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MACHINE SWITCHING STATIONS

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GENERAL

1. These specifications cover the standard machine switching stations. Manual stations are covered in separate specifications. The manual and other separate specifications are referred to herein by name (i. e., MANUAL STATIONS, etc.), rather than by number, as the numbers are likely to change when the specifications are revised.

Care should always be exercised not to interfere with subscribers' service. Therefore, when working on lines or at stations be sure that instructions given in Section 40, page 100, are followed.

The new cords included in these specifications are designated according to a new code system in which the first letter designates the type of cord (for example, "D" for desk stand), the numeral the number of conductors in the cord and the last letter other features of the cord.

APPARATUS

2. The apparatus given below is required for the work covered by these specifications.

Apparatus Blanks:

#50-B APPARATUS BLANK for wall sets.
Round metal plate with instruction card holder in center. Used to cover dial hole on #553 type wall sets when used at manual stations.

#50-D APPARATUS BLANK for #50 type stands. **Equiv. #50-A**
Round metal plate with instruction card holder in center. Used to cover dial hole on #50 type stands when used at manual stations. Has weight for balancing stand.

#50-E APPARATUS BLANK for #51 type stands.
Same as #50-D except that two terminals are provided on bottom of weight for connecting cords. May also be used (when #50-D and #50-A blanks are not available) on #50 type stands. When so employed terminals are not used.

Apparatus Blank Repair Parts:

For #50-A, #50-B, #50-D and #50-E Apparatus Blanks:

Card Holder Frame	P-154988
Card Holder Window	P-137593
Card Retainer	P-164442
Card Retainer Spring	P-172045

Backboards:

#146-A BACKBOARD. **Equiv. #143-A**
Metal writing shelf to be used with #148-A Backboard where #553 type subscriber set with writing shelf is required.

#147-A BACKBOARD.*
Wood backboard for mounting #534, #553 and #554 type subscriber sets.

#148-A BACKBOARD.*
Wood backboard for mounting #553 type subscriber set and #146-A Backboard.

#148-B BACKBOARD.*
Wood backboard for mounting #553 type subscriber set and #7 type Coin Collector.

#150-A BACKBOARD.*
Wood backboard for mounting #7-A or #7-J Coin Collector.

#152-A BACKBOARD.*
Wood backboard for mounting #392 type subscriber sets to protect them from the weather.

* Use as required by STATION APPARATUS INSTALLATION.

Battery Boxes:

#1-A BATTERY BOX.
Metal box for holding 3 dry cells. Used at common battery signaling and local battery talking stations.

#2-A BATTERY BOX.
Metal box for holding 4 dry cells. Used at common battery signaling and local battery talking stations. Use only as required by STATION APPARATUS INSTALLATION.

Carrying Case:

#4-A CARRYING CASE.
Cardboard box with metal ends for carrying dial to protect it from injury.

Coin Collector:

#7-J COIN COLLECTOR. **Equiv. #7-A**
Single-coin collector for residence and business stations. Dial is mounted on desk stand or wall set used with collector.

Condenser:

#1021-BW CONDENSER.
1 M. F. condenser equipped with flexible leads having cord tips and furnished with mounting strap and screws. For installing at stations in #534-DE and #534-DF sets.

Cords:

#355-B CORD.
Desk stand cord for #50-C desk stands.

#541-B CORD.
Black waterproof desk stand cord for #50 type desk stands. Use only as required by Section 11, page 24.

#542-B CORD.
Black waterproof receiver cord for #50 type desk stands. Use only as required by Section 11, page 24.

#547-B CORD.
Transmitter cord for #50 type desk stands. Two required for each stand.

#549-B CORD.
Receiver cord for #50 type desk stands.

#550-B CORD.
Desk stand cord for #50 type stands.

#595-B CORD.
Dial cord for #50 type desk stands.

#600-B CORD.
Combination cord for #50-AL and #50-CM desk stands equipped with dials. Consists of:

Two #547-B Cords
One #549-B Cord
One #550-B "
One #595-B "

#672-B CORD.
Combination cord for #50-AL desk stands equipped with #50 type apparatus blanks. Consists of:

Two #547-B Cords
One #549-B Cord
One #550-B "

#692-B CORD.
Combination cord for #50-C desk stands equipped with dials. Consists of:

One #355-B Cord
Two #547-B Cords
One #549-B Cord
One #595-B "

#729-B CORD.
Combination cord for #50-C desk stands equipped with #50 type apparatus blanks. Consists of:

One #355-B Cord
Two #547-B Cords
One #549-B Cord

#795 CORD.
Cord for Hand Test Set D-75959. Two required. Has Frankel Clips #2538 on outside end and #30 and #76 Cord Tips on set end.

D3A CORD.
Desk stand cord for #51-AL and #51-CM desk stands. Also for #51-CN desk stands employed for Common Battery Signaling and Local Battery Talking Stations.

D3B CORD.
Switch cord for #51-AL and #51-CN desk stands.

D3C CORD.
Black waterproof desk stand cord for #51 type desk stands. Use only as required by Section 11, page 24.

D5A CORD.
Desk stand cord for #51-C desk stands.

D5B CORD.
Switch cord for #51-C and #51-CN desk stands.

R2A CORD.
Receiver cord for #144 receiver on #51 type desk stands.

R2B CORD.
Black waterproof receiver cord for #144 receiver on #51 type desk stands. Use only as required by Section 11, page 24.

R2G CORD. Equiv. #92
Worsted receiver cord for #144 receiver on wall sets.

R2H CORD.
Waterproof receiver cord for #146-A Receivers on #51 type desk stands. Use only as required by Section 11, page 24.

R2J CORD.
Receiver cord for #146-A receivers on #51 type desk stand and #146 receivers on wall sets.

T1A CORD.
Transmitter cord for #51 type desk stands and wall sets.

#6000 CORD.
Combination cord for #51-AL desk stands. Also for #51-CN stands employed for Common Battery Signaling and Local Battery Talking Stations. Consists of:

One T1A Cord
One R2A "
One D3A "
One D3B "

#6001 CORD.
Combination cord for #51-CM desk stands. Consists of:

Two T1A Cords
One R2A Cord
One D3A "
One D3B "

#6002 CORD.
Combination cord for #51-C desk stands. Consists of:

One T1A Cord
One R2A "
One D5A "
One D5B "

Cord Tip: **#76 CORD TIP.**
Semi-hard rubber sleeve. Used with #146 and #146-A receivers.

APPARATUS

Desk Stands:

#51-AL DESK STAND. Equiv. #50-AL
Machine switching desk stand for use at:
Individual Line Stations.
P.B.X. Stations With Dials.
Two-Party Selective Flat Rate Stations.
Four-Party Semi-Selective Stations.
Two-Party Selective Message Rate—Ring Station.
Four-Party Selective Stations.

#51-C DESK STAND. Equiv. #50-C
Desk stand for use at tip station on Two-Party Selective Message Rate machine switching lines.

#51-CM DESK STAND. Equiv. #50-CM
Desk stand, with transmitter cutout button, for machine switching stations on all lines given above for the #51-AL stand. Use only under special conditions—see MANUAL STATIONS.

#51-CN DESK STAND. Equiv. #50-AL
Desk stand for Common Battery Signaling and Local Battery Talking Stations. The #51-C or the #50-AL desk stand may also be used for these stations if the #51-CN desk stand is not available, see Section 36, pages 88 and 89.

Dials:

#2-AA DIAL.
For use at all machine switching stations requiring #132-A Number Plate.

#2-AB DIAL.
For use at all machine switching stations requiring #132-B Number Plate.

#2-AE DIAL.
For use at all machine switching stations requiring #132-E Number Plate.

Dial Repair Parts:

Card Holder Frame	P-154988
Card Holder Window	P-137593
Card Retainer	P-164442
Card Retainer Spring	P-172045
Cord Holder for use in attaching dial cord to #50 type desk stand	P-99910
Dial Mounting Screw for fastening dial to desk stand or wall set	P-115856
*Finger Stop for #2 type dials	P-172189
Finger Stop Screws	P-137536
Finger Wheel	P-153971
Finger Wheel Clamping Nut	P-153996
Number Plate Clamping Ring	P-153976
Steel Lock Washer for use with screw P-115856	P-99132

* When ordering finger stop, specify code number of dial on which it is to be used.

Gongs:

		Equiv. #25-A
#29-A	Gong, regular type	
*#31-A	" one slot	*#7 Wood
*#32-A	" four slots	*#7 Wood
*#33-A	" dome shape	*#7 Wood

*For use where two or more ringers are near together and it is necessary to provide distinctive tones.

NOTE: The #3 Cow, #10 Tea and the #6 Sleigh gongs may be used on exposed gong type sets (with special gong posts and clapper rods) if required by special conditions.

Hand Test Set:

HAND TEST SET D-75959.

For use in step-by-step and panel areas by installers and outside repair men. Consists of a metal handle upon which is mounted a transmitter, a receiver and a No. 2 type dial, attached with #54-A dial adapter. Equipped with two #795 cords. Inside the handle is mounted a 1/10 m.f. condenser.

Instruction Cards:

FORM E-300.
Circular card used on #2 type dials. Has code 211 for calling Long Distance, Central Office name (the first three letters of which are capitalized) and directory reference.

FORM E-301.
Circular card used on #2 type dials. Has code 211 for calling Long Distance, Central Office name (the first two letters of which are capitalized) and directory reference.

FORM E-302.
Circular card used on #2 type dials. Has code 211 for calling Long Distance and directory reference. Space for Central Office name left blank.

FORM E-303.
Circular card used on #2 type dials. Has code 110 for calling Long Distance, Central Office name (the first letter of which is capitalized) and directory reference.

FORM E-304.
Circular card used on #2 type dials. Has code 110 for calling Long Distance and directory reference. Space for Central Office name left blank.

FORM E-305.
Circular card used on #2 type dials. Has code 9 for calling Long Distance and directory reference. Space for Central Office name left blank.

FORM E-306.
Circular card used at P.B.X. stations. Has Central Office name with "Ext." below.

FORM E-307.
Circular card used on #50-A, #50-B, #50-D and #50-E Apparatus Blanks. May also be used in dial instruction card holder before cut-over. Has Central Office name only.

FORM E-308.
Circular card used at P.B.X. Stations and on #50-A, #50-B, #50-D and #50-E Apparatus Blanks. Entire card blank.

FORMS E-314 AND E-315.
Temporary instruction cards to inform the subscriber regarding the change in service. To be hung over transmitter mouthpiece.

Key:

#6002-B KEY.
Two-position lever type key making and breaking 2 sets of contacts. Used to cut in a dummy ringer in place of a ringer to be silenced.

Number Plates:

#132-A NUMBER PLATE.
Porcelain covered metal ring having numbers 1 to 0 with the word "Operator" above 0. Part of #2-AA Dial.

#132-B NUMBER PLATE.
Porcelain covered metal ring having numbers 1 to 0 with word "Operator" above 0 and three letters above each of the other numbers except 1. Part of #2-AB Dial.

#132-E NUMBER PLATE.
Porcelain covered metal ring having numbers 1 to 0 with the word "Operator" above 0 and the letters J, M, R and W to the left of the numbers 5, 6, 7 and 9 respectively. Part of #2-AE Dial.

Receivers:

#144 RECEIVER.
For use on desk stands and wall sets.

#146 RECEIVER.
Auxiliary receiver to be used with wall sets only as required by MANUAL STATIONS. Exposed cord tips connected to this receiver to be equipped with #76 Cord Tips. Receiver to be suspended by cup hook.

#146-A RECEIVER.
Auxiliary receiver to be used on desk stands as required by MANUAL STATIONS. Has switch for closing circuit. Exposed cord tips connected to this receiver to be equipped with #76 Cord Tips. Requires a #1-A Receiver Holder.

Receiver Holder:

#1-A RECEIVER HOLDER.
For holding #146-A Receiver on desk stands.

Subscriber Sets:

#392-D SUBSCRIBER SET.
Loud ringing bell (2500-ohms biased). For use at four-party selective stations.

#392-J SUBSCRIBER SET.
Loud ringing bell (1000-ohms biased). For use at Individual Line, P.B.X., Two-Party Selective Flat and Message Rate and Four-Party Semi-Selective Stations. (Air-gaps adjusted to .024" for biasing spring side and .012" for other side.) Furnished with 2-MF Condenser if so ordered.

#534-A SUBSCRIBER SET. — Equiv. 334-A, 295-A, 212-A, 212-F

Desk stand bell box, with ringer, for use at Individual Line, P.B.X. Two-Party Selective Flat Rate and Four-Party Semi-Selective stations and at extension stations on Four-Party Selective Lines.

#534-C SUBSCRIBER SET. — Equiv. 334-R, 295-AC, 131-K

Desk stand bell box, without ringer. For use at extension stations on Individual Line, P.B.X., Two-Party Selective Flat Rate, Four-Party Semi-Selective and Four-Party Selective Lines.

#534-P SUBSCRIBER SET.

Desk stand bell box for use with #7 type coin collectors at Two-Party Selective and Four-Party Semi-Selective stations. Has split condenser (1 MF-1 MF) in one can.

#534-R SUBSCRIBER SET.

Desk stand bell box equipped with high impedance ringer to reduce severe inductive noise at Two-Party Selective Flat Rate and Four-Party Semi-Selective stations. To be used only when covered by supplemental instructions.

#534-Y SUBSCRIBER SET. — Equiv. 295-AA

Desk stand bell box, with ringer. For use at Common Battery Signaling and Local Battery Talking stations.

#534-DE SUBSCRIBER SET. — Equiv. *43-AE

Extension ringer. For use at stations having #534-R or #553-R Subscriber sets. Furnished with #1021-BW condenser if so ordered.

#534-DF SUBSCRIBER SET. — Equiv. *43-F, **534-D, **334-P, **295-L, **127-A

Extension ringer. For use at stations except those having #534-R or #553-R Subscriber sets. Furnished with #1021-BW condenser if so ordered.

*Not arranged to mount condenser.
**Has condenser.

#553-A SUBSCRIBER SET.
Machine switching wall set. For use at:
Individual Line Stations.
P.B.X. Stations with Dials.
Two-Party Selective Flat Rate Stations.
Four-Party Semi-Selective Stations.
Also at extension stations on Four-Party Selective Lines.

#553-AR SUBSCRIBER SET.
Machine switching wall set. For use at main stations on Four-Party Selective Lines. Equipped with relay and has split condenser (1 MF-1/2 MF) in one can.

#553-B SUBSCRIBER SET.
Machine switching wall set. For use with #7 type coin collector at Two-Party Selective and Four-Party Semi-Selective stations. Has back contact on switch-hook.

#553-C SUBSCRIBER SET.
Machine switching wall set. For use at Two-Party Selective Message Rate stations. Has double condenser (1 MF-1 MF).

#553-R SUBSCRIBER SET.
Machine switching wall set. Equipped with high impedance ringer to reduce severe inductive noise at Two-Party Selective Flat Rate and Four-Party Semi-Selective stations. To be used only when covered by supplemental instructions.

#553-Y SUBSCRIBER SET.
Machine switching wall set. For use at Common Battery Signaling and Local Battery Talking Stations.

#554-AR SUBSCRIBER SET.
Machine switching desk stand bell box with ringer and relay. Has split condenser (1 MF-1/2 MF) in one can. For use at main stations on Four-Party Selective Lines.

#554-C SUBSCRIBER SET.
Machine switching desk stand bell box with ringer. For use at Two-Party Selective Message Rate stations. Has double condenser (1 MF-1 MF).

Switch:

#2047 SWITCH.
Indicating snap switch for use in silencing a ringer which is wired in parallel with another ringer.

Transmitters: #323 TRANSMITTER.
#329 TRANSMITTER.
#337 TRANSMITTER.
Used on desk stands and wall sets as required by the approved transmission zoning practice.

3. Apparatus Arranged According to Stations:

For convenience in selecting subscriber sets and desk stands for machine switching stations, they are grouped below according to class of station. Only standard apparatus regularly used at these stations is included. For equivalents see APPARATUS, pages 10 to 20.

For Individual Line Stations
" P.B.X. Stations with Dials*
" Two-Party Selective Flat Rate Stations
" Four-Party Semi-Selective Stations

Main Set		Extension Set		Desk Stand**
Desk	Wall**	Desk	Wall**	
#534-A	#553-A	#534-A or #534-C	#553-A	#51-AL

For Two-Party Selective Message Rate Stations:

#554-C	#553-C	#554-C	#553-C	Ring #51-AL Tip #51-C

For Four-Party Selective Stations:

#554-AR	#553-AR	#534-A or #534-C	#553-A	#51-AL

For C. B. Signaling and L.B. Talking Stations:***

#534-Y	#553-Y	#51-CN or #51-C

*At P.B.X. stations without dials follow MANUAL STATIONS.
**If stations are to operate for some time on a manual basis, desk stands and wall sets shall be equipped with #50 type apparatus blanks or dials in accordance with local instructions—see Section 14, page 25.
***Battery boxes and dry cells are required for these stations.

DESCRIPTION

4. Machine Switching Stations are substantially the same as common battery manual stations except that a dial is required to enable the subscriber to actuate the Central Office switches to complete local connections without the aid of an operator and to call an operator for toll and long distance connections, for information calls, etc. The installation and maintenance practices for machine switching stations are therefore practically the same as for manual stations except where they relate to the dial.

The dial consists of two sets of spring contacts known as the "Pulse" and "Off Normal" contacts and a mechanism to control the movements of these contacts. This mechanism consists of a finger wheel, pulse wheel and pawl, main spring and governor. Mounted directly under the finger wheel is a number plate bearing the digits (numbers or letters and numbers) required for dialing. The finger wheel contains ten holes which, in the normal position, are directly over the digits. When in this position, the finger wheel is capable of a rotary motion in a clockwise direction.

To make a call the subscriber first removes his receiver from the hook and listens for the "Dial Tone" which indicates that the Central Office apparatus is ready to receive the dial pulses. Upon hearing the dial tone he inserts his finger in the hole in the finger wheel corresponding to the first letter or number of the station desired and rotates the wheel until his finger comes in contact with the finger stop. The finger is then removed and the wheel returns to normal. The remaining digits are dialed in a similar manner. During the return movement of the finger wheel, the "Pulse Contacts" are intermittently opened and closed by the pulse wheel and pawl, the number of interruptions corresponding to the digit dialed. These interruptions in the circuit operate the Central Office apparatus to complete the connection.

Description

When the finger wheel is released, it is driven back to normal position by the main spring. The speed of the finger wheel in returning to normal and consequently the rate of interruption of the "Pulse Contacts" is regulated by the governor on back of dial. In order that the Central Office apparatus may function properly, the rate of interruption of the "Pulse Contacts" and the "per cent. break" must be within certain limits. The "per cent. break" is explained below.

A complete dial pulse consists of two parts:

(1) The break—when "Pulse Contacts" are open.
(2) The make—when "Pulse Contacts" are closed.

The length of the "break" compared with the total length of time required for the complete pulse is known as the "per cent. break." When dials are manufactured or repaired, the "per cent. break" is adjusted to close limits. If the "per cent. break" is outside of these limits, the dial is likely to fail to operate the Central Office equipment properly even if the speed is within the proper limits.

The "per cent. break" depends largely on the position of the tip of the pulse spring with respect to the pulse pawl which operates it and on the tension of the pulse spring. Because of this the pulse spring and the pulse spring stop should always be protected from injury and **no attempt should be made to adjust pulse spring or stop or to otherwise adjust dial except as covered in these specifications.**

As soon as the finger wheel is operated and until it returns to normal, the "Off Normal" contacts are operated. These contacts eliminate dialing noises by opening the receiver circuit and establish a uniform resistance through the station set by shunting the transmitter which has a variable resistance.

The ringing of the called station bell is automatic and the bell rings intermittently until the called party answers or the calling party hangs up. An audible "Ringing Signal" is given to the calling subscriber while the ringing is in progress. If the called line is busy a "Busy Signal" is sent back to the calling subscriber to indicate this condition. If the call is for a station which has been disconnected or reported out of

order, the calling subscriber is automatically connected to an operator who will report this condition to him.

The switch-hook should not be operated after the receiver has been removed from the hook to make a call. Operation of the switch-hook during dialing or talking may release the connection and make it necessary to start over again. Operation of the dial while talking may also release the connection.

There are two types of Machine Switching Central Office equipment—"Panel" and "Step-by-Step." Panel central office equipment will, in general, be used in the larger multi-office areas. Step-by-Step central office equipment will, in general, be used in the smaller multi-office areas and in single office areas. The type to be used in each district is determined by the Engineering Department. The station practices are the same for both types except in the few cases where it is otherwise specified.

