GROUPBAND DATA SYSTEMS
SWITCHED NETWORK AND 2-POINT PRIVATE LINE
GENERAL MAINTENANCE

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1. GENERAL

1.01 This section provides general maintenance information for groupband data channels carrying the line signals of the 303-type data set. These channels may either be part of a switched network or may be 2-point private lines. The model network, described in Section 314-609-110, is used in this section as an example of a switched network.

1.02 This section is reissued to correct Fig. 1 to show the wideband access line as being connected between the 4-wire switch and the Wideband Data Test Bay (WDTB). A test trunk is added between WSB and WDTB.

1.03 This section covers the maintenance of the wideband data channels primarily. The maintenance of voice frequency channels is discussed only as it relates to the wideband data channels.

1.04 In the maintenance of interarea wideband data channels which use channels in carrier facilities, maintenance procedures given in sections covering the particular facility should be followed when testing and adjusting the carrier facilities.

1.05 A list of specific tests and requirements for groupband data channels is given in Section 314-609-310 covering the line-up of switched networks and 2-point, private line circuits. Schedules for routine maintenance are given in Section 314-609-312. Trouble location procedures are described in Section 314-609-311.

1.06 Test equipment required for the maintenance of groupband data channels is listed in Section 314-609-310 covering the line-up of switched networks and 2-point, private line circuits and also in the 314-609-5XX series of sections, which provide detailed procedures for specific tests.

2. SWITCHED NETWORK

2.01 Since the 4-wire switches in the wideband data channels are slaved to the 2-Wire Switching System to which the voice frequency coordination channels are connected, the status of the wideband channel is reflected by the status of the associated voice frequency channel. The voice frequency channel (and associated wideband data channel) may be made busy at a master test frame or testboard.

A. Wideband Data Channels

2.02 Tests on wideband data channels are performed at the wideband data test center which is comprised of the J79915A wideband data test bay (WDTB) and the J70168( ) wideband service bay (WSB). Depending on the number of circuits served by an office, the WSB may consist of more than one bay. The testing arrangement is shown in simplified form in Fig. 1. If circuit tests indicate that additional tests must be made on specific

equipments such as wideband loop repeaters, wideband modems, or data terminals, refer to sections covering the equipments. Testing arrangements for these equipments are shown in the sections covering the equipments and are not shown in this section.

Wideband Subscriber Lines

2.03 The WDTB has a voice frequency access line to the 2-wire, No. 5 Crossbar Switching System and appears to the switching system as one of the subscriber data stations. Access to the wideband data network can be obtained from the wideband data test center in the same manner that access is obtained from any data station. When the line number of a data station is pulsed from the WDTB, the voice frequency access line is connected through the 2-wire switching system to the voice frequency coordination channel of the data station in question. When the line number is prefixed by a special code (the twelfth digit on the keyset), the wideband access line is connected through the slaved 4-wire switches to the wideband subscriber line of the data station in question. The wideband access line has jack appearances at the WDTB and the WSB as shown in Fig. 1. Once access to the wideband subscriber line is made, transmission tests of the wideband subscriber line are performed from the wideband access line jacks at the WSB. Remote tests of the wideband subscriber data station are normally made from the wideband access line jacks at the WDTB.

2.04 Some offices may provide test jacks in the wideband subscriber line on the line side of the 4-wire switches, as shown in Fig. 1. These jacks may be used for testing a section of the wideband subscriber line such as an N-carrier link, but are ***not*** used for line-up purposes. Line-up tests on wideband subscriber lines are always performed at the wideband access line jacks at the WSB.

2.05 Monitor jacks in the WSB can be used for certain in-service tests, including the oscilloscope tests and monitoring performance checks using a data set connected to an operating circuit through a high-impedance bridging amplifier. Monitoring connections on wideband subscriber lines are available only when the optional WSB jack appearances are provided on the line side of the 4-wire switches.

2.06 A loop back feature may be used to loop the wideband subscriber line only, or the wideband subscriber line and data set at the data station. When only the wideband subscriber line is looped, transmission tests of the wideband subscriber line may be performed from the data test center. When the wideband subscriber line and data set are included in the loop, the data set will act as a regenerative repeater, and its operating characteristics may be checked from the data test center. These tests may be made without assistance at the data station. Procedures for establishing the loop back feature from the data test center are given in Section 314-602-100.

