HALF GROUPBAND DATA SYSTEMS
2-POINT PRIVATE LINE
TROUBLE LOCATION

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1. GENERAL

1.01 This section provides general trouble location information for Half Groupband Data Channels carrying the line signals of Data Set 303B- or 303H-type. The transmission system used in this section is described in Section 314-608-100.

1.02 A typical half groupband service comprising a data station may consist of one 28-44 kHz channel and five voice-frequency channels. This arrangement, if used, will require that troubleshooting methods be employed for these facilities. The trouble procedures provided in this section supplement those given in Section 310-405-500.

1.03 Transmission faults that activate office alarms which are both audible and visual are easily located and cleared. The troubles are cleared by following established office procedures and procedures covered by other Bell System Practices. Faults that do not activate office alarms, but are reported by the data customer, require coordinated efforts of repair forces to insure that the trouble can be located and cleared in the most efficient manner.

1.04 The trouble report received from the customer or the report used during troubleshooting can be useful in determining what initial procedures are necessary to locate the trouble. Forms E4225 and E2545 titled Trouble Reports and Circuit Order Tests, respectively, are used for trouble calls on voice-frequency channels. These trouble reports will generally relate to trouble that will usually fall into one of two categories: No data or voice message being received; or data or voice being received but containing error rates or other impairments. Each category of trouble will require different steps in the initial fault-locating procedures. All details of the trouble report or reports should be documented and given equal consideration, even though some of the details may seem to be insignificant at the time of the trouble report. The trouble must be well defined before it can be located.

1.05 If the trouble still exists after all transmission objectives have been met and all dynamic tests are within limits, engineering assistance or the aid of an engineering data specialist should be requested. When the request is made, the documented trouble report or reports and all test information should be available for use by the engineer or data specialist.

2. TROUBLE LOCATING PROCEDURES

A. General

2.01 The instructions given in this section are used to locate a trouble condition by sectionalizing the data and voice circuits into the wideband subscriber or station lines, the data sets, and the wideband trunks or interexchange facility. The wideband subscriber lines or station lines and the data sets are checked on a remote basis by following the procedures in the 314-608-5xx series of sections.

2.02 When the particular section or portion of the data circuit which is causing the trouble condition has been determined, additional tests are

performed on that portion to determine the exact cause of the trouble condition.

2.03 When the exact cause of trouble has been located and appropriate corrective action taken, digital error rate tests are then made to verify that the trouble has been cleared on the data channel. The customer or customers involved in the original trouble report should then be notified that the trouble has been cleared.

2.04 The following procedures are not intended to be directive, rather, they should provide examples of the general steps necessary for locating transmission circuit faults or deficiencies. The actual steps used should be those which can quickly locate and correct the trouble with a minimum of labor involved. It is possible that the trouble may exist in the customer's business machine. However, it must be assumed that the customer has verified that his business machine is operating satisfactorily before initiating the trouble report.

B. Private Line Voice Channels

2.05 Voice circuit trouble should, in general, require that the circuit be released by the customer and removed from service. If the voice channel is distant but usable to one or more points, the 1000-cycle net loss tests described in Section 310-405-500 should be made. If the circuit cannot be released, the following procedure may be used.

(a) Select an office to send 1000 cycles at the proper power level in the direction of the trouble. This office will generally be at one end of the main line circuit. Request other offices on the line to arrange their transmission measuring sets for level measurements on the line in trouble.

(b) The test tone should not be sent for more than one minute. The sending office should monitor the circuit during the test.

2.06 At the end of the release from service period, perform the following steps before restoring full service to the customer:

(a) At the customer's station, verify that all equipment is restored to its working condition.

(b) At the Serving Test Center (STC), verify that all test equipment, talking sets, and test terminations have been removed from all jacks.

(c) The STC should then notify the control office that service is restored.

(d) The control office then performs a continuity test of the circuit verifying restoration of service. Notify the customer's control station that the circuit is now in service.

(e) The customer's control station then notifies the customer that the trouble has been cleared.

C. 2-Point Private Line Data Channel

2.07 Two possible circuit arrangements for a 2-point private line are shown in Fig. 1 and 2. Figure 1 shows a relatively simple 2-point private line with one STC which is also the circuit control office (CCO). Figure 2 shows a 2-point private line circuit with two STCs one of which is the CCO.

