

HANDLING CUSTOMER TROUBLE REPORTS ON TWX AND WIDE AREA SERVICES

1. GENERAL

1.01 This practice covers the handling of TWX and Wide Area Services trouble reports. It includes those of a nature that may require the use of an automatic data test line for 3-row 60 words per minute (wpm) teletypewriters, a No. 5A automatic data test line for 4-row 100 wpm teletypewriters, a "back-up" test center, or a 904 type Data Test Center (DTC). The term "back-up" test center is explained in 1.04. The 904 type DTC is discussed in 1.05. Trouble conditions such as NDT, BDR, CBDT, etc, common to other customer telephone services, will not be discussed in this section.

1.02 This section is reissued to:

- (a) Change the title of the section to Handling Customer Trouble Reports on TWX and Wide Area Services.
- (b) Include the handling of WADS and WATS trouble reports.
- (c) Change the term Automatic Test Line (ATL) to Automatic Data Test Line (ADTL).
- (d) Provide information on the No. 5 Automatic Data Test Line (No. 5A ADTL). Since this a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 All messages between TWX and WADS stations, and between WATS lines equipped with auxiliary data equipment when used in data mode, will be via data signals generated at the stations. Traffic will be routed over the DDD, WADS, and other switching plans. Figs. 1 through 8 show typical arrangements for TWX, WADS, and WATS circuits. A general description of TWX service is given in Section 972-100-100, and in Sections 972-200-102 and 972-205-100 for WADS.

1.04 The term "back-up" test center is used to designate the test center that is arranged to make tests on TWX and WADS stations beyond the capabilities of the Serving Plant Serv-

ice Center and portable test apparatus. The back-up test center should furnish the findings of its tests to the Serving Plant Service Center as soon as possible.

1.05 The 904 type DTC is designed to test data sets used to furnish DATA-PHONE Service, including such services using WATS access lines. Since WATS is an outgoing service only, the Serving Plant Service Center must furnish the DTC the customer's regular telephone number, in addition to the assigned WATS number. The DTC will also test the 103 type data sets used with customer-owned business machines on TWX and WADS services.

1.06 The Serving Plant Service Center will be required to furnish the back-up test center or DTC with all pertinent information necessary to make the test. *In all cases, the Serving Plant Service Center is responsible for the report and the disposition of the report.*

2. SERVING PLANT SERVICE CENTER

2.01 For the purpose of this practice, the Plant Service Center (PSC) for the area in which the TWX, WADS, or WATS station is located shall be designated as the Serving Plant Service Center (SPSC). It shall assume full responsibility for the customer's service. It shall keep records of all TWX and Wide Area Services in its area. This will include a complete file of all trouble reports regardless of their source. If a centralized PSC has been established specifically to handle customer trouble reports on data services, such a PSC (DATA) becomes the SPSC and assumes full responsibility for the customer's service.

3. RECORDING REPORTS AND MEASURING SERVICE

3.01 Trouble reports on TWX and Wide Area Services will be classified as customer trouble reports and will be recorded on edge sort trouble tickets, Form E-4732-1 or E-4732-2.

3.02 The features of the "Customer Trouble Report Analysis Plan" will apply to trouble reports on TWX and Wide Area Services.

4. INVESTIGATING TROUBLE REPORTS

4.01 *It is of utmost importance that all trouble reports on TWX and Wide Area Services be given special handling in order to effect prompt restoration of service.*

4.02 If the cause of the trouble is evident, refer the trouble to the appropriate force for action. If the cause of the trouble is *not* evident, it may be necessary to call the customer for more information and test the circuit for continuity, grounds, crosses, etc. Determine that the circuit is idle before making a test. It must be remembered that if the circuit is in service and in the data mode, getting up on it with a test selector in step-by-step offices, or no-test selectors in No. 1 and No. 5 crossbar offices, may cause trouble ("hits").

