

## 100 KEY EQUIPMENT MULTIPLE LINE EQUIPMENT DESIGN REQUIREMENTS STATION 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 of the No. 100 Key Equipment — Multi Line.

**1.02** The equipment is tested to insure that it meets the requirements covered by the circuit and equipment drawings specified herein before being turned over to the customer. All apparatus used in the manufacture of this equipment conforms to the Bell System Practices except as modified or supplemented by the circuit requirements.

**1.03** This specification is reissued to incorporate previous appendix changes.

#### Description

**1.04** The No. 100 Key Equipment — Multiple Line, hereinafter referred to as the No. 100 Key Equipment, is an arrangement whereby several telephone lines, whether central office, PBX, or private lines, may be made available before a telephone user with but one telephone set. In addition, by the use of a multiple arrangement, these same telephone lines can be made available before other telephone users on the same premises. Any of the persons before which the lines appear can either originate or answer calls. This equipment is arranged for use in manual, common battery and dial areas. No provision however has been made for connection to a Magneto Central Office.

**1.05** Some of the most extensive uses of the No. 100 Key Equipment are in brokers' offices, in small taxicab headquarters, telegraph offices, etc. Use is also found for this equipment

as an order turret and in connection with private lines between offices either in the same or different buildings. It is also used where it is desirable to have a multiple of several lines from a PBX in a commercial office appear before several persons in order to insure better attended lines. This is of particular advantage where employees are not at their desks constantly during business periods and where it is frequently necessary in a particular group to have some one, other than the person to whom the call has been originally directed, pick up the call.

#### *Equipment Arrangement*

**1.06** The equipment used for this purpose consists, in addition to the regular telephone set, essentially of keys and lamps in a small wooden box which is located in a convenient place on the top or side of the subscriber's desk. Each line is terminated on one of these keys, the operation of which connects the line to the telephone set. Associated with each line is a lamp signal and also a buzzer signal, if desired, which indicate that the line is to be answered. With each line, before all persons at which that particular line appears, is also associated a busy lamp signal which lights when the key is operated as an indication that somebody is using the line.

**1.07** The relay equipment required for the operation of the lines is mounted in an apparatus cabinet or on a relay rack. While this equipment is located on the same premises with the key boxes, it need not be located in the same room.

#### *Operating Features*

##### **1.08** *Line Circuits:*

- (a) **Central Office or PBX Lines:** Lines from a central office or PBX terminate at the 100 Key Equipment in line circuit per

SD-69000-01, Fig. 2. From this circuit the leads are carried to the key and lamp box. As many as 12 key boxes may be multipled to the same line circuit. An incoming ring is received on a ringing relay, which functions to light the line lamps in the key boxes. The central office or PBX is signaled by lifting the receiver from the hook and operating a talk key.

(b) **Tie Line:** A tie line may be provided between two 100 Key Equipments, usually not on the same premises. Tie line relay equipment, SD-69001-01, Fig. 5 is required at each end of the connection. The signaling is automatic, in both directions, that is, when either station lifts his receiver and operates the talk key, the distant party is automatically signaled. No connection to the central office or PBX is required.

(c) **Private Line:** Occasionally an installation requires a private line with a 100 Key Equipment at one end and an ordinary telephone at the other. For this purpose SD-69000-01, Fig. 2 is used at the key equipment end. Private line circuit SD-96128-01 is provided at an intermediate central office to furnish transmission battery and to automatically signal one of the stations when the receiver is removed from the switchhook at the other station.

1.09 Provision is made in both of these line circuits for both visual and audible signals on the incoming lines. The visual signals are lamps and the audible signals are buzzers. A line lamp to indicate an incoming call and a busy lamp to indicate whether or not a line is busy are associated with each line, wherever that line appears. The buzzer circuit is arranged for a single buzzer common to a group of lines and, if desired, an individual buzzer for each line. The individual buzzer is usually provided when it is desired to have a particular person give preferential service to a particular line.

1.10 On an incoming call, after the line lamps light, the call is answered by operating the associated key to its first operated position, that is, the talking position. After the key is operated the busy lamp lights at all appearances of that line as an indication that the line is in use. A key operated holding feature is also provided so that a line may be held if desired. A line is held

by operating the key lever through the talking position to the second operated position of the key.

