NON-REGISTERED NAVSHIPS 93516

TECHNICAL MANUAL

FOR

TRANSMITTER TRANSFER SWITCHBOARD

SB-988 /SRT

TABET MANUFACTURING CO., INC.

NORFOLK, VIRGINIA

CONTRACT N126-091617

DEPARTMENT OF THE NAVY

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TRANSMITTER TRANSFER SWITCHBOARD

SB-988/SRT

SECTION 1

GENERAL INFORMATION

1.1 INTRODUCTION.

This Technical Manual describes the operation, installation and maintenance of Transmitter Transfer Switchboard SB-988/SRT. It is intended to provide operating and maintenance personnel with the necessary information to utilize the equipment for its primary function of transferring remote control stations to radio transmitters such as are used on shipboard and in shore stations.

1.2 TECHNICAL MANUAL COVERAGE.

This Technical Manual contains data pertaining to Transmitter Transfer Switchboard SB-988/SRT and to its use as replacement for Transmitter Transfer Switchboard SB-83/SRT.

1.3 PURPOSE AND BASIC PRINCIPLES.

The purpose of the equipment is to provide facilities for switching the standard Navy 12 wire transmitter control circuits so that remote control stations can be selectively transferred to a choice of radio transmitters. The equipment incorporates ten, 12-circuit, rotary selector switches having eight rotary positions, permitting the transfer of any one or all of ten remote control stations to any one of six transmitters. Arrangement of the circuitry is such that it is impossible to parallel transmitter control circuits. Facilities are provided for transferring all circuits to additional Transmitter Transfer Switchboards SB-988/SRT when more than ten remote control stations, or when when more than six transmitters, are installed in the system.

1.4 REFERENCE DATA.

a. Transmitter Transfer Switchboard SB-988/SRT
b. Contract: N126-091617
c. Contractor: Tabet Manufacturing Co., Inc.
Norfolk 12, Va.
d. Inspector: Inspector of Naval Material,
Baltimore, Md.
e. Number of Packages: One complete unit per package.
f. Cubical Contents: 1.18 cu. ft.
g. Total Weight: 40 lbs.
h. Current Capacity: 2 amperes or less
j. Breakdown Voltage of Unit: In excess of 1,000 volts

Table 1-1 Equipment Supplies.

Quan. Per Unit	Name of Unit	Navy Type Desg.	Overall Dimensions (In.)			Vol. Cu. In.	Weight
			Height	Width	Depth		
1	Transmitter Transfer Switchboard	SB-988/SRT	17⅞	10	11⅜	2033¼	34 lb.
2	Technical Manuals						

1.5 DESCRIPTION OF UNITS.

A photograph of the unit is shown in Figure 1-1.

Transmitter Transfer Switchboard SB-988/SRT consists of an unventilated aluminum cabinet having a hinged front panel and removable cable entrance plates on the two sides, top and bottom (see Figures 1-1 and 3-1).

The cabinet contains solder type terminal boards for terminating cabling from switch receptacles and for connecting external lines to remote control stations and transmitters and interconnecting cables.

The cabinet has ten rotary switches, stacked in two vertical columns of five each. The switches are wired so that transmitter circuits are parallel in the two vertical columns. The common wiper contact of each rotary switch is wired for connection to a remote control station which allows for a total of ten remote control stations per switchboard.

1.6 INTERNAL WIRING

Internal connections for the ten rotary switch units in Transmitter Transfer Switchboard SB-988/SRT are made to the underside of two banks of solder type connection terminals, located in the cabinet base. Connections to external equipments are to be made to the top terminals of each bank. (See Figures 1-2 and 1-3).

The bottom bank of terminals is secured to the cabinet base and comprises sixteen strips of twelve terminals each. The top bank of terminals is secured to threaded spacers on top of the bottom bank of terminals and comprises ten strips of twelve terminals each. The bottom bank of terminal stripes is numbered T1 through T6 (each strip relating to a remotely controlled transmitter) and R1 through R10 (each strip relating to a remote control station).

Each of the ten terminal strips in the top bank (numbered X1 through X10) is connected internally to rotary position "X" of its respective switch unit. This is for the purpose of connecting terminal strips X1 through X10 to corresponding R1 through R10 terminal strips in additional Transmitter Transfer Switchboards SB-988/SRT.

1.7 SWITCH ASSEMBLY

A rotary switch consists of 6 rotary-switch wafers. The conductors of rotary-switch wafers are printed wiring on approved phenolic material. Contacts are radially arranged on both sides of the phenolic wafers and positioned so that an active contact segment on one side is directly opposite an active contact segment on the other side. Each switch has 7 active contact segments on each side, and 1 "off" position. Thus, each wafer controls 2 circuits. The active and inactive segments are arranged in relation to the "off" position 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 by a double, insulated, rotary arm.

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

1.8 SWITCH WAFERS

The printed wiring wafers are individually mounted in a frame so that the wafers 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 to the external cabling.

When the switch is in the "off" position, a slot in the 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 framework holds the switch wafers in proper alignment by slots or grooves into which the wafers can be easily inserted and locked into place. The framework contains a detent device to assure positive positioning of the contacts of the mechanism on the active segments of the switch wafers.

SECTION 2

OPERATING INSTRUCTIONS

2.1 GENERAL

Each switch operating knob corresponds to a remote control station (see Figure 3-2). Each rotary switch position (one through six) corresponds to a controlled transmitter. Rotary position X corresponds to an extension connecting all remote station circuits to additional Switchboards. Rotary postion OFF disconnects all remote station circuits.

2.2 SINGLE UNIT INSTALLATION

When it is required, for example, that remote control station number two is to have control of transmitter number three; switch knob designated number two is rotated until its pointer indicates position three on its respective dial plate (See Figure 2-1). Any of the remote stations may thus be connected to control any of the transmitters connected to the system (See Figure 2-2).

2.3 MULTIPLE UNIT INSTALLATION

When, in a multiple switchboard installation, it is required, for example, that remote station number two is to have control of transmitter number nine; switch knob designated number two is placed so that its pointer indicates position X; switch knob designated number two on the appropriate additional switchboard panel is rotated until its pointer indicates position nine. This connects remote station number two to the control circuits of transmitter number nine. (See Figure 2-3).

When, in a multiple switchboard installation, it is required, for example, that remote station number twelve is to have control of transmitter number six, switch knob designated number twelve on the appropriate additional switchboard panel is rotated until its pointer indicates position number six (See Figure 2-4).

Following the above procedures any remote control station can be switched to control any transmitter connected in the system.

SECTION 3

INSTALLATION

3.1 LOCATION

In locating Transmitter Transfer Switchboards SB-988/SRT consideration must be given to the number of switchboards required for the total remote control stations, number of transmitters to be connected, and ample allowance for the multiple conductor cables necessary. Four 13/32 inch diameter holes are provided in the cabinet for mounting. Clearance must be maintained for the hinged front panel. The clearance must be sufficient to allow the panel to swing about a 90 degree arc to provide accessibility to the terminal boards on the back of the cabinet. (See Figure 3-1).

3.2 CABLE ENTRANCE PLATES

Removable access plates are provided on top, bottom and sides, of each switchboard for installation of entrance bushings for external control cables (See Figure 3-1). In multiple installations, access plates on adjacent cabinets should be removed to expose the openings for interconnecting cables. See paragraph 3.7.

3.3 EXTERNAL TRANSMITTER CABLE CONNECTIONS

Connections from the control circuits of transmitters are to be made, in order, to terminal strips T1 through T6. (See Figures 3-3 and 3-4). To obtain access to the bottom bank of terminals remove six screws holding the top bank of terminals to the supporting spacers, lift the top bank of terminals away from the base of the cabinet and lay them on the back of the switch housings. All transmitter cable connections are made at this time, including incoming lines from transmitter equipments and outgoing cable B-1, if used. (See paragraph 3-5).

3.4 EXTERNAL REMOTE CONTROL STATION CONNECTIONS

Connections from remote control stations are to be made, in order, to terminal strips R1 through R10. (See Figures 3-3 and 3-4). Connections from X1 through X10 in horizontally related additional switchboards should be made, in order, to terminal strips R1 through R10. These latter connections provide for the control of from one to six additional transmitters by the remote control stations connected to the first switchboard.

Replace the top bank of terminals. Make all outgoing A-1 and A-2 cable connections, if used, to appropriate X terminals.

3.5 EXTENDING REMOTE CONTROL STATIONS

When more than ten remote control stations are to be connected, additional Transfer Switchboards SB-988/SRT must be installed. One additional switchboard (in vertical relation to the first switchboard) must be installed for each ten remote control stations added. See Figure 3-5 for installation details of cable B-1 when more than 10 Remote Control Stations are required.

3.6 EXTENDING TRANSMITTER STATIONS

When more than six transmitters are to be connected, additional Transmitter Transfer Switchboards SB-988/SRT must be installed. One additional switchboard (in horizontal relation to the first switchboard) must be installed for each six transmitters added. See Figure 3-7 for installation details of cables A-1 and A-2 when more than six Transmitters are to be controlled by Remote Control Stations.

3.7 INTERCONNECTING CABLES

Cable Assembly W-101 (See Table t-1) consists of two interconnecting cables designated A-1 and A-2. It is required for each Transmitter Transfer Switchboard SB-988/SRT, excluding number one, to be installed in horizontal relation. See Figure 3-7 for installation details of interconnecting cables A-1 and A-2 when control of more than six transmitters is required. (See Figure 3-9 for Cable Assembly W-101).

Cable Assembly W-102 consists of interconnecting cable designated B-1. It is required for each Transmitter Transfer Switchboard SB-863/SRT, excluding number one, to be installed in vertical relation. See Figure 3-5 for installation details of interconnecting cable B-1 when more than ten remote control stations are required. (See Figure 3-10 for Cable Assembly W-102). See paragraph 3-8 for installation of interconnecting cables to SB-83/SRT.

3.8 REPLACEMENT OF TRANSMITTER TRANSFER SWITCHBOARD SB-83/SRT WITH TRANSMITTER TRANSFER SWITCHBOARD SB-988/SRT

If proper precautions are observed Transmitter Transfer Switchboard SB-988/SRT can be used as a direct replacement for Transmitter Transfer Switchboard SB-83/SRT.

Group installations should not have a Transmitter Transfer Switchboard SB-83/SRT installed between incoming circuits from remote control stations and Transmitter Transfer Switchboard SB-988/SRT. Damage will result if an interposed Transmitter Transfer Switchboard SB-83/SRT is connected to transmitter circuits at the time a circuit is selected on a Transmitter Transfer Switchboard SB-988/SRT.

All Transmitter Transfer Switchboards SB-83/SRT located between a Transmitter Transfer Switchboard SB--988/SRT and incoming remote control station circuits, must have its control knob in the off position before a circuit selection is made on Transmitter Transfer Switchboard SB-988/SRT. Conversely, it is required that Transmitter Transfer Switchboard SB-988/SRT be in the off position before selecting circuits on an interposing Transmitter Transfer Switchboard SB-83/SRT.

Due to the necessary precautions involved, the following replacement plans are generally recommended.