TWX and WADS Trouble Reports

4.03 Ask the customer to check the teletypewriter (TTY) in the LOCAL mode. If errors are found, dispatch a craftsman. If *no* errors are found, and the nature of the report indicates that an automatic data test line test is appropriate, ask the customer to call the test line from his machine. The customer's handbook at the station contains instructions on how to connect to and use the test line. If the customer appears to be hesitant about making the test, tactfully explain the need for the test in order that the trouble may be quickly located and cleared. If necessary, the customer should be assured that he will not be charged for any calls he makes to the test line. However, if the customer refuses to make the call, dispatch a craftsman. When a Divided Access Line Circuit (DALC) is used with a 3-row 60 wpm TWX circuit, the ADTL will test only the originating portion of the line.

4.04 Ask the customer for the results of the test. If the customer reports errors, OUT LIM, 20% or 20%+ (distortion) in the results of his test, it will be necessary to dispatch a craftsman. To maintain customer goodwill, test-

ing with the customer's personnel should be held to a minimum.

4.05 Should these tests prove inconclusive, or if the nature of the report warrants, have the back-up test center make additional and more precise station tests with the craftsman or the customer, as appropriate. These tests would include:

- (1) Testing the terminating portion of a TWX customer's line where a DALC is involved.
- (2) Measuring actual distortion of signals received from a station.
- (3) Measuring actual levels of incoming signals.
- (4) Transmitting distorted and undistorted signals to the station.
- (5) Measuring F1 and F2 marking and spacing frequencies transmitted from the station.
- (6) Monitoring station signals where intermittent trouble persists.

WATS Trouble Reports

4.06 If a WATS customer reports trouble affecting DATA-PHONE service, and the SPSC test indicates that no trouble exists in the customer line and the station telephone, the SPSC shall refer the trouble report to the 904 type DTC for test of the data set. In order to eliminate unnecessary visits to customer premises, DATA-PHONE data sets are equipped with built-in loop-back test features which permit remote testing, with the assistance of the customer, from the DTC to the interface between the Telco data set and the customer's business machine. It is, therefore, important that any reports of trouble suspected to locate in the data set be confirmed by the DTC tests before a craftsman is dispatched to the customer's premises. The SPSC must give the DTC the customer's WATS number and his regular telephone number, together with any other pertinent information on station equipment and facilities required by the DTC to properly test and analyze each trouble report. The DTC will report the result of the test to the SPSC for whatever further action is necessary.

TWX, WADS, and WATS Trouble Reports

4.07 TWX, WADS, and WATS trouble reports referred to other offices, the back-up test center, or the DTC will be held open at the SPSC until the trouble has been cleared, or until it is decided the trouble has disappeared and no further investigation is warranted.

4.08 If analysis of the report indicates that the trouble is in the DDD or WADS switching plans, or in the far end plant, the report should be referred to the home Data Service Bureau (DSB) or DDD Service Bureau as outlined in Section 660-100-013. The SPSC should close out the report as a Referred-Out (Disposition Code 0).

4.09 The Data Service Bureau (DSB) :

- (a) Directs action on and refers reports of suspected "far end" troubles to distant DSB's.
- (b) Receives trouble reports from other DSB's and refers these troubles to its own PSC's for action.
- (c) Accumulates and analyzes trouble data from its own PSC's, assistance operators, and other DSB's to detect trunk and switching troubles.

5. DESCRIPTION AND USE OF THE AUTOMATIC DATA TEST LINES

5.01 The ADTL and the No. 5A ADTL provide for one-person testing of TWX and WADS stations. They furnish the SPSC valuable tools for clearing troubles on TWX and WADS stations and for reducing "No Trouble Found" cases.

5.02 The automatic data test lines may be used to check the following conditions of the station equipment:

- (a) Ability of the station to originate and terminate calls. The test lines do *not* test station ringer or unattended features.
- (b) Orientation limits and range finder adjustment of the TTY machine.
- (c) Ability to receive undistorted and distorted copy under all test line operating conditions.
- (d) Keyboard signal distortion. The ADTL will measure distortion on a go or no-go basis only. The No. 5A ADTL will measure

amount of distortion, e.g., 5%, 10%, 15%, 20% or 20%+.

- (e) Check the Data Set sensitivity (on a go or no-go basis only).

5.03 Before testing with a test line, the TTY shall always be tested in the LOCAL mode.

5.04 The ADTL is equipped with seven test lines. Each of four test lines provides the same programmed sequence of tests. A connection to any one of the four *programmed* test lines causes the test equipment to transmit a group of test sentences undistorted, with 28 per cent combined switched distortion and with reduced level distortion attenuated by a pad.

