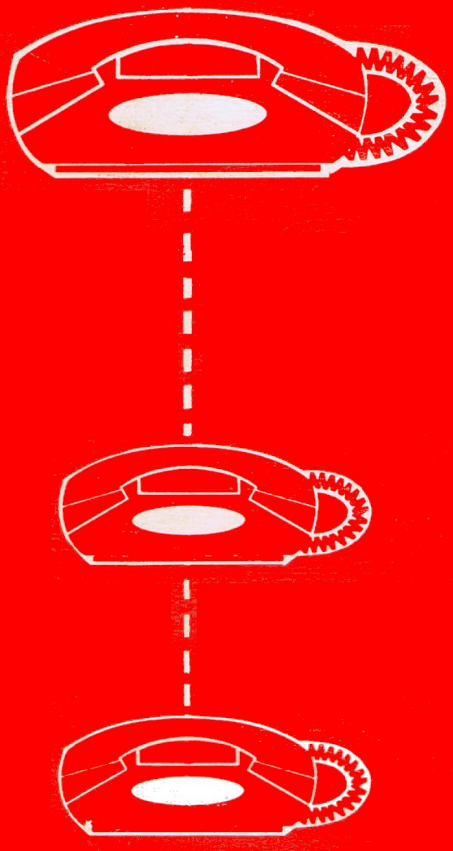
EDITION 3

ELECTRONIC DISTRIBUTION SYSTEMS*



AML

ADDED MAIN LINE

GENERAL DESCRIPTION

TRANSMISSION AND APPLICATION

INSTALLATION AND MAINTENANCE

SUPERIOR CONTINENTAL CORPORATION

ELECTRONICS DIVISION

SUPERIOR SALES & SERVICE

HICKORY, NORTH CAROLINA 28601
704/328 - 2171

* PATENTS PENDING

ADDED MAIN LINE
SUBSCRIBER LINE CARRIER SYSTEM

GENERAL TECHNICAL DESCRIPTION AND FIELD OF USE

Contents

1. INTRODUCTION

1.01 This section of the manual covers the general description and use of the "Added Main Line" carrier telephone system on exchange cable pairs.

2. GENERAL

2.01 The "Added Main Line" (AML) system has been designed to provide an economical means of providing an additional private subscriber telephone circuit within the normal non-loaded cable distances from the Central Office. It provides a "two-for-one" cable pair expansion in the subscriber exchange plant with the physical circuit still usable for private or multi-party service.

2.02 The "derived" voice-frequency circuit covered in this manual refers to the demodulated output from an AML system.

2.03 The subscriber "physical" voice-frequency circuit described in this manual refers to the circuit over which the AML carrier frequencies are transmitted in both directions and from which the AML subscriber terminal obtains charging current for its internal nickel-cadmium battery. The "physical" circuit must be a working line (connected to a working subscriber line circuit in the central office), or connected to resistance battery in the case of a disconnected physical line.

2.04 The "physical" circuit must not be a prepay type paystation line.

3. SYSTEM FEATURES

3.01 "Added Main Line" is a single channel carrier system designed to provide a second private line derived voice channel over an existing, working cable pair. This "doubling" of usage for the cable pair is gained by superimposing AML carrier frequencies on the same pair as the physical subscriber without affecting, in any way, the operating characteristics of the physical subscriber's telephone set.

3.02 System length must be within the normal design criteria for non-loaded subscriber loops. CAC Super-load coils can be employed to extend this length. Bridge taps and carrier frequency cable losses may also add further restrictions.

3.03 The equipment is so designed that no external adjustments are required. There is no common circuit equipment associated with the central office terminal. Therefore, no economic penalty is involved in applications where only a small number of AML channels are needed. The equipment can be installed on a circuit-by-circuit basis, as required.

3.04 The AML subscriber terminal is designed for use as a private line only. No party line service can be provided via AML equipment. It will provide for any number of extensions off the derived circuit, but it is designed to ring a maximum of three standard straight-line ringers. No more than two princess or trimline ringers should be employed on the derived circuit.

3.05 AML can operate over physical pairs providing one party or multi-party service as long as an isolation filter is used to isolate the physical telephone set or sets at carrier frequencies.

3.06 Each AML channel consists of two terminals; one mounted in the central office on the horizontal main frame, vertical main frame, or in a relay rack; the other is usually mounted on the customer's premises. A separate isolation filter is also mounted on the AML customer's premises on the physical line for second line applications and on the physical circuit drops for providing new private line service via on AML channel.

4. GENERAL TECHNICAL DESCRIPTION

4.01 AML is a completely transistorized single channel, double side-band amplitude modulated system.

4.02 The frequencies used are: Transmission from the central office - 76 kHz. Transmission from the subscriber terminal - 28 kHz.

4.03 The power source for operation of AML subscriber terminal is derived completely from the physical pair over which it is applied. The central office 48-volt battery on the physical circuit is the power source for both the physical and the AML subscriber circuits.

4.04 The subscriber terminal contains a rechargeable nickel-cadmium battery. The battery is trickle charged from the central office battery supplied to the physical pair during all conditions in which the physical set or sets are on hook. With the physical off-hook, an electronic switch isolates the AML channel from the physical circuit and the AML then operates from the nickel-cadmium battery.

4.05 Ringing on AML is through detection of the presence of ringing voltage at the C. O. terminal. With ringing voltage applied, carrier is transmitted to the subscriber terminal. The subscriber terminal detects the carrier and through appropriate circuitry connects the 6-volt nickel-cadmium battery to an inverter which, in turn, provides a nominal 70 volts ac to ring standard straight line ringers.

4.06 The AML subscriber terminal is installed within the subscriber's premises. It is contained in a molded plastic box 4-1/2" wide by 6" high by 1-1/2" deep.

4.07 The only connections required at the subscriber terminal are to the telephone physical circuit. No power connections are required.

4.08 The COT-2 central office terminal mounts on the horizontal main frame or with mounting bars attached to a 19 or 23 inch standard relay rack. This assembly is powered from the 48 volts supplied by the central office switching equipment to each subscriber circuit. The only connections required are the two pairs from the central office equipment line terminals and connections to the desired transmission cable pair. It cannot be used in offices which have "dry circuit" time during switching such as the Western Electric type I crossbar, type 5 crossbar, Kellogg type K60 or North type NX-1. Restrictions must also be applied to it's use in offices which remove battery during any part of the ringing cycle.

4.09 The COT-3 central office terminal is powered from the 48-volt central office battery by a separate feed and requires approximately 35 ma per terminal. Other than the power connections, the only connections required are the two pairs from the central office equipment line terminals and the connections to the desired transmission cable pair. Powering the central office terminal from the central office battery supply permits the use of COT-3 with Type I and 5 crossbar and other switching equipment which may have "dry circuit" time during switching or ringing. Mounting is in shelves attached to 19 or 23 inch racks or by employing a special housing, on the horizonal or vertical side of a main frame.

5. CIRCUIT DESCRIPTION

5.01 "Central Office Terminal"

The COT-3 central office terminal is powered by a separate 48-volt central office battery feed. This voltage is supplied through dropping resistors to power regulation and control circuits. Figure 1 is a block diagram of COT - 3.

The COT-2 central office terminal is similar to COT-3 except it is powered from the 48-volt battery supplied by the line equipment connected to the carrier derived voice drop. Figure 2 is a block diagram of COT-2.

5.02 Voltages derived from the power regulation and control circuit are used to: (a) Power the standby circuit of the receiver in an "on-hook" condition.

(b) Turn on the transmitter when a carrier frequency signal is received from the subscriber terminal.

(c) Turn on the transmitter when ringing voltage is applied to the drop of the carrier-derived circuit and the subscriber terminal telephone is "on-hook".

5.03 When the subscriber terminal is in an "on-hook" condition, no carrier is transmitted from the subscriber terminal to the central office terminal. In this condition the contacts of the receive relay in the C. O. terminal are open. The transmitting oscillator is not turned on and carrier frequency is not transmitted from the central office terminal. The COT-3 draws approximately 35 ma from the central office battery under all conditions. The COT-2 draws approximately 3 ma in idle circuit conditions and 50 ma during "off-hook" conditions to hold in line relays. It is regulated to a value of 9 volts and then applied to the receiver carrier frequency amplifier and detector circuits.

5.04 When a carrier frequency signal is received from the subscriber terminal (carrier subscriber handset "off-hook"), 28 kHz, the received signal causes the COT receiver relay to close. This causes the line relay associated with the central office equipment to close, thus giving an "off-hook" indication to the central office equipment. The transistor which causes the receive relay to close also activates a control circuit, which turns on the transmit oscillator in the terminal and causes carrier (76 kHz) to be transmitted toward the subscriber terminal.

5.05 Thus, when the carrier subscriber handset goes "off-hook", it causes the central office transmitter to turn on; fully activates the receiver in the carrier terminal, making the complete terminal operative; and gives an indication to the central office dial equipment that the subscriber carrier terminal handset is in an "off-hook" condition.

5.06 When the subscriber carrier terminal handset is in an "on-hook" condition (receive relay in the C. O. terminal not energized), and ringing voltage is applied to the carrier drop, the ringing voltage is applied to the control circuit mentioned in 5.04 and causes the transmit oscillator to be turned on, thus causing carrier frequency to be transmitted toward the subscriber terminal.

5.07 When the subscriber terminal receives the carrier from the central office terminal and the subscriber terminal handset is in an "on-hook" condition, the subscriber terminal closes a circuit, which activates a 6-volt dc to 70-volt ac inverter in the subscriber terminal. Thus, the application of ringing voltage of any type to the central office terminal when the carrier subscriber terminal handset is in an "on-hook" condition will cause the bell at the carrier subscriber terminal to ring.

5.08 Central office talking battery to the telephone on the normal physical circuit, over which the normal subscriber telephone is operated, is applied through a voice-band low pass filter (part of the central office terminal) to the physical circuit. This filter isolates the carrier frequency currents on the transmission pair from the normal physical circuit drop and central office equipment.

5.09 "Subscriber Terminal"

The subscriber terminal is completely powered by normal talking battery current which is supplied from the central office line relay circuit connected to the cable pair associated with the normally connected subscriber telephone on the physical circuit. Figure 3 is a block diagram of the subscriber terminal.

5.10 When the physical subscriber telephone set is in an "on-hook" condition, talking battery is connected through a DC/DC converter circuit to charge a nickel-cadmium battery, which is contained in the AML Subscriber Terminal-3.

5.11 When the subscriber carrier terminal is in an "on-hook" condition, approximately 1.5 ma of current from the power supply is applied to the receiver section of the subscriber carrier terminal, which consists of the receive carrier frequency amplifier and the detector circuit.

5.12 When the subscriber carrier terminal receives carrier frequency from the central office carrier terminal (and the carrier subscriber handset is in an "on-hook" condition), the ring control circuit supplies power to an inverter which puts out a 20 Hertz ringing voltage (nominal 70 volts) for application to the telephone set ringer. Ringing voltage is applied between yellow wire connection and red wire connection. Ringing cannot be applied between tip and ring wires. Therefore, three wire connections are always required to each telephone instrument equipped with a ringer.

5.13 When the telephone set associated with the carrier terminal is placed in an "off-hook" condition, it deactivates the ringing control circuit and applies power to the transmitter in the subscriber terminal and the VF output stage in the receiver. The current drawn by these stages passes through the telephone set and provides a nominal 20 ma talking battery to the carbon transmitter.

5.14 When the subscriber terminal telephone set is in an "on-hook" condition and ringing current is not being applied at the central office terminal, total standby current of less than 3 ma is being drawn from the physical subscriber line on STU-3. This current is used to operate a DC/DC converter which furnishes approximately 8 ma at 6.8 volts, which is used to charge the nickel-cadmium battery. During standby, 6 to 6.5 ma of charge current is flowing into the battery. The balance of this current is used to power the standby current drain of the subscriber terminal.

5.15 The current drawn from the physical line corresponds to a leak of approximately 20,000 ohms when the physical subscriber is in an "on-hook" condition. This apparent leak increases to over 50,000 ohms when the physical circuit is in an "off-hook" condition.

5.16 When the telephone connected to the physical circuit is in an "off-hook" condition, the DC/DC converter is deactivated and the drain from the physical circuit drops to below 0.5 ma, which will not degrade the normally connected subscriber circuit.

5.17 Dialing the telephone set causes the transmitter to turn on and off in accordance with the dial pulses, and transmits signaling information to the central office.

5.18 Touch-tone operation is essentially the same as rotary dial. Placing the instrument in an off-hook condition activates the AML system and in turn causes the line circuit associated with the central office equipment to close, giving an off-hook indication to operate the central office equipment. The various tones transmitted by depressing the touch-tone keys on the subscriber handset are received by the central office equipment through the voice path of the AML system. The central office accepts these tones in a normal manner.

6. SYSTEM PERFORMANCE SPECIFICATIONS

6.01 Method of transmission - double sideband amplitude modulated.

6.02 Frequency allocation - central office to subscriber = 76 kHz;
subscriber to central office = 28 kHz.

6.03 Maximum system loss = 43 dB at 76 kHz including effects of bridged taps.

6.04 Systems per cable - up to 100% fill.

6.05 AML subscriber location - anywhere along cable route.

6.06 Maximum resistance of subscriber loop from subscriber terminal unit - approximately 25 ohms (750 feet of 22 gauge station wire).

6.07 VF response - 3 dB points at 300 and 3000 Hz referred to 1000 Hz; + 1 to -3 dB variation within the band of 300 to 3000 Hz.

6.08 Channel net loss - nominal
C. O. to subscriber - -4 dB
Subscriber to C. O. - -2 dB

6.09 VF drop impedance - nominal 900 ohms + 2 microfarads

6.10 Return loss at C.O. - 15 dB minimum

6.11 Type of service available on AML - one party (private line) only.

6.12 Type of service available on physical - one, two or multi-party.

6.13 Type of AML subscriber ringing - operates standard straight line ringers on any type of ringing system.

6.14 Number of connected ringers - three standard straight line ringers.

6.15 Lightning Protection

A. C.O. Terminal - built-in gas tube protectors coordinated with main frame protectors.

B. Subscriber Terminal - built-in gas tube protectors coordinated with station protectors.

C. Isolation filters - self-contained rare gas tube protectors.

6.16 System power

Subscriber terminal- completely powered from 48-volt "talking battery" (battery in subscriber's terminal is charged from 48-volt physical battery and does not require connection to subscriber's AC supply). COT-3 central office unit is powered from 48-volt central office battery (current drain approximately 35 ma per channel). COT-2 central office unit is powered from the 48-volt "talking battery" on the carrier derived VF drop which is supplied by the central office switching equipment.

6.17 Ambient temperature limits - Central office and subscriber terminals - +20°F to +120°F. Isolation filter - -40°F to +140°F.

7. FIELD OF USE

7.01 In general, AML has applications -

A. To provide a second line for the subscriber served by a physical circuit.

B. As a means for providing new service to a subscriber other than the one (s) served by the physical circuit.

C. As a means of up-grading a multi-party subscriber who has requested private line service.

Each of these cases are discussed in some detail in the paragraphs following.

