

LONG-HAUL MICROWAVE RADIO RELAY CONTROL OFFICE RESPONSIBILITIES

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1. GENERAL

1.01 This section:

- (a) Specifies the operating and maintenance responsibilities of offices associated with the control of long-haul microwave radio facilities
- (b) Provides a procedure for releases of radio channels.

1.02 It is reissued to revise the release procedure for the various types of switching systems and to change the exhibit designations to charts.

1.03 A long-haul microwave radio facility is generally defined as a hetrodyne system consisting of one or more multiunit switching sections in a radio route between a frequency modulation (FM) transmitter IN and an FM receiver OUT, eg, TD2, TD3, TH, L, CM, etc.

1.04 Control offices are selected as outlined in Section 660-095-916PT. Control office responsibilities covered here involve the following types of offices:

- Radio Section Control Office
- Switching Section Maintenance Control Office
- Maintenance Center Office
- Surveillance and Control Center (SCOTS/TASC)

2. BASIC REQUIREMENTS FOR CONTROL OFFICES

2.01 Radio control office assignments are based on the ability of an office to fulfill maintenance or operational control functions.

2.02 The responsibilities of maintenance control cannot be relinquished by the control office, regardless of its hours of coverage.

3. RESPONSIBILITIES

3.01 Each control office must assume full responsibility for the proper operation and performance of its assigned section or sections, within Bell System Practice (BSP) requirements. This includes the proper operation and performance of the associated protection switching system. A method

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for keeping fully informed and maintaining proper records of the section performance must be available, and appropriate action must be taken whenever indicators demonstrate substandard performance.

3.02 The control office sectionalizes and directs the clearance of trouble which impairs proper operation of the controlled facility.

Radio Facility Control Office

3.03 The Radio Facility Control Office:

- (a) Maintains continuity and correct transmission levels.
- (b) Schedules and performs prescribed periodic overall tests. On video facilities, the radio facility control office is responsible for scheduling and performing these transmission tests on facilities connecting within the controlled radio section, including sidelegs.
- (c) Localizes troubles to switching sections, refers troubles to the switching section maintenance control office, and follows progress closely for prompt clearance.
- (d) Keeps the Surveillance and Control Center (SCOTS/TASC) advised of hazardous conditions, failures, or standing troubles which might affect the operation of a radio/broadband facility.
- (e) Performs initial overall tests on new facilities, coordinates these tests with the Switching Section Maintenance Control Offices in the controlled radio section, and also advises Switching Section Maintenance Control Office and the SCOTS/TASC center of the service assigned and the effective service date.
- (f) Notifies the Pacific Area Regional Operations Control Center (PAROCC) when new protection channels are placed in service.
- (g) Cooperates with Television Section and Message Unit Radio (MUR) Control Offices and the Facilities Management Center-Television (FMC-TV) in locating trouble and when establishing new message or video channels in the controlled territory.

(h) Maintains appropriate records of troubles and conditions which might affect operation of the radio facility.

(i) Analyzes reports from service control groups to determine if unsatisfactory radio conditions are causing service difficulties, and initiates corrective action.

Switching Section Maintenance Control Office

3.06 The Switching Section Maintenance Control Office:

- (a) Maintains radio channels in controlled switch section within required transmission performance requirements to ensure that the message, data, and video services being carried by them will not be degraded.
- (b) Keeps the Surveillance and Control Center (SCOTS/TASC) advised of any hazardous conditions, failures, or standing troubles which might affect the operation of a radio/broadband facility.
- (c) Assists the Radio Facility Control Office and the Maintenance Center Offices, as requested.
- (d) Schedules and executes prescribed periodic overall tests in the controlled section.
- (e) Localizes switch section troubles and closely follows progress for prompt clearance on all channels. Personnel, therefore, should have a full understanding of overall system operation and be aware of those conditions which can contribute to service impairments.
- (f) Performs initial overall tests on new radio channels.
- (g) Analyzes automatic protection switching registers as indicators of poor performing channels within the controlled section, and takes necessary corrective action. On some switching systems, registers are located at the transmit end. Obtain readings on these systems at intervals indicated in switching system instructions or by channel performance.

