



I-3015

ROUTINE MAINTENANCE OPERATIONS

FOR

ITEC EMS-1 SWITCHING EQUIPMENT

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A. GENERAL

This document specifies general maintenance operations required for ITEC EMS-1 switching systems.

Maintenance practices for EMS-1 are similar to electro-mechanical SXS. The principal difference is, electronic EMS-1 does not require periodic cleaning, lubricating or adjustment.

Maintenance operations on EMS-1 consists of periodically verifying that the equipment is operating properly and replacing any circuit cards found to be malfunctioning. Circuit Card repair is not normally performed in the Central office.

SXS maintenance personnel can be quickly trained to maintain EMS-1. Their present knowledge of stage by stage switching operation applies to EMS-1, because, calls are processed in the same sequence as SXS, the circuits perform the same functions, and the LEDs (Light Emitting Diodes) duplicate the relay operations the personnel are accustomed to observing.

EMS-1 utilizes many LED's and displays to inform maintenance personnel of equipment status and call progress. Maintenance personnel will soon learn to determine if the equipment is operating correctly by observing the LEDs during normal call processing. SXS maintenance personnel can apply their SXS training and experience to EMS-1 with only a short familiarization program.

It is very important to be sure a replacement circuit card has been strapped properly before installing. If the defective circuit card was known to have performed properly before failing, use it as a pattern.

It is not necessary to disconnect power before removing circuit cards, however, circuit cards should not be removed unless absolutely necessary.

Refer to the applicable equipment Technical Instructions for more detailed information.

B. RECOMMENDED MAINTENANCE ROUTINES

1. DAILY

Verify proper operation each morning of:

Ringing Voltage
Ring Back Tone
Dial Tone
Busy Tone
Battery Voltage -48Vdc
Metering Battery Voltage +48Vdc

2. WEEKLY

a. **Fuse Alarms** - Insert a blown GMT fuse into a spare fuse position of the fuse panel mounted in the bay at the end of each row. Observe that the major alarm lamps light on the bay, the aisle alarm and the master alarm panel. The major alarm bell should sound.

It is not recommended that fuses in individual circuit cards be tested for alarm, as damage may result from handling cards. A test at 6 mos. intervals can be performed from the backplanes if deemed necessary.

b. **Switching Circuit Cards** - Make a walk-through of the equipment room and observe LEDs on all cards for any unusual indications. Also, any cards that have busy switches operated should be checked and returned to service or replaced.

c. **Trunks** - Using a hand test telephone, plug into the face plate jack, place a call on every outgoing trunk to a test number in the distant office to verify operation of the trunk, the cable and the incoming selector in the distant office.

3. MONTHLY

a. **Test Finder & Allotter Operations** - The purpose of this routine test is to verify that all linefinders are working and that the Allotter is properly rotating successive calls through all finders.

1. Operate the MON switch on the Allotter to turn on the Display (Display turns off after 30 minutes).
2. Plug a hand test telephone into the line test jack (line 96) on the Finder test card.

b. **Selector Test** - Using a hand test telephone, routine Test each selector to verify it is performing properly. Tests to be performed are:

1. Turn on Selector Test Card display by operating "STEP" switch to display the number of the Selector to be tested.
2. Plug the test telephone into the jack on the faceplate, listen for Dial Tone if a 1st Selector.
3. Dial each working code or level while observing the LED's for proper cut-through operation. If a selector drops out on cut-through, determine if it is because the selector is bad or if an outlet is bad. Try different levels and if only one level drops out, test the outlets of that level using the "force" feature of the Selector Test card.

NOTE: When testing allow up to 500 ms. for the Selector to drop out before disconnecting.

4. Selector LED functions

OS (Out of Service) - Indicates the OS switch is operated.

SZ (Seize) - Same as dialing or A relay. Follows dial pulses.

BY (Busy) - Same as hold or B relay.

CT (Cut Through) - Indicates the selector is cut through to an outlet.

BT (Busy Tone) - Indicates all outlets are busy in the level dialed.

FA (Fuse Alarm) - Indicates the fuse on the circuit card is blown.

c. **Connectors** - Routine test each Connector to verify it is performing properly. Use a hand test telephone and the connector test card display.

Tests to be performed are:

1. Turn on test display by operating the "STEP" switch.
2. Plug test telephone into the jack on the faceplate. Dial 99 test number. Observe that Connector test display reads 99. Listen for ring back tone, answer & talk. Observe LEDs for proper indications. Listen for any unusual noise in transmission path. Disconnect.

3. Go off-hook and obtain Dial Tone on each Finder that is not busy. Observe that each successive seizure steps to the next available Finder. Observe that the Allotter Display properly displays the Finder used and the 96 test line number.

4. Function of Line Module LED's by Circuit

Line Card

L1 thru L8 (Line 1 thru 8) - When illuminated indicate line busy from either an originating or terminating call. Also, a line LED flashes at 240 IPM to show delayed dial tone or will flash at 60 IPM to show a line in lockout if lockout is equipped.

REQ (Request) - Indicates a line is requesting the Allotter to connect a Finder. (Flashes on briefly during normal operation, stays on if a block condition exists).

PS (Permanent Signal) - On lockout line circuits, shows a line has been in lockout for 40 minutes or more.

FA (Fuse Alarm) - Indicates a blown fuse on the card. (Line card has 2 fuses).

Finder

OS (Out of Service) - Shows that the busy switch has been operated to remove the Finder from service.

BY (Busy) - Shows the Finder is in use.

NEXT - Indicates that the Allotter has preselected this Finder to be used by the next line to request service.

FA (Fuse Alarm) - Indicates a blown fuse on the Finder Card.

Allotter

AFB (All Finders Busy) - Indicates that all Finders are busy, either from use or manually busied out.

MIN (Minor) - Indicates that a Finder is selected, but the Allotter was unable to establish a connection in 1 second.

MAJ (Major) - Indicates that Idle Finders are available but the Allotter is unable to select one for use in 50 seconds.

FA (Fuse Alarm) - Indicates a blown fuse on the Allotter Card.

3. Dial a second call to a busy number. Listen for Busy Tone, Observe LEDs. Disconnect.

4. Connector LED functions

OS (Out of Service) - Indicates OS switch is operated.

SZ (Seize) - Same as dialing or A relay. Follows dial pulses.

BY (Busy) - Same as hold or B relay.

CT (Cut Through) - Indicates matrix is connected.

RING (Ringing) - Indicates ringing is enabled.

ANS (ANSWER) - Follows supervision of called party.

CONN (Connect) - Same as ring trip relay operation.

BT (Busy Tone) - Indicates call went to busy.

RC (Revertive Call) - Indicates call went to revertive call (only used when revertive call by directory number option is equipped). Not used outside North America.

PBX (PBX Hunt) - Indicates that the connector terminated to a subscriber number other than the one dialed due to the PBX rotary hunt function operating.

FA (Fuse Alarm) - Indicates a fuse on the circuit card is blown.

4. FOUR MONTHS INTERVAL

Metering Control Circuits - Test each circuit for meter pulse (+48Vdc) on answer and for timed pulses after answer on trunk routes.

5. YEARLY

- a. Check all power cable connectors for tightness including those on the power panel & the battery straps.
- b. Ring Supply - Test for proper voltage and frequency.
- c. Tone Supply - Test for proper level.
- d. Test Desk - Calibrate meter.

6. AS REQUIRED

PBX Hunting- When customer complaints indicate that PBX hunting may not be functioning properly, and each time a new PBX group is assigned, test each PBX card in the number group.

Refer to I-2130 for instructions to check all numbers stored in the PBX control memory.