1.11 While the line circuits are so arranged that several attendants may bridge across the same line for conference purposes, no two lines before any one attendant can be bridged together.

1.12 **Timing Circuit and Cut-Off Switch:** In order to insure that the line lamps associated with lines from the central office or PBX do not remain lighted for any great length of time when the lines are unattended, provisions are made either to allow them to remain lighted for only a limited time after ringing current has ceased or to light only during ringing periods.

1.13 When it is desired to eliminate the line lamp lock up feature entirely during unattended periods, a manually operated cut-off switch is used. In this case when the lines are attended and the cut-off switch is in its normal position, the line lamps will remain lighted until the associated lines are answered. An automatic timing circuit, which permits the line lamps to remain lighted for only a definite period after ringing has ceased, is used in place of the cut-off switch when it is felt that the cut-off switch might not be operated and the line lamps might

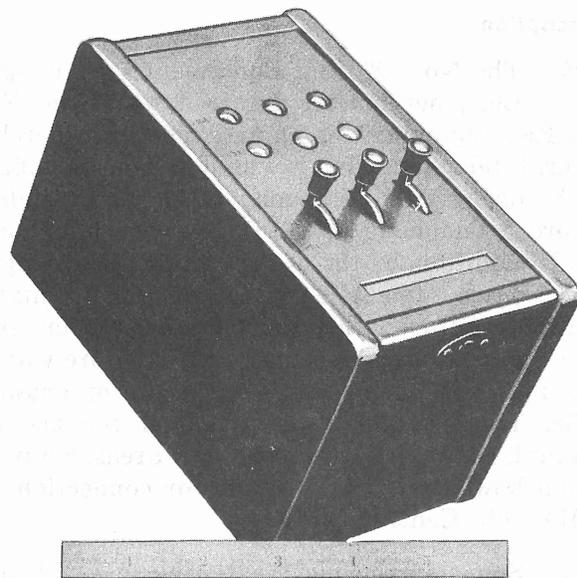


Fig. 1 — Exterior of 3-Line, Single Sided Key Box Without Base

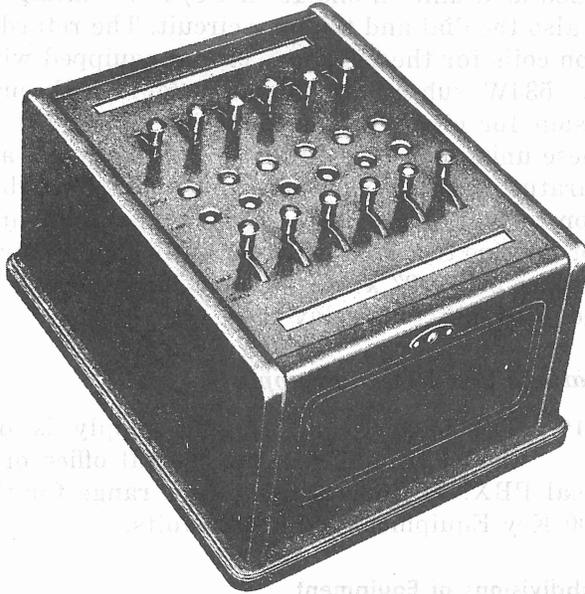


Fig. 2 - Exterior of 6-Line, Double Sided Key Box

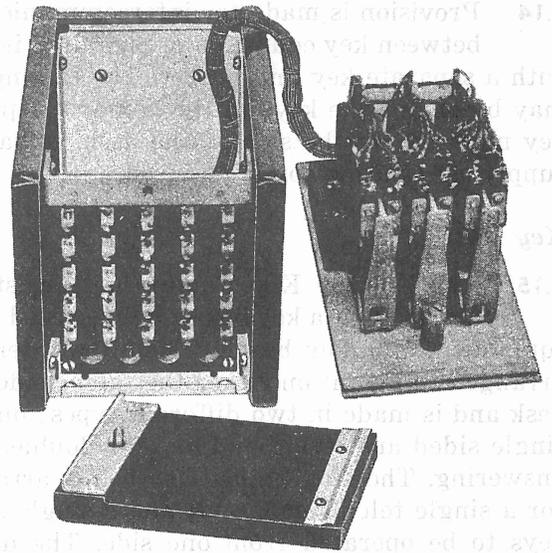


Fig. 3 - 3-Line, Single Sided Key Box With Top and End Removed Showing Ease of Maintenance