- (h) Ensures the proper operation of the automatic protection switching system. This includes the use of exerciser and noise detectors and making sure that the voice frequency (VF) line facilities are maintained to meet BSP requirements. Reports irregularities on the VF line to the control office for clearance.
- (i) Notifies maintenance centers of the effective service date of new facilities.

Note: Whenever it is necessary to connect together channels in adjacent automatic switch sections for establishing a special radio channel for service, the facility becomes a radio section. Radio section receive end control functions are temporarily in effect, according to responsibilities in 3.03.

Maintenance Center Office

3.07 The Maintenance Center Office:

- (a) Performs preventive maintenance routines and clears troubles.
- (b) Receives reports on conditions concerning or relating to stations in the maintenance territory.
- (c) Keeps the switching section maintenance control and the Surveillance and Control Center (SCOTS/TASC) Offices advised of any hazardous conditions, failures, or standing troubles which might affect the operation of a radio/broadband facility.
- (d) Must be capable of assisting in locating system troubles that may exist, in addition to maintaining the assigned radio equipment in the section. Personnel, therefore, should have a full understanding of overall system operation and be aware of those conditions which can contribute to service impairments.
- (e) Acts promptly to clear any reported trouble or to take precautionary measures whenever there is an indication of a threatening condition. Any switching section maintenance control office or Surveillance and Control Center (SCOTS/TASC) reporting a faulty condition must be informed at reasonable intervals about the progress being made to clear the trouble. Some maintenance jobs, which are the basic responsibility of the maintenance center, may be performed by the surveillance and control center when they can best be done by that office, eg, initiating engine runs.
- (f) Plans their work on radio repeater equipment so that emergency restoration can be accomplished as soon as possible. Radio stations should not be left unattended while channels are not available for service. If this cannot be avoided, the surveillance and control center must be notified before leaving and immediately upon return. *This time must be kept to a minimum.*
- (g) Provides accurate written data to the Surveillance and Control Center (SCOTS/TASC) describing the status and command assignments at the remote location. This would include any information pertaining to facilities changes and office layout arrangements. This information must be made available as much in advance of changes as possible to allow for computer data base updating.
- (h) Verifies the accuracy of the status and commands connected to the remote station against what is displayed at the Surveillance and Control Center (SCOTS/TASC) at turn-up and at scheduled intervals, as applicable.
- (i) Provides local written instructions to the Surveillance and Control Center (SCOTS/TASC) for operations that require special handling by the surveillance center.
- (j) Makes portable microwave repeater available to the surveillance and control center for use when testing TD radio routes and when bay out-of-service time is expected to be *30 minutes or more.*
- (k) Provides accurate, updated written call lists to the Surveillance and Control Center (SCOTS/TASC) for each remote station. These lists would include but not be limited to the following:
- Supervisors
 - Police

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- Fire Department
- Power companies
- Medical, including doctor, hospital, and ambulance

Surveillance and Control Center (SCOTS/TASC)

3.08 SCOTS/TASC Center personnel should have a comprehensive understanding of the alarm system. They should understand the various alarm conditions that can occur at a radio station, as well as the results and the action required.

3.09 The Surveillance and Control Center (SCOTS/TASC):

- Provides full-time surveillance, responds to all alarms promptly, and analyzes these alarms to provide a single point with the overall picture of radio/broadband network status within its surveillance area.
- Takes appropriate action necessary to maintain continuity of service on the radio/broadband network.
- Provides operational control of all receive switching sections within its surveillance area. This includes controlling all receive switches on a remote basis and granting channel releases for routine maintenance or trouble clearance as required by the switching section maintenance control office or maintenance center office.

Exception: The SCOTS/TASC Center may grant a blanket release on the protection channel and delegate switching operations to the switch section maintenance control office for overall channel testing. This type of release should be granted only for end-to-end switch section testing, not for midpoint trouble clearance. When this is done, the switch section maintenance control office assumes all responsibilities, including the one described in item 3.09 (d).

