

NAVSHIPS 0969-124-8010

TECHNICAL MANUAL
FOR COMMUNICATION
PATCHING SWITCHING
SB-2727B/SRR

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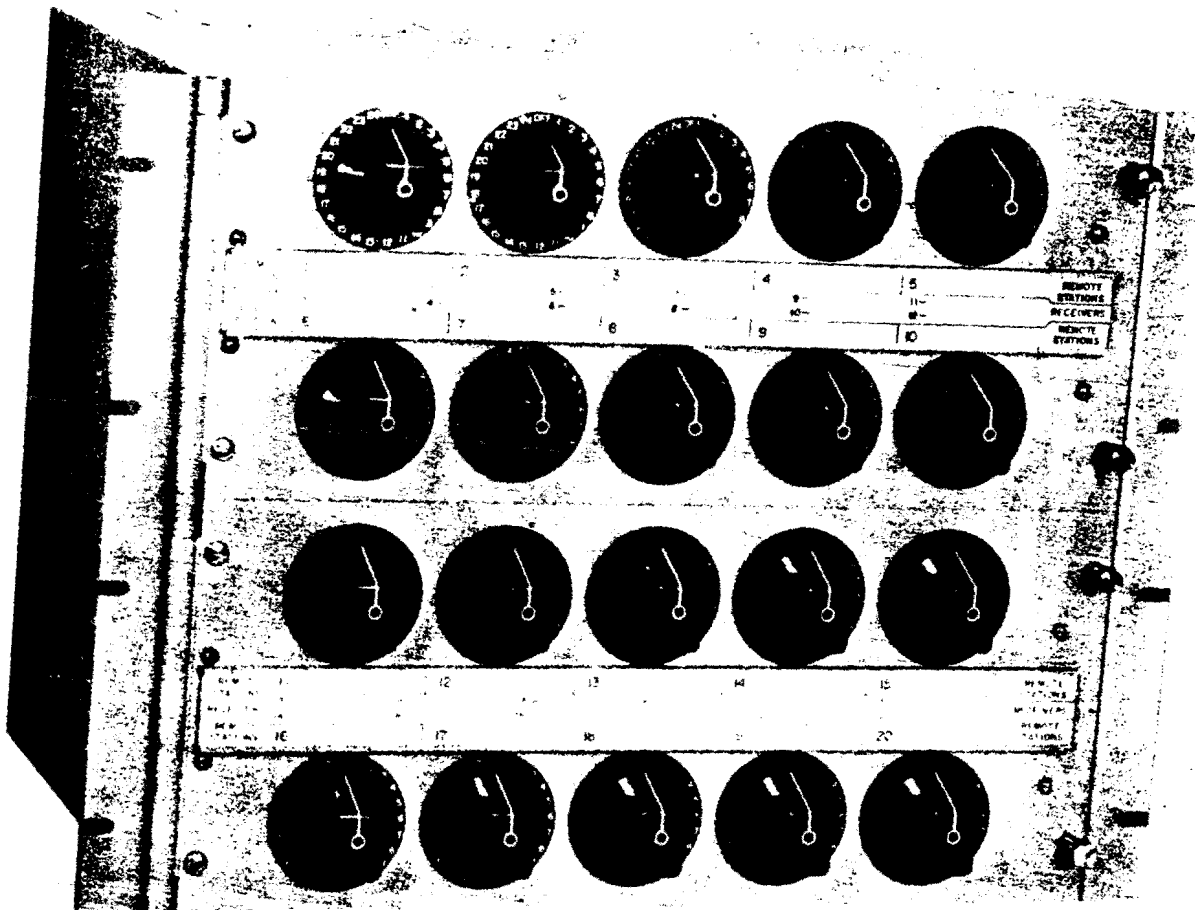


FIG. 1.1 COMMUNICATION PATCHING SWITCHBOARD SB-2727/SRR

COMMUNICATION PATCHING SWITCHBOARD

SB-2727/SRR

SECTION 1

GENERAL INFORMATION

1.1 INTRODUCTION.

This technical Manual describes the operation, installation and maintenance of Communication Patching Switchboard SB-2727/SRR. It is intended to provide operating and maintenance personnel with the necessary information to utilize the equipment for its primary function of transferring radio receivers, or other signal sources, to remote control stations such as are used on shipboard and in land based communication facilities.

1.2 MANUAL COVERAGE.

This Technical Manual contains data pertaining to Communication Patching Switchboard SB-2727/SRR.

1.3 PURPOSE AND BASIC PRINCIPLES.

The purpose of the equipment is to provide facilities for transferring two wire audio lines so that remote control stations can be selectively transferred to a choice of radio receivers. The equipment incorporates twenty, two circuit, removable wafer, rotary selector switches having twenty-five rotary positions; twenty-four active and one "off" position. This design permits the transfer of any one or all twenty remote control stations to any one of twenty-four receivers. Facilities are provided for transferring all circuits to additional Communication Patching Switchboards when more than twenty remote control stations, or when more than twenty-four receivers, are installed in the system.

1.4 REFERENCE DATA.

- a. Communication Patching Switchboard SB-2727/SRR.
- b. Manufacturer: Tabet Manufacturing Co., Inc., Norfolk, Virginia.
- c. Contract Tcg-04,451-A June 30, 1964
- d. Number of Packages: One complete unit per package.
- e. Cubical Contents: 1.7 cu. ft.
- f. Total Weight: 44 lbs.
- g. Electrical Capacity: .125 ampere ac or dc @ 120 volts make and break.
 1 ampere ac @ 120 volts with arc suppression.
 3 amperes carrying capacity.
 -10 to +10 DBM audio level.
 Hi-pot test: 500 volts RMS.

TABLE 1.1 EQUIPMENT SUPPLIED

Quan. Per Unit	Name of Unit	C. G. Type Desg.	Overall Dim. Inches			Cu. Ft.	Weight
			Height	Width	Depth		
1	Communication Patching Switchboard	SB-2727/SRR	13 31/32	19	11 1/8	1.7	44 lbs.
2	Technical Manuals						

Accessory interconnection cable harnesses are required if more than one switchboard is installed. See Paragraphs 3.7 and 3.8, section 3.

1.5 DESCRIPTION OF EQUIPMENT.

An illustration of the equipment is shown in Figure 1.1. Communication Patching Switchboard SB-2727/SRR consists of an unventilated aluminum enclosure having a horizontally divided front panel, hinged on the left hand side and has removable cable entrance plates on the top, bottom and rear of the enclosure. See Figures 1.1 and 3.1.

The rear of the enclosure contains receptacles for plugging-in the panel assemblies and barrier type terminal boards for terminating cabling from the receptacles and for connecting external lines to remote control stations, receiver or signal, lines and interconnecting cables.

The hinged front panel is divided into two sections on each of which are mounted ten removable wafer rotary selector switches, arranged in two horizontal rows of five each. The front panel thus

containing twenty switches. Each panel section is interchangeable with the other, if required. The switches are wired so that receiver circuits are parallel in four horizontal rows and represent switch positions, providing for twenty-four, two wire receiver circuits per switchboard. The common wiper contact of each switch is wired for connection to a remote control station which allows a total of twenty remote control stations per switchboard.

Two knurled, retaining thumb screws are provided on each panel section permitting opening or removal of panels for maintenance or installation.

1.6 INTERNAL WIRING.

Internal connection for the twenty rotary switch units in Communication Patching Panel SB-2727/SRR are made to four, sixty terminal plugs (two from each panel section). Internal connections from the four mating receptacles are made to solder terminals on the underside of three sets of barrier type terminal boards, located on the back of the enclosure. Connections to external equipments are to be made to screw terminals on the top of the barrier type terminal boards. See Figure 3.1.

