SCC/SCCS CENTRALIZED TRUNK OPERATION
SWITCHING CONTROL CENTERS
OPERATIONS SUPPORT SYSTEMS

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1. GENERAL

1.01 This section provides procedures for trunk operations of a No. 1/1A Electronic Switching System (ESS) at a Switching Control Center (SCC) equipped with the No. 2 Switching Control Center System (SCCS). These procedures are applicable to Generic SC5 and all earlier generics. These guidelines can also be used for No. 2/2B and No. 3 ESS offices, with minor changes. The descriptions for processing trunk orders, Centralized Automatic Reporting on Trunks (CAROT) reports, and trouble reports are identical for No. 1/1A, No. 2/2B, and No. 3 ESSs. The Trunk Outage Control information is similar except for the input and output messages used in obtaining the trunks out-of-service (TOS) lists.

Note: SCCS Generic Program SC6 provides a trunk maintenance package (TRUMP) which impacts manual procedures. Refer to Section 190-130-201 (scheduled second quarter 1981).

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph. •

1.03 The title for each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

1.04 Recommendations for changes, additions, or deletions to this section should be forwarded on Form E-3973 as specified in Section 000-010-015, How to Comment on Bell System Practices.

1.05 The general methods and organizational considerations for performance of SPCS trunk maintenance at the SCC are included in Section 190-130-120. This section supplements Section 190-130-120 by providing recommended detailed procedures for certain trunk maintenance tasks at an SCC equipped with the No. 2 SCCS.

1.06 The following list consists of major craft responsibilities for the remote trunk maintenance function at the SCC:

(a) Trunk outage control which includes:

(1) Processing TOS lists

(2) Initiating trouble tickets, as required, and recording outage on the trunk outage log

(3) Updating the trunk outage log.

(b) Trunk ineffective attempt (TN08) analysis which includes:

(1) Responding to TN08 real time analysis and batch reports

(2) Initiating trouble tickets, as required, and recording outage on the trunk outage log.

(c) Trunk trouble referrals and reports which include:

(1) Responding to trunk trouble referrals

(2) Processing trunk transmission and test call failure reports from CAROT

(3) Analyzing trunk trouble indications from other external sources such as Network Service Center (NSC) and Traffic Service Position System (TSPS)

(4) Completing trunk transmission measurement reports for manually measured trunks

(5) Initiating trouble tickets, as required, and recording outage on the trunk outage log.

(d) Trunk trouble sectionalization which includes:

(1) Verifying trunk operational and transmission troubles and sectionalizing, using remote trunk testing capabilities

(2) Responding to calls for testing assistance.

(e) Trunk orders which include:

(1) Logging and coordinating trunk orders

(2) Testing and turning up new trunks.

1.07 General responsibilities are listed on the Work Assignment List for trunk maintenance in Section 190-130-120. In addition, in some locations, translation changes associated with trunk orders may be entered by the trunk maintenance group.

1.08 These responsibilities may not require Stored Program Control System (SPCS) training. They do, however, require familiarity with the following:

(a) SPCS methods for trunk access

(b) SPCS trunk maintenance features and messages

(c) Signaling, pulsing, and transmission operations of trunks

(d) Far-end office testing arrangements

(e) Trunk testing methods

(f) Basic knowledge of SCCS.

Trunk maintenance is primarily a day-shift function. It is recommended that the responsibilities listed be performed at the SCC by personnel dedicated to trunks.

1.09 Some of the work responsibilities for a given office or offices may be assigned to one person. For example, it is recommended that the person handling trunk outage control for a given office also handle trunk trouble referrals and trouble sectionalization. This individual will be referred to as the trunk test person. That person may also respond to TN08 real time and batch reports. This practice is recommended when the TN08 performance is in the "H" or "O" bands and the work load of responding to TN08s does not justify dedicated craft personnel. This action has the following advantages:

(a) Trouble tickets due to TN08s will be known immediately by the person processing the TOS list, thereby reducing the number of duplicate tickets.

(b) The test procedure, in response to TN08 reports, may be accomplished more easily by the person who is responsible for other testing for that office.

1.10 The number of work positions needed will depend on the condition of each office. If the condition of the trunks is poor (soft spot), repair may be desirable before allowing the SCC to assume full trunk responsibility. If performance continues to be poor, additional craft personnel will be required. Where there are high concentrations of switched special services (tie trunks, etc),

additional craft personnel or hardware may be required. The anticipated numbers of work positions are as follows:

(a) ***Trunk Testing—Trunk Outage Control Plus Trunk Referrals and Reports Plus Trunk Trouble Sectionalization:*** One position per 10,000 outgoing and incoming trunks (one position per 5,000 outgoing trunks).

(b) ***TN08 Analysis:*** One position per 14,000 to 20,000 outgoing and incoming trunks.

(c) ***Trunk Orders:*** Depends on activity.

1.11 The assignment of particular offices to work positions depends upon the trunk work activity of each office, ie, the trouble rate, complexity of distributing frame, etc, as well as the number of trunks in each office. A work position assigned to offices with low trouble rates may be able to handle more trunks than the figures given in paragraph 1.10 while offices with high trouble rates may reduce the number of trunks handled.

2. EQUIPMENT ARRANGEMENTS

2.01 Equipment arrangements may vary due to physical layout at different locations. Figure 1 illustrates a possible SPCS-SCC trunk and facility maintenance area layout. The following paragraphs and reference figures present arrangements that are typical for most locations.

TRUNK TEST POSITION

2.02 The recommended trunk test equipment for No. 1/1A ESS to perform tests at the SCC is shown in Fig. 2. This equipment would be used by the craft person responsible for trunk outage control, trouble referrals and reports, and trouble sectionalization. The SCC is shown on the left side of the figure and the No. 1/1A ESS office is shown on the right side. Note that two communication links may be used between the SCC and the No. 1/1A ESS for trunk maintenance.

2.03 A cathode ray tube (CRT) terminal is connected via the SCCS to the local or remote maintenance teletypewriter (TTY) channel of the No. 1/1A ESS machine. This terminal is used to receive output TTY messages from the ESS and to enter messages for certain tests to be performed.

2.04 A remote trunk test system may be used to request operational and measurement tests. The system consists of trunk test consoles at the SCC and a remote unit in each office. Operation of test keys at the console at the SCC controls the type of test applied to the trunk by the remote unit. Measurement results are transmitted back to the console as data and are converted and displayed in real time on an analog or digital meter. Information on the trunk test console operation is available in Section 190-130-203 (available first quarter 1981).

2.05 A number of test functions are controlled by console keys. Operation of appropriate control keys at the console causes operation of relays in the remote unit. These relays, through wired logic in the remote unit, cause relays in the interface circuit to operate. Make contacts of relays in the interface circuit are bridged across make contacts of keys at the trunk and line test panel (TLTP) so that operation of relays in the interface circuit simulates the operation of these keys. For example, operation of the control labeled TRUNK/TEST would cause closures across key contacts at the TLTP for the TRUNK and TEST keys. The TOUCH-TONE® key pad at the console is bridged across the TOUCH-TONE key pad of the TLTP and may be used to key in test information remotely, such as the trunk network number (TNN), in the same manner as that done at the TLTP.

2.06 If a DC test is desired, appropriate key operations at the console would cause a test connection to be established between the trunk under test (TUT) and TLTP by the ESS machine. This connection is extended over to the remote test unit through bridged wiring at the TLTP. Various types of tests can then be made using DC TEST keys at the console.

2.07 To outpulse a trunk, that trunk must first be connected to the remote unit, using key operation similar to that of the TLTP. If the trunk is traffic busy, it will be identified by flashing of the equipment status/progress and error (ES/PE) lamp at 60 interruptions per minute (IPM) at the console. The trunk may be monitored, via the no test vertical at the No. 1/1A ESS office, by operation of the control key labeled TFR/TRK MON.

2.08 If a trunk is to be made maintenance busy, the control key labeled OP/MB (outpulse/make

busy) would be operated at the console, and a closure would appear across the contacts of the MB (make busy) key at the TLTP.

2.09 Sectionalization of transmission troubles requires that tones or terminations be applied manually or measurements be made at various locations along a trunk, including the No. 1/1A ESS switch, while working with other forces. These actions can be accomplished at the No. 1/1A ESS switch by entering appropriate TTY input messages from the SCC. If the received level of 1 kHz tone at the switch is to be measured, the processor controlled interrogator (PCI), in conjunction with the remote office test line (ROTL) equipment, is used to make a snapshot measurement. The result is reported on the TTY channel. Tones and terminations are applied to the trunk by the ESS machine upon TTY request. Near-end noise measurement is not currently possible because the appropriate input message does not exist, thereby limiting far-to-near noise sectionalization. However, near-to-far noise sectionalization may be accomplished, via TTY input message, by application of a balanced termination at the switch. In addition, one person end-to-end transmission measurements to test lines can be made via the TTY and PCI to verify troubles.

2.10 A call director is used for general communications with other craft personnel. Incoming calls to the master test line at the office may be call forwarded to the call director.

TN08 ANALYSIS POSITION

2.11 Handling TN08 real time reports requires that an alarm monitor screen, displaying trunk alarm summary messages, be within view of each work station that is to respond to the reports. Each such work station should be equipped with a CRT with keyboard as well as a call director for general communications. Access to a line printer is needed for receipt of TN08 batch reports. An additional CRT is needed to drive the alarm monitor display.

> ***Note:*** A TN08 analyzer is not responsible for sectionalizing troubles.

2.12 In addition to TN08 real time alarms, the trunk maintenance force at some SCC locations may be responsible for other types of alarms (ie, carrier system alarms). Where this situation exists, such alarm groups may also be directed to the trunk alarm monitor, thereby excluding the groups from other alarm monitors.

2.13 Since trunk maintenance is normally a day-shift work function at the SCC, it is necessary to provide coverage for trunk alarms for evening, night, and other periods where trunk maintenance might be unattended (ie, lunch hours). Several alternatives are listed in paragraphs 2.14 through 2.17.

2.14 First, the trunk alarm monitor may be placed so that it is readable from the work station that is handling switching alarms which will always be attended. The audible alarms would not have to be transferred since they could be heard from both positions. In this case, the switching "control" person can enter the following input commands into the CRT keyboard to retire trunk alarms:

R:<trunk subsysname>!

or

R:<trunk subsysname>,<ofname>!

2.15 Other arrangements must be used if the trunks and switching alarm monitors are physically separated, such as in different rooms and in the same location.

2.16 If the SCCS is operating under Generic SC5 and later generics, trunk alarms can be transferred to the Switching Alarm Subsystem by use of the **RC:ALMRPT** input command (see IM-1P135). Since the alarm routing previously established is not lost, it can be restored later by again using the **RC:ALMRPT** command. (See PA-1P135, Section 10, for a complete description of the alarm transfer feature.)

> ***Note:*** The transferring of alarms using the **RC:ALMRPT** message will also transfer the audible alarms. Therefore, no other action need be taken.

2.17 If the SCCS is operating under Generic SC4 or earlier, a hardware arrangement must be used as shown in Fig. 3. Two trunk alarm monitors should be provided. The second trunk alarm monitor can be multipled to the first and installed physically close to the switching alarm monitor. When trunk maintenance is attended, the second alarm monitor can be turned off. When

trunk maintenance is unattended, the second alarm monitor should be operational in the switching room. Trunk alarms can be retired by the switching "control" person by use of the commands listed in paragraph 2.14.

2.18 An alarm device may be used to sound audibles for trunk maintenance. In Generic SC4 and earlier generics, when the trunk room is unattended, a four-pole, double-throw switch may be operated to transfer the audibles to another alarm device in the switch room. This arrangement is nonstandard and must be engineered locally.

TRUNK ORDER POSITION

2.19 The work position for trunk order coordination requires a call director for communications and a CRT with keyboard. Trunk order completion tests should be done at the SCC. It is recommended that this work be done by the person doing trunk order coordination. In this case, the trunk coordination work position should be equipped with the trunk test console. It is possible that trunk order completion tests may be performed by the person at the trunk test position. In this case, the work must be referred to the trunk test craft personnel.

COMMUNICATIONS

2.20 Telephone sets are required at each trunk work station for general communication with other craft personnel. A call director should be provided with one line per trunk work station for outgoing calls.

2.21 Incoming calls for assistance should be received at the SCC rather than at the central office (CO). This may be accomplished by call forwarding on the existing directory numbers or by publishing certain numbers at the SCC as the number to be called for trunk assistance.

> ***Note:*** It is recommended that a new number for trunk assistance from the SCC be published. The CO phone number for trunk assistance should be disconnected and eliminated from all publications.

2.22 Incoming calls may occasionally be received at the Master Test Line (MTL). These calls should be call forwarded to the SCC through the use of **T-TNN-MT** input message.

2.23 A hunt group of four lines to receive incoming calls should be assigned for each SCC trunk work station's listed number.

3. RECORDS

3.01 In the initial phases of establishing centralized trunk maintenance, it may be necessary to maintain sets of records at both the CO and SCC while significant amounts of trunk testing continue to be done at the CO. However, when the SCC has assumed the vast majority of trunk maintenance, records may be kept at the SCC only, thereby minimizing the problems of maintaining duplicate sets of records. For the few cases where tests must be done at the CO, information can be obtained from the SCC by phone.

3.02 The following records are needed in mechanized or manual form at the SCC for trunk maintenance:

(a) Individual Circuit Switch Assignment Information

(b) Facility Assignments of Trunks

(c) Trunk Inventory Record (Form BS-551). Refer to paragraph 3.07.

(d) Carrier Group Alarm (CGA) Records

(e) Translation Forms ESS-1204, 1300, 1303A, 1303B, 1303C, 1305(1), 1305(2), 1504, and 1505

(f) Trunk Records Update Support Technique (TRUST) Printout.

3.03 Many companies are installing mechanized trunk record systems such as Trunks Integrated Records Keeping System (TIRKS). In this case, switch and facility assignment of trunks might be obtained from the SCC in real time via a request from a terminal.

3.04 Paper records with individual circuit information may be kept at the SCC. Paper records received from TIRKS will include the Work Order Record and Details (WORD) document. See Section 780-260-100 for a description of WORD. If TIRKS is not present, manually-generated records must be kept at the SCC. This information should be accessible for both ends of trunk groups for

which the SCC has maintenance control. An example of a near-end record is shown in Fig. 4, while an example of the far-end record is shown as Fig. 5. For trunk groups not controlled by the SCC and for service circuits, only the near-end record need be kept. The format may vary from company to company and be known by various names, but the data content should be as indicated in Fig. 4. The forms are typically received with each trunk order, along with the facility information. All three parts should be retained as an updated trunk record.

3.05 Trunk facility assignments and transmission design information should be kept with the switch assignment records for each controlled trunk group to make a complete package for each such trunk group. Figures 6 and 7 are examples of the facility information for a trunk group. This information will enable the craft person to request assistance at main frames and carrier terminals, other SCCs, COs, etc, and to sectionalize troubles. It is essential that these records be kept current. Hence, changes affecting only facility assignments of controlled trunks should be received and retained by the SCC. In order to contact the various locations for sectionalization assistance, it will be necessary to keep a directory at each location of various telephone numbers to be called for assistance. Most companies publish such directories.

3.06 When paper records are used, it is recommended that the trunk records of all interoffice trunks and service circuits be placed in a single file arranged by TGN. For most activity on SCC-controlled trunks and service circuits, the TGN will be known, and it will be possible to retrieve the appropriate individual circuit information. For noncontrolled trunks, request calls for assistance will often be from the controlling location which has all three parts of the trunk record and which will therefore be able to supply the TGN. TN08 exception reports generated by the SCCS on incoming, 2-way, and outgoing trunks will identify the TGN. In the few cases where the TGN is not known, it may be obtained by one of the two methods outlined in paragraphs 3.07 and 3.08.

Note: The SCC should keep trunk records if it is a subcontrol on switched special services.

3.07 If only the far-end office is known, the TGN may be obtained by searching an index record of TGN to common language identification of the trunk group. Form BS-551 is used for this record. An example of this form is illustrated in Fig. 8.

3.08 If only the TNN is known, enter **VFY-TNN** or **VFY-UTCN** input messages. The ESS response for **VFY-TNN** will identify the trunk group and other data and the individual circuit information can then be referenced. If only the Universal Trunk (UT) circuit number is known, enter the message **VFY-UTCN**. The ESS response will indicate the TNN and a **VFY-TNN** message can be used. This method requires access to the TTY channel and can be more time consuming than consulting paper records.

3.09 CGA records are needed for trunk order work as described in Part 6 and should be maintained by the SCC on the basis of information received from new orders and from changes in facility assignments. Form ESS-1506 or a form designed locally may be used for CGA records. Several additional types of translation forms should be readily accessible but will not be used frequently. These forms should include ESS-1204; 1300; 1303A, B, and D; 1305(1) and (2); 1504; and 1505. The ESS-1204 form provides certain class information (such as wink start or delay dial, etc) about the operational characteristics of the trunk group which may be needed for trouble shooting. The 1300 series forms may be needed for trunk problems caused by incorrect routing translations. Forms ESS-1504 and 1505 are needed to correct Automatic Test Table (ATT) errors as described in paragraph 5.07.

3.10 If the trunk maintenance work area is in close proximity to the switching area where the records listed in paragraph 3.09 are normally kept, then switching records may be used by trunk maintenance. However, if switching and trunk maintenance are located some distance away from each other, a duplicate set of these records may be needed at the trunk maintenance location. Since these records are subject to little change activity, maintenance of duplicate records should not be a difficult task.

3.11 TRUST records should also be kept to provide a translation from signal distributor (SD) point to TNN. The office assignment drawings (T Drawings) must first be consulted to convert the SD to equipment location conversion.

4. TROUBLE ESCALATION

4.01 To minimize trunk outage, it is essential that management be made aware of trunks which are out of service for an extended period of time. To facilitate the steps for trouble escalation, the following procedures would be used by the craft person. These procedures may be modified as required by special circumstances.

TROUBLES REFERRED TO DISPATCH

4.02 Troubles referred to dispatch prior to 3:00 pm on a given day should be cleared by 8:00 am two days later. Troubles referred to dispatch after 3:00 pm should be cleared by 8:00 am three days later. If the preceding conditions are not met, the craft person should take the following action:

(1) The craft person will determine the status of the trouble through dispatch personnel.

(2) The craft person will request increased priority of the trouble to assure clearance that day if dispatch has not been made aware of the trouble or if the trouble is not in the process of repair.

(3) If the trouble exists 24 hours later, the craft person will notify the supervisor and give the current status, who received the referral, and when the problem was received.

(4) The craft supervisor will negotiate with dispatch as necessary. If the trunk is still out of service 24 hours later, the craft person will notify the supervisor who will refer it to the SCC manager.

TROUBLES REFERRED TO ANOTHER OFFICE OR ORGANIZATION

4.03 Referred out troubles should normally be cleared back to the craft person within 48 hours. If the referrals are not cleared back to the craft person within the given time requirements, the craft person should take the following action:

(1) Determine the status of the trouble by calling the person who received the trouble referral.

(2) If the trouble is not cleared within 24 additional hours, refer it to the trunk supervisor with full details of the referral.

(3) Alert the trunk supervisor to call the distant office supervisor and negotiate the repair.

(4) If the trouble is not cleared within 48 hours of the trunk supervisor's call, the craft person will notify the trunk supervisor who will then refer it to the SCC manager.

5. TROUBLE DETECTION AND ANALYSIS

5.01 Trouble detection and analysis can be carried out most effectively by following the procedures outlined in this part.

TRUNK OUTAGE CONTROL

5.02 The following trunk outage control work responsibilities are indicated in Section 190-130-120:

(1) Processing TOS lists, initiating tickets from the lists, and recording these outages on the trunk outage logs as required.

(2) Updating trunk outage logs with any changes in status for outages recorded from all sources.

(3) Verifying that all trunk trouble tickets are completed properly, closing the entries on the outage logs, and returning the completed tickets to the trunk supervisor.

(4) Routing outage logs for calculation of trunk service results indices.

5.03 Each trouble ticket should be logged on a per office trunk outage log. Refer to Section 660-400-010 for information on the Trunk Outage Log, Form E-4255. It is recommended that outgoing and incoming trunk tickets be recorded on the same set of logs with noncontrolled trunks clearly excluded from outage time calculations. An alternative is to record incoming trunk tickets and service circuits on a separate section of the log. This has the disadvantage that up to three logs must be examined in order to assign or locate tickets. In either case, the log serves to indicate the current status of outstanding tickets and is also used by the craft person who is processing the TOS list.

5.04 In general, before a trouble ticket is written and logged, the log should be examined to determine if there is an existing ticket on the same

trunk. If a trouble ticket does exist, note the ticket with the new trouble report. This additional information on the ticket may be helpful in clearing the trouble. This procedure will also avoid writing duplicate tickets and possibly duplicating corrective effort.

TOS LIST PROCESSING

5.05 The recommended procedure for processing the TOS list of a No. 1 ESS office is shown in Fig. 9. This procedure should be executed each morning before the traffic busy hour. Additional executions of this procedure during the day may be desirable to minimize outage times. The TOS list consists of a listing of TNNs of trunks and service circuits that are currently maintenance busy. In recent generics, the trunk listing may be obtained as the message trunks out of service (MOS) and the service circuits out of service (SOS). An example of a list is shown in Fig. 10.

5.06 In processing the SOS list, only transmitter and receiver troubles should be handled by the trunk operations group at the SCC. The TGNs of transmitters and receivers should be known or available to the persons processing the SOS list. The analysis work group in the switching portion of the SCC is responsible for processing the remainder of the service circuits on the SOS list.

5.07 This procedure will not function efficiently if Automatic Test Tables and far-end test lines are not in good working order. In this case, many test failures will result from testing to the wrong termination or to a bad test line, while in fact, trunk troubles may not exist. An indication of this situation is the appearance of an abnormal number of trunks on the TOS list for a particular trunk group. An example of a list is shown in Fig. 10. When this is observed and cannot otherwise be explained, the possibility of an incorrect Automatic Test Table or bad far-end test line should be investigated as described in Part 6.

> ***Note:*** It is important that the Automatic Test Table specify an operational test, such as the synchronous test line test, as the normal diagnostic.

5.08 The TOS list processing procedure requires that automatic progression testing be turned off by 6:00 am daily. Otherwise, progression testing may cause trunks and service circuits to be added to the list after the procedure has begun, thereby complicating it. Also, for offices designated as carrying normal business day (NBD) traffic, trunk outage is taken for trunks out of service to 10:00 pm. Since trunk maintenance will generally not be attended during the evening hours, it would not be possible to repair and return trunks to service during these hours. Therefore, it is recommended that progression testing not begin before 10:00 pm each evening. The 10:00 pm to 6:00 am interval should be sufficient to allow all trunks and service circuits to be tested routinely at least once per week in all but the largest offices. In the offices which have been designated as operating under abbreviated business day(ABD), traffic may start progression testing earlier than 10:00 pm but after the ABD ends.

5.09 The first step of the procedure is to return good trunks to service in all offices as quickly as possible before the busy hour. When this is complete, new troubles of a more obvious nature will be ticketed in all offices. Finally, possible trunk group troubles of a subtle nature are identified and ticketed for later investigation.

5.10 Typically, the trunk maintenance function at the SCC will be unattended during the night, but the switching area of the SCC will be attended. One of the job functions of the night coverage person should be to enter a TTY message for each office requesting diagnosis of all trunks and service circuits on the TOS list. This request should be entered in the on-line mode with the message:

TRK-LIST-DOS.

5.11 The message should be entered after automatic progression tests for the night are turned off and early enough to have all trunk tests of the TOS list completed prior to the arrival of the day person. This would typically be 6:00 am if the automatic progression testing recommendations are followed. The following steps are recommended in processing the TOS lists:

(1) The trunk maintenance day person, upon arrival, should request a copy of the MOS, SOS, and junctor out of service (JOS) lists, arranged by trunk group number, by entering

the following message in the on-line mode for the first office to be processed:

TRK-LIST-MOS/
SOS/JOS.

After it has been observed that the lists for that office have been output by the No. 1/1A ESS, a printout should be obtained by entering the filter command into the No. 2 SCCS:

F:<ofc>;PAT TOS,FROM XXXX;RDT LPR!

Where **XXXX** is the time that the list request was entered. The pattern, TOS, must be defined previously in the system by the message:

RC:PAT TOS/
ESS1/ (or **ESS1A**)
SCTAB "TN10"!

An example of the MOS and SOS printout is shown in Fig. 10. A duplicate copy of the SOS list should be made for use by the analysis group at the SCC.

(2) The craft person who is processing the list should then enter a command into the SCCS to filter the DOS test results and place these results into a file. This command is

F:<ofname> PAT DOSR, FROM DOS; RDT<filename>!

Where patterns **DOS** and **DOSR** were defined previously in the system by the messages:

RC:PAT DOS/
ESS1/ (or **ESS1A**)
SCTAB "TRK-LIST-DOS."!
RC:PAT DOSR/
ESS1/ (or **ESS1A**)
SCTAB ("TN01"+"TN05")!

While the filter is being executed, the printout of the MOS and SOS lists should be handled as follows:

(3) All entries which are not transmitters or receivers should be crossed off the SOS list. The analysis group at the SCC which also receives an SOS list will take care of these crossed-out entries.

(4) Trunks and service circuits with outstanding trouble tickets should be marked "TT" and crossed out. Previous MOS and SOS lists and the trouble ticket log may be consulted for this information. Trunks with trouble tickets are handled as described in Part 6.

(5) Trunks on trunk order should be marked "TO" and crossed out. No further action will be taken on these trunks.

(6) Trunks which have been reported and made busy by CAROT 2 should be marked "CT" and crossed out. These will be handled when the CAROT printout is processed. In order to identify these trunks, the CAROT 2 report for the previous night must first be obtained. CAROT 1 reports of a Q2 trouble or CAROT 2 reports without the trunk make busy option exercised would require taking the trunk out of service manually, issuing a trouble ticket, and be covered in Step (4) of this procedure.

(7) Trunks which appear for the ***first time*** on the MOS list that are the responsibility of another work organization should be referred to that work organization. A memo ticket (MT) is initiated with referral information. MT and the ticket number are entered into the MOS list. Before the MT is written, the previous MOS list and trouble ticket log should be consulted to determine if the ticket has already been written and referred to the responsible work organization. If this has occurred, the trunks on the latest MOS list should be crossed out and marked "MT". Examples of such trunks are 2-way trunks controlled by the far end and switched special service trunks controlled by another organization. One-way incoming trunks also fall into this category but will not often appear on the MOS list.

(8) Remaining trunks should be examined for a past history of appearance on the TOS list. It is suggested that the last 5 days of TOS printouts, including the present day, be analyzed. If 3 out of the 5 days or the preceding day show this trunk, it should be marked "RP" (repeat). The appearance of the TOS list will now be as shown in Fig. 11.

(9) Determine the DOS test results for each TNN not crossed out and also for those with tickets outstanding. Experience has shown that referred troubles are frequently not reported back to the SCC when cleared. Refer to

paragraph 5.13 for more information. If a trunk with a ticket outstanding is observed to pass test, it may be that the trouble has been fixed but not reported to the SCC. Enter the following command into SCCS:

B:<filename>!

The test results messages will be displayed and should be marked in a second column on the TOS printout.

(10) Units which are marked "ATP" and which are not marked "TT," "TO," "CT," "MT," or "RP" should be returned to service and the entry on the lists crossed out. The appearance of the list will now be as shown in Fig. 12.

(11) When this is complete for the first office, the same sequence of steps should be repeated for each office. This will ensure that good trunks are placed back into service as soon as possible.

(12) When Steps (1) through (10) of this procedure have been completed for all offices, each trunk not crossed out should be examined to determine if it is part of a trunk group problem. A trunk group problem may exist when an abnormally large percentage of trunks in a group are out of service for reasons other than trunk orders. If the number of such trunks is more than one half of the true AML (automatic maintenance limit) for the group, a trunk group problem should be suspected. Find the first trunk crossed out and note if there are other trunks in the same group which are not crossed out. If the number of such trunks in the trunk group is 2 or more, then calculate the AML for the group. Enter the **VFY-TKGN** message in the on-line mode to determine the number of trunks in the group. Subtract the number of trunks on trunk order that are currently within that TGN. This gives the true number of working trunks in that group. The true AML is 25 percent of this number, up to a group size of 16 trunks. Above 16 trunks, add one-eighth of the remaining trunks. If the number which is out of service in this group for reasons other than trunk order is greater than one half of the true AML, then a trunk group trouble is possible. A trouble ticket should be written and logged. The TNNs involved should be listed on the ticket, along with existing ticket numbers on individual TNNs as well as the DOS test results for these trunks. The ticket number should be recorded on the TOS list next to each TNN potentially involved in the trouble.

(13) Those units remaining which are marked with RP or with a test failure should have a trouble ticket written which indicates the type of trouble. The tickets should be recorded on the trunk outage log. The ticket number should be recorded on the list.

(14) Trunks with an NTST result should be tested manually with a remote DC voltmeter and/or by placing a test call. Depending upon the result, the trunk should be treated as fail or ATP.

(15) Trunks with a DOS test result of BLKD (blocked) should be individually rediagnosed. Test results of failure, ATP (all tests pass), or NTST (no test) should be treated as in Step (14) of this procedure. If BLKD is obtained again, it should be treated as a test failure.

(16) When all trunks on the list are crossed out or have a new ticket number assigned, the appearance of the list will be as in Fig. 13. Steps (12) through (16) of this procedure should then be repeated for each office. When these steps have been completed for all offices, the next phase of processing the list should commence. This involves determining if a trunk group trouble exists, based upon its ATP history on the TOS list.