DROP AND BLOCK WIRING

5. Follow DROP and BLOCK WIRING.

PROTECTOR INSTALLATION

6. Follow STATION AND PRIVATE BRANCH EXCHANGE PROTECTOR INSTALLATION.

At stations to be cut over to machine switching and not equipped with #58-AP or #12-BP Protectors, replace the #1 and #2 Protector Blocks and #3 Protector Micas with #26 and #27 Protector Blocks.

APPARATUS INSTALLATION

7. General. Follow STATION APPARATUS INSTALLATION except as modified and added to by these specifications. Install private branch exchange stations which are not equipped with dials according to MANUAL STATIONS.

8. Handling Apparatus:

Handle all apparatus with care to **avoid injury to dials, transmitters, cords, receivers, etc.** Improper handling may lead to impaired service and expense to the Company for repairs.

9. Locating Apparatus:

Locate desk stands and wall sets where there will always be sufficient light for dialing. At existing desk set stations, if necessary to relocate to obtain sufficient light, it will be advisable in most cases to leave bell box in its present location and run inside wire to a connecting block at new desk stand location. At existing wall set stations where there is not sufficient light for dialing it will be necessary to relocate set.

Relocating existing apparatus should be avoided where possible. In relocating avoid danger of wet cords due to open windows.

Where a manual wall set is replaced by a machine switching wall set, locate the machine switching wall set in same location occupied by manual wall set unless change is required to obtain sufficient light for dialing as given above. This means that the requirement of 56-1/2 inches for transmitter height will generally be reduced slightly, but this practice should be followed except in cases where reducing the transmitter height is not satisfactory to the subscriber.

10. Receivers and Transmitters:

All stations having machine switching type apparatus (either with dials or apparatus blanks) shall be equipped with #144 Receivers and #323, #329 or #337 Transmitters as required by the **approved transmission zoning practice.**

11. Use of Waterproof Cords:

Install waterproof desk stand and receiver cords at stations permanently located outdoors or where exposed to corrosive fumes or in damp locations (such as may be found in subways, markets, cellars, basements, laundries, stables, chemical works, etc.).

12. Use of Side Tone Reduction Circuit:

See Section 28, page 36.

13. Use of Desk Stands with Transmitter Cut-Out Buttons:

These stands shall be used only under special conditions. See MANUAL STATIONS and Section 38, pages 95 to 98.

14. Installing Machine Switching Apparatus with Apparatus Blanks or Dials at New Manual Stations (In districts specified by supplemental instructions):

In manual districts which are to be cut over to machine switching, install apparatus as given for each class of station Section 3, page 20, at new stations and in connection with changes at existing stations. The desk stands and wall sets shall be equipped with apparatus blanks or dials in accordance with local instructions. Where apparatus blanks are installed they shall be removed and dials substituted just before cut-over. See Section 16, pages 28 and 29.

At four-party selective stations **operating with pulsating ringing current,** transfer blue lead from relay in #553-AR and #554-AR sets from terminal B to terminal C (see pages 80 to 82 for location of terminals). No change is required in these sets in superimposed ringing districts.

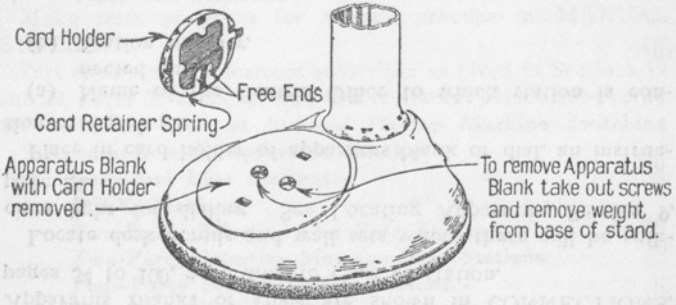
Connections for #51-AL and #50-AL Desk Stands with Apparatus Blanks or Dials are shown in CONNECTIONS, pages 34 to 100, according to class of station.

Locate desk stands and wall sets where there will be sufficient light for dialing. See Locating Apparatus, Section 9, page 24.

Place in card holder of apparatus blank or dial, an instruction card giving:

(a) Name of the Central Office to which station is connected and

(b) Station number.



In assembling make sure that Card Holder is securely fastened to Apparatus Blank (bend free ends of Card Retainer Spring apart if necessary)

Use care in removing Card Holder to avoid injury to finish of Apparatus Blank.

Tests—All Stations:

Make tests as given for manual practice in MANUAL STATIONS.

Test apparatus and instruct subscribers as given in Sections 19 and 20, pages 30 to 33, on last visit to station before cut-over.

15. Installing Machine Switching Apparatus with Dials at Existing Manual Stations: (In districts specified by supplemental instructions.)

Individual Line Stations.

P.B.X. Stations (where specified).

Two-Party Selective Flat Rate Stations.

Four-Party Semi-Selective Stations.

(a) Replace manual desk stands by machine switching desk stands and connect machine switching desk stands to bell boxes already installed.

Equip ringer with biasing spring, if not already provided, or replace set with #534-A Set or equivalent if ringer is not arranged for biasing spring.

(b) Connect bell box and ringer leads according to class of station as shown in CONNECTIONS, pages 34 to 100.

(c) See that ringer air gaps are according to ADJUSTMENT OF STATION APPARATUS.

(d) Replace manual wall sets with machine switching wall sets unless the manual sets are to be converted as covered by supplemental instructions or specifications.

(e) Equip loud ringing bells with biasing spring (having red cord) and stop screws of #392-J subscriber set and adjust air-gaps to .024" for biasing spring side and .012" for other side. If bell is not equipped for biasing spring replace with #392-J set.

(f) Replace #20, #40 and #48 type manual transmitter arms (and desk stand brackets furnished by subscriber) with machine switching desk stands unless otherwise specified in supplemental instructions. The reason for this is that transmitter arms have a tendency to rotate and interfere with dialing.

(g) See that wiring plans are properly connected according to STATION WIRING PLANS.

Two-Party Selective Message Rate Stations.
Four-Party Selective Stations.

(a) Replace manual desk stands, bell boxes and wall sets on two-party selective message rate lines with machine switching desk stands, bell boxes and wall sets. Replace manual desk stands and bell boxes on four-party selective lines with machine switching desk stands and bell boxes. Replace manual wall sets on four-party selective lines with machine switching wall sets unless manual sets are to be converted as covered by supplemental instructions or specifications.
Where stations on two-party message rate lines have #554-C sets and stations on four-party selective lines have #554-AR sets, these sets shall not be replaced.

(b) Follow (b), (e) and (f) above.

#7 Coin Collector Stations.

At #7 coin collector stations make same changes as in (a), (b), (c) and (d), pages 26 and 27. At two-party selective and four-party semi-selective desk stand stations replace bell boxes with #534-P subscriber sets (having split condenser circuit) unless these sets are already installed.

Tests—All Stations:

Make tests as given for manual practice in MANUAL STATIONS.

Test apparatus and instruct subscriber as given in Sections 19 and 20, pages 30 to 33, on last visit to station before cut-over.

16. Installing Dials at Stations Having Machine Switching Apparatus with Apparatus Blanks:

Individual Line Stations.

P.B.X. Stations.

Two-Party Selective Flat Rate Stations.

Two-Party Selective Message Rate Stations.

Four-Party Semi-Selective Stations.

Four-Party Selective Stations.

(a) At stations with No. 51 type desk stands disconnect cord terminals from apparatus blank and remove blank from stand. Install dial on desk stand using three screws, P-115856, and three lock washers, P-99132, which must be ordered separately. Connect dial as shown under CONNECTIONS, pages 34 to 100.

(b) At stations with No. 50 type desk stands remove apparatus blank from stand and install dial and dial cord. Attach dial to desk stand with screws and lock washers given above and fasten dial cord with steel cord holder, P-99910. Remove straps from terminals "BK" and "Y" and terminals "BB" and "W" on back of desk stand rack. Connect dial cord as shown under CONNECTIONS, pages 34 to 100, and fasten cord to rack and in base of stand as shown under MAINTENANCE, Section 43, pages 106 to 108.

(c) At wall set stations, remove apparatus blank from set and install dial. To attach the dial to the set three screws, P-115856, and three lock washers, P-99132, are required and must be ordered separately. Disconnect flexible dial leads from terminals REC. and TRANS. in set and connect leads as shown under CONNECTIONS, pages 34 to 100.

#7 Coin Collector Stations.

At #7 Coin Collector stations make same changes in desk stands and wall sets as in (a), (b) and (c) above.

Tests—All Stations:

Make tests as given for manual practice in MANUAL STATIONS.

Test apparatus and instruct subscriber as given in Sections 19 and 20, pages 30 to 33, on last visit to station before cut-over.

17. Installing Machine Switching Apparatus with Dials at New Stations in Working Machine Switching Districts—All Stations:

Install apparatus as given for each class of station on page 20 and connect as shown under CONNECTIONS, pages 34 to 100.

At party line stations where ringer ground is different from protector ground or where no protector is used, place tag in set showing location of ringer ground clamp.

At all stations where extension ringer is bridged to line between point of entrance and main station, place tag in main station set showing location of extension ringer.

Tests—All Stations:

Make tests as given for manual practice in MANUAL STATIONS.

Test apparatus and instruct subscriber as given in Sections 19 and 20, pages 30 to 33. Also verify line or station number as given in Section 47, page 115.

18. Instruction Cards:

Temporary Instruction Cards:

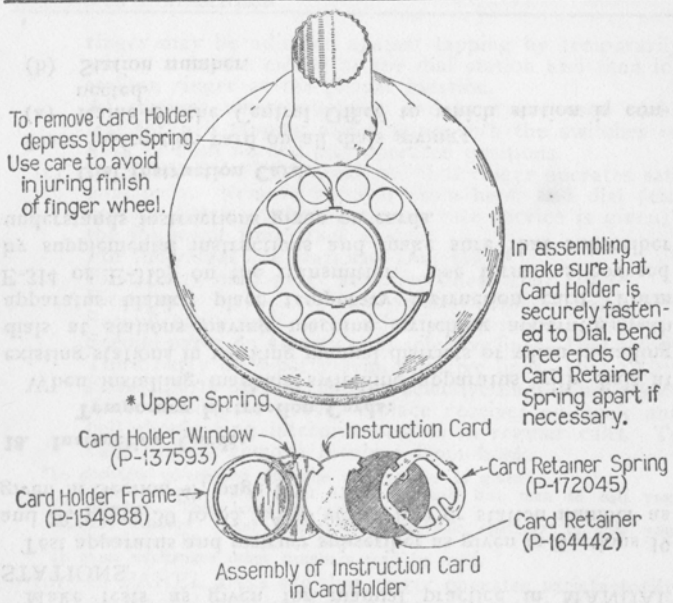
When installing machine switching apparatus with dials at existing stations in working manual districts or when installing dials at stations having machine switching apparatus with apparatus blanks, place temporary instruction card (Form E-314 or E-315) on the transmitter. Use forms as covered by supplemental instructions and make sure that subscriber understands instructions given on cards.

Dial Instruction Card:

Place instruction card on all dials giving:

(a) Name of the Central Office to which station is connected.

(b) Station number.



* If upper spring on card holder frame rubs on number plate clamping ring (when card holder is attached to dial) remove card holder and bend tip of spring with pliers.

19. Testing Apparatus:

Connection to Test Trunk and Test Desk:

In order to make the required apparatus tests at stations equipped with dials it is necessary to obtain connection to a test trunk and the Test Desk.

In manual districts before cutover to machine switching obtain test trunk by giving the "A" operator the line number and requesting "Machine Test" (unless otherwise required by local routine). Replace receiver on hook for a brief interval and upon removing receiver from hook, dial tone should be heard, indicating that the line is connected over a test trunk to the machine switching office. Then dial Test Desk.

After tests are completed (to insure that subscriber's line is disconnected from test trunk) advise Test Desk that all tests have been made and proceed (unless otherwise required by local routine) as follows:

Leave receiver off hook until "A" operator answers. This will show that subscriber's line is again connected to the manual office. If "A" operator does not answer within a reasonable time, hang up receiver for a few moments. Then remove receiver, dial Test Desk and request that subscriber's line be disconnected from test trunk. Leave receiver off hook until "A" operator answers.

In working machine switching districts numbers should be dialed direct, the assistance of an operator not being required (except as may be specified by local routine).

After tests are completed replace receiver on hook.

NOTE: These apparatus tests and instructions to subscribers (see Sections 19 and 20, pages 30 to 33) shall be made in such sequence as to avoid separate connections to test trunk and Test Desk.

Use of Hand Test Set:

For operation and maintenance of hand test set see Section 46, page 114.

Crosses in Desk Stands:

Make test for crosses at all desk stand installations according to Section 44, page 109.

Ringers—All Stations Except Four-Party Selective Stations:

To prevent tapping of bells from charge and discharge of condenser when dials are operated and insure satisfactory ringing, check the following:

(a) See that subscriber sets and red and black ringer leads are connected according to class of line in CONNECTIONS, pages 34 to 100.

(b) See that biasing springs are adjusted so that the dial, when operated in making tests (c) or (d), does not cause bell tapping.
Where an extension ringer is so located that its tapping would not be audible at the dial station, hand test set may be connected to the tip and ring sides of the line near the extension ringer (provided tip and ring are both available) and the hand test set dial used in testing for tapping of extension ringer. Same test may be made by having subscriber operate dial or extension

ringer may be adjusted against tapping by temporarily wiring it in the circuit at the dial station and then installing ringer at the proper location.

At stations where switches and keys are used make test for bell tapping and ringing with the switches or keys in both normal and operated positions.

(c) In STEP-BY-STEP areas see that ringer operates satisfactorily. Remove receiver from hook and dial (except in districts where message rate service is given)* the following Ring Back Codes:

For individual line stations—Dial 1197**
First party on 2-party selective lines—Dial 1197**
First party on 4-party semi-selective lines—Dial 1197**
Second party on 2-party selective lines—Dial 1198**
Second party on 4-party semi-selective lines—Dial 1198**
Third party on 4-party semi-selective lines—Dial 1199**
Fourth party on 4-party semi-selective lines—Dial 1190**

After dialing as above, replace receiver on hook and bell should ring intermittently as in regular calls. To stop ringing remove receiver from hook.

*In districts where any message rate service is given:
Before cutover: Dial Test Desk and ask test man to call your number. Then hang up receiver.
After cutover: Dial "Operator" and ask operator to call your number. Then hang up receiver.

**In some exchanges other numbers may be used.

(d) In PANEL areas see that ringer operates satisfactorily. At manual stations before cutover, obtain Test Desk and ask test man to ring the bell. At party-line stations advise test man whether station is connected to ring or tip side of line. Replace receiver on hook.

At new stations in working machine switching districts dial "Operator" and ask Operator to call you on the line, giving the operator the subscriber's number. Replace receiver on hook.

(e) If necessary to make ringer adjustments (other than that of biasing spring), follow ADJUSTMENT OF STATION APPARATUS. If any ringer adjustments (including biasing spring adjustments) are made, repeat tests (c) or (d) and see that bell does not tap during dialing.

(f) Be sure that special tests for Two-Party Selective Message Rate stations, given on page 68, are made.

Relays and Ringers—Four-Party Selective Stations.

(a) At four-party selective stations, operating with pulsating ringing current and equipped with #553-AR and

#554-AR sets, transfer blue lead from relay from terminal C to terminal B. (See pages 80 to 82.)

(b) Make sure that dial when operated in calling test desk does not cause #85 relay armature in subscriber set to close its contact. If contact closes carefully bend front stop of relay away from armature to reduce the sensitiveness of relay. See ADJUSTMENT OF STATION APPARATUS.

(c) Call Test Desk by removing receiver from hook and dialing Test Desk number. Advise Test Desk whether first, second, third or fourth party and adjust ringers (with Test Desk) with bell adjusting current according to ADJUSTMENT OF STATION APPARATUS.

(d) Ask Test Desk to ring bell with regular ringing current.

Dials:

With connection established to Test Desk, ask for dial speed test (see **Testing Dial Speed,** page 112) and when dial tone is heard, dial "zero." If dial speed is not between 8 and 11 pulses per second, follow **Adjusting Dial Speed,** page 113.

If difficulty is experienced with station dial, use hand test set dial to call Test Desk. Have receiver on hook when hand test set dial is used.

20. Instructing Subscribers (where required by local routine):

The object of these instructions is to acquaint the subscriber with the method of dialing and the distinctive signals employed in machine switching service. Instructions shall be in accordance with local routine.

To prevent the operation of a trouble signal when a receiver is off the hook, always

(a) When having subscriber listen to dial tone replace receiver on hook or begin dialing within 30 seconds.

(b) Complete dialing by dialing all numbers or letters and numbers.

WIRING

21. Follow STATION WIRING.

CONNECTIONS

22. General:

Connect subscriber sets and associated apparatus according to these specifications. Where wiring plans are involved follow STATION WIRING PLANS.

There are no machine switching magneto or two or four-party common battery non-selective stations.

23. Tip and Ring:

"Tip" (ground) side of line is connected to ground side of Central Office battery.

"Ring" (battery) side of line is connected to live side of Central Office battery.

Test for "Tip" and "Ring" by connecting one terminal of receiver or hand test set to ground and other terminal alternately to each side of line. "Ring" side gives louder click in receiver.

At individual line stations if ground is not convenient test for "Tip" and "Ring" as follows:

Remove tension on biasing spring. Connect one side of line to L1 and the other side to C (see Figure 4, page 41). If armature is pulled towards biasing spring side, "Ring" side of the line is connected to L1. If armature is pulled away from biasing spring side, the "Tip" side of the line is connected to L1. (The foregoing applies in areas having positive side of central office battery grounded. In areas having the negative side grounded, armature pull is reversed with same line connection.)

24. Color Scheme:

Connect tracers of inside wire as follows:

Red tracer to "Ring" side of line.

Green tracer to "Tip" side of line.

Use yellow tracer for signaling ground wire or other purpose where a third wire is required.

Tracer conductor of outside wire corresponds to red tracer of inside wire and should be connected to "Ring" side of line.

In connecting wires and cords, connect like tracers (red to red, yellow to yellow, etc.).

25. Number of Ringers Allowed—All Stations:

In order to prevent premature tripping of machine ringing and to insure satisfactory ringing and dialing, do not install

#554-AR sets, transfer blue lead from relay from terminal C to terminal B. (See pages 80 to 82.)

(b) Make sure that dial when operated in calling test desk does not cause #85 relay armature in subscriber set to close its contact. If contact closes carefully bend front stop of relay away from armature to reduce the sensitiveness of relay. See ADJUSTMENT OF STATION APPARATUS.

(c) Call Test Desk by removing receiver from hook and dialing Test Desk number. Advise Test Desk whether first, second, third or fourth party and adjust ringers (with Test Desk) with bell adjusting current according to ADJUSTMENT OF STATION APPARATUS.

(d) Ask Test Desk to ring bell with regular ringing current.

Dials:

With connection established to Test Desk, ask for dial speed test (see **Testing Dial Speed,** page 112) and when dial tone is heard, dial "zero." If dial speed is not between 8 and 11 pulses per second, follow **Adjusting Dial Speed,** page 113.

If difficulty is experienced with station dial, use hand test set dial to call Test Desk. Have receiver on hook when hand test set dial is used.

20. Instructing Subscribers (where required by local routine):

The object of these instructions is to acquaint the subscriber with the method of dialing and the distinctive signals employed in machine switching service. Instructions shall be in accordance with local routine.

To prevent the operation of a trouble signal when a receiver is off the hook, always

(a) When having subscriber listen to dial tone replace receiver on hook or begin dialing within 30 seconds.

(b) Complete dialing by dialing all numbers or letters and numbers.

WIRING

21. Follow STATION WIRING.

Two-Party Selective Stations (Flat and Message Rate):

With two ringers in series where there is a parallel bridge with a single ringer (to insure satisfactory ringing).*

Four-Party Semi-Selective Stations:

With two ringers in series (to insure satisfactory ringing).*

Four-Party Selective Stations:

In the case of these stations the sets are provided with split condensers. The portion of the condenser in series with the relay is a ½ MF condenser.

*High impedance ringers require 1 MF condensers as covered on pages 60, 61, 63, 78 and 79.

Condenser capacities for loud ringing bells at all stations may be the same as for normal ringing bells. However, to obtain maximum volume of sound, it is desirable to use 2 MF condensers with loud ringing bells not having another ringer in series, provided this does not conflict with the condenser capacity requirements.

