

**COMMAND POST ALERTING NETWORK (COPAN)
JOINT CHIEFS OF STAFF ALERTING NETWORK (JCSAN)
CIRCUIT MAINTENANCE**

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1. GENERAL

1.01 This section covers periodic routine tests to be made on individual circuits. It may also be helpful in the investigation of troubles located in the equipment at a customer location. Investigation of facility troubles should be in accordance with standard operating practices for the type of facility involved.

1.02 This section is reissued to update the section as required.

2. TESTING REQUIREMENTS AND PROCEDURES

2.01 Tests should be made at monthly intervals, as shown in the Attachment of this section, under the direction of the Network Control Office. If tests cannot be made as scheduled (due to customer action, holidays, etc), the Network Control Office should be notified. The Network Control Office or the Plant Control Office (PCO) will reschedule at the earliest possible date and notify all offices concerned.

2.02 To keep circuit release time to a minimum, all offices involved should be ready to start promptly at the scheduled time and should be sure that all necessary testing equipment is available, calibrated, and functioning properly.

2.03 Power supply voltages at Terminal Switch Points and Remote Command Post (RCP) locations should be checked and adjusted, if necessary, prior to making tests.

2.04 All measurements will be made at 1000 Hz, except where noted otherwise.

2.05 For lineup procedures outlined in this section, refer to the drawings contained in Fig. 1, 2, and 3. These drawings are typical and should be used only as a guide to the method of lineup.

2.06 Reference should be made to the drawing issued by the Customer Service Engineer for a particular location. This drawing will provide amplifier designations, type of installation, the established "normal" dBm levels for that particular location, and the equipment provided.

2.07 On circuits which can be switched from the Main Command Post (MCP) to an alternate MCP location, the alternate Circuit Control Office should measure facilities to the "Y" point and direct tests to be made in accordance with 4.03. Overall tests from the alternate MCP, as directed in 4.10(15), will be made after the Network Control

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Office has completed overall tests from the MCP location.

3. TESTING EQUIPMENT

3.01 Telephone Company Central Offices

- (a) KS-19353 Oscillator or equivalent
- (b) 13A, 21A, Northeast Electronics TTS-4 or equivalent TMS.

3.02 Customer Locations

- (a) 21A TMS or equivalent
- (b) 5A Attenuator
- (c) Cords as required for the particular type of transmission sets used and the jacks involved.
- (d) Two 328D (600-ohm) Plugs
- (e) One 165C (dummy) Plug
- (f) Echo Suppressor Test Set (J68605M, L1 or L3)
- (g) Relay blocking and insulating tools per Section 069-020-801.
- (h) At locations where the Duty Officer (DO) J Bay is physically separated from the line bays, an additional source of 1000-Hz tone and a separate 600-ohm measuring set will be required.

4. ROUTINE TRANSMISSION LINEUP

A. Preliminary

4.01 The Control Office will first measure the overall facilities between this office and the Terminal Switch Point. This will determine the condition of the overall facilities and permit the Control Office to clear any line troubles while other points are making local tests.

- (1) Control Office will send -16 dBm at input to transmitting line amplifier.
- (2) Terminal Switch Point will measure at the receiving line (A AMP) output.

Requirement: $+7.0$ dBm (Fig. 2).

- (3) Terminal Switch Point will send -16 dBm at transmitting line (B AMP) input (Fig. 2).
- (4) Control Office will measure at the output of its receiving line amplifier.

Requirement: $+7.0$ dBm.

- (5) Repeat Steps (1) through (4) for alternate circuit (JCSAN only).

4.02 The Control Office will direct the distant Serving Test Center (STC) to have local maintenance forces make tests.

B. Main Command Post

4.03 The Control Office will make the following tests with the MCP (refer to Fig. 1).

- (1) Control Office will send tone at normal level (2.06) toward MCP. Leave tone at this point for Steps (2) and (3).
- (2) MCP will measure at receiving line AMP OUT. The Control Office will direct adjustment of this amplifier for reading of $+7.0$ dBm, if required (2.06) (Fig. 1).
- (3) MCP will measure at PBX terminating jack.

Requirement: -10.0 dBm (use zero loss trunk provided at MCP).