Each set of terminal boards comprises four boards. The left hand set has twenty pairs of terminals for connection of twenty, two wire lines to the audio input of remote control stations. The middle set has twenty-four pairs of terminals for connection of twenty-four, two wire lines from the audio output of receivers. The right hand set has twenty pairs of terminals for connection of interconnecting cables for use when additional switchboards are required in a system containing more than twenty-four receivers. These terminals are furnished with jumpers which are to be removed when interconnecting cables are used. See paragraph 2.4 and Figure 2.5.

The middle set of terminal boards is also used to connect interconnecting cables to an additional switchboard when more than twenty remote control stations are required in a system. In this case the receiver lines are paralleled to corresponding receiver line terminals in the additional switchboard. See paragraph 2.3 and Figure 2.4.

1.7 SWITCH WAFERS.

A rotary switch contains two, removable, rotary switch wafers. The conductors of switch wafers are printed wiring on insulating material. Each switch wafer has twenty-four active contact segments and one "off" segment. Contacts are radially arranged on each side of the wafer and positioned so that even number segment positions are on one side and odd number segment positions are on the other side. Two wafers per switch thus provide for switching twenty-four circuit pairs. The printed circuit patterns on the wafers are arranged, in relation to off position of the switch, so that wafers can be inserted into the switch assembly without regard to which face of the wafer is right hand or left hand. Circuits through the contact segments are made to double rotary arms.

The design and spacing of the active and inactive segments are such that the rotary contacts are non-shorting; that is, the rotary contact will clear one active contact before engaging the next active contact segment.

1.8 SWITCH ASSEMBLY.

The printed wiring wafers are individually mounted in a frame so that each wafer can be plugged into place and engage a receptacle. Contacts of the receptacle connect with the printed wiring of the wafers to complete the several switch circuits and the receptacles are internally wired to the appropriate terminal boards.

When a switch is in the "off" position, a slot in the wafer's rotary mechanism is aligned with a slot in the wafer so that any wafer can be withdrawn without otherwise disconnecting or dismantling the switch assembly. The switch framework contains a detent device to assure positive positioning of the contacts of the mechanism on the active segments of the wafers.

COMMUNICATION PATCHING SWITCHBOARD

SB-2727/SRR

SECTION 2

OPERATING INSTRUCTIONS

2.1 GENERAL

Communication Patching Switchboard SB-2727/SRR is designed to provide means to switch the output of one to twenty-four radio receivers, or other signal sources, to any one or all of twenty remote control stations. It is intended, generally, for use with equipment such as Radio Receivers, R-389/URR, R-390/URR; Audio Amplifiers, AM-215/U, VP107-4 and Remote Control Units, C-1138B/U. All lines between these equipments are terminated in 600 ohm impedance.

Each switch operating knob on the switchboard corresponds to a remote control station. See Figure 2.1. Each rotary switch position (one through 24) corresponds to a receiver. Rotary position "off" disconnects all remote control stations.

Terminal boards are provided in each switchboard for connections to interconnecting cables when more than twenty-four receivers or more than twenty remote control stations are required in a system. See Figure 3.1. Switch operating knobs, on the front panel, are numbered one through twenty in four horizontal rows. Switch positions are numbered radially one through twenty-four and off. Designation strips are provided on the front panel for identifying the equipment controlled by each switch and for identifying the equipment connected to each rotary position.

2.2 SINGLE SWITCHBOARD OPERATION.

When only one Communication Patching Switchboard is required, twenty-four receiver audio circuits can be selectively transferred to any one or all of twenty remote control audio circuits.

When it is required, for example, that remote control station number two is to be connected to receiver circuit number five; switch knob designated number two is rotated until its pointer indicates position number five on its respective dial plate. See Figure 2.2.

When it is required, for example that remote control station number two is to be connected to receiver circuit number twelve; switch knob designated number two is rotated until its pointer indicates position number twelve on its respective dial plate. If it is required that remote control station number nine, for example, is also to receive from receiver circuit number twelve, switch knob number nine is also rotated until its pointer indicates position number twelve on its dial plate. Thus any or all remote control stations can be switched to any one receiver circuit. By following the above procedure any remote control station can be connected to any receiver connected to the switchboard.

2.3 MULTIPLE SWITCHBOARD OPERATION. ADDITIONAL REMOTE CONTROL STATIONS.

When more than twenty remote control stations are in a system an additional switchboard is provided. Switch operating knobs on the front panel of switchboard number two then become twenty-one through forty in the four horizontal rows. Switch position numbers remain the same as on switchboard number one.

When it is required, for example, that remote control station number twenty-three is to be connected to receiver circuit number five; switch knob designated number three, on switchboard number two is rotated until its pointer indicates position number five on its dial. See Figure 2.4. This procedure is followed to connect any of the additional remote control stations connected to switchboard number two to any one of the twenty-four receiver circuits.

2.4 MULTIPLE SWITCHBOARD OPERATION. ADDITIONAL RECEIVERS.

When more than twenty-four receivers are in a system an additional switchboard is provided.

When an additional switchboard is installed to accommodate more than twenty-four receivers, no receiver circuits are connected to switch rotary position twenty-four in switchboard number one. Switch rotary positions number twenty-four in switchboard number one now provide means for transferring the remote control station circuits in switchboard number one to the rotary arms of switches in switchboard number two allowing the remote control circuits to be connected to any receiver wired in switchboard number two. See Figure 2.5.

When, in operation, it is required, for example, that remote control station number two is to be connected to receiver circuit number twenty-eight; switch knob designated number two in switchboard number one is rotated until its pointer indicates position number twenty-four and switch knob

designated number two in switchboard number two is rotated until its pointer indicates position number five. See Figure 2.5.

To effect transfer of any remote control station to receiver circuits more than the twenty-three controlled in switchboard number one, each switch corresponding to the remote control desired must be placed in rotary position number twenty-four and the corresponding switch in switchboard number two must be placed in a rotary position representing the receiver desired. Following this procedure any or all of the remote control stations can be connected to any one of forty-seven receiver circuits.

2.5 MULTIPLE SWITCHBOARD OPERATION.

ADDITIONAL RECEIVERS AND REMOTE CONTROL STATIONS.

When more than twenty-four receivers and more than twenty remote control stations are in a system a total of four switchboards are provided. This number of switchboards provides circuits for up to forty remote control stations and up to forty-seven receivers.

Figure 2.6 illustrates the connection arrangement for three typical switching groups.

Using one typical circuit for example, it is required to switch receiver number thirty-one to remote control station number twenty-three; switch knob designated number three in switchboard number two is rotated until its pointer indicates position number twenty-four and switch knob designated number three in switchboard number four is rotated until its pointer indicates position number eight.

2.6 REFERENCES.

All of the diagrams referenced for illustration of operational functions are shown as typical single pair circuits. The remaining circuits for a given installation and function are to be applied similarly for each receiver and remote control station involved.