27. Connecting Ringer Leads:

To prevent tapping of bells when dials are operated and to insure satisfactory ringing, make sure that red and black ringer leads are always connected according to the figures on pages 38 to 100. In some old style sets the ringer leads are not red and black. In these cases the ringer coil lead nearest the biasing spring corresponds to the black lead.

The #534-DE and #534-DF extension ringer sets have terminals marked R and B (corresponding to the red and black leads), and a third terminal (for use where a condenser is required) which is marked "L2."

28. Use of Side Tone Reduction Circuit:

In panel areas use side tone reduction circuit according to MANUAL STATIONS. Connect sets for side tone reduction according to class of line shown in figures, pages 38 to 100.

In step-by-step areas side tone reduction is not required because of the type of central office circuit (except under special conditions as may be covered by supplemental instructions).

29. Sets and Desk Stands for Extension Stations:

Where a **ringer is required** at extension stations, use set with induction coil, condenser and ringer (#534-A or equivalent for individual lines, etc.). Where a **ringer is not required** make sure that **desk stand only** is used except under the following unusual conditions, where a set with induction coil and condenser but no ringer (#534-C or equivalent for individual lines, etc.) should be used:

(a) Where main station has wood type wall set.

(b) Where wire run between main and extension stations is over 250 feet.

(c) Where main and extension stations are in different buildings in accordance with contract order.

(d) At common battery signaling and local battery talking stations (use set with induction coil, condenser and ringer, disconnecting ringer).

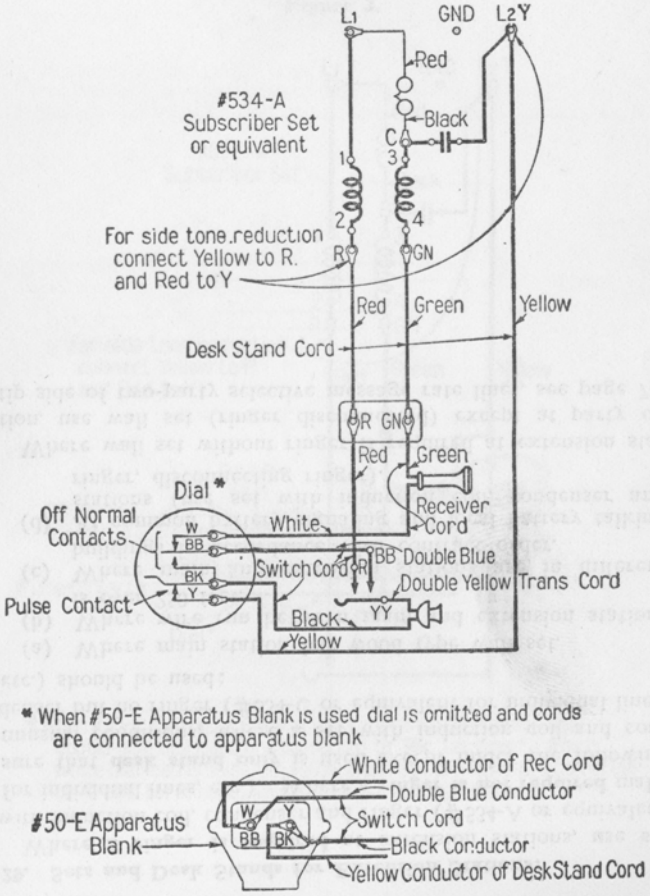
Where wall set without ringer is required at extension station, use wall set (ringer disconnected) except at party on tip side of two-party selective message rate lines, see page 71.

30. Individual Line Stations.

Desk Stand Connections:

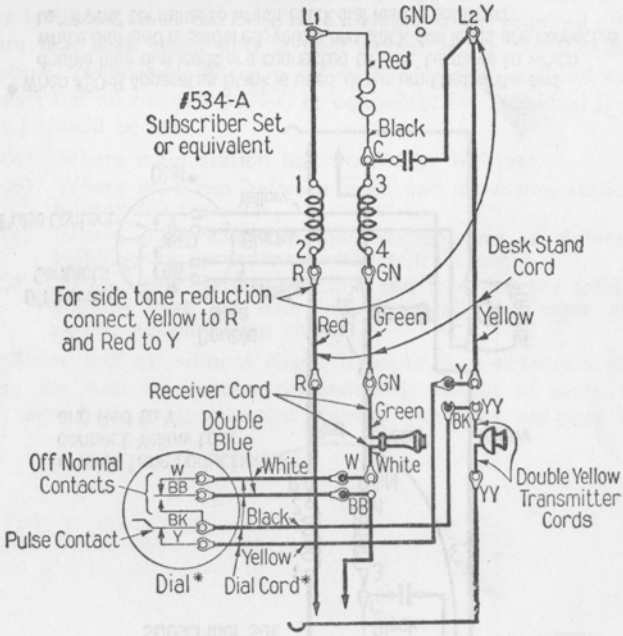
Figure 1.

#51-AL Desk Stand.



* When #50-E Apparatus Blank is used dial is omitted and cords are connected to apparatus blank

Figure 2.
#50-AL Desk Stand.



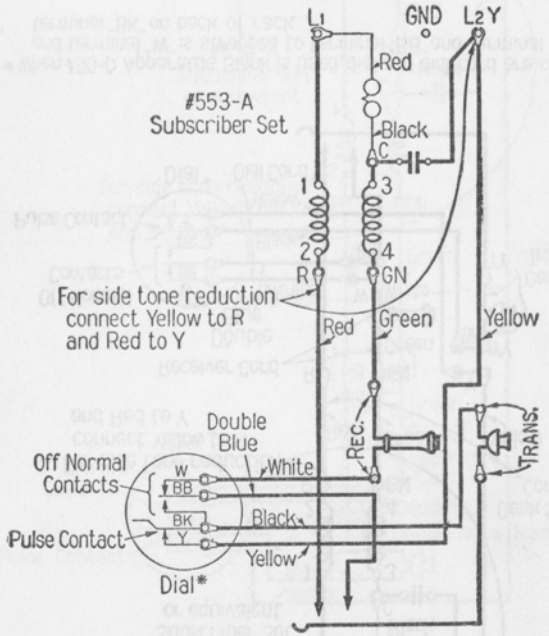
* When #50-D Apparatus Blank is used, dial and dial cord are omitted and terminal "W" is strapped to terminal "BB" and terminal "Y" to terminal "BK" on back of rack.

o Terminal on front of rack.
• Terminal on back of rack.

Individual Line Stations.

Wall Set Connections:

Figure 3.



* When #50-B Apparatus Blank is used, dial is omitted; white and double blue dial leads are connected to "Rec." terminal to which white dial lead is soldered; yellow and black dial leads are connected to "Trans." terminal to which black dial lead is soldered

Line and Ringer Connections:

Figure 4.
Main Station.

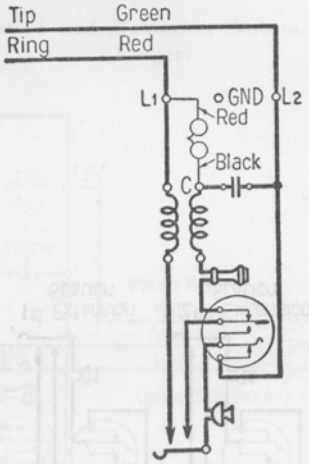
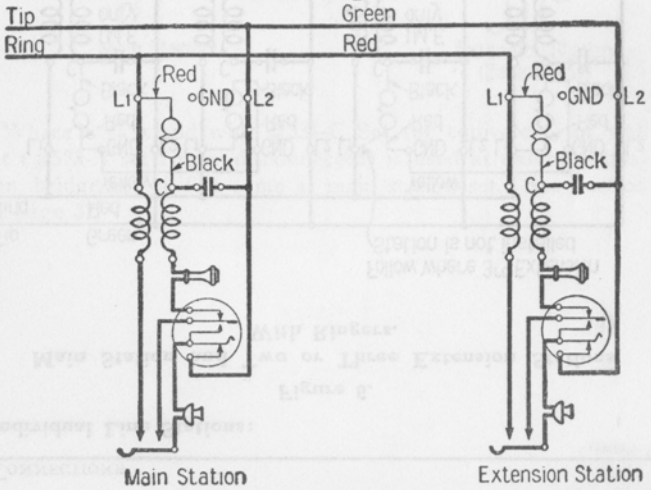


Figure 5.
Main Station and One Extension Station With Ringer.



Individual Line Stations:

Figure 6.

Main Station and Two or Three Extension Stations With Ringers.

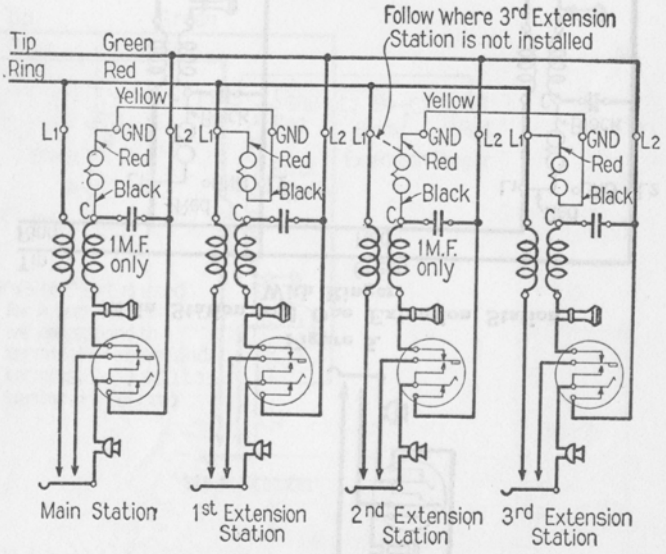
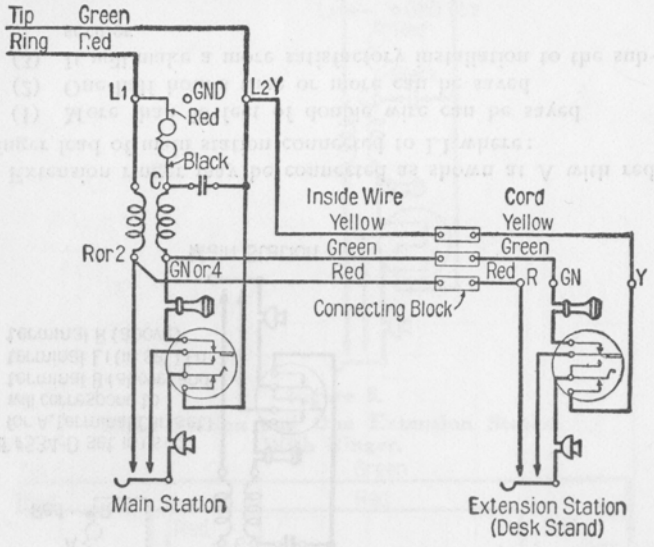


Figure 7.

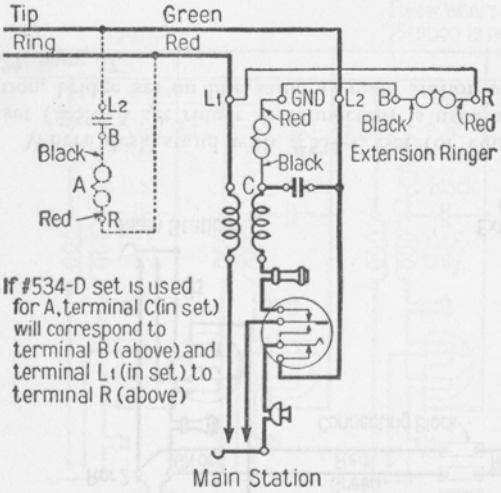
Main Station and Extension Station Without Ringer.



Where desk stand with #534-C Set (or equivalent) or wall set (#553-A set ringer disconnected) is used at extension station, bridge set on line same as main station set. See Section 29, page 37.

Individual Line Stations:

Figure 8.
Main Station With One Extension Ringer (Normal or Loud Ringing).

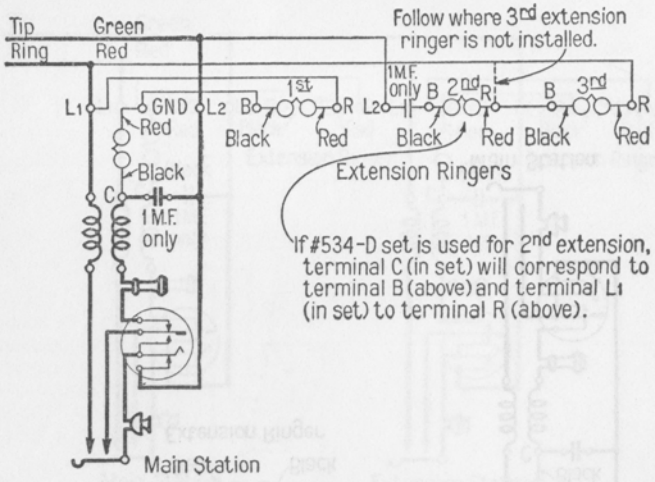


Extension ringer may be connected as shown at A with red ringer lead of main station connected to L1 where:

(1) More than 50 feet of double wire can be saved
(2) One-half hour's time or more can be saved
(3) It will make a more satisfactory installation to the subscriber.

Figure 9.

Main Station With Two or Three Extension Ringers (Normal or Loud Ringing).



Individual Line Stations:

Figure 10.

Main Station With Extension Ringer Near Entrance. (Normal or Loud Ringing).

Use where less work is involved than with Figure 8.

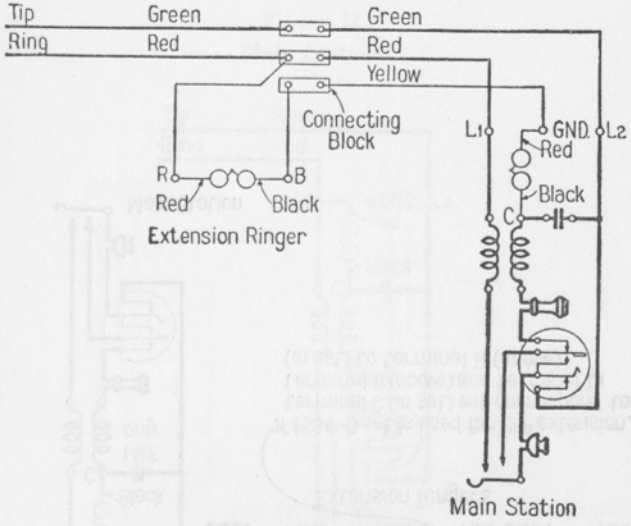
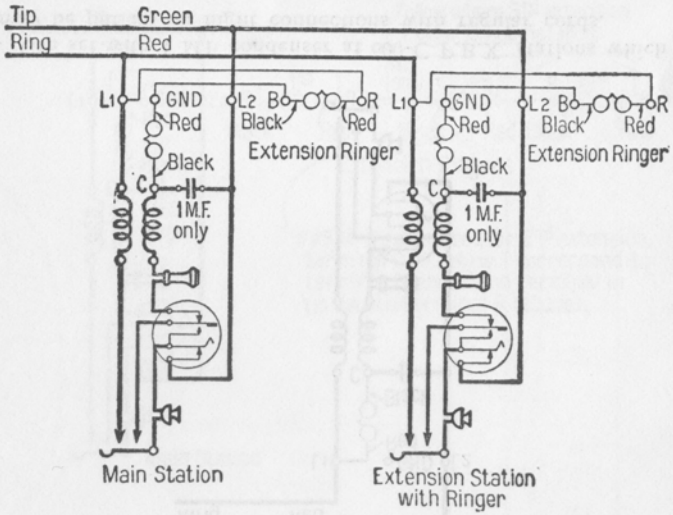


Figure 11.

Main Station and Extension Station With Extension Ringers. (Normal or Loud Ringing).



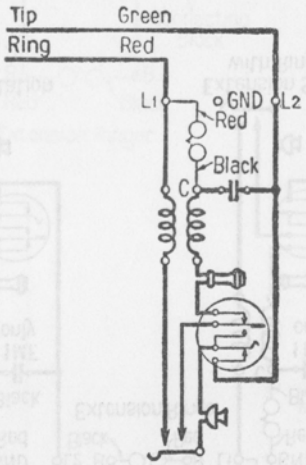
31. Private Branch Exchange Stations with Dials:

Desk Stand and Wall Set Connections:

The desk stand and wall set connections are the same as for individual lines, pages 38 to 40.

Line and Ringer Connections:

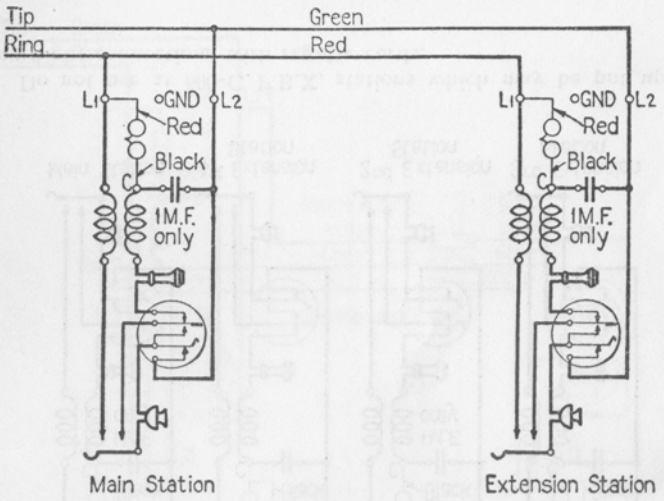
Figure 12.
Main Station.



Use set with 1 MF condenser at 600-C P.B.X. stations which may be put up on night connections with regular cords.

Figure 13.

Main Station and One Extension Station With Ringer.

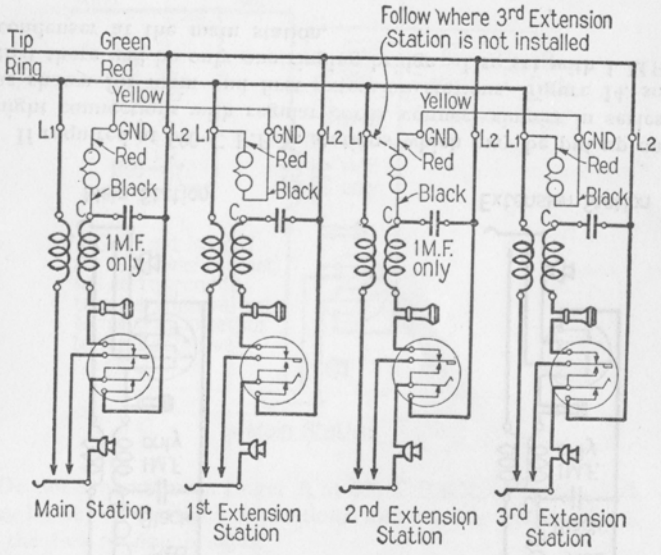


If required at 600-C P.B.X. stations which may be put up on night connections with regular cords, connect ringers in series as shown for main and first extension stations, Figure 14, so that there will be only one ringing bridge. Use set with 1 MF condenser at the main station.

P.B.X. Stations with Dials:

Figure 14.

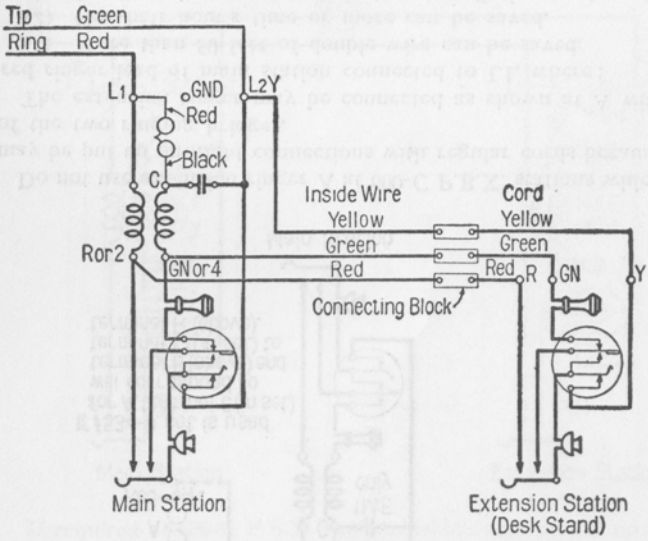
Main Station and Two or Three Extension Stations With Ringers.



Do not use at 600-C P.B.X. stations which may be put up on night connections with regular cords.

Figure 15.