7.02 Second line service

A. AML is especially attractive as a means of providing a second line service for an existing subscriber. Some of the obvious advantages are:

1. Ease of Installation - It has been found that a second line could be added via AML in as little as thirty minutes.

2. Cost Savings - Installation of a second line via AML fully utilizes existing facilities including the cable pair, drop wire, and station protector.

3. Premise visit required only to customer's location. This is not true of other types of AML installations since an isolation filter will be required at each subscriber location or at a cable terminal serving the physical subscribers.

4. In dedicated plant areas, where facilities have been dedicated on a pair-per-living unit basis and second lines are not dedicated, the use of AML may eliminate multiple visits to access points, and possibly control points, as second lines are added and removed.

C. From the above discussion, it is evident that there is little question about the economic advantage of AML for second line application. Where spare facilities are limited and growth rates are such that cable relief, with cable sized to meet five or ten year requirements, are difficult to justify, or there just is not money available to relieve such areas, AML will prove to be an effective means of meeting service demands.

7.03 New Service

A. AML can be used to derive a private line to provide primary service to a new subscriber. The carrier can be added on a physical circuit which is being used to provide any class of telephone service (the working line must be connected to a subscriber telephone number in the central office to provide battery to operate AML).

B. In this type of application, AML is a means of deriving a private line circuit via carrier in lieu of providing a cable pair. AML may be considered economically attractive when compared to average loop costs, the availability of physical facilities will be the determining factor.

C. As it was pointed out in paragraph 7.02C, cable pairs are cheap only when added in bulk quantities. Average loop costs are meaningless when only a few additional loops are needed.

D. In areas close (within 18 kf subject to other transmission considerations) to a central office, where spare facilities are not available, or are available only at a premium cost due to required rearrangements and changes, AML will prove to be an economical means of providing service.

E. AML may be considered as an expedient in areas where a cable project is programmed to provide relief at a later date. In such cases, the temporary AML system(s) can be salvaged for reuse. In slow-growing areas where facility shortages exist and demand is not sufficient to warrant the scheduling of a relief project, which might involve a large cable and a considerable expenditure, AML may be considered for a permanent installation.

7.04 Up-grading Service

A. AML can be used to derive a private line to provide up-grading service to a subscriber now served on a multi-party line. The carrier can be added on the physical circuit which is presently being used to provide any class of telephone service.

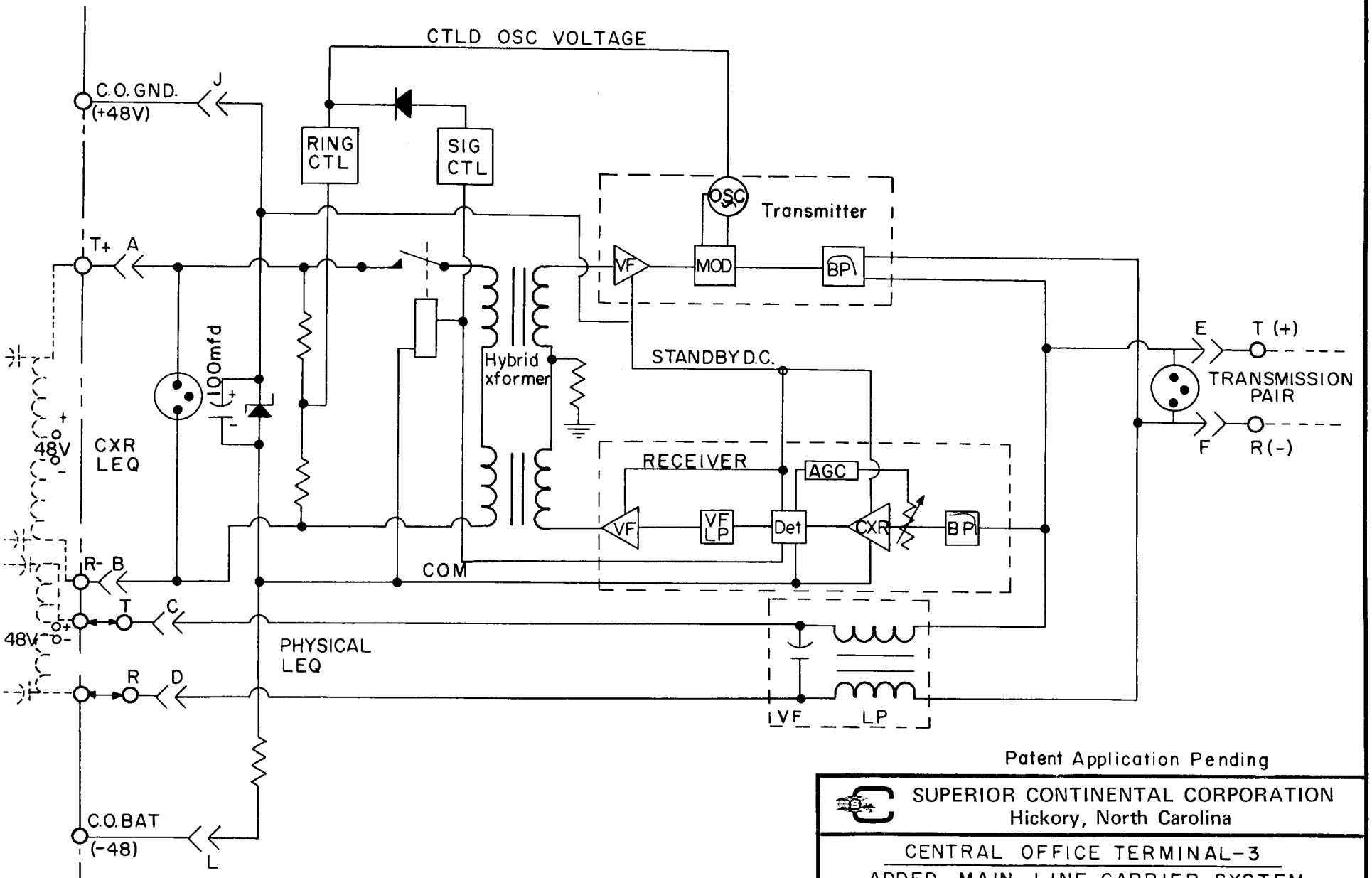
B. In this application, AML offers many of the advantages that it does in second line applications.

1. Ease of Installation - It has been found that the up-graded private line could be obtained via AML in as little as thirty minutes.

2. Cost Savings - Installation of up-graded service via AML fully utilizes existing facilities.

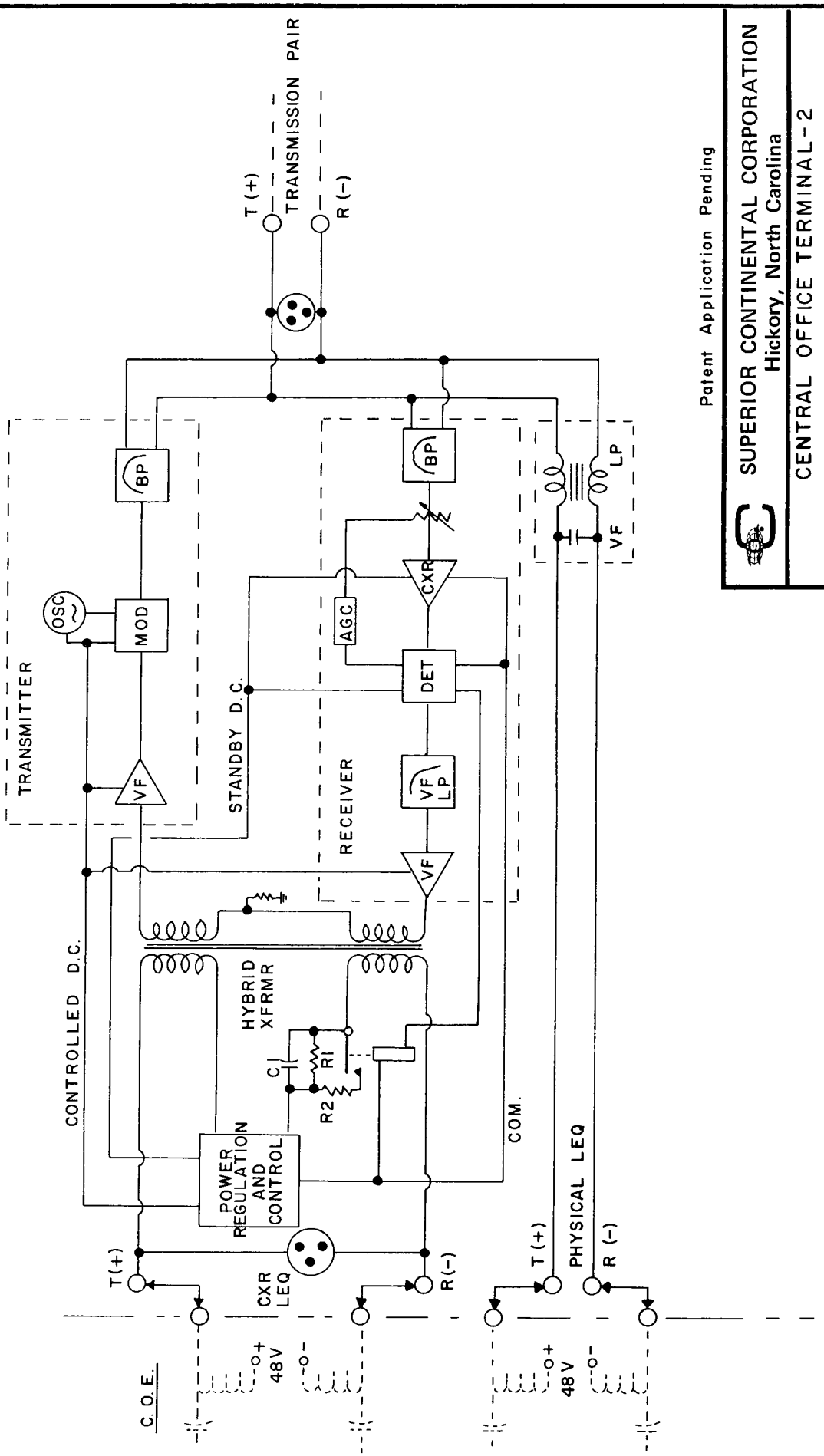
3. If up-grading is not likely to be of a permanent nature, when service is discontinued carrier equipment can be salvaged and reused.

C. As previously stated, where spare facilities are limited or not available, AML will prove to be an effective and economical means of meeting service demands.



Patent Application Pending

SUPERIOR CONTINENTAL CORPORATION Hickory, North Carolina		
CENTRAL OFFICE TERMINAL-3 ADDED MAIN LINE CARRIER SYSTEM		
DRAWN BY T. JOHNSON	SCALE	SHEET NO. _____OF_____
APPROVED BY	DATE	DRAWING NO. FIGURE 1

