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TECHNICAL MANUAL

for

REMOTE CONTROL SYSTEM

MODEL TPCA-1



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N.Y.

OTTAWA, ONTARIO

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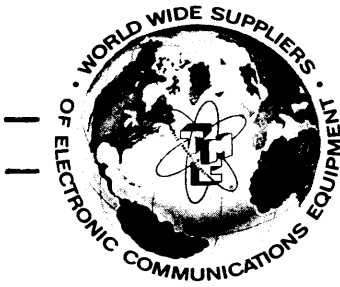


THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N. Y.

OTTAWA, CANADA

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700 FENIMORE ROAD

MAMARONECK, N. Y.

W a r r a n t y

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.

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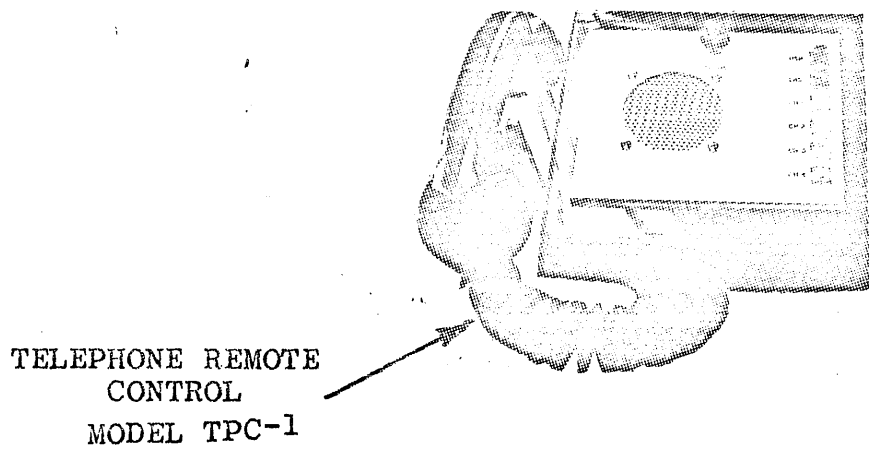
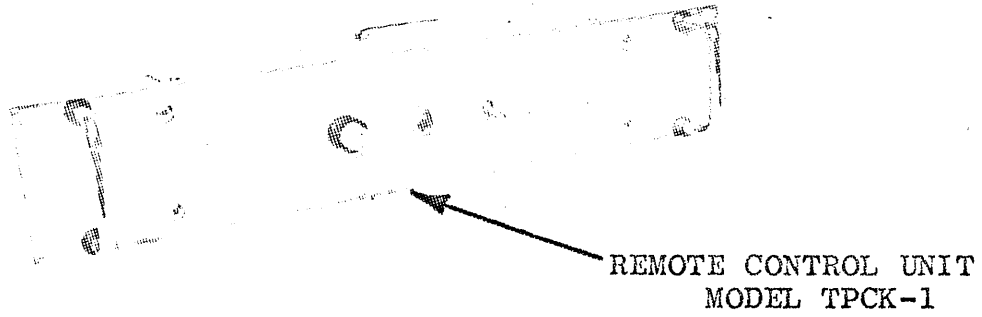


Figure 1-1. Remote Control System Model TPCA-1.

SECTION 1

GENERAL INFORMATION

1-1. PURPOSE AND DESCRIPTION.

Remote Control System, Model TPCA (figures 1-1 and 1-2) permits a transmitter-receiver, compatibly equipped, to be remotely controlled. Also provided is a remote simplex transmit/receive capability.

Pushbutton control on the TPC, through the TPCK, permits the USB (upper sideband) or LSB (lower sideband) of any one of four fixed frequencies to be selected. Also on the TPC is a telephone hand set with a pushbutton that permits an operator to talk or listen on the LSB or USB of the selected fixed frequency. If the hand set is not used, a loudspeaker on the TPC permits an operator to monitor the selected channel.

Power for the remote control system is obtained from a 115-volt, 50 to 60 cycle, single phase source. If a 115-volt source is not available, a 230-volt source can be used, providing minor wiring changes are made.

