SWITCHING SYSTEMS MANAGEMENT
NO. 3 CROSSBAR SYSTEM (2-WIRE)
OPERATIONAL FEATURES
GENERAL DESCRIPTION

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1. GENERAL

1.01 This section describes the No. 3 Crossbar Switching System. Although similar in many respects to the No. 5 Crossbar System, this system employs some new crossbar design concepts. The purpose of this section is to describe only those switching operations, features, and engineering considerations which differ from No. 5 crossbar. It is assumed that the reader is familiar with No. 5 crossbar.

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

1.03 References in this section to methods, planning, data requirements, service levels, and equipment quantities are based on American Telephone and Telegraph Company recommendations.

1.04 The No. 3 Crossbar System is a modularly constructed system for general use in an environment requiring a small community dial office (CDO). This system will serve wire centers from 200 to 1200 lines.

1.05 All equipment is installed on 7-foot high frames mounted on a trailerized steel pallet. A truss system is added to ensure safe transit and handling. After the truss members are in place and prepacking has been accomplished, an external vinyl coated shipping skin is attached and the trailer is ready for shipment to the central office site.

1.06 The switching frames are arranged on the switching modules as shown in Fig. 1. The switching modules of 400 or 800 lines are now rated MD. A standard 200- to 1200-line switching frame is now available. The switching module can be expanded in 200-line increments from a 200-line minimum to a 1200-line maximum.

1.07 The No. 3 Crossbar System utilizes small size, 12-level, 6-wire crossbar switches; a 3-stage switching network; a line number translator; plug-in registers; senders; and trunks. Incoming registers and out senders are capable of operating in either the dial pulse or multifrequency mode. The system also employs markers which perform dial tone and completing marker functions and act as the automatic number identification (ANI) transverter.

1.08 The maximum quantities of lines and common control and switching equipment that can be provided in the 200- to 1200-line, the 200- to

800-line, and the 200- to 400-line switching modules are shown in Table A.

1.09 The No. 3 Crossbar System is similar in design and concept to the No. 5 Crossbar System currently in use. The following are the distinct differences:

(a) The No. 3 crossbar office utilizes a 3-stage switching network of crossbar switches. The customer lines appear on the horizontals of the first-stage switches; the trunks appear on the verticals of the third-stage switches. The intermediate or second-stage switches are used to interconnect line links to the first-stage switches and junctors to the third-stage switches. The 3-stage network reduces the control circuitry, as well as the size and cost of the network. Three hold magnets and six crosspoints must be closed using two links to complete a channel from a line to a trunk. There are eight possible channels between any particular line and any particular trunk. (See Fig. 2.)

(b) The No. 3 crossbar line circuit provides automatic lockout and reorder tone to the customer. Therefore, lockout is forced whenever reorder is returned to an originating call.

(c) In No. 3 crossbar, the ringing selection switch has been eliminated. Multiparty ringing is set up by relays within the trunks, and line-busy tone and reorder tone are provided by level 9 of the third-stage trunk switches directly through crosspoints to the incoming or intraoffice trunk.

(d) The line intercept terminations appear on level 8 of the third-stage (trunk) switches. This level is accessible for line intercept by both incoming and intraoffice trunks.

(e) The ANI transverter has been eliminated, and its functions have been taken over by the line number translator. When ANI translation is required, the marker accesses the line number translator for the required information.

(f) The function of the number group and ANI translator frames has been combined into the line number translator. This provides ANI, number group translations, and line class-of-service indications.

(g) Coin service has been greatly simplified by the elimination of the coin supervisory link, coin supervisory circuit, and local coin trunks. A coin auxiliary line is used for coin control on local calls or to return coins on toll calls that are abandoned before completion to an operator or a Traffic Service Position System (TSPS) office.

(h) Originating registers are equipped to provide dial-tone-first announcement when required and also to register the station digit on revertive calls when required.

1.10 The common control equipment functions on all attempts are generally similar to No. 5 crossbar. The following is a general description of these functions:

(a) ***Dial Tone Connection:*** The initial functions are the same as No. 5 crossbar. Identification of the calling line is initiated when the marker is seized. Line identification is made (1) in terms of line link number, line block, line group, and line and (2) by a 3-digit number. The class of service of the line is obtained by the marker from the line number translator, which is seized when line group identification has been completed. The line link number is indicated to the marker by the marker connector upon marker seizure. Upon receipt of the class of service, the marker will select a trunk switch and connector on the trunk frame with idle registers and preferentially select and seize an idle originating register. The originating register will transmit dial tone to the customer as an indication that dialing may begin. (See Fig. 3.)

(b) ***Originating Connection:*** This type of connection requires a connection between the customer line appearance on the link link frame and a trunk appearance on the trunk frame. The marker determines the required route from the translation of the called number and the signals received from the originating register and operates the route relay. The line number translator is seized to obtain line translation (ANI) if required. After the selection of a trunk switch and connector containing the desired idle trunks, an idle trunk is selected according to required trunk block and trunk group information. If a sender is required for pulsing information to a connecting office, (a) an out sender is seized through the out sender connector and out sender

link and (b) required information is transmitted to the sender. (See Fig. 4.)

(c) ***Incoming Connection:*** An incoming connection is placed to a customer which requires a connection between the trunk frame and the called customer appearance on the line link frame. The marker must first seize the trunk switch and connector on which the incoming trunk terminates. The trunk switch and connector number is received from the incoming register and the trunk is controlled through the marker connector and the incoming register link. The marker accesses the line number translator to translate the called number into the equipment location. The line link containing the called number is seized and the connection is established. (See Fig. 5.)

(d) ***Reverting Call:*** A reverting call is a call to a customer on the same line as the calling customer. Due to the unique operation of the No. 3 Crossbar System, only one type of reverting trunk is required. Since all customers on the same line have the same line location, the marker makes the reverting test by matching the calling line location against the called line location; if a match is made, the call is handled as a reverting call. The calling line location is received from the originating register and stored in the marker. The called number is also received, and the translation of its office code causes the seizure of the line number translator for translation of the called number to the equipment location. The marker will match the line location received from the originating register with that received from the line number translator. The call will then proceed as a reverting call.

1.11 An important difference exists in the ordering procedure of a No. 3 crossbar office which requires special attention. The equipment cross-connections normally installed and tested by Western Electric during the installation interval of a No. 5 crossbar order will be wired and tested by the factory on No. 3 crossbar orders. Therefore, it is mandatory that equipment cross-connections (see Western Electric Questionnaire E8106) accompany No. 3 crossbar equipment orders. The compressed schedule (from order date to ship date) of the No. 3 crossbar depends on the simultaneous transmittal of the equipment order and cross-connections. Delay in providing the cross-connection information will jeopardize the job schedule and the advantages of factory-tested wiring. For this reason, it is recommended that organizations responsible for the preparation of cross-connections be notified of this requirement as soon as the decision is made to employ a No. 3 crossbar office.

1.12 The traffic order is the basic source document for the preparation of the Western Electric No. 3 Crossbar Questionnaire E8106, which is used for ordering No. 3 crossbar equipment (including quantities, features, and arrangements). Accordingly, the questionnaire format is recommended as a guide for the Network Design engineer to furnish the information to be included in the traffic order.

1.13 The trunk tables and trunk assignment work sheets in Figures 13 and 14 are in agreement with Issue 3 of E8106. The block diagrams in Figures 3, 4, 5, and 18 through 24 illustrate the various call connections which are possible in the No. 3 crossbar.

2. EQUIPMENT—OPERATION, USE, FUNCTION, AND CAPACITIES

2.01 In general, the equipment elements of No. 3 crossbar perform the same as comparable items in No. 5 crossbar. Differences in functions and capacities are covered in the following description of the various components.

A. Line Link Frames

2.02 The No. 3 crossbar line link frame is physically comprised of eight blocks of 200 lines each. This allows for the network to grow in increments of 200 lines. (See Fig. 6.) Each line block has two line switch units (LU) or line links (LL). Each line switch unit consists of four 12-level, 6-wire, 20-vertical small crossbar switches and 100 line and cutoff relay circuits. The maximum call carrying capacity (CCS) is as follows:

200 lines, 1340 CCS

400 lines, 2530 CCS

600 lines, 3490 CCS

800 lines, 4240 CCS

1000 lines, 4850 CCS

1200 lines, 5350 CCS

2.03 A line block of customer lines consists of the horizontals of two physical, 12-level, 6-wire, small crossbar switches which are divided into five groups (line groups) of eight verticals each. (See Fig. 7.) All lines in the same line block are associated with the same group of eight electrical channel switches. Each horizontal will serve two customers by the use of discriminating levels A and B to associate either customer with a link. A line group of customer lines consists of 10 horizontals accommodating 20 customer lines. Unlike No. 5 crossbar, the class-of-service cross-connection field is located on the line number translator frame rather than on the line link frame.

2.04 Line group electrical switches 0 through 4 and channel electrical switches 0 through 7 comprise one line block of 100 lines. The ten A junctors of each channel switch of line block 0 are connected to trunk switch circuit 0; the ten B junctors of each channel switch of line block 0 are connected to trunk switch circuit 1 horizontals in a standard junctor spread. The junctors of channel switches 0 through 7 of line blocks 0 through 3 on each line unit are multipled together so that each line block will access each trunk switch circuit through a set of common junctors. (See Fig. 8.)

2.05 The line load control feature is not provided in the No. 3 Crossbar System.

B. Line Relay Circuits

2.06 Each line block is equipped with 100 line circuits composed of 200 wire-spring relays. There is one line (L) relay and one cutoff (CO) relay per line circuit. The wire-spring L relay can provide any of the following types of service: ground-start coin (provided by a more sensitive line relay in the auxiliary coin line circuit), ground-start PBX, loop-start coin, loop-start flat rate, and loop-start measured rate. Class-of-service cross-connections, as previously stated, are made in the line number translator frame.

2.07 When ground- or loop-start coin lines are to be provided, they must be assigned in the first two lines of a line group. Coin lines are provided 10 per line unit to a maximum of 30. It will also be necessary to provide an auxiliary coin line circuit used in place of the coin supervisory and coin supervisory link circuits. Auxiliary coin line circuits are provided 2 per mounting plate on a maximum of 15 mounting plates. The auxiliary coin line circuit has the internal circuitry that enables the coin line to function as a regular customer line. The ultimate quantity of coin lines to be provided will be determined when writing the initial traffic order so that the necessary auxiliary coin line circuits will also be provided.

C. Line Circuit Feature

2.08 ***Line Lockout:*** All No. 3 crossbar line circuits are furnished with relay apparatus (CO relay) to provide the lockout feature. Lockout is activated when a customer line remains in the off-hook position (permanent signal condition) or when overflow tone is required on an originating attempt. When the line is in the lockout condition, 120-ipm tone is returned to the customer. The line lockout feature prevents lines in a prolonged permanent signal condition from tying up central office switching and common control capacity. Overflow tone is placed on the line from a tone circuit connected directly to the line block switch from an interrupter circuit. The lockout feature releases automatically when the customer line is restored to normal (receiver placed on-hook or line trouble cleared).

2.09 Since the customer lines in the No. 3 Crossbar System are located on the horizontals, a line-busy test cannot be made by testing the channel sleeve for ground busy. Therefore, a contact on the CO relay will indicate over the line test (LT) lead the condition of the line to the marker. In a No. 5 crossbar terminating connection, the marker had to make a receiver-off-hook test to determine if the line was busy or locked out. In the No. 3 Crossbar System, a locked-out line tests like a busy line since its cutoff relay is operated.

2.10 Overflow tone is returned by the line circuit on all originating requests if the marker finds any of the following conditions:

(a) All trunks busy

(b) All senders busy

(c) Failure to match (all paths busy)

(d) Mutilated digits.

On a sender call, after the marker has released, the sender assumes control of the channel in addition to the conditions in (a) through (d). If for any

reason the sender is unable to complete its functions, the sender will release the channel, which will result in cutoff and 120-ipm tone will be returned to the customer. This eliminates the need for overflow relays in the outgoing trunk circuits and also precludes the need for common overflow and tone trunks.

2.11 ***Permanent Signals:*** When the marker receives an attempt from an originating register marked as a permanent signal, it will access the tip and ring through the originating register to determine if the permanent signal is caused by either a trouble condition or a receiver off-hook (ROH) condition. Treatment of lines in an ROH condition may be handled either of the following ways:

(a) The marker may be directed to immediately release the channel which will place the line in the cutoff condition and place 120-ipm tone on the line.

(b) The marker may be directed to route the attempt to an operator type of trunk. There the call may be challenged to determine if an emergency condition exists. If unable to determine if an emergency exists, the operator releases the trunk which then automatically places the line in the lockout position. Lines in trouble may also be handled in either of two ways; they may be directed to disconnect to lockout or to route as required. In either condition, prior to marker release, a trouble record will be taken and the permanent signal overflow register will be advanced to maintain a count.

2.12 ***Line Busy and Incoming Reorder:*** When the marker determines that the called line is busy on an intraoffice forward linkage (IAO-FLG) call or an incoming call, the IAO or INC trunk is directed to level 9A of the trunk switch for application of line-busy tone. Incoming reorder is applied from level 9B of the trunk switch under the following conditions:

(a) Five-digit incoming vacant codes

(b) Incoming register link release

(c) Incoming register reorder signal

(d) All paths busy

(e) Second trial trouble release

(f) Multilated digits.

2.13 ***Call Waiting Service:*** Call Waiting service provides a means whereby a customer, who is off-hook and has completed dialing or talking on an incoming call, is notified by a (beep) tone that a call is waiting. The customer may place the first party on hold and transfer to the waiting call by momentarily depressing the switchhook. The customer may, by subsequent flashes of the switchhook, talk alternately to or disconnect from either party.

2.14 Call Waiting service is provided by a Call Waiting auxiliary line circuit which provides the alerting (beep) tone, switchhook flash detecting, holding, supervisory, and transfer functions required to set up and maintain a Call Waiting call. The Call Waiting auxiliary line circuit is wired to provide dialing protection (to prevent any Call Waiting circuit action, such as alerting tones, from disturbing dial pulses or TOUCH-TONE® signals).

2.15 Customers desiring Call Waiting service will require two line link appearances for each one line of Call Waiting service. Two line numbers (one directory number) will also be required for each line of Call Waiting service. The capacity for Call Waiting service is based upon physical limits of mounting plate space for Call Waiting auxiliary line circuits. The system may be provided with a maximum of 15 auxiliary line circuits on 5 mounting plates, 3 circuits per plate.

D. Recorded Announcement Applications

2.16 The No. 3 Crossbar System utilizes a 4-track announcement machine, designated the 12A announcement system, to provide the types of announcements that are required. The system utilizes a continuous magnetic tape and has coordinated the start of announcement if desired. The maximum announcement length is approximately 12 seconds. An associated voice alarm and control circuit monitors the announcement circuit output. The following are the applications that may be provided.

(a) ***Dial-Tone-First Operation:*** With dial-tone-first operation, the customer is connected directly to the announcement machine without marker aid if a coin has not been deposited.

(b) ***Vacant Code:*** Originating vacant codes may be connected to an intercept trunk which has a trunk switch and connector appearance with the capability to switch the call to the announcement machine for vacant code announcement. This trunk will also transfer the call to an operator after one or two announcement cycles of the machine.

(c) ***Intercept:*** Blank number, regular, trouble, or temporary intercept may be handled by selecting the appropriate trunk on the intercept level of the trunk switch in the following manner:

(1) At the line number translator, if no cross-connections are made for a directory number, the marker will not receive a translation and will interpret it as a blank number (BN).

(2) At the line number translator frame, lines may be connected as BN, regular intercept (RI), and trouble intercept (TI). All indications may be sent to a remote location with standard signals for remote announcement or appearance at RI and TI operators. Blank number may be announced locally with transfer to operator trunks, and RI and TI may be sent to a remote position utilizing standard signals.

(d) ***Operation With Remote Intercept System—Automatic Intercept System (AIS):*** Intercept calls are trunked to the AIS center using a new intercept trunk that utilizes a sender. The sender outpulses a digit that indicates the type of intercept and the called number. No provision is made for a local blank number announcement if AIS is available.

E. Trunk Frames

2.17 Four different size trunk frames are available for No. 3 crossbar offices:

(a) One 4-bay frame—TF0

(b) One 3-bay frame—TF1

(c) Two 2-bay frames—TF3 and TF4

(d) Four 1-bay frames—TF2, TF5, TF6, and TF7.

Trunk frames TF0 and TF2 are basic frames and are always provided. TF1 is the only optional frame for the MD (200—800 line) offices. Frames TF1 and TF3 through TF7 are optional for the standard (200—1200 line) offices. Optional trunk frames can be provided initially or added on a plug-in basis, depending on the number of lines and trunks required. If TF1 is not provided initially, it must be added before any additional frames are added, since it contains the first expansion of the trunk switch and connector circuits (from 8 to 12 verticals for the 0 through 9 trunk switches). TF3 must be provided before any of the TF4 through TF7 frames can be added. TF3 contains the final expansion of the trunk switch and connectors (from 12 to 20 verticals for the 0 through 9 trunk switches), as well as the IRL and OSL switches for the trunk equipment mounted on the frames TF5 through TF7. (See Figures 9 and 10.)

2.18 Trunk circuits are located on all trunk frames. However, only frames TF0, TF1, and TF3 contain crossbar switches to form the trunk switch and connector circuits, out sender links (OSL), and incoming register links (IRL). An expansion of the IRL for the 200- to 1200-line office is located on the extension incoming register (EIR) frame.

2.19 The trunk switch portion of the trunk switch and connector on TF0 is comprised of four 12-level, small crossbar switches. These four switches are further broken down into ten electrical trunk switches. (See Fig. 11.) The trunk switch portion of TF1 is also comprised of four 12-level, small crossbar switches. These switches are further broken down into 20 electrical switches. These switches, when utilized, become 4-vertical extension switches of the 0 through 9 electrical switches on TF0. (See Fig. 12.) Trunk switches 0 through 9 with 8 verticals (when TF0 and TF2 are utilized) and 12 verticals (when TF0, TF1, and TF2 are utilized) comprise one trunk switch and connector circuit. Each trunk switch has eight A junctors and eight B junctors. The A junctors connect to line link 0 channel switches; the B junctors connect to line link 1 channel switches. (See Fig. 8.) The junctor spread is such that the trunk switch number is equivalent to the channel switch horizontal and the trunk switch horizontal is equivalent to the channel switch number.

2.20 The operation and functions of the No. 3 crossbar trunk switch and connector are basically the same as No. 5 crossbar small switch trunk link frames, except the trunks appear on

the verticals of the trunk switch rather than on the horizontals. (Refer to 1.09[a].)

2.21 The trunk switch and connector on trunk frame 0 is equipped with TB relays numbered TB0 through TB6. The trunk test (TT) leads, TT0 through TT11 of TB relays, are cross-connectable and can be associated with any switch and vertical similar to the manner in which No. 5 crossbar small switch trunk link frames are wired. Originating registers (prewired to switches 0 through 5 on vertical 0) can only be assigned to TB relay 0.

2.22 The No. 3 Crossbar System contains either four or seven trunk equipment bays containing trunk positions which are equipped for plug-ended trunks. Trunk positions numbered in the 000 series are located on TF0, trunk positions numbered in the 100 series are located on TF1, trunk positions in the 200 series are located on TF2, etc. (See Fig. 13, Trunk Assignment Table.)

2.23 In No. 5 Crossbar, there is no fixed relationship between trunk link frame appearances and trunk relay frames. That is, trunk types are assigned to trunk link frame appearances and the appearances are cabled to appropriate trunks on the most convenient trunk relay frames. In No. 3 crossbar, each trunk switch appearance is precabled to (a) a specific plug-ended originating register position on an originating register frame, (b) a specific plug-ended trunk position on a trunk frame [TF0, TF1, and TF2], or (c) a specific plug-ended trunk position on miscellaneous frames 2 and 3.

2.24 Each plug-ended trunk position on TF0, TF1, and TF2 and its associated trunk switch appearance are limited to accommodate only certain types of trunks by precabling of the trunk plug and in some cases by mounting space limitations. The precabling of the plugs in some trunk positions is limited to the connections required for only one category of trunks. They are designated fixed positions and appearances. (See Fig. 14.) For example, trunk plugs arranged for intraoffice trunks are cabled to two trunk switch appearances. Trunk positions and associated trunk switch appearances fixed for intraoffice trunks cannot be used for incoming or outgoing trunks because the plugs are not cabled to incoming register link or out sender link switches. There are, however, fixed positions and appearances for certain trunk types of each category: reverting, incoming, and outgoing trunks.

2.25 Some trunk positions and associated trunk switch appearances are designated flexible. (See Fig. 14.) Flexible trunk positions are equipped with two plugs, one of which is precabled to a switch and vertical appearance on a trunk switch and connector circuit and an incoming register link appearance. The other plug is precabled to a switch and vertical appearance on the same trunk switch and connector circuit sender link appearance. Each flexible position is thereby arranged to serve one incoming trunk and one outgoing trunk; or by using both plugs, a flexible position can serve one of certain types of intraoffice or 2-way trunk types. (See Fig. 14.)

> ***Note:*** Flexible positions should be used only when trunking requirements exceed the quantities of trunks that can be provided in fixed positions since their utilization reduces trunking versatility. It should be noted that assignment of 2-way trunks to flexible positions will use both plug positions, but will occupy one trunk switch appearance.

F. Trunks

2.26 All traffic handling trunks required in No. 3 crossbar must be specified in the traffic order. The No. 3 crossbar trunk types available are shown in the trunk tables (AP, BP, CP, DP, EP, FP, GP, and MP) in Fig. 15. These trunks are plug-ended and installation consists of mounting the trunk unit on the frame and connecting the plugs. When required, Maintenance forces can install or change trunk units, thus providing fast reaction to changing trunk requirements or office balance characteristics.

2.27 Fig. 16 is a summary of the No. 3 crossbar trunk types that may be provided. Note that, since the trunk frame appearances and trunk positions are arranged to accommodate more than one type trunk, the use of an appearance for one trunk type reduces the quantities of all other types for which the appearance was arranged by the quantity of one. This interrelating characteristic of trunk assignments renders the ordinary method of summarizing trunk quantities inadequate. It also prevents the accurate determination of whether a No. 3 Crossbar System contains the trunking capabilities to meet the requirements of a given office until (a) the ultimate quantity of each trunk type has been determined and (b) the quantities

of all trunk types have been applied to Fig. 14 as covered in the notes.

2.28 ***Intraoffice Trunks:*** Intraoffice trunks are arranged in four subgroups (maximum 12 trunks per group) and are restricted to trunk group 0 (TG0), trunk blocks 1 through 4 (TB1-4) by fixed arrangements within the marker circuit. Four dedicated route relays are provided for the intraoffice route and are as follows:

(a) Intraoffice route "A" (IRA)

(1) (RR) ALA—TG0, TB1 (12 trunks per trunk switch)

(2) (RR) ALB—TG0, TB3 (12 trunks per trunk switch)

(b) Intraoffice route "B" (IRB)

(1) (RR) ALA—TG0, TB2 (12 trunks per trunk switch)

(2) (RR) ALB—TG0, TB4 (12 trunks per trunk switch).

Intraoffice trunks should be spread as evenly as possible between IRA and IRB. They should also be spread evenly between the two TB relays within IRA and IRB.

2.29 ***Intercept Trunks:*** Intercept trunks used for regular, trouble, and blank numbers are associated with levels 8A and 8B and are common to all trunk switches 0 through 9 of the same trunk switch and connector circuit (maximum two trunks per circuit—four per system). Intercept trunks used for vacant codes are assigned to verticals of the trunk switches in the same manner as other trunks.

2.30 When the trunking capacity of No. 3 crossbar is found to be adequate for the life expectancy of an office, the trunk requirements for the impending job should be applied to the trunk assignment work sheets of Western Electric Questionnaire No. E8106. When trunk assignment is performed in accordance with the work sheet notes, each trunk type is distributed equally over the trunk switches. A trunk frame assignment chart is provided in Fig. 13 to illustrate the capabilities of No. 3 crossbar.

