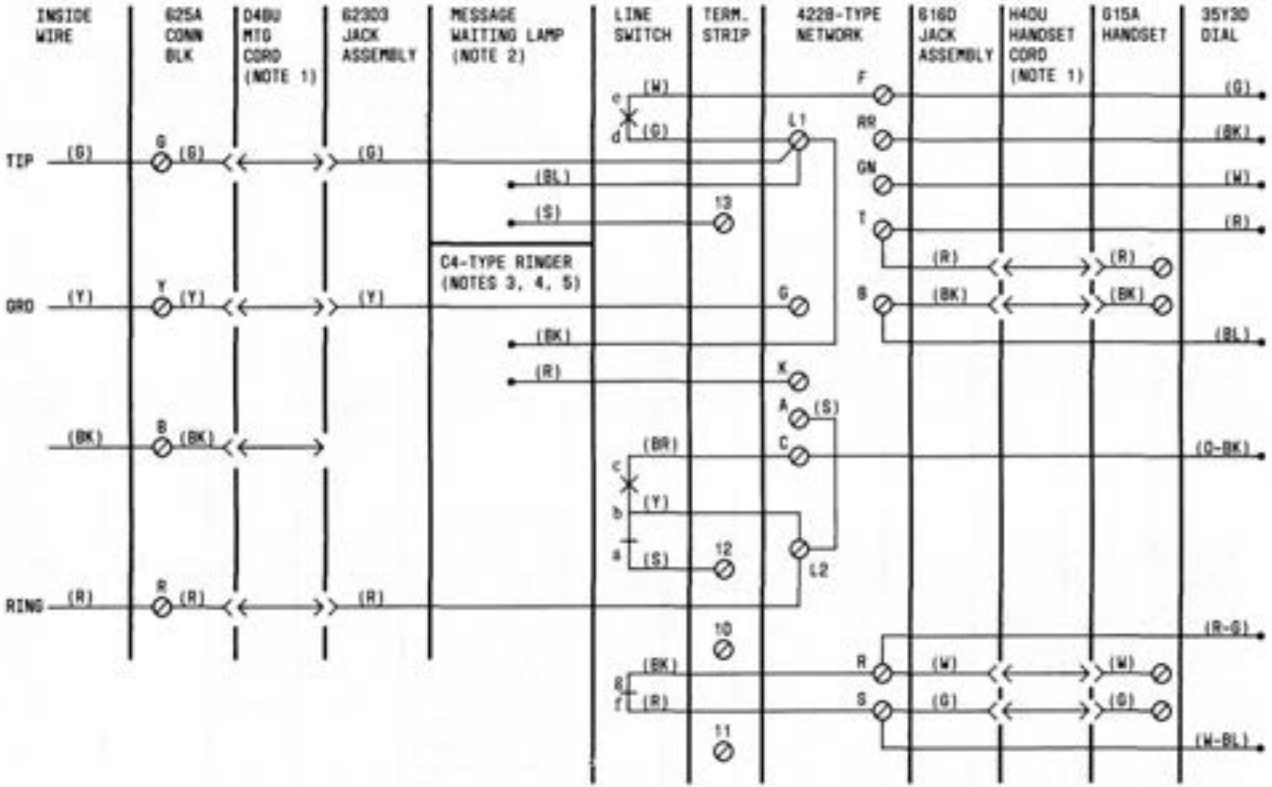

NOTES:
1. H4DU CORD MUST BE ORDERED SEPARATELY.
2. LAMP AND BRACKET ASSEMBLY 812854420 (P-28E442) FOR MESSAGE WAITING LAMP.
3. SET FACTORY-WIRED FOR BRIDGED SERVICE.
4. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO SECTION 501-250-303.
5. CONNECTIONS FOR C4B RINGER SHOWN. IF C4A RINGER IS USED, WIRE AS FOLLOWS:
   (BK) TO L1 (S-R) TO A
   (S) TO K (R) TO L2
   REMOVE (S) STRAP FROM A TO L2 OF NETWORK.

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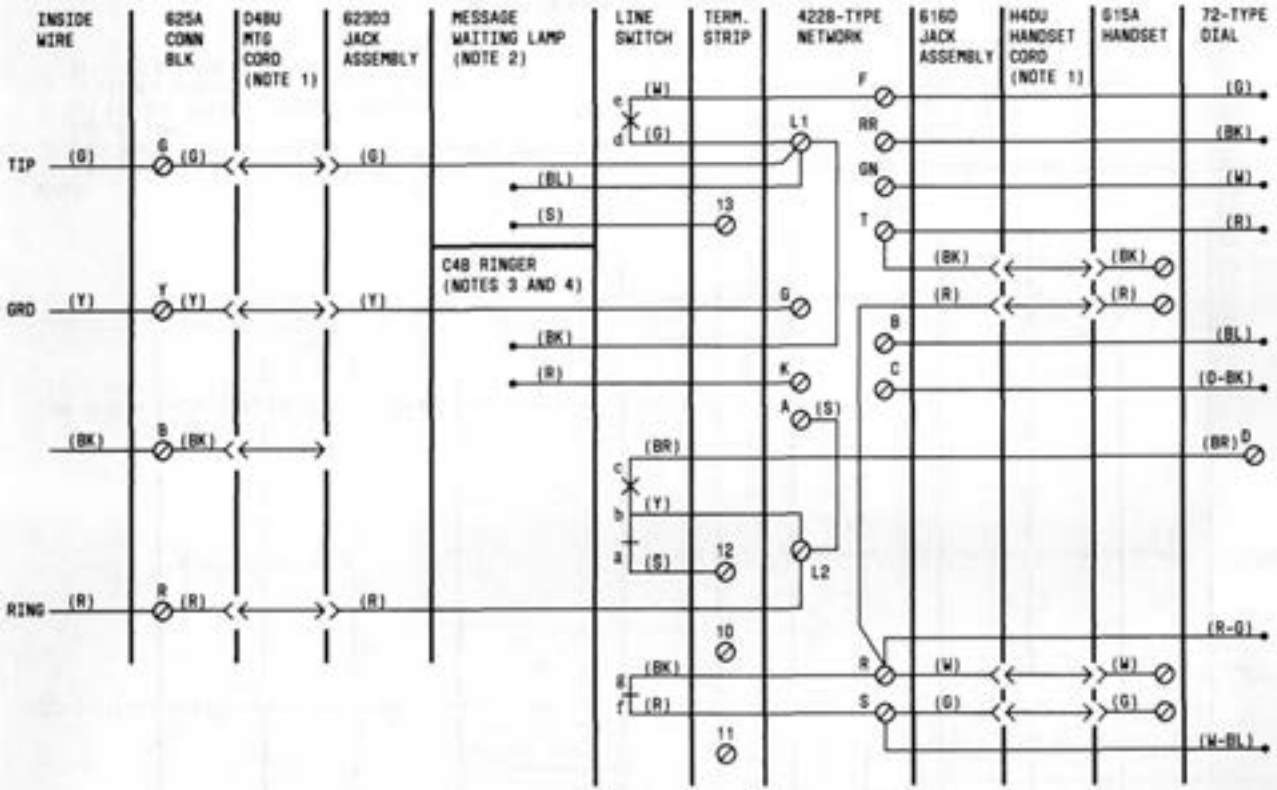
Fig. 2—♦2500YM Telephone Set, Connections♦



NOTES:
1. H4DU CORD MUST BE ORDERED SEPARATELY.
2. LAMP AND BRACKET ASSEMBLY 812054420 (P-28E442) FOR MESSAGE WAITING LAMP.
3. SET FACTORY-WIRED FOR BRIDGED SERVICE.
4. TO SILENCE RINGER FOR ALL CLASSES OF SERVICE REFER TO SECTION 501-250-303.

Fig. 3—▮2500YMG Telephone Set, Connections▮

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◊TABLE B◊

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL IN 2500YM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	BR	C	D*
616D Jack (Handset)	R	T	R
	BK	B	T

*72-type dial terminal.

◊TABLE C◊

MODIFICATION TO REPLACE 35-TYPE DIAL AND POLARITY GUARD WITH 72-TYPE DIAL IN 2500YM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM NETWORK (35-TYPE DIAL)	CONNECT TO NETWORK (72-TYPE DIAL)
Dial	G	F	F
	BK	RR	RR
	R-G	R	R
	R	T	T
	W-BL	S	S
	W	GN	GN
	O-BK	C	C
	BL	B	B
Line Switch	W	T†	F
	BR	S†	D‡
616D Jack (Handset)	R	T	R
	BK	B	T
Polarity Guard*	G	F	—
	W	C	—

* Polarity guard should be removed from telephone set.

† Polarity guard terminal.

‡ 72-type dial terminal.

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SERVICE

2514B, 2514BM, AND 2514BMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2514B (MD), 2514BM, and 2514BMG telephone sets (Fig. 1, 2, and 3). These sets have jacks which accept an optional headset. These sets are factory wired for A-lead control

1.02 This section is being reissued to add information on 2514BMG telephone set equipped with a 72-type dial. Revision arrows are used to emphasize the more significant changes.

2. CONNECTIONS

2.01 ➧When a polarity guard is required in the 2514B (MD) or 2514BM telephone set, install a D-180896 Kit of Parts as shown in Table A. This polarity guard kit is a direct replacement for the 819040528 (P-90D052) (MD) guard assembly.

2.02 The 2514BMG telephone set is furnished equipped with a 72-type dial which contains a polarity guard eliminating the possibility of improper operation due to line reversals.

2.03 Refer to Table B or C for modifications when replacing 35-type dial with a 72-type dial in 2514BM telephone set.➧

➧ TABLE A ➧

POLARITY GUARD CONNECTIONS [819040528 (P-90D052) (MD) GUARD ASSEMBLY OR D-180896 KIT OF PARTS POLARITY GUARD, SEE NOTE]

TEL SET	WIRE OR LEAD	COLOR	REMOVE FROM		CONNECT TO		
			TERM. STRIP	NET.	TERM. STRIP	NET.	POLARITY GUARD
2514B (MD)	D10P MTG Cord	W-BL	2				T
2514BM	623D6 Jack	G					
	Strap	S					
2514B (MD) and 2514BM	Line Switch	W		C			S
	642A Key	S-R					
	Polarity Guard	G			2		
		W				C	

Note: For use only with 35-type dial when specified by local instructions for end-to-end signaling installations.

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TABLE B

MODIFICATION TO REPLACE 35-TYPE DIAL WITH 72-TYPE DIAL IN 2514BM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM (35-TYPE DIAL)		CONNECT TO 72-TYPE DIAL)	
		TERM. STRIP	NET.	TERM. STRIP.	NET.
Dial	G	2		2	
	BK		RR		RR
	R		T		T
	W-BL		S		S
	W		GN		GN
	R-G		R		R
	BL		B		B
	O-BK		C		C
Headset ON-OFF Key	S-R		C		D*
Line Switch	W		C		D*
616D Jack	R		T		R
Strap	R		T		R
Headset ON-OFF Key	S-BK		B		T

* 72-type dial terminal.

TABLE C

MODIFICATION TO REPLACE 35-TYPE DIAL POLARITY GUARD WITH 72-TYPE DIAL IN 2514BM TELEPHONE SET

WIRE OR LEAD	COLOR	REMOVE FROM (35-TYPE DIAL)		CONNECT TO (72-TYPE DIAL)	
		TERM. STRIP	NET.	TERM. STRIP.	NET.
Dial	G	2		2	
	BK		RR		RR
	R		T		T
	W-BL		S		S
	W		GN		GN
	R-G		R		R
	BL		B		B
	O-BK		C		C
623D6 Jack	G		T†	2	
Strap	S		T†	2	
Line Switch	W		S†		D‡
Headset ON-OFF Key	S-R		S†		D‡
616D Jack	R		T		R
Strap	R		T		R
Headset ON-OFF Key	S-BK		B		T
Polarity Guard*	G W	2	 C	— —	— —

* Polarity guard should be removed from telephone set.
† Polarity guard terminal.
‡ 72-type dial terminal.

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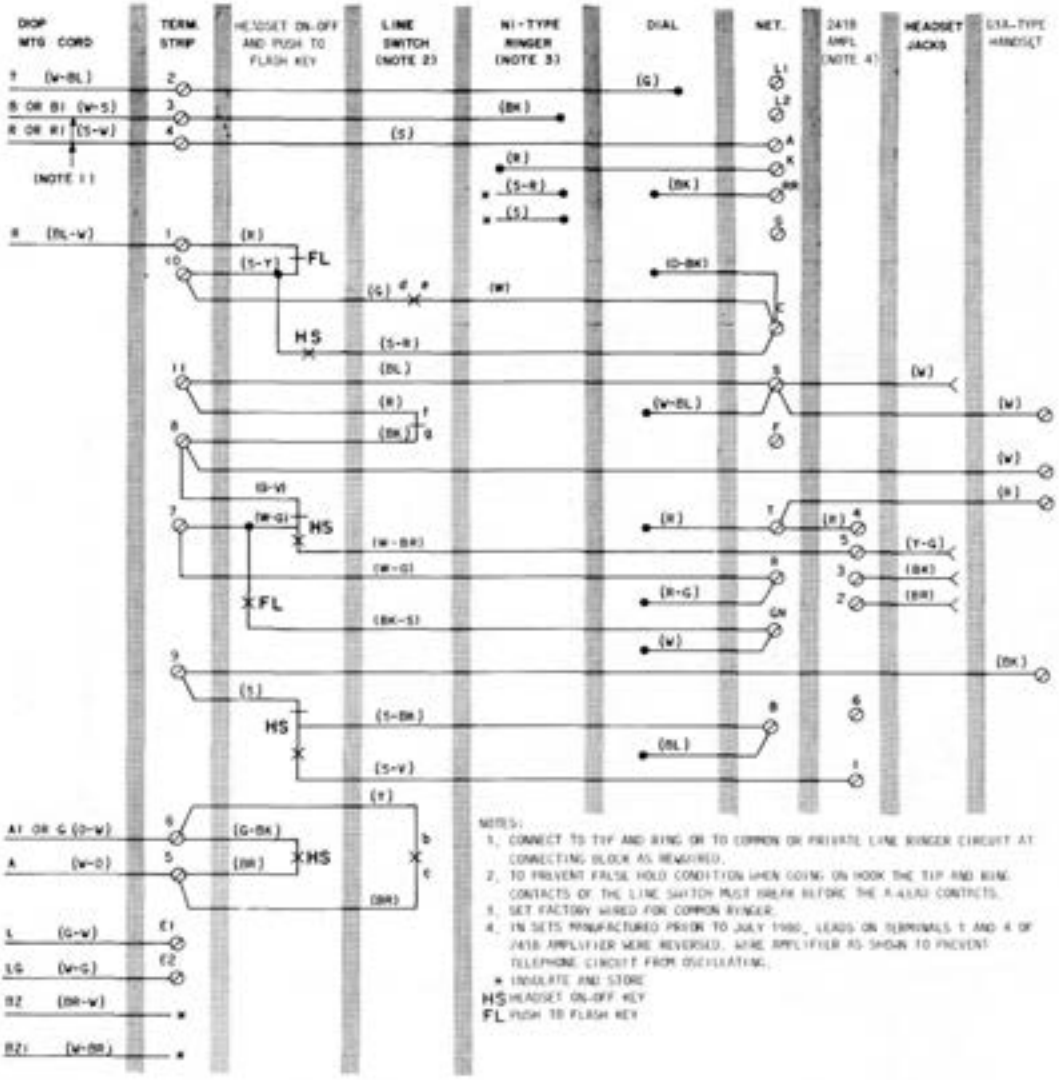

Fig. 1—2514B (MD) Telephone Set, Connections

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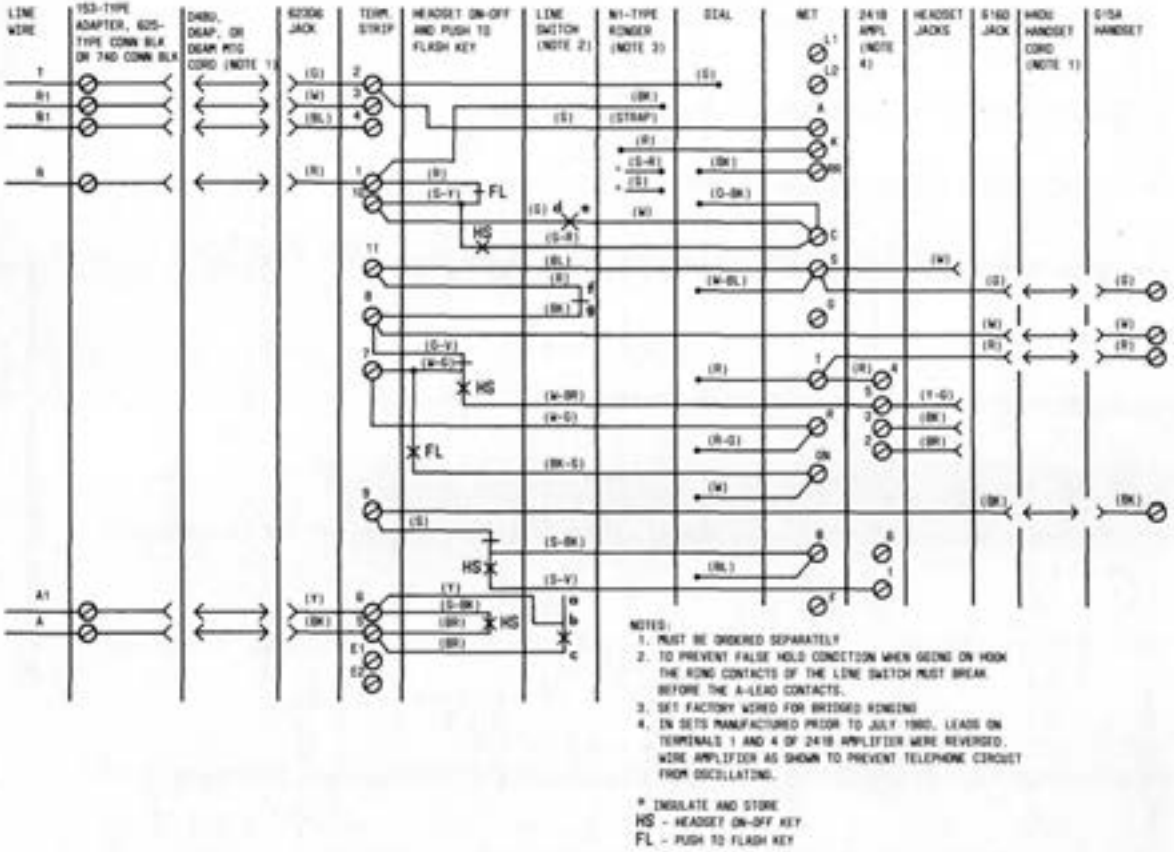

Fig. 2—2514BM Telephone Set, Connections

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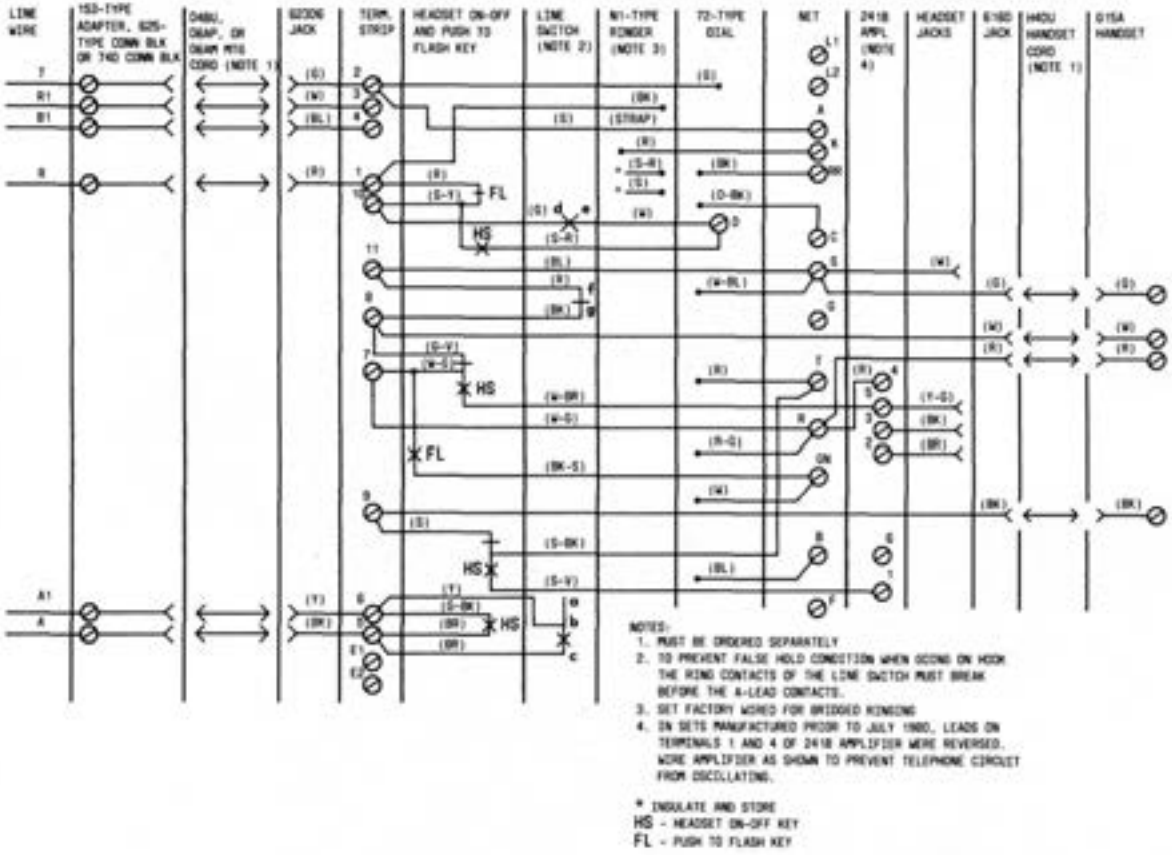

Fig. 3—#2514BMG Telephone Set, Connections#

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SERVICE

2526B, 2526BM, AND 2526BMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information for the 2526B (MD), 2526BM (MD), and 2526BMG weatherproof telephone set.

1.02 Reissued to:

- Add 2526BMG telephone set
- Add D-181006 Kit of Parts
- Add D-181051 Kit of Parts
- Show 2526BM telephone set MD.

TABLE A

FACEPLATE CODE NUMBER

FACEPLATE CODE NUMBER	INTENDED USE	
	TELEPHONE SET	OPTIONAL (KIT TYPE) FEATURES
253C1	2526B (MD), 2526BM (MD), or 2526BMG (TOUCH-TONE Dial)	Single Line Service with or without Exclusion
253C2		Two Line Pick-Up Switch
253C3		Circuit Lock
253C4		Circuit Lock and Two Line Pick-Up Switch

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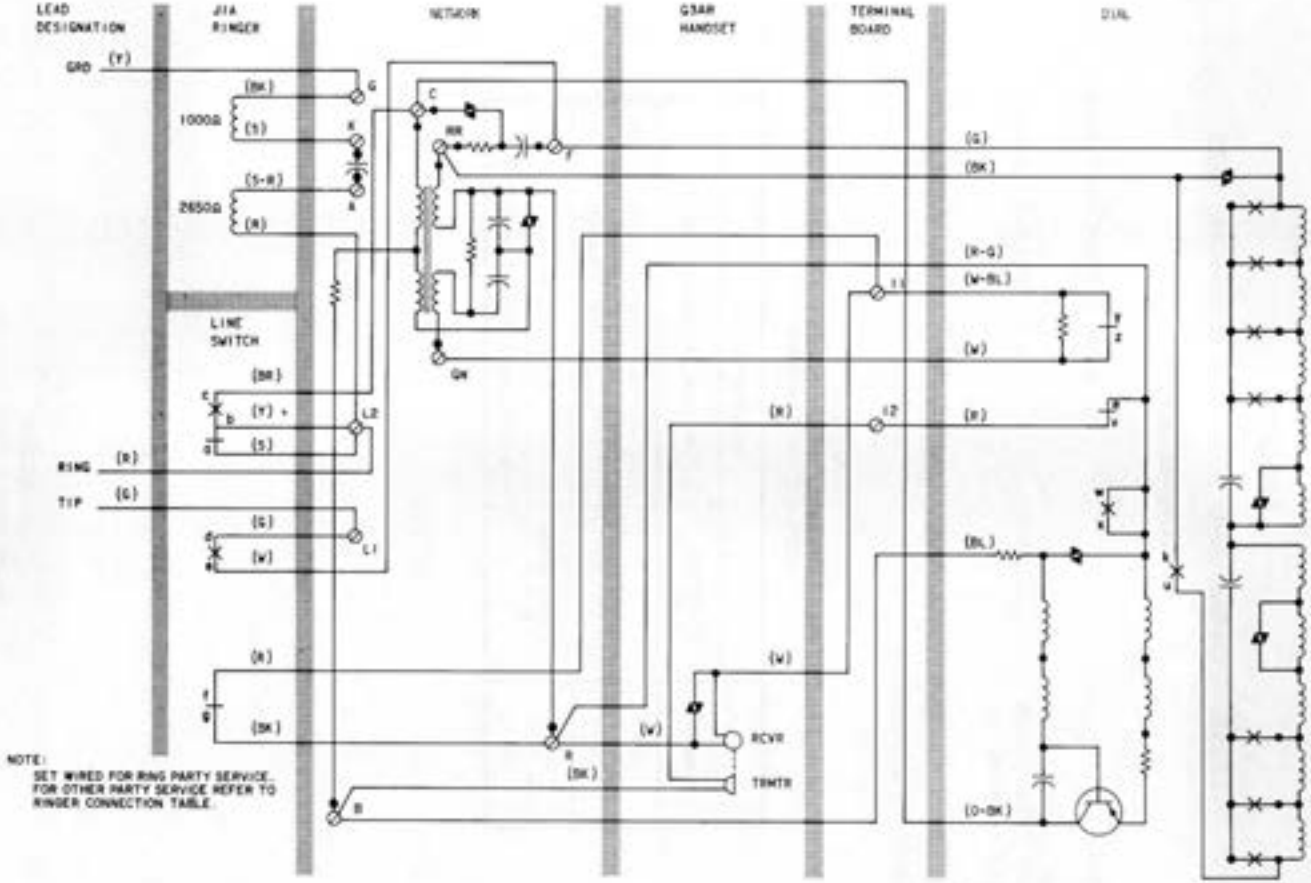

Fig. 1 2500-type (MF) Telephone Set Connections

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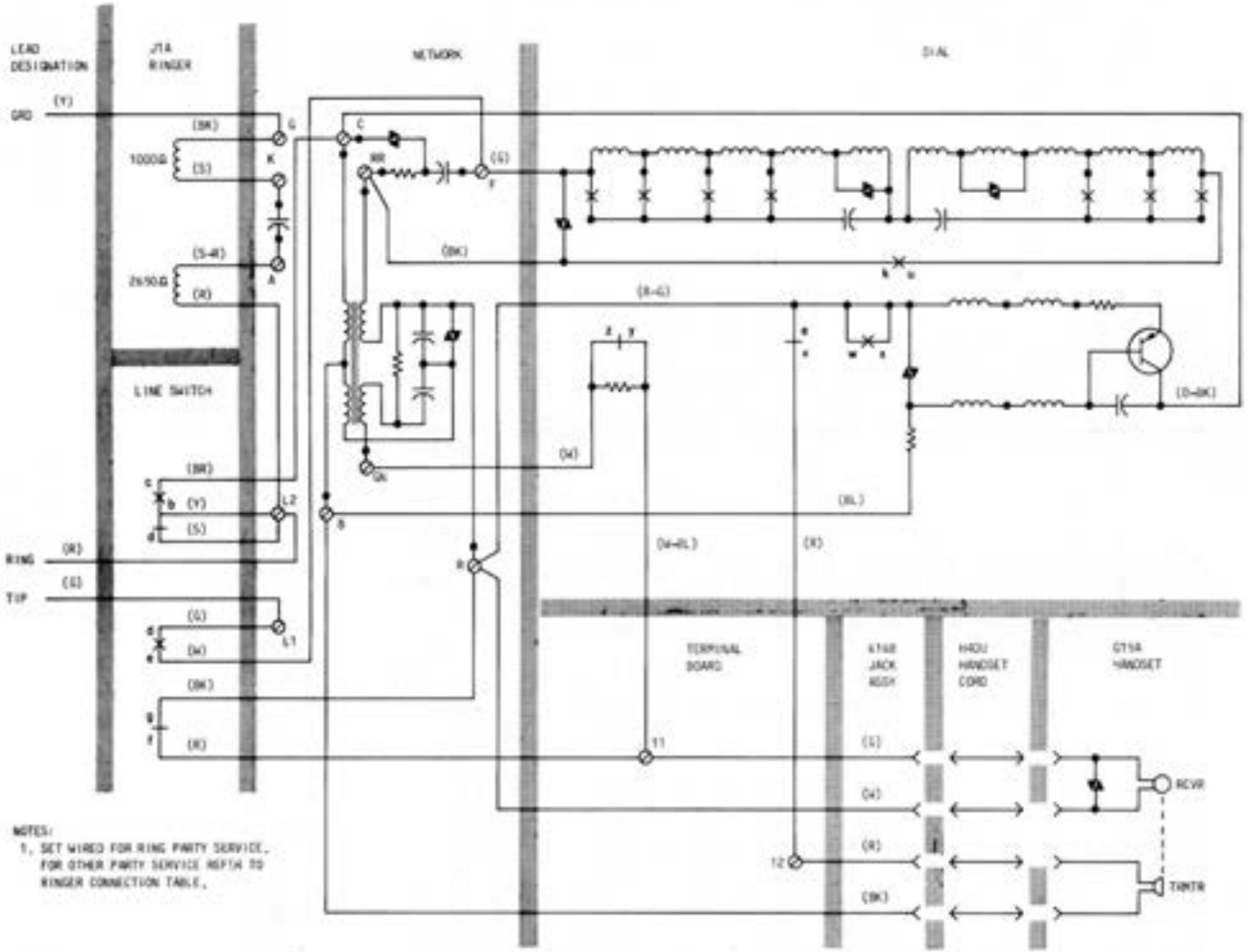

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Fig. 2—2526BM (MD) Telephone Set, Connections (Manufactured before 2/77)

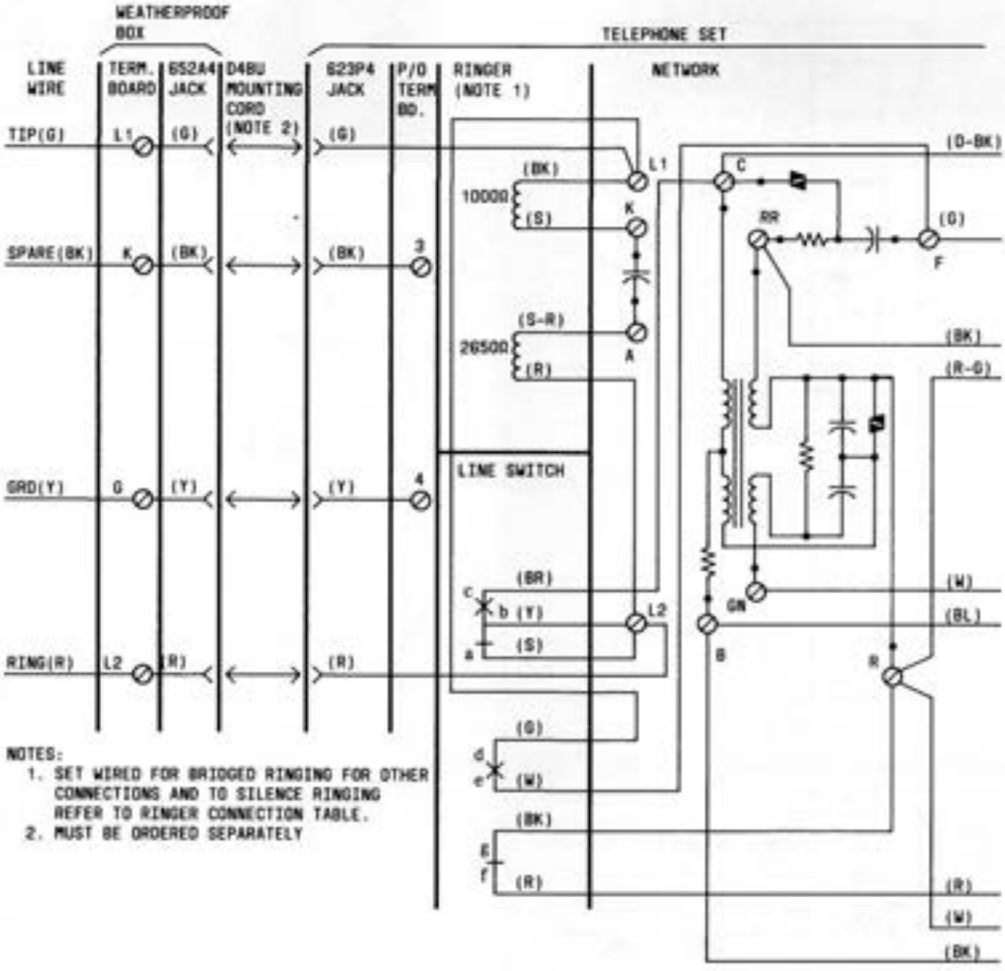

Fig. 3—2526BM (MD) Telephone Set, Connections (Manufactured after 1/77 using a D-180849 Kit of Parts) (Sheet 1 of 2)

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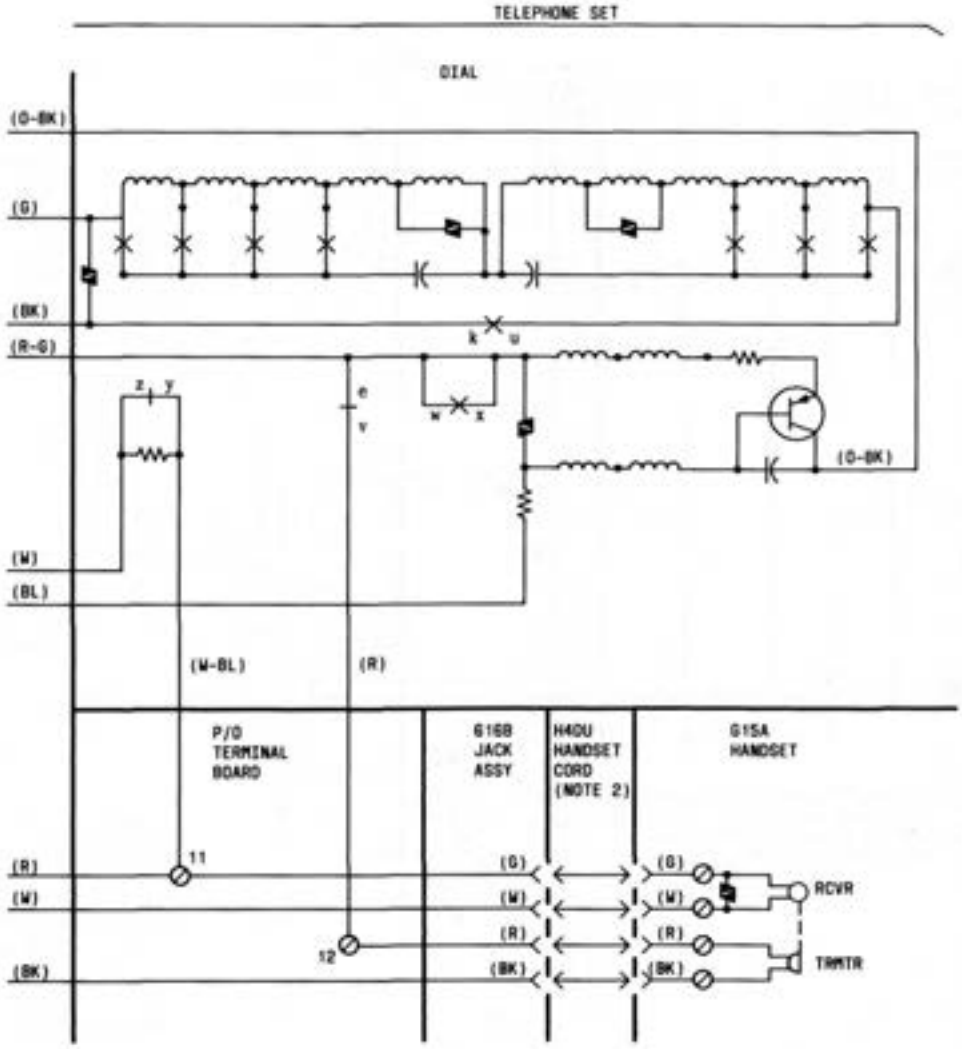

Fig. 3—2526BM (MD) Telephone Set, Connections (Manufactured after 1/77 Using a D-180849 Kit of Parts) (Sheet 2 of 2)

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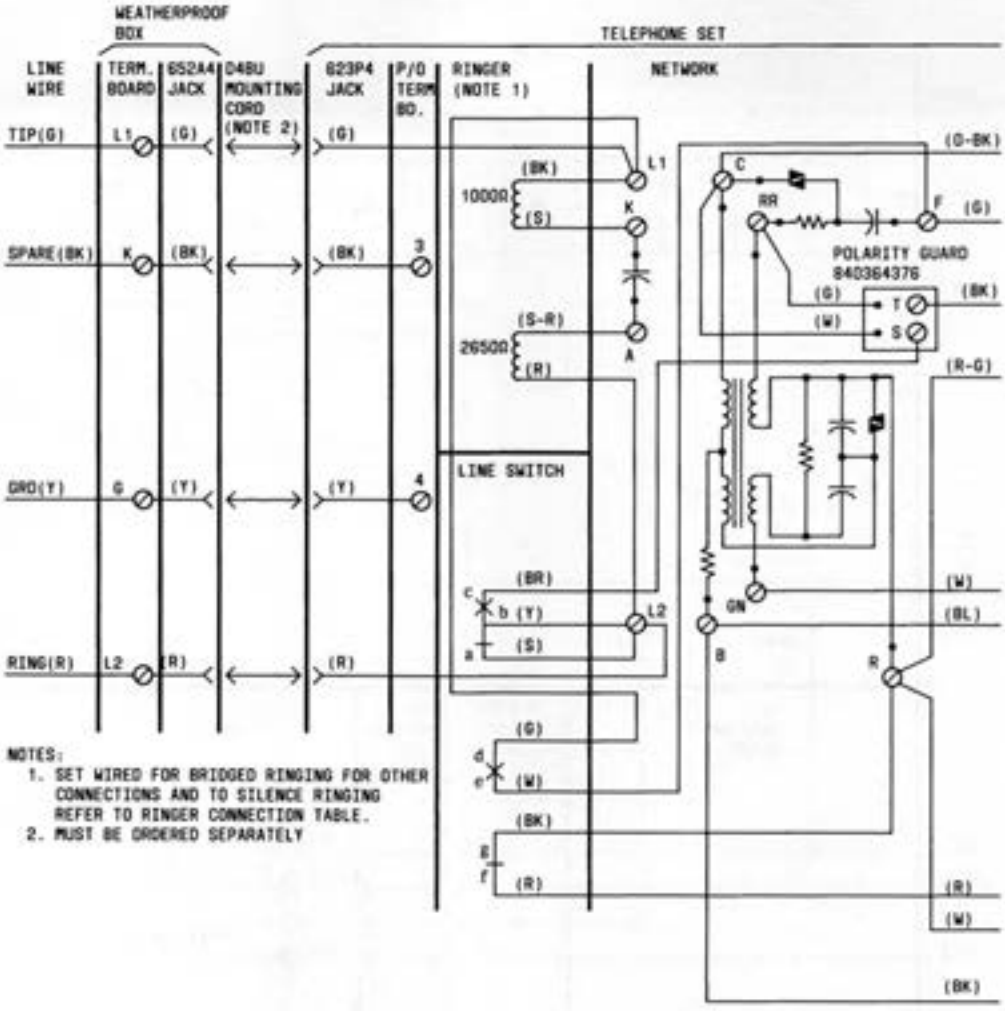

Fig. 4—▼2526BMG Telephone Set, Connections (Using a D-180849 Kit of Parts) (Sheet 1 of 2)▲

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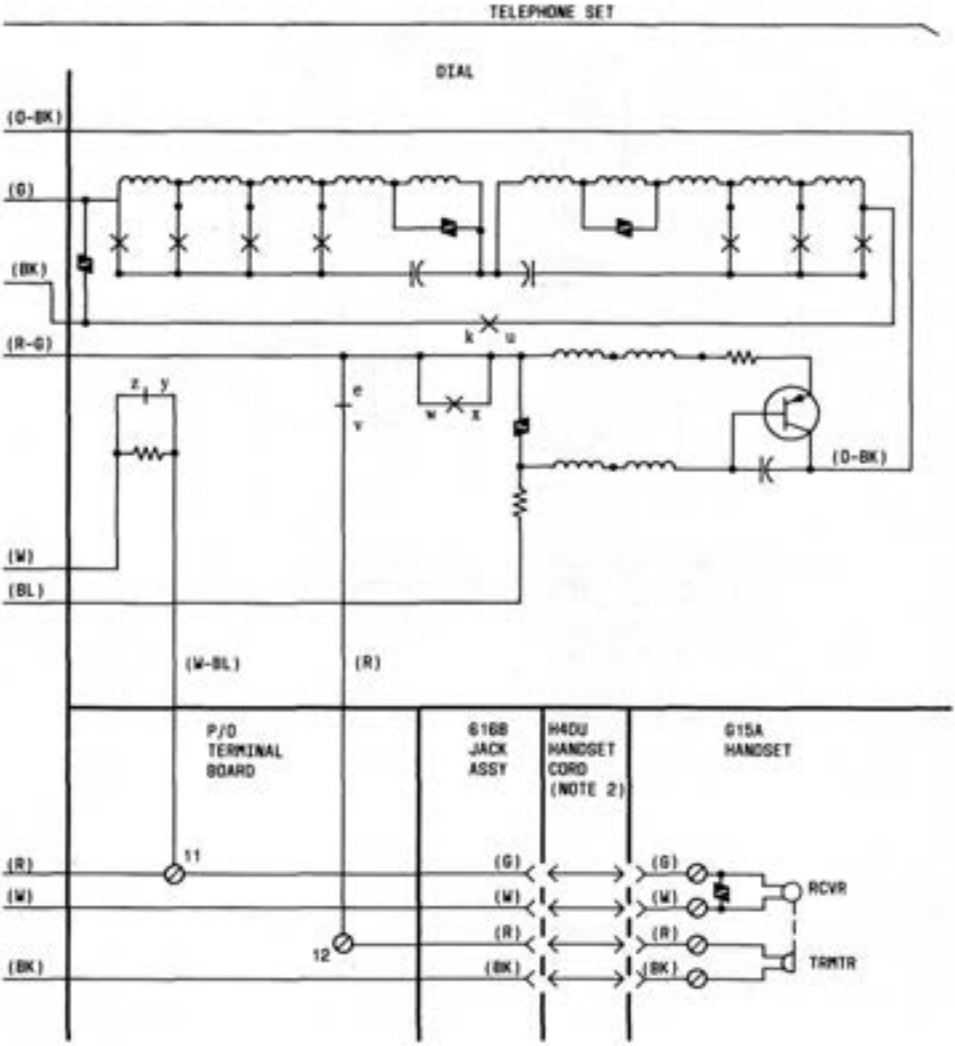

Fig. 4—#25268MG Telephone Set, Connections (Using a D-180849 Kit of Parts) (Sheet 2 of 2)#

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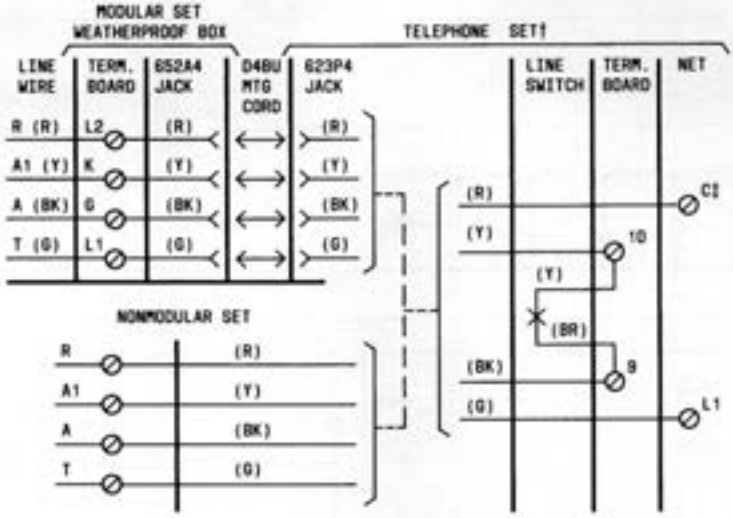
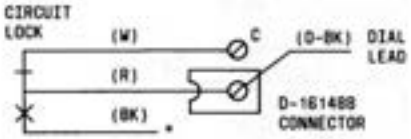


† FOR 2526B OR 2526BM SET, MOVE (R) RINGER LEAD TO C OF NET. FOR 2526BMG SET, MOVE (R) RINGER LEAD TO TERMINAL S OF POLARITY GUARD.

‡ (R) LINE WIRE TERMINATES ON TERMINAL S ON POLARITY GUARD IN 2526BMG SET.

Fig. 5—2526-Type Telephone Set, Wired For 1A1 or 1A2 Key System



NOTE:
CIRCUIT LOCK DISABLES DIAL AND RESTRICTS TELEPHONE SET TO INCOMING CALLS.

* INSULATE AND STORE

Fig. 6—2526-Type Telephone Set, Electric Circuit Lock (Using D-180385 Kit of Parts)

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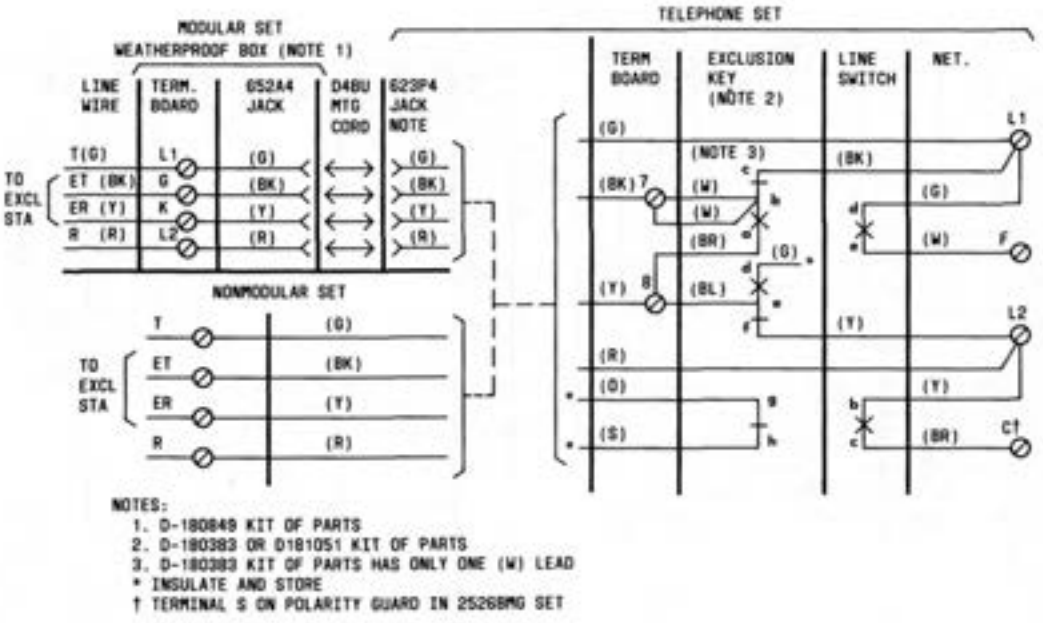

Fig. 7—2526-Type Telephone Set, Wired For Exclusion (Using a D-180849 and D-180383 or D-181051 Kit of Parts)

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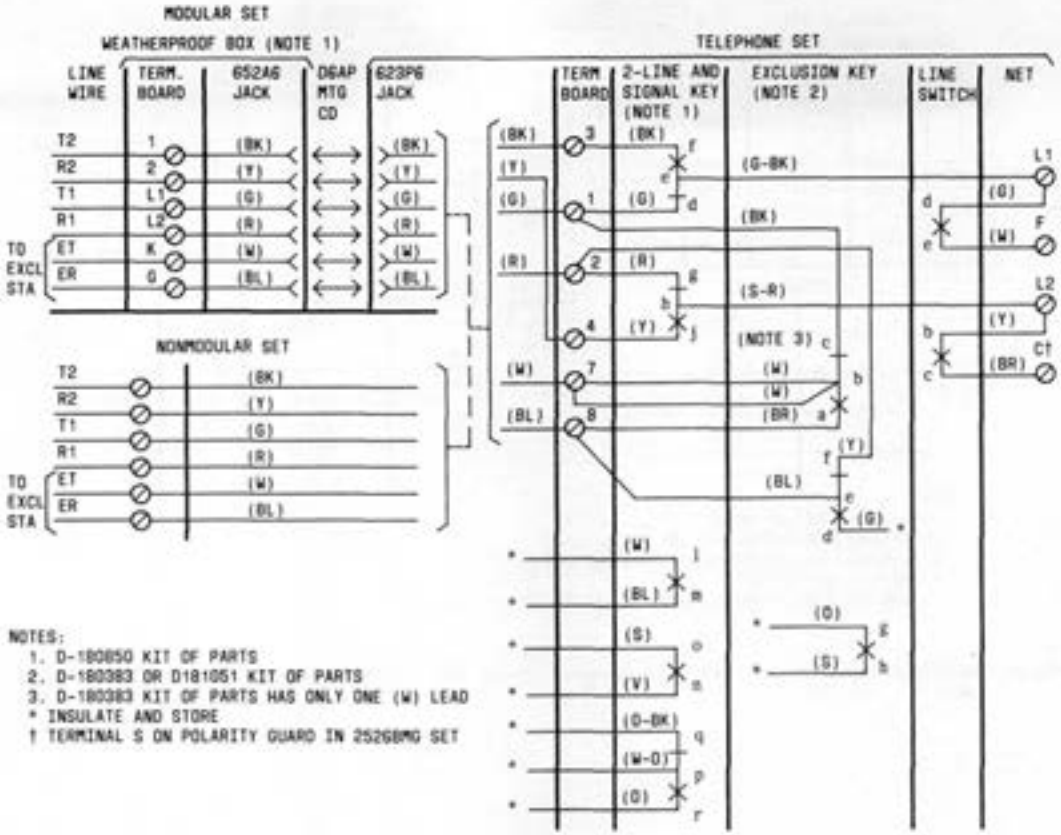

Fig. 8—2526-Type Telephone Set, 2-Line Pickup and Exclusion (Using a D-180850 and D-180383 or D-181051 Kit of Parts)

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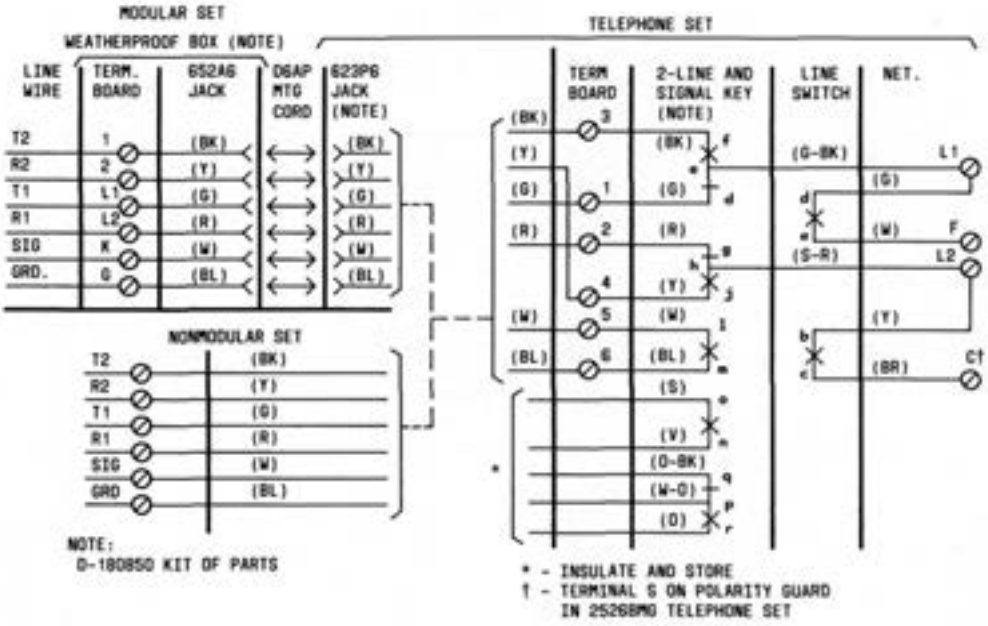

Fig. 9—2526-Type Telephone Set, 2-Line Pickup and Signaling (Using a D-180850 Kit of Parts)

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TABLE B

OPTIONAL FEATURE KITS FOR 2526-TYPE TELEPHONE SETS

KIT OF PARTS NUMBER	KIT COMPONENTS	INTENDED USE
D-180382 (See Note)	834854564 (P-48V456) Lock Assembly (Includes Key) 834854209 (P-48V420) Strike Plate	Mechanical lock for 526A housing door
D-180383	812750537 (P-27E053) Exclusion Switch Arm 801809500 (P-180950) Screws (two) 812750578 (P-27E057) Hook and Plunger Assembly	Provide exclusion feature in set with old-type line switch
D-181051	841388432 Hook and Plunger Assembly 842620700 Pile-up and Lead assembly 840705891 Hex. H. M. Screw 842620296 Exclusion Drive Arm 842620304 Exclusion Slide	Provide exclusion feature in sets with new slide-type line switch
D-180385	834854580 (P-48V458) Circuit Lock Assembly 814313763 (P-43A376) Screws (two)	Disables dial on telephone set base
D-180490	834854697 (P-48V469) Plug Assembly 834854382 (P-48V438) Magnet Holder 997028493 (RM-702849) Magnetic Catch 840166763 Screws (four)	Magnetic catch for 526A housing door
D-180849	840363932 Bracket 840363840 Box 801812504 (P-181250) Screws (five) 804703361 (P-470336) Washer (two) 811713619 (P-17A361) Terminal Board Assembly Screws, Phillips Head No. 8-1/2 in. (two) Cover Cable Connector Union Pipe Nipple Galvanized 1/2 in. by 3 in. Protector 123A Jack 652A4	Provide for single line pickup
D-180850	840363832 Bracket 840363840 Box 801812504 (P-181250) Screws (five) 804703361 (P-470336) Washers (two) 811713619 (P-17A361) Terminal Board Assembly Screws, Phillips Head No. 8-1/2 in. (two) Cover Cable Connector Union Pipe Nipple Galvanized 1/2 in. by 3 in. Protector 128A Jack 652A6 Jack 623P6 834854572 (P-48V457) Switch and Arm Bracket 814454211 (P-44E421) Screws (two)	Provide for two line pickup ans signaling

Note: Extra keys for 834854564 (P-48V456) lock assembly may be ordered from Western Electric Co. as their (840164545) part number.

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♦TABLE C♦

2526-TYPE TELEPHONE SETS, RINGER CONNECTIONS

WIRE OR LEAD	COLOR	INDIV. OR BRIDGED	RING PARTY	TIP PARTY	TIP PARTY	
					INDENT. GROUND	
					1000‡	2650‡
Ringer Leads	R	L2	L2	L1	K	B
	BK*	L1	G	G	G	B
	BK†	L1	4‡	4‡	4‡	B
	S	K	K	K	B	K
	S-R*	A	A	A	B	G
	S-R†	A	A	A	B	4‡
Line Switch	S	L2	L2	L2	A	A

Note: To silence ringer, adjust the four-step volume control to cutoff by bending the stop tab and moving the volume control wheel to a fifth position (Section 501-256-100).

* 2526B set (2526BM early version).

† 2526BMG, (2526BM, later version).

‡ Terminal board

♦TABLE D♦

POLARITY GUARD CONNECTIONS
[D-181006 (840364376) GUARD ASSEMBLY]

LEAD		REMOVE FROM	CONNECT TO	
		NET.	NET.	POLARITY GUARD
Dial	BK	RR		T
Line Switch	BR	C		S
Polarity Guard	G		RR	
	W		C	

Note: For field installation when specified by local instructions for end-to-end signaling.

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♦TABLE E♦

CONNECTIONS FOR 2526-TYPE TELEPHONE SETS FOR 1A1 OR 1A2 KEY TELEPHONE SYSTEM

APPARATUS		LEAD COLOR	CONNECT TO		
			WEATHERPROOF BOX TERM. BD	TEL SET	
				TERM. BD	NET.
Line Wire	T		L1		
	R		L2		
	A		G		
	A1		K		
652A4 Jack in Weatherproof Box		G	L1		
		R	L2		
		BK	G		
		Y	K		
623P4 Jack in Tel Set		G			L1
		R			C*
		BK		9	
		Y		10	
Line Switch		Y		10	
		BR		9	
Ringer		R			C*

* Terminal S on polarity guard in the 2526BMG telephone set.

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TABLE F

2526-TYPE TELEPHONE SET WITH SINGLE LINE PICKUP (D-180849 KIT OF PARTS) AND EXCLUSION (D-180383 OR (D-181051 KIT OF PARTS)

APPARATUS		LEAD COLOR	CONNECT TO		
			WEATHERPROOF BOX TERM. BD	TEL SET	
				TERM. BD	NET.
Line Wire	T		L1		
	R		L2		
	ET		G		
	ER		K		
652A4 Jack in Weatherproof Box		G	L1		
		R	L2		
		BK	G		
		Y	K		
623P4 Jack in Tel Set		G			L1
		R			L2
		BK		7	
		Y		8	
Exclusion Key (Note)		BK			L1
		Y			L2
		W		7	
		W		7	
		BR		8	
		BL		8	
Line Switch		G			L1
		W			F
		Y			L2
		BR			C*

Note: D-180383 Kit of Parts has only one (W) lead.

* Terminal S on polarity guard in 2526BMG telephone set.

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♦TABLE G♦

2526-TYPE TELEPHONE SET WITH TWO-LINE PICKUP (D-180850 KIT OF PARTS) AND EXCLUSION (D-180383 OR D-181051 KIT OF PARTS)

APPARATUS		LEAD COLOR	CONNECT TO		
			WEATHERPROOF BOX	TEL SET	
			TERM. BD	TERM. BD	NET.
Line Wire	T2		1		
	R2		2		
	T1		L1		
	R1		L2		
	ET		K		
	ER		G		
652A6 Jack in Weatherproof Box		BK	1		
		Y	2		
		G	L1		
		R	L2		
		W	K		
		BL	G		
623P6 Jack in Tel Set		BK		3	
		Y		4	
		G		1	
		R		2	
		W		7	
		BL		8	
Two-Line Pickup And Signal Key in Tel Set		G-BK			L1
		BK		3	
		S-R			L2
		G		1	
		R		2	
		Y		4	
Exclusion Key (Note)		BK		1	
		W		7	
		W		7	
		BR		8	
		BL		8	
		Y		2	

Note: D-180383 Kit of Parts has only one (W) lead.

