15D "A" SWITCHBOARD EQUIPMENT DESIGN REQUIREMENTS NO. 1 CROSSBAR AND PANEL SYSTEMS

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 manufacture and installation of the A switchboard for No. 1 crossbar and panel offices.

1.02 This specification is reissued to incorporate previous appendix changes.

CAPACITY

1.03 The keyshelf equipment for special service positions is 12 regular cords and 2 recording completing cords. (See note B.) The multiple capacities are as follows.

Maximum Face Equipment Combinations			
	Final Terminals	Trunks	
Swdb	No. Checking, 8-pan. Mult	OGT, 6-pan. Mult	Ans Jk, 8-pan. Mult
7-ft 8-1/2 In. Height, 35-1/2 In. Jk Opening	20,000	1680	400
	30,000	720	400
	40,000	360	400
6-ft 2-in. Height, 24-1/2 In. Jk Opening		1680	400

Notes

A. The face equipment capacities given are for special service positions.

B. Positions are available having 12-cord capacity with Calculagraph shelves.

DESCRIPTION

12-cord Capacity Positions

1.04 The No. 15D A switchboard covered by this specification is for use in crossbar and panel dial central offices for handling A board toll, assistance calls, and other types of service which for various reasons are not handled entirely on a mechanical basis. It is also for use as a central A board.

1.05 To cite an example, a call reaches the operator over a trunk circuit selected by the usual dial originating equipment and terminated in an answering jack and lamp in the switchboard. The call is answered with the answering end of a cord, and is completed:

(a) By plugging the calling end into a straightforward trunk to a B board and passing the called number verbally to the B operator, or

(b) By plugging into a trunk circuit associated with dial completing equipment and obtaining the called number by keypulsing (or dialing, on dialing boards).

1.06 The keypulsing positions may be arranged for keypulsing on the answering cord as well as on the calling cord to facilitate calling back the calling subscriber or delayed calls. In any case, busy tests may be made with the answering cord. These features of the answering cord and the addition of cord splitting arrangements are among the things which distinguish this switchboard from the No. 15C A switchboard.

1.07 As further aids in handling toll traffic, the No. 15D A switchboard provides Calculagraph shelves, narrow ticket boxes between cord circuit keys, and greater distance between operators.

1.08 Where all originating traffic requiring toll tickets is handled by the DSA board, the completion of calls to points beyond the scope of A board toll is handled through trunks to a toll tandem board at the nearest toll center.

1.09 Where long-haul toll calls are not handled directly by the DSA board, recording completing cords are furnished. These are for the pupose of connecting to the regular outward toll operator at the toll center, those calls which have come to the DSA board by the subscriber dialing "0" instead of the prescribed toll code 211.

1.10 Special Service Position: The positions handling the type of calls

briefly referred to in 1.05 through 1.09 comprise the larger portion of a switchboard line-up, and are special service positions. They are arranged for a maximum of 12 special service cords and 2 recording completing cords, together with the necessary common position keys. The chief optional features are flashing recall, coin control, key-pulsing on the calling cord or on both calling and answering cords, crossbar office number checking, positional cord splitting, grounded supervision, and master ringback and ring forward keys as required for individual and party line offices. These positions have their cords on 1-3/32 inch centers with 1/4-inch ticket boxes between the cord keys. Calculagraph shelves are furnished between pairs of positions, one Calculagraph serving two operators. The cord circuit relay apparatus together with 24- and 48-volt fuses are located in the rear of the section. The keyset and cord splitting relays are relay rack mounted.

1.11 Section Framework: The section frameworks of the separate upper and lower unit type may be had in two different overall heights, 7 feet 8-1/2 inches for those boards having checking multiple initially or ultimately, and 6 feet 2 inches for others. In either case, the keyshelf height is 40 inches. The former has a jack opening of 35-1/2 inches, and the latter, 24-1/8 inches. Unlike sections previously used for DSA boards, the positions cover three panels of face equipment. Both heights of upper sections are available in a 9-panel length, and the section 6 feet 2 inches in height is available in a 3-panel length so that a switchboard of any number of positions,not necessarily a multiple of three, may be provided. The dimensions of the larger section are such that it may be lined up with any existing DSA boards other than the semimechanical board.