(17) The first trunk group with one or more trunks which ATP and without a ticket against the group should be analyzed. The last 5 days including the current day should be examined. If trunks which ATP appeared on 3 of the last 5 days or the last 2 days, a ticket should be written against the group and logged. This procedure should be applied to all trunk groups for which Trunk Operations is responsible.

5.12 When the procedure in paragraph 5.11 is done, processing of the TOS list is complete. The appearance of the list is illustrated on Fig. 14. The trunks with tickets should then be sectionalized from the SCC as described in Part 6.

5.13 Since the DOS results were marked alongside trunks with tickets outstanding, some useful information of the ticket status may be obtained. If a trunk with a ticket is observed to pass test, it may be that the trouble has been fixed but not reported back to the SCC. The ticket should be examined to determine if it is based upon the ATP history of the MOS or SOS list. If so, the ATP on the current day is not evidence of the repair. However, if it is not based upon ATP history, the party that the trouble was referred to should be contacted, the trunk placed back into service, and the ticket cleared.

5.14 When tickets are closed out, the entry on the trunk outage log should also be closed out. Also, the entry TT should be crossed out on the current day. At the end of each day, the number of trunks remaining out of service ("TT" not crossed out) should be reviewed. It is suggested that a criterion of 3 per 1000 outgoing trunks left out of service due to trouble be used as a performance objective.

NO. 2 SCCS TN08 ANALYSIS

5.15 Among the features provided in the No. 2 SCCS are two types of analyses on TN08 messages:

(a) Multiple message thresholding (MMT) analysis is performed in real-time as the TN08 messages are received, generating exception reports on those trunks and service circuits experiencing a higher than normal call failure rate.

(b) TN08 batch analysis is a scheduled, longer-term analysis which generates a hard-copy summary of those trunks, trunk groups, and service circuits (transmitters and receivers) which received excessive failure implications by TN08 messages during the analysis period.

5.16 In order to fully realize the effectiveness of these analysis tools in terms of finding troubles and improving service with reasonable expenditure of effort, it is necessary to follow proper procedures for processing the analysis reports and for setting the variable parameters such as thresholds and schedules associated with each analysis.

5.17 These procedures are presented in Section 190-113-315, along with detailed guidelines for the following:

(a) Responding to TN08 MMT analysis reports

(b) Setting MMT parameters (list size, thresholds, time windows)

(c) Processing TN08 batch analysis reports

(d) Setting batch analysis thresholds and schedules.

5.18 Also included are descriptions of the TN08 MMT and batch analysis algorithms and reports and a discussion of the role of each analysis in the overall trunk maintenance job.

TROUBLE REFERRALS AND REPORTS

A. CAROT Routine Test Results

CAROT Routine Test Results Handling—Overview

5.19 CAROT reports processed previously at remote offices should be directed to a CAROT terminal located at the SCC. These reports are the responsibility of the SCC trunk maintenance group and should be processed with the same priority as the TOS list when they are obtained at the SCC. It is important that if the option in CAROT 2 to make trunks maintenance busy with Q2 failures is utilized, the CAROT 2 Routine Test Results should be obtained and used in processing the TOS list. Otherwise, trunks which pass diagnostic tests but fail transmission tests may be returned to service in processing the TOS list. See Fig. 15 for the recommended general sequence of handling the various segments of the CAROT 2 Routine Test Results.

5.20 When facility analysis, Q-2, and trunks not tested segments have been completed for the first office, these segments should be performed for the remaining offices. The Q-1 segments for all offices should then be processed as the work load permits. The following paragraphs describe the handling of each segment.

Q-2 Segment

5.21 Trunks which are reported to have a confirmed Q-2 should be removed from service as indicated in the following procedure. As an option

in CAROT 2, these trunks may be removed by CAROT 2 up to the automatic maintenance limit (AML). If this option is exercised, CAROT 2 will have removed trunks with Q-2s. This will be indicated on the CAROT 2 routine test results.

5.22 See Fig. 16. Select the first Q-2 on the printout. Determine in the following manner if a previous trouble ticket exists as facility, pending Q-1 or operational trouble:

(1) Examine the trouble ticket log to see if a pending facility or Q-1 ticket exists. If a pending facility or Q-1 ticket does not exist, determine if the Q-2 is part of a facility problem by examining the printout for other troubles on the same facility. If a facility problem exists, write a facility ticket marking the Q-2 on the ticket and log. Mark "TT" on the CAROT printout if a ticket was written or pending. If not listed as "confirmed," make a transmission test of the trunk using the processor controlled interrogator (PCI).

- If a Q-2 test result is obtained or if listed as "confirmed," ensure that the trunk is out of service and mark the pending ticket with the test result and out-of-service status. Update the ticket log with the new outage.

- If a Q-1 or ATP test result is obtained, mark the test result on the pending ticket.

- Determine if the cause for the Q-2 was a CAROT data base error. If so, write a trouble ticket and log. When all CAROT reports are processed, they should be referred to the CAROT Center. Go to the next Q-2.

(2) If a pending facility or Q-1 ticket does not exist, examine the TOS list to determine if an operational ticket exists. If so, indicate the Q-2 failure on the ticket and mark "TT" on the CAROT printout. Go to the next Q-2.

(3) If a trouble ticket does not exist, and if not listed as "confirmed" on the routine test results, perform a transmission test with the PCI to confirm the trouble.

- If the test does not confirm the Q-2, ensure that the trunk is in service and mark the CAROT printout with the test result. Determine if the cause for the Q-2 report was a CAROT data base error. If so, write and log a trouble ticket.

- Write a ticket if the PCI test indicated a Q-1. Mark the printout and the analysis form with the ticket number and log the ticket. Go to the next Q-2.

- If a Q-2 test result is obtained or the Q-2 is listed as confirmed on the CAROT routine test results, take the trunk out of service, if not already out, and write a trouble ticket. Mark the printout with the ticket number and log the ticket.

5.23 When all Q-2s on the printout have been handled, process the trunks not tested segment for that office as described in the "Trunks Not Tested" segment.

Trunks Not Tested Segment

5.24 This segment of the identifying CAROT test call failures should be checked each day. Trunks with high and dry reports or other operational failures during transmission test attempts should be tested operationally. Trunks reported busy and not tested by CAROT should be monitored to determine if a true service busy condition exists. If a trouble condition is found, a trouble ticket should be written if one does not exist. Examine the trouble ticket log to determine if a ticket has been written. If a trouble ticket does exist, note the ticket with the CAROT test call failure.

5.25 Duties and responsibilities of the CAROT 2 Center and summarization of test results may be found in Section 190-102-010 and 190-102-015.

Q-1 Segment

5.26 Q-1 failures are not considered immediate action type troubles and the trunks reported need not be removed from service immediately. In general, the trunks would be removed only at the time that the trouble ticket is being worked.

5.27 See Fig. 17. Select the Q-1 with the greatest deviation for the first office. Determine if a trouble ticket is pending as a facility or Q-1

trouble or as an operational trouble using the Trouble Ticket Log:

(1) If a trouble ticket exists as a pending individual Q-1 trouble, note the additional Q-1 on the ticket. If it exists as a facility ticket, note the Q-1 on the ticket. If an operational trouble ticket exists, note the Q-1 on the ticket. Mark the entry on the CAROT printout with "TT" if a ticket exists because of any of the three cases.

(2) If a ticket does not exist, determine if a facility problem exists by examining the printout. If a facility problem does exist, write a ticket and log. Mark the Q-1 on the ticket and "TT" on the CAROT printout. If a facility problem does not exist, perform a transmission test on the trunk to verify the trouble. If the test does not indicate a Q-1 failure, determine if the cause for the Q-1 was an error in the CAROT data base. If so, write a ticket and log. After all CAROT routine tests results have been processed, data base errors should be referred to the CAROT Center. If the retest result is a Q-2, ensure that the trunk is out-of-service, write a trouble ticket, and log. Mark the printout with the Q-2 and ticket number. If the retest result is ATP, mark the printout and analysis form with ATP and ensure that the trunk is in service.

(3) If a Q-1 test result is obtained, write a trouble ticket and log. Ensure that the trunk is in service and mark the printout with the ticket number. If more Q-1s exist for this office, repeat this procedure beginning with Step (1) for the next worse Q-1, as work load permits, until all Q-1s have been handled. When this is completed, process the CAROT Q-1 reports for the remaining offices.

B. Trunk High and Wet (THAW) List Processing

5.28 The No. 1/1A ESS THAW list should be processed daily for each office. Trunks on this list will fall into the categories discussed in paragraphs 5.29 through 5.32.

5.29 Outgoing trunks to the Traffic Service Position System (TSPS) may be on the THAW list as a result of a trunk make busy condition applied from the TSPS. Typically, battery reversal would be applied by manual request at the TSPS or by automatic trouble detection routines in the TSPS. When the originating No. 1 ESS detects this supervisory condition on a TSPS trunk, it will place the trunk on the THAW list and monitor for removal of the condition. It should be noted that these trunks are 1-way outgoing for traffic handling purposes but may be marked 2-way in translations to allow the far-end make busy condition to be recognized. Outgoing trunks to TSPS are controlled by the SCC. Therefore, follow-up corrective action must be taken after these trunks are identified.

5.30 In addition, 1-way outgoing and 2-way trunks may appear temporarily on the THAW list due to a momentary condition, such as while a test is being made. This will not require any action by the SCC.

5.31 Incoming seizures and subsequent receiver time-out on an incoming or 2-way trunk under certain circumstances, can cause the trunk to be placed on the THAW list. Trunks falling into this category are the responsibility of a control location which is often not assigned to the same SCC as the incoming end of the trunk. When the SCC is not control, it needs only to refer the trouble.

5.32 The procedure to process the THAW lists is as follows:

(1) Select an office and obtain the THAW printout for that office.

(2) Enter requests for printouts of the lists for the remaining offices. While the lists for the remaining offices are being printed, begin processing of the first office.

(3) Trunks with outstanding trouble tickets should be marked TT and crossed out. The THAW list from the previous day and the trouble ticket log should be consulted for this information.

(4) Remaining TNNs on the printout which are outgoing to TSPS should be identified and marked "TSPS" using an information record.

(5) A trouble ticket should be written and logged for each outgoing TNN to TSPS. A telephone call should be placed to the TSPS control location to determine the reason for the make busy

condition, and this information should be recorded on the ticket. The trouble ticket number should be marked on the THAW list next to the TNN. The remaining trunks are incoming or 2-way with a seizure condition or may be outgoing trunks temporarily on the THAW list. The latter requires no action and will not appear if a subsequent THAW list is taken. The first category, incoming trunks with a seizure condition, will generally cause trouble symptoms to be detected at the originating end and corrective action to be initiated there. Therefore, an immediate response to these TNNs is not necessary. However, if the TNN stays on the list for a day or more, the trouble should be referred because of the possibility that it is not being worked on. Proceed to determine those TNNs falling into the latter category.

(6) Take the first unmarked TNN on today's list and determine if it appears as unmarked on the previous THAW list. If so, write and log a trouble ticket and mark the ticket number on today's list. Refer the trouble and close out the ticket and entry on the log. If the TNN did not appear on the previous list, do not ticket.

(7) Do Step (6) of this procedure for each unmarked TNN. When all TNNs on the list have been marked or crossed out, processing of the list is complete for this office.

(8) Steps (3) through (7) of this procedure should be repeated for each office printout.

(9) When all offices have been completed, the processing is complete. The printouts should be filed in a folder.

C. Junctor Out-of-Service (JOS) List Processing

5.33 The JOS list should be processed daily. The following steps describe the recommended procedures:

(1) In processing the TOS list, obtain a copy of the JOS list as part of the procedure described in paragraph 5.11, Step (1), for the first office.

(2) Consult the previous JOS list and the trouble ticket log to see if each current entry has an outstanding trouble ticket. If so, the entry should be marked "TT" and crossed out.

(3) If the entry does not have a trouble ticket and did appear on the previous JOS list (or three of the last five lists [counting the current list]), a trouble ticket should be written. The entry on the current list should be marked "TT" with the ticket number (TTXXXX). Log the ticket.

(4) A diagnostic test should be requested for each entry not marked and optionally for entries marked "TT" without the ticket number. This option may provide some information as to whether repair is complete on outstanding trouble tickets. The test result should be marked next to the entry.

(5) Entries not marked "TT" or "TTXXXX" with an ATP result should be returned to service.

(6) A trouble ticket should be written and logged for each entry with test failures not marked "TT" or "TTXXXX." This entry should now be marked "TT" with the ticket number.

(7) An ATP test result for an entry marked "TT" may indicate repair is complete. These entries should be investigated.

D. Other Referrals and Reports

5.34 Sources of trouble referrals will vary in operating telephone companies. Some of these sources may be Network Service Center (NSC), Repair Service Bureau (RSB), other SCCs, COs, and departments.

5.35 The NSC will receive a printout of machine detected interoffice irregularities (MDII) which is a TN08 daily results analysis of many COs within a given area. This data will be referred to the SCC trunk maintenance group when trouble is indicated in one of their COs.

5.36 Another NSC report is an analysis of Operator Trouble Reports (OTRs) from TSPS and cord-board operators. These reports are screened and analyzed by the Automatic Trouble Reporting System (ATRS) in the NSC and by the Network Operations Trouble Information System (NOTIS) for Long Lines in Cleveland, Ohio. The troubles

will then be referred to the SCC trunk maintenance group for any corrective action.

5.37 Trouble reports from other departments, such as RSB, Commercial, Marketing, Traffic, etc, and other SCCs will be referred to the SCC trunk maintenance group for necessary corrective action.

5.38 Referrals from all sources will be logged and a trouble ticket initiated in the SCC trunk maintenance group for analyses and corrective action if a ticket does not exist from other sources. If one does exist, note the ticket with the reported failure. Procedures to clear the trouble should be followed according to the type of trunk involved as outlined in Part 5 of this section. Every effort that can be made from the SCC to clear the trouble should be tried before dispatching any trouble to the CO craft personnel. After corrective action has been completed, the trouble ticket and log should be closed, outage time should be computed as required, and a notification call to provide completion information should be made to the source of the report.

6. TRUNK SECTIONALIZATION AND TESTING ASSISTANCE

6.01 The recommended procedures for sectionalizing operational troubles on outgoing trunks are given in Fig. 18 through Fig. 26 and described in the following paragraphs. Since the flowcharts are largely self-explanatory, descriptions of individual figures are not given.

OUTGOING TRUNKS

A. Cable Trunks

6.02 ***Open:*** To check the cable trunks, place a short through the coils at the outgoing cable pair, if the trunk passes through at least one manned intermediate office. If the short can be seen using the trunk test console, the open is between this intermediate office and the terminating office. If the loop cross cannot be seen, the trouble is between this intermediate office and the originating office. By checking one point, a significant portion of the trunk can be eliminated as the source of the trouble. If the trouble is in the CO, go to Step (1). If the trouble is in the cable, go to Step (2).

(1) ***CO Trouble:*** In the case of a trunk open in the originating CO, make certain that the trunk proves good by placing a short at the equipment exit point (T&R leaving UT/MT frame), before requesting assistance from the frame forces.

(2) ***Cable Trouble:*** In the case of a trunk open in the cable pair, notify the appropriate group to correct the trouble. A new pair will probably have to be obtained. When the new pair is received, notify the locations that control the work of changing the pair. Ensure that all trunk records are updated.

6.03 ***Short or Foreign EMF (FEMF):*** Have the coils removed at the midpoint of the trunk if the trunk passes through at least one manned intermediate frame. If the trouble condition disappears, the trouble is between this frame and the terminating equipment. If the trouble condition remains, the trouble is between this frame and the origination equipment.

6.04 If the trunk is crossed or grounded in the originating office, make certain that the trunk proves good at the equipment exit point. If a plug-in unit, remove the trunk unit from the UT frame.

> ***Note:*** Before pulling the trunk unit, make certain that the other trunk assigned to the plug-in unit is made busy and is clear of traffic.

If the trunk is on an MT frame, remove the T&R crosswire at the MT. This proves all equipment, cable, and crosswire from the TSF to the UT/MT frame.

6.05 ***No Wink:*** With normal conditions on the tip and ring (if not sure what the correct conditions should be, compare to another trunk which is known good in the same group), have coils pulled or opened at the terminating office. The pair should look clear, open, and balanced. If a trouble condition is observed, follow the procedure described in paragraph 6.03 for short or FEMF. If the facilities check good to this point, refer the trouble to the terminating office or Trunk Control Center. If the terminating office is an ESS, have them check for maintenance busy or held to another trunk.

6.06 ***Won't Complete to Test Line:*** Test the outgoing trunk equipment by using the substitute trunk test if the defective trunk is an SD-1A165 trunk. If the trunk tests good using the substitute trunk test circuit, the originating trunk equipment should be considered defective. If the substitute trunk test fails, refer the trouble to the terminating office unless the trunk does not require a sender. In this case, have the coils pulled or get an open plug at the terminating office and check for a clear, open, and balanced condition. If the trouble condition is observed, follow the procedure described in paragraph 6.04 for crossed or grounded trunks.

6.07 ***Fails Program Controlled Diagnostic:*** If the retest results are STF (some tests fail), the printed results must be analyzed using TLM-1A001 and/or PK-1A045 (if raw data are available). Anyone not familiar with the use of these documents should refer associated problems according to local practices. The substitute trunk test can be used to isolate the trouble into or out of the plug-in unit, associated wiring, and ferrods. ***Any printout analysis indicating possible supervision failures (a cause of cutoffs) should be dealt with according to paragraph 6.08.***

6.08 ***Cutoffs:*** If a test call is placed from the trunk test console over a trunk causing cutoffs, the connections will not be torn down when the cutoff occurs. The cutoff indication is given by the MTL lamp at the STTP but cannot be seen by the remote trunk test console. Therefore, the trunk ferrods should be displayed using the CC No. 1A/2A or SCC console equipment. Place a call to a charge test line or if none are available, to a telephone set in the terminating office, over the suspected trunk. When the call is answered, the ferrods in the trunk under test should not be lighted (representing an off-hook condition). Observe the lamps for at least 1 minute. If either is lighted or becomes lighted during this time, a cutoff has occurred. If the line-side ferrod is lighted, the trouble is in the originating office. If the trunk-side ferrod is lighted, the trouble is in the terminating office. Some possible causes are:

(a) Double reversal of crosswire at originating end; one reversal at the trunk distributing frame (TDF) and the other at the main distributing frame (MDF) or the intermediate distributing frame (IDF).

(b) Defective scanner or scanner ferrods associated with trunk

(c) Defective trunk at originating office

(d) Trunk crossed at some point with another trunk

(e) Wrong wiring options in trunk equipment at terminating office

(f) Defective trunk equipment at terminating office.

6.09 ***Can't Hear, Poor Transmission:*** Usually, a standard 1000 Hz loss test using the PCI will identify a trunk with this problem. However, this may not be true if the trunk terminates in an ESS office whose generic program is CTX-7 or earlier. In this case, the incoming trunk unit is in the bypass state and a trunk-to-trunk connection is established to the tone trunk. With the incoming in the bypass state, its transmission equipment (capacitor and inductor) is bypassed and not tested. To circumvent this problem, make a test call to a telephone in the terminating office and talk over the trunk. A trunk with transmission bad enough to generate subscriber reports should be obvious.

B. Carrier Trunks

6.10 ***Open:*** A trouble in the carrier trunks would exist between the originating trunk equipment and the originating channel unit in the carrier system. The originating channel unit should be checked to ensure that it is fully seated in its appropriate connectorized slot. If it is in place, a continuity check should be made through the originating trunk equipment by placing a short on the tip and ring leaving the equipment for the transmission and signaling facilities.

6.11 ***Short or FEMF:*** This trouble would exist between the originating trunk equipment and the originating channel unit in the carrier system. The originating carrier channel unit should be removed. If this does not clear the trouble, the originating trunk equipment (plug-in unit) should be removed. ***Make certain that the other trunk assigned to the plug-in unit is also made busy before pulling the trunk unit.*** If the cause of the trouble has not been identified, assume originating trouble.

6.12 ***No Wink:*** Refer to the terminating end to check for a wink at the carrier channel unit at the terminating end. If a wink is obtained at this point, go to the originating end channel unit to test for wink. Have the channel unit changed where a wink is not obtained.

6.13 ***Won't Complete to Test Line:*** Test the outgoing trunk equipment using the substitute trunk test, if applicable. If the trunk tests good using the substitute trunk circuit, the originating trunk equipment should be repaired or replaced. If the test still fails (trunk does not routine), refer the trouble to the terminating office.

6.14 ***Fails Program Controlled Diagnostic, Can't Hear, Poor Transmission, and Cutoffs:*** These troubles should be referred to paragraphs 6.07 through 6.09.

6.15 ***Noise, Howling, Chopped, Voice and/or Bad Data Transmission:*** These troubles are usually caused by faulty components in the carrier system and should be referred as required.

INCOMING TRUNKS

6.16 The flowchart for incoming trunk troubles (see Fig. 27) does not reference other flowcharts since it is assumed that the responsibility of the terminating offices is from the frame to the switch only. Therefore, no facilities troubles have to be sectionalized.

A. Cable Trunks

6.17 ***Open:*** Have a short placed at the T&R leaving the UT/MT frame. If the loop is not seen, check the T&R leaving the TSF. If the loop is seen, the TDF crosswire is open or the trunk unit is defective or missing (if plug-in trunk).

6.18 ***Short or FEMF:*** If the trunk is plug-in, remove the trunk pack. ***Make certain that the other trunk assigned to plug-in unit is also made busy before pulling the trunk unit. Make sure both trunks are idled after replacing pack.*** If the trouble still exists, the trouble is in TDF or TSF. If the trouble disappears, the trouble is the trunk unit or the crosswire to the cable pair.

6.19 ***No Wink:*** Check to see if the trunk is made busy. If made busy, find out why, if possible. Return the trunk to service as soon as possible. If not made busy, check to see if the trunk is on the high and wet (THAW) list. If the trunk appears on the THAW list, have the coils pulled at the MDF and check the state of the trunk. If the trunk is removed from the THAW list (after Audit 36 is run), refer the trouble to the control office as trouble out. If the trunk is not made busy and not on the THAW list, have the trunk checked at the output of the T&R from the UT/MT frame. If the sender is seen at this point, refer back to the control office.

6.20 ***Fails Program Controlled Diagnostic:*** If the tests results are STF, the printed results must be analyzed using TLM-1A001 and/or PK-1A045 (if raw data are available). Anyone not familiar with the use of these documents should refer associated problems according to local instructions. Make sure the trunk looks clear and balanced out and that a sender is seen, if required. If these conditions are met, the trunk pack (if UT trunk) should be repaired or replaced.

6.21 ***Cutoffs:*** Repair or replace the trunk unit. Ferrods may be displayed during a call using Control Console 1A/2A or SCC console.

6.22 ***Can't Hear, Poor Transmission:*** If the terminating office is on Generic Program CTX-7 or earlier, the incoming trunk unit is in the bypass state when tested to a standard 1000 Hz tone line. Therefore, the transmission equipment (capacitor and inductor) is bypassed and not tested. To circumvent this problem, have a test call made to a telephone in the terminating office from the control office. A talk test should determine if a trouble exists.

B. Carrier Trunks

6.23 ***Open in CO, Short or FEMF, No Wink, Fails Program Controlled Diagnostic, Cutoffs, Can't Hear, Poor Transmission:*** See information on cable trunks, paragraphs 6.17 through 6.22.

6.24 The only difference is that when looking out on the trunk, normal conditions for T-Carrier trunks are as follows:

MF (D1) 0 volt tip or ring — 100K tip or ring (HI OHMS)

MF (D3) 39 volts tip — 70K tip
MF (D3) 36 volts ring — 16K ring (HI OHMS)

Conditions other than these would indicate trouble.

6.25 ***Trunk Group Troubles:*** The two types of trunk group troubles from TOS list processing are (1) a large number of trunks on today's test, and (2) a small number of trunks that reappear on the list each day over several days. By diagnosing the group, manually placing a test call over the trunks, or looking for battery and ground and a wink, the cause of the trouble should be determined to be one of the following:

(a) Incorrect data in the ATT (Automatic Test Table)

(b) Defective far-end test lines

(c) Incorrect ATT entry in the trunk group translations

(d) Defective common facilities

(e) Defective originating or terminating equipment

(f) Incorrect Trunk Class Code (TCC) or Supervisory Program Index (SPI) data.

6.26 ***Identifying ATT Errors and Bad Far End Test Lines:*** If a trunk group has a ticket written against it and all trunks of that group on the list fail diagnostic tests, improper conditions applied during diagnostic tests may be the reason. This may be due to one of two items. First, it may be that diagnostic tests are being attempted to a termination at the far end office other than the proper test line. This would cause failure of the diagnostic test and removal of trunks from service during automatic progression testing. The cause in this case is an incorrect far-end directory number being outpulsed because the wrong number is stored in translations. The second possibility is a malfunctioning test line at the far-end office, also causing failure of the test.

6.27 Perform the following steps for checks on far-end test lines. Refer to Fig. 28 for a flowchart.

(1) Place a test call to the appropriate far-end test line used in the 00 diagnostic test and listen to the response. Do this on several trunks in the group. If some or all do not pass, there is a trunk group trouble or a malfunction in one or more of the far-end test lines.

(2) To determine if the fault is in the test lines, test calls to another type of far-end test line (such as permanently busy) may be placed and/or transmission tests using the PCI may be made.

(3) If the trunks generally pass the tests in Step (2), the trouble is probably with the far-end test line used in the 00 diagnostic. Refer trouble to the far-end to check the test line. If the trunks fail these tests, a trunk group trouble is likely.

(4) If all test calls to the 00 DG test line appear to pass test, hold one test call and request a 00 diagnostic via TTY input message for several trunks on the TOS list. If these ATP where they previously failed the 00 diagnostic, the trunk group should be cleared as NTF. If the diagnostic fails, investigate the possibility of a wrong number stored in translations, using the procedure in paragraphs 6.28 through 6.31. If the ATT is correct, the trouble is in the far-end test line used in the 00 diagnostic.

6.28 To determine the ATT number assigned in translations, enter the on-line mode to the office and enter the following message:

VFY-TKGN-14 bbb.

Where **bbb** is the trunk group number.

6.29 The response, **TR10**, will include the ATT number if it is 6 or less. See OM-1A001. If it is 7 or more, 7 will be printed and the TGN AUX block address, also given in TR10 in octal form, must be used. Add 1 to this address and enter the following message:

T-READ-XXXXXXX 01.

Where **XXXXXXX** is the value obtained.

6.30 The system response, **TW02**, will be an 8-digit octal number. The last 3 digits indicate the ATT number. Convert this octal number to decimal.

6.31 Compare this decimal ATT number assigned in translations to the value shown on Form

ESS-1504. Also, compare the far-end test line number shown on Form ESS-1505 to the number used for manual test calls. If they disagree, investigate and correct.

TIE TRUNKS

6.32 Since many tie trunks are 2-way trunks, the trunk trouble could be either outgoing or incoming. The trouble sectionalization should be done by the control point for the trunk. The flowchart for E&M or F-type tie trunks is shown in Fig. 29.

6.33 Since this type of trunk is connected to an applique circuit, normal DC sectionalization cannot be done using the trunk test console. The normal trouble would be no sender. If control for the trunk is in another group, the sectionalization would be done by that group.

SERVICE CIRCUITS

6.34 If the service circuit fails the diagnostic, look up the trouble number in TLM-1A001. Test circuit troubles can result in service circuit failures. If the trouble number does not exist in the TLM, request a raw data printout. The raw data should be analyzed with PK-1A045. For intermittent troubles, consider the use of a 32 repeat diagnostic test. Anyone not familiar with the use of these documents should refer the trouble according to local practices. Part 8 provides information concerning several common service circuit types.

TRANSMISSION TROUBLE SECTIONALIZATION PROCEDURES

6.35 The recommended procedure to be followed to sectionalize a transmission trouble reported by CAROT or by other routine transmission tests is shown in Fig. 30. This procedure is also used in shooting an operational trouble caused by poor transmission. It should be noted that milliwatt tones applied at frames and other locations are measured at the No. 1 and No. 1A ESS office using the PCI via an input TTY message (see Part 8). ESS Output Message AT01 will indicate the test results. Milliwatt may also be applied at the ESS office via an input TTY message (see Part 8). Craft personnel at frames and other locations may then measure the received level and report the result to the SCC.

TESTING ASSISTANCE

6.36 A specific directory number should be assigned to receive incoming calls for trunk test assistance for each CO. Each directory number may be assigned to handle several COs to coincide with the assignment of trunk trouble referrals and reports. These assignments should be published or otherwise be made available to other work forces so that the number to call for assistance for a particular CO will be well known. The various numbers should be assigned to hunting groups so that incoming calls to lines that are busy will be directed to a clerk or another work station which will pass the request to the work station assigned to the CO or satisfy the request if possible. Pickup from any work station should be possible.

6.37 The purpose of the incoming call will generally be to obtain information concerning a trunk or to apply a test condition to a trunk or trunks. Often, the required information can be obtained from the records listed in Part 3, while test conditions can be applied using the methods described in Section 190-130-203.

7. TRUNK ORDERS

7.01 Trunk order coordination consists basically of arranging for work to be completed on the order, monitoring the status of the order, and closing out of the order. It is recommended that this job be combined with trunk order completion testing to consolidate, as much as possible, the overall responsibility for an order to a single individual and to reduce the amount of administration associated with routing and coordinating work. For the same reasons, trunk order translations of an ordinary nature may be done by trunk order coordination while more complex translations associated with new trunk groups may be done by a separate group with individuals who are responsible for such translations.