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TABLE H

2526-TYPE TELEPHONE SET WITH TWO-LINE PICKUP AND SIGNALING (D-180850 KIT OF PARTS)

APPARATUS		LEAD COLOR	CONNECT TO		
			WEATHERPROOF BOX	TEL SET	
			TERM. BD	TERM. BD	NET.
Line Wire	T2		1		
	R2		2		
	T1		L1		
	R1		L2		
	GRD		G		
	SIG		K		
652A6 Jack in Weatherproof Box		BK	1		
		Y	2		
		G	L1		
		R	L2		
		BL	G		
		W	K		
623P6 Jack in Tel Set		BK		3	
		Y		4	
		G		1	
		R		2	
		BL		6	
		W		5	
Two-Line Pickup and Signal Key		BK		3	
		G-BK			L1
		G		1	
		S-R			L2
		R		2	
		Y		4	
		W		5	
		BL		6	

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TABLE I

FASTENERS FOR 29D BRACKET

SURFACE	QUAN	FASTENERS
Wood	4	1-1/2 in. No. 14 RH galvanized wood screws
Wood poles	4	2-1/2 in. or longer No. 14 RH galvanized wood screws
Wood poles (where diameter of pole is 8 inches or less)	2	5/16 x 3 in. coach screws or 2-1/2 in. or longer No. 14 RH galvanized wood screws
Finished masonry, brickwork, concrete, etc	4	5/16 x 2-1/4 in. hammer drive anchors, or approved equivalent
Solid metal — metal fences, columns, etc*	4	5/16 × 1 in. cadium plated, self-tapping screws. Drill mounting holes using 9/32 in. drill
Masonry block corrugated metal, etc.	4	1/4 x 4 in. RH toggle bolts

* Iron straps, bolts, etc may be used where local instructions permit. Attach telephone set securely.

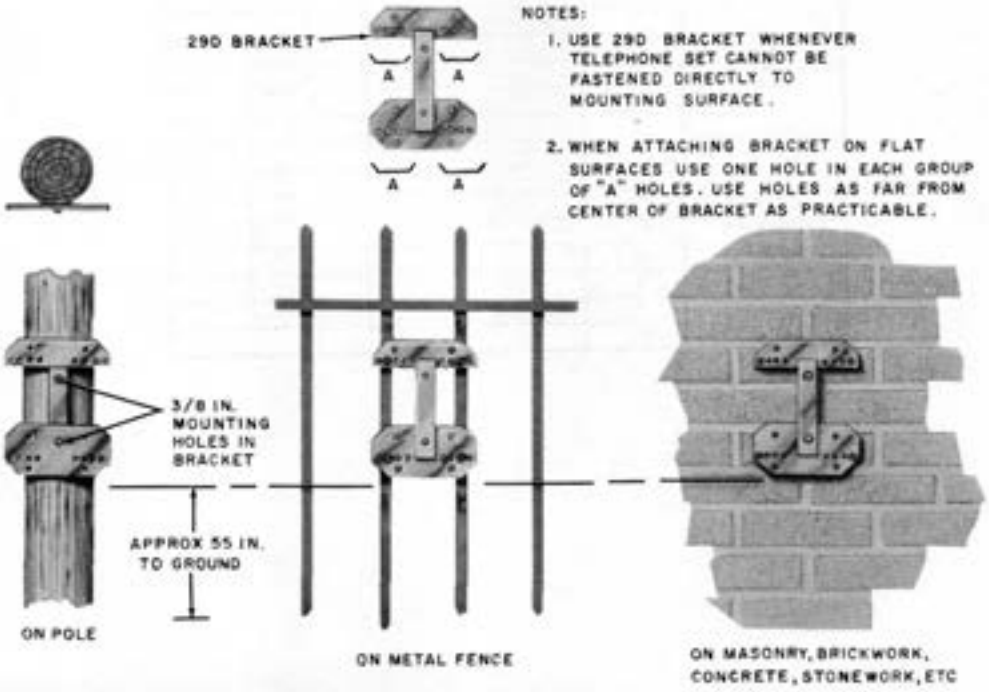

Fig. 10—29D Bracket Mounted on Various Surfaces

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SERVICE

702B AND 702BM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.001 This addendum supplements Section 502-721-402, Issue 7. Place this pink sheet ahead of Page 1 of this section.

1.002 This addendum is issued to show the 702BM telephone sets manufacture discontinued (MD).

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SERVICE

702B AND 702BM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 702B (MD) and 702BM telephone sets (Fig. 1, 2, and 3).

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Revise grounding information (Note 1, Fig. 1 and 2)
- Show new line switch contacts (d', e') in Fig. 2
- Add D-181059 Kit of Parts (dial illumination, Fig. 3).

1.03 Refer to Tables A, B, and C for line and ringer connections.

1.04 Figure 4 or 5 indicates the termination of the D4BT mounting cord in sets equipped with 4010- or 4228-type networks, respectively.

1.05 Refer to Section 501-320-100 if conversion to four- or eight-party ringing is required.

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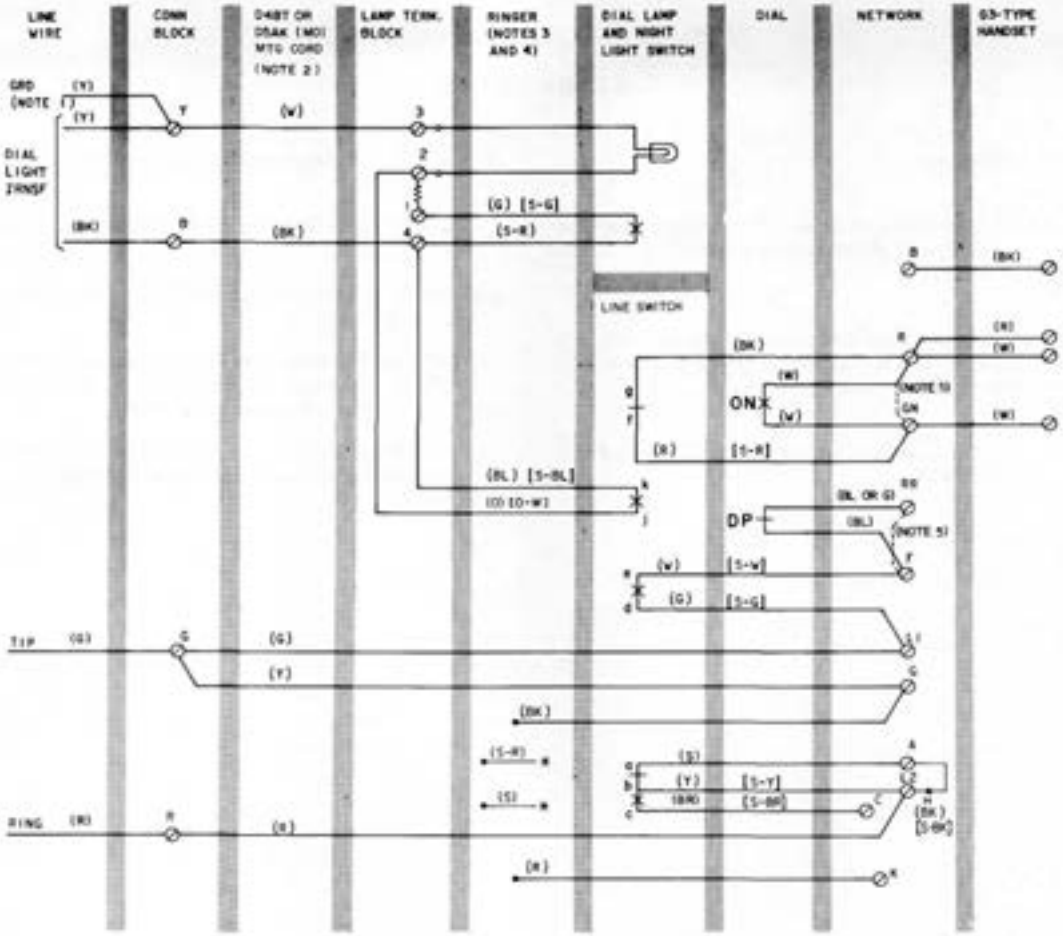

NOTES:
1. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
2. CONNECTIONS SHOWN FOR D5AK MOUNTING CORD. IF D4BT MOUNTING CORD IS USED, REFER TO TABLE B.
3. WIRED FOR BRIDGED RINGING, SEE TABLE A OR B FOR OTHER CLASSES OF SERVICE.
4. TO SILENCE RINGER PERMANENTLY REFER TO THE APPROPRIATE RINGER SECTION IN DIVISION 501.
5. DASHED LINES INDICATE MANUAL SET CONNECTIONS.

( ) CURRENT COLOR CODE
[ ] MD COLOR CODE
* INSULATED AND STORED
DP- DIAL PULSE
ON- OFF NORMAL

Fig. 1—2702B (MD) Telephone Set, Connections

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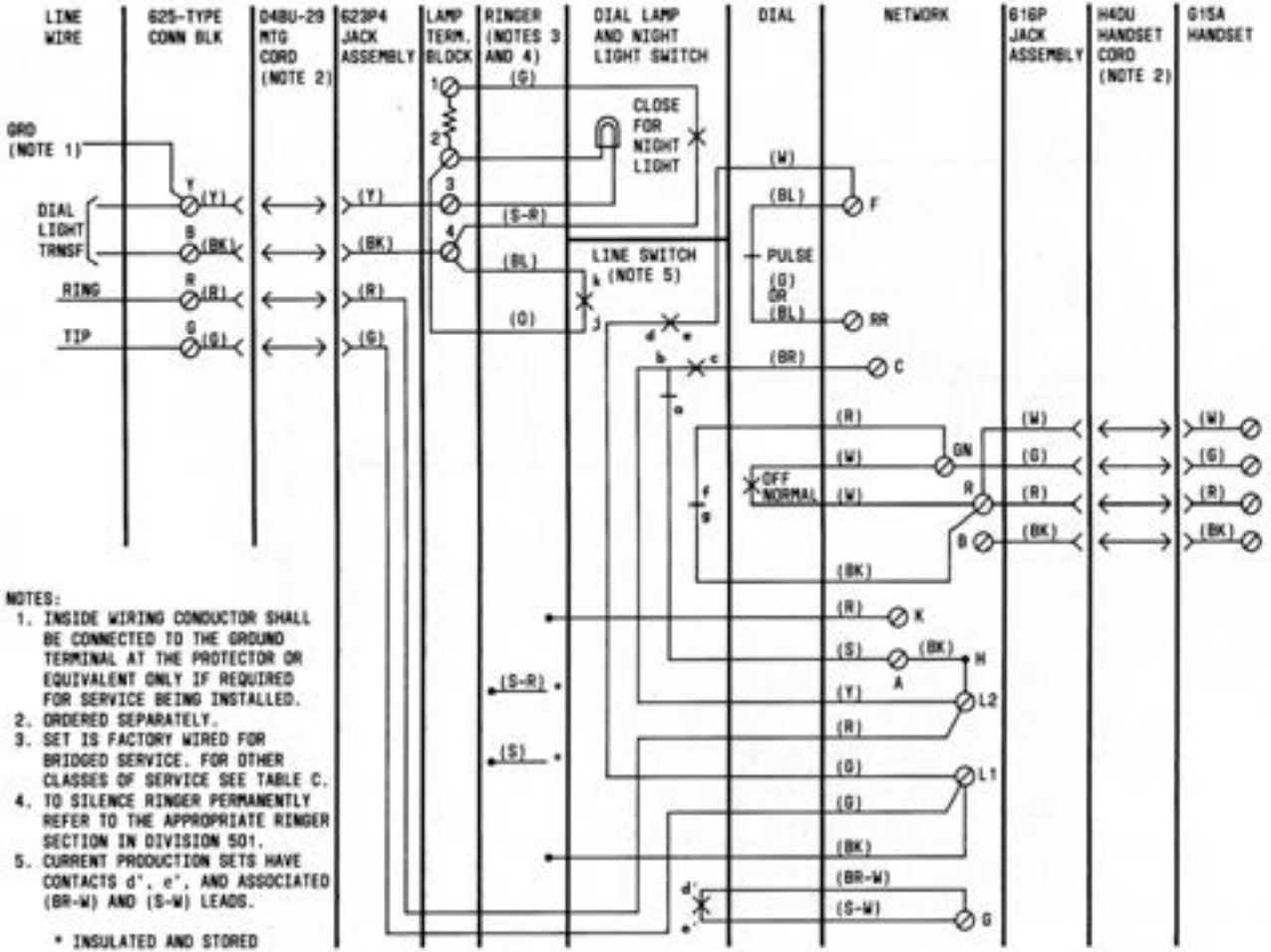

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Fig. 2—#702BM Telephone Set, Connections

NOTES:
1. P/O D-181059 KIT OF PARTS.
2. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
3. CORD FROM TELEPHONE SET AND TRANSFORMER CAN BE PLUGGED INTO EITHER JACK OF 338A ADAPTER.
4. ORDERED SEPARATELY.
5. SET IS FACTORY WIRED FOR BRIDGED SERVICE. FOR OTHER CLASSES OF SERVICE SEE TABLE C.
6. TO SILENCE RINGER PERMANENTLY REFER TO THE APPROPRIATE RINGER SECTION IN DIVISION 501.
7. CURRENT PRODUCTION SETS HAVE CONTACTS d', e' AND ASSOCIATED (BR-W) AND (S-W) LEADS.

* INSULATED AND STORED.

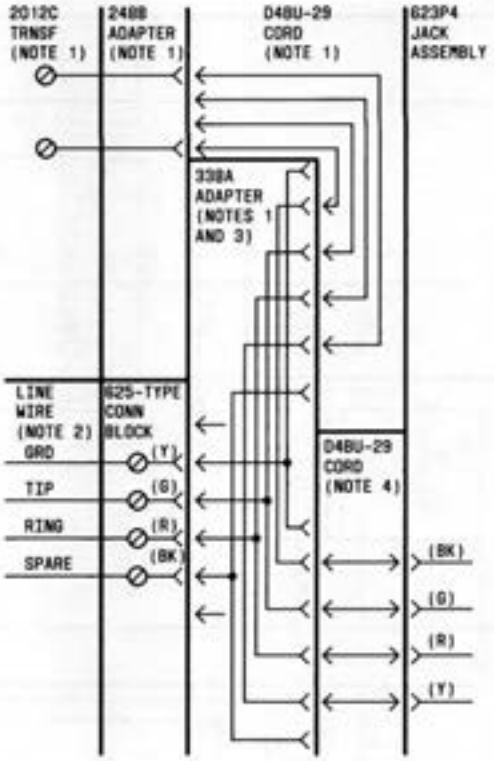

Fig. 3—▮702BM Telephone Set, Connections Using D-181059 Kit of Parts (Sheet 1 of 2)▮

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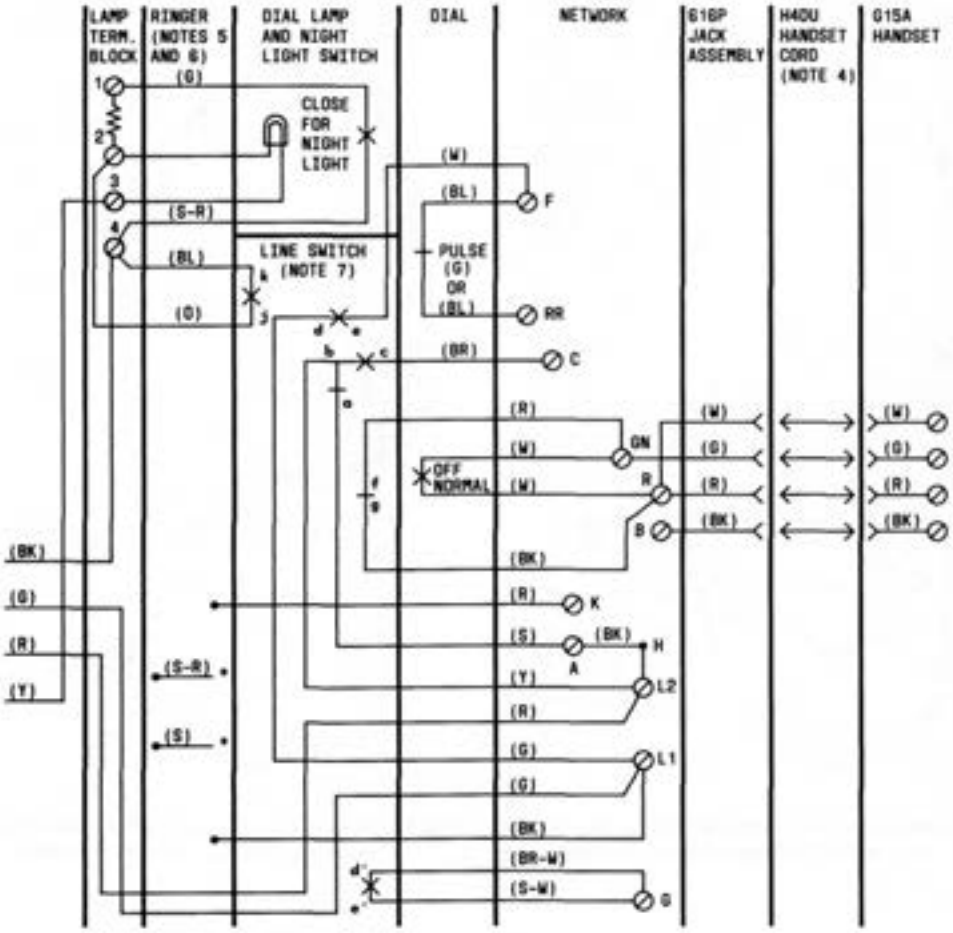

Fig. 3—ϕ702BM Telephone Set, Connections Using D-181059 Kit of Parts (Sheet 2 of 2)ϕ

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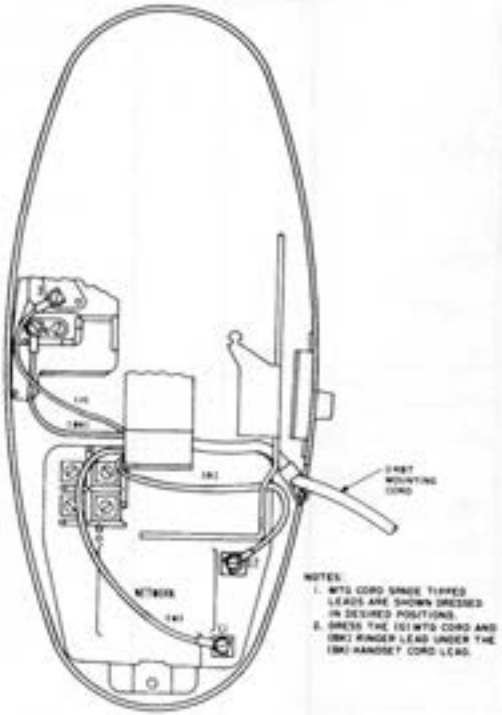

Fig. 4—Method of Terminating D4BT Mounting Cord on Sets With 4010-Type Network (See Notes 1 and 2)

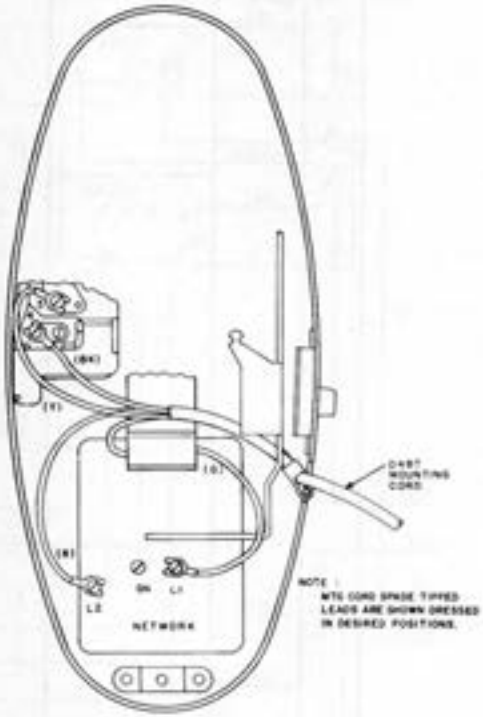

Fig. 5—Method of Terminating D4BT Mounting Cord on Sets With 4228-Type Network (See Note)

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TABLE A

LINE AND RINGER CONNECTIONS

702B (MD) TELEPHONE SET WITH D5AK (MD) MOUNTING CORD

WIRE OR LEAD		INDIVIDUAL OR BRIDGED ‡	RING PARTY ‡	TIP PARTY		
				NO IDENT GRD	IDENTIFYING GROUND	
					1000 OHMS	2650 OHMS
Inside Wire at Conn Block	Ring	R	R	R	R	R
	Tip	G	G	G	G	G
	Grd	Y	Y	Y	Y	Y
Dial Light Transformer	1	Y	Y	Y	Y	Y
	2	B	B	B	B	B
D5AK Mtg Cord at Conn Block	(R)	R	R	G	G	G
	(G)	G	G	R	R	R
	(Y)	G	Y	Y	Y	Y
	(BK)	B	B	B	B	B
	(W)	Y	Y	Y	Y	Y
D5AK Mtg Cord at Set Terminals (Note 2)	(R)	L2	L2	L2	L2	L2
	(G)	L1	L1	L1	F	F
	(Y)	G	G	G	G	G
	(BK)	4†	4†	4†	4†	4†
	(W)	3†	3†	3†	3†	3†
Ringer Leads (Note 1)	(R)	K	K	K	K	K
	(BK)	G	G	G	G	G
	(S)	*	*	*	L1	*
	(S-R)	*	*	*	*	L1
Line Switch	(W)	F	F	F	B	B
Strap from H	(BK)	A	A	A	*	*

Note 1: To silence ringer for all classes of service, refer to the appropriate ringer section in Division 501.

Note 2: When connecting the D5AK mounting cord leads for tip party identifying ground, use D-161488 connectors and M1W straps as required to extend conductor leads.

* Insulated and stored.
† Terminals on lamp terminal block.
‡ Factory-wired for bridged or ring party

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TABLE B

LINE AND RINGER CONNECTIONS

7028 (MD) TELEPHONE SET WITH D4BT MOUNTING CORD

WIRE OR LEAD		INDIVIDUAL OR BRIDGED	RING PARTY	TIP PARTY		
				NO IDENT GRD	IDENTIFYING GROUND	
					1000 OHMS	2650 OHMS
Inside Wire at Conn Block	Ring	R	R	R	R	R
	Tip	G	G	G	G	G
	Grd	Y	Y	Y	Y	Y
Dial Light Transformer	1	Y	Y	Y	Y	Y
	2	B	B	B	B	B
D4BT Mtg Cord at Conn Block	(R)	R	R	G	G	G
	(G)	G	G	R	R	R
	(Y)	Y	Y	Y	Y	Y
	(BK)	B	B	B	B	B
D4BT Mtg Cord at Set Terminals	(R)	L2	L2	L2	L2	L2
	(G)	L1	L1	L1	F	F
	(Y)	3†	3†	3†	3†	3†
	(BK)	4†	4†	4†	4†	4†
Ringer Leads (Note)	(R)	K	K	K	K	K
	(BK)	L1	3†	3†	3†	3†
	(S)	*	*	*	L1	*
	(S-R)	*	*	*	*	L1
Line Switch	(W)	F	F	F	B	B
Strap from H	(BK)	A	A	A	*	*

Note: To silence ringer for all classes of service, refer to the appropriate ringer section in Division 501.

* Insulated and stored.

† Terminals on lamp terminal block.

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TABLE C

702BM TELEPHONE SET LINE AND RINGER CONNECTIONS

WIRE OR LEAD		INDIVIDUAL OR BRIDGED (NOTE 3)	RING PARTY	TIP PARTY		
				NO IDENT GRD	IDENTIFYING GROUND (NOTE 1)	
					1000 OHMS	2650 OHMS
Dial Light Transformer	1	Y	Y	Y	Y	Y
	2	B	B	B	B	B
623P4 Jack Assembly in Set	(R)	L2	L2	L1	F	F
	(G)	L1	L1	L2	L2	L2
	(BK)	4†	4†	4†	4†	4†
	(Y)	3†	3†	3†	3†	3†
Ringer Leads (Note 2)	(R)	K	K	K	K	K
	(BK)	L1	3†	3†	3†	3†
	(S)	*	*	*	L1	*
	(S–R)	*	*	*	*	L1
Line Switch	(W)	F	F	F	B	B
Strap from H of Net.	(BK)	A	A	A	*	*

Notes:

1. For tip party service with identifying ground, remove insulate and store (BK) strap between network terminals A and H.
2. To silence ringer for all classes of service, refer to the appropriate ringer section in Division 501.
3. Sets are factory-wired for bridged service.

*Insulated and stored.
†Terminals on lamp terminal block.

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SERVICE

2702B, 2702BM, AND 2702BMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.001 This addendum supplements Section 502-723-401, Issue 9. Place this pink sheet ahead of Page 1 of the section.

1.002 This addendum is issued for the following reasons:

(a) To show the D-180229 Kit of Parts (polarity guard) manufacture discontinued (MD)

(b) To revise Table A

(c) To show that 2702BM telephone sets manufactured after 6-1-82 will be marked (under or near date code) "1-PTY". This marking indicates the set cannot be used for multiparty service connections.

2. CHANGES TO SECTION

2.001 On Page 8, Table A is obsolete. A new Table A is provided in this addendum.

2.002 On Page 1, add paragraph 1.07 as follows:

1.07 Telephone sets ***not*** marked "1-PTY" are adaptable for all classes of line and ringer connections. Sets marked "1-PTY" cannot be used for multiparty service connections. If service other than individual or bridged ringing is required, a 2702B2M or 2702B2MG base, housing, and handset must be ordered separately.

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TABLE A

POLARITY GUARD CONNECTIONS (SEE NOTE)

RINGER	POLARITY GUARD	WIRE OR LEAD	COLOR	REMOVE FROM NET.	CONNECT TO	
					NET.	POLARITY GUARD
M-Type Ringer	D-181063 Kit of Parts	Line Switch	W	F		T
			BR	C		S
		Polarity Guard	G		F	
			W		C	
	D-180229 (MD) Kit of Parts	Dial	BK	RR		3*
		Line Switch	BR	C		4*
		Polarity Guard	R			3*
			BK			4*
			G		RR	
			W		C	
P-Type Ringer	D-180896 Kit of Parts	Line Switch	W	F		T
			BR	C		S
		Polarity Guard	G		F	
			W		C	

Note: For use when specified by local instructions for end-to-end signaling installations.

* Terminals 3 and 4 are on terminal board which is part of D-180229 (MD) Kit of Parts.

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SERVICE

2702B, 2702BM, AND 2702BMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on 2702B (MD), 2702BM, and 2702BMG telephone sets (Fig. 1, 2, 3, 4, and 5).

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Revise grounding information (Note 1; Fig. 1, 2, and 3)
- Add D-181059 Kit of Parts (dial illunimation, Fig. 4 and 5)
- Add information on D-181063 Kit of Parts (polarity guard, Table A).

1.03 If a polarity guard is required in a 2702B (MD) or 2702BM set, refer to Table A for connections and Section 502-703-100 for installation information.

1.04 Refer to Tables B, C, and D for line and ringer connections.

1.05 Figure 6 or 7 indicates the termination of the D4BT mounting cord in sets equipped with 4010- or 4228-type networks, respectively.

1.06 Refer to Section 501-320-100 if conversion to four or eight party ringing is required.

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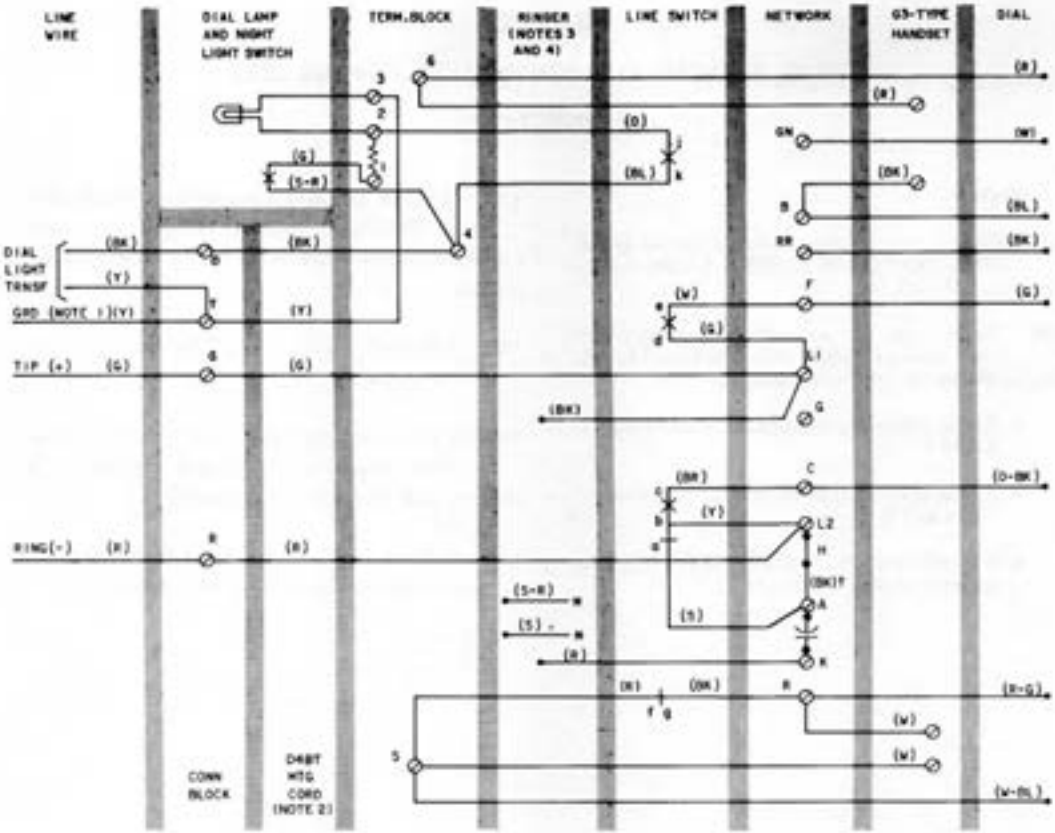

NOTES:
1. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
2. CONNECTIONS SHOWN FOR D4BT MTG. CORD. IF D5AK (MD) MTG. CORD IS USED, REFER TO TABLE B.
3. TO SILENCE RINGER PERMANENTLY FOR ALL CLASSES OF SERVICE REFER TO THE APPROPRIATE RINGER SECTION IN DIVISION 501.
4. WIRED FOR BRIDGED SERVICE. FOR OTHER CLASSES OF SERVICE SEE TABLE B OR C.

* INSULATE AND STORED
† THIS LEAD GOES DIRECTLY TO L2 ON 42289 NET.

Fig. 1—#2702B (MD) Telephone Set, Connections

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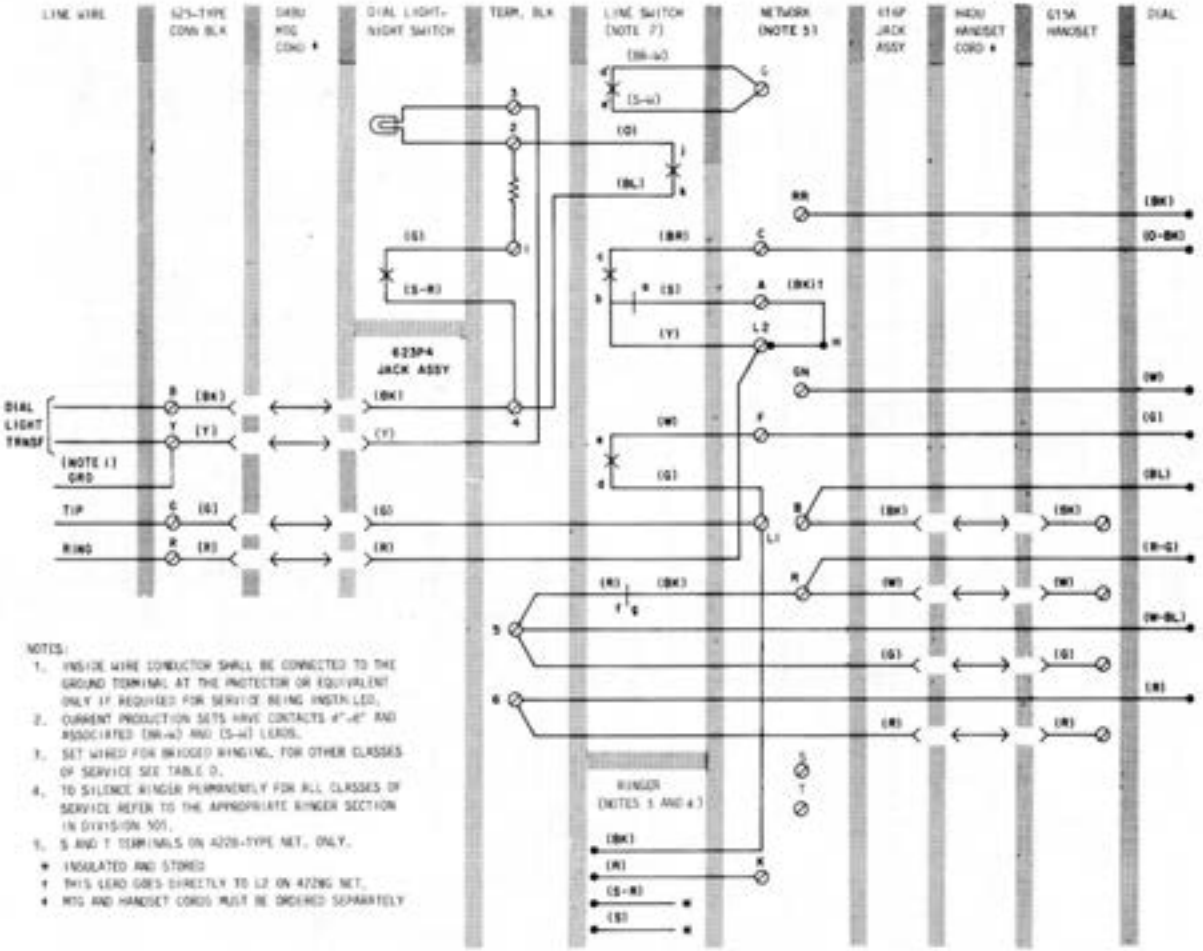

NOTES:

1. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
2. CURRENT PRODUCTION SETS HAVE CONTACTS #"-#" AND ASSOCIATED (BK-W) AND (S-W) LEADS.
3. SET WIRED FOR BRIDGED RINGING. FOR OTHER CLASSES OF SERVICE SEE TABLE D.
4. TO SILENCE RINGER PERMANENTLY FOR ALL CLASSES OF SERVICE REFER TO THE APPROPRIATE RINGER SECTION IN DIVISION 501.
5. S AND T TERMINALS ON 4228-TYPE NET. ONLY.

* INSULATED AND STORED

† THIS LEAD GOES DIRECTLY TO L2 ON 4228 NET.

‡ MTG AND HANDSET CORDS MUST BE ORDERED SEPARATELY

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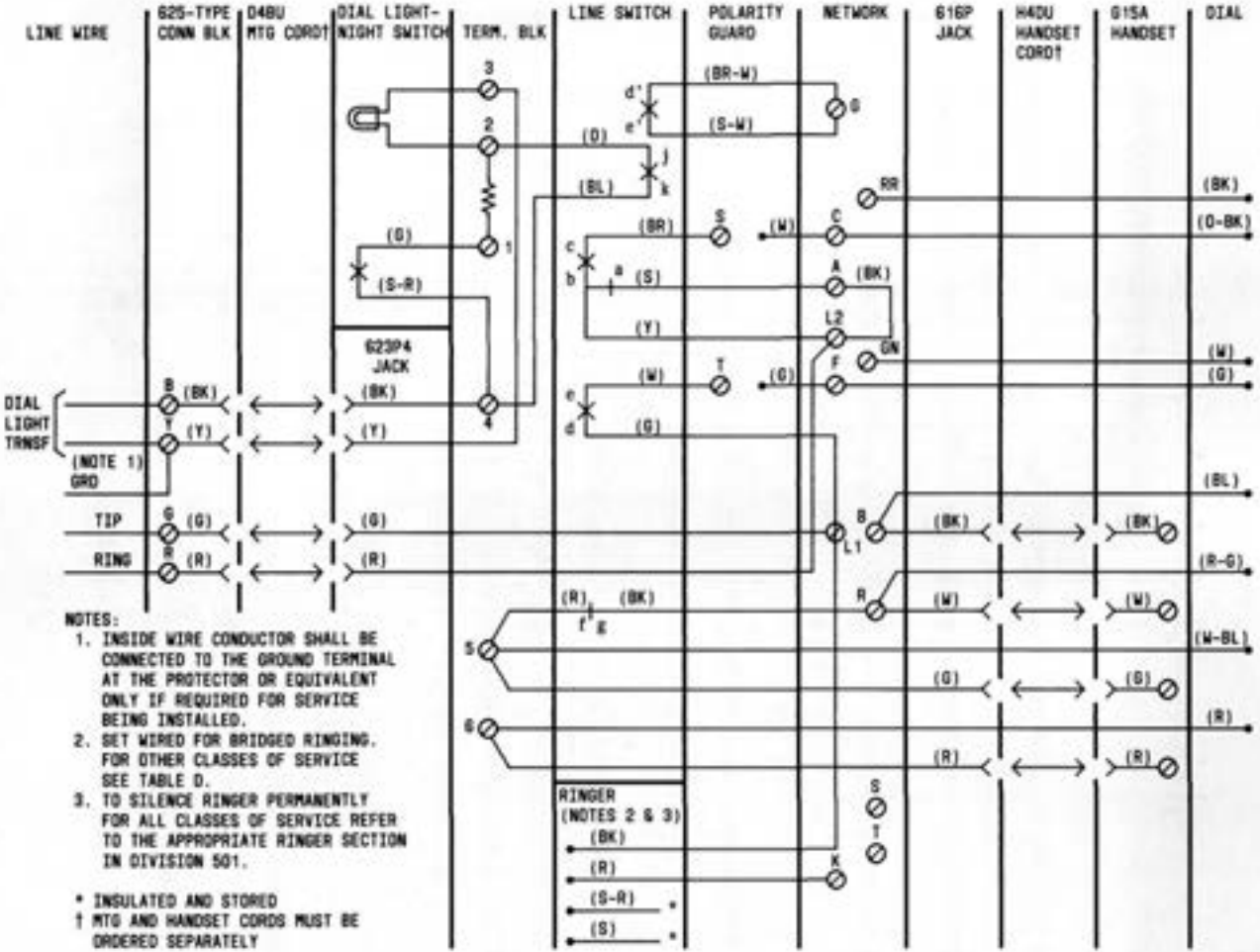

Fig. 3—▶2702BMG Telephone Set Connections◀

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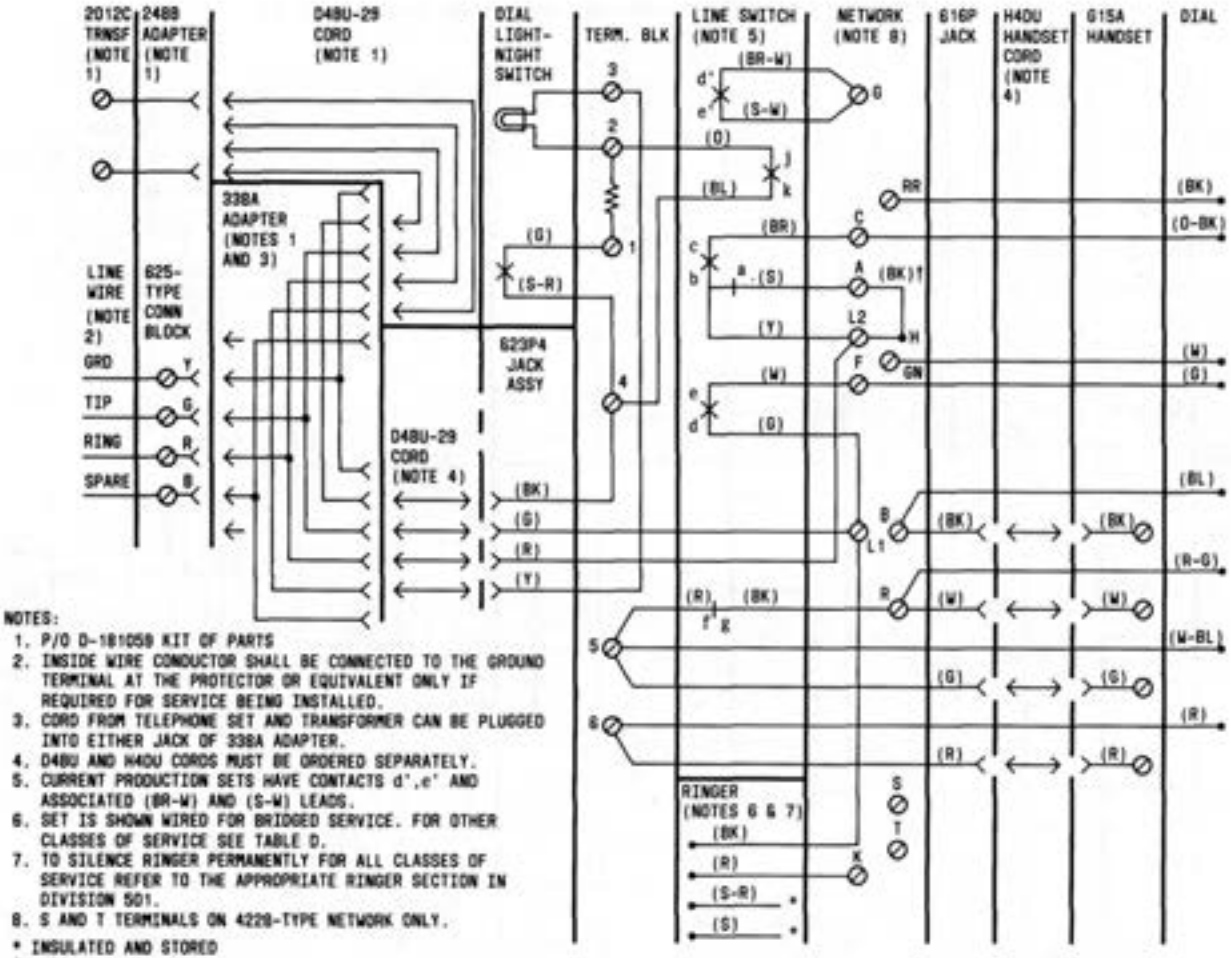

NOTES:

1. P/O D-181059 KIT OF PARTS
2. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
3. CORD FROM TELEPHONE SET AND TRANSFORMER CAN BE PLUGGED INTO EITHER JACK OF 338A ADAPTER.
4. D48U AND H4DU CORDS MUST BE ORDERED SEPARATELY.
5. CURRENT PRODUCTION SETS HAVE CONTACTS d',e' AND ASSOCIATED (BR-W) AND (S-W) LEADS.
6. SET IS SHOWN WIRED FOR BRIDGED SERVICE. FOR OTHER CLASSES OF SERVICE SEE TABLE D.
7. TO SILENCE RINGER PERMANENTLY FOR ALL CLASSES OF SERVICE REFER TO THE APPROPRIATE RINGER SECTION IN DIVISION 501.
8. S AND T TERMINALS ON 4228-TYPE NETWORK ONLY.

* INSULATED AND STORED

† THIS LEAD GOES DIRECTLY TO L2 ON 4228G NET.

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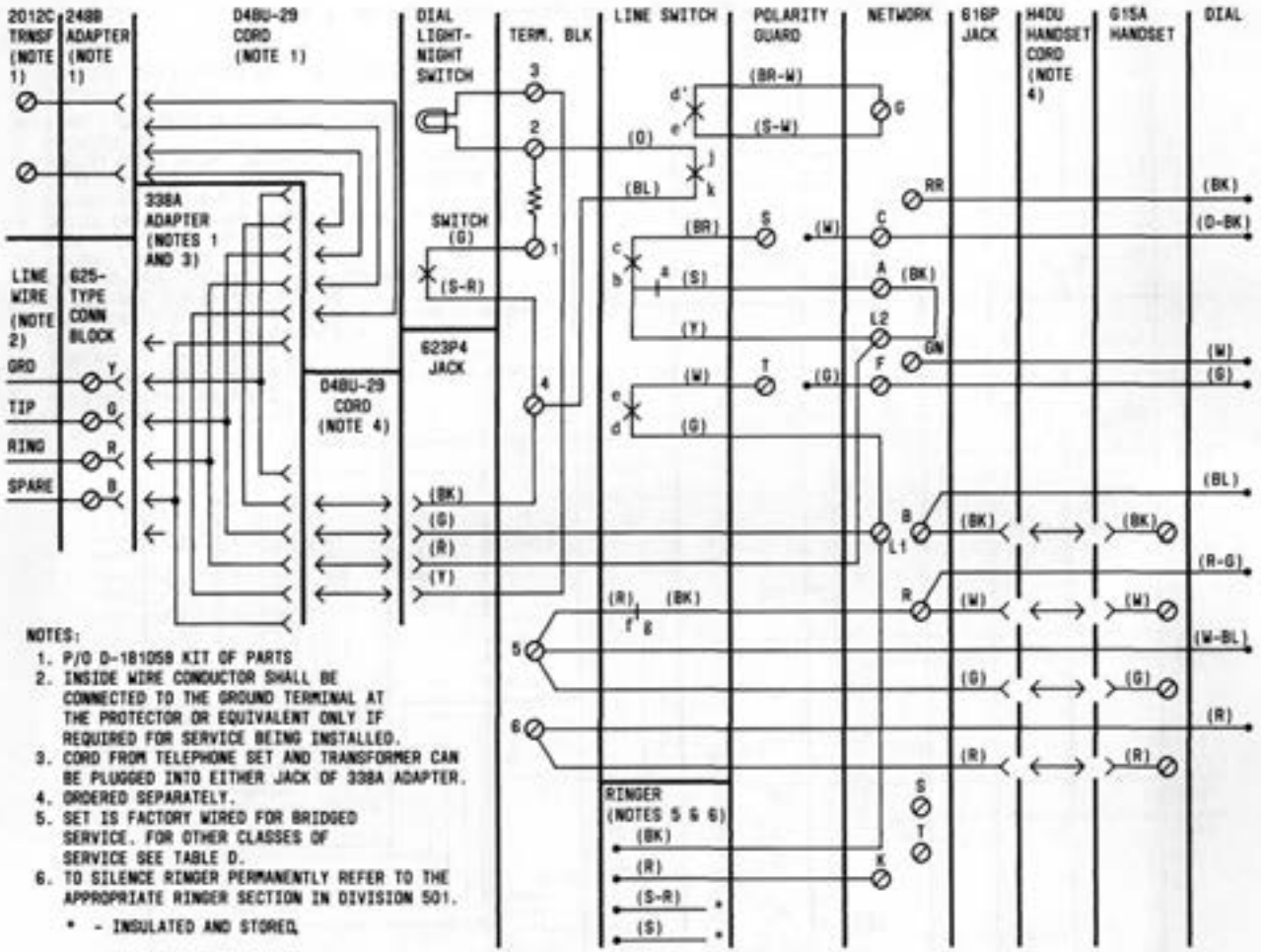
Fig. 4—#2702BM Telephone Set, Connections Using D-181059 Kit of Parts4



NOTES:

1. P/O D-181058 KIT OF PARTS
2. INSIDE WIRE CONDUCTOR SHALL BE CONNECTED TO THE GROUND TERMINAL AT THE PROTECTOR OR EQUIVALENT ONLY IF REQUIRED FOR SERVICE BEING INSTALLED.
3. CORD FROM TELEPHONE SET AND TRANSFORMER CAN BE PLUGGED INTO EITHER JACK OF 338A ADAPTER.
4. ORDERED SEPARATELY.
5. SET IS FACTORY WIRED FOR BRIDGED SERVICE. FOR OTHER CLASSES OF SERVICE SEE TABLE D.
6. TO SILENCE RINGER PERMANENTLY REFER TO THE APPROPRIATE RINGER SECTION IN DIVISION 501.

* - INSULATED AND STORED.

Fig. 5—[illegible] Telephone Set Connection Using D-181059 Kit of Parts

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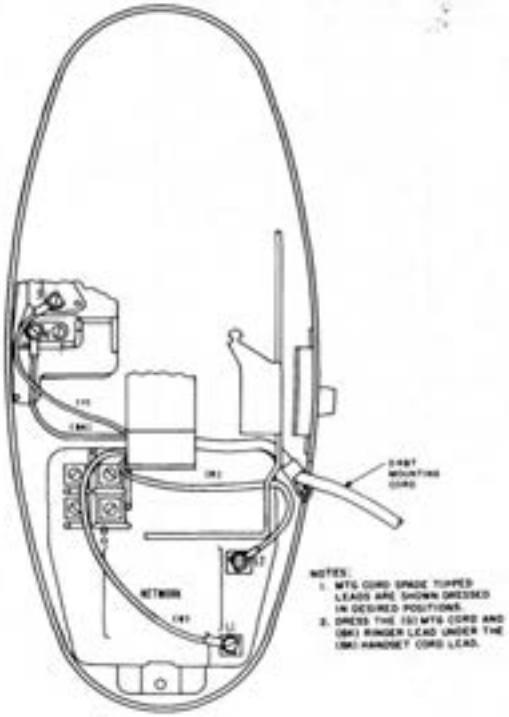

Fig. 6—Method of Terminating D4BT Mounting Cord on Sets with 4010-Type Network (See Notes 1 and 2)

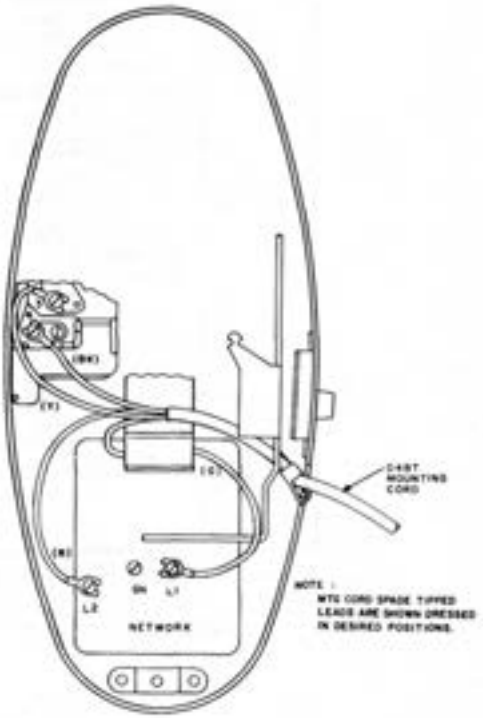

Fig. 7—Method of Terminating D4BT Mounting Cord on Sets with 4228-Type Network (See Note)

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◆ TABLE A ◆

POLARITY GUARD CONNECTIONS (Note)

TEL SET NET.	POLARITY GUARD	WIRE OR LEAD	COLOR	REMOVE FROM NET.	CONNECT TO	
					NET.	POLARITY GUARD
4010-Type	D-181063 Kit of Parts	Line Switch	W	F		T
			BR	C		S
		Polarity Guard	G		F	
			W		C	
	D-180229 Kit of Parts	Dial	BK	RR		3*
		Line Switch	BR	C		4*
		Polarity Guard	R			3*
			BK			4*
			G		RR	
			W		C	
4228-Type	D-180896 Kit of Parts	Line Switch	W	F		T
			BR	C		S
		Polarity Guard	G		F	
			W		C	

Note: For use when specified by local instructions for end-to-end signaling installations.

* Terminals 3 and 4 are on terminal board which is part of D-180229 Kit of Parts.

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TABLE B

LINE AND RINGER CONNECTIONS
2702B (MD) TELEPHONE SET WITH D5AK (MD) MOUNTING CORD

WIRE OR LEAD		INDIVIDUAL OR BRIDGED ‡	RING PARTY ‡	TIP PARTY		
				NO IDENT GRD	IDENTIFYING GROUND	
					1000 OHMS	2650 OHMS
Inside Wire at Conn Block	Ring	R	R	R	R	R
	Tip	G	G	G	G	G
	Grd	Y	Y	Y	Y	Y
Dial Light Transformer	1	Y	Y	Y	Y	Y
	2	B	B	B	B	B
D5AK Mtg Cord at Conn Block	(R)	R	R	G	G	G
	(G)	G	G	R	R	R
	(Y)	G	Y	Y	Y	Y
	(BK)	B	B	B	B	B
	(W)	Y	Y	Y	Y	Y
D5AK Mtg Cord at Set Terminals (Note 2)	(R)	L2	L2	L2	L2	L2
	(G)	L1	L1	L1	C	C
	(Y)	G	G	G	G	G
	(BK)	4†	4†	4†	4†	4†
	(W)	3†	3†	3†	3†	3†
Ringer Leads (Note 1)	(R)	K	K	K	K	K
	(BK)	G	G	G	G	G
	(S)	*	*	*	L1	*
	(S-R)	*	*	*	*	L1
Line Switch (Note 3)	(BR)	C	C	F	F	F
	(W) [S-W]	F	F	C	B	B
Strap From H	(BK) [S-BK]	A	A	A	*	*

Note 1: To silence ringer permanently for all classes of service, refer to the appropriate section in Division 501.

Note 2: When connecting the D5AK mounting cord leads for tip party identifying ground, use D-161488 connectors and M1W straps as required to extend conductor leads.

Note 3: This change does not apply to sets equipped with a polarity guard.

* Insulated and stored.
† Terminals on lamp terminal block.
‡ Factory-wired for bridged or ring party.
( ) Current color code.
[ ] MD color code.

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TABLE C

LINE AND RINGER CONNECTIONS
2702B (MD) TELEPHONE SET WITH D4BT MOUNTING CORD

WIRE OR LEAD		INDIVIDUAL OR BRIDGED	RING PARTY	TIP PARTY		
				NO IDENT GRD	IDENTIFYING GROUND	
					1000 OHMS	2650 OHMS
Inside Wire at Conn Block	Ring	R	R	R	R	R
	Tip	G	G	G	G	G
	Grd	Y	Y	Y	Y	Y
Dial Light Transformer	1	Y	Y	Y	Y	Y
	2	B	B	B	B	B
D4BT Mtg Cord at Conn Block	(R)	R	R	G	G	G
	(G)	G	G	R	R	R
	(Y)	Y	Y	Y	Y	Y
	(BK)	B	B	B	B	B
D4BT Mtg Cord at Set Terminals	(R)	L2	L2	L2	L2	L2
	(G)	L1	L1	L1	C	C
	(Y)	3†	3†	3†	3†	3†
	(BK)	4†	4†	4†	4†	4†
Ringer Leads (Note 1)	(R)	K	K	K	K	K
	(BK)	L1	3†	3†	3†	3†
	(S)	*	*	*	L1	*
	(S-R)	*	*	*	*	L1
Line Switch (Note 2)	(BR)	C	C	F	F	F
	(W) [S-W]	F	F	C	B	B
Strap From H	(BK) [S-BK]	A	A	A	*	*

Note 1: To silence ringer permanently for all classes of service, refer to the appropriate section in Division 501.

Note 2: This change does not apply to sets equipped with a polarity guard.

* Insulated and stored.
† Terminals on lamp terminal block.
( ) Current color code.
[ ] MD color code.

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TABLE D

2702BM AND 2702BMG TELEPHONE SET LINE AND RINGER CONNECTIONS WITH D4BU MOUNTING CORD

WIRE OR LEAD		COLOR	INDIVIDUAL OR BRIDGED (NOTE 3)	RING PARTY	TIP PARTY		
					NO IDENT GRD.	IDENTIFYING GROUND (NOTE 4)	
						1000 OHMS	2650 OHMS
Line Wire at Conn Block	Ring	R	R	R	R	R	R
	Tip	G	G	G	G	G	G
	GRD	Y	Y	Y	Y	Y	Y
Dial Light Transformer	1	Y	Y	Y	Y	Y	Y
	2	BK	B	B	B	B	B
623P4 Jack Assembly in Set (Note 2)		R	L2	L2	L1	C	C
		G	L1	L1	L2	L2	L2
		Y	3	3	3	3	3
		BK	4	4	4	4	4
Ringer Lead (Note 1)		BK	L1	3	3	3	3
		R	K	K	K	K	K
		S	*	*	*	L1	*
		S-R	*	*	*	*	L1
Line Switch at Net. (Note 5)		W	F	F	C	B	B
		BR	C	C	F	F	F
Strap of Net.		BK	A	A	A	*	*

Note 1: To silence ringer permanently for all classes of service, refer to the appropriate section in Division 501.

Note 2: When connecting the 623P4 jack assembly leads for tip party identifying ground, use D-161488 connectors and M1W straps as required to extend conductor leads.

Note 3: Sets are factory-wired for bridged service.

Note 4: For tip party service with identifying ground, remove insulate and store (BK) strap between network terminals A and H.

Note 5: This change does not apply to sets equipped with a polarity guard.

* Insulated and stored.

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SERVICE

712B AND 712BM TELEPHONE SETS

1. GENERAL

1.01 Reissued to add:

- 712B Connections Fig. 3, 5, and 7.
- 712BM Connections Fig. 2, 4, and 6.