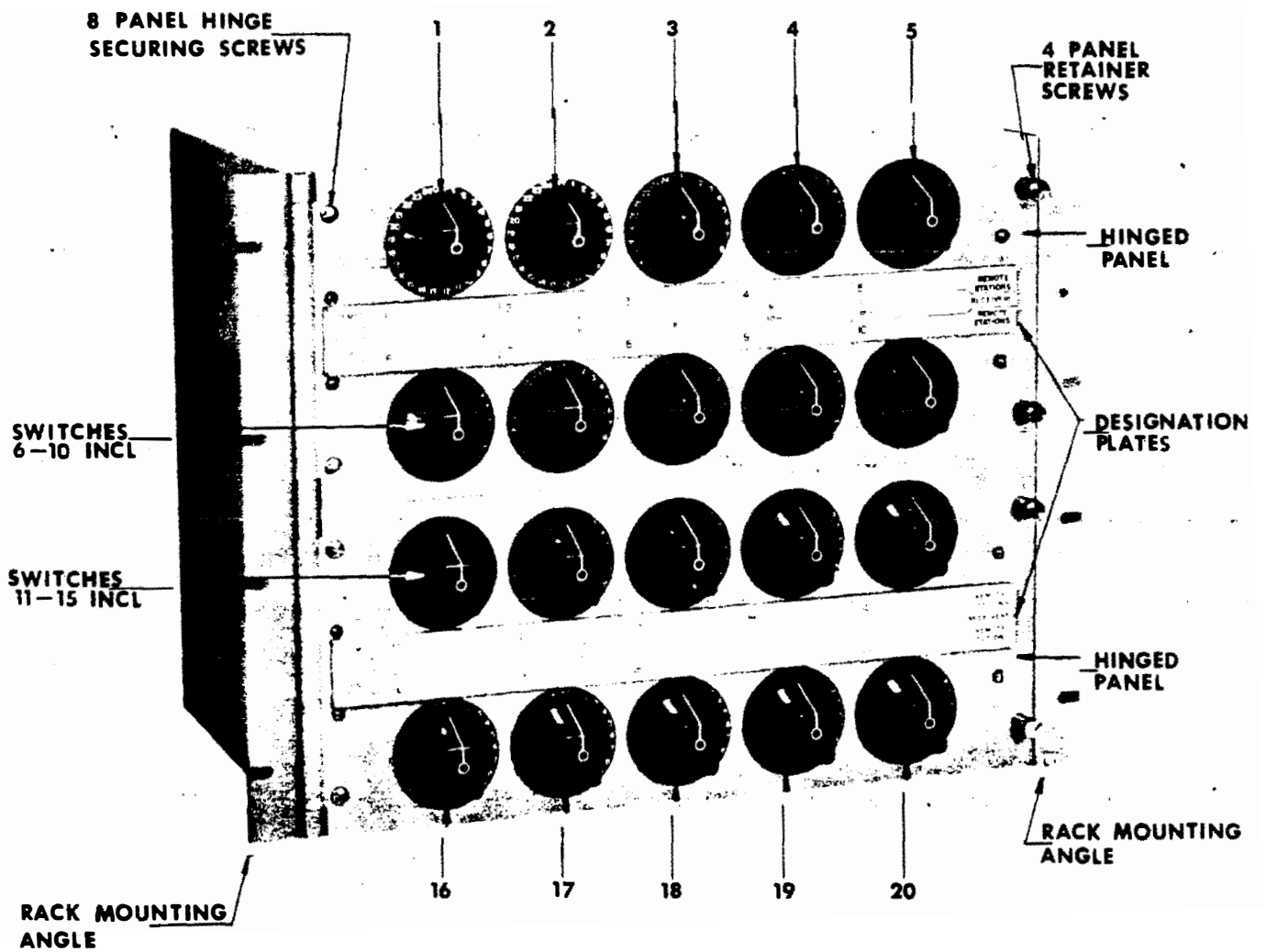


FIG. 2.1 COMMUNICATION PATCHING SWITCHBOARD
SB-2727/SRR
VIEW OF FRONT PANEL

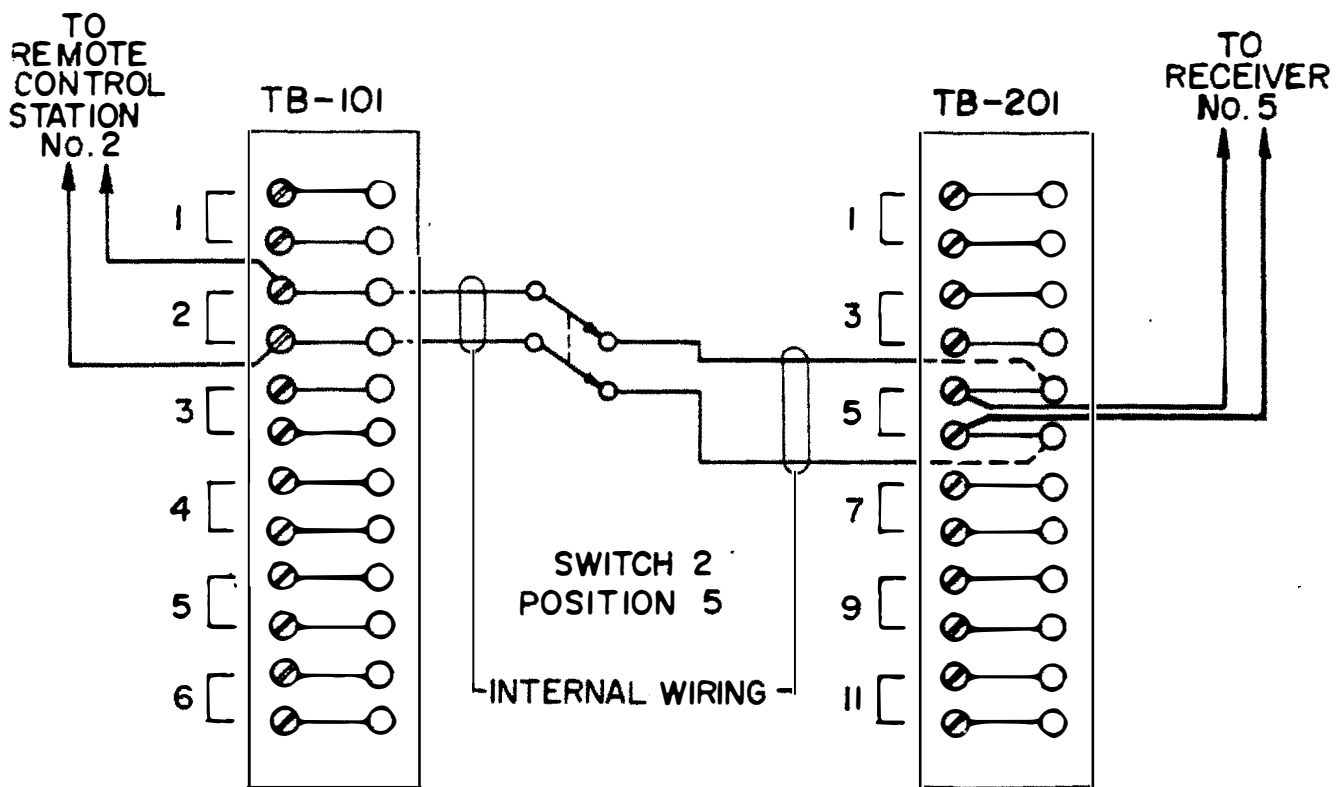


FIG. 2.2 TYPICAL SCHEMATIC DIAGRAM SHOWING OPERATION OF RECEIVER NO. 5 TO REMOTE CONTROL STATION NO. 2.