Main Station and Extension Station Without Ringer.



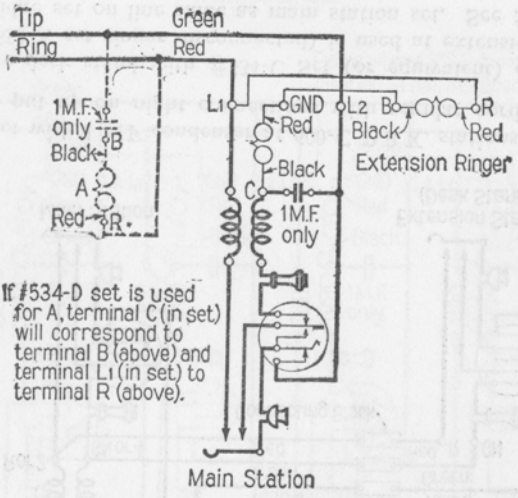
Use set with 1 MF condenser at 600-C P.B.X. stations which may be put up on night connections with regular cords.

Where desk stand with #534-C Set (or equivalent) or wall set (#553-A set ringer disconnected) is used at extension station, bridge set on line same as main station set. See Section 29, page 37.

P.B.X. Stations with Dials:

Figure 16.

Main Station With One Extension Ringer (Normal or Loud Ringing).



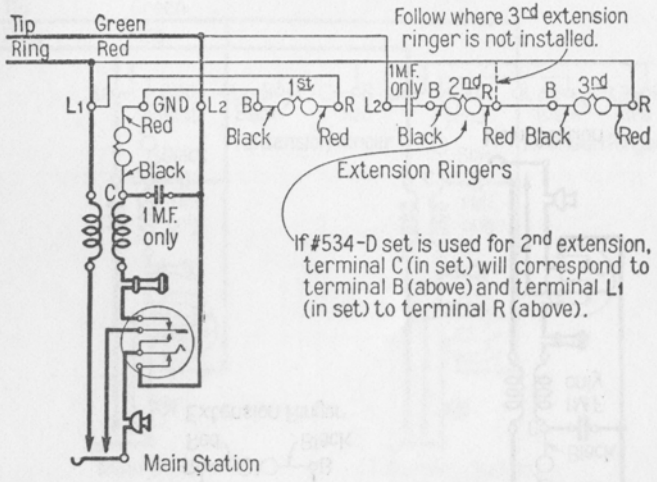
Do not use extension ringer A at 600-C P.B.X. stations which may be put up on night connections with regular cords because of the two ringing bridges.

The extension ringer may be connected as shown at A with red ringer lead of main station connected to L1, where:

(1) More than 50 feet of double wire can be saved.
(2) One-half hour's time or more can be saved.
(3) It will make a more satisfactory installation to the subscriber.

Figure 17.

Main Station With Two or Three Extension Ringers (Normal or Loud Ringing).



Do not use at 600-C. P.B.X. stations which may be put up on night connections with regular cords.

P.B.X. Stations with Dials:

Figure 18.
Main Station With Extension Ringer Near Entrance.
(Normal or Loud Ringing).

Use where less work is involved than with Figure 16.

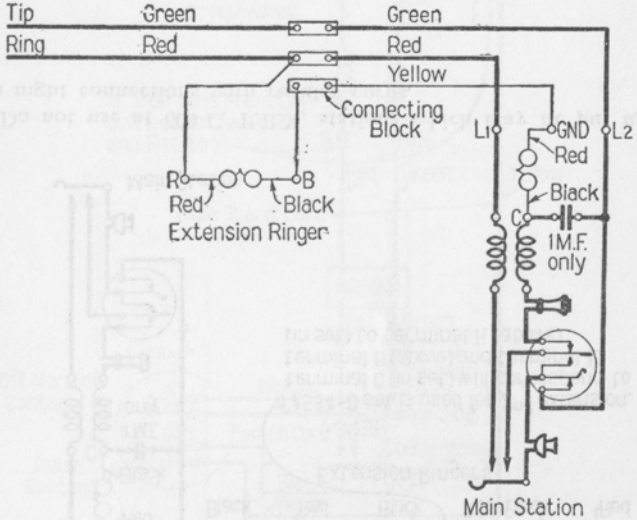
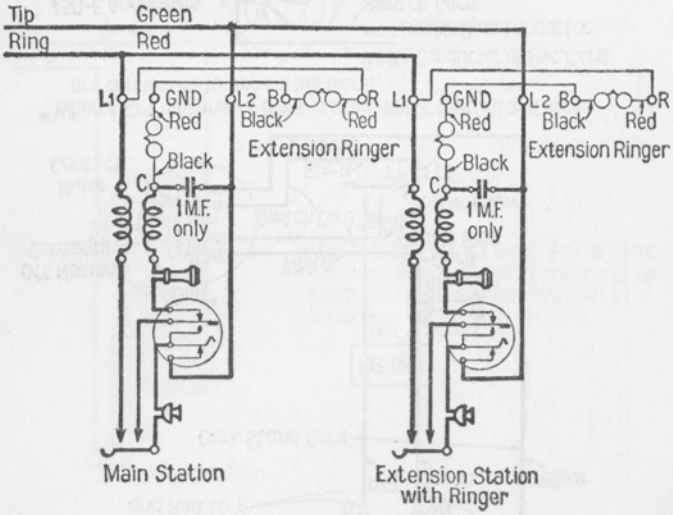


Figure 19.

Main Station and Extension Station With Extension Ringers. (Normal or Loud Ringing).



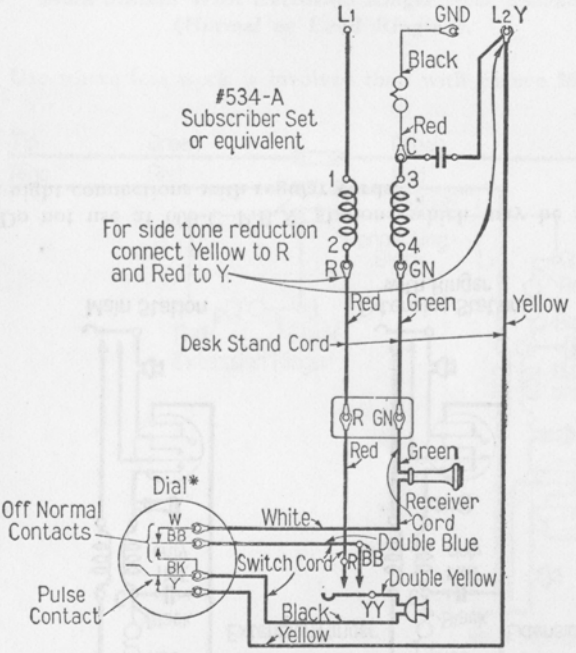
Do not use at 600-C P.B.X. stations which may be put up on night connections with regular cords.

32. Two-Party Selective Flat Rate Stations.

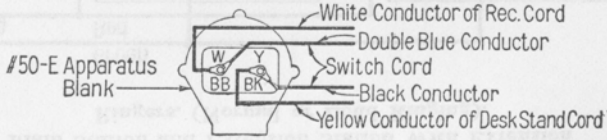
Desk Stand Connections:

Figure 20.

#51-AL Desk Stand.

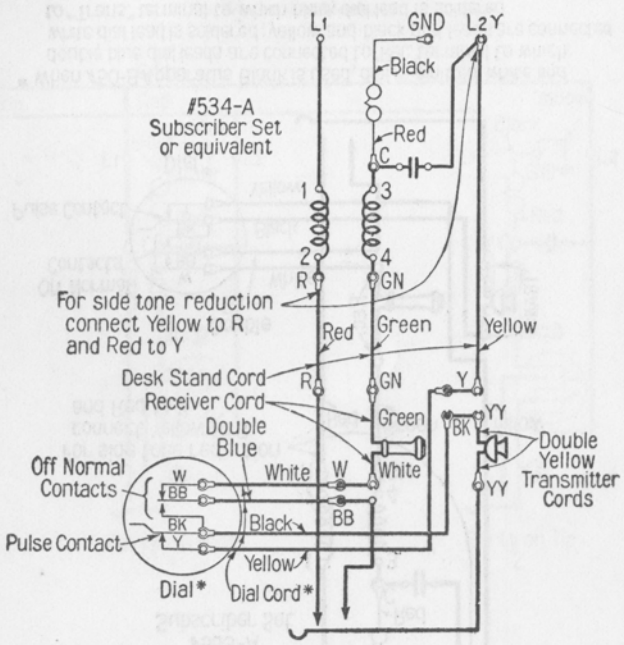


* When #50-E Apparatus Blank is used, dial is omitted and cords are connected to apparatus blank.



Should #534-R Set (high impedance ringer set) be installed, in accordance with supplemental instructions, connect as above.

Figure 21.
#50-AL Desk Stand



* When #50-D Apparatus Blank is used, dial and dial cord are omitted and terminal "W" is strapped to terminal "BB" and terminal "Y" to terminal "BK" on back of rack

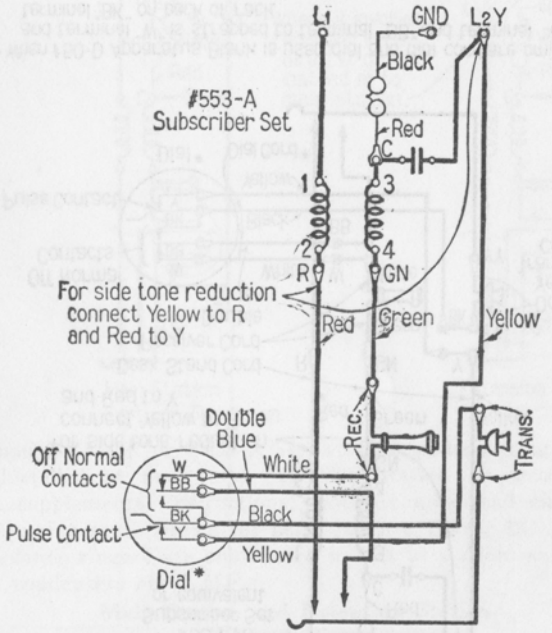
○ Terminal on front of rack.
● Terminal on back of rack

Should #534-R Set (high impedance ringer set) be installed in accordance with supplemental instructions, connect as above.

Two-Party Selective Flat Rate Stations.

Wall Set Connections:

Figure 22.

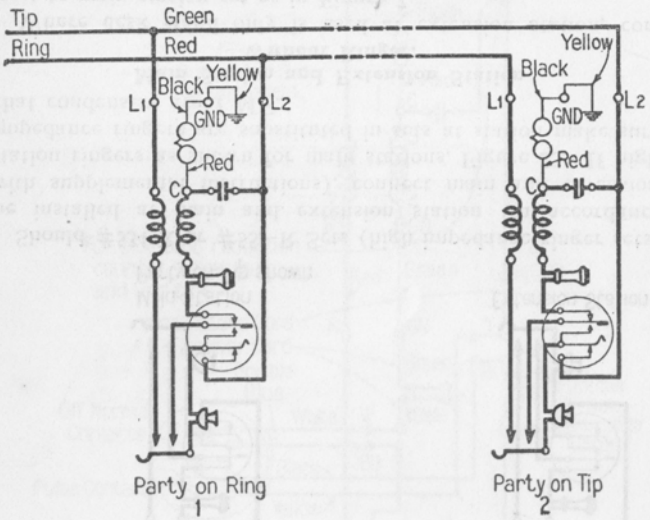


* When #50-B Apparatus Blank is used, dial is omitted; white and double blue dial leads are connected to "Rec." terminal to which white dial lead is soldered; yellow and black dial leads are connected to "Trans." terminal to which black dial lead is soldered

Should #553-R Set (high impedance ringer set) be installed, in accordance with supplemental instructions, connect as above.

Line and Ringer Connections:

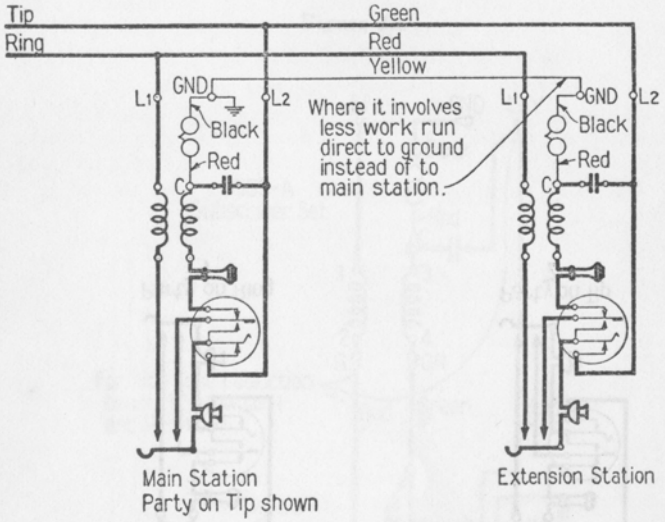
Figure 23.
Main Stations.



Two-Party Selective Flat Rate Stations:

Figure 24.

Main Station and Extension Station With Ringer.



Should #534-R or #553-R Sets (high impedance ringer sets) be installed at main and extension station (in accordance with supplemental instructions), connect main and extension station ringers as shown for main stations, Figure 23. If high impedance ringers are substituted in sets at station make sure that condensers are 1 MF.

Main Station and Extension Station Without Ringer.

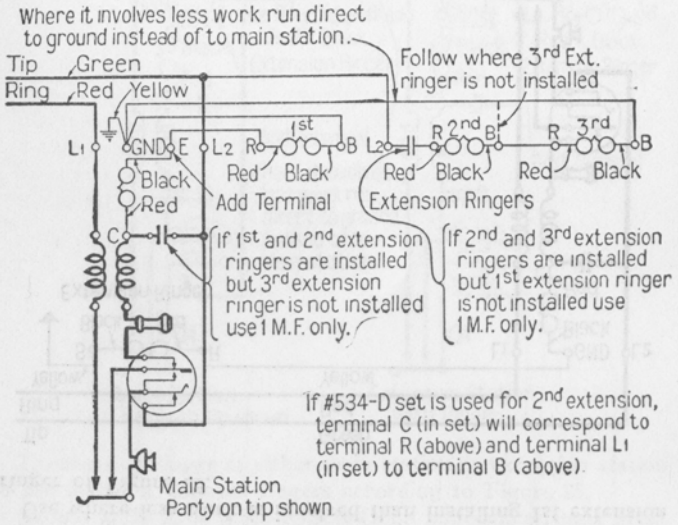
Where desk stand only is used at extension station, connect to main station set as in Figure 7.

Where desk stand with #534-C set (or equivalent) or wall set (#553-A set ringer disconnected) is used at extension station, bridge set on line same as main station set. See Section 29, page 37.

Figure 25.

Main Station With One, Two or Three Extension Ringers (Normal or Loud Ringing).

Where less work is involved with one extension ringer, cut into signaling ground wire, Figure 26.



If one or two extension ringers are installed they may be connected as shown above for 2nd or 2nd and 3rd extension ringers, with ringer at main station connected to GND instead of E, where:

(1) More than 50 feet of double wire can be saved.

(2) One-half hour's time or more can be saved.

(3) It will make a more satisfactory installation to the subscriber.

Should #534-R or #553-R Sets (high impedance ringer sets) be installed in accordance with supplemental instructions, connect normal ringing extension ringers (534-DE set) as follows:

With one extension ringer connect main station ringer to GND and first extension ringer (534-DE set) in parallel

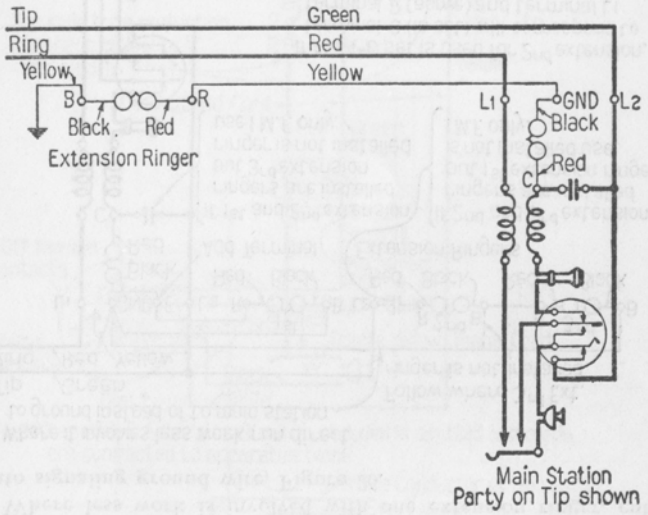
Two-Party Selective Flat Rate Stations:

with main station ringer. With two extension ringers use #534-DE Set, equipped with condenser, connecting it as shown above for 2nd extension ringer. With three extension ringers, connect third extension ringer (#534-DE set) in parallel with second extension ringer.

If high impedance ringers are substituted in sets at station make sure that condensers are 1 MF.

Figure 26.
Main Station With Extension Ringer Cut Into Signaling Ground Wire.

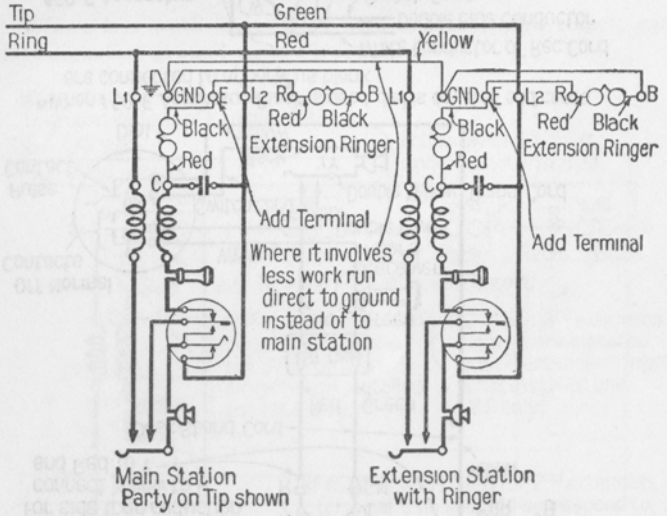
Use where less work is involved than installing 1st extension ringer of Figure 25.



Do not use where main station has #534-R or #553-R Sets (high impedance ringer sets).

Figure 27.

Main Station and Extension Station With Extension Ringers.



If extension ringer at either main station or extension station is not installed, connect ringers according to Figure 25.

Should #534-R or #553-R Sets (high impedance ringer sets) be installed (in accordance with supplemental instructions) at main and extension stations, connect main and extension station ringers to GND and extension ringers (#534-DE sets or equivalent) in parallel with main and extension set ringers. If high impedance ringers are substituted in sets at station make sure that condensers are 1 MF.

33. Two-Party Selective Message Rate Stations.

The connections for tip and ring stations differ in order to obtain selective control of the operation of the central office message registers. It is **accordingly essential that the special tests given on page 68 for Party on Ring and Party on Tip be made with the greatest care.**

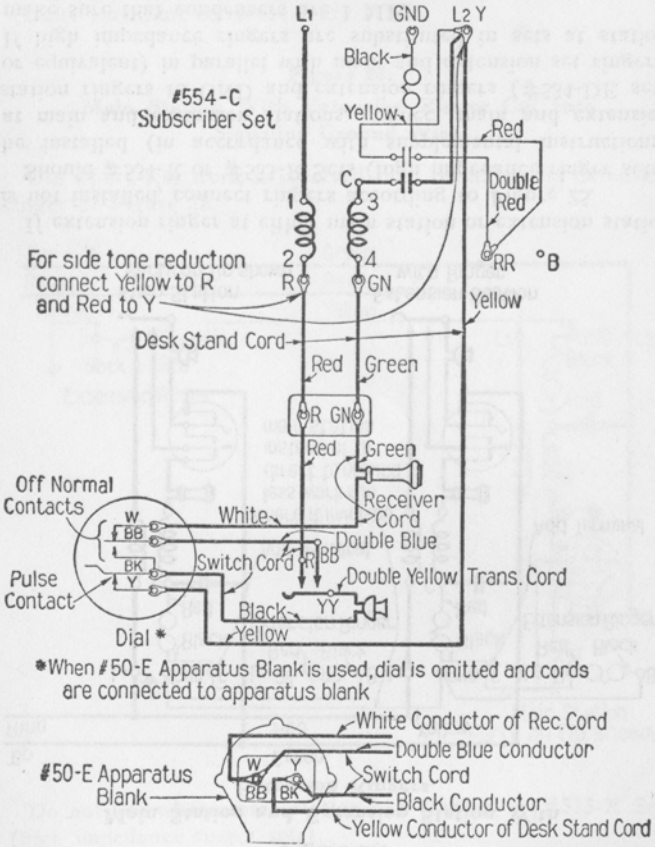
Two-Party Selective Message Rate Stations.