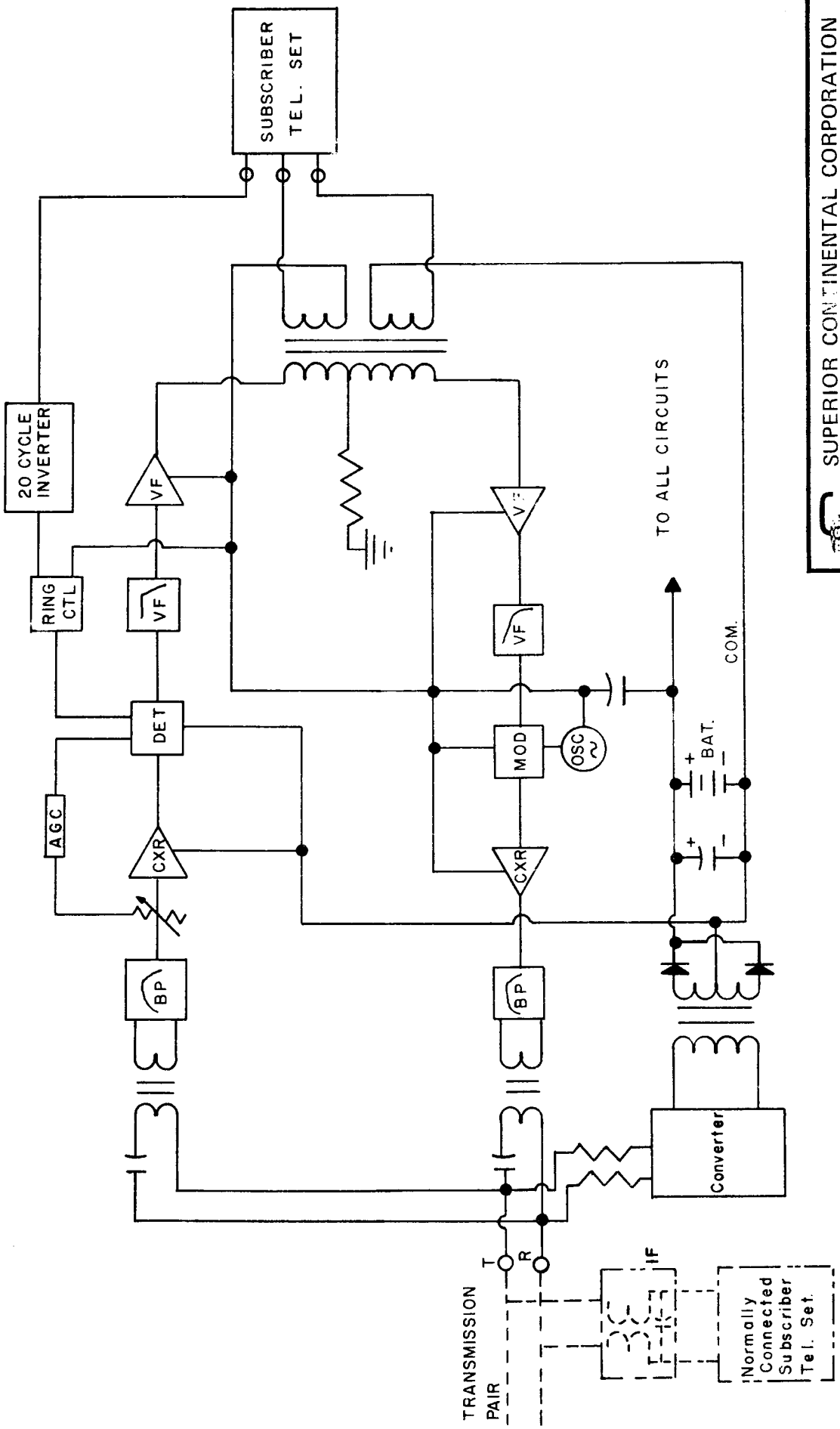


Patent Application Pending

SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina

CENTRAL OFFICE TERMINAL-2
ADDED MAIN LINE CARRIER SYSTEM

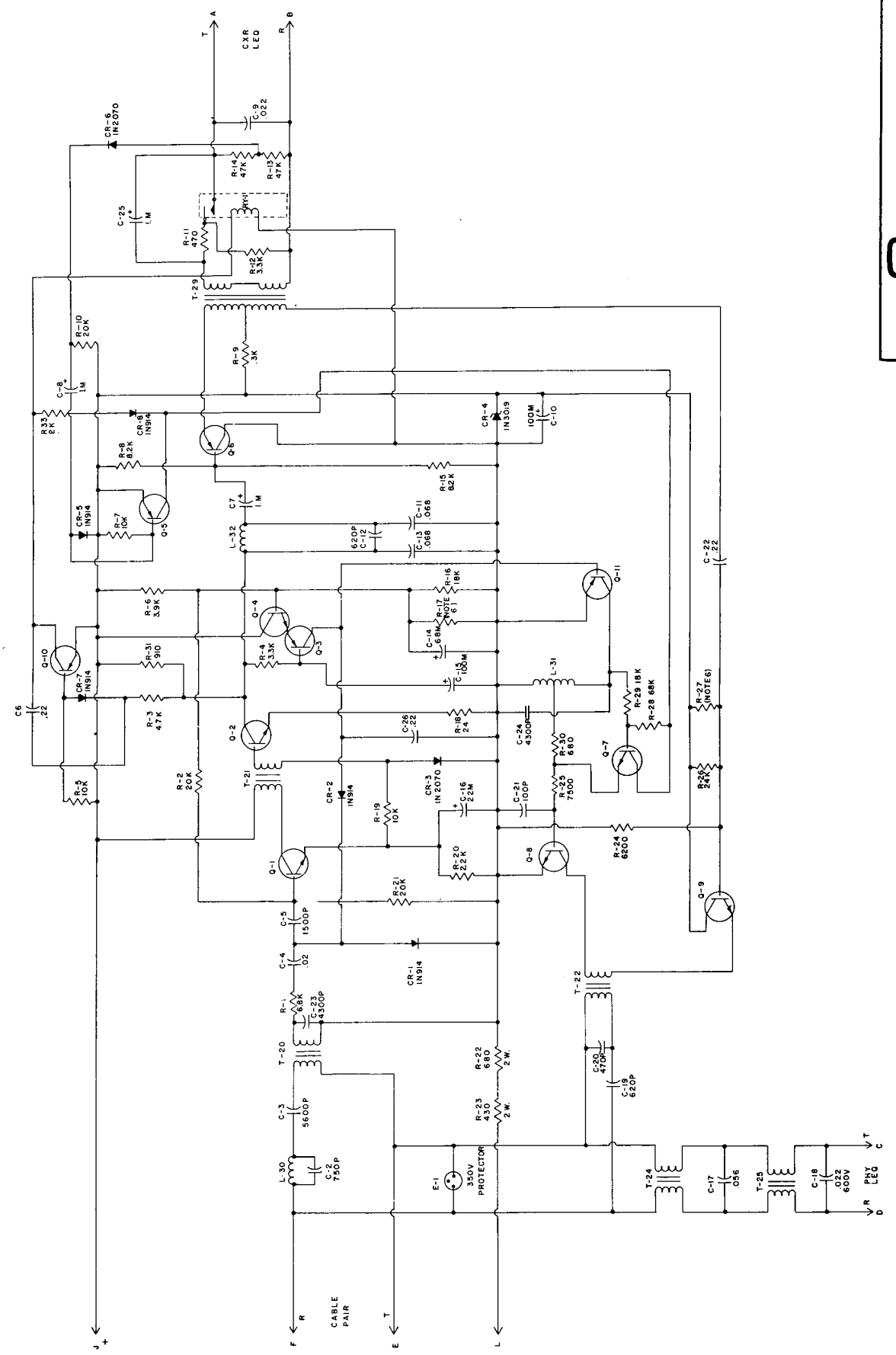
DRAWN BY	SCALE	SHEET NO.
J. D. W.		OF
APPROVED BY	DATE	DRAWING NO.
		FIGURE 2

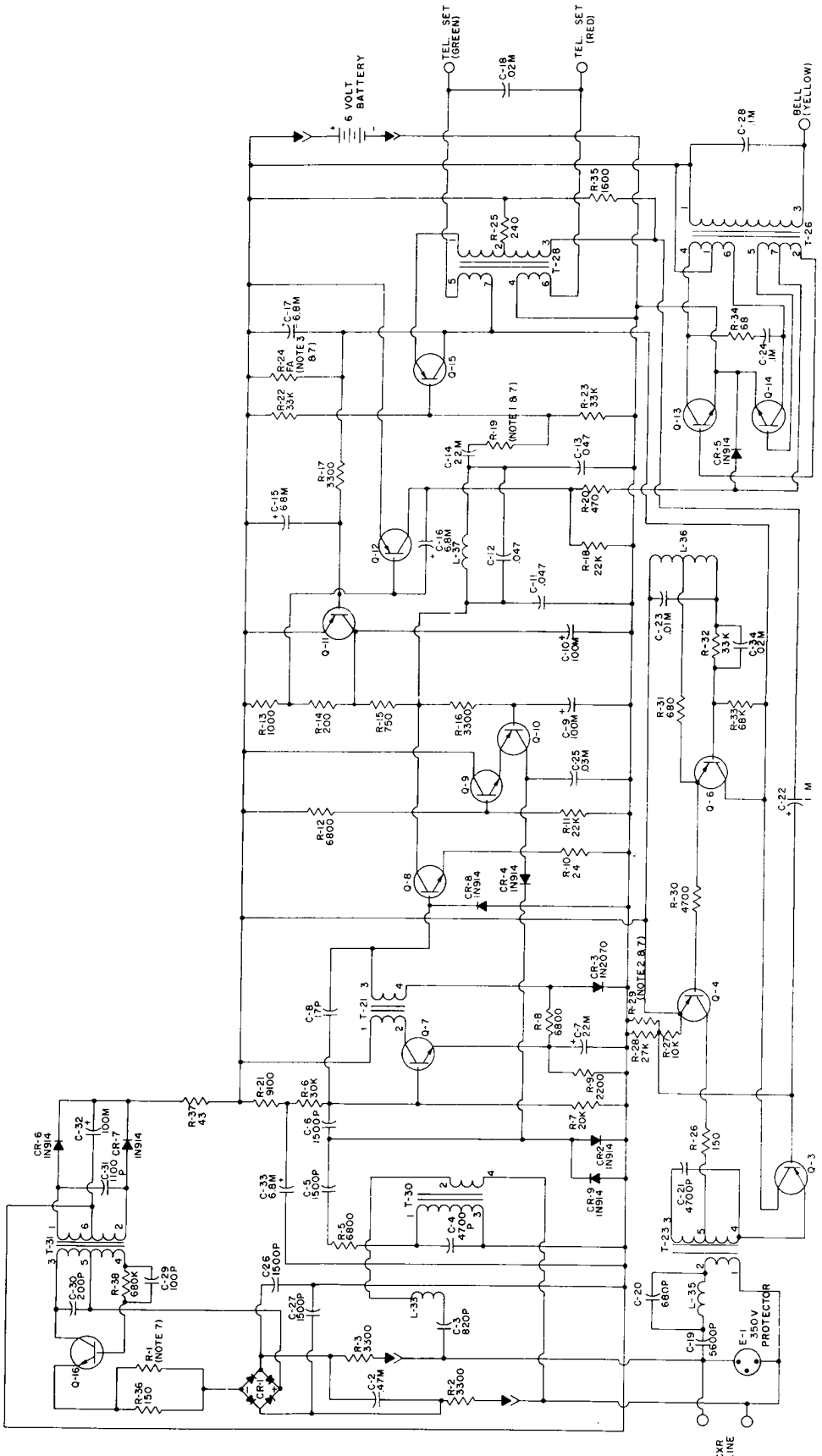


SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina

SUBSCRIBER TERMINAL
ADDED MAIN LINE

DRAWN BY T. JOHNSON	SCALE	SHEET NO. ___ OF ___	
APPROVED BY	DATE	DRAWING NO.	FIGURE 3


SUPERIOR CONTINENTAL CORPORATION
HICKORY, NORTH CAROLINA
COT 3
AML
COT 3 SCHEMATIC
DRAWN BY
T. JOHNSON
SCALE
DATE
MARCH 1968
SHEET NO.
OF
DRAWING NO.
APPROVED BY
CABLE PAIR
350V PROTECTOR
CXR LEQ
PHY LEQ



SUPERIOR CONTINENTAL CORPORATION
HICKORY, NORTH CAROLINA

AML

STU-3 SCHEMATIC

DRAWN BY	SCALE	SHEET NO. OF
T. JOHNSON		
APPROVED BY	DATE	DRAWING NO. FIGURE 5

ADDED MAIN LINE
SUBSCRIBER LINE CARRIER SYSTEM

TRANSMISSION AND APPLICATION CONSIDERATIONS

Contents

1. INTRODUCTION

1.01 This section of the manual covers the transmission and application considerations of the "Added Main Line" carrier telephone system on exchange cable pairs.

2. GENERAL

2.01 The "Added Main Line" (AML) system has been designed to provide an economical means of providing an additional private line subscriber telephone circuit within the normal non-loaded cable distances from the central office.

2.02 The system provides a "two-for-one" cable pair expansion with the physical circuit usable for private or multi-party service.

3. TRANSMISSION CONSIDERATIONS

3.01 Limiting transmission is based upon the 76 kHz carrier frequency used for transmission from the central office to the subscriber terminal.

3.02 The maximum attenuation loss of AML at 76 kHz is 43 dB.

3.03 The loss characteristics of commonly used cable facilities at this frequency is shown in Table I. For mixed facilities, add the losses for each segment.

TABLE I

Nominal Attenuation of Insulated Pair Facilities @76 kHz

AWG	Paper Insulated dB/kf	Paper Insulated dB/Mi	Plastic Insulated dB/kf	Plastic Insulated dB/Mi	Figure 8 - RDW dB/kf	Figure 8 - RDW dB/Mi
19	1.10	5.8	1.0	5.3	1.0	5.3
22	1.69	8.9	1.5	8.0	1.5	7.9
24	2.48	13.1	2.2	11.5	-	-
26	3.44	18.2	2.8	14.8	-	-

3.04 For data on other facilities, contact Superior Continental Corporation.

3.05 Assuming no bridged taps, the following plastic insulated cable loops can be served using AML equipment.

26 gauge - 15.3 kf
24 gauge - 19.5 kf
22 gauge - 28.6 kf*
19 gauge - 43.0 kf*

*Physical loops longer than 18 kf require loading. Therefore, the maximum practical limit is 18 kf for all gauges unless carrier frequency by-pass load coils are employed.

3.06 Application information and considerations on the use of AML with the carrier frequency "Super-load coils" is discussed in Superior Continental's publication SL1-1.

3.07 Drop wire in excess of 250 feet should be included in loss calculations. Assume a 76 kHz loss of 0.3 dB per 100 feet.

3.08 Bridged taps can limit the application of AML equipment.

A. Where it does not seem feasible to remove the existing bridged tap, Figure 1 provides a means of estimating the tap loss at 76 kHz.

B. Compute the loss by determining the loss for each tap and adding these individual losses to obtain the total bridged tap loss.

C. Where bridged taps are encountered, it does not mean that AML cannot be used. It depends upon the loss of the facility make-up to the subscriber plus the total bridged tap loss. For example, 12.2 db of bridging loss will reduce the usable length of AML to 30.8 dB or 11 kf on a 26 gauge loop.

3.09 AML is designed for use only on shielded cable facilities. Some applications may require short lengths of RDW and Open Wire to extend the cable facility. Under certain conditions, bell tapping will occur during lightning on these unshielded facilities.

3.10 On RDW or Open Wire facilities, absorption peaks and/or excessive loss at carrier frequencies may cause the transmission limits of the system to be exceeded before normally expected. It is recommended that these facilities not be used for AML operation.

3.11 Illustrative Example

A. Figure 2 shows a representative situation where AML is applicable. Several subscribers now working on party lines have requested private lines. Existing facilities are inadequate to provide the required up-grading. AML versus reinforcing the cable was compared and a decision was made to use AML to supply the extra circuits.

B. From Table I, the transmission losses to the most distant subscriber can be determined as follows:

10 kf of 22 gauge, plastic insulated cable at 1.50 dB/kf = 15.0 dB. Only one bridged tap was found. It was on pair 302 and it could easily be removed. The attenuation is well within range of 43 dB loss so no further consideration of transmission is needed for this application.

C. The central office in which the equipment is to be installed a K60, so it is necessary to use a 71-112-00 central office terminal. A 23-inch relay rack is available for mounting the equipment so a 71-110-06 channel shelf is adequate for present needs.

D. Equipment List

From the solution to the problem of Figure 2, an equipment list can be determined.

ITEM	PART NO.	QUANTITY
Central Office Terminal-3	71-112-00	3
Subscriber Terminal	71-713-00	3
Isolation Filter	71-700-12	5
12 Channel 23" shelf	71-110-06	1

E. Route Layout

From plant records, verify gauge of cable, absence of loading length, splice points or pedestal locations. This will insure that design limitations are not exceeded due to excessive length or gauge and also permit decisions on whether to locate the isolation filters at the station protector, in the ready access terminals or pedestals.

4. APPLICATION OF AML

4.01 AML is designed to operate over non-loaded or Super-loaded subscriber loop facilities that are in good operating condition and are well maintained.

4.02 AML will operate with conventional telephone sets as well as touch-tone sets.

4.03 In normal subscriber service it will ring three straight line ringers.

4.04 Detailed application studies are not required with AML other than that reasonable care is exercised in not exceeding the design limits.

4.05 If the facilities are found to be within the transmission limits of the system numerous types of applications can be employed with the AML equipment. Three of the most commonly required are:

(1) Second line on the same premises as the physical phone.

(2) New primary private line service on a private or multi-party physical.

(3) Up-grading a multi-party subscriber to a private line on a multi-party physical.

4.06 Block schematics of the three above applications are shown in Figures 3, 4, and 5 respectively.

4.07 An AML system should not be employed on physical circuits which are in continuous use. The battery charging circuit is deactivated while the physical is "off-hook". Continuous use of the physical therefore does not allow charging time for the battery in the AML subscriber terminal.