5.05 The three remaining test lines provide a continuous predetermined source of TTY signals. Any one of these three may be arranged to transmit continuous signals either undistorted, with 28 per cent combined switched distortion, or reduced level distortion attenuated by a pad.

5.06 The No. 5A ADTL is equipped with one programmed trunk and two break-controlled trunks with provisions made for three additional programmed trunks and two break-controlled trunks. The programmed trunk sends a sequence of test sentences that makes a thorough test of the station. In addition, when the station transmits signals to the test line, a distortion measurement is made of the signals received from the station. The break-controlled test trunks function independently of each other without any waiting period after a connection has been established. The test sequence is controllable by break signals from the station.

**3-row 60 wpm TWX Station Testing
Using the ADTL**

5.07 These are the operations to be performed at the TTY:

- (a) Operate the ORIG key. Dial tone will be heard in the handset.
- (b) Dial the number associated with the ADTL. Monitor the call. About one second after ringing stops, a steady tone will be heard. A second later, the tone will stop as the TTY motor turns on. The TTY will then be in a marking (circuit closed) condition.

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(c) If the ADTL programmed test line distributor is busy, an off-hook signal will be received and intermittent "letters" characters will be pulsed to the TTY to indicate that a connection has been made. These characters will be sent until a test line distributor is available. The waiting period should be only a few seconds.

(d) The ADTL now sends (see Exhibit 1):

- (1) UNDIS — Two lines of undistorted fox.
- (2) DIS 28 — Two lines of fox with 28 per cent combined switched distortion.
- (3) DIS PAD — Two lines of distorted fox attenuated by a pad.
- (4) GA RY — Bell rings.

(e) Immediately after receiving GA RY (Bell), send approximately half a line of RY's, or any other signal or group of characters.

(f) ADTL now sends:

- (1) TRAN OK — If the signal contains less than 15 per cent distortion.
- (2) OUT LIM — If the signal contains more than 15 per cent distortion.
- (3) FLIP — Bell rings twice.

(g) On the command FLIP, push the CLEAR key momentarily, and then, before the CLEAR lamp extinguishes, push the ANS key and hold it depressed until the ANS lamp lights. This will change the station from the originating mode to the answering mode.

(h) If the station is equipped with an automatic answerback, the code will be printed at this time.

(i) The ADTL now repeats the entire test from (d) through (f) with the exception of (f) (3) FLIP.

(j) At the conclusion of the test (TRAN OK or OUT LIM), TNX END is sent. The TTY will run open for about one second, the CLEAR lamp will light, the ANS lamp will be extinguished, and the TTY motor will turn off. The CLEAR lamp will stay lighted for about one second and then will be extinguished as all relays release.

4-row 100 wpm TWX or WADS Station Testing Using the No. 5A ADTL

5.08 These are the operations to be performed at the WADS station *not* equipped with a transmitter-distributor:

(a) Operate the ORIG key. The dial lamp indicator will light and dial tone will be heard in the loudspeaker or in the handset.

(b) Dial the number assigned to the No. 5A ADTL. A steady high-pitched tone will be heard momentarily. Immediately after the tone stops, the TTY motor turns on. The TTY will then be in a marking (circuit closed) condition.

(c) If the No. 5A ADTL programmed test trunk is in use, you will get a busy.

(d) After connecting, the No. 5A ADTL sends (see Exhibit 2):

- (1) Two lines of undistorted fox. UNDIST.
- (2) Two lines of switched distorted fox. SW-DIS.
- (3) Two lines of distorted fox attenuated by a pad. DISPAD.
- (4) GA SEND.

(e) Immediately after receiving GA SEND, type approximately half a line of 78IU's or any other signal or group of characters. This must be done within 12 seconds or the test line will disconnect.

(f) Immediately thereafter, the restraining (REST) lamp will light momentarily, then the break release (BRK-RLS) lamp will light momentarily.

(g) The No. 5A ADTL now sends:

- (1) 5% — if the signal contains less than 5 per cent distortion.
- (2) 10% — if the signal contains more than 5 but less than 10 per cent distortion.
- (3) 15% — if the signal contains more than 10 but less than 15 per cent distortion.
- (4) 20% — if the signal contains more than 15 but less than 20 per cent distortion.
- (5) 20%+ — if the signal contains more than 20 per cent distortion.
- (6) FLIP.