In a group installation in which Transmitter Transfer Switchboard SB-988/SRT is to be used as replacement for Transmitter Transfer Switchboard SB-83/SRT, all Transmitter Transfer Switchboards SB-988/SRT being incorporated in the group shall be so placed that they are always the first switchboards to which incoming remote control station control lines are terminated. Transmitter Transfer Switchboard SB-83/SRT should not be located between a Transmitter Transfer Switchboard SB-988/SRT and remote control station incoming lines.

Assume that a bank of switchboards of any number have the control cables from all remote control stations entering from the left hand side of the bank of switchboards: Transmitter Transfer Switchboards SB-988/SRT should be installed starting at the left hand side of the bank; Transmitter Transfer Switchboards SB-83/SRT should always be placed to the right of Transmitter Transfer Switchboards SB-988/SRT; and a Transmitter Transfer Switchboard SB-83/SRT should not be installed in the group between any two Transmitter Transfer Switchboards SB-988/SRT.

Figures 3-12 and 3-13 show typical installation arrangements that meet the above requirements.

Take as an example an existing installation containing only Transmitter Transfer Switchboards SB-83/SRT, where it is required to replace one or more with Transmitter Transfer Switchboards SB-988/SRT. It will be necessary that all Transmitter Transfer Switchboards SB-83/SRT, connected in the circuits between the type SB-83/SRT to be replaced and incoming control lines from remote control stations, also be removed and replaced with Transmitter Transfer Switchboards, SB-988/SRT. It is imperative that no Transmitter Transfer Switchboard SB-83/SRT be installed between any Transmitter Transfer Switchboard SB-988/SRT and incoming remote control lines. Figure 3-12 shows the method of installation using these procedures.

For example a bank of 8 Transmitter Transfer Switchboards SB-83/SRT, having four switchboards in horizontal order and 2 switchboards in vertical order, require replacement of the third switchboard, from remote control station incoming lines, in the first horizontal row. In this case it will be necessary to remove the two Transmitter Transfer Switchboards SB-83/SRT that are interposed, and replace with two Transmitter Transfer Switchboards SB-988/SRT. (See Figure 3-12).

Assume that in the previous example it is required to replace the second switchboard from remote control station incoming lines, in the second horizontal row. In this case it will be necessary to also remove the one Transmitter Transfer Switchboard SB-83/SRT that is interposed, and replace with a Transmitter Transfer Switchboard SB-988/SRT. (See Figure 3-12).

Cable Assembly W-104 (See Table 5-1) consists of two interconnecting cables designated A-1-A and A-2-A. It is required for connecting each Transmitter Transfer Switchboard SB-988/SRT to each Transmitter Transfer Switchboard SB-83/SRT, installed in horizontal relation. (See Figures 3-8 and 3-14).

Cable Assembly W-103 (See Table 5-1) consists of one interconnecting cable designated B-1-B. It is required for connecting each Transmitter Transfer Switchboard SB-988/SRT to each Transmitter Transfer Switchboard SB-83/SRT, installed in vertical relation. (See Figure 3-11).

3.9 MARKING OF TRANSMITTER AND REMOTE CONTROL STATION

Each of the ten switch units in Transmitter Transfer Switchboard SB-988/SRT, corresponds to a remote control station. The designation of remote control stations should, at the time of installation, be engraved on the engraving strip, adjacent to the respective switch knob. (See Figure 3-2).

Rotary switch positions one through six corresponds to a transmitter control circuit. The designation of the transmitter should, at the time of installation, be engraved on the engraving plate in the order of switch position rotation.

The X, or seventh, rotary position of each switch unit corresponds to an extension to additional transmitter control circuits and may be so engraved on the engraving plate at the time of installation of additional Radio Transmitter Transfer Switchboards, SB-988/SRT.

Transmitter Transfer Switchboards SB-998/SRT are furnished with dial plates having rotary position numbers one through six. The plates are reversible, having rotary position numbers seven through twelve on the reverse side. In installations having two switchboards, mounted in horizontal relation, for the purpose of adding additional transmitters seven through twelve, the dial plates should be reversed to obtain appropriate rotary position numbers on the second switchboard.

SECTION 4

MAINTENANCE

4.1 REPLACEMENT OF SWITCH WAFERS

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

Lower front panel to a horizzontal position. Locate switch in which wafer is to be replaced and remove the single screw holding the wafer retaining plate (see Figure 3-3) and slide the plate out. Using this cover plate, insert the two projecting tips into the two holes provided in the wafer to be removed, and gently pry the wafer loose from its receptacle. Slide the wafer out from its guiding grooves. Position the rotor in the new wafer assembly so that its slots are in alignment; slide the new wafer assembly into position in the grooves and press firmly into receptacle. Replace wafer retaining plate and close frontpanel.

4.2 CLEANING OF SWITCH WAFERS.

Remove the wafer as explained in paragraph 4.1. 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 phenolic material show excessive burning or pitting the wafer must be replaced.

4.3 REPLACEMENT OF SWITCH RECEPTACLES

Lower front panel to a horizontal position. Remove all five receptacle retaining clips (See Figure 3-3) from the five switches on the side of the panel containing the defective receptacle. Each receptacle retaining clip is held with two screws. Slide out the cable retaining rod, located near the panel hinge allowing the cables to be free. Lift out each row of five receptacles by sliding upward and out until the row containing the defective receptacle is reached. Note the order in which the connecting wires are soldered to the receptacle and clip off each one close to the terminals. Strip ¼ inch of insulation from the removed wires, tin lightly with solder, and reconnect to a new receptacle in the same order that they were removed. Carefully solder all terminals and replace all receptacles in the reverse order that they were removed. Replace the cable retaining rod and the five receptacle retaining clips.

SECTION 5

REPLACEMENT PARTS LIST

5.1 INTRODUCTION

Table 5-1 is a replacement parts list which includes the reference Designation, Descriptions and the Contractors Number of the maintenance parts.

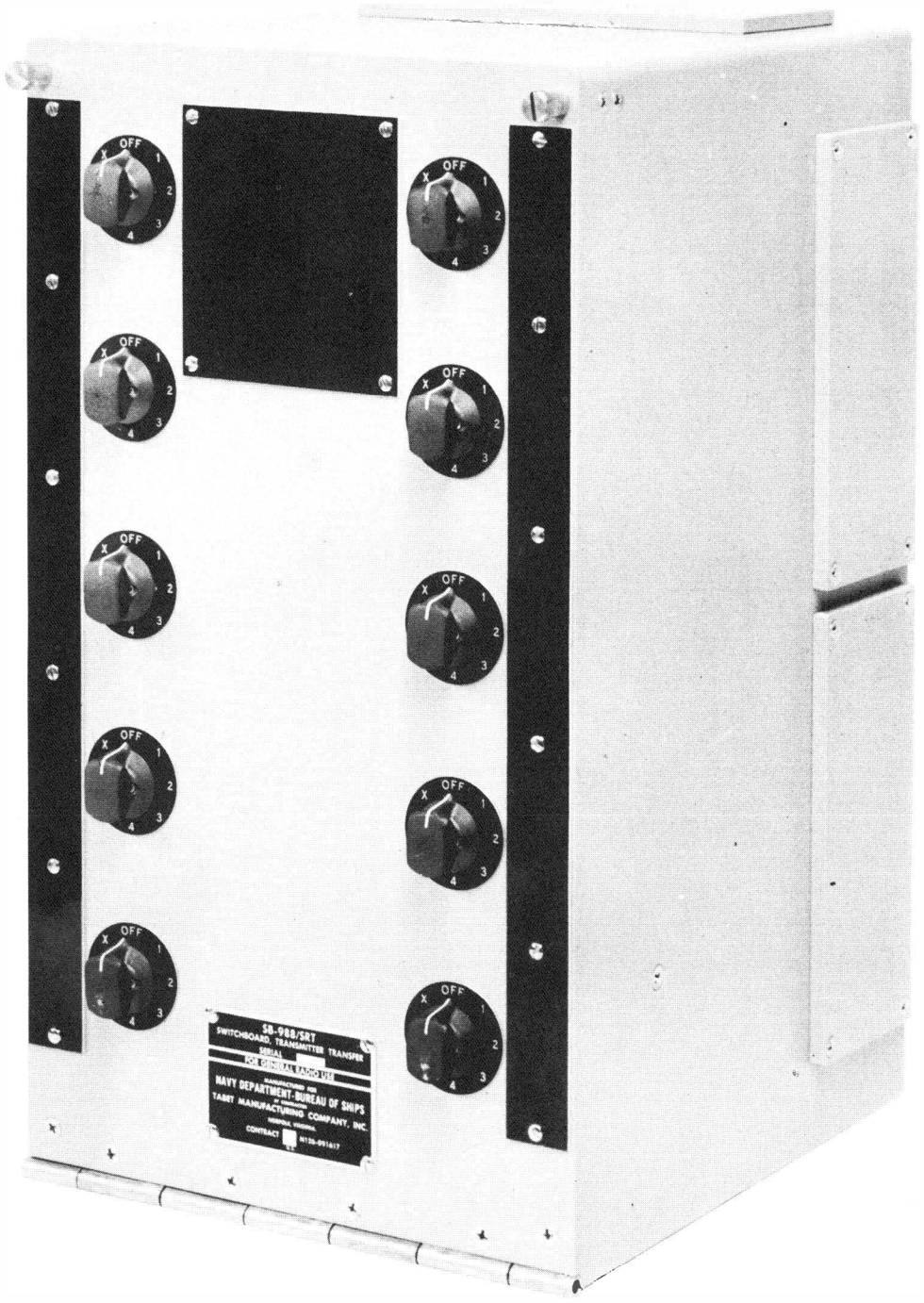
New Stock Number Identification Tables (SNIT's) issued by the Electronics Supply Office include Federal Stock Numbers and Source, Maintenance, and Recoverability Codes. Therefore, reference shall be made to the SNIT for this information.

