

**LINE CHOICE CONNECTOR FRAME
AND LINE JUNCTOR CONNECTOR FRAME
EQUIPMENT DESIGN REQUIREMENTS
NO. 1 CROSSBAR SYSTEM**

1. GENERAL

Scope

1.01 This specification, together with the supplementary information listed herein, covers the equipment design requirements for the framework, equipment, and circuits to be used in the engineering, manufacture, and installation of the line choice connector frame and line junctor connector frame in No. 1 crossbar offices.

1.02 This section is reissued to incorporate previous appendix changes.

Capacity

1.03 The line choice connector frame is available in two sizes, one with two line choice connector circuits, each serving a maximum of ten terminating markers, and the other with two connector circuits, each serving a maximum of six markers.

1.04 The line junctor connector frame has a capacity of four sets of connector relays, each set serving four line link frames.

Description

1.05 These two frames are covered in the same specification because functionally they are closely associated and the equipment on both frames is covered by the same circuit drawing.

1.06 A line choice is defined as an association of four line groups (line link frames) which the terminating marker treats as a unit in setting up connections from incoming links to lines. The line choice connector frame contains multicontact relays (three per connector per marker) which cut through a number of leads to the four line link frames and to a set of junctor connector relays on the line junctor connector frame for test and control on terminating calls.

1.07 The line junctor connector frame contains a set of 24 multicontact relays per line choice, which cut through leads from the line choice connector frame to the line link frames (1) for test on line junctors and (2) for test on line links.

1.08 Both frames are 11' 6" bulb-angle bays, the 10-marker capacity line choice connector and the line junctor connector being 2' 8-1/8" wide, and the 6-marker capacity line choice connector 1' 10-1/8" wide.

1.09 The equipment of the line choice connector, from top down, consists of a fuse panel; miscellaneous terminal strip; three mounting units of multicontact relay-type terminal strips; two mounting units of multicontact relays; a key, jack, and lamp panel mounting; four mounting units of multicontact relays; and four mounting plates for "U" relays and associated apparatus. Each mounting unit of multicontact relays contains a vertical plate for mounting the contact protection resistances and condensers for the relays thereon.

1.10 The equipment of the line junctor frame, from top down, consists of a miscellaneous and a battery and ground terminal strip; four mounting units of multicontact relays (two each per line choice); a key, jack, and lamp panel mounting; four more mounting units of multicontact relays, duplicates of the above; and three plates of "U" relays and related apparatus. On the rear, associated with each mounting unit, is a 1/2" bar mounting containing two 1 by 20 terminal strips.

1.11 The operation and functions of these frames depend on the previous operation of frames associated with the number group connector circuit. Following the transfer of the digits of the called number from the originating sender to the terminating sender, a terminating marker is seized, which in turn seizes a number group connector circuit which tests the called line for busy and returns information to the terminating marker as to which line choice contains the called line. If the line is idle, the marker seizes that line choice connector and operates the connector relays (MCA), (MGB), and (MCC) on the line choice connector frame. Certain leads are cut through directly to the line link frames, only those connecting to the frame containing the called line being operative. These leads momentarily lock-out originating calls on that frame, and enable the marker to operate the proper