- (4) MCP will send 0 dBm at PBX terminating jack. Leave tone at this point for Steps (5) and (6).
- (5) MCP will measure at the transmitting line AMP OUT and adjust for proper level (2.06) toward Control Office (Fig. 1).
- (6) Control Office will measure for normal level (2.06) from MCP.
- (7) Control Office will make a return loss measurement to an *off-hook* telephone connected to the PBX drop at the MCP. There should be no reading due to the echo suppressor in the circuit.

- (8) Control Office will send normal level (2.06) toward MCP.
- (9) MCP will operate the SW and BSA (TRO) relays and measure at PAD OUT of the associated bridge leg. Measurement should be 0 dBm.
- (10) MCP will send -19.6 dBm into AMP IN of amplifier associated with the bridge leg. Measurement at this AMP OUT should be -16.0 dBm. Leave tone on for Step (11).
- (11) Control Office will measure for normal level (2.06) from MCP. Reading should be the same as in Step (6).
- (12) The Control Office will make a return loss measurement toward the MCP bridge. Loss should be at least 60 dB.
- (13) Repeat Steps (8) through (12) for each bridge, operating the BSB (TR1) BSC (TR2) or BSD (TR3) as required.
- (14) Repeat Steps (1) through (13) for alternate circuit (JCSAN only).

C. Terminal Switch Points and Remote Command Post—Primary Circuit Lineup

4.04 For JCSAN RCP lineup and overall tests, refer to Section 480-713-500. For an abbreviated transmission sketch of a typical COPAN RCP, per SD-1G158-01, refer to Fig. 3. For lineup information of the amplifier in Fig. 3, refer to SD-1G158-01 (2.06).

4.05 Remote Command Post—Residence Lines

There is no routine lineup required on Residence Lines. For initial lineup requirements, refer to Section 310-504-501, Part 10.

4.06 Duty Officer Console: There is no routine lineup required on the DO Console. For initial lineup requirements, refer to Section 310-504-501, Part 11.

D. VOLCAS Unit Tests

4.07 Check the sensitivity of each VOLCAS unit as follows:

- (1) Terminate PA OUT and PB IN with 328D (600-ohm) plugs.
- (2) Insert 165C dummy plug into associated TR jack located on VOLCAS unit.
- (3) Send 1200-Hz tone into the PA IN through a variable attenuator or 21A TMS.
- (4) Reduce level of sending tone until the OPR LAMP is extinguished; then slowly increase level until lamp lights. Measure the level of the sending tone. This is the operating sensitivity. The level should be -42 dBm + 3 dB, -2 dB (between -39 dBm and -44 dBm).

Note: If a 1C pad is installed as an integral part of the VOLCAS unit (ie, between the IN jacks and the unit), add the pad value numerically to the measurement of the input tone. For example: level of sending tone measures -26 dBm with an integral pad of 16 dB. Then VOLCAS sensitivity is -42 dBm.

- (5) Slowly reduce the level of the sending tone from Step (4) until OPR LAMP goes OUT. This is the release level and should be between 1- and 3-dB lower level than the operating sensitivity obtained in Step (4).
- (6) Move the 328D plug from the PA OUT to the PB OUT and the 328D plug from the PB IN to the PA IN, leaving the 165C plug in the TR jack.
- (7) Send 1200-Hz tone into the PB IN and repeat Steps (4) and (5).
- (8) Remove all cords and plugs.

Note: If VOLCAS does not meet the sensitivity limits, swapping relays and/or tubes will usually indicate the defective component. If trouble cannot be determined by this method, it will be necessary to follow procedures outlined in Section 310-504-500.

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E. Echo Suppressor Tests

4.08 Echo suppressor tests at Terminal Switch Points will be made per Section 332-410-500. Requirements are obtained from the drawing issued by the Customer Service Engineer for that location.

F. Overall Tests

4.10 After the completion of all local tests, the Control Office will make the following tests with the Remote Command Post.