G. Originating Registers

2.31 The No. 3 Crossbar System can be equipped with a maximum of 12 originating registers (ORs). The ORs perform the same basic functions and have the same capabilities as the No. 5 crossbar ORs except as noted. Features and functions provided in No. 5 crossbar by the originating register line memory frame have been incorporated into the originating register frame circuitry. There are no arrangements for pretranslator frames.

2.32 Each originating register frame is completely wired and equipped to mount two ORs. ORs are provided two at a time on a per-frame basis. The Network Design engineer should specify the quantity in the traffic order. Eight ORs (maximum) are provided in a 400-line module: two each in IR-OR 0, and OR 1 through OR 3. Four more ORs are provided by the addition of bays OR 4 and OR 5 in an 800- or 1200-line module. Features of the OR are shown in Fig. 17.

2.33 All No. 3 crossbar originating registers are equipped to provide the following:

(a) Pretranslation, A-0, B-0/1, C-0/1.

(b) Interchangeable codes; No. 3 crossbar may not be N 0/1 X code.

(c) Single prefix 0- and 1-digit operation with 3.5-second timing after seven digits. Also, New York plan (212 area) where 0 or 1 indicates ten digits, and Los Angeles plan (213 area) where 1 indicates ten digits (0 may be either seven or ten digits).

(d) TOUCH-TONE® or rotary dial.

(e) Coin service—prepay or dial-tone-first.

(f) Eight classes of service per office code.

(g) X11 service codes.

(h) Prefix counting for digit 1 access code (1+, 0+ in TSPS).

2.34 The following features are not provided:

(a) Centrex

(b) Twelve-digit operation (TSPS international direct distance dialing [IDDD])

(c) IDDD

(d) PICTUREPHONE®

(e) 11X service codes

(f) 60 ipm and 120 ipm

(g) Rate treatment by customer class of service

(h) Private line network operation where register is required to recognize that access digit 8 was dialed to reach the No. 3 crossbar office

(i) Coin return.

2.35 Originating registers are restricted to TG0, TB0 and perform in the same manner as a No. 5 crossbar OR except for the following differences:

(a) ***Revertive Calls:*** Two types of revertive call arrangements can be provided as follows:

(1) ***All negative coded ringing:*** When all negative coded ringing is employed, the calling party is not required to dial an additional identification digit. After the calling party has received dial tone and dialed the called number, the OR will seize a marker which will establish the connection from the calling party to a revertive trunk which, upon marker release, will apply busy tone until the calling party goes on-hook. The revertive trunk will then apply ringing to both the calling and called parties and will supervise the connection.

(2) ***Four-party full select or 8-party:*** When positive/negative superimposed ringing is employed, the calling party is required to dial an additional identification digit. After the calling party has received dial tone and dialed the called number, the marker, after seizure and translation of the called number, will cause the OR to return the second dial tone. After the calling party has dialed the additional identification digit, the OR will seize a marker which will establish the connection from the calling party to a revertive trunk which, upon marker release, will apply busy tone until the calling party goes on-hook. The revertive trunk will then apply ringing to both the calling and called parties and will supervise the connection.

(b) ***Dial-Tone-First Announcement:*** This circuit will connect directly to the OR. The OR will be arranged to permit certain dial-tone-first calls, such as dial 0 and 911 calls, to complete without initial coin deposit. On coin calls without the required initial deposit, the OR will connect the calling line to the dial-tone-first announcement circuit directly without requiring a marker.

2.36 Originating register holding times will generally be identical to those of the No. 5 crossbar originating registers except as follows. In large party line installations where the calling party is required to dial an additional identification digit, the originating register is required to return a second dial tone to record this digit. This additional function will place an added load on the originating registers and increase the holding time. Therefore, in the absence of any historical data, add 3.0 seconds for dial pulse and 2.0 seconds for TOUCH-TONE to the average holding times. Originating registers should be engineered for service based on the capacities. One originating register should always be provided for maintenance. Holding times are shown in Table B.

H. Markers

2.37 As in all crossbar systems, the primary control circuits are called markers. The No. 3 marker establishes all connections through the office. The services of the marker may be requested by lines (line switch circuit) for dial tone, originating registers for completion of originating calls, and incoming registers for termination of incoming calls.

2.38 The No. 3 Crossbar System is arranged for one marker group (M0), with the option for a second marker (M1). However, it is recommended that the markers always be provided initially for service protection. The markers, M0 and M1, are equivalent to No. 5 crossbar wire-spring completing markers arranged for originating line identification (OLI). With this arrangement, the markers perform both the dial tone and completing functions. The No. 3 markers also perform the functions of the eliminated transverter frame by accessing the line number translator on ANI call attempts. The

marker also passes class-of-service information from the line number translator to the originating register on dial tone attempts. The following are the marker holding times per type of call. These holding times are average measured times during periods of light traffic when no frame seizure delays are encountered.

TYPE	HOLDING TIME (SECONDS)
Dial Tone	.59
Intraoffice	.93
Incoming	.55
Outgoing (Sender required)	.48
Outgoing (No Sender required)	.46
ANI	.59
Revertive	.70
Revertive	.35*

*First part of call where station digit has not been received.

2.39 While the No. 3 crossbar marker function is basically the same as No. 5 crossbar markers, certain features have been changed or deleted as follows:

(a) Quantities of code points, route relays, class-of-service relays, marker connector relays, etc, have been reduced to No. 3 crossbar proportions.

(b) Obsolete features such as 11X service code screening have been eliminated.

(c) Features which are inappropriate to the No. 3 Crossbar System, such as foreign area code translation, local automatic message accounting (LAMA) operations, centrex operations, and IDDD. Group alerting has been replaced by an optional emergency reporting auxiliary line circuit located on miscellaneous frame 0.

2.40 Features of No. 3 crossbar markers are as follows:

(a) ***Call Types:*** Markers can establish the various types of call connections illustrated by block diagrams in Figures 3, 4, 5, and 18 through 24.

(b) ***PBX Terminal Hunting—Block Hunting:*** Hunting is accomplished on the pilot number handled as regular numbers. A PBX is restricted to a maximum of two blocks (20 lines). Each line number translator may be equipped for six 10-line blocks of (1) four 10-line blocks and one 20-line block or (2) two 10-line blocks and two 20-line blocks.

(c) ***Two-Line Hunt Groups:*** An unlimited number of 2-line groups may be provided; the only restrictions are that their line location (line unit, line block, and line number) must be the same and they must be in adjacent line groups. Ringing combination RC8 causes a hunt to the higher numbered line group and ringing combination RC9 to the lower group if the first line tested is busy.

(d) ***Code Points:*** No. 3 crossbar has the same code point translation capabilities as No. 5 crossbar, with the following exceptions:

(1) In No. 5 crossbar, 1000 code points (ABC digits 000 through 999) are furnished for full translation of ABC digits. In No. 3 crossbar, 64 code points (22 to 29, 32 to 39, 42 to 49, etc, through 92 to 99) representing all usable AB code points are provided. Cross-connections are provided to extend any 48 AB codes for full ABC translation. NPA codes are not translated; they appear as one common code point.

(2) Cross-connection arrangements are provided for extending the translation of two ABC code points to ABCD code points.

(e) ***Route Relays:*** Each No. 3 crossbar marker contains 20 outgoing routes in two ground supplies, 0 to 9 and 10 to 19. In addition, the marker has a fixed dial tone route and a fixed intraoffice (IAO) route which are arranged in such a manner that four TB relays may be assigned to provide maximum IAO capability. A route advance is made from one ground supply to the other. The first advance may be made to an alternate route; the second advance is final (reorder tone). Reorder is provided by wiring the RA punching on the second route relay to the reorder tone (ROT) punching. For example, if the route advance is from route relay

01 to route relay 10, the RA punching on route relay 10 must be wired to ROT.

(f) ***Allotter Groups:*** In addition to the allotting provided on IAO trunks, other groups may be allotted over two TB relays by cross-connecting the route relay TB terminal to AL 0-1. Two groups in addition to the IAO group may be allotted.

(g) ***Screening Relays:*** The No. 3 crossbar marker is equipped for direct screening by the class of service and prefix dialed to accommodate the majority of screening conditions. Five sets of class-of-service screening points and seven sets of prefix screening points are provided. In addition, ten S relays with individual contacts are available for use if additional screening points are required. Ten auxiliary route relays are equipped to be used as diverted routes, transfer routing, or additional screening, if required.

(h) ***Number Series:*** No. 3 crossbar may be arranged for one or two number series—office A or B with rate discrimination. Any one of four different thousands digits or any one of 12 thousands-hundreds combinations may be employed (six per line number translator). Offices A and B may have the same thousands-hundreds digits assigned for the directory number if the office codes are different. This requires that the marker assign two TH(A-D) relays for the same thousands number to allow a separate thousands-hundreds block to be assigned for each office. The tens and units digits may be duplicated. For ANI translations, only one office code can be generated for office A and one office code for office B.

(i) ***Vacant Code Treatment***

(1) Originating vacant codes may be connected to a trunk switch intercept trunk which connects to the announcement machine for a vacant code announcement. These codes will transfer to an operator trunk after one or two cycles of the machine.

(2) Incoming vacant code calls will receive 120-ipm overflow tone from the trunk switch.

(j) ***X11 Service Codes:*** Capabilities are provided for X11 service code treatment.

(k) ***PBX Dialing Arrangements:*** Features are incorporated for providing 4-digit intercom service with dial 9 out and direct in-dialing to the station for one PBX customer. The No. 3 Crossbar System is used only as the PBX switch. No mixture of dial 9 and class 5 operation is allowed. This combination of features does not provide facilities for reaching an attendant. The tariff offerings for PBX and centrex provide for a PBX or centrex attendant with (1) a listed number and (2) the capability to advance a call to a PBX centrex station. Therefore, caution should be exercised when considering the use of these features since they are not covered by either existing PBX or centrex tariffs.

(l) ***Toll Diversion:*** The standard toll diversion is provided, except that all PBX classes are treated alike.

(m) ***Toll Restriction:*** The toll restriction feature (on "0" and ANI calls) applies to PBX application of No. 3 crossbar. This is not recommended.

(n) ***Digit Deletion:*** One, two, and three digits may be deleted; in addition, delete called number (DLN) or delete ANI (DLA) information which may be transmitted to the sender.

(o) ***Arbitrary Codes:*** The sender may be instructed to prefix any one of four cross-connectable single digits. Two- or 3-digit prefixes or code conversion is not available.

(p) ***Incoming Classes:*** Four incoming class marks can be received from incoming registers:

(1) OA—Office A (4 digits)

(2) OB—Office B (4 digits)

(3) AB—A or B (5 digits)

(4) SPL (test and no test).

I. Outgoing Senders And Outgoing Sender Links And Trunk Identifier

2.41 A No. 3 crossbar office has the capability to provide up to five outgoing senders. The senders are plug-ended and the sender frames are completely wired and equipped with sockets to accept the desired number of plug-ended senders. After initial installation of the office, additional senders may be ordered as needed and easily installed by Maintenance forces. Insertion of a sender in the frame automatically provides a preassigned connection to the out sender connector and out sender link and trunk identifier.

2.42 Unlike No. 5 crossbar, the out senders in No. 3 crossbar appear on the verticals of the out sender link switch and the trunks appear on the horizontals. Out sender link appearances are permanently cabled to trunk positions on trunk frames 0, 1, and 2 and miscellaneous frames 2 and 3. Out senders are permanently cabled to verticals on the out sender link switches. The out sender link switches are two 12-level, small crossbar switches that are broken down into eight electrical switches. These switches are located on bay 1 of trunk frame 0. The out sender link switches have the capacity for 96 outgoing trunks that require an out sender. (See Fig. 25.)

2.43 No. 3 crossbar outgoing senders are arranged to outpulse either multifrequency or dial pulses on successive calls; therefore, only one sender group is provided.

2.44 The No. 3 crossbar senders are equipped to provide the following features:

(a) Standard out sender operation (wink, delay dial, stop-go, etc).

(b) Steering and registration for ten digits.

(c) Ability to either DP or MF outpulse as required.

(d) Arrangement for ANI (including person to person collect and special instruction calls [PPCS]) to remote CAMA (MF only).

(e) Arrangement to delete on any or all calls these combinations of digits: "A" or "A and B" or "A, B, and C."

(f) Arrangement to outpulse one arbitrary digit.

(g) Arrangement so that one sender may be held stuck (key controlled) at one time. Stuck sender trouble record which includes trunk identification information is taken on all stuck senders.

(h) Arrangement to operate with DP receiving offices which require time for register selection (wink start).

Quantity Of Senders

2.45 The No. 3 crossbar out sender requirements can be determined based on the out sender capacity table (Table C). Methods for determining sender usage are similar to those for the No. 5 crossbar. However, since the No. 3 crossbar out senders handle both MF and DP, combine MF and DP usage to arrive at total usage.

J. Incoming Registers And Incoming Register Links

2.46 A total of five incoming registers may be provided in a No. 3 Crossbar System. An optional single-bay frame called extended incoming register frame provides two additional incoming registers. The registers are plug-ended and are mounted on the incoming register—originating register frame 0 (IR-OR0). The IR-OR0 frame is completely wired for five registers and equipped with sockets to accept the registers. Insertion of a register in the frame automatically provides the register with a preassigned connection to an incoming register link and an incoming register marker connector.

2.47 The No. 3 crossbar incoming registers are arranged to accept either multifrequency or dial pulses on successive calls; therefore, only one incoming register group is provided.

2.48 The registers are arranged for the following features:

(a) Five-digit storage capacity

(b) Bylink operation

(c) Variable number of digits (4 and 5)

(d) Four trunk classes—OA, OB, AB, SPL.

Quantity Of Incoming Registers

2.49 The No. 3 crossbar incoming register requirements can be determined based on the incoming register capacity table (Table D).

2.50 ***Incoming Register Links:*** Unlike No. 5 crossbar, the No. 3 crossbar incoming register link switches are arranged so that the registers appear on the verticals and the trunks appear on the horizontals of incoming register link switches. The No. 3 crossbar incoming register link utilizes two 12-level, small crossbar switches that are broken down into eight electrical switches. The capacity of these switches is 96 trunks, 48 per switch. These switches are located on bay 1 of trunk frame 0 (see Fig. 9). Incoming register link appearances are permanently cabled to trunk positions on trunk frames 0, 1, and 2 (see Fig. 26). Incoming registers are permanently cabled to verticals of the incoming register link switches.

K. Line Number Translator

2.51 The No. 3 crossbar line number translator and connector frame is patterned basically after the No. 5 crossbar number group frame. The basic frame is comprised of a marker connector, common control unit, small cross-connection field, and line number translator translation unit. Each module is equipped with two line number translators (LNT 0, 1). A third frame is available on an optional basis for offices with large party line installations.

2.52 The line number translator is equipped to provide class-of-service identification and number-to-line and line-to-number translation. Its use is required on all dial tone, intraoffice, ringer test, and incoming and outgoing identified (ANI) calls.

2.53 Each translator can be equipped to translate a maximum of 600 numbers arranged in six hundreds blocks HB(A-F), a maximum of 400 ring party lines arranged in 4-ring hundreds blocks RB(A-D), and 200 tip party lines arranged in four blocks of 50 lines each TB(A-D).

2.54 Customer numbers in the line number translators may be assigned in one or two numbering series. The numbering may have up to four thousands series (maximum of four thousands series for office A or B or offices A and B combined). Any hundreds number may be assigned within each thousands series, but a maximum of 12 thousands-hundreds blocks may be assigned. The cross-connections which assign the thousands-hundreds blocks are made in the marker. No single hundreds block HB(A-F) may be assigned to both office A and office B.

2.55 Each line number translation unit will normally translate 200 ring party lines for ANI (100 of which also may be assigned with tip parties) and 300 directory numbers.

2.56 The customer lines are identified by a 4-digit number from 0000 to 1199. The correlation between the 4-digit line number and the line equipment location is as shown in the following line number translator listing:

LINE NUMBER TRANSLATOR LISTING

LINE NO LINE THOUSAND/ HUNDREDS NO	EQUIPMENT LOCATION		LINE NO LINE TENS AND UNITS NO.	LINE GROUP	LINE SWITCH	
	LINE LINK	LINE BLOCK			HORIZONTAL	APPEARANCE
00	0	0	00-09	0	0-9	A
01	1	0	10-19	0	0-9	B
02	0	1	20-29	1	0-9	A
03	1	1	30-39	1	0-9	B
04	0	2	40-49	2	0-9	A
05	1	2	50-59	2	0-9	B
06	0	3	60-69	3	0-9	A
07	1	3	70-79	3	0-9	B
08	0	4	80-89	4	0-9	A
09	1	4	90-99	4	0-9	B
10	0	5				
11	1	5				

2.57 Relays HB(A-C), RBA, RBB, and TBA, TBB are associated with the first line number translation unit and relays HB(D-F), RBC, RBD and TBC, TND are associated with the second line number translation unit.

2.58 Lines to be translated for ANI must be assigned as follows:

TYPE OF LINES	LINE NUMBERS
Individual lines	(-) 00-99
Two-party lines	(-) 05-09, 15-19 etc, to 95-99

2.59 Lines assigned to hunting groups must be selected from lines (-)00-04, 20-24, 40-44, 60-64, and 80-84 (first five line switch levels in each line group, appearance A).

2.60 The line number translator is divided into four translation blocks for line translation. Each block will translate 150 numbers associated with a line block, 100 ring terminations, and 50 tip terminations.

2.61 The line location is directed to the proper translation block and the proper portion by the marker translation of the party information. The marker receives information from the translator relative to the directory number of the line and the call proceeds in the normal manner.

2.62 Coin lines must be assigned to lines (-)00, 01, 20, 21, 40, 41, 60, 61, 80, and 81 (first

two line switch levels in each line group, appearance A).

L. Traffic Measurement Facilities

2.63 Traffic register facilities are provided via plug-in mounting plates located on miscellaneous frame 1. Space is provided for five mounting plates which have the capacity for either eleven 4-digit registers or eight 5-digit registers per plate. The quantity of registers required should be determined by the Network Design engineer in the amount and combinations of 4- or 5-digit registers necessary to measure the system. See Fig. 27 for the types and description of registers that may be provided.

2.64 The measurement leads are terminated on a terminal strip located on miscellaneous frame 1 and may be either cross-connected or connected via a patching cord to the desired traffic register punching. The cross-connections or patching cords can be moved if other items not being measured are required.

2.65 Since no usage measuring device is furnished it is recommended that a permanently installed TUR or the equivalent be provided on a special order basis. The TUR leads are provided in accordance with Fig. 28 and are centrally located on a terminal strip which is located on miscellaneous frame 1. They may be utilized by either cross-connecting or by patching cords to the TUR. The No. 3 Crossbar System also is compatible with the Engineering and Administration Data Acquisition System (EADAS).

2.66 ***Dial Tone Speed:*** Dial tone speed measuring equipment is not provided. However, it is recommended that the standard unit be installed on a special order basis and located on a vacant relay rack.

2.67 A maximum of 48 message registers for measured rate lines are provided in the system. The message registers are mounted 16 to a mounting plate and are cabled to the combined distributing module (CDM) for cross-connection to measured rate (MR) lines. Each mounting plate of 16 message registers may be designated either tip party or ring party, but they may not be mixed. The message registers are located on miscellaneous frame 3.

3. ABBREVIATIONS AND ACRONYMS

AB	Office A or B
AIS	Automatic Intercept System
ANI	Automatic Number Identification
BN	Blank Number
CAMA	Centralized Automatic Message Accounting
CDM	Combined Distributing Module
CDO	Community Dial Office
CO	Cutoff
DLA	Delete ANI
DLN	Delete Called Number
EADAS	Engineering and Administration Data Acquisition System
EIR	Extension Incoming Register
HB	Hundreds Block
IAO	Intraoffice
IAO-FLG	Intraoffice Forward Linkage
IDDD	International Direct Distance Dialing
IRA	Intraoffice Route A
IRB	Intraoffice Route B
IRL	Incoming Sender Linkage
IR-OR	Incoming Register—Origination Register
L	Line
LAMA	Local Automatic Message Accounting
LL	Line Link
LNT	Line Number Translator

LT	Line Test
LU	Line Unit
MR	Measured Rate
OA	Office A
OB	Office B
OLI	Originating Line Identification
OR	Originating Register
OSL	Outgoing Sender Link
PPCS	Person to Person Collect and Special Instruction Calls
RC	Ringing Combination
RI	Regular Intercept
ROH	Receiver Off Hook
ROT	Reorder Tone
SPL	Test and No Test
TB	Trunk Block
TF	Trunk Frame
TG	Trunk Group
TI	Trouble Intercept
TSPS	Traffic Service Position System
TT	Trunk Test

4. REFERENCES

Bell System Practices

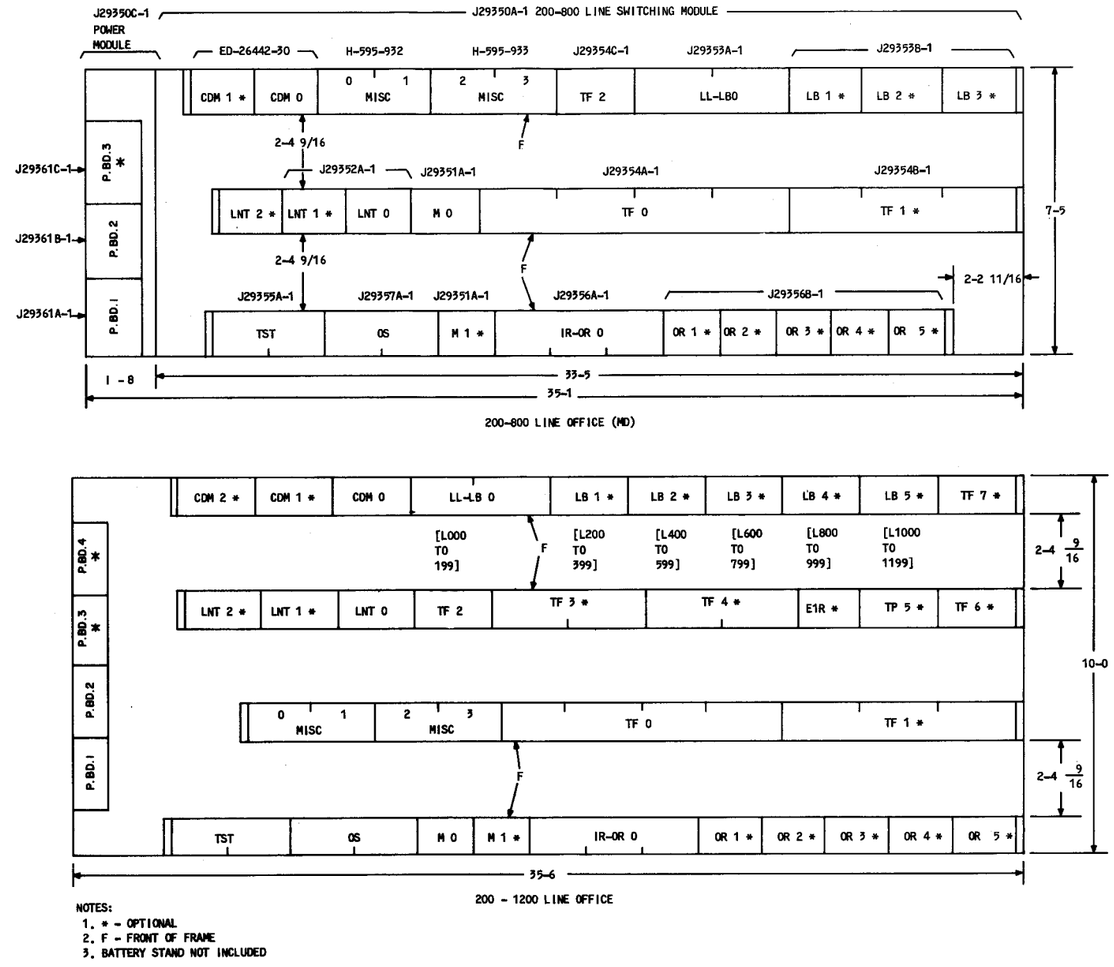
SECTION	TITLE
218-000-003	Alphabetical and Circuit Index, No. 3 Crossbar Offices
819-902-150	Performance Requirements on Site Test No. 3 Crossbar System
819-910-160	No. 3 Crossbar System Trunk Tables

Traffic Facilities Practices

Division D, Section 8-p, May 1974, Dial Facilities No. 3 Crossbar System

Other

E8106, Order Blank for Ordering No. 3 Crossbar Switching System, Small Central Office, 200- to 1200-Line Application E8106A, Cross-Connection Form for No. 3 Crossbar Switching System, Small Office, 200- to 1200-Line Application.