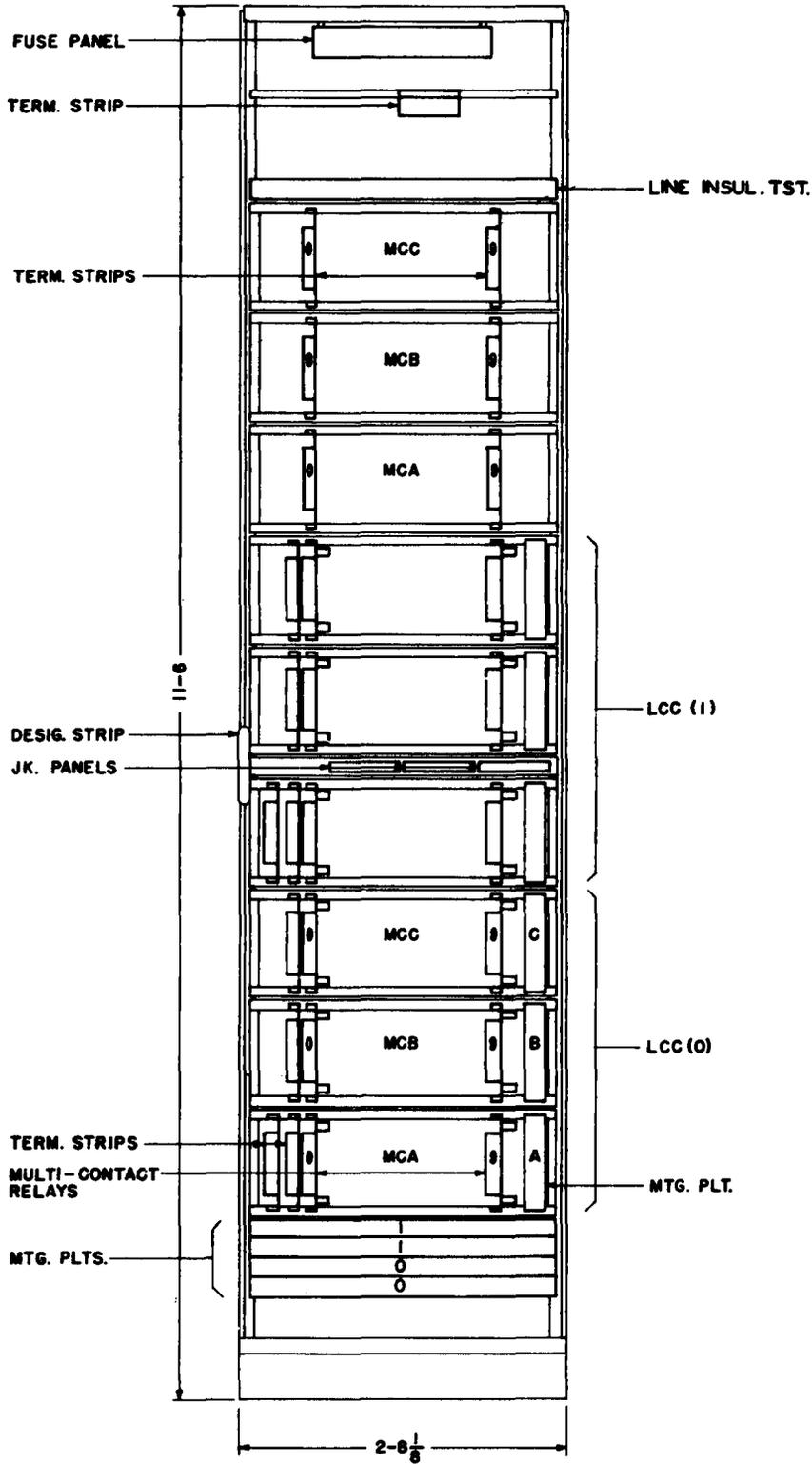


Fig. 1 - Line Choice Connector Frame

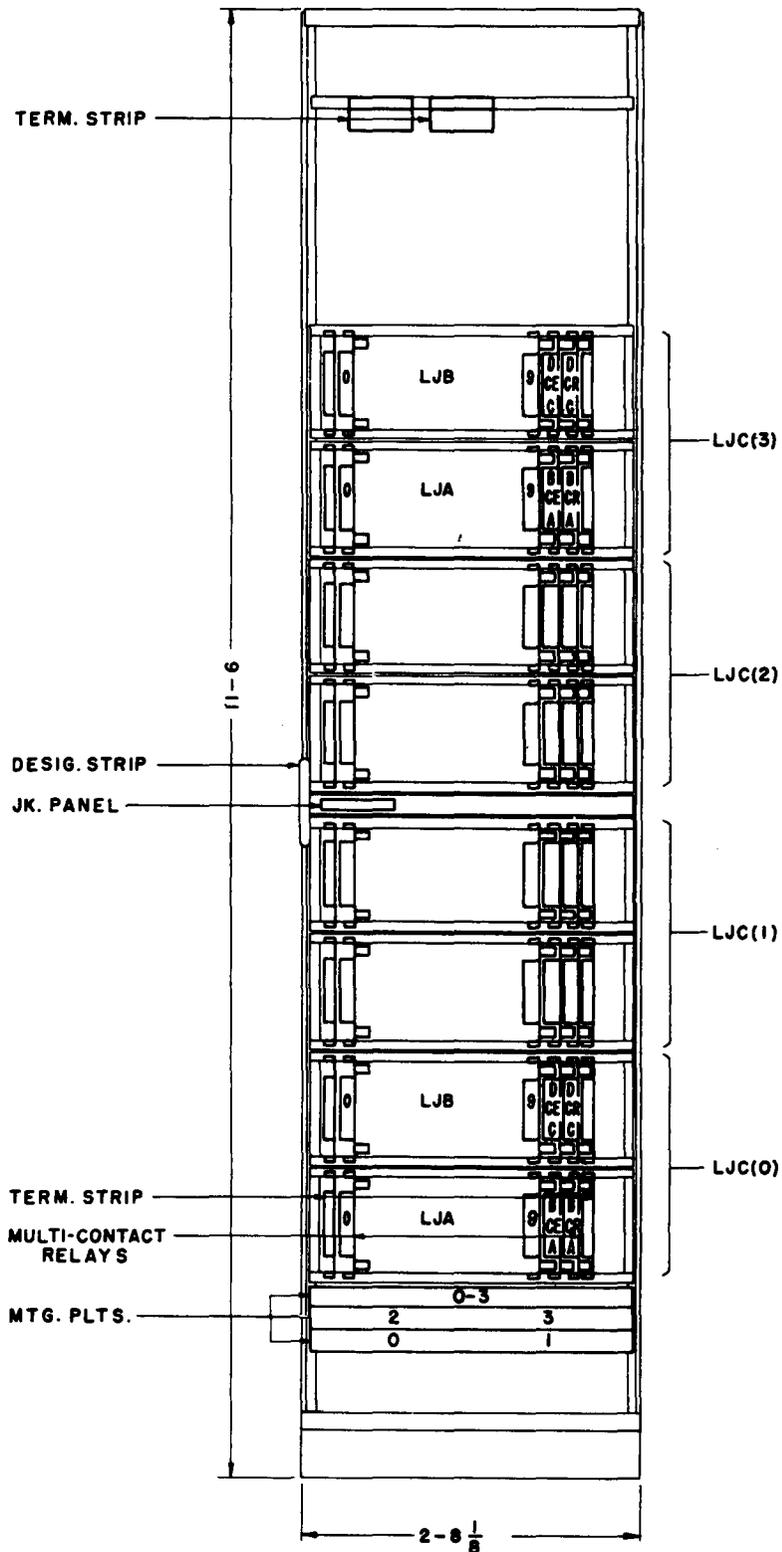


Fig. 2 - Line Junctor Connector Frame

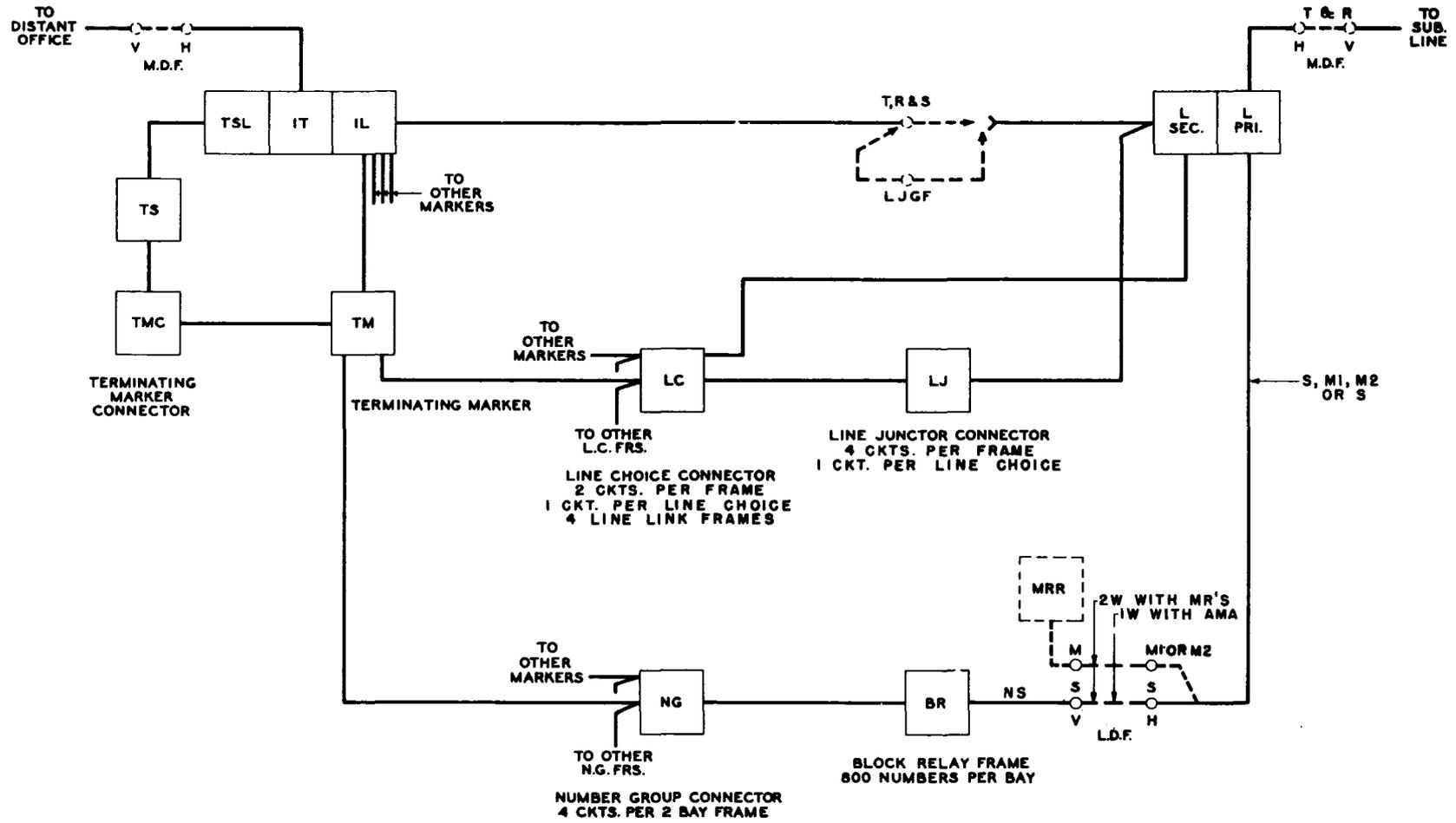


Fig. 3 - Terminating Frames - Schematic of Equipment

horizontal group relays and hold magnets on the line link. Other leads are cut through to the line junctor connector relays which in turn are operated to extend leads to test line junctors from incoming links to line link secondary, to operate proper hold magnets after test, to check proper operation on the call, to control "no-test" calls, and to operate load and peg count registers.