- (1) Control Office will send tone at normal level (−16 dBm at transmitting line AMP IN) (Fig. 2).
- (2) Terminal Switch Point will measure at the A AMP OUT (line bay). The Control Office will direct adjustment of the A amplifier, if required, for an output of +7.0 dBm.
- (3) Terminal Switch Point will send at −16 dBm into B AMP IN (line bay), and Control Office will measure for normal level (+7.0 dBm at receiving line AMP OUT).
- (4) With Control Office sending as in Step (1), measure at distant customer PBX terminating jack. Measurements should be −10 dBm.
- (5) Send tone at 0 dBm at distant customer PBX terminating jack. Control Office will measure as in Step (3).
- (6) Control Office will make a return loss measurement to an *off-hook* telephone connected to the PBX drop at the distant end. Loss should be at least 45 dB.
- (7) Control Office will have MCP send tone at 0 dBm from PBX terminating jack at MCP. Distant end will measure as in Step (4). Measurement should be −10 dBm.
- (8) Have distant end send 0 dBm at PBX terminating jack as in Step (5) and have MCP measure at PBX terminating jack. Measurement should be −10 dBm.
- (9) Control Office will place circuit in COPAN condition and request DO to conference his local PBX drop. Send tone at normal level and

have RCP measure at PBX terminating jack. Measurement should be −10 dBm.

- (10) With circuit in same condition as in Step (9), have RCP send 0 dBm at PBX terminating jack. Control Office will measure normal level.
- (11) With circuit in same condition as in Step (9), Control Office will make return loss measurement to an *off-hook* telephone connected to the PBX drop. Loss should be at least 45 dB.
- (12) Control Office will check the operation of pulse code signaling by sending code (release code) 10 dB above normal level (2.06) and 10 dB below normal level. Reply pulse should be received in either case.
- (13) With circuit in the idle condition, Terminal Switch Point will measure 2400-Hz idle circuit tone at A AMP OUT (line bay). Measurement should be −13 dBm (20 dBm below normal level). Control Office will then measure 2600-Hz idle circuit tone from distant end at receiving amplifier AMP OUT. Measurement should be −13 dBm at a +7 dBm point (20 dB below normal level).
- (14) Repeat Steps (1) through (13) for alternate circuit.
- (15) On circuits which can be remotely switched to an alternate MCP, the Control Office will request the alternate Control Office to have circuits switched and repeat Steps (4), (5), (7), (8), and (13).
- (16) Restore circuit to normal operating condition and request MCP Duty Officer to COPAN the circuit (primary) and "talk out" with RCP Duty Officer.
- (17) On circuits which can be remotely switched to an alternate MCP location, request customer to operate switch. COPAN and "talk out" circuit with the RCP Duty Officer.
- (18) Restore circuit to normal operating condition and have MCP PBX ring out circuit to distant PBX. Turn up circuit to customer.

5. OPERATIONAL TESTS

5.01 Operational tests are not required on a routine basis, but will be made on new installations or when existing equipment is modified or moved. The Network Control Office may request operational tests be made in an effort to isolate chronic or unusual troubles.

5.02 The Control Office will direct all operational tests. It is suggested that telephone company or maintenance personnel be available to operate the consoles at the MCP and RCP so as not to impose on the customer.

5.03 The tests outline in 5.05 are shown as being made between the MCP console and the RCP Duty Officer. The Control Office can make individual tests with either the MCP or the RCP by simulating the required conditions. These tests are described further in Section 310-504-500 for tests to the MCP and Section 310-504-501 for tests to the RCP.

5.04 The following tests are designed to cover all features of the system. Refer to Section 310-504-100, Parts 6 and 7, for operations and indications at the MCP and RCP, respectively. The Control Office will make or verify all observations.

5.05 Method of Testing

STEP	ACTION	VERIFICATION
1	Request MCP to COPAN primary circuit.	Proper codes. Long pulse reply to codes. Proper supervision at consoles. Pre-emption of both PBXs. Proper supervision at PBXs. Pre-empt tone at PBXs.
2	Request MCP to rering RCP using RECALL key. RCP DO (still <i>off-hook</i>) will answer by operating RRR (rering release) key.	Proper codes. Long pulse reply to codes. RCP gets rering. RCP retires bell with RRR key.
3	Request RCP to go <i>on-hook</i> .	SC2 code from RCP. Flashing BRIDGE-CONN lamp at MCP.
4	Request MCP to rering RCP using RECALL key.	Proper codes. Long pulse replies to codes. Proper supervision at MCP. Proper supervision at RCP.
5	Request MCP to release circuit.	Proper codes. Long pulse replies to codes. Proper supervision at MCP. Proper supervision at RCP.
6	Request MCP to COPAN primary circuit. <i>Note:</i> Request RCP to wait 15 seconds after receiving ring before answering.	<i>Off-hook</i> inquiry code sent twice. No Long pulse relay to <i>off-hook</i> inquiry code. Flashing BRIDGE-CONN lamp at MCP.
	RCP answer call.	Long pulse is sent by RCP. MCP sends <i>off-hook</i> inquiry. RCP sends Long pulse reply. Proper supervision at MCP. Proper supervision at RCP.