7.02 Each trunk order will fall into one of two classifications of responsibility. First, the SCC can be the control location for the order. In this case, the Trunk Operations group has overall responsibility for the order and working with all locations that must do the work. Second, the SCC is not control for the order but does control the work done by its own organization. In this case, Trunk Operations is responsible for forwarding its

completion information and jeopardy reports to the location having trunk control.

7.03 The trunk order flow for adds, deletes, and rearrangements is shown in Fig. 31, Fig. 32, Fig. 33, and Fig. 34. Figure 31 illustrates the procedure that initially applies to adds, deletes, and rearrangements. Figure 32 is the trunk order flow for trunk additions. Figure 33 applies to trunk deletions, and Fig. 34 applies to trunk rearrangements. These figures assume that completion testing and trunk order translations are done by the trunk order coordination person.

7.04 Upon receipt of the trunk order, the person responsible for trunk order coordination logs the order on the Trunk Order Log (see Fig. 35) which is kept on an SCC basis. A Work File Face Sheet, Form E-10210, is then initiated. If the SCC is responsible for the offices at both ends of the trunk, a face sheet is made out for each end. As each item of work on the order is completed, an entry is made on this form. More information on the Work File Face Sheet may be found in Section 190-130-130.

7.05 The data on the trunk order is checked against existing records to identify obvious errors. If any are detected, a DVA jeopardy report should be made. The trunk assignment group or other group responsible for initiating the order should be contacted, the error resolved, and the trunk order corrected prior to the DVA date. If the order is corrected before the DVA date, the DVA jeopardy in TIRKS should be cleared. Record verification should be entered on the face sheet.

7.06 The translations currently associated with the trunks in the No. 1/1A ESS machine should be checked against the data on the trunk orders. This requires that appropriate verify messages be entered. Depending upon work load, this could be done now or at a future date but no later than the day before DVA.

7.07 The trunk order coordination person should enter the verify messages and examine the responses. The trunk circuit location and the TCC in the TR14 response should be compared to the values indicated on the trunk order. The TGN should be 0 (zero) for trunk additions. The SPI should be correct. If a discrepancy exists, a DVA jeopardy report should be entered in TIRKS. The trunk assignment group or other group responsible for assignments should be contacted, the discrepancy resolved, and the trunk order corrected prior to the DVA date. It may then be necessary to enter recent change messages to correct the discrepancy. If the discrepancies are corrected prior to the DVA date, the DVA jeopardy in TIRKS should be cleared.

7.08 If no discrepancies are found on the trunk order, a DVA completion report should be made. This report can be entered prior to DVA. The noncontrol SCC should report the DVA no later than the day before DVA. On DVA, the control SCC should review the status of each location associated with the circuit.

7.09 If TIRKS is present, the TIRKS Circuit Order Control (COC) module has an Order Status Report (CCSTATI) which displays the completions and jeopardies associated with each work location. If all work locations have posted a DVA completion, the control SCC should post DVA completion at the order level.

7.10 If any work locations have not reported or a jeopardy is posted, the control SCC should contact the work location to establish the reason and the resolution of the jeopardy. If the jeopardy is resolved, a DVA completion should be posted for the order; otherwise, the control SCC should post a DVA jeopardy at the order level and indicate the reason.

TRUNK ADDITIONS

7.11 If the trunk order requires a new trunk group for which translations are not built or a new CGA number, a work request and a copy of the changes needed should be routed to dispatch for loading to translations. The person in translations who is assigned the order constructs and enters the required recent change (RC) messages and coordinates necessary card writing and/or wiring of a CGA to a scan point through dispatch. The trunk order coordination person should be notified when trunk group translations are completed. This would then be entered on the face sheet.

7.12 When translations for the spare trunk are correct, a work request may be issued for field work. This requires that certain physical work be done on site at the CO. For the switch portion of the order, a check should be made to

ensure that the TNN is wired correctly to the trunk circuit location on the Trunk Distributing Frame. If the SCC is responsible for frame or facility terminals, this wiring may also be required. A work request for loading this work should be routed to dispatch.

7.13 When dispatch has assigned the order to the field, the field person completes the required on-site work. Dispatch routes the completion back to trunk order coordination where the face sheet is updated.

7.14 The procedure to follow depends on whether the far-end office operates with the improved trunk maintenance states of locked-out and disabled. If it does, the procedure is simpler and allows the omission of certain steps which are indicated by dotted boxes on Fig. 32. In the following description, these steps will be indicated by brackets [ ] around the steps. It is assumed that the near-end office operates with the improved states.

7.15 If the trunks are 1-way incoming, they may now be moved into their trunk group and placed in-service. This requires that the trunks be placed in the maintenance busy state, moved, then placed active or in-service.

7.16 If the trunks are 2-way in traffic usage but not controlled by the SCC, the trunk order coordination person should wait for the request from trunk control. When this is received, the near end should place the trunks in the locked-out state and move the trunks to the proper trunk group. The near end is left in the locked-out state. The control end may then perform the required completion tests. Upon satisfactory completion of such tests, the noncontrol end of 2-way trunks will be requested to perform completion tests. [If the far end does not have the improved trunk maintenance states, the trunks must be placed in service there to allow the tests.] If the trunks pass, the completion should be forwarded to the control end. The trunks should be assigned to a CGA if required; the associated RC messages should be entered; and the trunk should be placed in service. If a trunk fails test, it should be placed out of service at the control end. It should be repaired and the completion tests made.

7.17 If the SCC is controlled for the trunks, it should receive notification from any work group that will not have its required work on the trunks completed by the PTD. On the PTD or sooner, preliminary tests with the DC voltmeter may be made to verify the completion. If the trunks do not pass all tests, trunk order coordination should follow up to get the problems corrected. At this time, the trunks are in TGO in the active or in-service state. If the trunks are 2-way, the noncontrol end should be contacted to either place the trunks locked out or in service. Those required circuit order tests, as specified in Section 660-450-301 that can be made in TGO, should be made by trunk order coordination. With the exception of dial pulse (DP) trunks, all circuit order tests can be made from the SCC. For DP trunks, trunk order coordination will have to request that overall pulsing tests be made by the field forces. Those trunks that do not pass test should be sectionalized and corrected by the person doing the tests. [If trunks are 2-way trunks, they should be taken out of service at the far end.] The trunks at the near end should then be placed in the locked out or maintenance busy state and moved to their trunk group.

7.18 The remaining completion tests should then be made. Those trunks that do not pass test should be sectionalized and corrected by the person doing the test. [If trunks are 2-way trunks, they should be taken out of service at the far end.] If the trunks are not 2-way and they pass completion tests, they should be assigned to a CGA, if required. The associated RC messages should be entered and the trunks should be put in service by the person doing the tests. If the trunks are 2-way, the noncontrol end should then be called for completion tests from that end. When the far-end reports satisfactory completion of the tests, the control end should assign the trunks to a CGA, if required. The associated RC messages are then entered and the trunks are placed in service. Trunk order coordination should report the completion. If the trunks will not be placed in service before the Due Date (DD), a DD jeopardy report should be made.

7.19 The face sheet should be closed out. The records should be updated and filed and the entry on the trunk order log closed out.

TRUNK DELETIONS

7.20 On the Due Date (DD), at an agreed-upon time, 1-way outgoing trunks should be placed locked out or out of service. Two-way and incoming

trunks should be placed disabled or out-of-service. It is important that work on the order by responsible work groups not be initiated until the trunks are first removed from service. Normally, the wiring should begin to be removed the day after DD and should be completed before the Inventory Available Date (IAD). When the trunks are removed from service, the translation RC messages are entered by the trunk coordination person and the face sheet is updated. Also, if the SCC organization is responsible for any frame or facility work associated with the order, a work request is initiated and routed to dispatch for loading to the field. When this work is completed, the trunk order person is notified by dispatch.

7.21 If the SCC does not control the order, its work on the order is now completed. If the SCC is control for the order, the completion should be reported. The face sheet should be closed out, the trunk records filed, and the trunk order log closed out.

TRUNK REARRANGEMENTS

7.22 Rearrangements include changes in switching assignments or changes in facility assignments or both. It is essential that rearrangement notices involving only facility changes be received by the SCC for controlled trunks and noncontrolled 2-way trunks. This is necessary so that CGA translation changes can be entered and the trunk records can be updated for controlled trunks for aid in sectionalization of troubles.

7.23 It is important that work on the order by responsible work groups not be initiated until after the trunks are first removed from service. If the SCC is control for the order, the other groups with work responsibility for the order should be contacted and start dates for the work should be obtained. This may be done by a clerk if one is assigned to this task. The dates should be entered on the face sheet.

7.24 On or before the agreed-upon date and time (which should be before the PTD), 1-way outgoing trunks should be placed locked out or out of service. Two-way and incoming trunks should be placed disabled. When this is done, any required translation RC messages associated with changing the switch assignments of the trunks should be entered by the trunk coordination person and the face sheet should be updated. These messages may include removal from a CGA, moving the trunks to TGO, changing the peripheral equipment, and placing active or in-service in TGO. The messages will not be necessary if only the facility is to be changed. Also, if any field work associated with the order (TDF, frame, facility, etc) is required, a work request should be initiated and routed to dispatch for loading to the field. When this is completed, the trunk order coordination person should be notified by dispatch.

7.25 If the trunks are 1-way incoming, they may be moved into their trunk group and placed in service. This requires that the trunks be placed in the maintenance busy state, moved, then placed active or in service.

7.26 If the trunks are 2-way in traffic usage but not controlled by the SCC, the trunk order coordination person should wait for the request from trunk control. When this is received, the near end should place the trunks in the locked out state and move the trunks to the proper trunk group. The near end is left in the locked-out state. The control end may then perform the required completion tests. Upon satisfactory completion of such tests, the noncontrol end of 2-way trunks will be requested to perform completion tests. [If the far end does not have the improved trunk maintenance states, the trunks must be placed in service there to allow the tests.) If the trunks pass, the completion should be forwarded to the control end. The trunks should be assigned to a CGA if required, the associated RC messages should be entered, and the trunk should be placed in service. If a trunk fails test, it should be placed out of service at the control end, repaired, and the completion tests made.

7.27 If the SCC is controlled for the trunks, it should receive notification from any work group that will not have its required work on the trunks completed by the PTD. On the PTD, preliminary tests with the DC voltmeter (or otherwise) may be made to verify the completion. If the trunks do not ATP, trunk order coordination should follow up to correct the problems. If the trunks are 2-way, the noncontrol end should be contacted to place the trunks locked out or in service there. If only facility changes are called for by the order, the required completion tests specified in Section 660-450-301 should be made. If switching changes were required by the order, then at this time, the trunks are in TGO in the

active or in-service state. Required circuit order tests, as specified in Section 660-450-301, that can be made in TGO should be made by trunk order coordination. With the exception of DP trunks, all circuit order tests can be made from the SCC. For DP trunks, trunk order coordination will have to request that overall pulsing tests be made by the field forces. Those trunks that do not pass test should be sectionalized and corrected by the person doing the tests. (If trunks are 2-way trunks, they should be taken out of service at the far-end.) The trunks at the near-end should be placed in the locked out or maintenance busy state and moved to their trunk groups.

7.28 The remaining completion tests should be made then. Trunks that do not pass test should be taken out of service at the far end if 2-way and should be sectionalized and corrected by the person doing the test. If the trunks are not 2-way and they pass completion tests, they should be assigned to a CGA if required, the associated RC messages should be entered, and the trunks should be put in service by the craft person doing the trunk order tests. If the trunks are 2-way, the noncontrol end should be called for completion tests from that end. When the far end reports satisfactory completion of the tests and the trunks are in service, the control end should assign the trunks to a CGA if required, enter the associated RC messages, and place the trunks in service. Trunk order coordination should report the completion. If the trunks will not be placed in service before the Due Date (DD), a DD jeopardy report should be made.

7.29 The Work File Face Sheet should be closed out. The records should be updated and filed and the entry on the trunk order log closed out.

8. GENERAL TROUBLE ANALYSIS INFORMATION

ANALYZING REVERTIVE PULSE TRANSMITTER RELEASES

8.01 To analyze Revertive Pulse (RP) transmitter releases properly, the incoming and final selections must be obtained from the called number. To accomplish this, the following method can be employed:

FAILING NUMBER = 3792

(1) Divide the first digit of the failing number by 2 (3/2 = 1 with a remainder of 1). Incoming brush (IB) = 1 (answer, not remainder).

(2) Including any remainder from Step 1 division, divide the second digit by 5 as follows:

(17/5 = 3 with a remainder of 2)

Incoming Group (IG) = 3 (division answer)

Final Brush (FB) = 2 (remainder).

(3) The last two digits of the failing number are the last two final selections:

Final Tens (FT) = 9

Final Units (FU) = 2.

8.02 When analyzing RP failures, the following points should be considered:

(1) Does the trunk fail to only one particular IB? If so, test calls to numbers with other IB selections will be useless.

(2) Are the failures always selecting the same IG?

(3) If several trunks on the same incoming frame are failing, check to see if the same final frame is always involved. If the final frames are different, suspect the incoming frame.

(4) If the same final frame appears on several printouts, the problem could be a final selector. Routine to a test number located on the same final frame and as close to the failing numbers as possible. Hold the first failing test call to trace and identify the failing final selector.

MF FAILURES

8.03 In the case of MF failures where no patterns are obvious, consider the possibility of defective receiving equipment at the distant end unable to detect one frequency which may be common to several different digits.

8.04 MF signaling uses a group of six frequencies in the speech band. A valid signal consists of exactly two of these frequencies and a signaling code known as the two-out-of-six code. There are 15 valid combinations which can be used as digits (to identify called customer directory numbers) or other signals.

GENERAL INFORMATION — NO. 1 CROSSBAR

8.05 Explanations of MF and revertive pulse calls into No. 1 crossbar are similar to those given for No. 5 crossbar except for the following:

(1) A "T" relay in the trunk performs the functions of the CO relay in addition to providing for supervision.

(2) Terminating senders instead of incoming registers receive the pulses from the distant office.

(3) The connection between an incoming trunk and a terminating sender is through a sender link.

GENERAL INFORMATION — NO. 5 CROSSBAR

A. General

8.06 The following list would be helpful for trouble detection and sectionalization for No. 5 crossbar offices:

(1) Equipment which receives pulsing information on an incoming call is an incoming register.

(2) Any given incoming trunk has access to a maximum of 10 incoming registers through an incoming register link.

(3) An incoming trunk prefers incoming registers in a given order dependent upon which horizontal group the trunk appears in the incoming register link frame.

(4) In a light load period, there is a good chance that a given trunk will always seize the same incoming register because of the preference per paragraphs 8.03 and 8.04.

(5) MF receivers are wired, one for one, directly to MF incoming registers.

(6) Any given outgoing trunk has access to a maximum of 10 outgoing senders.

(7) There is no order of preference for outgoing senders.

(8) If an MF incoming register does not receive a KP signal or any digits or receives some digits with no start pulse, it will time out in 19-37 seconds and a marker will set the incoming trunk to reorder.

(9) An MF incoming register (through a marker) will cause an incoming trunk to be set to reorder immediately:

- If three frequencies are received.
- If an incorrect number of digits followed by a start pulse is received (for example, the trunk requires 4 digits to be received but 3 or 5 plus a start pulse are received).

(10) There will ***not*** be a trouble card for conditions in paragraphs 8.09 through 8.16 unless the terminating reorder trap is activated.

(11) With MF pulsing, a low level can cause mutilated digits.

(12) A marker receiving mutilated digits from any type of incoming register will cause a trouble record to be taken and then set the incoming trunk to reorder.

B. MF Incoming Wink Start—No. 5 Crossbar

8.07 The following list provides checks for an MF incoming wink start. Refer to Fig. 36.

(1) "V" wiring should be used if external circuit loop is 3115 ohms or under (SD-26070).

(2) Circuit idle and at seizure—battery on the ring (on hook):

- Battery through primary winding of A relay in trunk to ring of line.
- Ground directly (V wiring) to tip of line through normal CO relay or through secondary winding of A relay in trunk (V wiring not used).

(3) Trunk seized and incoming register attached—battery on the tip (off hook):

- The CO relay in the trunk is operated by the incoming register and removes the trunk A relay from across the T&R. Battery and ground are then furnished through the winding of the A relay in the incoming register and through the normal contacts of the RV relay to the tip and ring with battery on the tip.

(4) Incoming register ready to receive pulses—battery on the ring (on hook):

- When the incoming register is ready to receive pulses, the RV relay operates (operate time of the RV is 140-290 milliseconds) the wiring battery and ground and again places the battery on the ring.

(5) Incoming register functions completed—ringing period battery on the ring:

- When the incoming register has received all of the digits, it removes its own A relay from across the tip and ring (T&R) and operates the D relay in the trunk. The D relay in operating reconnects the trunk A relay across the T&R (both windings whether or not V option is used) with battery on the ring.

(6) Called subscriber answers—battery on the tip:

- When the called subscriber answers, the T relay operates reversing battery and ground to the line, placing battery on the tip.

C. Revertive Pulse—Incoming

8.08 The following are checks for the revertive pulse incoming on the No. 5 crossbar. Refer to Fig. 37.

(1) Circuit idle and at seizure—battery on the tip.

- Battery through the primary winding of the A relay and B resistor in parallel in the trunk to the tip of the line.
- Ground through the secondary winding of the A relay and the A resistor in parallel to the ring of the line.

(2) Trunk seized and incoming register attached and ready to pulse—battery on the tip:

- The CO relay in the trunk is operated by the incoming register, removing the trunk A relay from across the T&R:
- Battery and ground are then furnished by the register through the windings of the L and STP relays in series, with battery connected to the tip.

(3) Completion of final pulse—battery on the ring:

- On completion of the final pulse, the RV1 relay in the register operates to place a short across the T&R. The RV2 then operates removing the short and sending reverse battery toward the originating end battery on the ring.

(4) Incoming register functions completed—ringing period—battery on the tip:

- After the reversal on completion of the final pulse, the register opens its own T&R and operates the D relay in the trunk. The D relay, in operating, reconnects the trunk A relay across the T&R with the A and B resistors no longer shunting the windings of the A relay. Battery is on the tip.

(5) Called subscriber answers—battery on the ring:

- When the called subscriber answers, the T relay operates reversing battery and ground to the line, placing battery on the ring.

STEP-BY-STEP ANALYSIS

8.09 The following paragraphs provide general checks for trouble detection and sectionalization in a step-by-step office. Refer to Fig. 38, Fig. 39, and Fig. 40.

8.10 No start signal is required for pulsing into a step-by-step office because each incoming trunk has an incoming selector switch (or transmission

selector switch) directly associated with it which accepts the first digit.

Note: Some incoming selectors can be arranged to absorb digits (in effect, deleting them) which means that more than one digit may be pulsed into some incoming selectors but only the last digit into the switch will direct the call toward the called number.

8.11 Selectors (incoming, transmission, intermediate, etc) are switches which step vertically (up to ten levels) under control of the originating office, DP sender, or transmitter. A relay in the switch follows the DP pulsing and in turn, pulses a magnet which steps the switch vertically. Another magnet steps the switch in a rotary direction on a level under control of circuitry within the switch. That is, the rotary motion is not controlled by the DP sender. Each selector accepts one digit except as noted previously.

8.12 Connectors accept the last two digits of the called number. They step both vertically (next to the last digit) and rotary (last digit) under control of the originating office sender or transmitter and again, a relay in the switch follows the DP with mechanical motion caused by the stepping of magnets. Completion of the last pulse causes the connector to rest on the terminals (T, R, and S), representing the called number, where it tests for a busy condition. If the called number is busy, the connector supplies 60 IPM busy tone toward the calling end. If the called number is idle, the connector supplies ringing current toward the called number and audible ringing toward the calling number.

8.13 Talking battery and supervision are furnished by the connector in a nontoll train; in a toll train, either a toll transmission selector or a trunk furnish talking battery and supervision. Toll trains are not normally used for local office to local office trunks, but there are areas where the toll trains have been used in this manner.

8.14 Selectors in stepping rotary on a level are searching for an idle succeeding selector (one out of ten) or for an idle connector (one out of ten). If all ten selectors (or connectors) associated with the level are busy, the selector will step to the eleventh rotary position. In this position, the selector supplies 120 IPM reorder tone to the calling end. There should be no flash with the tone and no off-hook signal.

8.15 Unused levels on selectors may have the first one or two positions on the level wired to intercept trunks with the remaining positions made busy. Or the whole level may be made busy causing the selector to step to the eleventh rotary position if this level is dialed.

8.16 Selectors (other than transmission selectors) furnish battery and ground through the windings of a relay to the T&R, respectively. This relay operates on seizure and follows the pulses, as received, from a sender or transmitter and causes the selector to step vertically. When the selector cuts through to the succeeding switch (selector or connector), it operates a relay which removes its own pulsing relay from across the T&R and provides a clear T&R path to the pulsing relay of that succeeding switch. Transmission selectors have a relay connected across the T&R which follows all pulsing, stepping the transmission selector itself to the level representing the first digit. It then repeats pulses to the remaining switches in the train with cut through by succeeding selectors as described for the local train.

CROSSBAR TANDEM—MF INCOMING WINK START

8.17 The following list consists of procedures to check a crossbar tandem MF incoming wink start. Refer to Fig. 41.

(1) Circuit idle and at seizure—battery on the ring (on hook): Battery and ground through the windings of the A relay to the T&R, respectively.

(2) Trunk seized and sender attached—battery on the tip (off-hook): The T relay in the trunk is operated by the sender when it is attached. This removes the trunk A relay from across the T&R. Battery and ground are then furnished, through the winding of the L relay in the sender, through the normal contacts of the RV relay to the T&R with battery on the T.

(3) Sender ready to receive pulses—battery on the ring (on hook): When the sender is ready to receive pulses, the RV relay operates (the operate time of the RV relay is 140 to 264

milliseconds) reversing battery and ground and again placing battery on the R.

(4) Sender functions completed—battery on the ring: When the sender has received all of the digits and has then outpulsed, it operates the D relay in the trunk which in turn operates the D1 and D2 relays. The sender also releases the tip. With the relays in this condition, the trunk A relay is again connected to the T&R, but through the windings of the T repeat coil, with battery on the R.

(5) Called subscriber answers—battery on the tip: When the called subscriber answers, the CS relay operates, in turn, operating the tip. The tip relay in operating reverses battery and ground, placing battery on the tip toward the calling end.

511 TRUNK TO LOCAL TEST DESK (LTD)

8.18 The following trunk conditions are as seen from an originating office (ESS, No. 5 crossbar, etc). Refer to Fig. 42.

(1) Idle condition:

- T&R dry (open both sides)
- 48V on S.

(2) Seizure at originating end (by a ground on S lead) will cause flashing red (BY) lamp at LTD.

(3) Answer at LTD—red lamp changed to steady S lead transferred to sleeve of test pack, sleeve conditions now controlled by keys at LTD.

(4) Both ends disconnect but connection held from calling station to LTD for further testing:

- Ground on T
- Battery on R&S.

(5) Reseized at originating end (by station off-hook or loop across T&R) will cause flashing white (SP) lamp at LTD.

(6) Both ends disconnect on completion of testing DIS key operated at LTD—connects low resistance 142 ohms battery to S lead causing disconnect.

611 TRUNK TO LTD

8.19 The following information is provided concerning the 611 trunk. (Refer to Fig. 43 for circuit information for the LTD HI-LO supervision.)

(1) Idle condition:

- T&R dry - 13,000 ohms loop (plus cable).

(2) Seized:

- By originating office furnishing battery and ground.

(3) Talking condition:

- Loop drops to approximately 600 ohms (plus cable).

TRUNK TO OPERATOR AT SWITCHBOARD—NON-COIN

8.20 The following trunk conditions are as seen from originating office (ESS, No. 5 crossbar, etc) for trunks to an operator at a switchboard (non-coin) (refer to Fig. 44):

(1) Idle condition:

- T&R dry - 7500 ohms loop (plus cable).

(2) Seizure:

- The office is seized by originating office furnishing battery and ground across T&R.

(3) Operator answers:

- -48V on R
- Ground on T.

(4) Operator rings back:

- -48V on T
- Ground on T.

TRUNK TO OPERATOR AT SWITCHBOARD—COIN

8.21 The following trunk conditions are as seen from the originating office (ESS, No. 5 crossbar, etc) for an operator at a switchboard (coin). Refer to Fig. 45:

(1) Idle condition:

- T&R dry — 7500 ohms loop (plus cable).

(2) Operator answers:

- -48V on R

  Ground on T.

(3) Operator rings back:

- -48V on T
- Ground on R.

(4) Operator collects coin:

- -48V on T
- +130V on R.

(5) Operator returns coin:

- -48V on R.

9. REFERENCE DOCUMENTATION

9.01 The following documentation contains additional information on the subjects and systems mentioned in the SCC organization practices:

SECTION	TITLE
190-102-100	Generic 2—General Description
190-103-300	CAROT Center Operation and Administration—Duties and Responsibilities of the (CAROT)—Central and Remote Offices
190-103-311	CAROT Center Operation and Administration—Test Line Directory Maintenance Program—Operating Procedures
190-103-312	CAROT Center Operations and Administration—Trunk Maintenance File—Data Base Requirements
190-103-313	CAROT Center Operation and Administration—Trunk Maintenance File—General and Updating
190-103-314	CAROT Center Operation and Administration—Preparation for Routine or Demand Trunk Tests and Test Program—Operating Procedures
190-103-330	CAROT 1 Center Operation and Administration—Test Frame Tape —Generation and Updating.
660-402-300	Transmission Maintenance—Overall 1000 Hz Loss Measurements on Message Trunks
660-450-300	Trunk Order or Circuit Order Tests for All Types of Message Trunks—General Information
660-450-301	Trunk Order or Circuit Order Tests for All Types of Message Trunks Tests

Stored Program Control System:

No. 2 Switching Control Center System:

3600, 3601, and 3602	Engineering Planning Letters
190-110-110	Common Application—Description
190-110-310	Common Application—Hardware Operation and Reconfiguration
190-113-110	No. 1 ESS Application—Description and Operation
190-113-311	No. 1 ESS Application—Emergency Action Procedures
190-113-312	No. 1 ESS Application—Analysis of Network Failures and TN08 Messages.