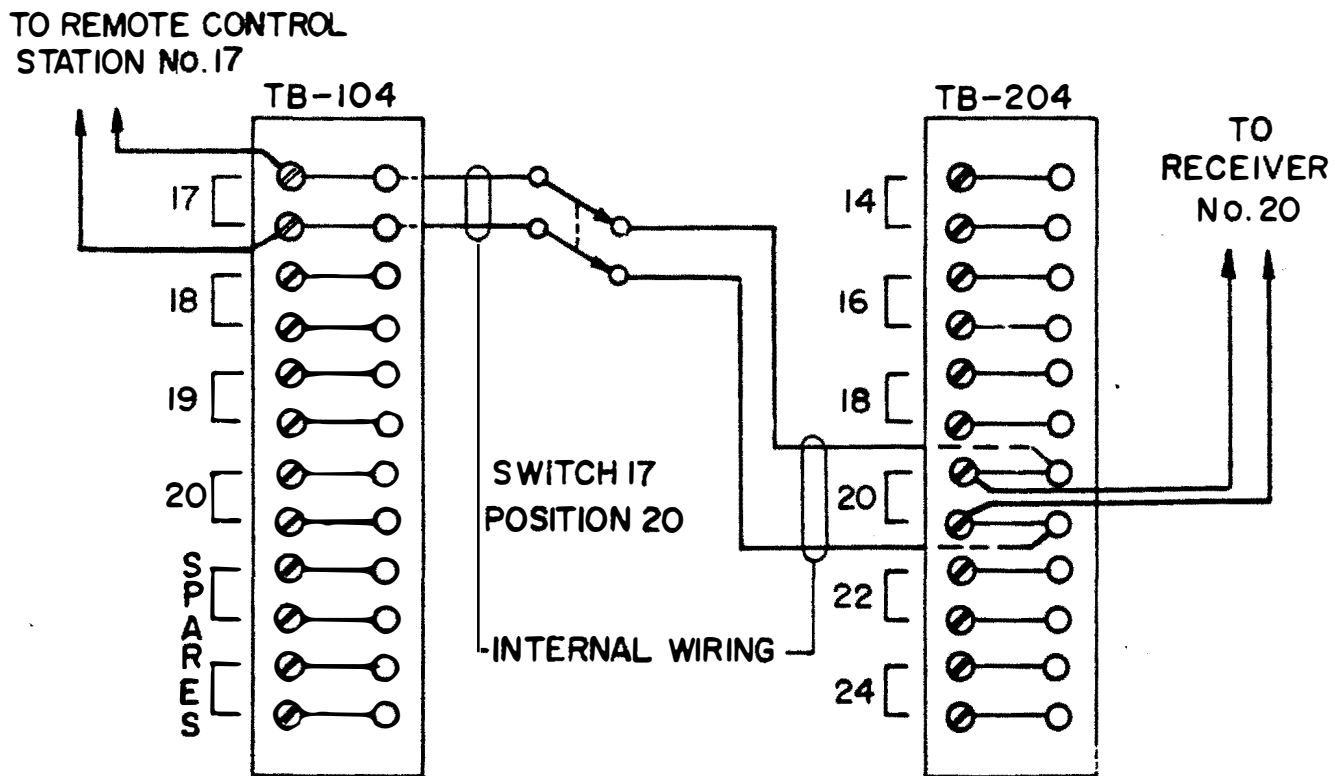


FIG. 2.3 TYPICAL SCHEMATIC DIAGRAM SHOWING OPERATION OF RECEIVER NO. 20 TO REMOTE CONTROL STATION NO. 17.

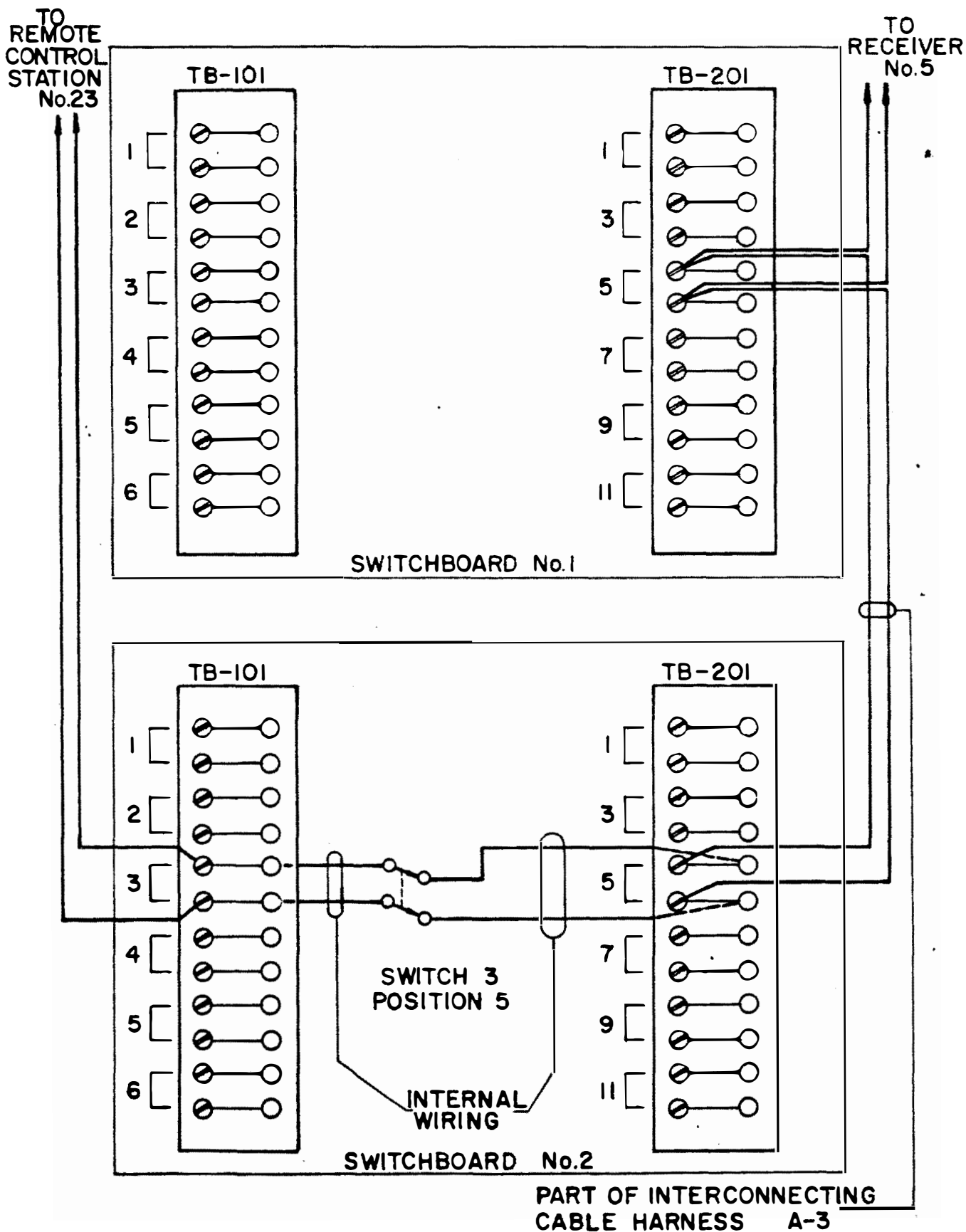


FIG. 24 TYPICAL SCHEMATIC DIAGRAM SHOWING OPERATION OF RECEIVER NO. 5 TO REMOTE CONTROL STATION NO. 23.