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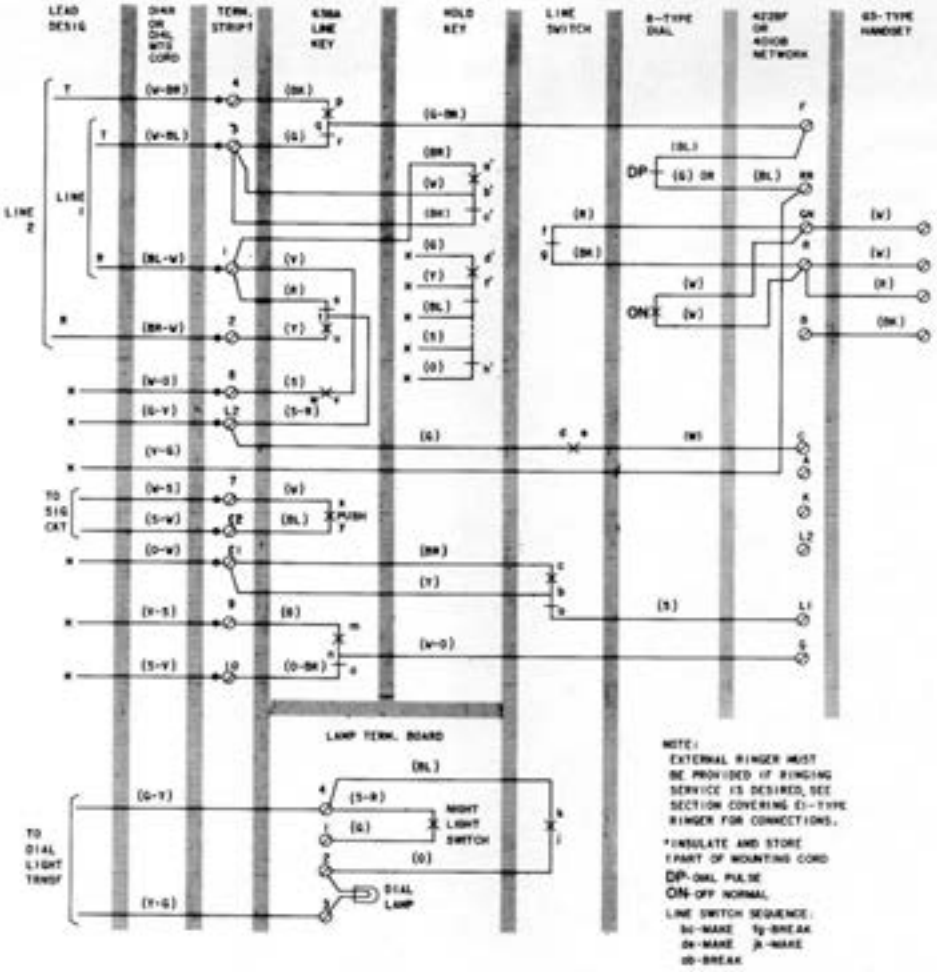

Fig. 1—712B Telephone Set, Connections, Wired for 2-Line Pickup, Hold on Line 1, and Signaling (Factory Wiring)

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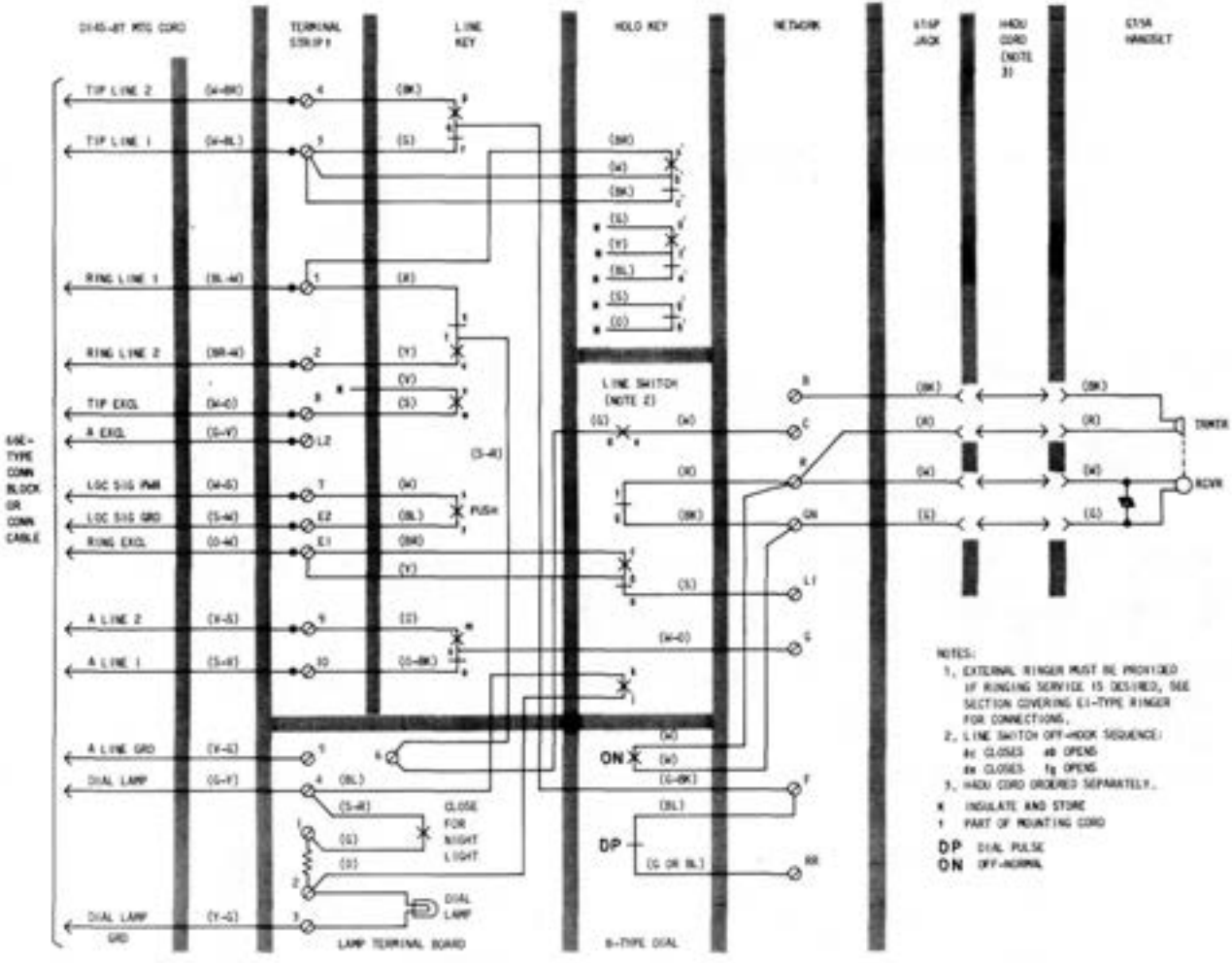

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Fig. 2—♦7128M Telephone Set, Connections, Wired for 2-Line Pickup, Hold on Line 1, and Signaling♦

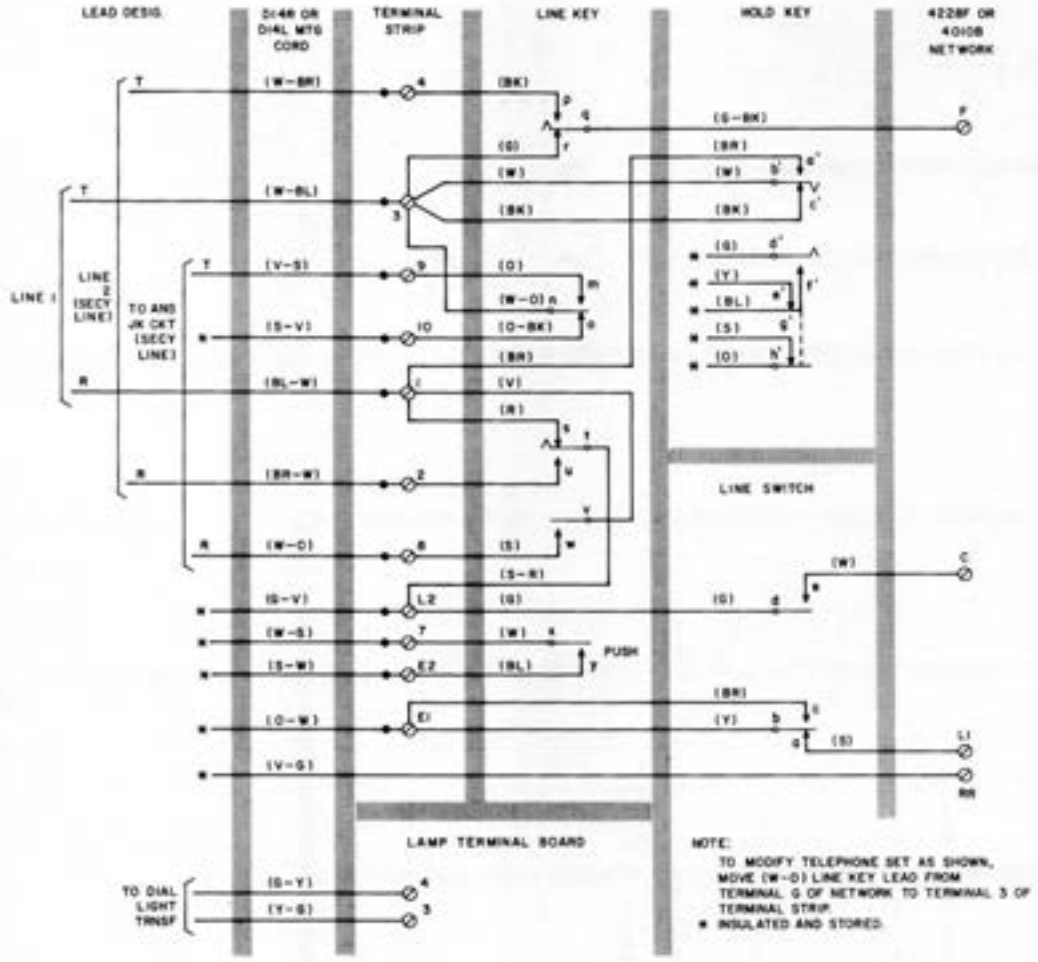

Fig. 3—712B Telephone Set, Connections, 1-Line Pickup, Hold, and Secretarial Service (Used Without 1A1 or 1A2 KTS)

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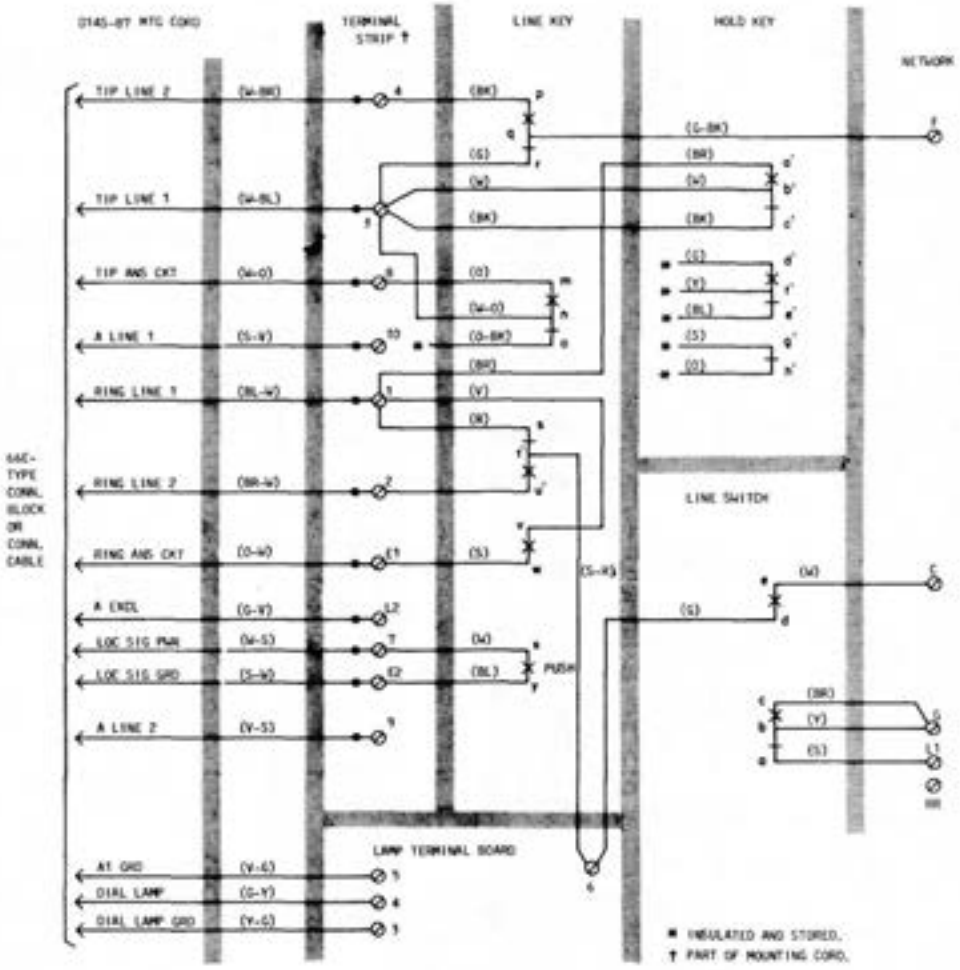

Fig. 4—◆712BM Telephone Set, Connections, 1-Line Pickup, Hold, and Secretarial Service (Used With 1A1 or 1A2 KTS)◆

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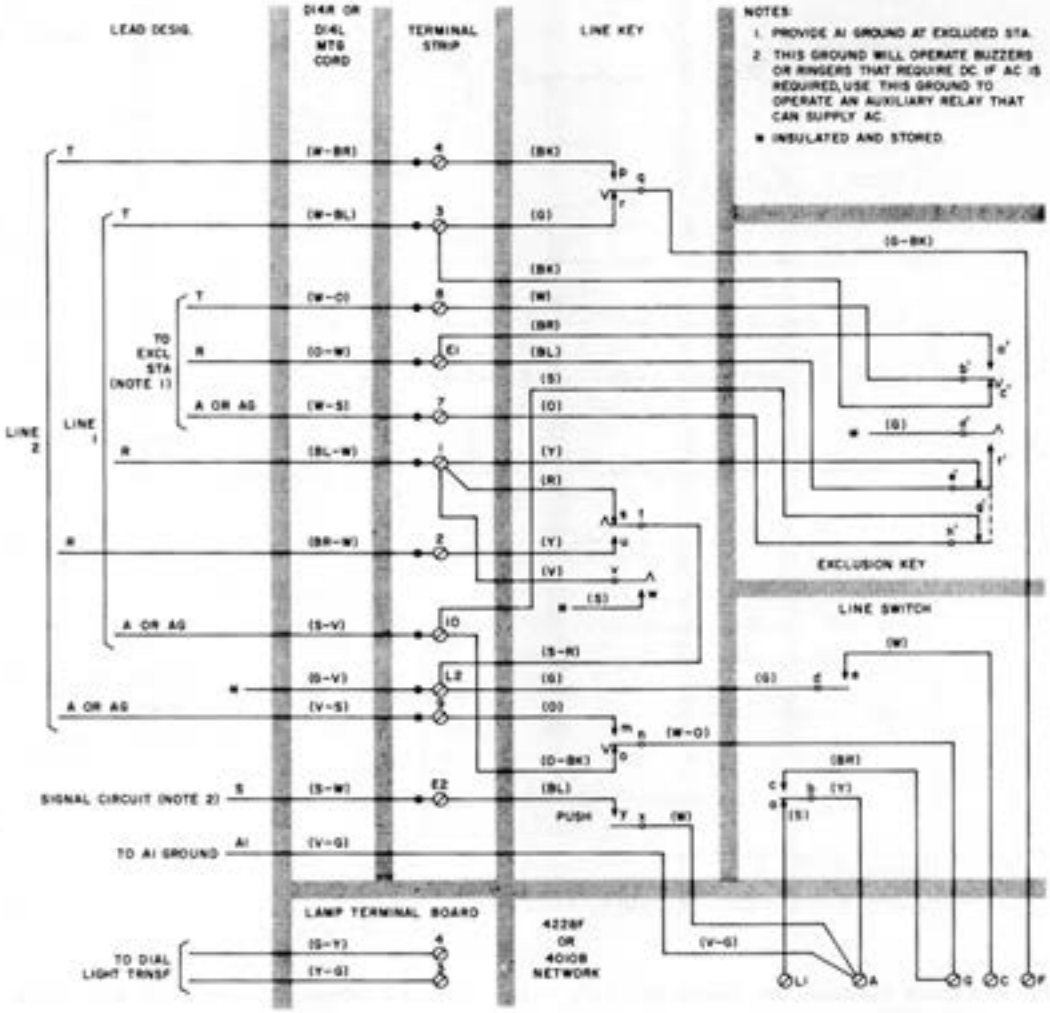

Fig. 5—712B Telephone Set, Connections, 2-Line Pickup, Exclusion on Line 1, and Signaling (Used With 1A1 or 1A2 KTS)

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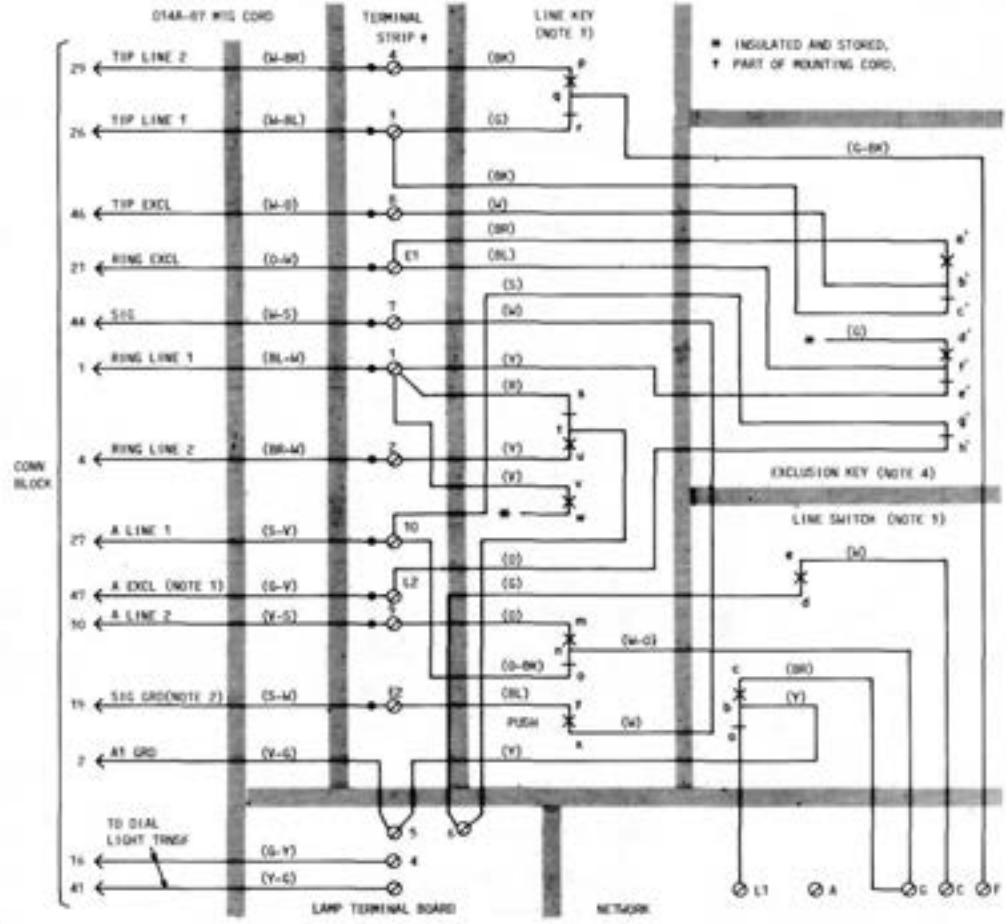

NOTES:
1. PROVIDE A1 GROUND AT EXCLUDED STA.
2. THIS GROUND WILL OPERATE BUZZERS OR RINGERS THAT REQUIRE DC. IF AC IS REQUIRED, USE THIS GROUND TO OPERATE AN AUXILIARY RELAY THAT CAN SUPPLY AC.
3. TO PREVENT A FALSE HOLD CONDITION, THE A LEAD CONTACTS ON THE LINE SWITCH AND LINE KEY MUST MAKE BEFORE THE TIP AND RING CONTACTS.
4. TO PROVIDE EXCLUSION ON LINE 2, CONNECT (BK), (Y), AND (S) EXCLUSION KEY LEADS TO TERMINALS 4, 2, AND 9 RESPECTIVELY.

Fig. 6—◆7128M Telephone Set, Connections, 2-Line Pickup, Exclusion on Line 1, and Signaling (Used With 1A1 or 1A2 KTS) (Factory Wiring)◆

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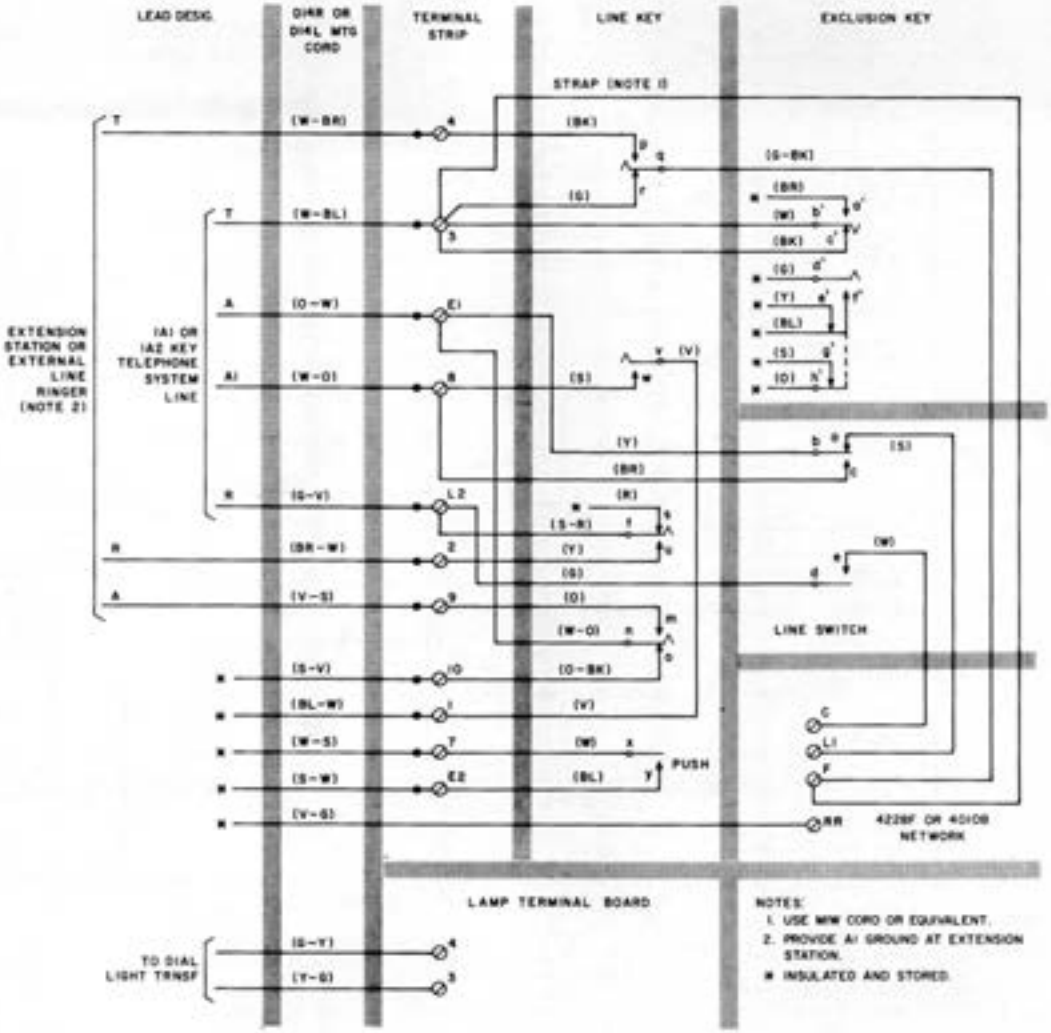

Fig. 7—7128 Telephone Set, Connections, Wired for 1-Line Pickup, Cutoff Feature for Extension Station or External Line Ringer

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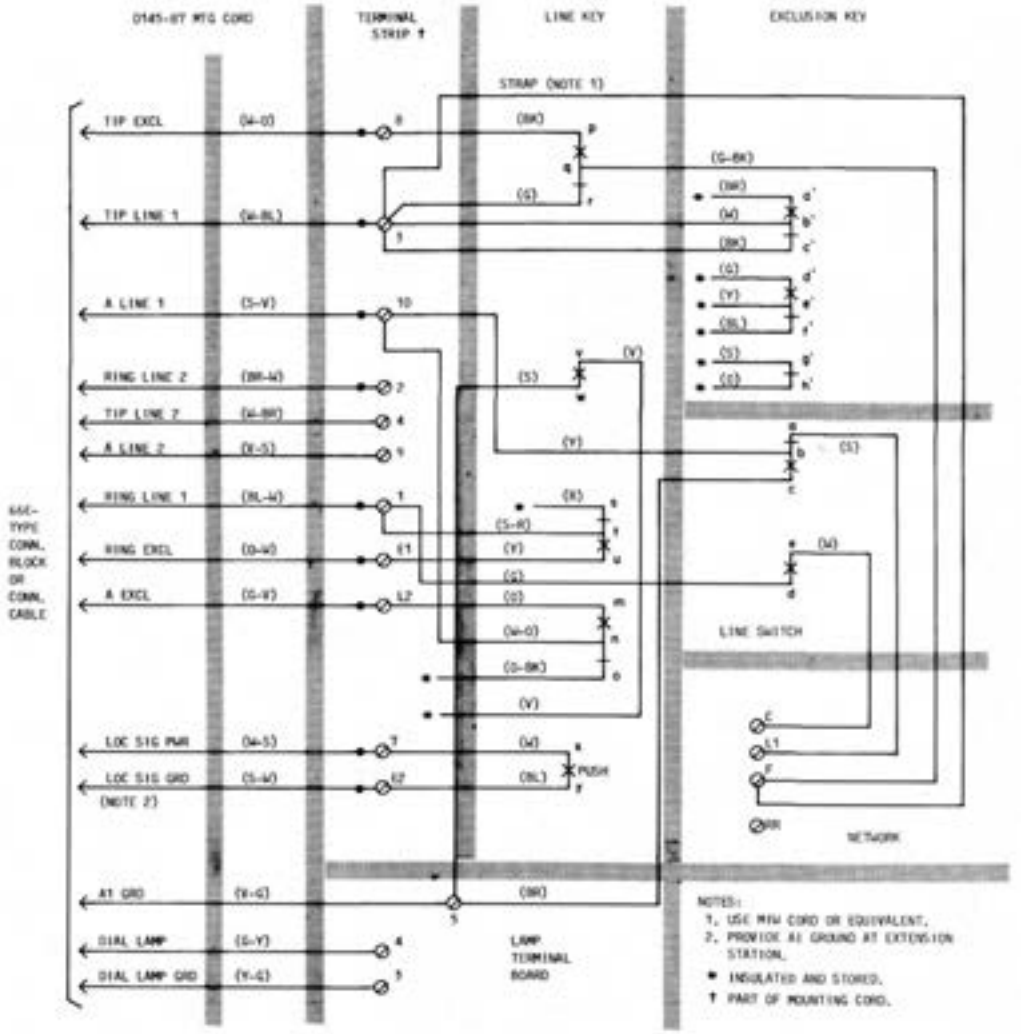

Fig. 8—#712BM Telephone Set, Connections, Wired for 1-Line Pickup, Cutoff Feature for Extension Station or External Line Ringer#

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SERVICE

2712B AND 2712BM TELEPHONE SETS

1. GENERAL

1.01 Reissued to:

- Add modular jacks and cords (Fig. 2)
- Revise Table B
- Add Tables C through H.

Caution: Do not use 2A or similar clamp on outlets where center mounting screws hold the duplex outlet in box. Do not connect more than one transformer to the same inside wiring pair.

TABLE A

POLARITY GUARD CONNECTIONS
(D-180229 KIT OF PARTS)
(2712B/BM)

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	NET.	POLARITY GUARD TERM. BOARD
Dial	BK	RR		3
Line Switch	W	C		4
Polarity Guard	R			3
	BK			4
	G		RR	
	W		C	

Note: For use when specified by local instructions for end-to-end signaling installations.

TABLE B

MODIFICATION FOR EXCLUSION ON LINE 1
(NONKEY TELEPHONE SYSTEM USE)
(2712B/BM)

LEAD	COLOR	REMOVE FROM	CONNECT TO
		TERM. STRIP	TERM. STRIP
638B/E Line Key	S†	8	*
Line Switch	Y	E1	*
	BR	E1	*
Hold Key (Exclusion)	BR	1	E1
	W	3	8
	Y	*	1
	BL	*	E1

* Insulate and store.

† 2712B-type only.

Note: Connect (W-Ω) and (O-W) mounting cord leads to tip and ring, respectively, of excluded station at connecting block for the 2712B-type only.

TABLE C

MODIFICATION FOR 1-LINE PICKUP, HOLD, AND SECRETARIAL SERVICE (2712B)

WIRE OR LEAD	COLOR	REMOVE FROM	CONNECT TO
		NET.	TERM. STRIP
Line Key	W-O	G	3

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♦TABLE D♦

MODIFICATION FOR 2-LINE PICKUP, EXCLUSION ON LINE 1, AND SIGNALING (USED WITH 1A1 OR 1A2 KTS) (27128)

WIRE OR LEAD	COLOR	REMOVE FROM		CONNECT TO	
		TERM. STRIP	NET.	TERM. STRIP	NET.
Line Key	S	8		*	
	W	7			L2
Exclusion Key	BR	1		E1	
	W	3		8	
	Y	*		1	
	BL	*		E1	
	S	*		10	
	O	*		7	
Line Switch	BR	E1			G
	Y	E1			L2
Mtg Cord	V-G		RR		L2

* Insulate and store.

♦TABLE E♦

MODIFICATION FOR 2-LINE PICKUP, CUTOFF FEATURE FOR EXTENSION STATION OR EXTERNAL LINE RINGER (27128)

WIRE OR LEAD	COLOR	REMOVE FROM	CONNECT TO	
		TERM. STRIP	TERM. STRIP	NET.
Line Key	W-O	G‡	E1	
Hold Key	BR	1	*	
Line Switch	BR	E1	8	
Strap†		(3) →	(F) →	

* Insulate and store.

† M1W cord or equivalent.

‡ Network terminal.

♦TABLE F♦

MODIFICATION FOR 2-LINE PICKUP, HOLD ON LINE 1 (NONKEY SYSTEM) (27128M).

WIRE OR LEAD	COLOR	REMOVE FROM	CONNECT TO
		TERM. STRIP	TERM. STRIP
Hold Key	W	8	3
	BR	E1	1
	Y	1	*

* Insulate and store.

♦TABLE G♦

MODIFICATION FOR 1-LINE PICKUP, HOLD, AND SECRETARIAL SERVICE (27128M)

WIRE OR LEAD	COLOR	REMOVE FROM		CONNECT TO
		TERM. STRIP	NET.	TERM. STRIP
Line Key	W-O		G	3
	O	9		L2
	O-BK	10		*
	S	*		E1
Hold Key	BR	E1		1
	W	8		3
	Y	1		*
	BL	E1		*

* Insulate and store.

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TABLE H

MODIFICATION FOR 1-LINE PICKUP, CUTOFF FEATURE FOR EXTENSION STATION OR EXTERNAL LINE RINGER (2712BM)

WIRE OR LEAD	COLOR	REMOVE FROM		CONNECT TO
		TERM. STRIP	NET.	TERM. STRIP
Line Key	W-O		G	10
	O	9		L2
	O-BK	10		*
	BK	4		8
	V	1		*
	R	1		*
	S-R	6		1
	Y	2		E1
Hold Key	Y	1		*
	BL	E1		*
	S	10		*
	O	L2		*
	BR	E1		*

* Insulate and store.

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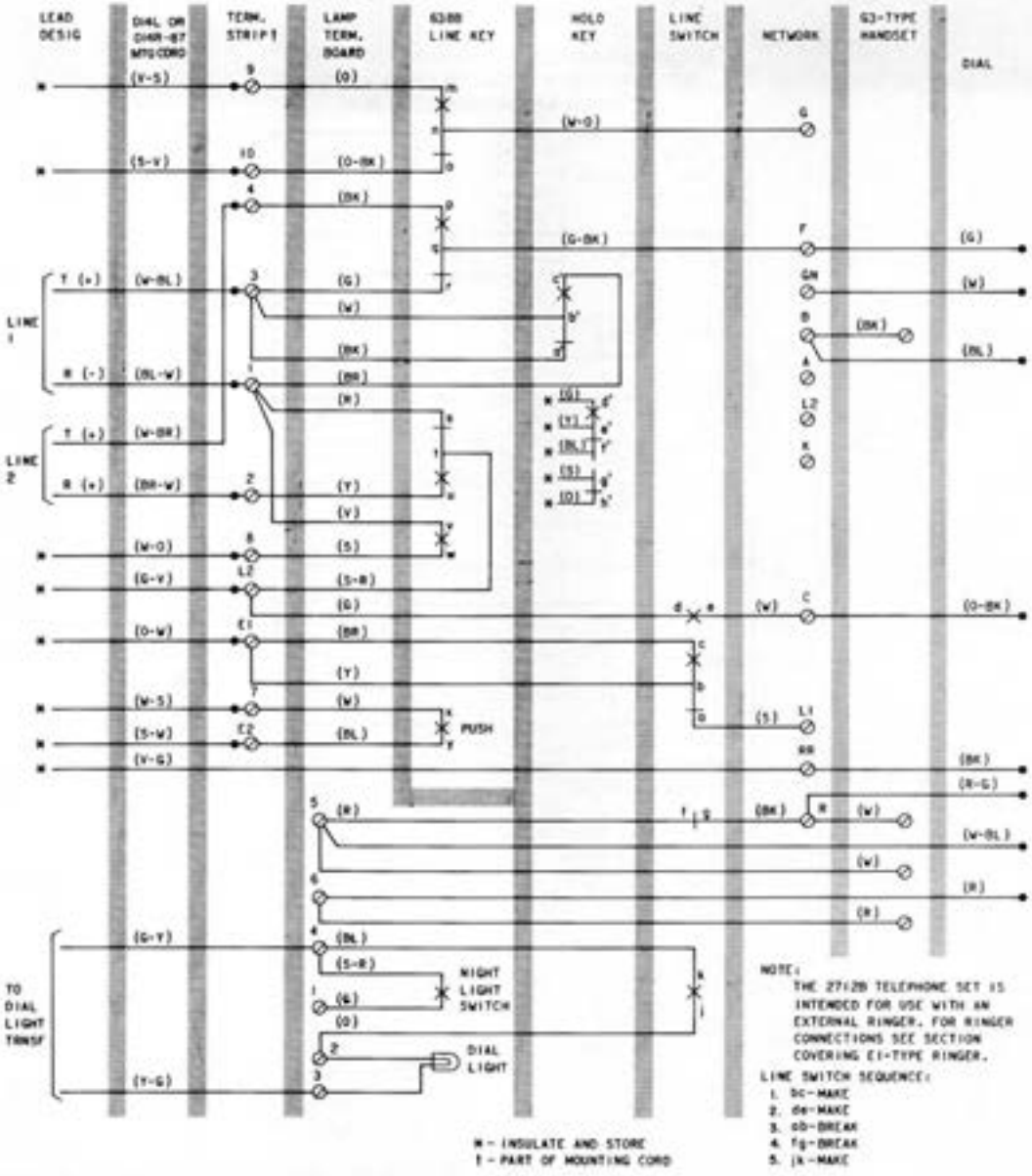

Fig. 1—2712B Telephone Set Connections, 2-Line Pickup with Hold on Line 1 (Factory Wiring)

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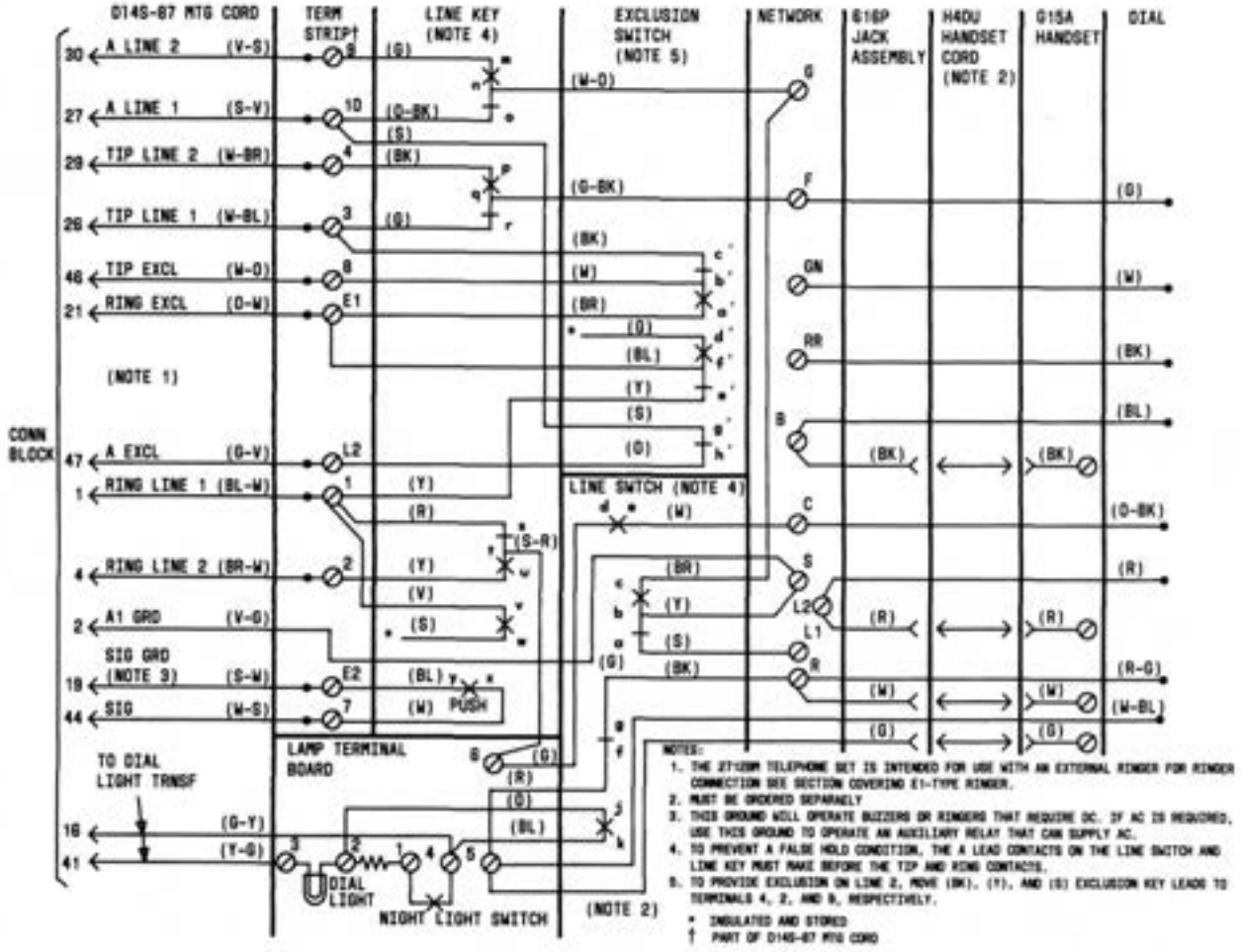

Fig. 2—2712BM Telephone Set Schematic, Single Party, Exclusion on Line 1, and Signaling (Used with 1A1 or 1A2 KTS) (Factory Wiring)

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SERVICE

713B AND 713BM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 713B (MD) and 713BM telephone sets.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add the D-181059 Kit of Parts (dial illumination kit)
- Show the D-180819 Kit of Parts MD (dial illumination kit).

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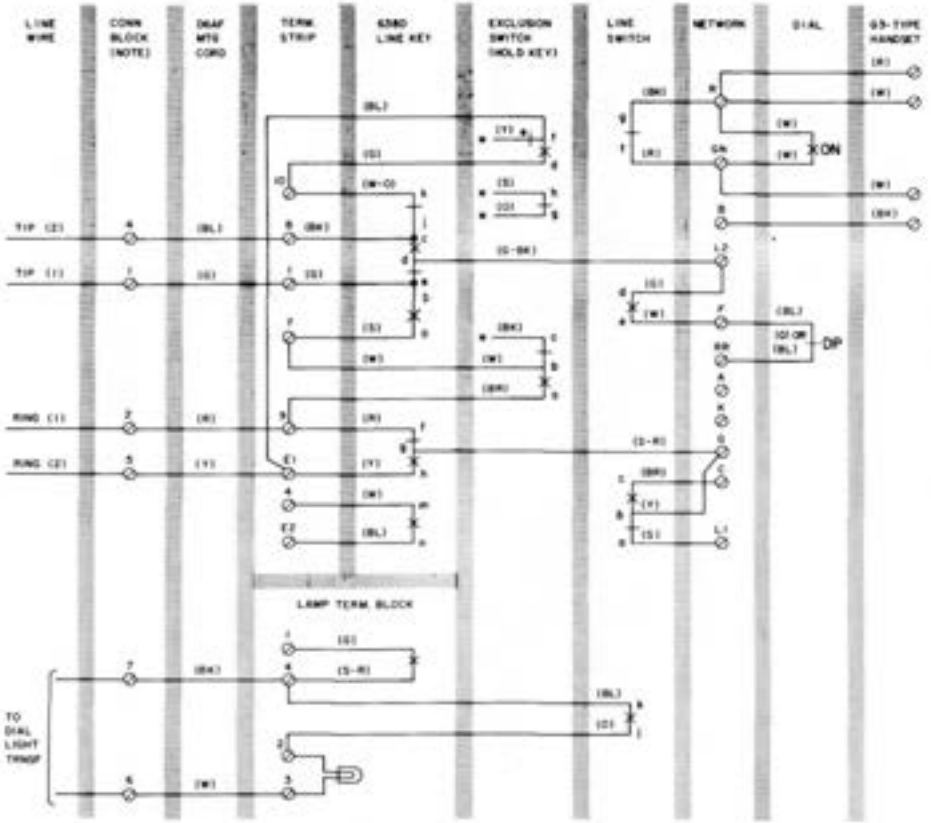

NOTE:
IF RINGER IS REQUIRED, REPLACE CONNECTING BLOCK WITH SEPARATELY ORDERED E1-TYPE RINGER.

* INSULATED AND STORED.

Fig. 1—◆713B (MD) Telephone Set, Connections (Nonmodular)◆

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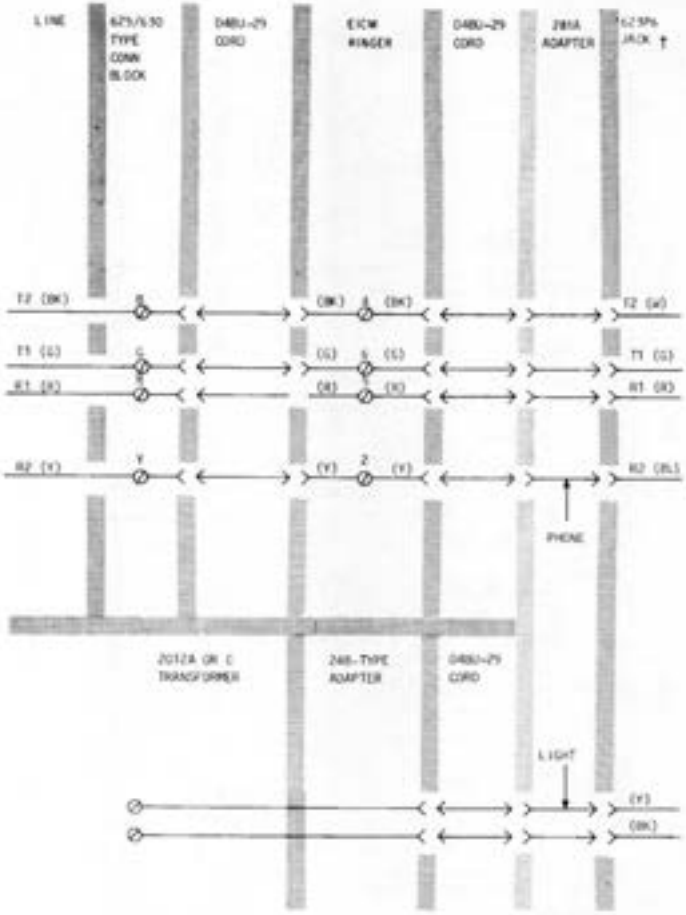

Fig. 2—8713BM Telephone Set, Modular Connections Using a 281A (MD) Adapter Part of the D-180819 Kit of Parts (MD) and Two Mounting Cords to Set (Sheet 1 of 2)

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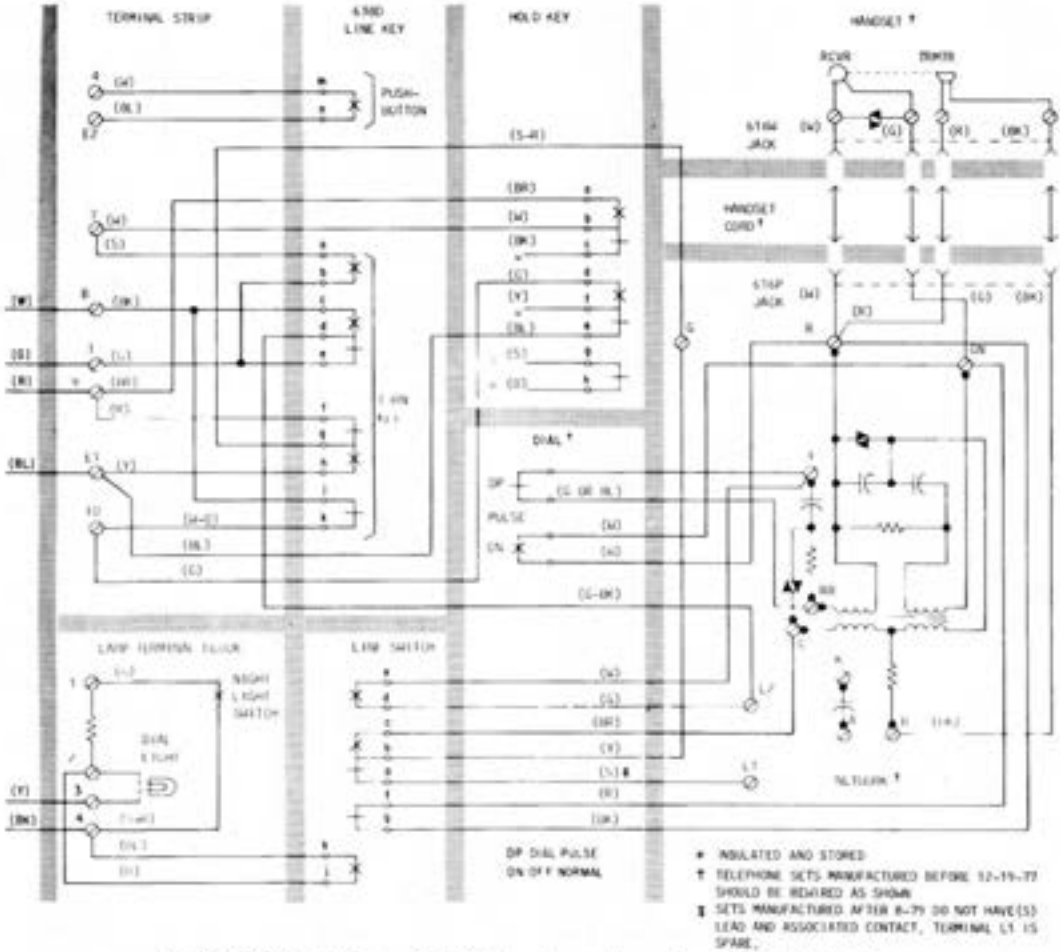

* INSULATED AND STORED

† TELEPHONE SETS MANUFACTURED BEFORE 12-19-77 SHOULD BE REWIRED AS SHOWN

‡ SETS MANUFACTURED AFTER 8-79 DO NOT HAVE (S) LEAD AND ASSOCIATED CONTACT, TERMINAL L1 IS SPARE.

Fig. 2—◆7138M Telephone Set, Modular Connections using a 281A (MD) Adapter Part of the D-180819 Kit of Parts (MD) and two Mounting Cards to Set (Sheet 2 of 2)◆

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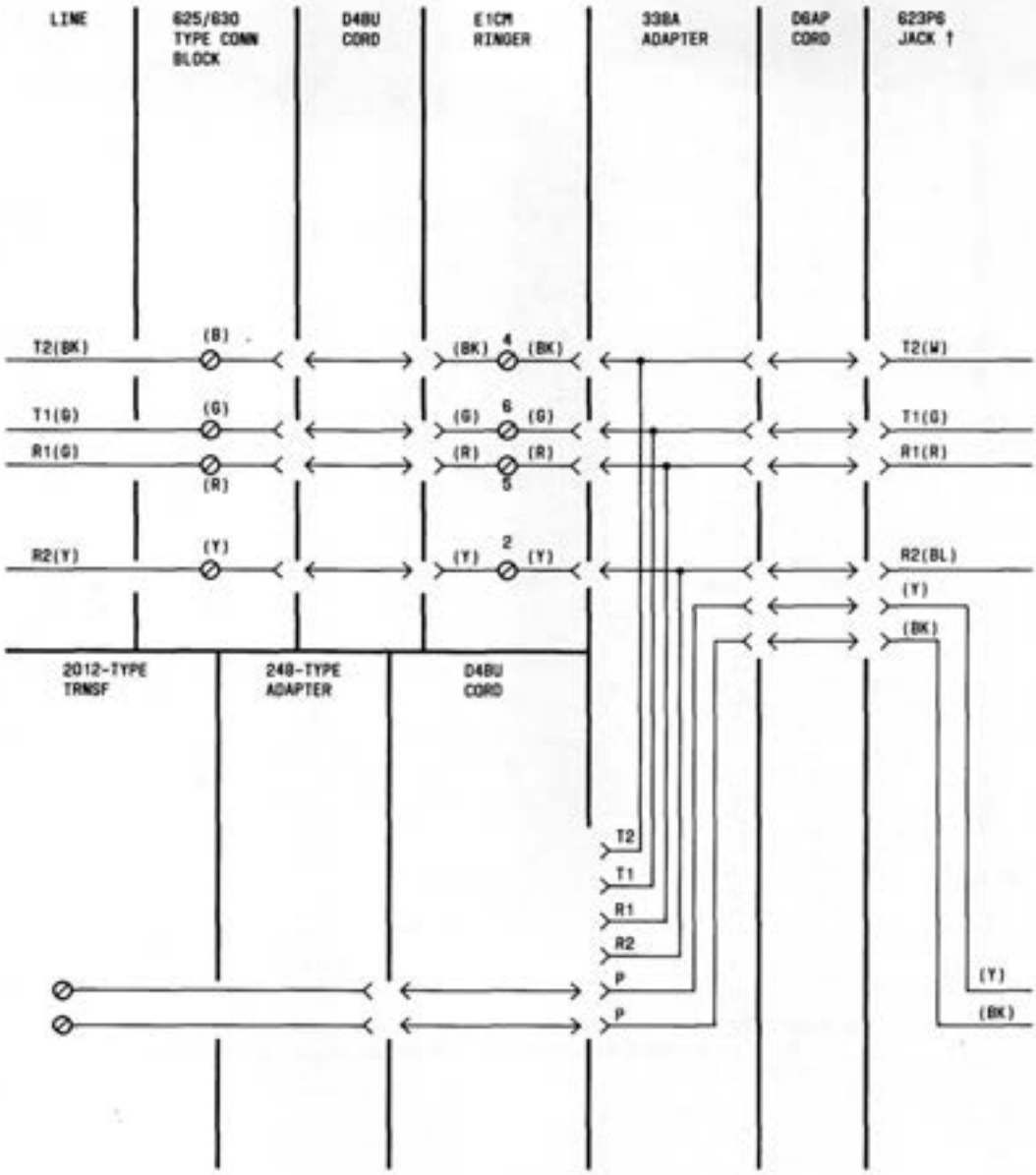

Fig. 3—♦713BM Telephone Set, Modular Connections Using a 338A Adapter Part of the D-181059 Kit of Parts (Sheet 1 of 2)♦

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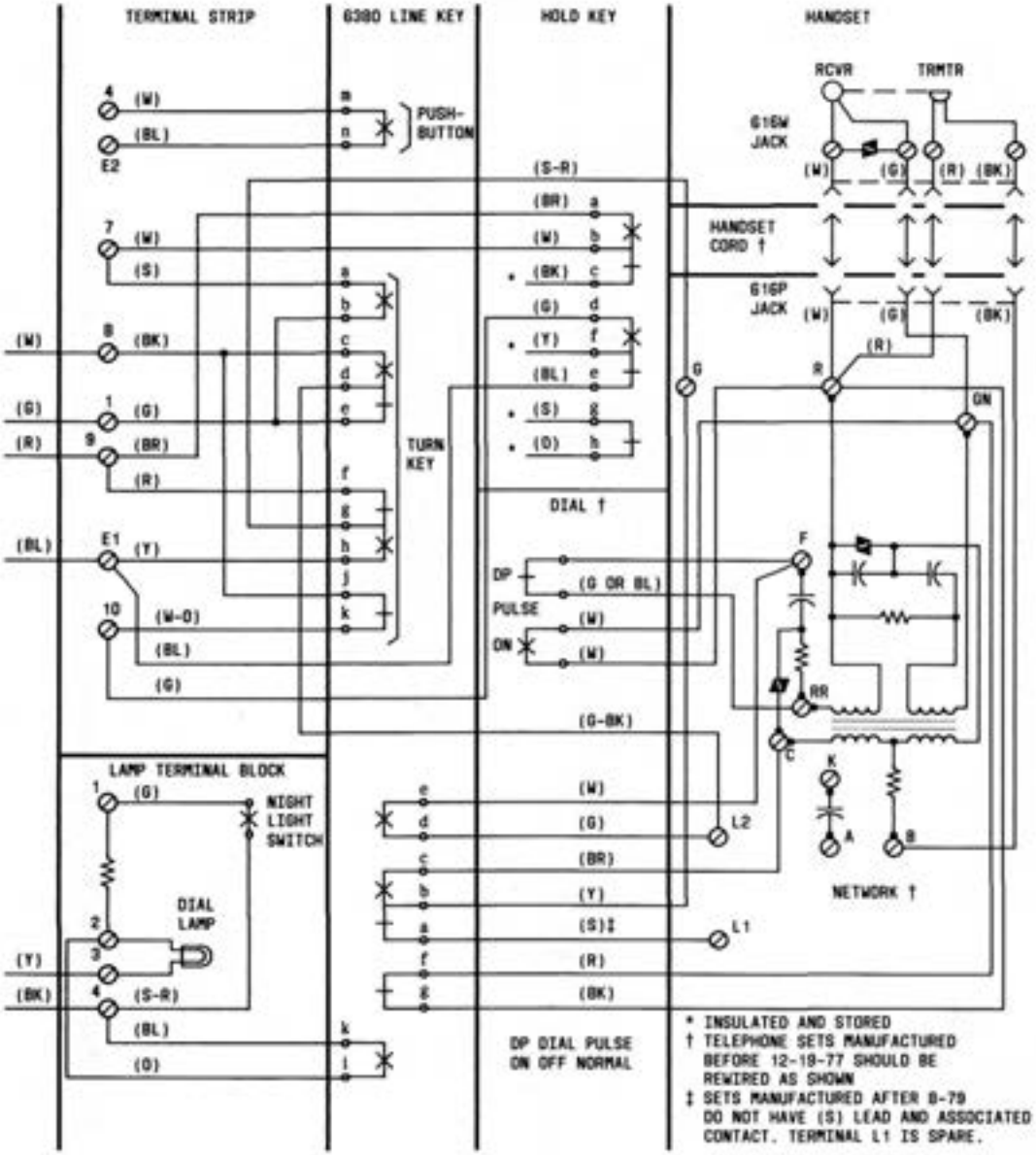

Fig. 3—◆7138M Telephone Set, Modular Connections Using a 338A Adapter Part of the D-181059 Kit of Parts (Sheet 2 of 2)◆

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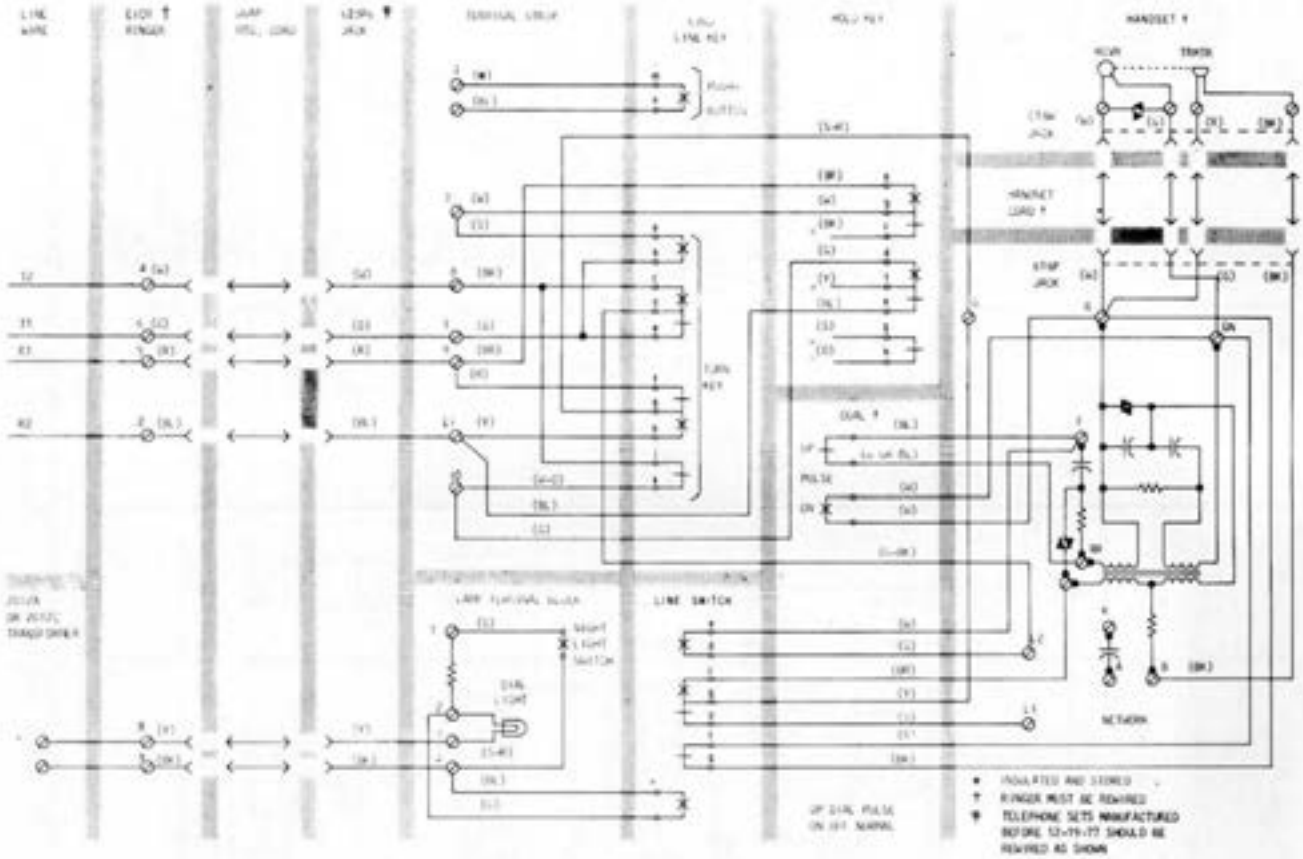

Fig. 4—♦713BM Telephone Set, Modular Connections Using a Combination of Both Hand Wiring and Modular Connections Through an E1CM Ringer♦

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SERVICE

2702D AND 2702DM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information for the 2702D (MD) and 2702DM (MD) telephone sets.

1.02 Reissued to:

- Show 2702D and 2702DM telephone sets MD
- Show the D5AK mounting cord MD

TABLE A

POLARITY GUARD CONNECTIONS
(D-180229 Kit of Parts)

WIRE OR LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	NET.	TERM. BLOCK*
Line Switch	BR	C		4
Dial	BK	RR		3
D-180229 Polarity Guard	R BK G W		 RR C	3 4

* Component of message waiting lamp assembly located between dial mounting brackets. Use screws from terminal board in D-180229 Kit of Parts.

Note: Terminal board and retainer furnished with D-180229 Kit of Parts are not used on sets equipped with message waiting feature. Install polarity guard only when specified by local instructions for end-to-end signaling.

