

## SYSTEM EVALUATION

### NO. 2B ELECTRONIC SWITCHING SYSTEM

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8. NETWORK FABRIC TESTS . . . . .	10	1.01 This section describes a method of procedure for evaluating the integrity of a No. 2B Electronic Switching System (ESS). The testing procedures, in varying degrees, are applicable for the following:	
9. RINGING AND TONE (RT) AND RECORDED ANNOUNCEMENT (RA) TESTS . . . . .	12	<ul style="list-style-type: none"> <li>• Part of acceptance testing prior to cutover of a new office</li> <li>• Prior to and after growth additions, restart, and retrofit to an in-service office</li> <li>• Periodic evaluation of an in-service office, includes detection of register errors with the maximum allowable failure rate of 5/10,000 for all register errors and a 1/10,000 failure rate for bad address errors.</li> </ul>	
10. TRUNK TEST PANEL TESTS . . . . .	16	1.02 This section is reissued to revise Office Alarm Tests and Emergency Action and Error Recovery and to eliminate unnecessary changes of the AMA tapes through rearrangement of the test sequences. Since this is a general revision, arrows ordinarily used to denote changes have been omitted.	
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1.03 The system evaluation is primarily a check of the hardware and software capability of the office to operate in the normal standby mode with little or no difficulty and to sustain call processing at an acceptable call completion rate.

1.04 The No. 2B ESS performance requirements (Section 820-600-186) require that, during the precutover load testing, the number of mishandled calls (for example, calls left high and dry, calls wrongly routed) should not exceed 1 in 10,000. The allowable troubles that indicate some malfunction, but do not definitely indicate a failure to complete, shall not exceed 5 in 10,000. While the quantity of mishandled calls in a cutover office cannot be established exactly, analysis of the PUM and CUA counters (Table A) will establish limits on the capability of the machine.

1.05 Reference should be made to Input Message Manual (IM-2H200) and Output Message Manual (OM-2H200) for detailed descriptions of input and output messages which appear in this section.

1.06 It is not the intent of this section to precisely detail all procedures pertaining to a system evaluation. Reference is made to other procedural and test documents which are essential as a part of system evaluation.

1.07 If trouble is encountered during the system evaluation, normal maintenance procedures should be used to locate and clear the trouble before proceeding with subsequent tests.

1.08 Whenever the term TOUCH-TONE® telephone service is used, it refers to the equipment required to provide this service to the customer.

1.09 The system evaluation procedures contain the following tests:

(a) **Evaluation of TTY Printouts:** This evaluation consists of the following:

(1) The plant measurement printouts of the past 2 days are inspected for specific measurements which provide information relative to the performance of and the service offered by the switching system.

(2) Review TTY printouts of previous 24 hours for related TTY alarm printouts if a plant

measurement printout exceeds the specified value.

(3) Analyze the hourly printouts of the last 2 days to determine the integrity of the system on an hourly basis.

(4) Review the alarm printouts of the last 2 days and determine the disposition of each.

(5) Calculate the percentage of incoming matching loss calls and the percentage of originating matching loss calls and determine if the values are normal for the office.

(b) **Maintenance Tests:** Verify the operation of the maintenance control and display panel functions using Section 232-306-501.

(c) **TTY Verification Tests:** These tests verify that the TTY facilities are operational.

(d) **Tape Data Controller Operational Procedures:** The tape data controller operational procedures are performed in accordance with Section 232-304-301.

(e) **Network Fabric Tests:** The network fabric tests verify the path connections through the switching network.

(f) **Ring and Tone (RT) and Recorded Announcement (RA) Tests:** These tests verify the RT and RA facilities. Each tone and recorded announcement is accessed and verified.

(g) **Trunk Test Panel (TTP) Tests:** The TTP tests verify the operation of all TTP functions using Section 232-130-501.

(h) **Service Circuit Tests:** The service circuit tests consist of diagnostics of circuits with automatic diagnostics and manual tests of service circuits which do not have automatic diagnostics.

(i) **Trunk Tests:** The trunk tests consist of trunk diagnostics, translation checks, and circuit checks.

(j) **Office Alarms Tests:** The office alarms tests are performed in accordance with Section 232-315-501.

- (k) **Emergency Action and Error Recovery:**  
This test verifies the emergency action and error recovery functions of the system.

1.10 The following documents are required or will be of assistance in performing a No. 2B ESS system evaluation:

DOCUMENT	TITLE
232-120-301	Traffic and Plant Measurements
232-306-501	Maintenance Control and Display Panel—Tests
232-304-301	Updating Main Store Translation Information
232-315-501	Office Alarms Tests
IM-2H200	Input Message Manual
OM-2H200	Output Message Manual
232-204-501	Centrex Attendant Loop Circuit (SD-2H172) and Trunk Circuit (SD-2H173) Test
232-208-301	Impedance Balancing Procedure on SD-2H182 (Centrex Attendant Trunk Circuit) Arranged for 4-Wire to 2-Wire Conversion
232-130-501	Trunk Test Panel Circuit (SD-2H075)—Tests

## 2. APPARATUS

2.01 The following apparatus and test equipment are required for the performance of the system evaluation.

- Test cord, 1 foot long, equipped with a 411A (test pick) tool on one end and a 360 tool on the other end.
- 1025A Headset equipped with a 310 plug or equivalent.
- Clip, Connecting, KS-6278.
- Resistors, 200, 900, 1800, 2200, 4300, 8500, and 9000 ohms with 2-clip leads.

- 258C Dummy Plug.

## 3. EVALUATION SETUP PROCEDURES

**Note:** This evaluation setup procedure applies only to office evaluations performed prior to cutover.

3.01 In order to perform the evaluation of TTY printouts in Part 4, **prior to cutover**, the system must be processing a volume of traffic. This traffic load can be simulated by the use of traffic simulator (load box) combination ITE 4643-4675, or ITE 5385 (PDP-8/E miniprocessor system). Section 232-002-302 contains procedures for setting up the ITE 5385. Section 232-002-503 contains procedures for setting up the ITE 4643-4675. The procedures in these sections are intended for performing the call completion rate test during a 24-hour period. The traffic may be generated for an additional 24-hour period in order to evaluate the TTY printouts identified in Part 4.

## 4. EVALUATION OF TELETYPEWRITER (TTY) PRINTOUTS

4.01 **Evaluation of the last 48 hours of printouts will give a true indication of system performance. In particular, the automatic test results for both the control complex and the peripheral units (PU) indicate the condition of these units. Examination of the plant measurements gives performance characteristics of the system during traffic load.**

4.02 Evaluation of the automatic test results consists of verifying that all units did have these tests performed (verify that no tests were aborted) and that the results were satisfactory or explainable. Explainable means that trouble(s) was detected by the automatic tests but was discounted because the trouble(s) was located and cleared.

4.03 Evaluation of the plant measurements is a relative task because the performance of the system presently should be compared to the performance 6 months or a year ago. For this purpose, information concerning past values of the plant measurements listed in Table A is needed. Prior to cutover the present performance can only be compared to the values listed in Table A since past values are not available. The plant measurements described in Table A give information relative to the performance of and service offered by the

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switching system. The number of allowed errors, failures, etc, should ideally be zero; however, in a real situation, any number other than zero may indicate problems. Obtain previous measurements

from the dial administration organization and compare with the present measurements. Analyze the reasons for any differences.

