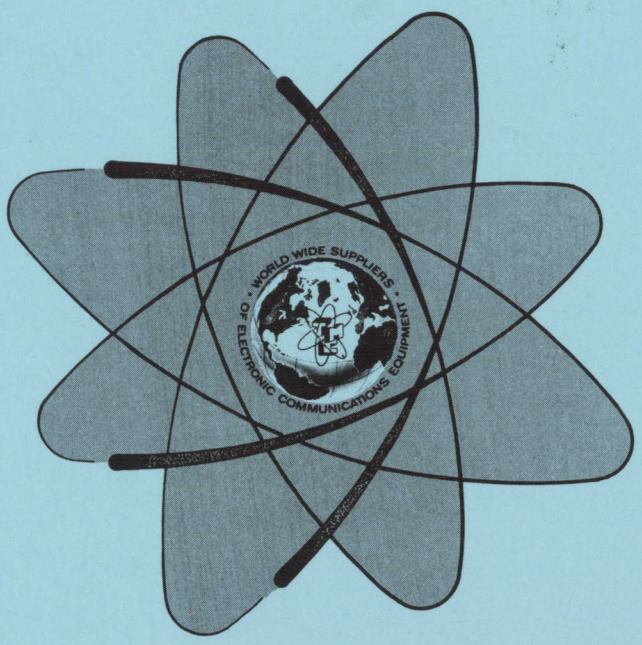
TECHNICAL MANUAL

for

TRANSFER RELAY CONTROL PANEL

MODEL TRCP-1



THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

Printed in U.S.A.

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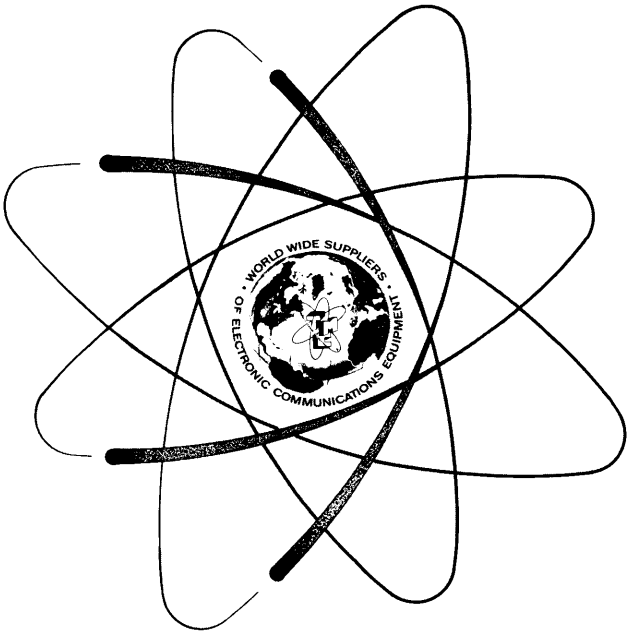

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THE TECHNICAL MATERIEL CORPORATION
COMMUNICATIONS ENGINEERS
700 FENIMORE ROAD MAMARONECK, N. Y.

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.

2. That the defect is not the result of damage incurred in shipment from or to the factory.

3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.

4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes*furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By

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SECTION 1

GENERAL INFORMATION

1-1. INTRODUCTION

The Transfer Relay Control Panel, TMC model TRCP-1, is designed for use in a system which includes two transmitters (primary and standby, operating on the same frequency), TMC model GPTM-2.5KJ2. The TRCP-1 operates in conjunction with a coaxial relay (located external to the TRCP-1, but within the transmitting system) and provides automatic switching of primary and standby transmitter outputs to the antenna, in the event of primary transmitter failure. The TRCP-1 provides operation-status indications for both the primary and standby transmitters. In addition, it provides a manual override control for transmitter selection. The dc control voltage, which is required for the operation of the TRCP-1, is provided by the associated transmitters, eliminating the requirement for a separate power supply.

1-2. PHYSICAL DESCRIPTION

The TRCP-1 is designed for mounting in the standard equipment rack for the GPTM-2.5KJ2 transmitter. The associated coaxial relay is mounted on top of the primary transmitter rack. Four retaining screws on the front panel of the TRCP-1 support the unit in the transmitter rack. All operating controls and indicators are located on the front panel; jacks for interconnection of the primary and standby transmitters are located on the rear panel.