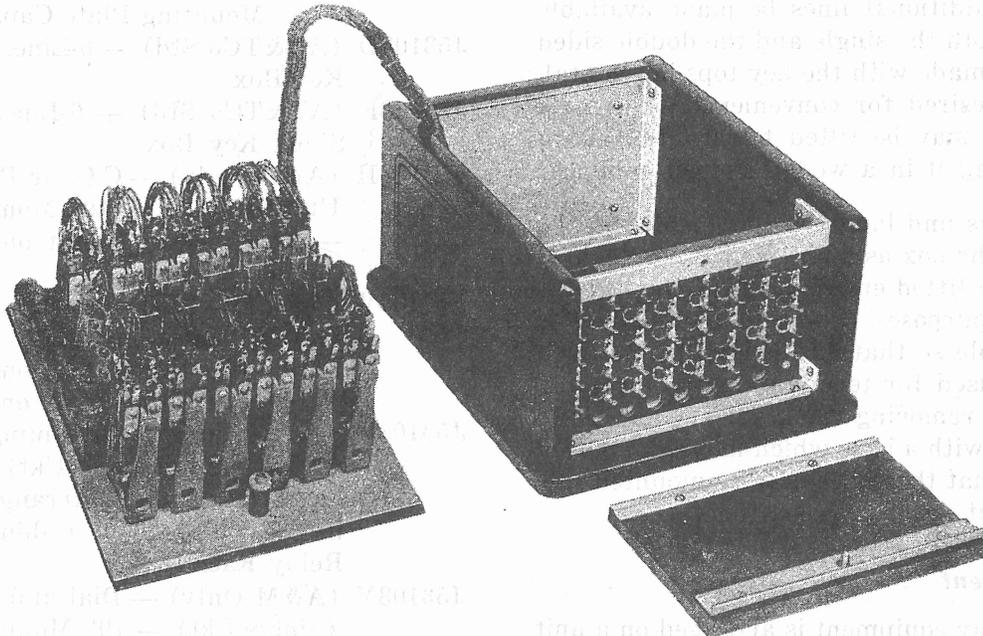


Fig. 4 - 6-Line, Double Sided Key Box With Top and End Removed

remain lighted for long periods of time while the lines are unattended.

**1.14** Provision is made for intercommunication between key equipments. Signaling is done with a separate key and buzzer. The talking key may be one of the keys in the box or a separate key mounted on the side of the desk. A battery supply retardation coil is required.

### **Key Boxes**

**1.15** The No. 100 Key Equipment consists essentially of a key box and associated relay equipment. The key box is a small wooden box arranged to mount on either the top or side of a desk and is made in two different types; one for single sided answering and one for double sided answering. The single sided key box is arranged for a single telephone circuit and a single set of keys to be operated from one side. The double sided key box is arranged for two telephone circuits and with multiple keys so that it may be used on a double sided desk or between adjacent desks and the keys operated by two persons, one on either side.

**1.16** Both the single and double sided key boxes are made in two sizes; one for three lines and the other for six lines. The keys and lamps are arranged in the top so that several boxes may be lined up side by side when it is desired that additional lines be made available at one desk. Both the single and the double sided key boxes are made with the key tops horizontal. However, if desired for convenience, the single sided key box may be tilted toward the attendant by placing it in a wedge shaped sub-base.

**1.17** The keys and lamps are assembled in the top of the box as a unit which is so cabled that it may be lifted entirely out of the box for maintenance purposes. One end of the box is made removable so that access may be obtained to terminals used for terminating the incoming leads, without removing the keys. The key boxes are furnished with a base which may be removed if desired so that the boxes may be mounted side by side without space between them.

### **Relay Equipment**

**1.18** The relay equipment is arranged on a unit basis. The private line circuit unit and the line circuit to C.O. or PBX unit are each single

circuit units requiring one 19" x 1-3/4" mounting plate. The timing and auxiliary circuits are combined as a unit on one 19" x 1-3/4" mounting as is also the dial and tripping circuit. The retardation coils for the telephone circuit equipped with the 534W subset are mounted four, with provision for eight on one mounting plate. All of these units may be mounted in the new steel apparatus cabinets or upon a relay rack. In addition to these units there is also a 10-circuit unit for the line to C.O. or PBX circuit which requires a space of 7, 19" x 1-3/4" mountings and can be mounted only on a relay rack.