NOTES:
1. * - OPTIONAL
2. F - FRONT OF FRAME
3. BATTERY STAND NOT INCLUDED

Fig. 1—No. 3 Crossbar Equipment Layout and Floor Plan

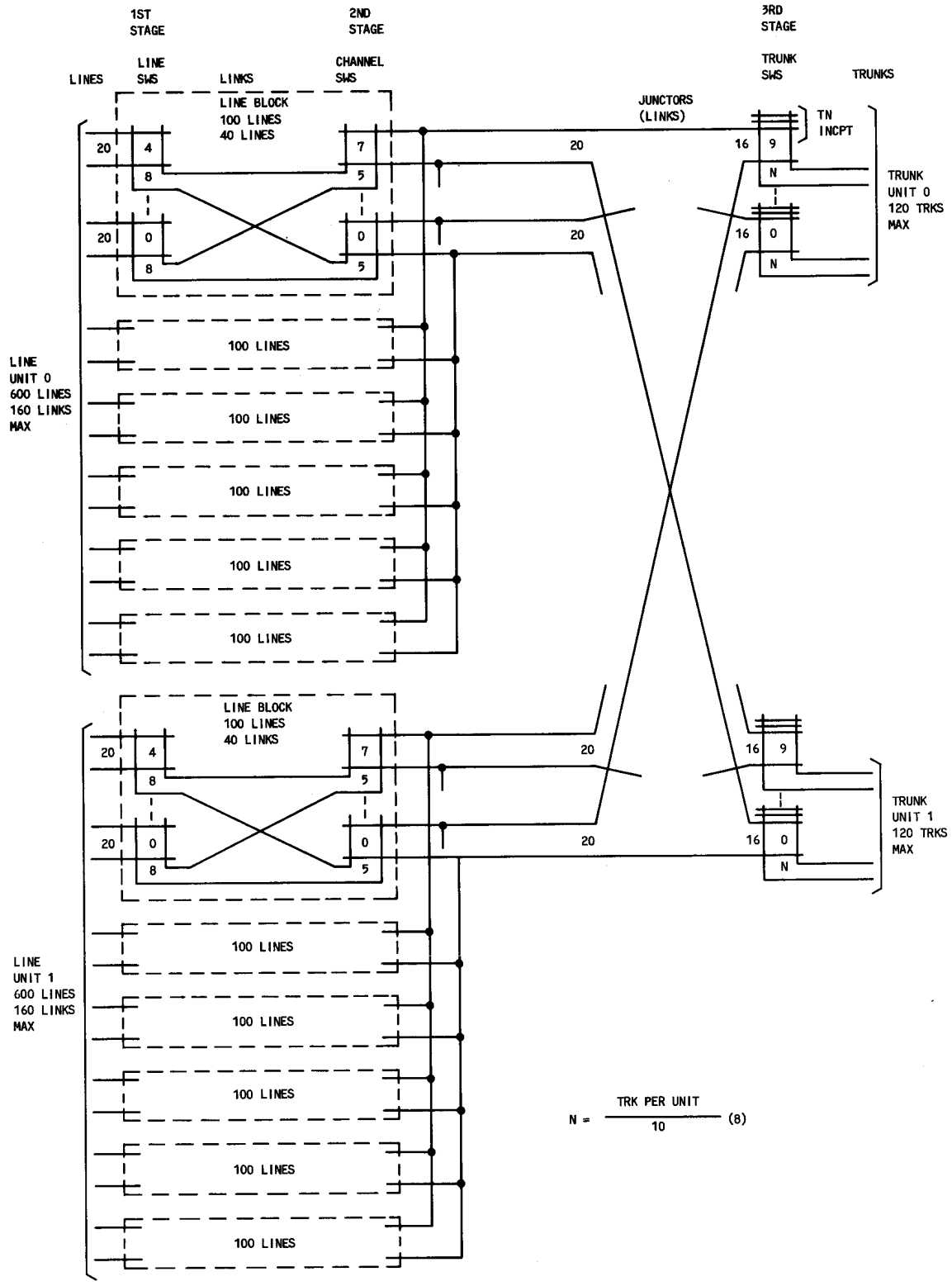


Fig. 2—Three-Stage Switching Network

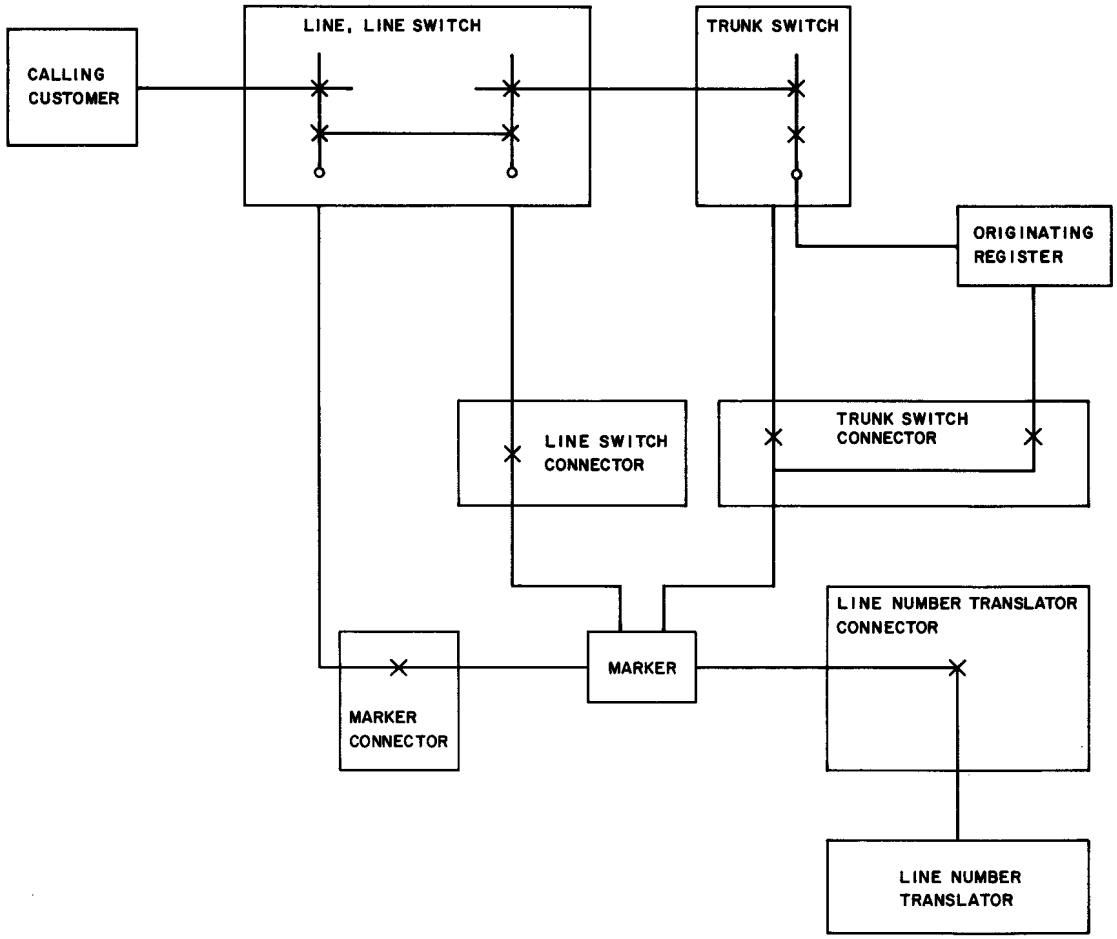


Fig. 3—Dial Tone Connection

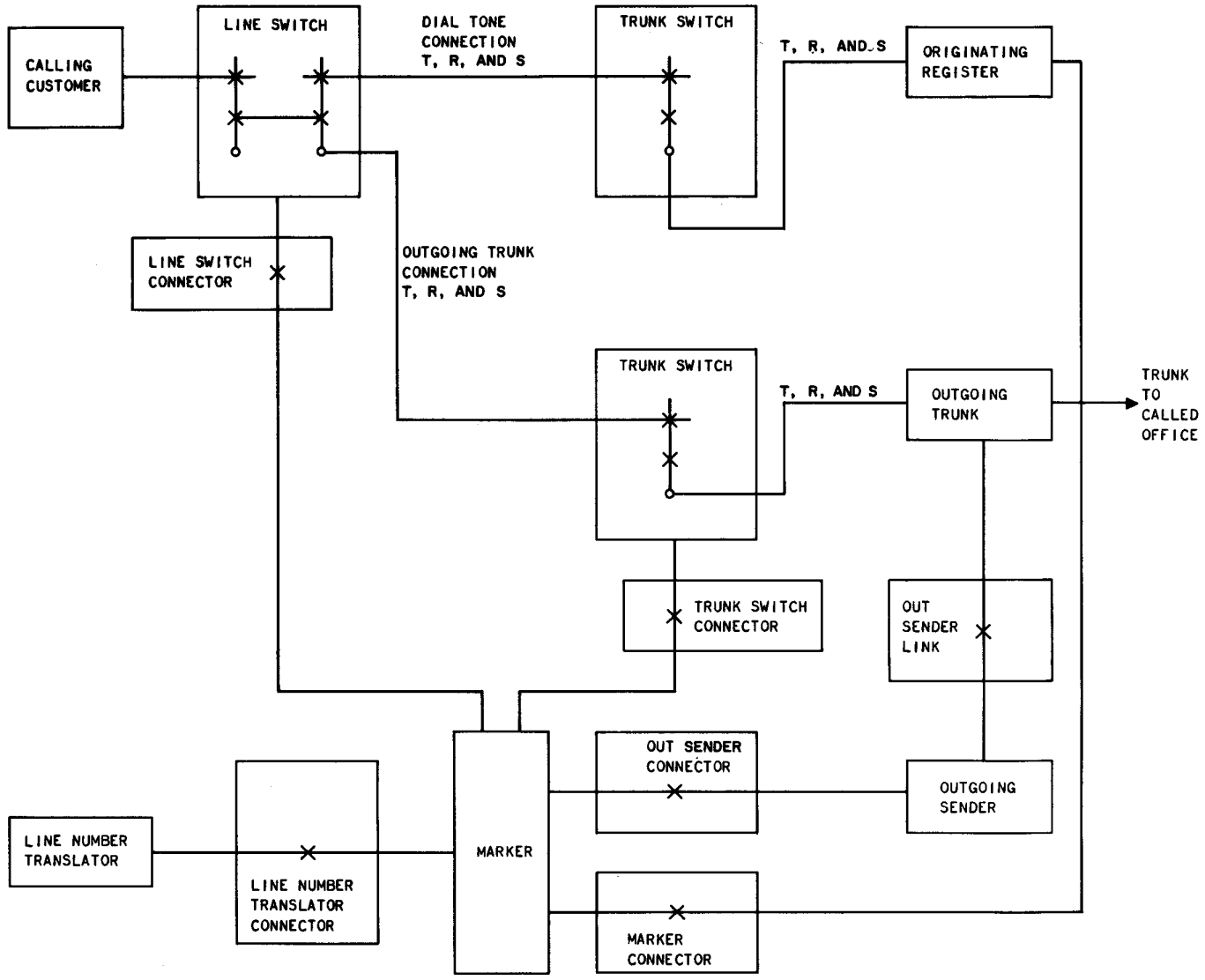


Fig. 4—Outgoing Trunk Regular and CAMA Connection

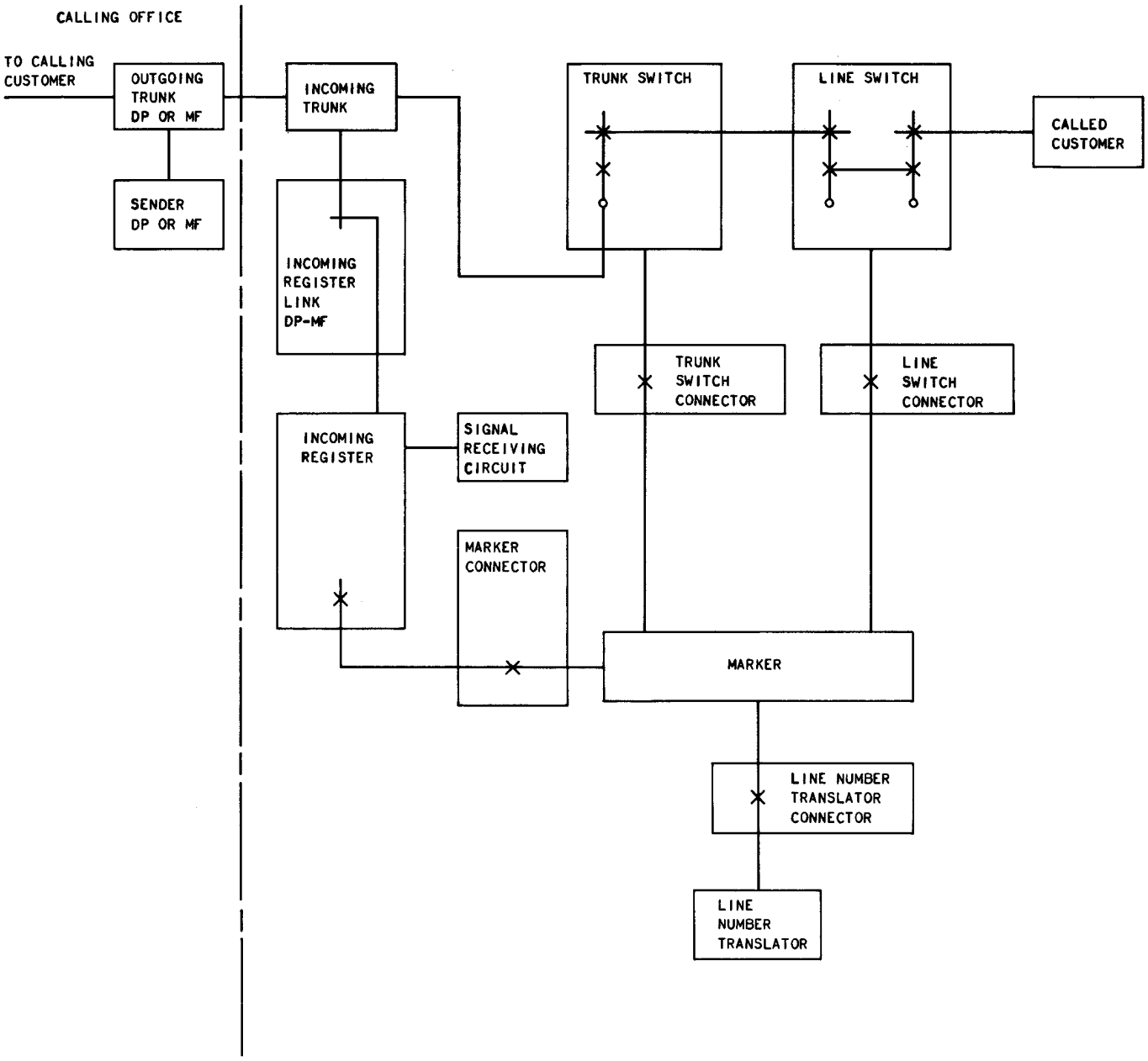


Fig. 5—Incoming Connection—Local Completion

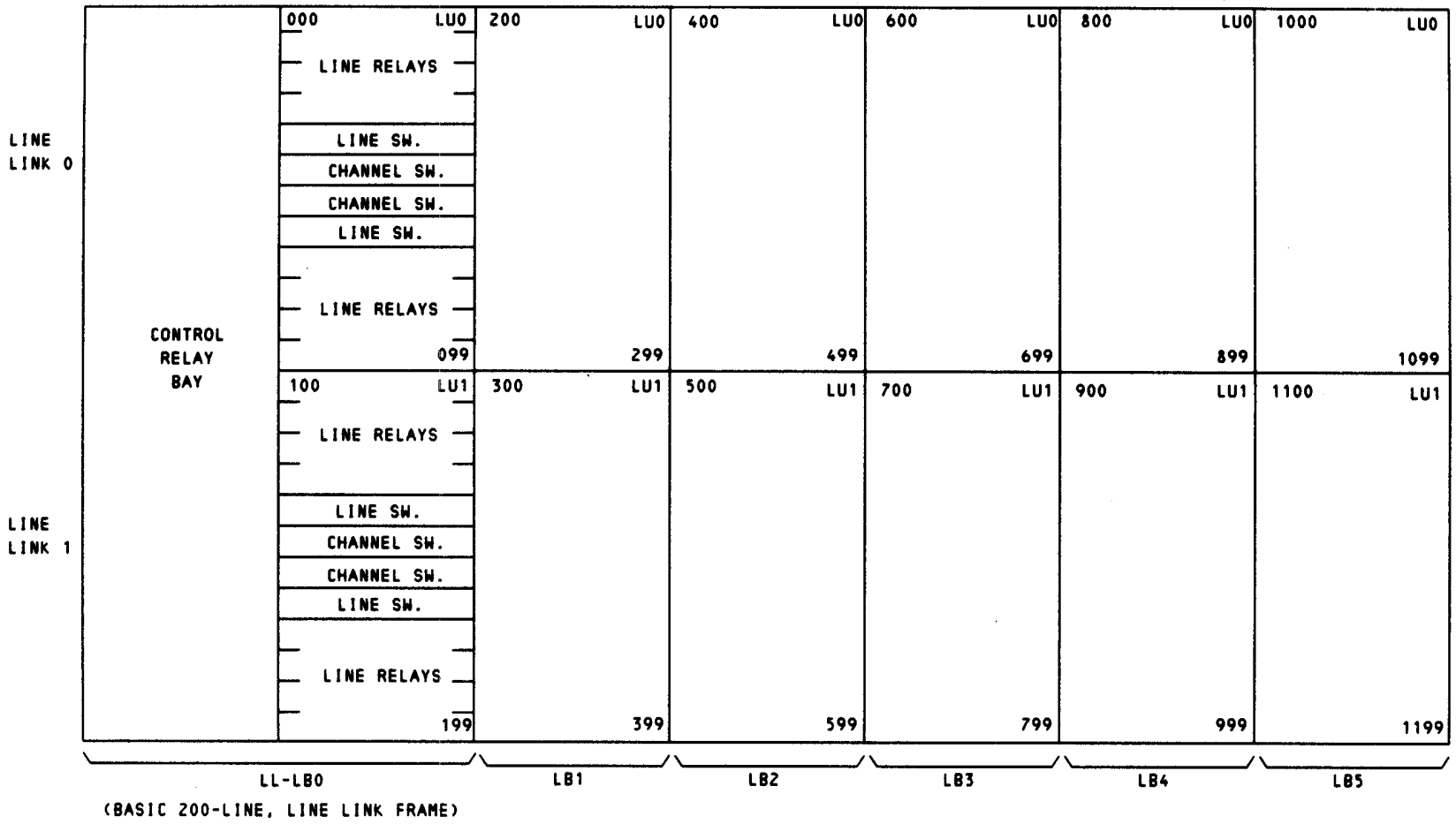


Fig. 6—Line Link, Line Block Frames

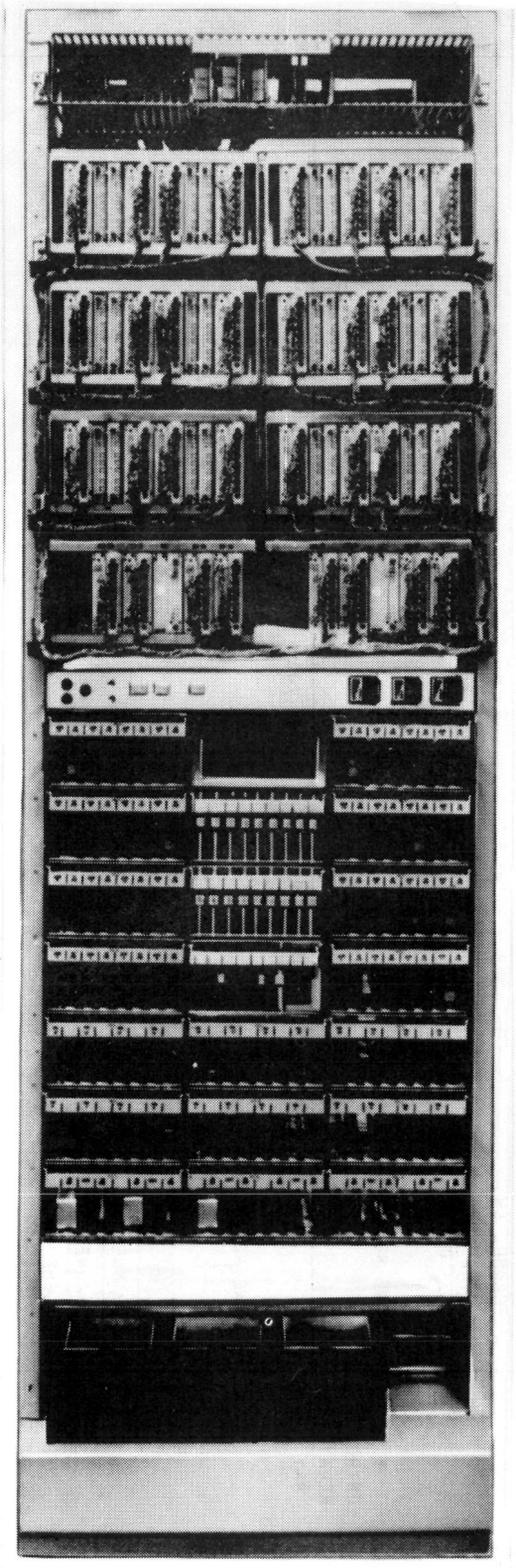


Fig. 7—Line Block, Line Group Network

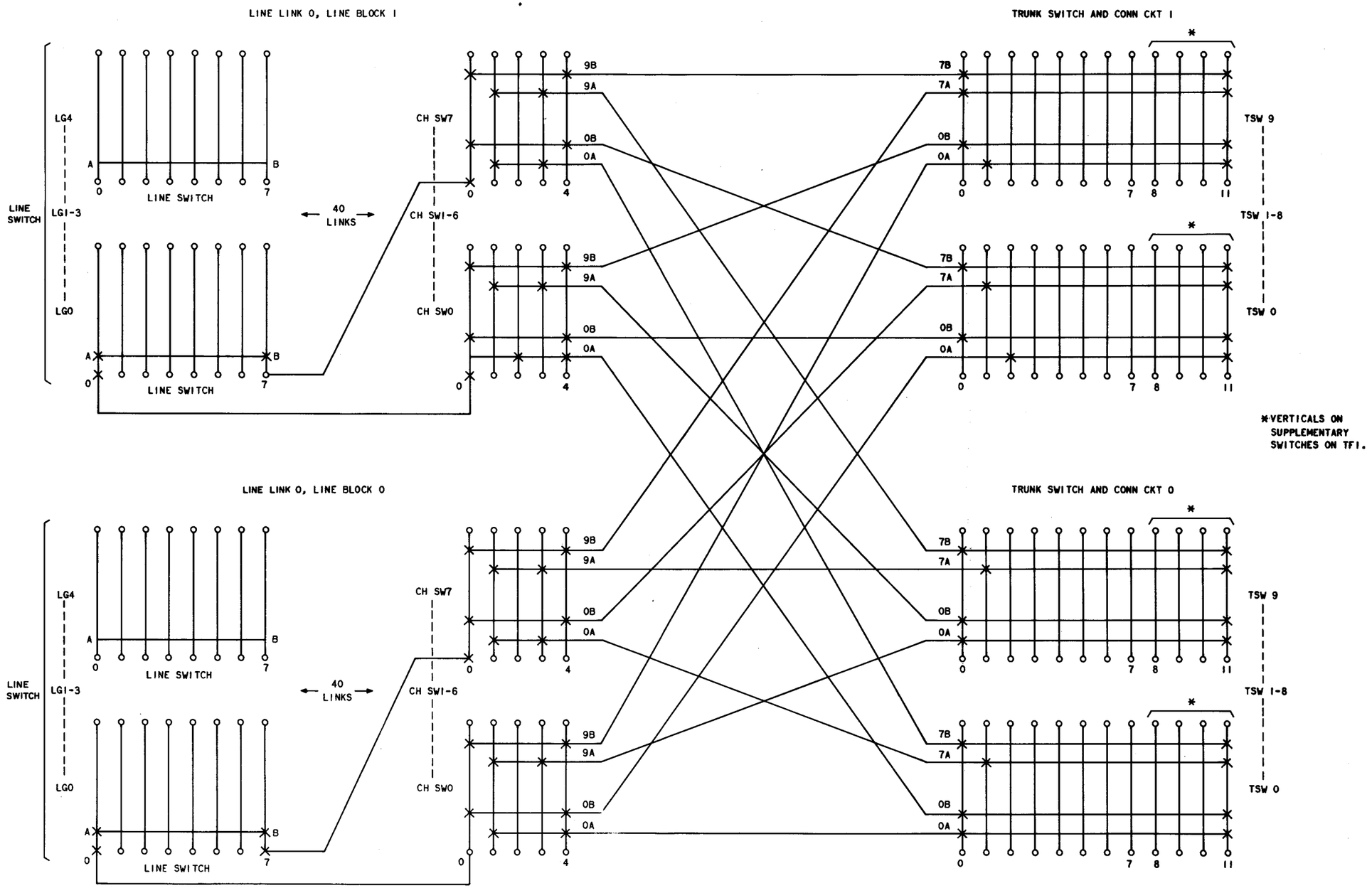


Fig. 8—Line Link, Line Block, Trunk Switch Network

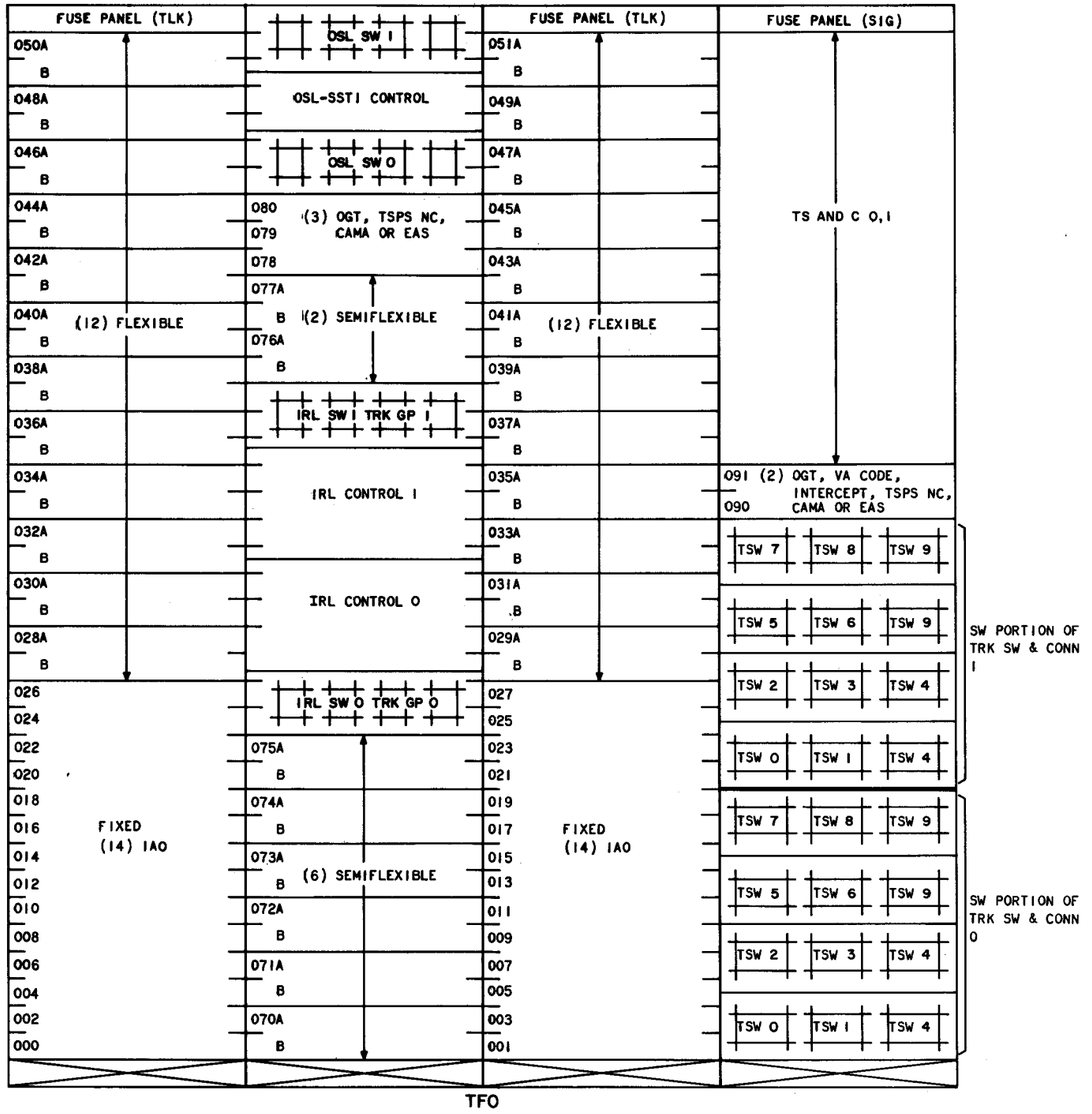


Fig. 9—Trunk Frame 0

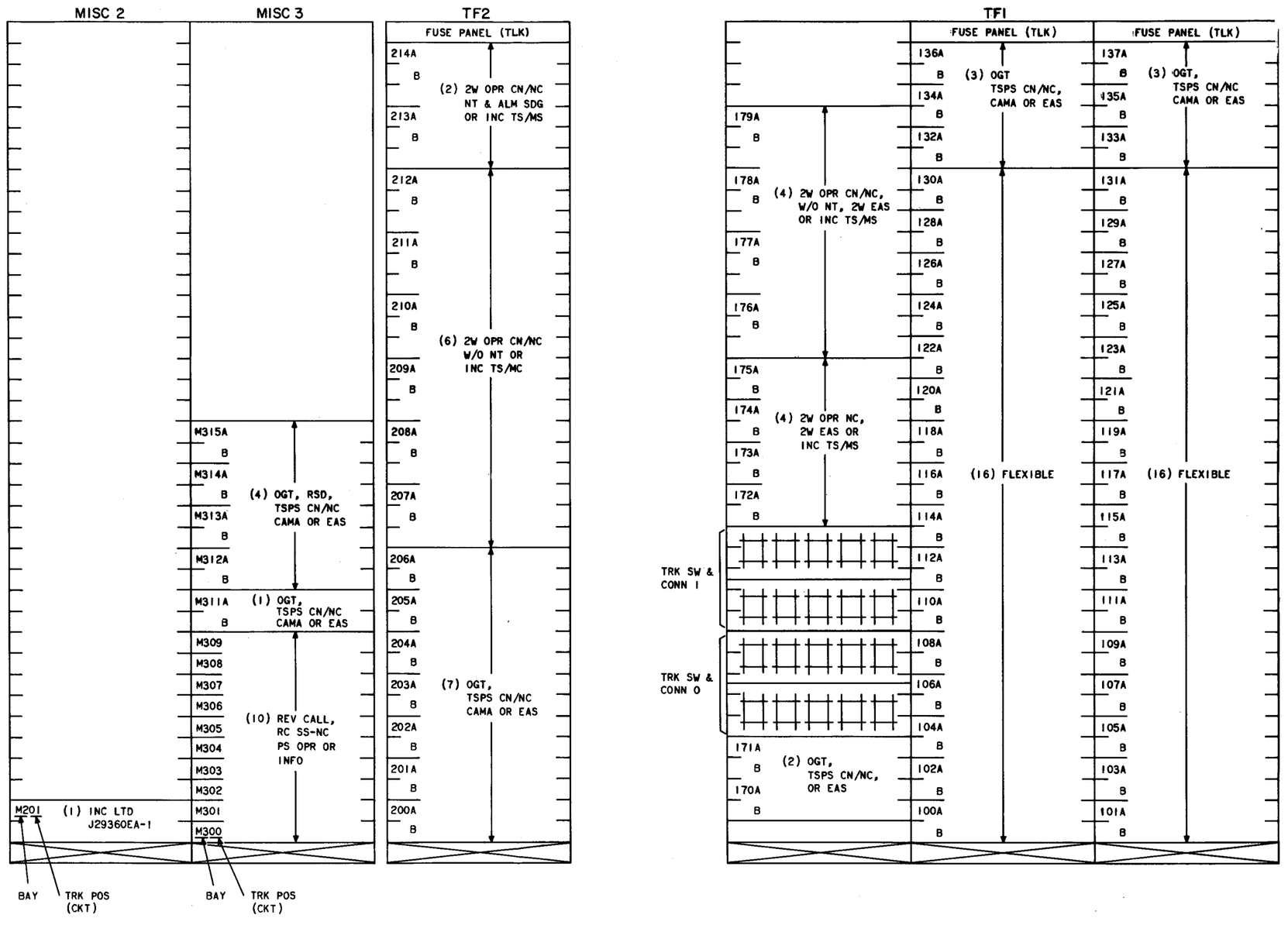


Fig. 10—Trunk Frames 1 and 2

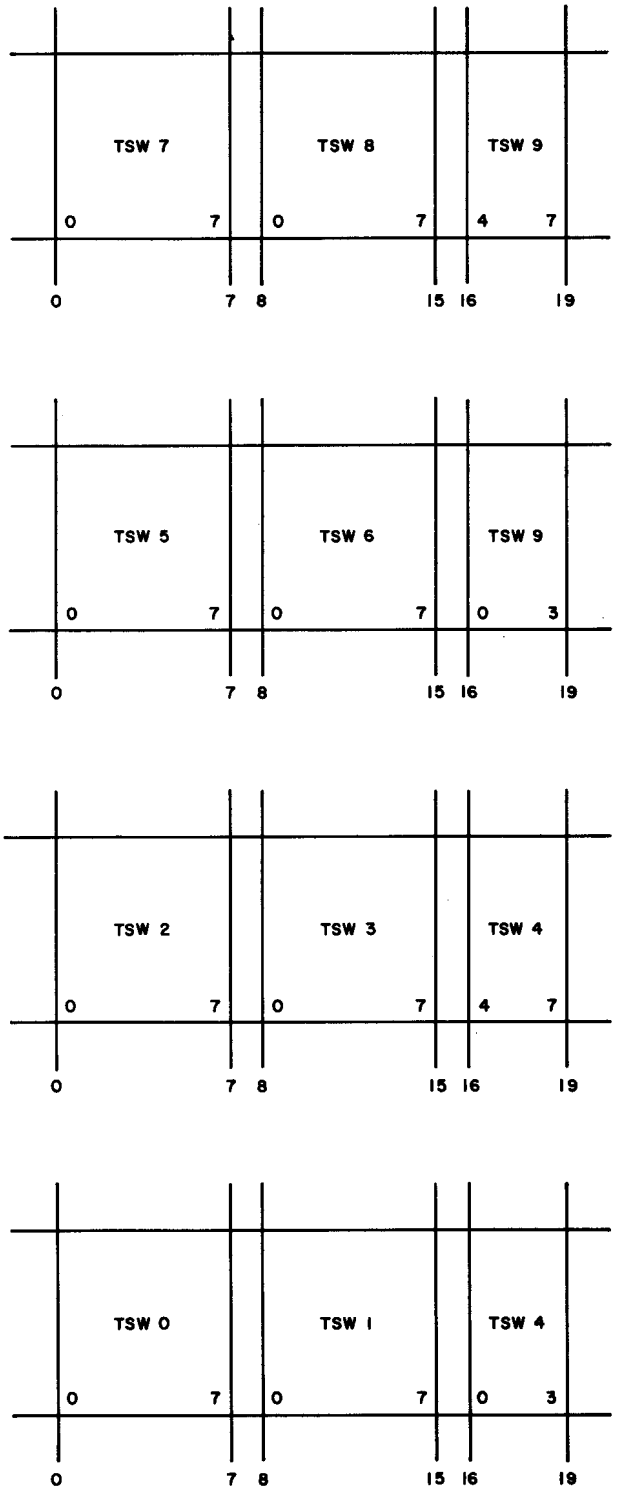


Fig. 11—Trunk Switch, Trunk Frame 0

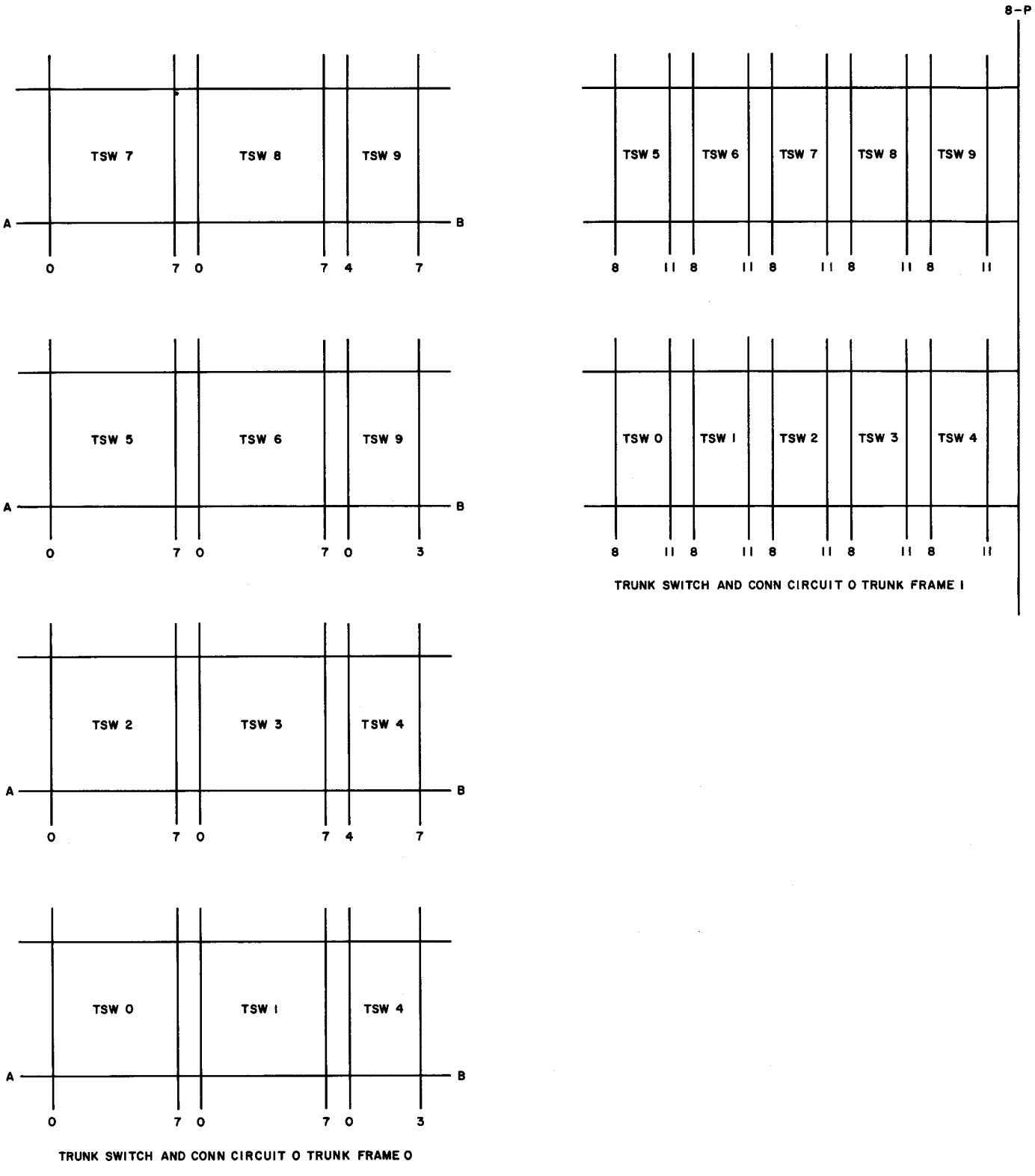


Fig. 12—Trunk Switch and Connector Circuit

TRK SW & CONN CKT	TRK SW & JC REL	TRUNK FRAME 0 (160 APPEARANCES)												TRK SW & JC REL	TRUNK FRAME 1 (80 APPEARANCES)					TRK SW & JC REL
		SW GR (SW REL)	TRUNK SWITCH VERT												SW GR (SW REL)	TRUNK SWITCH VERT				
			0		1		2		3		4	5	6	7		8	9	10	11	
			TRK POS													TRK POS				
1	9	1	003	CLD	013	*CLG	023	CLD	*033B		043A	*213	*M315	*091	9	2	109A	*119B	129A	*177	9
	8			*CLG	011	CLD		*CLG	031A		*043B	051A	*M313	*079	8		*109B	117A	*129B	*175	8
	7		001	CLD		*CLG	021	CLD	*031B		041A	*051B	*M311	*M309	7		107A	*117B	127A	*173	7
	6			*CLG	009	CLD		*CLG	029A		*041B	049A	* 211	*M307	6		*107B	115A	*127B	*171	6
	5		*OR 5-1			*CLG	019	CLD	*029B		039A	*049B	* 209	*M305	5		105A	*115B	125A	*137	5
	4	0	*OR 4-1		007	CLD		*CLG	027	CLD	*039B	047A	* 207	*M303	4		*105B	113A	*125B	*135	4