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STEP	ACTION	VERIFICATION
7	Request RCP to conference local residence line. When local residence line is in conference, have MCP talk to residence line. Request RCP DO to go <i>on-hook</i> . Request RCP DO to come back on line.	No <i>on-hook</i> code from RCP. Transmission quality. No <i>on-hook</i> code from RCP. MCP and RCP residence line can converse. RCP monitor speaker and recorder still on circuit. Verify that monitor and speaker were on while DO was <i>on-hook</i> .
8	Request RCP to go <i>on-hook</i> again. Request residence line to go <i>on-hook</i> Request MCP to rering RCP.	No <i>on-hook</i> code from RCP. <i>On-hook</i> code received from RCP. MCP has flashing BRIDGE-CONN lamp.
9	Request MCP to release circuit. <i>Note:</i> Repeat Steps 7 and 8 for all residence and PBX lines on initial tests.	
10	Request RCP to reverse pre-empt to MCP.	SC2 code from RCP. 20-Hz induced ring from MCP. Flashing yellow COPAN SEL/REL lamp at MCP.
11	Request MCP to answer call.	20-Hz induced ring ceases. Proper supervision at MCP. Proper supervision at RCP. Pre-emption of MCP and RCP PBXs.
12	Request MCP to release circuit.	
13	Request RCP DO to place call to MCP PBX.	1000-Hz timed ring (3 sec.) from RCP. MCP PBX answers. RCP PBX cut off. Transmission quality.
14	Request RCP DO to go <i>on-hook</i> .	Release of circuit. No <i>on-hook</i> code from RCP.
15	Request MCP PBX to call RCP PBX.	Proper signaling and transmission.
16	Request RCP PBX to call MCP PBX.	Proper signaling and transmission.
17	Request MCP to release circuit.	
18	Request MCP to COPAN primary circuit. Control Office opens transmit side of primary circuit.	
19	Request MCP to rering RCP.	RCP DO answers.
20	After codes go out twice on circuit—switch to spare sender and send twice more.	Transmission of codes twice from MCP. No Long pulse replies.

STEP	ACTION	VERIFICATION
	Control Office restores primary circuit to normal.	No answer—circuit alarms.
21	Request MCP to release circuit.	