SECTION 5

REPLACEMENT PARTS LIST

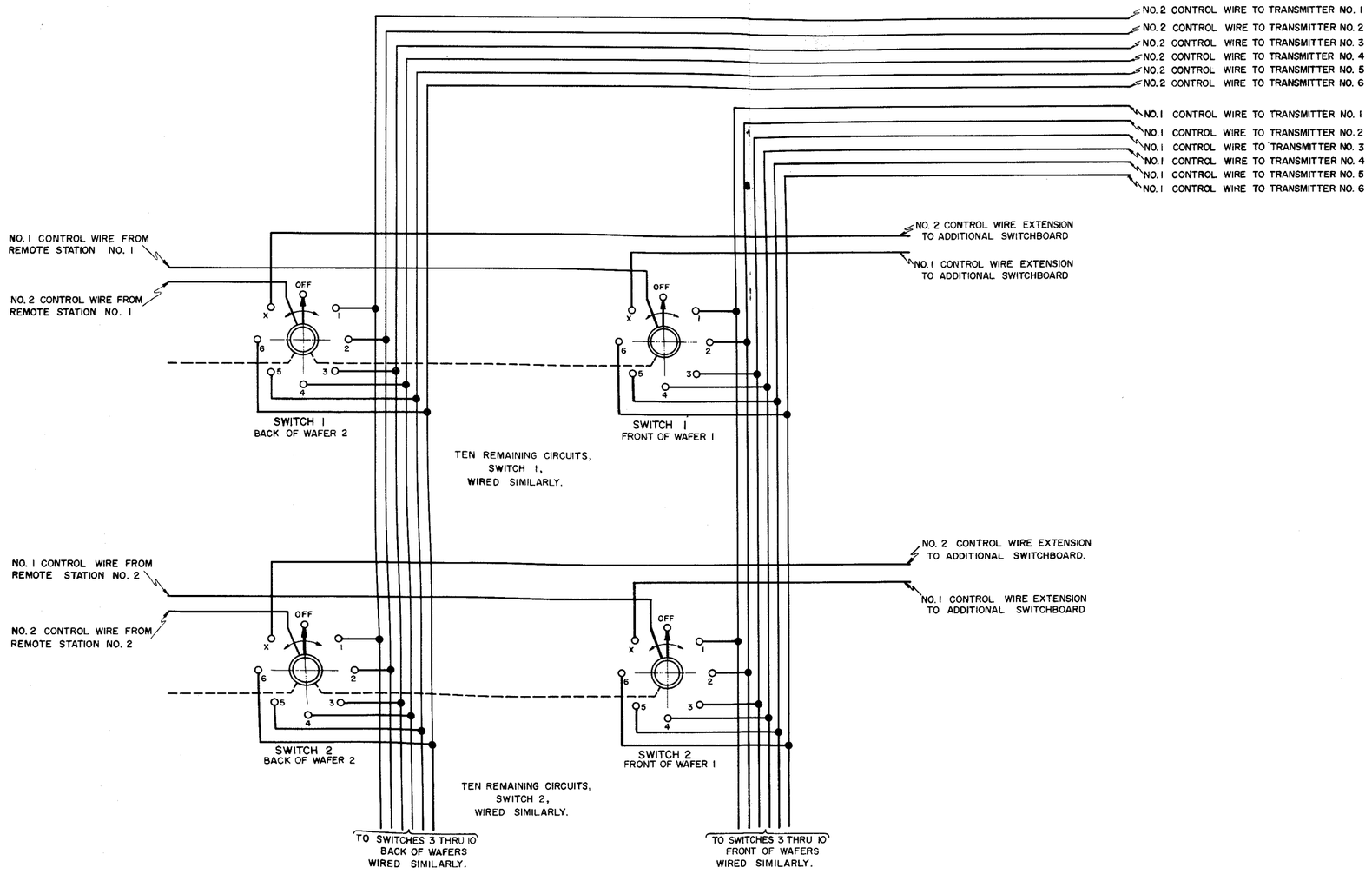
Table 5-1

Reference Designation	Description	Tabet Mfg. Co., Inc. Part Number
E-101	Wafer, Switch: Printed Circuit with integral rotor mechanism, 2 circuits, 8 positions; 2½" x 2½" x 9/32" overall.	121-1001-49
J-101	Receptacle: Switch Wafer Connector; molded phenolic; 16 terminals; 2 23/32" long x ½" wide x ¾" deep; 2 mounting holes on 2 11/32" mounting centers.	121-1001-2A
MP-101	Knob: Black phenolic skirted with pointer; 1" diameter skirt; overall dimensions 1⅛" diameter x ⅝" high; two set screws located at 45 and 180 degrees from pointer, brass insert; for ¼" diam. shaft.	121-1001-46
TB-101	Board Terminal: Laminated phenolic with 12 solder post type terminals on ⅜" centers; Terminals numbered 1 through 12: overall dimensions 9/16" wide x 5⅜" long x 11/16" deep; Two mounting holes .150" diameter on 5" mounting centers.	121-1001-40
W-101	Cable Assembly: Consists of two cable harnesses A-1 and A-2.	125-1001-55
W-102	Cable Assembly: Consists of one cable harness B-1.	125-1001-56
W-103	Cable Assembly: Consists of one cable harness B-1-B.	125-1001-57
W-104	Cable Assembly: Consists of two cable harnesses A-1-A and A-2-A.	125-1001-58