1.12 The line choice connector frame may be arranged for automatic line insulation testing through connections to a terminating marker and the line insulation test frame to obtain access to the subscribers' lines on the line link frames of a terminating marker group. Two or three U-type relays as required are provided on the "0" line choice connector frame to open certain leads to the marker assigned to work with the line insulation test frame. This marker is made busy to regular service to permit the test circuit to use its multiple at the line choices.

Subdivisions of Equipment

- J27851A (AT&TCo Std.) - Line Choice Connector Frame - Capacity Ten Markers
- J27851B (AT&TCo Std.) - Line Choice Connector Frame - Capacity Six Markers
- J27851C (AT&TCo Std.) - Line Junctor Connector Frame

2. SUPPLEMENTARY INFORMATION

816-000-000 - No. 1 Crossbar System Index

J23651 - Line Insulation Test Frame
 Floor Plan Data - Section 9.1, Sheet 17 - Line Choice Connector Frame
 Section 9.1, Sheet 21 - Line Junctor Connector Frame

3. DRAWINGS

Key Sheet

SD-25000-01 - Keysheet - No. 1 Crossbar System

Framework

- ED-25020-01 - Cable Brackets and Miscellaneous Mounting Details
- ED-25021-01 - Key, Jack, and Lamp Panels
- ED-25022-01 - Multicontact Relay Mounting Assembly
- ED-25023-01 - Frame Details
- ED-25025-01 - Fuse Panel Assembly
- ED-25278-01 - Key, Jack, and Lamp Panel - Bay Width
- ED-25287-01 - Line Choice Connector Frame Assembly
- ED-25304-01 - Line Junctor Connector Frame Assembly