TABLE A

## EVALUATION OF SELECTED PLANT MEASUREMENTS

PLANT REGISTER	MAX. COUNT ALLOWED	DESCRIPTION
CUA 05	*	Maintenance initiated switches (excludes TTY requested noninitializing switches)
PUM 01	*	Transient errors and bad address errors on SCPDs, local CPD, AMA and AIOD
PUM 02	*	Transient errors and bad address errors on network controllers (except FCG and power cross)
PUM 03	*	Transient errors and bad address errors on line scanners
PUM 04	*	Transient errors and bad address errors on universal scanners
PUM 05	*	Not used
PUM 06	*	Diagnostic faults on SCPDs, local CPD, AMA, AIOD, RA, and R&T
PUM 16	*	Continuity test failures (total system continuity test failures on all types of calls)†
PUM 17	*	False cross and ground failures
PUM 18	*	Power cross failures‡
PUM 19	*	Links removed from service (total number of network links [A, B, and C] removed from service for maintenance purposes by error analysis)

**Note:** Peripheral unit measurements do not include results of manually requested tests or periodic exercise tests. A transient error occurs when an external order fails the first time but succeeds on a retry. A fault is a true failure found by a diagnostic program as a result of a call processing request (working mode). A bad address occurs when an external order fails the first time and on all subsequent retries.

\* The total quantity or error counts in **all** registers in Table A shall not exceed 5/10,000 calls. Transient errors may or may not indicate call failures, therefore, count against the 5/10,000 calls requirement. Bad address errors **do indicate call failures**, therefore count against the 1/10,000 calls requirement. Analyze printouts to determine if errors are transient or bad address. (Refer to Section 820-600-186 for No. 2B ESS performance requirements.)

† The number of continuity test failures can vary due to customer dialing habits, condition of outside plant lines, and system problems.

‡ Failures may be caused by outside plant troubles or network troubles.

## Legend:

SCPD — Supplementary Central Pulse Distributor  
 CPD — Central Pulse Distributor  
 AMA — Automatic Message Accounting  
 AIOD — Automatic Identified Outward Dialing  
 RA — Recorded Announcement  
 R&T — Ringing and Tone

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**4.04** Section 232-120-301, Traffic and Plant Measurements, provides a detailed description of the traffic and plant schedules and printouts. A description of and comments about each register measurement are given. Section 232-120-301 should

be used in conjunction with OM-2H200 for evaluation of the traffic and plant measurement printouts.

**4.05** The procedure to evaluate TTY printouts follows:

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STEP	PROCEDURE
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**EXAMINATION OF PLANT MEASUREMENTS**

- 1 Inspect the plant measurement printouts (output message index TI PR PLT) of the past 2 days. Verify that the counts in Table A are not exceeded unless a justified explanation can be made. The counts shown are totals for 1 day.
- 2 If the system evaluation is being performed prior to growth or on a routine basis, compare present values with past values.
- 3 If any of the plant measurements for a single day exceed the values in Table A, review the preceding 24 hours of printouts for alarm or trouble messages which relate to the excessive counts.
- 4 Discount any troubles which were located and cleared.
- 5 Outline any problem areas which require additional work. (That is, if maintenance initiated switches (CUA05) were excessive, determine if they were due to control unit (CU) faults or peripheral unit (PU) faults.)

**Hourly Printout Evaluation**

- 6 The hourly printouts

tt SYS STAT day dd1 dd2 dd3

where:

day = Day of the week (SUN, MON, TUES, WED, THURS, FRI, SAT).

dd1 = Contents of memory location SYSTATE; 16-bit, 6-digit octal field. (Table B)

dd2 = Contents of memory location SSPMAP+3; 16-bit, 6-digital octal field. (Table C)

dd3 = Contents of memory location SSPMAP+2 and SSPMAP+4, 16-bit, 6-digit octal field. (Table D)

- 7 If any bit in Tables B, C, and D is set, except Bits 0 or 9 in Table B, determine why.
- 8 All failures or troubles in the critical areas (Step 7) must be explained or accounted for before they can be discounted.

STEP	PROCEDURE
<b>Alarm Messages Evaluation</b>	
9	Analyze all major and minor alarm messages received during the past 2 days.  A major alarm message is preceded by two asterisks (**), and a minor alarm message is preceded by a single asterisk (*).
10	All major and minor alarms must be accounted for and cleared.
<b>Service Analysis</b>	
11	Contact the dial administration organization and ask for an analysis of the service offered by the system the past 2 days. Determine if the percentages of incoming matching loss calls and originating matching loss calls for the past 2 days are normal values for the office.

TABLE B

SYSTEM STATE

BIT NO.	DEFINITION
0	Off-line CU is standby ready
1	Off-line CU is out of service
2	Off-line CU is unavailable (locked or forced)
3	System is in initialization interval—last initialization was less than 2 minutes ago
4	Off-line CU has been automatically removed due to a fault
5	Off-line CU has been removed by TTY request
6	System has updated the off-line CU memory
7	A program is using the off-line CU
8	Off-line CU panel is in MANUAL
9	0—CU0 is on-line 1—CU1 is on-line
10	Off-line main store is out of service
11	System status panel is out of service
12	Maintenance channel is out of service
13	A restore CU is in progress
14	An unconditional switch is in progress
15	Power key on off-line CC is operated

TABLE C

## MAJOR EQUIPMENT LOSS AND ALARMS

BIT NO.	DESIG	TROUBLE DEFINITION
0	MISC	Miscellaneous
1	RA	Recorded Announcement
2	RT	Ringing and Tone
3	AMA	Automatic Message Accounting
4	SCAN	Line, Master, and Universal Scanner
5	NET	Network
6	MAS	Main Store
7	ATI	Automatic Test Inhibit
8		Spare
9		Spare
10	BATT	Alarm Battery Alarm
11	PWMAJ	Major Power Alarm
12	PWMIN	Minor Power Alarm
13	MINOR	Minor Alarm
14	MAJOR	Major Alarm
15	FUSEA	Fuse Alarm

TABLE D

## MAJOR EQUIPMENT UNIT ALARMS

BIT NO.	DESIG	TROUBLE DEFINITION
0	TOLNW	Toll Network Protection Active
1	DSP	Dynamic Service Protection Active
2	TRAFIC	Traffic
3	MANFE	Manual Force
4	TAPEB	Tape Data Controller
5	CKTLM	Circuit Limit
6	BLDG	Building Alarm
7	TTY	Maintenance Channel TTY Controller
8	CBLDG	Building Alarm
9	CCO	Control Units
10	CNET	Networks
11	CMAS	Main Store
12	CMISC	Miscellaneous
13	CFORCE	Abnormal Manual State
14	CTRAF	Traffic
15		Spare

**5. MAINTENANCE TESTS**

5.01 If a complete office evaluation is to be performed, the procedures in Section 232-306-501 should be used to verify the operation of the maintenance control and display panel functions.

and free of wiring errors. The procedure may be performed prior to cutover, before and after growth, restart, or retrofit, and periodically.