SUBDIVISIONS OF EQUIPMENT AND DETAILED INDEX

Framework

ED-90628-30 - End Panel, 7-foot 8-1/3 Inch Height
ED-90638-31 - Large Cable Turning Section, 7-foot 8-1/2 Inch Height
ED-90645-03 - Angle Section, 7-foot 8-1/2 Inch Height
ED-90651-71 - 9-panel Upper Unit, 7-foot 8-1/2 Inch Height
ED-90739-31 - Small Cable Turning Section, 7-foot 8-1/2 Inch Height
ED-90794-30 - Small Cable Turning Section, 6-foot 2-inch Height
ED-90795-30 - End Panel, 6-foot 2-inch Height
ED-91008-70 - Cable Turning Section Mounting Details
ED-91338-71 - 3-panel Upper Unit, 6-foot 2-inch Height
ED-91340-71 - 9-inch Upper Unit, 6-foot 2-inch Height
ED-91348-70 - Cable Brackets and Pin Supports
ED-91349-71 - End of Line-up Details, 6-foot 2-inch Height
ED-91366-70 - Ground Bus Bar
ED-91373-71 - Calculagraph Shelf
ED-91381-71 - End of Line-up Details, 7-foot 8-1/2 Inch Height

Twelve-cord Position Units

J91103H (A&M Only) - Special Service Position

2. SUPPLEMENTARY INFORMATION

815-000-000 - Panel Systems Index
816-000-000 - No. 1 Crossbar System Index
AA128.006 - List of General Equipment Requirements Sections
816-007-181 - Performance Requirements, Crossbar Offices
J21301 - Call Distributing B Switchboard
J23052 (816-026-150) - Crossbar System - Relay Rack Equipment
J91101 (815-075-151, 816-028-151) - Relay Rack Equipment for 15C and 15D A Switchboards
J91501 - 8-1/2 Inch Panel Switchboard Sections
X-61400 - List of Engineering Requirements Specifications, Panel Offices
Floor Plan Data
Section 7.2
Sheet 34 - 9-panel Section, 7-foot 8-1/2 Inch Height
Sheet 43 - 9-panel Section, 6-foot 2-inch Height
Sheet 44 - 3-panel Section, 6-foot 2-inch Height
Section 7.3
Sheet 2 - Angle Section, 7-foot 8-1/2 Inch Height

3. DRAWINGS

WECo J drawings should be ordered by referring to the prefix and base number and requesting the current dash (-) number.

Keysheets

SD-21300-01 - Panel Offices
SD-25000-01 - Crossbar Offices

Framework

ED-90628-30 - End Panel Assembly (High)
ED-90638-01 - Cable Turning Section Assembly (Large, High)
ED-90645-33 - Angle Section Assembly, 30 Degrees (High)
ED-90651-71 - Upper Unit Assembly (High, 9-panel)
ED-90652-71 - Upper Unit Iron Framework (High, 9-panel)
ED-90660-10 - Portable Writing Shelf Assembly
ED-90739-31 - Cable Turning Section Assembly (Small, High)

ED-90794-30 - Cable Turning Section Assembly (Small, Low)
ED-90795-30 - End Panel Assembly (Low)
ED-91008-70 - Cable Turning Section Mounting Details
ED-91336-70 - Cord Protection Panel Assembly
ED-91338-71 - Upper Unit Assembly (Low, 3-panel)
ED-91339-71 - Upper Unit Iron Framework (Low, 3-panel)
ED-91340-71 - Upper Unit Assembly (Low, 9-panel)
ED-91341-71 - Upper Unit Iron Framework (Low, 9-panel)
ED-91348-70 - Cable Pin Supports
ED-91349-71 - End of Line-up Details (Low)
ED-91366-70 - Ground Bus Bar
ED-91373-71 - Calculagraph Shelf Assembly
ED-91381-71 - End of Line-up Details (High)

Equipment

J91103H-( ) - Special Service Position
ED-91007-10 - Cable Turning Section Equipment
ED-91310-31 - Filter Panel
ED-91387-01 - Front Equipment, 6-foot 2-inch Height Section
ED-91388-01 - Front Equipment, 7-foot 8-1/2 Inch Height Section
ED-91390-10 - Roof Equipment and Cable
ED-91391-01 - Front Equipment Details

Wiring and Cabling

ED-90738-01 - Checking Multiple Cable
ED-91375-01 - Position Local Cable
ED-91396-01 - Position Local Cable Supports and Protection Details

4. EQUIPMENT

Framework

ED-90628-30 - End Panel

Group 3 - End panel for 1-foot 4-3/8 inch keyshelf, 7-foot 8-1/2 inch height.

ED-90638-31 - Cable Turning Section - Large 7-foot 8-1/2 Inch Height

Group 7 - Cable turning section for right end of switchboard.

Group 8 - Cable turning section for left end of switchboard.

ED-90645-33 - Angle Section - 30 Degrees, 7-foot 8-1/2 Inch Height

Group 6 - One angle section for use with 1-foot 4-3/8 inch keyshelf

Group 8 - One multiple shelf.

Group 13 - One upper multiple shelf.

Group 14 - One lower multiple shelf.

ED-90651-71 - 9-panel Upper Unit 7-foot 8-1/2 Inch Height

Group 1 - One upper unit without multiple shelf.

Group 3 - One lower multiple shelf.

ED-90739-31 - Cable Turning Section - Small 7-foot 8-1/2 Inch Height

Group 5 - Cable turning section for right end of switchboard.

Group 6 - Cable turning section for left end of switchboard.