TRANSMITTER TRANSFER SWITCHBOARD
SB-988/SRT
VIEW SHOWING FRONT, SIDE AND TOP OF UNIT

FIG. 1-1

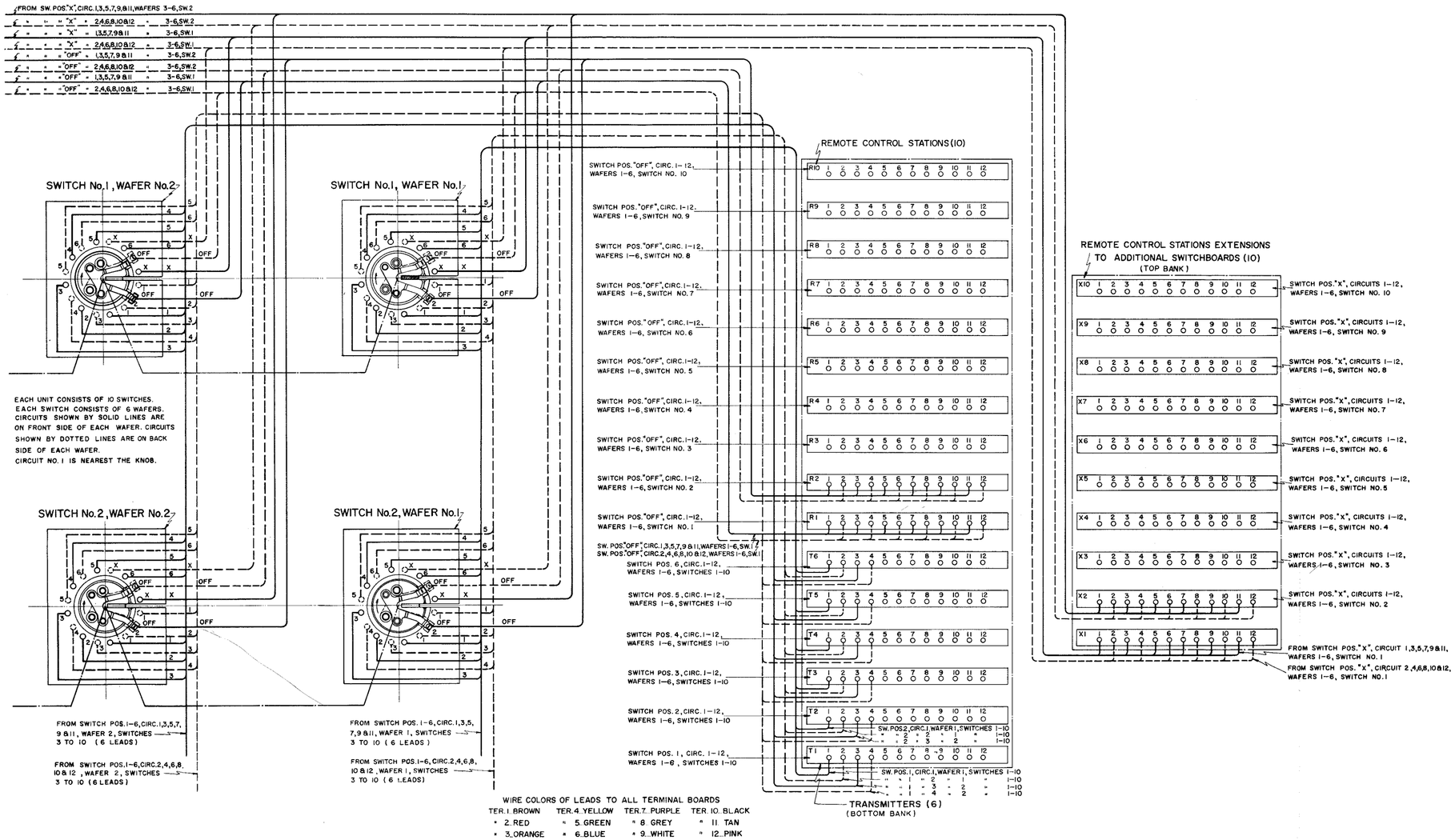


TRANSMITTER TRANSFER SWITCHBOARD
SB-988/SRT

SCHEMATIC DIAGRAM

TYPICAL SWITCH WAFER CIRCUITS

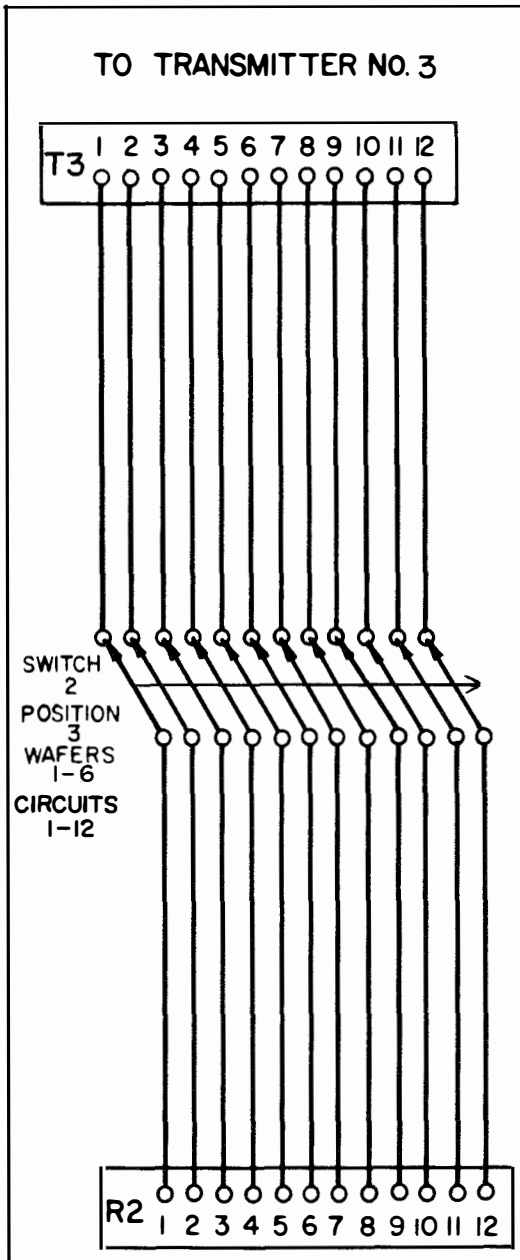
FIGURE 1-2



TRANSMITTER TRANSFER SWITCHBOARD SB-988/SRT

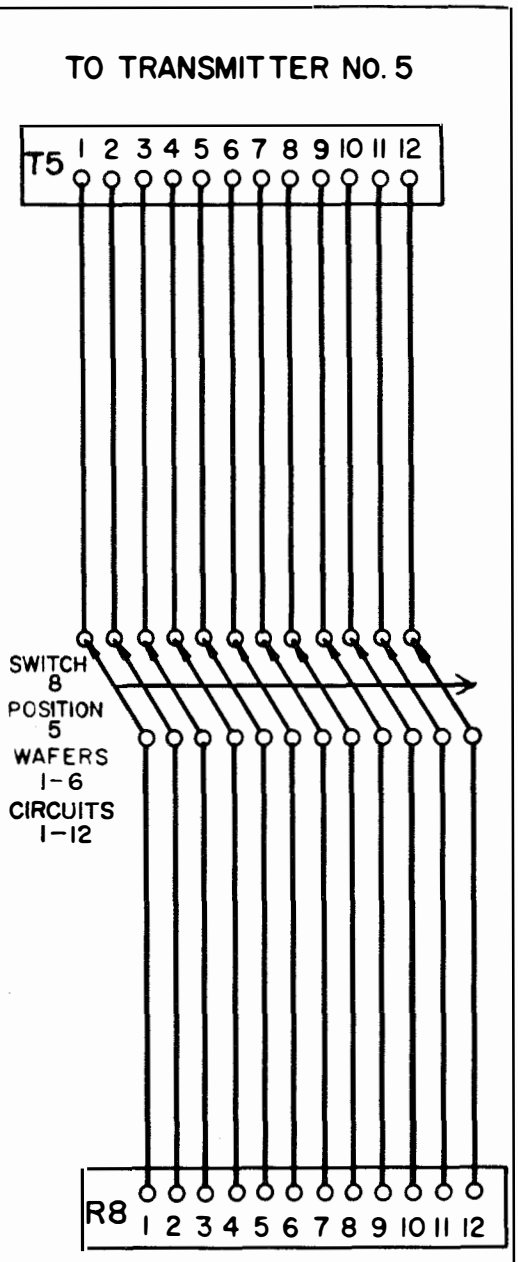
WIRING DIAGRAM

FIGURE 1-3