**Note:** Personnel are required at each TTY location for Steps 8 through 12 of this procedure.

**6. TELETYPEWRITER VERIFICATION TESTS**

6.01 The following procedures are provided to determine if the TTY facilities are operational

STEP	ACTION	VERIFICATION
1	At SYSTEM EMERGENCY MANUAL CONTROL section of system status panel (SSP)— Depress TTY INIT key.	At maintenance TTY— System response: INIT TTYC ALL INIT TTYC a STAT PORT cc EQP dd BCP g  On all other TTY— System response: INIT a STAT PORT cc EQP dd BCP g  <b>Note:</b> Refer to OM-2H200 for explanation of variable fields.
2	At maintenance TTY— Type in: RMV:TTYC 1!	At maintenance TTY— System response: INIT TTYC 0 STAT PORT cc EQP dd BCP g
3	At maintenance TTY— Type in: DGN:TTYC 1!	At maintenance TTY— System response: DGN TTYC 1 COMPL ATP OOS
4	At maintenance TTY— Type in: RST:TTYC 1!	At maintenance TTY— System response: DGN TTYC 1 COMPL ATP IN INIT TTYC 1 STAT PORT cc EQP dd BCP g
5	At maintenance TTY— Type in: RST:TTYC 0!	At maintenance TTY— System response: DGN TTYC 0 COMPL ATP IN INIT TTYC 0 STAT PORT cc EQP dd BCP g
6	Perform Steps 7 through 13 for each TTYC (except for maintenance TTYCs) before proceeding to the next TTYC.	
7	At maintenance TTY— Remove TTYC under test by typing in: RMV:TTYC a!	At maintenance TTY— System response: OK

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
	a = TTYC (2-5), use the number of TTYC under test.	
8	At remote TTY on TTYC under test— Type in: DGN:TTYC a!	At TTY under test— System response: ?O
9	Repeat Step 8 from local TTY on the TTYC under test.	
10	At maintenance TTY— Restore the out-of-service TTYC by typing in: RST:TTYC a!	At TTY under test— System response: INIT TTYC a STAT PORT cc EQP dd BCP g At maintenance TTY— System response: DGN TTYC a COMPL ATP IN
11	At maintenance TTY— Remove TTYC under test by typing in: RMV:TTYC a!	At maintenance TTY— System response: OK
12	At remote TTY of TTYC under test— Operate BREAK-RLS key.	At TTY under test— System response: INIT TTYC a STAT PORT cc EQP dd BCP g
13	Repeat Steps 10 and 11 for each local TTY on the TTYC under test.	
14	At maintenance TTY— Restore the out-of-service TTYC by typing in: RST:TTYC a!	At TTY under test— System response: INIT TTYC a STAT PORT cc EQP dd BCP g At maintenance TTY— System response: DGN TTYC a COMPL IN
15	Repeat Steps 7 through 13 for remaining TTY controllers.	

**7. TAPE DATA CONTROLLER OPERATIONAL PROCEDURES**

**7.01** Follow the procedures in Section 232-304-301 to verify error free writing of the tape data controller. These procedures may be performed prior to cutover, before and after growth restart, or retrofit, and periodically. The update procedures should be performed with each 3A CC active.

these tests are performed when the NETFAB program is initiated:

- False cross or ground test
- Tip and ring continuity test
- Spurious pulse path test.

**8. NETWORK FABRIC TESTS**

**8.01** Included in the network fabric test program (NETFAB) are the following tests. All of

This procedure may be used prior to cutover, before and after growth, and periodically, on both existing and growth networks. The NETFAB program is designed to be compatible with call processing. Before a path is tested, the status of

each link in the path must be determined. If a critical link is found to be busy, no test will be run on the path. If a noncritical link is busy, an alternate noncritical link is searched for. If none is found idle, no test will be performed on the path. When an idle path is found it is marked busy to prevent call processing from tearing it down. Any trouble detection or state change will cause the NETFAB test to abort, thus preventing impairment to call processing.

**Note:** The NETFAB test program should not be run under high traffic conditions in an operating office. To do so would not permit a complete test of the network since only idle paths are tested.

**8.02** To completely test all paths in a network (LTN or RN), type each of the following TTY input messages and observe the respective response (refer to Section 232-108-301):

INPUT	RESPONSE
(1) MS NW:FAB:fg 0- 00c0! MR NW FAB fg 0- ATP	
(2) MSNW:FAB:fg 0- 4007! MR NW FAB fg 0- ATP	

fg = network of interest (0 through 14)

c = last concentrator group equipped in the network of interest (0 through 7)



*At this point in the NETFAB test program, the tip and ring test have been performed within all concentrator groups and grids using controller 0. Also, the complete pulse path test has been completed using controller 0. Two options (A and B) are provided for the remaining portion of the NETFAB test program. Choose only one option:*

- **Option A** will require considerably more machine time to complete than Option B but

may be performed without supervising the TTY. For example, the tests may be performed during the night while the office is unattended. Option A repeats all of the above tests on controller 1.

- **Option B** may be performed in considerably less time than Option A; however, Option B will require inserting four input messages per concentrator group and two input messages per grid at the TTY. For this reason this option should only be performed while the office is attended or under surveillance. Option B performs only those tests that are necessary to test the pulse paths using controller 1, since the tip-ring paths were tested above.

**OPTION A**

INPUT	RESPONSE
(3) MS NW:FAB:fg 1- 00c0! MR NW FAB fg 1- ATP	
(4) MS NW:FAB:fg 1- 4007! MR NW FAB fg 1- ATP	

**OPTION B**

INPUT	RESPONSE
(5) MS NW:FAB:fg 1- 2c00! MR NW FAB fg 1- ATP	
(6) MS NW:FAB:fg 1- 2c11! MR NW FAB fg 1- ATP	
(7) MS NW:FAB:fg 1- 2c62! MR NW FAB fg 1- ATP	
(8) MS NW:FAB:fg 1- 2c73! MR NW FAB fg 1- ATP	
(9) MS NW:FAB:fg 1- 50g0! MR NW FAB fg 1- ATP	
(10) MS NW:FAB:fg 1- 60g0! MR NW FAB fg 1- ATP	

fg = network of interest (0 through 14)

c = concentrator groups (0 through 7, as equipped)

g = grid (0 through 7)

**Note 1: If Option A was used:**

Repeat (3) and (4) for each network in the office.

**Note 2: If Option B was used:**

Repeat (5) through (8) for each concentrator group that is equipped (c = 0 through 7).

Repeat (9) for each grid (0 through 7).

Repeat (10) for each grid (0 through 7).

Repeat (5) through (10) for each network in the office.

**9. RINGING AND TONE (RT) AND RECORDED ANNOUNCEMENT (RA) TESTS**

**A. RT Frame Diagnostics**

**9.01** RT frame diagnostics may be performed prior to cutover and before and after growth, restart, retrofit, and/or periodically. Request a diagnostic of the RT frames by typing the following TTY input message and observe the expected output messages:

Input: M RT:DGN:fg h-!

fg = 2-digit decimal equipment number of RT frame of interest (00)

h = plant of interest (0-1)

= omitted for the on-line plant

= 0 for plant 0, which must be in the off-line mode

= 1 for plant 1, which must be in the off-line mode

Output: MR RT DGN fg hi ATP

**Note:** If any message other than the preceding is received, an error condition exists. Refer to OM-2H200 for an explanation of this message.

**B. RA Frame Diagnostics**

**9.02** RA frame diagnostics may be performed prior to cutover and before and after growth, restart, retrofit, and/or periodically. Request a diagnostic of the RA frames by typing the following TTY input message and observe the expected output message.

Input: M RA:DGN:fg -!

fg = 2-digit equipment number of RA frame of interest (00 through 15)

Output: MR RA DGN fg - ATP

**Note:** If any message other than the preceding is received, an error condition exists. Refer to OM-2H200 for an explanation of this message.

**C. Tone and Recorded Announcement Tests**

**Caution:** The following tone and recorded announcement tests should only be performed prior to cutover.

**9.03** Determine the RA channels assigned and the group number of each channel from the Recorded Announcement Tables, form ESS-2509 5J.