### **Battery and Ringing Supply**

**1.19** The battery and ringing supply is obtained from either the central office or a local PBX. The operating voltage range for the 100 Key Equipment is 14 to 26 volts.

### **Subdivisions of Equipment**

- ED-69012-01 — Details for Mounting Key Boxes
- ED-69065-01 — Protector and Ground Punching Panel for use in Cabinet  
ED-91472-01
- ED-91180-01 — Steel Apparatus Cabinet — 18 Mounting Plate Capacity
- ED-91296-01 — Floor Stand for Mounting  
ED-91472-01 Cabinet
- ED-91472-01 — Steel Apparatus Cabinet — 4 Mounting Plate Capacity
- J53103D (AT&TCo Std) — 6-Line, Single Sided Key Box
- J53103F (AT&TCo Std) — 6-Line, Double Sided Key Box
- J53103H (A&M Only) — C.O. or PBX Line Unit (10-Ckt) — 19" Mounting Plates — Arranged to Mount on Relay Rack Only
- J53103V (AT&TCo Std) — C.O. or PBX Line Unit (Single Ckt) — 19" Mounting Plate — Arranged to Mount in Steel Apparatus Cabinets or on Relay Rack
- J53103W (AT&TCo Std) — Timing and Aux. Signal Unit (Single Ckt) — 19" Mounting Plate — Arranged to Mount in Steel Apparatus Cabinets or on Relay Rack
- J53103Y (A&M Only) — Dial and Trip Unit (Single Ckt) — 19" Mounting Plate — Arranged to Mount in Steel Apparatus Cabinets or on Relay Rack

J53103AA (A&M Only) — Telephone Unit (4 Ckt) — 19" Mounting Plate — Arranged to Mount in Steel Apparatus Cabinets or on Relay Rack

J53103AB (AT&TCO Std) — Key Equipment Tie Line Unit — 19" Mounting Plate — Arranged to Mount in Steel Apparatus Cabinet or on Relay Rack

## 2. SUPPLEMENTARY INFORMATION

812-000-000 — Station Systems Index

AA128.006 — List of General Equipment Requirements

J53007 (812-260-150) — Key Telephone System No. 1A — Station Systems

J99206 (AA388.032) — Equipment Units — Relay Rack Mounted — Common Systems

J99219 (AA381.315) — Steel Apparatus Cabinets

## 3. DRAWINGS

### Circuits

SD-69000-01 — Line to C.O. or PBX, Timing and Auxiliary Signal Circuits

SD-69001-01 — Tie Line and Auxiliary Signal Circuit

SD-69002-01 — Telephone, Dial, and Tripping Circuits

SD-69162-01 — Attendant's Telephone and Dial Circuit

SD-96128-01 — Private Line Ckt located at C.O.

### Framework

ED-69077-01 — 6-Line, Single Sided Key Box Assembly

ED-69078-01 — 6-Line, Double Sided Key Box Assembly

ED-90395-01 — Framework for 10-Ckt C.O. or PBX Line Unit

ED-91180-01 — Steel Cabinet — Capacity 18, 19" Mounting Plates

ED-91296-01 — Floor Stand for Mounting ED-91472-01 Cabinet

ED-91472-01 — Steel Cabinet — Capacity 4, 19" Mounting Plates

### Equipment and Cabling

ED-69006-01 — Relay Equipment 10-Ckt C.O. or PBX Line Unit for Relay Rack Mounting

ED-69016-01 — 6-Line, Single Sided Key Box — Equipment and Cabling

ED-69019-01 — 6-Line, Double Sided Key Box — Equipment and Cabling

ED-69065-01 — Equipment and Cabling — 19" Mounting Plate Units — Arranged for Relay Rack or Cabinet Mounting