	3		*OR 3-1			*CLG	017	CLD		*CLG	037A	*047B	* 077	*M301	3		103A	*113B	123A	*133	3
	2		*OR 2-1		005	CLD		*CLG	025	CLD	*037B	045A	* 075	*205	2		*103B	111A	*123B	131A	2
	1		*OR 1-1			*CLG	015	CLD		*CLG	035A	*045B	* 073	*203	1		101A	*111B	121A	*131B	1
	0		*OR 0-1		013	CLD		*CLG	033A		*035B	M201	* 071	*201	0		*101B	119A	*121B	*179	0
0	9	1	002	CLD	012	*CLG	022	CLD	*032B		042A	*214	*M314	*090	9	2	108A	*118B	128A	*176	9
	8			*CLG	010	CLD		*CLG	030A		*042B	050A	*M312	*080	8		*108B	116A	*128B	*174	8
	7		000	CLD		*CLG	020	CLD	*030B		040A	*050B	* 206	*M308	7		106A	*116B	126A	*172	7
	6			*CLG	008	CLD		*CLG	028A		*040B	048A	* 212	*M306	6		*106B	114A	*126B	*170	6
	5		*OR 5-0			*CLG	018	CLD	*028B		038A	*048B	* 210	*M304	5		104A	*114B	124A	*136	5
	4	0	*OR 4-0		006	CLD		*CLG	026	CLD	*038B	046A	* 208	*M302	4		*104B	112A	*124B	*134	4
	3		*OR 3-0			*CLG	016	CLD		*CLG	036A	*046B	* 076	*M300	3		102A	*112B	122A	*132	3
	2		*OR 2-0		004	CLD		*CLG	024	CLD	*036B	044A	* 074	*204	2		*102B	110A	*122B	130A	2
	1		*OR 1-0			*CLG	014	CLD		*CLG	034A	*044B	* 072	*202	1		100A	*110B	120A	*130B	1
	0		*OR 0-0		012	CLD		*CLG	032A		*034B	*078	* 070	*200	0		*100B	118A	*120B	*178	0

Note:
Trk pos in 000 series are located on TF0.
Trk pos in 100 series are located on TF1.
Trk pos in 200 series are located on TF2.
Trk pos in M100 series are located on misc frame 1.
Trk pos in M200 series are located on misc frame 2.
Trk pos in M300 series are located on misc frame 3.
Trk pos OR — Denotes OR frame and register.

CLD = IAO trunk called end
CLG IAO trunk calling end

—A = INC trunk or IAO trunk called end
—B OGT trunk IAO trunk calling end
or 2-way trunk.

*Indicates trk positions which can be selected by the marker and require cross-connections on a trunk block and trunk group basis.