Desk Stand Connections:

Figure 29.

#51-AL Desk Stand—Party on Ring.

Double Condenser (1 MF-1 MF) Subscriber Set.

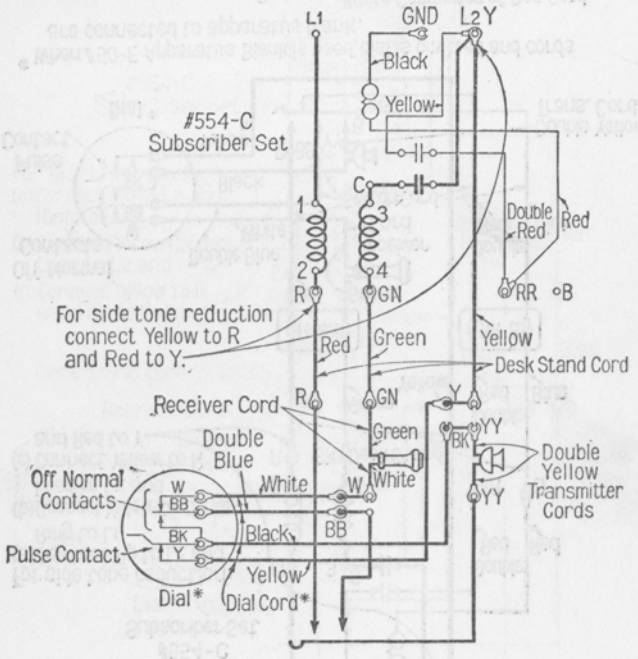


Before leaving station make special tests given on page 68.

Figure 30.

#50-AL Desk Stand—Party on Ring

Double Condenser (1 MF-1 MF) Subscriber Set.



* When #50-D Apparatus Blank is used, dial and dial cord are omitted and terminal "W" is strapped to terminal "BB" and terminal "Y" to terminal "BK" on back of rack.

○ Terminal on front of rack.
● Terminal on back of rack.

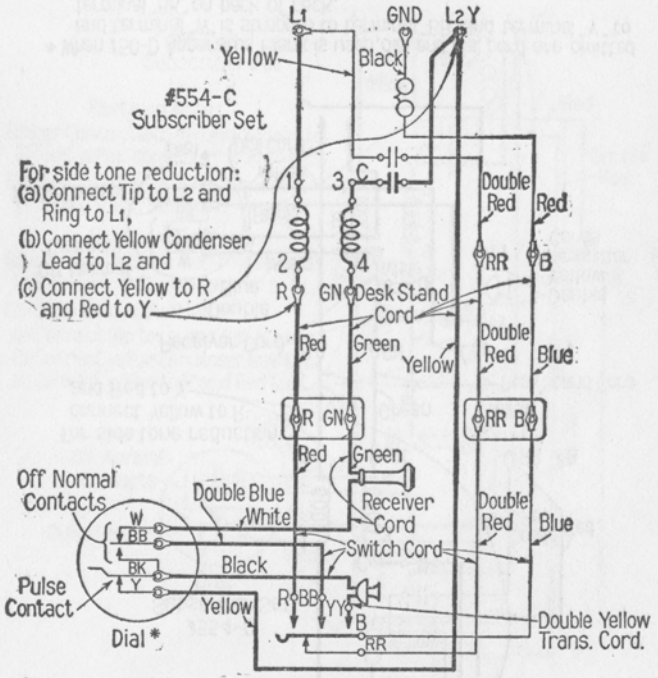
Before leaving station make special tests given on page 68.

Two-Party Selective Message Rate Stations:

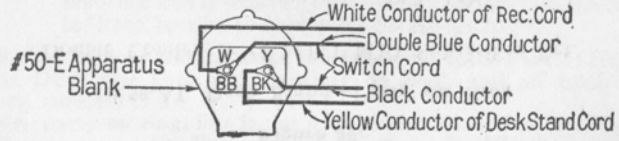
Figure 31.

#51-C Desk Stand—Party on Tip.

Back Contact Desk Stand and Double Condenser (1 MF-1 MF) Subscriber Set.



* When #50-E Apparatus Blank is used, dial is omitted and cords are connected to apparatus blank.

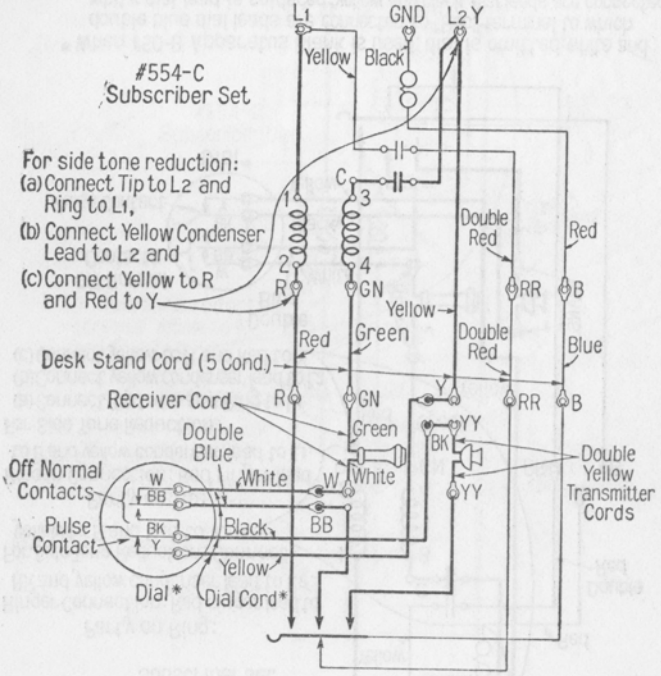


Before leaving station make special tests given on page 68.

Figure 32.

#50-C Desk Stand—Party on Tip

Back Contact Desk Stand and Double Condenser (1 MF-1 MF) Subscriber Set.



* When #50-D Apparatus Blank is used, dial and dial cord are omitted and terminal "W" is strapped to terminal "BB" and terminal "Y" to terminal "BK" on back of rack

° Terminal on front of rack.
• Terminal on back of rack.

Before leaving station make special tests given on page 68.

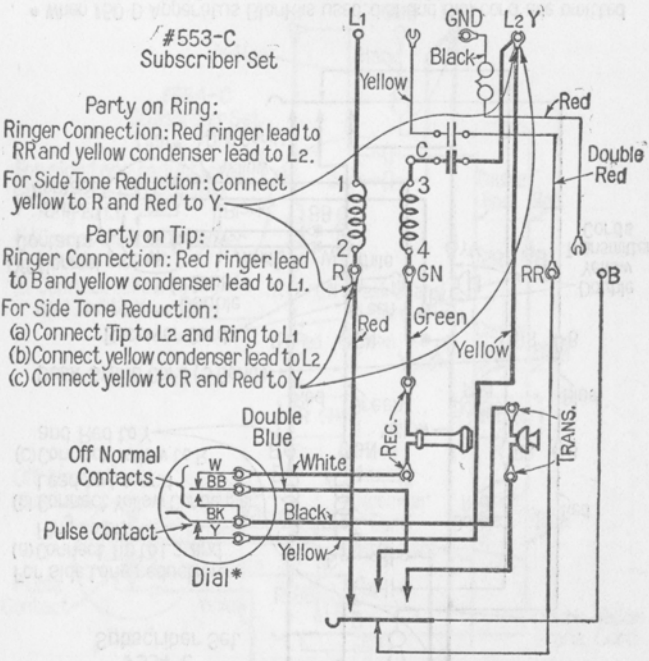
Two-Party Selective Message Rate Stations.

Wall Set Connections:

Figure 33.

Party on Ring and Party on Tip.

Double Condenser (1 MF-1 MF) Subscriber Set.



* When #50-B Apparatus Blank is used, dial is omitted; white and double blue dial leads are connected to "Rec." terminal to which white dial lead is soldered; yellow and black dial leads are connected to "Trans." terminal to which black dial lead is soldered.

Before leaving station make the following special tests: Have Test Desk test both with receiver on hook and off hook to make sure that:

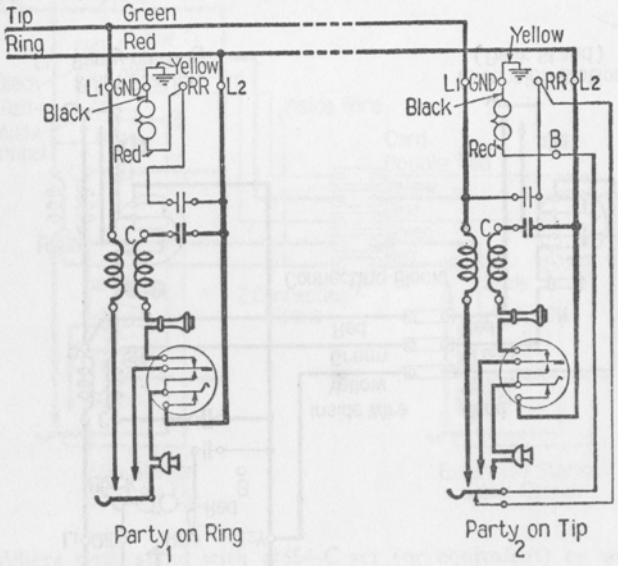
For party on ring, line is not grounded under either condition.

For party on tip, line is grounded through 1000-ohm ringer

when receiver is off hook and clear of ground when receiver is on hook.

Make test at both main and extension stations.

Line and Ringer Connections:
Figure 34.
Main Stations.



Main Station and Extension Station With Ringer.

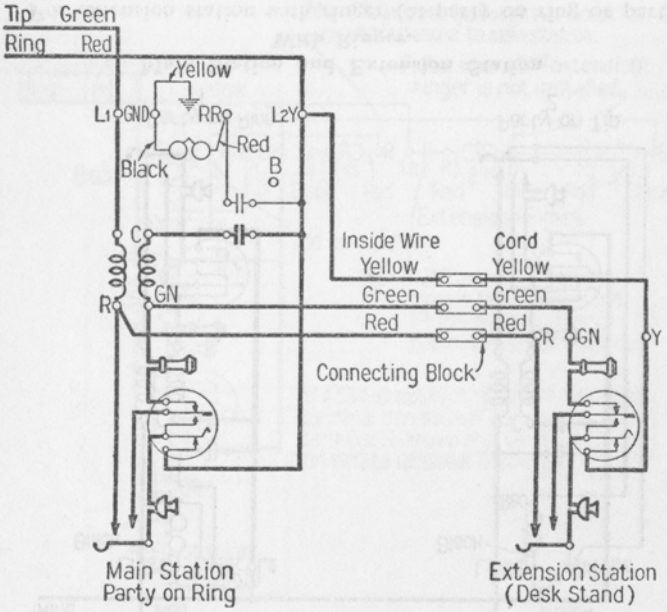
For extension station with ringer (at party on ring or party on tip) bridge set on line and make ringer connections same as main station set for that party.

If key is installed for temporarily silencing ringer in set at main or extension station on tip side, key must be wired so that it cuts in 1000-ohm dummy ringer (see Section 39, pages 99 and 100) in place of ringer to be silenced. In making special tests (page 68) with Test Desk make sure that line is grounded through 1000-ohm ringer with key in both normal and operated positions.

Two-Party Selective Message Rate Stations:

Figure 35.

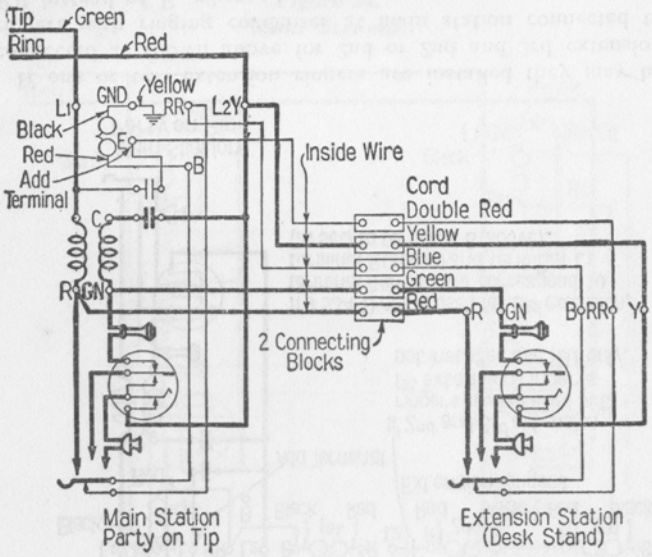
Main Station and Extension Station Without Ringer—Party on Ring.



Where desk stand with #554-C set (or equivalent) (ringer disconnected) or wall set (#553-C set with ringer disconnected) is used at extension station, bridge set on line same as main station set.

Figure 36.

Main Station and Extension Station Without Ringer—Party on Tip.

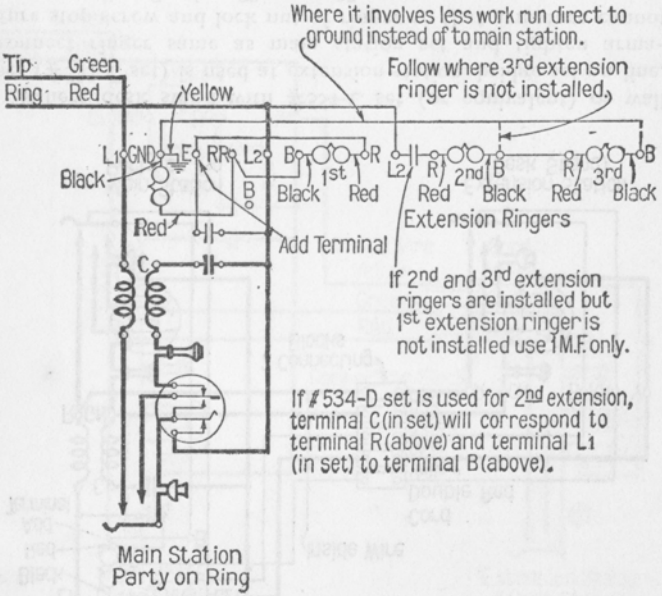


Where desk stand with #554-C set (or equivalent) or wall set (#553-C set) is used at extension station, bridge set on line, connect ringer same as main station set and tighten armature stop screw and lock nut of ringer so that armature cannot operate. See Section 29, page 37.

Two-Party Selective Message Rate Stations:

Figure 37.

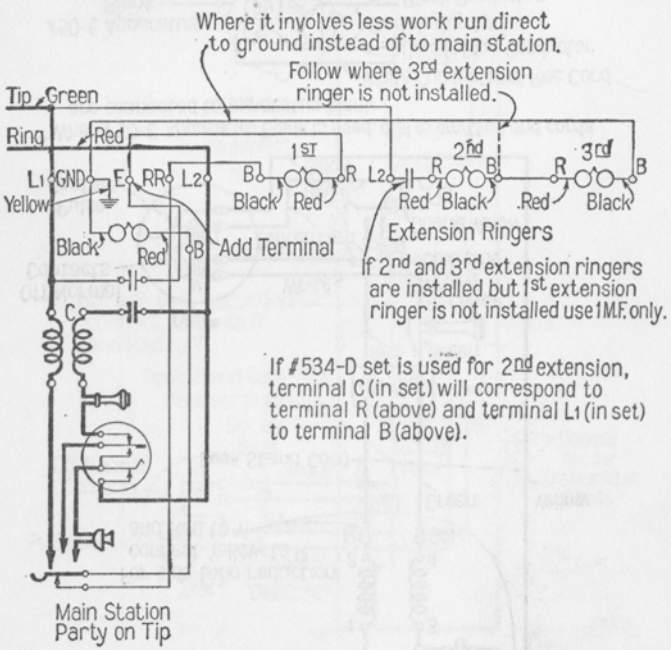
Main Station With One, Two or Three Extension Ringers (Normal or Loud Ringing)— Party on Ring.



If one or two extension ringers are installed they may be connected as shown above for 2nd or 2nd and 3rd extension ringers with ringing condenser at main station connected to RR instead of E, where:

(1) More than 50 feet of double wire can be saved.
(2) One-half hour's time or more can be saved.
(3) It will make a more satisfactory installation to the subscriber.

Figure 38.
Main Station With One, Two or Three Extension Ringers (Normal or Loud Ringing)— Party on Tip.



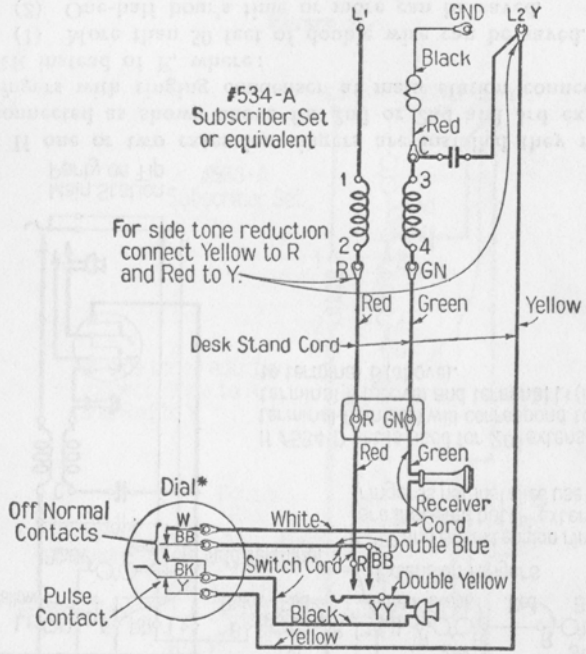
If one or two extension ringers are installed they may be connected as shown above for 2nd or 2nd and 3rd extension ringers with ringing condenser at main station connected to RR instead of E, where:

(1) More than 50 feet of double wire can be saved.
(2) One-half hour's time or more can be saved.
(3) It will make a more satisfactory installation to the subscriber.

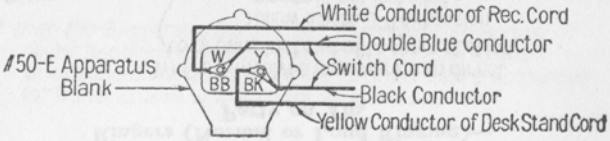
Main Station and Extension Station With Extension Ringers.

Connect extension ringers same as 1st and 3rd extension ringers, Figure 38. Connect ringer of extension set same as 2nd extension ringer, Figure 38.

34. Four-Party Semi-Selective Stations: Desk Stand Connections; Figure 39. #51-AL Desk Stand

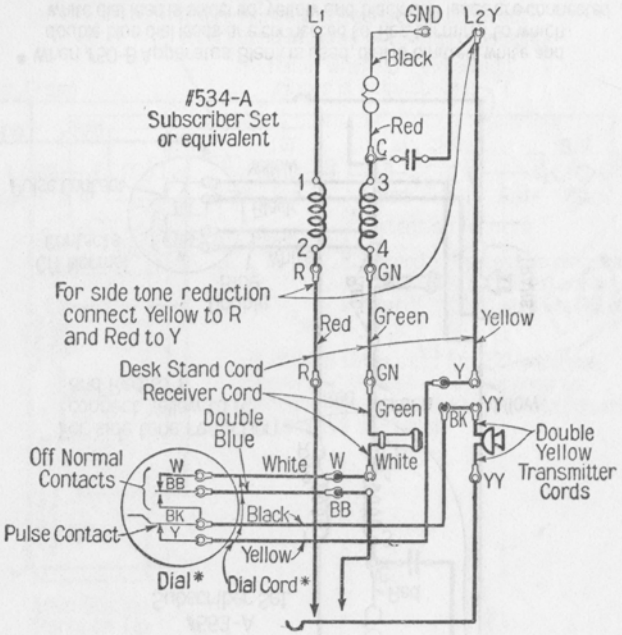


* When #50-E Apparatus Blank is used, dial is omitted and cords are connected to apparatus blank



Should #534-R (high inpedance ringer set) be installed in accordance with supplemental instructions, connect as above.

Figure 40.
#50-AL Desk Stand.



* When #50-D Apparatus Blank is used, dial and dial cord are omitted and terminal "W" is strapped to terminal "BB" and terminal "Y" to terminal "BK" on back of rack.