Network Trunks

2.07 To test the wideband channel of a network trunk, a patch is made from the test equipment directly to the WSB trunk test jacks. The 4-wire switches are bypassed in order to obtain the easiest access to the desired trunk. Although access can be obtained from the WDTB to a network trunk, there is no provision for selecting a particular trunk in a trunk group except by making all other trunks in the group busy. Direct patching avoids this problem. Connections must not be made until the trunk has been removed from service.

2.08 Each WDTB has access to the 2-wire switching system. If there is a WDTB at each testing location, the voice frequency coordination channel may be used for establishing voice communications between testing locations. In this case, the associated wideband channel is automatically removed from service while the voice frequency coordination channel is in use. If another DDD network line is used to establish voice communications between testing locations, the voice frequency coordination channel and the associated wideband channel to be tested, should be removed from service. After initial voice contact has been made, the voice frequency coordination channel can be used for test coordination. Connections are made through the 4-wire talk and monitor circuits in the WSB. The monitoring provision described in 2.05 also applies for testing network trunks. Monitoring connections to network trunks are available at the WSB.

B. Voice Frequency Coordination Channels

2.09 Arrangements for testing voice frequency coordination channels are shown in simplified

form in Fig. 2. Trunk tests can be made from a 17E testboard which connects to test points in the trunk at terminals at the outgoing side of the 2-wire switching system. Supplementary test points, as required for testing trunk equipment, are provided in the circuit patching bay and voice frequency patching bay. Switching tests can be performed from a master test frame. Testing procedures are given in sections covering the testboard and the master test frame.

2.10 The switchboard shown in Fig. 2 is provided only at the hub toll office of the switched network. Dial access can be obtained from one data station to another only when the stations are served by the same toll office. When a wideband connection is to be established over intertoll facilities, a request for the connection must be made over the DDD network to the operator at the switchboard. The operator at the switchboard receives all requests for intertoll connections and receives trouble reports from subscribers when trouble on network trunks is encountered. Trouble reporting procedures are covered in Section 593-800-300.

3. TWO-POINT PRIVATE LINE

A. Wideband Data Channel

3.01 No switching is involved in a 2-point private line provided for groupband data transmission. The WSB test jacks in the wideband data channel permit the direct patching of test equipment to the wideband data channel in either direction. The WDTB is either adjacent to or close by the WSB; so that test equipment in either bay may be connected to the test jacks.

3.02 Transmission tests are made at the WSB only on an out-of-service basis. Connections should not be made unless the data circuit has been released by the customer. Monitoring tests may be made on an in-service basis. The monitoring tests include the oscilloscope tests and performance checks on an operating circuit, using a data set connected through a high-impedance bridging amplifier.

B. Voice Frequency Coordination Channels

3.03 The subscriber line sections of a 2-point private line provided for groupband data transmission are served from private line testboards. The private line sections have test appearances at testboards in each toll office and have testing arrangements similar to those of a switched trunk.

3.04 Initial voice contact between a wideband data test center and a data station or between two wideband data test centers is made over the DDD network. After the initial voice contact is made, the voice frequency coordination channel may be used for test coordination, if required. Connection to the voice frequency coordination channel is made, at the WSB, through the 4-wire monitor and talk circuit.

4. PRECAUTIONS

4.01 If spare LMX equipment is to be used when the normally used equipment is patched out for maintenance, care should be exercised in selecting equivalent equipment. Observe the following requirements.

(a) Data circuits must be assigned to groups and supergroups which are acceptable for groupband data transmission.

(b) The frogging rule concerning groups 2 and 4 within a supergroup must be observed.

(c) Equalized connectors must be used at group connecting points.

(d) The 104.08-kHz pilot tone should be used.

(e) The 92-kHz band elimination filters must be removed.