ED-90794-30 - Cable Turning Section - Small 6-foot 2-inch Height

Group 5 - Cable turning section for right end of switchboard.

Group 6 - Cable turning section for left end of switchboard.

ED-90795-30 - End Panel

Group 3 - End panels for 1-foot 4-3/8 inch keyshelf - 6-foot 2-inch height.

ED-91008-70 - Cable Turning Section Mounting Details

Group 3 - Filter panel mounting details and cable lugs, left-to-right growth.

Group 4 - Filter panel mounting details and cable lugs, right-to-left growth.

Group 5 - Terminal strip mounting and ground bar details, left-to-right growth.

Group 6 - Terminal strip mounting and ground bar details, right-to-left growth.

Group 7 - Terminal strip mounting and ground bar details, left-to-right growth.

Group 8 - Terminal strip mounting and ground bar details, right-to-left growth.

ED-91338-71 - 3-panel, Upper Unit - 6-foot 2-inch Height

Group 1 - One upper unit without multiple shelf.

ED-91340-71 - 9-panel Upper Unit - 6-foot 2-inch Height

Group 1 - One upper unit without multiple shelf.

ED-91348-70 - Cable Brackets and Pin Supports

Group 1 - Cable pin supports, 2-panel, 6-foot 2-inch height.

Group 2 - Cable pin supports, 9-panel, 6-foot 2-inch height.

Group 6 - Cable pin supports, 9-panel, 7-foot 8-1/2 inch height.

Group 7 - Cable pin supports, angle section, 7-foot 8-1/2 inch height.

Group 8 - Cable brackets, 2 pin; 3-panel section.

Group 9 - Cable brackets, 3 pin; 3-panel section.

Group 10 - Cable brackets, 4 pin; 3-panel section.

Group 14 - Cable brackets, 2 pin; 9-panel section.

Group 15 - Cable brackets, 3 pin; 9-panel section.

Group 16 - Cable brackets, 4 pin; 9-panel section.

Group 17 - Cable brackets, 2 pin; angle section.

Group 18 - Cable brackets, 3 pin; angle section.

Group 19 - Cable brackets, 4 pin; angle section.

ED-91349-71 - End of Line-up Details, 6-foot 2-inch Height

Group 1 - End of line-up details without multiple shelf details.

Group 2 - Multiple shelf details.

ED-91366-70 - Ground Bus Bar

Group 1 - Ground bus bar and junction, 3-panel section.

Group 3 - Ground bus bar and junction, 9-panel section.

Group 4 - Terminal for end connection.

Group 5 - Ground bus bar and junction for angle section.

Group 22 - Ground bus bar for one 3-panel lower unit.

Group 23 - Ground bus bar for three 9-panel lower units.

Group 24 - Junction for end of line-up of lower units.

Group 25 - Junction for 30-degree angle section.

ED-91373-71 - Calculagraph Shelf

Group 1 - One Calculagraph shelf for Calculagraph.

Group 3 - One blank Calculagraph shelf.

Group 4 - One half Calculagraph shelf.

Group 19 - One shelf for KS-14156 switchboard position clock without bulletin holder for use with 1-foot 4-3/8 inch keyshelf.

ED-91381-71 - End of Line-up Details - 7-foot 8-1/2 Inch Height

Group 1 - End of line-up details without multiple shelf details.

Group 2 - For lower multiple shelf only.

Group 3 - For switchboard without multiple shelves.

J91103H (A&M Only) - Twelve-cord Special Service Position

Lower Unit Equipment - J91103H-( )
Local Cable - ED-91375-01

List 1 - Framework, assembly, wiring, and common equipment for one special service position lower unit.

	Wire	Equip	See Notes
Special Serv Cord Ckts, SD-96130-01, Fig. 1, 2, A, & B, "Y" Option	12	0	
Rec Com Cord Ckt, SD-90452-01, Fig. 1	2	0	
Opr Tel Ckt, SD-96151-01, Fig. 1, 2, A, & C	1	1	
Flashing Recall Ckt, SD-90458-01, Fig. 1 & 2, "Z" Option	1	0	
Key Set Ckt, SD-96133-01, Fig. 3 & 5, "H" & "K" Options	1	0	A
Cord Splitting Ckt, SD-96132-01, Fig. 2	1	0	
Master Ring, Key Ckt, SD-90586-01, Fig. 1, 3, & 7	1	0	
Aux Sig Ckt Line & Trk Rel, SD-90464-01, Fig. 3	6	0	
Aux Sig Ckt Line & Trk Pilot Lamps, SD-90464-01, Fig. 5	3	0	
Aux Sig Ckt Coin Cont Pilot Lamp, SD-90464-01, Fig. 6	1	0	
Coin Cont Ckt, SD-90459-01, Fig. 1 & B	1	0	