ED-90440-01 — Local Cable for 10-Ckt C.O. or PBX Line Unit

ED-90976-01 — Switchboard Cabling at Relay Rack

ED-91195-01 — Cabling for 4-Plate Steel Cabinet

ED-91196-01 — Cabling for 18-Plate Steel Cabinet

ED-91631-01 — Private Line Unit — Equipment

ED-91929-01 — Equipment Units — Angle Type 1-3/4"

## 4. EQUIPMENT

*ED-69012-01 — Key and Jack Box Mounting Arrangements*

*Group 3* — Mounting block for tilting 6-line single sided key box on top of desk

*Group 4* — Bracket for mounting single sided key box on side of desk

*ED-91472-01 — Steel Apparatus Cabinet — Four Mounting Plate Capacity*

*Group 2* — One cabinet complete with cover arranged to mount 4, 19" x 1-3-4" mounting plates — olive green finish

*Group 3* — One cabinet complete with cover arranged to mount 4, 19" x 1-3-4" mounting plates — walnut finish

*Group 4* — One insulating board — olive green finish

*Group 5* — One insulating board — walnut finish.

*ED-91180-01 — Steel Apparatus Cabinet — 18 Mounting Plate Capacity*

*Group 4* — Framework, screws, and nuts for mounting 18, 19" mounting plates and five, 100 type terminal strips

*Group 10* — One cabinet complete less wooden base — olive green finish

**Group 11** — One cabinet complete less wooden base — walnut finish

**Group 12** — One wooden base and four bolts, nuts, and washers — olive green finish

**Group 13** — One wooden base, four bolts, nuts, and washers — walnut finish

**ED-91296-01 — Floor Mounting Stand for Cabinet ED-91472-01 — Capacity two Cabinets**

**Group 2** — One mounting stand — olive green finish

**Group 3** — One mounting stand — walnut finish

**ED-69065-01 — Protector and Ground Punching Panel**

**Group 1** — One panel for use in apparatus cabinet ED-91472-01 equipped with 5, 62C protectors with associated ground punchings (See notes 5.01 and 5.09)

**Group 4** — Material required in addition to Group 1 for ac buzzer, per Fig. 10

**Group 5** — Material required in addition to Group 1 for dc buzzer, per Fig. 10

**J53103D (AT&TCo Std) — 6-Line Single Sided Key Box**

Equipment and Local Cable — ED-69016-01

**List 1** — Framework, assembly, wiring, and equipment for 6-line single sided key box, arranged for a single telephone, as follows: (See note 5.05)

	WIRE	EQUIP
Key Box Assembly ED-69077-01	—	1
Line Ckt SD-69000-01, Fig. 4	6	6

**List 2** — This list is the same as list 1 except that base is omitted

**J53103F (AT&TCo Std) — 6-Line Double Sided Key Box**

Equipment and Local Cable — ED-69019-01

**List 1** — Framework, assembly, wiring, and equipment for 6-line double sided key box, arranged for two telephones, as follows: (See note 5.05)

	WIRE	EQUIP
Key Box Assembly ED-69078-01	—	1
Line Ckt SD-69000-01, Fig. 1	6	6

**J53103H (A&M Only) — C.O. or PBX Line 10-Ckt Unit for Mounting on Relay — 19" Mounting Plates**

Equipment — ED-69006-01, Fig. 1

Local Cable — ED-90440-01, Fig. 2

**List 1** — Framework, assembly, wiring, and equipment for a 10-circuit C.O. or PBX line unit, as follows:

	WIRE	EQUIP	SEE NOTE
Framework ED-90395-01, Fig. 1	—	1	
Line Ckt SD-69000-01, Fig. 2 ("R" wiring)	10	10	5.08

#### Note

A. When the 61A filters ("S" wiring and apparatus) are required they shall be added at the time of installation, being suspended from the terminals of the (S) relays.

**J53103V (AT&TCo Std) — C.O. or PBX Line Single Circuit Unit for Mounting in Steel Apparatus Cabinets or on Relay Rack — 19" Mounting Plate**

Equipment — ED-69065-01, Fig. 4

**List 1** — Assembly, wiring, and equipment for one single circuit C.O. or PBX line unit, wired and equipped per SD-69000-01, Fig. 2 ("R" wiring) (See notes 5.04 and 5.08)

#### Notes

A. Lines may be multiplied a maximum of 12 times. This may be accomplished by multiplying from key box to key box or a number of the key boxes may be wired to the circuit unit and multiplied at its terminal strip. Three punchings are available for each lead for this purpose. In the larger apparatus cabinet there is provision for additional terminal strips which may also be used for this purpose.