SIMPLIFIED SCHEMATIC DIAGRAM SHOWING OPERATION OF TRANSMITTER No. 3 FROM CONTROL STATION No. 2

FIGURE 2-1



SIMPLIFIED SCHEMATIC DIAGRAM SHOWING OPERATION OF TRANSMITTER No. 5 FROM CONTROL STATION No. 8

FIGURE 2-2

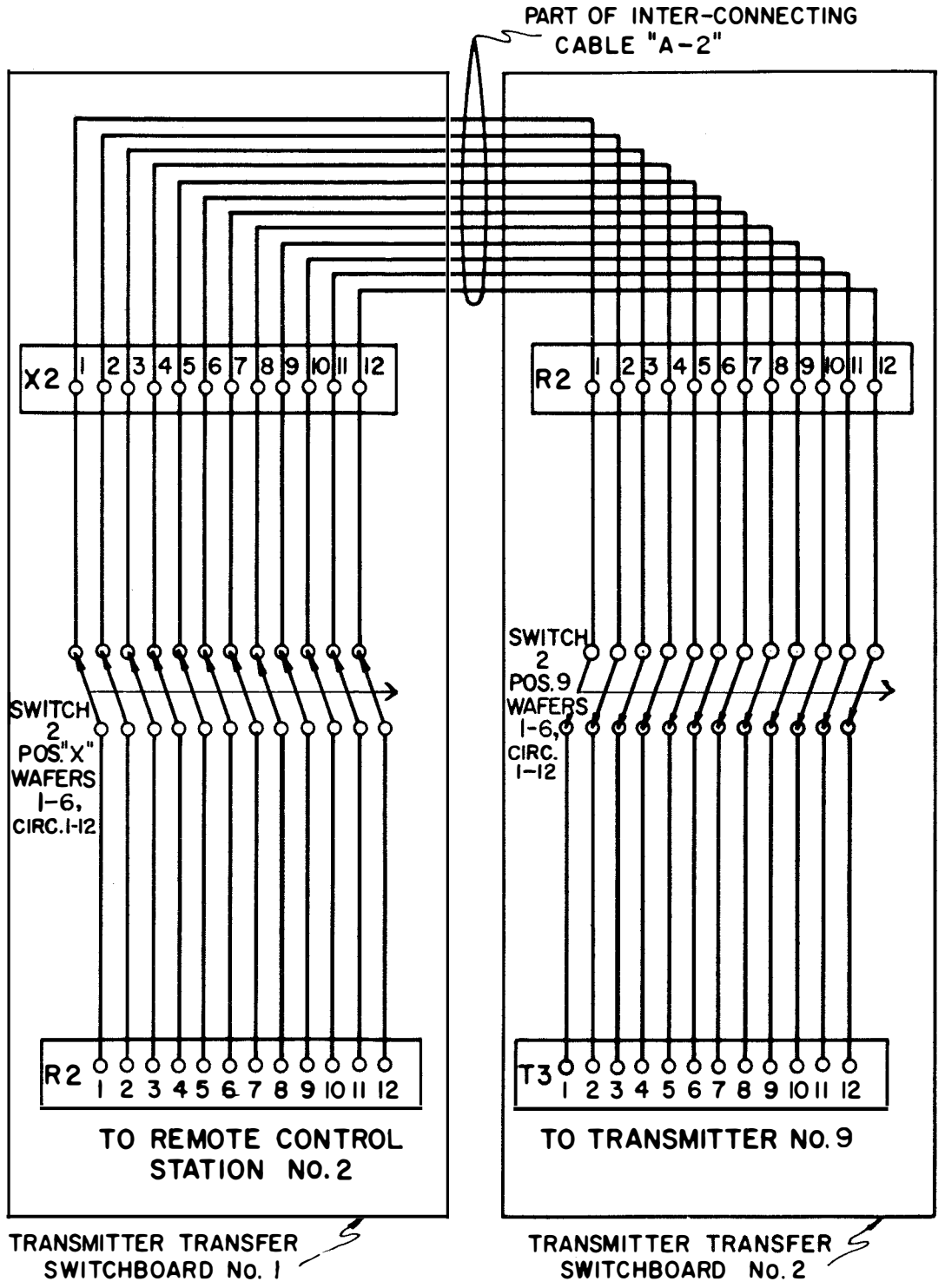


FIGURE 2-3 SIMPLIFIED SCHEMATIC DIAGRAM SHOWING OPERATION OF TRANSMITTER NO. 9 FROM REMOTE CONTROL STATION NO. 2

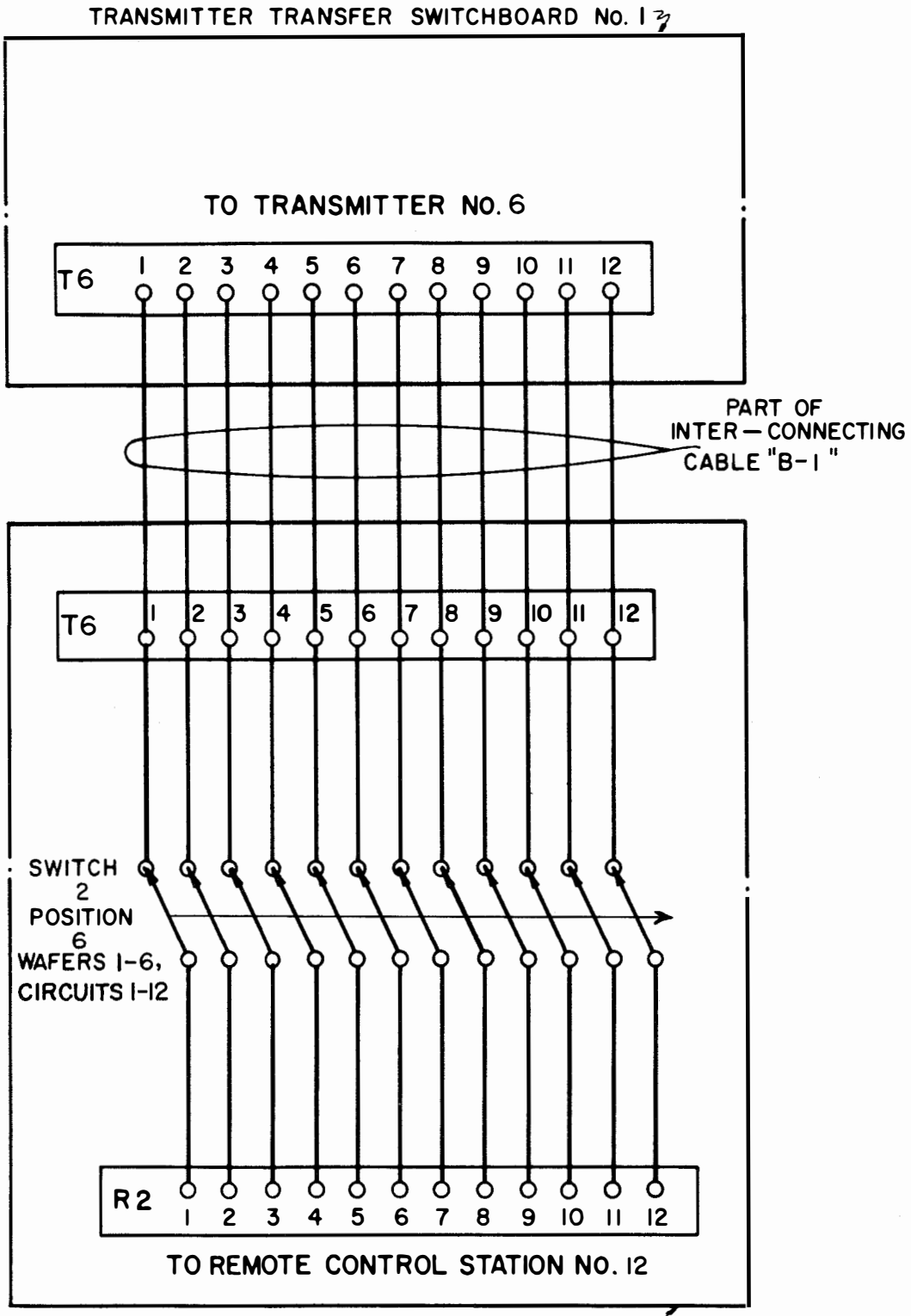
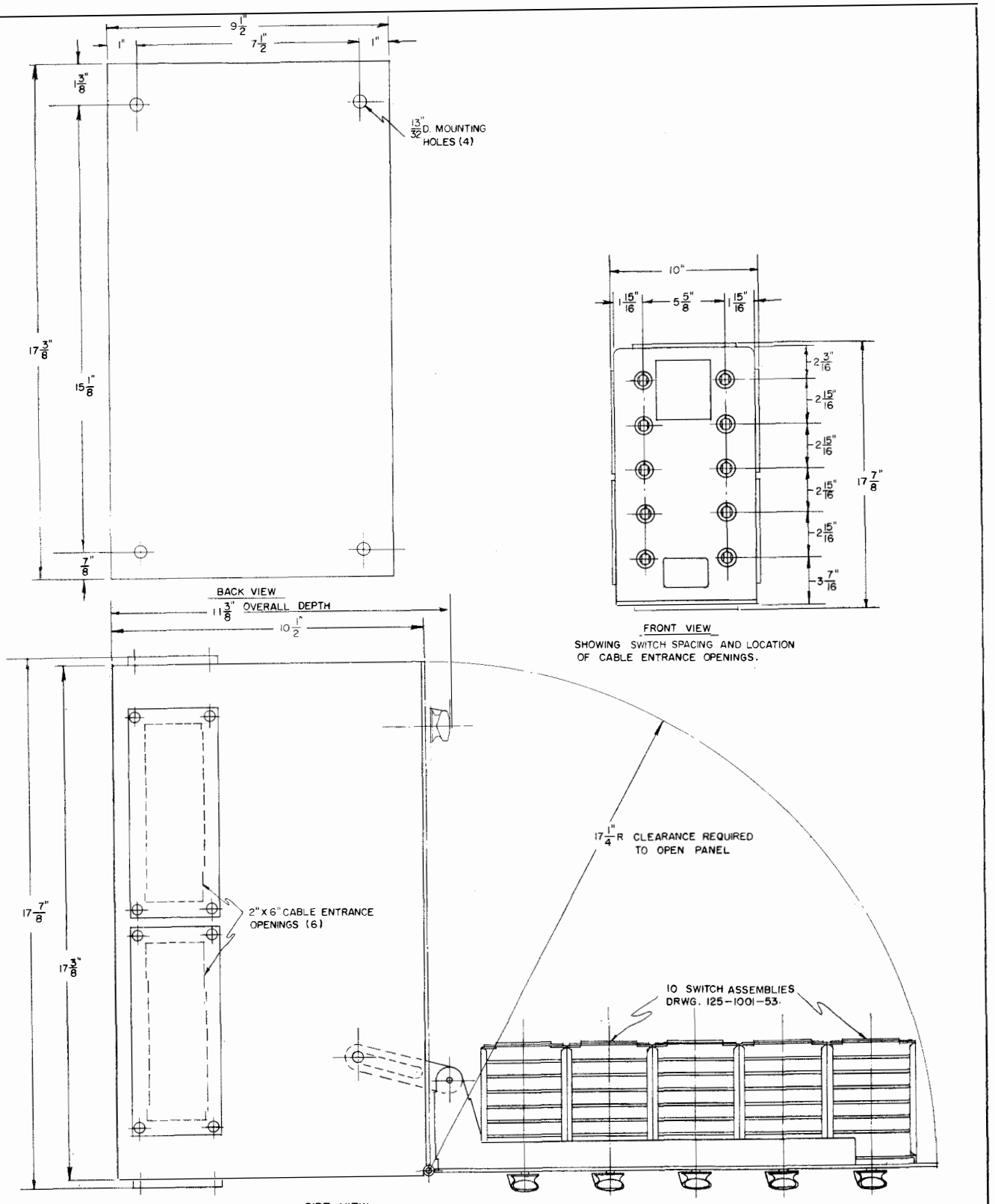
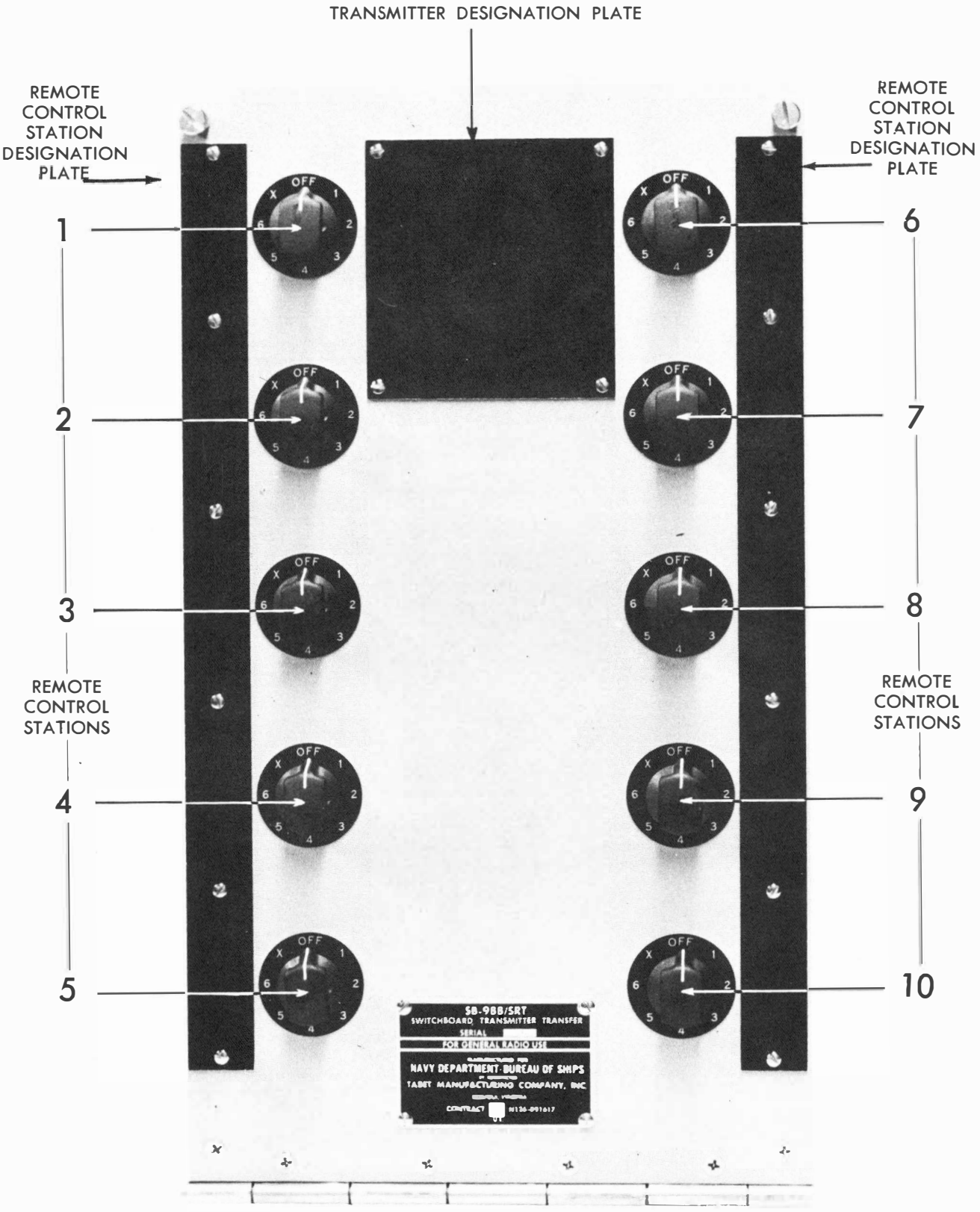