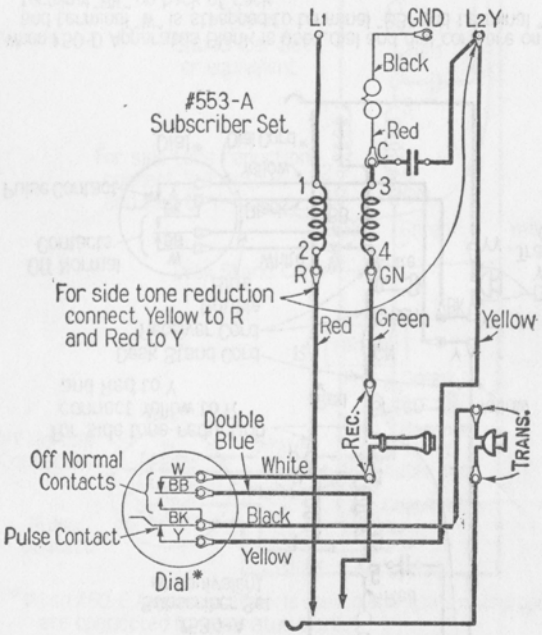
○ Terminal on front of rack.
● Terminal on back of rack.

Should #534-R Set (high impedance ringer set) be installed in accordance with supplemental instructions, connect as above.

Four-Party Semi-Selective Stations.

Wall Set Connections:

Figure 41.



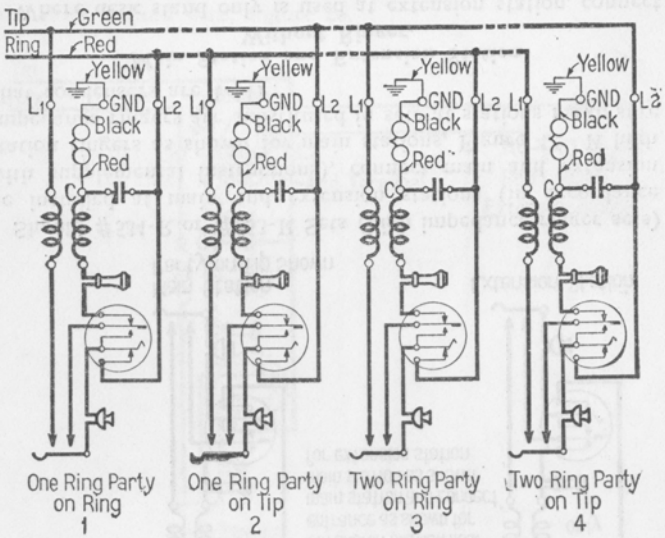
* When #50-B Apparatus Blank is used, dial is omitted; white and double blue dial leads are connected to "Rec." terminal to which white dial lead is soldered; yellow and black dial leads are connected to "Trans." terminal to which black dial lead is soldered

Should #553-R Set (high impedance ringer set) be installed, in accordance with supplemental instructions, connect as above.

Line and Ringer Connections:

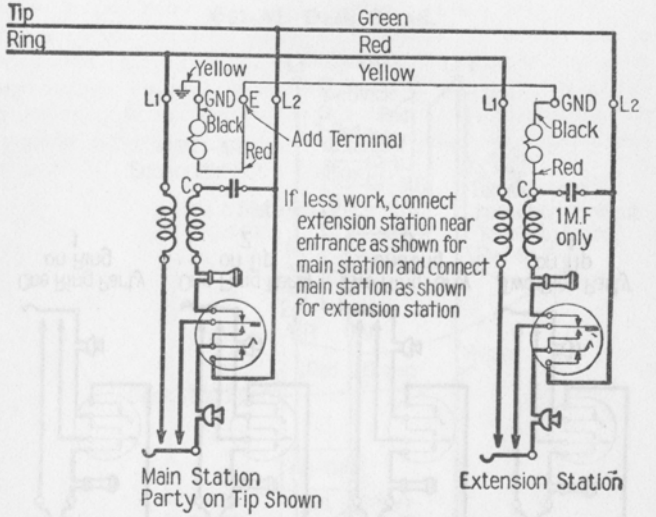
Figure 42.

Main Stations.



Four-Party Semi-Selective Stations:

Figure 43.
Main Station and Extension Station With Ringer.



Should #534-R or #553-R Sets (high impedance ringer sets) be installed at main and extension stations (in accordance with supplemental instructions), connect main and extension station ringers as shown for main stations, Figure 42. If high impedance ringers are substituted in sets at stations make sure that condensers are 1 MF.

Main Station and Extension Station Without Ringer.

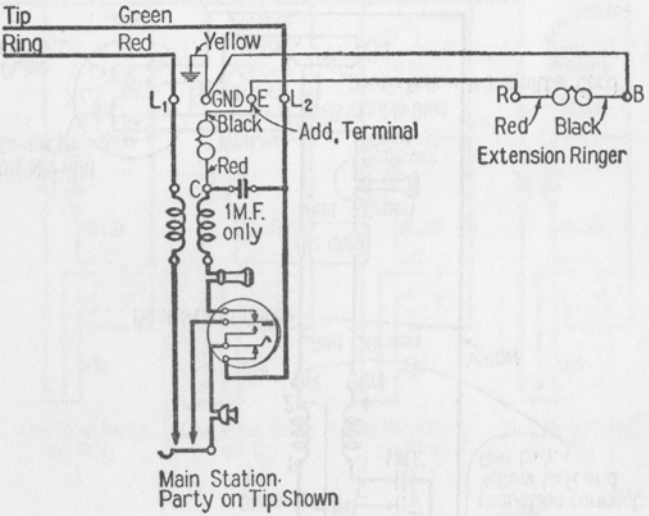
Where desk stand only is used at extension station, connect to main station set as in Figure 7.

Where desk stand with #534-C set (or equivalent) or wall set (#553-A set with ringer disconnected) is used at extension station, bridge set on line same as main station set. See Section 29, page 37.

Figure 44.

Main Station With Extension Ringer (Normal or Loud Ringing).

Where less work would be involved cut extension ringer into signaling ground wire, Figure 26.

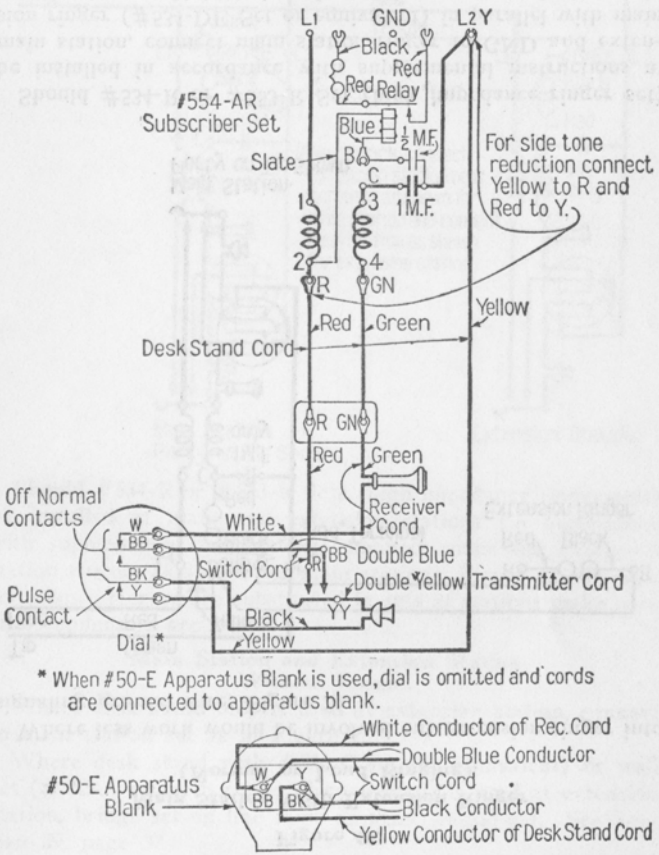


Should #534-R or #553-R Set (high impedance ringer set) be installed in accordance with supplemental instructions at main station, connect main station ringer to GND and extension ringer (#534-DE Set or equivalent) in parallel with main station ringer. If high impedance ringers are substituted in sets at station make sure that condensers are 1 MF.

35. Four-Party Selective Stations.

Desk Stand Connections:

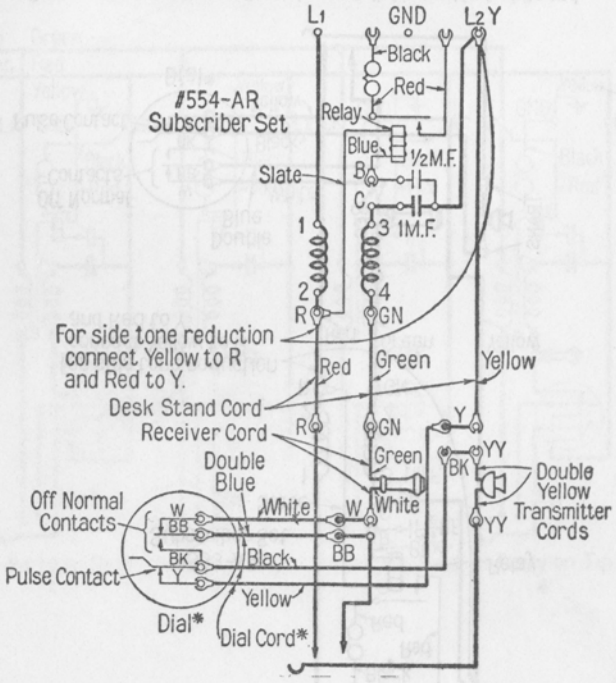
Figure 45.
#51-AL Desk Stand.



* When #50-E Apparatus Blank is used, dial is omitted and cords are connected to apparatus blank.

Figure 46.

#50-AL Desk Stand.



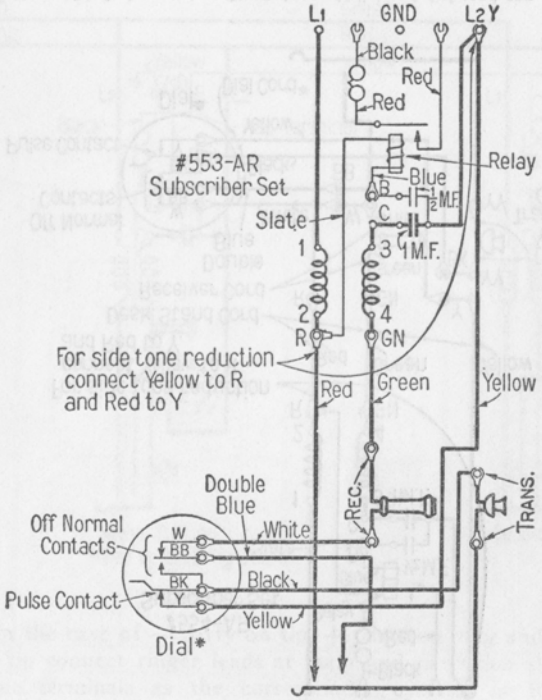
*When #50-D Apparatus Blank is used, dial and dial cord are omitted and terminal "W" is strapped to terminal "BB" and terminal "Y" to terminal "BK" on back of rack.

○ Terminal on front of rack.
● Terminal on back of rack.

Four-Party Selective Stations.

Wall Set Connections:

Figure 47.

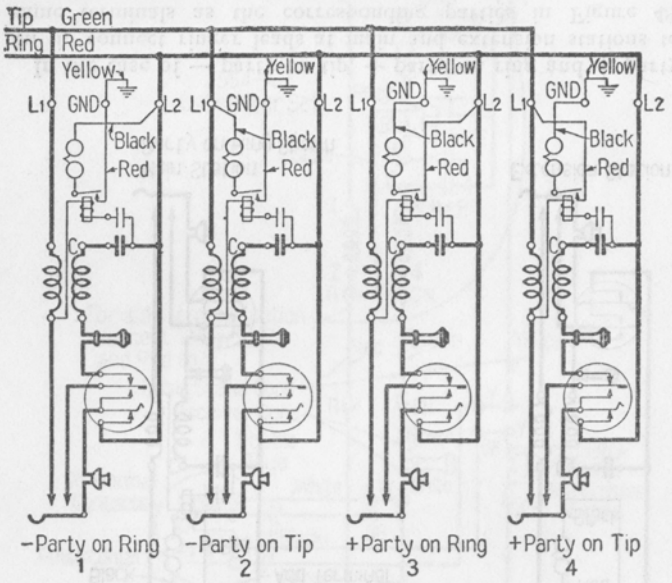


*When #50-B Apparatus Blank is used, dial is omitted; white and double blue dial leads are connected to "Rec." terminal to which white dial lead is soldered; yellow and black dial leads are connected to "Trans." terminal to which black dial lead is soldered.

Line and Ringer Connections:

Figure 48.

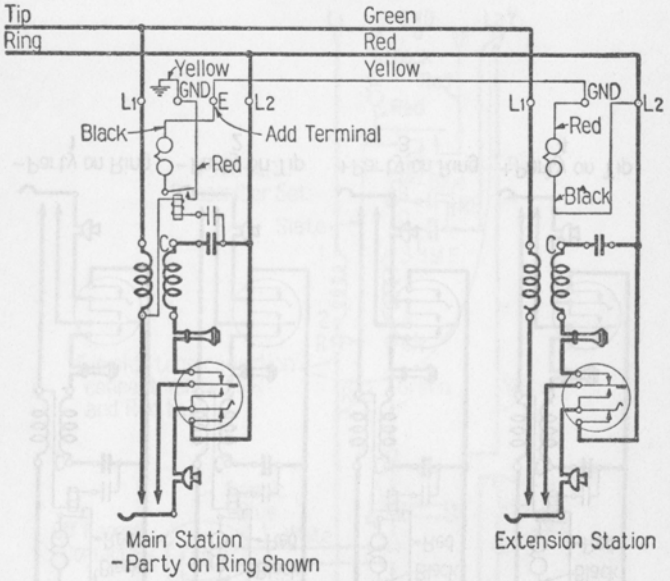
Main Stations.



Four Party Selective Stations:

Figure 49.

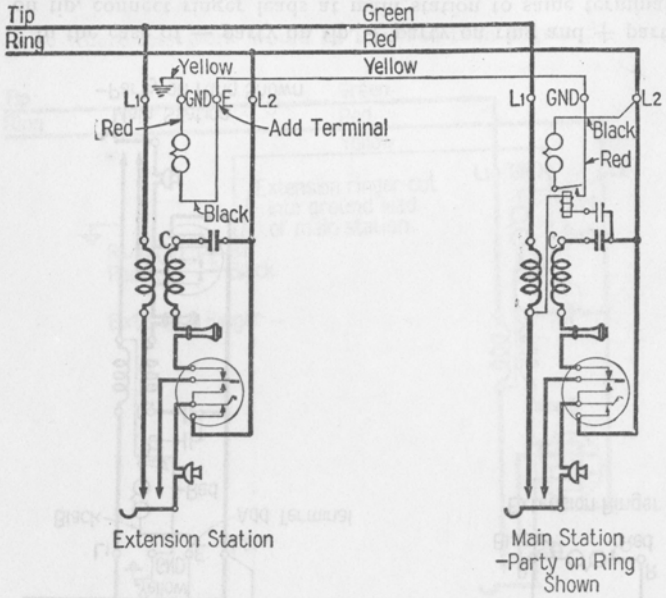
Main Station and Extension Station With Ringer.



In the case of — party on tip, + party on ring and + party on tip connect ringer leads at main and extension stations to same terminals as the corresponding parties in Figure 48, except that at main station lead connected to line should be connected to "E."

Figure 50.
Main Station and Extension Station With Ringer—Extension Station Near Entrance.

Use where it involves less work than Figure 49.



In the case of — party on tip, + party on ring and + party on tip connect ringer leads at main and extension stations to same terminals as the corresponding parties in Figure 48, except that at extension station lead connected to line should be connected to "E."

Main Station and Extension Station Without Ringer.

Where desk stand only is used at extension station, connect to main station set as in Figure 7.

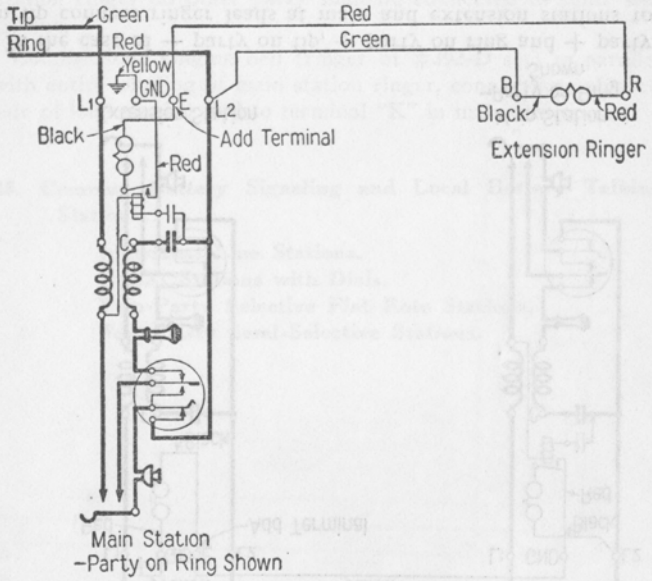
Where desk stand with #534-C set (or equivalent) or wall set (#553-A set with ringer disconnected) is used at extension station, bridge set on line same as main station set. See Section 29, page 37.

Four-Party Selective Stations:

Figure 51.

Main Station With Extension Ringer (Normal Ringing).

Where less work would be involved cut extension ringer into signaling ground wire, Figure 52.

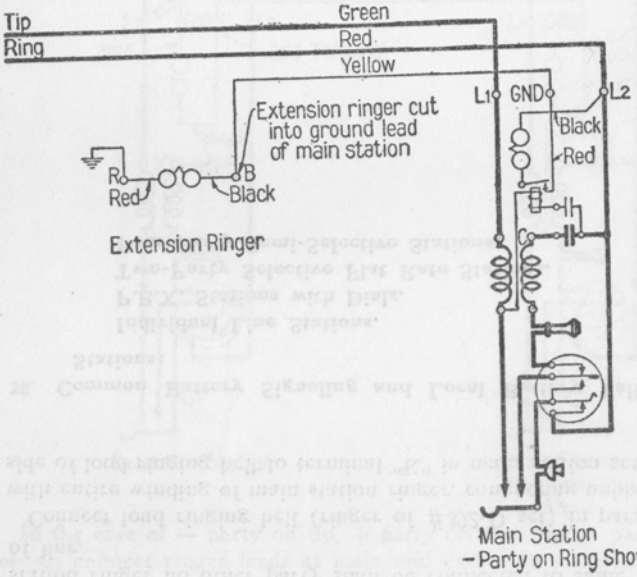


In the case of — party on tip, + party on ring and + party on tip, connect ringer leads at main station to same terminals as the corresponding parties in Figure 48, except that ringer lead connected to line should be connected to "E." Connect one extension ringer lead to line terminal as in Figure 48 and connect other extension ringer lead to "E."

Figure 52.

Main Station With Extension Ringer Cut Into Signaling Ground Wire. (Normal Ringing).

Use where less work would be involved than Figure 51.



In the case of — party on tip, + party on ring and + party on tip, connect ringer leads at main station to same terminals as the corresponding parties in Figure 48. Connect one extension ringer lead to ground connection as in corresponding parties in Figure 48 and connect other extension ringer lead to "GND" terminal.

Four-Party Selective Stations:

Main Station With Extension Ringer (Loud Ringing).

Where loud ringing bell only is required, connect ringer of #392-D set in place of main station ringer.

Where loud ringing bell is required in addition to main station ringer no other party shall be connected to same side of line.

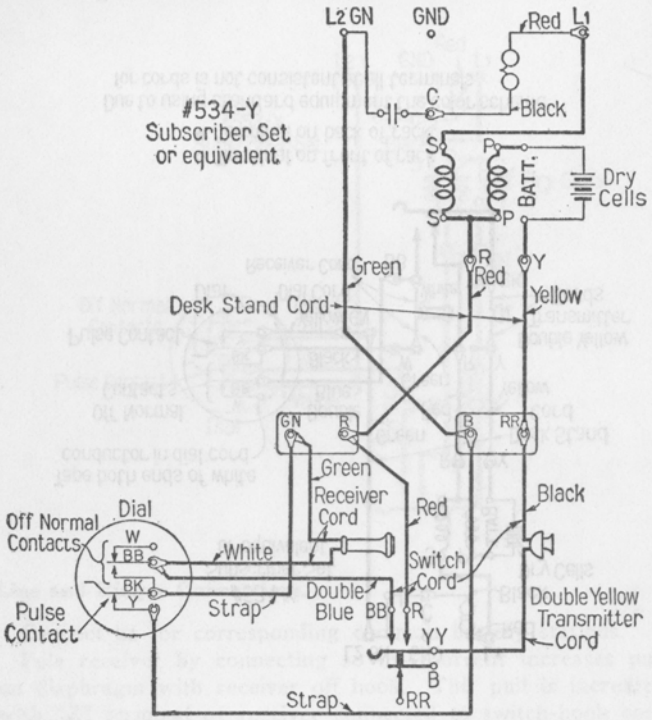
Connect loud ringing bell (ringer of #392-D set) in parallel with entire winding of main station ringer, connecting unbiased side of loud ringing bell to terminal "K" in main station set.