B. Where it is necessary to suppress the radio frequency induction arising from (S) relay contacts, the 61A filter ("S" wiring and apparatus) shall be ordered separately and added locally.

***J53103W (AT&TCo Std) — Timing Signal Single Circuit Unit for Mounting in Steel Apparatus Cabinets or on Relay Rack — 19" Mounting Plate***

Equipment — ED-69065-01, Fig. 5

**List 2** — Assembly, wiring, and equipment for one timing unit, wired and equipped per SD-69000-01, Fig. 2B (See notes 5.03 and 5.04)

***J53103Y (A&M Only) — Dial and Trip Single Circuit Unit for Mounting in Steel Apparatus Cabinets or on Relay Rack — 19" Mounting Plate***

Equipment — ED-69065-01, Fig. 7

**List 1** — Assembly, wiring, and equipment for one dial and tripping single circuit unit, wired, and equipped per SD-69002-01, Fig. C (See notes 5.02 and 5.04)

**List 2** — Assembly, wiring, and equipment for one tripping single circuit unit, wired and equipped per SD-69002-01, Fig. B (See notes A, 5.02, and 5.04)

**Note**

A. The mounting plate for list 2 is drilled for the dialing equipment covered in list 1.

***J53103AA (A&M Only) — Telephone Circuit Unit for Mounting in Steel Apparatus Cabinets or on Relay Rack***

Equipment — ED-69065-01, Fig. 8

**List 1** — Assembly, wiring, and equipment for one unit of four telephone circuits, wired and equipped per SD-69002-01, Fig. A (See notes 5.02 and 5.04)

**Note**

A. The mounting plate for this unit is drilled for the equipment for eight circuits. It is however equipped only for four circuits.

***J53103AB (AT&TCo Std) — Key Equipment Tie Line Single Circuit Unit for Mounting in Steel Apparatus Cabinets or on Relay Rack — 19" Mounting Plate***

Equipment — ED-69065-01, Fig. 11

**List 1** — Assembly, wiring, and equipment for one single circuit PBX tie line unit, wired and equipped per SD-69001-01, Fig. 5 (See notes A and 5.04)

**Note**

A. Where individual buzzers are used with this tie line the (CR) relay per SD-69001-01, Fig. 6 (one per installation) is to be provided. The unit mounting plate is drilled for but not equipped with this relay. When it is required it shall be ordered separately and mounted and wired locally. When it is provided a ground lead separate from all other ground leads to the key boxes or station subsets shall be run from this tie line unit to the line lamps. Where the key boxes are not arranged for a separate ground lead to the line lamps they shall be mounted locally to agree with SD-69001-01, Fig. 1K or 2K.

**5. GENERAL NOTES**

**5.01** With the units that are arranged to mount in the steel apparatus cabinets or on the relay rack, (J53103V, J53103Y, J53103AA, and J53103AB) no fuses have been included and it is necessary to provide a fuse panel in all cases. The protector and ground punching panel ED-69065-01, G1 is for use with the small steel apparatus cabinet and fuse panel ED-91786-01, G2 for the larger steel apparatus cabinet. No provision has been made on this fuse panel for ground punchings. Punchings on a 100 type terminal strip in the cabinet should be used for this purpose. When the equipment is mounted on the relay rack a standard type fuse panel should be provided as required.

**5.02** The 100 Key Equipment is designed to operate with a handset, desk stand, or headset receiver and chest type transmitter. Any standard subscriber set can be used with the handset and desk stand. However, when a headset with chest type transmitter is used, the equipment on SD-69162-01 is required. For common battery service SD-69162-01, Fig. 1, is used. For local battery service, SD-69162-01, Fig. 2, is used. The equipment units associated with Fig. 2 may be mounted in a 105-type apparatus box located underneath the attendants desk. When a 6A dial is required, it is mounted on a 6000D dial mounting with a 52D dial adapter plus a

64A dial adapter. The 64A dial adapter is to be assembled between the 6A dial and the 52D dial adapter.