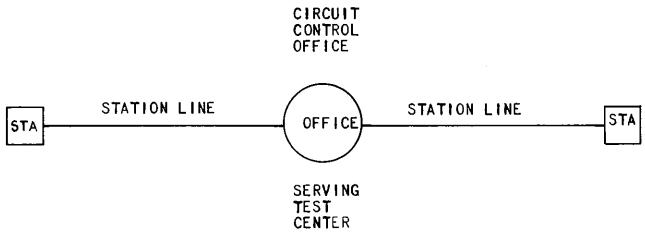

Fig. 1—Half Groupband Service No Interexchange Facility

Fig. 2—Half Groupband Service With Interexchange Facility

2.08 The data transmission lines connecting the STC to the served wideband data station are called station lines. The data transmission channel which interconnects the two STCs is called an interexchange facility.

2.09 For a 2-point private line, the customer will normally report trouble to personnel at his serving test center Wideband Service Bay (WSB) or private line testboard. If the 2-point private line has only one STC as shown in Fig. 1, the STC will test both station lines. However, if the 2-point private line contains two STCs, as shown in Fig. 2, the STC receiving the trouble report will notify the CCO so that this office can coordinate the work effort of the two WSBs at the STCs.

2.10 If a trouble is reported on a 2-point private line which contains only one serving test center as shown in Fig. 1, the following procedures should be followed.

(a) Perform the procedures in the 314-608-5XX series of sections in order to associate the trouble with the data set or the station line. The procedures check the station line by making digital error rate tests over the line with the data set operating in the remote test 1 (RT 1) condition. If the station line passes this test, the data set is checked by placing the data set in the remote test 2 (RT 2) condition and making digital error rate tests over the line using the data set as a regenerative repeater. These tests should be relatively short go-no go tests at first, intended for isolating trouble sources as rapidly as possible.

(b) If the data set is found to be the source of trouble, refer to Section 593-800-500.

(c) If the station line is found to be the source of trouble, additional tests are performed as covered in the 314-608-5XX series of sections, to determine the cause of trouble. These tests should be performed in the following sequence until the cause of the trouble is found.

(1) Net Loss at 29.6 kHz (314-608-501)

(2) Noise (314-608-503)

(3) Gain Frequency (314-608-501)

(4) Envelope Delay (314-608-506)

(d) When the cause of trouble has been found and corrected, digital error rate tests should be performed to verify that the trouble has been cleared and that the data circuit is functioning normally.

(e) The circuit should then be restored to the data station and the customer or customers notified that the trouble has been cleared.

2.11 If trouble is reported on a 2-point private line containing two STCs as shown in Fig. 2, the following procedures should be followed.

(a) Personnel at the STC receiving the trouble report will notify personnel at the CCO.

(b) Personnel at the CCO will direct craft employees at each STC to perform the procedures in 2.10 in order to check the two station lines and data sets.

(c) If the trouble is not found in the station lines, the interexchange facility between the two STCs must be checked. The following tests should be performed in the sequence given until the cause of trouble in the interexchange facility is found.

(1) Net Loss at 29.6 kHz (314-608-501)

(2) Noise (314-608-503)

(3) Gain Frequency (314-608-501)

(4) Envelope Delay (314-608-506)

(d) When the cause of trouble has been found and corrected, digital error rate tests, as described in Section 314-608-504, should be performed to verify that the trouble has been cleared and that the data circuit is functioning normally.

(e) The circuit should then be restored to the data station and the customer or customers should be notified that the trouble has been cleared.

3. PRECAUTIONS

3.01 Trouble can occur in equipment which is common to both the wideband data channel and the voice-frequency channels. Certain troubles, such as loss of pilot or changes in groupband pilot signal levels in L-Type Multiplex Systems, or

complete or partial failure in certain units of N or L carrier facilities, can affect the overall system gain and result in interference between voice and data channels. All precautions should be taken to avoid disruption of service to other customers. When such troubles are encountered, the restoration procedures are to be performed only under the direction of the wideband circuit control office or network control office.