1-3. TECHNICAL SPECIFICATIONS

Table 1-1 lists the technical specifications for the Transfer Relay Control Panel, TRCP-1 and its associated coaxial relay.

TABLE 1-1. TECHNICAL SPECIFICATIONS

Coaxial Relay Specifications

Type:	Coaxial vacuum switch, four pole transfer
Frequency Range:	2 to 30 mhz
VSWR:	Maximum 1.1 throughout frequency range
RF Contacts:	Make-before-break
Switching Time:	30 milliseconds, under full power
Control Voltage:	24 vdc (provided by associated transmitter)
Insertion Loss:	Less than .1 db
RF Power:	Up to 3 kw PEP

TABLE 1-1. TECHNICAL SPECIFICATIONS Continued

Transfer Relay Control Panel Specifications

Size:	3-1/4 inches high x 6-1/2 inches deep x 19 inches wide
Weight:	approximately 6 pounds
Control Voltage:	24 vdc (provided by associated transmitter)
Transmitter Status Indicators:	ON LINE, STANDBY, and FAULT indicators for both primary and standby transmitters
Controls	PRIMARY XMTR SELECT, OVERRIDE XMTR SELECT, and MANUAL OVERRIDE/AUTO TRIP

SECTION 2

OPERATOR'S SECTION

2-1. GENERAL

The Transfer Relay Control Panel, TMC model TRCP-1 is designed to operate within a transmitting system and in conjunction with two GPTM-2.5KJ2 transmitters. For operating procedures for the TRCP-1, the operator should refer to the Operator's Section of the associated transmitting system. Before operating the unit, however, the operator should familiarize himself with the TRCP-1 operating controls and indicators by referring to paragraph 2-2 of this technical manual.

2-2. OPERATING CONTROLS AND INDICATORS

The operating controls and indicators for the TRCP-1 are all located on the front panel of the unit, as shown in figure 2-1. Table 2-1 lists the TRCP-1 controls and indicators and their functions. The item numbers on Table 2-1 are referenced to the callouts on figure 2-1.

TABLE 2-1. OPERATING CONTROLS AND INDICATORS

Item Number	Designation	Function
1	ON switch	Applies 24 vdc control voltage from associated transmitters for operation of the TRCP-1
2	POWER indicator (blue)	Indicates 24 vdc control voltage is applied to the TRCP-1 and its associated coaxial relay
3	PRIMARY XMTR SELECT switch	Momentary spring loaded switch which selects the primary transmitter (XMTR 1 or XMTR 2)
4	MANUAL OVERRIDE/AUTO TRIP switch	In AUTO TRIP position provides automatic switching of primary to standby transmitter when primary transmitter fails; In MANUAL OVERRIDE position sets TRCP-1 in an override condition for manual selection of primary transmitter
5	OVERRIDE XMTR SELECT switch	Momentary spring loaded switch which selects the primary transmitter (XMTR 1 or XMTR 2) when the TRCP-1 is in a manual override condition

TABLE 2-1. OPERATING CONTROLS AND INDICATORS Continued

Item Number	Designation	Function
6	XMTR 1 ON LINE indicator (green)	When illuminated, indicates that transmitter 1 is on the air
7	XMTR 1 STANDBY indicator (amber)	When illuminated, indicates that transmitter 1 is in standby status
8	XMTR 1 FAULT indicator (red)	When illuminated, indicates loss of high voltage in transmitter 1
9	XMTR 2 ON LINE indicator (green)	When illuminated, indicates that transmitter 2 is on the air
10	XMTR 2 STANDBY indicator (amber)	When illuminated, indicates that transmitter 2 is in standby status
11	XMTR 2 FAULT indicator (red)	When illuminated, indicates loss of high voltage in transmitter 2
12	DC fuse indicator	Protective fuse for 24 vdc control voltage