**5.03** When the timing equipment is not provided a ground cut-off key per SD-69000-01, Fig. 2A is to be furnished. The Hart and Hege-man Mfg. Co's. #611 or its approved equivalent is to be used unless otherwise specified. Only one common cut-off switch is required unless the current is greater than 5 amperes. The location of this switch is to be specified by the customer.

**5.04** Units J53103V, J53103W, J53103Y, J53103AA and J53103AB are surface wired in accordance with the general requirements for surface wiring per ES-392580.

**5.05** Figs. 1, 4, A, B, and 3 of SD-69000-01 are identical with Figs. 1, 2, B, A, and 4 of SD-69001-01 respectively.

**5.06** The steel apparatus cabinet ED-91180-01 is arranged to mount terminal strips on which the incoming leads may be terminated and connection made from them to the units by means of jumper wire, or the incoming leads may be run direct to the terminal strip on the units.

**5.07** Provision is made in the metal cabinets per ED-91180-01 and ED-91472-01 for the storing of detailed wiring drawings in an envelope. A record card for recording the numbers of the drawings and other information is glued to the inside of each cabinet. A record card shall also be glued to each envelope. Where the steel cabinets are equipped in the Branch House or factory. The Western Electric Co. will provide wiring diagrams covering the equipment mounted in the cabinet and make the necessary record on both record cards, the one in the cabinet and the one on the envelope. When the Telephone Companies order units without the cabinets, they will order any drawings required and keep their records.

**5.08** Where the C.O. and PBX line circuit SD-69000-01 is used as a private line between No. 100 Key Equipment and a distant private line equipped with only a bell box and desk stand or handset it is necessary to provide the private line SD-96128-01 at an intermediate central office. The equipment for this circuit is

covered by J99206K for a 5-circuit unit and ED-91631-01, Fig. 2 for a single-circuit unit.

**5.09** Provision has been made for mounting on the fuse panel in the large cabinet and protector mounting panel in the small cabinet, a 638A mounting plate equipped with a 46A lamp socket and 12B lamp (for use when an ac buzzer is to be used in the auxiliary signal circuit) or a 638B mounting plate equipped with a 439A condenser in position 1 and a 47N retardation coil in position 2 (for use when a dc buzzer is to be used). This equipment, however, is not provided as part of the fuse panel, but must be ordered separately. Groups are provided on the protector mounting panel, so that the panel may be ordered equipped with buzzer equipment when required.

**5.10** Intercommunicating facilities may be provided between key equipments, when specified, in accordance with SD-69000-01, Fig. 10, 12, and 13, and Fig. 11 if spare keys in the key boxes are not available. The 2A key telephone unit in Fig. 10 may be located in a 105-type apparatus box which, with the buzzer, should be located as specified by the customer.

#### 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	REPLACING EQUIPMENT
J53103A	Mfr Disc.	6	1A K.T.S.
J53103B	Mfr Disc.	1	J53103A & ED-69012-01, G2
J53103C	Mfr Disc.	6	1A K.T.S.
J53103E	Mfr Disc.	1	J53103D & ED-69012-01, G3
J53103G	Mfr Disc.	5	J53103V
J53103H	A&M Only	6	J53103V, quantity as required
J53103J	Mfr Disc.	5	J53103W List 2
J53103K	Mfr Disc.	5	
J53103L	Mfr Disc.	4	J53103W List 2

EQUIPMENT	RATING	DETAILS		EQUIPMENT	RATING	DETAILS	
		LAST SHOWN IN ISSUE	REPLACING EQUIPMENT			LAST SHOWN IN ISSUE	REPLACING EQUIPMENT
J53103M	Mfr Disc.	5	J53103V	J53103S	Mfr Disc.	4	J53103Y
J53103N	Mfr Disc.	4	J53103X				List 1
J53103P	Mfr Disc.	5	J53103Y List 2	J53103T	Mfr Disc.	5	J53103AA
J53103Q	Mfr Disc.	5	J53103Y List 1	J53103U	Mfr Disc.	4	J53103AA
J53103R	Mfr Disc.	4	J53103Y List 2	J53103W	Mfr Disc.	5	—
				Lists 1 & 3			
				J53103X	Mfr Disc.	5	J53103V
				J53103Y	A&M Only	6	See Note 5.02
				J53103AA	A&M Only	6	See Note 5.02

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