FIGURE 2-4 SIMPLIFIED SCHEMATIC DIAGRAM SHOWING OPERATION OF TRANSMITTER No.6 FROM REMOTE CONTROL STATION No. 12



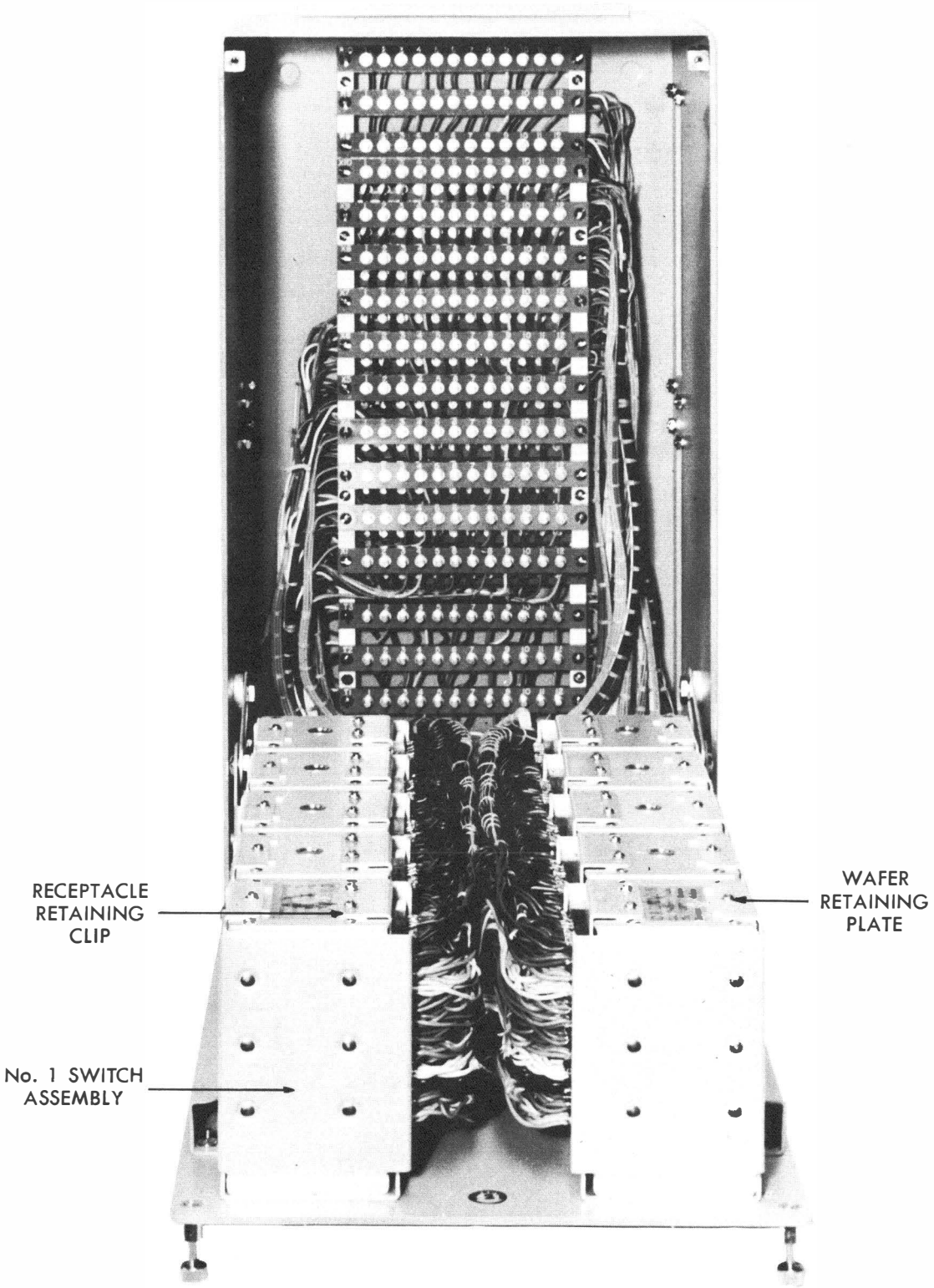
SB-988/SRT TRANSMITTER TRANSFER SWITCHBOARD
OUTLINE AND MOUNTING DIMENSIONS~

FIGURE 3-1



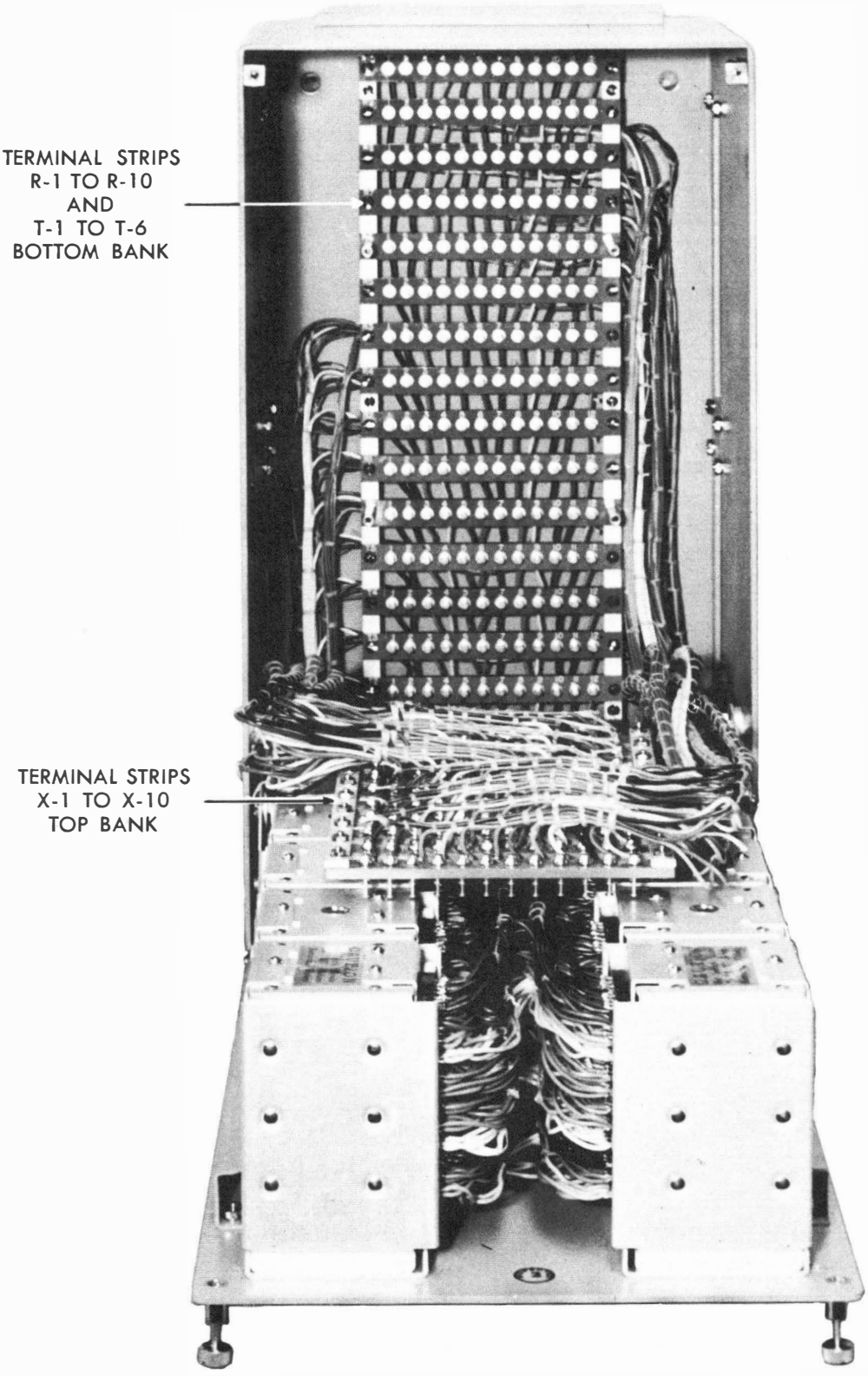
TRANSMITTER TRANSFER SWITCHBOARD
SB-988 /SRT
VIEW OF FRONT PANEL

FIG. 3-2



TRANSMITTER TRANSFER SWITCHBOARD
SB-988/SRT
INSIDE VIEW WITH TOP BANK OF TERMINAL STRIPS IN POSITION

FIG. 3-3



TRANSMITTER TRANSFER SWITCHBOARD
SB-988/SRT
INSIDE VIEW WITH TOP BANK OF TERMINAL STRIPS LOWERED

FIG. 3-4

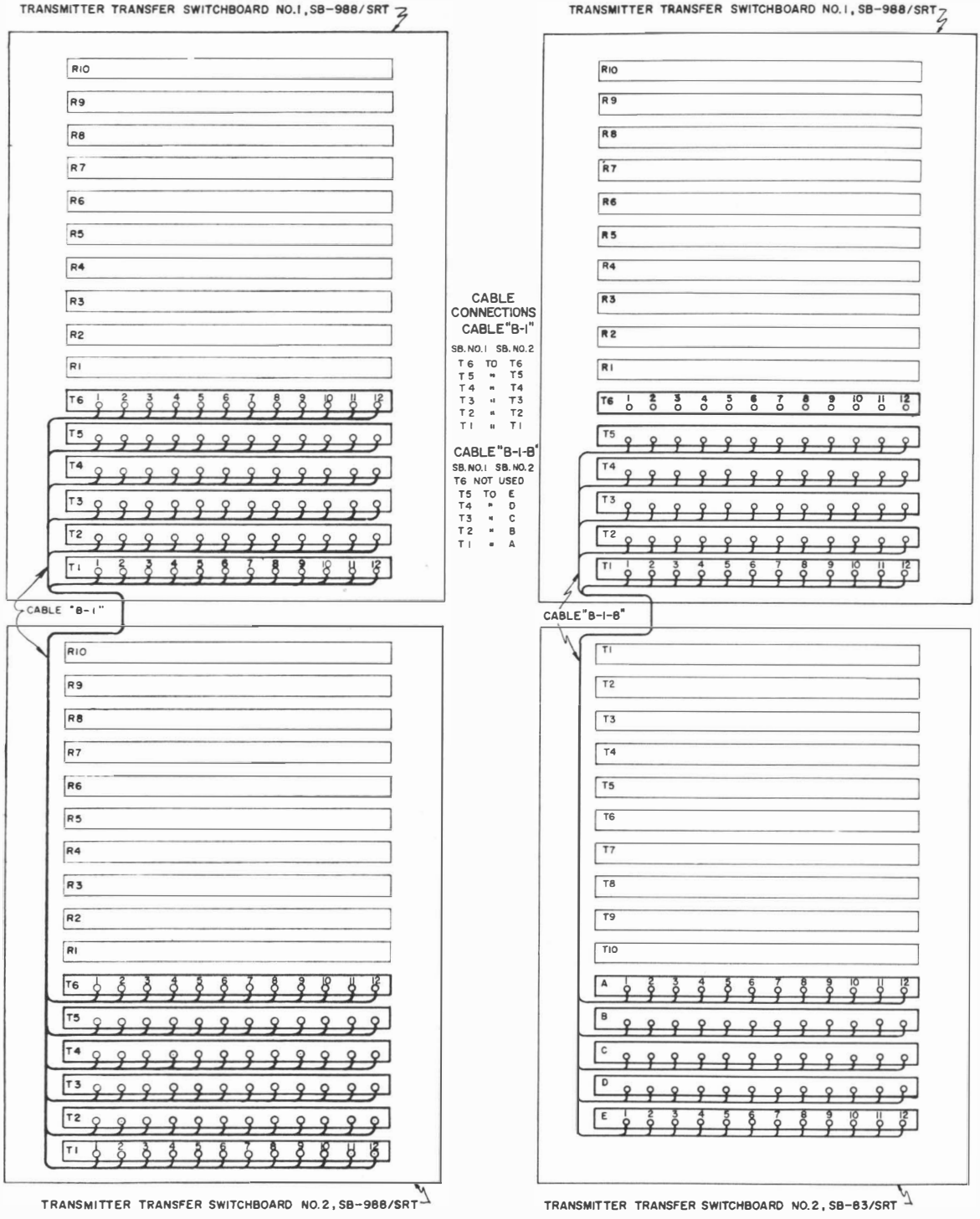


FIGURE 3-5

FIGURE 3-6

DIAGRAM SHOWING INSTALLATION OF CABLES "B-1" AND "B-1-B" FOR EXTENSION OF REMOTE CONTROL STATIONS

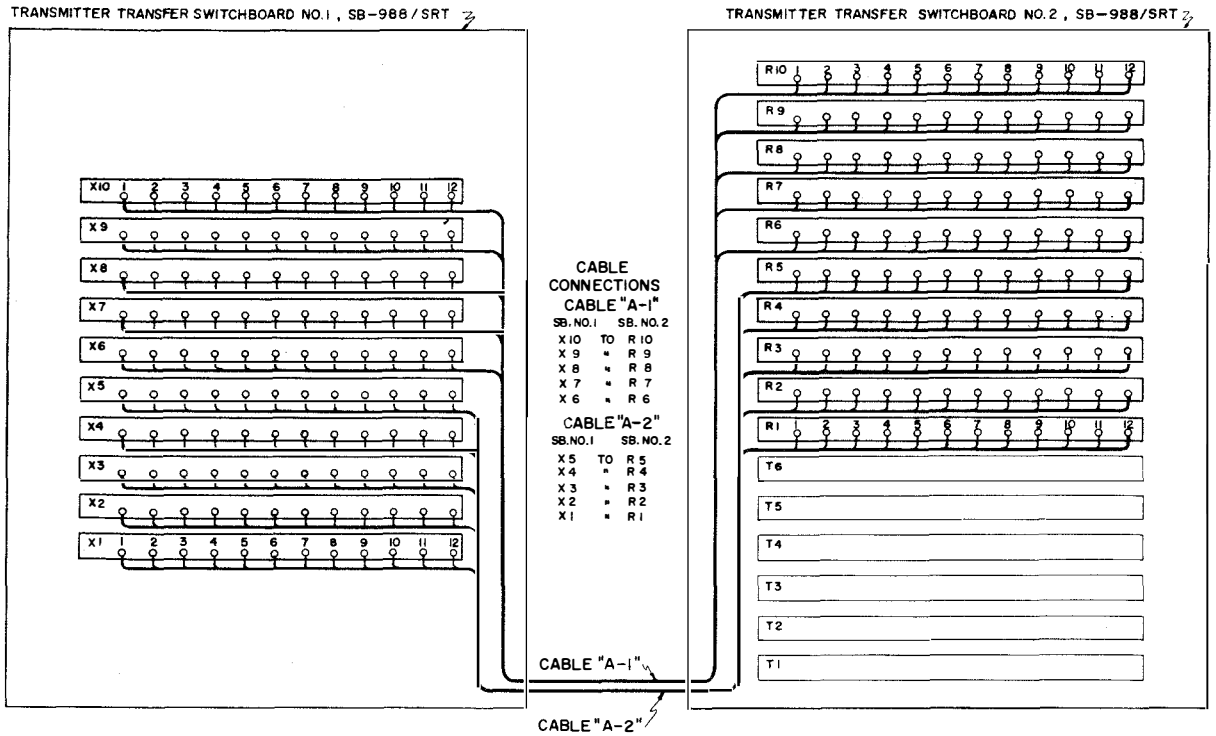


DIAGRAM SHOWING INSTALLATION OF CABLES "A-1" AND "A-2" FOR EXTENSION OF TRANSMITTER STATIONS (SB-988/SRT TO SB-988/SRT)