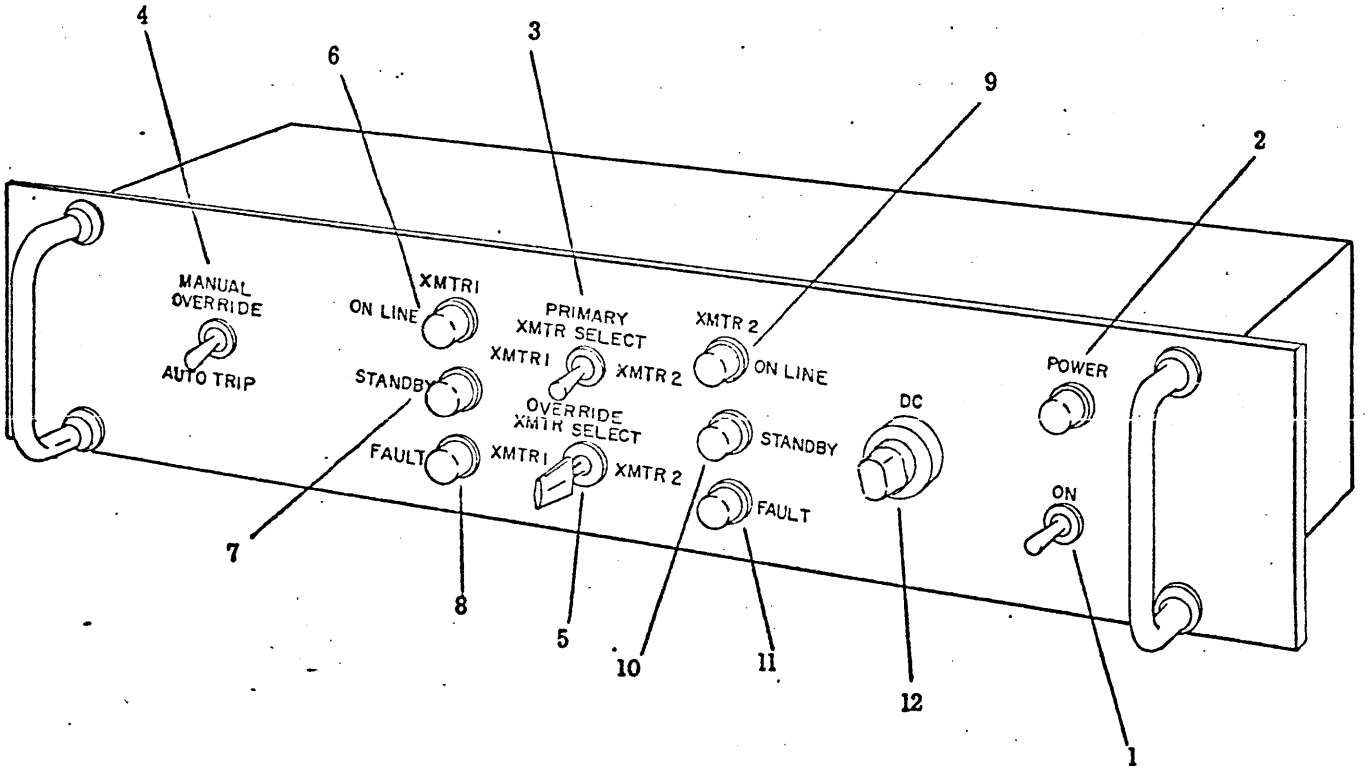

Figure 2-1. Location of Operating Controls and Indicators

SECTION 3

PRINCIPLES OF OPERATION

3-1. INTRODUCTION

The Transfer Relay Control Panel, model TRCP-1 is intended for use with two GPT-2.5KJ2 transmitters (primary and standby) operating on the same frequency. The TRCP-1 is connected in the associated transmitters' PTT and HV ON-OFF circuitry and provides the transfer of rf power to the antenna from one transmitter (primary) to another (standby) in the event of primary transmitter failure.

Basically, the TRCP-1 consists of an externally mounted coaxial relay and the control panel itself which contains transmitter-operation status indicators and control switches for primary transmitter selection and automatic switching of transmitters.