	Wire	Equip	See Notes
Number Checking Pos Ckt, SD-25253-01, Fig. 4	6	0	
Number Checking Pos Ckt, SD-25253-01, Fig. 3	1	0	
Supervisor's Tel Ckt Jacks, SD-96163-01, Fig. 5 & 7	1	0	
Calculagraph Ckt, SD-95012-01, Fig. 1	1	0	
Clock Ckt, SD-90409-01, Fig. A	1	0	
Fuse Alarm Ckt, SD-96153-01, Fig. 1	1	1	
Dial Ckt, SD-96232-01, Fig. 1	1	0	A
MF Keyset Ckt (Opr Tr Pos), SD-95429-01, Fig. 3, 4,& B	1	0	A
MF Keyset Ckt (Reg Pos), SD-95423-01, Fig. 3 & 4	1	0	A
Comb. DC & MF Keyset Ckt (Opr Tr Pos), SD-96438-01, Fig. 3 & 5	1	0	A
Comb. DC & MF Keyset Ckt (Reg Pos), SD-95416-01, Fig. 3 & 5	1	0	A
Centralized Supervisors Jack and Key Ckt, SD-95980-01, Fig. 1	1	0	

List 2 - Equipment required in addition to list 1 for one coin control circuit per SD-90459-01, Fig. 1, "X" apparatus.

List 3 - Equipment required in addition to list 1 for one flashing recall circuit per SD-90458-01, Fig. 1.

List 4 - Equipment required in addition to list 1 and 10 or 11 for keypulsing on calling cords only, and with start key operation, per SD-96133-01, Fig. 5, "C" apparatus.

List 5 - Equipment required in addition to list 1 and 10 or 11 for keypulsing on calling cords only, and without start key operation per SD-96133-01, Fig. 5, "D" apparatus.

List 6 - Equipment required in addition to list 1 and 10 or 11 for keypulsing on both cords, and with start key operation per SD-96133-01, Fig. 5, "F" and "S" apparatus.

List 7 - Equipment required in addition to list 1 and 10 or 11 for keypulsing on both cords, and without start key operation per SD-96133-01, Fig. 5, "E" and "S" apparatus.

List 8 - Equipment required in addition to lists 1 and 4, 5, 6 or 7 for crossbar number checking

	Equip
Keyset Ckt, SD-96133-01, Fig. 5, "K" Option	1
Number Checking Pos Ckt, SD-25253-01:	
Fig. 3	1
Fig. 4	6

List 9 - Wiring required in addition to list 4, 5, 6, or 7 in keyset circuit when crossbar number checking is not equipped per SD-96133-01, Fig. 5, "H" wiring.

List 10 - Equipment required in addition to lists 1 and 4, 5, 6 or 7 for keyset having letters for office codes per SD-96133-01, Fig. 3, "A" apparatus.

List 12 - Equipment required in addition to list 1 for one auxiliary signal circuit line and trunk relay per SD-90464-01, Fig. 3.

List 13 - Equipment required in addition to list 1 for supervisor's section telephone jacks per SD-96163-01, Fig. 10.

List 14 - Equipment required in addition to list 1 for master ringback key, individual line office, per SD-90586-01, Fig. 1, "B" apparatus.

List 15 - Equipment required in addition to list 1 for master ringback keys, 2-party selective or 4-party semiselective office, per SD-90586-01, Fig. 3, "B" apparatus.

List 17 - Equipment required in addition to list 1 for master ringback and ringforward keys, 4-party selective office, per SD-90586-01, Fig. 7, "B" apparatus.

List 19 - Equipment required in addition to list 1 for one cord splitting circuit per SD-96132-01, Fig. 2.

List 20 - Equipment required in addition to list 1 for telephone circuit features for combined panel and crossbar offices per SD-96151-01, Fig. A.

List 21 - Equipment required in addition to list 1 for telephone circuit features for crossbar offices per SD-96151-01, Fig. C.

List 22 - Equipment required in addition to list 1 for supervisor's section telephone jacks for combined A and B division per SD-96193-01, Fig. 5.

List 23 - Equipment required in addition to lists 1 and 22 for combined A and B supervisor's division position key equipment per SD-96193-01, Fig. 7.

List 24 - Unassigned

List 25 - Mounting plate required in addition to list 1 when cord circuits 11 or 12 are equipped.

List 26 - Mounting plate required in addition to list 1 when either or both lists 39 and 43 is furnished.

List 27 - Mounting plate required in addition to list 1 when cord circuits are arranged for grounded supervision.

List 28 - Equipment required in addition to lists 1 and 13 for one supervisor's division position key equipment per SD-96163-01, Fig. 7.

List 29 - Equipment required in addition to lists 1 and 4, 5, 6, 7, 55 or 56 for crossbar number checking (two offices ultimate) per SD-95416-01, Fig. 5, SD-96438-01, Fig. 5, or SD-96133-01, Fig. 5 and SD-25253-01, Fig. 3 and 6, "A" apparatus.