(h) On the command FLIP, push the CLEAR key momentarily, and then, before the CLEAR lamp extinguishes, push the ANS key and hold it depressed until the ANS lamp lights. This will change the station from the originating mode to the answering mode and the answerback code will be printed. If these operations are not completed within 12 seconds, the test line will disconnect.

(i) The No. 5A ADTL now repeats the entire test from (d) through (g) with the exception of (g) (6) FLIP.

(j) At the conclusion of the distortion test, END is sent. The CLEAR lamp will light, the ANS lamp will extinguish, and the TTY will turn off.

5.09 The operations to be performed at the WADS station equipped with a transmitter-distributor are the same as in 5.08 except that:

(a) If a tape is in the transmitter, the characters in the tape can be transmitted by depressing the transmitter-distributor (TD) key.

(b) The keyboard (K) key or keyboard tape (KT) key can be depressed and the 78IU's or other characters can be transmitted from the keyboard. The No. 5A ADTL will disconnect in about 12 seconds if it receives no signals.

6. ANALYSIS OF TEST LINE RESULTS

6.01 Analysis of the copy received from the programmed line will assist in determining the cause of the trouble report and whether or not a craftsman should be dispatched.

6.02 Some of the possible troubles that may be indicated through the use of the test line are:

(a) Cannot Connect to the Test Line. This may be due to:

- (1) Dialing trouble.
- (2) Not receiving F2 tone from the test line.
- (3) Data set not sending F1 tone.
- (4) Central office switching, trunk, or test line trouble.

(b) Cannot Receive Copy — UNDIS or UN-DIST. If the TTY will not accept undistorted test sentences, the trouble may be:

- (1) Mechanical trouble in the TTY.
- (2) In the receive portion of the data set.
- (3) In the line.

(c) Cannot Receive Copy — DIS 28 or SW-DIS. If the TTY accepts the undistorted test sentences but not the DIS 28 or SW-DIS test sentences:

- (1) Assume that the line is OK.
- (2) There may be margin trouble in the TTY.
- (3) There may be bias in the Discriminator Card.

(d) Cannot Receive Copy — DIS PAD. If the TTY accepts the undistorted and DIS 28 or SW-DIS sentences, but not the DIS PAD test sentences:

- (1) Signal may be attenuated below working limits of the station. In this case, the station may disconnect during the DIS PAD transmission.
- (2) Data set sensitivity should be checked by use of the Maintenance Test Card.

(e) Sent RY's or 78IU's—Received OUT LIM, or 20 or 20+ per cent. Suspect TTY, set, or loop (4-wire circuit only).

(f) Cannot FLIP. Suspect Data set or customer set or attendant unit trouble. It should be determined that the customer clearly understands the FLIP procedure. For example, the customer may be holding the CLEAR key depressed too long thereby disconnecting the station.

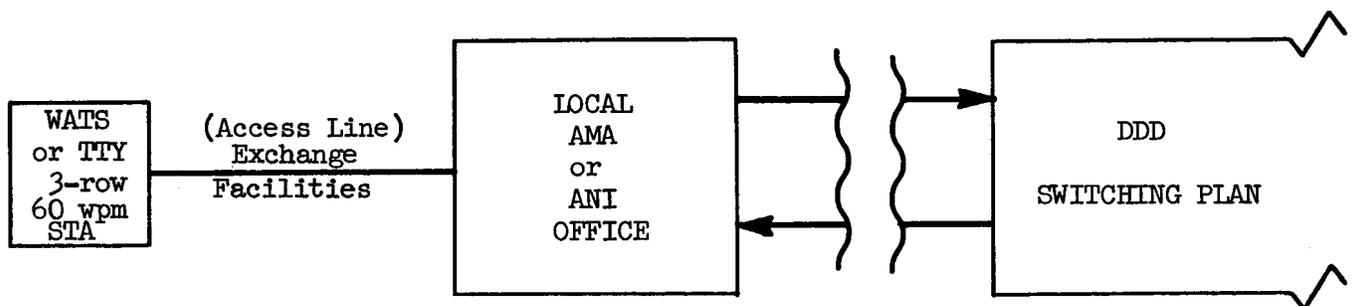


Fig. 1 — WATS or TTY station with local (serving) office equipped for WATS service and both originating and terminating TWX service.