4.08 For special application considerations, contact Superior Continental Corporation.

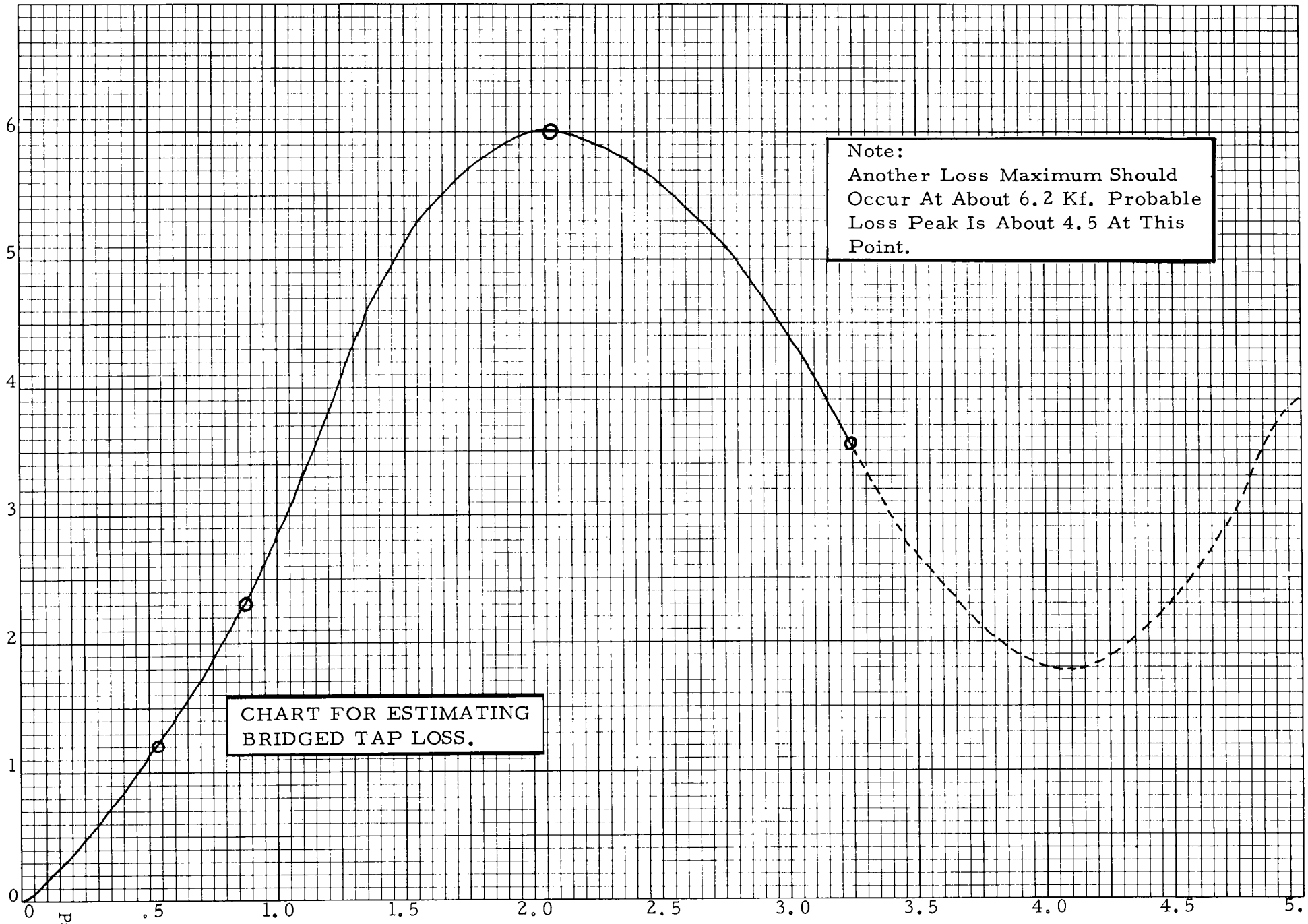
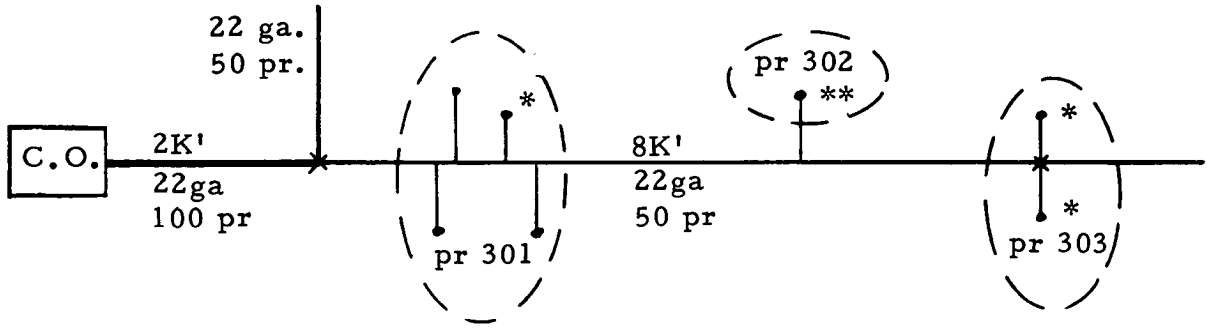

Loss in db at 76 KC*
Note:
Another Loss Maximum Should Occur At About 6.2 Kf. Probable Loss Peak Is About 4.5 At This Point.
CHART FOR ESTIMATING BRIDGED TAP LOSS.
0
1
2
3
4
5
6
0
.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Length of Bridged Tap In Kilofeet (One Continuous Length Tap)

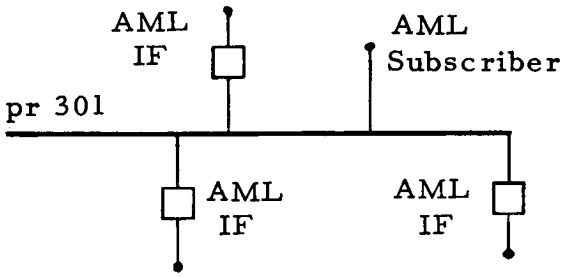
Figure 1

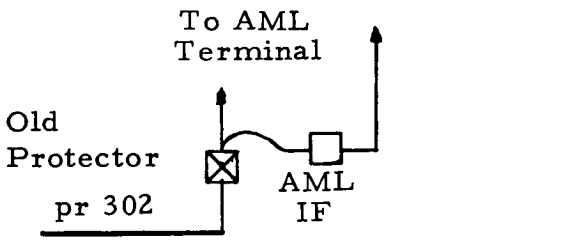
PROBLEM



* Desires private line
**Desires "Teen Age" Telephone in Home.

SOLUTION





To Telephone Set
Physical Line

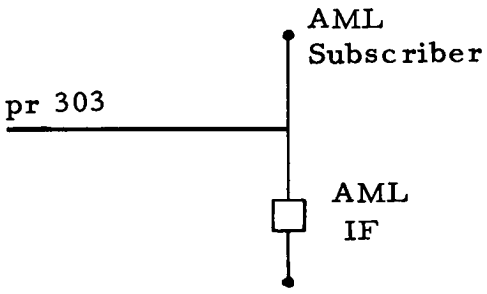
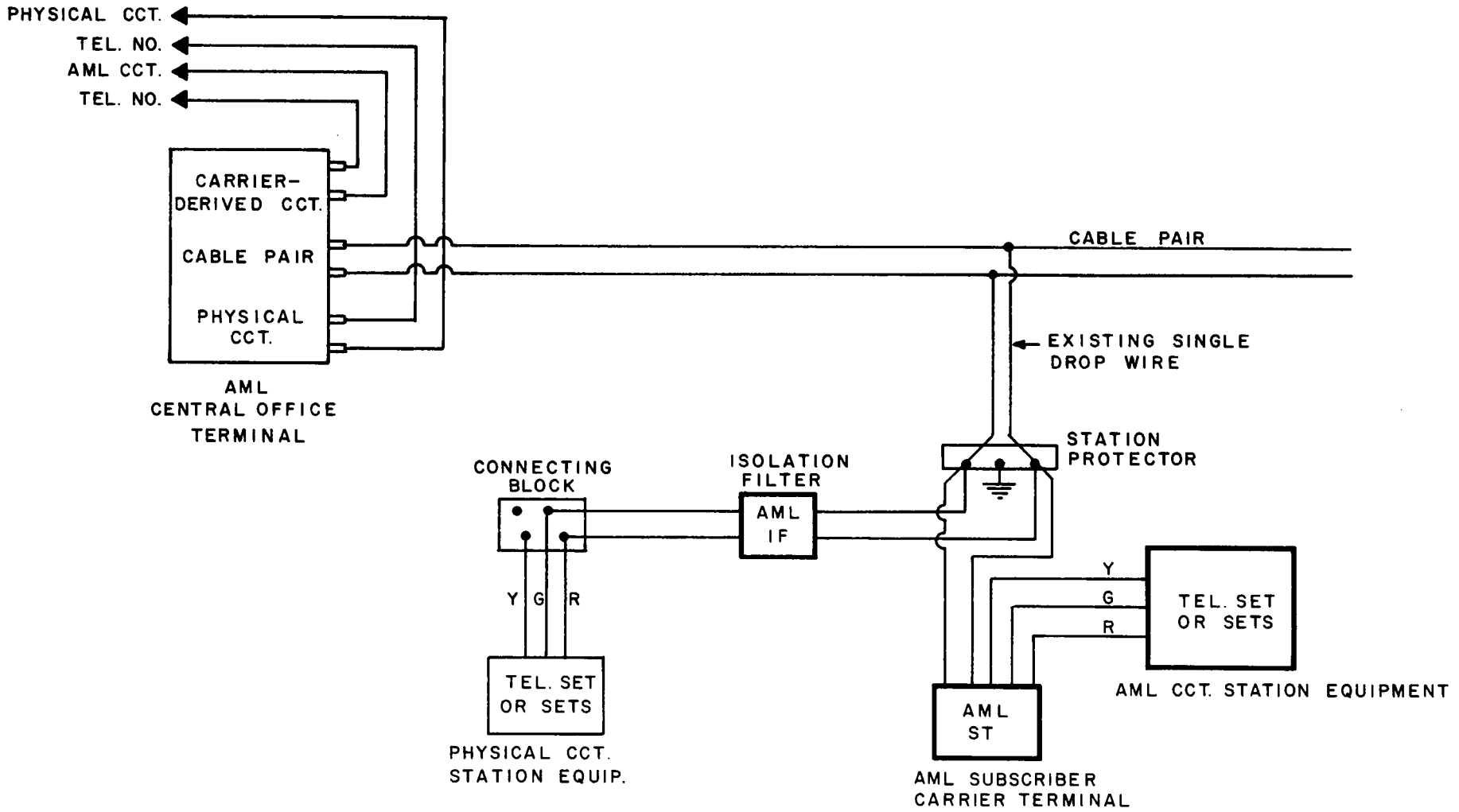


Figure 2



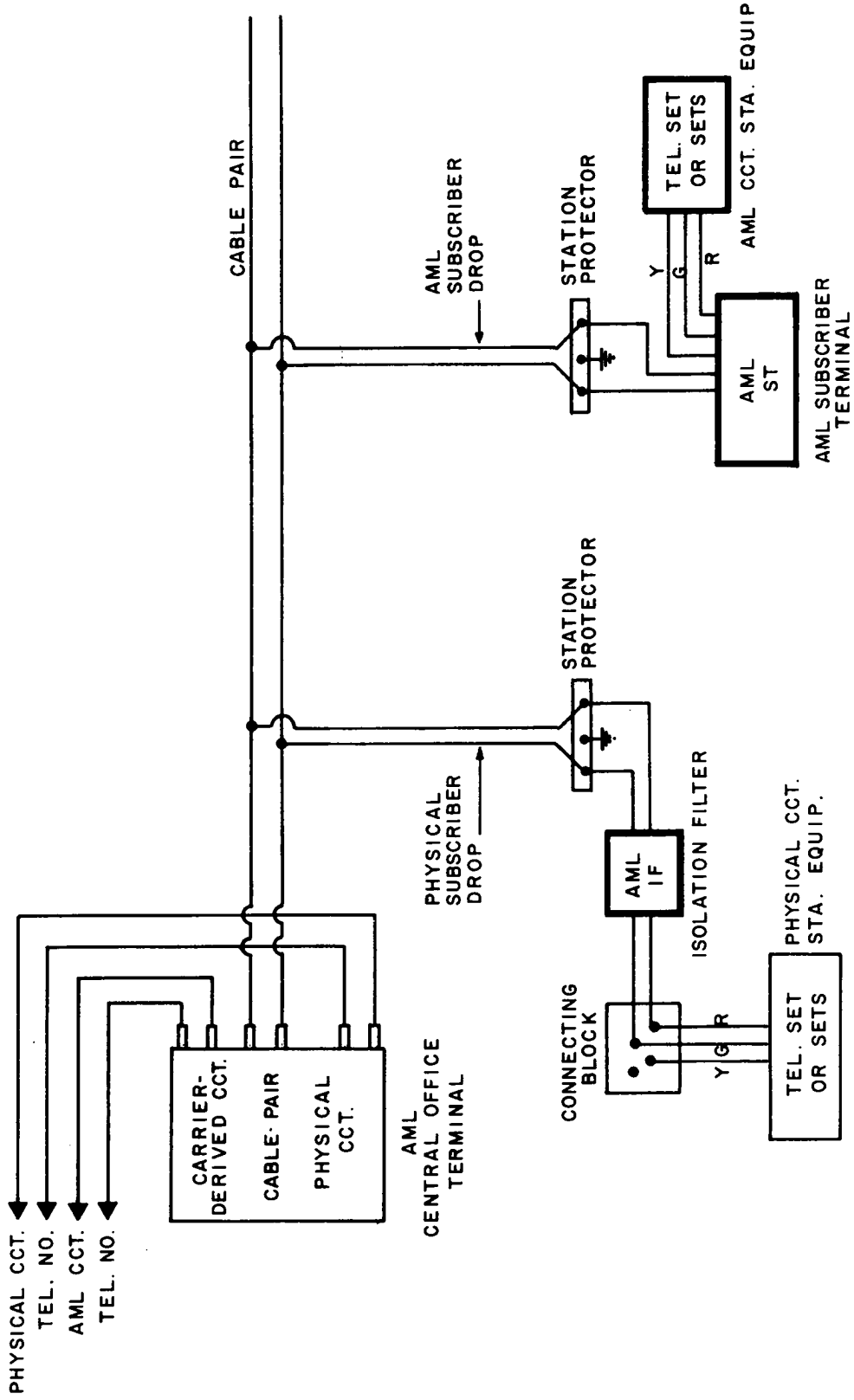
NOTE: AN ISOLATION FILTER IS ALWAYS INSERTED BETWEEN THE LINE AND ALL PHYSICAL STATION EQUIPMENT.

SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina

AML SYSTEM

SECOND LINE ON SAME PREMISES

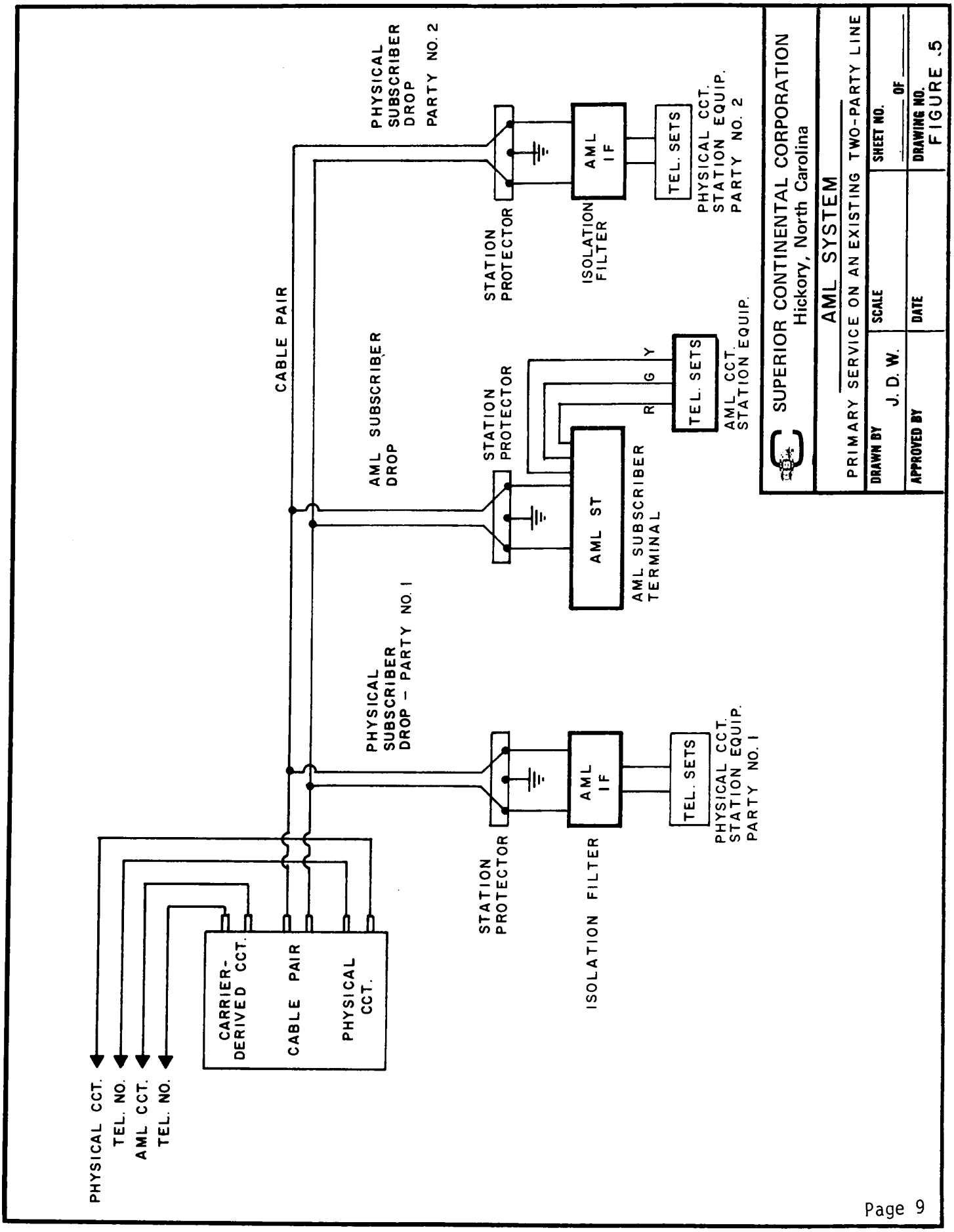
DRAWN BY	SCALE	SHEET NO.
J. D. W.		____ OF ____
APPROVED BY	DATE	DRAWING NO.
		FIGURE 3



SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina

AML SYSTEM
PRIMARY SERVICE ON SEPARATE PREMISES

DRAWN BY J. D. W.	SCALE	SHEET NO. ___ OF ___	
APPROVED BY	DATE	DRAWING NO. FIGURE 4	


PHYSICAL CCT. TEL. NO.
AML CCT. TEL. NO.
CARRIER-DERIVED CCT.
CABLE PAIR
PHYSICAL CCT.
CABLE PAIR
PHYSICAL SUBSCRIBER DROP – PARTY NO. 1
AML SUBSCRIBER DROP
PHYSICAL SUBSCRIBER DROP PARTY NO. 2
STATION PROTECTOR
ISOLATION FILTER
AML IF
TEL. SETS
PHYSICAL CCT. STATION EQUIP. PARTY NO. 1
STATION PROTECTOR
AML ST
AML SUBSCRIBER TERMINAL
R
G
Y
TEL. SETS
AML CCT. STATION EQUIP.
STATION PROTECTOR
ISOLATION FILTER
AML IF
TEL. SETS
PHYSICAL CCT. STATION EQUIP. PARTY NO. 2
SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina
AML SYSTEM
PRIMARY SERVICE ON AN EXISTING TWO-PARTY LINE
DRAWN BY J. D. W.
SCALE
SHEET NO. OF
APPROVED BY
DATE
DRAWING NO. FIGURE .5

ADDED MAIN LINE
SUBSCRIBER LINE CARRIER SYSTEM

INSTALLATION AND MAINTENANCE PROCEDURES

Contents

1. GENERAL

1.01 This section includes information on the installation of both the central office and the subscriber terminal of an "Added Main Line" subscriber carrier system.

2. COT-2 CENTRAL OFFICE TERMINAL

2.01 The COT-2 is designed for mounting on the horizontal iron work of the main distribution frame or on relay racks with special iron work added. Each COT card consists of a single printed circuit card which contains both the carrier circuitry and the low pass filter used to isolate the physical telephone circuit from the carrier line.

2.02 The plastic enclosure contains the complete central office terminal. No power feed or common equipment needs to be associated with the AML channel. Gas tube protectors and zener diodes are built in which coordinate with the main frame protectors. A terminal strip is provided on top of the unit for connection of the three pairs of wires needed to complete the installation.

2.03 Physical dimensions of the AML central office terminal are 6" x 6" x 1-1/2". Figure 1 shows the AML central office terminal mounted on the horizontal main frame. The wiring lugs protrude in front of the horizontal ironwork to a distance equal to or less than that of standard bunching blocks. All lugs are plainly marked and wiring is as shown in Figure 1.

2.04 Preferred locations for horizontal frame mounted units are to be found generally in miscellaneous space near the top of the frame and usually at a location where the minimum number of jumpers will have to be laid by these units at a later date. A location near the end of the frame is usually most suitable.

2.05 Relay rack mounting is provided by the use of special mounting bars. Figure 2 provides a drawing of the relay rack mounting.

A. The 19-inch mounting bar provides space for 11 AML central office terminals in five 1-3/4" vertical mounting spaces or 8-3/4 inches.

B. The 23-inch mounting bar provides space for 14 AML units in the same vertical space.

2.06 Cabling from relay rack mounted central office terminals to the bunching blocks on the horizontal frame should follow standard practices with regard to numbering of channels, fanning out and dressing of leads, and lashing of the finished wiring. The lugs on the bunching block should correspond in position (front-to-back) with those on the AML unit itself. Special care should be taken to insure that the color code is strictly followed and that no "split" pairs occur in the cabling.

3. COT-2 INSTALLATION INSTRUCTIONS

3.01 Mount the central office terminal on the iron work of frame or mounting bar using the mounting plate and screws provided. Refer to Figure 3 for the following steps.

3.02 Using jumper wire connect the two rear terminals to the group and terminal of the private line subscriber to be served by AML.

3.03 Using jumper wire connect the two middle terminals to the protector and physical cable pair.

3.04 Using jumper wire, connect the two front terminals to the group and terminal of the subscriber(s) served on the physical.

3.05 At this point, it is well to temporarily connect an AML subscriber terminal to the physical pair terminals and check operation by dialing up the AML subscriber number. A telephone set equipped with a straight line ringer can be connected to the subscriber terminal to verify ringing, dialing, etc. If the unit does not operate, check wiring, C.O. line assignment, etc. If trouble cannot be found, substitute another AML subscriber terminal and/or COT. This step saves disturbing subscribers and facilitates rapid installation and check out of AML at the station.

NOTE: If the above check is made before the cable pair is connected to the COT-2 central office terminal, a .1 microfarad condenser should temporarily be connected across the jumper used to connect the central office terminal with the subscriber terminal. This will furnish proper termination for the carrier frequency filters and assure proper checkout of the carrier unit.

4. COT-3 CENTRAL OFFICE TERMINAL

4.01 Mounting for COT-3 is a relay rack mounted card rack with provisions for plugging in individual COT-3's. An optional mounting arrangement is available to facilitate single system operation on horizontal or vertical side of the MDF. Each COT consists of a single printed circuit card which contains both carrier circuitry and the low pass filter used to isolate the physical telephone circuit from the carrier line.

4.02 The rack mounted card holder for 23" rack uses 3 mounting spaces and is designed to accommodate 12 COT cards. Another version of the 23" rack mount occupies 14 rack spaces and accommodates 60 COT's. A 19" rack mount occupies 4 rack spaces or 7" for 10 COT units with the second option occupying 16 rack units or 28" and housing 50 AML-3 COT units.

4.03 All connections are made to the rear of the rack mounted card housing to wire wrap terminals on the card plugs. Wiring is as shown in Figure 4.

4.04 Cabling from relay rack COT's to the bunching block on the horizontal frame should follow standard practices with regard to numbering of channels, fanning out and dressing of leads, and lacing of the finished wiring. Special care should be taken to insure that the color code is strictly followed and that no split pairs occur in the cabling.

4.05 Use of the MDF housing allows installation of one system at a time in a central office. Mounting locations for the MDF housing is generally found in miscellaneous space near the top of the frame and usually at a location where the minimum number of jumpers will have to be laid by these units at a later date. A location near the end of the frame is usually most suitable.

4.06 Forty-eight volt central office power is necessary for the operation of COT-3 units. Each unit draws 35 milliamperes which amounts to 420 milliamperes per 12-channel shelf. The central office battery is applied through a dropping resistor which is a part of each channel card. For this reason, failure of the electronic portion cannot blow a central office fuse so that the number of channels powered from one fuse is optional.

5. COT-3 INSTALLATION INSTRUCTIONS

5.01 Mount the card holder for the COT-3 units on designated relay rack. Refer to Figure 5 for the following steps.

5.02 Wire wrap connections on the socket pins of the COT-3 card rack reading from top to bottom are designated as A,B,C,D,E,F,H,J,K & L. Cabling from relay rack to terminal blocks should correspond in position, front to back, with wire wrap socket pins on the COT-3 card rack reading from top to bottom. The two terminals on the COT-3 card rack designated A & B, are the carrier derived circuit tip and ring. The next two terminals C & D are the physical circuit tip and ring. The next two, E & F, go to the cable pair tip and ring. Below this, the next terminal, H, is vacant. The next terminal, J, is ground or central office battery plus. The bottom terminal, L, is minus 48-volt central office battery and goes to the fuse block assigned to the COT-3 terminal.

5.03 Using jumper wire, connect the two rear terminals of the terminal block to the protector and physical cable pair.

5.04 Using jumper wire, connect the two middle terminals of the terminal block to the group and terminal of the subscriber(s) served of the physical.

5.05 Using jumper wire, connect the two front terminals of the terminal block to the group and terminal of the private line subscriber to be served by carrier.

5.06 At this point, it is well to temporarily connect the subscriber terminal to the physical pair terminals and check operation by dialing up the carrier subscriber number. A telephone set equipped with straight line ringer can be connected to the subscriber terminal to verify ringing, dialing, etc. If the unit does not operate, check wiring, C.O. line assignment, etc. If trouble cannot be found, substitute another subscriber terminal and/or COT Card. This step saves disturbing subscribers and facilitates rapid installation and check-out of AML at the station.

NOTE: If the above check is made before the cable pair is connected to the COT-3 central office terminal, a .1 microfarad condenser should temporarily be connected across the jumper used to connect the central office terminal with the subscriber terminal. This will furnish proper termination for the carrier frequency filters and assure proper check-out of the carrier units.

6. SUBSCRIBER TERMINAL

6.01 This unit consists of a molded plastic enclosure suitable for mounting on floor joists, backboards, walls or other convenient locations on the subscriber's premises. The physical dimensions of this assembly are 6" x 4-1/2" x 1-1/2".

6.02 The complete subscriber terminal circuit is contained on one printed wiring board which slides into grooves in the plastic base-mounting unit. Gas tube protectors and zener diodes are built-in which coordinate with the station protection provided at the customer's premises.

6.03 Where second line service is to be provided on the same customer's premises, an isolation filter is also used to separate the carrier circuit from the physical circuit. The isolation filter is always inserted between the station protector and any existing station wiring in order to provide for isolation of the two services.

6.04 Where primary service via an AML channel is to be provided, isolation filters must be installed on all physical parties working on the same pair with the AML channel. These units are usually mounted adjacent to the station protector on the physical subscriber's premises. They are, in effect, inserted between the station protector and the station wiring.

7. SUBSCRIBER TERMINAL-3 - INSTALLATION INSTRUCTIONS

7.01 If the ST-3 unit has been in storage over 60 days, the nickel-cadmium battery may be at least partially discharged. In such cases, it can be charged by connecting the CXR line terminals of the ST-3 unit to any 48-volt resistance-type battery feed circuit in the central office. An overnight charge will be adequate to deliver full rated voltage to the subscriber terminal circuitry.

Physical Subscribers

7.02 Mount the isolation filter near the physical subscriber's station protectors, using the screws provided.

7.03 Refer to application drawings on Figures 7, 8 or 9 as appropriate for schematic wiring information and to Figure 6 for the connection diagram of a correctly installed ST-3 unit.

7.04 Disconnect the physical subscriber's station wiring leads from the protector and connect the blue and white pair from the isolation filter to the station protector using the same lugs as those connected to the incoming drop wire.

7.05 Connect the orange and white pair from the IF unit to a connecting block.

7.06 Reconnect all physical circuit station wiring to the same lugs on the connecting block as the orange and white leads from the IF unit.

7.07 At this point follow normal check-out procedure for the physical subscriber's circuit.

AML Subscriber

7.08 Remove the snap cover from the unit and slide out the printed circuit card.

CAUTION: Do not set the circuit board on any metal surface if battery is connected.

7.09 Mount the plastic base unit as near to the station protector and to existing connecting blocks as possible. Be sure to leave sufficient room to remove the circuit card at a later date, should this ever become necessary.

7.10 Replace the circuit card by sliding it into the plastic base mount and insert the 6-volt nickel-cadmium battery into its holder on the card using associated quick-connect terminals.

7.11 Connect the Added Main Line subscriber terminal as shown in Figure 8 with the CXR leads wired direct to the station protector lugs (already connected to the drop and to the isolation filter blue and white leads). The ST unit is in effect bridged directly onto the incoming drop.

7.12 Connect the tip (green) and ring (red) wires to the ST unit as shown in Figure 5. Also connect the "bell" or yellow wire as shown.

CAUTION: Do not multiple the yellow lead from the telephone set to either the tip or the ring from the set. A separate wire must be used all the way to the ST-3 unit.

It may be desirable to connect the yellow lead to ground to minimize radio interference where this is a problem. The yellow lead also may use one of the leads between the lighting transformer used for princess and trim line telephones and the telephone instrument. See Figure 5.

7.13 Snap the plastic cover on the base mount for the ST unit. This completes the installation and wiring.

7.14 In the telephone instrument, connect a straight line ringer across the red and yellow leads of the connector cord. Make certain that the bias spring of the ringer is in minimum bias setting and that the capacitor associated with the ringer is wired in the circuit.

