

# DIGITAL TRANSMISSION SYSTEMS

## D3 CHANNEL BANK

### MAINTENANCE CONSIDERATIONS

	CONTENTS	PAGE
1.	<b>GENERAL</b> . . . . .	1
2.	<b>INITIAL TESTS</b> . . . . .	1
3.	<b>ROUTINE MAINTENANCE</b> . . . . .	2
4.	<b>TROUBLE LOCATING</b> . . . . .	2
5.	<b>TEST EQUIPMENT</b> . . . . .	2

**1. GENERAL**

**1.01** This section and its associated sections describe methods and test equipment for tests, routine maintenance, and trouble location in the D3 channel bank. Special test equipment is also considered.

**1.02** This section is reissued to include information on the channel extender unit; channel signaling test unit; KS-21144, L1 lamp extractor; and implementation of Section 365-150-502. Arrows are used to indicate changes. This issue does not affect the Equipment Test List.

**1.03** The testing program for the D3 bank falls into three categories.

- (1) **Initial tests** are made at the time of installation before service is connected to the system.
- (2) **Routine tests** of transmission and noise are made on a single channel "go-no-go" in-service basis.
- (3) **Trouble-locating tests** are based on quick replacement of plug-in units to provide minimum out-of-service time.

**1.04** Only general information concerning the maintenance philosophy employed in the D3 bank is discussed in this section.

**1.05** Locating common equipment troubles results in replacing the defective unit with a "hot spare". Because the spare unit is being continually monitored, replacement of the defective unit with a known working unit is ensured.

**2. INITIAL TESTS**

**2.01** The basic philosophy for initial alignment of the D3 bank is the same as for D1. However, the adjustments found in D1 have been eliminated through the use of highly stable hybrid integrated circuits (HICs) and solid state electronics. Initial alignment, therefore, consists of merely ensuring that the transmitter and receiver are within limits. Detailed instructions for initial installation and single-end tests are found in Section 365-150-501.

**2.02** Banks partially equipped with channel units are checked in the following way. If necessary, spare channel units are added to fill slots 1 through 6 and 13 through 18 to perform single-end tests; then, as channel assignments are made, the proper channel units are installed and the specified tests of Section 365-150-502 are performed on those channels. If spare channel units are to be stored in the bay, they must be disabled by inserting 258C dummy plugs into the XMT jacks until trunk circuits are connected.

**2.03** The receiver is checked first using a digital representation of a 0-dBm0 test tone from the code generator, the channel access unit, and a channel unit. When this check has been completed, the performance of the transmitter is checked using the built-in 1020-Hz oscillator of the channel access unit, a channel unit, and the tested receiver.

**2.04** After these initial tests have been completed, an overall channel net loss test as described

## SECTION 365-150-500

in Section 365-150-502 may be made. End-to-end tests are not required if both end terminals meet the requirements of the single-end tests.

**2.05** The channel unit pads and build-out capacitors are selected from information according to the carrier layout record card and Section 365-150-503.

**2.06** Common signaling circuits can be checked during single-end (channel bank looped) tests by inserting the J98718BR D3 channel signaling test unit into any channel unit slot of the D3 bank. The test unit also has XMT and RCV jacks for transmission test towards the line side of a channel.

**2.07** Individual channel unit signaling can be checked by end-to-end testing with the tester at a D3 bank, using the procedures of Section 365-150-504. However, if the receiving test bank is not D3, the tester must use the section for that specific bank.

### 3. ROUTINE MAINTENANCE

**3.01** Routine in-service maintenance checks of net loss, noise, crosstalk, and distortion should be performed in both directions of transmission on one channel. This sample should show the need for further maintenance. These tests are described in Section 365-150-505. Refer to the Equipment Test List for the interval.

### 4. TROUBLE LOCATING

**4.01** An alarm unit is provided in the D3 bank which performs the normal alarm functions of notifying the office alarm system of a trouble condition. Alarms occur with the loss of synchronism between terminals and also with the failure of fuses in the power supply.

**4.02** Indicating lamps plus a terminal looping scheme have been provided in the alarm unit to help localize alarm troubles. A red alarm indicates the possibility of an incoming trouble (receiver or line) while a yellow alarm indicates the possibility of an outgoing trouble (transmitter or line). Red and yellow alarms appearing simultaneously indicate that the local terminal has been indicating a yellow alarm and that the remote terminal has been looped. Before replacing the alarm control unit because indicating lamps fail to light, remove the suspected lamps, using the KS-21144, L1 lamp extractor. Using the KS-14510,

L5 VOM, verify lamp filament continuity. If the VOM reading indicates an open filament condition, replace the lamp (obtainable from Shelly Associates).

**4.03** The alarms permit localization of a trouble to the transmitter, digital line, or receiver by identifying incoming from outgoing alarms. Although additional steps may be required to arrive at the source of trouble, the alarm arrangement aids significantly in trouble locating. Detailed trouble-locating techniques are described in Section 365-150-505.