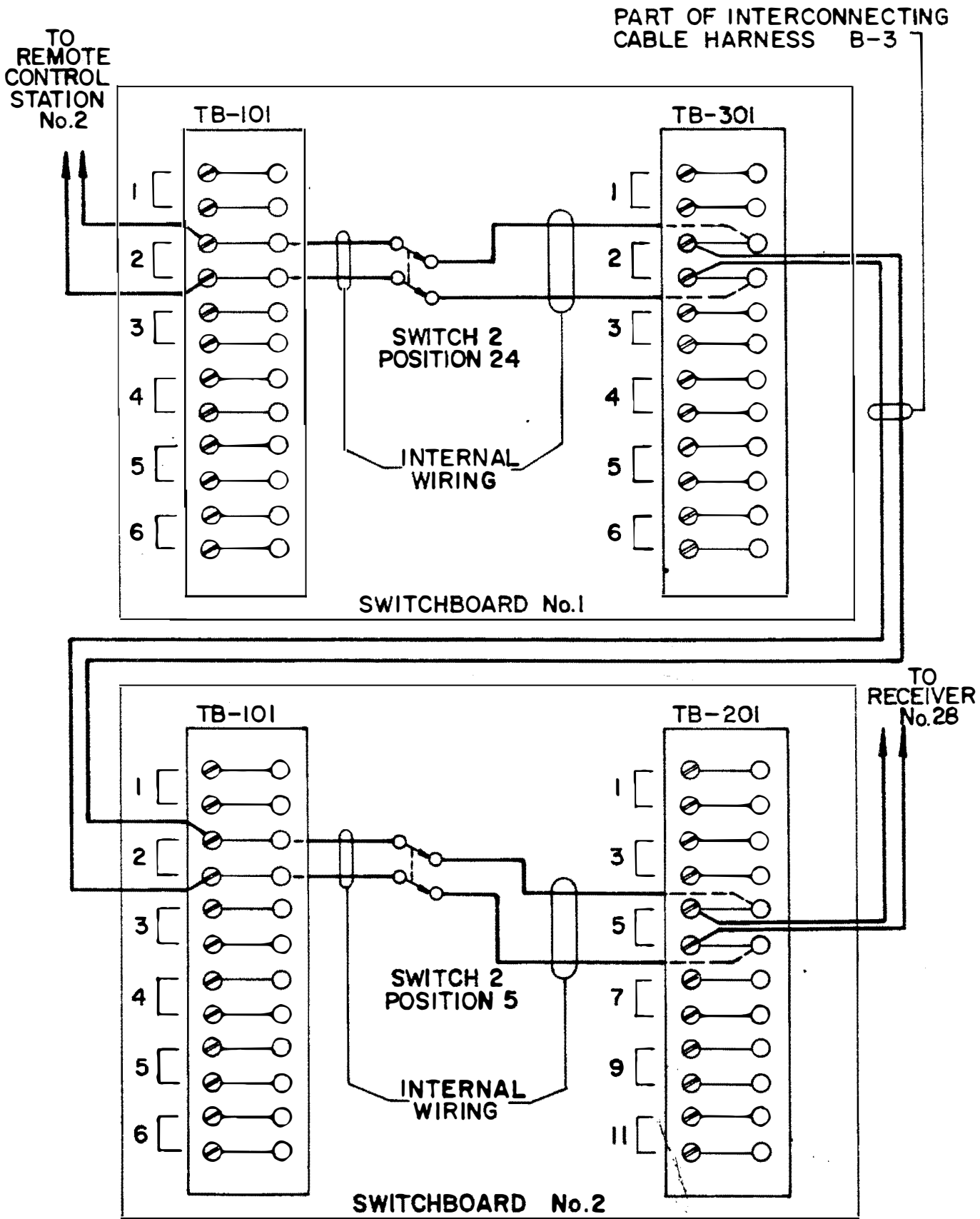


FIG. 2.5 TYPICAL SCHEMATIC DIAGRAM SHOWING OPERATION OF RECEIVER NO. 28 TO REMOTE CONTROL STATION NO. 2.

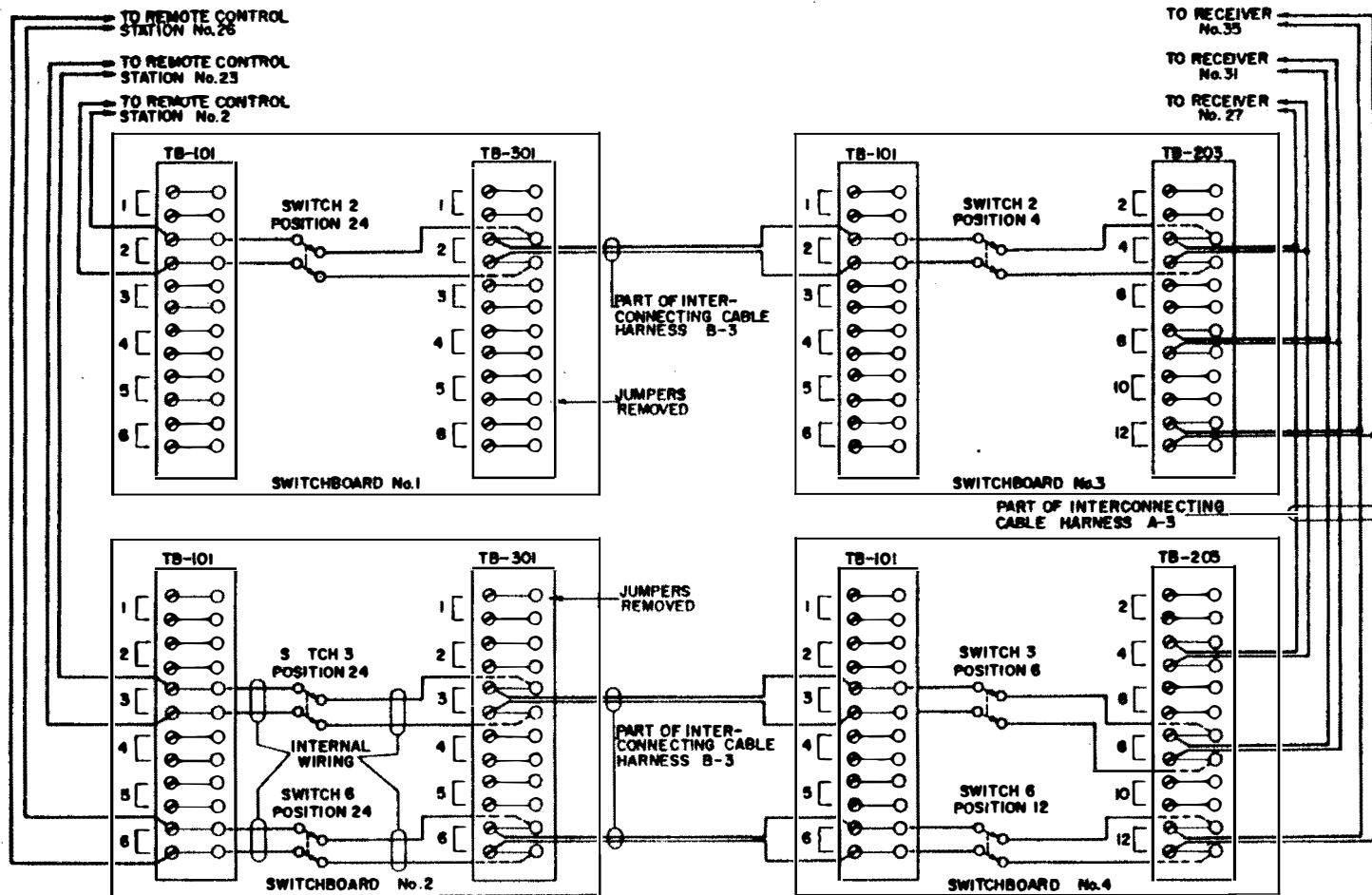


FIG. 2.6 TYPICAL SCHEMATIC DIAGRAM SHOWING OPERATION OF MULTIPLE SWITCHBOARD INSTALLATION.

SECTION 3 INSTALLATION

3.1 LOCATION.

Communication Patching Switchboard SB-2727/SRR may be mounted in standard 19 inch racks or bulkhead mounted. In locating the switchboards for bulkhead mounting consideration must be given to the number of switchboards required for the total number of remote control stations to be connected and the number of receivers to be connected. One switchboard is required for twenty remote control station circuits and twenty-four receiver circuits. Additional switchboards are required if more than twenty remote control stations or more than twenty-four receivers are to be accommodated. Ample allowance must be made for the multiple cables required. Clearance must be maintained for the hinged front panel sections. The clearance must be sufficient to allow the panels to swing about a 90 degree arc to gain access to the switch wafers and terminal boards on the back of the enclosure. See Figure 3.2.