- Assures that all equipment attached to a channel for test purposes on a channel released by the SCOTS/TASC Center is removed from that channel prior to putting it back into service. This will be accomplished by both alarm

indications on that switch section and verbal communication with the people involved in the release.

- Makes every effort to find and refer troubles concerning service failures to the switch section involved.

- Follows the steps listed below in the event of a service failure:

- Notifies the PAROCC of the facility failure, the time of the failure, and if a protection channel is being used to restore service.
- Pursues and locates the trouble. This will be accomplished by alarm indications and communications with other surveillance centers and switch section maintenance control offices.
- Notifies the MUR receive terminal office after the trouble has been located.
- Initiates trouble tickets on all failures and keeps a log of events concerning each failure.
- Provides documentation concerning failures, upon request.
- Establishes restoration plans pertaining to the SCOTS area and acts as the sole contact for PAROCC.
- Establishes plans, operates all facility switches, and coordinates with personnel at manned locations for all work associated with occasional TV feeds.
- At the discretion of the SCOTS/TASC manager, returns control to the standby alarm centers in the event of a SCOTS/TASC computer failure.
- Notifies the responsible maintenance supervisor (first level) in charge of the maintenance area where the alarm originated for trouble referral. If the maintenance supervisor is unavailable, the SCOTS/TASC Center refers to the management callout list as provided by the maintenance center. The SCOTS/TASC Center closely follows the progress for prompt clearance of troubles or conditions hazardous to service.

- (k) Uses the latest available callout list for notification of:
- Supervisors
 - Police
 - Fire Department
 - Power companies
 - Medical, including doctor, hospital, and ambulance
- (l) Initiates trouble tickets on:
- (1) All events (alarm conditions) coming into SCOTS, with the exception of those that are brought in by routine maintenance activities.
 - (2) Conditions existing in a station that will not be cleared by the end of the day (power plant and support equipment awaiting parts for repairs, etc).
- (m) Takes trip tickets between the hours of 1630 and 0800 during the regular work week, 24 hours per day on weekends and holidays, and when maintenance centers are unmanned. The SCOTS/TASC Center takes no trip tickets between the hours of 0800 to 1630 on regular working days (Monday through Friday), unless a hazardous condition exists or it is required by local working practice or agreement.
- (n) Analyzes multiple alarm indications involving more than one maintenance territory, determines the location of the failure, and notifies the supervisor in charge of that maintenance area. If location of the failure cannot be determined, the surveillance and control center notifies supervisors of both maintenance areas involved to isolate the trouble.
- (o) Responds to an AC power failure alarm condition as follows:
- (1) Notifies the power company responsible for the station involved 30 minutes after the power failure occurs.
 - (2) In the event of a power failure without an engine start, provides immediate notification to the supervisor responsible for that station and to the serving power company.
- (3) Notifies the power company at the time of restoral.
- (4) Keeps a record on all power failures.
- (5) Notifies the power company again if it is determined that power will be off for over 4 hours, or engine run time exceeds 4 hours, then notifies the supervisor responsible for the station.
- (p) Responds to open door, no log in alarm condition as follows:
- (1) Tries to establish communications with authorized personnel in the station.
 - (2) Notifies the supervisor responsible for the station involved, or refers to the management callout list as provided by the maintenance center.
 - (3) Notifies the Company Security group within 10 minutes after receiving the open door alarm, then notifies the local law enforcement agency for that station maintenance territory within 30 minutes, unless instructed otherwise by the Company Security group or the responsible maintenance supervisor.
 - (4) Starts a trouble ticket and keeps a log of events concerning the alarm.
- (q) Responds to obstruction lighting alarm conditions as follows:
- (1) Maintains the logs required by the FAA on obstruction lighting; makes a log entry when an alarm occurs.
 - (2) Immediately notifies the supervisor responsible for the station and the FAA, per FCC rules and regulations (Part 17), upon failure of obstruction lighting and again on restoral.
- (r) Performs routine engine runs remotely as requested by the maintenance center. Any deviations noted during the run will be referred to the maintenance area involved, and a trouble ticket will be initiated by the SCOTS/TASC

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Center. Engine runs at main terminal offices will be performed during the time the offices are manned.