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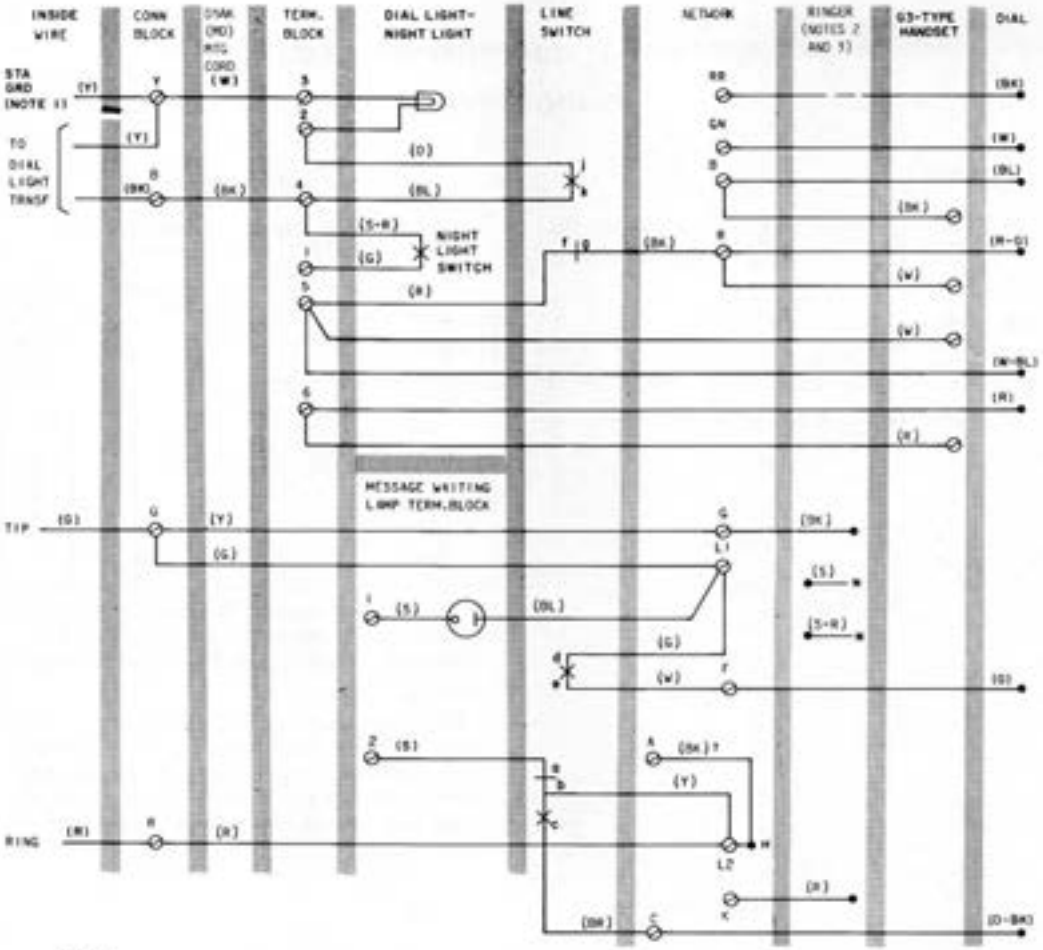

Fig. 1—♦2702D (MD) Telephone Set, Connections Using D5AK (MD) Mounting Cord♦

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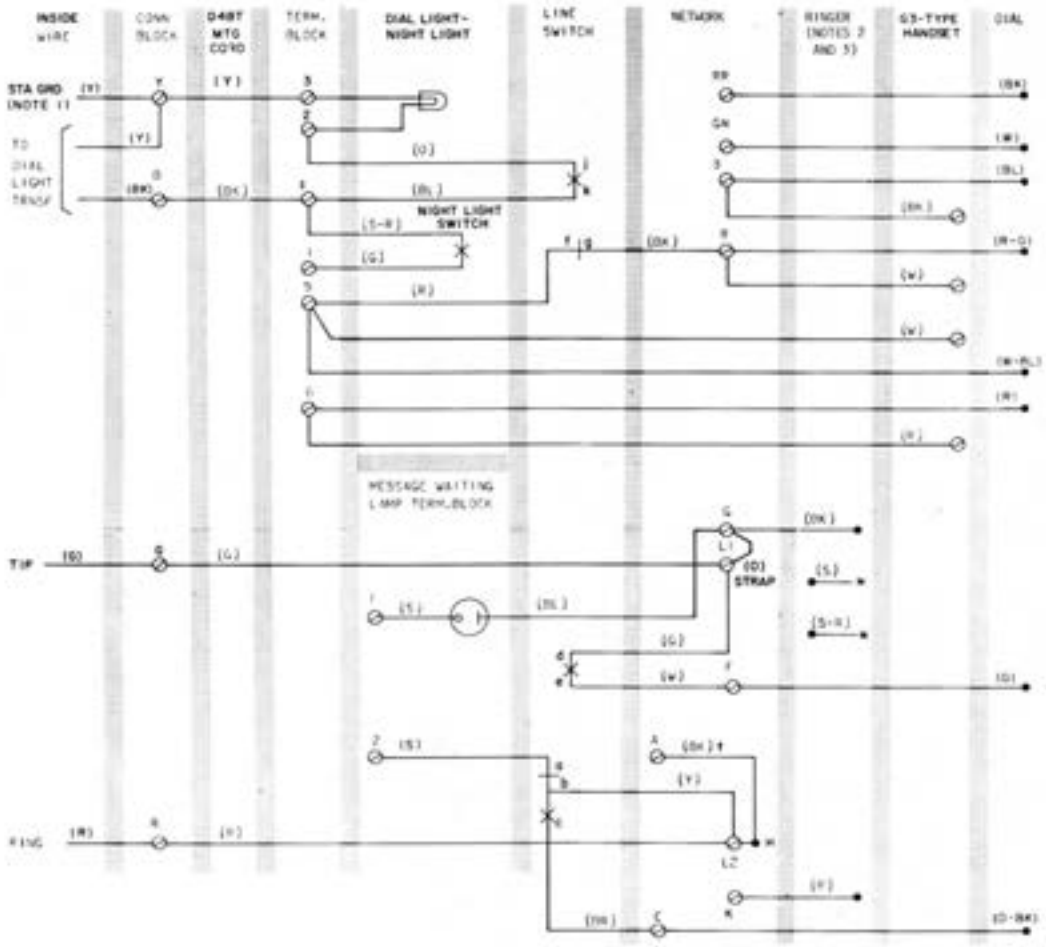

NOTES:
1. STATION GROUND SHALL BE PROVIDED FOR ALL INSTALLATIONS.
2. TO SILENCE RINGER PERMANENTLY, REFER TO APPROPRIATE RINGER SECTION IN DIVISION 501.

* INSULATED AND STORED
† ON 4220G NET, THIS LEAD IS SPADE-TIPPED ON BOTH ENDS AND CONNECTS TO TERMS. A AND L2.

Fig. 2—◆2702D (MD) Telephone Set, Connections Using D4BT Mounting Cord◆

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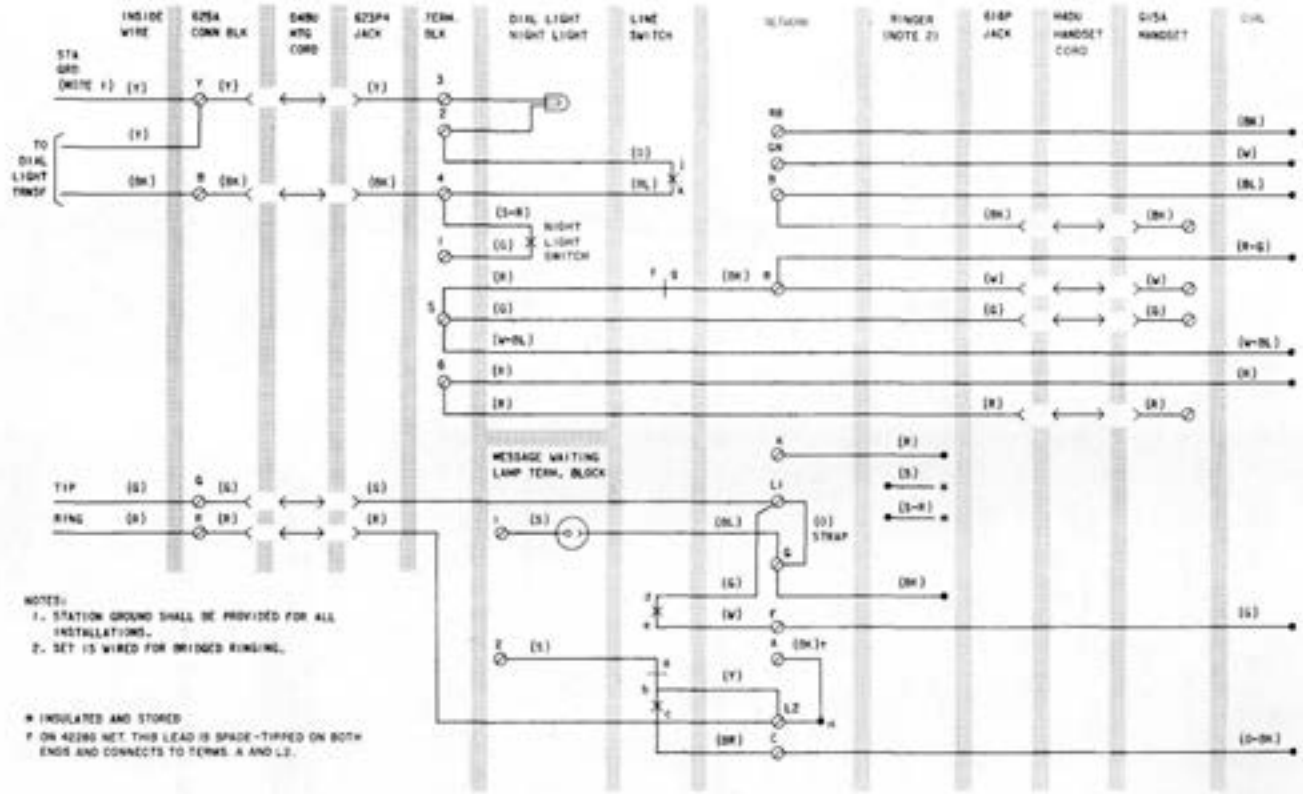

Fig. 3—#2702DM (MD) Telephone Set, Connections#

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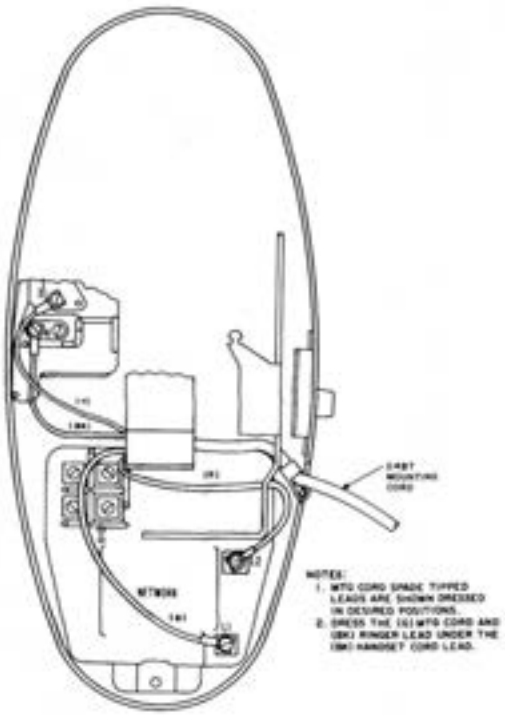

Fig. 4—Method of Terminating D4BT Mounting Cord in Sets Equipped With 4010-Type Network

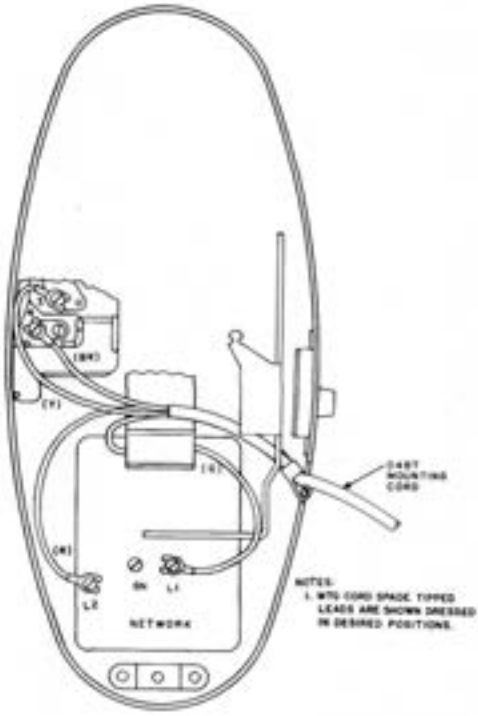

Fig. 5—Method of Terminating D4BT Mounting Cords in Sets With 4228-Type Network

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SERVICE

2713B AND 2713BM TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2713B (MD) and 2713BM telephone sets.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add the D-181059 Kit of Parts (dial illumination kit)
- Add the D-180896 Kit of Parts (polarity guard kit) for use only in sets with 4228-type network
- Add the D-181063 Kit of Parts (polarity guard kit) for use only in sets with 4210-type network
- Show the D-180819 Kit of Parts (MD) (dial illumination kit).

Danger: Securely attach 2A or similar retaining clamp to ac outlet using outlet cover screw before attempting to install 2012A or C transformer unit. A retaining clamp is not required on transformers with folded blade prongs. The transformer and any other cord plugged into the ac outlet should always be unplugged completely from outlet before attempting to attach or remove the clamp. Do not use 2A or similar retaining clamp on outlets where center mounting screw holds the duplex outlet in the box.

Caution: Do not connect more than one transformer to the same inside wiring pair.

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◗ TABLE A ◖

2713B (MD) AND 2713BM TELEPHONE SETS POLARITY GUARD CONNECTIONS (See Note)

TEL SET NET.	POLARITY GUARD	WIRE OR LEAD	COLOR	REMOVE FROM NET	CONNECT TO	
					NET.	POLARITY GUARD
4010-Type	D-181063 Kit of Parts	Line Switch*	W	F		T
			BR	C		S
		Polarity Guard	G		F	
			W		C	
	D-180229 Kit of Parts	Dial	BK	RR		3†
		Line Switch	BR	C		4†
		Polarity Guard	R			3†
			BK			4*†
			G		RR	
			W		C	
4228-Type	D-180896 Kit of Parts	Line Switch	W	F		T
			BR	C		S
		Polarity Guard	G		F	
			W		C	

Note : For use when specified by local instructions for end-to-end signaling installations.

* Connect to L2 of network when associated with 1A1 or 1A2 KTS.

† Terminals 3 and 4 are on terminal board which is part of D-180229 Kit of Parts.

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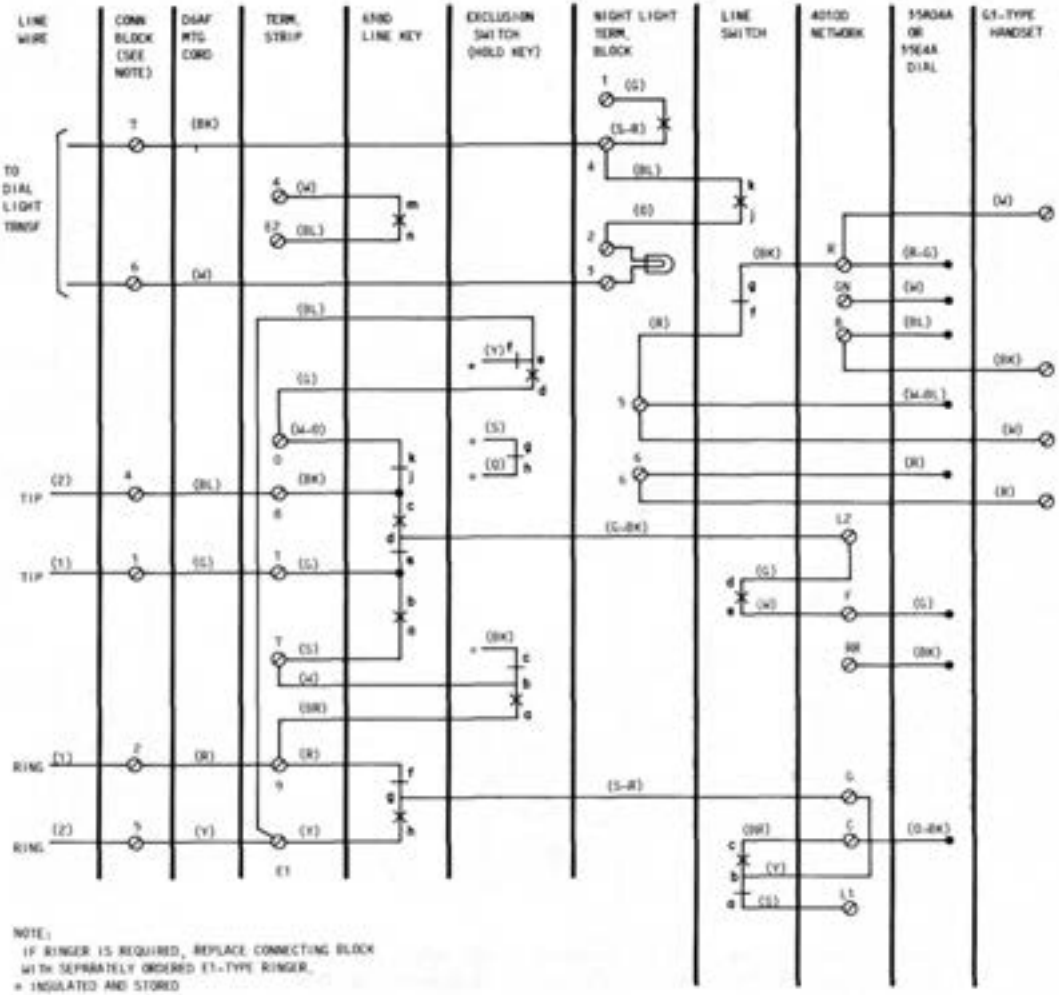

Fig. 1—◆2713B (MD) Telephone Set, Connections (Nonmodular)◆

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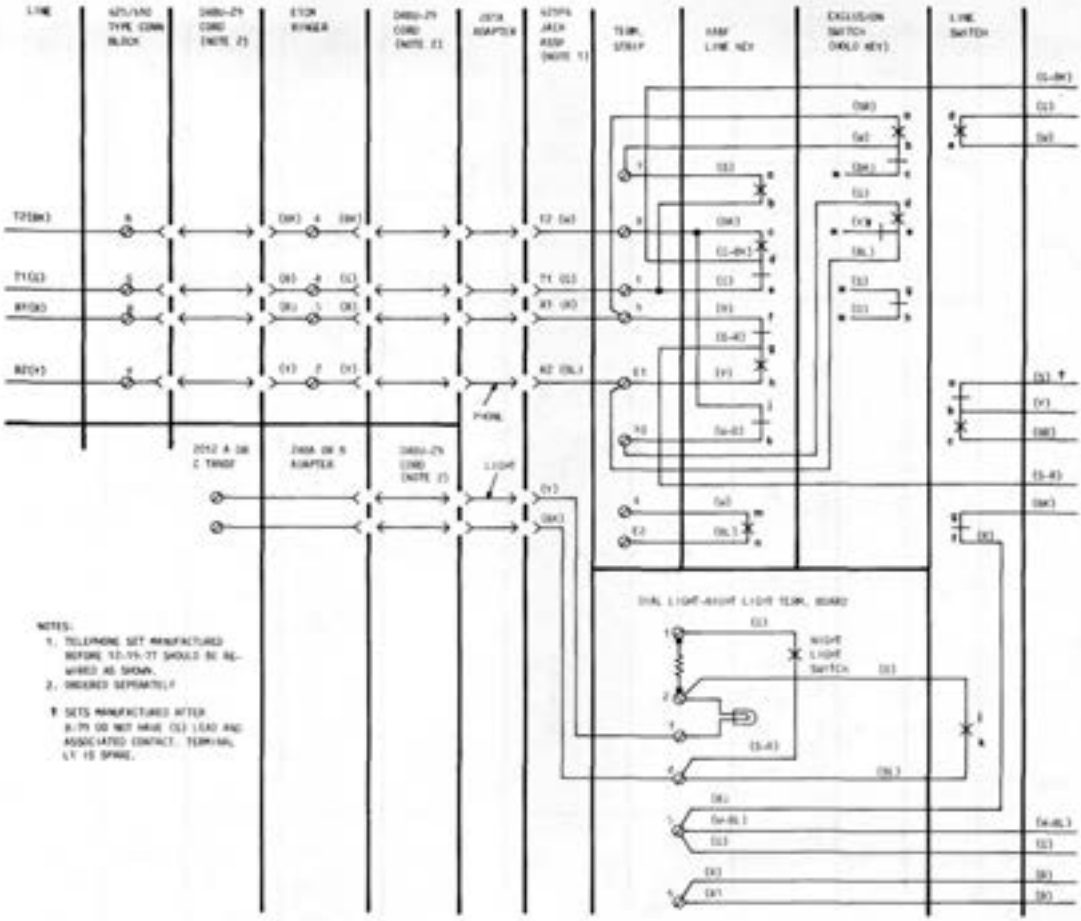

Fig. 2—♦2713BM Telephone Set, Modular Connections Using a Combination of Both Hand Wiring and Modular Connections Through an E1CM Ringer (Sheet 1 of 2)♦

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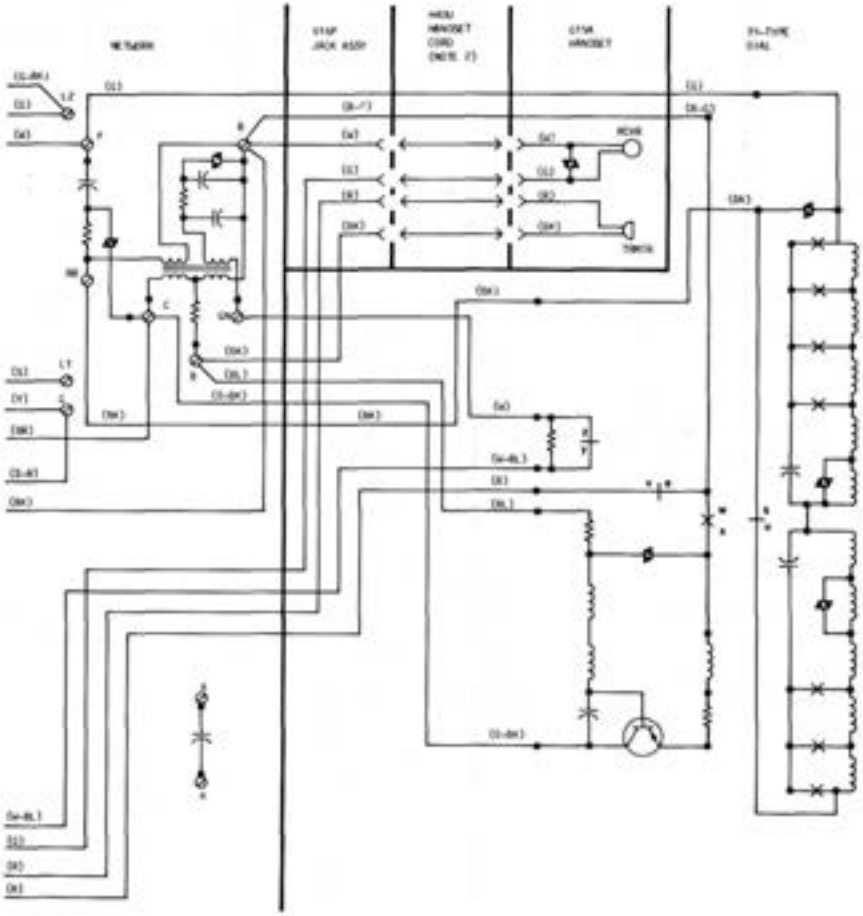

Fig. 2—#2713BM Telephone Set, Modular Connections Using a Combinaton of Both Hand Wiring and Modular connections through an E1CM Ringer (Sheet 2 of 2)#

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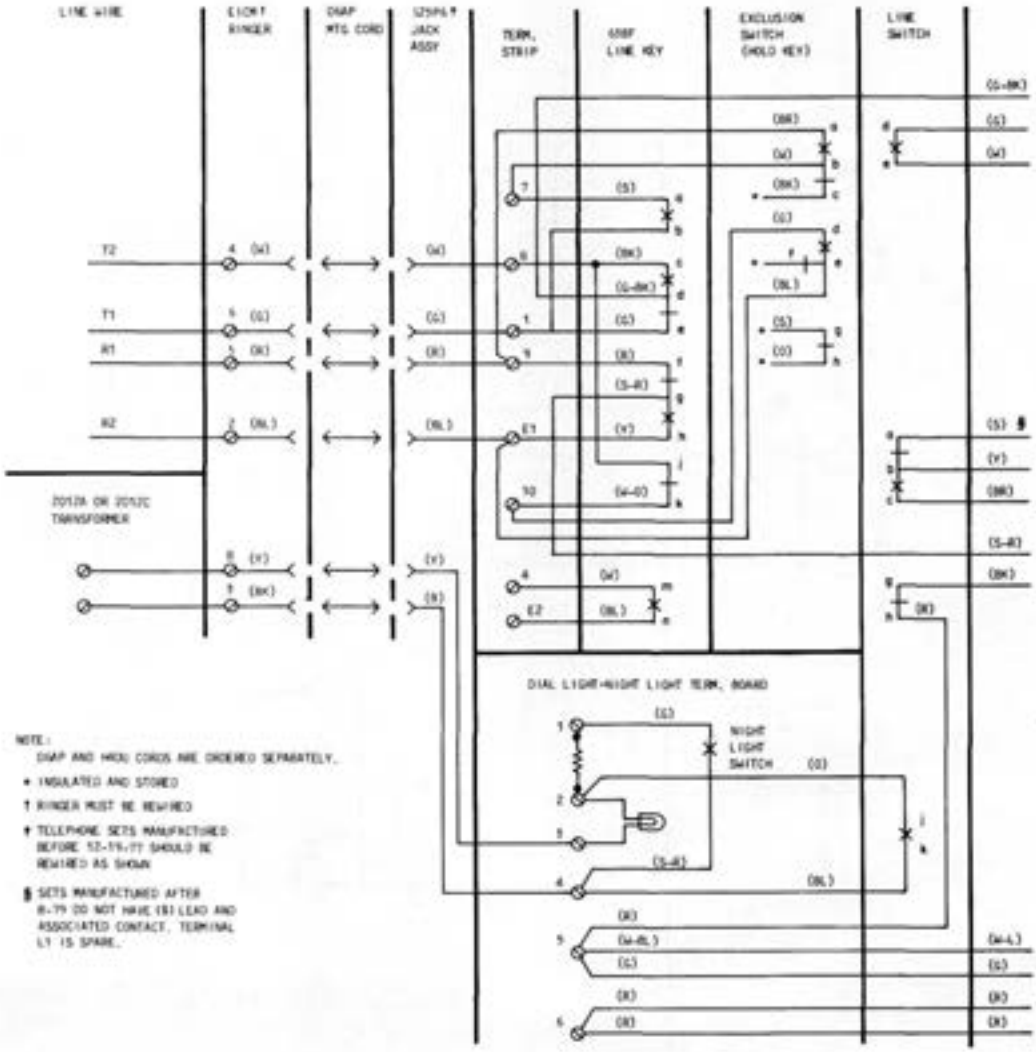

Fig. 3—PhoneCenter Type Installation, 2713BM Telephone Set, Modular Connections Using a 281A (MD) Adapter Which is Part of the D-180819 Kit of Parts (MD) and Two Mounting Cords to Set (Sheet 1 of 2)

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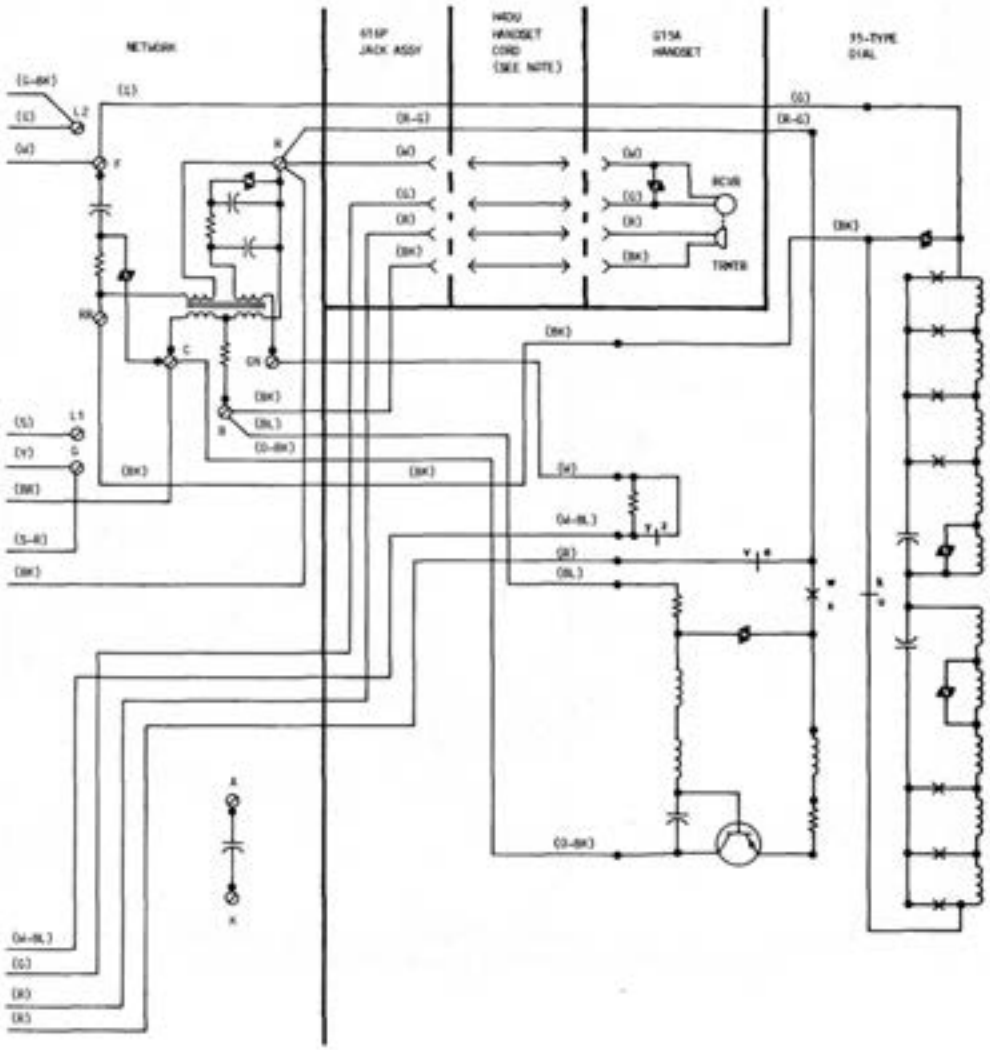

Fig. 3—PhoneCenter Type Installation 2713BM Telephone Set, Modular Connections Using a 281A (MD) Adapter Which is Part of the D-180819 Kit of Parts (MD) and Two Mounting Cords to Set (Sheet 2 of 2)

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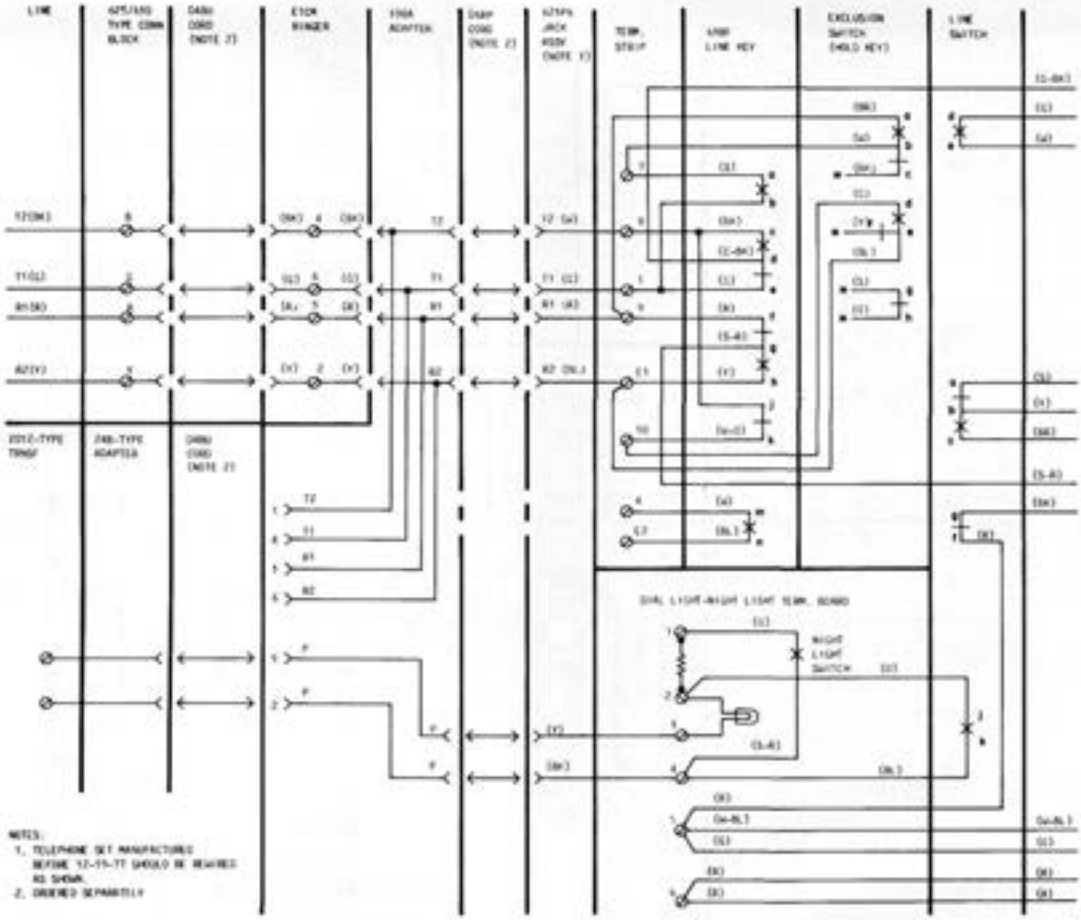

Fig. 4—PhoneCenter Type Installation, 2713BM Telephone Set, Modular Connections Using a 338A Adapter Which is Part of the D-181059 Kit of Parts (Sheet 1 of 2)

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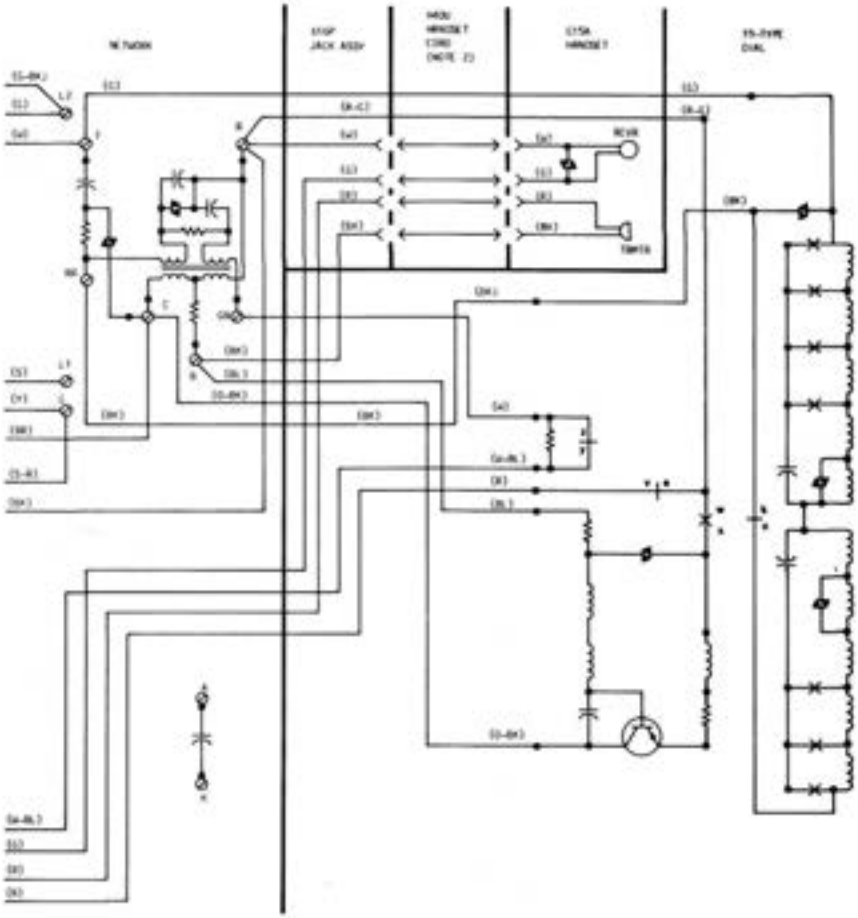

Fig. 4—PhoneCenter Type Installation, 2713BM Telephone Set, Modular Connections Using a 338A Adapter Which is Part of the D-181059 Kit of Parts (Sheet 2 of 2)

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SERVICE

750-TYPE TELEPHONE SET

1. GENERAL

1.01 Reissued to:

- Revise figures
- Revise Table A.

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TABLE A

750A, B (MD) (LATEST MODEL) AND 750AM, BM TELEPHONE SETS LINE, RINGER, AND 426A TUBE CONNECTIONS (FIG. 1 AND 2)

WIRE OR LEAD		COLOR	INDIV OR BRIDGED (FACTORY WIRING)		RING PARTY		TIP PARTY		TIP PARTY WITH IDENT. GRD						SELECTIVE RINGING (Note 1)					
									1000 OHMS			2650 OHMS			NEGATIVE (−) RING			POSITIVE (+) RING		
			TB2	NET.	TB2	NET.	TB2	NET.	TB2	MTG BLK	NET.	TB2	MTG BLK	NET.	TB2	MTG BLK	NET.	TB2	MTG BLK	NET.
CO Line at 71B Conn Block	Ring	R	2		2		1		1			1			2			2		
	Tip	G	1		1		2		2			2			1			1		
	GRD	Y	3*		3		3		3			3			3			3		
	Spare	BK	4		4		4		4			4			4			4		
Ringer Leads (Note 2)		R		R†		R†		R†			K			B			L2		R	
		BK		G†		L2		L2			L2			B			L2		R	
		S		K		K		K			B			K			K			K
		S-R		A		A		A			B			L2			A			A
Line Switch		S		L1		L1		L1			A			A			L1			L1
426A Tube (3-Element)		BK																		A
		R														GN	A		R	
		Y														R				L2
Strap		Y	Y† to L2		Y† to L2		Y† to L2		Y† to L2			Y† to L2			Y† to L2			Y† to L2		

* Ground may be omitted, if not required for service.

†Terminals are on 814313946 (P-43A394) mounting block (750A/B) or 841390735 TB1 terminal block (750AM/BM)

Notes:

1. For tip stations reverse tip and ring at connecting block.
2. To silence ringer permanently, refer to appropriate ringer practice in Division 501.

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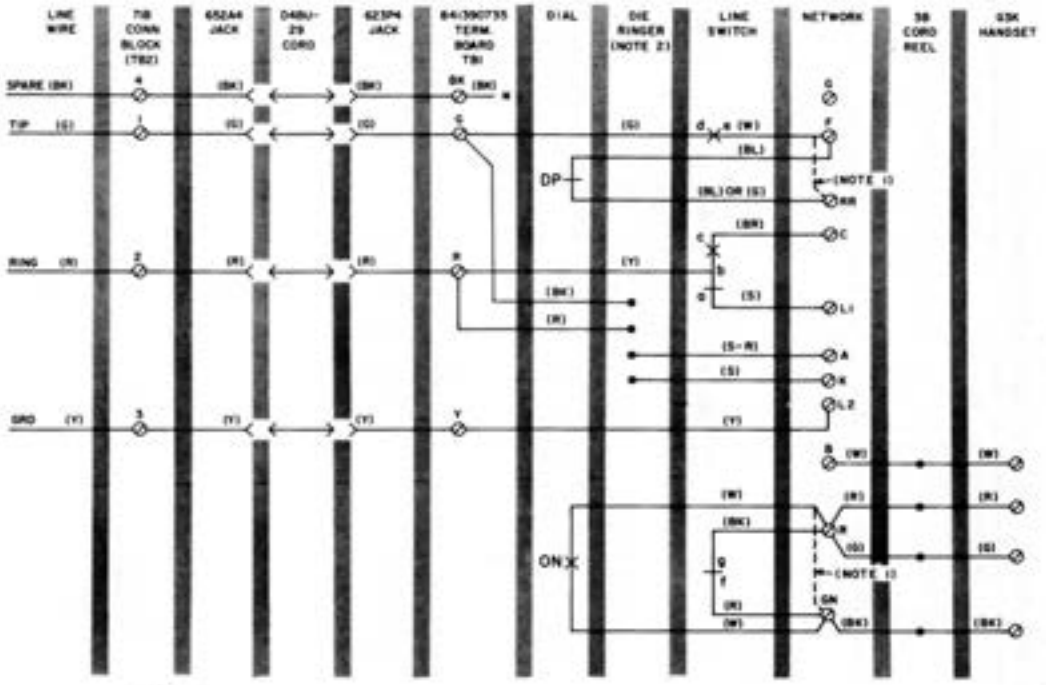

NOTES:

1. DASHED LINES INDICATE CONNECTIONS FOR MANUAL SERVICE, DIAL REMAINS ON SET.

2. FACTORY WIRED FOR BRIDGED RINGING. REFER TO TABLE A FOR ALL OTHER CLASSES OF SERVICE.

* —INSULATE AND STORE
DP—DIAL PULSE
ON—OFF NORMAL

Fig. 1—750AM and BM Telephone Sets, Connections

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TABLE B
750A AND B (MD) TELEPHONE SETS (LATER MODELS) LINE, RINGER, AND 426A TUBE CONNECTIONS (FIG. 3)

WIRE OR LEAD		COLOR	INDIVIDUAL OR BRIDGED (FACTORY WIRING)			RING PARTY			TIP PARTY			TIP PARTY WITH IDENTIFICATION GROUND						SELECTIVE RINGING							
												1000 OHMS			2650 OHMS			NEGATIVE (—) RING†				POSITIVE (+) RING†			
			TB2	MTG BLK	NET.	TB2	MTG BLK	NET.	TB2	MTG BLK	NET.	TB2	MTG BLK	NET.	TB2	MTG BLK	NET.	TB2	TB1	MTG BLK	NET.	TB2	TB1	MTG BLK	NET.
CO Line at 71B Conn Block	Ring	R	2			2			1			1			1			2				2			
	Tip	G	1			1			2			2			2			1				1			
	GRD	Y	3*			3			3			3			3			3				3			
			TB1	MTG BLK	NET.	TB1	MTG BLK	NET.	TB1	MTG BLK	NET.	TB1	MTG BLK	NET.	TB1	MTG BLK	NET.	TB2	TB1	MTG BLK	NET.	TB2	TB1	MTG BLK	NET.
Ringer Leads (Note 1)	R			R			R			R		2			2				1				1		
	BK	1				1			1			2			2				1				1		
	S				K			K			K		Y		1						K				K
	S-R	2				2			2			1				Y			2				2		
TB1 Straps (Note 2)	BK			GN			Y			Y				K			K			Y				R	
	S-R				A			A			A			B			B				A				A
Line Switch	S			R			R			R				A			A								
426A Tube (3-Element)	BK																				A				A
	R																			GN				R	
	Y																			R				Y	

* Ground may be omitted if not required for service.

† For tip party, reverse (R) and (G) mounting cord leads at TB2.

Notes:

1. To silence ringer permanently, refer to appropriate ringer practice in Division 501.
2. One end of straps permanently soldered to TB1, other end equipped with spade tip terminal.

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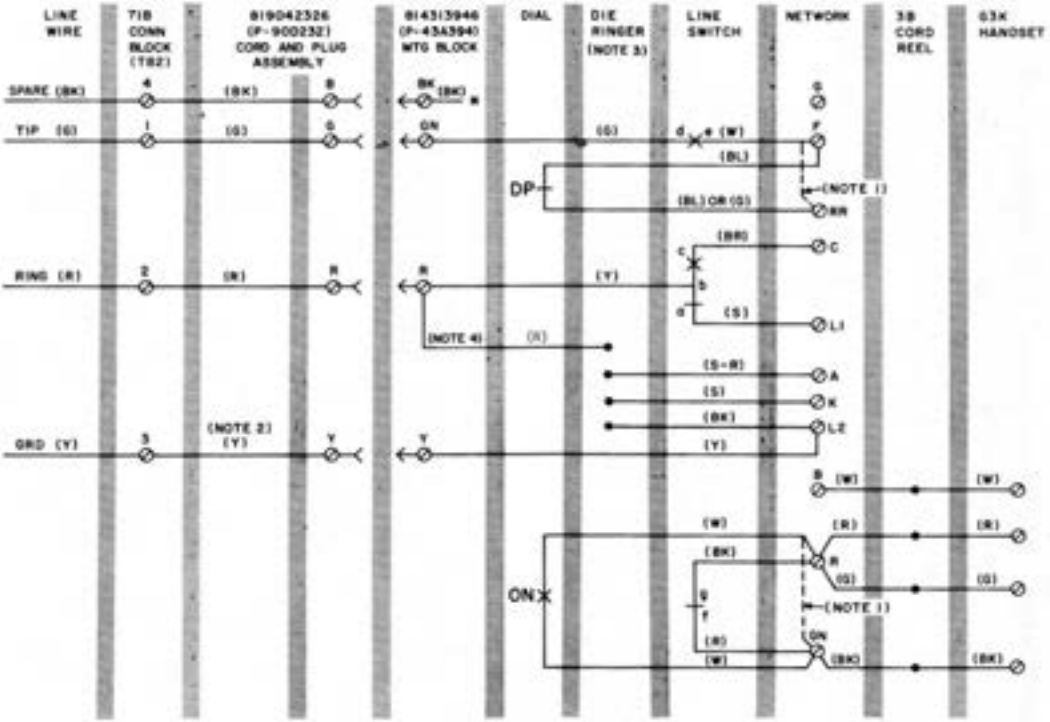

NOTES:
1. DASHED LINES INDICATE CONNECTIONS FOR MANUAL SERVICE, DIAL REMAINS ON SET.
2. GROUND MAY BE OMITTED IF NOT REQUIRED FOR SERVICE.
3. FACTORY WIRED FOR RING PARTY. REFER TO TABLE A FOR ALL OTHER CLASSES OF SERVICE.
4. PRIOR TO 2-74, RINGER LEAD WAS CONNECTED TO L1

* —INSULATE AND STORE

DP— DIAL PULSE

ON— OFF NORMAL

Fig. 2—750A and B (MD) Telephone Sets, Connections (Latest Models)

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TABLE C
750A AND B (MD) TELEPHONE SETS (EARLY MODELS) LINE, RINGER, AND 426A TO BE CONNECTIONS (FIG. 4)

WIRE OR LEAD		COLOR	INDIVIDUAL OR BRIDGED (FACTORY WIRING)			RING PARTY			TIP PARTY			TIP PARTY WITH IDENTIFICATION GROUND						SELECTIVE RINGING							
												1000 OHMS			2650 OHMS			NEGATIVE (—) RING†				POSITIVE (+) RING†			
			TB2	MTG BLK	NET.	TB2	MTG BLK	NET.	TB2	MTG BLK	NET.	TB2	MTG BLK	NET.	TB1	MTG BLK	NET.	TB2	TB1	MTG BLK	NET.	TB2	TB1	MTG BLK	NET.
CO Line at T1B Conn Block	Ring	R	2			2			1			1			1			2				2			
	Tip	G	1			1			2			2			2			1				1			
	GRD	Y	3*			3			3			3			3			3				3			
			TB1	MTG BLK	NET.	TB1	MTG BLK	NET.	TB1	MTG BLK	NET.	TB1	MTG BLK	NET.	TB1	MTG BLK	NET.	TB2	TB1	MTG BLK	NET.	TB2	TB1	MTG BLK	NET.
Ringer Leads (Note 1)	R	R				R			R			S-R			S-R				BK				R		
	BK	BK				BK			BK			S-R			S-R				BK				BK		
	S			K				K			K		Y		BK						K				K
	S-R	S-R				S-R			S-R			BK				Y			S-R				S-R		
TB1 Straps (Note 2)	R		R				R			R			R			R				R			R		
	BK		GN				Y			Y				K			K				Y		R			
	S-R			A				A			A			B			B				A				A
Line Switch	S		R				R			R				A			A								
426A Tube (3-Element)	BK																			A				A	
	R																		GN				BK		
	Y																	R					Y		

* Ground may be omitted if not required for service.

† For tip party, reverse (R) and (G) mounting cord leads at TB2.

Notes:

1. To silence ringer permanently, refer to appropriate ringer practice in Division 501.
2. One end of straps permanently soldered to TB1, other end equipped with spade tip terminal.

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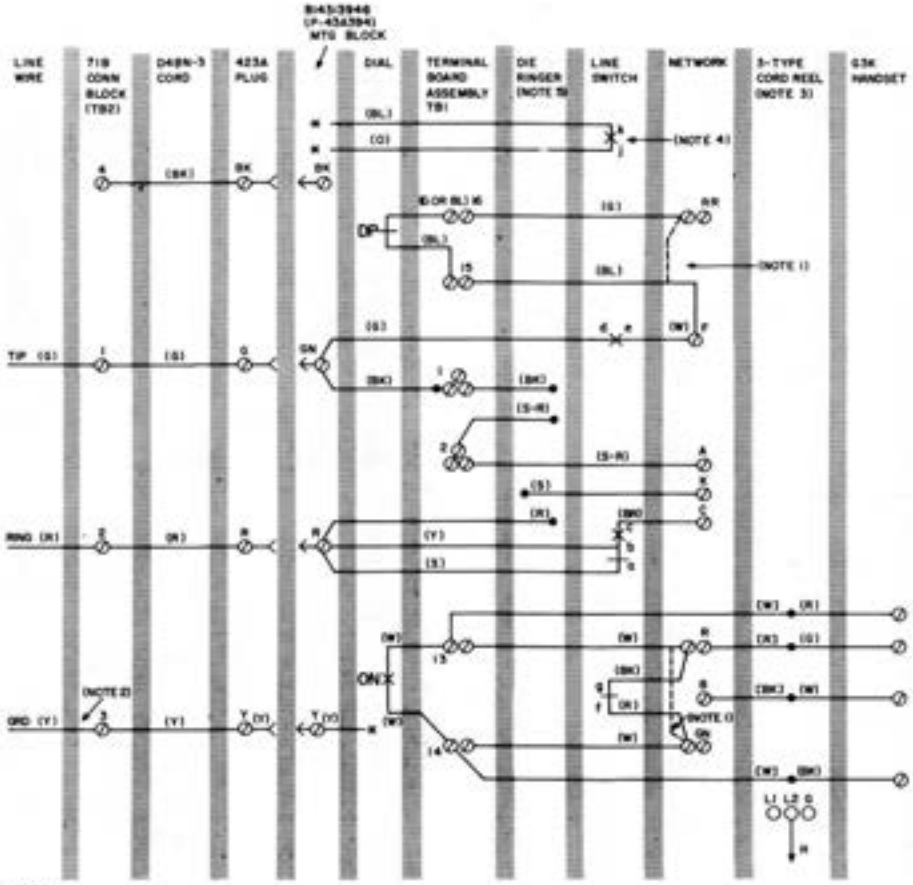

NOTES:

1. DASHED LINES INDICATE CONNECTIONS FOR MANUAL SERVICE, DIAL REMAINS ON SET.
2. GROUND MAY BE OMITTED IF NOT REQUIRED FOR SERVICE.
3. [ ] DENOTES 5A CORD REEL LEAD COLORS.
   ( ) DENOTES 5B CORD REEL LEAD COLORS.
4. IN CURRENT PRODUCTION MODELS (BL) AND (O) LINE SWITCH LEADS AND ASSOCIATED CONTACTS WILL BE OMITTED.
5. FACTORY WIRED FOR BRIDGED SERVICE. REFER TO TABLE B FOR ALL OTHER CLASSES OF SERVICE.

⊘ TERMINAL WITH SCREW.
○ TERMINAL WITHOUT SCREW.
* INSULATE AND STORE.

DP - DIAL PULSE
ON - OFF NORMAL

Fig. 3—750A and B (MD) Telephone Sets, Connections (Later Models)

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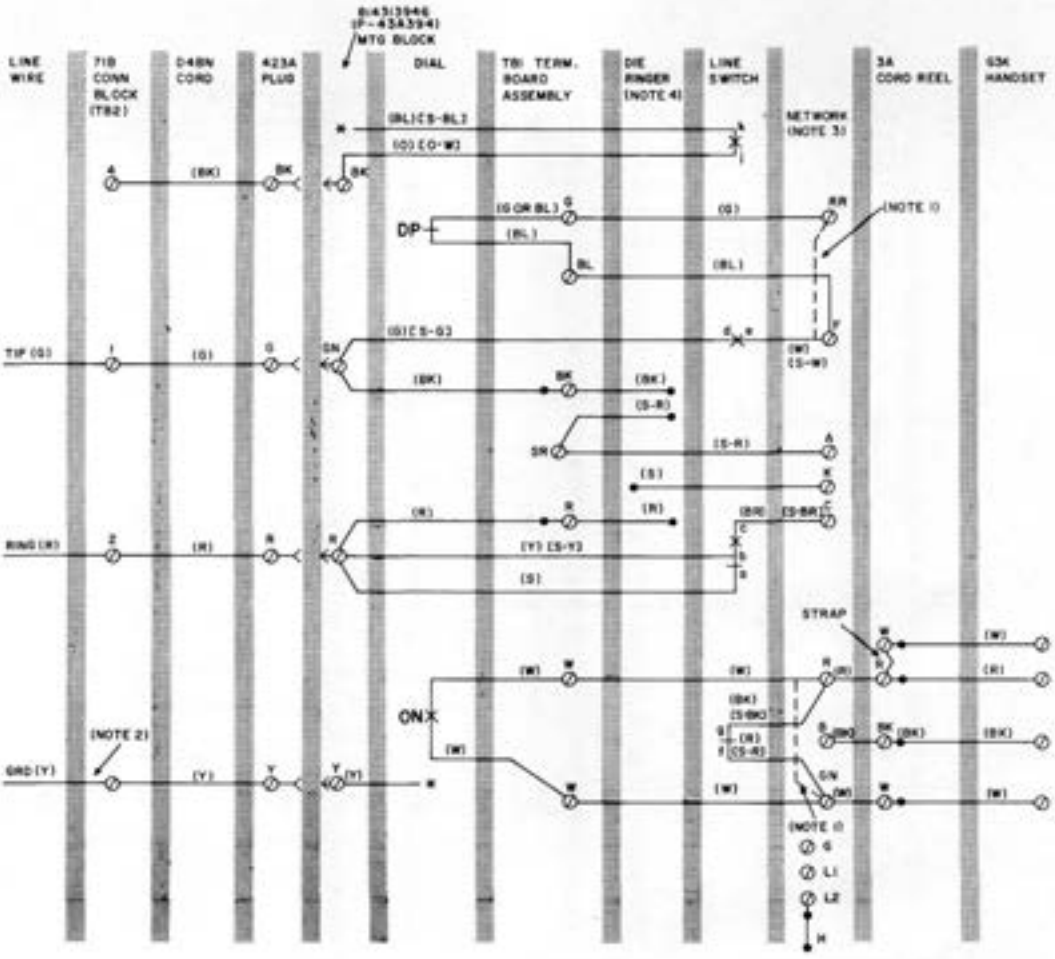

NOTES:
1. DASHED LINES INDICATE CONNECTIONS FOR MANUAL SERVICE. DIAL REMAINS ON SET.
2. GROUND MAY BE OMITTED IF NOT REQUIRED FOR SERVICE.
3. 401OR NETWORK IS EQUIPPED WITH TERMINALS G, L1, L2, AND H.
4. FACTORY WIRED FOR BRIDGED SERVICE. REFER TO TABLE C FOR ALL OTHER CLASSES OF SERVICE.

* INSULATE AND STORE
( ) CURRENT COLOR CODE.
[ ] WD COLOR CODE

DP – DIAL PULSE
ON – OFF NORMAL

Fig. 4—750A and B (MD) Telephone Sets, Connections (Early Models)

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SERVICE

2750A, 2750B, 2750AM, 2750BM, 2750AMG, AND 2750BMG TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2750A manufacture discontinued (MD), 2750B (MD), 2750AM (MD), 2750BM (MD), 2750AMG, and 2750BMG telephone sets.

1.02 This section is being reissued to change polarity guard connections in Fig. 1 and Table A. Revision arrows are used to emphasize the more significant changes.

1.03 The 2750AMG-58 and 2750BMG-60 are the same as the 2750AM-58 and 2750BM-60 telephone sets, respectively, except the 2750AMG-58 and 2750BMG-60 sets have a factory installed polarity guard.

2. CONNECTIONS

2.01 Table A contains polarity guard connections for 2750A (MD), 2750B (MD), 2750AM (MD), and 2750BM (MD) telephone sets. For additional information on polarity guards, refer to Section 501-321-100.

2.02 Tables B and C contain line and ringer connections for all classes of service.

2.03 Tables D and E contain modification connections when these sets are wired for key telephone system use.

2.04 Refer to Fig. 1, 2, 3, or 4 for individual telephone connections.

▮TABLE A▮

POLARITY GUARD CONNECTIONS D-181006 (840364376) OR D-180896 (840364202) KIT OF PARTS (SEE NOTE)

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	POLARITY GUARD	NET.
Line Switch	W	F	T	
	BR	C	S	
Polarity Guard	W			C
	G			F

Note: For field installation when specified by local instructions for end-to-end signaling.

