81 TELETYPEWRITER SWITCHING SYSTEMS

OUTLYING STATIONS

STATION PERFORMANCE TESTS

CONTENTS

1. GENERAL

1.01 This section outlines the station performance tests and suggested maintenance procedures applicable to outlying stations on 81C1 and 81D1 teletypewriter switching systems.

1.02 This section is reissued to include the information outlined in the addendum section, to change the title, to delete the information applying to stations equipped with automatic address equipment, and to generally bring it up to date. Due to the extent of the changes, marginal arrows have not been included to indicate the changes.

1.03 Reference should be made to the sections covering maintenance inspections and tests for detailed procedures applicable to the particular apparatus involved. Troubles following maintenance visits have been noted in some cases to be due to the method of carrying out the maintenance work. The maintenance instructions have been arranged with the view of avoiding such troubles and it is therefore important that they be very carefully followed.

1.04 This section applies to stations consisting of:

(a) Station control unit, sending equipment (19 or 28 ASR), receiving equipment (15 or 28 RO and, where provided, 14 or 28 ROTR).

(b) Sending and receiving equipment (controlled by a station control unit at another location).

(c) Sending and receiving equipment on single station lines.

(d) Arrangement (a) above and automatic relaying equipment.

(e) Station control circuits per SD-70883 and electronic selector circuits per SD-70882 equipped with 28ASR, 28RO and, where provided, a 28ROTR.

1.05 The sequence of work has been arranged to reduce interruptions to customer traffic to a minimum, consistent with satisfactory maintenance. Customer traffic may be handled at certain times during the course of the work, as the station is not skipped and/or intercepted for the entire maintenance interval.

1.06 Three station arrangements are included in this section and full advantage should be taken of each, as permitted during any type of maintenance work; they are:

(a) Typing unit magnet circuits arranged for interchange.

(b) Use of MAN CUT-ON key permitted.

(c) Use of MAN CUT-ON key not permitted.

1.07 Requests and arrangements for releasing, skipping, and intercepting are normally made in maintenance messages sent by the local customer directly to a supervisory position at the switching center. This method is used to reduce out-of-service time and to save time of the testroom and maintenance forces. However, when delays are encountered in receiving replies to the maintenance messages, and at stations with equipment arrangements other than those covered in 1.04, requests for the desired action should be made through the testroom serving the station. The procedures outlined above do not, in any way, relieve the teletypewriter repairman of the responsibility of keeping the serving testroom advised of any pertinent information during the course of maintenance work at an outlying station. This is particularly true whenever the work operation to be performed might interfere with normal traffic on either side of the circuit.

2. SYSTEMS REQUIRING SPECIAL PROCEDURES

2.01 Certain subscribers, particularly the Airlines, on both the 81C1 and 81D1 switching systems have made arrangements, through the Commercial Department, to have various special procedures or practices followed during routine maintenance.

2.02 This section does not specify either the name of the subscriber or the procedures required, but the arrangement of material herein is based on the specific requirements of them all.

2.03 Serving testrooms have, in all cases, been furnished copies of the special procedures required and it is their responsibility to keep the maintenance forces informed of the arrangements in effect.

2.04 Local station managers and operating personnel should also be thoroughly familiar with any special procedures required for the system involved and will cooperate with the maintenance force to the fullest extent possible.

2.05 Maintenance message format will vary depending upon the individual system requirements. Therefore, no attempt should be made by the maintenance force to prepare messages for transmittal to any switching system. The station personnel will prepare all required messages upon request, using the format specified for their particular system.

2.06 Maintenance messages from outlying stations will be coded to reach supervisory outlets located near the switching center control board, and acknowledgments will be directed to the station or stations concerned.

3. RELEASING, SKIPPING, AND INTERCEPTING

A. Releases for Routine Maintenance

3.01 Some customers require that arrangements for routine maintenance be made 24 hours in advance of the inspection time desired. In these cases, appointments should be made by calling the local customer, who will advise if the period selected is satisfactory after checking with the switching center. If the time proposed is not agreeable, the customer will suggest other periods which may be available.