3-2. CIRCUIT DESCRIPTION

The circuitry of the TRCP-1 may be divided into two catagories: (1) auto trip operation, and (2) primary transmitter selection. These categories are discussed separately in the text which follows:

a. Auto Trip Operation (refer to figure 5-1)

With primary and standby transmitters initially tuned up to a selected operating frequency, XMTR OVERRIDE/AUTO TRIP switch S4 set to the AUTO TRIP position, and transmitter 1 selected as primary, the TRCP-1 functions as follows: -24 vdc from transmitter 1 and transmitter 2 is routed to jack J2-A and J3-4, through POWER switch S1 and isolation diodes CR1 and CR2, to POWER indicator DS1. The -24 vdc is further routed through dc fuse F1 to chassis jack J1-L. The jack J1 is connected to the externally located coaxial relay via terminal strip E8008. The -24 vdc is further routed through the normally closed auxiliary contacts of transfer relay (connected to E8008 -(12) and -(11)) to J1-C and then E8008-3, to the (-) side of relay coil L2. If transmitter 1 fails due to an overload, a ground potential will be present at J8004-N in transmitter 1 and routed via J2-D, PRIMARY XMTR SELECT switch S2, XMTR OVERRIDE/AUTO TRIP switch S4, to one side of FAULT indicator DS7, through CR4 and to chassis jack J1-D. The ground is further routed to E8008-4 to the (+) side of L2, causing L2 to energize when primary transmitter 1 fails (high voltage removal due to an overload).

When transfer relay coil L2 is energized the following system actions occur:

(1) Transmitter rf output is routed to the antenna via the rf contacts of the transfer relay.
(2) Transmitter 2 PTT circuit is closed via relay auxiliary contacts connected to E8008-(9) and -(10)).
(3) Transmitter 2 HV ON-OFF circuit is completed (J8004-(M) and -(1)) via contacts on OVERRIDE XMTR SELECT switch S3.
(4) Transmitter 1 rf output circuit is opened.

(5) Transmitter 1 PTT circuit is opened via transfer relay contacts connected to E8008-(5) and -(6).

NOTE

The transmitter PTT circuitry operates to bias the final stage off. However, in this system configuration, the low voltage power supply AP128A is modified to also include biasing off the 2nd amplifier stage. In operation, the standby transmitter will also have excitation on the input stage at all times. (Refer to note on figure 5-1)

(6) Status indicators, XMTR 1 ON LINE and XMTR 2 STANDBY are illuminated to indicate that primary transmitter 1 is on and transmitter 2 is in standby status.

b. Primary Transmitter Selection (refer to figure 5-1)

Primary transmitter selection is accomplished by use of the XMTR OVERRIDE/AUTO TRIP switch S4 and OVERRIDE XMTR SELECT switch S3. The S3 switch is a momentary spring loaded type which provides the momentary ground potential necessary to latch the associated coaxial relay in the correct position for the transmitter selected as primary. With the S3 switch in the desired position (XMTR 1 for example) and XMTR OVERRIDE/AUTO TRIP switch S4 in the XMTR OVERRIDE position, a ground potential is routed from center arm of OVERRIDE XMTR SELECT switch S3 to pin A of chassis jack J1 and routed through E8008-(1) to relay coil L1. When L1 energizes, the auxiliary contacts (3PDT) close and provide a closure for transmitter 1 PTT line via relay contacts connected to E8008 -(5) and -(6). Simultaneously, auxiliary contacts connected to E8008-(9) and -(10) open, which opens transmitter 2 PTT line, placing transmitter 2 in a biased-off condition. In addition, as switch S3 is moved to the XMTR 1 position, the HV ON-OFF line for transmitter 2 momentarily opens to provide cold rf switching of the output to the antenna.

When transmitter 1 and transmitter 2 are initially tuned-up and high voltage is on in both transmitters, the selected primary transmitter ON LINE indicator will illuminate (XMTR 1) and the XMTR 2 STANDBY indicator light will illuminate for transmitter 2.

NOTE

The preceding text gave examples for transmitter 1 selection as primary. If transmitter 2 were selected as primary, the situation would be reversed, i.e. L2 would be energized with transmitter 2 selected, and L1 would energize if transmitter 2 failed (loss of high voltage).