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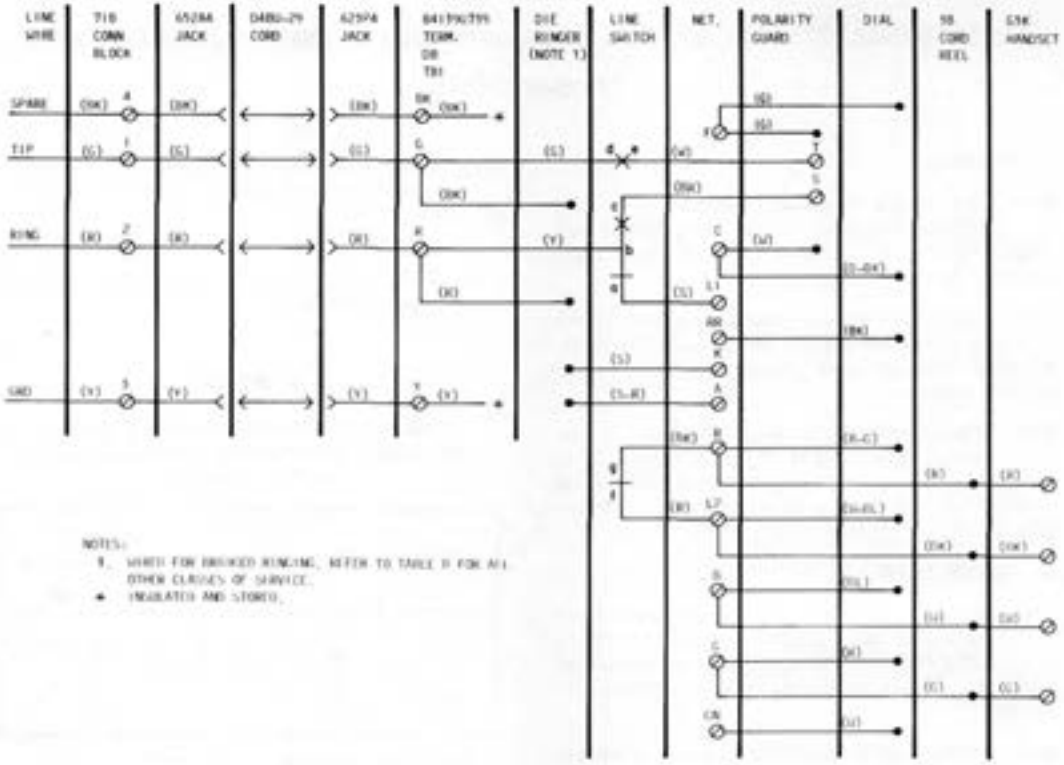

Fig. 1—2750AMG and 2750BMG Telephone Sets, Connections

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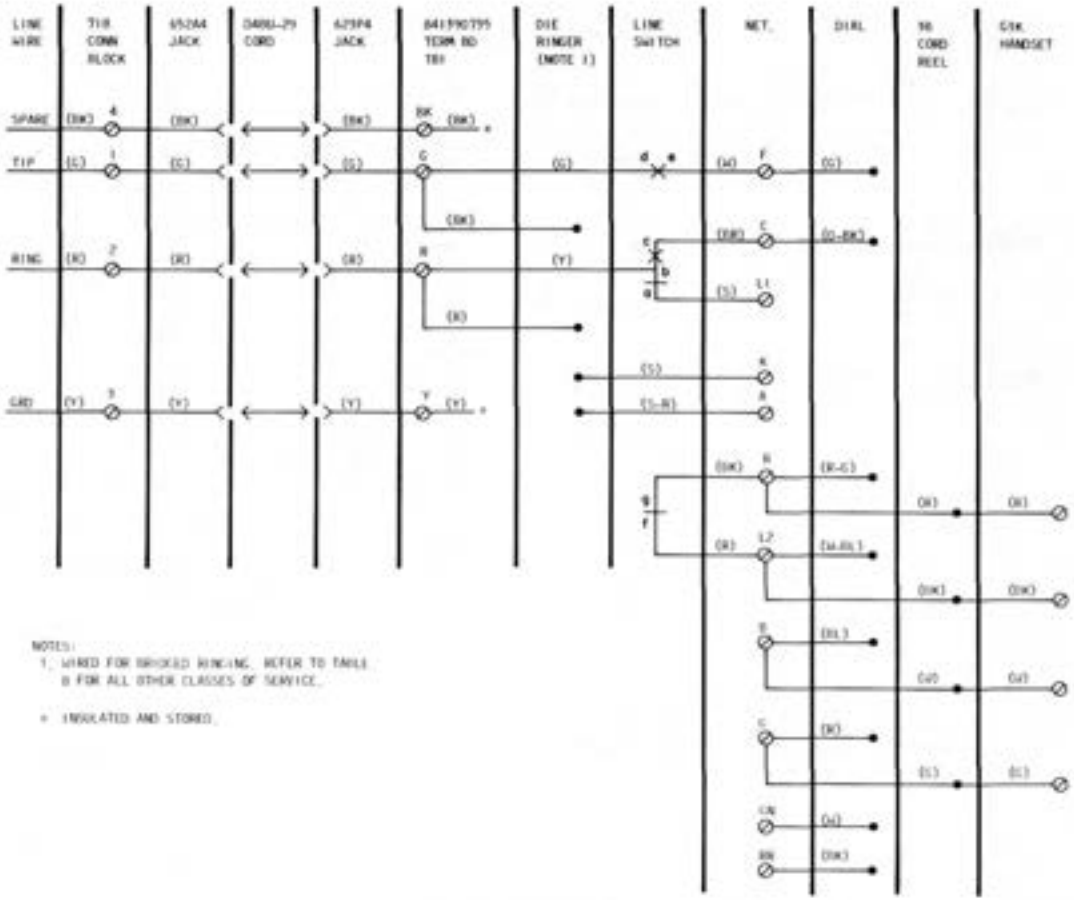

Fig. 2—2750AM (MD) and 2750BM (MD) Telephone Sets, Connections

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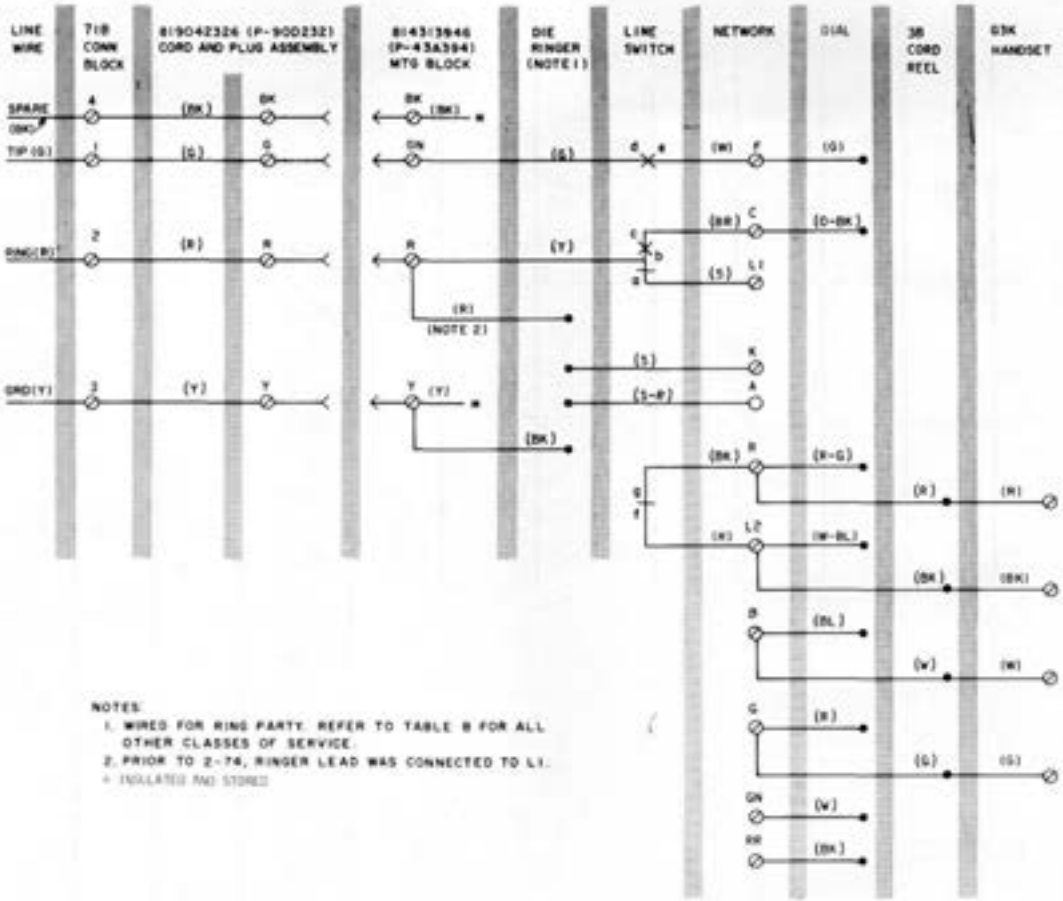

Fig. 3—2750A (MD) and 2750B (MD) Telephone Sets, Connections (Later Model)

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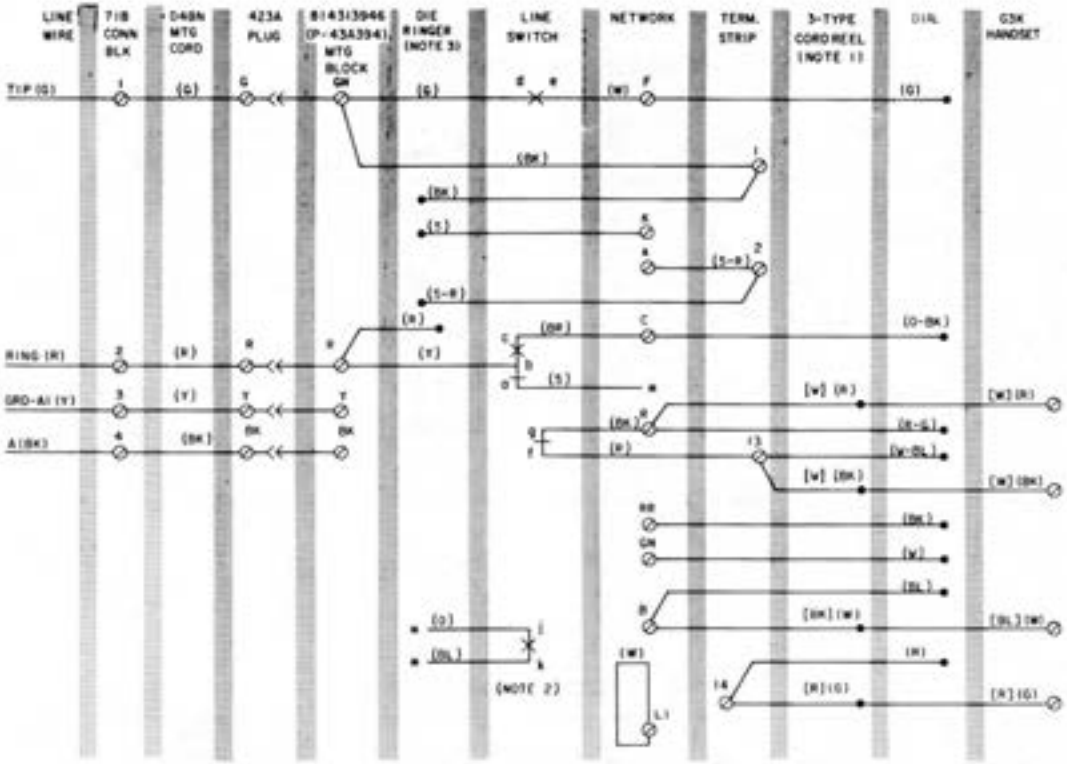

NOTES:
1. [ ] 3A CORD REEL LEAD COLORS.
   ( ) 3B CORD REEL LEAD COLORS.
2. IN SOME SETS (D) AND (BL) LINE SWITCH LEADS AND ASSOCIATED CONTACTS WILL BE DELETED.
3. WIRED FOR BRIDGED RINGING. SEE TABLE C FOR ALL OTHER CLASSES OF SERVICE.
* INSULATED AND STORED.

Fig. 4—2750A (MD) and 2750B (MD) Telephone Sets, Connections (Early Model)

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TABLE B

LINE AND RINGER CONNECTIONS (FIG. 1, 2, AND 3)

WIRE OR LEAD	COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY	TIP PARTY WITH IDENTIFYING GROUND	
					1000 OHMS	2650 OHMS
Line Wire at 71B Connecting Block	G	1	1	2	2	2
	R	2	2	1	1	1
	Y	3	3	3	3	3
	BK	4	4	4	4	4
Ringer Leads*	R	R†	R†	R†	K	B
	BK	G†	Y†	Y†	Y†	B
	S	K	K	K	K	K
	S-R	A	A	A	B	Y†
Line Switch	S	L1	L1	L1	A	A
	W	F	F	C‡	C‡	C‡
	BR	C‡	C‡	F	F	F

* To silence ringer, refer to appropriate ringer section in Division 501.

† Terminal on 814313946 (P-43A394) mounting block [2750A/B (MD)], or 841290735 TB1 terminal board [2750AM/BM (MD), AMG/BMG]

‡ Terminal S on polarity guard in 2750AMG and BMG telephone sets.

TABLE C

LINE AND RINGER CONNECTIONS (SEE FIG. 4)

WIRE OR LEAD	COLOR	INDIV OR BRIDGED	RING PARTY	TIP PARTY	TIP PARTY WITH IDENTIFYING GROUND	
					1000 OHMS	2650 OHMS
Line Wire at 71B Conn Block	G	1	1	1	2	2
	R	2	2	2	1	1
	Y	3	3	3	3	3
	BK	4	4	4	4	4
Ringer Leads*	R	R†	R†	GN†	L1	B
	BK	1‡	1‡	1‡	1‡	L1
	S	K	K	K	B	K
	S-R	2‡	2‡	2‡	2‡	2‡
Line Switch	S	ϕ	ϕ	ϕ	A	A
	W	F	F	F	C	C
	BR	C	C	C	F	F
Strap Conn	BK	GN† to 1‡	1‡ to Y†	1‡ to Y†	1‡ to Y†	1‡ to GN†
	S-R	A to 2‡	A to 2‡	A to 2‡	B to 2‡	Y† to 2‡
	W	L1	L1	L1	L1 to K	L1 to B

* To silence ringer, refer to appropriate ringer section in Division 501.

† Terminal on 814313946 (P-43A394) mounting block.

‡ Terminal on terminal strip inside set.

ϕ Insulated and stored.

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TABLE D

MODIFICATIONS FOR USE WITH 1A1 OR 1A2 KTS FOR (LATER MODEL) 2750A OR B (MD), 2750AM OR BM (MD), AND 2750AMG OR BMG SETS

WIRE OR LEAD		REMOVE FROM	CONNECT TO
Incoming Line at 718 Conn Block	Tip Ring GRD-A1 A	1 2 3	3 1 2 4
Ringer	R BK	R* G*	G* Y*
Line Switch Assembly	BR W S	C†‡ F† L1†	L1† C†‡ §
Strap	Y BK	§	F† L1†

* Terminal on 814312946 (P-43A394) mounting block assembly or TS1 on 2750AM/BM (MD) or 2750AMG/BMG sets.

† Terminal on network.

‡ Terminal S on Polarity guard in 2750AMG/BMG telephone set.

§ Insulated and stored.

TABLE E

MODIFICATIONS FOR USE WITH 1A1 OR 1A2 KTS FOR (EARLY MODEL) 2750A OR B (MD) SETS

WIRE OR LEAD		REMOVE FROM	CONNECT TO
Line Switch Assembly	Y	R*	Y*
	BR	C†	BK*
	G	GN*	R*
	W	F†	C†
M1W Cord or Equiv.		GN* To F†	

* Terminal on 814312946 (P-43A394) mounting block assembly.

† Terminal on network.

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SERVICE

751-TYPE TELEPHONE SETS

1. GENERAL

1.01 The 751A (MD) and 751B (MD) telephone sets can be used on PBX line circuits and 751C and 751D telephone sets on PBX line circuits and 1A1 or 1A2 KTS. ***These sets are no longer intended for residential use.***

1.02 Reissued to:

- Indicate that these sets are no longer for residential use
- Show 3A cord reel MD
- Revise Fig. 1 and 2.

The 3A (MD) cord reel shall be used when the telephone set is subjected to temperatures below 40 degrees F. The 3B cord reel shall be used when the telephone set is not subjected to temperatures below 40 degrees F.

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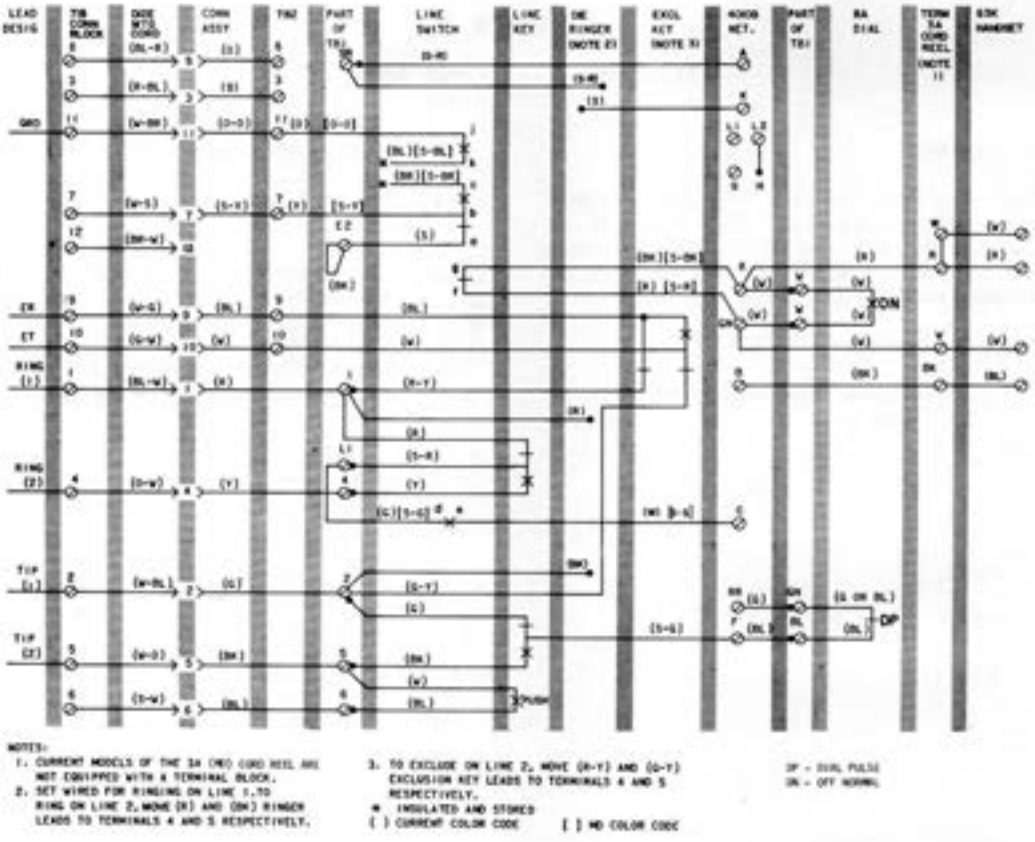

Fig. 1—751A (MD) and 751B (MD) Telephone Sets, Connections

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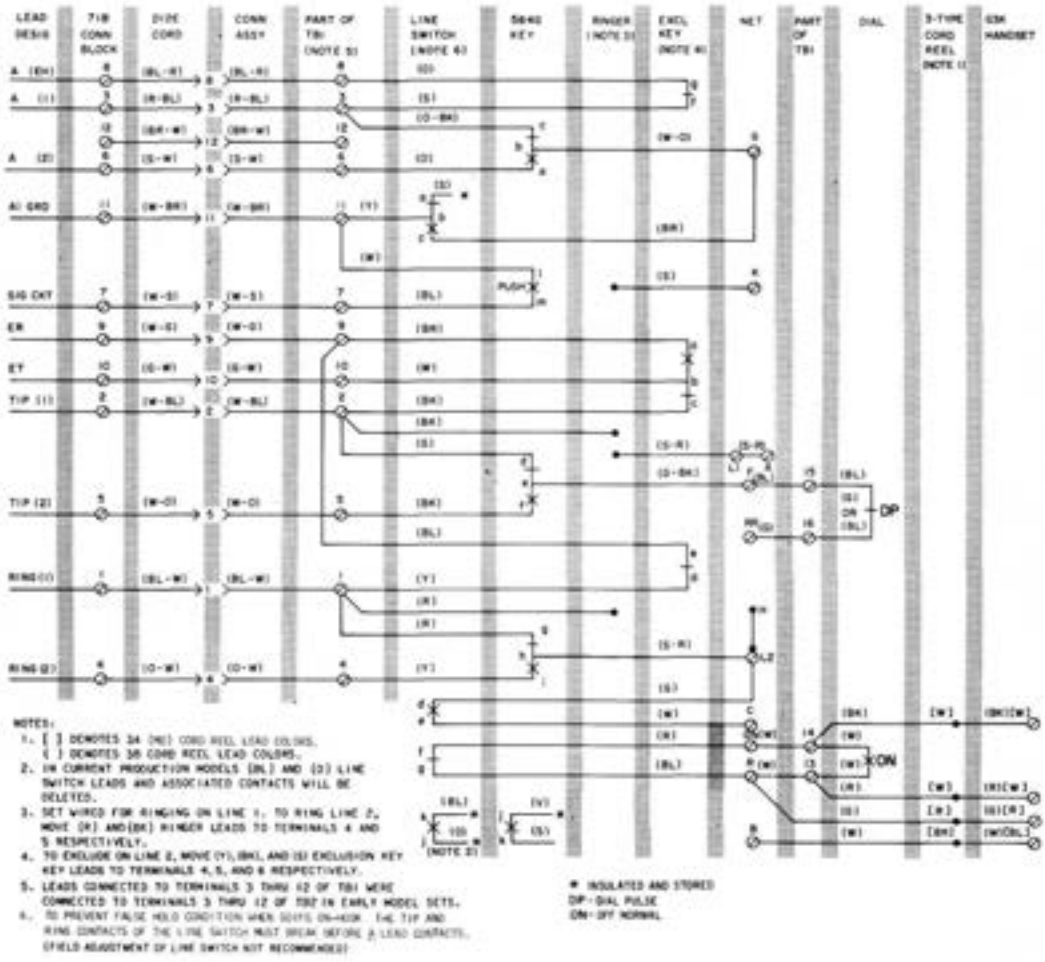

Fig. 2—◆751C and 751D Telephone Sets, Connections◆

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SERVICE

2751-TYPE TELEPHONE SETS

CONNECTIONS

1. GENERAL

1.01 This section contains information on the 2751-type telephone sets which can be used behind PBX and 1A1 or 1A2 KTS. ***These sets are intended for business type service only.***

1.02 Reissued to:

- Add 2751CG-58 and 2751DG-60 telephone sets
- Add D-181006 Kit of Parts
- Add Tables B and C
- Show 2751C-58 and 2751D-60 telephone set MD.

1.03 ♦The 2751CG-58 and 2751DG-60 are the same as the 2751C-58 (MD) and 2751D-60 (MD) telephone sets, respectively, except the 2751CG-58 and 2751DG-60 sets have a polarity guard installed at the factory.♦

♦TABLE A♦
POLARITY GUARD CONNECTIONS D-181006 (840364376) KIT OF PARTS (Note)

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	POLARITY GUARD	NET.
Dial	BK	RR	T	
Line Switch	W	C	S	
Polarity Guard	W			C
	G			RR

Note: For field installation when specified by local instructions for end-to-end signaling.

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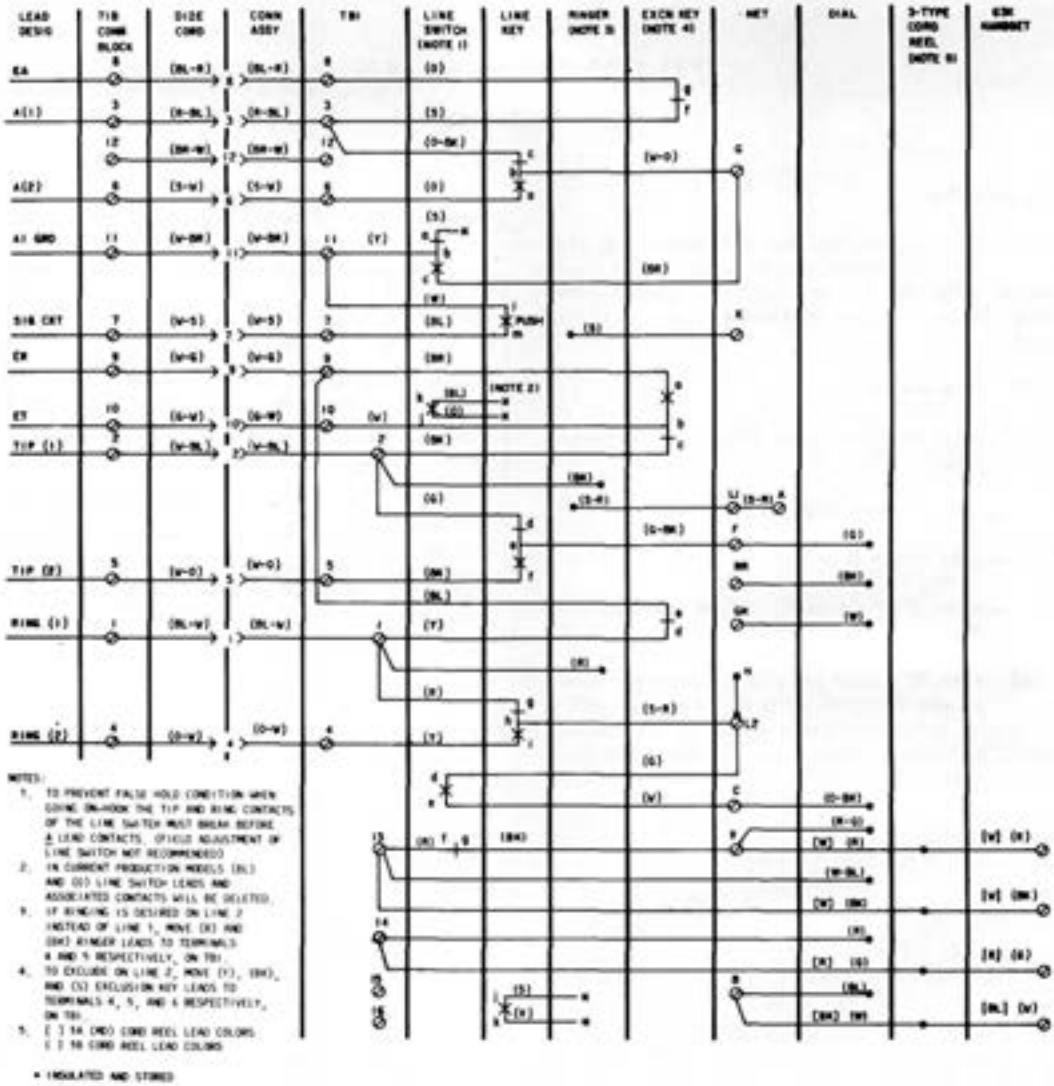

Fig. 1—2751C-58 (MD) or 2751D-60 (MD) Telephone Set, Connections

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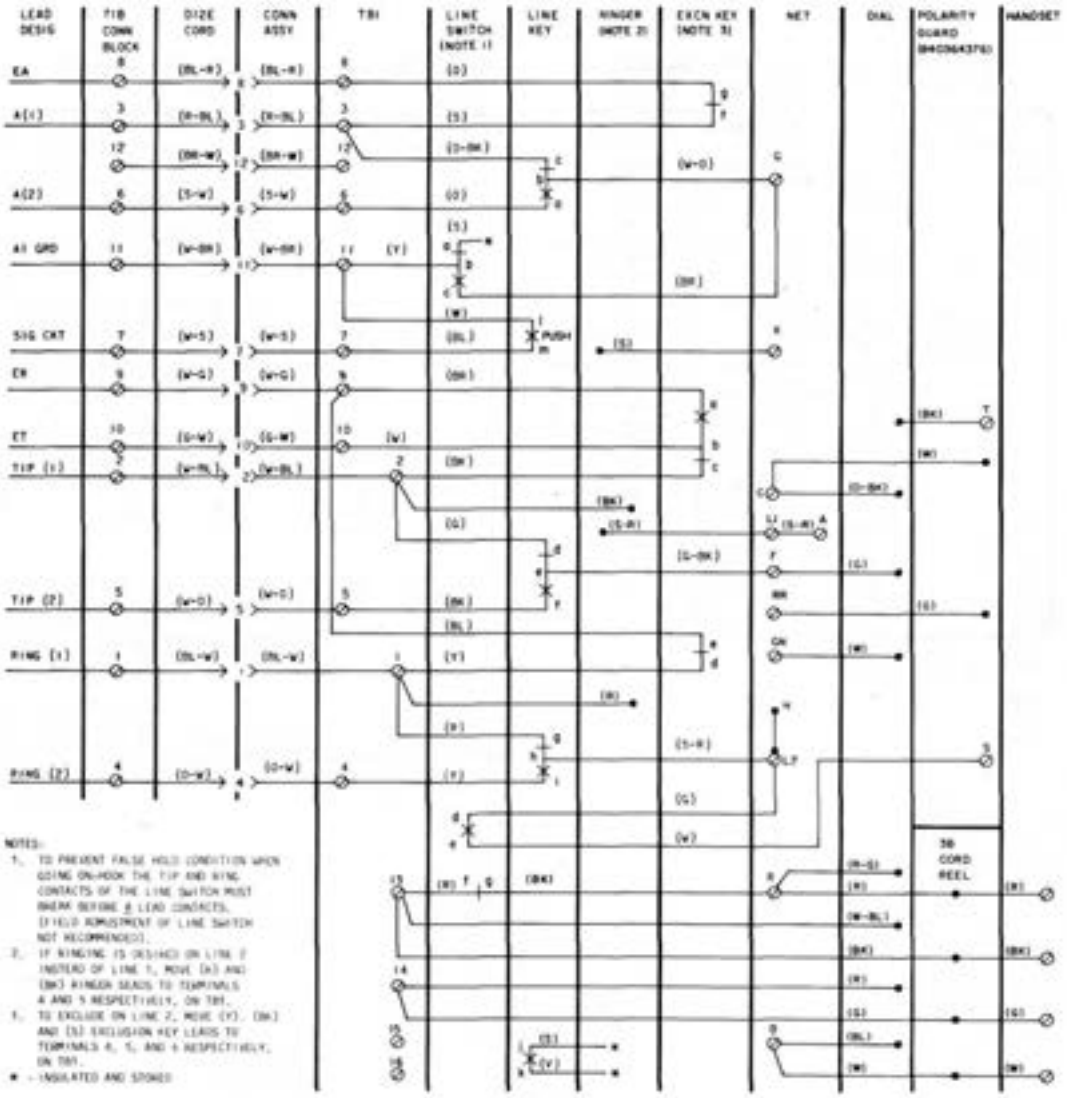

Fig. 2—#2751CG-58 or 2751DG-60 Telephone Set, Connections#

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TABLE B

CONVERSION FOR SECRETARIAL SERVICE, SIGNALING, AND HOLD (NONKEY SYSTEM)

APPARATUS	LEAD	REMOVE FROM		CONNECT TO
		TB1	NET.	TB1
Line Switch	Y	11		*
	BR		G	*
Exclusion or Hold Key	BR	9		1
	W	10		2
	BK	2		*
	Y	1		*
	BL	9		*
	S	3		*
	O	8		*
584G Line Key	O	6		10
	W-O		G	2
	O-BK	3		*
	V		†	1
	S		†	9
	W	11		6

* Insulate and store.

† Stored location.

TABLE C

CONVERSION FOR 1-LINE PICKUP, SIGNALING, AND CUTOFF FEATURE

WIRE OR LEAD		REMOVE FROM		CONNECT TO	
		TB1	NET.	TB1	NET.
Line Switch	BR		G	3	
	G		L2	1	
Exclusion or Hold Key	BR	9			*
	W	10			*
	BK	2			*
	Y	1			*
	BL	9			*
	S	3			*
	O	8			*
584G Line Key	G-BK		F	2	
	G	2			*
	O-BK	3			*
	W-O		G	3	
	R	1			*
	S-R		L2	1	
	W	11		10	
	BL	7		9	
M1W cord or Equivalent	Strap			2	F

* Insulate and store.

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SERVICE

753A AND B TELEPHONE SETS

1. GENERAL

1.01 Reissued to add nontechnical changes to Fig. 1.

The 3A cord reels shall be used when the telephone set is subjected to temperatures below 40 degrees F. The 3B cord reel shall be used when the telephone set is not subjected to temperautes below 40 degrees F.

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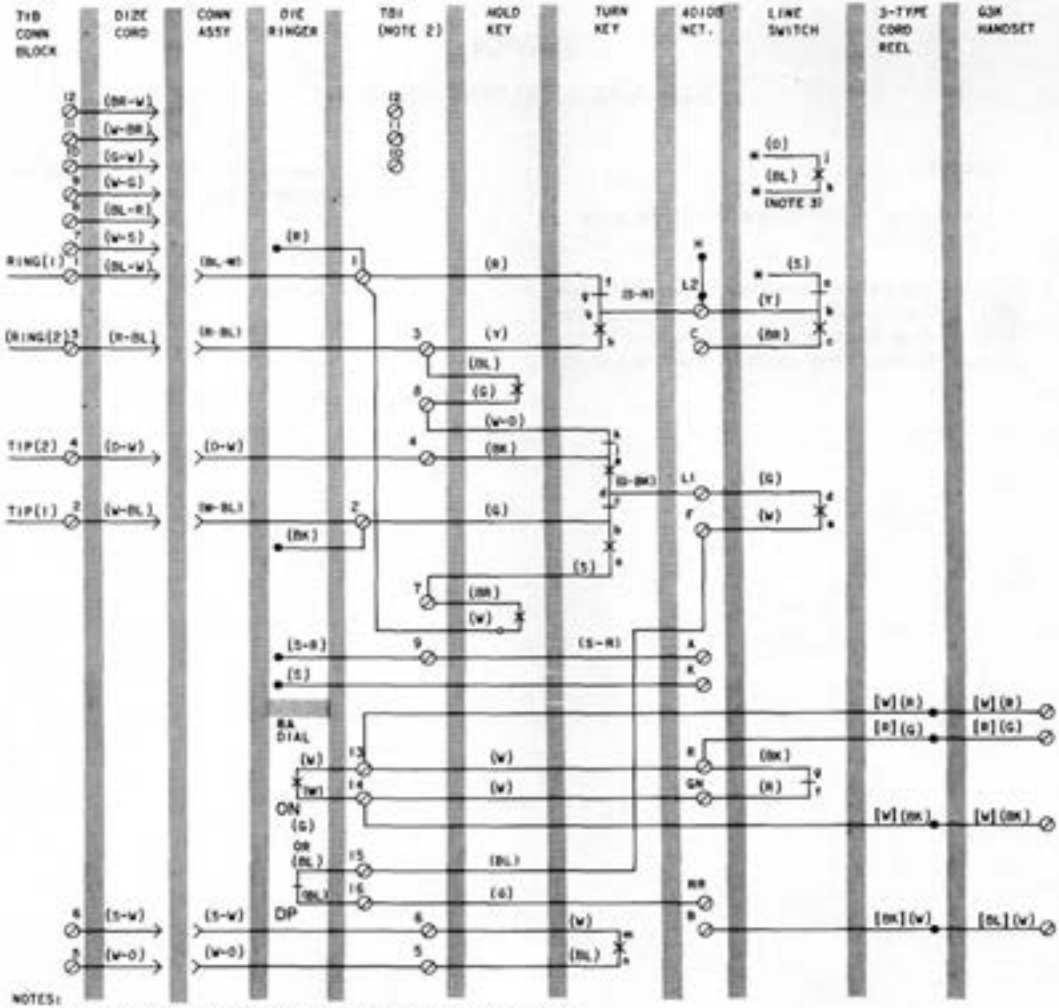

NOTES:
1. CONNECTIONS PROVIDE FOR RINGING ON LINE1. FOR RINGING ON LINE 2, MOVE (R) AND (BK) RINGER LEADS TO TERMINALS 3 AND 4, RESPECTIVELY.
2. TERMINALS 3 THRU 12 OF TB1 WERE LOCATED ON TB2 IN EARLY MODEL SETS.
3. CONTACTS j-k AND ASSOCIATED (O) AND (BL) LEADS HAVE BEEN OMITTED IN CURRENT MODEL SETS.
[ ] 3A CORD REEL LEAD COLORS.
( ) 3B CORD REEL LEAD COLORS.
* INSULATED AND STORED.
DP- DIAL PULSE
ON- OFF NORMAL

LINE SWITCH SEQUENCE:
bc- MAKE
de- MAKE
ab- BREAK
fg- BREAK
jk- MAKE

Fig. 1—ϕ753A and B Telephone Set, Connectionsϕ

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SERVICE

2753A AND B TELEPHONE SETS

1. GENERAL

1.01 Reissued to add nontechnical changes to Fig. 1 and Table A.

The 3A cord reels shall be used when the telephone set is subjected to temperatures below 40 degrees F. The 3B cord reel shall be used when the telephone set is not subjected to temperatures below 40 degrees F.

◆ TABLE A ◆

POLARITY GUARD CONNECTIONS
(P-90D060 GUARD ASSEMBLY)

LEAD	COLOR	REMOVE FROM	CONNECT TO	
		NET.	POLARITY GUARD	NET.
Dial	BK	RR	T	
Line Switch	BR	C	S	
Polarity	G			RR
Guard	W			C

Note: For use when specified by local instructions for end-to-end signaling installations.

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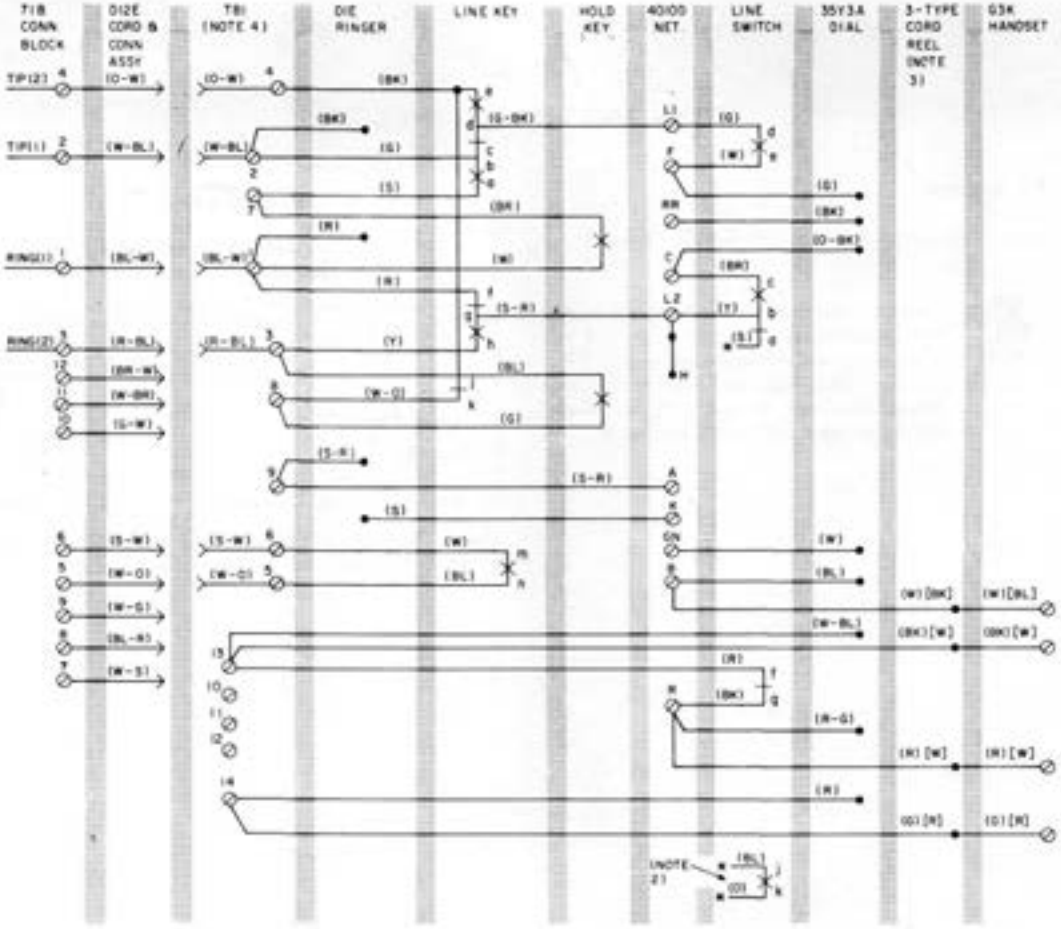

NOTES:

1. CONNECTIONS PROVIDE FOR RINGING ON LINE 1. FOR RINGING ON LINE 2, MOVE (R) AND (BK) RINGER LEADS TO TERMINAL 3 AND 4.
2. (BL) AND (O) LINE SWITCH LEADS AND ASSOCIATED CONTACTS WILL BE DELETED IN LATER PRODUCTION MODELS.
3. ( ) 36 CORD REEL
   [ ] 3A CORD REEL
4. TERMINALS 3 THRU 12 WERE LOCATED ON TB2 IN EARLY MODEL SETS.
* INSULATED AND STORED

LINE SWITCH SEQUENCE
bc - MAKE
de - MAKE
ab - BREAK
fg - BREAK
jk - MAKE

Fig. 1—◆2753A and B Telephone Set, Connections◆

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TELEPHONE SETS—MODULAR TYPE

1. GENERAL

1.01 This section contains general information on the modular concept of telephone sets.

1.02 This section is reissued to:

- Add 158A cover
- Add 625FS and G25H connecting blocks
- Add 616W3 and 623D6 jacks
- Add 1A converter
- Add information on the 228-, 229-, and 230-type adapters
- Add caution information on the 267A adapter
- Add 227C, 227D, 248B, 281A, 282A, and 304A adapters
- Add information on routing of 523A-type plug leads used to convert nonmodular wall telephone sets to modular
- Add information on 635B connecting block
- Add information on D impact tool and 8762D-630 blade
- Add D8AA mounting cord
- Add 523A4B wall set plug
- Add AD3 and AC2P telephone base
- Add 220C, 226A, 2220C, and 2226A hand telephone sets
- Show 635A connecting block MD
- Show 227B and 248A adapters MD
- Show current production 630A4 connecting block
- Revise Tables A, C, F, G and Fig. 4, 5.

Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The modular telephone set is the same as the standard telephone set except the telephone set base and handset are jack equipped to accept a plug-ended mounting cord (desk set) and handset cord (wall and desk sets). Modular wall sets are equipped with a plug to mount on a 630A4 connecting block.

1.04 Modular telephone sets are available assembled (less cords) or as components (housing, handset, telephone set base, etc.). See Tables A through D.

1.05 This section provides for the installation of connecting blocks, modular telephone sets, and modular components; conversion and/or repair of nonmodular telephone sets and nonmodular components.

2. IDENTIFICATION

2.01 When installing modular telephone sets or converting sets to modular, various items of the following auxiliary apparatus will be required.

(1) ***Connecting Blocks.***

Note: All connecting blocks will accept modular mounting cords, however, the 630A4 is used primarily for wall sets with 523A- or 523B-type plugs.

- 625A—Surface mounted for new installations (includes 42-type terminal block, Fig. 8).

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- 625B—Flush-mounted for new installation with associated mounting hardware and coverplate (Fig. 9).
- 625C—Same as 625A less 42-type terminal block (Fig. 8).
- 625F and 625FS—Flush-mounted for new installations, or for replacement of existing 47D or 47F connecting blocks and 548A jack (Fig. 10 and 12).
- 625H—Same as 625FS except provides contacts for two conductors only instead of four conductors (Fig. 12).
- 625S—Surface-mounted for new installations, (includes 42-type terminal block, Fig. 13).
- 625T—Same as 625S less 42A terminal block.
- 635A (MD)—Series connecting block (650A jack, Fig. 18).
- 635B—Series bridged connecting block (651A jack, optional 652A jack, Fig. 19).
- 630A—Surface mounted for wall set mounting (accepts 523-type plug and attaches set to wall, Fig. 14).

(2) ***Cover (Fig. 11):*** The 158A cover protects the exposed screw terminals of 625F and 47F connecting blocks and 548A jack.

(3) ***Handset Cord Jacks (slip-on).*** Used for conversion of telephone bases and telephone set bases (H4DU cord).

- 616B jack for TOUCH-TONE* wall sets and TOUCH-A-MATIC* sets.
- 616C jack for rotary wall sets.
- 616D jack for rotary and TOUCH-TONE general purpose desk, single line, 2-line, and multiline (key) set bases.
- 616E jack for CALL DIRECTOR* sets.
- 616J for Multibutton Electronic Telephone (MET) sets and TOUCH-A-MATIC (16) repertory dialer.
- 616JK jack for key telephone sets (jack with 963-type connector on leads).
- 616T jack for 10/20 button key telephone sets and multibutton wall sets.
- 616TY jack for TRIMLINE* desk and wall set bases.

(4) ***Handset Jacks for Handset Cord (H4DU).***

- 616W jack for G15A handsets equipped with 840402598 cup assembly and for K1-type handsets.
- 616WG jack with short leads for G6- and G7BM handsets.
- 616W3 jack same as 616WG jack less white lead for G6BM and G8BM (current) since 1977.
- 616Y2 jack for LED version of TRIMLINE handsets.

(5) ***Telephone Set Base Jacks for Mounting Cords (D4BU, D6AL, D6AM, and D6AP).***

- 623D3 jack for rotary and TOUCH-TONE general purpose desk sets, without options (factory supplied in 500DM and 2500DM telephone sets and 500D2M and 2500D2M telephone set bases).
- 623D4 jack for rotary and TOUCH-TONE general purpose desk sets, with options (used for field conversion).
- 623D6 jack for rotary and TOUCH-TONE general purpose sets with multiple options.
- 623D6B jack similar to 623D6 except leads are 11 inches long.
- 623E4 jack for transaction telephone sets.
- 623P4 jack for PRINCESS* sets, and DESIGN LINE* sets.

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- 623T4 jack for TRIMLINE desk and wall bases.
- 623D6 jack for 2-line general purpose sets and/or sets with options requiring up to 6 conductors.
- 623P6 jack for 2-line PRINCESS sets.
- 623T6 jack for TRIMLINE desk and wall bases with options requiring up to 6 conductors.

(6) ***Plug for Wall Sets:***

- 523A3—three conductors
- 523A4—four conductors
- 523A4B—similar to 523A4 except leads are 2-1/2 inches long
- 523B—for 960A01M and 2960A01M repertory dialers. (Converts desk sets to wall sets.)

(7) ***Adapters for Plug-in Mounting of Nonmodular and Modular Wall Sets (must be combined with a 523A-type plug).***

- 228A or 228B adapter for 554-, 555-, 556-557-, 558-, and 559-type telephone sets.
- 229A or 229B adapter for 2554-, 2555-, and 2558-type telephone sets.
- 230A or 230B adapter for AC1-type telephone bases.

Note: ***A*** coded adapters are shipped without screws but ***B*** coded adapters have screws driven into the adapter.

Note: In modular wall telephone set and telephone set base codes, no distinction is made between apparatus which include adapters and newer apparatus whose basepans do not require adapters. The wiring and function of the two assembled configurations are identical.

(8) ***Modular Cords.***

- H4DU (handset cord) available in 6-foot (standard) and 12-foot (long) lengths.
- D4BU-29 (mounting cord) available in 7-foot (standard), 14-foot (long), and 25-foot (extra long) lengths.
- D6AM-29 (mounting cord) available in 7-, 14-, and 25-foot lengths.
- D6AL-87 (MD) or D6AP-87 (mounting cords) are a twisted conductor cords and should be used in lieu of a D6AM if there is a problem of cross-talk between lines. These cords are also available in 7-, 14-, or 25-foot lengths.
- D8AA-87 (mounting cord) available in 7-, 14-, and 25-foot lengths for options requiring a twisted eight conductor cord.
- M4AR-3, test cord, 15-1/2 inches long with a 4-conductor modular plug on one end, and spade tips on the other for testing modular jacks and connecting blocks.

(9) ***Adapters:***

- 224A—D4BU or D6AM (as applicable) cord to 541- and 551-type jacks (Fig. 25)
- 225A—D4BU cord to 548- and 549-type jacks (Fig. 26)
- 227B (MD)—H4DU cord to 220A or 2220B hand telephone sets.
- 227C—component of the D-180824 Kit of Parts used for tip party identification in 220AL hand telephone sets
- 227D—H4DU cord to 220A, 220AL (factory installed), or 2220B hand telephone sets
- 231B—H4DU cord to TRIMLINE base
- 248A (MD) and 248B—D4BU cord (pins 2 and 5) to 2012 transformer (Fig. 28, 29, and 30)
- 267A—for connecting two 4-conductor modular cords to a modular connecting block (Fig. 31)

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- 281A—for connecting two 4-conductor modular cords to a modular PRINCESS telephone mounting cord jack

- 282A—component of the D-180825 Kit of Parts used for tip party identification in 220C and 222DC hand telephone sets

- 304A—for connecting two modular cords, one 4- or 6-conductor and one 8-conductor to a modular connecting block

- 153AM1—male miniature ribbon connector for modular cord to 25 pair cable connector, with 6-conductor modular jack (Fig. 33)

- 153AM2—similar to 153AM1 except equipped with 4-conductor jack

- 153BM1—female miniature ribbon connector for modular cord to 25 pair cable connector, with 6-conductor modular jack, (Fig. 33)

- 153BM2—similar to 153BM1 except equipped with 4-conductor jack.

(10) ***Converter.***

- 1A converter—permanently converts 548- and 549-type jacks to accept D4BU mounting cord.

(11) ***Apparatus Blanks (Fig. 24).***

- 123A—fills in jack notch in 500D2 and 2500D2 modular housing when using spade-tipped cords.

- 124A—fills in jack notches in 2554B2, 702B2 and 2702B2 modular housings, when using spade-tipped cords.

(12) ***Tools.***

- 8762D-630 blade, used with D impact tool for terminating station wire leads on 630A4 connecting block.

- 797A tool, used with 788A1 tool (handle), for terminating station wire leads on 630A4 connecting block (Fig. 21).

- 798A tool for notching nonmodular housings to retain slip-on jacks (Fig. 22).

- 799A tool (Fig. 23), a template used to determine notching location on housings.

(13) There are adhesive protective labels available to place over the jack opening of unused connecting blocks. The 841011802 labels are used on 625A or 625C blocks and the 841011810 labels on 625B or 625F blocks.

2.02 Refer to Tables A through D for ordering information.

3. INSTALLATION

A. Connecting Blocks

3.01 Connections to both 625- and 630-type connecting blocks are made according to Table E to insure compatibility of service. Wiring changes for party line service are made within the set and not at the connecting block.

3.02 The 625-type connecting block provides a termination for station wire and the mounting cord as follows.

(a) The 625A is intended for new installations of modular desk sets using a surface mounted connecting block.

(b) The 625C used to convert existing 42A connecting blocks to accept plug-ended mounting cords. Dress leads as shown in Fig. 8.

(c) The 625F (Fig. 10) is intended for new installations requiring flush-type connecting block or replacement of 548A jack. Install in same manner as 548A jack (Sections 461-610-100 and 461-630-100).

(d) The 625B assembly (Fig. 9) includes 625F connecting block, 43B bracket, faceplate, and six screws.

The plug entrances of the 625A and/or 625C connecting blocks should be positioned facing downward if at all possible (maintaining sufficient clearance so modular cord can be plugged into jack) or to the right or left, never facing upward. This prevents foreign matter and cleaning fluids from entering the jack (Fig. 8). If notch is required

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in cover of 625A or 625C to provide entrance for station wiring, break out appropriate notch using long nose pliers.

(e) The 625S (Fig. 13) and 625FS and 625H (Fig. 12) have a customer operable spring-loaded cover which protects the interior telephone line contact springs from contamination. These connecting blocks are intended for use in areas subject to high humidity and condensation or locations exposed to dripping, washing, mopping, or foreign matter. The 625FS connecting block is intended for use in locations subjected to spray painting. The 625S contains a 42-type terminal block.

(f) The 625T has a spring-loaded cover like the 625S and is used to convert existing 42A or 625A connecting blocks.

3.03 The 630A4 connecting block (Fig. 14), includes a 1034A mounting plate, two 800413577 (P-41357) 3/16-inch screws, two 840705008 5/16-inch screws, and two 803355825 (P-335582) 3/4-inch screws. The 3/4-inch screws are used to attach the connecting block to a box or bracket and either the 3/16- or 5/16-inch screws are used to attach the 1034A mounting plate. The 630A4 connecting block replaces the 630A6 connecting block. The connecting block is intended to mount directly to the wall surface (surface mounted) and various brackets as follows.

(1) To mount the connecting block, use the fasteners indicated in Table H. In all cases, the connecting block should be flat against the wall. It may be necessary to break off the rest ears on early production models to achieve this. If a previous installation used a KS-19407 or KS-20502 bracket, remove it and install the connecting block over opening.

(2) Plumb connecting block. Tighten screws. In some cases, such as when mounting hardware is underflush, the connecting block will distort if screws are too tight. In such cases tighten screws until just tight enough to make the assembly tight on the wall once mounting plate is attached.

The 630A4 connecting block does not recess into wall and may be used with exposed as well as concealed station wire. Exposed wire should enter from the bottom.

Note: Wire that is larger than 22 gauge or which has heavily insulated conductors may cause difficulty in installation and/or damage to the connecting block. Retermination at the same connector slot is unreliable.

(3) The 630A4 connecting blocks manufactured after 3-77 will be shipped from the factory with a plastic protective wrapper folded around the quick-connect terminals. To connect station wire, fold out the front and side flaps, make connections and dress leads per (3)(b), and refold wrapper across terminals. This wrapper protects the terminals from foreign matter and also prevents wire ends from making contact with 1034A mounting plate. If a 630A4 connecting block without this protective wrapper is used, insulating tape should be applied to the inside surface of the 1034A mounting plate to prevent any wire ends from making contact with the plate. Make connections as shown in Table E using the following procedures.

(a) Do not strip conductors, (unless using excessively large conductors).

(b) Dress the conductors in such a way that they will not be crossed over each other and/or pinched.

(c) Insert conductors snugly into bottom of slots with the lead insertion tool (Fig. 17). Do not twist or rock the tool, and allow generous slack. Do not insert more than one conductor in each slot.

Note: The blade of this tool (Fig. 21) is plastic and disposable. It should be replaced after 100 to 200 operations or sooner if wear is excessive.

(d) Trim (not on looping terminations) and dress leads as shown in Fig. 17.

Clipped conductor ends shall be bent toward the mounting surface so they will not contact the mounting plate and cause trouble on the line.

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Approximately 1/4-inch of wire should be left for bending over.

Note: The connecting block has four quick-connect terminals, each providing three station wire terminations. Holes for test probes are provided on each terminal (Fig. 15).

(4) Attach the mounting plate (Fig. 14). The mounting plate may be easier to install with 5/16-inch screws, but in some cases of surface mounting they protrude into the wall behind the connecting block when fully tightened. When they cannot be completely tightened due to interference with the wall, the 3/16-inch screws should be used.

(5) Check for continuity on each lead by inserting M4AR-3 cord and connecting hand test set.

3.04 A 635A (MD) connecting block (Fig. 18) may be used for series type service or when exclusion is provided. The 635A connecting block is designed to be used with an 8-conductor modular cord. Connections for the 635A connecting block are shown in Table F.

3.05 The 635B connecting block (Fig. 19) replaces the 635A connecting block and is used to permit company-owned and customer-provided equipment using the D8AA mounting cord to be placed in series with telephone company equipment. A 652A jack may be field-installed on the 635B connecting block to provide plug-in capability for additional equipment.

3.06 The 74D connecting block contains a 6-conductor modular jack and was designed for use with the two-line PRINCESS telephone sets. It may also be used for mounting ringer isolators or other ringer coupling devices used with modular type telephone sets when the devices can not be mounted within the sets or whenever five or six conductors are required. Internal connections for the 74D connecting block are shown in Table G.

B. Backboards

3.07 A 191-type backboard (Fig. 20) may be installed by snapping over the 630A4 connecting block. Its use in this manner is optional, for decor purposes. The 191C backboard incorporates the features of the 182B and 191B backboards. All holes have knockouts that conceal the holes not being used. Also the code numbers of the sets used with this backboard are molded into the back adjacent to the appropriate holes for each set.

The 191C backboard is available in colors per Table A.

C. Telephone Sets

3.08 Install assembled modular telephone sets and bases as follows.

(1) Install appropriate connecting block for a desk (paragraph 3.02) or wall (paragraph 3.03) set.

(2) Plug handset and mounting cords (desk sets) into the handset and telephone set base.

(3) For desk sets, plug mounting cord into connecting block and test for proper operation.

(4) When connecting set to wall, proceed as follows to prevent damage to 523-type plug or to receptacle in 630A-type connecting block.

(a) Begin with slight engagement of plug in receptacle.

(b) Raise set (with plug slightly engaged) and push toward wall to engage studs in corresponding holes in base of set. (The plug will slide up and down in the base of the set.)

(c) ***Pull set downward until firmly seated.***

(d) Gently tug on the top and then on the bottom of the set. If one of the studs is not engaged, that end of the set will move away from the wall. In that case, push up to remove the set and repeat the procedure.

(e) Test set for proper operation

(5) Provide modular station number card E-6417 for rotary set and E-6418 for TOUCH-TONE sets (letter M is located above the area code).

3.09 Install and assemble modular telephone sets and components as follows.

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(1) When assembling the following sets, make any required wiring changes (see Part 4) before installing housing.

(2) Install appropriate connecting block if required.

(3) On 500D2M and 554B2P (Fig. 36), install dial parts as required for dial being used.

(4) Install housing (including faceplate for 2500D2 housing).

(5) Mount set (wall sets only) on 630A4 connecting block [paragraph 3.07(4) or Fig. 34].

(6) Install handset, handset cord, and mounting cord (desk set only) as shown in Fig. 1 through 7.

Note: When installing H4DU handset cord on some TRIMLINE telephone bases, it is necessary to use 231B (base) and 227D (hand telephone set) adapters.

(7) Test for proper operation.

(8) Provide modular station number card.

D. Special Purpose Handsets

3.10 Where required, the G15A handset used with these sets can be replaced with other types.

- G4BM—shoulder rest
- G6BM or modified G8BM—impaired hearing
- G7BM—weak speech
- G8BM—noisy locations.

Refer to Section 501-210-102 for additional information on the G4BM and Section 502-211-102 for additional information on the G6BM, G7BM, and G8BM handsets.

3.11 Special purpose transmitters for use with G15A handset are the KS-16664L3 (high noise level) and KS-20043L2 (low noise level). For installations requiring 238-, 276-, or 277-type amplifier, install amplifier on G15A handset transmitter cup to terminals shown for handset leads in Section 501-226-100.

When nonmodular components must be replaced during installation or repair visits, refer to Part 4.

E. Apparatus Blanks

3.12 The 123A and 124A apparatus blanks (Fig. 24) are one-piece slip-on blank which are required whenever a modular plan housing (notched for jacks) is used with a spade-tipped handset and/or mounting cord.

3.13 The 123A apparatus blank slips on the baseplate flange (Fig. 37) and fills the housing notch for handset cord and/or mounting cord in the 500D2 and 2500D2 housings.

3.14 The 124A apparatus blank has two faces. The higher face is used to fill and conceal the notch in the 2554B2 housing (Fig. 39). The lower face fills and conceals the notches in the PRINCESS set housings. The blank is slipped on the housings so that its unused face is inside the housings and the grooved edges mate with the edges of the housing hole.

F. Adapters

3.15 The 224A and 225A adapters are intended for use when it is not desirable to replace existing jacks. The 227- and 231-type adapters are used with TRIMLINE sets.

(a) The 224A adapter (Fig. 25) is used to adapt D4BU mounting cord to the 541A and 551A jacks (12 pin jack).

(b) The 225A adapter (Fig. 26) is used to adapt D4BU mounting cord to 404B (MD), 493A (MD), 497A (MD), 548A, and 549A jacks (4 pin).

Note: The 541A, 548A, 549A, and 551A jacks should not be mixed with 625-type connecting blocks where portable telephone service is required.

(c) The 227A (MD), 227B (MD), and 227D adapters (Fig. 4) are used to adapt H4DU handset cord to 220A, 220AL (factory installed), or 2220B hand telephone set. The 227D adapter replaces the 227B adapter.

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(d) The 227C adapter is similar to the 227D except it is used for tip party identification in 220AL hand telephone set only. The 227C, component of the D-180824 Kit of Parts, has black and yellow spade-tipped leads for connection to the network.

(e) The 231A (MD) or 231B adapter (Fig. 4) is used to adapt H4DU handset cord to AD2M or AC1M bases.

3.16 The 248A (MD) adapter will connect to a dial light transformer (Fig. 30) and has a jack that accepts one end of a modular mounting cord. The other end of the cord would plug into a 281-type adapter to provide power for dial/night lights. Power is provided on pins 2 and 5 of the 248A adapters. The 248A is also used with a 2012B transformer to provide power to 16-button TOUCH-A-MATIC telephone sets.

Danger: When providing power for illuminated station sets, two or more transformers should never feed the same inside wiring pair. If one transformer is unplugged while the secondary terminals of that transformer are being energized through the inside wiring, by another transformer, the exposed terminal blades of the unplugged transformer would be energized with approximately 110 volts ac. Installations of multiple transformers connected to the same inside wire pair should be avoided and corrected if encountered in the field.

3.17 The 248B adapter (Fig. 29) is similar to 248A adapter (Fig. 28) except it will mount on transformers with different center spacing between screw terminals. The 248B is available in two colors Lt. Olive Gray (-49) and Ivory (-50).

3.18 The 267A adapter (Fig. 31) is a modular TEE adapter with two 6-conductor modular jacks designed to plug into a modular connecting block and will accept D4BU, D6AM, D6AL, or D6AP modular cords. A wiring schematic is shown in Fig. 32 for the 267-type adapter and outlines some of the applications in which it may be used.