4.02 In the transmission of groupband line signals of the 303-type data set, the signal spectrum is modified so that frequencies at the lower end of the baseband are attenuated to avoid transmission difficulties in carrier systems. When transmitting sine wave test signals over the data channels in the frequency range of 1 through 33 kHz, it is recommended that signal power should not exceed a level of –10 dBm for a single tone. Single-frequency test tones transmitted in the 500-Hz to 1-kHz area should be decreased another 3 dB. Even these levels of single-frequency tones, which are acceptable to the wideband data circuit, may cause interference to message channels in parallel N Carrier Systems or crosstalk between message channels in an L Multiplex System. Single-frequency test tones should, therefore, be used only as required for making or checking circuit line-up and gain

characteristics and should not be transmitted longer than necessary.

4.03 Wideband subscriber lines may use T1 carrier, a digital carrier system. Tests should not be made over this medium using sine wave test signals. The T1 Carrier System is a regenerative system and therefore most of the types of transmission tests that can be used on analog transmission systems are not applicable. Refer to the 365-119-XXX series of sections for information pertaining to the T1 carrier terminals.

4.04 The integrity of tip-to-tip and ring-to-ring connections must be maintained throughout the wideband channel. Care should be exercised to prevent lead turnover when making patches or replacing equipment. If doubt exists as to whether turnover has occurred in the wideband channel, a procedure for performing a polarity check is given in Section 314-643-300. The procedure will apply to polarity tests made between wideband service bays as well as polarity tests made between a wideband service bay and a data auxiliary set.

5. RECORDS AND REPORTS

5.01 The Transmission Measurements Form, described in Section 314-609-310, is provided for recording results of measurements and other information, which is considered to be significant. The results obtained from measurements made at an office should be compared with the initial measurements. Engineering should be consulted if the results are not the same. The results of all measurements should be forwarded to the network or circuit control office.