B. Intercepting

3.02 Requests for intercepting should be made of the local customer, who will send a maintenance message to the switching center requesting this action. Where the work to be done will interfere with traffic to another station operated from the same station control unit, request that the other station be intercepted also, and advised of the work to be done. Do not proceed with the work until the request is acknowledged by the switching center in a return message. If the work will, in any way, interfere with traffic to any other station on the circuit, the serving testroom shall be requested to remove the drop involved from the main circuit in the prescribed manner so as not to cause an interruption to service.

3.03 Stations should be removed from intercept in a similar manner, excepting only the cases where the testroom has the station removed from the circuit. In these cases, the testroom shall be requested to restore the station to the circuit. After restoral, the usual release from INTERCEPT request message should be transmitted. These requests will also be acknowledged by the switching center.

C. Skipping

3.04 Requests for skipping should also be made of the local customer, and an estimate given as to the length of time the station is to remain on skip. Where the work to be done will prevent pickup of traffic or interfere with the answerback from another station operated by the same station control unit, request that the other station be skipped also, and advised of the work to be done. Do not proceed with the work until the request is acknowledged by the switching center. If the work to be done will in any way interfere with traffic from any other station on the same circuit, the serving testroom shall be requested to remove the sending side of the station from the circuit in a manner that will not cause an interruption to service.

3.05 When the work which has required skipping has been completed, request the testroom to restore the station to the circuit, provided it has been removed. The customer should prepare a message requesting that the station be removed from skip, or to have its status changed as required in 4. of this section. The switching center will attempt to pick up this message at the end of the estimated interval given in the message covered in 3.04. On an 81D1 system a No-response Alarm will be received at the switching center if the station is not yet ready to transmit. Attempts to pick up the message will be repeated at frequent intervals. Receipt of this message at the switching center will also be confirmed in a return message. The procedure on the 81C1 systems will be identical to the above except that the No-response Alarm will not be received as H response is not used.

3.06 As indicated in 4. of this section, requests for skipping are normally combined with requests for other action by the switching center.

4. PROCEDURES

Note 1: The following procedures are based on the assumption that all typing unit selector magnet circuits have been brought out to loop switchboard appearances as shown on SD-70466 and SD-70529. In the event that certain older 81C1 installations do not have the magnet circuits so terminated, it will be necessary to physically interchange the actual typing units. In this case, of course, only like units (14, 15, or 28) may be interchanged. The station involved should be placed on INTERCEPT during the interchange period.

Note 2: In the case of stations equipped with station control circuits per SD-70883 and electronic selector circuits per SD-70882, the following procedures are based on the assumption that all typing unit selector magnet circuits have been brought out to loop switchboard appearances as shown on SD-70883.

A. Stations Consisting of Station Control Unit, 19 or 28 ASR, 15 or 28 RO and, Where Provided, a 14 or 28 ROTR - Typing Units of the ASR and RO with Same General Operating Features

4.01 Obtain permission from the local customer to start routine. If required by local practices, notify the serving testroom that the routine work is being started.

4.02 At the 63C1 loop switchboard, patch the selector magnet circuit of the sending set (ASR) to the receive side of the SOTUS unit. Incoming messages will now be received on the typing unit of the ASR. Tapes may be prepared in a normal manner but a hard copy will not be obtained as preparation and transmission to the line will be "blind". Routine the regular receiving-only teletypewriter. During an idle circuit period, remove the patch made above. Advise the customer that the sending and receiving sides are now normal.