Caution: Because of the possibility of installing more than one transformer on the same inside wiring pair, the 267A adapter shall not be used to connect dial light transformers to modular systems.

3.19 The 281A adapter is a modular TEE adapter with one 4-conductor modular jack and one 2-conductor modular jack. It provides connection of mounting and dial light cords to modular PRINCESS telephone sets.

3.20 The 282A adapter, when installed on the existing handset cord jack of the 220C and 2220C hand telephone sets, provides two additional leads for connection to the network when tip party identification is required. The 282A adapter is a component of the D-180825 Kit of Parts.

3.21 The 304A adapter is a modular TEE adapter with two modular jacks designed to plug into a modular connecting block. One modular jack (PHONE) will accept D4BU, D6AL, D6AM, or D6AP modular cords and the other jack will accept D8AA modular cord.

3.22 The 153AM1 and 153BM1 adapters (Fig. 33) are miniature ribbon connectors for connecting one line to a 25 pair cable connector or bridging point. The 153AM1 is a male connector and the 153BM1 is a female connector. Both adapters pick up pin terminals 1-26, 2-27, and 25-50 in a 25 pair connector and may be used to connect a single line set to key system cable. Wiring is available in these adapters to allow modification to pick up pins 4-29, 5-30, and 20-45 in a 25 pair connector.

3.23 The 153AM2 and 153BM2 adapters are equipped with a 4 pin modular jack and will pick up pin terminals 1-26 and 2-27 in a 25 pair connector.

G. Converter

3.24 The 1A converter is permanently installed to permit the D4BU mounting cord to be used with 548A- or 549A-type jack. The converter cannot be removed once it is installed.

4. CONVERSION

4.01 ***Convert telephone set as follows.***

(1) Remove housing, handset, and spade-tipped handset cord. If wall set, disconnect inside wire. If desk set, remove spade-tipped mounting cord.

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Note: If a current version of the G3 handset is being used (modular type cord opening in handset), it may be converted to a G15 handset per Section 501-210-103.

(2) On rotary dial sets requiring housing color change, remove fingerwheel, finger stop, and dial number plate.

(3) On 7-type dials, remove the protrusion of the finger stop support (part of the dial frame) in such a manner that the remaining stop surface shall not project above the lip of the frame. Install the universal number plate, using the 840699979 lock ring and two 802108100 RHM screws, and the 840161285 finger stop. Provide modular station number card and install fingerwheel.

(4) For sets equipped with 9C-type dial, install universal number plate, finger stop, and 811152974 (P-11E297) lock ring. For sets equipped with a 9CA-type dial, install universal number plate and 840158372 finger stop—lock ring not required. Install 811714229 (P-17A422) ring assembly over edge of number plate. Provide modular station number card and install fingerwheel.

(5) For wall telephone set, inspect basepan of telephone set. If there is an opening for a 523A plug, install as follows.

(a) The end of the plug marked "TOP" shall be oriented toward the top of the basepan. One side of the plug should be engaged in the track first. Then the plug should be rolled in toward the pan to snap in the opposite side.

(6) If basepan of wall set does not have the previous feature, install and connect the correct adapter (228, 229, or 230) and the 523A-type plug (Fig. 27). Install appropriate handset cord jack per Table B or C.

When a 523A-type plug is used with an adapter, dress the plug leads as shown in Fig. 27 to prevent shorting or grounding the leads.

(7) For desk telephone sets, modify basepan of telephone set base where required and install handset and/or mounting cord jacks per Fig. 41 through 50.

(8) Connect plug and/or jack leads per specific telephone set practices. Insulate and store unused conductors. Dress all leads to avoid ringer gongs, moving parts of ringer and line switch, and interference with other components when set is assembled.

(9) On sets requiring no housing change, install notched housing. If a notched housing is not available, punch housing per Fig. 51, 52, and 53 except for AC- and AD-type telephone bases which require no housing modification.

(10) Mount the wall telephone set base on the 630A4 connecting block (Fig. 34).

(11) Install handset, handset cord, and (desk set only) mounting cord.

(12) Provide modular station number card E-6417 and/or E-6418.

5. CONNECTIONS

5.01 ***Bridged Ringing Standard:*** All modular telephone sets will be supplied connected for bridged ringing.

5.02 ***Polarity Guards:*** Refer to appropriate Reference section in Division 502 for ordering and installation information.

6. MAINTENANCE

6.01 ***Replaceable Items:*** Standard replaceable items such as ringers, dials, receiver units, etc. can be replaced or maintained in accordance with sections covering the particular item.

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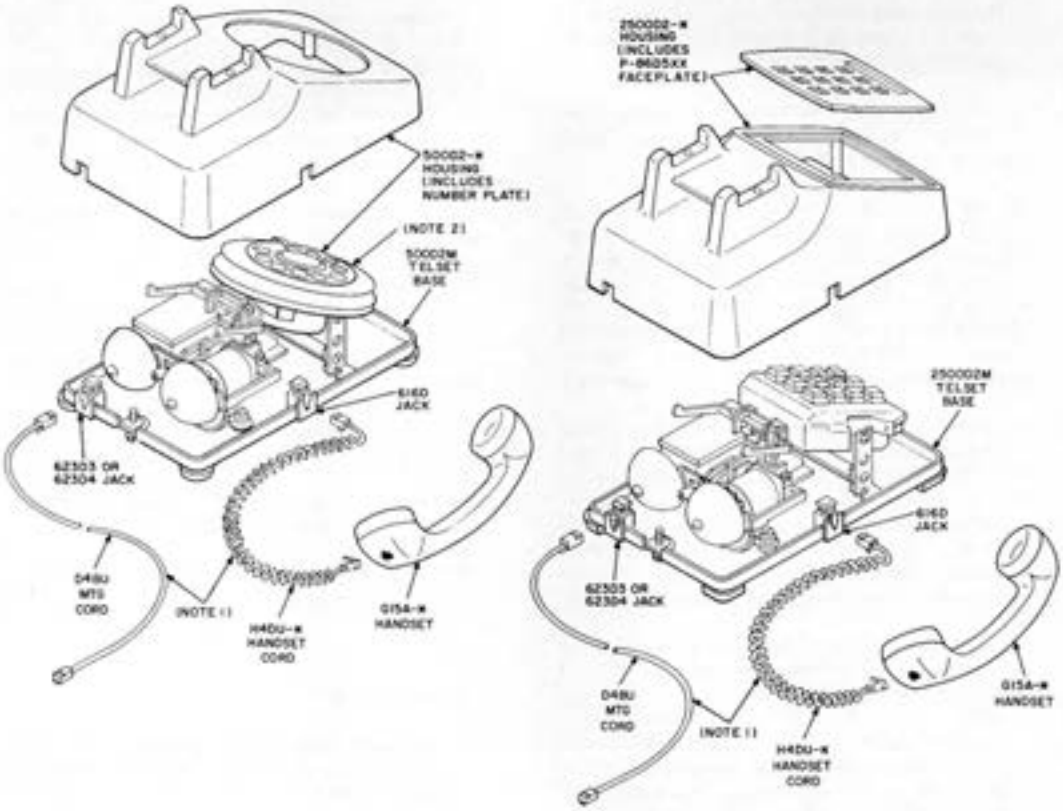

* ADD TWO DIGIT COLOR CODE.

NOTES:
1. CORDS SHOWN ARE NOT INCLUDED WITH TELEPHONE SETS AND MUST BE ORDERED SEPARATELY.
2. DIAL NOT FULLY ASSEMBLED ON SEPARATE TELEPHONE BASES.

Fig. 1—500DM and 2500DM Telephone Sets

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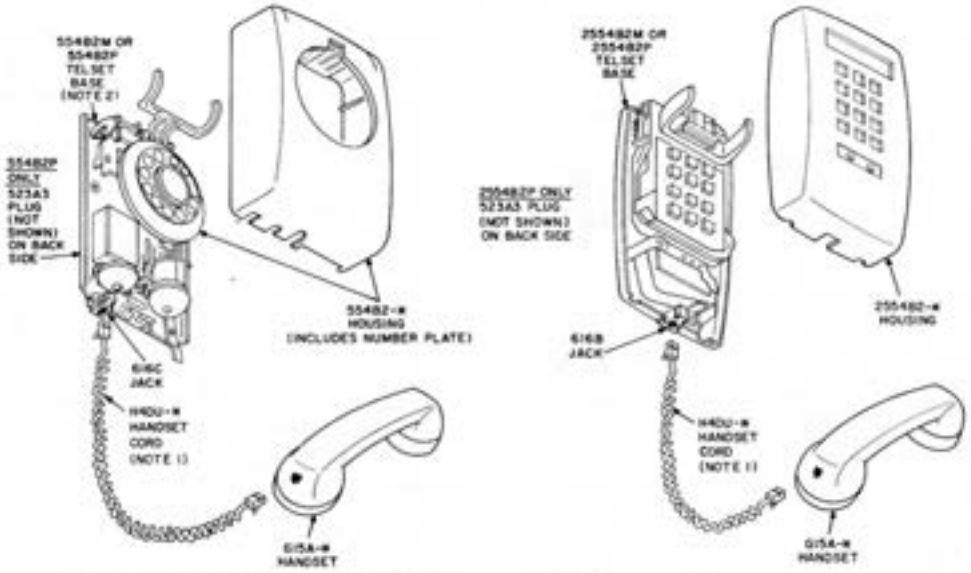

✱ ADD TWO DIGIT COLOR CODE.

NOTES:
1. H4DU-✱ CORDS MUST BE ORDERED SEPARATELY.
2. DIAL NOT FULLY ASSEMBLED ON SEPARATE TELEPHONE BASES.

Fig. 2—554BM, 554BMP, 2554BM, and 2554BMP Telephone Sets

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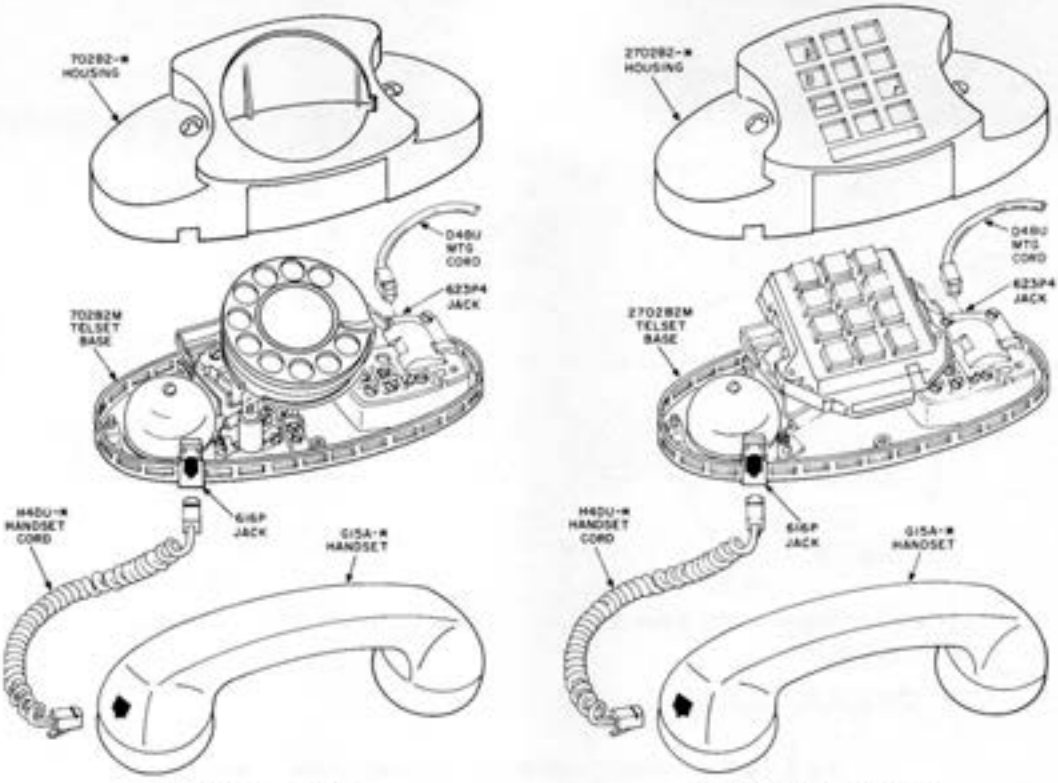

★ ADD TWO DIGIT COLOR CODE.

NOTE:
CORDS SHOWN ARE NOT INCLUDED WITH TELEPHONE SETS AND MUST BE ORDERED SEPARATELY.

Fig. 3—702BM and 2702BM Telephone Sets

TCI Library: www.telephonecollectors.info

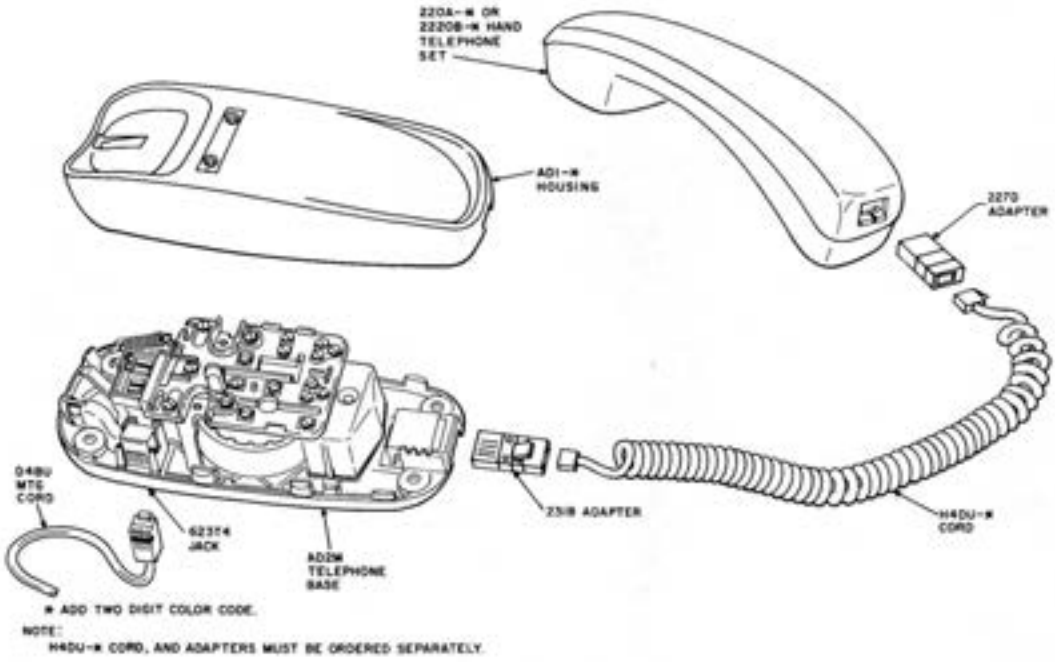

Fig. 4—AD2 Telephone Base With 220A or 2220B Hand Telephone Set

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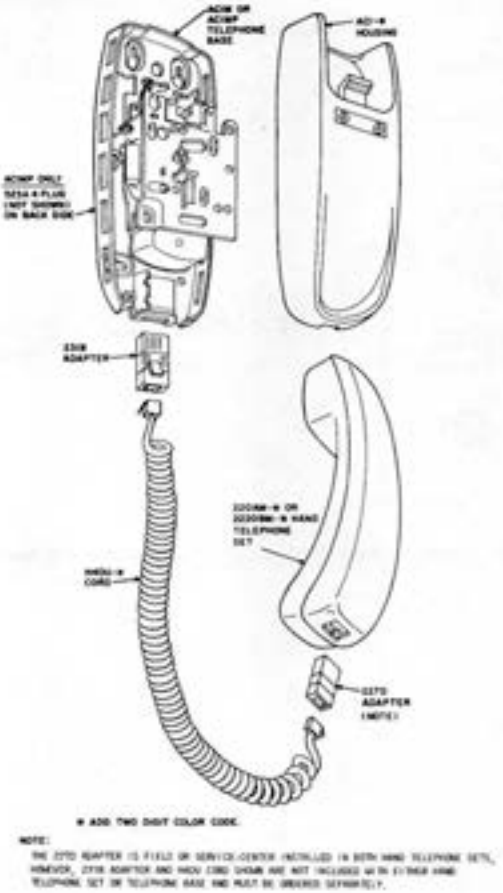

Fig. 5—AC1 or AC1P Telephone Base With 220AM or 2220BM Hand Telephone Set

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NOTE:
H4DU-* CORD MUST BE ORDERED SEPARATELY.

Fig. 6—AD3 Telephone Base With 220C, 226A, 2220C, or 2226A Hand Telephone Set

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Fig. 7—AC2P Telephone Base With 220C, 226A, 2220C, or 2226A Hand Telephone Set

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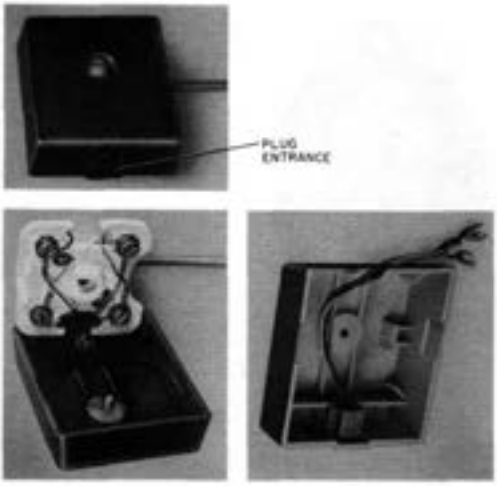
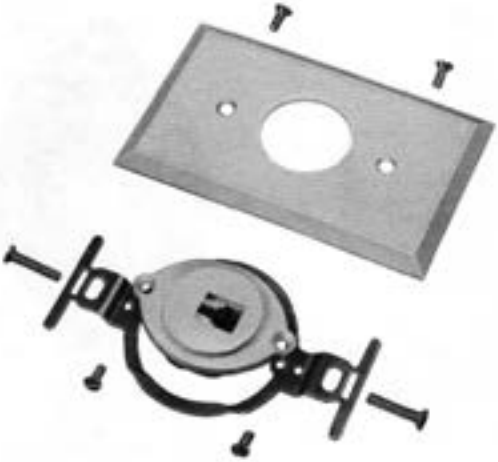


Fig. 8—625A and 625C Modular Connecting Blocks



- 4 CONTACTS
- FLUSH MOUNTED:
  FOR USE IN STANDARD ELECTRICAL OUTLET BOX
  NOTE:
  MOUNTING SCREWS, BRACKET, AND FACEPLATE PROVIDED
- MATES WITH 048U MOUNTING CORD PLUG
- FOR NEW INSTALLATIONS OR MODULAR REPLACEMENT OF 548-TYPE JACKS

Fig. 9—625B Connecting Block Assembly

TCI Library: www.telephonecollectors.info

- 4 CONTACTS
- FLUSH MOUNTED: USING 63-TYPE OR KS-20502,L2 BRACKET AND 16A FACEPLATE OR IN STANDARD ELECTRICAL OUTLET BOX USING 43B BRACKET OR IN WOODWORK USING 1-1/4 INCH HOLE
- MATES WITH D4BU MOUNTING CORD PLUG
- MOUNTING SCREWS SUPPLIED
- FOR NEW INSTALLATIONS OR MODULAR REPLACEMENT OF 548-TYPE JACKS

Fig. 10—625F Connecting Block

Fig. 11—158A Cover With 625F Connecting Block

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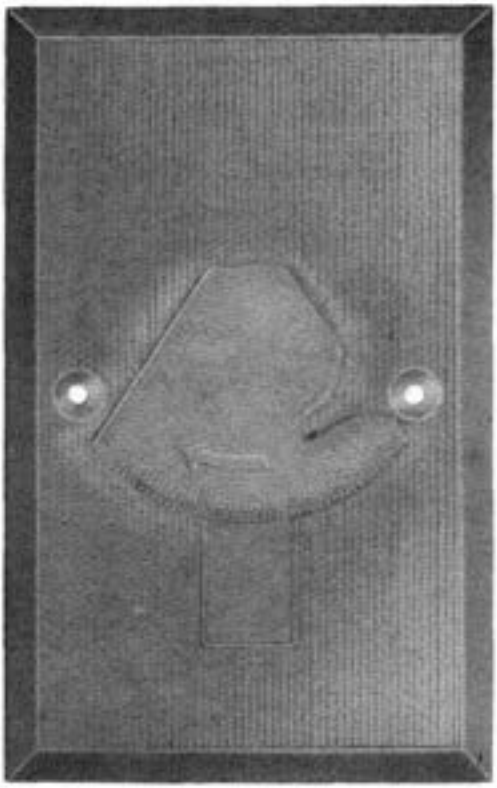

NOTE:
BRACKET IS USED TO MOUNT 625FS OR 625H TO GEM BOX, 63A, OR 63B MOUNTING BRACKET.

Fig. 12—625FS or 625H Connecting Block and Mounting Bracket

TCI Library: www.telephonecollectors.info

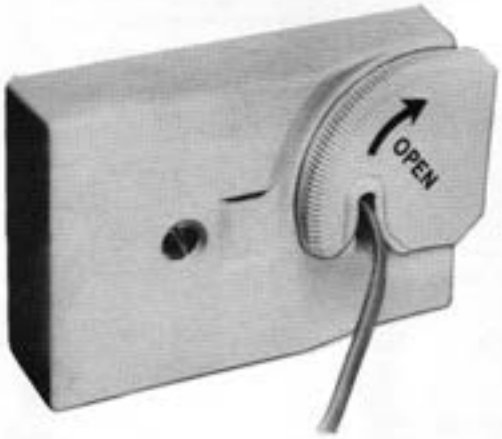

Fig. 13—6255 Connecting Block With D4BU Cord Inserted

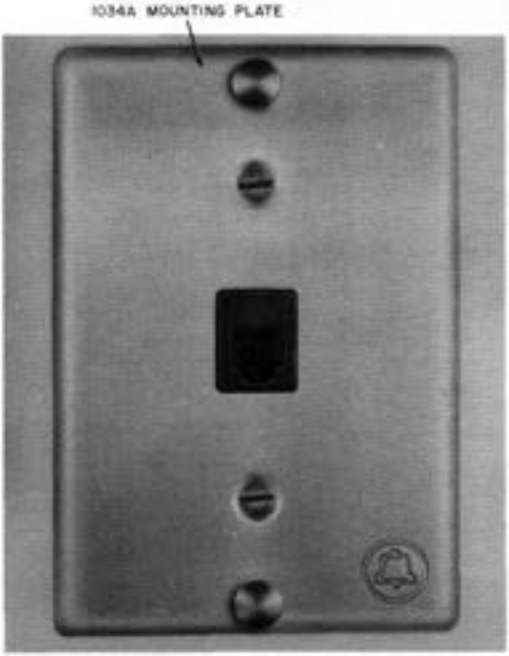

Fig. 14—630A4 Connecting Block

(1) 63-TYPE, KS-20502, L2 OR KS-19407, L1 (M0) BRACKET
(2) GEM BOX AND NORMAL WALL SURFACE
(3) OR (4) WEAK WALLS, OVER SIZE WIRING HOLE, LOCAL DAMAGE, ETC.
(5) 1034A MOUNTING PLATE

NOTE:
IF MORE THAN 2 FASTENERS ARE NECESSARY, USE ADDITIONAL MOUNTING HOLES AS REQUIRED

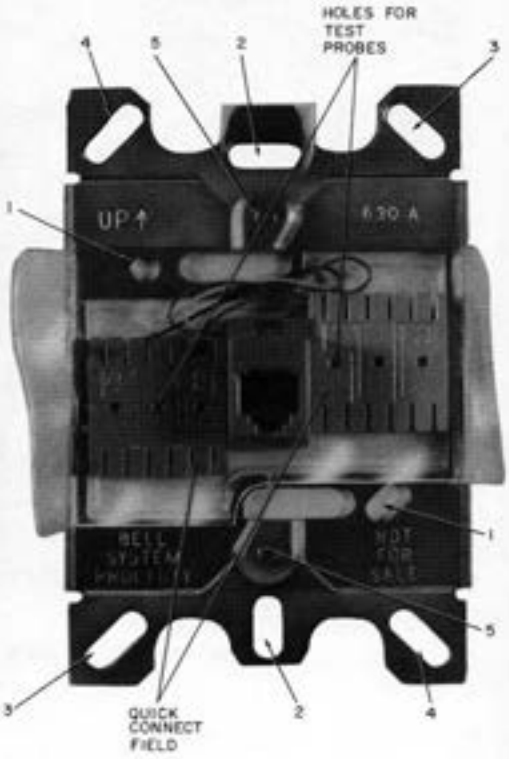

Fig. 15—630A4 Connecting Block With Protective Wrapper (Current Production Model)

TCI Library: www.telephonecollectors.info

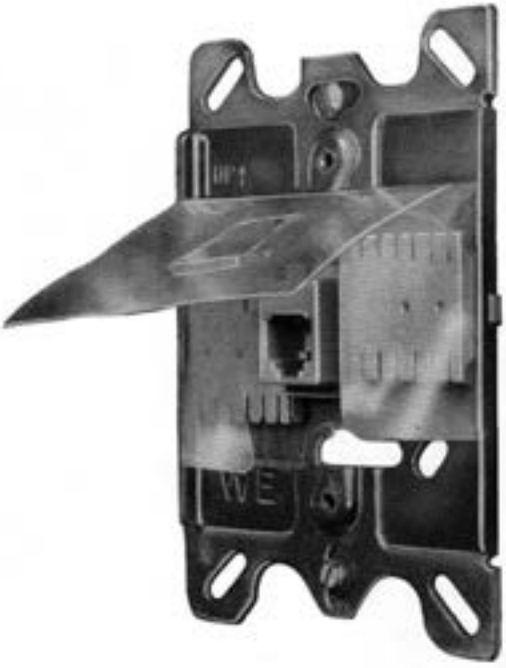

Fig. 16—630A4 Connecting Block - Refer to Fig. 15 for Mounting Instructions

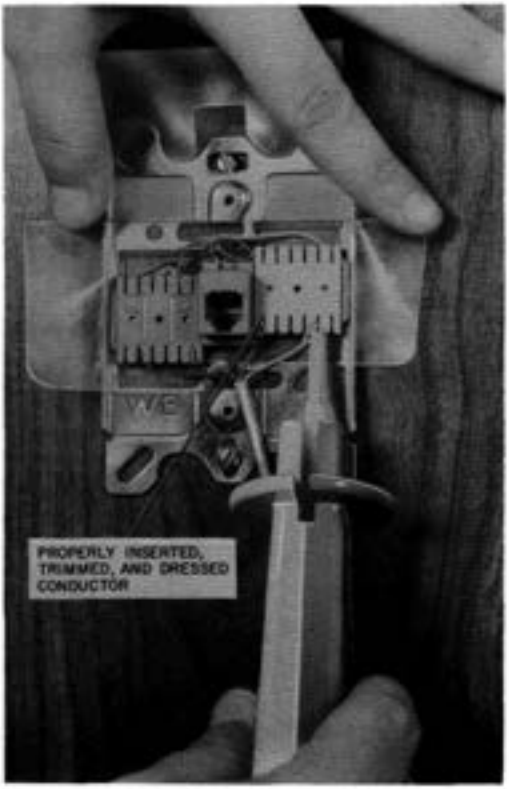

Fig. 17—Connecting Wire With Lead Insertion Tool

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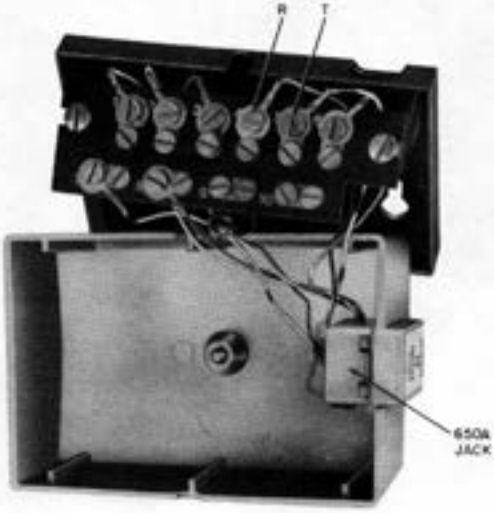

Fig. 18—635A (MD) Connecting Block

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Fig. 19—635B Connecting Block

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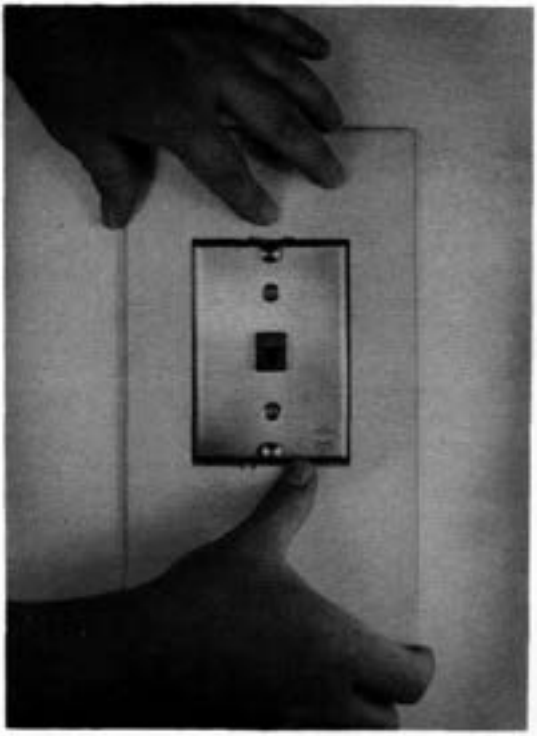

Fig. 20—191-Type Backboard

Fig. 21—Lead Insertion Tool

Fig. 22—798A Notching Tool

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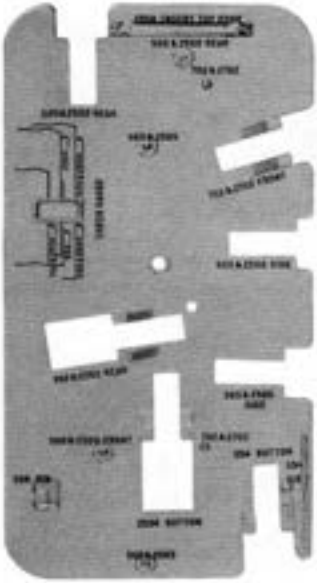

Fig. 23—799A Tool (Template)

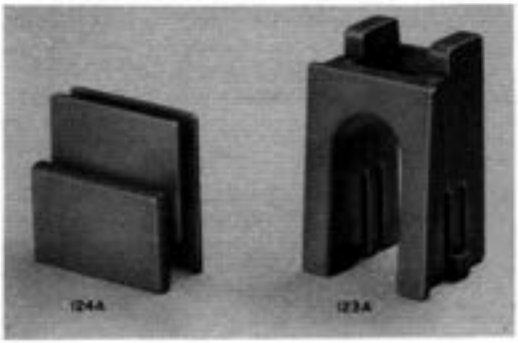

Fig. 24—Apparatus Blanks

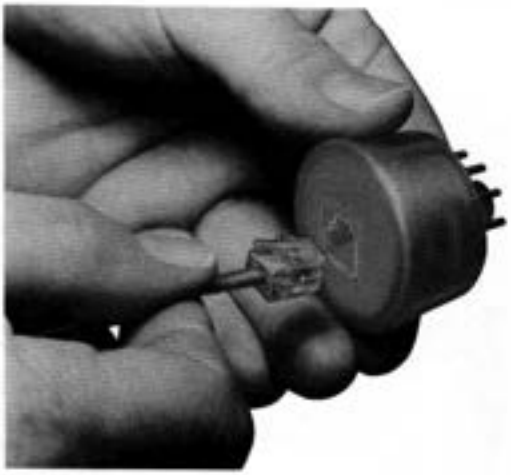

Fig. 25—224A Adapter

Fig. 26—225A Adapter

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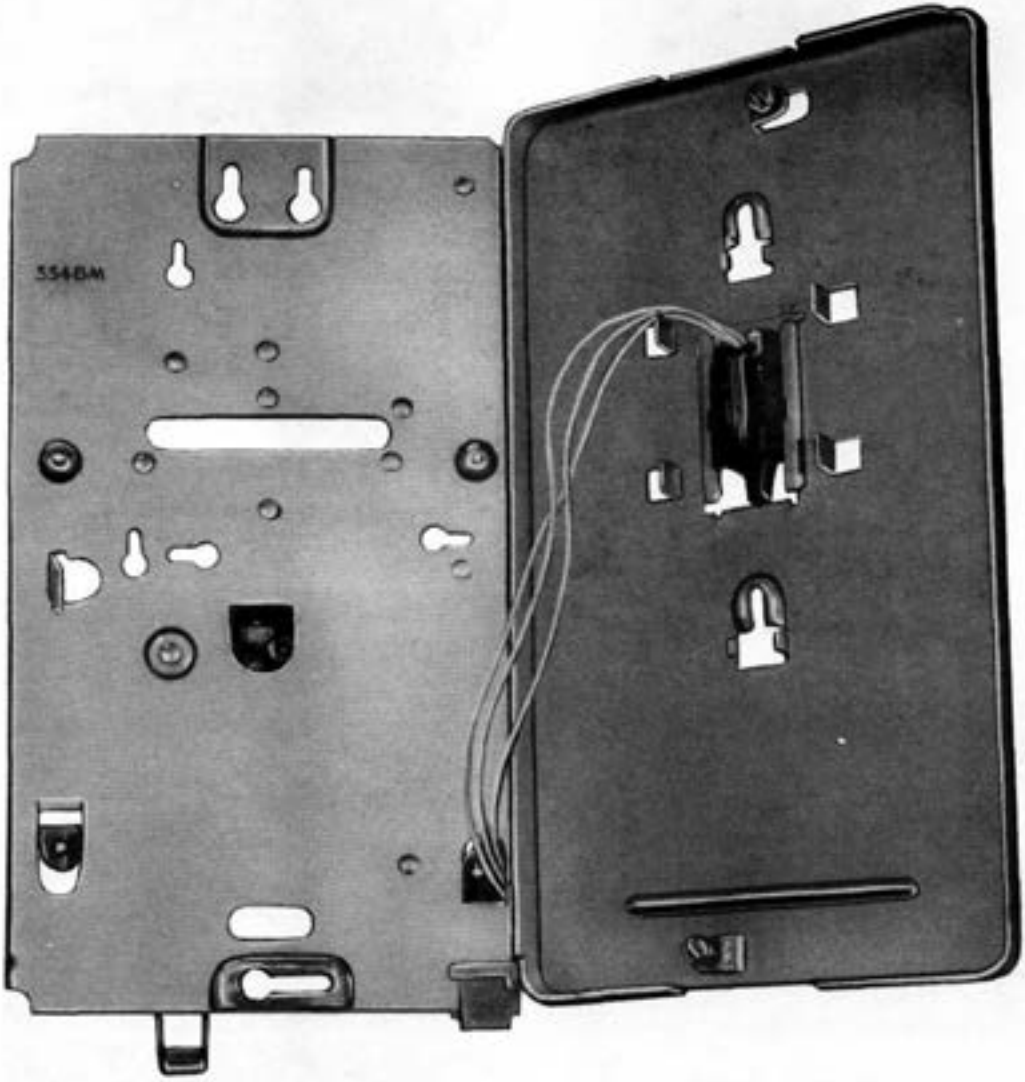

Fig. 27—228B Adapter With 523A-Type Plug, Showing Recommended Lead Routing

TCI Library: www.telephonecollectors.info

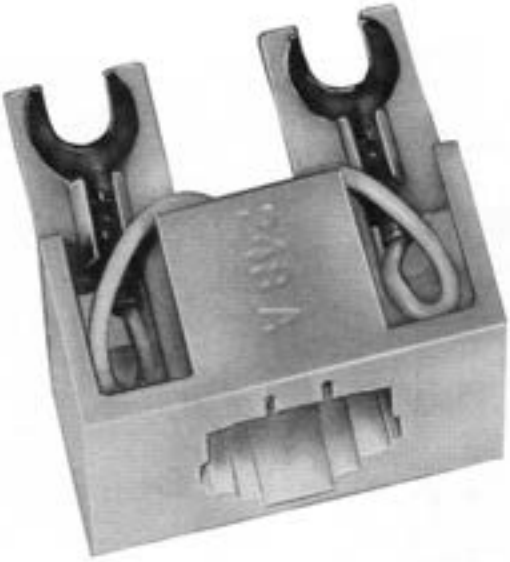

Fig. 28—248A (MD) Adapter

Fig. 30—248A or 248B Adapter as Used With 2012 Transformer

Fig. 29—248B Adapter

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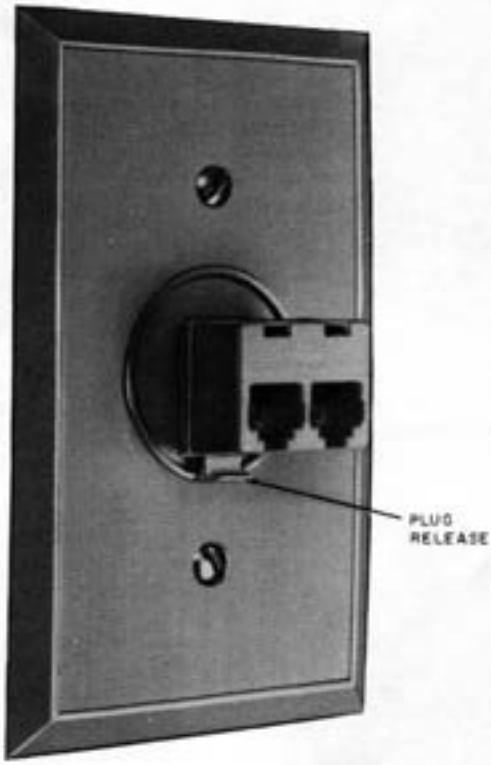

Fig. 31—267A Adapter Plugged into 625B Connecting Block

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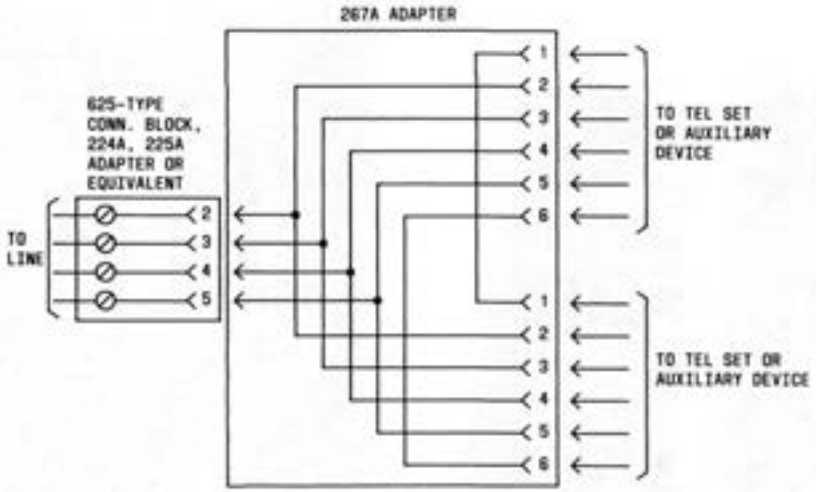

Fig. 32—Schematic of 267A Adapter

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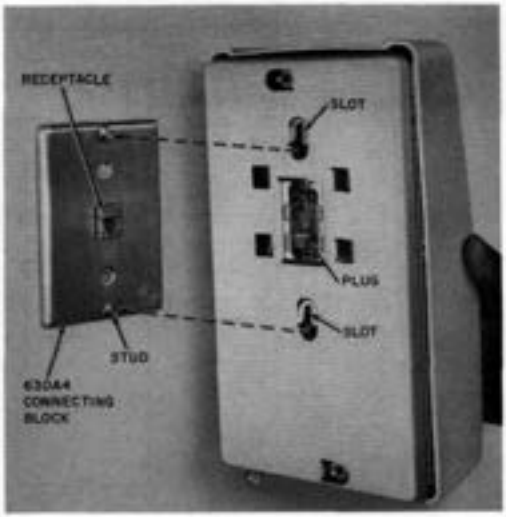
Fig. 33—153AM1 and 153BM1 Adapters



MOUNTING WALL SETS ON 630A4

(1)—BEGIN WITH SLIGHT ENGAGEMENT OF PLUG IN RECEPTACLE

(2)—RAISE SET (WITH PLUG SLIGHTLY ENGAGED) AND PUSH TOWARD WALL TO ENGAGE STUDS IN CORRESPONDING SLOTS OF WALL SET ADAPTER OR BASE PAN. (THE PLUG WILL SLIDE UP AND DOWN IN THE BACK OF THE WALL SET.)

(3)—PULL SET DOWNWARD UNTIL FIRMLY SEATED

Fig. 34—554BMP Telephone Set With 630A-Type Connecting Block

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Fig. 35—554BMP Telephone Set on 630A-Type Connecting Block

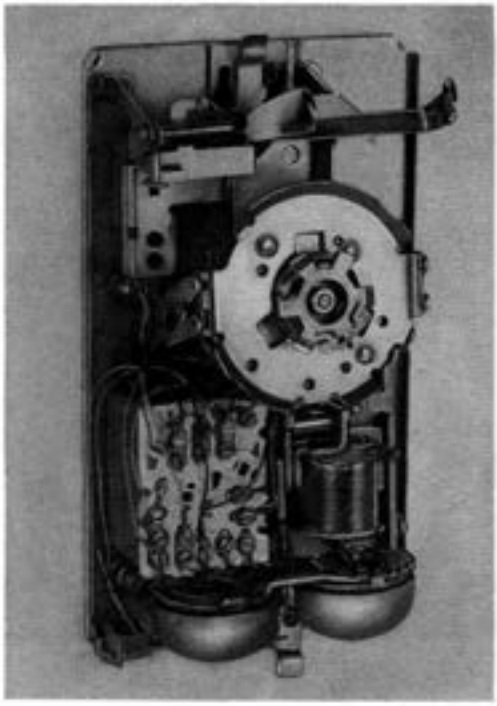

Fig. 36—554B2P Telephone Set Base

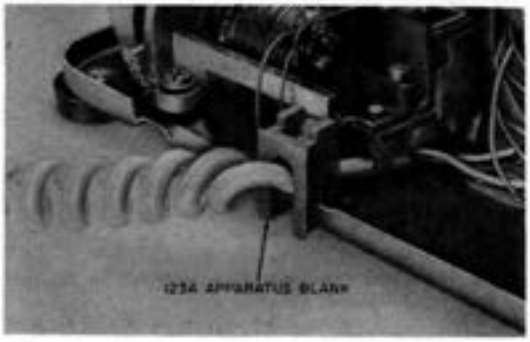

Fig. 37—123A Apparatus Blank Installed on 2500D1M Telephone Set Base

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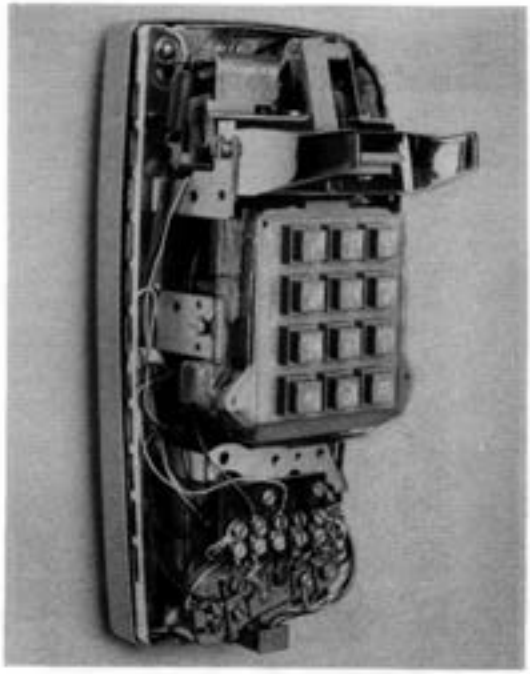

Fig. 38—2554B2P Telephone Set Base

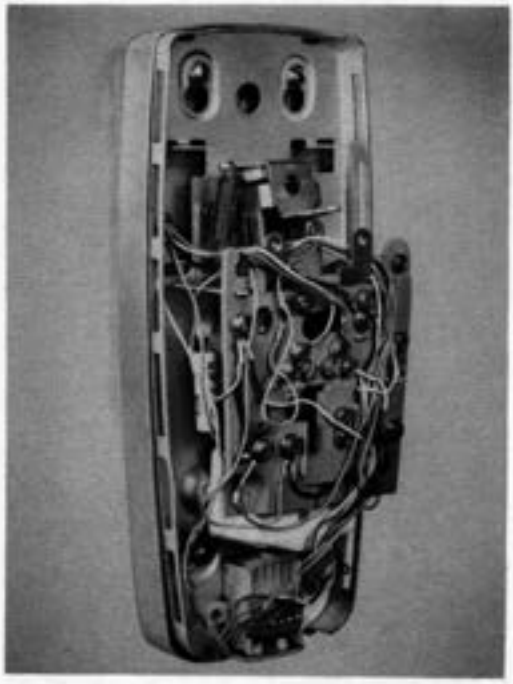

Fig. 40—AC1MP Telephone Base

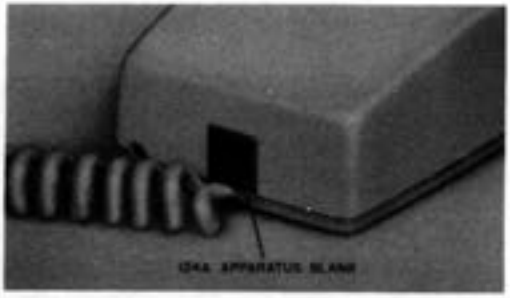

Fig. 39—124A Apparatus Blank Installed on 2554BM Telephone Set

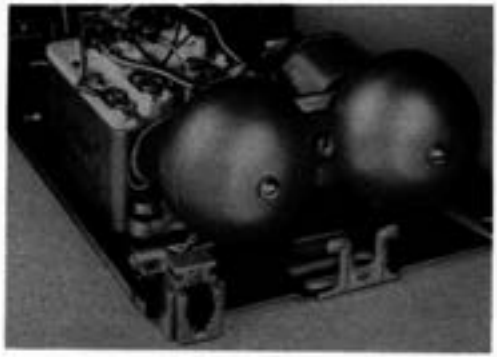

Fig. 41—554B2P Telephone Set Base With Handset Cord Jack Installed

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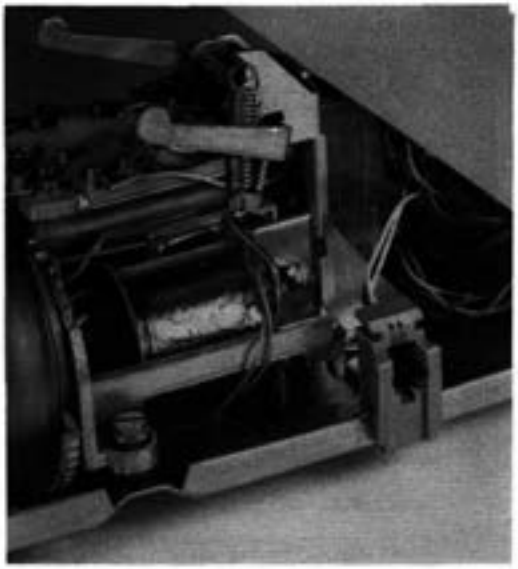

Fig. 42—500D2M or 2500D2M Telephone Set Base With Handset Cord Jack Installed

Fig. 43—2500D2M Telephone Set Base With Mounting Cord Jack Installed (500D2M Telephone Set Base is Similar)

Fig. 44—Modifying PRINCESS Telephone Set Base to Accommodate Mounting Cord Jack

Fig. 45—PRINCESS Telephone Set Base Modified to Accommodate Mounting Cord Jack

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Fig. 46—PRINCESS Telephone Set Base With Mounting Cord Jack Installed

NOTE:
ALL PRODUCT MANUFACTURED BEFORE 12-72 REQUIRES THIS MODIFICATION. CHECK FIT OF 6I6P JACK BEFORE BENDING TAB IN PRODUCT MANUFACTURED BETWEEN 12-72 AND 3-73. PRODUCT MANUFACTURED 4-73 OR AFTER DOES NOT REQUIRE THIS MODIFICATION.

Fig. 47—Modifying PRINCESS Telephone Set Base to Accommodate Handset Cord Jack

Fig. 48—PRINCESS Telephone Set Base With Handset Cord Jack Installed

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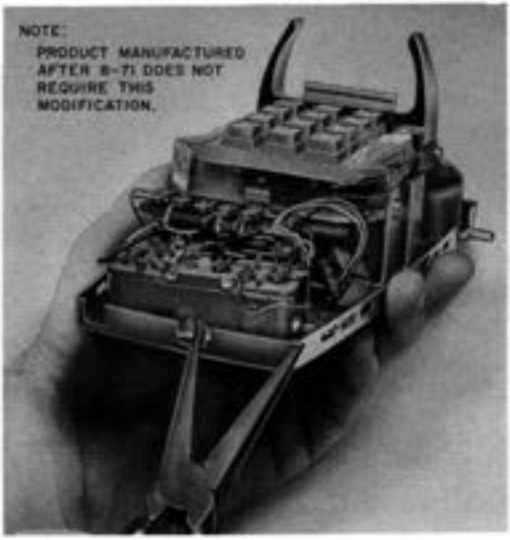

Fig. 49—Modifying 2554B1M Telephone Set Base to Accommodate Handset Cord Jack

Fig. 50—2554B2M Telephone Set Base With Handset Cord Jack Installed

NOTE:
ON SOME HOUSINGS IT WILL BE NECESSARY TO REMOVE ANY HOUSING RIBS THAT INTERFERE WITH PUNCHING TOOL. RIBS SHOULD BE CLIPPED OUT WITH DIAGONAL CUT PLIERS. ON THICK HOUSINGS IT MAY BE NECESSARY TO PUNCH HOUSING USING SUCCESSIVE BITES WITH HOUSING PUNCH.

Fig. 51—250001 Housing on Template

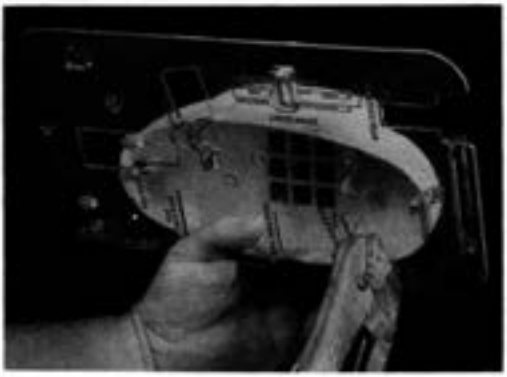

Fig. 52—Positioning Notching Tool (270281 Housing on Template)

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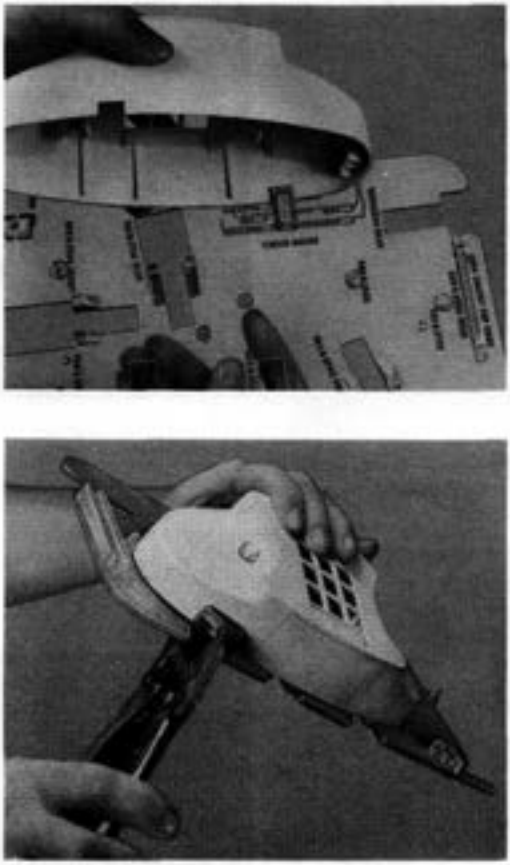

Fig. 53—Notching 270281 Housing and Using Check Gauge

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TABLE A

COLOR ORDERING GUIDE

TEL SET, HOUSING, 191C BACKBOARD, HANDSET, AND HANDSET CORD (NOTE 2)		COORDINATED FACEPLATE TOUCH-TONE DIAL (NOTE 1)		UNIVERSAL NUMBER PLATE ROTARY DIAL	
Black	-03	Charcoal	-70	840200034	-03
Ivory	-50	Muted Ivory	-80	840200505	-50
Green	-51	Light Green	-71	840200513	-51
Red	-53	Muted Red	-69	840200539	-53
Yellow	-56	Light Yellow	-72	840200562	-56
White	-58	Light Gray	-73	840200588	-58
Beige	-60	Muted Beige	-75	840200604	-60
Aqua Blue	-62	Muted Blue	-76	840200620	-62

Note: 1. Faceplates same color as housing are MD.

Note: 2. TRIMLINE telephone set and associated handset cord, and 191C backboard is available in two additional colors, brown (-104) and Rust (-124).

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TABLE B

MODULAR AND PARTIALLY MODULAR TELEPHONE SETS

TELEPHONE SET*†	TELEPHONE SET COMPONENTS			CORDS		TELEPHONE SET BASE FEATURES					
	HOUSING†	HANDSET†	TEL SET BASE	HANDSET† CORD	MTG CORD	PLUG	MTG CORD JACK	HANDSET CORD JACK	RINGER	NET.	DIAL
500DM	500D2§	G15A	500D2M	H4DU	D4BU		623D3¶	616D	C4A	425E or 4228A	T-type or 9-type**
2500DM	2500D2		2500D2M							425K or 4228B	35A3A 35Y3A 35Y3D
554BM (MD)‡	554B2§		554B2M§					616C		425E or 4228A	T-type or 9-type**
554BMP	554B2§		554B2P			523A3††				425E or 4228A	
2554BM (MD)‡	2554B2		2554B2M§					616B	P1A	4010D or 4228K	35A3A 35Y3A 35Y3D
2554BMP	2554B2		2554B2P			523A3††				4010D or 4228K	
702BM	702B2		702B2M		D4BU		623P4	616P	M1A	4010B or 4228F	8A
2702BM	2702B2		2702B2M							4010D or 4228G	35E4A
702DM	‡‡		None §§							4010B or 4228F	8A
2702DM	‡‡									4010D or 4228G	35E4A

* Modular and partially modular telephone sets are supplied without cords. Cords must be ordered separately.

† Color suffix applies; see Table A.

‡ Partially modular; handset cord jack only — Line conductors wired directly to set terminals.

§ Includes universal dial number plate.

¶ Factory-equipped with 623D3 jack; converted or repaired with 623D4 jack.

** Assembled sets equipped with fully-assembled dials; separate telephone set bases equipped with dial mechanisms and dial adapter keys. (No color-sensitive parts.)

†† Factory-equipped with 523A3 plug; converted or repaired with 523A4 plug.

‡‡ To order housings refer to specific set practice for comcode numbers.

§§ Only assembled sets available.

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TABLE C

IDENTIFICATION OF TRIMLINE COMPONENTS AND ASSOCIATED APPARATUS (NOTE 1)

HAND TEL SET CODE	METHOD OF IDENT.	TEL BASE CODE	WALL JACK OR MTG CORD CODE	HANDSET CORD CODE	BASE HANDSET JACK ADAPTER CODE	HAND TEL SET JACK ADAPTER CODE	METHOD OF PROVIDING TIP PARTY IDENT. GRD
220A or 2220B	Large Handset Coed Jack With Code Stenciled Inside on Shell	AC1, AC1P	630A (AC1P)	H4DB	None	None	H5AA Cord
		AD1	D5AL				
		AC1, AC1P	630A (AC1P)				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	231B (AD2)	227D	None Note 3
		AD2, AD3	D4BU				
220AM or 2220BM	227D Adapter in Handset Jack of a 220A or 2220B	AC1, AC1P	630A (AC1P)	H4DU	231B	227D†	Note 4
		AD1	D5AL				
		AC1, AC1P	630A (AC1P)				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	None	227D†	None Note 3
		AD2, AD3	D4BU				
220AL	LED Printed Under Finger-stop. 227D Adapter in Handset Jack	AC1, AC1P	630A (AC1P)	H4DU	231B	227D*	D-180824 Kit of Parts
		AD1	D5AL				
		AC1, AC1P	630A (AC1P)				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	231B (AD2)		
		AD2, AD3	D4BU				
220B or 2220C (Early Version)	(4) Wire Springs in Handset Jack. Square Buttons (2220C) (Minimodular)	AC1, AC1P	630A (AC1P)	H4DU	231B	None	D-180825 Kit of Parts Note 2
		AD1	D5AL				
		AC1, AC1P	630A (AC1P)				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	231B (AD2)		
		AD2, AD3	D4BU				
220C, 226A, 2220C (Late Version) or 2226A	LED Printed under Finger-stop (220C and 226A) Square Buttons on Dial (2220C and 2226A) Minimodular	AC1, AC1P	630A (AC1P)	H4DU	231B	None	
		AD1	D5AL				
		AC1, AC1P	630A (AC1P)				
		AD2	D4BU				
		AC2, AC2P	630A (AC2P)	H4DU	231A (AD2)		
		AD2, AD3	D4BU				

* Factory installed.

† Field or service center installed.

Notes:
1. All TRIMLINE components and apparatus are ordered separately.
2. The 220B and 2220C (early version) do not require the 282A adapter.
3. This combination of components can not be wired for tip party identification.
4. 227D adapter must be removed for tip party identification.

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TABLE D

MANUFACTURED DISCONTINUED TELEPHONE SETS THAT MAY BE CONVERTED USING MODULAR COMPONENTS

TELEPHONE SET*	HANDSET CORD JACK	MTG CORD JACK	ADAPTER (WALL SETS)	PLUG (WALL SETS)
500C/D 500E/F 500L/M† 500W/Y 501C/D/F 510A/B† 515B† †† 2500D 2500M 2500Y 2515† ††	616D	623D4		
702B 702D 2702B 2702D	616P	623P4		
554A/B/F‡ 555B‡ †† 556AR/BR‡ 557 559 593BRW	616C		228-Type ‡	523A§
2554B‡ 2555B‡ ††	616B		229-Type ‡	523A§

TELEPHONE SET*	HANDSET CORD JACK ONLY
500AD 500R/S 502A/B 503B/C 510E/F 511F/H 513B 514B 529B 2500S 2502B 2503C 2504B 2510F 2511F/N 2514B¶	616D
558F/DRW	616C
2558D	616B
564HC, 565GK/HK 2564HC, 2565GK/HK	616D**

* Housing must be notched to clear any jack installed.

† Mounting cord jack leads must be at least 9 inches. Use D-161488 connectors and M1W straps to extend conductors if necessary.

‡ Adapter not required if basepan has two keyhole shaped ramps along vertical centerline with rectangular plug track in between.

§ Use any type 523A plug with at least the conductors needed to provide the desired service.

¶ Dress jack leads down back of jack frame to avoid hand telephone set key mounting bracket.

** Push top of jack under terminal board. Do not pinch leads.

†† Signaling feature from m-n contacts cannot be provided simultaneously with 2-line service in these telephone sets.