**9.04** Verify that the assigned channels have the proper announcement recorded on them using form ESS-2509 and the 624-10 telephone set. If any channels do not have the proper announcement on them, record it on them.

**9.05** Use the following test procedure and Table E to check all recorded announcements or tones. When all members of a group have been tested and all errors found corrected, go to the next group until all recorded announcement or tone groups have been tested.

**Test Procedure**

**9.06** This procedure is to be used to check all recorded announcements or tones.

(1) Connect either a telephone subset or coin station to the proper type of test line as needed to perform the test of the group. (See Table E.)

(2) Remove all but one tone presence detector, SD-2H132, group 47, from service by typing the following TTY input message:

M SV:RMV:47 a!

a = Member number of circuit to be removed from service.

(3) Manually remove the power from the tone presence detector left in service.

(4) Request a high-priority diagnostic of the group to be tested by typing the following TTY input message:

MH SV:DGN:ggg!

ggg = Trunk group number.

All members should fail and be removed from service.

(5) Restore power to the tone presence detector removed in (3) and restore the first member of the group to be tested.

(6) Using the telephone set connected in 1, take the necessary action outlined in Table E to cause the RA or tone for the group under test to be returned in the telephone handset.

(7) If the announcement or tone was verified, restore the next member of the group under test and remove the one just tested.

(8) Repeat (6) through (7) until all members of the group under test have been tested. Restore all members of group just tested.

(9) Repeat (1) through (8) until all groups have been tested per Table E.

(10) Restore all members of the tone presence detector group removed from service.

TABLE E

## TONE AND RECORDED ANNOUNCEMENT

TRK GRP #	TYPE OF TONE OR ANNOUNCEMENT	TYPE OF TELEPHONE	ACTION
16	Dial-Tone-First Coin	Dial-Tone-First Coin	Dial legal local telephone number without depositing initial deposit (10 cents or more, as local practice dictates).
18	Permanent Signal	TOUCH-TONE or Dial Pulse Phone	Remove receiver; just hold.
19	Partial Dial	TOUCH-TONE or Dial Pulse Phone	Dial only the first 5 digits of a legal telephone
20	"No 1+" Dialing Error	TOUCH-TONE or Dial Pulse Phone	Using Form ESS-2300, 3- and 16-Digit Translation, find an entry which has an "R" option entered in Column 31. The first digit of the office code is given in the upper right-hand corner of the form with the second and third digits given in the left-most column for any horizontal entry. Now dial this office code without the required "1" prefix. If no "R" exists in Column 31, this announcement is not used in this office.
21	Special Service	TOUCH-TONE or Dial Pulse Phone	Dial 72# or 72 plus time-out on a test line which has Call Waiting and/or Add-On Customer Calling features only.
23	Overtime Monitor	Timed Coin Phone and TOUCH-TONE or Dial Pulse Phone	Check "OFFOP0" to see if bit 12=1 (use TDATA or PA-2H200 to find program store address). If bit 12 is 1, then this announcement can be tested by inserting the initial deposit, dialing the number of the handset, answering it, and leaving both phones off-hook until the announcement occurs. If bit is 0, skip this group.
24	"Extra 1+" Dialing Error	TOUCH-TONE or Dial Pulse Phone	Follow procedure outlined for trk group 20 to find an entry into Form ESS-2300 which has a "P" option in Column 31. Then dial this office code using the unwanted "1" prefix.
30	Receiver Off-Hook Tone	TOUCH-TONE or Dial Pulse Phone	Remove receiver from hook, wait until ROH tone is heard; a permanent signal announcement is given before the ROH tone is connected.
31	Busy Tone	Two TOUCH-TONE or Dial Pulse Phones	Take one phone off-hook; dial that phone with the other one. Listen for 60-ipm busy tone.

TABLE E (Contd)

## TONE AND RECORDED ANNOUNCEMENT

TRK GRP #	TYPE OF TONE OR ANNOUNCEMENT	TYPE OF TELEPHONE	ACTION
34	Reorder Tone	TOUCH-TONE or Dial Pulse Phone	<p>(1) Use Form ESS-2202-R, Trunk Group Table, to find the nonoperator local trunk group having the least number of members.</p> <p>(2) Use Form ESS-2303-R, Route Index Expansion Table, Columns 36-38, to see if a "Next Route Index" is given for that group. If so, repeat Step 1 until the group with the lowest number of members and no "Next Route Index" is found.</p> <p>(3) Using the code Group Translation Table, Form ESS-2304-R, find the "Code Group Number" which points to RI which uses the trunk group selected.</p> <p>(4) Look in the 3- and 6-Digit Translation Table, Form ESS-2300-R, in the "No Prefix" column, Columns 25-27, for the code group found in Step 3. The office code can now be read off the table.</p> <p>(5) Remove all members of the trunk group from service using the M TK RMV ggg mmm! request where ggg=trunk group number and mmm=member number. <b>Warning:</b> This can be service-affecting.</p> <p>(6) Now dial a telephone number using the office code found in Step 4. Reorder (120 ipm) tone should be returned.</p>
Locally Assigned	Locally assigned by TELCO	TOUCH-TONE or Dial Pulse Phone	<p>(1) Using form ESS-2202-R, find any other tone or local recorded announcement groups.</p> <p>(2) On ESS-2303-R, locate a RI that uses the selected trunk group.</p>

TABLE E (Contd)  
TONE AND RECORDED ANNOUNCEMENT

TRK GRP #	TYPE OF TONE OR ANNOUNCEMENT	TYPE OF TELEPHONE	ACTION
			(3) Using the code Group Translation Table, Form ESS 2304-R, find the "Code Group Number" which points to an RI which uses the trunk group selected. (4) Use ESS Form 2300-R, in any one of the prefix columns for the code group found in Step 3. (5) Dial the call as indicated by the digits on ESS 2300-R.

**D. Low, High, and Milliwatt Tone Test**

**9.07** To test the low tone (Trunk Group 33), the high tone (Trunk Group 32), and the milliwatt tone (Trunk Group 35) groups, use the following procedure at the TTP. These tests may be performed prior to cutover, before and after growth, restart, retrofit, and/or periodically.

- (1) Dial a 1 access code + 3-digit group number + 3-digit member number (member to be tested) + ST.
- (2) Plug a headset into TEL SET A and B jacks and operate the TALK key. The tone should be heard.
- (3) Repeat (1) and (2) until all members of the group have been tested and any errors found corrected.

**10. TRUNK TEST PANEL TESTS**

**10.01** The trunk test panel (TTP) tests should be performed in accordance with Section 232-130-501. These tests may be performed prior to cutover, before and after growth, restart, or retrofit, and/or periodically.

**11. SERVICE CIRCUIT TESTS**

**A. Service Circuit Diagnostics**

**11.01** Service circuit diagnostics may be performed prior to cutover before and after growth, restart, retrofit, and/or periodically. Request a diagnostic of all service circuits in the office, which

have diagnostics, by typing the following input message:

M SV:DGN!

The following output message will be printed to indicate that automatic progression service circuit testing has begun.

MR SV BGN ggg

ggg = Service circuit group that is currently being tested.

If a service circuit fails the diagnostic, one of the following TTY printouts will be received.

MR SV BLK a b ggg mmm ccc dddd dddd

MR SV DGN a b ggg mmm ccc dddd dddd

The following TTY printout will be received when all service circuits (which have diagnostics) have been diagnosed.