4.03 Obtain release of the ROTR, where provided. If a separate directing code is assigned to the ROTR, request the customer to send a maintenance message to the switching center requesting that the ROTR code be placed on INTERCEPT. Do not remove the unit from service until an acknowledgment is received from the switching center. If a separate CDC is not assigned to the ROTR, the set may be removed from service in the following manner, provided the customer's operating routine will allow. Plug off the set jack of the proper strip in the 63C1 loop switchboard so that the receiving-only (RO) teletypewriter will not be interfered with. If this procedure is not allowable, of course, the ROTR and RO must be intercepted during the routine on the ROTR. Routine the complete ROTR. Request the customer to send a message to the switching center advising that the ROTR code may be released from intercept, or remove the plug from the 63C1 loop switchboard, as required.

4.04 Remove and routine the typing unit of the sending set. Request the customer to have the station placed on SKIP for the length of time

it is estimated it will take to complete the routine on the remainder of the ASR. It is not necessary to have 81C1 stations skipped unless required by local practice. Routine remainder of the ASR.

	If Use of Manual Cut-on Key Is Permissible	If Use of Manual Cut-on Key is Not Permissible
4.05	(1) Operate Manual Cut-on key to connect the station to receive all messages. (2) Routine the SOTUS, except for completion of tests.	(1) Request the serving testroom to have station or stations placed on intercept and to terminate the receive loop in the usual manner. (2) On advice that this has been done, routine the SOTUS, except for completion of tests.

4.06 Advise the serving testroom that the routine has been completed. They will arrange with the switching center to have the station placed on INTERCEPT, if required, and will cooperate in making the following tests:

(1) Receiving tolerance tests on the SOTUS unit, receiving-only TTY and, where provided, on the typing reperforator.

(2) Transmitter start feature operation and transmission from the T-D.

(3) Test SOTUS for failure to disconnect RO on receipt of TSC.

(4) Monitor reception of the No. 4 test tape (smudge test) for a period of time sufficient to provide suitable assurance that the connect, disconnect, deactivate, and alarm features are functioning satisfactorily.

Following completion of these tests, the serving testroom will advise the switching center that the routine has been completed and that the station may be removed from SKIP and INTERCEPT. Switching center will send a maintenance message to the station advising that they have been released from intercept. The customer sends a short message to the switching center acknowledging receipt of this message. Switching center immediately thereafter releases any intercepted traffic for the station or stations involved. Maintenance personnel shall remain at the station until adequate service observations have been made.

B. Stations Consisting of Sending and Receiving Equipment Operating from Remote Station Control Units — Typing Units Having the Same General Operating Features

4.07 Routine the receiving-only (RO) teletypewriter, the receiving-only typing reperforator (ROTR) where provided, and the sending (ASR) equipment following procedures outlined in 4.01 through 4.04. Advise serving testroom that you are ready for over-all tests. They will arrange to procure a release on the main station and have them placed on SKIP and INTERCEPT. Arrange to make the following tests with the cooperation of the test room.

(1) Receiving tolerance tests on the receiving-only TTY and, where provided, on the typing reperforator.

(2) Transmission from the T-D.

(3) Monitor reception of the No. 4 test tape (smudge test) for a period of time sufficient to provide suitable assurance that the connect, disconnect, deactivate, and alarm features are functioning properly.

Serving testroom will restore all loops to the main circuit, advise the switching center that routine maintenance has been completed and request that the main station and the extension station be removed from SKIP and INTERCEPT. Switching center will send a message to the station advising of release from SKIP and INTERCEPT. Upon receipt, the customer will send a reply to the switching center acknowledging the message. Immediately following receipt of this acknowledgment, the switching center will release any traffic for the station or stations involved that may have been intercepted. Maintenance personnel shall remain at the station until adequate service observations have been made.

C. Sending and Receiving Equipment on Single Station Lines

CAUTION: SENDING AND RECEIVING UNITS ON SINGLE STATION LINES ARE AT ALL TIMES CONNECTED DIRECTLY TO THE SWITCHING CENTER. THEREFORE, EXTREME CARE MUST BE EXERCISED TO PREVENT LOSS OF TRAFFIC IN EITHER DIRECTION.