36. Common Battery Signaling and Local Battery Talking Stations:

Individual Line Stations.
P.B.X. Stations with Dials.
Two-Party Selective Flat Rate Stations.
Four-Party Semi-Selective Stations.

Desk Stand Connections:
Figure 53.
#51-CN Desk Stand

Ringer shown connected as for Individual Line Stations.



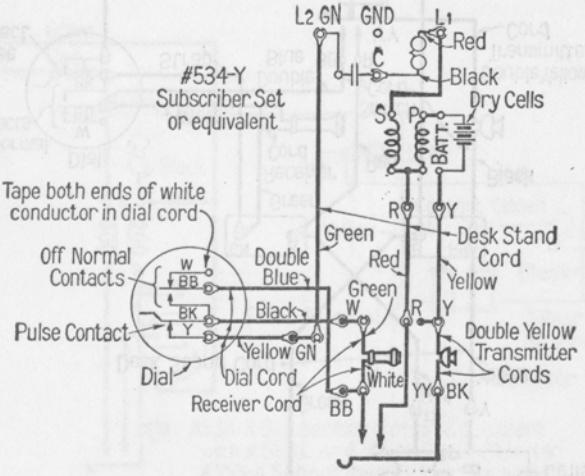
If #51-CN stand is not available, #51-C may be used and connected as above except that on the rack the red switch cord terminal should be connected to "YY" and the double yellow transmitter cord terminal to "B".

Due to using standard equipment the color scheme for cords is not consistent at all terminals.

Common Battery Signaling Local Battery Talking Stations:

Figure 54.
#50-AL Desk Stand

Ringer shown connected as for Individual Line Stations.



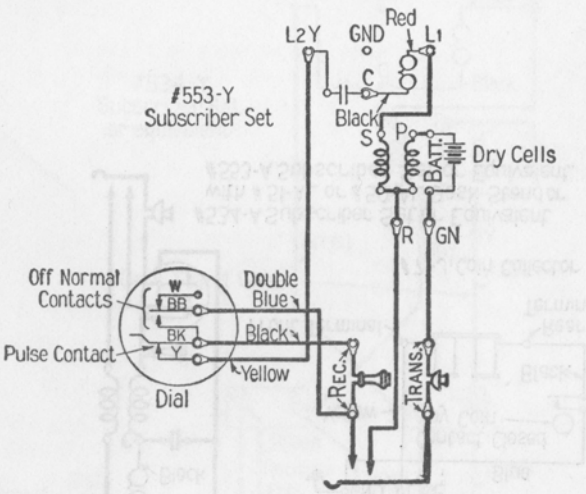
o Terminal on front of rack
• Terminal on back of rack

Due to using standard equipment the color scheme for cords is not consistent at all terminals.

Wall Set Connections:

Figure 55.

Ringer connected as for Individual Line Stations.



Line and Ringer Connections.

Connect as for corresponding common battery stations.

Pole receiver by connecting so line current increases pull on diaphragm with receiver off hook. This pull is increased with "Z" terminal of receiver connected to switch-hook contact when ring of line is connected to L1. When line is reversed at two-party selective and four-party semi-selective stations, connect "Z" terminal of receiver to "BK" terminal of dial.

37. Coin Collector Stations:

#7 Type Single-Coin Collectors at Individual Line Stations.

Figure 56.

#7-J Coin Collector With Desk Set or Wall Set.

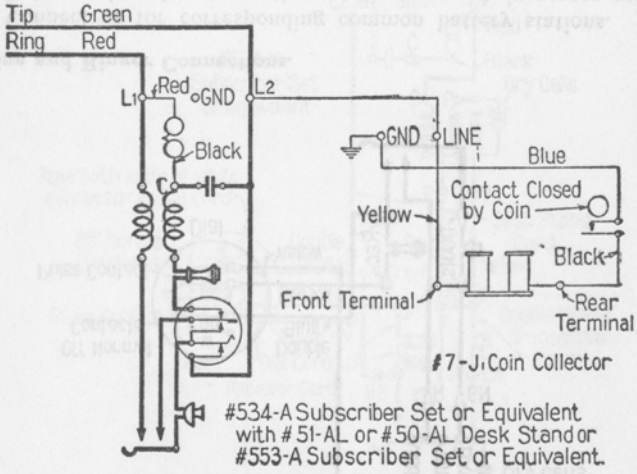
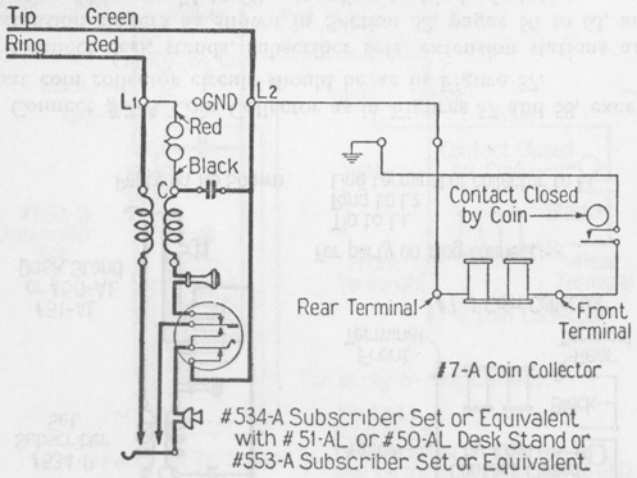


Figure 57.

#7-A Coin Collector With Desk Set or Wall Set.

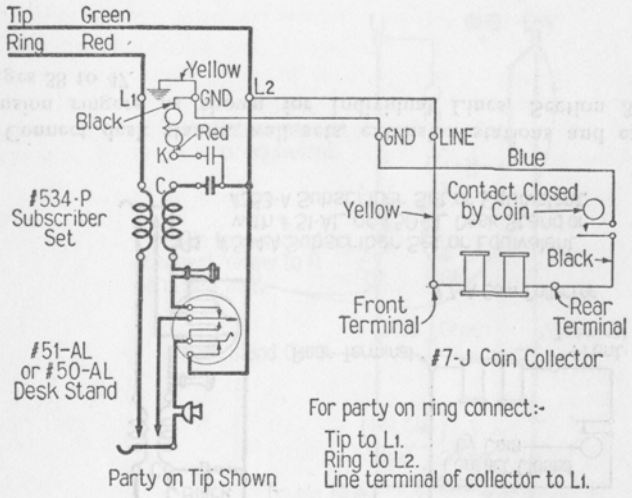


Connect desk stands, wall sets, extension stations and extension ringers as shown for Individual Lines, Section 30, pages 38 to 47.

Coin Collector Stations:

#7 Type Single-Coin Collectors at Two-Party Selective and Four-Party Semi-Selective Stations.

Figure 58.
#7-J Coin Collector With Desk Set.

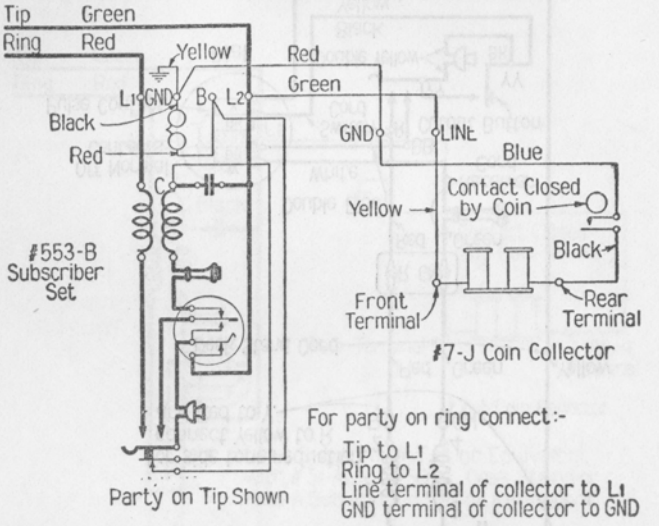


Connect #7-A Coin Collector as in Figures 57 and 58, except that coin collector circuit should be as in Figure 57.

Connect desk stands, subscriber sets, extension stations and extension ringers as shown in Section 32, pages 56 to 63, and Section 34, pages 74 to 79, according to kind of station.

Figure 59.

#7-J Coin Collector With Wall Set.



Connect #7-A Coin Collector as in Figures 57 and 58 except that coin collector circuit should be as in Figure 57.

Connect wall sets, extension stations and extension ringers as shown in Section 32, pages 56 to 63, and Section 34, pages 74 to 79, according to kind of station.

38. Desk Stands With Transmitter Cut-Out Buttons.

This type of stand is to be used only under special conditions as required by MANUAL STATIONS.

Individual Line Stations.

P.B.X. Stations with Dials.

Two-Party Selective Flat Rate Stations.

Two-Party Selective Message Rate Stations—Party on Ring.*

Four-Party Semi-Selective Stations.

Four-Party Selective Stations.

*There is no standard back contact stand with cut-out button for Two-Party Selective Message Rate Stations—Party on Tip.

Desk Stands With Transmitter Cut-Out Buttons.

Desk Stand Connections:

Figure 60.

#51-CM Desk Stand.

Individual Line Station Shown.

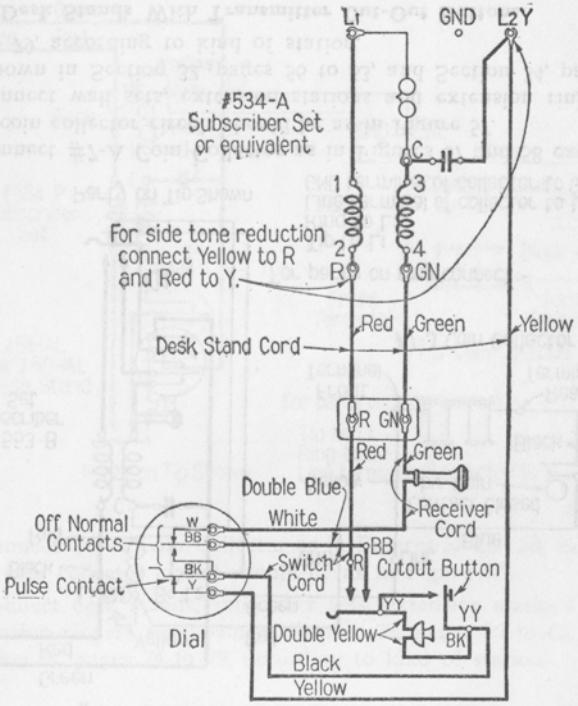
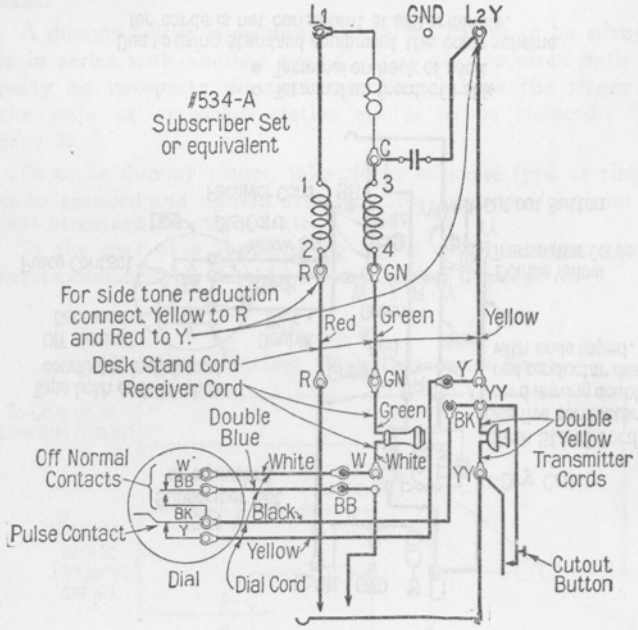


Figure 61.
#50-CM Desk Stand

Individual Line Station shown



○ Terminal on front of rack.
● Terminal on back of rack.

Line and Ringer Connections:

Connect same as for corresponding stations without cut-out buttons.

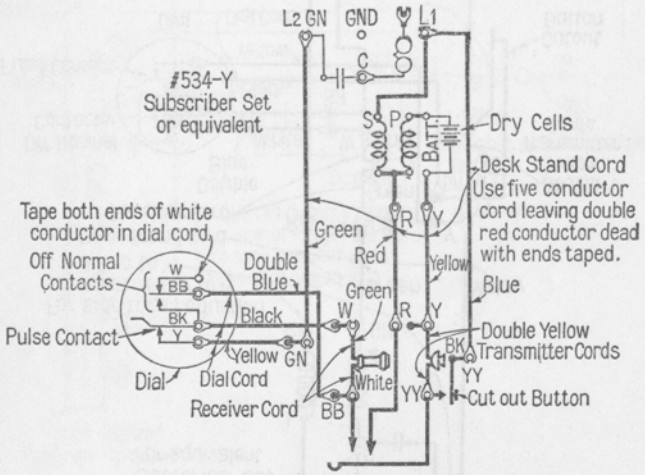
Desk Stands With Transmitter Cut-Out Buttons:

Common Battery Signaling and Local Battery Talking Stations:

Figure 62.

#50-CM Desk Stand.

This is the only cut-out button stand for these stations.



o Terminal on front of rack
• Terminal on back of rack

Due to using standard equipment the color scheme for cords is not consistent at all terminals.

39. Keys and Switches to Silence Ringers—All Stations.

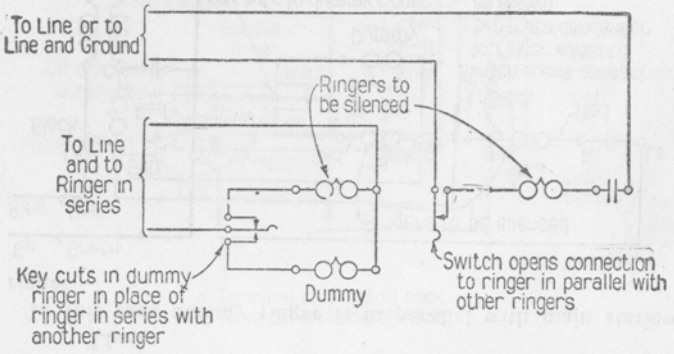
Keys and switches may be installed for temporarily cutting out ringers at main stations, extension stations or extension ringers. Where this is done the arrangement should insure at least one ringer connected to the line at all times to receive calls.

A dummy ringer is required where the ringer to be silenced is in series with another ringer. It is also required with tip party on two-party message rate lines where the ringer at the main or extension station set is to be silenced. See page 69.

To make dummy ringer, take ringer of same type as ringer to be silenced and tighten armature stop screw and locknut so that armature cannot operate.

In the case of a loud ringing bell a normal ringer of the corresponding type should be used for the dummy.

Figure 63.
All Ringers Except High Impedance Type.



The use of an extension ringer set with condenser is preferable to the use of a dummy ringer.

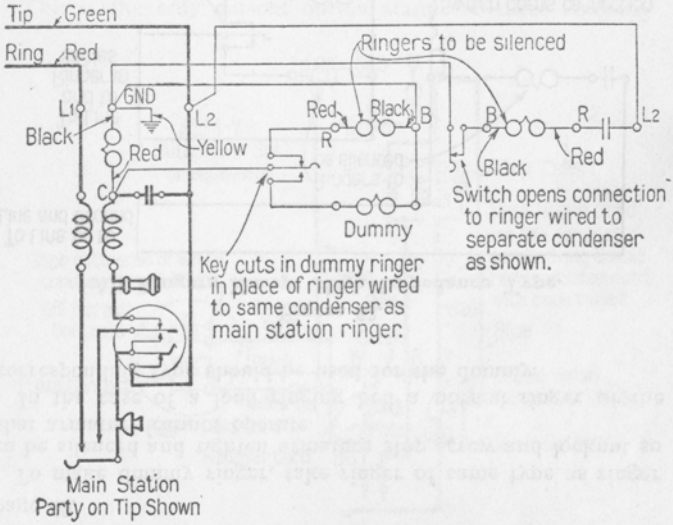
For line and ringer connections and condensers required, see main and extension station connections applying to class of line on which ringer or ringers are to be silenced.

Keys and Switches to Silence Ringers:

Figure 64.

Where high impedance ringers are used on Two-Party Selective Flat Rate and Four-Party Semi-Selective Lines.

In this case dummy ringer is in parallel with main station ringer.



MAINTENANCE

40. Avoiding Interference with Subscriber's Service:

Disconnect leads from "R" and "Y" terminals in set or red and yellow conductors at connecting block while working on desk stands or sets so that switchhook operation or short circuiting of terminals will not cause interference with incoming calls or false operation of central office apparatus.

In using hand test set do not bridge on line without condenser in series until sure that line is not in use.

41. Receivers and Transmitters:

If defective, replace with #144 Receiver, #323, #329 or #337 Transmitter as required by the **approved transmission zoning practice.**

Maintain transmitters, receivers, cords, etc., according to standard practices. Be sure that receiver caps are tight.

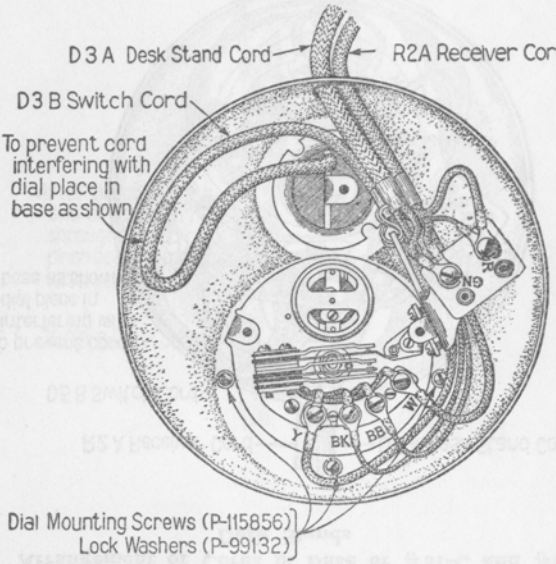
Should subscriber complain of loud side tone, follow MANUAL STATIONS except in Step-by-Step areas. See Section 28, page 36.

42. Adjustment of Relays and Ringers:

See ADJUSTMENT OF STATION APPARATUS.

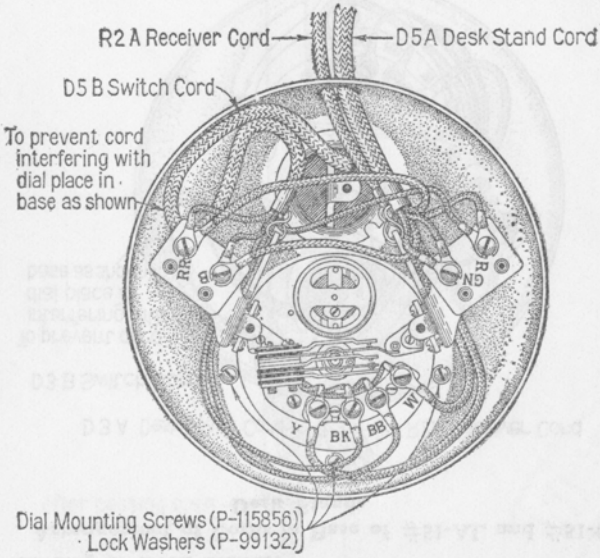
43. Cording of Desk Stands:

Arrangement of Cords in Base of #51-AL and #51-CM Desk Stands



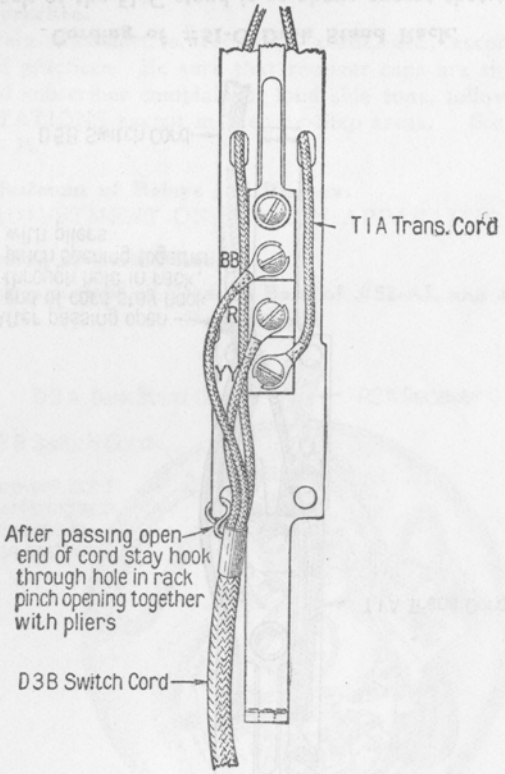
After passing open ends of cord stay hooks through hole in bracket, pinch openings together with pliers.