(s) Updates the C1 and E2 centers with changes in alarms or status bits for backup of the SCOTS.

(t) Calls the Maintenance Center Office to make arrangements for the use of a portable microwave repeater (where available) when testing TD radio routes before giving a channel release when the bay out-of-service time is expected to be *30 minutes or more*.

4. RADIO CHANNEL RELEASE PROCEDURE

4.01 During the release procedure, it is important to maintain continuous communications between the radio station requesting the release and the Surveillance and Control Center (SCOTS/TASC). This will ensure prompt correction of any problems that may occur.

4.02 Requests for channel releases shall be referred to by the R unit number — the only authorized designation of radio channel equipment in a radio switch section. Each time the R unit number is passed between individuals, it shall be repeated clearly to be sure it is properly understood.

4.03 On radio routes carrying television service, no switching of a channel assigned to a television service shall be done without the concurrence of the Television Operating Center (TOC). The Surveillance and Control Centers (SCOTS/TASC) are responsible for keeping a record of the channels which carry a television service.

4.04 Generally, this release procedure will not require the use of circuit assurance monitoring for normal routine maintenance. However, during very unusual circumstances or activities, circuit assurance monitoring may be used.

4.05 The craftsperson at the radio station requests a release of a radio channel, by R unit number, from the Surveillance and Control Center (SCOTS/TASC).

4.06 The Surveillance and Control Center (SCOTS/TASC) will arrange for a manual switch of the requested channel to protection and will verify its completion.

4.07 The craftsperson at the radio station will remove the radio frequency (RF) monitor cord or operate alarm power circuit breaker. The surveillance and control center will verify that the alarm received is on the channel to be released.

Note: Leave the RF monitor cord out to prevent recurring alarms. Replace it when the alarm sensitivity test is made or when the channel tests have been completed and the alarm center is requested to scan the station.

4.08 The craftsperson at the radio station will:

(a) Open the intermediate frequency (IF) input to the main amplifier at auxiliary TD, TH-3, TN-1 stations or the IF input to the modulator at main TD, TH-3, TN-1 stations.

(b) Remove the cord from the transmitter modulator input at TH-1 stations. The alarm center shall check the next station to see that an RF power output alarm is *not* received. A receive alarm should be received in 45 seconds.

Note: If an RF power output alarm is received from the next station, put the channel together immediately. Dispatch a person to the next station to clear the IF resupply trouble. If this is not done, noise could be introduced into the entire system.

(c) Open the IF path at a suitable point on non-Western Electric Company (WE) radio (Collins, Lenkurt, etc).

4.09 Immediately after completing 4.08, verify that a channel failure has been indicated as follows by the initiator in the switching main station at the receive end:

(a) 100A: Channel fail

(b) THAS: Channel fail (see Section 412-420-501)

(c) TDAS:

(1) If the office is attended, read the initiator A voltage. It should be approximately +40.

(2) If the office is unattended, it is not possible to take this reading, so the channel

fail indication cannot be verified. The alarm center should make sure that it has not received an alarm indicating a wrong channel opened. It would be desirable to schedule routine maintenance at a time when the unattended switching main station could be covered, in order to check the switching at least once.

- (d) 400A: Channel fail (noise or carrier)
- (e) Non-WE switch system: Suitable fail indication.

4.10 When it has been determined that the correct channel was opened, the craftsman at the radio station should install a portable microwave repeater in the released channel (if applicable), then proceed with the routine or repair.