MR SV END

**Note:** Refer to OM-2H200 for an explanation of variable fields.

**B. Manual Service Circuit Tests**

**11.02** The following is a list of service circuits and associated tests sections. More comprehensive manual tests are required for these circuits since they do not have automatic tests or since the automatic tests are not extensive enough. These service circuits should be tested in accordance

with the associated test section. If any of these tests were performed during the past month they may be omitted. Manual service circuit tests may be performed prior to cutover, before and after growth, restart or retrofit, and periodically.

TEST SECTION	SERVICE CIRCUIT
232-111-501	MF Test Environment Circuit (SD-2H134)
232-117-501	Precise Level Test Tone Circuit (SD-2H169)
232-135-501	TOUCH-TONE Station Test Circuit (SD-1A199)
232-136-501	TOUCH-TONE Calling Detector Test Circuit (SD-2H131)
232-137-501	Dial Pulse Receiver Test Circuit (SD-2H133)
232-138-501	Line Insulation Test Circuit (SD-2H142)
232-144-501	Station Ringer Test Circuit (SD-2H129)
232-154-501	Tone Presence Detector Circuit (SD-2H132)
232-155-501	Ringling and Coin Control Test Circuit (SD-2H135)

## 12. CENTREX TESTS

### A. Centrex Universal Console Demand Exercise Program Procedures

**12.01** Section 232-202-302 describes the use of the centrex universal console lamp and key demand exercise program as a maintenance aid in identifying and in locating faults in centrex attendant telephone consoles, centrex console control cabinets, and centrex data links associated with the No. 2B ESS.

**12.02** Improper universal console lamp operations and key signals may be caused by faults occurring in a centrex universal attendant telephone console (hereafter referred to as console), a centrex console control cabinet, the interconnecting data

link circuitry, or the No. 2B ESS central office equipment.

**12.03** When a fault becomes apparent at the attendant consoles, attempts may be made at the ESS central office to determine and to correct the faults. Data link diagnostic programs may be requested to determine if the fault is occurring in the data link circuitry. The data link diagnostic programs may be requested automatically due to repeated parity failures or they may be requested manually from the TTY. TTY messages are printed out to indicate any difficulties in the data link circuitry discovered by diagnostic routines.

**12.04** If the trouble cannot be located and corrected from the central office, it may be necessary for maintenance personnel to go to the centrex customer location to aid in determining the trouble.

**12.05** When a fault causing a trouble occurs at a centrex customer location, its cause may not be readily apparent to maintenance personnel on the customer premises. By requesting that the exercise program be performed at the ESS central office, routine exercises may be directed to the desired console (and associated equipment) to aid in locating and identifying the fault. These routines may be performed only on consoles and console controls (or trunk busy memory units) which previously have been removed from service by the proper TTY input message.

**12.06** If a request is made to initiate exercise routines and the console and console control to which they are directed have not been removed from service, the request is denied by the ESS.

**12.07** The exercise program is capable of encoding and transmitting data which attempts to operate the lamps on the consoles to all of the states to which they may normally be operated. The exercise program can also receive and analyze key signal data originating from consoles. When key signals are analyzed by the exercise program, a signal is encoded and is then transmitted back to the console to indicate to personnel at the console whether or not the proper key signal was received. Lamps or keys may be exercised either individually or in special sequences.

**12.08** When a major trouble (such as a loss of console power) occurs at the console or

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when troubles occur in the data link serving the console control cabinet, the use of the exercise routines may not be practical.

**12.09** A console and a console control unit may be returned to service at any time during the progress of a test by a TTY input message. Exercise routines which are in progress when a console is returned to service are aborted. A TTY printout indicates that the exercise has been aborted.

**12.10** Exercise routines may be requested for a console (which was previously removed from service) by an input message at the maintenance TTY or by actions by maintenance personnel at the console location. (Actions required at the console location are covered in Section 540-576-304.)

**B. Centrex Data Link and Console Demand Exercise Fault Location Procedures**

**12.11** Section 540-576-304 describes the use of centrex data link and console demand exercise routines to verify the overall operation of console and console controls located on the customer premises. The routines are part of the attendant diagnostic program and the results of the exercise routines may be used as an aid in determining fault locations.

**C. Centrex Attendant Loop Circuit (SD-2H172) and Trunk Circuit (SD-2H173) Tests**

**12.12** Centrex attendant loop circuit and trunk circuit tests should be performed in accordance with Section 232-204-501. The test consists of verification of the circuit state and scan point operation and transmission losses of the loop and trunk circuits in their various states. Furthermore, the test is to be performed on a periodic basis when a malfunction of one of the circuits is suspected.

**D. Impedance Balancing Procedures on SD-2H182 (Centrex Attendant Trunk Circuit) Arranged for 4-Wire to 2-Wire Conversion**

**12.13** The impedance balancing procedures, Section 232-208-301, describes and specifies methods of adjusting balancing networks and making balance tests in centrex offices where 4-wire via net loss circuits are switched on a 2-wire basis. In addition, this section includes the necessary procedures to

align the attendant trunk circuit to obtain a negligible bridging effect.

**13. TRUNK TESTS**

**A. Trunk Diagnostics**

**13.01** Trunk diagnostics may be performed prior to cutover, before and after growth, restart, or retrofit. Request a diagnostic of all testable trunks in the office by typing the following input message:

M TK:DGN!

**Note:** Only the following SDs can be tested, and then only if a proper TOTANI reference is made for each trunk group (2H103, 2H112, 2H144, 2H148, 2H157, 2H158, 2H174, and 2H180). SD-2H176 can also be tested but does not need a TOTANI reference.

The following output message will be printed to indicate that automatic testing of a trunk group has begun.

MR TK BGN ggg

ggg = Trunk group.

If a trunk fails the diagnostic, one of the following TTY printouts will be received.

MR TK DGN a b ggg mmm ccc dddd dddd

MR TK BLK a b ggg mmm ccc dddd dddd

The following TTY printout will be received when all trunk groups (which have diagnostics) have been diagnosed.

MR TK END

**Note:** Refer to OM-2H200 for an explanation of variable fields.

**B. Translation Check and Circuit Test**

**13.02** The translation check test on the trunks listed in Table F need only be performed if the office data translation (ODT) changed since turnover or since the last time this test was performed.

13.03 A translation check and circuit check will be performed prior to cutover, before and after growth, restart, or retrofit on the terminated trunks and the nonterminated trunks as listed in Table G.

TABLE F

## TRUNKS WITH TRANSLATION CHECKS ONLY

SD AND SELECTION NUMBER	DESCRIPTION	TERMINATION
SD-2H109-01 232-140-501	Incoming Trunk from Local Test Desk No. 14 or Local Test Cabinet No. 3; Sleeve Lead Supervision Circuit.	None
SD-2H113-01 232-139-501	Outgoing Trunk to Switchboard No. 3CL in Distant Building; Local Coin Overtime and Stuck Coin Circuit.	None
SD-2H141-01 232-141-501	Outgoing Trunk to Local Test Desk No. 14; Sleeve Lead Supervision Circuit.	None
SD-2H147-01 232-141-504	Outgoing Trunk Circuit to Repair Service Desk No. 2; High-Low Supervision.	None
SD-2H151-01 232-145-501	Outgoing Trunk Circuit, Coin Zone Dialing to SWBD No. 3CL in Distant Bldg., Polar Double Duplex Supervision.	None

TABLE G

## TRUNKS WITH TRANSLATION CHECKS AND CIRCUIT CHECKS

*Note:* See Table B of Section 232-105-302 as to what test circuits are used to test each trunk listed below.