**4.04** Interlock circuits prevent a working terminal from being looped until an alarm occurs and the ACO pushbutton is depressed. With this arrangement, accidental interruption of service is avoided. However, looping a terminal for test purposes can be accomplished as described in Section 365-150-501.

### 5. TEST EQUIPMENT

**5.01** The built-in test equipment should be sufficient to perform all maintenance and trouble locating. However, provision has been made for the use of external test equipment.

**5.02** In addition to the 1-kHz rejection filter built into the channel access unit (CAU), a 3-type NMS is required to make noise and distortion tests.

**5.03** Voltage checks contained in the 365-150-777 layer are based on usage of the KS-14510, L5 VOM.

**5.04** When the Hewlett-Packard 400L is used as a detector, a special cord and termination assembly will be needed. This cord can be built locally in accordance with Fig. 1. The detectors in the 21A TMS and the Northeast Electronics TTS-4A are acceptable.

**5.05** Special test leads are required per Fig. 2, when performing some of the tests. These cords should be made locally. The configuration of the 3-inch shorting strap used during installation testing, as described in Section 365-150-501, is shown on Fig. 2. This strap should also be made locally or purchased as a "special" 2-inch version of cord W1BC. A special double patch cord P6AA is available and sometimes is more convenient to use than two separate P3E patch cords. Cord

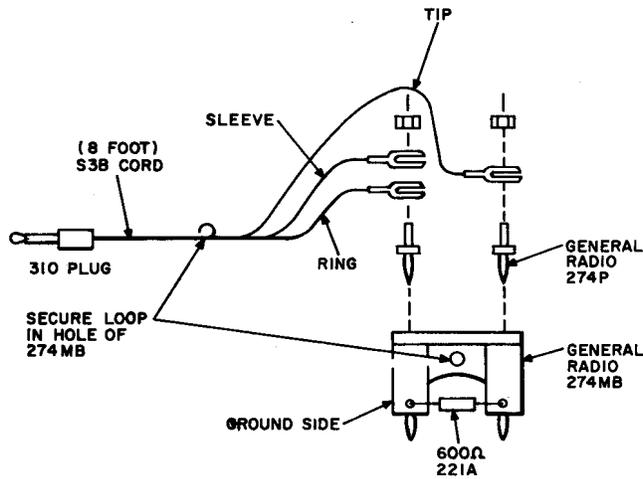
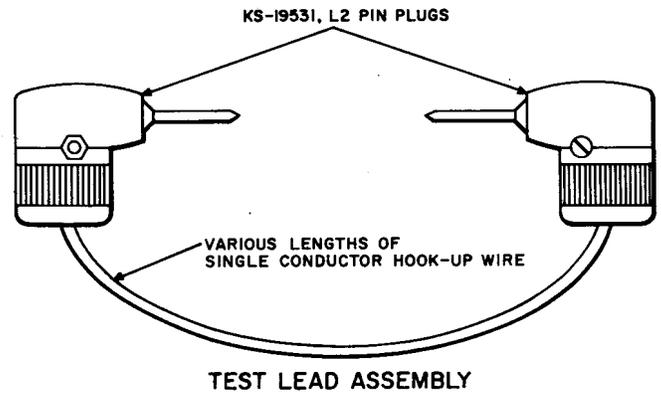


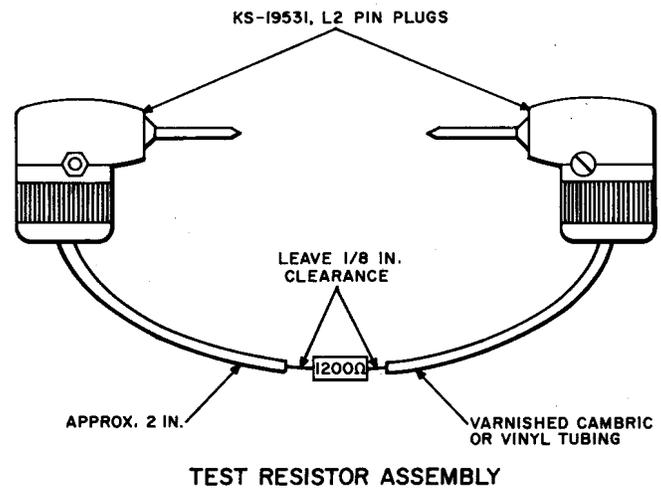
Fig. 1—Cord and Termination for HP 400L

P2FC is available for monitoring D3 channels for tests.◀

5.06 ▶ Channel unit extender ED-3C424 can be inserted into any D3-type channel unit position. The channel unit for that position is then inserted into the extender which provides jacks for splitting transmission and signaling leads towards the digital bank equipment (line side) or the office switching equipment (drop side).◀



TEST LEAD ASSEMBLY



TEST RESISTOR ASSEMBLY

Fig. 2—Test Leads