4.08 Obtain permission from the local customer to start the routine. If required by local practices, notify the serving testroom that the routine work is being started. If an incoming message is not being received, patch the typing unit of the sending set in place of the receiving typing unit. This patch will be made at the 63C1 loop switchboard. Incoming messages will now be received on the typing unit of the ASR. Outgoing messages (tapes) may be prepared and transmitted in a normal manner except that a hard copy will not be received as preparation and transmission to the line will be "blind".

4.09 Routine receiving-only teletypewriter. During an idle circuit period remove the patch made in 4.08 above. Advise customer that sending and receiving sides are now normal.

4.10 Obtain release of the ROTR, if provided. If local practices permit, plug off the set jack of the proper strip in the 63C1 loop switchboard so that the work to be done will not interfere with incoming traffic on the receiving only (RO) unit. If this is not allowable, arrange to have the ROTR intercepted for the time it will take to make the routine. Routine the complete ROTR. During an idle circuit period, remove the plug from the 63C1 loop switchboard placed above, or arrange for release from INTERCEPT, as applicable.

4.11 Remove and routine the typing unit of the ASR. Tapes may be prepared and transmitted to the line Blind during this phase of the routine. Routine the remainder of the ASR.

4.12 Advise the serving testroom that you are ready for over-all tests as required. The testroom will request the switching center to place the station on INTERCEPT. Do not proceed with the tests until advised that this request has been complied with. In cooperation with the testroom, make the following tests:

(1) Receiving tolerances on the receiving-only TTY and, where provided, on the typing reperforator.

(2) Transmission from the T-D.

Request serving testroom to (1) put the station loops regular, (2) advise switching center that the routine has been completed, and (3) to have station released from INTERCEPT. Switching center will send a message advising that the station has been taken off INTERCEPT. The customer will immediately reply to this message, at which time the switching center will release any traffic that has been intercepted. Maintenance personnel shall remain at the station until adequate service observations have been made.

D. Stations Equipped with Automatic Relaying Equipment in Addition to Regular Sending and Receiving Equipment

Note: Automatic relaying equipment is used to relay traffic between two 81-type systems. This arrangement consists of a 13Y-type repeater and a reperforator-transmitter together with the associated control equipment at two outlying stations on separate 81-type systems. Normally, this equipment will be routined in conjunction with other teletypewriter units at the outlying station. Therefore, seldom if ever will both stations of this relaying equipment be routined together.

4.13 Routine sending and receiving equipment in accordance with 4.01 through 4.12, as applicable. The following procedures cover only the reperforator-transmitters as routine maintenance on the control equipment or 13-type repeaters is not considered necessary.

CAUTION: THE RECEIVE SIDE OF THE EQUIPMENT TO BE ROUTINED IS UNDER CONTROL OF A SOTUS UNIT ASSOCIATED WITH ANOTHER 81-TYPE SYSTEM. THEREFORE, EXTREME CARE MUST BE EXERCISED TO AVOID AN INTERRUPTION TO THIS EQUIPMENT; ANY INTERRUPTION MAY RESULT IN LOST MESSAGES.

Obtain permission from the local customer to proceed with the routine. Advise the serving testroom that you are starting this phase of the work. Request the serving testroom to arrange with the switching center on the other system to INTERCEPT the Foreign System Switching Code for the reperforator-transmitter to be routined. Do not proceed with the work until advised that the unit is on INTERCEPT and all stored tapes have been transmitted.

4.14 Routine the complete reperforator-transmitter.

4.15 Request the customer to send a maintenance message requesting that all transmitter start codes for the station be SKIPPED for the length of time that it is estimated it will take to perform the required routine tests. When

advised that the station is on SKIP notify the serving testroom that the routine has been completed and make the following tests.

(1) Receiving tolerances on the reperforator portion of the R-T.

(2) Transmission tests on the transmitter portion of the R-T.

Request the testroom to contact the switching centers concerned and have the station released from SKIP and INTERCEPT. The release from SKIP or INTERCEPT will be acknowledged in a message from the switching center to the station or stations involved. This acknowledgment must be replied to, by the customer. Upon receipt of the reply, the switching center will release any traffic intercepted during the routine. Maintenance personnel shall remain at the station until adequate service observations have been made.