SECTION	TITLE
190-113-315	No. 1 ESS Application—TN08 Message Analysis Procedures
190-113-310	No. 1 ESS Application—Operating and Diagnostic Test Procedure
190-113-312	No. 1 ESS Application—Analysis of Network Failures and TN08 Messages
Switching Control Center:	
190-130-010	SPCS-SCC CMP (available 4th quarter 1980)
190-130-110	Introduction, Planning and Implementation
190-130-112	Administrative Guidelines—Stored Program Control Section
190-130-115	Organizational Sizing of Switching Control Centers
190-130-120	Organization and Responsibility Guidelines
190-130-130	Administrative Procedures
190-130-131	Pricing Guides—Ordering Information
190-130-140	Work Schedule—Form E-6837—Preparation and Use
190-130-144	Stored Program Control System—Operational Review
190-130-146	Building and Power Alarms—Central Office Maintenance
190-130-150	Load and Work Time Record—Form E-6843
190-130-160	Work Load and Force Measurement Plan
190-130-201	Trunk Maintenance Package (TRUMP)—Switching Control Centers—Operations Support Systems (available second quarter 1981)
190-130-203	Remote Trunk and Line Procedures Using Remote Trunk Test Interface (SD-1A485-01)—Switching Control Centers—Operations Support Systems (available first quarter 1981)

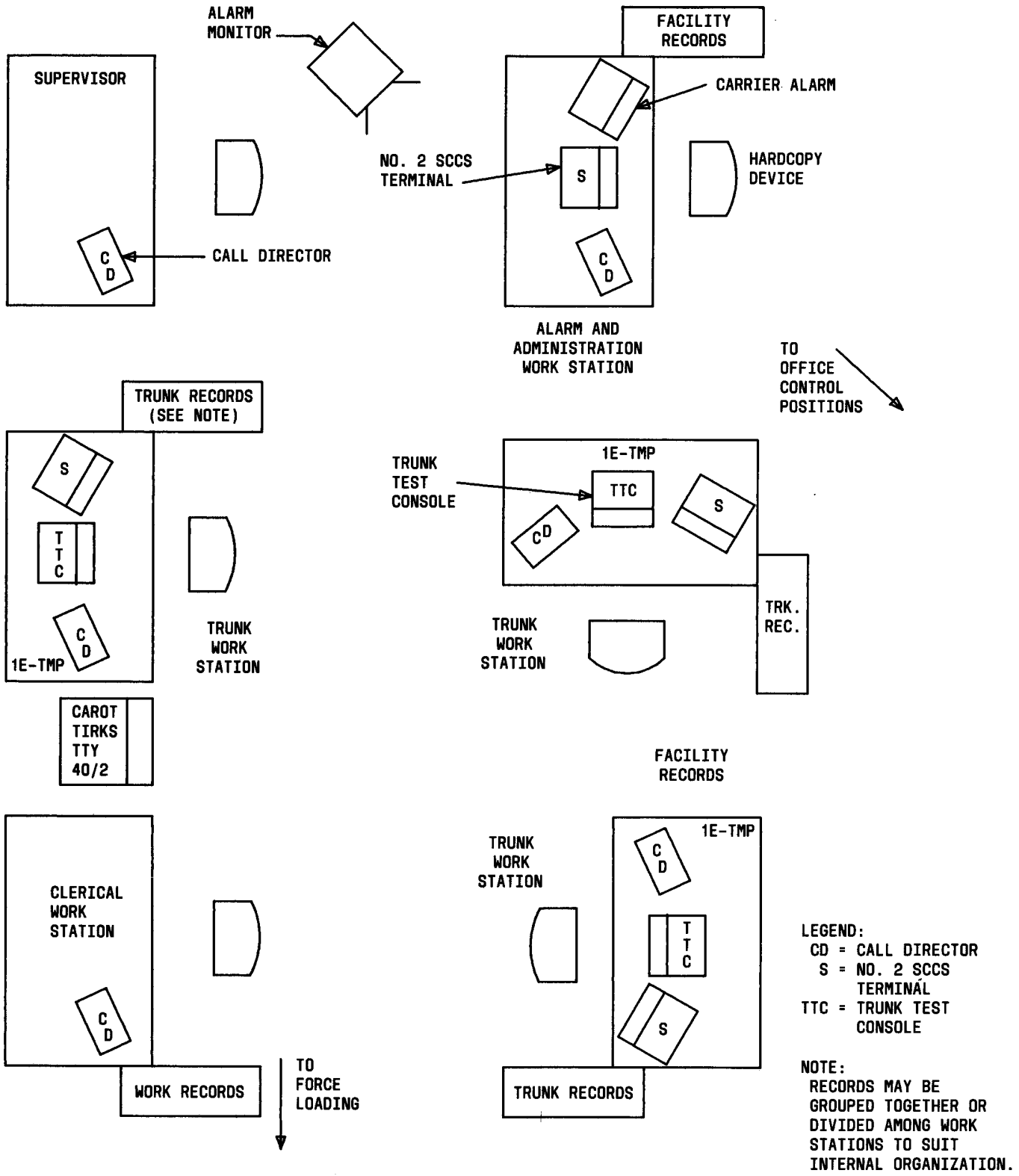


Fig. 1—SPCS-SCC Trunk Maintenance Area Layout (2.01)

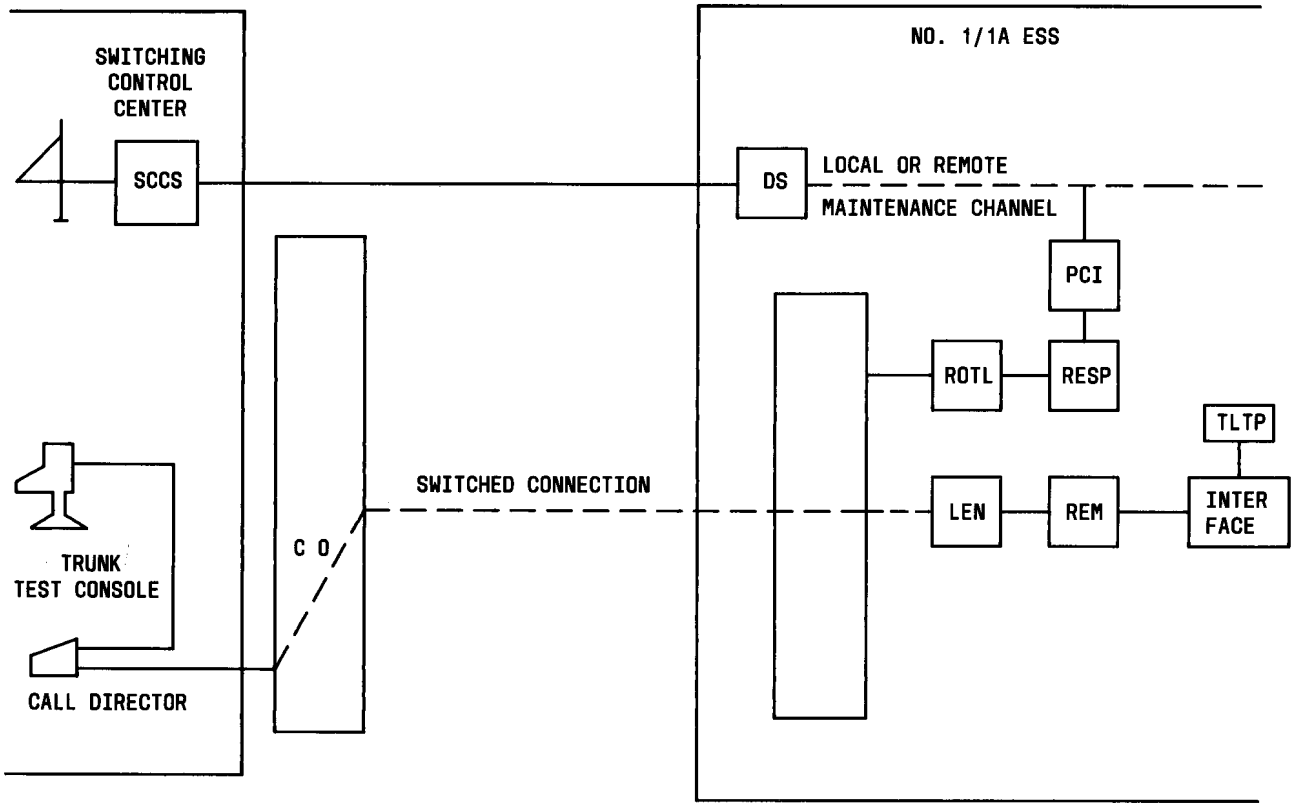


Fig. 2—Recommended Trunk Test Equipment (2.02)

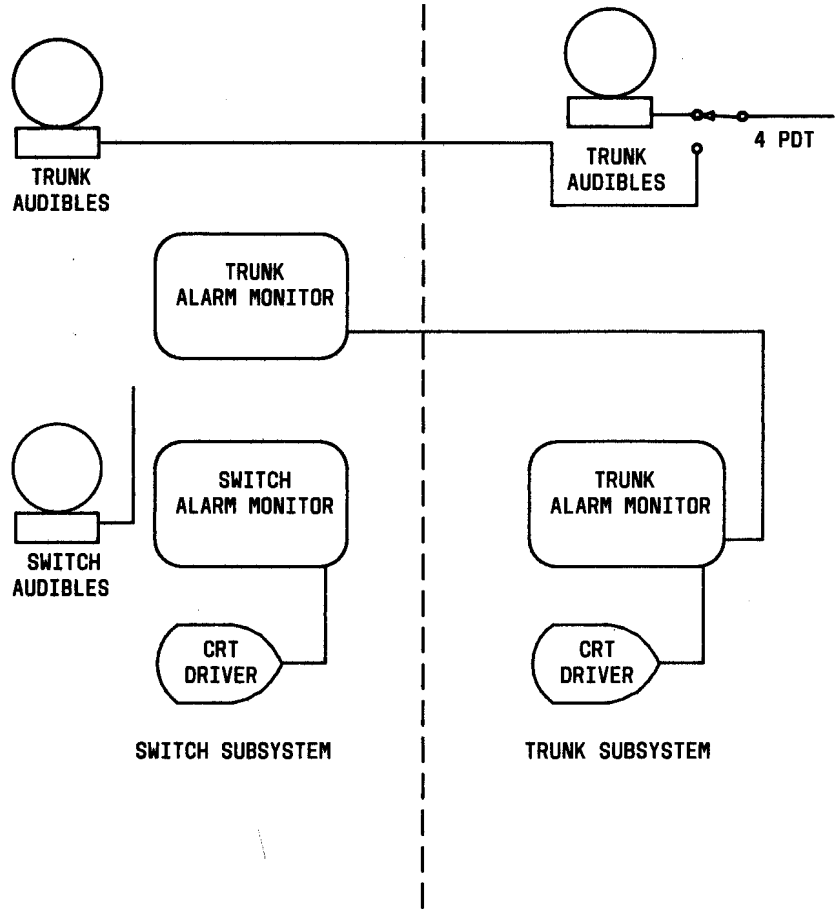


Fig. 3—Physically Separated Trunk and Switch Alarm Monitors (2.17)

PART 1 OR PART 3
#1 ESS TRUNK ORDER AND TRUNK GROUP RECORD

TRUNK TYPE: TRAFFIC CLASS	OFFICE CLASS	TRAFFIC USE	MODIFIER	OFFICE "A": BLDG.	TYPE	TYPE & DIRECTION PULSING	OFFICE "Z": BLDG.	TYPE	REL. ORD.	ORDER NO.
DF	55	1E		CMWA	ESS	M-	ARTN	5XB		
				CMBRMAWACG1			ARTNMAPLMGO		Issue 5 / Div. of Rev.	DUE DATE: TEST 11-7-77; SERVICE 11-17-77; ISSUE DATE 10-6

CROSS–CONNECTIONS

DIGITS PULSED	
TEST TABLE NO.	
TNP REQ'D.	
ROUTE INDEX	0201

LEADS	TR	TR
FRAME		
S.D. NO.	1A165-02 1E SL 00200	

	ITEM	LINE	WORK	TRUNK NO.	TURNK GRP.	MEM NO.	TRK CLS CODES	TRUNK NETWORK NO. TRUNK LK NET	TRUNK SW FR	GRID	SW	LEV	EQUIPMENT LOCATION FR TY	FR NO.	BAY	HORIZONTAL MTG PLT	VERT FILE	CKT NO. H/M (UT)	W.E. OPTS.	SERV. OPTS.
		01		000	201	000	035	00	0	0	0	1	U	002	0	11	1	111		
		02		001		001		00	1	0	0	1		003		11	1	1M		
		03		002		002		00	2	0	0	1		004		10	2	1H		
		04		003		003		00	3	0	0	1		005		10	1	0M		
		05		004		004		00	4	0	0	1		011		09	2	0M		
		06		005		005		01	0	0	0	1		012		09	0	0H		
		07		006		006		01	1	0	0	1		006		08	3	0H		
		08		007		007		01	2	0	0	1		007		08	2	1M		
		09		008		008		02	1	0	2	2		006		04	0	1H		
		10		009	201	009	035	02	0	0	2	2	U	012	0	04	1	1H		
	1	11	A	010	201	010	035	02	4	3	1	2	U	011	0	04	1	1M		
	2	12	A	011	201	011	035	02	4	3	7	1	U	008	0	05	0	1H		
	3	13	A	012	201	012	035	02	3	0	7	1	U	007	0	05	1	1M		
	4	14	A	013	201	013	035	01	3	1	7	1	U	008	0	05	2	1H		
		15																		
		16																		
		17																		
		18																		
		19																		
		20																		

REMARKS: A = ADD TRUNKS # 010 - 013

Issued By	Name J. SMITH	Tel. # 1011	
	Name	Tel. #	

A – CONNECT
D – DISCONNECT
C – CHANGE

	INIT.	DATE	PAGE
WORK COMPLETED			1
ORDER COMPLETED			

Fig. 4—Near-End Record Example (3.04)

PART 3 – NO 5 XBAR
TRUNK ORDER AND TRUNK GROUP RECORD

TRUNK TYPE: TRAFFIC CLASS	OFFICE CLASS	TRAFFIC USE	MODIFIER	OFFICE A: BLDG	TYPE	NPA	TYPE & DIRECTION PULSING	OFFICE Z: BLDG	TYPE	NPA	REL ORD	ORDER #
DF	55	IE		CMBRMAWACG1	ESS		M-	ARTNMAPLMGO	5XB		ISSUE 2	BFM004665

DIV OF REV	DUE DATE: TEST	ISSUE DATE
	11-7-77	10-6
	SERVICE 11-17-77	

TUR: PJ	REG	PEG COUNT: PJ	REG

CROSS CONNECTIONS

X-CONN APP # 2
SAME AS APP # 1
AS REQUIRED

PART → TR

TPC TPU TPU CL

RC CL → KT

RC

F G L LL VHG RF

LEADS																																		
TS LOC																																		
FRAME	MDF				INCOMING REGISTER LINK								TRK. LINE		TUR			NUMBER GROUP																
S.D. DRAWING#	26070-01LP																																	
ITEM	WORK	DES / TRK#	TRUNK EQUIPMENT: TYPE	REL. RK	CKT	MDF FLEX TS LOC	FR	TK TENS HG	TP REL SW VER	B PHG TPC	A PHG TPU	A PHG TFU	C PHG CL	FR	SW / LEV	TUR # SCHV	PJ NO	TS PCHG	DIRECTORY NO. TH	HN	T	U	LINE LINK APP# FR	VG	HG	VF	RC	W.E. ORDERING OPTIONS	SERVICE OPTIONS
		000	B61M	223-00	07		MF 5	0	07	07	07	0	4	00	1-0B														
		001	B61M	223-00	32		MF 5	1	11	11	11	1	4	01	2-1B														
		002	B61M	223.02	00		MF 5	0	20	20	20	2	4	02	0-0B														
		003	B61M	223-02	33		MF 5	1	30	30	30	3	4	03	3-1B														
		004	B61M	223-04	06		MF 6	0	07	07	07	4	4	04	6-0B														
		005	B61M	223-04	24		MF 6	1	05	05	05	5	4	05	4-0B														
		006	B61M	223-06	11		MF 6	0	31	31	31	6	4	06	1-1B														
		007	B61M	224-05	08		MF 6	1	37	37	37	7	4	07	8-1B														
		008	B61M	223-08	01		MF 7	0	01	01	01	8	4	08	1-1B														
		009	B61M	223-08	20		MF 7	0	20	20	20	9	4	09	0-0B														
		010	B61M	223-08	14		MF 7	1	13	13	13	8	4	08	4-1B													NONE	5-X-Y-V
		011	B61M	223-08	32		MF 7	1	29	29	29	9	4	09	2-1B														
		012	B61M	223-10	07		MF 6	2	07	07	07	0	4	10	7-0B														
		013	B61M	223-10	13		MF 6	2	11	11	11	0	4	10	3-1B														

REMARKS: A= ADDED TRUNKS # 010 THRU 013

Issued By: Name JAN JONES Tel.# 1013

A - CONNECT		INIT.	DATE	PAGE
D - DISCONNECT				
C - CHANGE	WORK COMPLETED			
	ORDER COMPLETED			

Fig. 5—Far-End Record Example (3.04)

PART 2
TRUNK ORDER AND TRUNK GROUP RECORD

TRUNK TYPE					OFFICE				OFFICE			REL ORD	ORDER	BFM004665	
TRAFFIC CLASS	OFFICE CLASS	TRAFFIC USE		MODIFIER	BLDG	TYPE	NPA	TYPE*+ DIRECTION PULSING	BLDG	TYPE	NPA		DATE	TEST 11-7-77	ISSUE DATE
DF	55	1E			CMWA	ESS		M-	ARTN	5XB		ISSUE 6 DIV OF REV		SERVICE 11-17-77	10-6

			CO LOSS	LENGTH TYPE	LRESIS LOSS	LENGTH TYPE	LRESIS LOSS	LENGTH TYPE	LRESIS LOSS	LENGTH TYPE	LRESIS LOSS	LENGTH TYPE	LRESIS LOSS	LENGTH TYPE	LRESIS LOSS	CO LOSS	
TRUNK ON LINE NO.	1-7	S	0.5	4.2	820											0.5	S
		T	0.5	22H88	3.6											0.5	T
	8,11,13	S	0.5	4.2	790											0.5	S
		T	0.5	22H88	3.5											0.5	T
	12,14	S	0.5	4.2	910							—	100			0.5	S
		T	0.5	22H88	4.0							E6	-2.0			0.5	T
	9,10	S	0.5			—	100	2.2	655	3.6	740					0.5	S
		T	0.5			E6	-3.9	24H88	3.0	22H88	3.5					0.6	T

CONDITIONS SW T TEST | ALLOWABLE LOOP RESIS: 5285SC | STANDARD LOSS SW TO SW: 3.0db

CROSS CONNECTIONS
PART

PART

ITEM	LINE	WORK	DES / TRK #	CA	PR	E CMBRWA RR	E CMBRWA CKT	CMBRWA SOVL CA	CMBRWA SOVL PR	SOVL CA	SOVL PR	E ARTN RR	E ARTN CKT			EML DB	LOOP RESIS	SW TO SW LOSS
	1		000	2601	295											4.6	820	4.6
	2		001	2601	267											4.6	820	4.6
	3		002	2601	282											4.6	820	4.6
	4		003	2601	283											4.6	820	4.6
	5		004	2601	291											4.6	820	4.6
	6		005	2601	300											4.6	820	4.6
	7		006	2601	307											4.6	820	4.6
	8		007	2601	1558											4.5	790	4.5
	9		008			104	4458	636	4426	323						3.6	1545	3.6
	10		009			105	4458	637	4426	324						3.6	1545	3.6
1	11	A	010	2601	1474											4.5	790	4.5
2	12	A	011	2616	1							111.02	1			3.0	1010	3.0
3	13	A	012	2601	1481											4.5	790	4.5
4	14	A	013	2616	8							111.02	8			3.0	1010	3.0
	15																	
	16																	
	17																	
	18																	
	19																	
	20																	

	9-10		
TRUNK ON LINE NO			
LOCATION	CMBRWA		
DISABLER	NONE		
LBOA	END SEC	GA	OHMS
	833	19	NET
LBOB	END SEC	GA	OHMS
	2681	24	135
GAIN	5.1		
T & R	CMBR		
LOOP RESIS	100		
TRUNK ON LINE NO	12,14		
LOCATION	ARTN		
DISABLER	NONE		
LBOA	END SEC	GA	OHMS
	5740	22	295
LBOB	END SEC	GA	OHMS
	832	A	NET
GAIN	2.4		
T & R	ARTN		
LOOP RESIS	100		
TRUNK ON LINE NO			
LOCATION			
DISABLER			
LBOA	END SEC	GA	OHMS
LBOB	END SEC	GA	OHMS
GAIN			
T & R			
LOOP RESIS			
TRUNK ON LINE NO			
LOCATION			
DISABLER			
LBOA	END SEC	GA	OHMS
LBOB	END SEC	GA	OHMS
GAIN			
T & R			
LOOP RESIS			

A-CONNECT
D-DISCONNECTS
C-REARRANGED

TO

TOTAL COPIES

REMARKS

	INIT	DATE	PAGE
WORK COMPLETED			1/1
COMPLETED			

Fig. 6—Trunk Group Facility Information, Example 1 (3.05)

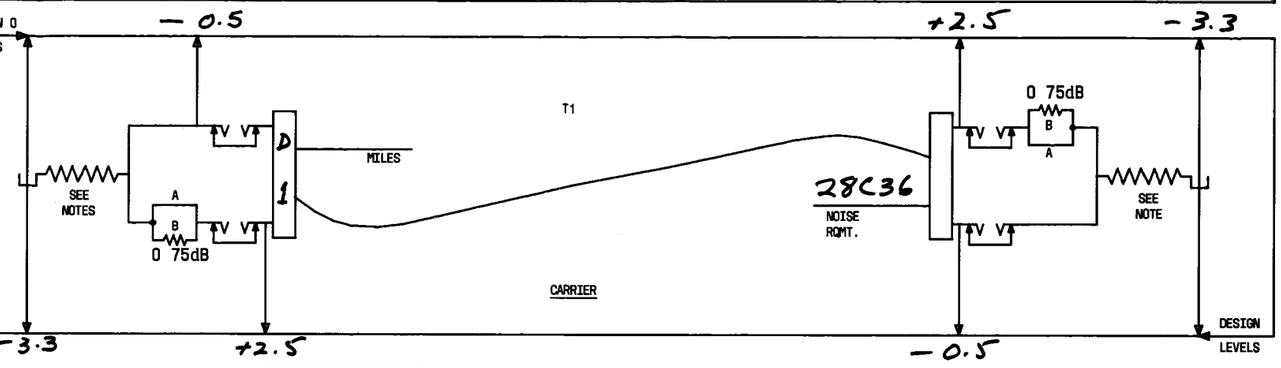
SMETDS 2220T (1-81)
NET & T CO

PART 2
TRUNK ORDER AND TRUNK GROUP RECORD

TRUNK TYPE				OFFICE A		PLSG	OFFICE B		REL ORD		ORDER NO. 85M-00 32 44	
TRAFFIC CLASS	OFFICE CLASS	TRAFFIC USE	MODIFIER	BLDG CMBRWA	TYPE ESS		BLDG RDNG	TYPE 5XB			DD DATE: TEST	ISSUE DATE 9-20
PH	55	IE		CMBRMAWACG1		M-	RDNG MA LIMGO		ISSUE	DIV OF REV	SERVICE 11-17-77	

NOTE
PROVIDE OPTIONS PER THE FOLLOWING CHART

PANEL NO. 1XB BAR NO. 5XBAR ESS & XBAR TANDEM OFFICES			CHANNEL UNIT SCHEMATIC DRAWING
OPTIONS			
W	V	X	
REMOVE STRAP			SD9704901 SD9705001 SD9705101 SD9705201
LEAVE STRAP	SCREW OUT	SCREW IN	SD9704902 SD9705002 SD9705102 SD9705202



ITEM	LINE	WORK	DES / TRK #	SYSTEM NO.	CARRIER DESIGNATION		CHANNEL NO.	TYPE CHANNEL UNIT ORIG. OFFICE	TYPE CHANNEL UNIT TERM OFFICE	EML dB	SW TO SW LOSS
1	1	C	000	101T	CMBRWA - RDNG	3.1	17	TICD 400B	TICD 510D	3.3	3.3
2	2	C	001	101T	CMBRWA - RDNG	3.6	24	TICD 400B	TICD 510D	3.3	3.3
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										
	11										
	12										
	13										
	14										
	15										
	16										
	17										
	18										
	19										
	20										

REMARKS: C = PLACE TRUNKS 0 & 1 ON DIRECT CXR

ISSUED BY
CKT. PROVISION

CLERK

PAGE

A-ADD
D-DISCONNECT
C-CHANGE

Fig. 7—Trunk Group Facility Information, Example 2 (3.05)

Bell System OFFICE: CMBRWA

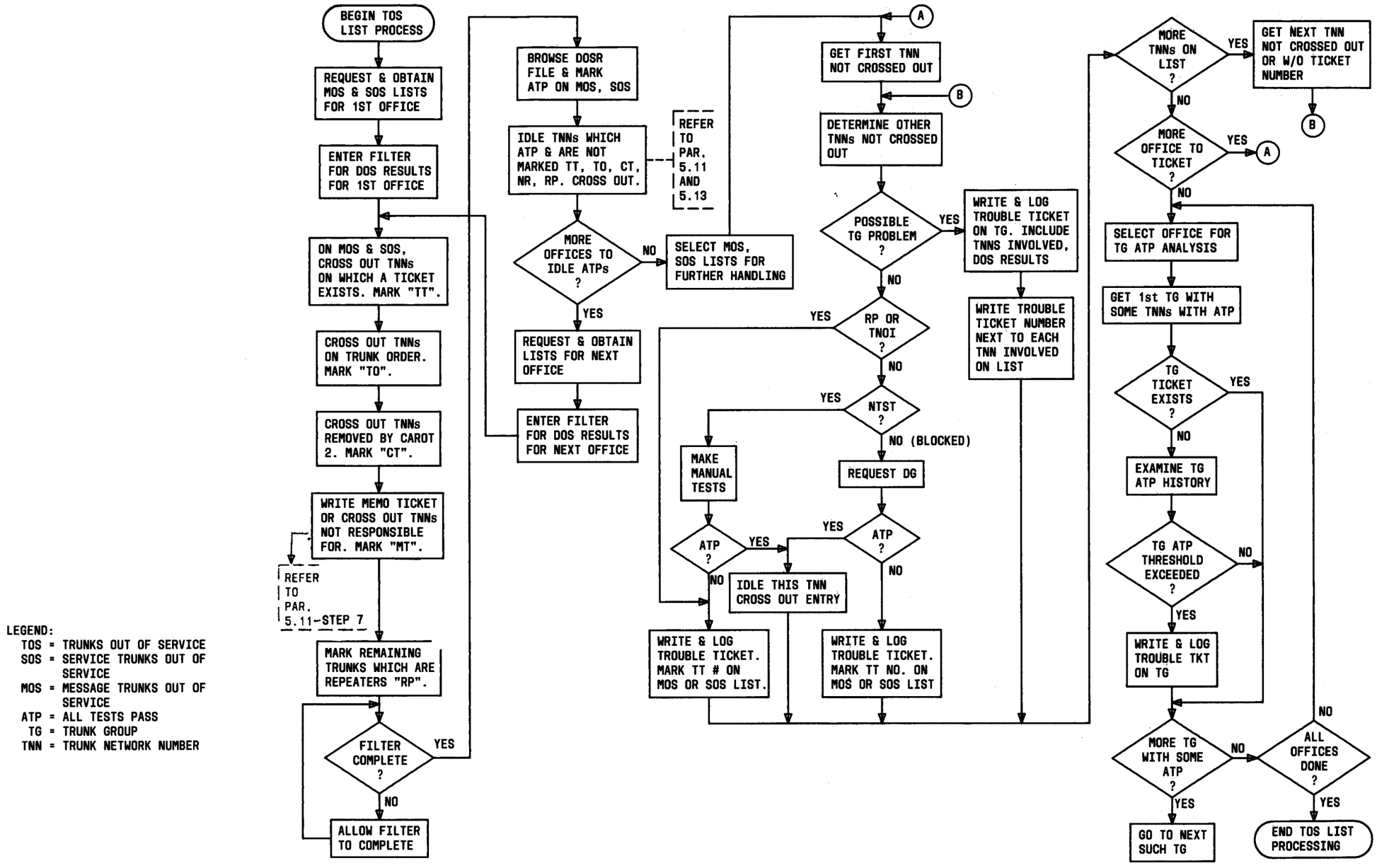
Trunk Inventory

BS-551
(12-80)

TGN	Name	Source Data E-4417 Message Trunk: Terminal: Interlocal	Terminal: Toll Connecting	Terminal: Intertoll	Terminal: Auxiliary	Control: Control	Control: Control - E RPTR	Control: Control - CXR And Other RPTR	Control: Intermediate OFC V Or E RPTR	Source Data E-3994: Trunk Outage Results Plan: Controlled Trunks: Local	Toll Connecting	Intertoll	Auxiliary	Miscellaneous	OGT/Inc	Trunk Group Common Language Identification
200																
201	ARL MGO		5								5					DF551E *- M-ARTNMA PLMGO
202	ARL MG1		7				7				7				OGT	DF551E *- M-ARTNMA PLMG1
203																
204																
205																
206																
207	RDNG MGO		10			10					10				INC	PH 551E RDNG MALIMGO *
208	RDNG CG1			15			15					15			INC	PH 551E RDNG MALICG1 *
209	RDNG CGO			17			17					17			INC	PH 551E RDNG MALICGO *
210	RDNG MG1		10			10					10				INC	PH551E RDNG MALIMG1 *

Note: It is not necessary to repeat your office designation in TG CLI.