3.2 MOUNTING.

Two brackets are supplied with each switchboard. These are normally supplied attached to the front of the switchboard enclosure. A similar, captive nut, arrangement is provided on the rear sides of the enclosure to which position the two brackets are to be transferred when bulkhead mounting is required. See Figure 3.2.

3.3 CABLE ENTRANCE PLATES.

Flush type removable cable entrance plates are on the top, bottom and rear of the enclosure of each switchboard, for installation of entrance bushings for external connecting cables. In multiple installations entrance plates on adjacent enclosures should be removed to expose the openings for interconnecting cables. See Paragraphs 3.7 and 3.8.

3.4 INSTALLATION WIRING.

Prior to mounting and wiring the enclosure both switch front panel sections are to be removed and stored in a safe place until installation is completed. This is accomplished as follows:—

- A. Loosen the four thumb screws on the right hand side of the panel sections. Swing panels open.
- b. Remove four plugs connecting the panels to the enclosure terminal boards.
- c. Very carefully support the panel and switch assemblies and remove one panel section at a time by removing the four hinge securing screws on the left hand side of each panel section. See Figure 2.1.
- d. When installation is completed re-install the panels, reversing the above procedure.

The two panel sections are interchangeable physically and electrically but it should be noted that if the sections are interchanged the function designation strips must be exchanged to retain the correct order of switch numbers.

3.5 INCOMING REMOTE CONTROL STATION CONNECTIONS.

Connections from remote control stations are to be made, in paired order, to terminal boards TB-101, TB-102, TB-103 and TB-104, designated as "REMOTE LINES." See Figures 3.1 and 2.2.

3.6 INCOMING RECEIVER CONNECTIONS.

Connections from receiver output circuits are to be made, in paired order, to terminal boards TB-201, TB-203, TB-202 and TB-204, designated RECEIVER LINES. See Figures 3.1 and 2.2

3.7 MULTIPLE SWITCHBOARD CONNECTIONS FOR MORE THAN TWENTY REMOTE CONTROL STATIONS.

When an additional switchboard is installed to accommodate more than twenty remote control stations accessory cable harness, symbol W-101, part A-3, (see table 5.1) must be installed. Cable harness A-3 is connected from "RECEIVER LINES" terminal boards in switchboard number one to corresponding terminals on "RECEIVER LINES" terminal boards in switchboard number two. This, in effect, parallels the receiver circuits from switchboard one to switchboard two for selective switching of the receiver circuit to remote control stations connected to switchboard number two. See Figures 2.4 and 2.6.

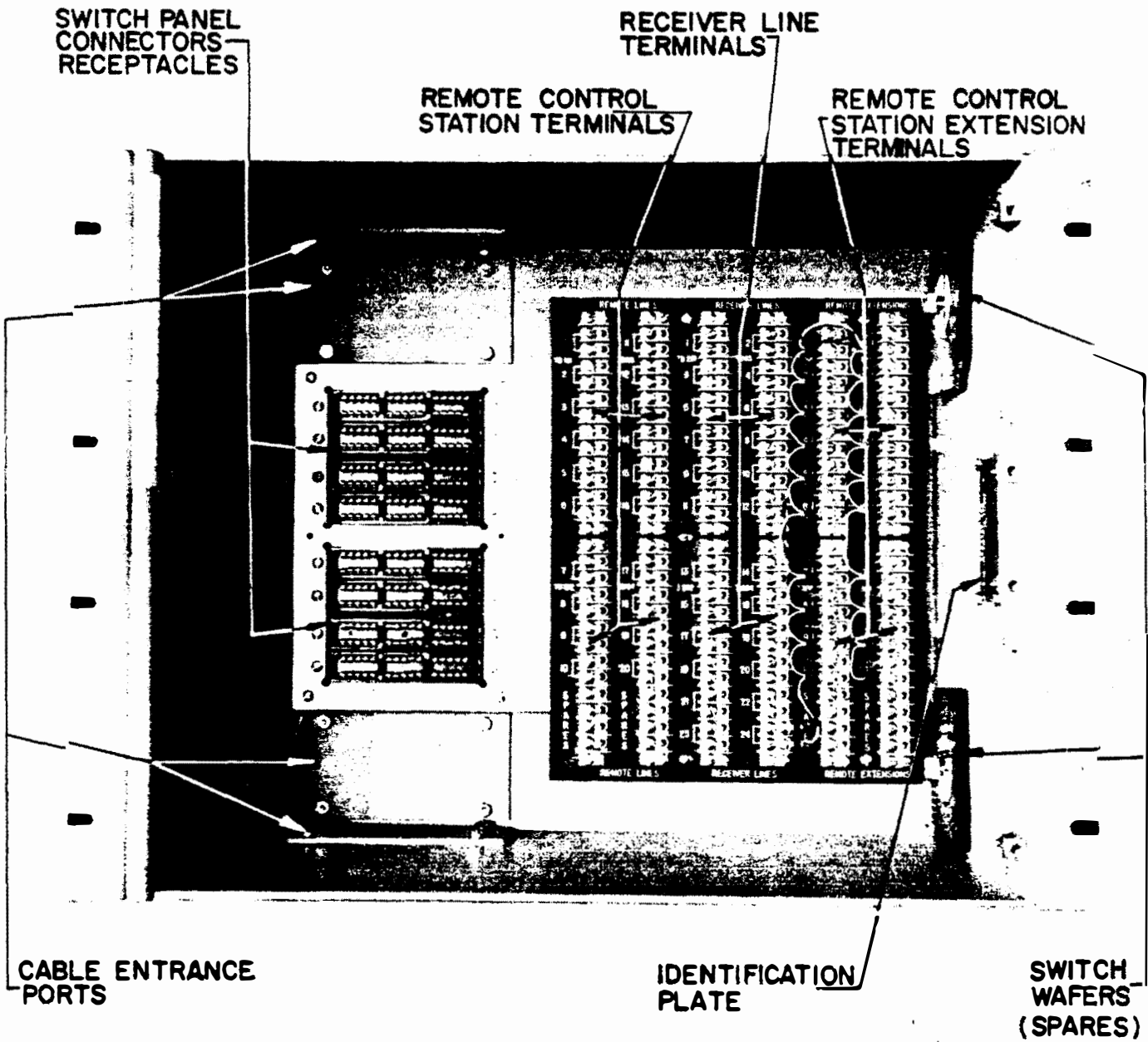
3.8 MULTIPLE SWITCHBOARD CONNECTIONS FOR MORE THAN TWENTY-FOUR RECEIVERS.

When an additional switchboard is installed to accommodate more than twenty-four receivers accessory cable harness, symbol W-102, part B-3, (see table 5.1) must be installed. Cable harness B-3 is connected from "REMOTE EXTENSIONS" terminal boards in switchboard number one to "REMOTE LINES" terminal boards in switchboard number two. Terminal boards designated "REMOTE EXTENSIONS" are supplied with series jumpers wired to provide for the use of switch rotary position twenty-four as a receiver position when only one switchboard is installed. When additional switchboards are used to extend the receiver capability these jumpers must be removed and cable harness B-3 connected to their terminals. By this provision, switch rotary positions number twenty-four in switchboard number one now become extension positions, because of the internal wiring arrangement, permitting remote control station circuits in switchboard one to be switched to receivers connected to switchboard two. See Figures 2.5 and 2.6.