FIGURE 3-7

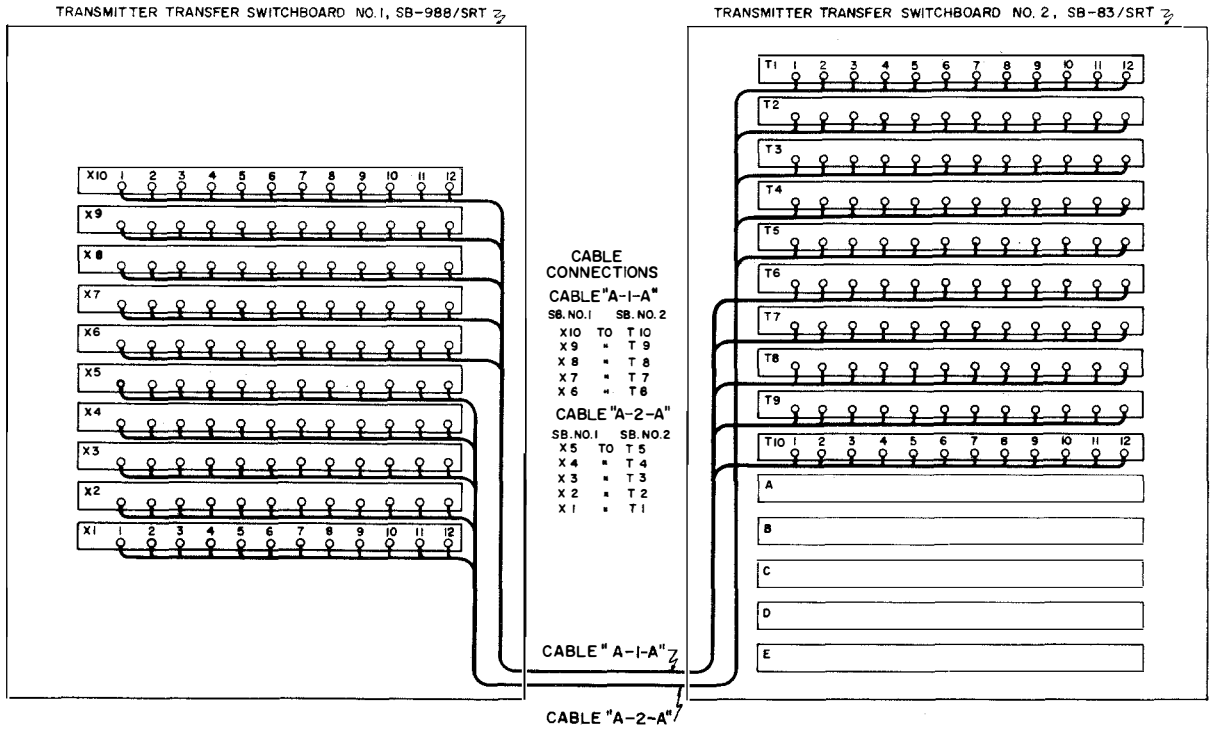
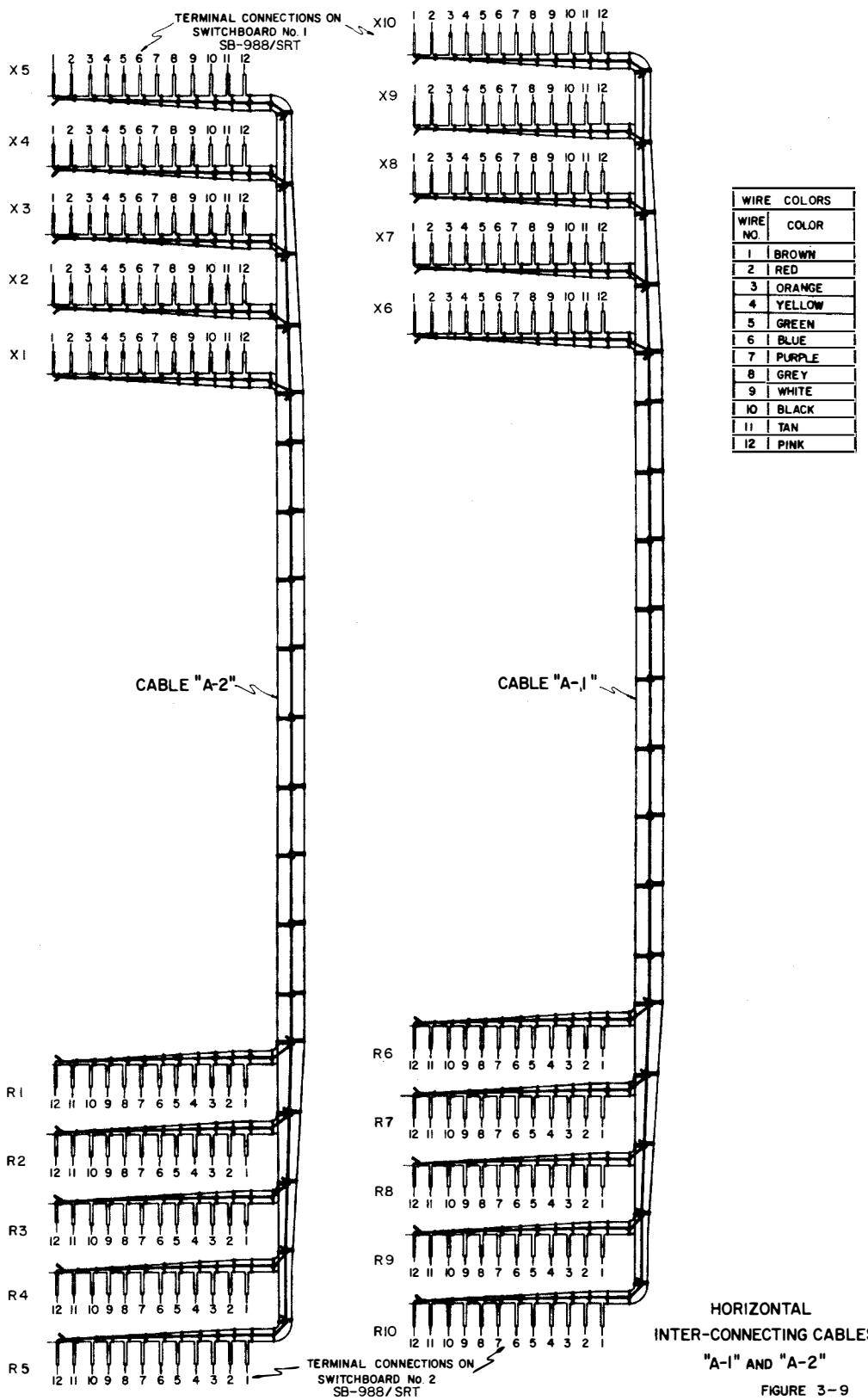


DIAGRAM SHOWING INSTALLATION OF CABLES "A-1-A" & "A-2-A" FOR EXTENSION OF TRANSMITTER STATIONS (SB-988/SRT TO SB-83/SRT)

FIGURE 3-8



WIRE COLORS	
WIRE NO.	COLOR
1	BROWN
2	RED
3	ORANGE
4	YELLOW
5	GREEN
6	BLUE
7	PURPLE
8	GREY
9	WHITE
10	BLACK
11	TAN
12	PINK

HORIZONTAL INTER-CONNECTING CABLES "A-1" AND "A-2"

FIGURE 3-9

WIRE COLORS	
WIRE No.	COLOR
1	BROWN
2	RED
3	ORANGE
4	YELLOW
5	GREEN
6	BLUE
7	PURPLE
8	GREY
9	WHITE
10	BLACK
11	TAN
12	PINK