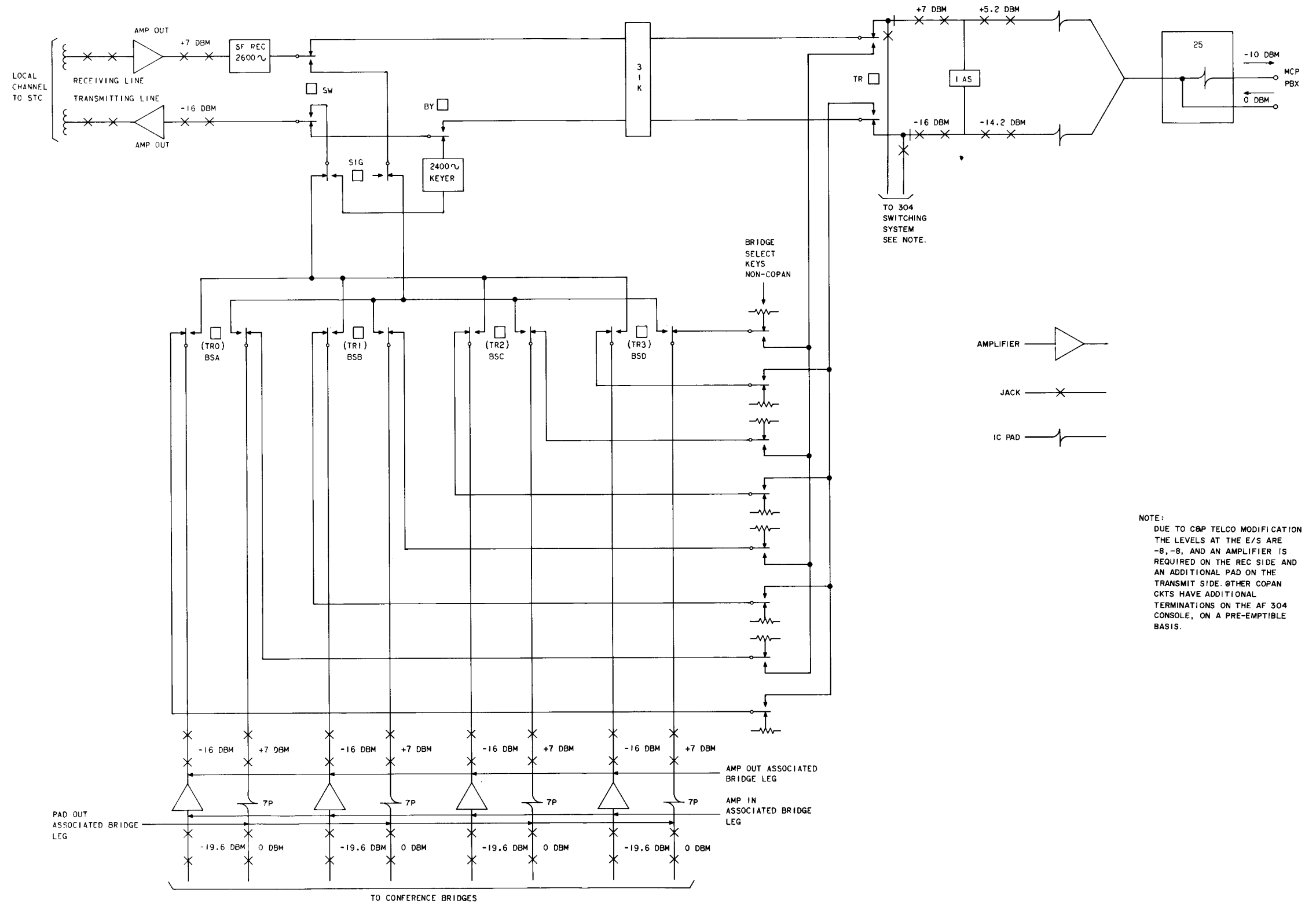
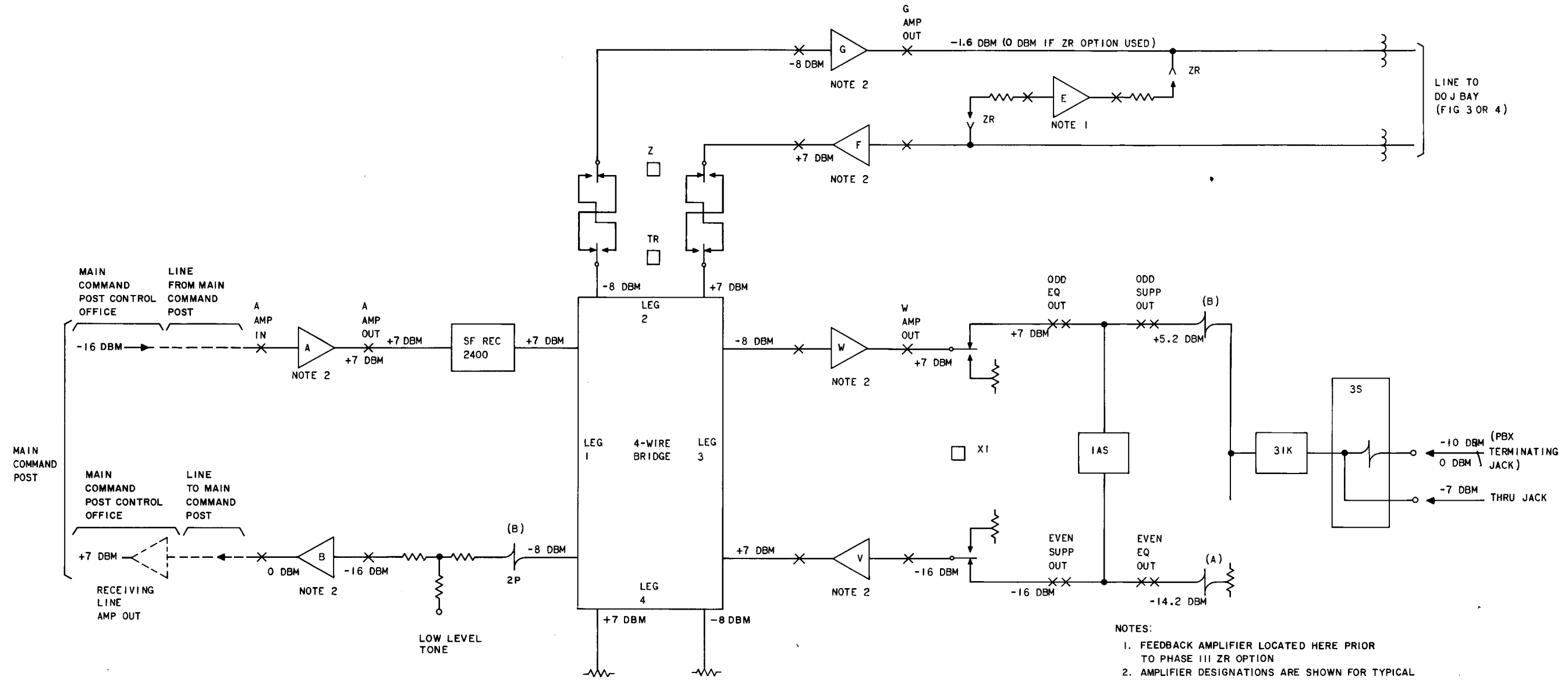