4.11 If the correct channel fail indications in 4.09 were not obtained, it means there is trouble in the automatic switching system. The switching section maintenance control office should arrange for clearance of the trouble as soon as feasible. Some possible causes of switching system failure are:

- 70 MHz leakage in trans-mod plate circuit
- Tertiary interference

- 40 MHz shifter tones
- RF leakage
- RF interference
- Maladjusted initiators
- THAS — Insufficient suppression of status tone or status tone detector fails to operate at -2 dBm input (see Section 413-600-506)

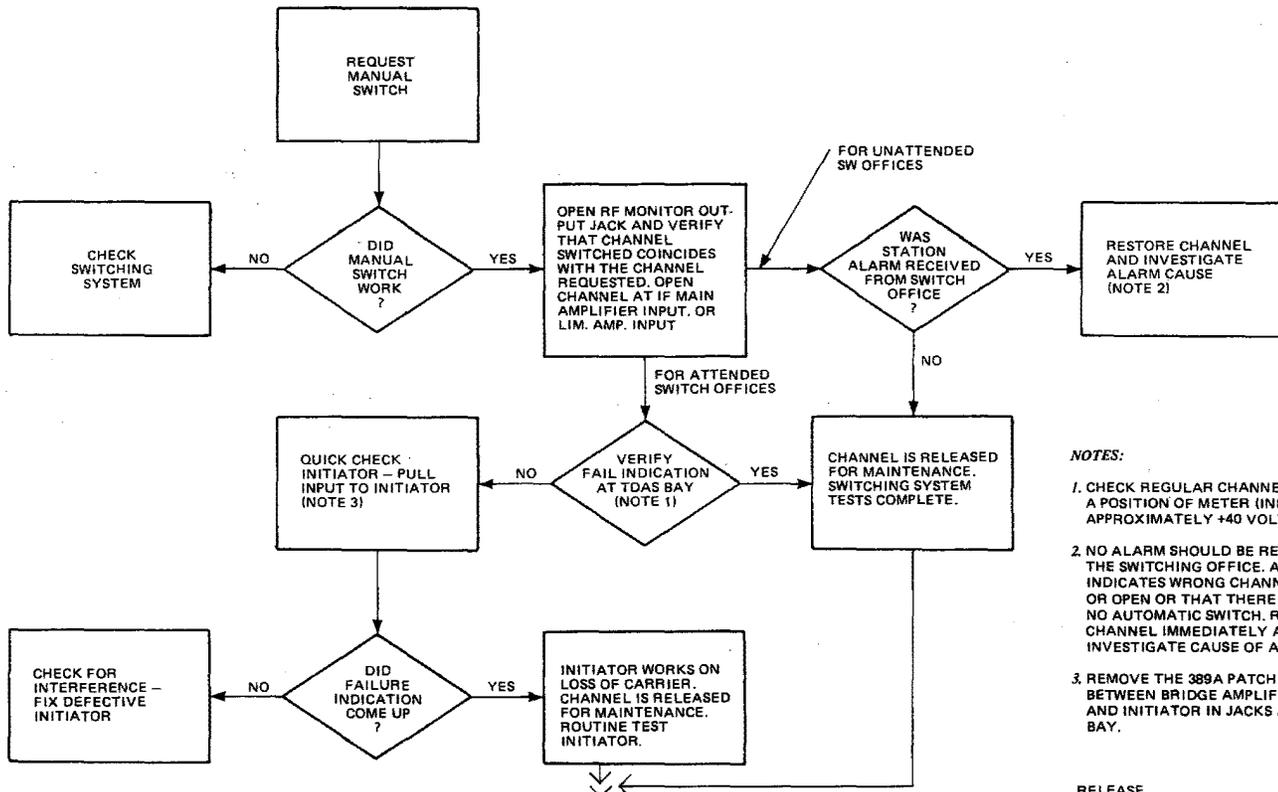
4.12 Upon completion of the routine, again perform steps in 4.09. At TD2 stations having 40 MHz shifters, perform an additional channel switching test by removing the shifter 250-volt fuse. Apply 4.11 procedures if required.