Fig. 8—Trunk Inventory Record (Form BS-551) (3.07)



LEGEND:
- TOS = TRUNKS OUT OF SERVICE
- SOS = SERVICE TRUNKS OUT OF SERVICE
- MOS = MESSAGE TRUNKS OUT OF SERVICE
- ATP = ALL TESTS PASS
- TG = TRUNK GROUP
- TNN = TRUNK NETWORK NUMBER

Fig. 9—Procedure for Processing TOS List of No. 1 ESS Office (5.05)

```
M 36 TN10 MOS
  0     1 3 2 7 0     161 LKDO
  0     2 2 3 5 0     178 LKDO
  0     1 0 3 6 6     182 LKDO
  0     1 4 0 1 4     189 LKDO
  0     2 2 0 0 1     190 LKDO
  0     2 1 2 3 0     190 LKDO
  0     2 0 3 1 1     190 LKDO
  0     1 5 2 1 1     190 LKDO
  0     1 5 1 7 0     190 LKDO
  0     2 5 2 5 3     327 DSBLD
  0     1 3 0 6 0     336 LKDO
  0     0 4 2 2 6     338 LKDO
  0     0 5 3 2 6     339 LKDO
  0     1 0 2 4 6     340 LKDO
  0     2 3 3 2 1     498 DSBLD
        MOS   END
  5/17 16:12


M 12 TN10 SOS
  0     7 2 0 7 5     34  LKDO
  0     0 4 0 6 7     111 LKDO
  0     9 1 2 7 0     116 LKDO
  0     9 0 3 6 0     142 LKDO
  0     2 3 1 3 6     142 LKDO
  0     1 2 1 3 6     142 LKDO
        SOS END
  5/17 16:13
```

Fig. 10—TOS List Example (5.07)

```
M 36 TN10 MOS
 0    1 3 2 7 0    161 LKD0
 0    2 2 3 5 0    178 LKD0  TT
 0    1 0 3 6 6    182 LKD0
 0    1 4 0 1 4    188 LKD0  TT
 0    2 2 0 0 1    188 LKD0  TT
 0    2 1 2 3 0    190 LKD0
 0    2 0 3 1 1    190 LKD0
 0    1 5 2 1 1    190 LKD0
 0    1 5 1 7 0    190 LKD0
 0    2 5 2 5 3    327 DSBLD MT 1234
 0    1 3 0 6 0    336 LKD0  TO
 0    0 4 2 2 6    338 LKD0  CT
 0    0 5 3 2 6    339 LKD0  TT
 0    1 0 2 4 6    340 LKD0
 0    2 3 3 2 1    498 DSBLD MT
      MOS  END
 5/17 16:12

M 12 TN10 SOS
 0    7 2 0 7 5     34 LKD0
 0    0 4 0 6 7    111 LKD0
 0    0 1 2 7 0    116 LKD0
 0    0 0 3 6 0    142 LKD0  TT
 0    2 3 1 3 6    142 LKD0  TT
 0    1 2 1 3 6    142 LKD0  RP
      SOS END
 5/17 16:13
```

Legend:

MT	=	Memo Ticket
RP	=	Repeat
TO	=	Trunk Order
TT	=	Trouble Ticket

Fig. 11—Analyzed TOS List Example (5.11[8])

```
M 36 TN10 MOS
 0    1 3 2 7 0    161 LKD0          ATP
 0    2 2 3 5 0    178 LKD0  TT      F
 0    1 0 3 6 6    182 LKDO          F
 0    1 4 0 1 4    180 LKD0  TT      F
 0    2 2 0 0 1    190 LKD0  TT      F
 0    2 1 2 3 0    190 LKDO          BLKD
 0    2 0 3 1 1    180 LKD0          ATP
 0    1 5 2 1 1    190 LKDO          F
 0    1 5 1 7 0    180 LKD0          ATP
 0    2 5 2 5 3    327 DSBLD MT      1234
 0    1 3 0 6 0    336 LKD0  TO
 0    0 4 2 2 6    338 LKDO  CT
 0    0 5 3 2 0    333 LKD0  TT      ATP
 0    1 0 2 4 6    340 LKDO          NTST
 0    2 3 3 2 1    498 DSBLD MT
      MOS  END
 5/17 16:12

M 12 TN10 SOS
 0    7 2 0 7 5    34  LKD0
 0    0 4 0 6 7    111 LKDO          F
 0    9 1 2 7 0    116 LKD0
 0    9 0 3 6 0    142 LKD0  TT      F
 0    2 3 1 3 6    142 LKD0  TT      ATP
 0    1 2 1 3 6    142 LKDO  AP      ATP
      SOS END
 5/17 16:13
```

Legend:

ATP	=	All Tests Pass
BLKD	=	Blocked
CT	=	Carrier Trunk
F	=	Failed
MT	=	Memo Ticket
NTST	=	No Test
TO	=	Trunk Order
TT	=	Trouble Ticket

Fig. 12—Analyzed TOS List With Good Trunks Returned to Service Example (5.11[10])

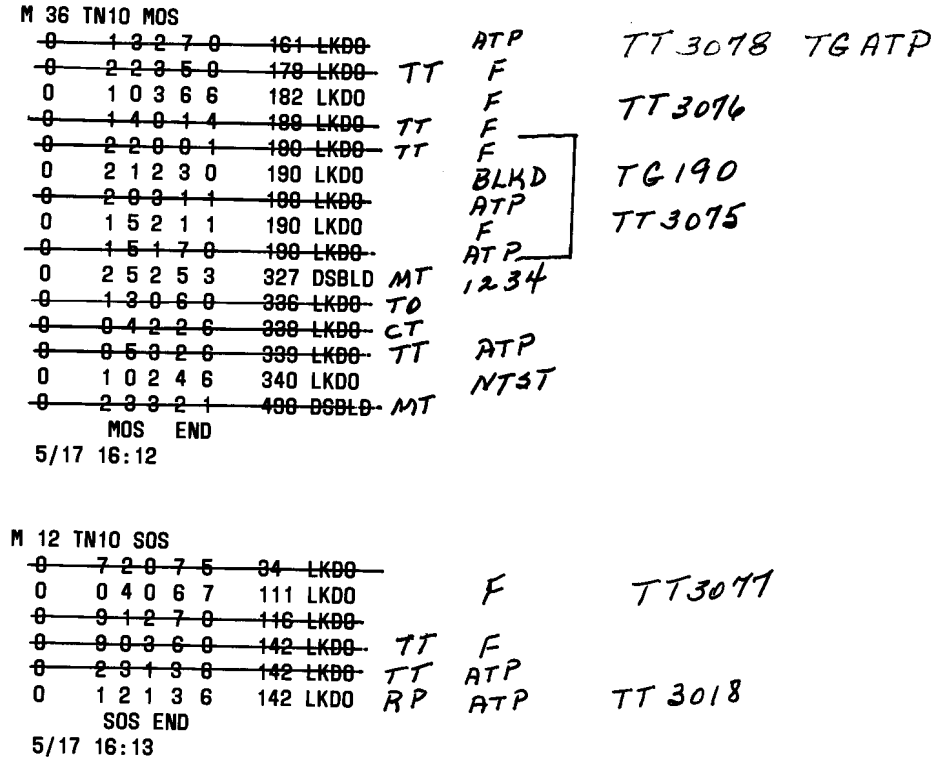
```
M 36 TN10 MOS
 0    1 3 2 7 0    161 LKDO
 0    2 2 3 5 0    178 LKDO  TT
 0    1 0 3 6 6    182 LKDO
 0    1 4 0 1 4    188 LKDO  TT
 0    2 2 0 0 1    188 LKDO  TT
 0    2 1 2 3 0    190 LKDO
 0    2 0 3 1 1    190 LKDO
 0    1 5 2 1 1    190 LKDO
 0    1 5 1 7 0    190 LKDO
 0    2 5 2 5 3    327 DSBLD MT
 0    1 3 0 6 0    336 LKDO  TO
 0    0 4 2 2 6    338 LKDO  CT
 0    0 5 3 2 6    339 LKDO  TT
 0    1 0 2 4 6    340 LKDO
 0    2 3 3 2 1    400 DSBLD MT
      MOS  END
 5/17 16:12
```

```
M 12 TN10 SOS
 0    7 2 0 7 5    34  LKDO
 0    0 4 0 6 7    111 LKDO
 0    0 1 2 7 0    116 LKDO
 0    0 0 3 6 0    142 LKDO  TT
 0    2 3 1 3 6    142 LKDO  TT
 0    1 2 1 3 6    142 LKDO  RP
      SOS END
 5/17 16:13
```

Legend:

ATP	=	All Tests Pass
CT	=	Carrier Trunk
F	=	Failed
MT	=	Memo Ticket
TO	=	Trunk Order
TT	=	Trouble Ticket

Fig. 13—New Trouble Tickets Written Example (5.11[16])



Legend:

ATP	=	All Tests Pass
F	=	Failed
MT	=	Memo Ticket
NTST	=	No Test
TO	=	Trunk Order
TT	=	Trouble Ticket

Fig. 14—Completed TOS List Example (5.12)

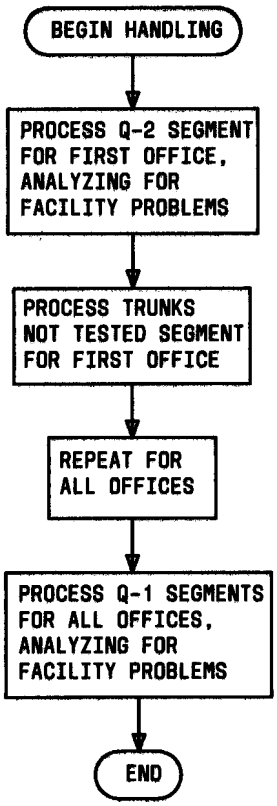
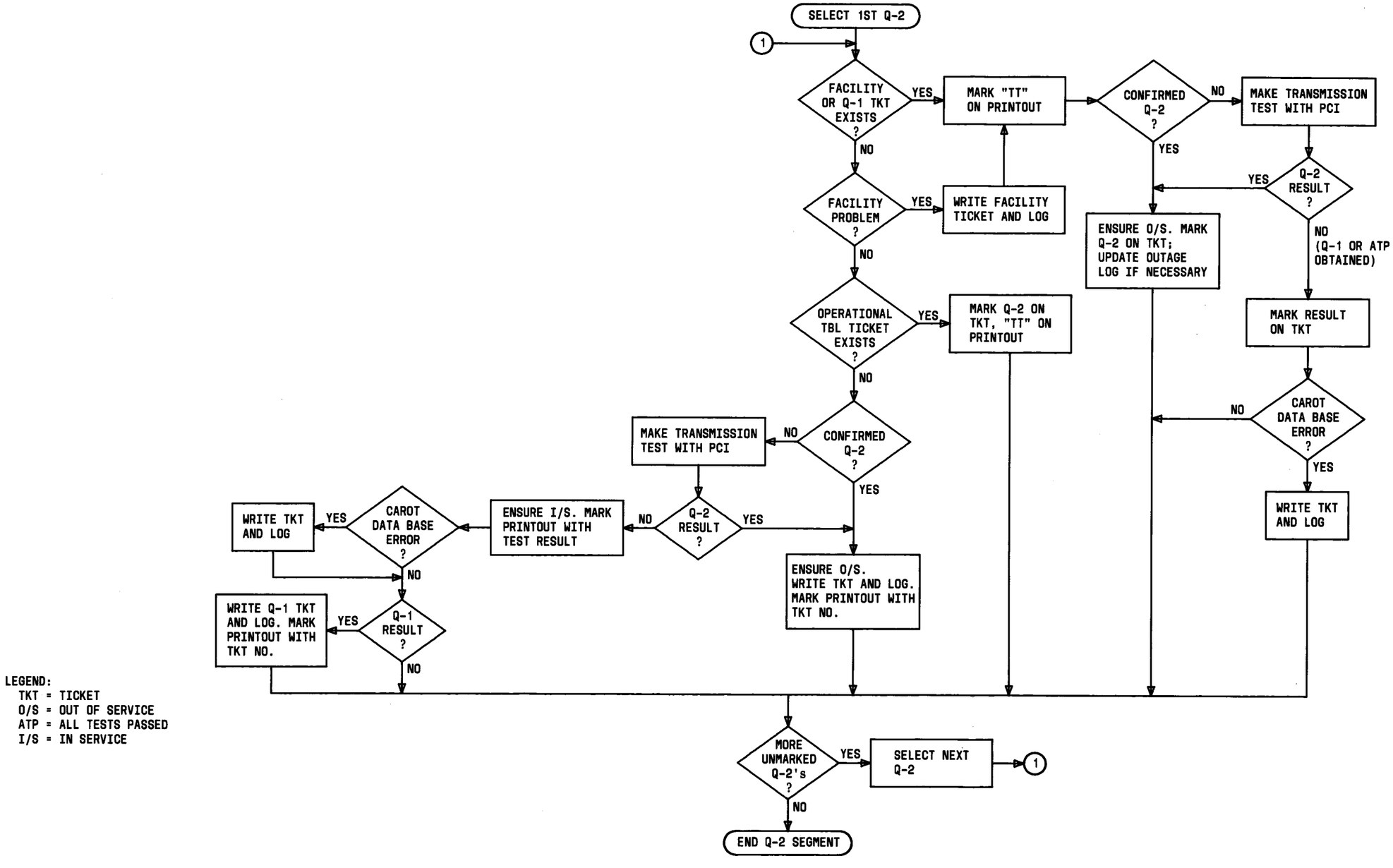


Fig. 15—General Handling of CAROT 2 Routine Test Results (5.19)



LEGEND:
- TKT = TICKET
- O/S = OUT OF SERVICE
- ATP = ALL TESTS PASSED
- I/S = IN SERVICE

Fig. 16—CAROT Q2 Reports (5.22)

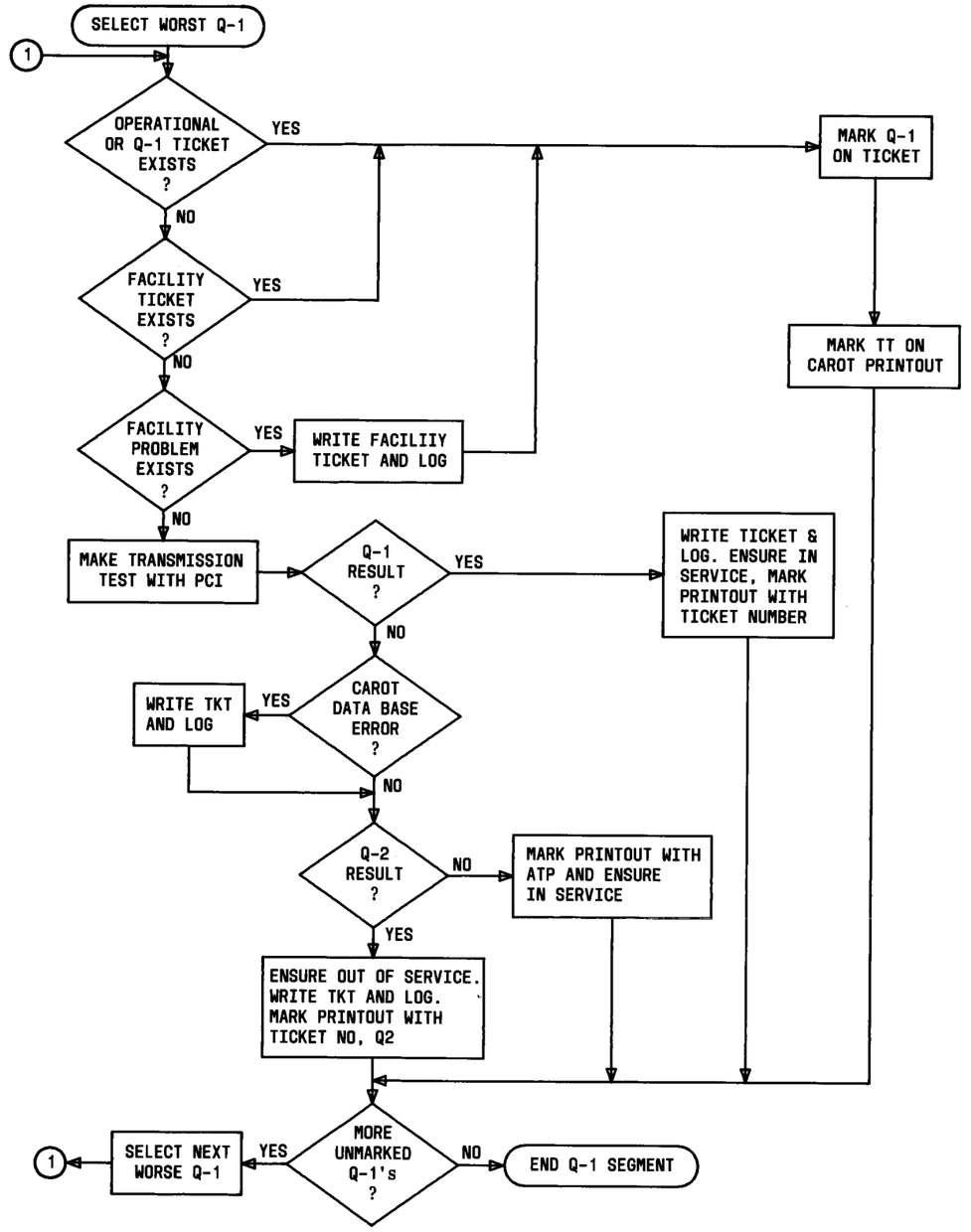


Fig. 17—CAROT Q1 Reports (5.27)

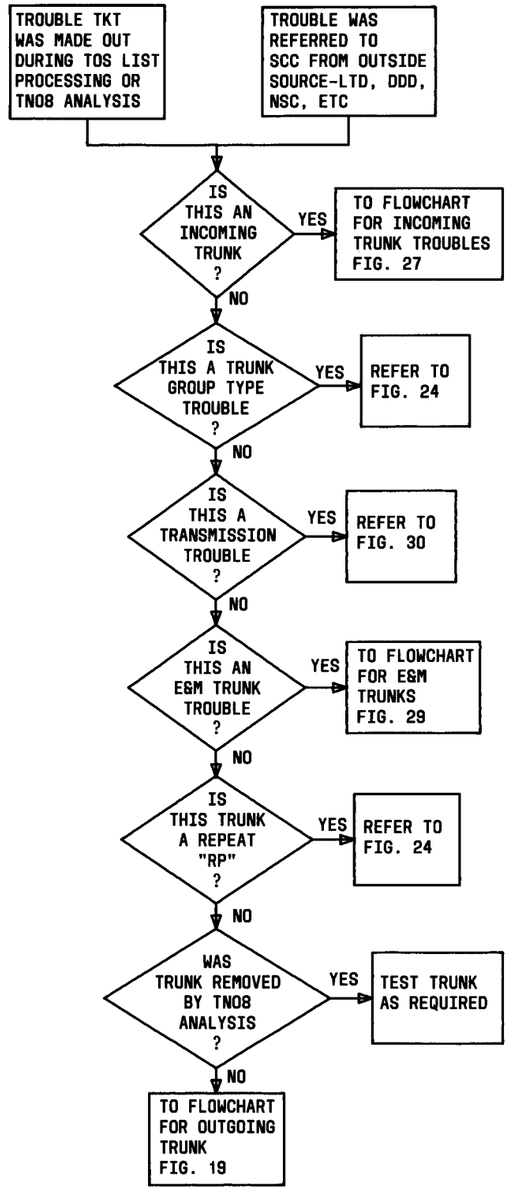


Fig. 18—Start of Trunk Trouble Sectionalization (6.01)

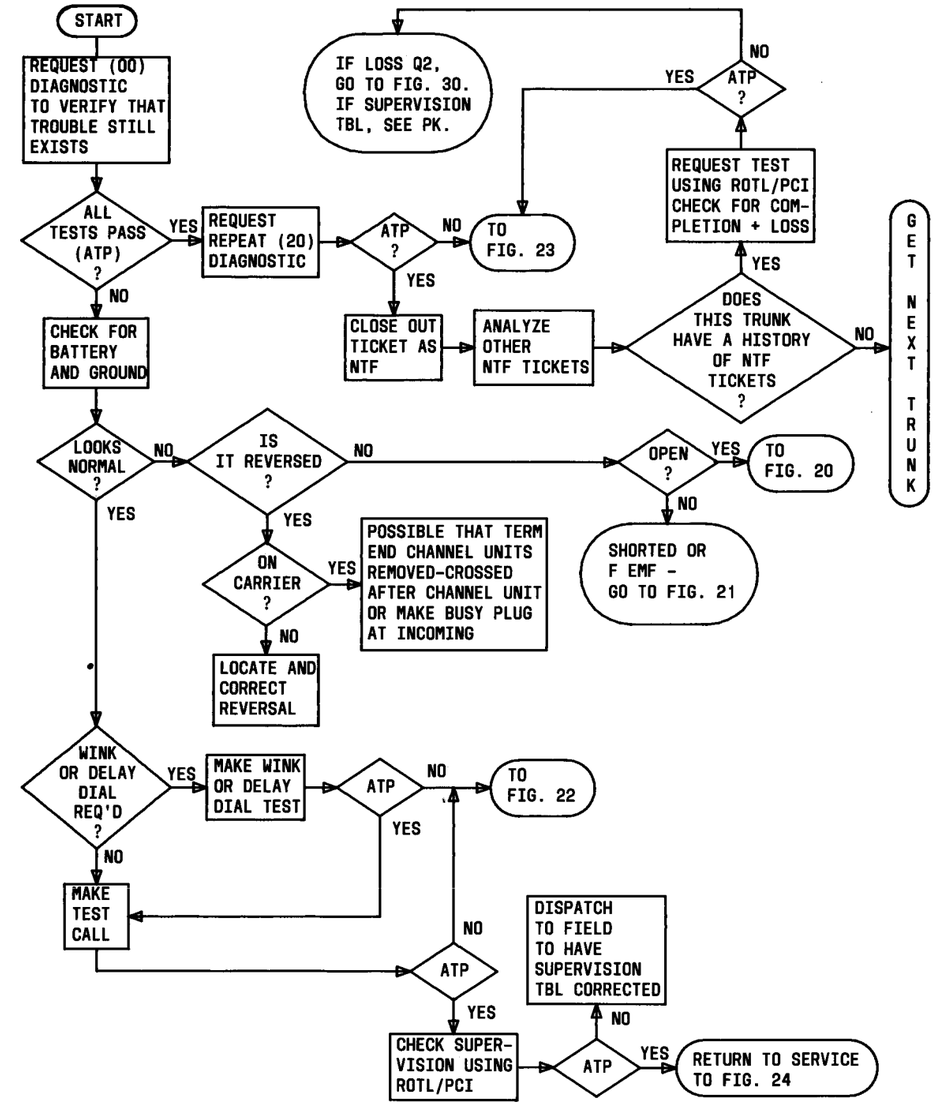
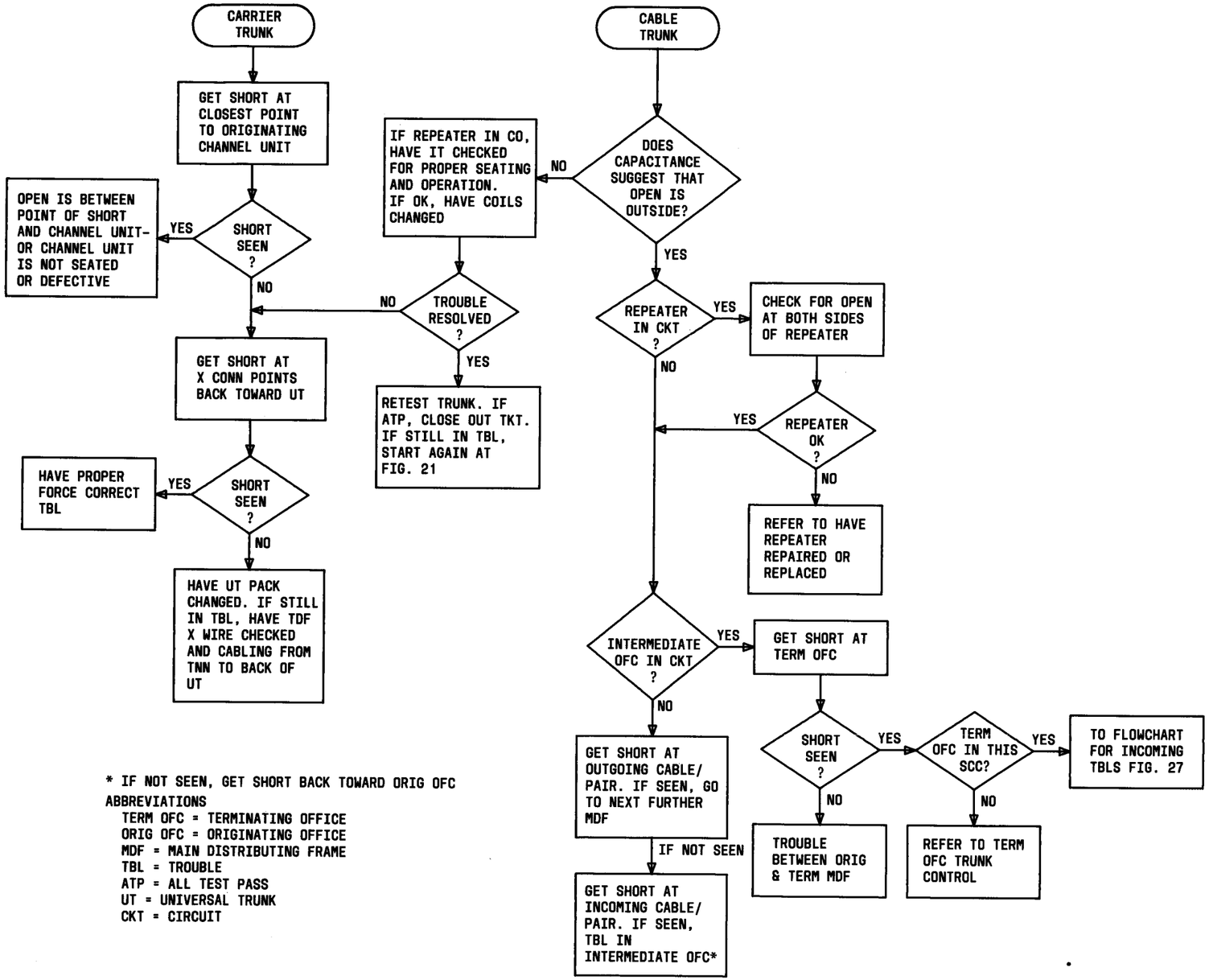


Fig. 19—Outgoing Trunk—Failed DOS (Diagnostic Out-of-Service) (6.01)

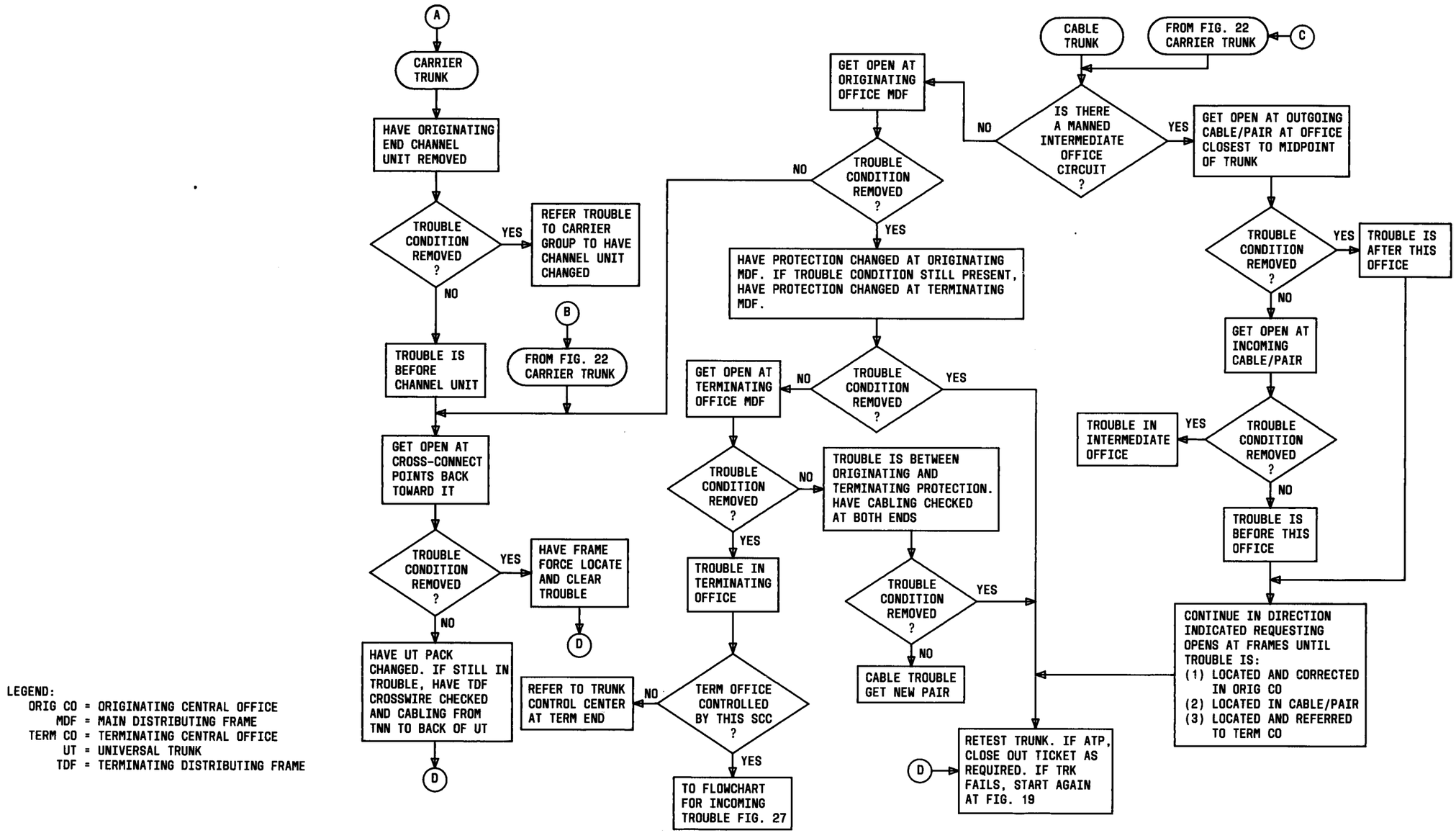


* IF NOT SEEN, GET SHORT BACK TOWARD ORIG OFC

ABBREVIATIONS

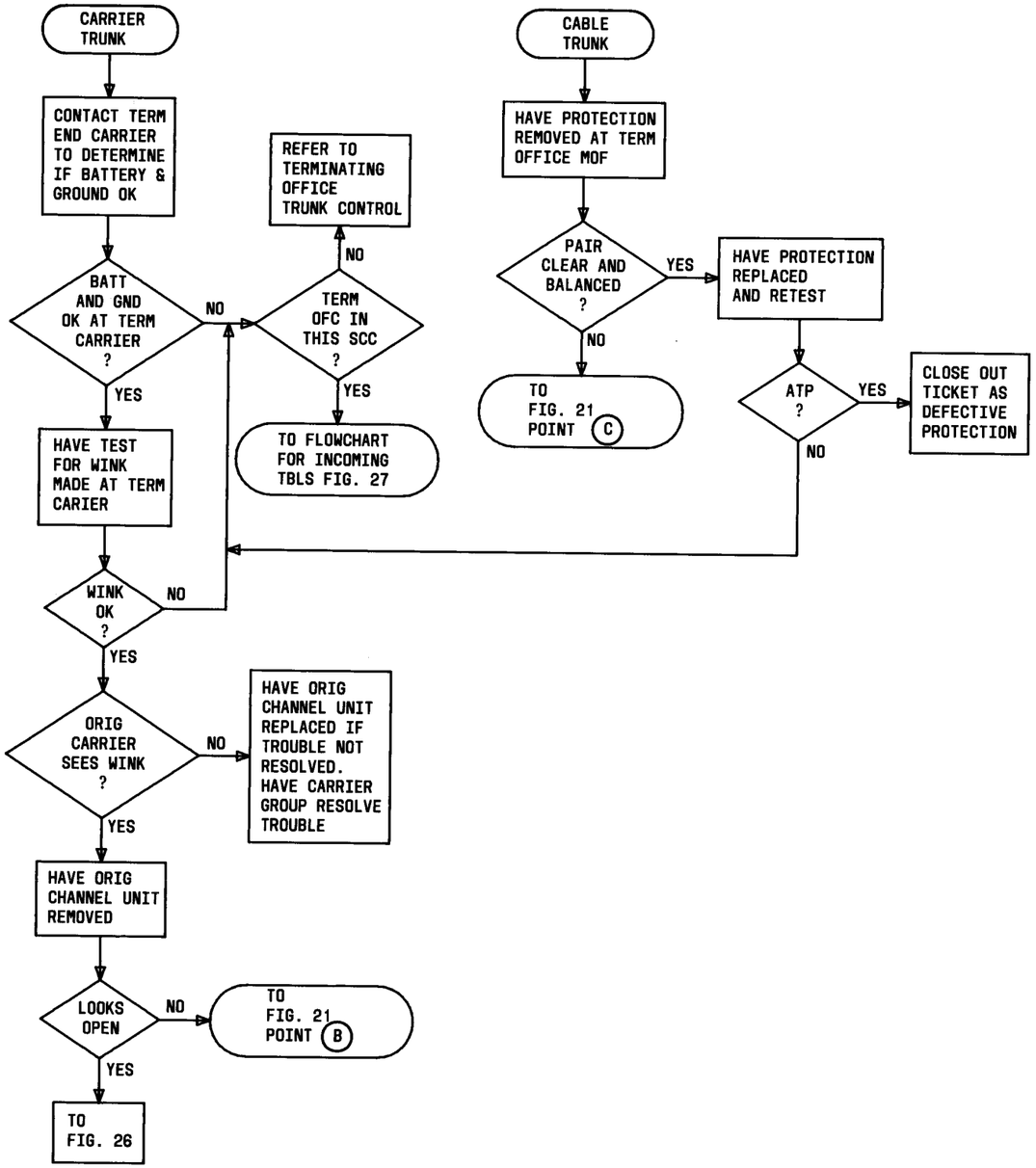
- TERM OFC = TERMINATING OFFICE
- ORIG OFC = ORIGINATING OFFICE
- MDF = MAIN DISTRIBUTING FRAME
- TBL = TROUBLE
- ATP = ALL TEST PASS
- UT = UNIVERSAL TRUNK
- CKT = CIRCUIT