List 30 - Equipment required in addition to lists 1 and 4, 5, 6, 7, 55 or 56 for KP lower unit for crossbar number checking (more than two offices ultimate) per SD-95416-01, Fig. 5, SD-96438-01, Fig. 5, or SD-96133-01, Fig. 5 and SD-25253-01, Fig. 3 and 6, "C" apparatus.

List 31 - Equipment required in addition to list 1 for one special service cord circuit less key and repeating coil (cords 1 to 10) per SD-96130-01, Fig. 1 and 2.

List 32 - Equipment required in addition to list 1 for one special service cord circuit less key and repeating coil (cords 11 and 12) per SD-96130-01, Fig. 1 and 2.

List 33 - Equipment required in addition to list 31 or 32 for coin key for one special service cord circuit per SD-96130-01, Fig. 1, "U" apparatus.

List 34 - Equipment required in addition to list 31 or 32 for noncoin key for one special service cord circuit per SD-96130-01, Fig. 1, "V" apparatus.

List 35 - Equipment required in addition to list 31 for coin relay for one special service cord circuit (cords 1 to 10) per SD-96130-01, Fig. 2, "T" apparatus.

List 36 - Equipment required in addition to list 32 for coin relay for one special service cord circuit (cords 11 and 12) per SD-96130-01, Fig. 2, "T" apparatus.

List 37 - Equipment required in addition to list 31 or 32 for metallic supervision for one special service cord circuit per SD-96130-01, Fig. A.

List 38 - Equipment required in addition to list 31 or 32 for gronded supervision for one special service cord circuit per SD-96130-01, Fig. B.

List 39 - Equipment required in addition to list 31 for flashing recall for one special service cord circuit (cords 1 to 10) per SD-96130-01, Fig. 2, "B" apparatus.

List 40 - Equipment required in addition to list 32 for flashing recall for one special service cord circuit (cords 11 and 12) per SD-96130-01, Fig. 2, "B" apparatus.

List 41 - Equipment required in addition to list 31 for keypulsing on both cords for one special service cord circuit (cords 1 to 10) per SD-96130-01, Fig. 2, "S" apparatus.

List 42 - Equipment required in addition to list 32 for keypulsing on both cords for one special service cord circuit (cords 11 and 12) per SD-96130-01, Fig. 2, "S" apparatus.

List 43 - Equipment required in addition to list 31 or 32 for crossbar number checking for one special service cord circuit per SD-96130-01, Fig. 2, "Y" option.

List 44 - Equipment required in addition to list 31 or 32 for 120C repeating coil for one cord circuit per SD-96130-01, Fig. 2, "C" apparatus.

List 45 - Equipment required in addition to list 31 or 32 for 120D repeating coil for one cord circuit per SD-96130-01, Fig. 2, "D" apparatus.

List 46 - Equipment required in addition to list 31 or 32 for 94E repeating coil for one cord circuit per SD-96130-01, Fig. 2, "E" apparatus.

List 47 - Equipment required in addition to list 31 or 32 for 94F repeating coil for one cord circuit per SD-96130-01, Fig. 2, "F" apparatus.

List 48 - Equipment required in addition to list 1 for one recording completing cord circuit (keyshelf apparatus) per SD-90452-01, Fig. 1, "B" apparatus.

List 49 - Unassigned

List 50 - Equipment required in addition to list 1 forfuse panel for use with bus bar battery and ground feeders.

List 51 - Equipment required in addition to list 1 for first recording completing cord for lower unit arranged for dialing per SD-90452-01, Fig. 1,. "A" apparatus.

List 52 - Equipment required in addition to list 60 or 61 for 750J mounting plate when list 41 is specified.

List 53 - Equipment required in addition to list 1 for combined DC and MF keypulsing digit key circuit (regular position) per SD-95416-01, Fig. 3.

List 54 - Equipment required in addition to list 1 for combined DC and MF keypulsing digit key circuit (operator training position) per SD-96438-01, Fig. 3.

List 55 - Equipment required in addition to list 53, 54, 57, or 58 for connecting key and lamp circuit when keypulsing is required on calling cord only per SD-95416-01, Fig. 5, "Y" apparatus, SD-96438-01, Fig. 5, "Y" apparatus less 'T key and lamp, SD-95423-01, Fig. 3, "Y" apparatus, or SD-95429-01, Fig. 3 and B, "Y" apparatus less T key and lamp.

List 56 - Equipment required in addition to list 53, 54, 57, or 58 for connecting key and lamp circuit when keypulsing is required on both cords, or in addition to list 53 or 54 when combined DC and MF keypulsing is required on the calling cord and DC keypulsing on the anwering cord per SD-95416-01, Fig. 5, "U" and "S" apparatus, SD-96438-01, Fig. 5, "U" and "S" apparatus less T lamp and key, SD-95423-01, Fig. 3, "Z" apparatus, or SD-95429-01, Fig. 3 and B, "Z" apparatus less T lamp and key.

List 57 - Equipment required in addition to list 1 for MF keyset digit key circuit (regular position) per SD-95423-01, Fig. 4.