E. Stations Consisting of Station Control Circuits per SD-70883, Electronic Selector Circuits per SD-70882, 28ASR, 28RO and, where provided, a 28ROTR

4.16 Obtain permission from the local customer to start routine. If required by local practices, notify the serving testroom that the routine work is being started.

4.17 At the 63C1 loop switchboard, patch from the set jack associated with the 28ASR to the looping jack associated with the 28RO. Incoming messages may now be received on the typing unit of the ASR. Tapes may be prepared in a normal manner but a home copy will not be obtained during preparation, and transmission to the line will be blind. Routine the regular receiving-only teletypewriter. Restore the receiving-only teletypewriter to its base. At the 63C1 loop switchboard, patch from the set jack associated with the 28RO to the looping jack associated with the 28ASR.

CAUTION: NO PATCHES SHOULD BE MADE IN JACKS ASSOCIATED WITH THE LOOP.

On the 28ASR, rotate the keyboard control knob to the K-T position. Sending from the 28ASR, make local receiving tolerance tests on the 28RO as outlined in the section covering teletypewriter station tests, orientation and distortion tests under test procedures for nonrepeatered circuits. This local test is considered adequate because in normal operation all incoming signals are regenerated in the electronic selector. During an idle circuit period, remove the patches made above. Advise the customer that the sending and receiving sides are normal.

4.18 Obtain a release of the 28ROTR, where provided. If a separate directing code is assigned to the ROTR, request the customer to send a maintenance message to the switching center requesting that the ROTR code be placed on INTERCEPT. Do not remove the unit from service until an acknowledgment is received from the switching center. If the ROTR does not have a separate directing code but is connected as a No. 2 machine, the 63C1 loop switchboard is not required and it can be removed without intercepting and without interrupting the 28RO. Routine the complete ROTR. At the 63C1 loop switchboard, where provided, patch from the set jack associated with the ROTR to the looping jack associated with the 28ASR. On the 28ASR, rotate the keyboard control knob to the K-T position. Sending from the 28ASR, make local receiving tolerance tests on the 28ROTR as outlined in the section covering teletypewriter station tests, orientation and distortion tests under test procedures for nonrepeatered circuits. In the event that the ROTR is connected as a No. 2 machine, these tests will require the assistance of the serving testroom in sending the unbiased test sentence. However, the tests specified above should be sufficient. During this test period the receiving side of the circuit will have to be placed on INTERCEPT. Advise customer that the routine and testing of the ROTR has been completed. If the ROTR and/or the RO has been placed on INTERCEPT, request the customer to send a message to the switching center advising that these codes may be released from INTERCEPT.

4.19 Remove and routine the typing unit of the ASR. Request the customer to have the station placed on SKIP for the length of time it is estimated that it will take to complete the routine on the remainder of the ASR. Routine the remainder of the ASR.

4.20 Advise the serving testroom that the routine has been completed. The serving testroom will then cooperate in making the following tests:

(1) Transmitter start feature operation.

(2) Sending distortion tests as outlined in the section covering teletypewriter station tests, orientation and distortion tests.

Following completion of these tests, the serving testroom will advise the switching center that the routine has been completed and that the station may be removed from SKIP. Advise the customer that the station is now ready to resume normal operation. Maintenance personnel shall remain at the station until adequate service observations have been made.

5. REFERENCES

5.01 The following is a list of material which field maintenance forces and serving testrooms may find helpful in maintaining outlying stations on 81-type systems:

CD, SD 70466 TTY Switching Units — 81D1 Station Control Unit.

CD, SD 70529 TTY Switching Units — 81C1 Station Control Unit.

CD, SD 70882 Electronic Receiving Selector Circuit

CD, SD 70883 TTY Switching Unit — 81D1 Station Control Circuit Arranged for 120 Code Capacity