SECTION 4

Parts List for TRCP-1

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CR1 thru CR6	Semiconductor, Device, Diode	1N547
DS1 thru DS7	Lamp, Incandescent	BI110-9
F1	Fuse, Cartridge	FU102-2
S1	Switch, Toggle, DPDT	ST103-25-63
S2	Same as S1	
S3	Switch, lever, 4PDT	SW523-3
S4	Same as S1	
XDS1	Socket, Lamp	TS153-11
XDS2	Socket, Lamp	TS153-9
XDS3	Socket, Lamp	TS153-10
XDS4	Socket, Lamp	TS153-8
XDS5	Same as XDS2	
XDS6	Same as XDS3	
XDS7	Same as XDS4	
XF1	Fuseholder, Indicator	FH104-11
**	Relay, Coaxial	RL177
	** NOTE: Located external to the TRCP-1, but within the associated transmitter system configuration.	

XMTR 1

E8006

-24 VDC 11
XMTR PTT 4
XMTR ON-OFF 9

J8004

HV OFF IND N
HV ON-OFF M
GRD L
V

J2

A B C D E F G

SI POWER OFF ON

CR1 IN547

CR2 IN547

DSI POWER

XMTR 2

E8006

-24 VDC 11
XMTR PTT 4
XMTR ON-OFF 9

J8004

HV OFF IND N
HV ON-OFF M
GRD L
V

J3

A B C D E F G

S2 PRIMARY XMTR SELECT

S4 OVERRIDE

2 COM 1
2 COM 1

OVER.
AUTO OVER
AUTO

1 2

S3
OVERRIDE XMTR SELECT
(SHOWN IN CENTER POSITIO

NOTE: ADD CR5003 & R5017 TO A4699 RESISTOR TERM. BD. ASSY. ON CK1464 LV PWR SPLY, AP128A, SCHEMATIC.

P/O K5004 P.T.T.

8 11 9

CR5003 IN547

R5017 8.2K/1W

R5008 3.9K/2W

2nd AMPL BIAS ADJ R5007 25K/2W

R5002 18K 2W

R5001 25K 2W

FINAL BIAS ADJ

	TRCP-1	
QTY / UNIT	MODEL USED ON	ASS'Y NO.
APPLICATION		
	CODE	

UNLESS OTHERWIS
DIMENSIONS ARE
AND INCLUDE CHEMI
OR PLATED F

TOLERANC

DECIMALS
.X ± .05
.XX ± .01
.XXX ± .005

MATERIAL

FINISH

REVISIONS							
ZONE	LTR	DESCRIPTION	DATE	E.M.N.NO	DRAFT	CHKD	APPD

F1
DC
2 A.

DS1
POWER

CR3
IN547

CR4
IN547

J1

E8008

L1

L2

(92)
(90)
(93)
(95)
(9)
(2)
(6)
(0)
(5)
(7)
(4)
(3)
(1)

TRANSFER
RELAY

RELAY SHOWN WITH XMTR 1 TO ANTENNA. RELAY POSITION 2 WITH L1 ENERGIZED, RF TERM. 1&2, 3&4 CLOSED.

FOR XMTR 2 TO ANTENNA, RELAY SWITCHES TO POSITION 1, L2 ENERGIZED, RF TERM. 1&4, 2&3 CLOSED.

2
FAULT
DS 4

CR5
IN547

1
FAULT
DS7

CR6
IN547

1 ON
DS 5

2 ON
DS 2

1 STBY
DS6

2 STBY
DS 3

S4
VERRIDE
OVER.
AUTO
OVER
AUTO

TO
ANTENNA

TO
XMTR 1

TO
XMTR 2

2 →

TR SELECT
ENTER POSITION)

CK1970

QTY. REQ.	ITEM	PART NO.	DESCRIPTION	SYMBOL

LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES

TOLERANCES ON

DECIMALS	FRACTIONS
.X ± .05	± 1/64
.XX ± .01	ANGLES
.XXX ± .005	± 0° -30'

MATERIAL

FINISH

FINAL APPROVAL		DATE 28 DEC 72
MECH. DES.		DATE
ELECT. DES.		DATE 28 DEC 72
CHECKED		DATE 28 DEC 72
DRAWN		DATE 20 DEC 72

THE TECHNICAL MATERIEL CORP.
MAMARONECK, NEW YORK

FIGURE 5-1: SCHEMATIC DIAGRAM, MODEL TRCP-1

012722110

5-1/5-2