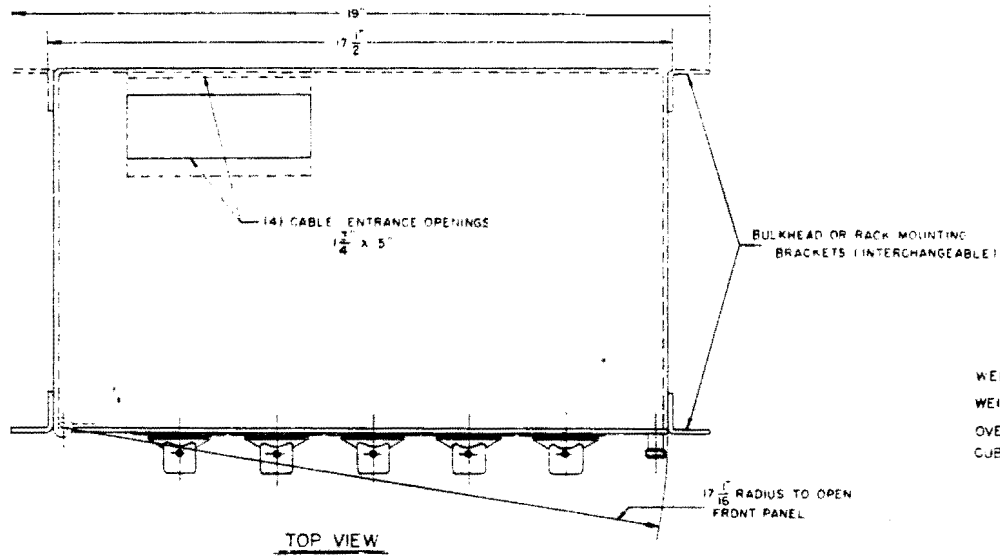
3.9 MULTIPLE SWITCHBOARD CONNECTIONS FOR MORE THAN TWENTY REMOTE CONTROL STATIONS AND MORE THAN TWENTY-FOUR RECEIVERS.

When more than twenty remote control stations and more than twenty-four receivers are in a system, a total of four switchboards must be installed. This will provide circuits for up to forty remote control stations and up to forty-seven receivers.

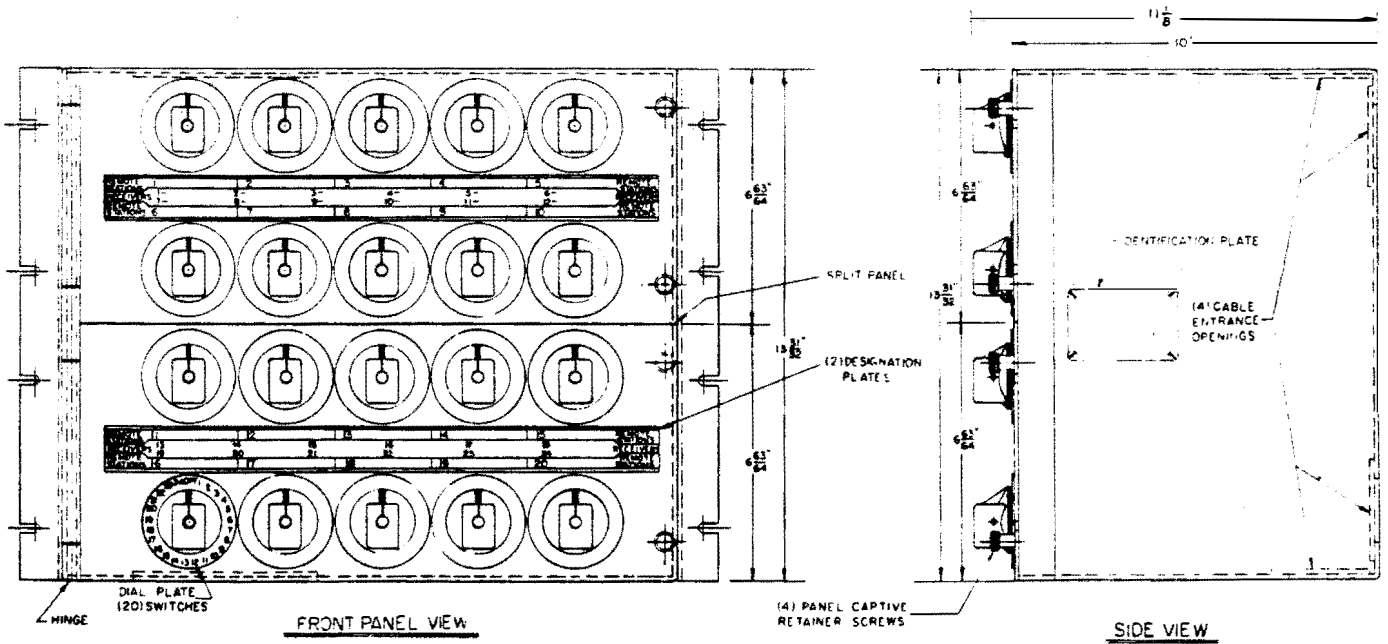
Installation procedures given in paragraphs 3.7 and 3.8 are to be followed. Figure 2.6 illustrates three single pair circuits for this installation and shows connections and operation of receiver number twenty-seven to remote control station number two, receiver number thirty-one to remote control station number twenty-three and receiver number thirty-five to remote control station number twenty-six.



**FIG. 3.1 COMMUNICATION PATCHING SWITCHBOARD
SB-2727/SRR
INSIDE VIEW OF ENCLOSURE SHOWING CONNECTION TERMINALS**



WEIGHT (NET)	44 LBS.
WEIGHT (BOXED)	49 LBS.
OVERALL DIMENSIONS (BOXED)	19 1/2" x 14 1/2" x 12"
CUBICAL CONTENTS (BOXED)	1.97 CU. FT.



**FIG. 3.2 COMMUNICATION PATCHING SWITCHBOARD
SB-2727/SRR
OUTLINE DRAWING**

SECTION 4 MAINTENANCE

4.1 MECHANICAL.

Communication Patching Switchboard SB-2727/SRR should be inspected periodically to insure that all connections, cables, knobs and other parts are firmly secured.

4.2 REPLACEMENT OF SWITCH WAFERS.

CAUTION

BE CERTAIN ALL KNOBS ARE IN THE "OFF" POSITION.