List 58 - Equipment required in addition to list 1 for MF keyset digit circuit (operator training position) per SD-95429-01, Fig. 4.

List 59 - Unassigned

List 60 - Equipment required in addition to list 1 for dialing lower unit with low speed dial per SD-96232-01, Fig. 4, "Y" and "T" apparatus.

List 61 - Equipment required in addition to list 1 for dialing lower unit with high speed dial per SD-96232-01, Fig. 4, "Z" and "T" apparatus.

List 62 - Equipment required in addition to lists 1 and 60 or 61 for 2-way cord splitting for lower unit arranged for dialing per SD-96132-01, Fig. 2, "U" apparatus and SD-96232-01, Fig. 4, "S" apparatus.

List 63 - Equipment per SD-95980-01, Fig. 1 required in addition to list 1 for centralized supervisors jack and key circuit. (See note B.)

Note

A. The wiring for the particular keyset or dial circuit, as specified, is provided in the local cable, and those not required are omitted.

B. Centralized supervisors jack and key circuit used a maximum of four times per line-up as required. Equipment is in place of supervisors telephone jacks.

Miscellaneous Equipment

4.01 The following list covers miscellaneous A switchboard circuits and associated equipment drawings not otherwise covered in this specification.

Circuits	Title	Equipments
SD-90467-01	Outgoing Trunk Jacks	ED-91387-01, ED-91388-01
SD-90468-01	Answering Jacks and Lamps	ED-91387-01, ED-91388-01
SD-96033-01, Fig. 5	Indicator Control Circuit	ED-91007-01
SD-96153-01	Fuse Alarm Lamp	ED-91007-01, ED-91390-01
SD-96470-01	Night Transfer Circuit	ED-91007-01, ED-91530-01
SD-80550-01	Calculagraph Power Supply	ED-91390-01

5. GENERAL NOTES

5.01 The upper section frameworks listed herein provide 9-foot 8-1/2 inch panel, 2-position sections in either 7-foot 8-1/2 inch height or 6-foot 2-inch height, and a 3-foot 8-1/2 inch panel, single-position section in the 6-foot 2-inch height. The choice of section height to be used is determined primarily by the amount of face equipment. In general, switchboards which do not have number checking multiple initially or ultimately will use the 6-foot 2-inch height section, and switchboards having number checking multiple will use the 7-foot 8-1/2 inch height section. The 3-panel single-position upper section will be used for the last one or two positions of line-ups not having a multiple of three positions. The arrangement of multiple shelf and cable pin supports is covered on the switchboard cabling drawings.

5.02 The keyshelves for the 12-cord positions listed herein are shorter than the 3-panel position length by half the width of a Calculagraph shelf. This shelf is put in place between pairs of positions at the time of installation. Where the layout of the board requires it, a half Calculgraph shelf may be furnished at the beginning or end of the line of Calculagraph positions. In boards for which Calculagraphs are not specified, position clocks may be mounted on the Calculagraph shelves.

5.03 Relay rack equipment associated with this switchboard is covered in J91101 and J23050.

5.04 The supervisor's telephone circuit, coils, condensers, and relays are located on relay rack units. The supervisor's jacks are wired for in every position, and equipped in the middle position of each section. The supervisor's division usually consists of three sections or nine positions. One section in excess of a multiple of three may be associated with the last division circuit. For a supervisor's division containing call distributing B equipment, one combined A and B circuit will be furnished.

5.05 In boards with position clocks, the clock groups are formed so that adjacent clocks are not in the same group. The group keys are located in the cable turning section key panel, and the relays are located on the relay rack. Master and secondary clock transfer keys are also located in the cable turning section, except in offices having zone and overtime registration where the transfer keys are located on a key panel on the relay rack.

5.06 The cords used in this switchboard are 6 feet in length, with colors as covered on the position lower unit equipment drawings. The cord weights are No. 119.

Switchboard Power Arrangements

5.07 A fuse panel is provided in each A position for the 48-volt talking battery fuses and talking ground, and 24-volt signal battery fuses and signal ground for the cord and position circuits mounted in the switchboard. The keyset circuit fuses are located on the miscellaneous fuse board serving the keypulsing senders because of circuit limitations.

5.08 In new panel offices with extended loops, and in crossbar offices, the 48-volt talking battery filter serving the entire A board line-up is mounted in the cable turning section. One 50-ampere capacity filter panel is furnished for a switchboard having 30 or less special service positions. Two 0000-gauge standard cables for 48-volt talking battery and talking ground are run from the filter panel through the switchboard at the top of the position rear equipment and tapped at each fuse panel by means of lugs furnished with the fuse panel. The talking ground is insulated from the section framework, except at the filter. One 0000-gauge standed cable for 24-volt signal battery is run through the switchboard on the cable rack at the bottom of the rear equipment, and tapped at each position by a No. 6 gauge solid conductor connected to the fuse panel by means of a lug furnished with the fuse panel. Signal ground is supplied through a copper bus bar mounted on the fuse panel supports at the top of the lower section framework.