Fig. 20—Open (6.01)



LEGEND:
ORIG CO = ORIGINATING CENTRAL OFFICE
MDF = MAIN DISTRIBUTING FRAME
TERM CO = TERMINATING CENTRAL OFFICE
UT = UNIVERSAL TRUNK
TDF = TERMINATING DISTRIBUTING FRAME

Fig. 21—Short or FEMP (6.01)



LEGEND:
TERM = TERMINATING
ORIG = ORIGINATING
TBLS = TROUBLES
MDF = MAIN DISTRIBUTING FRAME
ATP = ALL TESTS PASS

Fig. 22—Battery and Ground OK—No Wink or Won't Routine (6.01)

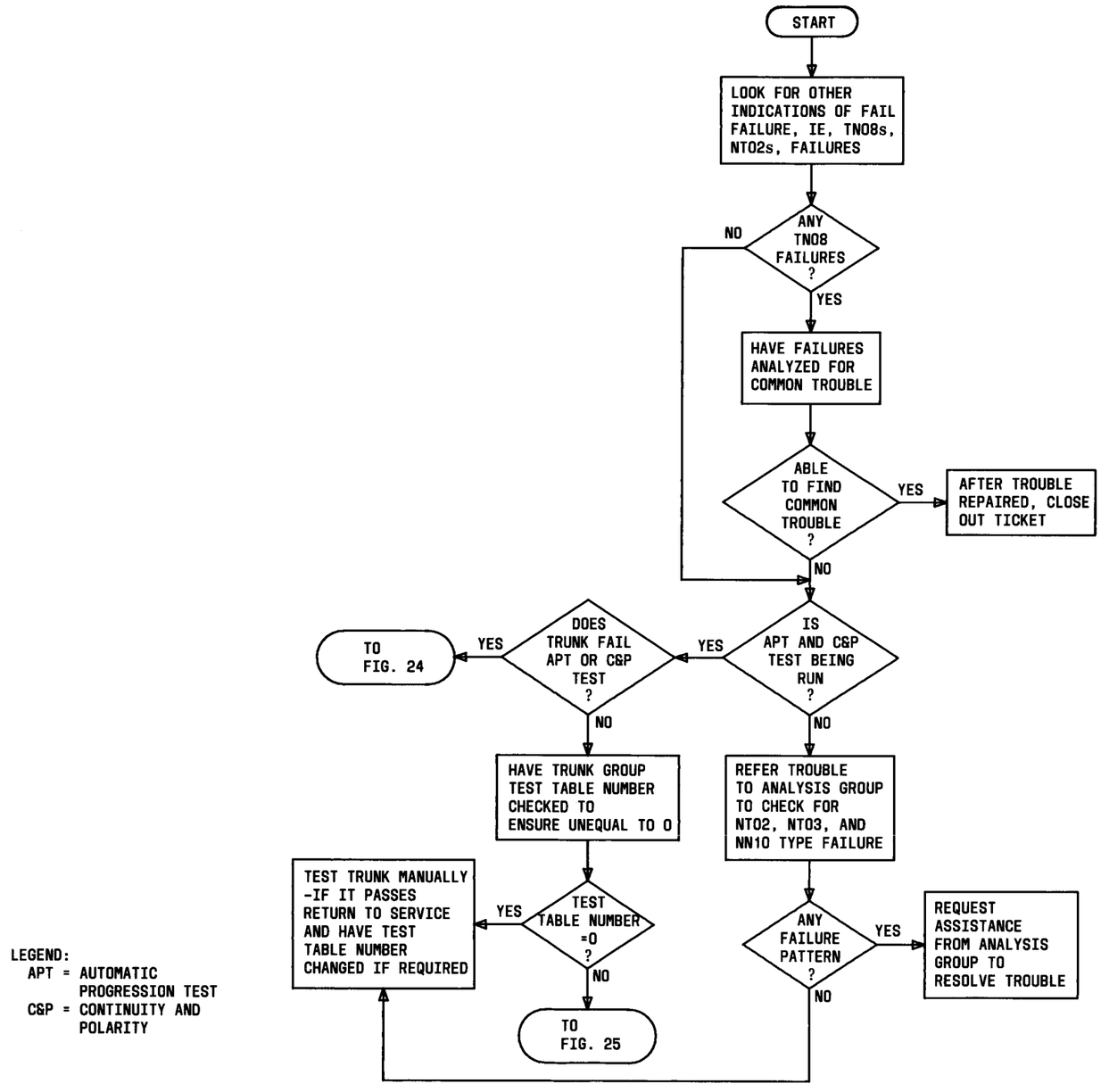
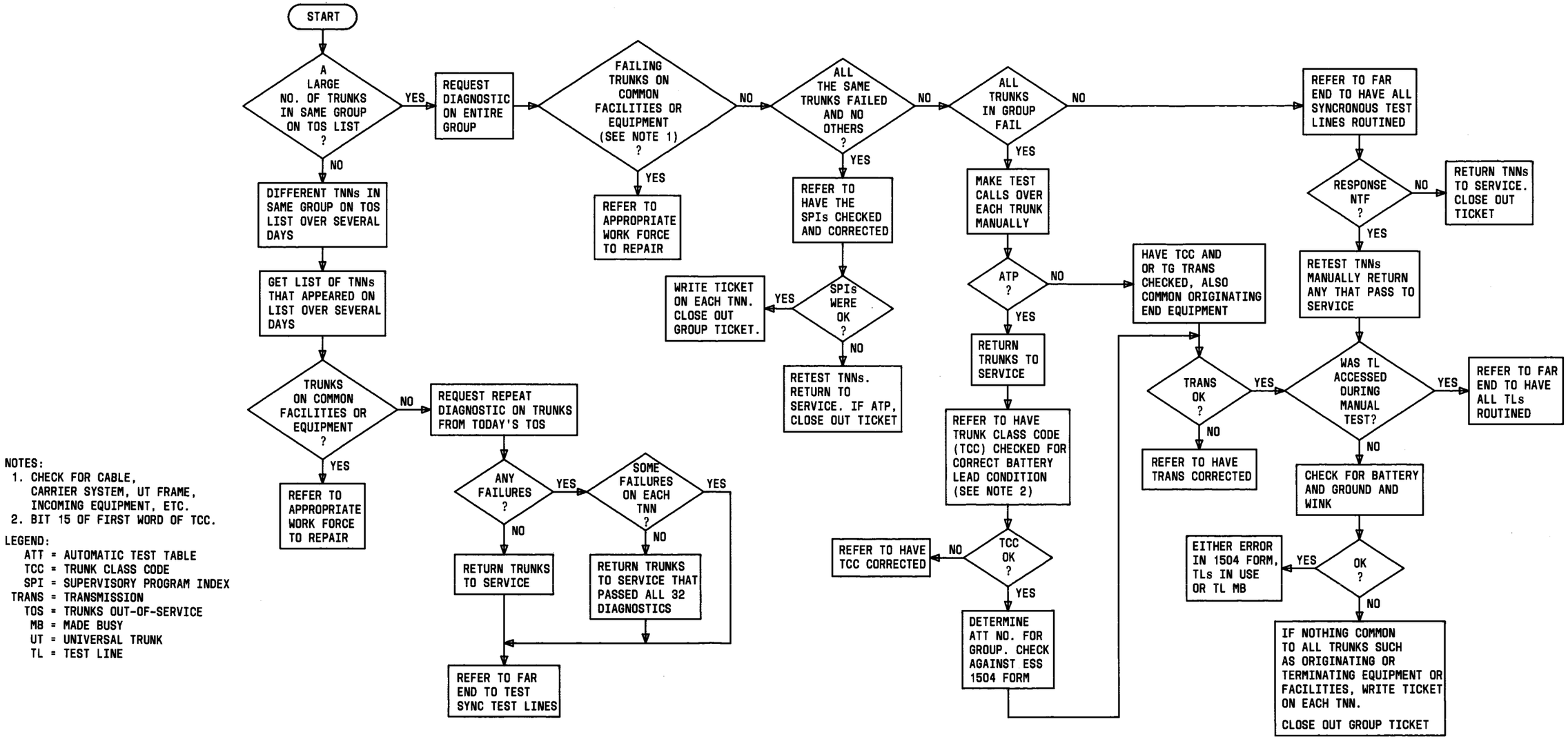


Fig. 23—Marked "RP" from TOS List Processing or Some Failures During Repeat Diagnostic (6.01)



NOTES:
1. CHECK FOR CABLE, CARRIER SYSTEM, UT FRAME, INCOMING EQUIPMENT, ETC.
2. BIT 15 OF FIRST WORD OF TCC.

LEGEND:
ATT = AUTOMATIC TEST TABLE
TCC = TRUNK CLASS CODE
SPI = SUPERVISORY PROGRAM INDEX
TRANS = TRANSMISSION
TOS = TRUNKS OUT-OF-SERVICE
MB = MADE BUSY
UT = UNIVERSAL TRUNK
TL = TEST LINE

Fig. 24—Trunk Group Troubles (6.01)

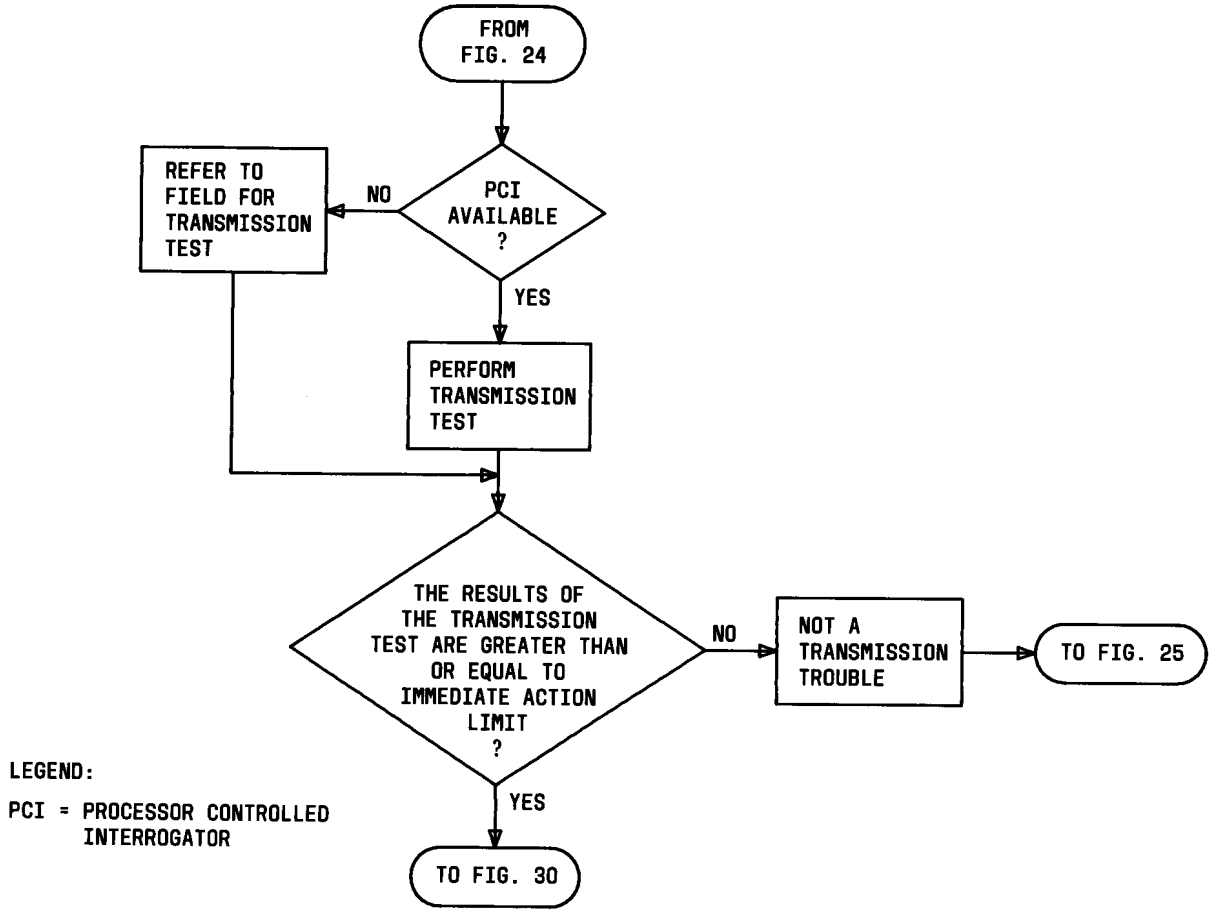


Fig. 25—Transmission Trouble Check (6.01)

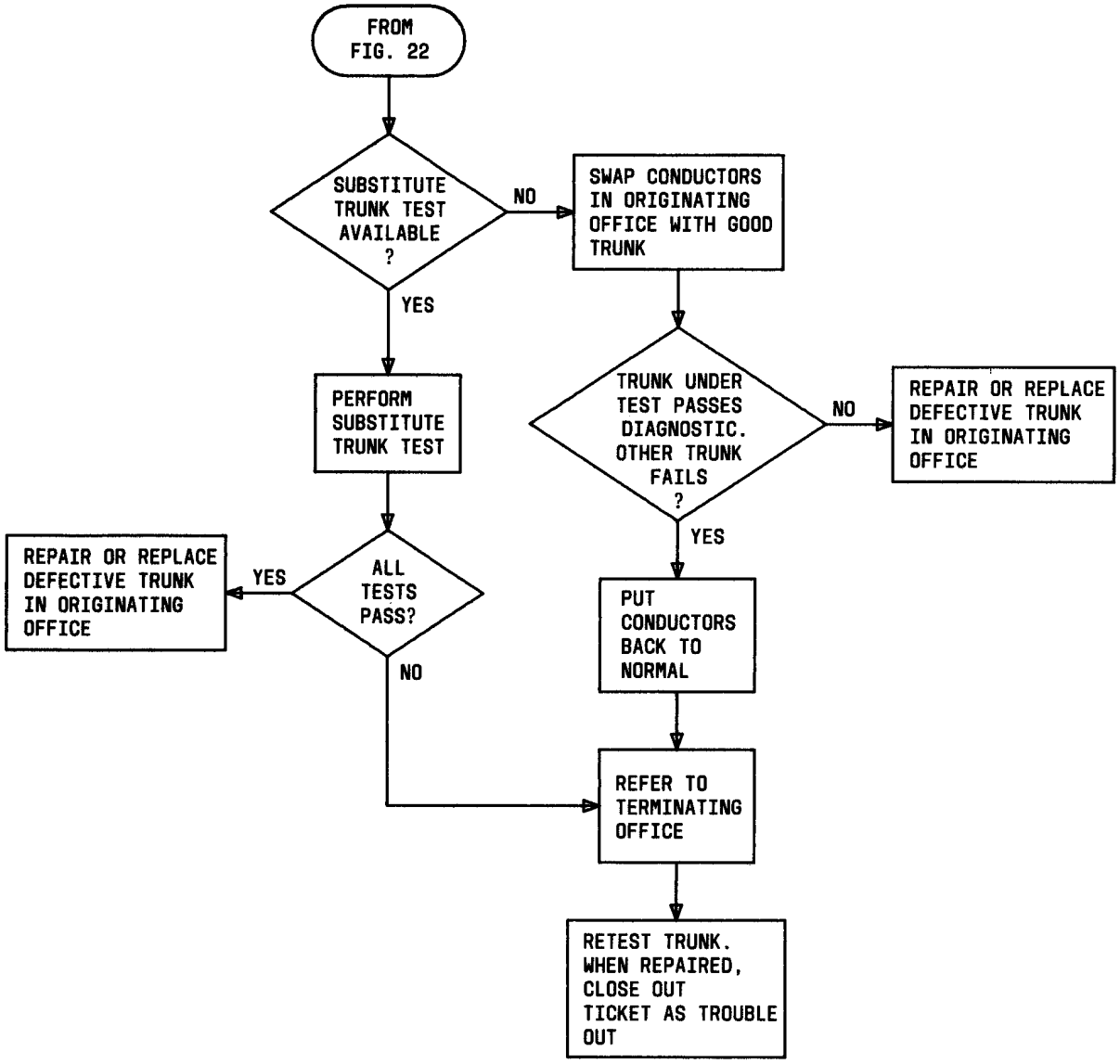


Fig. 26—Substitute Trunk List (6.01)

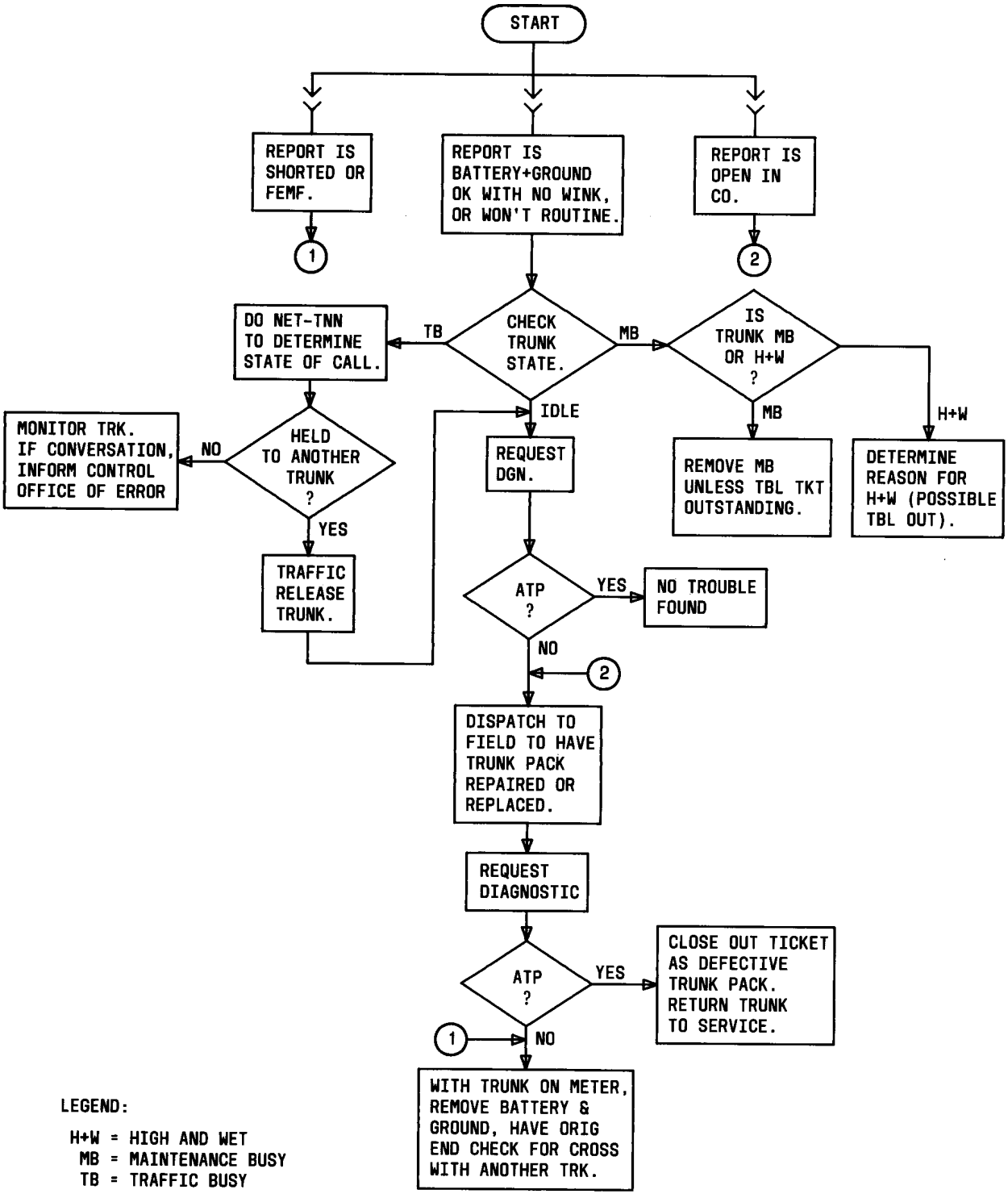
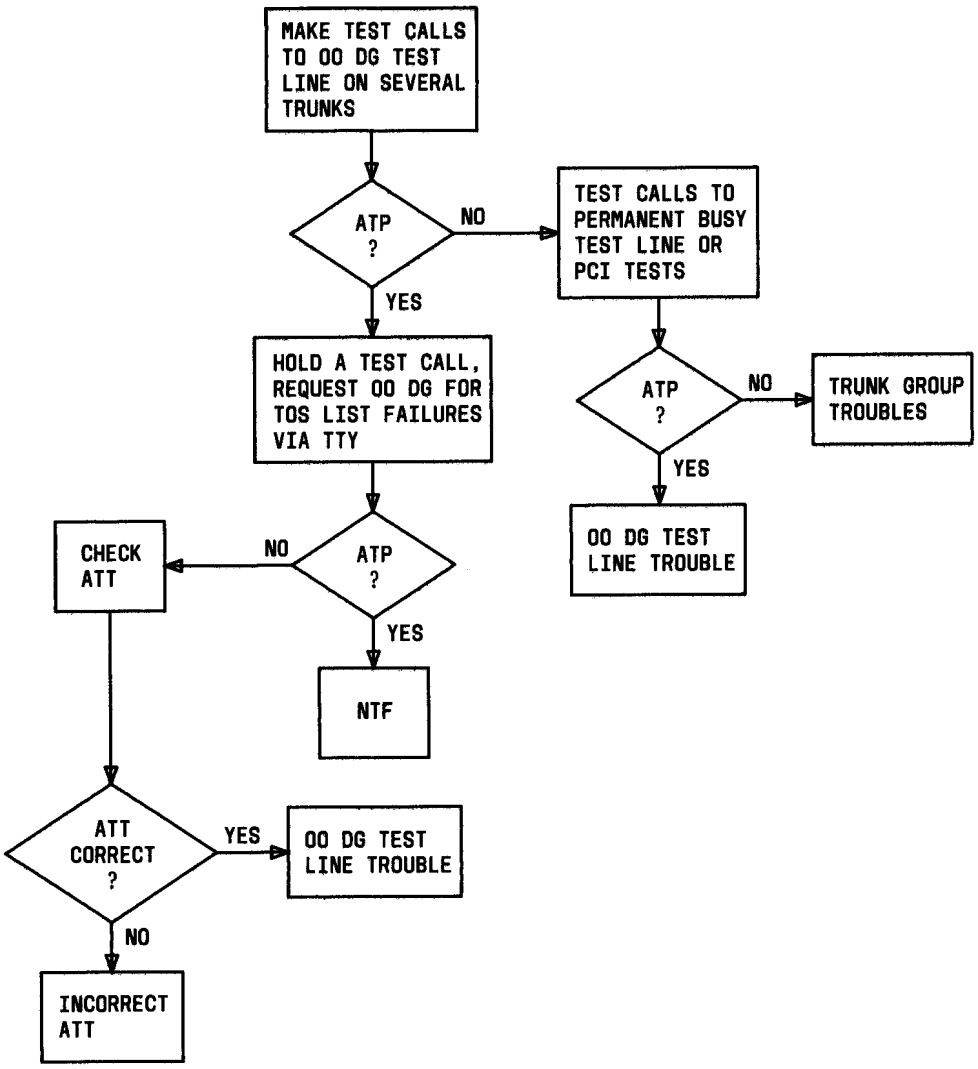


Fig. 27—Incoming Trunk Troubles (6.16)



LEGEND:

ATP = ALL TESTS PASS
PCI = PROCESSOR CONTROLLED INTEGRATOR
00 DG = "00" DIAGNOSTIC
ATT = AUTOMATIC TEST TABLE

Fig. 28—Identifying ATT Errors and Bad Far-End Test Lines (6.27)

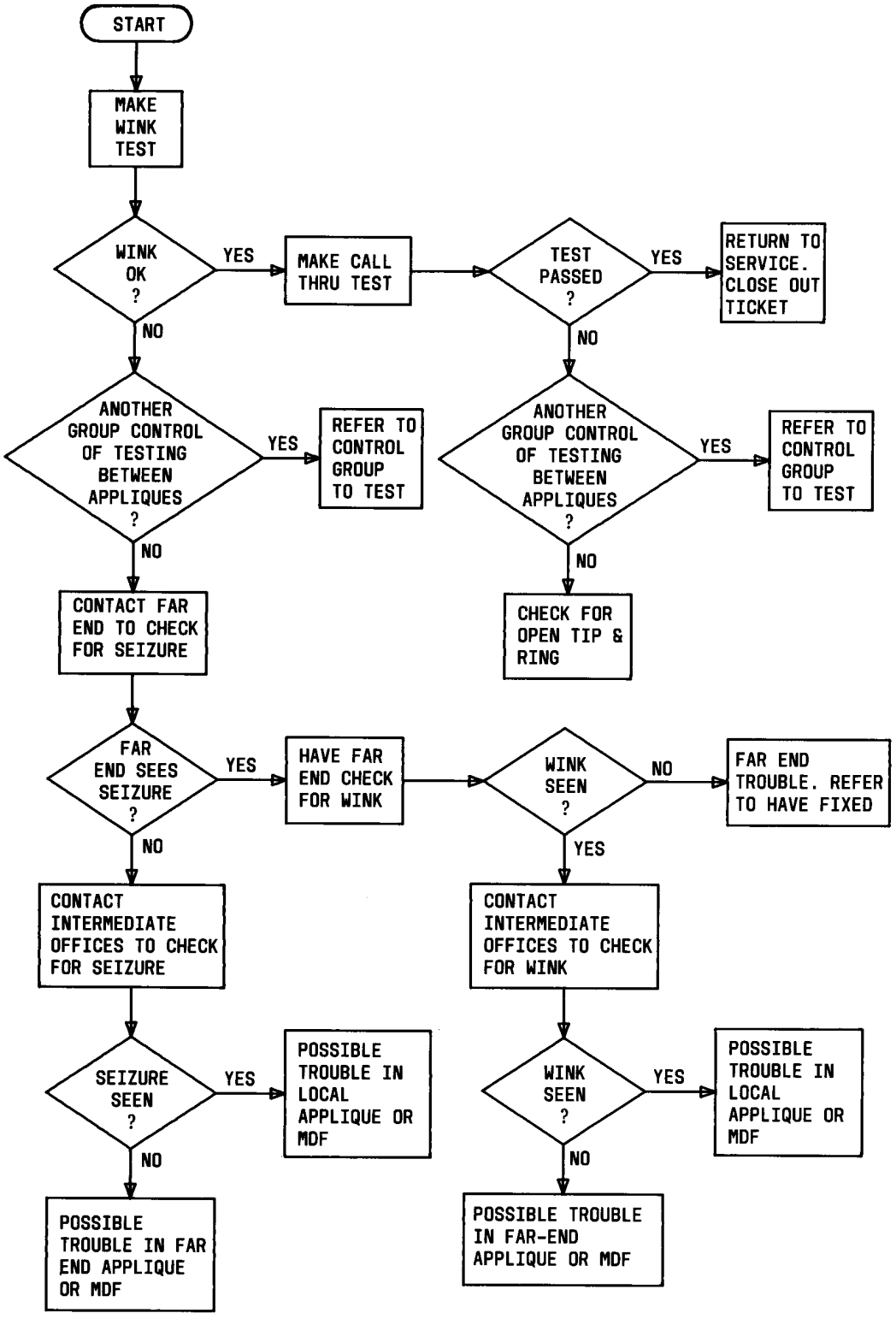


Fig. 29—E&M or F-Type Tie Trunks (6.32)