Equipment

- ED-25212-01 - Designation Cards
- ED-25288-01 - Line Choice Connector Frame Equipment
- ED-25303-01 - Line Junctor Connector Frame Equipment

Wiring and Cabling

- ED-25079-01 - Line Junctor Assignment Chart 200 Junctors per Incoming Link Frame
- ED-25080-01 - Line Junctor Assignment Chart - 400 Junctors per Incoming Link Group
- ED-25289-01 - Local Cable - Line Choice Connector Frame
- ED-25301-01 - Switchboard Cabling Details - Line Choice Connector Frame
- ED-25314-01 - Switchboard Cabling Details - Line Junctor Connector Frame
- ED-25319-01 - Local Cable - Line Junctor Connector Frame
- ED-25346-01 - Method of Running Power Feeders
- ED-25682-01 - General Switchboard Cabling Methods

4. EQUIPMENT

J27851A (AT&TCo Std.) - Line Choice Connector Frame - Capacity Ten Markers

Equipment - ED-25288-01
 Local Cable - ED-25289-01

List 1 - Framework, assembly, wiring, and common equipment for one line choice connector frame wired for two line choice connector circuits and ten markers

	<u>Wire</u>	<u>Equip</u>	<u>See Note</u>
Framework, ED-25287-01, G1		1	
Fuse Panel, ED-25025-01, Item 16		1	
Jack, Key, and Lamp Panel ED-25021-01, Item 10		1	
Line Choice Conn. Ckt., SD-25275-01:			
Marker Lockout and Control, Fig. 10	2	0	5.02
Marker Preference Relay Transfer, Fig. 7	6	0	
Trouble Make-busy Relay, Fig. 8	4	0	
Marker Conn., Fig. 2 (Rel. Winding and Contact Protection Wiring Only)	20	0	5.04
Marker Preference Rels.:			
Fig. 2A	2	0	
Fig. 2B	16	0	
Fig. 2C	2	0	D
Misc. Ckt., SD-25291-01:			
Figs. 2, 3, 5, 6, 7, and 10	1	1	
Fig. 9	2	2	

List 2 - Framework, assembly, and equipment required in addition to list 1 for one line choice connector circuit equipped for three markers 0, 1, and 2

	<u>Equip</u>	<u>Note</u>
MC Rel. Mtg. Assem., ED-25022-01, Item 16	3	
Line Choice Conn. Ckt., SD-25275-01:		
Marker Lockout and Control, Fig. 10 (Less CH and TMB Lamps, TMB Jack, TR and AR Keys)	1	
Marker Connector, Fig. 2	3	C
Marker Preference Rel.: Fig. 2A	1	
Fig. 2B	2	
Trouble Make-busy Relay, Fig. 8	1	

List 3 - Equipment required in addition to lists 1 and 2 to equip a line choice connector for one additional marker

	<u>Equip</u>	<u>Note</u>
Marker Conn., SD-25275-01, Fig. 2	1	
Marker Preference Rel., SD-25275-01, Fig. 2B or 2C	1	D

List 4 - Wiring and equipment per SD-25275-01, Fig. 2 required in addition to lists 1, 2, and 3 for one marker (see notes A and B)

List 6 - Equipment required in addition to lists 1 and 2 for first line choice connector on frame

	<u>Equip</u>
Jack, Key, and Lamp Panel, ED-25021-01, Item 2	1
SD-25275-01, Fig. 10 (CH and TMB Lamps, TMB Jack, TR and AR Keys Only)	1
SD-25291-01, Fig. 7	1

List 7 - Equipment required in addition to lists 1 and 2 for second line choice connector on frame

	<u>Equip</u>
Jack, Key, and Lamp Panel, ED-25021-01, Item 2	1
SD-25275-01, Fig. 10 (CH and TMB Lamps, TMB Jack, TR and AR Keys Only)	1

List 8 - Equipment per SD-25275-01, Fig. 7 required in addition to List 6 or 7 when marker 3, 6, or 9 is equipped

List 9 - Equipment per SD-25275-01, Fig. 8 required in addition to list 6 or 7 when marker 6 is equipped

List 11 - Equipment per SD-25275-01, Fig. 9, and wiring per Figs. 2 and 8 required in addition to list 1 when connection to the line insulation test frame is required (see note E)

List 12 - Equipment per SD-25275-01, Fig. 11 and wiring per Fig. 2 required in addition to list 11 when terminating markers do not use junctor pattern relays (see note E)

Notes

A. List 4 consists of three multicontact relay-type terminal strips and the vertical local cable multiple to the corresponding relays below for one marker. In case one line choice connector only is equipped on the frame, the multiple wires shall be looped and not cut at the positions of the connector relays of the second connector circuit.