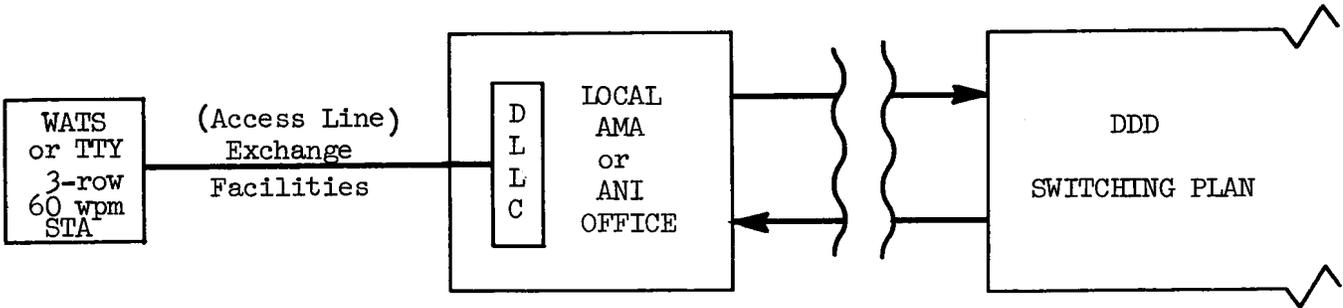


Fig. 2 – WATS or TTY station with local (serving) office equipped for WATS service and both originating and terminating TWX service. Dial Long Line Circuit (DLLC) installed to extend central office range of customer loop.

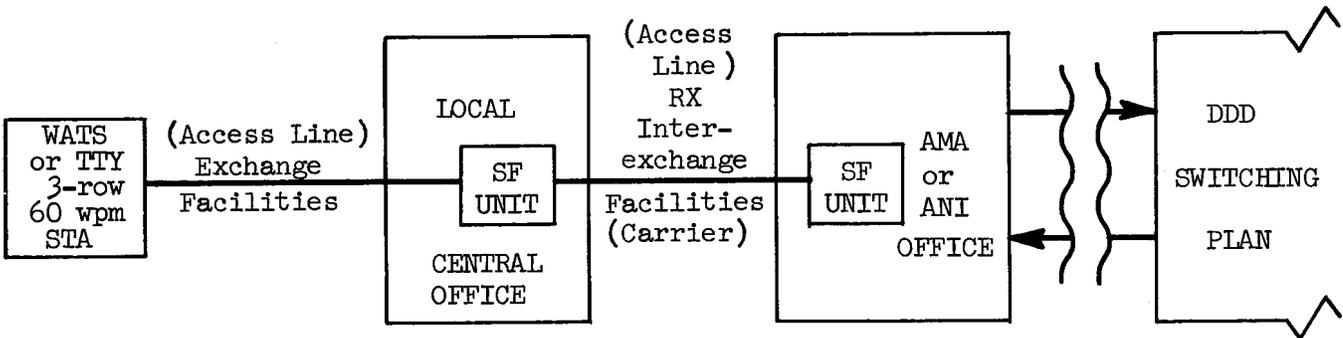


Fig. 3 – WATS or TTY station with local office not equipped for WATS or TWX service. Service has been extended to remote (serving) office equipped for WATS service and for originating and terminating TWX service. Single Frequency (SF) signaling units installed to convert DC loop signals to single frequency tones for transmission over a carrier system.