SD AND SECTION NUMBER	DESCRIPTION	TERMINATION
SD-2H101 232-140-503	Incoming trunk circuit for local and tandem, reverse battery supervision.	Outgoing tip and ring connected through 9000 ohms.
SD-2H103 232-141-502	Outgoing trunk circuit for local and tandem, reverse battery supervision.	Outgoing tip and ring open.
SD-2H104 232-140-503	Incoming trunk circuit for local and tandem, reverse battery supervision.	Outgoing tip and ring connected through 9000 ohms.
SD-2H107 232-143-501	Outgoing trunk circuit for verification request and intercept; reverse battery, high-low supervision.	Outgoing tip and ring open.
SD-2H108 232-140-505	Incoming trunk circuit from SWBD No. 3CL in distant building, 3rd wire coin control, simplex rering signal.	Outgoing T&R terminated in 8500 ohms.
SD-2H110 232-146-501	Two-way trunk circuit for switchboard No. 3CL in distant building; reverse battery supervision; inband coin and rering signals.	Outgoing tip and ring connected through 4300 ohms.
SD-2H111 232-140-504	Incoming trunk circuit from SXS; reverse battery supervision.	Outgoing tip and ring connected through 2200 ohms (short loop) or 4300 ohms (long loop).
SD-2H112 232-146-502	Two-way trunk circuit; E&M lead supervision; MF pulsing.	Outgoing tip and ring connected through 1800 ohms, "TO" lead grounded. "TV" lead connected to -48V, "E" leads connected through 200 ohms to ground.  <i>Note:</i> Code 258C Dummy Plug must be inserted in "D" jack of the E&M ACCESS located on the front edge of the trunk test panel.
SD-2H144 232-141-503	Outgoing trunk circuit to crossbar tandem office; reverse battery, high-low supervision.	Outgoing tip connected to "TP2". Outgoing tip connected through 4300 ohms to -48V. Outgoing ring connected to ground.

TABLE G (Contd)

## TRUNKS WITH TRANSLATION CHECKS AND CIRCUIT CHECKS

SD AND SECTION NUMBER	DESCRIPTION	TERMINATION
SD-2H148 232-146-503	Two-way trunk circuit; reverse battery supervision incoming; high-low outgoing, distant office requires start pulsing signal.	Outgoing tip and ring connected through 1800 ohms.
SD-2H149 232-140-502	Incoming trunk circuit for local and tandem; reverse battery supervision; delay dial.	Outgoing tip and ring connected through 4300 ohms.
SD-2H154 232-140-504	Incoming trunk circuit from SXS; reverse battery supervision.	Outgoing tip and ring connected through 2200 ohms (short loop) or 4300 ohms (long loop).
SD-2H155 232-207-501	Dial pulse repeater circuit.	Outgoing tip and ring connector through 1800 ohms.
SD-2H157 232-206-501	Two-way long haul trunk circuit, dial pulsing; E&M lead supervision.	"BO" lead connected to "CO" lead (pins 4 and 22 on CP A293A).
SD-2H158 232-206-501	Two-way long haul trunk circuit, MF pulsing.	Outgoing tip and ring connected through 1800 ohms; "BO" lead connected to "CO" lead (pins 4 and 22 on CP A293A); "E" lead connected to ground through 200 ohms.
SD-2H174 232-209-501	Foreign exchange trunk circuit, ground start.	Outgoing tip and ring connected through 2200 ohms.
SD-2H176 232-212-501	Six-port conference circuit.	None required.
SD-2H180 232-211-501	Foreign exchange trunk circuit (long haul); supervision on "A" and "B" leads; ground start.	"A1" lead connected to "B1" lead; outgoing tip and ring connected through 900 ohms.
SD-2H186 232-141-505	Line access trunk circuit with or without reverse battery supervision.	Outgoing tip and ring connected through 2200 ohms.

**Test Procedures**

**13.04** Check the office records and record the trunk group numbers for those groups which contain the above mentioned type of trunks.

**13.05** Connect the proper termination to the trunk to be tested per paragraphs 13.02 or 13.03.

**13.06** Request a test of each trunk group by typing the following TTY input message:

M TK:INT:ggg mmm!  
ggg = Trunk group number  
mmm = Trunk member number.

System response for a successful translation check and circuit check for trunks listed in paragraph 13.03 will be as follows:

MR TK ATP a b ggg mmm

**Note:** Refer to OM-2H200 for an explanation of variable fields.

Successful translation checks on trunks in paragraph 13.02 will be indicated by the following TTY output message:

MR TK BLK a b ggg mmm eee 4000 0145

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eee 4000 0145 = Trouble number found in TLM-2H100 indicating this group has passed translation checks.

If a trunk fails, one of the following TTY printouts will be printed:

MR TK DGN a b ggg mmm ccc dddd dddd

MR TK BLK a b ggg mmm ccc dddd dddd

**Note:** Refer to the OM-2H200 for an explanation of variable fields.

**14. OFFICE ALARMS TESTS**

**14.01** The office alarms tests should be performed in accordance with Section 232-315-501. These tests may be performed prior to cutover,

before and after growth, restart, retrofit, and/or periodically.

**15. EMERGENCY ACTION AND ERROR RECOVERY**

**15.01** The following procedures verify the emergency action and error recovery functions of the system which are not verified by automatic diagnostics.

**Caution:** *These procedures are potentially hazardous to call processing and should only be performed during a low traffic period.*

**Note:** Some messages may not be printed. These messages will be indicated by an asterisk (\*).

**A. Test of System Emergency Manual Control Section of the System Status Panel (SSP)**

STEP	ACTION	VERIFICATION
1a	If the system is not in the update mode— At maintenance TTY— Type in: RST:CU!	At maintenance TTY— System response: DGN CU 1 COMPL ATP UPD OMAS COMPL RST CU COMPL
2	Type in: MON:ST aa;RDT LAMPS! Where aa = The address of the System Status Panel Map (SSPMAP). RDT LAMPS = Direct the results to the DISPLAY BUFFER.	At DISPLAY BUFFER— LEDs 0 and 6 extinguished.
3	At SYSTEM INITIALIZATION section of SSP— Depress ENABLE key.	At SYSTEM INITIALIZATION section of SSP— ENABLE lamp lighted. At ALARM CONTROL section— ALARM RELEASE lamp lighted. Major audible alarm sounds. At maintenance TTY— System response: REPT ERR SSP KEY 100000 At DISPLAY BUFFER— LED 0 lighted.
4	At SYSTEM INITIALIZATION section— Depress MEMORY RELOAD key.	At SYSTEM INITIALIZATION section— MEMORY RELOAD lamp lighted. At DISPLAY BUFFER— LED 6 lighted.