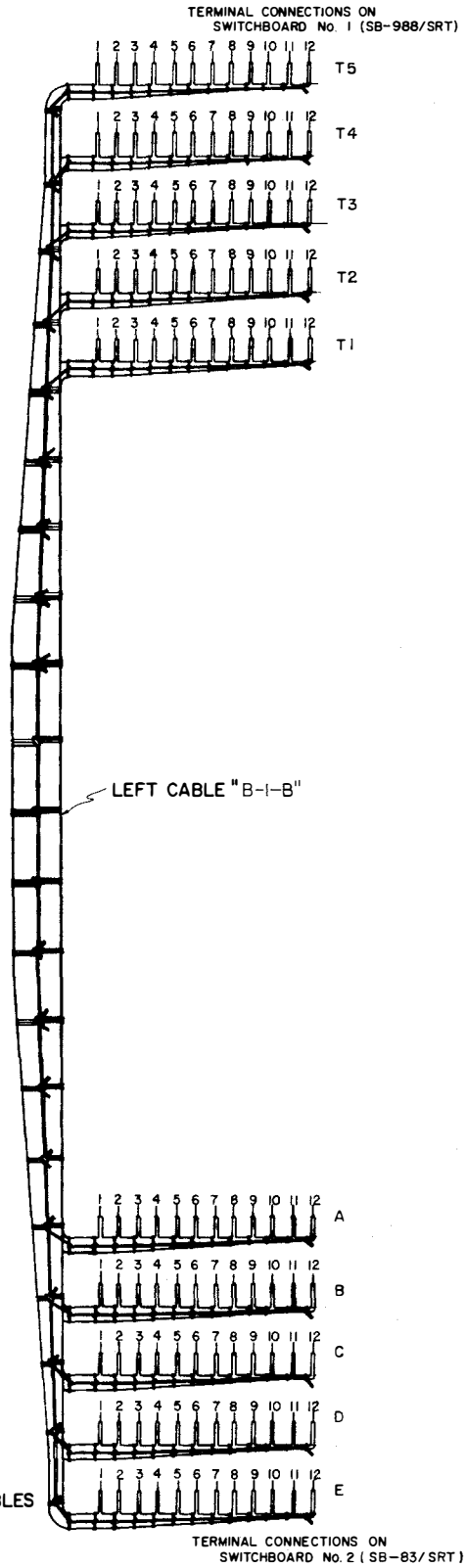


FIGURE 3-11

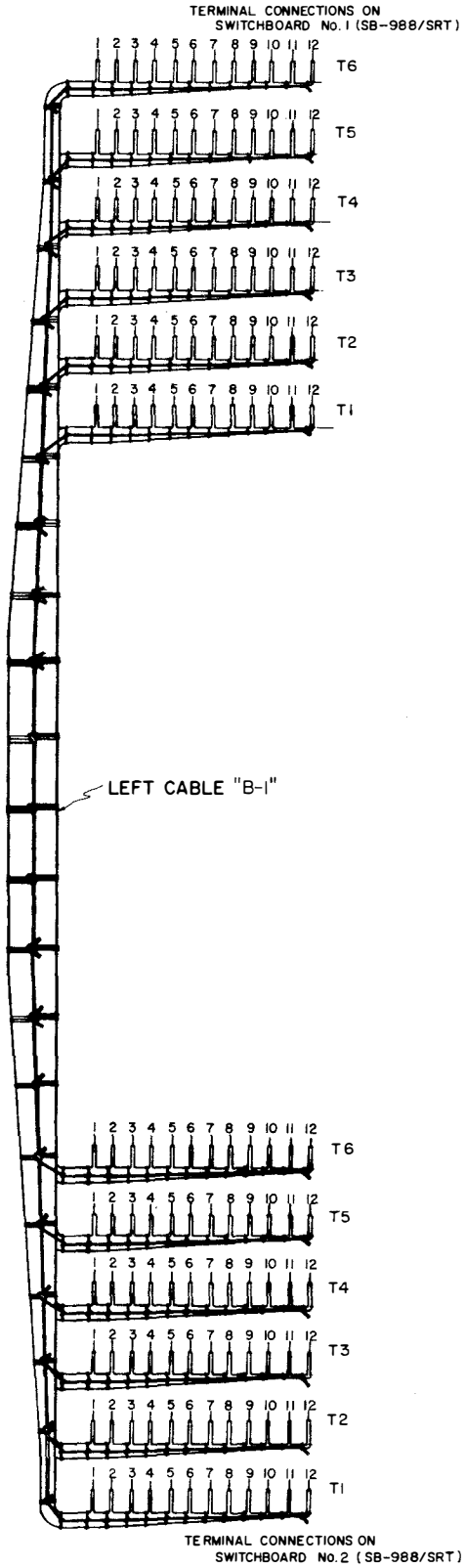


FIGURE 3-10

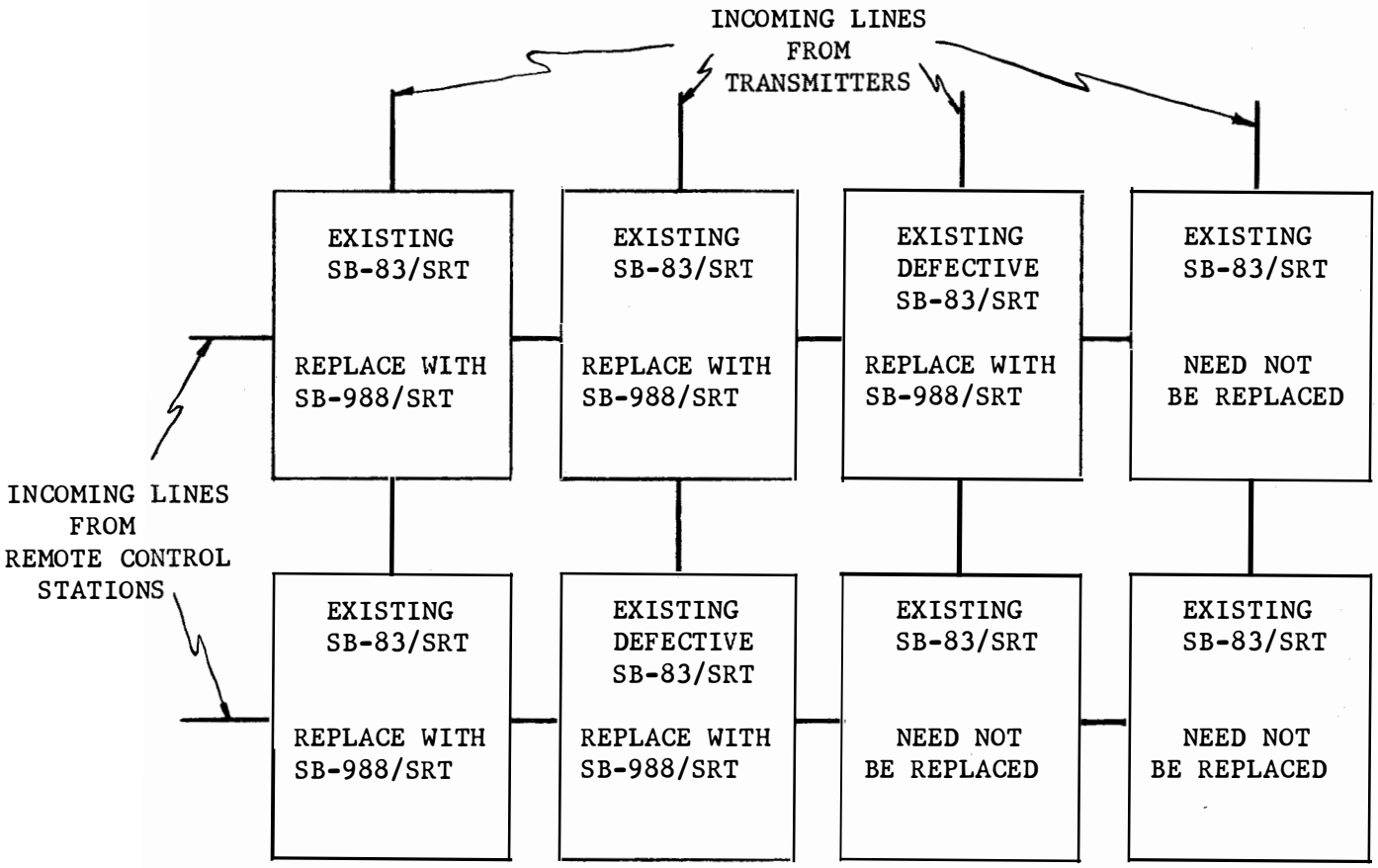


Figure 3-12

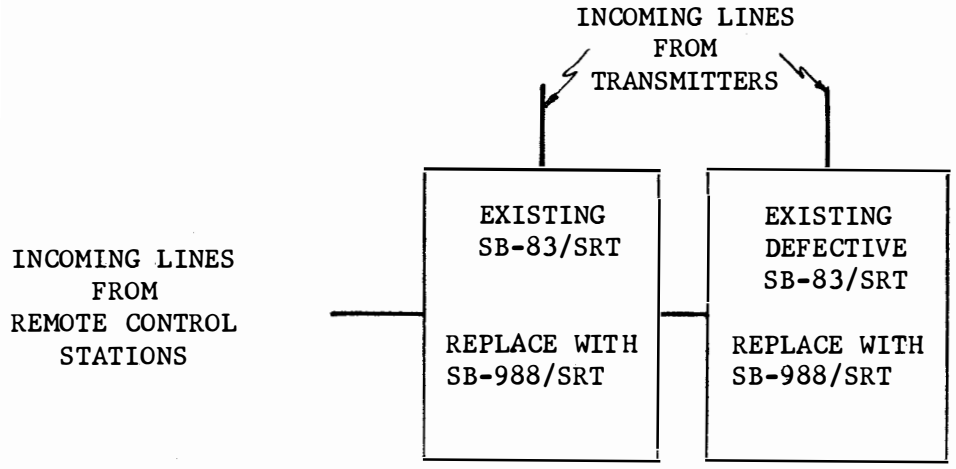
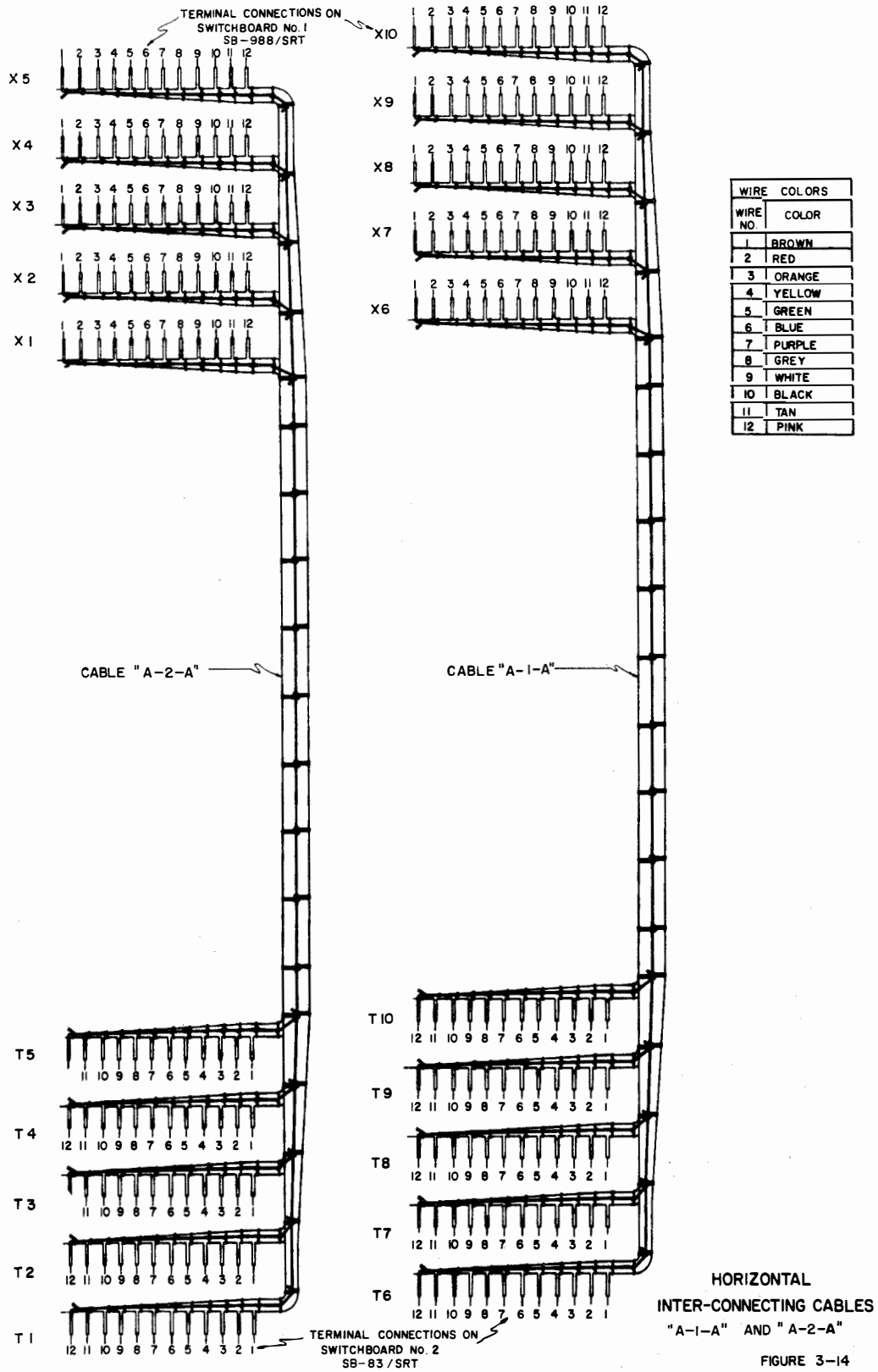


Figure 3-13

TYPICAL PLANS FOR REPLACEMENT OF TRANSMITTER TRANSFER SWITCHBOARDS, SB-83/SRT, WITH TRANSMITTER TRANSFER SWITCHBOARDS, SB-988/SRT.



HORIZONTAL INTER-CONNECTING CABLES "A-1-A" AND "A-2-A"

FIGURE 3-14