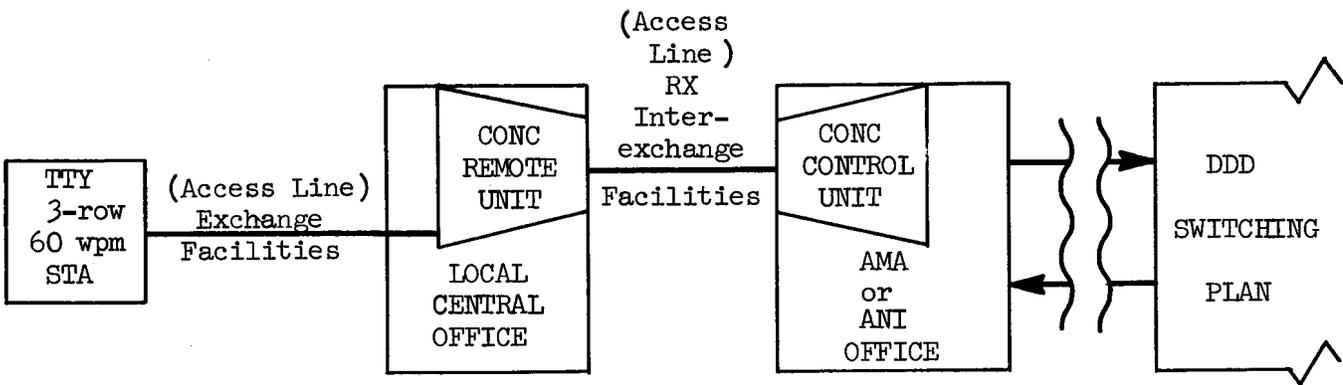


Fig. 4 – TTY station with local office not equipped for TWX service. Service has been extended to remote (serving) office for originating and terminating service. Concentrator used to provide trunking between local office and remote office.