STEP	ACTION	VERIFICATION
5	At SYSTEM INITIALIZATION section— Depress MEMORY RELOAD key.	At SYSTEM INITIALIZATION section— MEMORY RELOAD lamp extinguished. At DISPLAY BUFFER— LED 6 extinguished.
6	At maintenance TTY— Type in: STOP:UTIL!	At maintenance TTY— System response: OK
7	Type in: MON:ST aa;RDT LAMPS! Where aa = The address of SSPMAP+1. RDT LAMPS = Direct the results to the DISPLAY BUFFER.	At DISPLAY BUFFER— LEDs 13, 14, and 15 extinguished.
8	At SYSTEM INITIALIZATION section— Depress STABLE CALLS key.  <b>Note:</b> Proceed immediately to Step 9.	At SYSTEM INITIALIZATION section— STABLE CALLS lamp lighted. At DISPLAY BUFFER— LED 13 lighted.
9	At SYSTEM INITIALIZATION section— Depress STABLE CALLS key.	At SYSTEM INITIALIZATION section— STABLE CALLS lamp extinguished. At DISPLAY BUFFER— LED 13 extinguished.
10	At SYSTEM INITIALIZATION section— Depress RECENT CHANGE key.  <b>Note:</b> Proceed immediately to Step 11.	At SYSTEM INITIALIZATION section— RECENT CHANGE lamp lighted. At DISPLAY BUFFER— LED 14 lighted.
11	At SYSTEM INITIALIZATION section— Depress RECENT CHANGE key.	At SYSTEM INITIALIZATION section— RECENT CHANGE lamp extinguished. At DISPLAY BUFFER— LED 14 extinguished.
12	At SYSTEM INITIALIZATION section— Depress BACKDT OFFICE DATA key.  <b>Note:</b> Proceed immediately to Step 13.	At SYSTEM INITIALIZATION section— BACKDT OFFICE DATA lamp lighted. At DISPLAY BUFFER— LED 15 lighted. "Misc" LED lighted.
13	At SYSTEM INITIALIZATION section— Depress BACKDT OFFICE DATA key.	At SYSTEM INITIALIZATION section— BACKDT OFFICE DATA lamp extinguished. At DISPLAY BUFFER— LED 15 extinguished. "Misc" LED extinguished.
14	At SYSTEM INITIALIZATION section— Depress INIT EXECUTE key.	At SYSTEM INITIALIZATION section— INIT EXECUTE lamp may light momentarily. ENABLE lamp extinguished. At ALARMS section— SERVICE LOSS LED lighted.

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STEP	ACTION	VERIFICATION
		System goes out of the update mode momentarily. At maintenance TTY— System response: RECOVERY CU INIT a bbbbbb ccccc MI AM INL fg hi* MI SY CLR EAU ccc ddd eee MI AM DGN* MA AU RLF ATP MI SY MIS a* MI SY PTO a* REPT ERR CLR* RST CU COMPL UPD OMAS COMPL At ALARMS section— SERVICE LOSS LED extinguished.
15	At ALARM CONTROL section— Depress ALARM RELEASE key.	Major alarm silenced.
16	Type in: MON:ST aa;RDT LAMPS! Where aa = The address of SSPMAP+1. RDT LAMPS = Direct the results to the DISPLAY BUFFER.	At DISPLAY BUFFER— LED 8 extinguished.
17	At SYSTEM EMERGENCY MANUAL CONTROL section— Depress EMER LINE TRFR key.	At SYSTEM EMERGENCY MANUAL CONTROL section— EMER LINE TRFR lamp lighted. At ALARMS section— MAJOR LED lighted. At ALARM CONTROL section— ALARM RELEASE lamp lighted. Major audible alarm sounds. At maintenance TTY— System response: REPT ERR SSP KEY 000001 At DISPLAY BUFFER— LED 8 lighted.
18	At SYSTEM EMERGENCY MANUAL CONTROL section— Depress EMER LINE TRFR key.	At SYSTEM EMERGENCY MANUAL CONTROL section— EMER LINE TRFR lamp extinguished. At DISPLAY BUFFER— LED 8 extinguished.
19	At ALARM CONTROL section— Depress ALARM RELEASE key.	At ALARM CONTROL section— ALARM RELEASE lamp extinguished. Major alarm silenced.
20	At TTY— Type in: SW:CU!	At TTY— System response: REPT SW CU a bbbbbb

STEP	ACTION	VERIFICATION
21	Type in: STOP UTIL!	At maintenance TTY— System response: OK
22	Repeat Steps 1 through 21 <i>once</i> with the current CU on-line.	
<b>B. PU Recovery (Network and Miscellaneous Frames)</b>		
15.02	The following should be done while performing the PU recovery procedure.	(c) Watch for any unusual conditions.  (d) After each step, type the following input message: M PU:SI!
	(a) Monitor TTY printouts carefully.	<b>Note:</b> Some messages may not be printed. These messages will be indicated by an asterisk (*).
	(b) Mark on printout which step was performed.	

**Preparation (PU Recovery—CU 0 Active)**

STEP	ACTION	VERIFICATION
1a	If CU 0 is not in service, type the following input message: RST:CU!	TTY output messages printout: RST CU COMPL UPD OMAS COMPL
2a	Type input message: SW:CU!	TTY output messages printed: OK REPT SW CU a bbbbbb
3	Type input message: M PU:SI!	TTY output messages printed: MR AD SI jk 1 bbbbbb ccccc dddddd eeeee* MR AL SI fg hi oooooo oooooo oooooo oooooo* MR LS SI bbbbbb ccccc dddddd eeeee* MR TS SI bbbbbb ccccc* MR NW SI bbbbbb ccccc* MR DS SI bbbbbb ccccc* MR RA SIA 00bbbb 00cccc 00dddd 00eeee* MR RT SI 0bb000 ccccc dddddd* MR AM SI fg hi sss tuv* MR SN COL sczyde mmmmmm sczyde mmmmm* MR SI ACC cxzyde cxzyde cxzyde* MR LK AOS ff tcps* MR LK BOS ff pcbg* MR LK COS ff mgo* MR LK JOS ff olg* MR LS MSK cxzyrr* MR SI ADR cxzyde cxzyde cxzyde cxzyde* MR LK END
4	Connect a test phone to each network.	

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
	<b><i>Removing All Odd Controllers, Off-Line AMA Transports, RA Channels or Off-Line RT Plants</i></b>	
5	At TTY, remove odd controller from service of PU frame under test or off-line AMA transports, RA channel, or off-line RT plants by one of the following input messages: M NW:RMV:fg h-! M MS:RMV:fg h-! M US:RMV:fg h-! M DS:RMV:fg h-! M AM:RMV:fg h-! M RA:RMV:fg h-! M RT:RMV:fg h-!	One of the following output messages printed: MR LS RMV fg hi c MR NW RMV fg hi MR MS RMV fg hi MR US RMV fg hi MR DS RMV fg hi MR AM RMV fg hi MR RA RMV fg hi MR RT RMV fg hi
6	At those PU frames under test equipped with frame control— Depress FRAME CONTROL OFF-1 key.	At PU frame control— OS-1 lamp lighted.
7	Type the following input message: M PU:SI!	TTY status messages follow for PUs which have at least one controller, transport, channel or plant out of service.
8	Repeat Steps 5 through 7 for each frame of each PU type.	
9	Generate one intraoffice and one interoffice call from each network test phone.	Calls completed successfully.