7.15 Follow normal check-out procedure for the new installation and refer to the section on maintenance and trouble shooting if any difficulty is encountered.

CAUTION: Since the cable pair now provides service not only on the physical but also via an AML carrier channel, a lineman's telephone set should not be bridged directly across the cable pair, either at the station protector, or at one or more terminals along the cable route. It is suggested that the installer-repairman be equipped with a spare IF isolation filter fitted with clips on the leads. The isolation filter should be inserted between the lineman's telephone set and the cable pair whenever test calls or connections are made on AML equipped cable pairs. Failure to follow these instructions will cause the AML subscriber's telephone during the interval of test to be out of service due to the shunting effect of the lineman's set at carrier frequencies.

7.16 The subscriber terminal of AML is designed only for indoor mounting. This unit is not to be mounted outside because temperature extremes adversely affect life and capacity of the nickel-cadmium battery used to power the ST unit.

8. ADDED MAIN LINE MAINTENANCE

8.01 No routine maintenance of Added Main Line carrier systems is required.

9. TROUBLE LOCATION PROCEDURE - GENERAL

9.01 Trouble location for AML systems is entirely by a process of analysis of the nature of the trouble and by substitution of spare units. No special test equipment or circuit diagrams are ordinarily required. However, a volt-ohmeter may be used to advantage in determining the state of charge on the nickel-cadmium battery.

9.02 Trouble report on both physical and AML circuit

A. The physical circuit subscriber provides a constant check on the condition of outside plant facilities. Thus, a trouble report involving the physical circuit subscriber as well as the AML subscriber is most likely to be outside plant.

B. Perform routine tests and repairs as needed on the outside plant facilities.

9.03 Local Test Requirements - ST-3

Due to the normal charging current supplied to the AML subscriber terminal, a test from the central office local test board, test panel, or master test frame appears as a "short" of about 70 volts and no "ground". This is normal for AML equipped cable pairs. A leakage on the physical cable pair sufficient to cause failure of the physical circuit station will probably measure in the range from about 95 to 100 volts "short" or leakage.

9.04 Local Test Requirements - COT-3

If a "line" test is made from the local test board, test panel, or master test frame to the AML circuit telephone number; the apparent "line" leakage of about

50 volts "short" is actually a measure of the current drawn by the AML central office terminal by its signalling circuitry and represents normal operating conditions.

9.05 Local Test Requirements COT-2

If a "line" test is made from the local test board, test panel, or master test frame to an AML circuit telephone number; the apparent "line" leakage of about 88 volts "short" is actually a measure of the current drawn by the AML central office terminal and represents normal operating conditions.

10. TROUBLE INVOLVING AML SUBSCRIBER ONLY

10.01 Verify that physical circuit subscriber's telephone service is normal. If not, refer to paragraph 9.02 and clear line trouble.

10.02 If the physical circuit tests okay and trouble on the AML circuit is "no transmission" or "no ringing"; bridge a spare AML subscriber terminal directly across the physical pair at the central office main frame. Connect this AML ST unit to a spare telephone.

10.03 If operation is normal using the spare AML ST unit, trouble is at the subscriber terminal.

10.04 If operation is not normal using the spare AML ST unit bridged at the central office, replace AML central office terminal and re-check operation by dialing, ringing, and talking. If replacement of the AML COT clears trouble, call reporting customer and verify that the trouble has been cleared.

10.05 If replacement of the AML COT unit still fails to clear all trouble when call is made to the reporting customer, additional trouble exists at the subscriber's premises.

10.06 If trouble has been located to the subscriber's premises by the above procedures, visit station and try a substitute telephone set (or attempt to obtain normal operation from another extension station in the house). If trouble is isolated to telephone set, replace set. Verify that all connections to the AML ST unit are correct. If not, correct connections or substitute spare AML ST circuit board as indicated.

CAUTION: BE SURE TO DISCONNECT THE NICKEL-CADMIUM BATTERY IN THE DEFECTIVE AML ST UNIT. THIS PREVENTS THE BATTERY FROM DISCHARGING.

10.07 When storing AML ST units, disconnect battery to prevent discharging or remove the battery and store separately, if preferred.

10.08 Satisfactory condition of the nickel-cadmium battery in the AML ST unit can be checked with a voltmeter while the connected physical circuit is in an "off-hook" condition. (Thus, not charging the nickel-cadmium battery in the AML ST unit). The battery voltage should be equal to or higher than 6.1 volts. When an incoming 76 kHz carrier signal is applied to the AML ST unit, the ringers should ring and the battery voltage should not drop below 5.7 volts. The 76 kHz carrier signal is supplied by the AML COT whenever ringing voltage is applied to the AML telephone number group and terminal in the central office.

10.09 If all of the above procedures fail to clear the trouble at the AML subscriber's premises, there remains the possibility that a line trouble exists at carrier frequencies which does not affect the physical circuit to a noticeable degree.

11. TROUBLE INVESTIGATION OF HIGH-FREQUENCY LINE

11.01 The following information is intended as an outline guide for trouble investigation of the high-frequency line when the need for such a course of action is indicated on one or more specific loops equipped with AML channels.

11.02 In nearly every case, where the trouble fails to clear after performing all steps indicated in preceding paragraphs, the most likely condition is the existance of one or more unknown bridged taps which may be shunting down the received carrier level. The bridged taps may exist because of inaccurate cable records, possible errors in assignment records, or perhaps an unknown cross-connection.

11.03 The nature of trouble on the AML circuit may be excessive noise (exceeding 20 dBrnC and usually characterized by relatively loud "popping" and "dial click" noises). It may also take the form of the customer being able to place calls satisfactorily but cannot receive a ring or the bell rings "feebly". The AML subscriber's set may also fail to operate under any conditions. It is assumed at this point that a spare AML-ST unit, known to be in good working order, has been substituted without clearing the difficulty.

11.04 The first requirement, at this stage of the trouble investigation, is to obtain a well-calibrated carrier frequency voltmeter.

11.05 Bridge the carrier frequency voltmeter directly across the tip and ring of the station protector.

11.06 Check calibration of the test set and tune the dial to approximately 76 kHz on the frequency dial. Set the selector switch to 135 ohm bridging.

11.07 On the AML subscriber's set, dial a test line such as a milliwatt supply and monitor long enough to verify that the test line will not "time out" before carrier frequency measurements can be completed.

11.08 If the AML circuit does not return dial tone, refer to paragraph 11.11.

11.09 Slowly tune the frequency dial, searching for the 76 kHz received carrier signal, while progressively increasing the sensitivity of the test set with the attenuator knob.

11.10 "Peak" the reading of 76 kHz received level and switch the attenuator so that the meter reading obtained is in the upper portion of the scale. Read and record the measured level as the algebraic sum of the attenuator setting and the meter reading.

REQUIREMENT: The received 76 kHz level should not be lower than -43 dBm under any condition.

11.11 If, in paragraph 11.08, dial tone is not returned when the AML subscriber's set is taken off hook, it is an indication of very severe carrier attenuation either at 76 kHz, or at both 76 kHz and 28 kHz. Instead of excess bridged tap, it is probably a load coil inadvertantly left on the pair or placed in error.

12. HANDLING OF UNITS FOUND TO BE DEFECTIVE

12.01 Defective units should be returned to the Superior Continental Corporation for repair and replacement. The replacement will be at no cost during the first year of operation which is covered by the one year guarantee. It will be on a flat nominal charge basis after the guarantee expires.

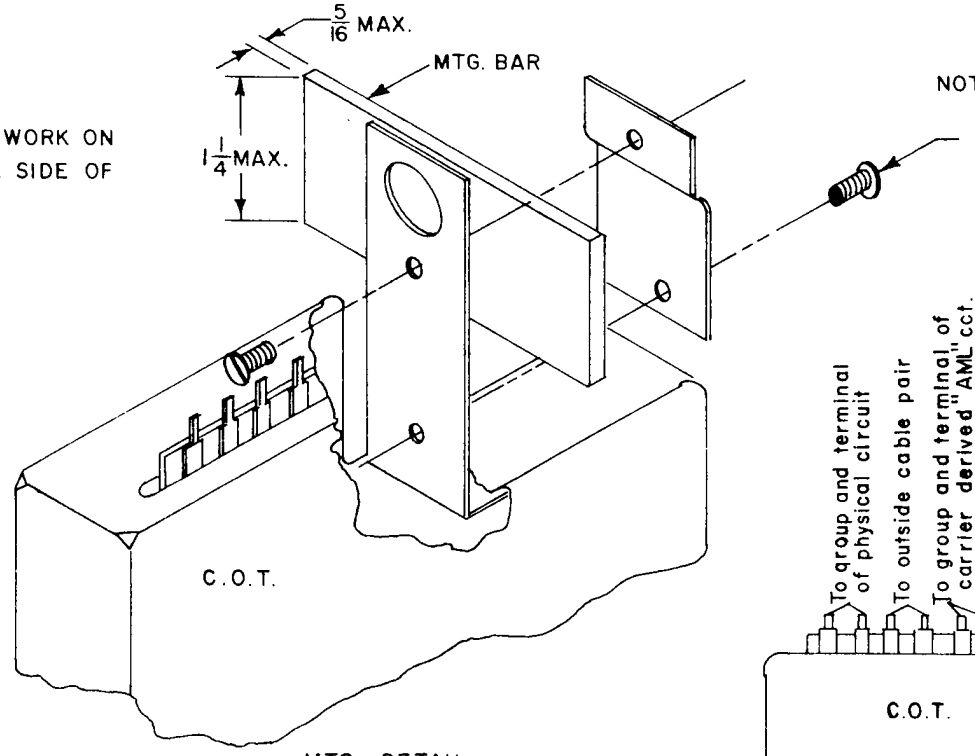
12.02 When an AML unit has been found to be defective, call, write, or wire: Superior Continental Corporation, P.O. Box 489, Hickory, North Carolina 28601. Telephone - 704-328-2171. A replacement unit will be shipped immediately. The following information concerning the defective unit should be provided:

Unit failed -
Perferred method of
shipment of replacement unit -

12.03 Instructions for return shipment of the defective unit will be furnished at the time of receipt of the replacement unit. The cost of the replacement will be billed to the customer and a credit will be issued when the defective unit is received.

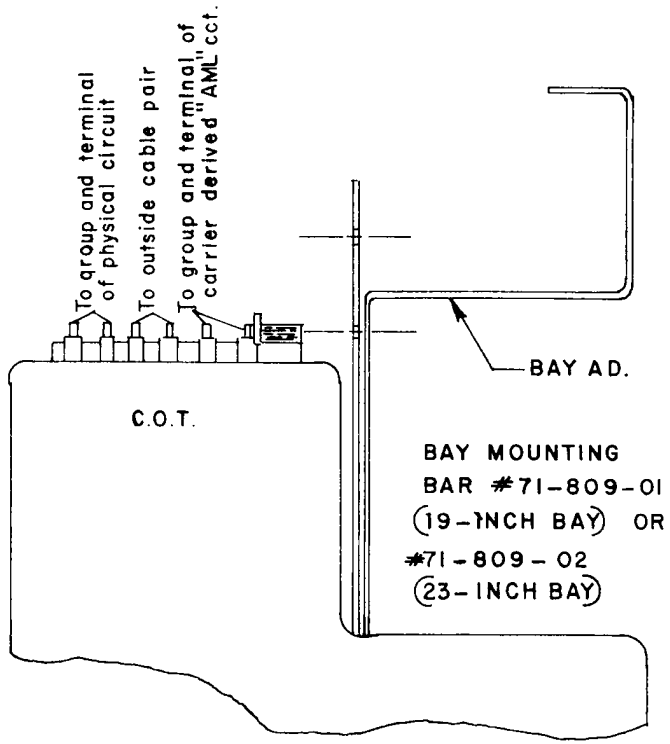
12.04 It should be noted that due to automated testing at the repair facility, it will be impossible to repair a unit which has been tampered with, modified, or damaged by physical abuse. Any of these conditions will void the guarantee and credit cannot be given for such units.

HORIZONTAL IRONWORK ON BUNCHING BLOCK SIDE OF MAIN FRAME.



MTG. DETAIL
HORIZONTAL IRON

NOTE: ADJUST SCREW TO ACCOMODATE MATERIAL THICKNESS OF MOUNTING BAR BEFORE INSTALLING AML COT UNIT.

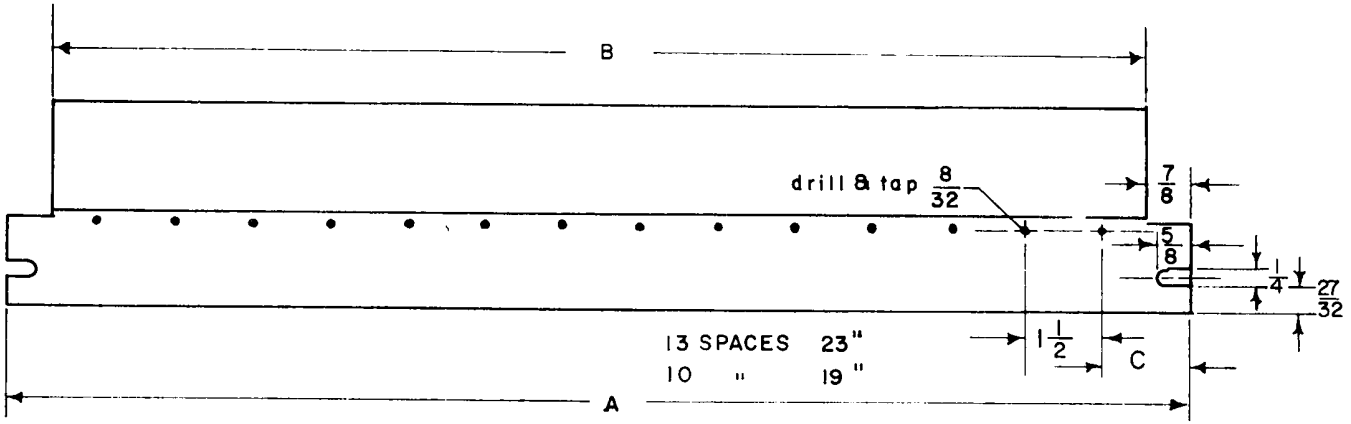


MTG. DETAIL
BAY ADAPTER

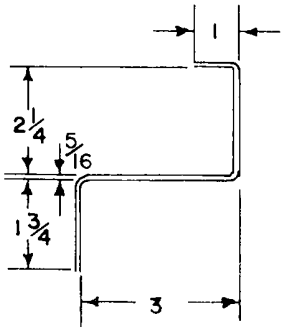
SUPERIOR CONTINENTAL CORPORATION Hickory, North Carolina		
MOUNTING DETAIL FOR A M L CENTRAL OFFICE TERMINAL		
DRAWN BY J. AGLE	SCALE	SHEET NO. ____ OF ____
APPROVED BY	DATE	DRAWING NO. FIG. 1

NOTE: 19 INCH BAR IS CODED #71-809-01 AND PROVIDES SPACE FOR 11 AML CENTRAL OFFICE TERMINALS IN FIVE 1 3/4 VERTICAL MOUNTING SPACES.