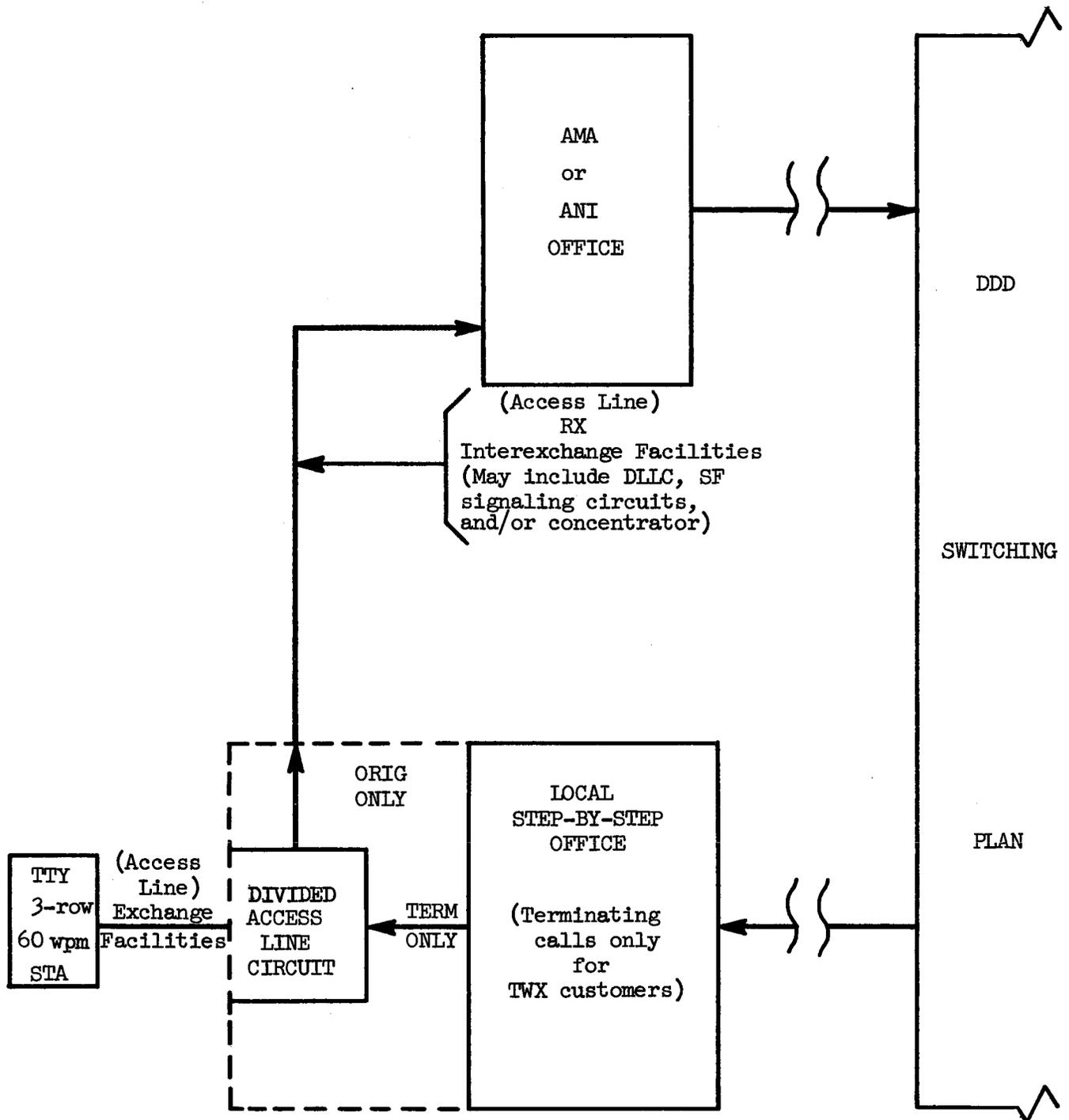


Fig. 5 - TTY station with local office *not* equipped for originating TWX calls but is equipped for terminating calls. The use of the Divided Access Line Circuit (DALC) allows the use of different offices for originating and terminating traffic.

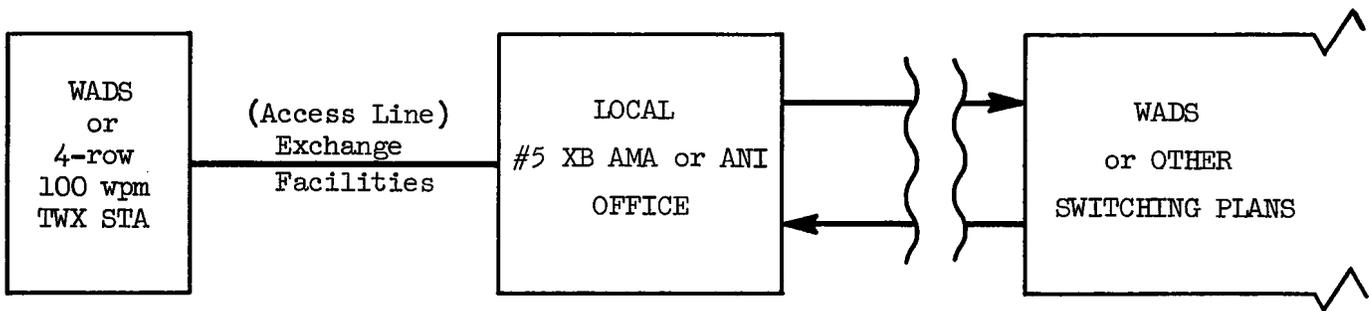


Fig. 6 – WADS or 4-row 100 wpm TWX station with local (serving) office equipped for both originating and terminating service.

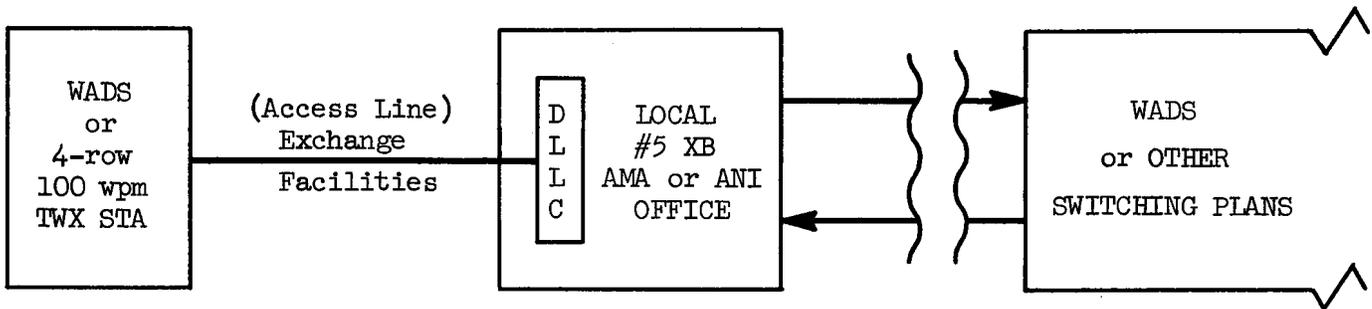


Fig. 7 – WADS or 4-row 100 wpm TWX station with local (serving) office equipped for both originating and terminating service. Dial Long Line Circuit (DLLC) installed to extend central office range of customer loop.