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TABLE E

MODULAR CONNECTING BLOCK CONNECTIONS

INSIDE WIRE					CONNECTING BLOCK	
ONE-LINE SERVICE			TWO-LINE SERVICE	WIRE OR LEAD COLOR	TERMINAL	
NO DIAL LIGHT	DIAL LIGHT	1A1, 1A2 KTS			625-TYPE	630A4
Tip	Tip	Tip	Line 1 (T)	Green	G	1
Ring	Ring	Ring	Line 1 (R)	Red	R	2
	TRNSF	A	Line 2 (T)	Black	B	4
Ground*	TRNSF	A1	Line 2 (R)	Yellow	Y	3

*Supply ground for all one-line installations

TABLE F

635A/B CONNECTING BLOCKS (SEE NOTES)

TYPES OF SERVICE AND AVAILABLE FEATURES	TERMINAL DESIGNATIONS AND LEAD FUNCTIONS							
	1	2	3	4	5	6	7	8
Single Line Series	R1			R	T			T1
Single Line Series With "A" Lead Control	R1		A	R	T	A1		T1
Two Lines - One Line Series, One Bridged	R1		T2	R	T	R2		T1

Notes:

1. There are two internal shorting bars in the jack, shorting terminals 1 and 4 and terminals 5 and 8.
2. Insertion of 8-pin plug will open shorting contacts.
3. When using 635B, insertion of 6-pin plug will not affect shorting contacts.

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TABLE G

74D CONNECTING BLOCK (SEE NOTE)

TERMINAL STRIP	652A6 JACK	
	JACK LEADS	PIN NOS.
1	G	4
2	R	3
3	Y	5
4	BK	2
5	BL	6
6	W	1

Note: The 74D may also be used for other services where 5 or 6 conductors are required, ie, with 28A ringer isolator.

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TABLE H
FASTENERS FOR 630A4 CONNECTING BLOCK (NOTE 1)

TO FASTEN CONNECTING BLOCK TO WALL (Note 4)	USE TWO (2) EACH OF FASTENERS INDICATED				
	FLAT HEAD NO. 6-32 MACHINE SCREW		B WALL ANCHOR SIZE 4 OR 6	D PLASTIC ANCHOR SIZE 10	NO. 8-15 BY 1 IN. FLAT HEAD TAPPING SCREW, TYPE AB (NOTE 3)
	3/16" OR 5/16"	3/4"			
1034A Mtg Plate	X				
63-Type Bracket, Device Box, Plaster Ring		X			
Stucco or Plaster on Wood Lath					X
Plaster on Metal Lath, Paneling on Furring Strips, or Plasterboard on Studs			*(Note 2)		X
Hollow Masonry			X(Note 2)		
Solid Masonry				X	X

* Alternate Fasteners

Notes:

1. If connecting block is not securely fastened to the wall with the recommended number of fasteners, additional fasteners should be used.
2. Use size 4 anchors for walls up to 5/8-inch thick and size 6 anchors for wall from 5/8-inch to 1-1/4 inch thick.
3. Or other available screw of equivalent (or greater) size, and thread engagement.
4. Fill any opening in the wall to prevent "chimney" effect which draws dirt into wall sets.

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581A TELEPHONE SET BASES

1. GENERAL

1.01 This section contains identification, installation, connections, and maintenance information for the 581A telephone set bases. The 581A telephone set base (Fig. 1), component parts furnished with the base and a 6TA or 6UA rotary dial (Fig. 2), ordered separately, are designed for assembling into a customer-supplied housing and handset.

1.02 This section is reissued to:

- Add D-180778 kit of parts (modular mounting cord jack)
- Add 840401723 inside connector and 840401731 outside connector
- Revise Fig. 1, 2, 3, 4, 6, 9, 11, 12, 14, 16, 17, and 18
- Add Fig. 5, 8, 10, 13, and 15
- Revise Tables A through G
- Add Tables H and I

Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

2. ORDERING GUIDE

Base, Set, Telephone, 581A (Fig. 1)

2.01 ***Associated Apparatus or Equipment (ordered separately):***

- Cord, Mounting, D4BU-29
- Cord, Handset, H4CJ-*, 6 feet
- Cord, Mounting, D6AA-* (specify length) (required when candlestick type telephone is installed)
- Cord, mounting, D10R-* (specify length) [when rotary dial set is used with 1A1 or 1A2 KTS and 3B (MD) or 4-type speakerphone]
- Dial, 6TA (Chrome)† or 6UA (Gold)†
- D-180460 Kit of Parts (TOUCH-TONE* dial).

* Add appropriate color suffix.

† Includes card holder assembly and three (3) screws (Fig. 2).

2.02 ***Optional Apparatus or Equipment (ordered separately):***

- D-180409 Kit of Parts (241B Amplifier)
- D-180461 Guard Assembly (Polarity Guard).

2.03 ***Features:***

- Standard components which provide an operative telephone circuit when properly assembled within an appropriate housing and handset
- Components provide a single line, rotary or TOUCH-TONE dial telephone set
- Provisions to add 241B amplifier, TOUCH-TONE dial, and polarity guard (optional).

3. INSTALLATION AND CONNECTIONS

3.01 The customer's housing must be an acceptable housing to accept standard components. The premises must be wired with an appropriate connecting block or jack in order to accept the D4BU-29 plug-ended mounting cord.

Acceptable Telephone Set Housings

3.02 Older acceptable housings carry an acceptance stamp located on bottom which reads "This Enclosure Conforms To Drawing B-696501". Space

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Bell System except under written agreement

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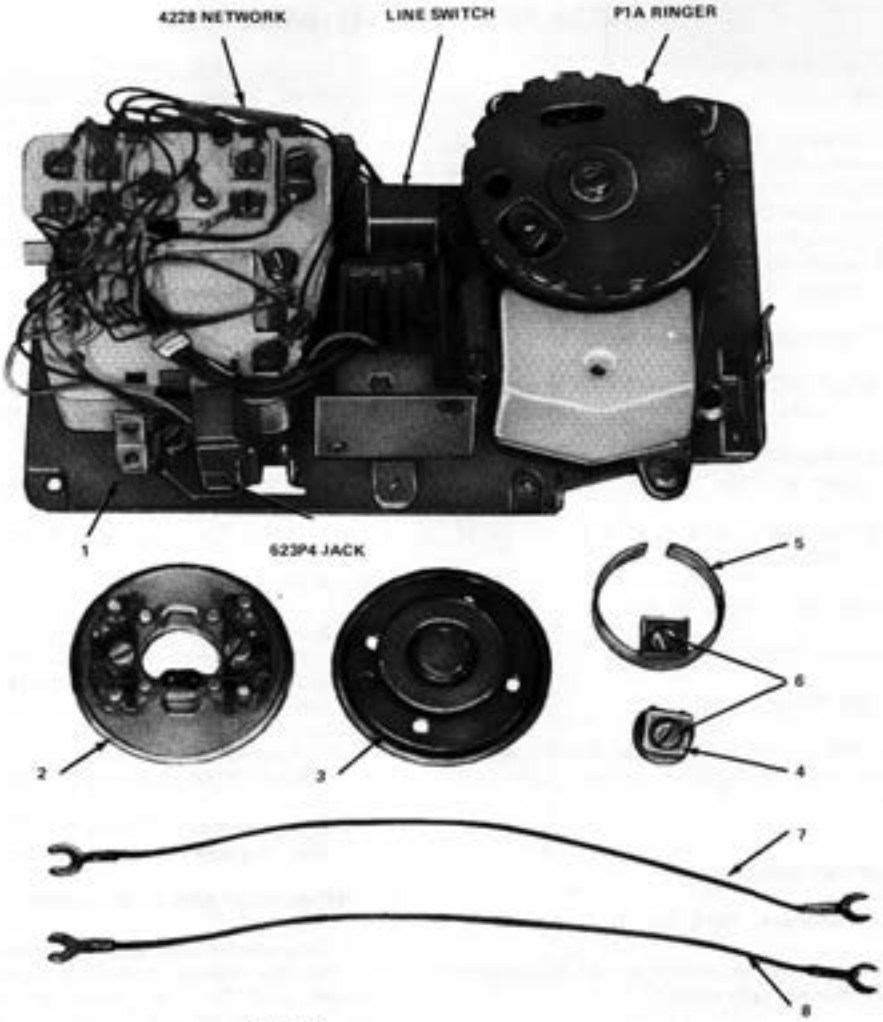

LEGEND

1 – 581A Telephone Set Base
2 – U3 Receiver Unit
3 – T1 Transmitter Unit
4 – 840401723 Connector Inside
5 – 840401731 Connector Outside
6– 840401673 Screw(s)
7– 840153274 Lead Assembly (BK) Required for Desk
8 – 840153290 Lead Assembly (R) Candlestick Set Only

Note: The receiver and transmitter units are shipped loose with base. Items 4 through 8 are also shipped loose and packaged as parts group 840151054. Dial must be ordered separately.

Fig. 1—581A Telephone Set Base and Parts Group

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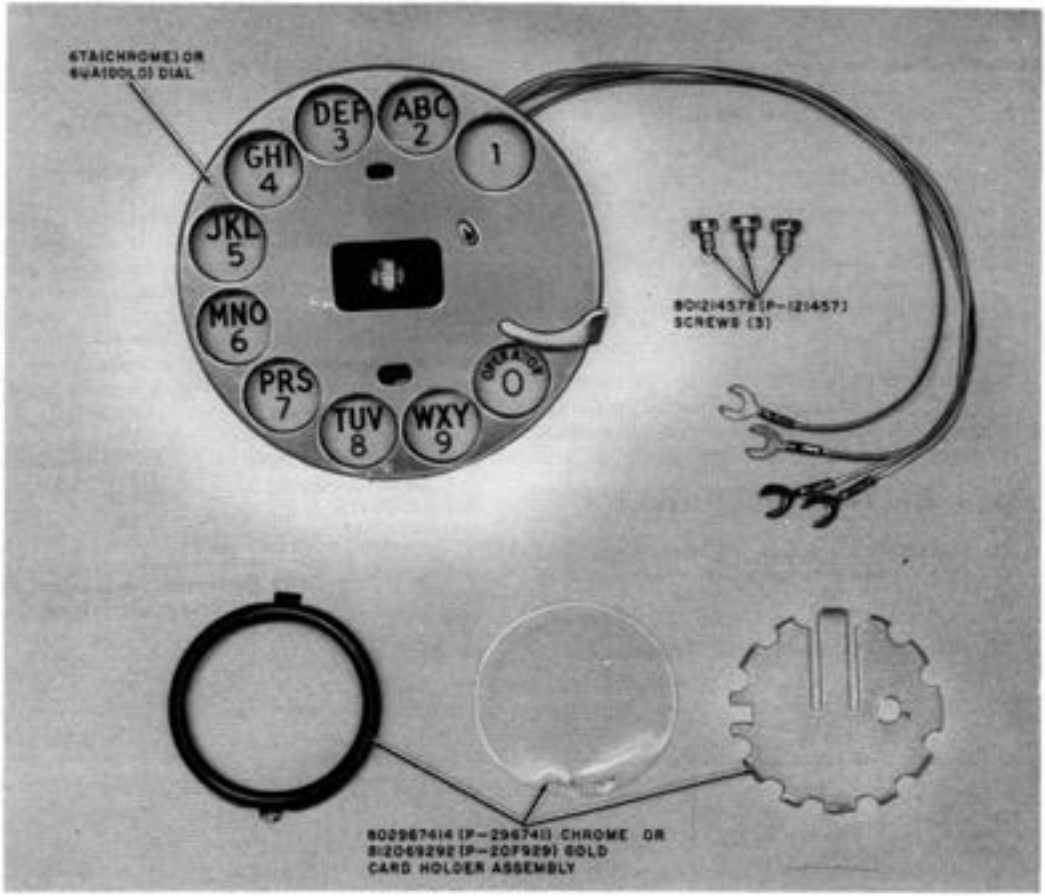

Fig. 2—6TA or 6UA Dial and Associated Parts

for the reviewing telephone companys name and their assignment number is also provided. Newer housings carry the marking "Bell System Identification #. This enclosure conforms to Bell System Voice Communication Technical Reference CAK."

Note: Inspect the customer's telephone set components before accepting them for service. Be sure he is aware of any missing or defective components found. All components and wiring furnished as part of the customer's housing must be removed prior to installation of telephone company parts and returned to the customer.

Nonconforming Housings

3.03 Housings which do not carry the acceptance stamp or identification number must be modified by the local Western Electric Service Center to accept these standard Bell System components. Components and wiring removed by

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the service center should be returned to the customer.

Assembly (Desk Set Type)

3.04 ***Install 581A Telephone Set Base as follows.***

(1) Remove upper housing from base of customer-owned housing.

(2) Position 581A telephone set base on base of customer's housing, ensuring that the ringer volume control is accessible through opening of base.

(3) Fasten 581A base using four screws, furnished with set or screws furnished with the housing. A typical installation in a customer-owned desk set type housing is shown in Fig. 3.

3.05 ***Rotary Dial (ordered separately).***

(1) Install 6TA (chrome) or 6UA (gold) dial (Fig. 2) using three screws furnished with dial.

(2) Refer to Table A for dial connections.

3.06 ***TOUCH-TONE Dial (D-180460 Kit of Parts), ordered separately.***

(1) When the customer's antique-decorator housing is intended to be used with TOUCH-TONE service, install a D-180460 Kit of Parts.

(2) Refer to Table B for dial connections.

3.07 If a polarity guard is required in conjunction with a 35Y3A TOUCH-TONE dial, install a D-180461 guard assembly, which consists of guard assembly, brackets, screws, and a printed wiring board assembly. The polarity guard is installed when specified by local instructions for end-to-end signaling purposes when battery and ground reversals are encountered. Refer to Fig. 4 for location and Table C for connections.

3.08 ***Mounting cord (ordered separately) and modular jack using a D-180778 Kit of Parts.***

New 581A bases come equipped with a 623P4 mounting cord jack.

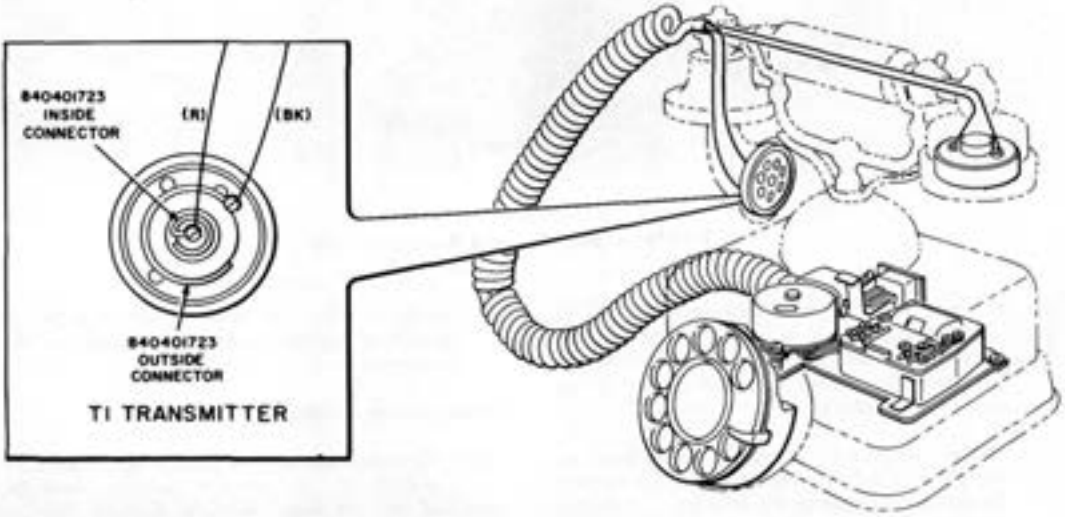

Fig. 3—Typical Installation, Desk Set Antique—Decorator Housing

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TABLE A

ROTARY DIAL AND HANDSET CONNECTION

WIRE OR LEAD	COLOR	CONNECT TO
6-Type Dial	BL	F
	BL	RR
	W	R
	W	GN
Handset Cord	R	R
	BK	B
	W	GN
	W	R

(1) Mount 623P4 jack and jack bracket to the network as shown in Fig. 5.

(2) Connect the four 623P4 jack leads and rearrange network leads as shown in Table D.

(3) Thread one end of the D4BU mounting cord into the set and plug into 623P4 jack as shown in Fig. 5. For connections refer to Table E or F.

TABLE B

TOUCH-TONE DIAL AND HANDSET CONNECTION

WIRE OR LEAD	COLOR	REMOVE FROM	CONNECT TO
35Y3A Dial	G	—	F
	BK	—	RR
	R-G	—	R
	R	—	T
	W	—	GN
	BL	—	B
	O-BK	—	C
	W-BL	—	S
Line Switch	R	GN	S
Handset Cord	R	—	T
	BK	—	B
	W	—	S
	W	—	R

3.09 ***Handset Cord (ordered separately).***

(1) Lay the set end of H4CJ handset cord on top of mounting cord and secure cord stay to bracket on base as shown in Fig. 5.

(2) Connect leads to appropriate network terminals (Table A or B).

(3) Remove transmitter and receiver caps from customer-owned handset. Insert handset cord leads through handset openings, feeding two white leads into receiver cavity and red and black leads into transmitter cavity.

(4) Connect white leads to U3 receiver unit, place unit in cavity and replace receiver cap.

(5) Snap inside and outside connectors on T1 transmitter unit and terminate red and black handset leads (Fig. 3).

The transmitter and receiver units, shall not be in contact with any conducting surface. Transmitter and receiver caps and transmitter and receiver clamping surfaces in

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Fig. 4—Installation Location of Components to Add Polarity Guard Feature

contact with the transmitter or receiver unit shall be made of insulating material such as plastic or rubber. Lacquer or paint shall not be used to provide insulation.

D-180409 Kit of Parts, Optional (Desk Set Type)

3.10 When the shape of the customer's handset places the center of the T1 transmitter unit grid 2-7/8 inches or further away from the speaker's lips mount a D-180409 Kit of Parts (ordered separately) and install as follows.

(1) Install the three 241B amplifier mounting brackets at location shown in Fig. 7, using screws furnished with kit of parts.

(2) Mount amplifier to brackets with screws furnished in kit of parts.

(3) Connect amplifier into telephone circuit in accordance with Table G for rotary dial and Table H for TOUCH-TONE dial.

TABLE C

POLARITY GUARD CONNECTIONS FOR TOUCH-TONE TELEPHONE SET D-180461 GUARD ASSEMBLY

LEAD	COLOR	DISCONNECT FROM	CONNECT TO	
		NET.	NET.	POLARITY GUARD
Dial	BK	RR		T
Line Switch	BR*	C		S
	W†			
623P4 Line Cord Jack Assy	R‡			
Polarity Guard	G		RR	
	W		C	

* If wired for bridged service or ring party.

† If wired for tip party with no identification ground, 1A1 KTS, or 1A2 KTS.

‡ If wired for tip party with identification ground.

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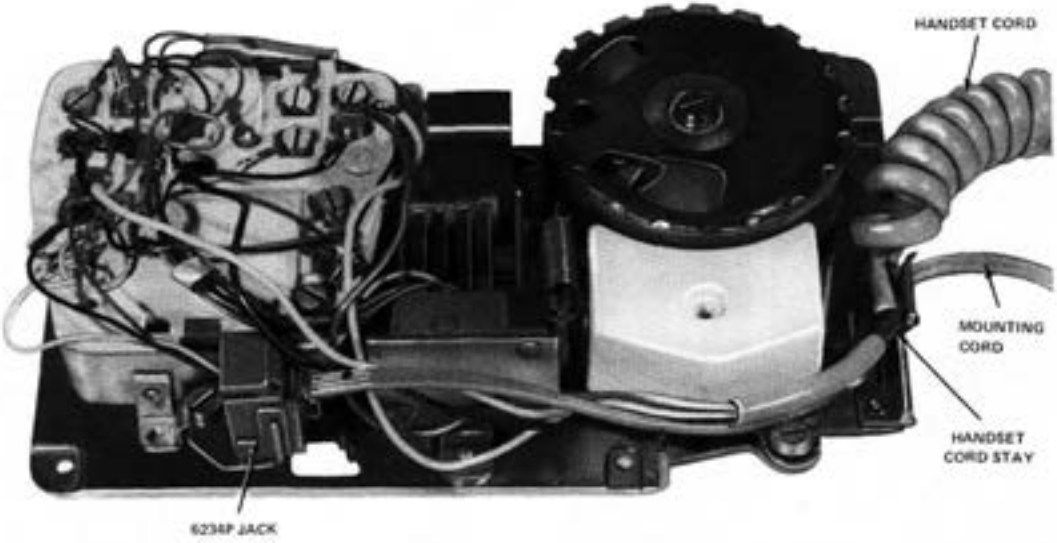

Fig. 5—Installation of Mounting Cord Using D-180778 Kit of Parts

Assembly (Candlestick Type)

3.11 ***Convert customer's candlestick housing as follows.***

(1) Remove four mounting screws which secures baseplate to candlestick housing.

(2) Remove dial bracket retaining screw from elongated hole in baseplate.

(3) Lift off dial mounting plate and remove dummy dial by removing two screws.

(4) See 3.13 for 6-type dial installation procedures.

(5) Remove dummy handset cord from base.

(6) See 3.15 for handset cord installation procedures.

Note: When disassembling transmitter housing avoid grasping the horn. When reassembling, make sure nut at pivot point is properly keyed.

3.12 ***Install 581A Telephone Set Base as follows.***

(1) Remove line switch from 581A base (current model only).

(2) Remove square snap-in cover from bottom of candlestick mounting base.

(3) Mount line switch to customer's set with actuator toward terminal board.

(4) A typical installation of a candlestick type telephone set is shown in Fig. 6.

(5) If 581A base (subset) is wall mounted, adjust ringer volume control to "LOUD" before attaching subset to wall.

When 581A base is mounted on a wall or other vertical surface, the base should be flush against surface for proper operation of P1A ringer.

(6) See 3.14 for mounting cord installation procedures.

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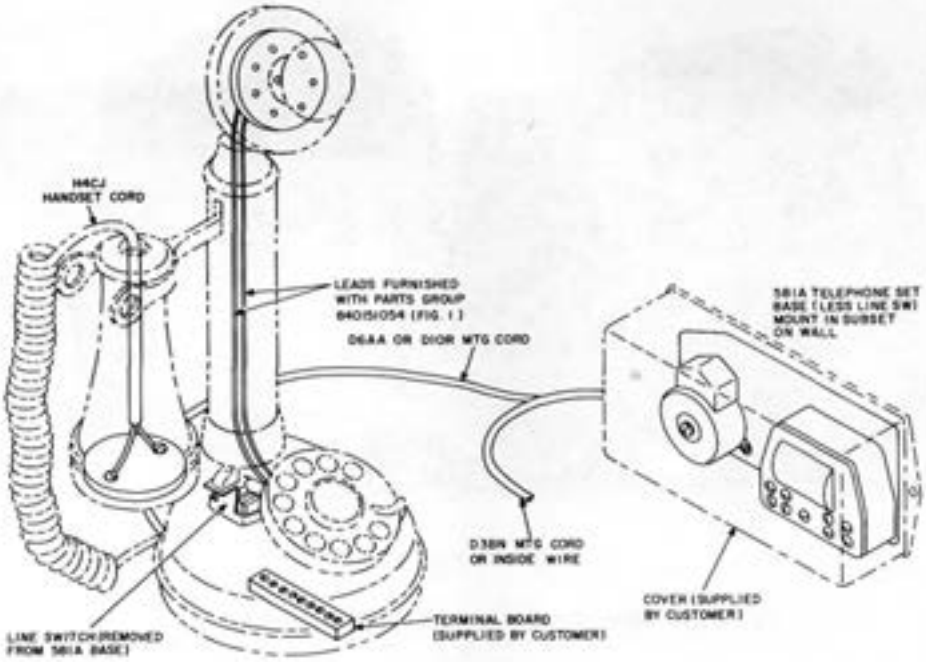

Fig. 6—Typical Installation of Candlestick Type Telephone Set

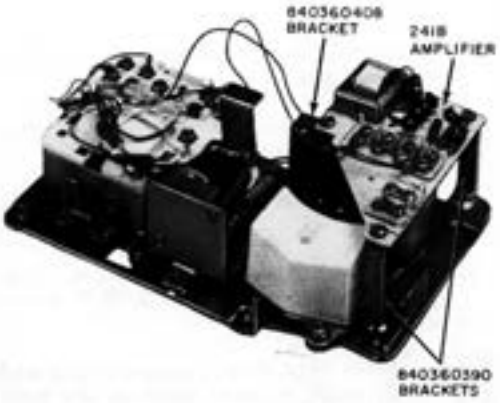

Fig. 7—Installation of D-180409 Kit of Parts

3.13 *Rotary Dial (ordered separately).*

(1) Install 6TA (chrome) or 6UA (gold) dial (Fig. 2) using three screws furnished with dial.

(2) Connect dial leads to terminal block furnished with customer's desk stand set as shown in Fig. 17.

3.14 *Mounting Cords (ordered separately).*

(1) A standard D3BN mounting cord is required for connections between the line wire, connecting block and the 581A base network terminals unless inside wire can be terminated directly in wall mounted subset. A D6AA mounting cord must be used to provide the connections between the 581A base and customer's desk stand set, except for party line service where a D10R mounting cord is used when tip party identification is required.

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(2) Install set end of D3BN and D6AA mounting cords to 581A base, secure cord stay and route cord as shown in Fig. 5. D6AA cord can lay on top of D3BN cord.

(3) Terminate cord leads at network terminals. Wire connecting block end of D6AA mounting cord to appropriate terminal block terminals furnished with customer's desk stand set (Fig. 17 or 18).

3.15 ***Handset Cord (ordered separately).***

(1) Install set end of H4CJ handset cord in opening located in base of customer's desk stand set housing and secure cord stay to base.

(2) Connect two white leads to terminal block located on desk stand base (Fig. 17 or 18).

(3) Remove transmitter and receiver caps from customer-owned set. Insert handset end of cord through opening in receiver handle and terminate two white leads to U3 receiver unit. Insulate and store the red and black handset cord leads at the terminal block and receiver unit (Fig. 17).

(4) Connect the red and black leads furnished with 840151054 parts group items 7 and 8, (Fig. 1) at terminal block in base of desk stand set, extend leads toward transmitter unit.

(5) Snap inside and outside connectors onto T1 transmitter unit and terminate red and black leads (Fig. 3).

(6) Refer to Read, 3.09 for transmitter and receiver unit insulation.

3.16 ***Line and Ringer Connections.***

(1) For all classes of service refer to Table E or F.

(2) The ringer volume control is blocked from off position by a factory placed stopscrew. To enable ringer cut-off feature, remove screw through access hole in top of ringer gong. Advise customer of cut-off position to avoid future service calls.

(3) To permanently silence ringer for all classes of service, refer to Section 501-259-101.

3.17 ***Disconnection of Customer-Owned Telephone Set Housings:*** Disconnected customer-owned telephone set housings should be disabled by the removal of all Bell System components.

4. MAINTENANCE

4.01 Maintenance is limited to those components installed as part of the telephone set base group or listed in the Ordering Guide as replaceable components. Maintenance of housing, handset, and other customer-owned parts is the responsibility of the customer.

4.02 Refer to appropriate section for maintenance covering a particular item such as dials or ringers.

4.03 Refer to connection figures as an aid in locating and clearing trouble.

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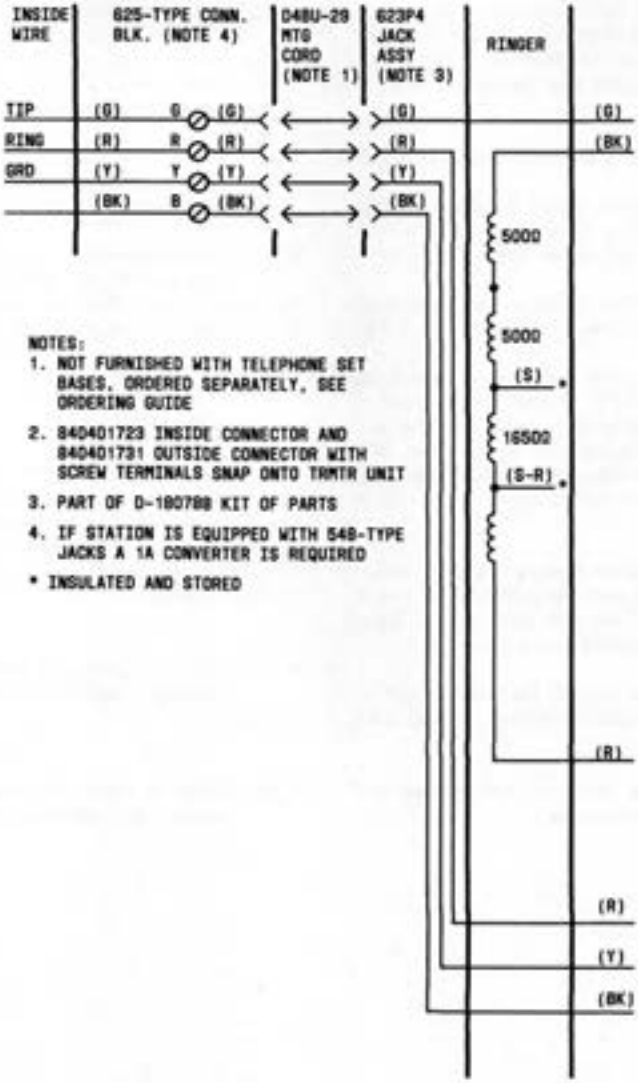

Fig. 8—581A Telephone Set Base With D-180778 Kit of Parts (Rotary Dial, Current Version) (Sheet 1 of 2)

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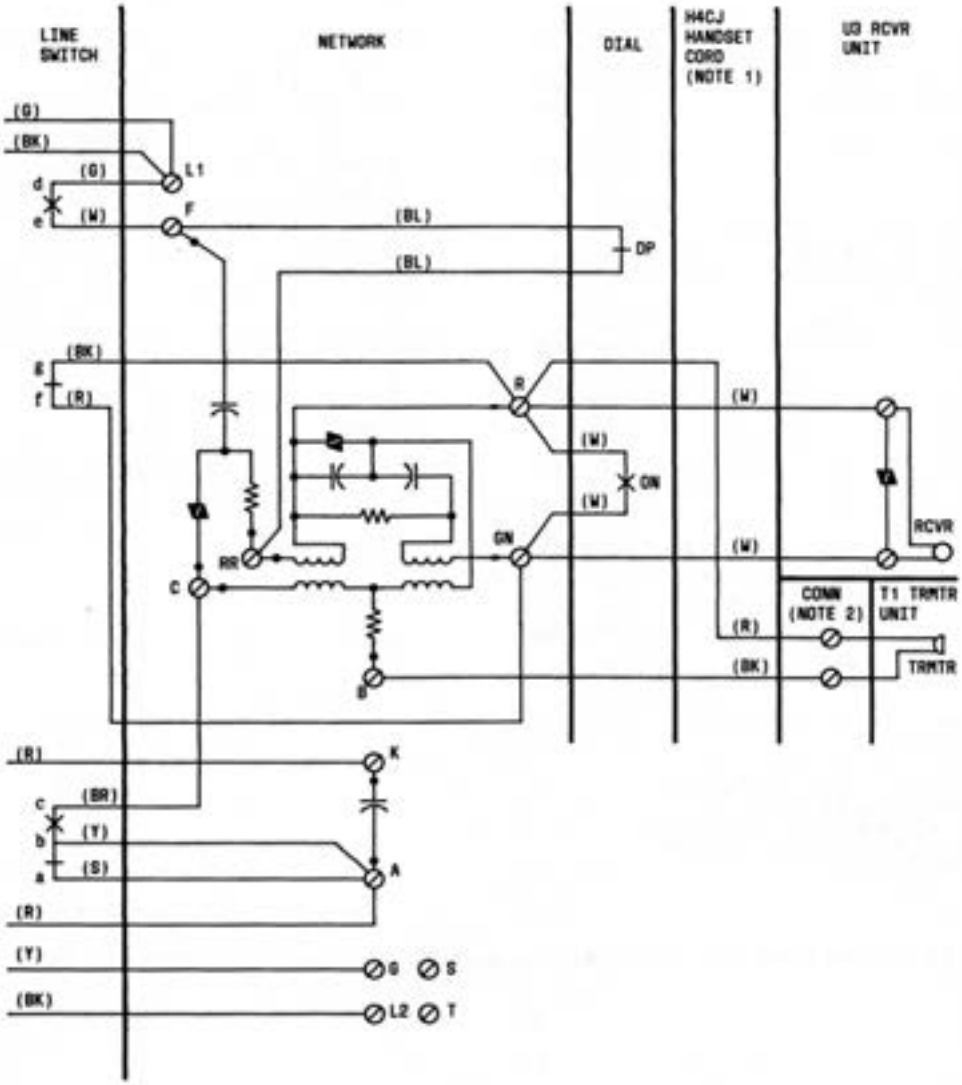

Fig. 8—581A Telephone Set Base With D-180778 Kit of Parts (Rotary Dial, Current Version) (Sheet 2 of 2)

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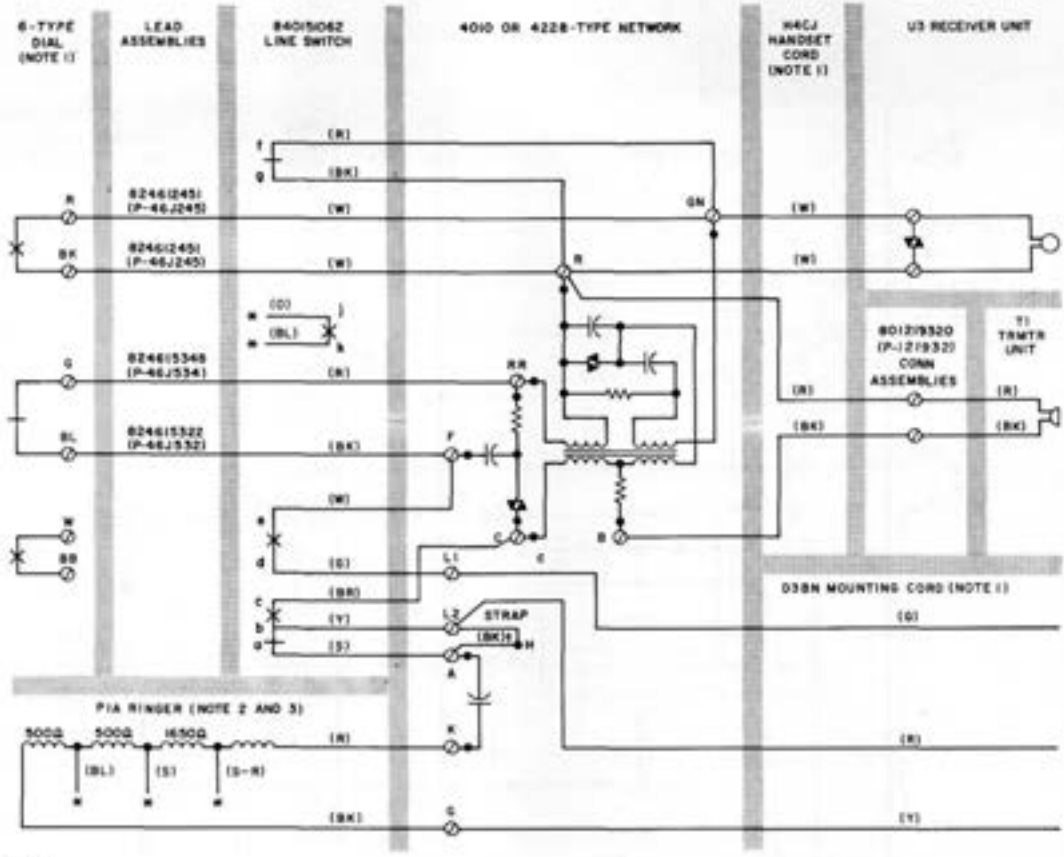

NOTES:
1. NOT FURNISHED WITH TELEPHONE SET BASES, ORDERED SEPARATELY, SEE ORDERING GUIDE.
2. WIRED FOR RING PARTY SERVICE.
3. P1A RINGERS MANUFACTURED AFTER 10-1-72 ARE NOT PROVIDED WITH (BL) RINGER LEADS.

* INSULATED AND STORED
† 4010B NETWORK ONLY

Fig. 9—581A Telephone Set Base and Component Parts, Connections (Rotary Dial, Early Version)

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TABLE D

LINE JACK CONVERSION

WIRE OR LEAD	COLOR	REMOVE FROM	CONNECT TO
623P4 Jack	R	—	A
	G	—	L1
	Y	—	G
	BK	—	L2
Strap	BK	L2	A
Line Switch	Y	L2	A
Ringer	BK	G	L1

TABLE E

LINE AND RINGER CONNECTIONS
(ROTARY TELEPHONE SET)

WIRE OR LEAD	COLOR	INDIVID OR BRIDGED	RING PARTY	TIP PARTY		
				NO IDENT GROUND	IDENT GROUND	
					1000Ω	2650Ω
Inside Wire at 625-Type Conn Blk	R	R	R	R	R	R
	G	G	G	G	G	G
	Y	Y	Y	Y	Y	Y
	BK	B	B	B	B	B
623P4 Line Cord Jack Assy	R	A	A	L1	F	F
	G	L1	L1	A	L2	L2
	Y	G	G	G	G	G
	BK	L2	L2	L2	*	*
Ringer	R	K	K	K	K	K
	S-R	*	*	*	*	L1
	S	*	*	*	L1	*
	BK	L1	G	G	G	G
Line Switch	Y	A	A	A	L2	L2
	W	F	F	F	B	B

* Insulate and store.

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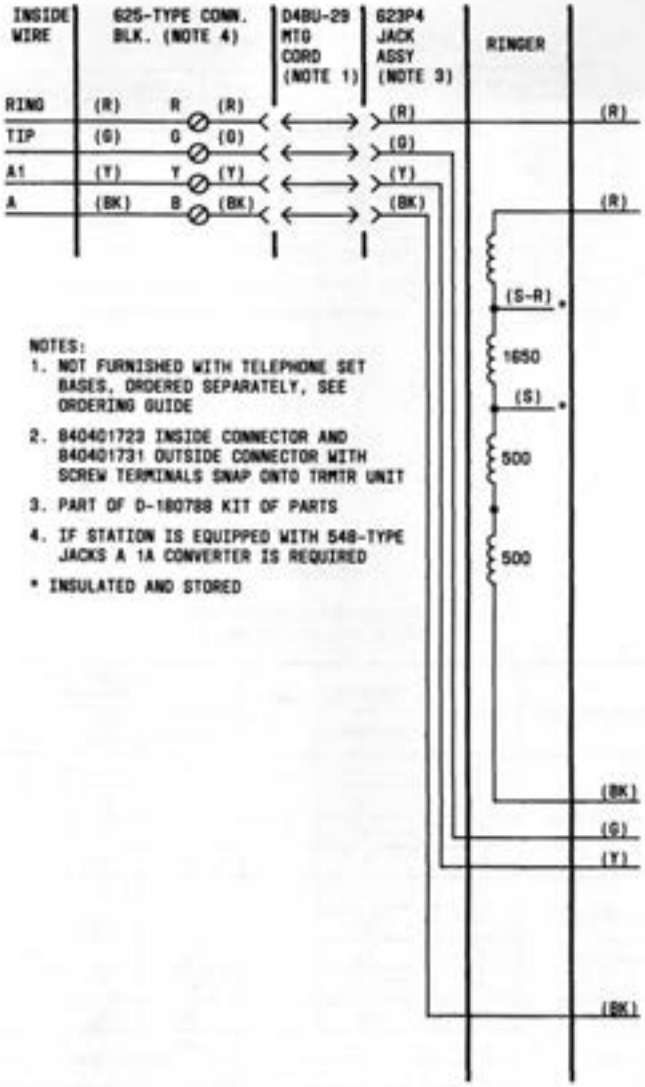

Fig. 10—581A Telephone Set Base, Wiring for 1A1, 1A2 KTS Using D-180778 Kit of Parts (Rotary Dial, Current Version) (Sheet 1 of 2)

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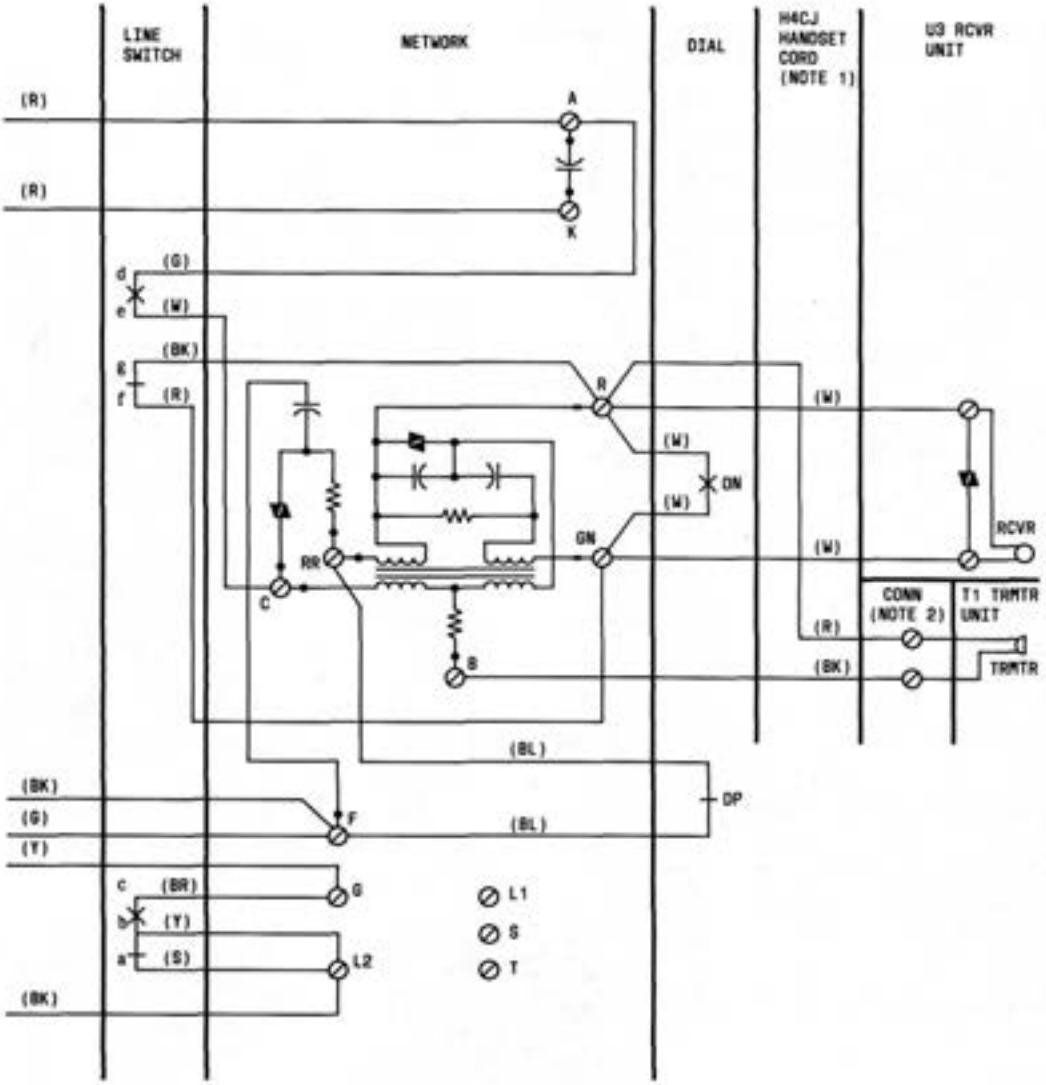

Fig. 10—581A Telephone Set Base, Wiring for 1A1, 1A2 KTS Using D-180778 Kit of Parts (Rotary Dial, Current Version) (Sheet 2 of 2)

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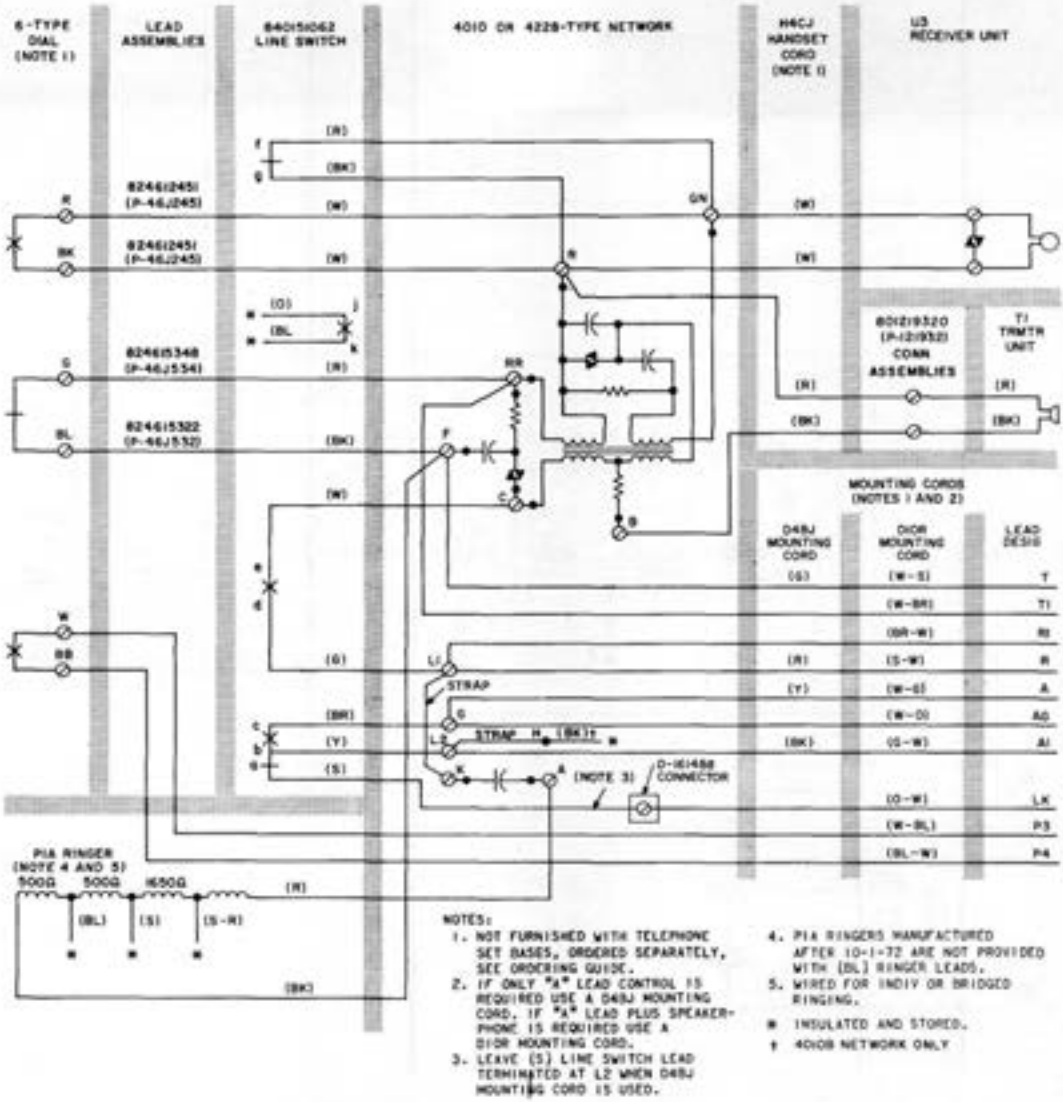

Fig. 11—Wiring for 1A1, 1A2 KTS or 3-Type (MD) Speakerphone and 1A1, 1A2 KTS (Rotary Dial, Early Version)

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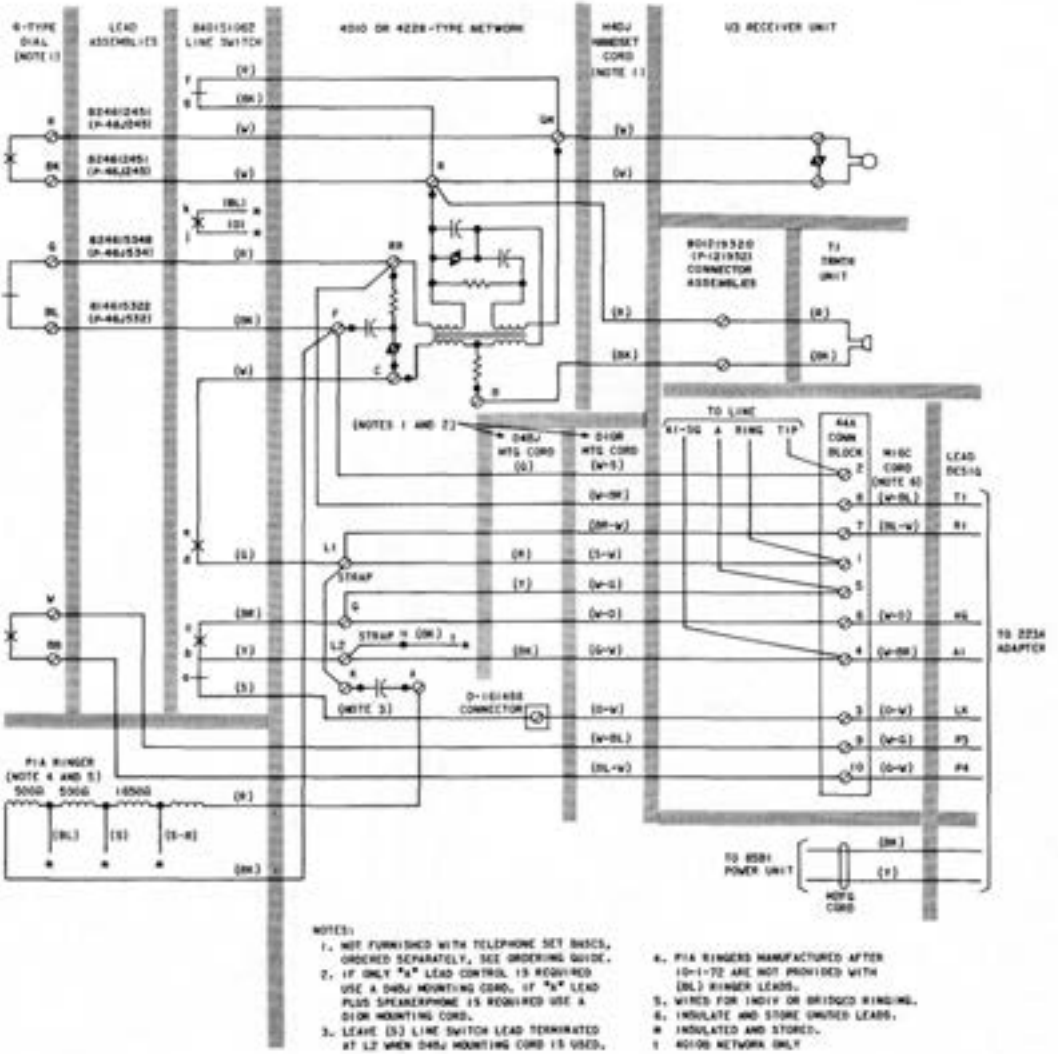

Fig. 12—Wiring for 1A1, 1A2 KTS or 4-Type Speakerphone and 1A1, 1A2 KTS (Rotary Dial)

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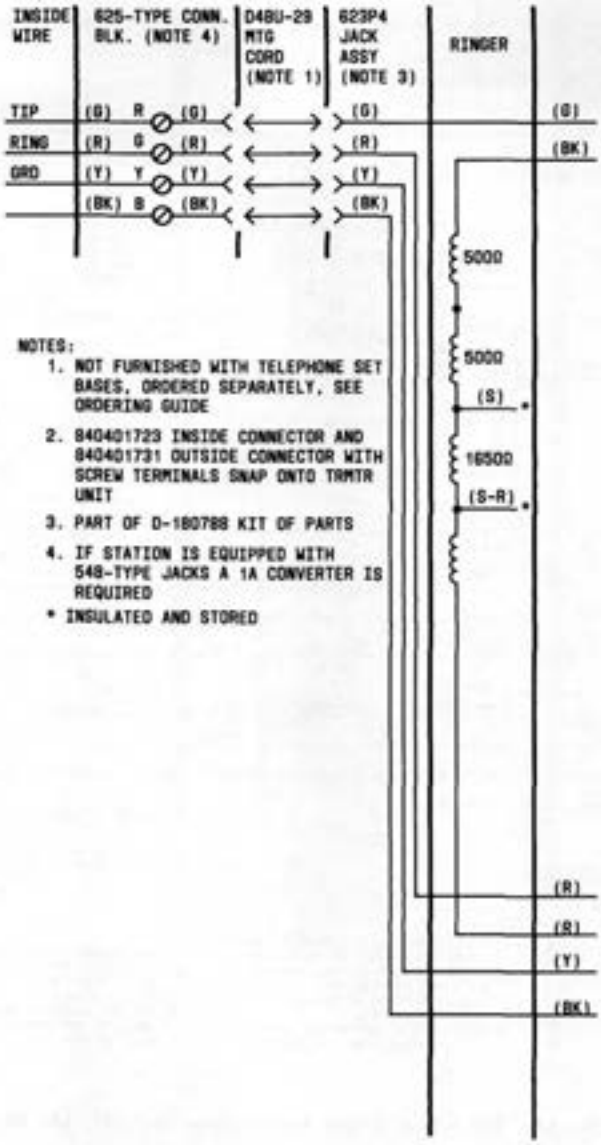

Fig. 13—581A Telephone Set Base Using a D-180778 Kit of Parts (TOUCH-TONE Dial, Current Version) (Sheet 1 of 2)

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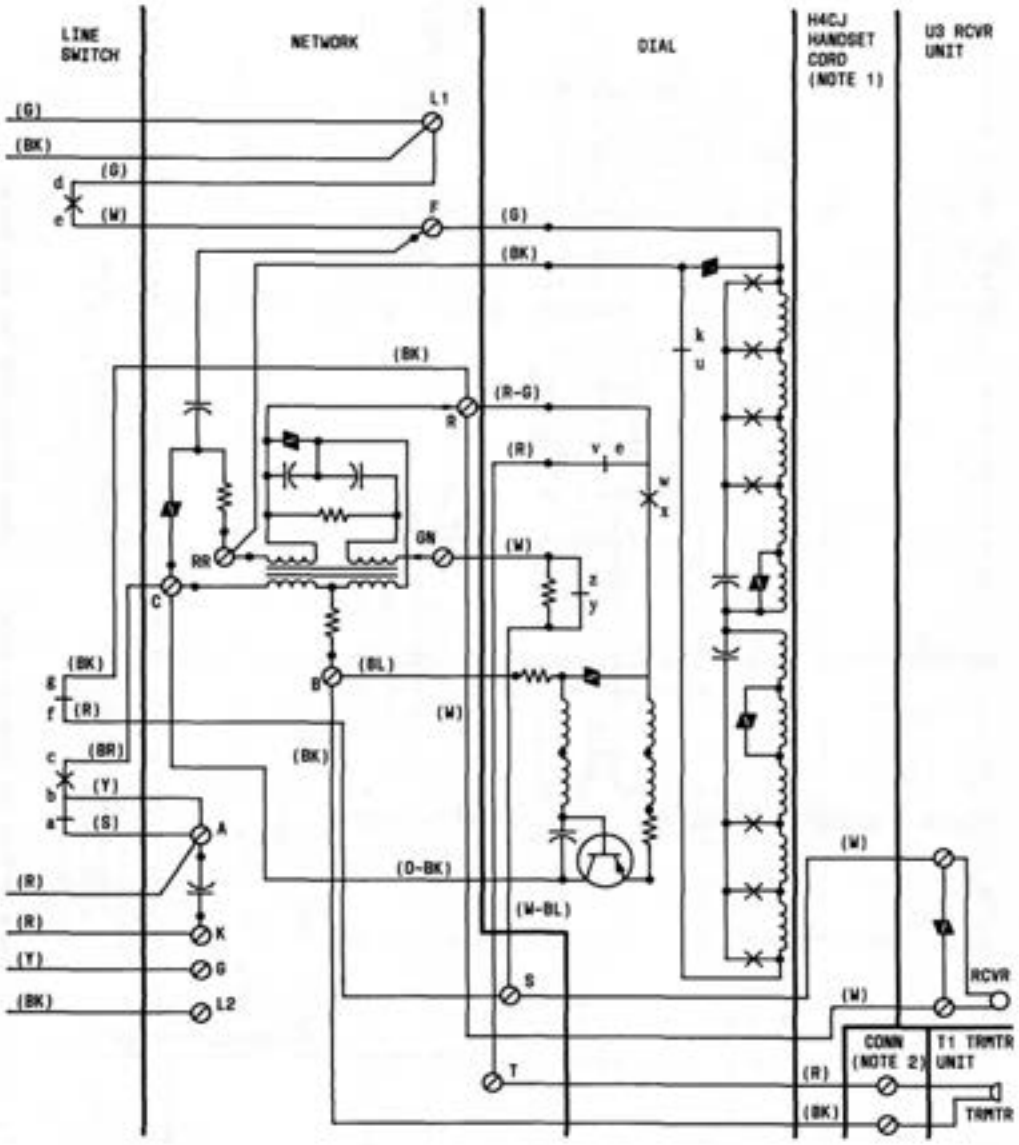

Fig. 13—581A Telephone Set Base Using a D-180778 Kit of Parts (TOUCH-TONE Dial, Current Version) (Sheet 2 of 2)

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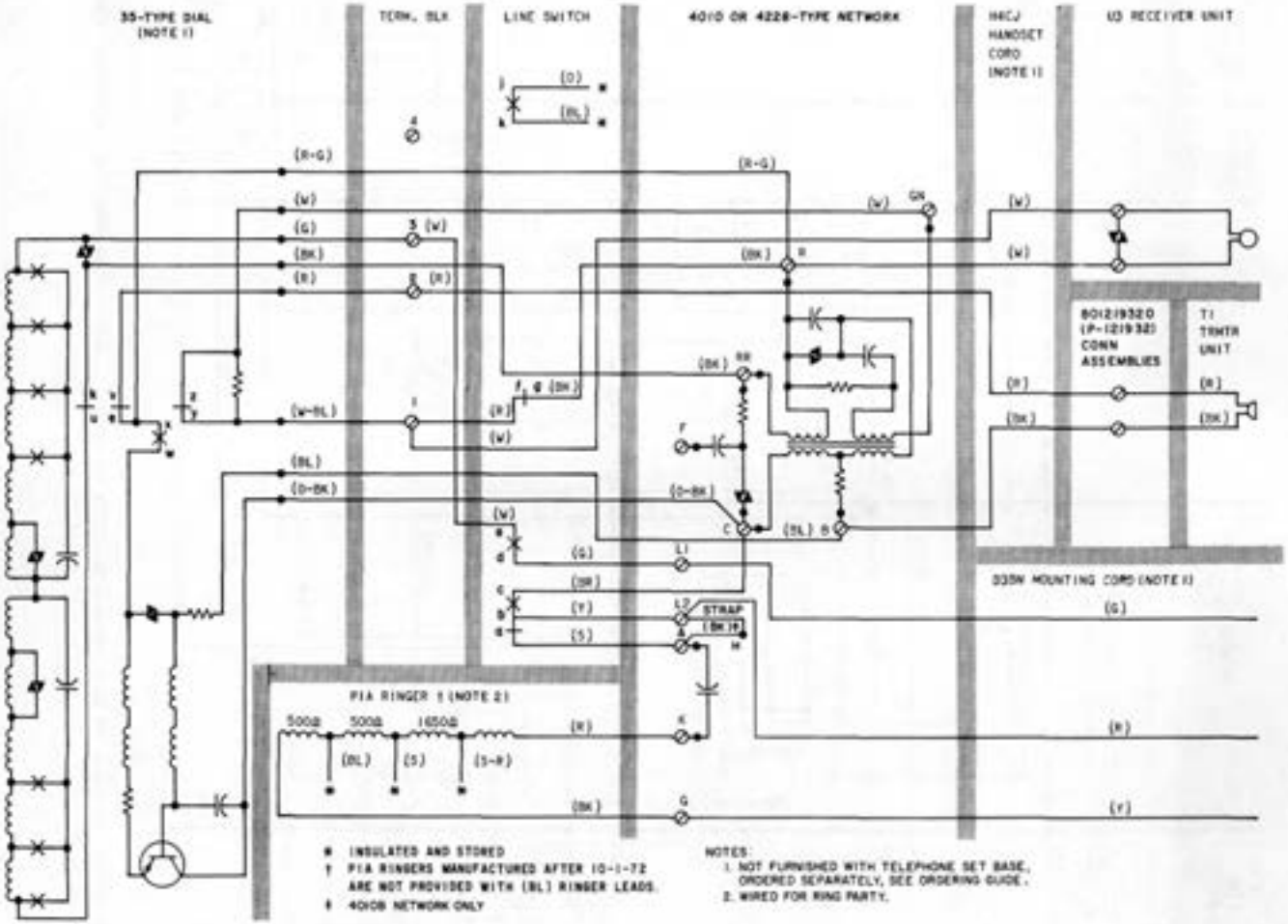

Fig. 14—581A Telephone Set Base and Component Parts, Connections (TOUCH-TONE Dial, Early Version)

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TABLE F

LINE AND RINGER CONNECTIONS (TOUCH-TONE TELEPHONE SET)

WIRE OR LEAD	COLOR	INDIVID OR BRIDGED	RING PARTY	TIP PARTY		
				NO IDENT GROUND	IDENT GROUND	
					1000Ω	2650Ω
Inside Wire at 625-Type Conn Blk	R	R	R	R	R	R
	G	G	G	G	G	G
	Y	Y	Y	Y	Y	Y
	BK	B	B	B	B	B
623P4 Line Cord Jack Assy	R	A	A	L1	C	C
	G	L1	L1	A	L2	L2
	Y	G	G	G	G	G
	BK	L2	L2	L2	*	*
Ringer	R	K	K	K	K	K
	S-R	*	*	*	*	L1
	S	*	*	*	L1	*
	BK	L1	G	G	G	G
Line Switch	Y	A	A	A	L2	L2
	W	F	F	C	B	B
	BR	C	C	F	F	F

* Insulate and store.