B. Each marker circuit has a single lead "TMB" from its (MCA) terminal strip to its (TMB) relay. These leads are included in the frame local cable and those for unequipped markers are doubled back in the highest horizontal arm below the (MC) terminal strips. When a marker is added this lead is loosened and run along the vertical arm to punching "11" of (MCA) terminal strip.

C. The horizontal bare wire strapping for the maximum of ten marker connectors shall be furnished as part of this list. When less than the full complement of marker connectors is equipped, this strapping shall be continued beyond the last unequipped positions and supported as illustrated in the wiring and cabling specification.

D. Fig. 2C shall be equipped only when marker 9 is required. When less than ten markers are provided 25B terminal punchings shall be equipped in the mounting plate position of the (MP) and (E) relays of Fig. 2C for terminating the loop leads designated "a" as covered by circuit note.

E. The relays per lists 11 and 12 are furnished per group of terminating markers and are located on a separate mounting plate near the top of LCC frame "0." List 12 is required only with marker groups not equipped with junctor pattern relays. The leads between the MCA, MCB, and MCC terminal strips of the marker assigned to work with the LIT frame and the LTL, 2, 3 relays shall be formed in with the switchboard cable leads by the installer on a job basis.

J27851B (AT&TCo Std.) - Line Choice Connector Frame - Capacity Six Markers

Equipment - ED-25288-01
Local Cable - ED-25289-01

List 1 - Framework, assembly, wiring, and common equipment for one line choice connector frame wired for two line choice connector circuits and six markers

	<u>Wire</u>	<u>Equip</u>	<u>See</u> <u>Note</u>
Framework, ED-25287-01, G2	1		
Fuse Panel, ED-25025-01, Item 15	1		
Jack, Key, and Lamp Panel, ED-25021-01, Item 1	1		
Line Choice Conn. Ckt., SD-25275-01:			
Marker Lockout and Control, Fig. 10	2	0	5.02
Marker Preference Relay Transfer, Fig. 7	2	0	
Trouble Make-busy Relay Fig. 8	2	0	
Marker Conn., Fig. 2 (Rel. Winding and Contact Protection Wiring Only)	12	0	5.04
Marker Preference Rel.:			
Fig. 2A	2	0	
Fig. 2B	8	0	
Fig. 2C	2	0	D
Misc. Ckt., SD-25291-01:			
Figs. 2, 3, 5, 6, 7, and 10	1	1	
Fig. 9	2	2	

List 2 - Framework, assembly, and equipment required in addition to list 1 for one line choice connector circuit equipped for three markers 0, 1, and 2

	<u>Equip</u>	<u>See</u> <u>Note</u>
MC Rel. Mtg. Assem., ED-25022-01, Item 17	3	
Line Choice Conn. Ckt., SD-25275-01:		
Marker Lockout and Control Fig. 10	1	
Marker Conn., Fig. 2	3	C
Marker Preference Rel.:		
Fig. 2A	1	
Fig. 2B	2	
Trouble Make-busy Relay, Fig. 8	1	

List 3 - Equipment required in addition to lists 1 and 2 to equip a line choice connector for one additional marker

	<u>Equip</u>	<u>Note</u>
Marker Conn., SD-25275-01, Fig. 2	1	
Marker Preference Rel. SD-25275-01, Fig. 2B or 2C	1	D

List 4 - Wiring and equipment per SD-25275-01, Fig. 2 required in addition to lists 1, 2, and 3 for one marker (see notes A and B)

List 6 - Equipment per SD-25275-01, Fig. 7 required in addition to lists 1, 2, 3, and 4 when marker 3 is equipped

List 8 - Equipment per SD-25275-01, Fig. 9 and 11, and wiring per Figs. 2 and 8 required in addition to list 1 when connection to line insulation test frame is required (see note E)