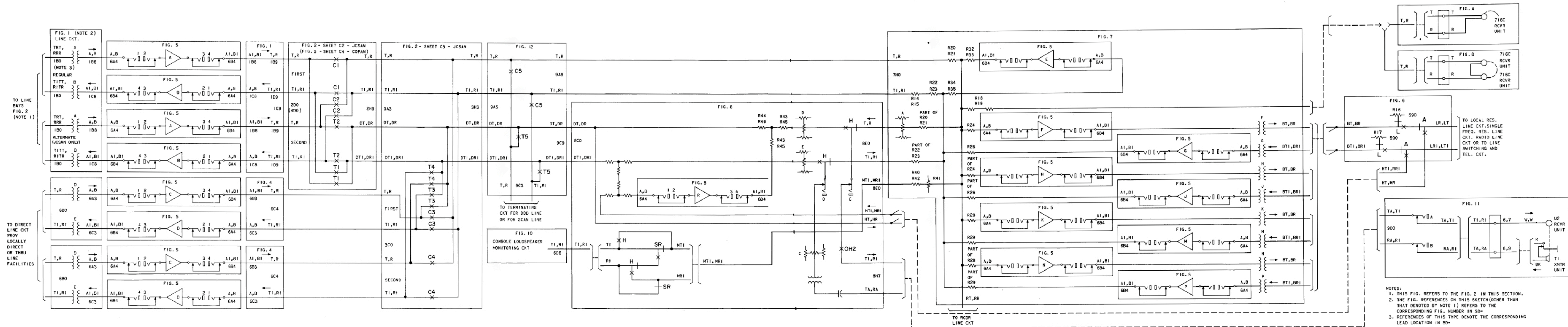
Fig. 1—Typical COPAN/JCSAN Circuit Termination: Main Command Post Transmission Path per SD-1G125-01