TABLE G

(OPTIONAL) 241B AMPLIFIER CONNECTIONS (D-180409 KIT OF PARTS) ROTARY DIAL

WIRE OR LEAD	COLOR	REMOVE FROM NET.	CONNECT TO	
			241B AMPLIFIER	NET.
D-180409 Kit of Parts	R		4	R
	BK		1	B
H4CJ Handset Cord (Set End)	R	R	2	
	BK	B	3	

TABLE H

(OPTIONAL) 241B AMPLIFIER CONNECTIONS (D-180409 KIT OF PARTS) TOUCH-TONE DIAL

WIRE OR LEAD	COLOR	REMOVE FROM	CONNECT TO	
			241B AMPL	NET.
D-180409 Kit of Parts	R		4	R
	BK		1	B
H4CJ Handset Cord (Set End)	W	TB-1	5	
	R	TB-2	2	
	BK	B	3	
35Y3A Dial	W-BL	TB-1	5	
	R	TB-2	2	
	G	TB-3	6	
	BL	B	3	
Line Switch	R	TB-1	5	
	W	TB-3	6	

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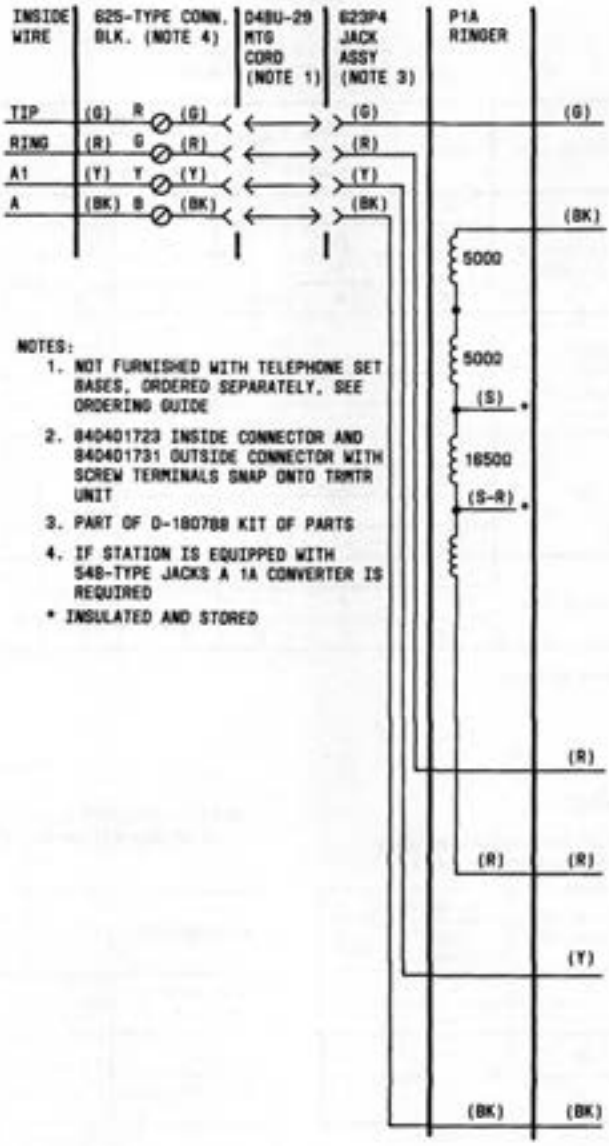

Fig. 15—Wiring for 1A1, 1A2 KTS Using D-180788 Kit of Parts (TOUCH-TONE Dial, Current Version) (Sheet 1 of 2)

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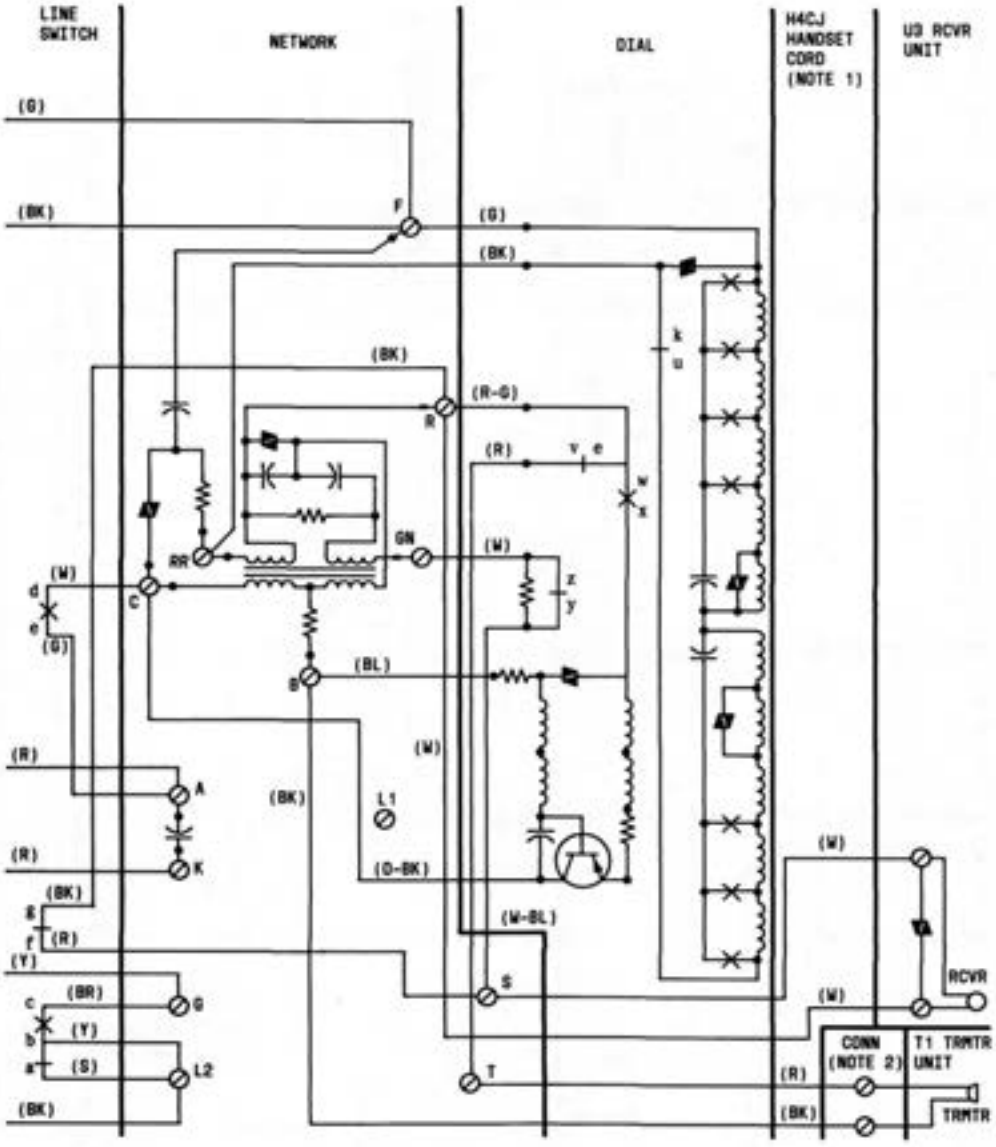

Fig. 15—Wiring for 1A1, 1A2 KTS Using D-180788 Kit of Parts (TOUCH-TONE Dial, Current Version) (Sheet 2 of 2)

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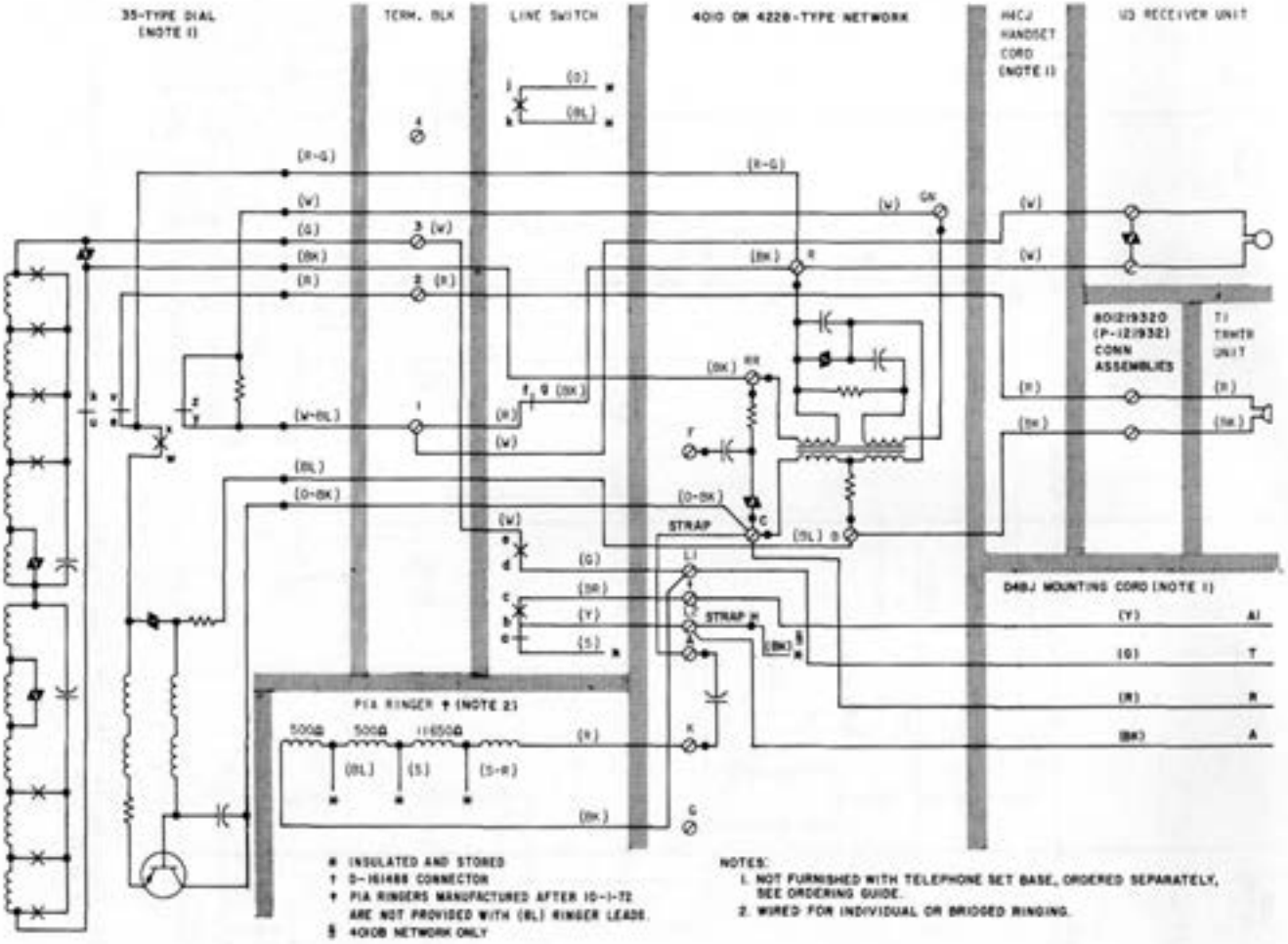

Fig. 16—Wiring for 1A1, 1A2 KTS (TOUCH-TONE Dial, Early Version)

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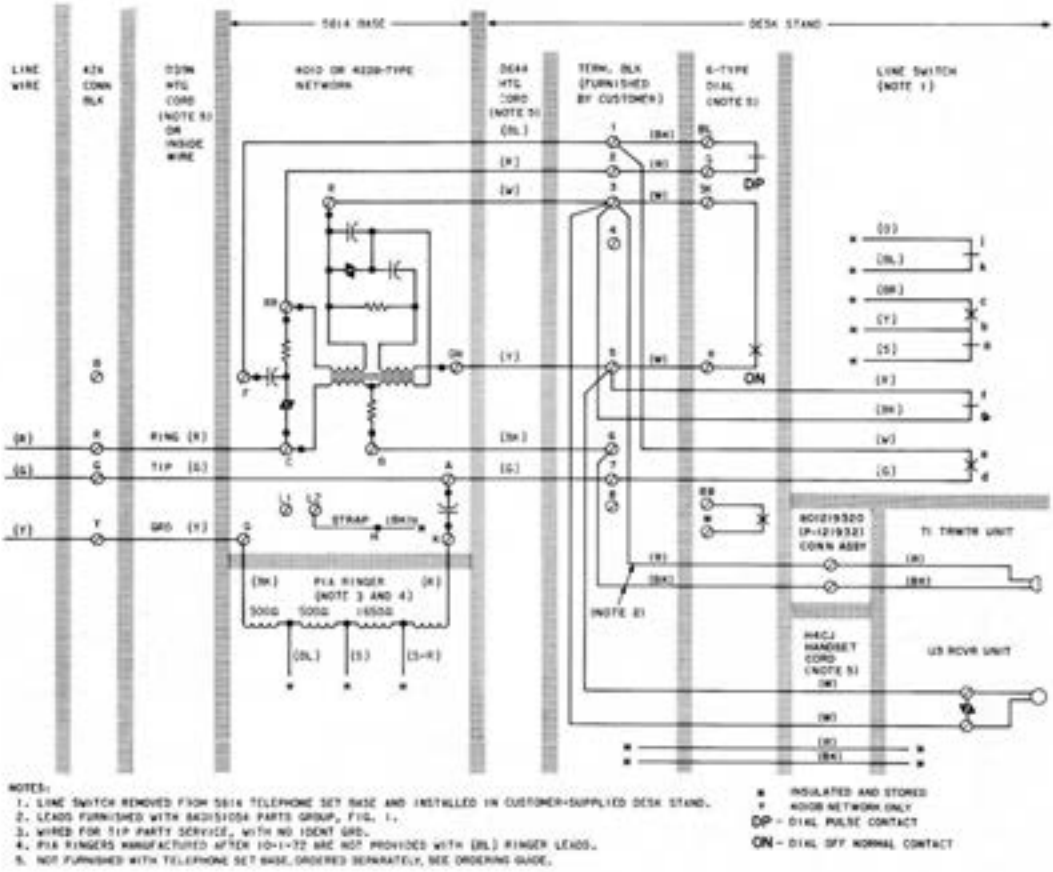

NOTES:
1. LINE SWITCH REMOVED FROM 5614 TELEPHONE SET BASE AND INSTALLED IN CUSTOMER-SUPPLIED DESK STAND.
2. LEADS FURNISHED WITH 842151D54 PARTS GROUP, FIG. 1.
3. WIRED FOR TIP PARTY SERVICE, WITH NO IDENT GRD.
4. PIA RINGERS MANUFACTURED AFTER 10-1-72 ARE NOT PROVIDED WITH (BL) RINGER LEADS.
5. NOT FURNISHED WITH TELEPHONE SET BASE, ORDERED SEPARATELY, SEE ORDERING GUIDE.

* INSULATED AND STORED
* KOIOB NETWORK ONLY
DP - DIAL PULSE CONTACT
ON - DIAL OFF NORMAL CONTACT

Fig. 17—Candlestick Type Telephone Set Connections (With D6AA Mounting Cord)

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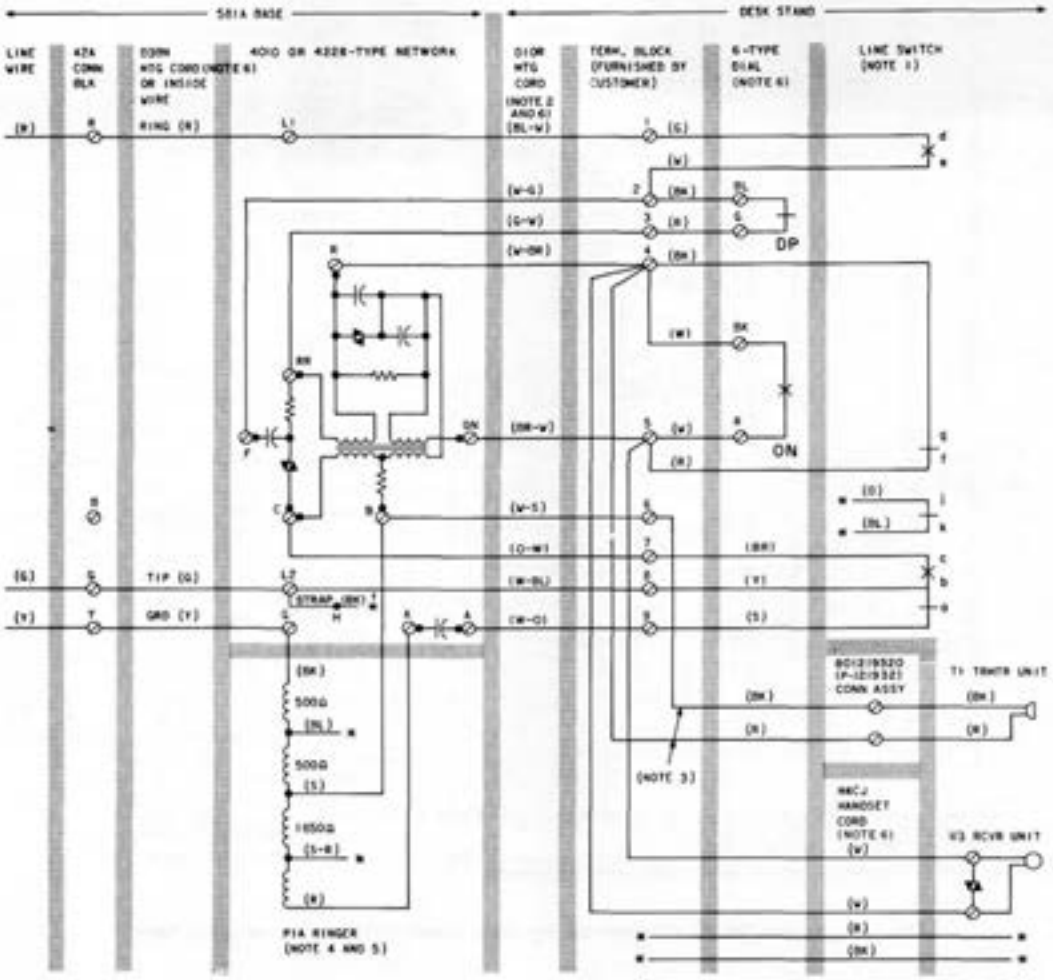

NOTES:
1. LINE SWITCH REMOVED FROM SB1A TELEPHONE SET BASE AND INSTALLED IN CUSTOMER-SUPPLIED DESK STAND.
2. INSULATE AND STORE (S-W) LEAD.
3. LEADS FURNISHED WITH 840151054 PARTS GROUP.
4. WIRED FOR TIP PARTY SERVICE WITH 1000Ω IDENT GRD.
5. P1A RINGERS MANUFACTURED AFTER 10-1-72 ARE NOT PROVIDED WITH (BL) RINGER LEADS.
6. NOT FURNISHED WITH TELEPHONE SET BASE. ORDERED SEPARATELY. SEE ORDERING GUIDE.

* INSULATED AND STORED.
+ 4010B NETWORK ONLY
DP - DIAL PULSE CONTACT
ON - DIAL OFF NORMAL CONTACT

Fig. 18—Candlestick Type Telephone Set Connections Wired for Tip Party Identification (With D10R Mounting Cord)

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TABLE I

MODIFICATIONS FOR 1A1 OR 1A2 KTS

LEAD	COLOR	NET. TERM.	
		REMOVE FROM	CONNECT TO
Line Switch	S	A	L2
	Y	A	L2
	BR	C	G
	G	L1	A
	W	F	C
623P4 Line Cord Jack Assembly	G	L1	F
Ringer	BK	L1	F

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5001T01A "TOUCH-A-MATIC*" TELEPHONE SET, S SERIES IDENTIFICATION, INSTALLATION, CONNECTIONS, OPERATION, AND MAINTENANCE

1. GENERAL

1.01 This section contains information on the TOUCH-A-MATIC telephone S series, 12-button, desk-type set (Fig. 1 and 2).

Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of Federal Communications Commission (FCC) Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at their own expense will be required to take whatever measures may be required to correct the interference.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more signifiant changes.

- Include electromagnetic interference warning notice in compliance with the FCC ruling which requires that a warning statement be placed in the user documentation for equipment that generates and uses radio frequency energy and may radiate that energy, paragraph 1.01
- Add information on M2A handset
- Revise battery replacement information on instruction label (Fig. 4)
- Eliminate Fig. 5
- Show 5001T01A-51 and 5001T01A-58 manufacture discontinued (MD) (Table A)
- Add emergency symbols (Fig. 2).

1.03 This telephone set can only be used for individual or single line TOUCH-TONE† service.

Note: This set is not designed for speakerphone, loudspeaker, *A* lead control, or party-line service.

1.04 This set is available in colors listed in Table A. The only faceplate color available for the automatic dialer is silver (-122).

2. IDENTIFICATION

2.01 The 5001T01A desk telephone set has a 12-button automatic dialing feature. The two top name and number buttons are illuminated red and green by light-emitting diodes (LEDs). The set also contains a TOUCH-TONE‡ telephone dial, tone ringer, and M1A handset.

2.02 Design features are as follows:

- Modular unit.
- Solid-state circuit memory and network.
- Automatic dialing of 12 stored numbers.
- Will store up to 16 digits per number.
- Capability to record, change, or delete numbers in memory.

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Fig. 1—5001T01A Telephone Set

- Single button dialing and directory space for names and numbers.
- Two illuminated buttons to highlight important numbers.
- M1A handset.
- Electronic tone ringer.
- Internal S1 sounder unit which provides tones for automatic dialing, indicating proper recording procedures, and for checking battery.
- Battery powered repertory dialer.
- Telephone number recording with handset on- or off-hook. Off-hook recording does not interfere with conversation.
- RECORD ON/OFF button protected during normal usage by faceplate to prevent inadvertent erasure of stored numbers.
- Built in polarity guard.

2.03 Operating features are as follows:

This set is not compatible with all network facilities due to limited available loop current, and may not function properly in all cases. When these sets are connected to these facilities, such as analog subscriber

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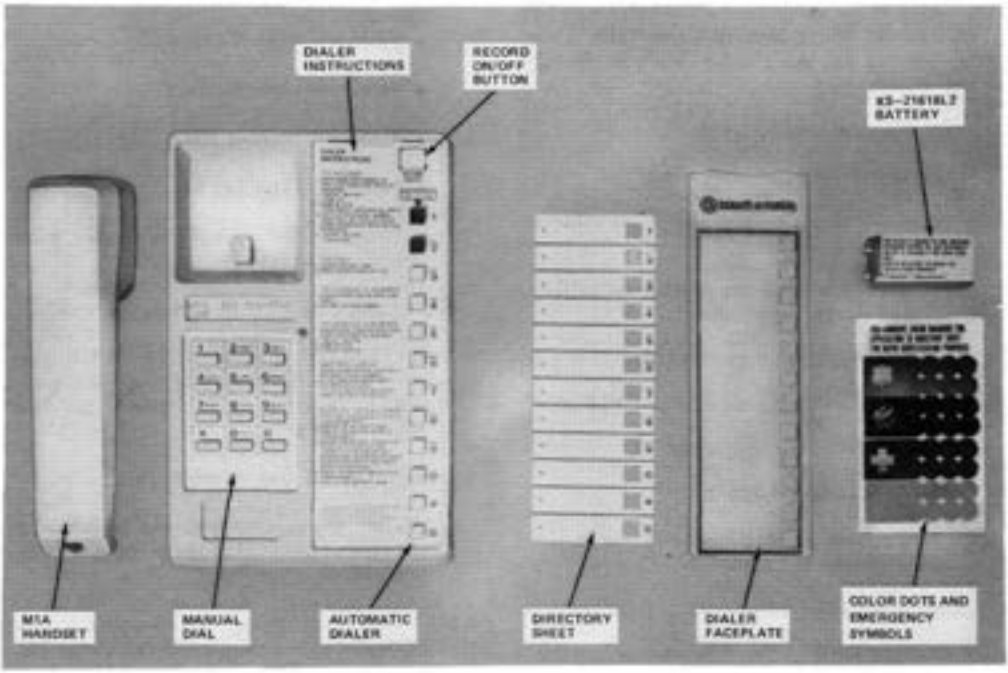

Fig. 2—▶5001T01A Telephone Set With Handset, Dialer Faceplate, Directory Sheet, and Battery, Removed◀

loop carrier systems (SLC-1 and SLC-8 type) and long loops (over 1300 ohms), the sets may not dial from the manual dial key pad. When this incompatibility is encountered, the customer should be directed to exchange the set for another product.

- 12-button memory field with low force, short travel nonlocking buttons.
- TOUCH-TONE dialing with short travel buttons.
- RECORD ON/OFF button (under faceplate) when momentarily depressed places dialer in the record mode, subsequent operation terminates the record mode.
- Approximately 1 to 1-1/2 minute automatic time-out if left idle in the record mode.
- Approximately 10 second light time-out on the red and green LED illuminated automatic dial buttons.
- Normal telephone usage with either the automatic dialer or manual TOUCH-TONE telephone dial.
- Tone ringer with slide adjustment for volume control.

2.04 Ordering guide is as follows:

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(a) The 5001T01A is a modular type telephone set and may be ordered as follows:

(1) Set, Telephone, 5001T01A-(see Table A for color or comcode number) includes the following:

(a) Faceplate, 1200A1-122

(b) Battery, KS-21618L2 (9-volt)

(c) Handset, M1A-(see Table A for color or comcode number)

(d) 841386352 Directory Marker (color dots and emergency symbols)

(e) 841396559 Directory Sheet (double-sided)

(f) Customer Instruction Booklet, CIB-2506.

(b) Order the following separately:

(1) Cord, Mounting, D4BU-29

(2) Cord, Handset, H4DU-(see Table A for color or comcode number).

(c) Replacement components are as follows:

- Alkaline Battery, 9-volt (customer replacement only)
- Handset, M1A-(see Table A for color or comcode number)
- Cord, Mounting, D4BU-29
- Cord, Handset, H4DU-(see Table A for color or comcode number)
- Faceplate, 1200A1-122
- 841408289 Card Retainer
- 841408255 Number Card
- 841396559 Directory Sheet (double-sided)
- Battery cover (see Table A for color or comcode number)

(d) ◗Associated apparatus is as follows:

(1) Handset, M2A-(see Table A for color or comcode number) (for use with inductive pickup hearing aids, refer to Section 501-210-110).◖

3. INSTALLATION AND CONNECTIONS

Note: Inside wire need not be connected to the ground terminal at the protector or equivalent.

3.01 Assure that the central office (CO) line is terminated into a connecting block that will accept a modular D4BU mounting cord.

3.02 The telephone set is shipped with a 9-volt alkaline battery which is to be connected at the time of installation. Remove the battery cover located on the bottom of the telephone set and make

◗ TABLE A ◖

TELEPHONE SET HOUSING, HANDSET CORD, BATTERY COVER, AND FACEPLATE COLORS

HOUSING, HANDSET CORD, AND BATTERY COVER COLOR	HOUSING AND HANDSET CORD, SUFFIX	BATTERY COVER NUMBERS	FACEPLATE COLOR	SUFFIX
Ivory	-50	841411507	Silver	-122
Green	-51 (MD)	841411515		
Yellow	-56	841411523		
White	-58 (MD)	841411531		
Brown	-104	841411549		
Rust	-124	841411556		

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the necessary connections (Fig. 3). Place the battery in the battery compartment and replace the cover.

Note: The battery should last approximately one year under normal telephone usage. All subsequent batteries are to be provided and installed by the customer. If service is disconnected, remove and discard the battery.

3.03 Plug one end of the mounting cord (D4BU) into the modular jack in the rear of the set and the other end into the 625-type modular connecting block. Connect the handset cord to the set (Fig. 3).

INSTALLATION TEST

A. Telephone Set

(1) Dial the appropriate code for ringback to test the telephone set tone ringer. Move the ringer volume control lever (Fig. 3) on the bottom of the set to check variation of volume. There is no provision for ringer cutoff using the volume control.

(2) Call the CO dial test line, when connected press the dial buttons in sequence 1 through 9, *, 0, and # verifying that correct signals is returned from the CO.

B. Automatic Dialer

(1) Record digits 1 through 9, *, 0, and # into first memory location.

(2) From the telephone set manually dial CO "dial test circuit."

(3) When test line is connected, depress the first memory button and verify that correct signal is returned from the CO.

(4) Repeat Steps (1), (2), and (3) for memory buttons two through twelve.

4. OPERATION

4.01 The memory location buttons are used for the following functions:

- To select memory locations
- To be used as specific digits when recording or changing numbers
- To automatically dial prerecorded numbers.

A. To Place a Number Into Memory

4.02 Perform the following operations in sequence.

(1) Remove the dialer faceplate by inserting fingernail into slot at top of faceplate, pull down slightly, and lift out.

(2) Remove the directory sheet and write or type the desired name(s) and telephone number(s).

(3) Momentarily depress the RECORD ON/OFF button (Fig. 2). (A constant tone will be heard.)

(4) Momentarily depress the memory button adjacent to the desired name listed on the directory sheet. (A double interrupt of the tone will be heard.)

(5) Manually dial the desired number using the digit designations to the right of the memory buttons on the dialer. (The tone will interrupt momentarily as each digit is recorded.) The manual dial key pad ***cannot*** be used to record a number into memory. A total of 16 digits can be recorded. When the sixteenth digit is recorded, the dialer will beep three (3) times and automatically end the recording procedure. If the dialer is inadvertently left in the record mode it will time out after 1-1/2 minutes, give three (3) beeps, and automatically reset.

(6) Momentarily depress the RECORD ON/OFF BUTTON. [The tone will cease and the dialer will be ready either for automatic dialing or to record another telephone number into memory. Repeat Steps (3) through (6)].

(7) Replace the faceplate after all numbers have been recorded.

Note: The two top name and digit buttons are illuminated by red and greens LEDs. Both buttons are illuminated for approximately 10 seconds when the handset is taken off-hook. This enables the user to identify important numbers such as police, fire, etc, especially in the dark. Other important numbers may be highlighted by use of the adhesive backed color dots furnished with the set.

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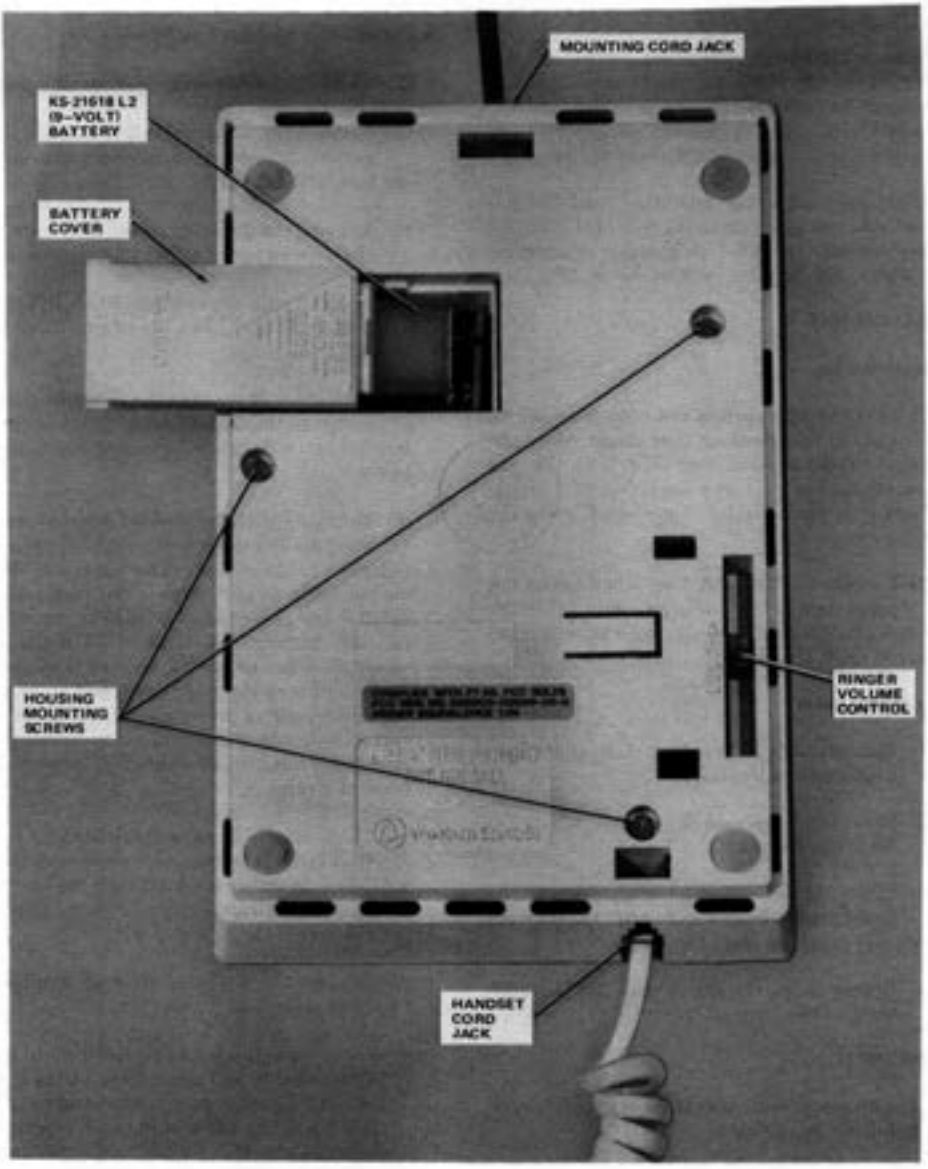

Fig. 3—5001T01A Telephone Set, Bottom View

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B. To Change a Number in Memory

4.03 When a new number is recorded in a previously used memory position, it will automatically replace the previously stored number.

C. To Delete a Number From Memory

4.04 Perform the following operations in sequence.

(1) Remove the dialer faceplate by inserting fingernail into slot at top of faceplate, pull down slightly, and lift out.

(2) Momentarily depress the RECORD ON/OFF button.

(3) Depress the memory button corresponding to the name and number to be deleted.

(4) Momentarily depress the RECORD ON/OFF button.

(5) Remove the persons name and number previously written or typed on the directory sheet.

(6) Replace the faceplate.

D. To Automatically Dial a Number From Memory

4.05 Perform the following to automatically dial a number.

(1) Lift the handset and listen for dial tone.

(2) Depress the desired memory button on the dialer.

5. MAINTENANCE

5.01 Maintenance is limited to replacement of mounting cord, faceplate, directory sheet, battery cover, handset cord, and handset.

Note: Only the M1A or M2A handset can be used with this telephone set.

Caution: Numbers stored in memory may be erased if battery is disconnected for longer than 1 minute during replacement.

5.02 The battery is to be replaced by the customer. Refer to instruction label (Fig. 4) or Customer Instruction Booklet (CIB-2506) for detailed testing and replacement procedures.

5.03 If a weak or dead battery is suspected, inform the customer a new battery is required.

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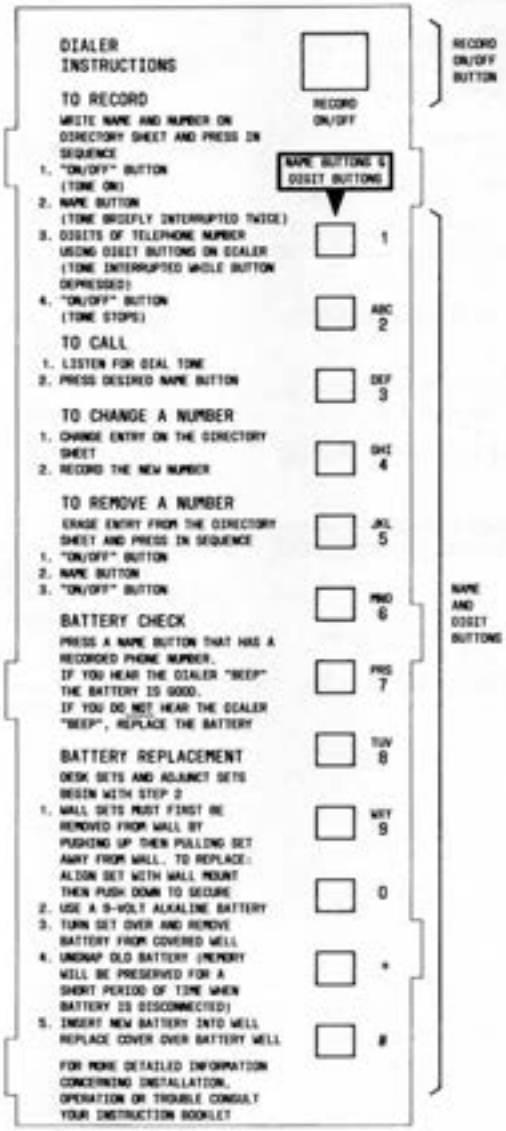

Fig. 4—Instruction Label

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5011T01A "TOUCH-A-MATIC*" TELEPHONE SET, S SERIES IDENTIFICATION, INSTALLATION, CONNECTIONS, OPERATION, AND MAINTENANCE

1. GENERAL

1.01 This section contains information on the TOUCH-A-MATIC telephone, S series 12-button, wall type telephone set (Fig. 1 and 2).

***Warning:** This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class B computing device pursant to Subpart J of Part 15 of Federal Communications Commission (FCC) Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.*

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Include electromagnetic interference warning notice in compliance with the FCC ruling which requires that a warning statement be placed in the user's documentation for equipment that generates and uses radio frequency energy and may radiate that energy, paragraph 1.01
- Add information on M2A handset
- Revise battery replacement information on instruction label (Fig. 4)
- Eliminate Fig. 5
- Show 5011T01A-51 and 5011T01A-58 manufacture discontinued (MD) (Table A)
- Add emergency symbols (Fig. 2).

1.03 This telephone set can only be used for individual or single line TOUCH-TONE† service.

Note: This set is not designed for speakerphone, loudspeaker, *A* lead control, or party line service.

1.04 The set is available in the colors listed in Table A. The only faceplate color available for the automatic dialer is silver (-122).

2. IDENTIFICATION

2.01 The 5011T01A wall telephone set has a 12-button automatic dialing feature. The two top name and number buttons are illuminated by red and green light emitting diodes (LEDs). The set also contains a TOUCH-TONE‡ telephone dial, tone ringer, and a M1A handset.

2.02 Design features are as follows:

- Modular unit.
- Solid state circuit memory and network.
- Automatic dialing of 12 stored numbers.
- Will store up to 16 digits per number.
- Capability to record, change, or delete numbers in memory.

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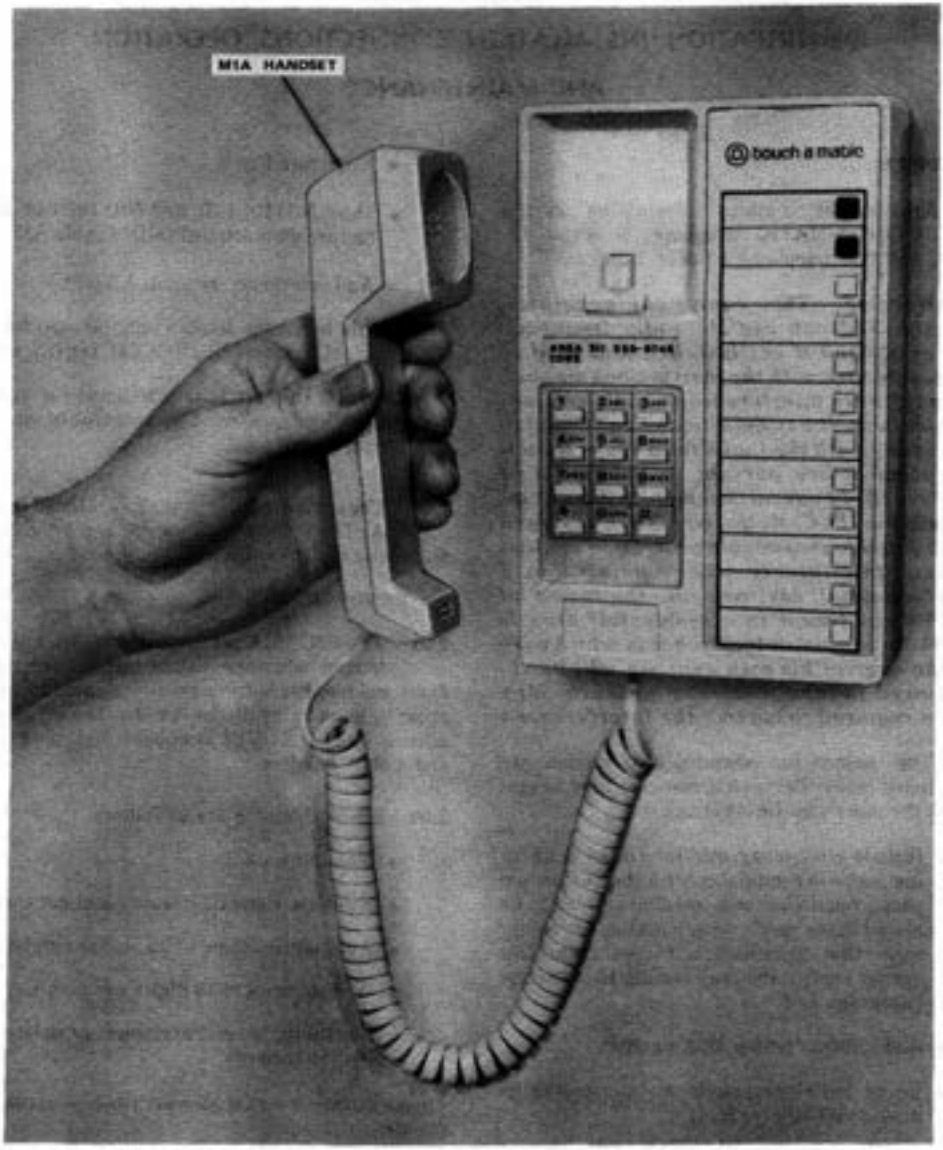

Fig. 1—5011T01A Telephone Set

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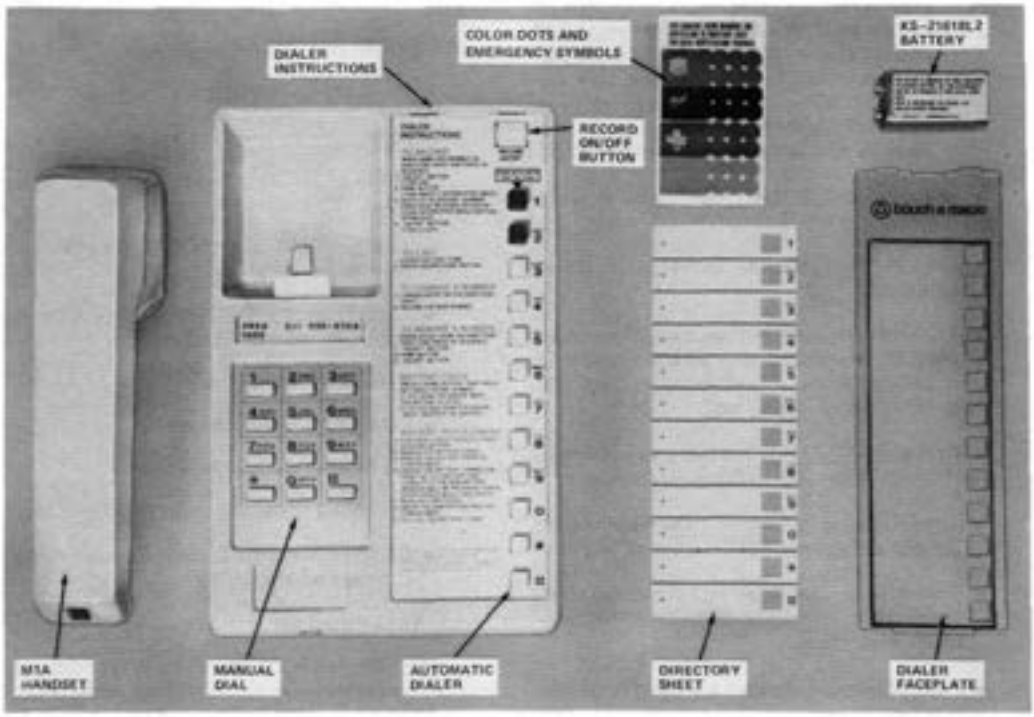

Fig. 2—5011T01A Telephone Set With Handset, Dialer Faceplate, Director Sheet, and Battery Removed

- Single button dialing and directory space for names and numbers.
- Two illuminated buttons to highlight important telephone numbers.
- M1A handset.
- Electronic tone ringer.
- Internal S1 sounder unit which provides tones for automatic dialing, indicating proper recording procedures, and for checking the battery.
- Battery powered repertory dialer.
- Telephone number recording with handset on- or off-hook. Off-hook recording does not interfere with conversation.
- RECORD ON/OFF button protected during normal usage by faceplate to prevent inadvertent erasure of stored numbers.
- Built in polarity guard.

2.03 Operating features are as follows.

This set is not compatible with all facilities due to limited available loop current, and may not function properly in all cases. When these sets are connected to these facilities, such as analog subscriber loop car-

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rier systems (SLC-1 type, SLC-8 type) and long loops (over 1300 ohms), the sets may not dial from the manual dial keypad. When this incompatibility is encountered, the customer should be directed to exchange the set for another product.

- 12-button memory field with low force, short travel nonlocking buttons.
- TOUCH-TONE dialing (with short travel buttons).
- RECORD ON/OFF button, under faceplate, when momentarily depressed places dialer in the record mode, subsequent operation terminates the recording mode.
- Approximately 1 to 1-1/2 minutes automatic time-out if left idle in the record mode.
- Approximately 10 second light time out on the red and green LED illuminated buttons.
- Normal telephone usage with either the automatic dialer or manual TOUCH-TONE telephone dial.
- Tone ringer with slide adjustment for volume control.
- No provisions have been made in this set design to provide for ringer cutoff.

2.04 Ordering guide is as follows:

(a) The 5011T01A is a modular type telephone set and may be ordered as follows:

(1) Set, Telephone, 5011T01A- (see Table A for color suffix or comcode number) includes the following:

(a) Faceplate, 1200A1-122

(b) Battery, KS-21618L2 (9-volt)

(c) Handset, M1A- (see Table A for color suffix or comcode number)

(d) 841386352 Directory Marker (color dots and emergency symbols)

(e) 841396559 Directory Sheet (double-sided)

(f) Customer Instruction Booklet, CIB-2506.

(b) Order the following separately:

- Cord, Handset, H4DU.

(c) Replaceable components are as follows:

- Alkaline Battery, 9-volt (customer replacement only)
- Handset, M1A- (see Table A for color suffix or comcode number)
- Cord, Handset, H4DU- (see Table A for color suffix or comcode number)
- Faceplate, 1200A1-122
- 841408289 Card Retainer
- 841408255 Number Card
- 841396559 Directory Sheet (double-sided)
- Battery Cover (see Table A for color suffix or comcode number).

(d) ▶Associated apparatus is as follow:

(1) Handset, M2A- (see Table A for color suffix or comcode number) (for use with inductive pickup hearing aids, refer to Section 501-210-110).◀

3. INSTALLATION AND CONNECTIONS

Note: Inside wire need not be connected to the ground terminal at the protector or equivalent.

3.01 The telephone set is shipped with a 9-volt alkaline battery, to be connected at the time of installation. Remove the battery cover on the rear of the set and make the necessary connections. Place the battery in the battery compartment and close the cover (Fig. 3).

Note: The battery should last approximately one year under normal telephone usage. All subsequent batteries are to be provided and installed by customer. If set is disconnected, remove and discard the battery.

3.02 A 630-type modular wall connecting block must be used to connect the telephone to the wall.

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TABLE A

TELEPHONE SET HOUSING, HANDSET CORD, BATTERY COVER, AND FACEPLATE COLORS

HOUSING, HANDSET CORD, AND BATTERY COVER COLOR	HOUSING AND HANDSET CORD, SUFFIX	BATTERY COVER NUMBERS	FACEPLATE COLOR	SUFFIX
Ivory	-50	841411507	Silver	-122
Green	-51 (MD)	841411515		
Yellow	-56	841411523		
White	-58 (MD)	841411531		
Brown	-104	841411549		
Rust	-124	841411556		

3.03 The rear of the set is recessed with two keyhole type slots (Fig. 3). Be sure the movable plug is in the down position as shown in Fig. 3. Align the keyhole slots with the mounting studs on the 630-type connecting block. Push the set in and down engaging the set to the connecting block. Connect the handset cord to the set.

INSTALLATION TEST

A. Telephone Set

(1) Dial the appropriate code for ring-back to test the telephone set tone ringer. Move the ringer volume control lever (Fig. 3) on the lower edge of the set to check variation of volume. There is no provision for ringer cut off using the volume control.

(2) Call the central office (CO) dial test line, when connected press the dial buttons in sequence 1 through 9, *, 0, and # verifying that correct signal is returned from the CO.

B. Automatic Dialer

(1) Record digits 1 through 9, *, 0, and # into first memory location.

(2) From the telephone set manually dial CO "dial test circuit."

(3) When test line is connected, depress the first memory button and verify that correct signal is returned from the CO.

(4) Repeat Steps (1), (2), and (3) for memory buttons two through twelve.

4. OPERATION

4.01 The memory location buttons are used for the following functions:

- To select memory locations
- To be used as specific digits when recording or changing numbers
- To automatically dial prerecorded numbers.

A. To Place a Number Into Memory

4.02 Perform the following operations in sequence.

(1) Remove the dialer faceplate by inserting fingernail into slot at top of faceplate, pull down slightly and lift out.

(2) Remove the directory sheet and write or type the desired name(s) and telephone number(s).

(3) Momentarily depress the RECORD ON/OFF button (Fig. 2). (A constant tone will be heard.)

(4) Momentarily depress the memory button adjacent to the desired name listed on the directory sheet. (A double interrupt of the tone will be heard.)

(5) Manually dial the desired number using the digit designations to the right of the memory buttons on dialer. (The tone will interrupt momentarily as each digit is recorded.) The manual dial

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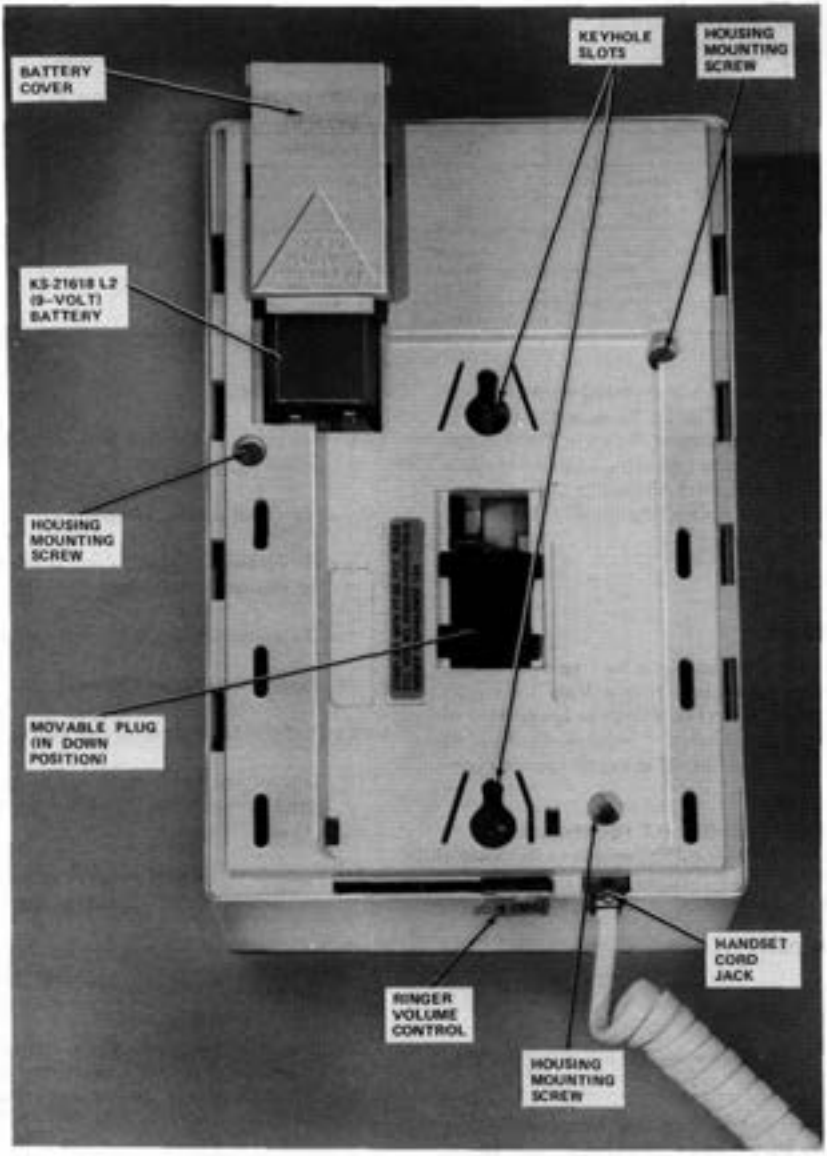

Fig. 3—5011T01A Telephone Set, Bottom View

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key pad ***cannot*** be used to record a number into memory. A total of 16-digits can be recorded. When the 16th digit is recorded, the dialer will beep three (3) times and automatically end the recording procedure. If the dialer is inadvertently left in the record mode it will time out after 1-1/2 minutes, give three (3) beeps, and automatically reset.

(6) Momentarily depress the RECORD ON/OFF button. [The tone will cease and the dialer will be ready either for automatic dialing or to record another telephone number into memory. Repeat Step (3) through (6).]

(7) Replace the faceplate after all numbers have been recorded.

Note: The two top name and digit buttons are illuminated by red and green LEDs. Both buttons are illuminated for approximately 10 seconds when the handset is taken off-hook. This enables the user to identify important numbers such as police, fire, etc., especially in the dark. Other important numbers may be highlighted by use of the adhesive backed color dots furnished with the set.

B. To Change a Number in Memory

4.03 When a new number is recorded in a previously used memory position it will automatically replace the previously stored number.

C. To Delete a Number From Memory

4.04 Perform the following operations in sequence.

(1) Remove the dialer faceplate by inserting finger nail into slot at top of faceplate, pull down slightly and lift out.

(2) Momentarily depress the RECORD ON/OFF button.

(3) Depress the memory button corresponding to the name and telephone number to be deleted.

(4) Momentarily depress the RECORD ON/OFF button.

(5) Remove the persons name and telephone number previously written or typed on the directory sheet.

(6) Replace the faceplate.

D. To Automatically Dial a Number From Memory

4.05 Perform the following to automatically dial a number.

(1) Lift the handset and listen for dial tone.

(2) Depress the desired memory button on the dialer.

5. MAINTENANCE

5.01 Maintenance is limited to replacement of, faceplate, directory sheet, battery cover, handset cord, and handset.

Note: Only the M1A ♦or M2A♦ handset can be used with this telephone set.

Caution: Numbers stored in memory may be erased if battery is disconnected for longer than 1 minute during replacement.

5.02 The battery is to be replaced by the customer. Refer to instruction label (Fig. 4) or Customer Instruction Booklet (CIB-2506) for detailed testing and replacement procedures.

5.03 If a weak or dead battery is suspected, inform the customer a new battery is required.

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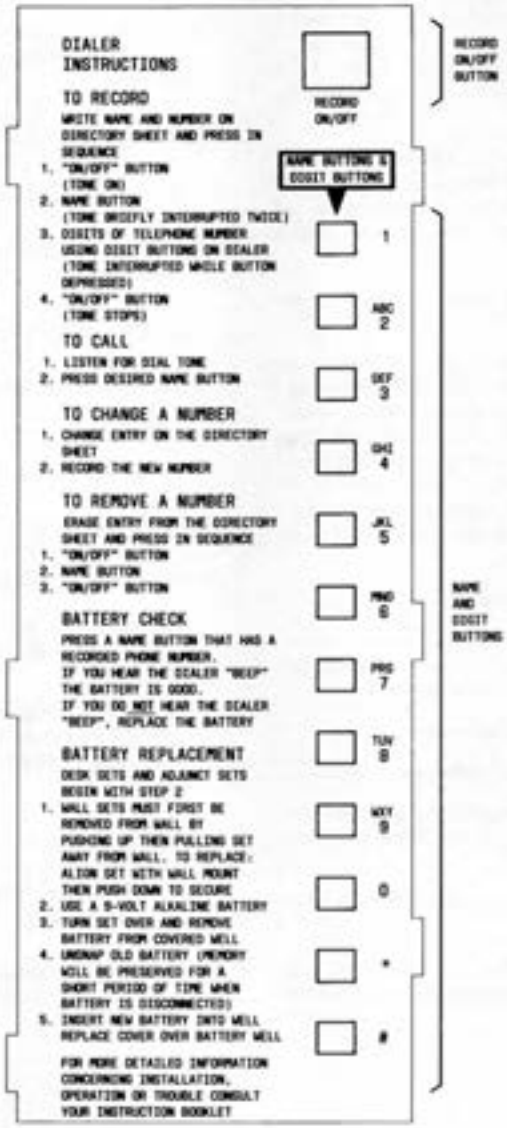

Fig. 4—Instruction Label

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