Notes

- A. List 4 consists of three multicontact relay-type terminal strips and the vertical local cable multiple to the corresponding relays below for one marker. In case one line choice connector only is equipped on the frame, the multiple wires shall be looped and not cut at the positions of the connector relays of the second connector circuit.
- B. Each marker circuit has a single lead "TMB" from its (MCA) terminal strip to its "TMB" relay. These leads are included in the frame local cable and those for unequipped markers are doubled back in the highest horizontal arm below the (MC) terminal strips. When a marker is added this lead is loosened and run along the vertical arm to punching "11" of (MCA) terminal strip.
- C. The horizontal bare wire strapping for the maximum of six marker connectors shall be furnished as part of this list. When less than the full complement of marker connectors are equipped, this strapping shall be continued beyond the last unequipped positions and supported as illustrated in the wiring and cabling specification.
- D. Fig. 2C shall be equipped only when marker 5 is required. When less than six markers are provided, 25A terminal punchings shall be equipped in the

mounting plate position of the (MP) and (E) relays of Fig. 2C for terminating the loop leads designated "a" as covered by circuit note.

- E. The relays per list 8 are furnished per group of terminating markers and are located on a separate mounting plate near the top of LCC frame 0. The leads between the MCA, MCB, and MCC terminal strips of the marker assigned to work with the LIT frame and the LT1, 2, and 3 relays shall be formed in with the switchboard cable leads by the installer on a job basis.

See
Equip Note

MC Relay Mtg. Assem., ED-25022-01, Item 3	1	
Line Choice Conn. Ckt., SD-25275-01:		
Juncor Conn., Fig. 3	10	A
Line Group Conn., Fig. 4	2	B

Notes

A. Each strip of relays has an associated (LJA) or (LJB) terminal strip on the rear. This terminal strip contains ten "M" punchings (0 to 9) and ten "J" punchings (0 to 9). The "M" (meaning marker side) punchings are connected to the ten "JA" or "JB" leads in the switchboard cable from the line choice connector frame, and the ten "J" (meaning juncor side) punchings are wired to the windings of the (LJA) or (LJB) relays. Cross connections between these punchings are made as indicated on the line juncor assignment chart for the size of office involved. The punchings are alternated "M" and "J" instead of being segregated on different halves of the terminal strip because, in most central offices, a large majority of cross connections will be made directly, that is, 0 to 0, 1 to 1, etc., and the alternate positions afford a large number of direct straps between adjacent punchings.

B. Beside the juncor connector relays mentioned in the list titles, each strip of (LJ) relays has in addition two 40-contact relays, (CR) and (CE), which serve to cut several leads (individual to the line link frame) into common leads to the marker connector relays. For assurance of continuity, each lead connects to parallel sets of contacts on two separate relay structures, the windings of which are also connected in parallel by the operation of the (MCB) relay. As shown on the cabling diagram, the leads in the switchboard cable from the line choice connector frame connect to the lower half of the (CR) terminal strip, designated (CR)A which is strapped across the (CR)A and (CE)A relays, which serve the first line link frame (LLA) of the choice. On the front of the frame, a local cable multiple takes these leads to the top half of the same terminal strip, (CR)B, thence to the unit above, multiplying to terminal strips (CR)C and (CR)D. Each terminal strip is strapped to its corresponding (CR) and (CE) relays. On the individual contact side of the relays, the multiple is made in local cable, connected in the shop to the (CE) relay, but left open at the (CR) relay because switchboard cable connections must be made to the same

J27851C (AT&TCo Std.) - Line Juncor Connector Frame

Equipment - ED-25303-01
Local Cable - ED-25319-01

List 1 - Framework, assembly, wiring, and common equipment for one line choice connector frame wired for four line juncor connectors

	Wire	Equip	See Note
Framework, ED-25304-01, G1 Jack, Key, and Lamp Panel, ED-25021-01, Item 10 Line Choice Conn. Ckt., SD-25275-01:			1
Juncor Conn., Fig. 3 (Rel. Winding and Contact Protection Wiring Only)	80	0	C 5.06
Line Group Conn., Fig. 4 (Local Cable Wiring Only)	16	0	D
Line Subgroup Check Ckt., Fig. 5	4	0	
Misc. Ckt., SD-25290-01: Figs. 1, 2, 3, and 5	1	1	

List 3 - Framework, assembly, and equipment required in addition to list 1 for one line juncor connector circuit for half line choice A

	Equip	See Note
MC Relay Mtg. Assem., ED-25022-01, Item 3	1	
Line Choice Conn. Ckt., SD-25275-01:		
Juncor Conn., Fig. 3	10	A
Line Group Conn., Fig. 4	2	B
Line Subgroup Check Ckt., Fig. 5	1	

List 4 - Framework, assembly, and equipment required in addition to lists 1 and 3 for one line juncor connector circuit for half line choice B

springs. Three leads from each relay to the traffic register circuit present no peculiarities, and are handled as shown on the cabling diagram.