23 INCH BAR IS CODED #71-809-02 AND PROVIDES SPACE FOR 14 AML CENTRAL OFFICE TERMINALS IN FIVE 1 3/4" VERTICAL MOUNTING SPACES.



LTR	DEM 23"	DEM 19"
A	23"	19"
B	21.25"	17.25"
C	1.75"	2"

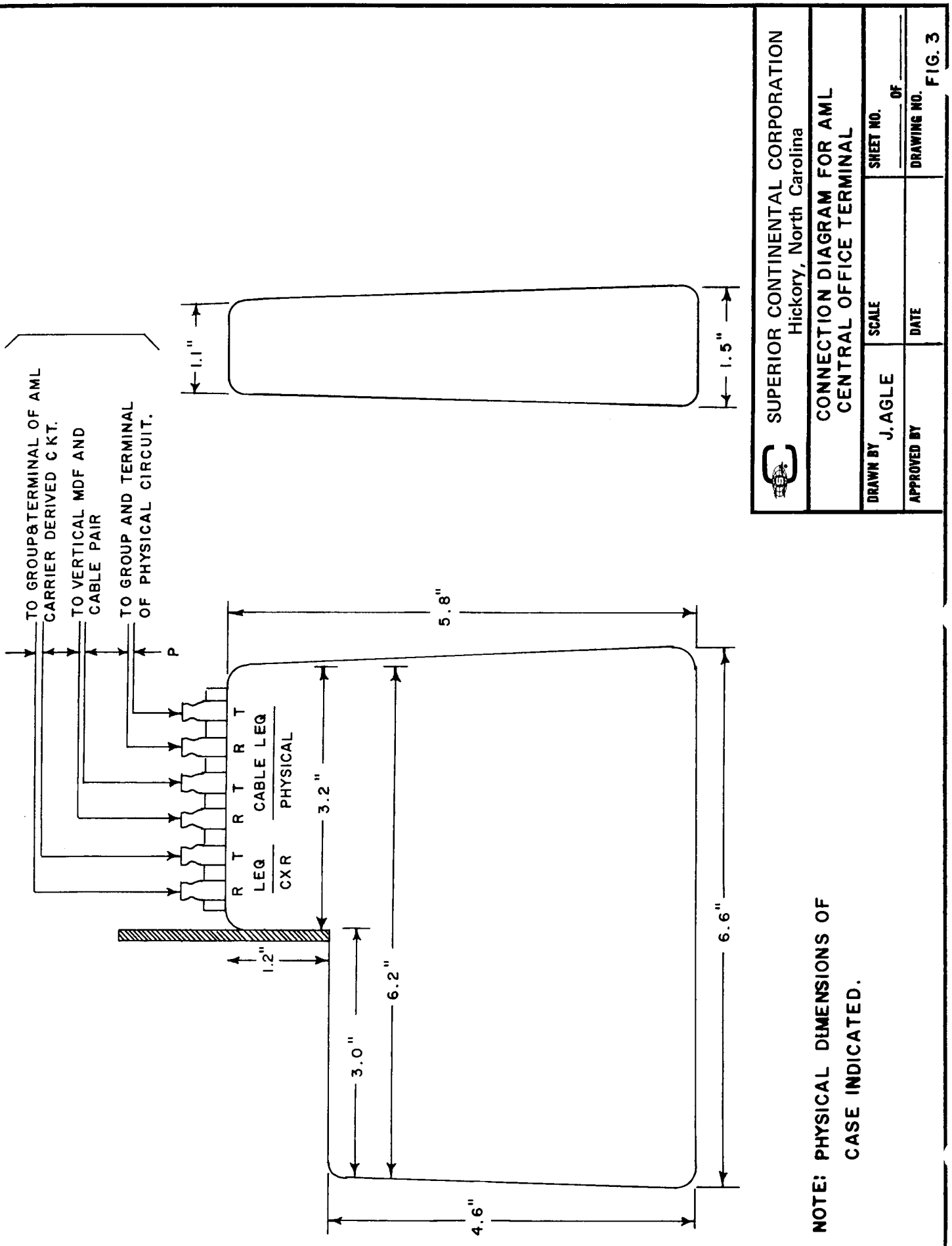


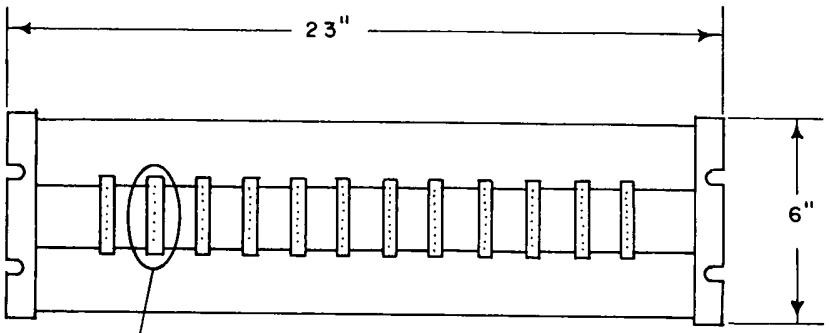
MATERIAL: .060 MILD STEEL
FINISH: CAD. IRIDITE

SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina

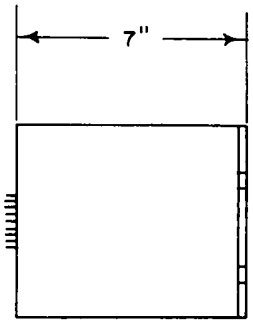
RELAY RACK MOUNTING BAR
AML CENTRAL OFFICE TERMINAL

DRAWN BY	SCALE	SHEET NO.
AGLE		_____ OF _____
APPROVED BY	DATE	DRAWING NO.
		FIG. 2

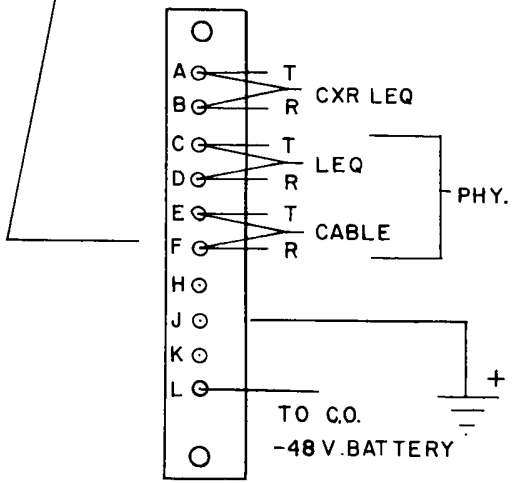

TO GROUP&TERMINAL OF AML CARRIER DERIVED C KT.
TO VERTICAL MDF AND CABLE PAIR
TO GROUP AND TERMINAL OF PHYSICAL CIRCUIT.
P
R T R T R T
LEQ / CXR
CABLE LEQ / PHYSICAL
1.1"
1.5"
5.8"
3.2"
6.2"
6.6"
1.2"
3.0"
4.6"
SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina
CONNECTION DIAGRAM FOR AML
CENTRAL OFFICE TERMINAL
DRAWN BY J. AGLE
SCALE
SHEET NO.
OF
APPROVED BY
DATE
DRAWING NO.
FIG. 3
NOTE: PHYSICAL DIMENSIONS OF CASE INDICATED.