Fig. 13—Trunk Assignment Table

LOCATION & SUMMARY OF CROSSBAR NO.3 PLUG-ENDED TRUNKS (200-1200 LINE APPLICATION) WORKSHEETS (MODULE PER J29350D-1, E-1 & F-1)

○ INDICATES QUANITY OF EQUIPPED PLUG-ENDED TRUNKS

200 TO 400 LINE MODULE / 200 TO 800 LINE MODULE / 200 TO 1200 LINE MODULE

INTRAOFFICE AND REV CALL TRK TYPES

TRK FR	AP1	APU1	AP2	AP3		
TF0	28	24				
TF2						
MISC 0-1						
MISC 2-3			10	10		
400 MOD QTY	28	24	10	10		
TF1 (OPT)		32				
800 MOD QTY	28	56	10	10		
TF3 (OPT)		12				
TF4 (OPT)		38				
TF5 (OPT)						
TF6 (OPT)						
TF7 (OPT)		10				
GRAND TOTAL QTY	28	116	10	10		

INCOMING TRUNK TYPES

TRK FR	BP1	BP2	BP3	BP4	BP5	BP6	BP7	BP8			BP11	
TF0	32	8	32	32		8	32				32	
TF2	8	8	8	8	2	8	8	2			8	
MISC 0-1												
MISC 2-3												
400 MOD QTY	40	16	40	40	2	16	40	2			40	
TF1 (OPT)	40	8	40	40		8	40				40	
800 MOD QTY	80	24	80	80	2	24	80	2			80	
TF3 (OPT)	12		12	12			12				12	
TF4 (OPT)	38		38	38			38				38	
TF5 (OPT)												
TF6 (OPT)	16	16	16	16		16	16				16	
TF7 (OPT)	14	4	14	14		4	14				14	
GRAND TOTAL QTY	160	44	160	160		44	160	2			160	

OUTGOING TRUNK TYPES

TRK FR	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11	
TF0	29	29	29	29	29				29		29	
TF2	7	7	7	7	7	7	7	7	7	7	7	
MISC 0-1												
MISC 2-3	5	5	5	5	5	5	5	5	5	5	5	
400 MOD QTY	41	41	41	41	41	12	12	12	41	12	41	
TF1 (OPT)	40	40	40	40	40	8	8	8	40	8	40	
800 MOD QTY	81	81	81	81	81	20	20	20	81	20	81	
TF3 (OPT)	12	12	12	12	12				12		12	
TF4 (OPT)	38	38	38	38	38				38		38	
TF5 (OPT)	20	20	20	20	20	18	18	18	20	18	20	
TF6 (OPT)												
TF7 (OPT)	10	10	10	10	10				10		10	
GRAND TOTAL QTY	161	161	161	161	161	38	38	38	161	38	161	

OUTGOING TRUNK TYPES TO SWITCHBOARD

TRK FR	DP1	DP2	DP3	DP4	DP7	DP8	DP9	DP10	DP11	DP12	
TF0			29	29		29	29	29	29		
TF2	7	7	7	7		7	7	7	7		
MISC 0-1											
MISC 2-3	5	5	15	15	1	15	15	15	15	4	
400 MOD QTY	12	12	41	41	1	51	51	51	51	4	
TF1 (OPT)	8	8	40	40		40	40	40	40		
800 MOD QTY	20	20	91	91	1	91	91	91	91	4	
TF3 (OPT)			12	12		12	12	12	12		
TF4 (OPT)			38	38		38	38	38	38		
TF5 (OPT)	18	18	20	20		20	20	20	20		
TF6 (OPT)											
TF7 (OPT)			10	10		10	10	10	10		
GRAND TOTAL QTY	38	38	171	171	1	171	171	171	171	4	

TWO WAY TRUNK TYPES

TRK FR	MP1	MP2	MP3	MP4	MP5		MP8	MP9	MP10	MP11
TF0	32	32	32				32	32	32	24
TF2		8		8	2					
MISC 0-1										
MISC 2-3										
400 MOD QTY	32	40	32	8	2		32	32	32	24
TF1 (OPT)	36	40	36	4			36	36	36	32
800 MOD QTY	68	80	68	12	2		68	68	68	56
TF3 (OPT)	12	12	12				12	12	12	12
TF4 (OPT)	38	38	38				38	38	38	38
TF5 (OPT)										
TF6 (OPT)	16	16	16	6			16	16	16	
TF7 (OPT)	10	14	10				10	10	10	10
GRAND TOTAL QTY	144	160	144	18	2		144	144	144	116

MAINTENANCE AND INTERCEPT TRUNK TYPES

TRK FR	EP1		FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8	FP9	FP10	FP11	FP12	FP13	FP14	FP15	TRK FR
TF0																2	1	TF0
TF2																		TF2
MISC 0-1			4	1	4	1	4	4	4	4	1	4	1	4	4			MISC 0-1
MISC 2-3	1																	MISC 2-3
400 MOD QTY	1		4	1	4	1	4	4	4	4	1	4	1	4	4	2	1	400 MOD QTY
TF1 (OPT)																		TF1 (OPT)
800 MOD QTY	1		4	1	4	1	4	4	4	4	1	4	1	4	4	2	1	800 MOD QTY
TF3 (OPT)																		TF3 (OPT)
TF4 (OPT)																		TF4 (OPT)
TF5 (OPT)																		TF5 (OPT)
TF6 (OPT)																		TF6 (OPT)
TF7 (OPT)																		TF7 (OPT)
GRAND TOTAL QTY	1		4	1	4	1	4	4	4	4	1	4	1	4	4	2	1	GRAND TOTAL QTY

NOTES

1- INTENT OF THIS WORKSHEET

TO PROVIDE A SIMPLE METHOD FOR LOCATING THE PLUG-ENDED TRUNKS INTO PRE-WIRED TRUNK POSITIONS ON TRUNK FRAMES AND TO QUICKLY EVALUATE IF TRUNKING WILL MEET THE NEEDS OF THE PROPOSED OFFICE. A CHART IS PROVIDED FOR EACH FRAME PLUS THE SUMMARY OF QUANTITIES ABOVE. PLEASE NOTE THAT MAXIMUM QUANTITIES SHOWN ARE FOR EACH TYPE & THAT TRUNK POSITIONS ARE USED INTERCHANGEABLY BY DIFFERENT TYPES. THEREFORE AN ACCURATE PICTURE CAN BE SEEN ONLY BY DECIDING WHICH CODES OF TRUNKS ARE REQUIRED AND WHERE THEY ARE TO BE LOCATED. SEE TRUNK TABLES PER BSP 819-910-160 (J29360) FOR INFORMATION ON TRUNK TYPES.

METHOD OF USE

AN "X" SHOWN FOR A CODE OF TRUNK INDICATES THAT THE TRUNK POSITION WILL FUNCTION WITH THAT CODE OF TRUNK. MOST TRUNK POSITIONS ARE WIRED FOR MORE THAN ONE CODE AND IT IS ONLY NECESSARY TO PLACE A CIRCLE OVER THE "X" TO INDICATED IT IS TO BE EQUIPPED. IE: ⓧ. QUANTITES SHOULD ALSO BE CIRCLED TO INDICATE THE NUMBER TO BE ORDERED. IE ⑥. ALL EVEN TRUNK POSITIONS ARE ASSIGNED TO TRUNK SWITCH & CONNECTOR CKT-0 AND ALL ODD ARE ASSIGNED TO TRUNK SWITCH & CONNECTOR CKT-1. THEREFORE BY USING POSITIONS IN A CONSECUTIVE ORDER AN EQUAL DISTRIBUTION IS ACHIEVED. START LOCATING BY SELECTING THOSE TYPES WITH THE FEWEST POSSIBLE MOUNTING LOCATIONS AND PROCEED TO THE HIGHEST. THIS WILL REDUCE THE POSSIBLITY OF CHANGE OR FURTHER JUGGLING OF POSITIONS. IT IS ALSO SIMPLIEST TO START WITH THE LOWEST NUMBERED POSITION FOR THE TYPE BEING CONSIDERED. FOR THE FLEXIBLE POSITIONS IT IS SUGGESTED THAT THE IAO TYPE TRUNKS BUILD FROM THE LOWEST TO THE HIGHEST AND ALL OTHER TYPES BUILD FROM THE HIGHEST TO THE LOWEST TO MAINTAIN THE BEST DISTRIBUTION OF IAO TRUNKS OVER THE TRUNK SWITCHES.

TRUNK POSITION NUMBERING

TRUNK POSITIONS ARE LOCATED ON FRAMES AS FOLLOWS:

FRAME	NUMBER SERIES
TF0	0
TF1	1
TF2	2
TF3	3
TF4	4
TF5	5
TF6	6
TF7	7
MISC 0-1	M1
MISC 2-3	M2 & M3

TRUNK SWITCH AND CONNECTOR APPEARANCES

THE SECOND & THIRD COLUMN FROM THE RIGHT ON EACH FRAME CHART PROVIDES THE TRUNK SWITCH AND CONNECTOR CIRCUIT APPEARANCE. A DESCRIPTION OF THE ABBREVIATIONS IS SHOWN IN THE UPPER RIGHT CORNER OF EACH CHART. FOR THE FLEXIBLE TRUNK POSITIONS THE FOLLOWING APPLIES: IAO TRUNKS USE BOTH THE "CALLING END" & "CALLED END" APPEARANCE
OG TRUNKS USE THE "CALLING END OR 1ST APPEARANCE" ONLY
INC TRUNKS USE THE "CALLED END OR 2ND APPEARANCE" ONLY
2 WAY TRUNKS USE THE "CALLED END OR 2ND APPEARANCE". THE "CALLING END OR 1ST APPEARANCE" IS DEAD AND NO LONGER A AILABLE
(CAPACITY: 160 TRUNK APPEARANCES ON TF0 FRAME, 80 ON TF1 FRAME AND 160 ON TF3 FRAME FOR SYSTEM TOTAL OF 400 TRUNK APPEARANCES, HALF ON EACH OF THE TWO TS & C CIRCUITS)

2- TRUNK POSITION 174A & M130 BOTH SHARE THE SAME OUTGOING SENDER LINK APPEARANCE. DO NOT USE TRUNK POSITION 174A FOR TRUNK TYPES MP1, M[illegible], MP8, MP9, MP10 OR MP11 WHICH REQUIRE OUTPULSING WHEN AUTOMATIC INTERCEPT SERVICE (AIS) IS REQUIRED AND TRUNK POSITION M130 IS EQUIPPED WITH TYPE FP12 OR FP13.

3- (OPT) INDICATES OPTIONAL FRAME.

4- ◢ TRUNK FRAME 3 PROVIDES THE TRUNK SWITCH AND CONNECTOR APPEARANCES, THE INCOMING REGISTER LINK APPEARANCES AND OUTGOING SENDER LINK & TRUNK IDENTIFIER APPEARANCES FOR THE OPTIONAL TRUNK FRAMES 3,4,5,6 & 7. IT MUST THEREFORE BE PROVIDED WHEN ANY OF THE FIVE FRAMES ARE REQUIRED.

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Fig. 14—Trunk Assignment Work Sheets (Sheet 1 of 8)

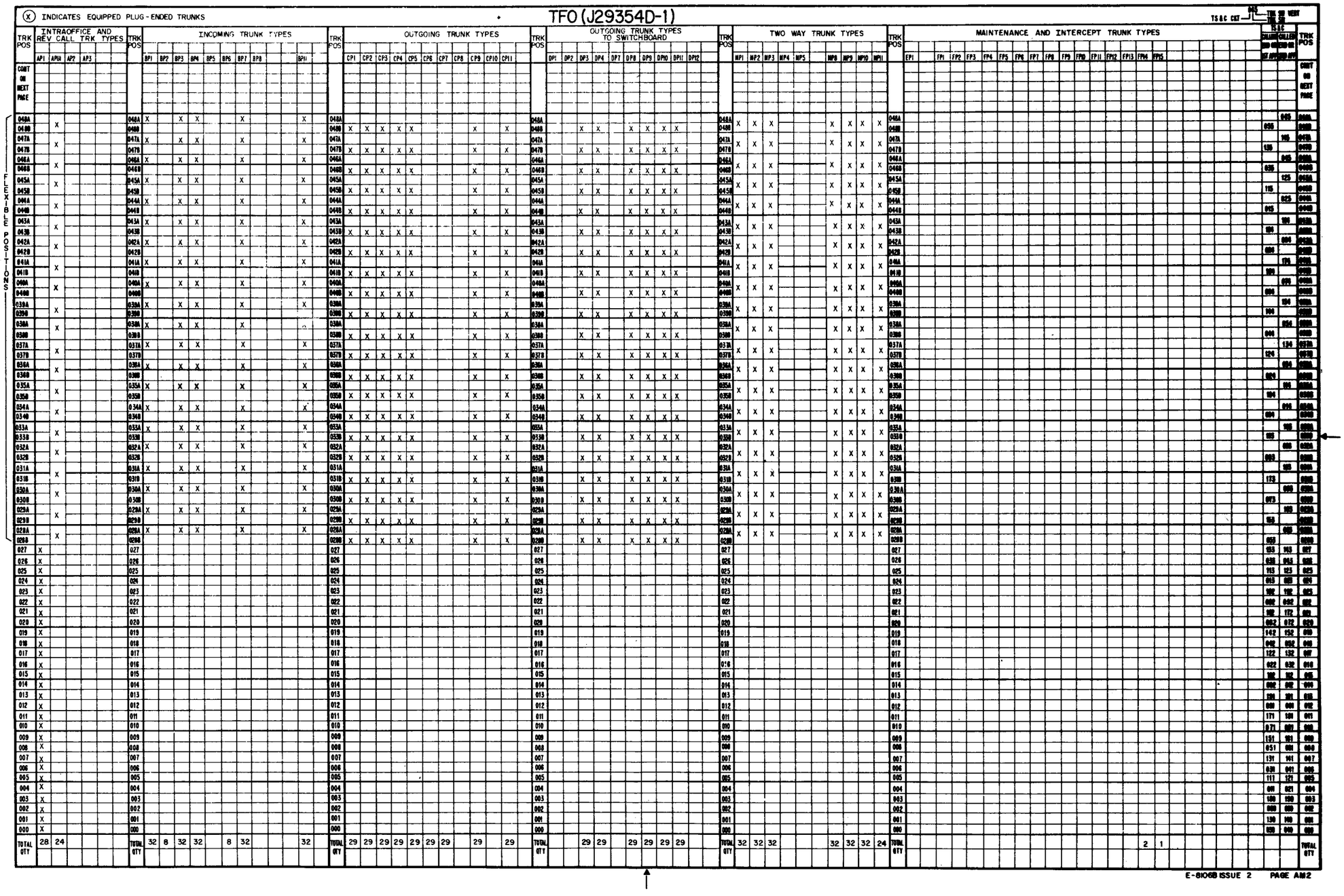

Fig. 14—Trunk Assignment Work Sheets (Sheet 2 of 8)

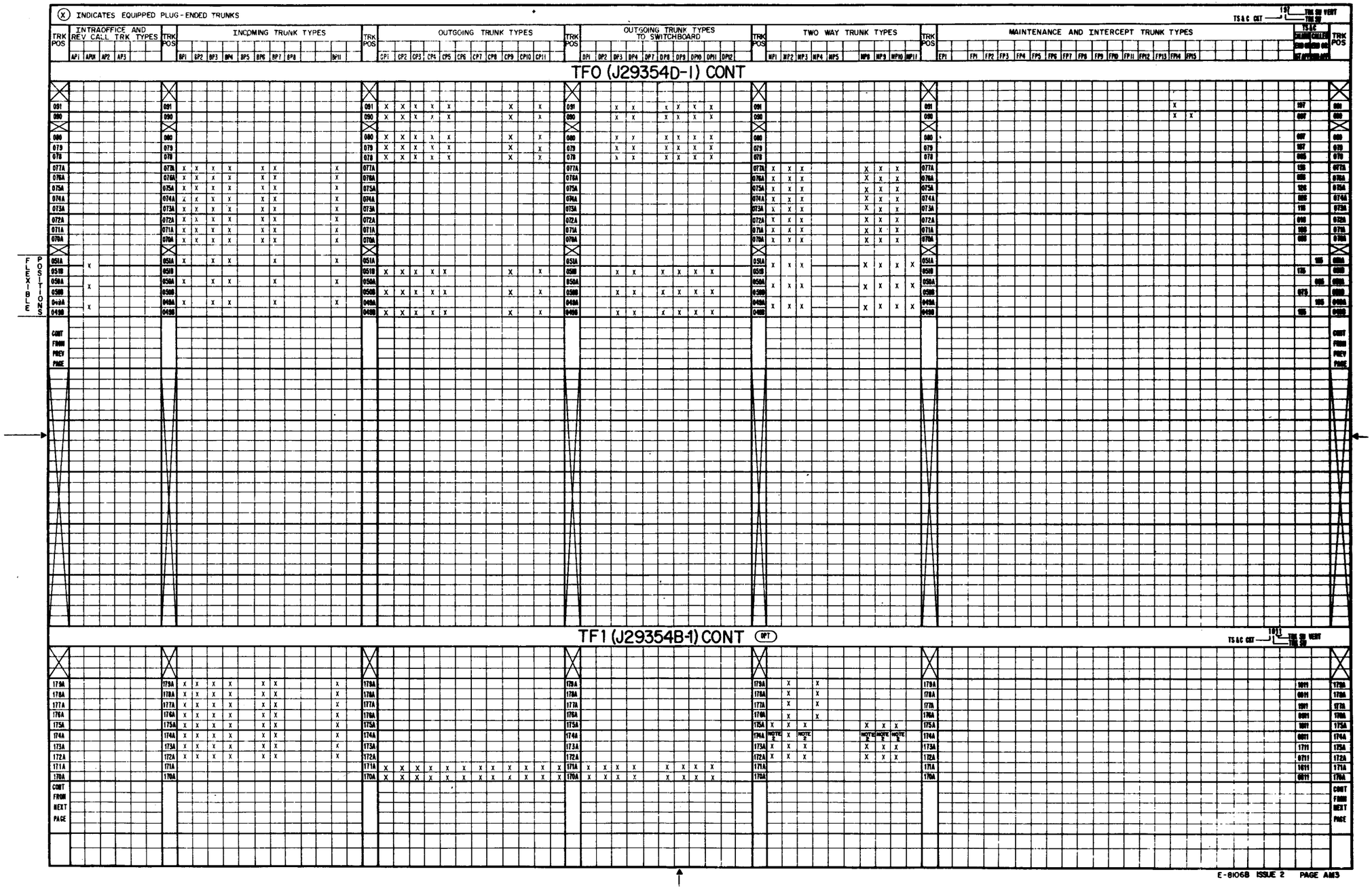

Fig. 14—Trunk Assignment Work Sheets (Sheet 3 of 8)

(X) INDICATES EQUIPPED PLUG-ENDED TRUNKS

TF1 (J29354B-1) (OPT)

TS & C CKT — 1511 — TRK SW VERT / TRK SW

FLEXIBLE POSITIONS (131A–100B)

INTRAOFFICE AND REV CALL TRK TYPES

TRK POS	AP1	APU1	AP2	AP3		
CONT ON PREV PAGE						
137A						
136A						
135A						
134A						
133A						
132A						
131A		X				
131B						
130A		X				
130B						
129A		X				
129B						
128A		X				
128B						
127A		X				
127B						
126A		X				
126B						
125A		X				
125B						
124A		X				
124B						
123A		X				
123B						
122A		X				
122B						
121A		X				
121B						
120A		X				
120B						
119A		X				
119B						
118A		X				
118B						
117A		X				
117B						
116A		X				
116B						
115A		X				
115B						
114A		X				
114B						
113A		X				
113B						
112A		X				
112B						
111A		X				
111B						
110A		X				
110B						
109A		X				
109B						
108A		X				
108B						
107A		X				
107B						
106A		X				
106B						
105A		X				
105B						
104A		X				
104B						
103A		X				
103B						
102A		X				
102B						
101A		X				
101B						
100A		X				
100B						
TOTAL QTY		32				

INCOMING TRUNK TYPES

TRK POS	BP1	BP2	BP3	BP4	BP5	BP6	BP7	BP8			BP11	
137A												
136A												
135A												
134A												
133A												
132A												
131A	X		X	X			X				X	
131B												
130A	X		X	X			X				X	
130B												
129A	X		X	X			X				X	
129B												
128A	X		X	X			X				X	
128B												
127A	X		X	X			X				X	
127B												
126A	X		X	X			X				X	
126B												
125A	X		X	X			X				X	
125B												
124A	X		X	X			X				X	
124B												
123A	X		X	X			X				X	
123B												
122A	X		X	X			X				X	
122B												
121A	X		X	X			X				X	
121B												
120A	X		X	X			X				X	
120B												
119A	X		X	X			X				X	
119B												
118A	X		X	X			X				X	
118B												
117A	X		X	X			X				X	
117B												
116A	X		X	X			X				X	
116B												
115A	X		X	X			X				X	
115B												
114A	X		X	X			X				X	
114B												
113A	X		X	X			X				X	
113B												
112A	X		X	X			X				X	
112B												
111A	X		X	X			X				X	
111B												
110A	X		X	X			X				X	
110B												
109A	X		X	X			X				X	
109B												
108A	X		X	X			X				X	
108B												
107A	X		X	X			X				X	
107B												
106A	X		X	X			X				X	
106B												
105A	X		X	X			X				X	
105B												
104A	X		X	X			X				X	
104B												
103A	X		X	X			X				X	
103B												
102A	X		X	X			X				X	
102B												
101A	X		X	X			X				X	
101B												
100A	X		X	X			X				X	
100B												
TOTAL QTY	40	8	40	40		8	40				40	

OUTGOING TRUNK TYPES

TRK POS	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8	CP9	CP10	CP11	
137A	X	X	X	X	X	X	X	X	X	X	X	
136A	X	X	X	X	X	X	X	X	X	X	X	
135A	X	X	X	X	X	X	X	X	X	X	X	
134A	X	X	X	X	X	X	X	X	X	X	X	
133A	X	X	X	X	X	X	X	X	X	X	X	
132A	X	X	X	X	X	X	X	X	X	X	X	
131A												
131B	X	X	X	X	X				X		X	
130A												
130B	X	X	X	X	X				X		X	
129A												
129B	X	X	X	X	X				X		X	
128A												
128B	X	X	X	X	X				X		X	
127A												
127B	X	X	X	X	X				X		X	
126A												
126B	X	X	X	X	X				X		X	
125A												
125B	X	X	X	X	X				X		X	
124A												
124B	X	X	X	X	X				X		X	
123A												
123B	X	X	X	X	X				X		X	
122A												
122B	X	X	X	X	X				X		X	
121A												
121B	X	X	X	X	X				X		X	
120A												
120B	X	X	X	X	X				X		X	
119A												
119B	X	X	X	X	X				X		X	
118A												
118B	X	X	X	X	X				X		X	
117A												
117B	X	X	X	X	X				X		X	
116A												
116B	X	X	X	X	X				X		X	
115A												
115B	X	X	X	X	X				X		X	
114A												
114B	X	X	X	X	X				X		X	
113A												
113B	X	X	X	X	X				X		X	
112A												
112B	X	X	X	X	X				X		X	
111A												
111B	X	X	X	X	X				X		X	
110A												
110B	X	X	X	X	X				X		X	
109A												
109B	X	X	X	X	X				X		X	
108A												
108B	X	X	X	X	X				X		X	
107A												
107B	X	X	X	X	X				X		X	
106A												
106B	X	X	X	X	X				X		X	
105A												
105B	X	X	X	X	X				X		X	
104A												
104B	X	X	X	X	X				X		X	
103A												
103B	X	X	X	X	X				X		X	
102A												
102B	X	X	X	X	X				X		X	
101A												
101B	X	X	X	X	X				X		X	
100A												
100B	X	X	X	X	X				X		X	
TOTAL QTY	40	40	40	40	40	8	8	8	40	8	40	

OUTGOING TRUNK TYPES TO SWITCHBOARD

TRK POS	DP1	DP2	DP3	DP4	DP7	DP8	DP9	DP10	DP11	DP12	
137A	X	X	X	X		X	X	X	X		
136A	X	X	X	X		X	X	X	X		
135A	X	X	X	X		X	X	X	X		
134A	X	X	X	X		X	X	X	X		
133A	X	X	X	X		X	X	X	X		
132A	X	X	X	X		X	X	X	X		
131A											
131B			X	X		X	X	X	X		
130A											
130B			X	X		X	X	X	X		
129A											
129B			X	X		X	X	X	X		
128A											
128B			X	X		X	X	X	X		
127A											
127B			X	X		X	X	X	X		
126A											
126B			X	X		X	X	X	X		
125A											
125B			X	X		X	X	X	X		
124A											
124B			X	X		X	X	X	X		
123A											
123B			X	X		X	X	X	X		
122A											
122B			X	X		X	X	X	X		
121A											
121B			X	X		X	X	X	X		
120A											
120B			X	X		X	X	X	X		
119A											
119B			X	X		X	X	X	X		
118A											
118B			X	X		X	X	X	X		
117A											
117B			X	X		X	X	X	X		
116A											
116B			X	X		X	X	X	X		
115A											
115B			X	X		X	X	X	X		
114A											
114B			X	X		X	X	X	X		
113A											
113B			X	X		X	X	X	X		
112A											
112B			X	X		X	X	X	X		
111A											
111B			X	X		X	X	X	X		
110A											
110B			X	X		X	X	X	X		
109A											
109B			X	X		X	X	X	X		
108A											
108B			X	X		X	X	X	X		
107A											
107B			X	X		X	X	X	X		
106A											
106B			X	X		X	X	X	X		
105A											
105B			X	X		X	X	X	X		
104A											
104B			X	X		X	X	X	X		
103A											
103B			X	X		X	X	X	X		
102A											
102B			X	X		X	X	X	X		
101A											
101B			X	X		X	X	X	X		
100A											
100B			X	X		X	X	X	X		
TOTAL QTY	8	8	40	40		40	40	40	40		