4.13 The following flow charts outline the release procedure for the various types of switching systems:

- Chart A — TDAS
- Chart B — 100A or 400A
- Chart C — THAS
- Chart D — A combination of all types of switching systems

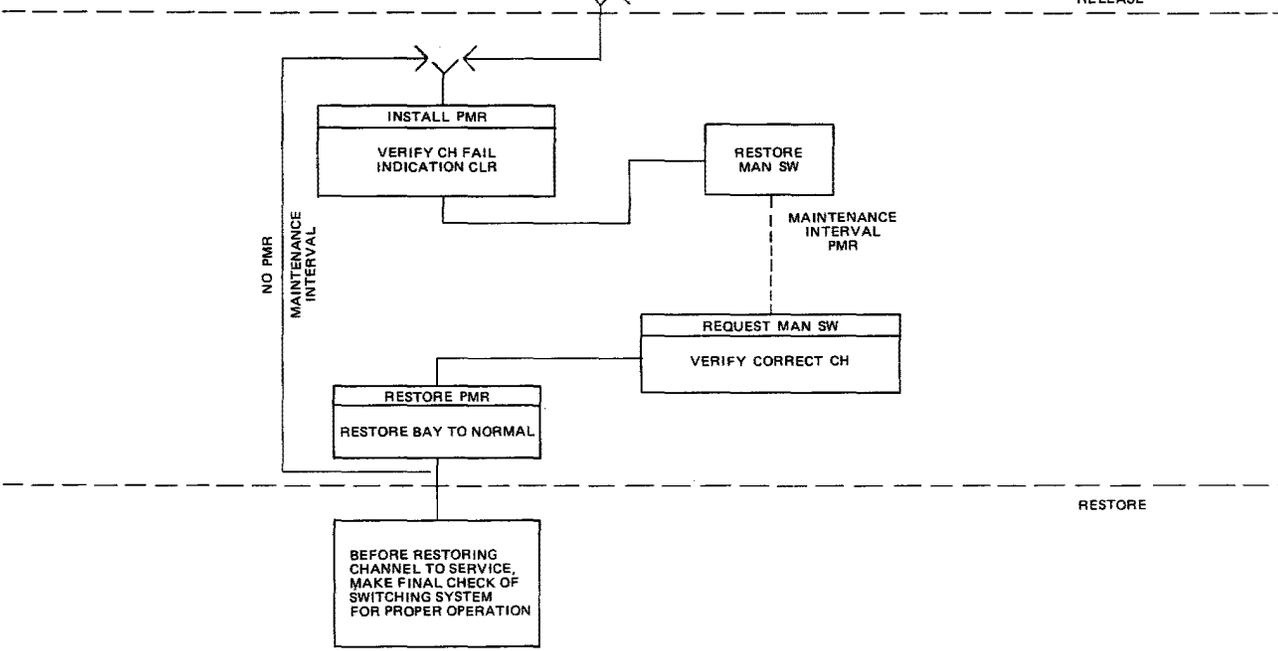
▶ CHART A ◀

RADIO CHANNEL RELEASE PROCEDURES – TDAS SWITCHING SYSTEM



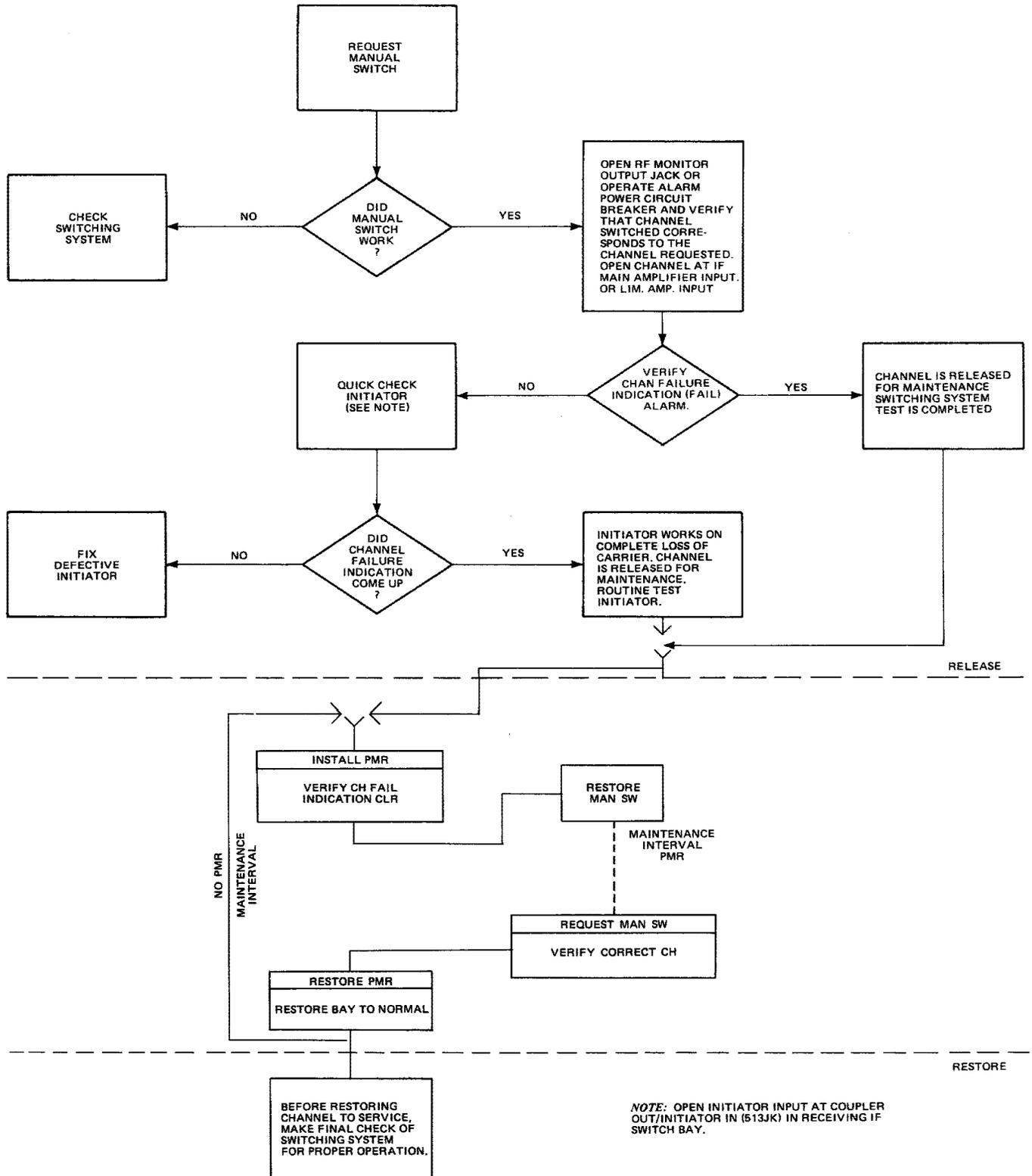
NOTES:

1. CHECK REGULAR CHANNEL INITIATOR A POSITION OF METER (INDICATION OF APPROXIMATELY +40 VOLTS).
2. NO ALARM SHOULD BE RECEIVED FROM THE SWITCHING OFFICE. AN ALARM INDICATES WRONG CHANNEL SWITCHED OR OPEN OR THAT THERE HAS BEEN NO AUTOMATIC SWITCH. RESTORE CHANNEL IMMEDIATELY AND INVESTIGATE CAUSE OF ALARM.
3. REMOVE THE 389A PATCH PLUG BETWEEN BRIDGE AMPLIFIER OUT AND INITIATOR IN JACKS AT INITIATOR BAY.