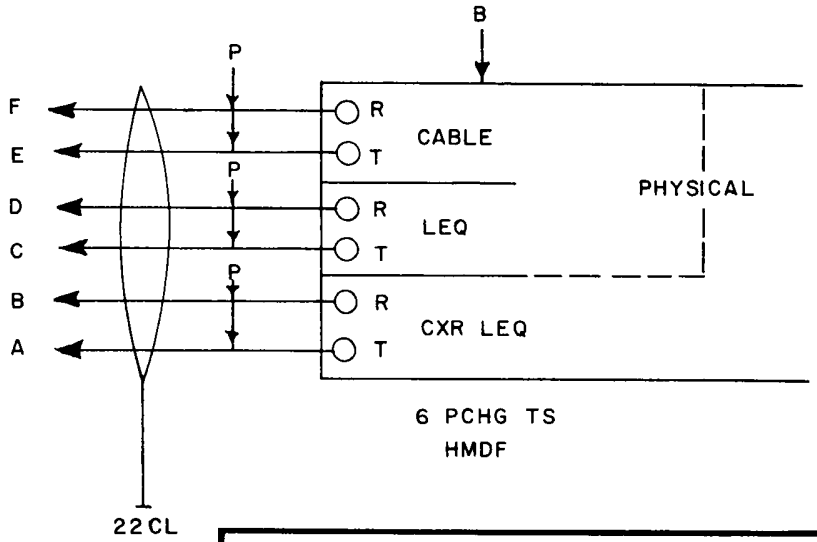


BACK VIEW



SIDE VIEW

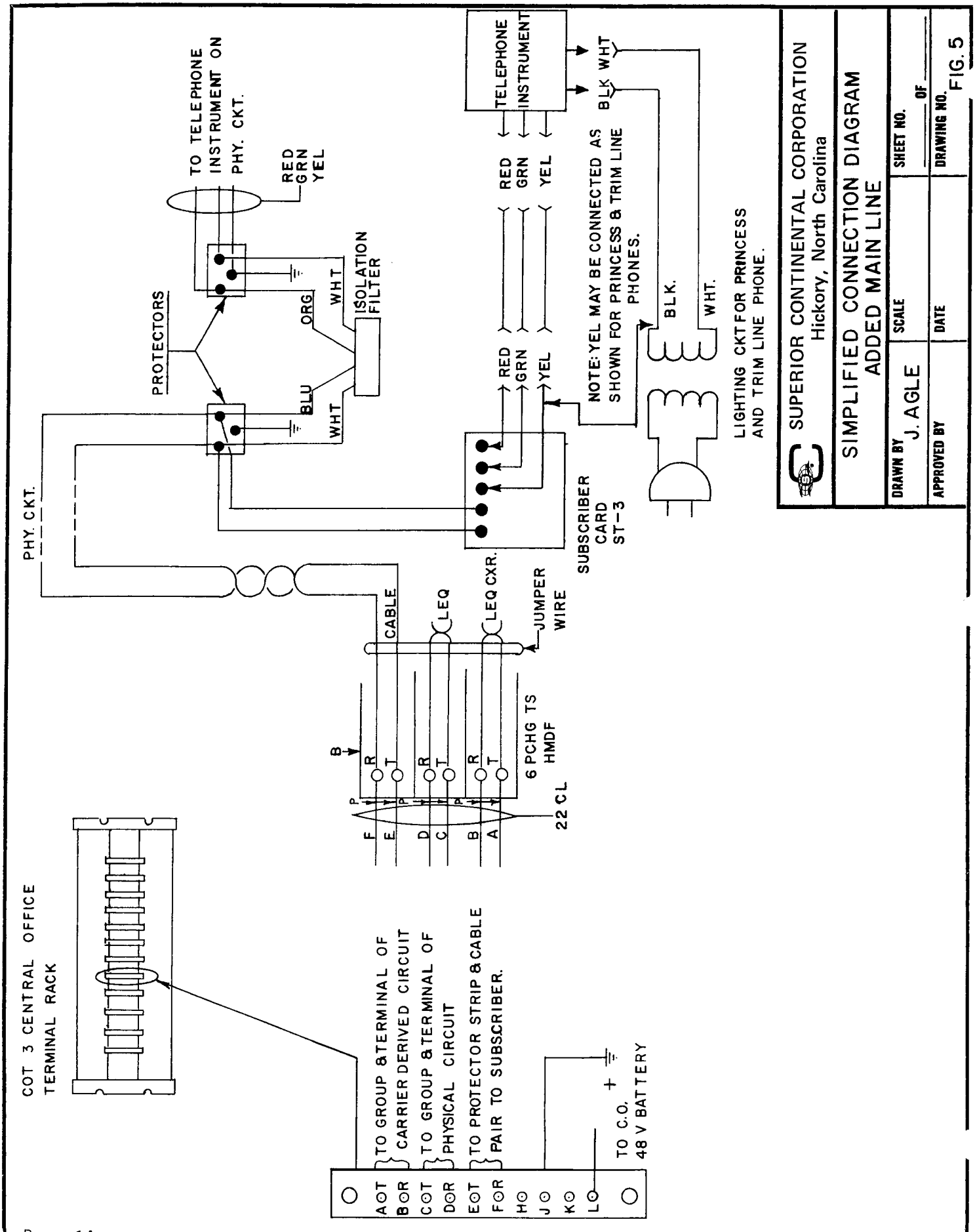


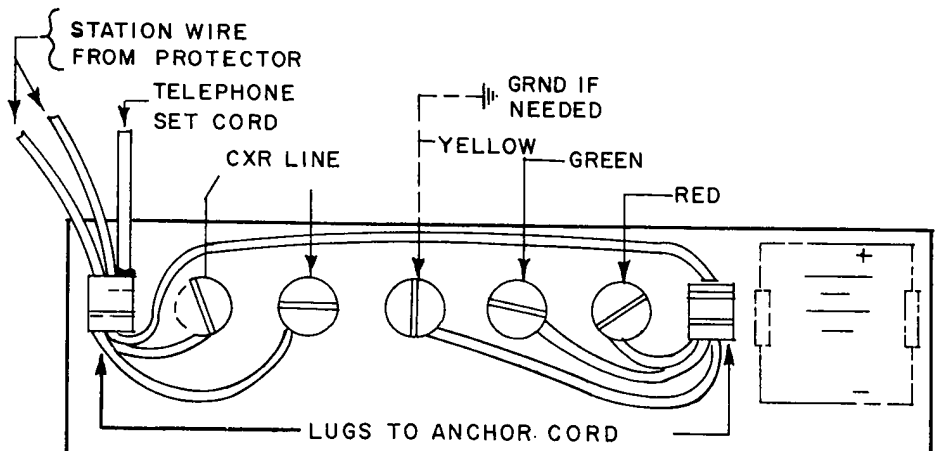


SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina

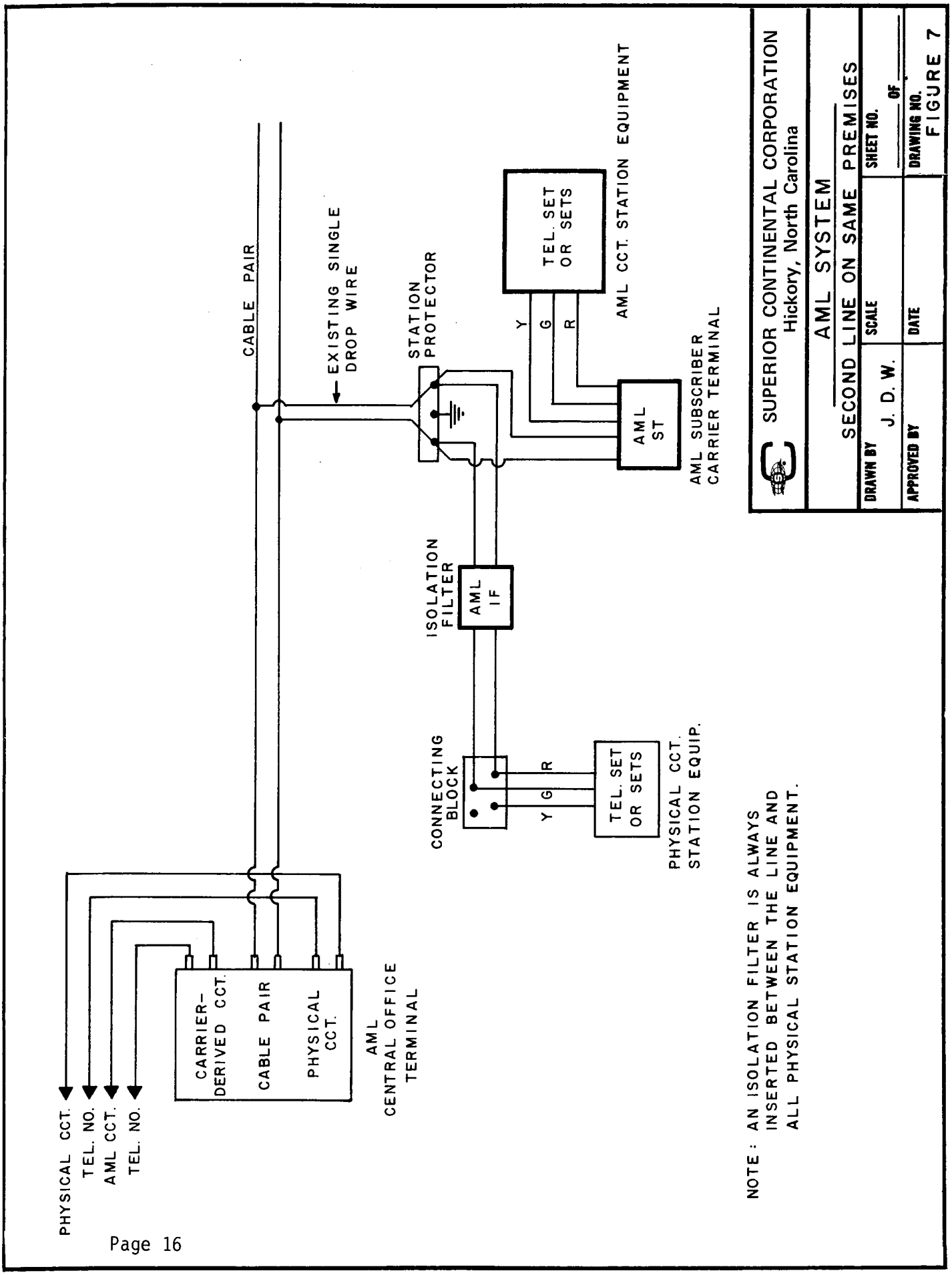
COT-3 CENTRAL OFFICE TERMINAL CABLING FROM RELAY RACK BAY TO MDF

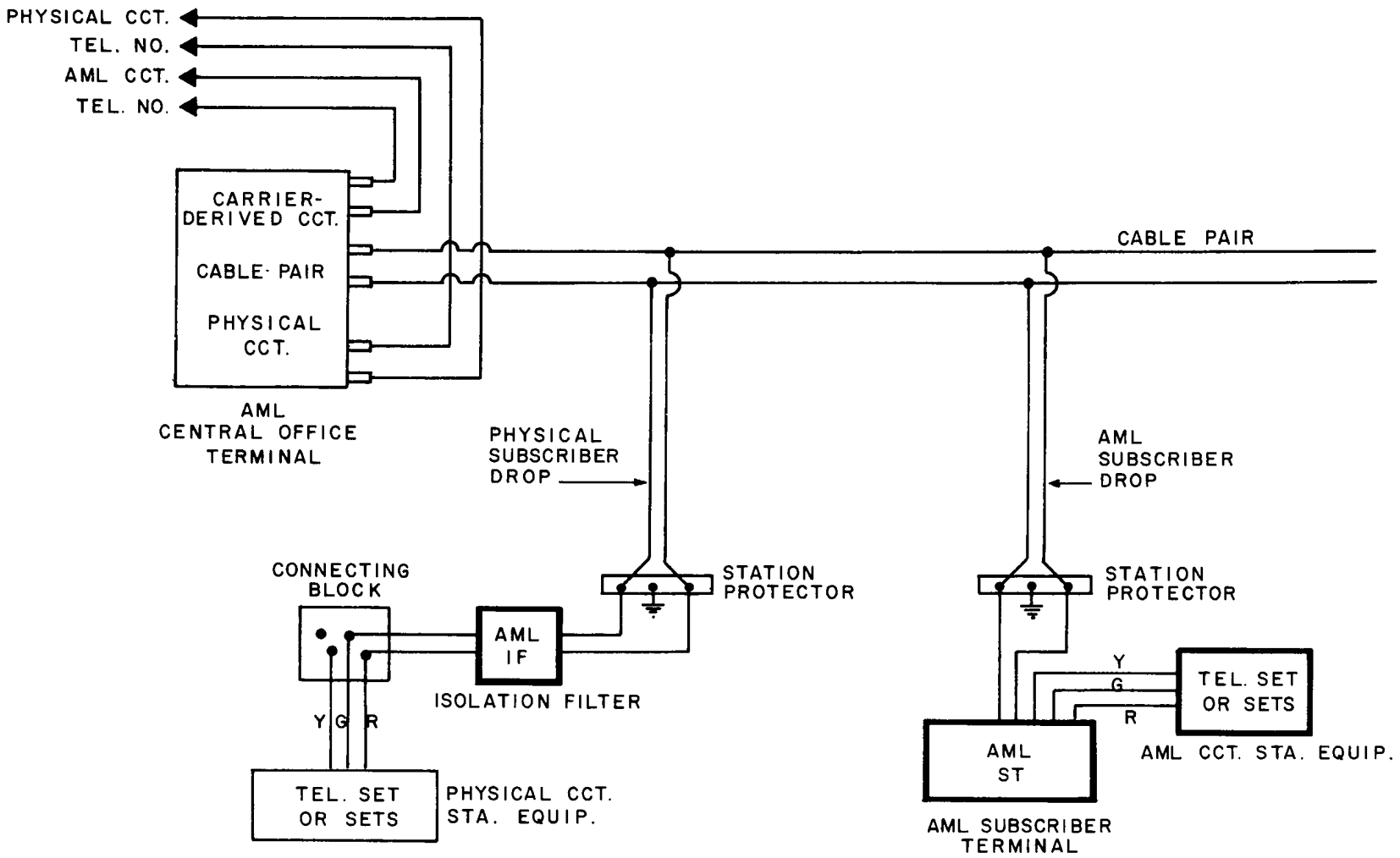
DRAWN BY	SCALE	SHEET NO.
J. AGLE		_____ OF _____
APPROVED BY	DATE	DRAWING NO. FIG.4


COT 3 CENTRAL OFFICE
TERMINAL RACK
TO GROUP & TERMINAL OF CARRIER DERIVED CIRCUIT
TO GROUP & TERMINAL OF PHYSICAL CIRCUIT
TO PROTECTOR STRIP & CABLE PAIR TO SUBSCRIBER.
TO C.O. 48 V BATTERY
AOT
BOR
COT
DOR
EOT
FOR
HO
JO
KO
LO
22 CL
6 PCHG TS HMDF
CABLE
LEQ
LEQ CXR.
JUMPER WIRE
PHY. CKT.
SUBSCRIBER CARD ST-3
PROTECTORS
ISOLATION FILTER
ORG
WHT
BLU
WHT
TO TELEPHONE INSTRUMENT ON PHY. CKT.
RED
GRN
YEL
TELEPHONE INSTRUMENT
RED
GRN
YEL
BLK
WHT
NOTE: YEL MAY BE CONNECTED AS SHOWN FOR PRINCESS & TRIM LINE PHONES.
BLK.
WHT.
LIGHTING CKT FOR PRINCESS AND TRIM LINE PHONE.
SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina
SIMPLIFIED CONNECTION DIAGRAM
ADDED MAIN LINE
DRAWN BY J. AGLE
SCALE
SHEET NO.
OF
APPROVED BY
DATE
DRAWING NO.
FIG. 5

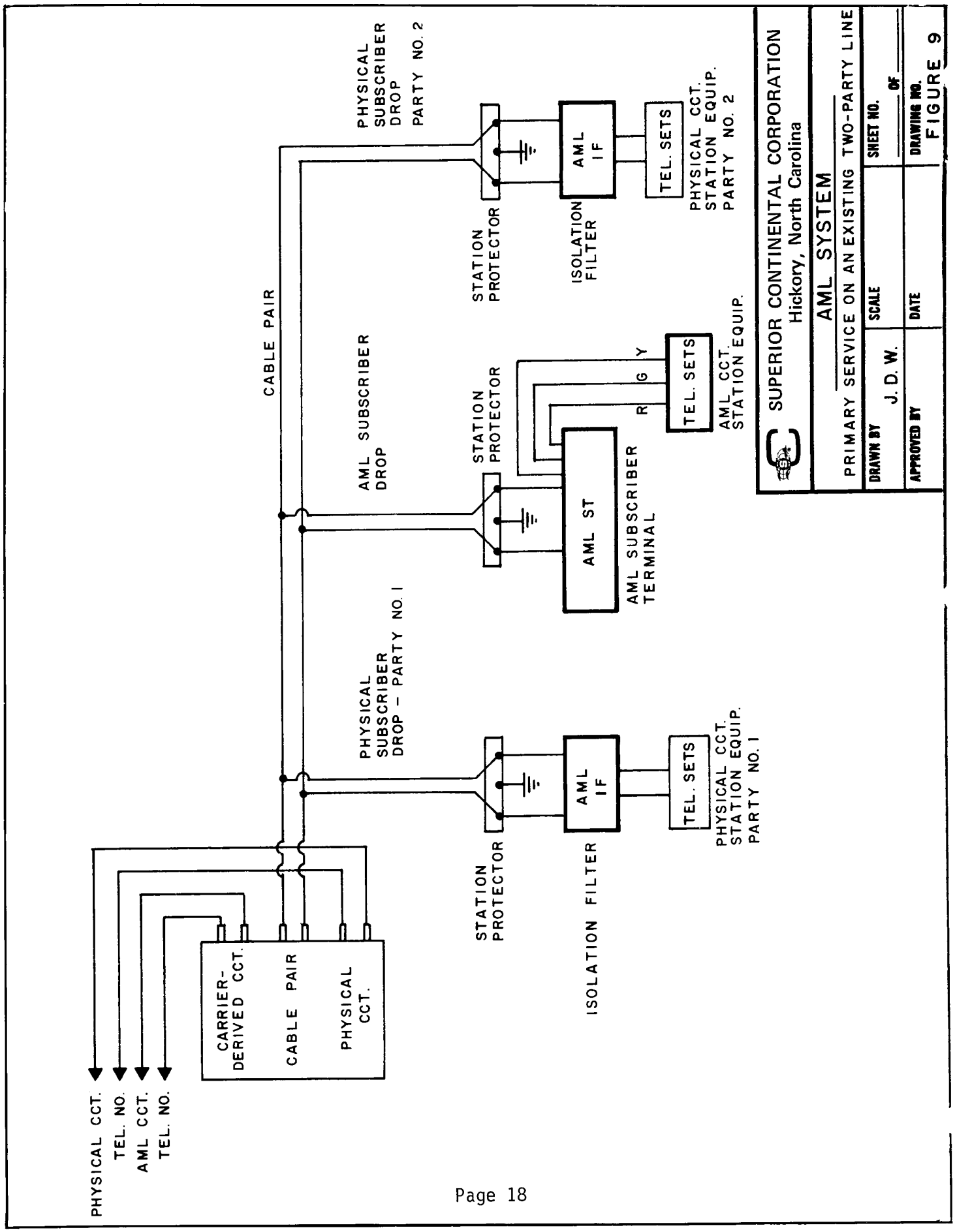


SUPERIOR CONTINENTAL CORPORATION Hickory, North Carolina		
ADDED MAIN LINE SUBSCRIBER'S TERMINAL		
DRAWN BY J.AGLE	SCALE	SHEET NO. _____ OF _____
APPROVED BY	DATE	DRAWING NO. FIG. 6


PHYSICAL CCT.
TEL. NO.
AML CCT.
TEL. NO.
CARRIER-DERIVED CCT.
CABLE PAIR
PHYSICAL CCT.
AML CENTRAL OFFICE TERMINAL
CABLE PAIR
EXISTING SINGLE DROP WIRE
STATION PROTECTOR
ISOLATION FILTER
AML IF
CONNECTING BLOCK
Y
G
R
TEL. SET OR SETS
PHYSICAL CCT. STATION EQUIP.
Y
G
R
TEL. SET OR SETS
AML CCT. STATION EQUIPMENT
AML ST
AML SUBSCRIBER CARRIER TERMINAL
NOTE: AN ISOLATION FILTER IS ALWAYS INSERTED BETWEEN THE LINE AND ALL PHYSICAL STATION EQUIPMENT.
SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina
AML SYSTEM
SECOND LINE ON SAME PREMISES
DRAWN BY J. D. W.
SCALE
SHEET NO. OF
APPROVED BY
DATE
DRAWING NO. FIGURE 7



SUPERIOR CONTINENTAL CORPORATION Hickory, North Carolina		
AML SYSTEM PRIMARY SERVICE ON SEPARATE PREMISES		
DRAWN BY J. D. W.	SCALE	SHEET NO. ____ OF ____
APPROVED BY	DATE	DRAWING NO. FIGURE 8


PHYSICAL CCT.
TEL. NO.
AML CCT.
TEL. NO.
CARRIER-DERIVED CCT.
CABLE PAIR
PHYSICAL CCT.
CABLE PAIR
PHYSICAL SUBSCRIBER DROP – PARTY NO. 1
AML SUBSCRIBER DROP
PHYSICAL SUBSCRIBER DROP PARTY NO. 2
STATION PROTECTOR
ISOLATION FILTER
AML IF
TEL. SETS
PHYSICAL CCT. STATION EQUIP. PARTY NO. 1
STATION PROTECTOR
AML ST
AML SUBSCRIBER TERMINAL
R
G
Y
TEL. SETS
AML CCT. STATION EQUIP.
STATION PROTECTOR
ISOLATION FILTER
AML IF
TEL. SETS
PHYSICAL CCT. STATION EQUIP. PARTY NO. 2
SUPERIOR CONTINENTAL CORPORATION
Hickory, North Carolina
AML SYSTEM
PRIMARY SERVICE ON AN EXISTING TWO-PARTY LINE
DRAWN BY J. D. W.
SCALE
SHEET NO. OF
APPROVED BY
DATE
DRAWING NO. FIGURE 9