- NOTES:
1. FEEDBACK AMPLIFIER LOCATED HERE PRIOR TO PHASE III ZR OPTION
 2. AMPLIFIER DESIGNATIONS ARE SHOWN FOR TYPICAL PRIMARY CIRCUIT. REFER TO CSE DRAWING OF INDIVIDUAL LOCATION FOR ACTUAL AMPLIFIER DESIGNATIONS. TYPICAL DESIGNATIONS FOR ALTERNATE CIRCUIT ARE LISTED BELOW:
- | PRIMARY | ALTERNATE |
|---------|-----------|
| A | C |
| B | D |
| E | H |
| F | J |
| G | K |
| W | S |
| V | R |
3. A-600 OHM TERMINATION
B-SPECIAL CUSTOMER EQUIPMENT
 4. THIS CIRCUIT REQUIRED FOR EACH LINE FROM THE MCP.
 5. THESE LEVELS DO NOT ALWAYS APPLY, SINCE SOME PBX'S HAVE BEEN CHANGED TO OTHER MODELS SINCE THE ORIGINAL INSTALLATION.

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Fig. 2—Typical COPAN/JCSAN Line Bay—Terminal or Intermediate Switch Point per SD-1G133-01



- NOTES:
1. THIS FIG. REFERS TO THE FIG. 2 IN THIS SECTION.
 2. THE FIG. REFERENCES ON THIS SKETCH (OTHER THAN THAT DENOTED BY NOTE 1) REFERS TO THE CORRESPONDING FIG. NUMBER IN SD-
 3. REFERENCES OF THIS TYPE DENOTE THE CORRESPONDING LEAD LOCATION IN SD-

Fig. 3—Simplified Transmission Sketch of Line and Duty Officer Telephone Set Circuit per SD-1G158-01

			LOCAL P#3 TIME EST
1st MONDAY	N - GP 20125-22 E - GP 20140-16 & 17	Weisbaden Balboa, Canal Zone	2A - 5A 5P - 8P
1st TUESDAY	N - GP 20125-32 E - GP 20140-04 & 05	S. Ruislip Ottawa	2A - 5A 5P - 8P
1st WEDNESDAY	N - GP 20140-24 N - GP 5917 D - GP 20125-12	Stuttgart Stuttgart Kelly AFB	2A - 5A 2A - 5A 10A - 2P
1st THURSDAY	D - GP 20125-26	Randolph AFB	10A - 2P
1st SATURDAY	D - GP 20140-12 & 13	Cheyenne Mt., Colo.	10A - 2P
2nd MONDAY	E - GP 20125-24 & Wash #1 GP 20019	Balboa, Canal Zone Bolling AFB	5P - 8P
2nd TUESDAY	D - GP 20125-16 E - GP 20125-04	Andrews AFB Scott AFB	8A - 10A 5P - 6P
2nd WEDNESDAY	N - GP 20140-18 & 19 N - GP 20125-02	Norfolk Naval Base Langley AFB	5A - 8A 5A - 8A
2nd THURSDAY	E - GP 20125-10	Maxwell AFB	7P - 10P
2nd FRIDAY	E - GP 20140-14 E - GP 20125-30 BRS - GP 5934	Elemendorf AFB Elemendorf AFB Elemendorf AFB	7P - 10P 7P - 10P 7P - 10P
3rd TUESDAY	E - GP 20125-06	Richards Gebaur	5P - 6P
3rd WEDNESDAY	N - GP 20140-02 N - GP 20125-28 BRS - GP 5933	Hickam AFB Hickam AFB Hickam AFB	5A - 8A 5A - 8A 5A - 8A
3rd THURSDAY	E - GP 20140-10 & 11	Offutt AFB	9P - 11P
4th MONDAY	N - GP 20125-20 E - GP 20140-06 & 07	Robbins AFB Malmstrom AFB	5A - 8A 5P - 8P
4th TUESDAY	N - GP 20125-08 E - GP 20140-08 & 09	Wright Patterson McDill AFB	5A - 8A 5P - 8P
4th THURSDAY	E - GP 20125-14	Ent AFB	6P - 9P

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ATTACHMENT

Responsibilities of the STCs regarding routines are as follow :

1. To make sure coverage is available on the day and time that the routine is scheduled.
2. To notify the PCO when maintenance personnel has arrived and is ready to start routine.
3. To notify the PCO when coverage can not be provided, for some unforeseen reason, on assigned day and time. The STC should notify the PCO the day before, or ASAP on the day that the routine is scheduled. This is so the routine can be rescheduled for that month only.

The schedule should be followed as listed in this attachment to ensure that each circuit is routined each month.