Arrangement of Cords in Base of #51-C and #51-CN Desk Stands

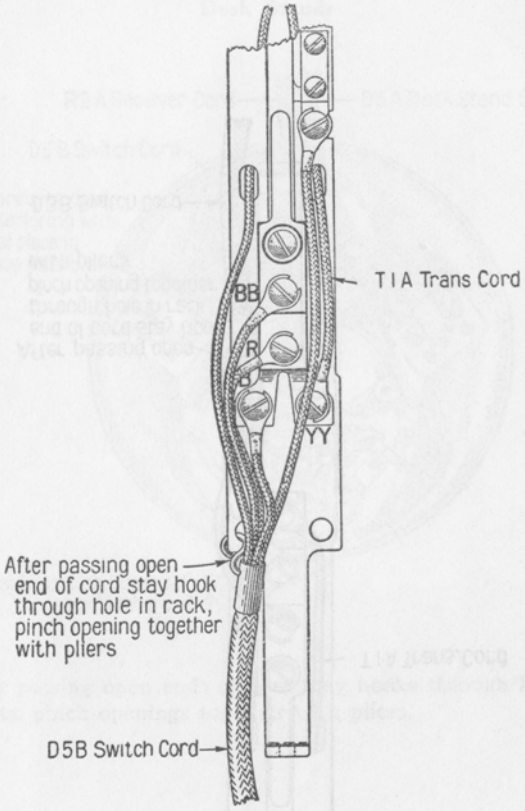


After passing open ends of cord stay hooks through holes in brackets, pinch openings together with pliers.

Cording of #51-AL Desk Stand Rack.



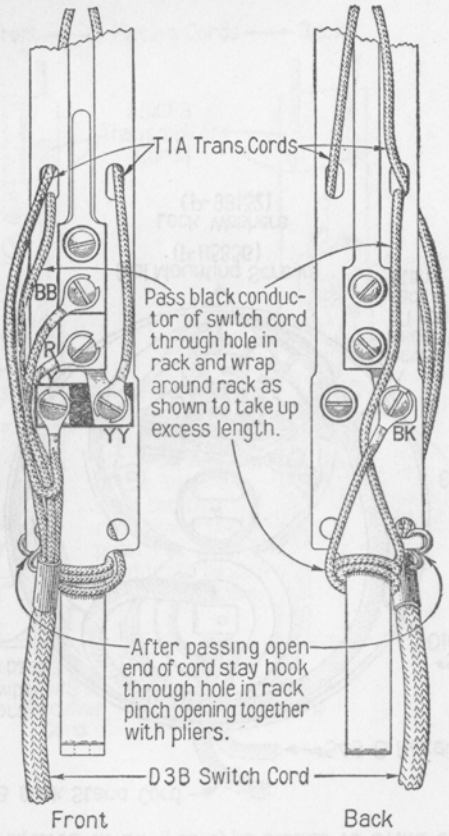
Cording of #51-CN Desk Stand Rack.



Cording of #51-C Desk Stand Rack.

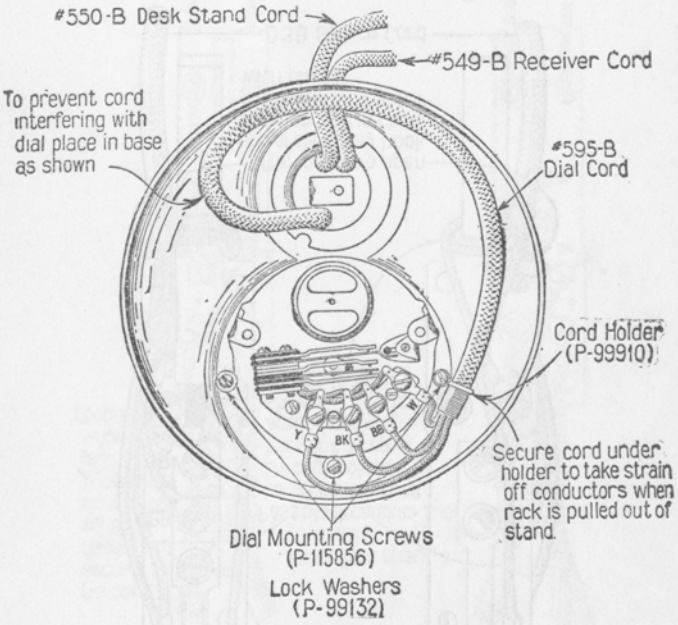
The rack of the 51-C stand is as above except that the position of terminals BB and R is reversed.

Cording of #51-CM Desk Stand Rack.

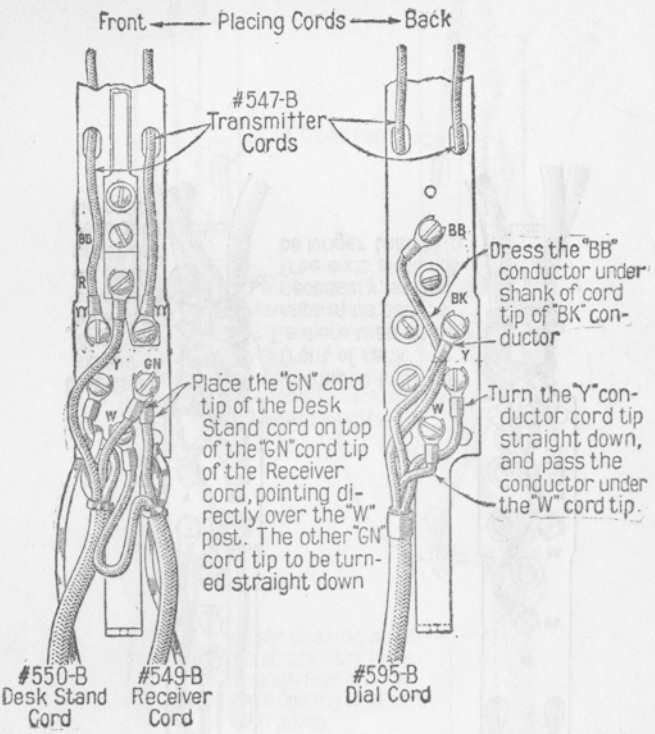


Arrangement of Cords in Base of #50 Type Desk Stands.

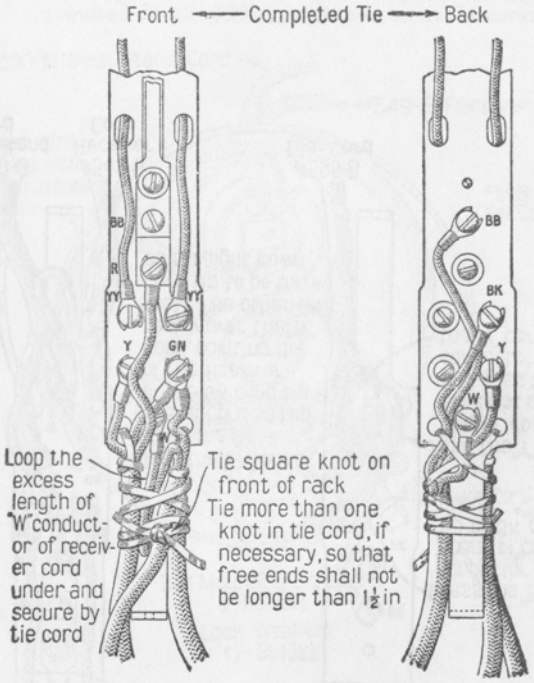
NOTE: "B" type cords which have whipped terminals are required in all #50 type stands to avoid crosses.



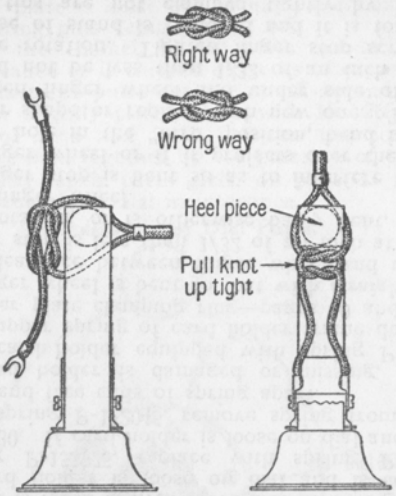
Cording of #50-AL Desk Stand Rack.



Cording of #50-AL Desk Stand Rack.



Tying Cords to #144 Receivers:



Pass one conductor on one side of heel piece and pass the other conductor on the other side of the heel piece. Tie with square knot, (see right way above), turn knot between limbs of magnet and insert spade tips under terminal screws.

44. Test for Crosses in Desk Stands:

Whenever changes are made in dials or cords, make the following test:

Connect one cord of hand test set to bare part of transmitter lug holder and the other cord to terminal L1. Remove receiver from hook and dial "9" (using desk stand dial). If loud clicks are heard in hand test set receiver there is a cross to frame of stand which must be cleared. Slight clicks will be heard even though no cross exists. Replace receiver on hook. Repeat test with cord connected to L2 instead of L1. Replace receiver on hook.

45. Dials:

Whenever a machine switching station is visited for any reason, inspect, and if necessary, repair external parts of dial as required below and clean dial number plate. If connection is established to test desk for other purposes test dial speed with Test Desk. If speed test shows dial not operating satisfactorily, adjust speed, see page 113. If connection is not established to test desk for other purposes and if satisfied that dial is operating satisfactorily, do not test speed of dial with test desk unless so instructed in supplemental instructions. **Make no adjustment of dial mechanism other than adjustment for speed.** Do not oil any parts of dial at stations.

Repair and Replacement of Dial Parts:

To avoid unnecessary replacement of dials make following repairs:

(1) If dial is loose tighten three dial mounting screws.

(2) If card holder is loose on dial and is equipped with spring P-153975, replace with spring P-172045. See page 30. If card holder is loose on dial and is equipped with spring P-172045, remove spring from card holder and bend free ends of spring apart.
If card holder is damaged or missing, replace with new card holder equipped with spring P-172045. See that upper spring of card holder frame does not touch number plate clamping ring—pages 30 and 111.

(3) If finger wheel is bent so that **with straight finger stop** the clearance between finger wheel and under side of finger stop is less than 1/32 of an inch at any point in the rotation, or is otherwise badly bent, replace with new finger wheel.

(4) If finger stop is bent so as to interfere with rotation of finger wheel or if it projects over the edge of the finger hole in the "zero" position, bend it back to its proper shape or replace with new one. The clearance between finger wheel and under side of finger stop should not be less than 1/32 of an inch at any point in the rotation. Tighten finger stop screws if loose.

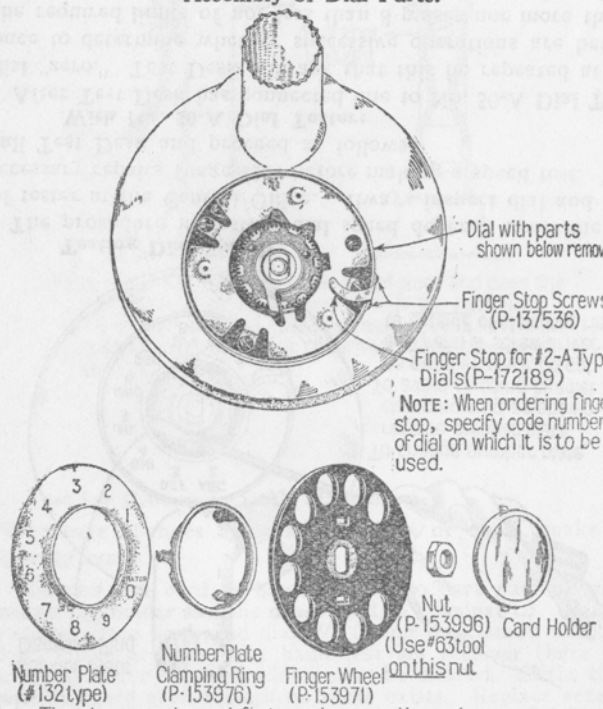
(5) If base of stand is removed and it is found that dial cord tips are not clamped tightly by dial terminal screws, tighten screws, making sure that cord tips are arranged as shown on pages 101, 102 and 106.

(6) Replace number plate with new one if:
(a) So damaged or scratched that any letters or numbers are not legible.
(b) If plate is loose due to more than one of the locating pins being broken off.
(c) If the enamel on the plate cannot be properly cleaned or is chipped off so as to expose the metal.

(7) If contacts of pulse springs or off-normal springs are dirty or slightly pitted, clean with No. 265 tool. Slide the tool back and forth between the contacts while they are held together by the pressure of their springs.

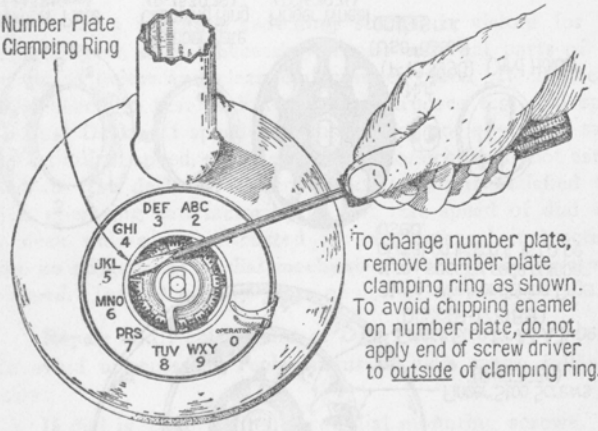
NOTE: The dial repair parts given on page 15 are required for the above dial maintenance.

Assembly of Dial Parts.



The above parts and finger stop are the only parts to be removed or replaced by repairman

Dials.



Testing Dial Speed:

The procedure in testing dial speed depends upon the type of tester at the Central Office. Always inspect dial and make necessary repairs (page 110) before making a speed test. Then call Test Desk and proceed as follows:

With No. 50-A Dial Tester:

After Test Desk has connected line to No. 50-A Dial Tester, dial "zero." Test Desk will ask that this be repeated at least once to determine whether successive operations are between the required limits of not less than 8 pulses nor more than 11 pulses per second. If dial speed is not between these limits, adjust governor—see page 113.

With No. 51-A Dial Tester:

Call Test Desk man and advise him that low speed dial is to be tested and whether it is desired to "test" or "adjust." The "adjust" limits are 9½ to 10½ and the "test" limits are 8 to 11. The test man will operate the proper keys for the test desired and associate the No. 51-A Dial Tester with the line. When the dial tester is ready to receive pulses, dial tone will be sent out over the line. When dial tone is heard, dial "zero" and listen for the audible signal which will indicate

whether the dial speed is O. K., fast or slow. The audible signals are as follows:

O. K.—Ringing Induction.
Fast—Rapidly Interrupted Dial Tone (.2 sec. on, .2 sec. off).
Slow—Slowly Interrupted Dial Tone (.15 sec. on, 1.15 sec. off).

If repeat test is desired, advise test man, who will operate the proper keys as before and when dial tone is heard, repeat test. If dial speed is not between 8 to 11 pulses per second, adjust governor as below.

Adjusting Dial Speed:

To adjust the governor, proceed as follows:

(a) Place #260 adjusting tool on governor.
(b) Loosen adjusting screw only enough to permit movement of adjusting arm with slight friction.
(c) Move adjusting arm toward "F" (to increase speed) or "S" (to reduce speed) as required.
(d) Tighten adjusting screw.
(e) Remove adjusting tool.
(f) Retest with Test Desk until speed is between the "adjust" limits, which are 9½ and 10½ pulses per second.*

*These narrower limits provide a greater margin of safety against the dial getting outside of the "test" limits.



If it is impossible to bring dial speed within the "adjust" limits or if after adjusting to them dial does not operate satis-

factorily, replace by another dial. **Do not bend or adjust any of the dial springs.**

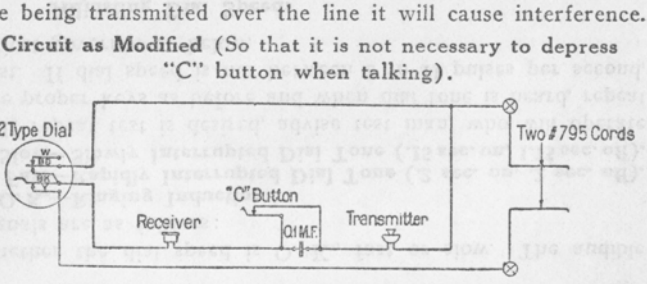
To avoid injury, carry dials in carrying case.

46. Use of Hand Test Set D-75959:

The **original set** of this type is provided with two buttons marked "C" and "R." Button "R" is not used by installers or outside repair men. Button "C," when depressed, shunts out the 1/10 MF condenser. In using this set connect cords in the usual manner and with "C" and "R" buttons normal, listen on line. If line is not in use, depress "C" button and if dial tone is heard, dial the number desired. Do not release "C" button during dialing or talking as this will release the connection in the central office. To immediately dial another number release "C" button for about two seconds, depress it and then dial. Never depress "C" button until sure that line is not in use because if dial pulses or ringing current are being transmitted over the line it will cause interference.

With the **modified set** the "R" button is omitted and the "C" button so arranged that it is not necessary to depress it when talking. In using this set depress "C" button, connect cords in the usual manner and listen on line. If line is not in use, release "C" button and if dial tone is heard, dial the number desired. Do not depress "C" button during dialing or talking as this will release the connection in the central office. To immediately dial another number, depress "C" button for about two seconds, release it and then dial. Never release "C" button until sure that line is not in use because if dial pulses or ringing current are being transmitted over the line it will cause interference.

Circuit as Modified (So that it is not necessary to depress "C" button when talking).



Test hand set dials (and if necessary adjust) with Test Desk daily when first call to test desk is made. Make test and adjustment as given in Section 45, pages 110 to 113.

47. Identifying Machine Switching Lines:

The methods of identifying these lines under various conditions are given below:

(1) Where Verification of Line (or Station) Number Only Is Desired:

(1a) If central office has number checking multiple, dial "Operator" over the line in question. Give her the central office name and line number. Ask her to verify the line number.

(1b) If central office has no number checking multiple, dial "Operator," identify yourself as telephone employee and proceed as follows:

In panel areas: Give number of line to be verified and ask to be met on this line over a cordless "B" trunk (or verifying dial trunk where there are no cordless "B" positions), cautioning her not to ring. Cut condenser of hand test set into circuit. When call comes through, cut out condenser and meet operator.

In step-by-step areas: Give number of line to be verified and ask to be met on this line over a verifying dial trunk. Keep hand test set across line with condenser cut out and meet operator when call comes through. If call does not come through, operator may be recalled by flashing with condenser button.

(2) Line Number Known, Pair Number to Be Determined: Dial Repair Clerk, give line number and obtain information from the repair file records. If verification of line number is necessary, follow (1).

(3) Pair Number Known, Line Number to Be Determined: Obtain the information from the cable records by calling the Wire Chief, Wire Chief's Clerk or Assignment Clerk, except where some other point is designated in local instructions. Verify as given under (1).

If impossible to obtain information as above, follow (4).

(4) Line and Pair Numbers Unknown, Either or Both to Be Determined:

Always follow (4a) if possible.

(4a) Have subscriber's bell rung and obtain number from subscriber as follows:

In panel areas dial "Operator" over the pair in question and ask her to ring back on line.

In step-by-step areas having no message rate service, dial Ring Back Codes. (See page 32.) In step-by-step areas where message rate service is given, follow (4b).

Remain on line with condenser of hand test set cut into circuit. When subscriber answers, cut out condenser and obtain line number. Verify line number as given under (1). If subscriber does not answer, follow (4b). If pair number also is desired, follow (2) after obtaining line number.

(4b) Dial Sender Monitor (panel areas) or Test Desk (step-by-step areas) and have connection traced to obtain line number. It is desirable to keep hand test set across line to hold the connection while it is being traced. If pair number also is desired, follow (2) after obtaining line number.