5.09 A fuse alarm circuit, associated with the fuse panel in each position and the filter condenser fuses in the cable turning section, is connected to the office alarm equipment. The operation of either a 24- or 48-volt fuse causes a lamp in an indicator mounted on the face of the cable turning section and another in a lamp strip in the cable turning section key panel to light, and also causes the operation of a minor audible signal and a pilot lamp at the terminal room floor alarm cabinets. A lamp is provided in the cable turning section lamp strip for each position, as well as for the filter condenser fuses.

5.10 In boards equipped with ten or less Calculagraphs, one 0.05-kilowatt self-protecting transformer is furnished in the switchboard as a Calculagraph power supply as covered on SD-80550-01. In boards equipped with more than ten, a relay rack mounted power supply per SD-80610-01 will be used in common with multiple registration and overtime coin collection circuits.

Answering Jacks

5.11 Answering jacks associated with such circuits as sender supervisory,

district coin control supervisory, permanent signal holding trunks, plugging-up lines, trouble intercepting, link down drive, vacant incoming multiple trunks, vacant code intercepting trunks, verification request trunks, and other circuits appearing in the sender monitor intercepting portion of the switchboard are not ordinarily multipled. They are equipped from top down below the outgoing trunk multiple, and from bottom up above the outgoing trunk multiple. Monitoring jacks and other central office observing circuits appearing at the observing position are likewise not multipled. Answering jacks associated with intercepting trunks are often not multipled, but may be multipled to not more than four appearances. Answering jacks associated with trunks incoming to special service operators, manual subscriber lines, coin overtime, trunks from information desks, and toll number checking request trunks are arranged on an 8-panel regular multiple basis. Circuits in this classification are arranged to operate the answering lamps of eight multipled appearances. When the number of appearances exceeds eight, an additional lamp relay per trunk associated with the answering jack circuit is used to operate the lamps of the 9th through the 16th and the 17th through the 24th, as well as the 1st through the 8th appearances.

5.12 Code 6024 or 24L cables are used for cabling 10 per strip answering jacks. As shown on the switchboard cabling drawing, the regular multiple answering jack cables are run horizontally on cable pins.

Outgoing Trunk Multiple

5.13 Outgoing trunk multiple jacks are multipled on a 6-panel basis. Code 6016 or 16L cables are used between the outgoing trunk multiple and the distributing frame for all outgoing trunks not arranged for group busy lamps or for idle trunk indicating. Code 16C or 16L is used for short multiple.

Group Busy

5.14 When the outgoing trunks are equipped with group busy lamps, code 6070 or 70L cable is used for the jacks and lamps for the first 33 or less lamp appearances. 70C or 70L cable is used for short multiple. For longer line-ups where there are more than 33 multiple appearances of the outgoing trunk group busy lamps, the lamp leads to the 34th appearance are run in separate switchboard cables. The same is done at the 67th and 100th appearances, as required.

5.15 In order to obtain at least 20 volts at the last lamp in the outgoing trunk group busy lamp multiple, the total length of 22-gauge switchboard cable and jumper from the miscellaneous fuse board to the first appearance of lamps should not exceed values given in the following table. The figures are for offices having 23 cell batteries in which the miscellaneous fuse panel voltage is not under 24.50 volts except at power failure.

No. of 2J Lamps In Multiple	Max Feet of Cable
33	235
30	280
25	330
20	505
15	710
12	910

Idle Trunk Indicating

5.16 Idle trunk indicating arrangements provide a lamp per trunk in the face of the switchboard operated on ac supplied from transformers through the contacts of lamp relays. The contacts of these relays are cabled directly to the switchboard without cross-connection. These relays are controlled by idle trunk indicating relays which are cross-connected on the regular distributing frame at the same terminal strips as those carrying tip, ring, and sleeve conductors of the trunk. The idle trunk indicating relays are controlled either directly by the sleeve of the trunk or by other relays in trunk or selector circuits. The formation of indicating group chains is done on terminal strips on the idle trunk indicating relay rack unit.

5.17 As illustrated by SD-90468-01, Fig. 4, both terminals of the idle trunk indicating lamps are multipled through the board. Short multiple cable for the jacks and these lamps is code 239C or 239L, using 20 pairs for "T" and "R" leads, 20 pairs for lamps, and 20 singles for "S" leads. The last appearance of the 283A lamp socket mountings will be arranged to ground the lower terminals to the stile strips. The stile strips are grounded with a bus bar connected to the relay rack bay carrying the idle trunk indicating transformer unit. The ac supply from the contacts of the lamp relays to the top terminals of the first appearance of the lamp socket mountings is cabled with code 6074 or 74L cable (22 gauge), or code 6125 or 125L (19 gauge), depending upon the number of multiples and the distance from the switchboard to the lamp relay bay as listed in the table on drawing ED-96164-01. The "T", "R", and "S" leads to the first appearance are cabled from the distributing frame with code 6016 or 16L cable.