TWO WAY TRUNK TYPES

TRK POS	NP1	NP2	NP3	NP4	NP5		NP8	NP9	NP10	NP11
137A										
136A										
135A										
134A										
133A										
132A										
131A	X	X	X				X	X	X	X
131B										
130A	X	X	X				X	X	X	X
130B										
129A	X	X	X				X	X	X	X
129B										
128A	X	X	X				X	X	X	X
128B										
127A	X	X	X				X	X	X	X
127B										
126A	X	X	X				X	X	X	X
126B										
125A	X	X	X				X	X	X	X
125B										
124A	X	X	X				X	X	X	X
124B										
123A	X	X	X				X	X	X	X
123B										
122A	X	X	X				X	X	X	X
122B										
121A	X	X	X				X	X	X	X
121B										
120A	X	X	X				X	X	X	X
120B										
119A	X	X	X				X	X	X	X
119B										
118A	X	X	X				X	X	X	X
118B										
117A	X	X	X				X	X	X	X
117B										
116A	X	X	X				X	X	X	X
116B										
115A	X	X	X				X	X	X	X
115B										
114A	X	X	X				X	X	X	X
114B										
113A	X	X	X				X	X	X	X
113B										
112A	X	X	X				X	X	X	X
112B										
111A	X	X	X				X	X	X	X
111B										
110A	X	X	X				X	X	X	X
110B										
109A	X	X	X				X	X	X	X
109B										
108A	X	X	X				X	X	X	X
108B										
107A	X	X	X				X	X	X	X
107B										
106A	X	X	X				X	X	X	X
106B										
105A	X	X	X				X	X	X	X
105B										
104A	X	X	X				X	X	X	X
104B										
103A	X	X	X				X	X	X	X
103B										
102A	X	X	X				X	X	X	X
102B										
101A	X	X	X				X	X	X	X
101B										
100A	X	X	X				X	X	X	X
100B										
TOTAL QTY	36	40	36	4			36	36	36	32

MAINTENANCE AND INTERCEPT TRUNK TYPES

TRK POS	EP1	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP8	FP9	FP10	FP11	FP12	FP13	FP14	FP15	TS & C CALLING END OR 1ST APP	TS & C CALLED END OR 2ND APP	TRK POS
137A																	1511		137A
136A																	0511		136A
135A																	1411		135A
134A																	0411		134A
133A																	1311		133A
132A																	0311		132A
131A																		1211	131A
131B																	1111		131B
130A																		0211	130A
130B																	0111		130B
129A																		1910	129A
129B																	[illegible]		129B
128A																		[illegible]	128A
128B																	[illegible]		128B
127A																		1710	127A
127B																	[illegible]		127B
126A																		0710	126A
126B																	[illegible]		126B
125A																		1510	125A
125B																	1410		125B
124A																		[illegible]	124A
124B																	0410		124B
123A																		1310	123A
123B																	1210		123B
122A																		0310	122A
122B																	0210		122B
121A																		1110	121A
121B																	1010		121B
120A																		0110	120A
120B																	[illegible]		120B
119A																		[illegible]	119A
119B																	190		119B
118A																		[illegible]	118A
118B																	090		118B
117A																		180	117A
117B																	170		117B
116A																		[illegible]	116A
116B																	070		116B
115A																		[illegible]	115A
115B																	150		115B
114A																		[illegible]	114A
114B																	050		114B
113A																		140	113A
113B																	130		113B
112A																		040	112A
112B																	030		112B
111A																		120	111A
111B																	110		111B
110A																		020	110A
110B																	010		110B
109A																		[illegible]	109A
109B																	100		109B
108A																		[illegible]	108A
108B																	[illegible]		108B
107A																		170	107A
107B																	[illegible]		107B
106A																		070	106A
106B																	[illegible]		106B
105A																		150	105A
105B																	140		105B
104A																		050	104A
104B																	040		104B
103A																		130	103A
103B																	120		103B
102A																		030	102A
102B																	020		102B
101A																		110	101A
101B																	100		101B
100A																		010	100A
100B																	000		100B
TOTAL QTY																			TOTAL QTY

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Fig. 14—Trunk Assignment Work Sheets (Sheet 4 of 8)

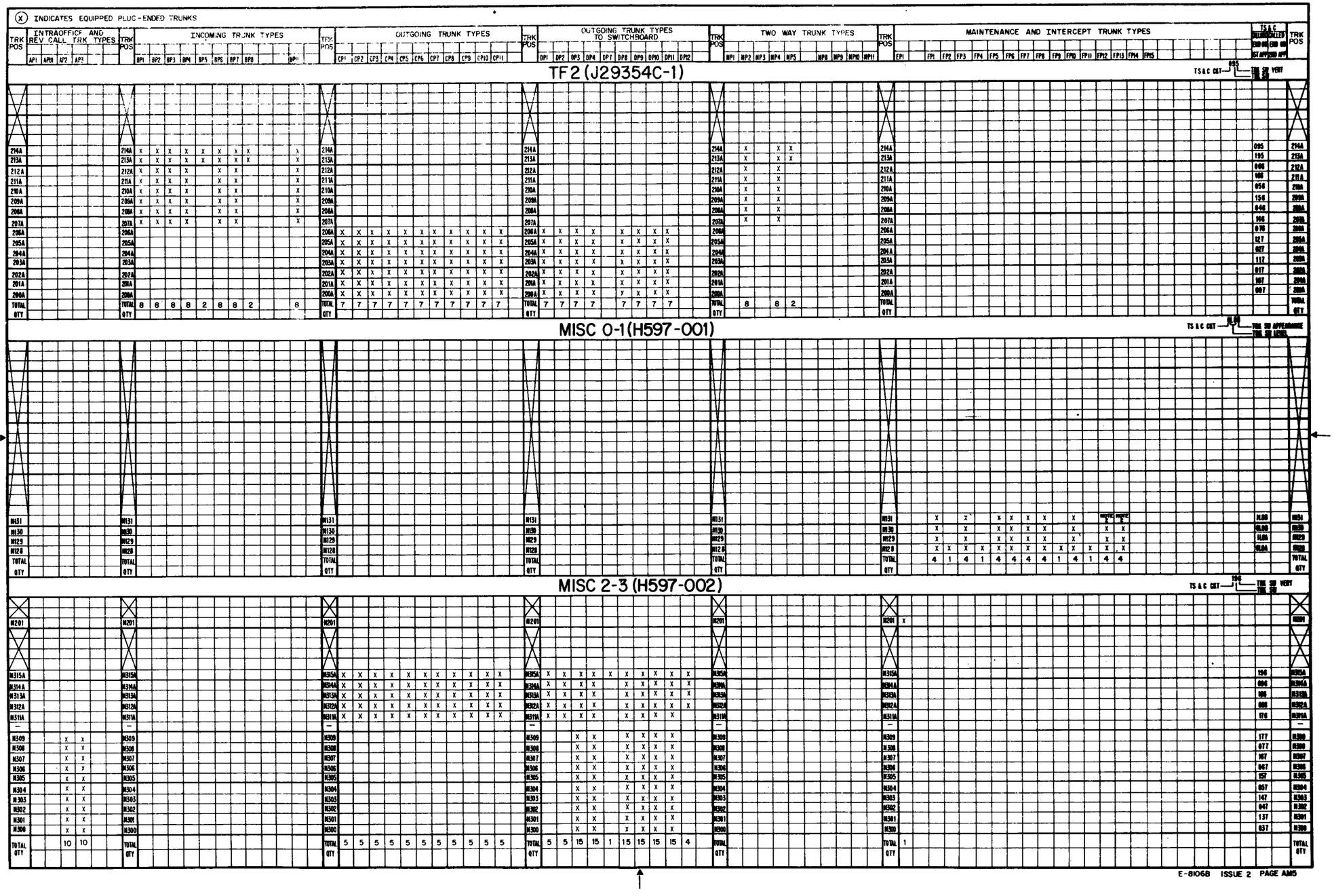


Fig. 14—Trunk Assignment Work Sheets (Sheet 5 of 8)

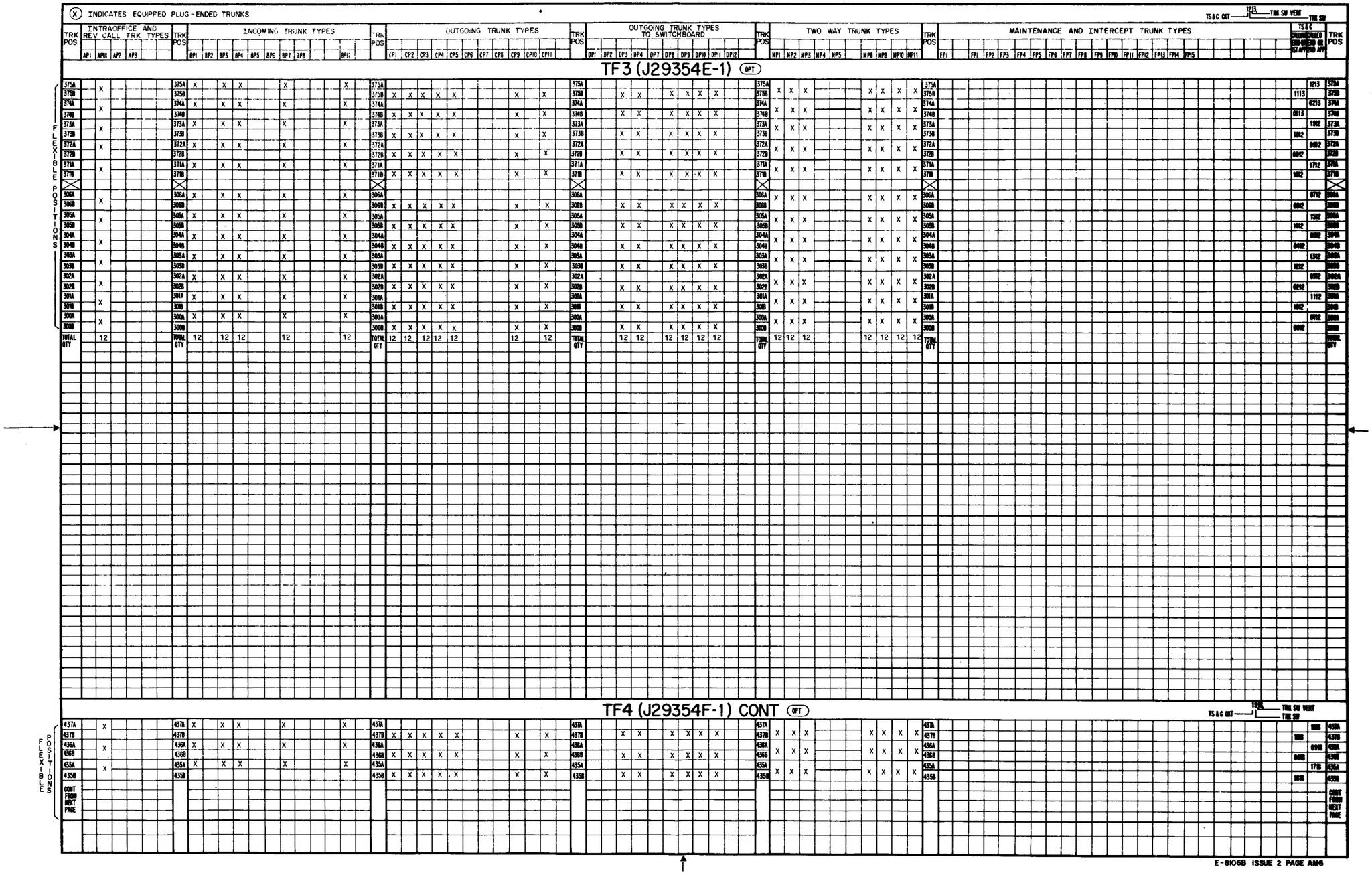


Fig. 14—Trunk Assignment Work Sheets (Sheet 6 of 8)

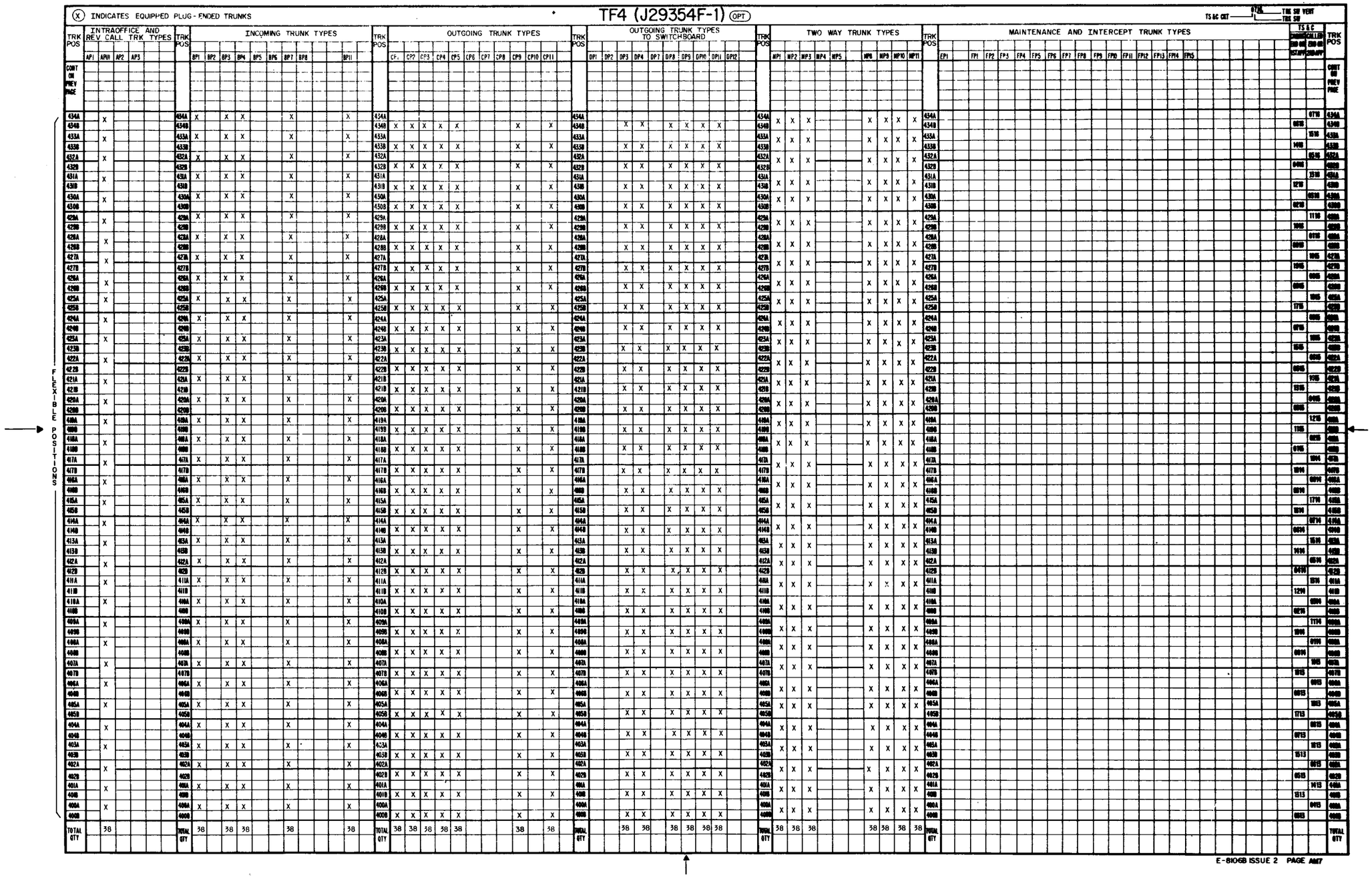


Fig. 14—Trunk Assignment Work Sheets (Sheet 7 of 8)

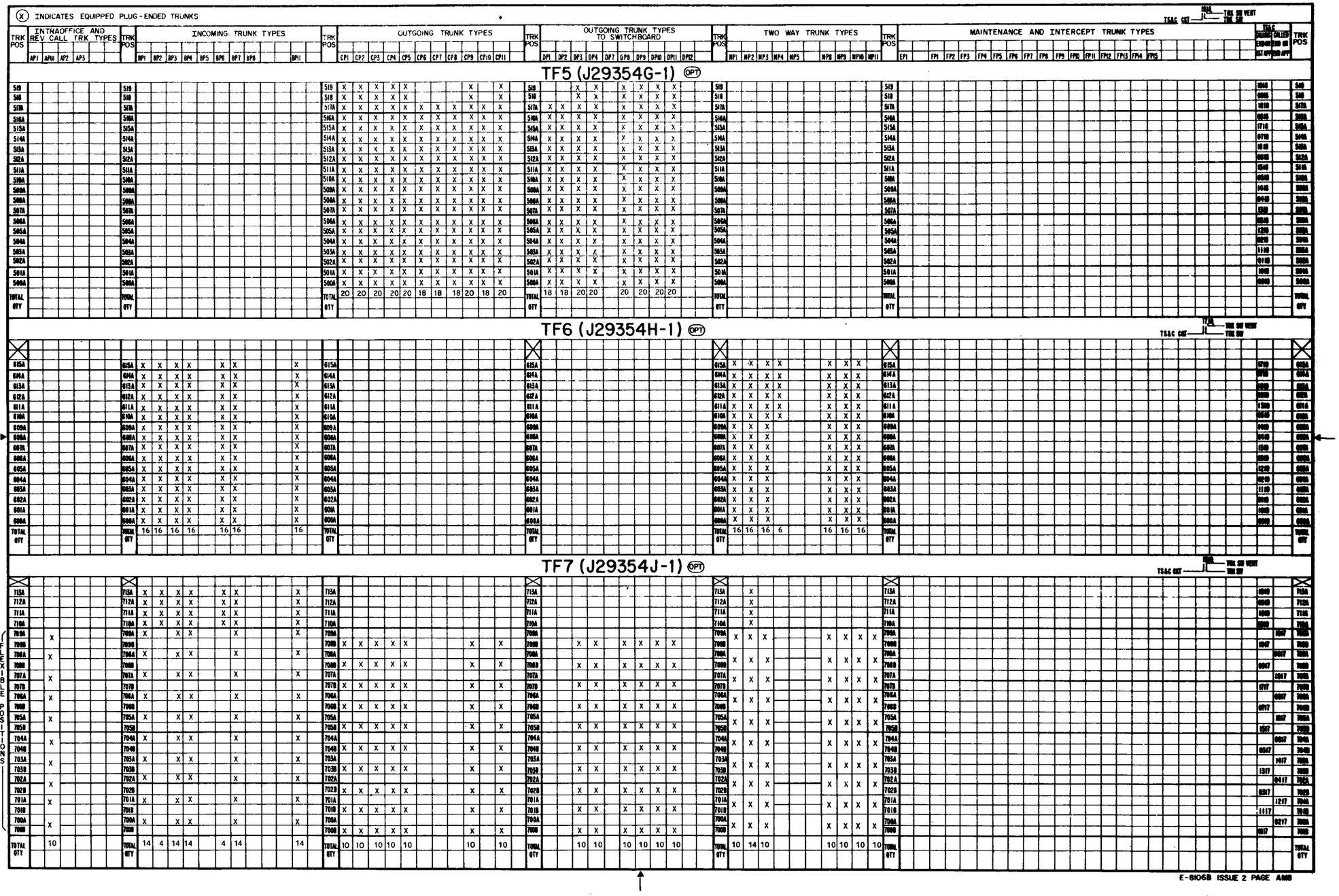


Fig. 14—Trunk Assignment Work Sheets (Sheet 8 of 8)

TRUNK TABLE AP – INTRAOFFICE AND REVERTING CALL TRUNKS

USE	CHARGING CONDITIONS			TYPE OF LINES					TYPE OF RINGING			CKTS PER UNIT	MTG PLATE SPACE PER UNIT	TRK TYPE	CIRCUIT DRAWING SD-	EQUIPMENT DRAWING J	SEE NOTE
	FLAT RATE	MESSAGE REG		IND & 2-PTY	4-PTY		8-PTY		SUPER-IMPOSED	CODED							
		IND	2-PTY		FULL SEL	SEMI-SEL											
Intra-office	√	√	√	√	√	√	√					1	1	AP1	26397-01	29360AA-	
	√	√	√	√	√	√	√					1	2	APU1	26397-01	29360AE-	
Reverting Call	√			√	√	√	√		√			1	1	AP2	26415-01	29360AB-	
	√			√		√	√			√		1	1	AP3	26443-01	29360AC-	

Fig. 15—Trunk Tables (Sheet 1 of 8)

TRUNK TABLE BP – INCOMING TRUNKS

USE	EXTRA MURAL SWBD	INC REG ASSOC WITH		CONT RING SX	4-PTY SEMI-SEL, 8-PTY	COIN STATION ARR FOR		TRK COND LP BAT. – GRD PULSING		INTEROFFICE SUPERVISION			CKTS PER UNIT	MTG PLATE SPACE PER UNIT	TRK TYPE	CIRCUIT DRAWING SD-	EQUIPMENT DRAWING J	SEE NOTE
								0-2K	2K-4.2K									
								LP PULSING										
		DP	MF			CN 1ST	CN SRV IMPR (DT 1ST)	0-1.2K	1.2K-2.5K	REV BAT.	E & M							
Inter-office (From Machine Switching Office)		√	√		√					√			1	1	BP1	26399-01	29360BA-	
		√	√		√						√		1	1	BP3	26417-01	29360BC-	
Inter-office (Bylink)		√			√			√		√			1	1	BP4	26418-01	29360BD-	
		√			√				√	√			1	1	BP7	26418-01	29360BD-	
		√			√						√		1	1	BP11	26418-01	29360BG-	
No Test	Any Toll or DSA	√	√	√	√						√		1	2	BP5	26419-01	29360BE-	
		√	√	√	√					√			1	2	BP8	26419-01	29360BE-	
Toll Switching or DSA Regular		√	√		√					√			1	1	BP1	26399-01	29360BA-	
		√	√		√	(See Note 2)				√			1	2	BP2	26410-01	29360BB-	1
		√	√		√	(See Note 2)					√		1	2	BP6	26420-01	29360BF-	1

Notes

1. This trunk can be used only with a swbd circuit which uses a wink signal to connect to the dual channel receiver circuit SD-26348-05 (HS-1 circuit pack). This receiver is included as part of trunk and is physically located on the rear of the trunk unit.
2. May be connected locally.

Fig. 15—Trunk Tables (Sheet 2 of 8)

TRUNK TABLE CP – OUTGOING TRUNKS

USE	TYPE OF PULSING	CHARGING CONDITIONS		INTEROFFICE SUPERVISION		CAMA MAKE-BUSY (SEE NOTE 1)		CKTS PER UNIT	MTG PLATE SPACE PER UNIT	TRK TYPE	CIRCUIT DRAWING SD-	EQUIPMENT DRAWING J	SEE NOTE
		MESSAGE REG		REV BAT.	E & M								
		IND	2-PTY										
Flat Rate or Message Rate	DP or MF	√	√	√				1	1	CP1	26398-01	29360CA-	
		√	√	√		√		1	1	CP9	26398-01	29360CA-	
	MF	√	√		√			1	1	CP3	26421-01	29360CC-	
	DP	√	√		√			1	1	CP4	26422-01	29360CD-	

USE	COIN CONTROL						INTEROFFICE SUPERVISION			CKTS PER UNIT	MTG PLATE SPACE PER UNIT	TRK TYPE	CIRCUIT DRAWING SD-	EQUIPMENT DRAWING J	SEE NOTE
	COIN AND NON-COIN	COIN STATION ARR FOR		AUTO. RETURN OF INIT COIN ON OPR ANS	IN-BAND	MULTI-WINK	HIGH-LOW	E & M							
		CN 1ST	CN SRV IMPR (DT 1ST)												
ANI – Opr Asst or Special Toll MF Pulsing							√			1	1	CP2	26402-01	29360CB-	
								√		1	1	CP5	26423-01	29360CE-	
	√		See Note 3				√			1	2	CP6	26424-01	29360CF-	2
	√		See Note 3			√	√			1	2	CP10	26424-01	29360CH-	2
	√		See Note 3		√			√		1	2	CP7	26425-01	29360CG-	2, 4
	√	√	See Note 3	√		√		√		1	2	CP8	26425-01	29360CJ-	2

Notes

1. For use with CAMA office.
2. May be connected locally for (+) or (—) coin collect or return.
3. May be connected locally.
4. A dual channel receiver circuit per SD-26348-05 (HS-1 circuit pack) is included as part of the trunk type and is physically located on the rear of the trunk unit.