- C. The (LJA) relays are wired to half-choice A (line link frames A and B). O (LJA) relay connects to the vertical file consisting of the ten, O line junctor verticals of line link secondary switches 0 to 9, 1 (LJA) relay to vertical file 1, etc., up to 9 (LJA) relay to vertical file 9. The 0 to 9 "HM" leads marked "to even half of half-choice" connect to line link frame A, the others to line link frame B, and the 0 to 9 "LJ" leads connect to line link frame B and multiple to corresponding vertical files on line link frame A. The corresponding connections are made from (LJB) relays to half-choice B (line link frames C and D).
- D. Strap the "CN" punching of all Figs. 4 serving coin line link frames to ground on miscellaneous punching 30.

5. GENERAL NOTES

Equipment

5.01 In general, a minimum of two LCC frames should be provided per group of terminating markers, thereby distributing the LC connectors over a minimum of four 20-ampere frame fuses. This requirement is less important for LJC frames since these are fused at the LCC frames. The LC connectors on a given frame are always associated with the same group of terminating markers. LJ connectors on the same frame, however, may be associated with two marker groups. For example, two terminating groups of ten line choices each would require two and one half LJC frames per group or a total of five frames.

5.02 Marker lockout and control circuit per Fig. 10 of SD-25275-01 includes provision for the release of alarms from a distant point that may come in while the emergency marker preference relays are in use. With the earlier arrangement per Fig. 6 of SD-25275-01, it was necessary that all LCC frames be operating on the regular marker preference relay chain, since an alarm caused by the emergency preference chain could not be released from the distant point.

Wiring

Local

5.03 No. 24 gauge type "C" wire shall be used for all local cable leads, except battery and ground distributing leads which shall be No. 22 type "C" wire.

5.04 Certain leads, as specified in the circuit notes, are "loop-wired" - i.e., a lead is run from a starting point to various pieces of apparatus and then back to the starting point, to insure operation if one open occurs in the circuit. The cross connections on SD-25275-01 indicate how such leads are to be run, particularly when such loops must be extended between frames.

Cabling

5.05 The marker multiple to the multicontact relays on each line choice frame is run in switchboard cable, only to the end of each line, and is extended from frame to frame within the line by local cable on the front of the frame. The local cable drawing covers this, and the general switchboard cabling drawing indicates variations introduced by growth.

5.06 The code numbers of the switchboard cables ordinarily used on the line choice connector frame are shown on the switchboard cabling drawing. The circuits should, however, be checked to insure that the proper codes are specified to meet the latest circuit requirements. The cross-connecting information on the circuit shows what groups of leads are to be combined in the same cables.

5.07 The schematic of cable runs to terminating markers is shown on the general switchboard cable drawing for the line choice connector frame.

Switchboard Power Cabling

5.08 Switchboard power cables containing the miscellaneous wiring from the centralized DPTS and SDPTS shall be run under the cable rack for each row of frames. At each frame the cables shall be looped at the miscellaneous terminal strips and connected as required.

5.09 The cabling between the DPTS and SDPTS and the points of termination of the various circuits shall be run in the largest switchboard cables consistent with the grouping of leads and the point of termination.

List of "A&M Only" and "Mfr. Disc." Equipment

5.10 The following equipment has been replaced as indicated:

<u>Equipment</u>	<u>Rating</u>	<u>Covered in Iss.</u>	<u>Replacing Equipment</u>
J27851A,L5	Mfr. Disc.	3	-
J27851A,L10	Mfr. Disc.	3	-
J27851B,L5	Mfr. Disc.	3	-
J27851B,L7	Mfr. Disc.	3	-
J27851B,L9	Mfr. Disc.	4	-
J27851C,L2	Mfr. Disc.	2	J27851C, L3 & 4

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