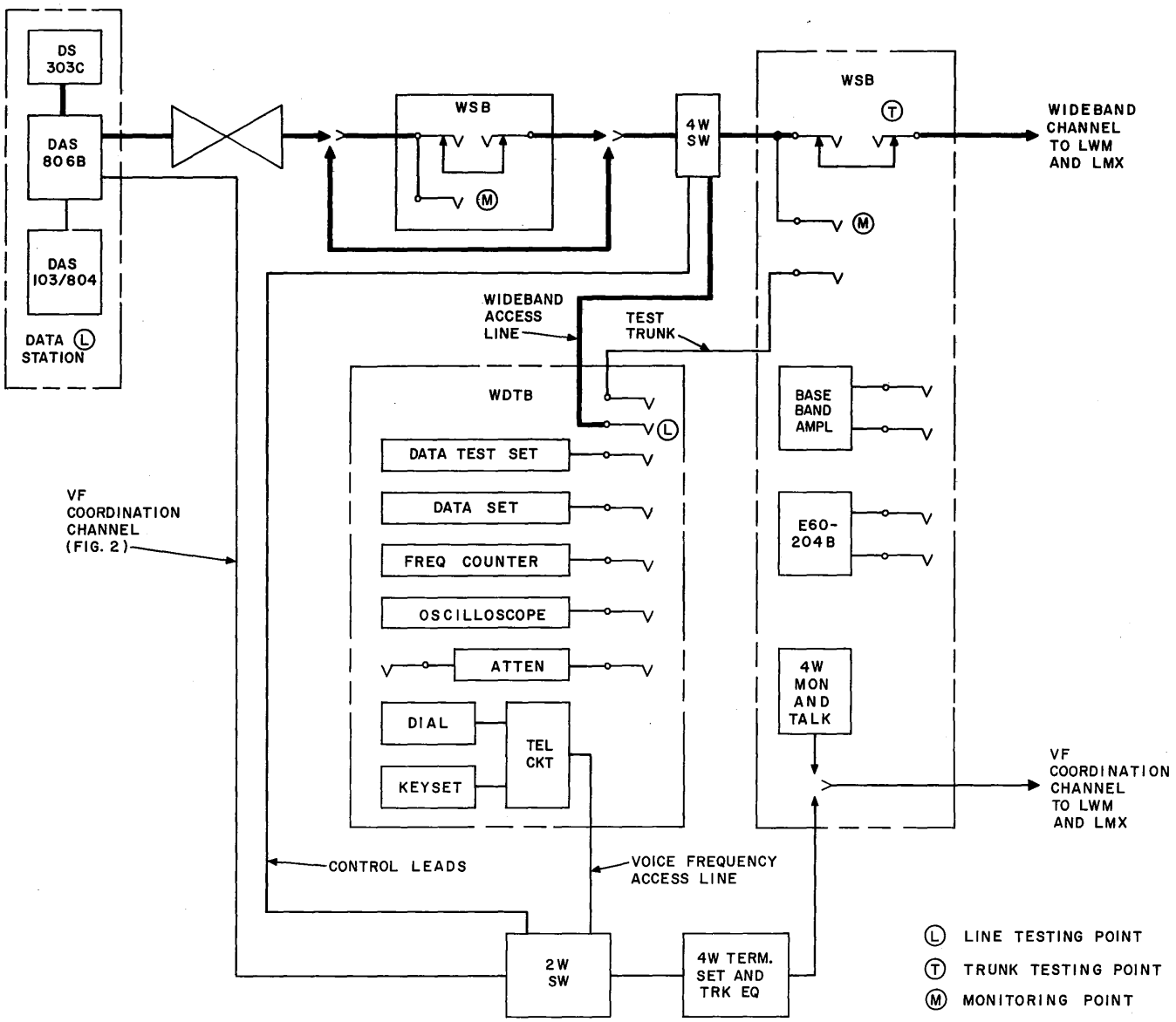
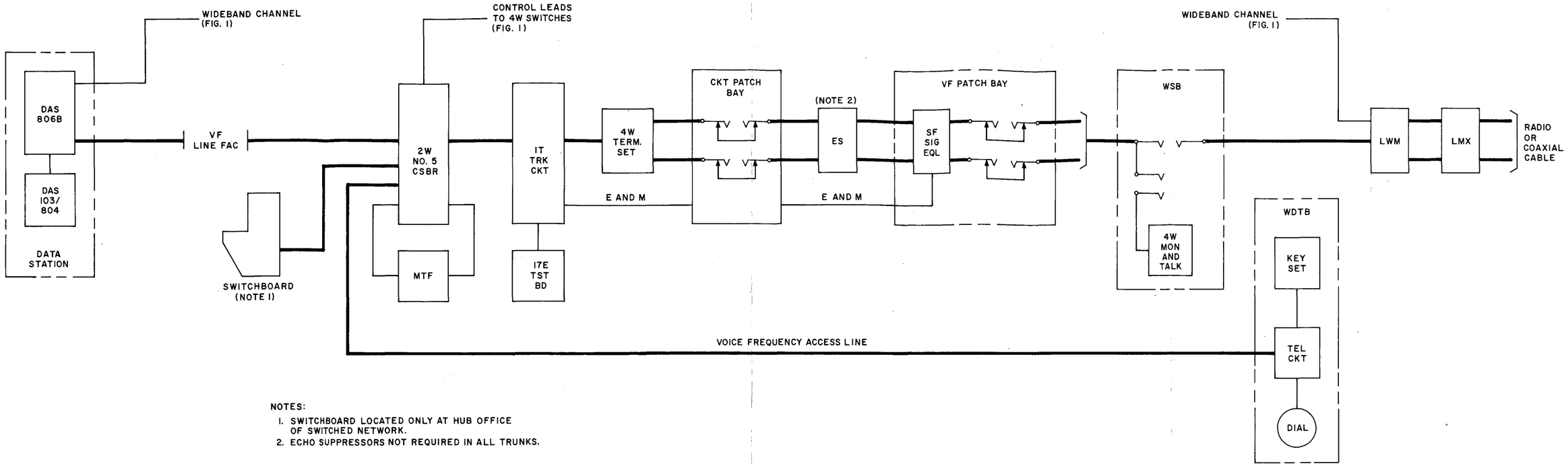


Fig. 1—Testing Arrangements, Switched Network, Wideband Data Channel



NOTES:

1. SWITCHBOARD LOCATED ONLY AT HUB OFFICE OF SWITCHED NETWORK.
2. ECHO SUPPRESSORS NOT REQUIRED IN ALL TRUNKS.

Fig. 2—Testing Arrangements, Switched Network, Voice Frequency Coordination Channel