Fig. 15—Trunk Tables (Sheet 3 of 8)

TRUNK TABLE DP – OUTGOING TRUNKS (ASSOC WITH SWBDS)

USE	EXTRA MURAL SWBD	CLASS-OF-SERVICE IDENT / TONE	COIN CONTROL: TIP AND RING	COIN CONTROL: COIN STATION ARR FOR: CN 1ST	COIN CONTROL: COIN STATION ARR FOR: COIN SRV IMPR (DT 1ST)	INTEROFFICE SUPERVISION: HIGH-LOW	INTEROFFICE SUPERVISION: E & M	INTEROFFICE SUPERVISION: LOOP	TRF & MAKE-BUSY CONT	CKTS PER UNIT	MTG PLATE SPACE PER UNIT	TRK TYPE	CIRCUIT DRAWING SD-	EQUIPMENT DRAWING J	SEE NOTE
Recording Compl or Special Service	Any	√	√	(See Note 4)		√				1	2	DP1	26401-01	29360DA-	1, 2
		√		(See Note 4)			√			1	2	DP2	26426-01	29360DB-	1, 2, 3
						√				1	1	DP3	26427-01	29360DC-	
							√			1	1	DP4	26428-01	29360DD-	
Trunk to Repair Service Desk						√			√	1	2	DP7	26432-01	29360DE-	5
						√				1	2	DP12	26432-01	29360DE-	
Directory Assistance								√		1	1	DP8	26433-01	29360DF-	
Permanent Signal to Operator							√			1	1	DP9	26391-01	29360DG-	
						√				1	1	DP10	29396-01	29360DH-	
Trunk to Repair Service Desk and Directory Assistance							√			1	1	DP11	26416-01	29360DJ-	

Notes

1. May be connected locally for (+) or (—) coin collect or return.
2. With automatic coin return after disconnect (191 coin collect).
3. This trunk can be used only with a SWBD circuit which uses a wink signal to connect to the dual channel receiver circuit SD-26348-05 (HS-1 circuit pack). This receiver is included as part of the trunk type and is physically located on rear of the trunk unit.
4. May be connected locally.
5. Only one circuit per office when transfer to switchboard is required.

Fig. 15—Trunk Tables (Sheet 4 of 8)

TRUNK TABLE EP – TRUNKS FOR MAINTENANCE PURPOSES

USE	FOR LOCAL SW	FROM			CKTS PER UNIT	MTG PLATE SPACE PER UNIT	TRK TYPE	CIRCUIT DRAWING SD-	EQUIPMENT DRAWING J	SEE NOTE
		LTD NO. 14, 15, OR 16	LTC NO. 3							
Incoming From LTD (DP or MF)	√	√	√		1	2	EP1	26413-01	29360EA-	

Fig. 15—Trunk Tables (Sheet 5 of 8)

TRUNK TABLE FP – INTERCEPT TRUNKS

USE	REG & TBL			BLANK NUMBERS		VAC CODE	CUT-THRU ST OF ANN CYC	ARR FOR OP	DEDICATED TRUNK SUPERVISION			CKTS PER UNIT	MTG PLATE SPACE PER UNIT	TRK TYPE	CIRCUIT DRAWING SD-	EQUIPMENT DRAWING J	SEE NOTE
	LOCAL ANN (SEE NOTE 1)	OPR	AUTO INCPT SRV	LOCAL ANN (SEE NOTE 1)	DIST ANN	LOCAL ANN (SEE NOTE 1)			REV HIGH-LOW	REV BAT.	E & M						
Inter-cept	√			√								1	2	FP1	26403-01	29360FA-	
	√			√			√					1	2	FP2	26403-01	29360FA-	2, 3
		√		√					√			1	3	FP3	26404-01	29360FB-	
		√		√			√		√			1	3	FP4	26404-01	29360FB-	2
		√			√				√			1	3	FP5	26404-01	29360FB-	
		√			√						√	1	3	FP6	26404-01	29360FB-	
		√			√			√			√	1	3	FP7	26404-01	29360FB-	
		√		√				√			√	1	3	FP8	26404-01	29360FB-	
		√		√			√	√			√	1	3	FP9	26404-01	29360FB-	2
		√		√							√	1	3	FP10	26404-01	29360FB-	
		√		√			√				√	1	3	FP11	26404-01	29360FB-	2
			√		√					√		1	1	FP12	26445-01	29360FC-	
			√		√						√	1	1	FP13	26445-01	29360FC-	
						√						1	1	FP14	26446-01	29360FD-	
						√	√					1	1	FP15	26446-01	29360FD-	2

Notes

1. After 1 or 2 accouncements, call will advance to the operator via an appearance on the line, line sw & conn circuit over the switching network on a nondedicated trunk using manual class indication to the marker for trunk selection.
2. Trunk types FP2, FP4, FP9, FP11, or FP15 may be provided on a once per office basis and are arranged to provide the ***cut-through with the start of announcement*** feature for the associated additional trunks (FP1, FP3, FP8, FP10, or FP14, respectively).
3. A service option in the trunk permits use without an announcement and access to an operator via an appearance on the line, line switch, and connector circuit over the switching network on a nondedicated trunk, using a manual class indication to the marker for trunk selection.

Fig. 15—Trunk Tables (Sheet 6 of 8)

TRUNK TABLE GP – MISCELLANEOUS LINES, CONTROL AND INDICATING UNITS

USE		CKTS PER UNIT	MTG PLATE SPACE PER UNIT	TRK TYPE	CIRCUIT DRAWING SD-	EQUIPMENT DRAWING J	SEE NOTE
Auxiliary Coin Line		2	1	GP1	26409-01	29360GA-	
Emer Reporting Auxiliary Line		1	3	GP2	26449-01	29360GB-	1
Supl Emer Line		3	2	GP3	26449-01	29360GC-	1
Calls Waiting		3	2	GP4	26431-01	29360GD-	2

Notes

1. Trunk type GP3 is required in addition to type GP2 when more than one line link appearance is required. A maximum of three GP3-type may be provided.
2. Trunk type GP4 serves three lines desiring calls waiting feature. A maximum of five type GP4, serving 15 is prewired in the system.

Fig. 15—Trunk Tables (Sheet 7 of 8)

TRUNK TABLE MP – 2-WAY TRUNKS

USE	INC PULSING	OG PULSING	ALM SDG & NO TEST	COIN STATION ARR FOR		INTEROFFICE SUPERVISION		TRK COND LOOP BAT. – GROUND PULSING		CKTS PER UNIT	MTG PLATE SPACE PER UNIT	TRK TYPE	CIRCUIT DRAWING SD-	EQUIPMENT DRAWING J	SEE NOTE
				CN 1ST	CN SRV IMPR (DT 1ST)	REV BAT.	E & M	0-2K	2K-4.2K						
								LOOP PULSING							
								0-1.2K	1.2K-2.5K						
2-Way Opr Office	DP or MF						√			1	2	MP2	26429-01	29360MB-	
				See Note 3			√			1	3	MP4	26429-01	29360MF-	1, 2
			√				√			1	3	MP5	26429-01	29360MF-	1, 2
2-Way For Exchange Use	DP or MF	DP or MF				√				1	2	MP8	26447-01	29360MD-	
	MF	MF					√			1	2	MP1	26400-01	29360MA-	
2-Way For Exchange Use (Incoming-Bylink)	DP	DP					√			1	2	MP3	26430-01	29360MC-	
						√		√		1	2	MP9	26448-01	29360ME-	
						√			√	1	2	MP10	26448-01	29360ME-	

Notes

1. May be connected locally for (+) or (—) coin collect or return.
2. A dual channel receiver per SD-26348-05 (HS-1 circuit pack) is included as part of the trunk type and physically located on rear of the trunk unit.
3. May be connected locally.

Fig. 15—Trunk Tables (Sheet 8 of 8)

NO. 3 CROSSBAR SYSTEM—PLUG-ENDED TRUNKS

TRUNK TYPE	SD-	J29360	NAME
			INTRAOFFICE AND REVERTING CALL TRUNKS
AP1	26397-01	AA-1	Intraoffice plug-ended trunk circuit
APU1	26397-01	AE-1	Intraoffice plug-ended trunk circuit
AP2	26415-01	AB-1	Reverting call plug-ended trunk circuit
AP3	26443-01	AC-1	Reverting call plug-ended trunk circuit arranged for all negative ringing on 2-, 4-, or 8-party lines
			INCOMING TRUNKS
BP1	26399-01	BA-1	Incoming plug-ended trunk circuit—reverse battery supervision, individual, 2-, 4-, or 8-party ringing
BP2	26410-01	BB-1	Incoming plug-ended trunk circuit—DP or MF pulsing, reverse battery supervision, in-band coin control
BP3	26417-01	BC-1	Incoming plug-ended trunk circuit—DP or MF pulsing, E&M lead supervision
BP4, BP7	26418-01	BD-1	Incoming plug-ended trunk circuit using bylink reverse battery supervision
BP11	26418-01	BG-1	Incoming plug-ended trunk circuit using bylink E&M lead supervision
BP5, BP8	26419-01	BE-1	Incoming plug-ended trunk circuit—no test, simplex controlled ringing, reverse battery, or E&M lead supervision
BP6	26420-01	BF-1	Incoming plug-ended trunk circuit—DP or MF pulsing, E&M lead supervision, in-band coin control
			OUTGOING TRUNKS (MACHINE SWITCHED)
CP1, CP9	26398-01	CA-1	Outgoing plug-ended trunk circuit—2-party message rate, with or without CAMA make-busy, reverse battery supervision
CP2	26402-01	CB-1	Outgoing plug-ended trunk circuit—MF pulsing, automatic number identification, operator assistance or special toll, high-low supervision, noncoin
CP3	26421-01	CC-1	Outgoing plug-ended trunk circuit—MF pulsing, E&M lead supervision
CP4	26422-01	CD-1	Outgoing plug-ended trunk circuit—dial pulsing, E&M lead supervision
CP5	26423-01	CE-1	Outgoing plug-ended trunk circuit—MF pulsing, automatic number identification, operator assistance or special toll, E&M lead supervision, noncoin
CP6	26424-01	CF-1	Outgoing plug-ended trunk circuit—MF pulsing, polar marginal, coin signals, high-low suprevision, coin and noncoin

Fig. 16—Summary of Trunk Types (Sheet 1 of 3)

NO. 3 CROSSBAR SYSTEM—PLUG-ENDED TRUNKS (Cont)

TRUNK TYPE	SD-	J29360	NAME
			OUTGOING TRUNKS (MACHINE SWITCHED) (CONT)
CP10	26424-01	CH-1	Outgoing plug-ended trunk circuit—MF pulsing, multiple wink, coin signals, high-low supervision, coin and noncoin
CP7	26425-01	CG-1	Outgoing plug-ended trunk circuit—MF pulsing, automatic number identification, operator assistance or special toll, E&M Lead supervision, coin, in-band or multiple wink coin control
CP8	26425-01	CJ-1	Outgoing plug-ended trunk circuit—MF pulsing, automatic number identification, operator assistance or special toll, E&M Lead supervision, coin and noncoin, multiple wink coin control
			OUTGOING TRUNKS (ASSOCIATED WITH SWITCHBOARDS)
DP1	26401-01	DA-1	Recording completing or special service plug-ended trunk circuit—high-low supervision to toll switchboard, coin and noncoin
DP2	26426-01	DB-1	Recording completing or special service plug-ended trunk circuit—E&M Lead supervision, coin and noncoin
DP3	26427-01	DC-1	Recording completing or special service plug-ended trunk circuit—high-low supervision to distant toll switchboard, noncoin
DP4	26428-01	DD-1	Recording completing or special service plug-ended trunk circuit—E&M lead supervision, noncoin
DP7, DP12	26432-01	DE-1	Outgoing plug-ended trunk circuit—repair service desk No. 2, local test desk No. 14 or 16, high-low supervision
DP8	26433-01	DF-1	Outgoing plug-ended trunk circuit to information desk, loop supervision
DP9	26391-01	DG-1	Permanent signal to operator plug-ended trunk circuit—E&M lead supervision
DP10	26396-01	DH-1	Permanent signal to operator plug-ended trunk circuit—high-low supervision
DP11	26416-01	DJ-1	Outgoing plug-ended trunk circuit to information desk, repair service desk No. 2, local test desk No. 14 or 16, E&M lead supervision
			INTERCEPT TRUNK
FP14, FP15	26446-01	FD-1	Outgoing plug-ended trunk circuit—vacant code to announcement machine

Fig. 16—Summary of Trunk Types (Sheet 2 of 3)

NO. 3 CROSSBAR SYSTEM—PLUG-ENDED TRUNKS (Cont)

TRUNK TYPE	SD-	J29360	NAME
		2-WAY TRUNKS	
MP1	26400-01	MA-1	Two-way plug-ended trunk circuit for exchange use, MF pulsing, E&M lead supervision
MP2	26429-01	MB-1	Two-way operator office plug-ended trunk circuit—DP or MF pulsing, E&M Lead supervision, noncoin
MP4, MP5	26429-01	MF-1	Two-way operator office plug-ended trunk circuit—DP or MF pulsing, E&M Lead supervision
MP3	26430-01	MC-1	Two-way plug-ended trunk circuit—dial pulsing using bylink E&M lead supervision

Fig. 16—Summary of Trunk Types (Sheet 3 of 3)

THE ORIGINATING REGISTER PROVIDES THE FOLLOWING FEATURES:

WHEN: –	THE ORIGINATING REGISTER: –
The marker transfers information it will need later to the register —	Stores the calling line location and class of service.
The dial tone connection has been established —	Return dial tone to the calling subscriber.
The calling customer dials or keys all of the digits for the called number	Registers and stores the called number.
The call is a coin class call —	Checks for presence of coin in coin box.
A customer on a dial tone first coin line makes an unauthorized call without a coin deposit —	Provides a means to connect to a recorded announcement.
The calling customer's line is a 2 party line —	Determines whether the tip party or ring party customer originated the call.
Manual class operation is required —	Generates a zero operator call without customer dialing.
The call is a revertive type call —	Will register the calling party identification digit, if needed.
Calls received have either 7 digits or 10 digits —	Can distinguish between 7 and 10 digit calls on a cross-connection basis.

Fig. 17—Originating Register Features

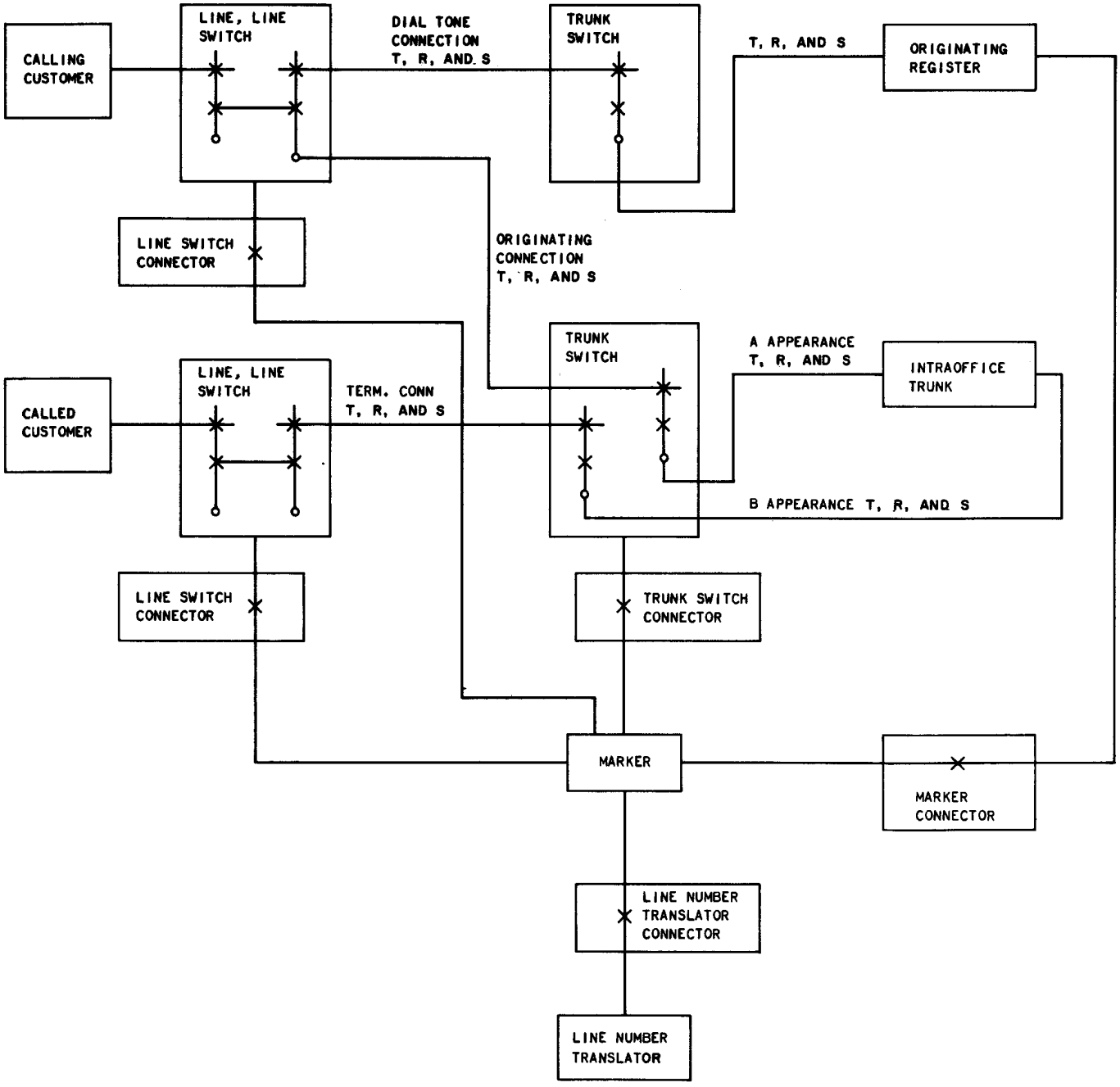
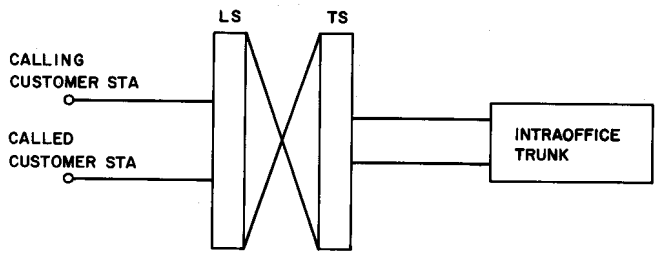
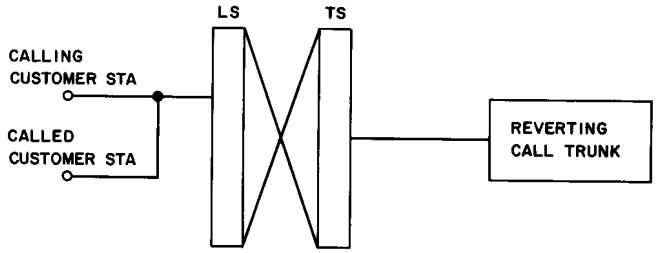


Fig. 18—Basic Connections

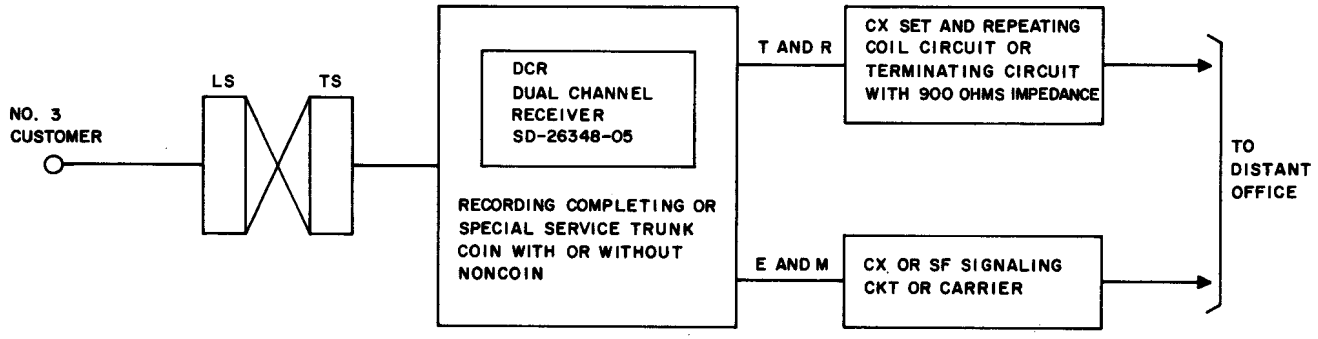


(A) INTRAOFFICE TRUNK CONNECTION



(B) REVERTING CALL CONNECTION

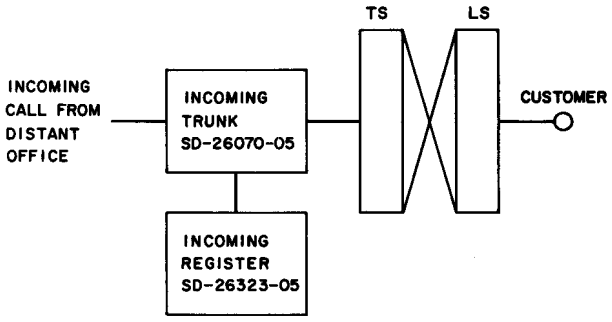
Fig. 19—Intraoffice Trunk Connections



NOTES:

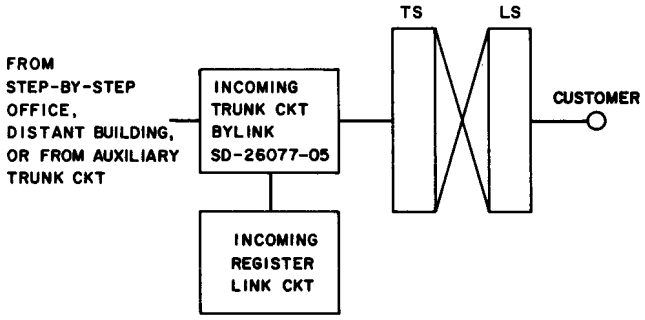
1. THIS CIRCUIT IS USED IN COMPLETING SPECIAL SERVICE OR TOLL CALLS FROM COIN CUSTOMER LINES IN A NO. 3 CROSSBAR OFFICE TO A DISTANT SWITCHBOARD OVER CARRIER EQUIPMENT OR EQUIVALENT FACILITIES USING E AND M SIGNALING.
2. THIS CIRCUIT CAN BE ARRANGED, ON AN OPTIONAL BASIS, TO COMPLETE ROUTE ADVANCED SPECIAL SERVICE OR TOLL CALLS FROM NONCOIN CUSTOMER LINES IN A NO. 3 CROSSBAR OFFICE TO A DISTANT SWITCHBOARD OVER CARRIER EQUIPMENT OR EQUIVALENT FACILITIES USING E AND M SIGNALING.
3. THIS CIRCUIT CAN BE ARRANGED, ON AN OPTIONAL BASIS, TO OMIT AUTOMATIC RETURN OF THE INITIAL COIN WHEN THE OPERATOR ANSWERS.
4. THIS CIRCUIT IS ARRANGED TO USE AC SIGNALING FOR THE COIN DISPOSAL AND RERING FEATURES. A 700-HZ FREQUENCY ACTIVATES THE RERING FEATURE, A 1100-HZ FREQUENCY ACTIVATES THE COIN RETURN FEATURE, AND A COMBINATION OF 700 AND 1100-HZ ACTIVATES COIN COLLECT.
5. THIS CIRCUIT CAN BE ARRANGED FOR UNRESTRICTED RINGBACK.

Fig. 20—Outgoing Trunk Connection—Recording Completing or Special Service Trunk



NOTE:
THIS INCOMING TRUNK CIRCUIT COMPLETES CALLS FROM LOCAL OR TANDEM OFFICES HAVING SENDERS OR OPERATOR POSITIONS ARRANGED FOR A START DIAL SIGNAL OR FOR DIAL TONE. THE ASSOCIATED INCOMING REGISTERS ARE ARRANGED FOR EITHER DIAL PULSING OR MULTIFREQUENCY PULSING.