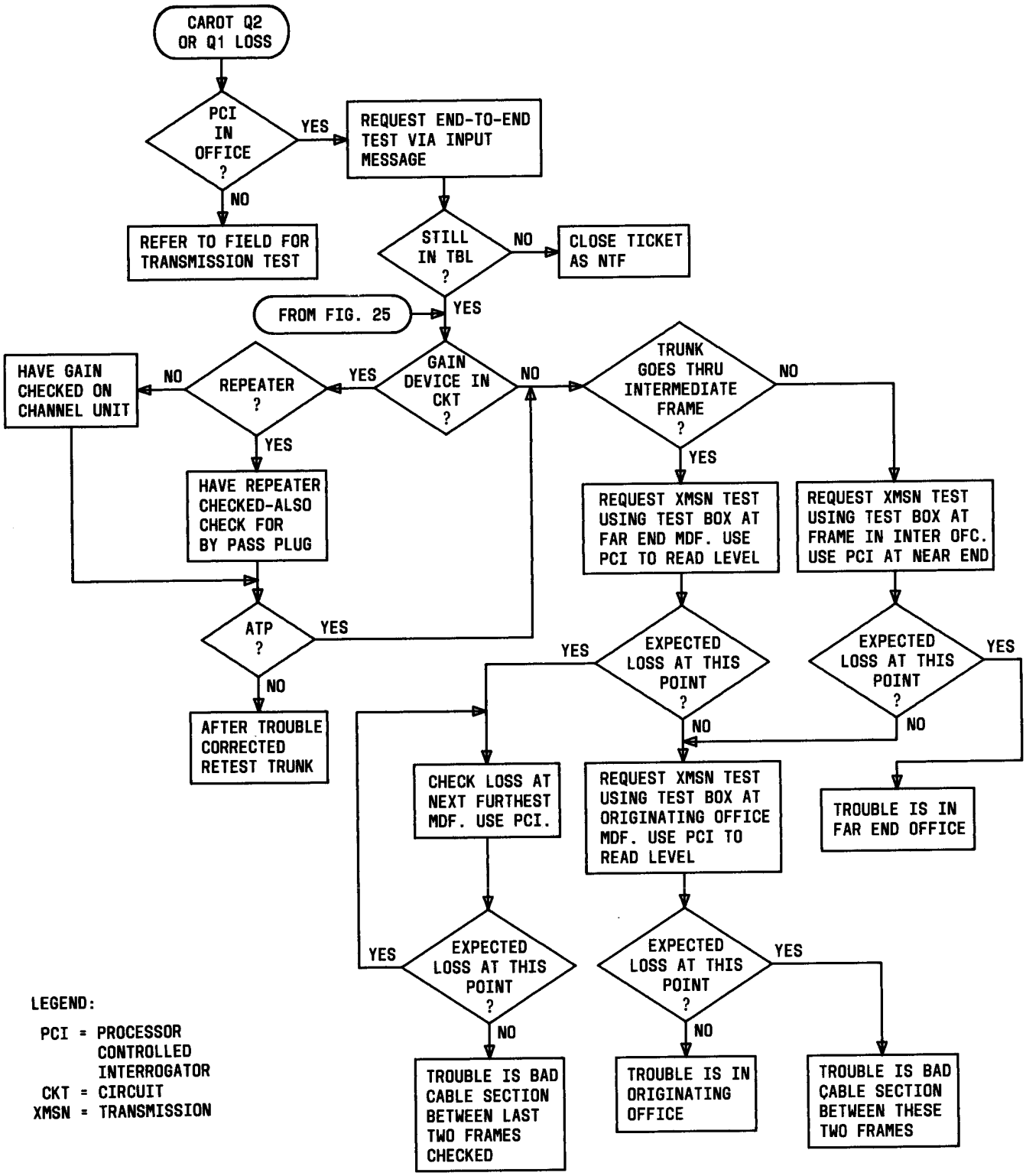
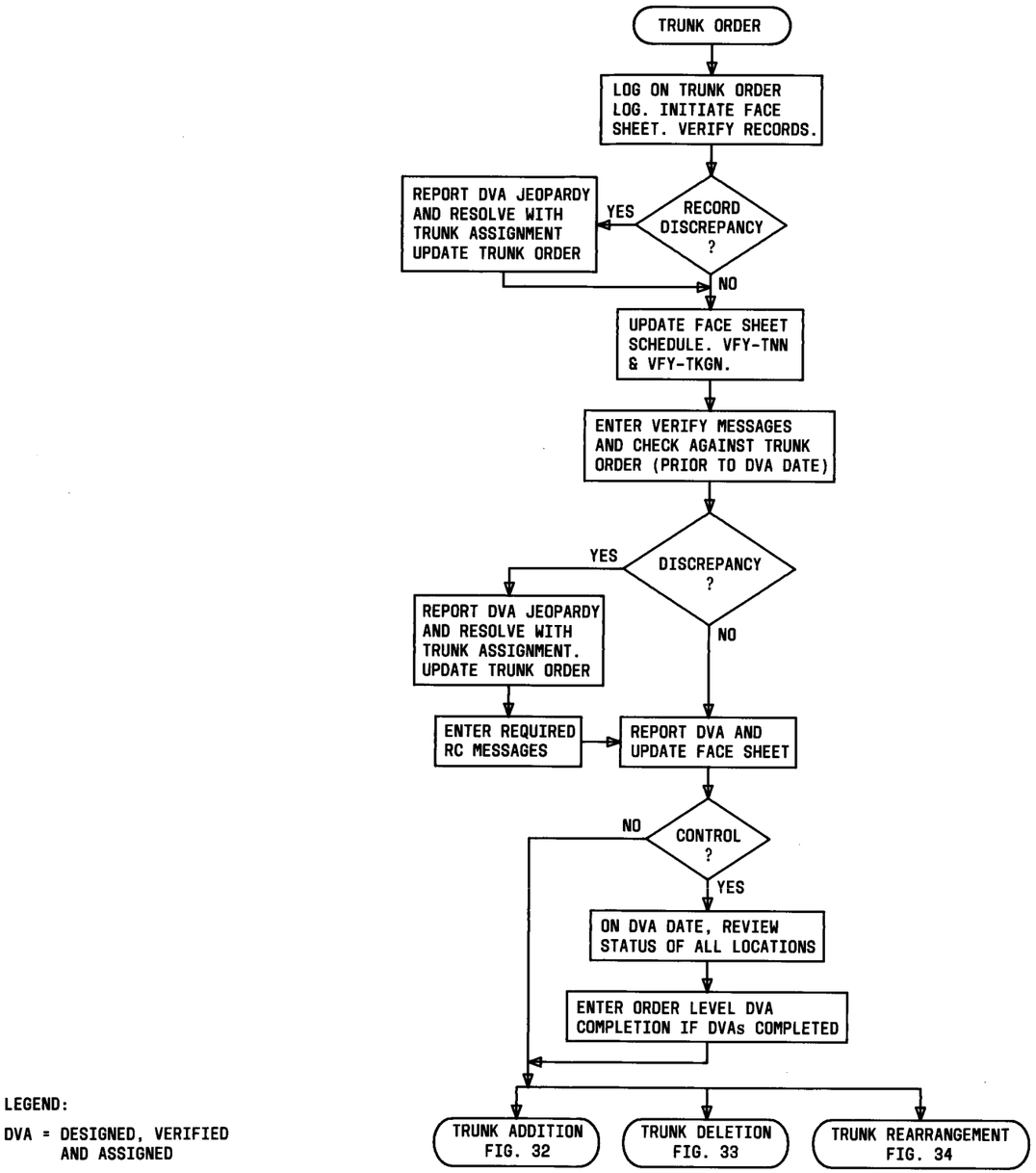


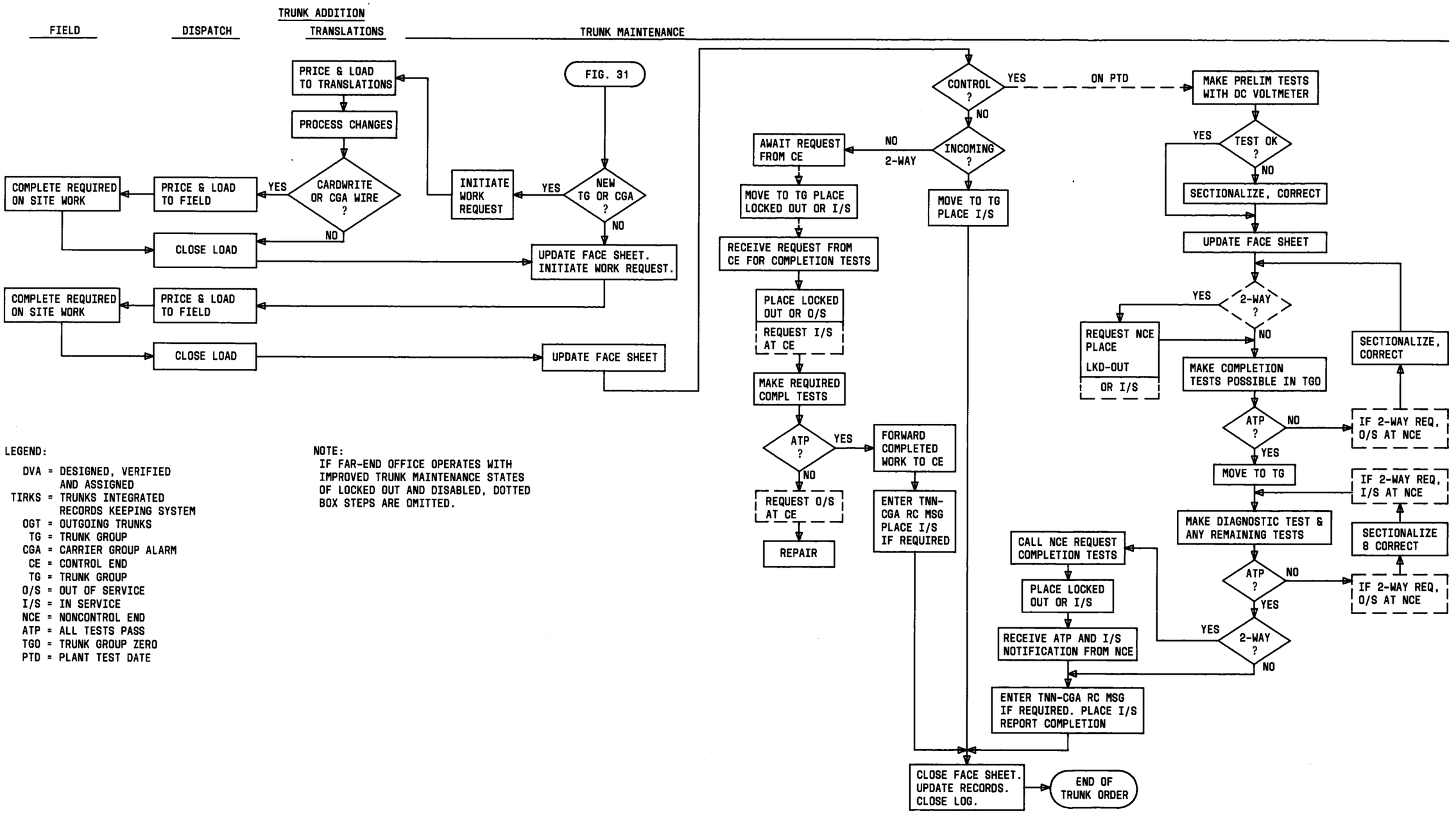
Fig. 30—Transmission Trouble (6.35)



LEGEND:

DVA = DESIGNED, VERIFIED AND ASSIGNED

Fig. 31—Initial Trunk Order Procedure (7.03)



LEGEND:

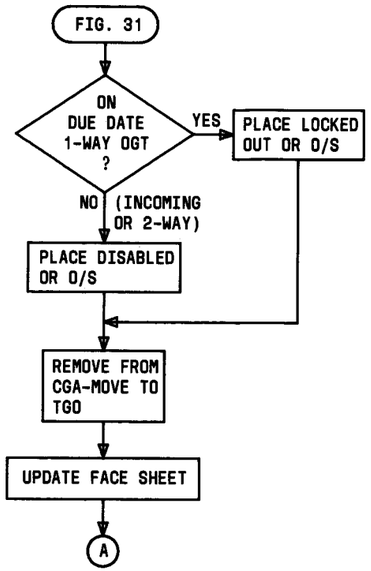
DVA	=	DESIGNED, VERIFIED AND ASSIGNED
TIRKS	=	TRUNKS INTEGRATED RECORDS KEEPING SYSTEM
OGT	=	OUTGOING TRUNKS
TG	=	TRUNK GROUP
CGA	=	CARRIER GROUP ALARM
CE	=	CONTROL END
TG	=	TRUNK GROUP
O/S	=	OUT OF SERVICE
I/S	=	IN SERVICE
NCE	=	NONCONTROL END
ATP	=	ALL TESTS PASS
TGO	=	TRUNK GROUP ZERO
PTD	=	PLANT TEST DATE

NOTE:
IF FAR-END OFFICE OPERATES WITH IMPROVED TRUNK MAINTENANCE STATES OF LOCKED OUT AND DISABLED, DOTTED BOX STEPS ARE OMITTED.

Fig. 32—Trunk Addition (7.03, 7.14)

DELETION 1 OF 2

FIELD | DISPATCH | TRANSLATIONS | TRUNK MAINT



LEGEND:

NCF = NON CONTROL END
DVA = DESIGNED, VERIFIED AND ASSIGNED
TIRKS = TRUNKS INTEGRATED RECORDS KEEPING SYSTEM
OGT = OUTGOING TRUNKS
O/S = OUT OF SERVICE
TGO = TRUNK GROUP ZERO
CGA = CARRIER GROUP ALARM
IDF = INTERMEDIATE DISTRIBUTING FRAME
FAC = FACILITIES

DELETION 2 OF 2

FIELD | DISPATCH | TRANSLATIONS | TRUNK MAINT

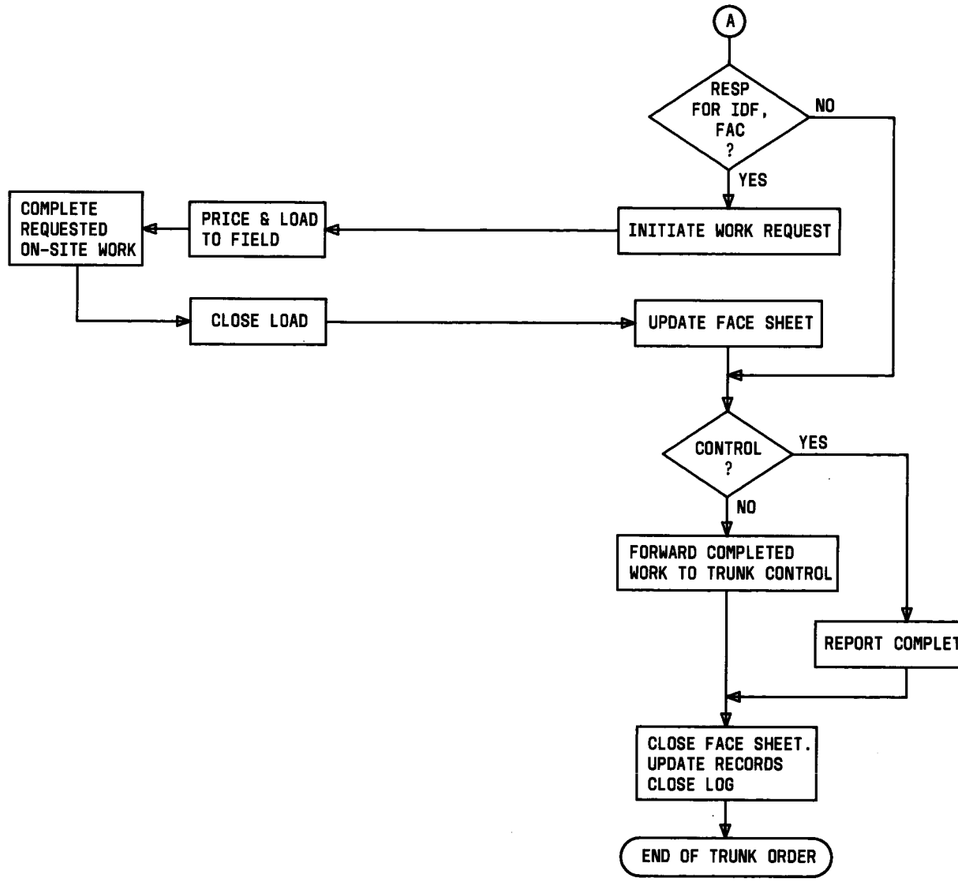
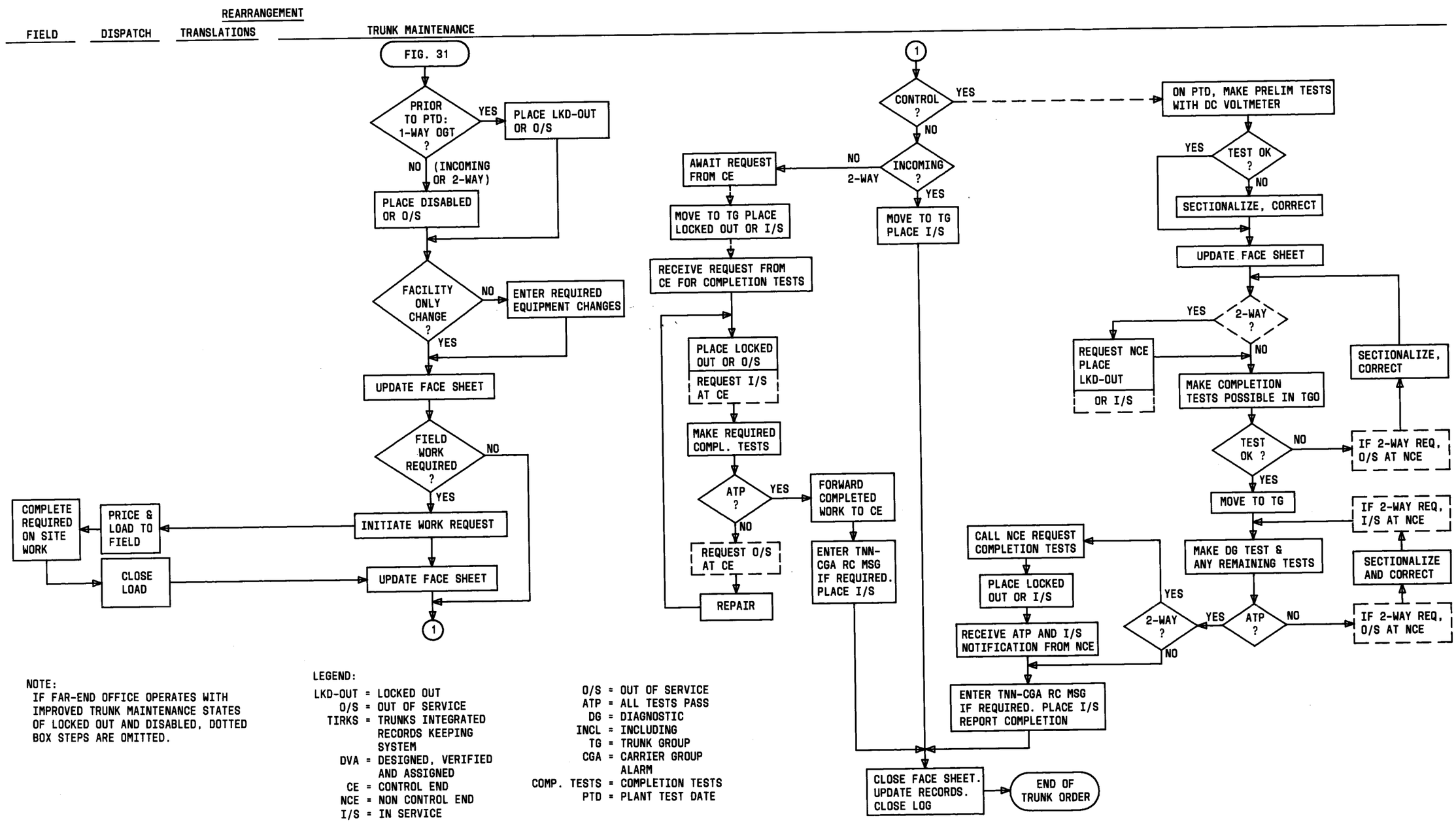


Fig. 33—Trunk Deletion (7.03)



NOTE:
IF FAR-END OFFICE OPERATES WITH IMPROVED TRUNK MAINTENANCE STATES OF LOCKED OUT AND DISABLED, DOTTED BOX STEPS ARE OMITTED.

LEGEND:

LKD-OUT = LOCKED OUT
O/S = OUT OF SERVICE
TIRKS = TRUNKS INTEGRATED RECORDS KEEPING SYSTEM
DVA = DESIGNED, VERIFIED AND ASSIGNED
CE = CONTROL END
NCE = NON CONTROL END
I/S = IN SERVICE
O/S = OUT OF SERVICE
ATP = ALL TESTS PASS
DG = DIAGNOSTIC
INCL = INCLUDING
TG = TRUNK GROUP
CGA = CARRIER GROUP ALARM
COMP. TESTS = COMPLETION TESTS
PTD = PLANT TEST DATE

Fig. 34—Trunk Rearrangement (7.03)

TRUNK ORDER LOG

ORDER NO.	DATE RCV'D	DUE DATE	ADD, DEL REARR	NO. ITEMS	DATE COMPLETED

Fig. 35—Trunk Order Log (7.04)

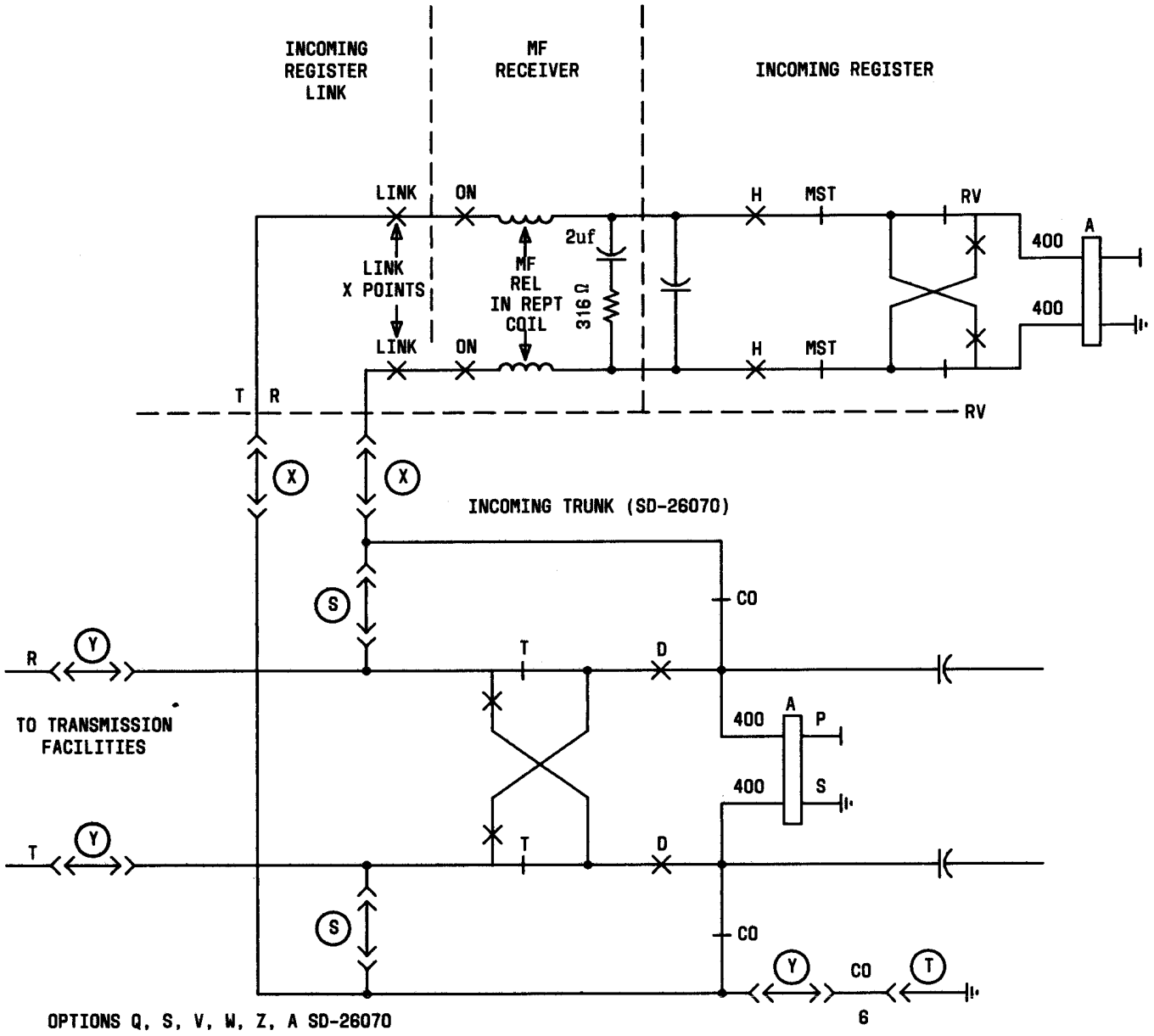


Fig. 36—Typical No. 5 Crossbar MF—Incoming Wink Start (8.07)

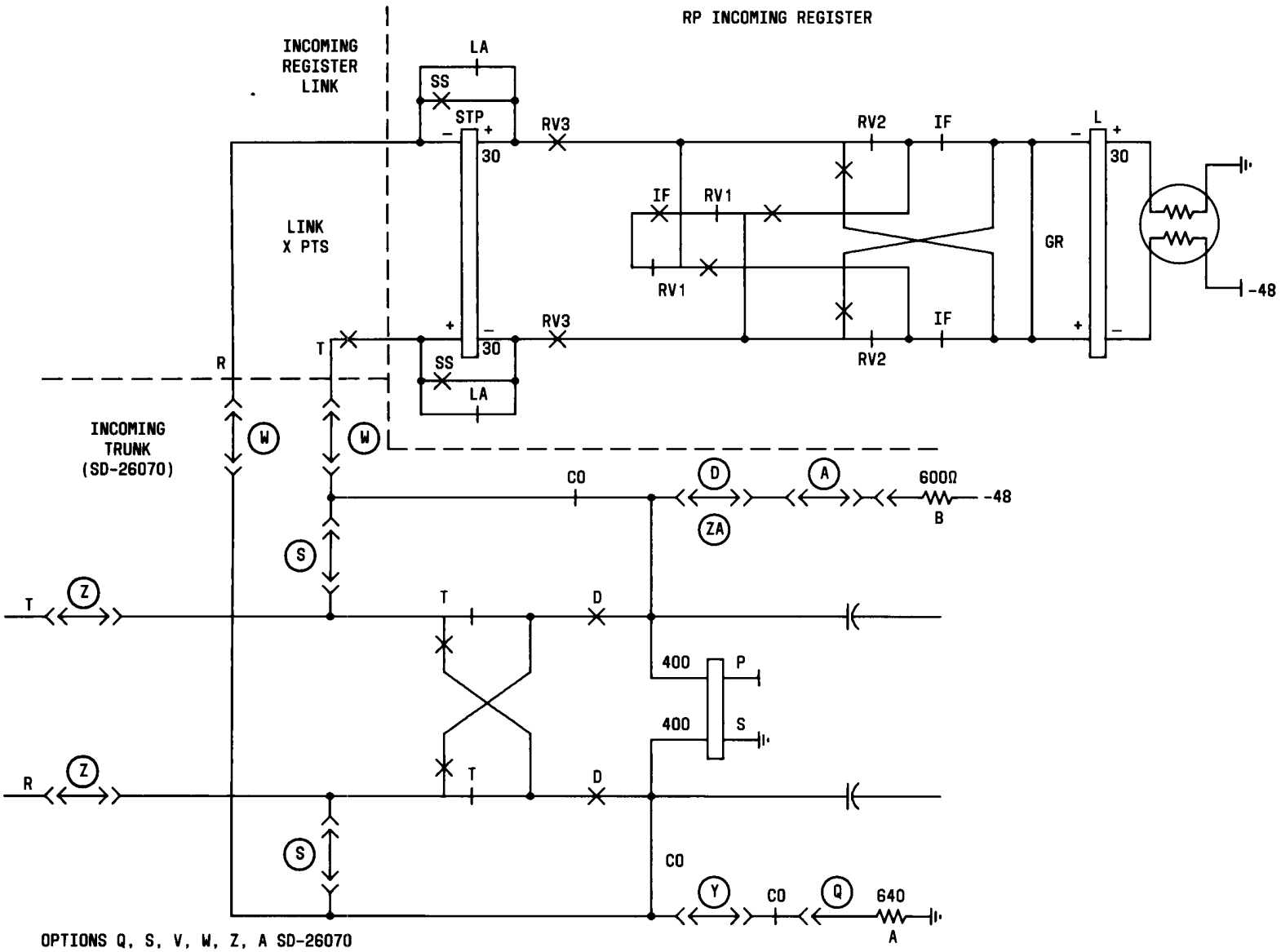


Fig. 37—Typical No. 5 Crossbar—Revertive Pulse Incoming (8.08)