5.18 The table shown on drawing ED-96164-01 or ED-91696-01 is a guide to the selection of the transformer unit and the gauge of cable to the first appearance of idle trunk indicating lamps. The installer will adjust the connections to

the transformer taps to obtain approximately 4 volts across the terminals of the lamp or lamps nearest the middle of the multiple where the voltage is lowest. The other voltages are for information only. The maximum cable runs for the smaller number of multiple appearances is actually greater than the 700 feet stated, but the table is carried only to this probable maximum distance.

Checking Multiple

5.19 Checking multiple, when specified in panel offices, consists of 200-point test strips arranged in an 8-panel multiple above the outgoing trunks, growing from bottom up.

Night Transfer

5.20 In offices having more than one line-up of DSA board, it is sometimes desirable to abandon an entire line of board at night. Arrangements are available, through the use of transfer circuit SD-96470-01, whereby a key is provided in the cable turning section key panel of the switchboard which is to be abandoned. The operation of this key transfers the answering lamp signals of the trunks having appearance in the night board, and makes busy all trunks not transferred. Also, when required in panel offices, it provides a tone on the number checking trunks in the abandoned board to indicate to a toll operator that number checking is waived.

Emergency Access Lines

5.21 In certain communities, arrangements are desired whereby a subscriber may be connected to fire, police, or hospital lines, when these lines are busy, by dialing operator. Emergency access line circuits, SD-21710-01 for panel and SD-25140-01 for crossbar, may be connected in between these line circuits and the associated final terminals for this service. A jack and a key are provided for each of these emergency lines by which the operator can cut off a conversation on the busy line and connect in the calling subscriber. The front equipment drawings show the key and jack equipment, and the relay rack equipment is covered in J91101 and J23050.

Switchboard Cable Length Limitations

5.22 To obtain proper illumination of the idle trunk indicating or group busy lamps in the outgoing trunk multiple, the resistance of the lamp leads is limited by restrictions in length and gauge of cable in 5.15 and 5.17. For proper operation of the various circuits involved in keypulsing, the keypulsing "loop" resistance within the office is subject to the limitations set up in J20151.

Miscellaneous

5.23 The Calculagraph shelves associated with the 12-cord positions are mounted at the time of installation.

5.24 As covered on the wiring lists of the position equipment drawings, universal wiring is provied, where required, for optional features.

5.25 Wiring in the position local cables for equipment located in the piling block or face of the board is connected at time of installation.

5.26 When an incoming call circuit and test trunks are specified in a special service position, they will be covered in job specifications following the sender monitor and observing position drawings.

5.27 The 12-cord positions are equipped with 11B ticket holders and 10A ticket boxes for 2-1/2 inch by 5-inch tickets. When it is desired to use the small tickets in the 12-cord positions, the 11A ticket holders should be substituted for the 11B, and 105A adapters added for each ticket box. In either case, when the ticket holder is furnished, it extends over the edge of the keyshelf to the adjacent calculagraph or keyshelf. Therefore, in order to set the holder squarely across the two shelves, the installer shall file down the separation strip, as required, at the point of contact with the ticket holder.

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

The following equipment has been replaced as indicated. Where "A&M Only" items appear, the issue numbers shown are those of the issue in which the rating was first applied.

Equipment	Rating	Details Last Shown in Issue	Equipment
J91103A	Mfr Disc.	1	J91103H
J91103B	Mfr Disc.	1	J91103J
J91103C	Mfr Disc.	1	J91103K
J91103D	Mfr Disc.	1	J91103L
J91103E	Mfr Disc.	1	J91103M
J91103F	Mfr Disc.	1	J91103N
J91103G	Mfr Disc.	1	J91103P
J91103H,L11 L16 & L18	Mfr Disc.	2	-
J91103J	Mfr Disc.	2	-
J91103K	Mfr Disc.	2	-
J91103L	Mfr Disc.	2	-
J91103M	Mfr Disc.	2	-
J91103N	Mfr Disc.	2	-

Equipment	Rating	Details Last Shown in Issue	Replacing Equipment	Equipment	Rating	Details Last Shown in Issue	Replacing Equipment
J91103P	Mfr Disc.	2	-	J91103Y	Mfr Disc.	2	-
J91103R	Mfr Disc.	1	J91103AD	J91103AA	Mfr Disc.	2	-
J91103S	Mfr Disc.	2	-	J91103AB	Mfr Disc.	2	-
J91103T	Mfr Disc.	2	-	J91103AC	Mfr Disc.	2	-
J91103U	Mfr Disc.	2	-	J91103AD	Mfr Disc.	2	-
J91103W	Mfr Disc.	2	-	J91103AE	Mfr Disc.	2	-

Bell Telephone Laboratories, Incorporated

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