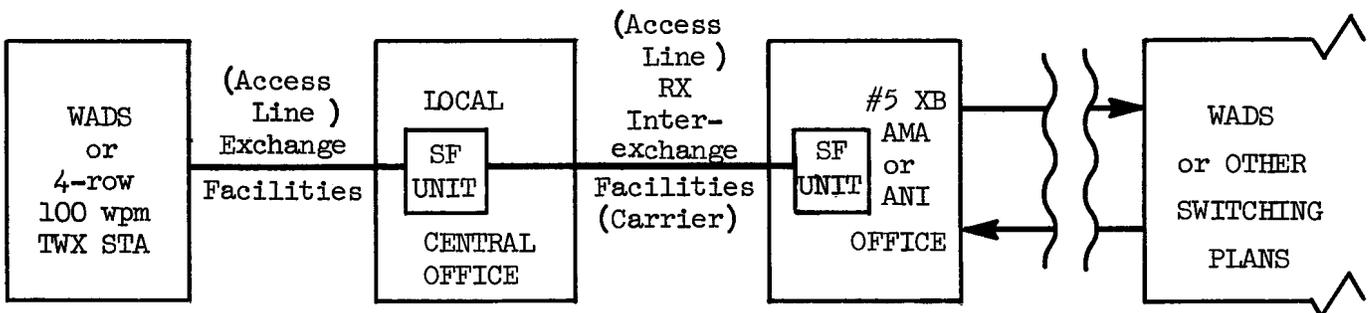


Fig. 8 – WADS or 4-row 100 wpm TWX station with local office not equipped for WADS or 4-row 100 wpm TWX service. Service has been extended to remote (serving) office for originating and terminating service. Single Frequency (SF) signaling units installed to convert DC loop signals to single frequency tones for transmission over a carrier system.

NOTES ON EXHIBIT 1

1. Programmed tests of the TTY in the originating (sending) mode.
2. The characters sent by the ADTL.
3. Signal from ADTL to send RY's. The bell rings at the time the signal is received.
4. Characters sent from TTY.
5. Results of ADTL tests of the TTY in the originating mode.
6. Command to change TTY from originating to terminating (answering) mode. If the TTY is equipped with an automatic multi-character answerback, it will be printed at this time.
7. Programmed tests of the TTY in the terminating mode.
8. Same as #2.
9. Same as #3.
10. Same as #4.
11. Results of ADTL tests of the TTY in the terminating mode.
12. End of tests.

NOTES ON EXHIBIT 2

1. Programmed tests of the TTY in the originating (sending) mode.
2. The characters sent by the No. 5A ADTL.
3. Signal from the No. 5A ADTL to send 78IU's.
4. Characters sent from the TTY.
5. Percent distortion in the originating mode.
6. Command to change TTY from originating to terminating (answering) mode. The multi-character answerback code of the TTY station will be printed at this time.
7. Programmed tests of the TTY in the terminating mode.
8. Same as #2.
9. Same as #3.
10. Same as #4.
11. Percent distortion in the terminating mode.
12. End of tests.

EXHIBIT 2

SAMPLE OF PROGRAMMED NO. 5A ADTL COPY
AS RECEIVED BY TTY

① — THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## UNDIST
 ② — THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## UNDIST
 — THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## SW-DIS
 THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## SW-DIS
 THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## DISPAD
 THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## DISPAD

③ GA SEND

④ 78IU78IU78IU78IU78IU78IU78IU78IU78IU

⑤ 15%

⑥ FLIP

⑦ — THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## UNDIST
 ⑧ — THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## UNDIST
 — THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## SW-DIS
 THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## SW-DIS
 THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## DISPAD
 THE QUICK BROWN FOX JUMPED OVER A LAZY DOG'S BACK 1234567890 ## DISPAD

⑨ GA SEND

⑩ 78IU78IU78IU78IU78IU78IU78IU78IU78IU

⑪ 5%

⑫ END

Characters used to fill out line