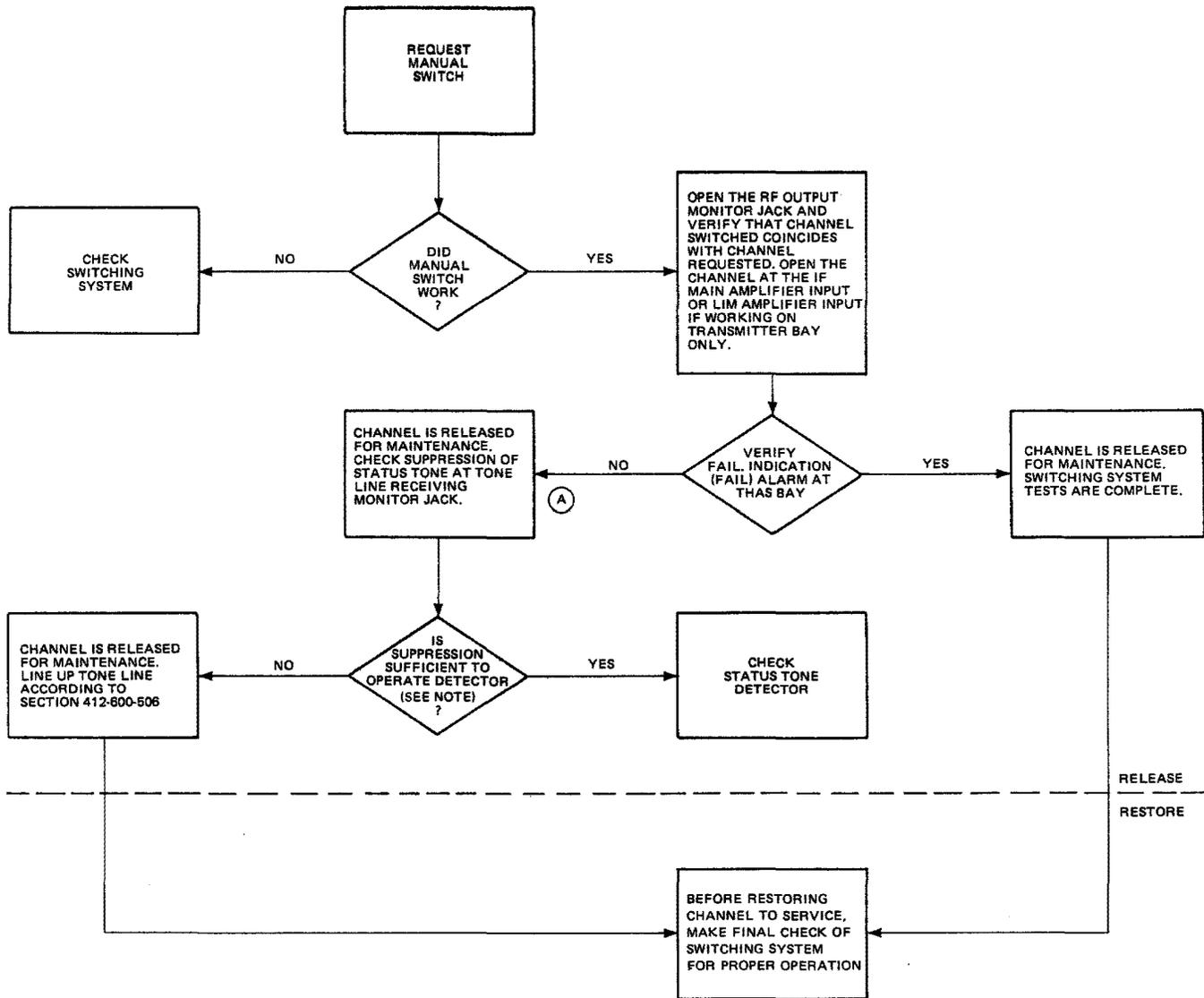
➔ CHART B ➔

RADIO CHANNEL RELEASE PROCEDURES – 100A/400A SWITCHING SYSTEM



NOTE: OPEN INITIATOR INPUT AT COUPLER OUT/INITIATOR IN (513JK) IN RECEIVING IF SWITCH BAY.

➔ CHART C ➔
RADIO CHANNEL RELEASE PROCEDURES – THAS SWITCHING SYSTEM



NOTE: STATUS TONE DETECTOR IS SET TO OPERATE AT -26 DBM. TONE LINE RECEIVING MONITOR JACK IS BRIDGED TO TONE LINE VIA 30 DB PAD.

➔ CHART D ➔

RADIO CHANNEL RELEASE PROCEDURES – ALL SYSTEMS