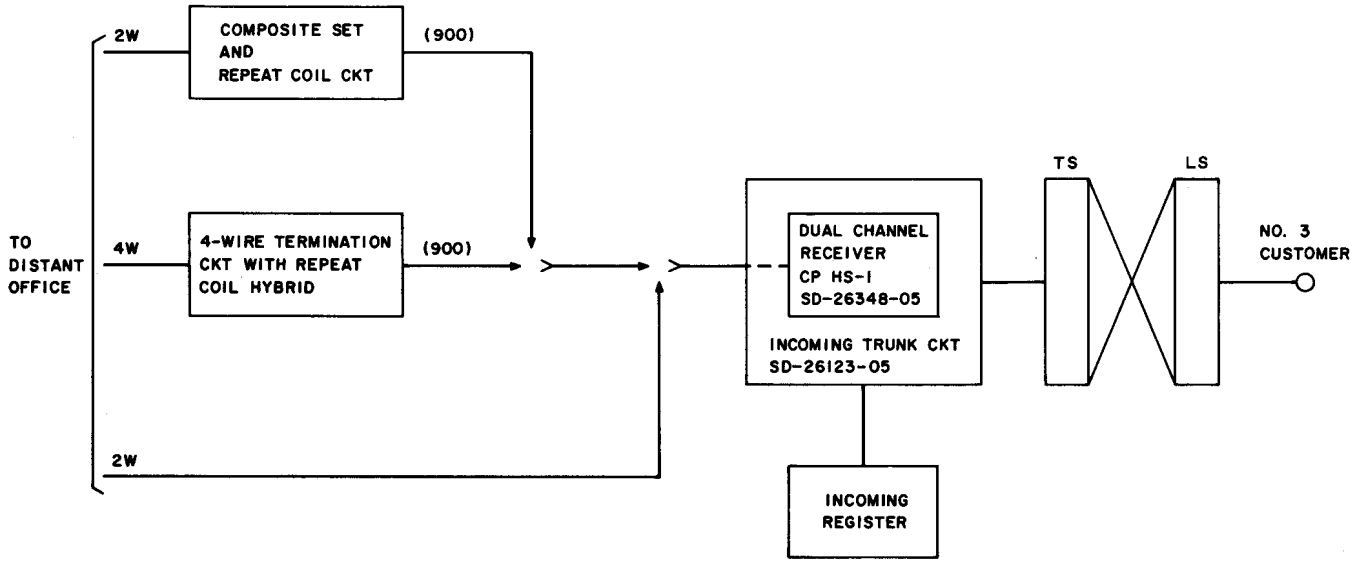
(A) MF OR DP



NOTE:
THIS CIRCUIT IS DESIGNED FOR USE IN THE NO. 3 CROSSBAR OFFICE AS AN INCOMING TRUNK CIRCUIT FROM A STEP-BY-STEP OFFICE. IT IS ARRANGED FOR BYLINK OPERATION.

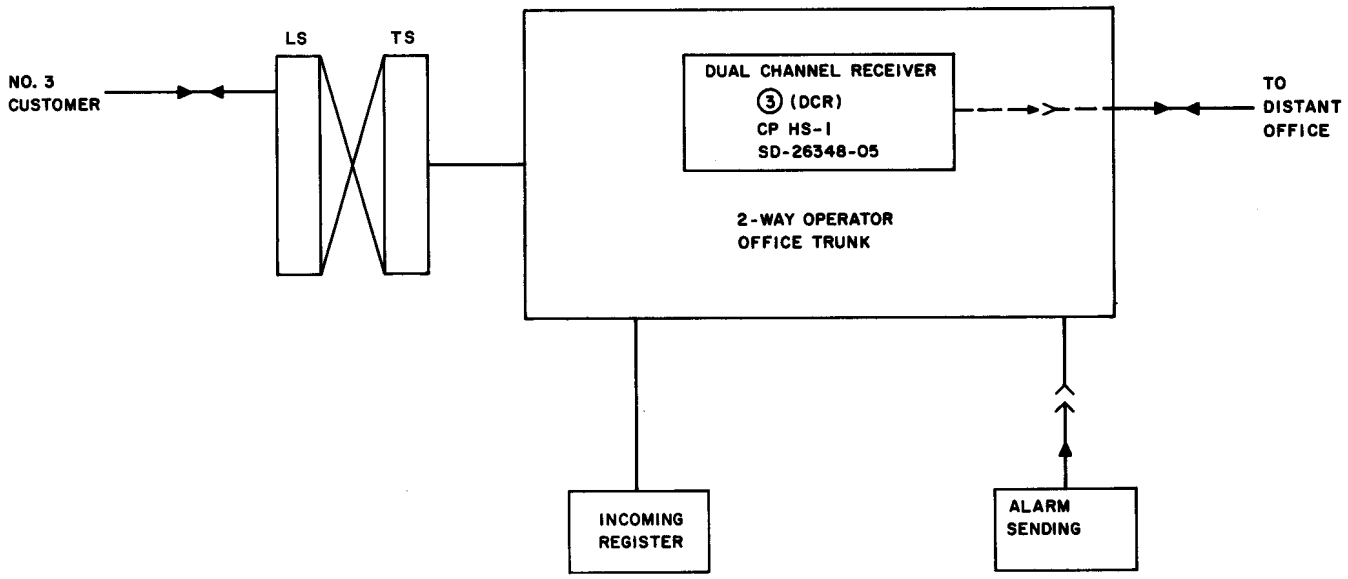
(B) BYLINK

Fig. 21—Incoming Trunk Connections—Miscellaneous



NOTES:
1. THIS CIRCUIT IS USED TO COMPLETE CALLS FROM A DISTANT TOLL OR DSA SWITCHBOARD TO COIN OR NONCOIN CUSTOMERS AND IS ARRANGED TO USE E AND M LEAD OR REVERSE-BATTERY SUPERVISION. THE COIN AND RERING FEATURES PROVIDED ARE CONTROLLED BY THE USE OF AC TONES.
2. THE CIRCUIT CAN BE ARRANGED FOR RESTRICTED OR UNRESTRICTED RINGBACK.

Fig. 22—Incoming Trunk Connection From Toll or DSA Switchboard With or Without Coin Control



NOTE:

THIS CIRCUIT CONNECTS BETWEEN A SINGLE TRUNK LINK FRAME APPEARANCE AND A TRUNK TO HANDLE COIN AND NONCOIN CUSTOMER OUTGOING CALLS TO AN OPERATOR, ALARM SIGNALS TO AN OPERATOR FROM AN ALARM SENDING CIRCUIT, INTERCEPT CALLS TO AN OPERATOR, DP OR MF BASIS INCOMING TERMINATING CALLS FROM A MACHINE SWITCHED OFFICE, AND DP OR MF BASIS INCOMING TERMINATING REGULAR AND NO-TEST CALLS FROM AN OPERATOR.

THIS CIRCUIT CAN BE ARRANGED FOR RINGBACK AS FOLLOWS:

(A) UNRESTRICTED RINGBACK PERMITS RINGBACK AGAINST BOTH OFF-HOOK AND ON-HOOK SIGNALS.

(B) RESTRICTED RINGBACK PERMITS RINGBACK AGAINST AN OFF-HOOK SIGNAL FROM A NONCOIN LINE AND BOTH OFF-HOOK AND ON-HOOK SIGNALS FROM COIN LINES.

Fig. 23—Two-Way Operator Office—Trunk Connection

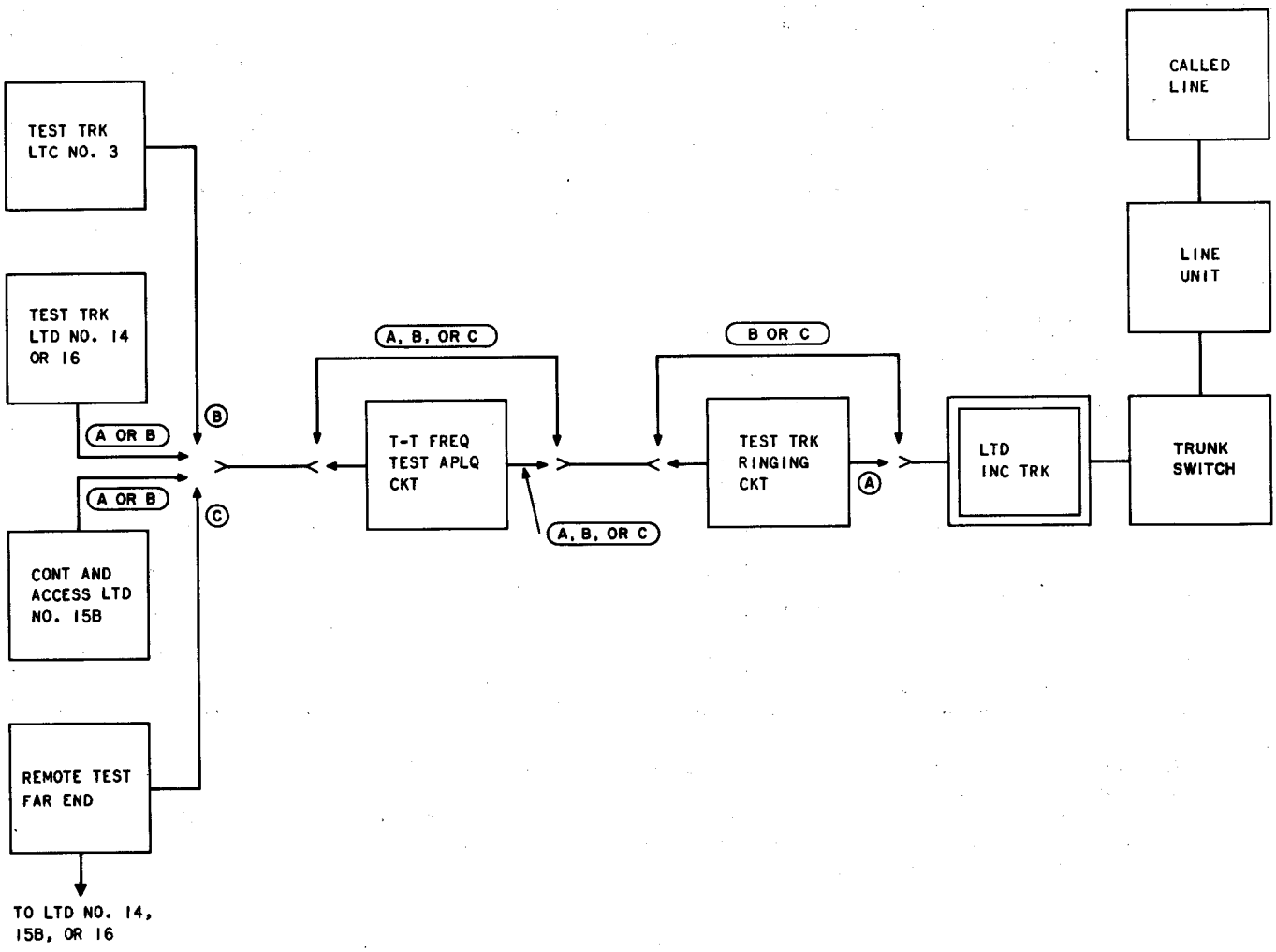


Fig. 24—Local Test Desk Connections

SW	SW LEV	VERTICAL GROUP				SW	SW LEV	VERTICAL GROUP			
		0	1	2	3			4(0)	5(1)	6(2)	7(3)
		VERTICALS						VERTICALS			
		0-4	5-9	10-14	15-19			0-4	5-9	10-14	15-19
		TRUNK POSITION						TRUNK POSITION			
S0	11	206A	M312A	M314A	M124	S1	11	M311A	M313A	M315A	M123
	10	Note 2	200A	202A	204A		10	175B	201A	203A	205A
	9	134A	136A	170A	172B		9	135A	137A	171A	173B
	8	126B	128B	130B	132A		8	127B	129B	131B	133A
	7	118B	120B	122B	124B		7	119B	121B	123B	125B
	6	110B	112B	114B	116B		6	111B	113B	115B	117B
	5	102B	104B	106B	108B		5	103B	105B	107B	109B
	4	078	080	090	100B		4	079	M125	091	101B
	3	070B	072B	074B	076B		3	071B	073B	075B	077B
	2	044B	046B	048B	050B		2	045B	047B	049B	051B
	1	036B	038B	040B	042B		1	037B	039B	041B	043B
	0	028B	030B	032B	034B		0	029B	031B	033B	035B

Notes:

1. Outgoing sender link vertical group information shown in ( ) indicates the VG lead designation associated with the assigned trunk positions.
2. Outgoing sender link switch S0, level 10, vertical group 0 is assigned to trunk positions 174B and M126. Only one of the two trunk positions may be equipped with a plug-ended trunk which requires this OSL appearance (174B E/W MP1, MP3, MP8, MP9 or M126 E/W FP12, FP13).

Fig. 25—Outgoing Sender Link and Trunk Identified

TRK GR (SW)	SW LEV	TRUNK BLOCK A VERTICALS 0-4 TP REL	A 0-4 TRK POS	A 5-9 TP REL	A 5-9 TRK POS	A 10-14 TP REL	A 10-14 TRK POS	A 15-19 TP REL	A 15-19 TRK POS
0	11	11		23		35		47	
	10	10	210A	22	212A	34		46	
	9	09	174A	21	176A	33	178A	45	208A
	8	08	126A	20	128A	32	130A	44	172A
	7	07	118A	19	120A	31	122A	43	124A
	6	06	110A	18	112A	30	114A	42	116A
	5	05	102A	17	104A	29	106A	41	108A
	4	04	072A	16	074A	28	076A	40	100A
	3	03	046A	15	048A	27	050A	39	070A
	2	*02		14	040A	26	042A	38	044A
	1	*01		13	034A	25	036A	37	038A
	0	*00	214A	12	028A	24	030A	36	032A

TRK GR (SW)	SW LEV	TRUNK BLOCK A VERTICALS 0-4 TP REL	A 0-4 TRK POS	A 5-9 TP REL	A 5-9 TRK POS	A 10-14 TP REL	A 10-14 TRK POS	A 15-19 TP REL	A 15-19 TRK POS
1	11	11		23		35		47	
	10	10	209A	22	211A	34		46	
	9	09	175A	21	177A	33	179A	45	207A
	8	08	127A	20	129A	32	131A	44	173A
	7	07	119A	19	121A	31	123A	43	125A
	6	06	111A	18	113A	30	115A	42	117A
	5	05	103A	17	105A	29	107A	41	109A
	4	04	073A	16	075A	28	077A	40	101A
	3	03	047A	15	049A	27	051A	39	071A
	2	*02		14	041A	26	043A	38	045A
	1	*01	M201	13	035A	25	037A	37	039A
	0	*00	213A	12	029A	24	031A	36	033A

* Denotes (TP) relay is wired and cross-connectable to indicate a no-test type trunk.

Fig. 26—Incoming Register Link

TRAFFIC REGISTER PEG COUNT

PEG COUNT REGISTERS FOR:	CONNECTING CIRCUIT		REMARKS:
	LEAD	NAME OF CKT	
OUTGOING TRUNK GROUP (Revertive Call and Permanent Signal) 10 Per Office	PC0—PC19	Marker	These registers will operate from the marker route relays when channel is set up.
Intraoffice Trunk Group 10/ Office	IPC		
Dial Tone Trunk Group 10/ Office	DPC		
MARKER TOTAL SEIZURES 1/DT & 1/COMPL MKR	TDT TCM	Marker	These registers should score on respective seizures of the marker.
TOTAL ORIGINATING 1/DP CALLS 1/TT CALLS	TOR DOR MOR	Marker	These registers are scored by the marker when it established a channel between a calling customer line and a trunk of any type on the trunk frame.
INCOMING CALLS TO BUSY LINE 1/Office	TMB	Marker	This register is scored by the marker on terminating attempts to busy lines.
OUTGOING SENDERS 1/DP CALLS 1/MF CALLS	DPS MFS	Marker	These registers are scored by the marker when it selects a respective sender for pulsing.
PERMANENT SIGNAL 1/Office	PSC	Marker	This register is scored by the marker when it has received a permanent signal from the originating register.
ALL INTERCEPT 1/Office for all types of intercept	INT	Marker	These registers will operate from the marker and score all terminating calls offered to the intercept trunks, including calls which find all intercepting trunks busy.
TOTAL CHANNEL 1/Office	TCH	Marker	This register will score when the marker selects a channel between a line switch and trunk switch on all calls including test calls. It scores twice on IAO calls.
SAMPLE CHANNEL 1/Office	SCH	Marker	This register will score when the marker sets up a channel over the 0 & 4 link between a line appearance on the LL fr and a trunk of any type on a TF fr.

Fig. 27—Registers (Sheet 1 of 4)

TRAFFIC REGISTER PEG COUNT

PEG COUNT REGISTERS FOR:	CONNECTING CIRCUIT		REMARKS:
	LEAD	NAME OF CKT	
ANI PEG COUNT 1/Office	APC	Marker	This register will score whenever the marker receives a line to number translation from the LNT CKT.
ABANDONED PARTIAL DIAL 1/Office (Totals DP & TT)	APD	Originating Register	This register will be operated by the originating register circuits on calls abandoned after the dialing of one or more digits.
INCOMING REGISTER (DP and MF) 1/Office — For DP Counts 1/Office — For MF Counts	DP MF	Incoming Register	These registers will operate from the incoming register circuit when seized by an incoming trunk.

Fig. 27—Registers (Sheet 2 of 4)

TRAFFIC REGISTER OVERFLOW

OVERFLOW REGISTERS FOR:	CONNECTING CIRCUIT		REMARKS:
	LEAD	NAME OF CKT	
OUTGOING TRUNK GROUPS (Revertive Call and Permanent Signal) 10 Per Office	OF0—OF19	Marker	These registers will operate from the marker route relays.
Intraoffice Trunk Group IO/ Office	10F		
Dial Tone Trunk Group IO/ Office	DOF		
TOTAL OFFICE 1/Office	1	FS4	This register scores whenever a customer originated call (except a permanent signal) does not complete. The register requires the use of a pulse lengthening circuit.
INCOMING MATCHING LOSS 1/Office	IFM	Marker	This register is operated by the marker on incoming calls in case of failure to match on incoming calls.
ALL SENDERS BUSY 1/Office	ASB	Marker	This register scores each time a marker fails to find an idle sender in a group.
TOTAL MATCHING LOSS 1/Office	TFM	Marker	This register is operated by the marker on any seizure encountering an all channels busy condition.
ORIGINATING REGISTER BUSY 1/Office	ORB	Alarm	This register is operated by the alarm circuit when all the originating registers become busy for a minimum of approximately 9.6 to 11.4 seconds.

Fig. 27—Registers (Sheet 3 of 4)

PLANT REGISTER PEG COUNT

PLANT REGISTER FOR:	REMARKS:
Incoming Register Link Release (LR Register) 1/Office	This register is operated by the marker each time trouble is encountered in the IRL
Mutilated Digit (MUD Register) 1/Office	This register pegs each time the marker detects a failure in the number by checking the called number from the register except permanent signal calls.
Verification Test (VRF Register) 1/Office	This register pegs each time the marker takes a trouble record for nuisance call recording, test frame request, or a service or verification request.
Permanent Signal Ground (PSG Register) 1/Office	This register scores each time a marker detects a permanent signal caused by a trouble condition.
Ground Test Failure (GTF Register) 1/Office	This register is operated by the marker each time a failure in a loop, ground, or continuity test occurs.
Dial Tone Call Failure (DTF Register) 1/Office	This register is operated by the marker each time trouble is encountered on a dial tone call except on a condition which would score another register.
Completing Trouble Record First Trial Failure (CTR Register) 1/Office	This register is operated by the marker each time trouble is encountered on first trial except on a condition which would score another register.
Completing Second Trial Failure (CST Register) 1/Office	This register is operated by the marker each time trouble is encountered on second trial except on a condition which would score another register.
Automatic Identification Failure on ANI call After second trial (AIF Register) 1/Office	This register operates from the marker each time for automatic identification failure on ANI calls after each second trial.
Sender Timeout or Trouble Release Failure (SS Register) stuck sender 1/Office	This register operates from the sender circuit for each sender timeout or trouble release failure.

Fig. 27—Registers (Sheet 4 of 4)

USAGE MEASURED	QTY LEADS
Marker	
Total	2
Maintenance	2
Originating Register	
Total	12
TOUCH-TONE	12
Maintenance	12
Incoming Register	
Total	5
Multifrequency	5
Maintenance	5
Outgoing Senders	
Total	5
Multifrequency	5
Maintenance	5
Trunks—intraoffice, reverting outgoing and 2-way	204
Sample channel (links 0 and 4)	20

Fig. 28—Traffic Usage Recorder Measurement Leads

TABLE A

NO. 3 CROSSBAR
COMMON CONTROL EQUIPMENT SUMMARY

COMMON CONTROL EQUIPMENT	MAXIMUM QUANTITIES		
	200-1200 MODULE	200-800 MODULE	200-400 MODULE
Call Carrying Capacity	5350	4240 CCS	2580 CCS
Numbers	1800	1200	1200
Line Block Frames	5	4	2
Lines	1200	800	400
Trunk Frames	8	3	2
Trunk Terminations and Originating Register Terminations	400	240	160
Originating Registers	12	12	8
Incoming Registers	7	5	5
Outgoing Senders	5	5	5
Line Number Translators	3	2	2
Markers (combined)	2	2	2

TABLE B

NO. 3 CROSSBAR
ORIGINATING REGISTER HOLDING TIMES
(IN SECONDS)

HOLDING TIME COMPONENTS	TYPE COMPLETING MARKERS ALL WIRE SPRING	
	DP	TT
Sum of intervals: (1) Dial tone to dialing start and (2) Dialing end or stations delay end to originating register release.	2.7	2.6
Dialing time per digit. See *Note* below.	1.5	8
To the above add the following for the conditions indicated:		
Digit Timing (Stations Delay)	3.6	3.6
Calls from coin lines to "O" and 3-digit operator codes (coin return)	1.5	1.5
Manual originating, total holding time	9	—
Examples of typical calls:		
To "O" operator, noncoin	4.2	2.9
To 7-digit local number	13.2	7.7
To DDD foreign NPA, "1" plus 10 digits	19.2	10.9

Note: The dialing time per digit component of the originating register holding time is applicable to all the digits dialed—not only in the number but also including any of the following:

Single-digit O operator code; 1, 9, and 0 directing codes; prefix to line number on 5-digit centrex intercom calls; and 4-wire priority control digit preceding listed number.

2-digit codes such as 4-wire 1X or priority control digits.

3-digit operator codes, NNX central office codes, NO/1X area codes, and 1XXX tie line codes. In the case of the 1XX tie line codes, each additional digit following the 1XX code may or mat not be registered in the OR, depending upon whether metallic tie lines or tie lines associated with outgoing senders are used. Any digits in addition to the 1XX code that are registered in the OR should also be accounted for in the computation of OR holding time.

TABLE C

NO. 3 CROSSBAR
OUT SENDER CAPACITY TABLE

SENDER GROUP TRAFFIC USAGE (CCS)		NUMBER OF SENDERS REQUIRED
AVERAGE 10 HIGH DAY	ABS	
0 — 1.9	0 — 1.1	2
2.0 — 12.9	1.2 — 9.7	3
13 — 29	9.8 — 24	4
30 — 49	25 — 42	5

TABLE D

NO. 3 CROSSBAR
INCOMING REGISTER CAPACITY TABLE

TRAFFIC USAGE (CCS)		NUMBER OF BY LINK INCOMING REGISTERS REQUIRED	NUMBER OF NON BY LINK INCOMING REGISTERS
10 HIGH DAY	ABS		
0 — 0.4	0 — 0.2	2	
0.5 — 5	0.3 — 3.7	3	
6 — 16	3.8 — 12	4	
17 — 30	13 — 24	5	
0 — 1.4	0 — 1.0		2
1.5 — 10	1.1 — 6.5		3
11 — 27	6.6 — 20		4
28 — 49	21 — 37		5