***Restoring All Odd Controllers, Off-Line AMA Transports, RA Channels or Off-Line RT Plants***

10	At PU frames equipped with frame control— Depress FRAME CONTROL NOR key.	At PU frame control— OS-I lamp extinguished.
11	At TTY, restore PU controller, AMA transport, RA channel or RT plant to service by one of the following input messages: M NW:RST:fg h-! M MS:RST:fg h-! M US:RST:fg h-! M DS:RST:fg h-! M AM:RST:fg h-! M RA:RST:fg h-! M RT:RST:fg h-!	One or more of the following output messages printed: MR LS DGN fg hi c ATP MR LS RST fg hi c MR MS DGN fg hi ATP MR MS RST fg hi MR NW DGN fg hi ATP MR NW RST fg hi MR US DGN fg hi ATP MR US RST fg hi MR DS DGN fg hi ATP MR DS RST fg hi MR AM DGN fg hi ATP MR AM RST fg hi MR RA DGN fg - ATP

STEP	ACTION	VERIFICATION
		MR RA RST fg hi MR RT DGN fg hi ATP MR RT RST fg hi
12	Repeat Steps 10 and 11 for each remaining PU frame.	
13	Restore all equipment to service from the TTY.	
14	Type the following TTY input message: M PU:SI!	TTY output messages printed: MR AD SI jk 1 bbbbbb cccccc dddddd eeeee* MR AL SI fg hi oooooo oooooo oooooo oooooo* MR LS SI bbbbbb cccccc dddddd eeeee* MR TS SI bbbbbb cccccc* MR NW SI bbbbbb cccccc* MR DS SI bbbbbb cccccc* MR RA SIA 00bbbb 00cccc 00dddd 00eeee* MR RT SI 0bb000 cccccc dddddd* MR AM SI fg hi sss tuv* MR SN COL sczyde mmmmmm sczyde mmmmm* MR SI ACC cxzyde cxzyde cxzyde* MR LK AOS ff teps* MR LK BOS ff pcbg* MR LK COS ff mgo* MR LK JOS ff olg* MR LS MSK cxzyrr* MR SI ADR cxzyde cxzyde cxzyde cxzyde* MR LK END

**Preparation (PU Recovery—CU 1 Active)**

15	Type input message: SW:CU	TTY output messages printed: OK REPT SW CU a bbbb
16	Type input message: M PU:SI!	TTY output message printed: MR AD SI jk 1 bbbbbb cccccc dddddd eeeee* MR AL SI fg hl oooooo oooooo oooooo oooooo* MR LS SI bbbbbb cccccc dddddd eeeee* MR TS SI bbbbbb cccccc* MR NW SI bbbbbb cccccc* MR DS SI bbbbbb cccccc* MR RA SIA 00bbbb 00cccc 00dddd 00eeee* MR RT SI 0bb000 cccccc dddddd* MR AM SI fg hl sss tuv* MR SN COL sczyde mmmmmm sczyde mmmmmm* MR SI ACC cxzyde cxzyde cxzyde cxzyde* MR LK AOS ff teps* MR LK BOS ff pcbg* MR LK COS ff mgo*

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
		MR LK JOS ff olg* MR LS MSK cxzyrr* MR SI ADR cxzyde cxzyde cxzyde cxzyde* MR LK END
17	Repeat Steps 5 through 14 with CU 1 on-line.	
18	Disconnect test phone from each network.	
19	Change AMA tape in accordance with Section 232-112-301 noting reason and time for change.	
20	Switch AMA s.	

***Removing All Even Controllers, Off-Line AMA Transports, RA Channels, or Off-Line RT Plants***

21	At TTY remove even controller from service of PU frame under test or off-line AMA transport, RA channel or off-line RT plant by one of the input messages in Step 5.	
22	At those PU frames equipped with frame control— Depress FRAME CONTROL OFF-0 key.	At PU frame control— OS-0 lamp lighted.
23	Type the following TTY input message: M PU:SI!	TTY status messages follow for PUs which have at least one controller transport channel or plant out of service.
24	Repeat Steps 21 through 23 for each frame of each PU type.	
25	Generate one intraoffice and one interoffice call from each network test phone.	Call completed successfully.

***Restoring All Even Controllers, Off-Line AMA Transports, RA Channel, or Off-Line RT Plants***

26	At those PU frames equipped with frame control— Depress FRAME CONTROL NOR key.	At PU frame control— OS-0 lamp extinguished.
27	At TTY, restore PU controller, AMA transport, RA channel, or RT plant to service by one of the input messages in Step 11.	
28	Repeat Steps 26 and 27 for each remaining PU frame.	

STEP	ACTION	VERIFICATION
29	Restore all equipment to service from the TTY.	
30	Type the following TTY input message: M PU:SI!	TTY output messages printed: MR AD SI jk 1 bbbbbb cccccc dddddd eeeee* MR AL SI fg hi oooooo oooooo oooooo oooooo* MR LS SI bbbbbb cccccc dddddd eeeee* MR TS SI bbbbbb cccccc* MR NW SI bbbbbb cccccc* MR DS SI bbbbbb cccccc* MR RA SIA 00bbbb 00cccc 00dddd 00eeee* MR RT SIA 0bb000 cccccc dddddd* MR AM SI fg hi sss tuv* MR SN COL sczyde mmmmmm sczyde mmmmm* MR SI ACC cxzyde cxzyde cxzyde cxzyde* MR LK AOS ff teps* MR LK BOS ff pcbg* MR LK COS ff mgo* MR LK JOS ff olg* MR LS MSK cxzyrr* MR SI ADR cxzyde cxzyde cxzyde cszyde* MR LK END
31	Repeat Steps 15 through 19.	

### C. Control Unit Force Verification

**Caution:** *This test is potentially hazardous to call processing and should only be performed during a low traffic period.*

1	Ensure that the CUs are in update.	
2	At TTY— Perform two CU switches by typing in twice: SW:CU!	System response: OK REPT SW CU
3a	If CU 1 is active, type in: SW:CU!	Same as Step 2.
4	At FORCE CU ACTIVE section of SSP— Depress SELECT 0 and FORCE keys.	At FORCE CU ACTIVE section of SSP— SELECT 0 and FORCE lamps lighted. UNAVAILABLE LED of CU 1 lighted. At maintenance TTY— System response: REPT CU STAT UAV At SYSTEM STATUS AND CONTROL section— MANUAL FORCED LED lighted.

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STEP	ACTION	VERIFICATION
5	At maintenance TTY— Type in: SW:CU!	At maintenance TTY— System response: RL CU 0 remains active.
6	At FORCE CU ACTIVE section— Depress SELECT 0 and FORCE keys.	At FORCE CU ACTIVE section— SELECT 0 and FORCE lamps extinguished. STANDBY LED of CU 1 lighted. UNAVAILABLE LED of CU 1 extinguished. At maintenance TTY— System response: REPT CU STAT AVL At SYSTEM STATUS AND CONTROL section— MANUAL FORCED LED extinguished.
7	At maintenance TTY— Type in: SW:CU!	At maintenance TTY— System response: OK REPT SW CU CU 1 is active.
8	At FORCE CU ACTIVE section— Depress SELECT 1 and FORCE keys.	At FORCE CU ACTIVE section— SELECT 1 and FORCE lamps lighted. UNAVAILABLE LED of CU 0 lighted. At maintenance TTY— System response: REPT CU STAT UAV At SYSTEM STATUS AND CONTROL section— MANUAL FORCED LED lighted.
9	At maintenance TTY— Type in: SW:CU!	At maintenance TTY— System response: RL CU 1 remains active.
10	At FORCE CU ACTIVE section— Depress SELECT 1 and FORCE keys.	At FORCE CU ACTIVE section— SELECT 1 and FORCE lamps extinguished. STANDBY LED of CU 0 lighted. UNAVAILABLE LED of CU 0 extinguished. At maintenance TTY— System response: REPT CU STAT AVL At SYSTEM STATUS AND CONTROL section— MANUAL FORCED LED extinguished.
11	At maintenance TTY— Type in: SW:CU!	At maintenance TTY— System response: OK REPT SW CU CU 0 is active.