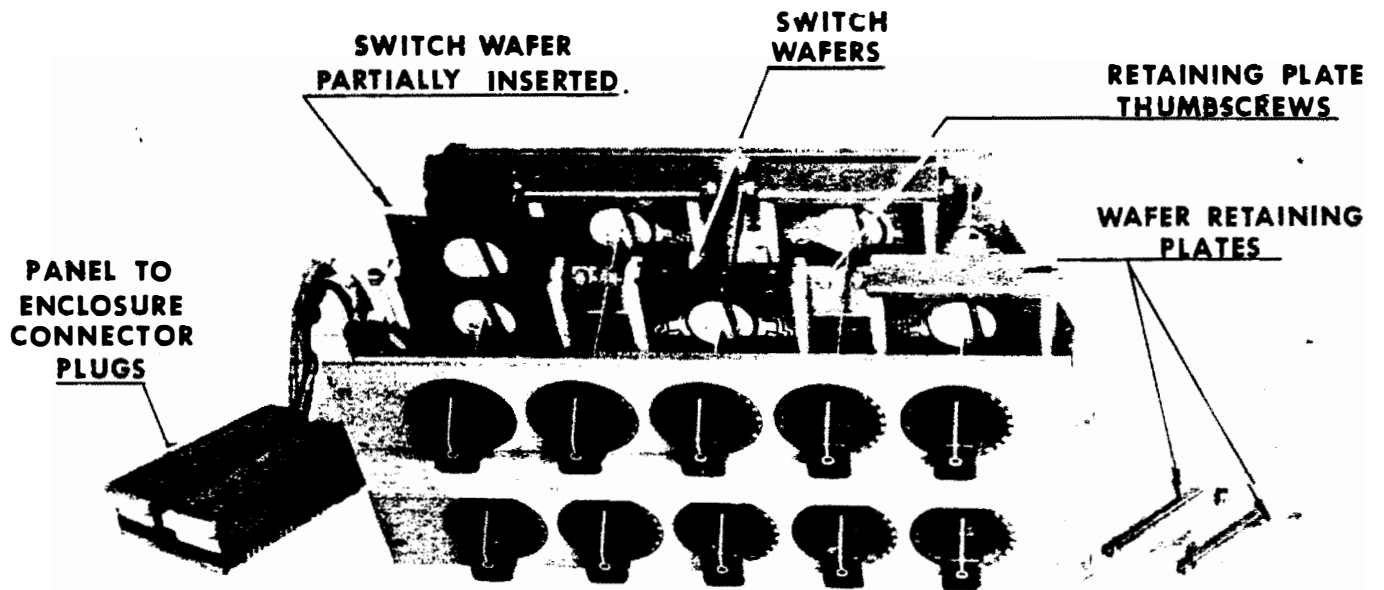
Determine which panel section contains the switch in which a wafer is to be replaced. Open the panel section by loosening two thumb screws on the right hand side. Secure panel in the open position with its supporting bar. Locate switch to be repaired and loosen two thumb screws holding the wafer retaining plate. See Figure 4.1. Using the wafer retaining plate as a tool insert its two small projecting tips into the two holes in the wafer to be replaced. Gently pry the wafer from its receptacle and remove. Position the rotor in the new wafer assembly so that its slots are in alignment; slide the new wafer into position in the guiding grooves and press firmly into receptacle. Replace wafer retaining plate, tighten securing thumb screws and close front panel section.

4.3 CLEANING SWITCH WAFERS.

Remove the wafers as explained in paragraph 4.2. Moisten a clean, lint-free cloth in de-natured alcohol and firmly rub both sides of the printed circuit board until any foreign matter, deposits or arcing smudges are removed.

Take care not to exert pressure on the rotor spring arms and do not let the wiping cloth catch on the arm tips. If, after cleaning, the contacts or insulating material show excessive burning or pitting the wafer assembly must be replaced.

4.4 FIGURE 4.2 SHOWS THE SCHEMATIC DIAGRAM OF THE SWITCHBOARD ASSEMBLY.



**FIG. 4.1 COMMUNICATION PATCHING SWITCHBOARD
SB-2727/SRR
VIEW OF ONE PANEL SECTION SHOWING SWITCH WAFERS.**

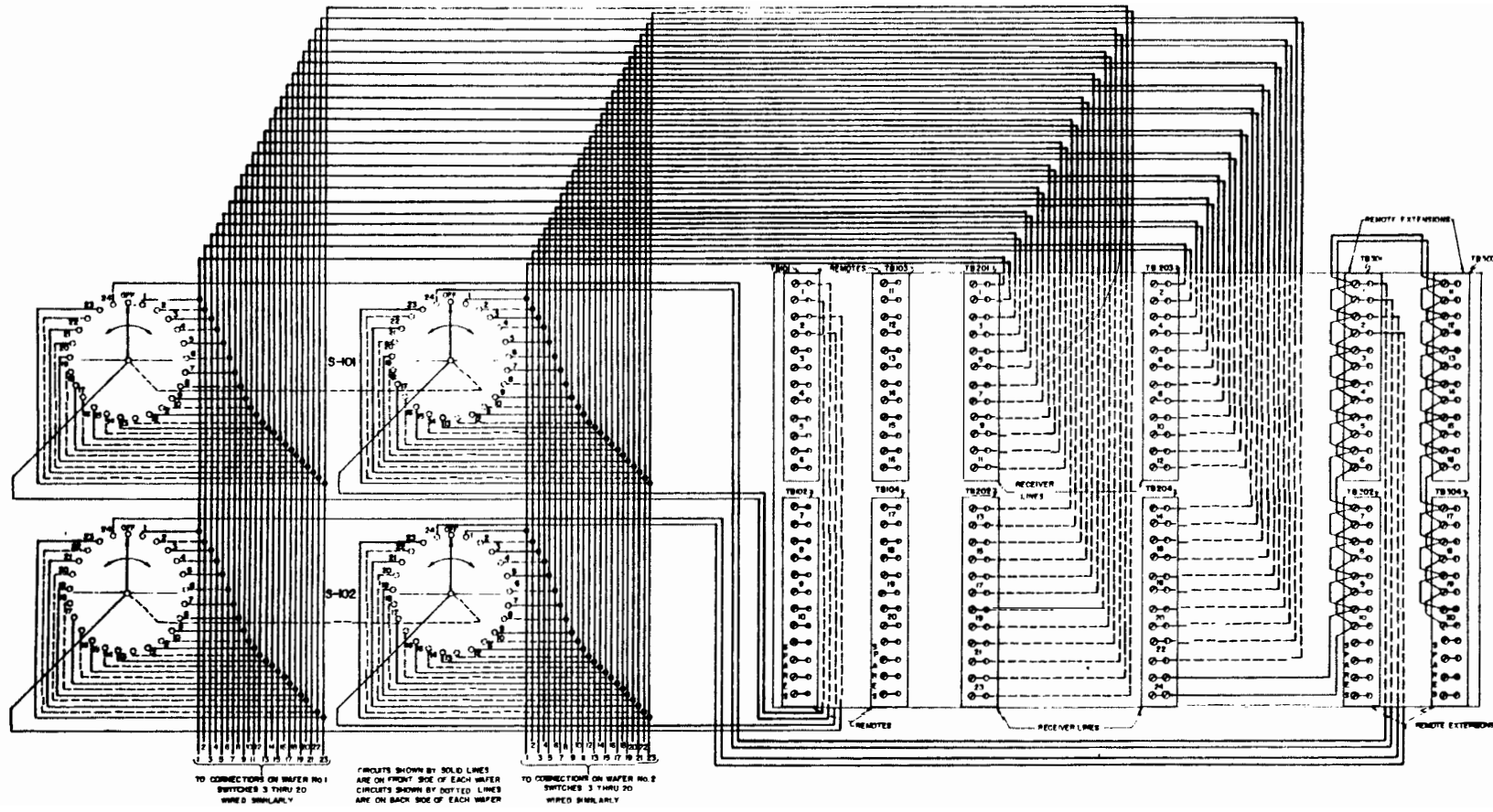


FIG. 4.2 COMMUNICATION PATCHING SWITCHBOARD SB-2727/SRR SCHEMATIC DIAGRAM

SECTION 5 MAINTENANCE PARTS LIST

TABLE 5.1

Reference Designation	Description	Tabel Mfg. Co. Part Number
E-101	Wafer, Switch; Printed Wiring with rotor. 1 circuit, 25 positions.	142-4
J-101	Receptacle, Wafer; 28 terminals. 3 5/16" mounting centers.	142-5
J-102	Receptacle. Connector; 30 terminals. 4 1/16" mounting centers.	130-53
MP-101	Knob; Black, 1 3/4" dia., for 1/4" shaft.	142-6
P-101	Plug, Connector; 60 terminals. Plug assembly complete.	130-52
TB-101 through TB-304	Board, Terminal; 12 terminals, barrier type. 4 7/8" mounting centers.	142-7
W-101	Cable Harness, Interconnecting. A-3.	142-8
W-102	Cable Harness, Interconnecting. B-3.	142-9