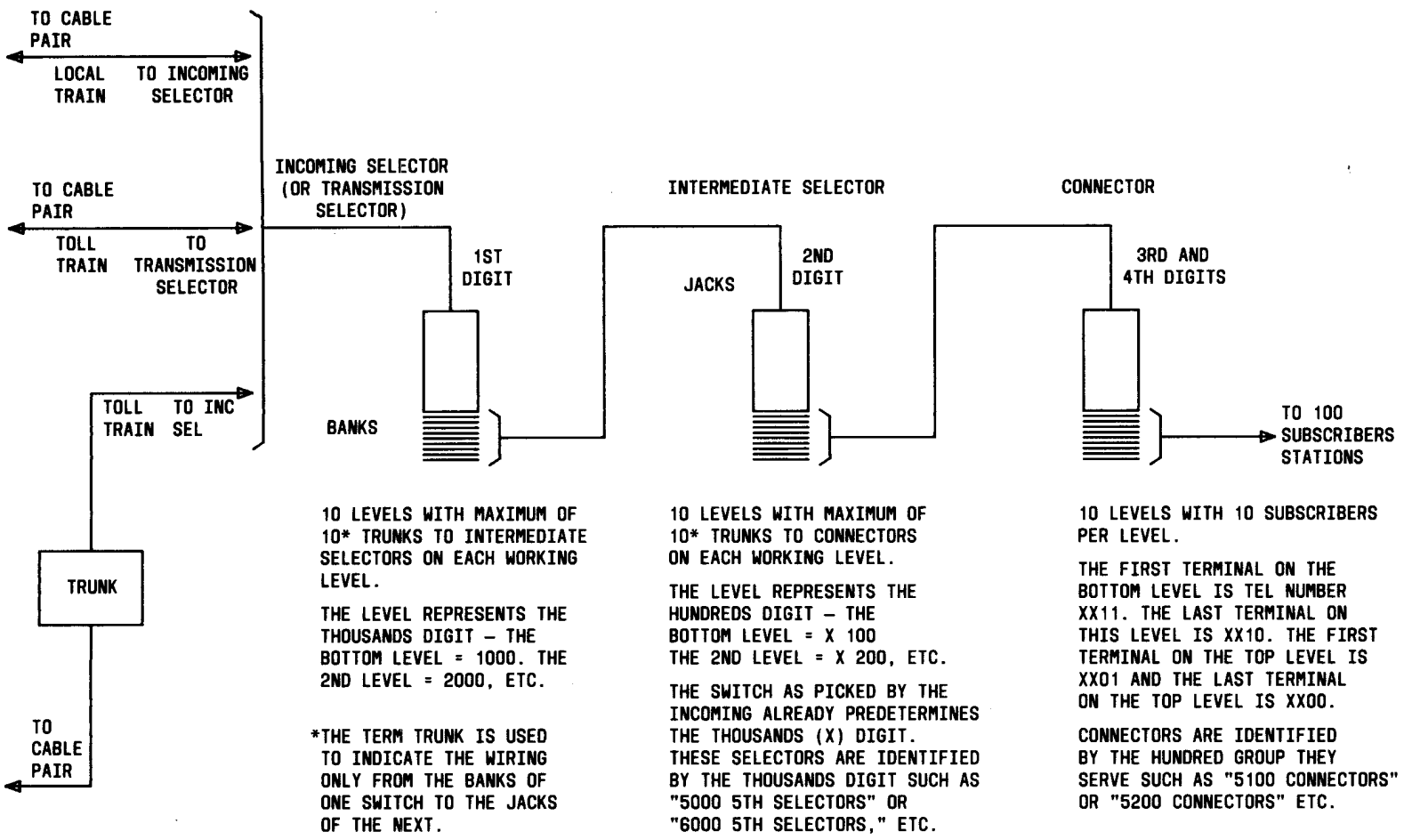


Fig. 38—General Information for Step-by-Step (8.09)

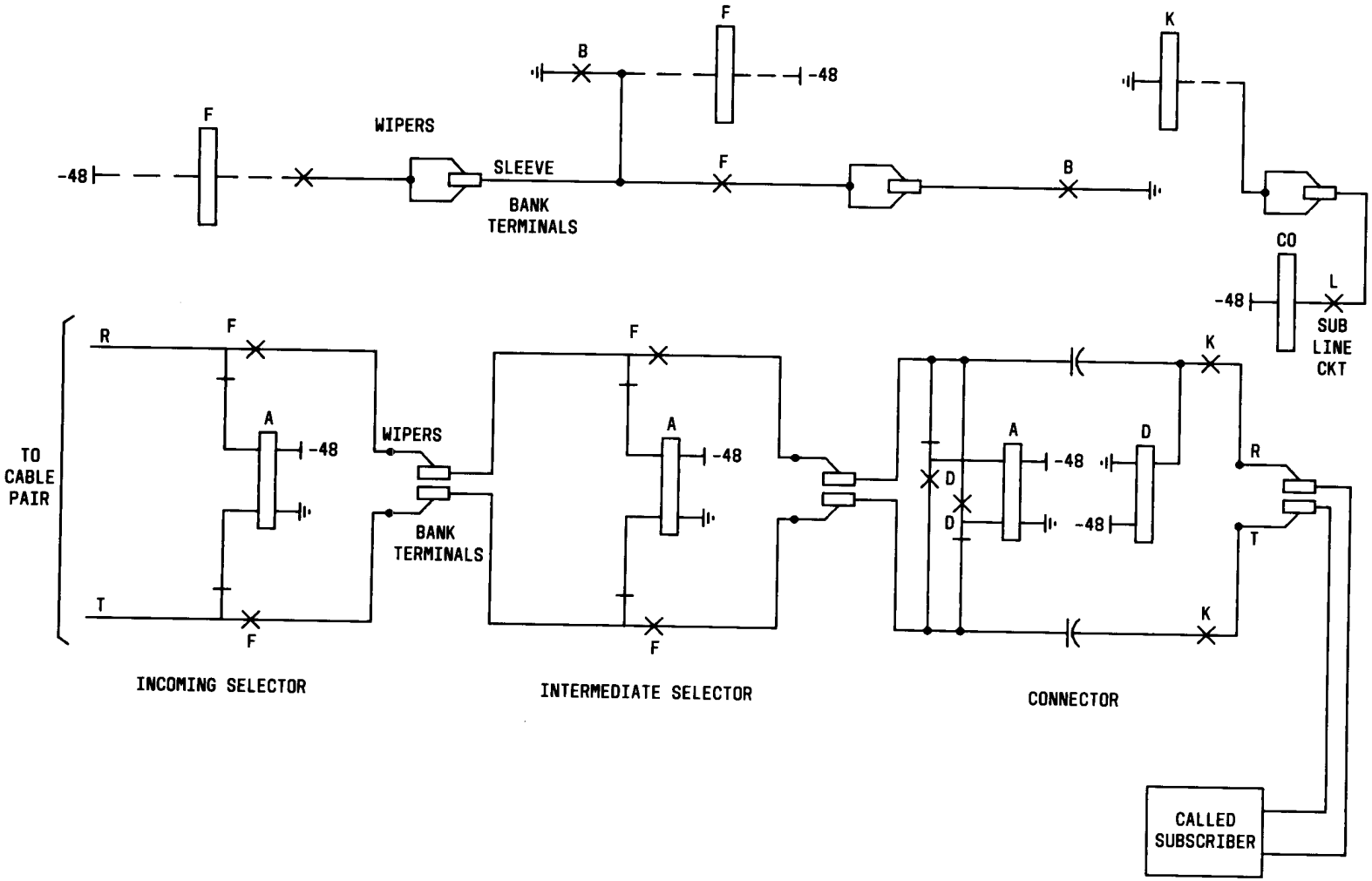


Fig. 39—Simplified Diagram of Step-by-Step Switch Train (8.09)

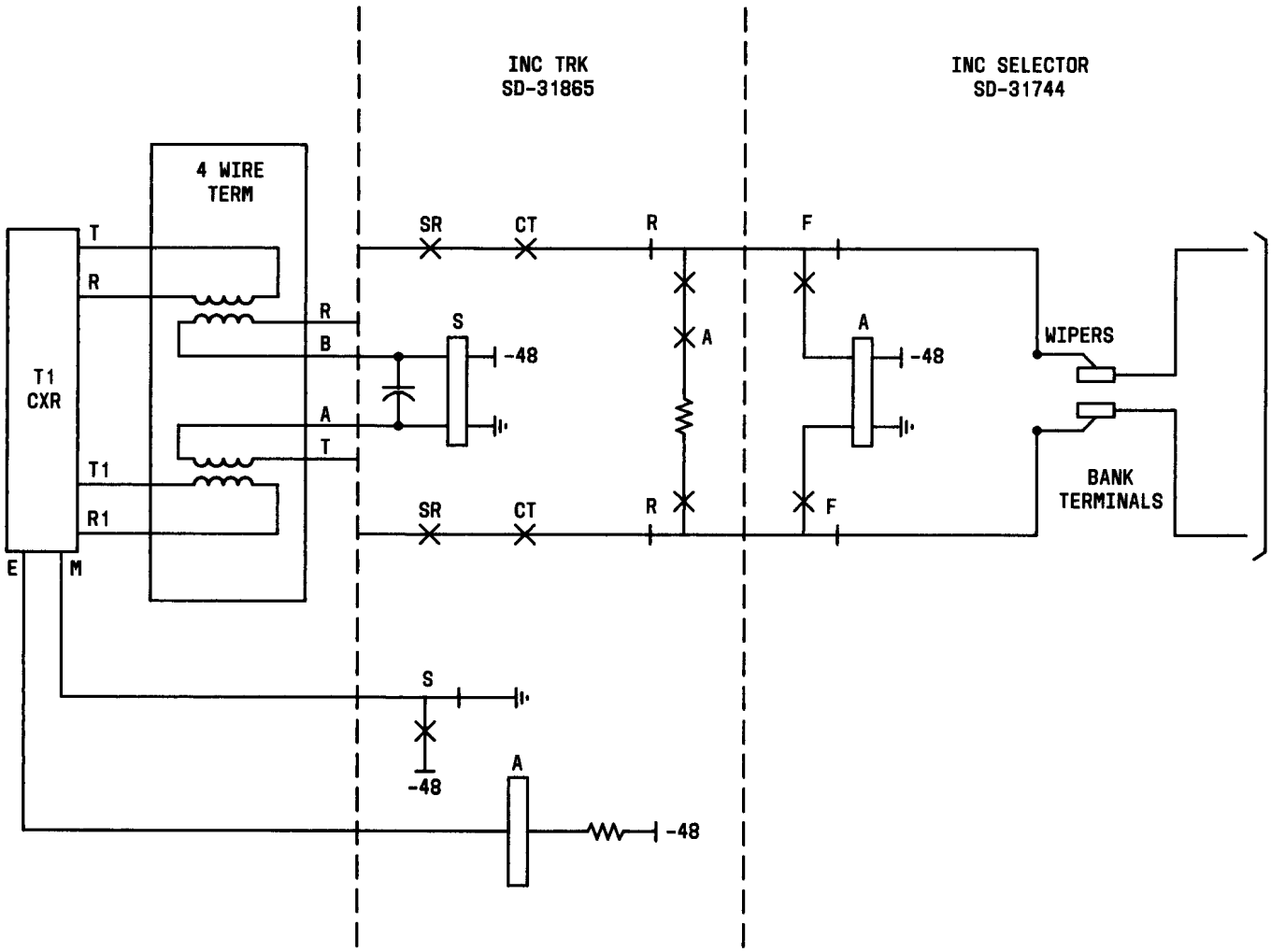


Fig. 40—Typical E&M Type Incoming Trunk to Step-by-Step (8.09)

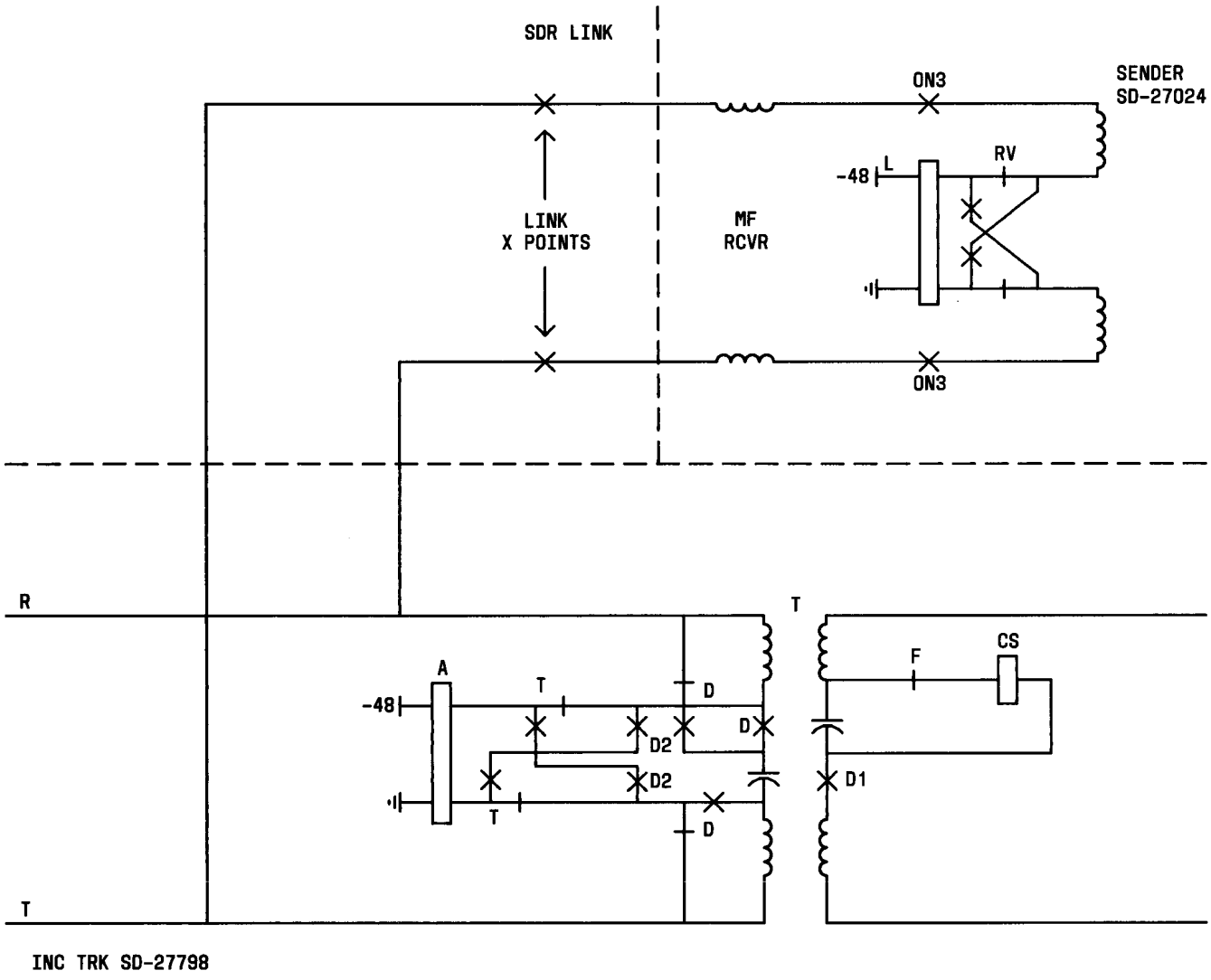


Fig. 41—Crossbar Tandem—MF Incoming Wink Start (8.17)

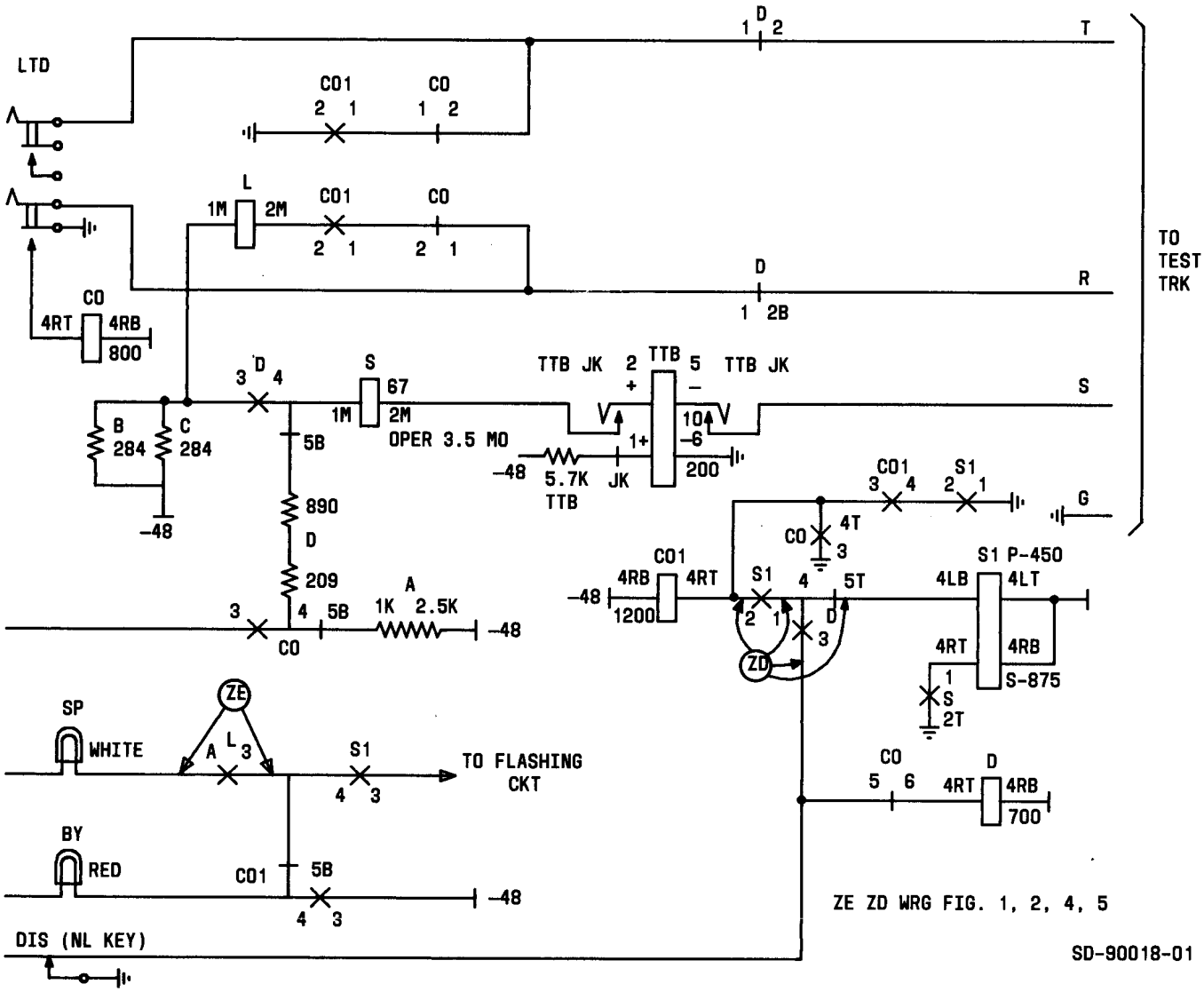


Fig. 42—LTD Equipment—511 Trunk (8.18)

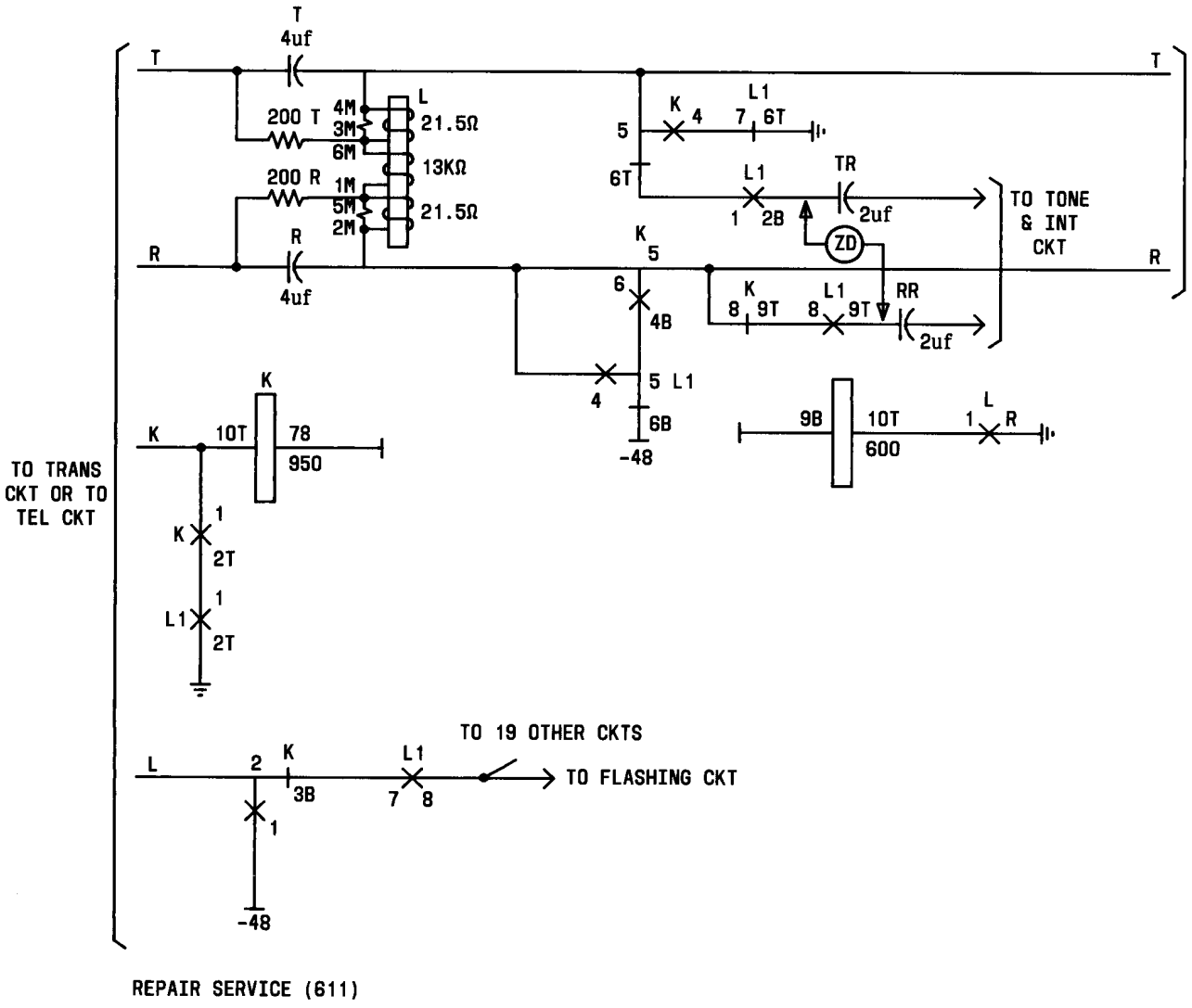


Fig. 43—LTD Equipment—HI-LO Supervision (8.19)

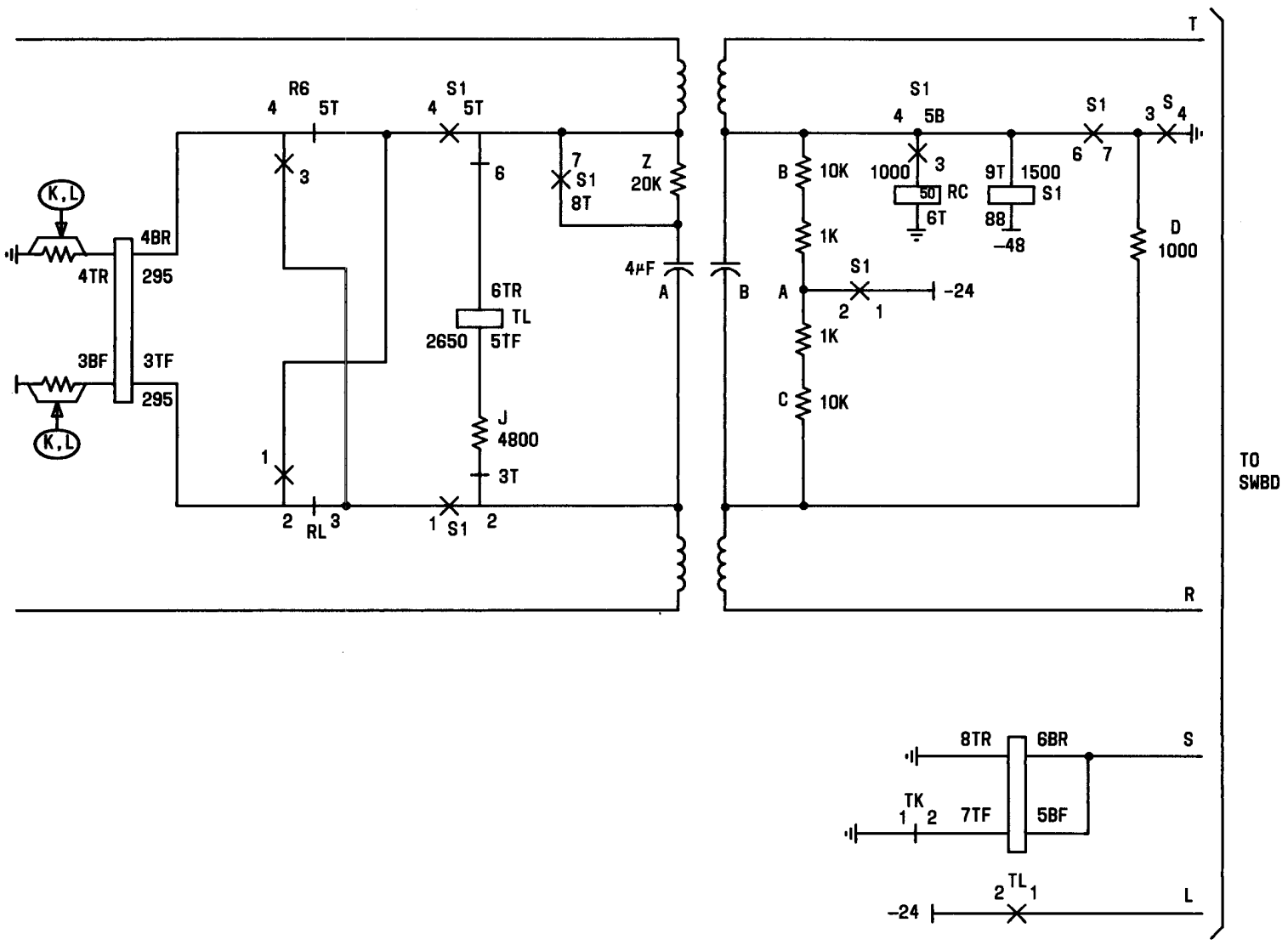


Fig.. 44—Trunk to Operator at Switchboard—Non-Coin (8.20)

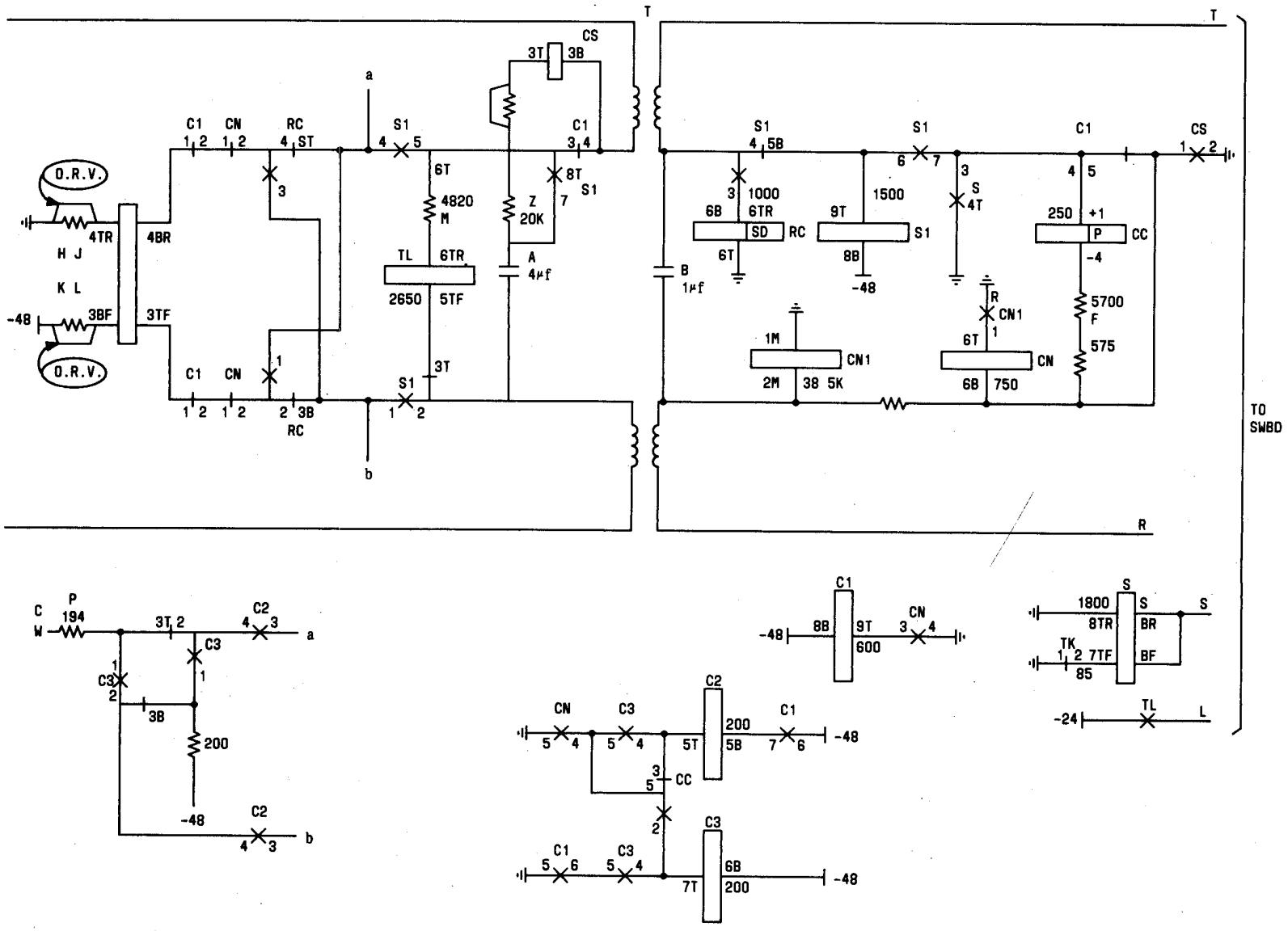


Fig. 45—Trunk to Operator at Switchboard—Coin (8.21)