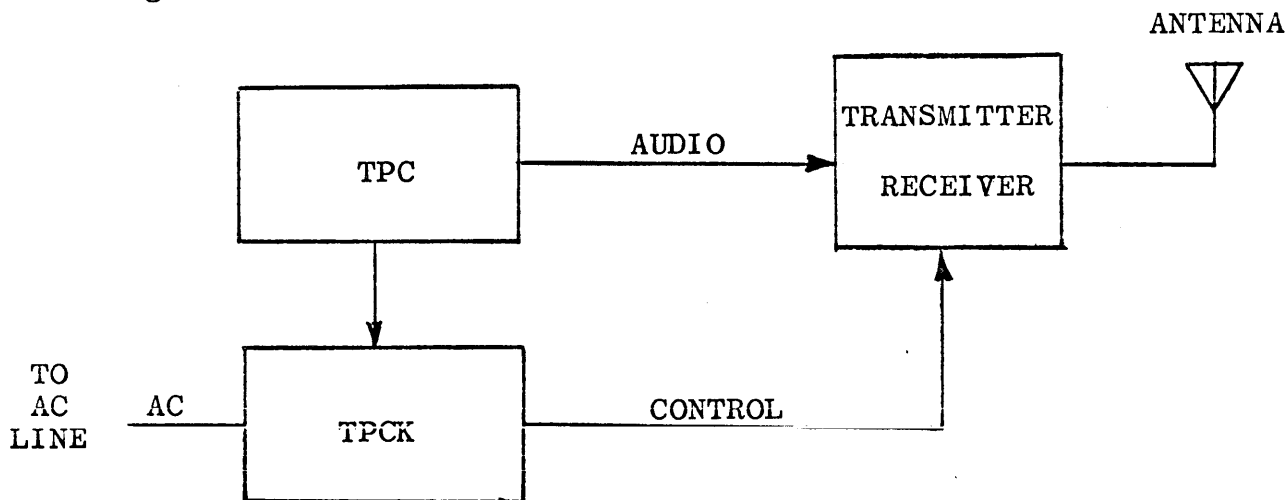


Figure 1-2. TPCA, Simplified Block Diagram.

Sub Station

Table 1-1. Leading Particulars

NOMENCLATURE		POWER REQUIREMENTS						DIMENSIONS IN INCHES			WEIGHT IN LB
		V	A	W	PH	FREQ IN CYCLES	HGT	W	D		
FORMAL Remote Control System Model TPCA-1 Telephone Remote Control Model TPC-1 Remote Control Unit Model TPCK-1	COMMON	115/ 230 ^a			1	50-60				13-1/2	
	Remote control system or TPCA						4	10-1/8	8	6	
	Telephone remote control or TPC										
	Remote control unit or TPCK	115/ 230 ^a			1	50-60	3-1/2	19	6-1/4	7-1/2	

^a Factory wired for 115-volt operation; may be rewired for 230-volt operation

TECHNICAL SPECIFICATIONS

1-3. CAPABILITIES AND LIMITATIONS.

Table 1-2 lists operational capabilities and limitations of the remote control system. *Technical specifications for the TPCA are as follows:* Data presented covers specific functional and environmental characteristics.

Functional characteristics:	
Channel selection	Up to four channels
Telephone remote control:	
Speaker	
Audio frequency response	
Impedance	Four ohms (nominal)
Handset:	
Earpiece frequency response	
Earpiece impedance	Four ohms (nominal)
Mouthpiece frequency response	
Mouthpiece impedance	

Table 1-2. Capabilities and Limitations^a (Cont)

CAPABILITIES	LIMITATIONS
<p>Environmental characteristics:</p> <p>Temperature:</p> <p> Operating</p> <p> Extremes for storage</p> <p>Relative humidity</p>	<p>0° to 50° C (32° to 122° F)</p> <p>Minus 65° to plus 50° C (minus 85° to 122° F)</p> <p>Up to 95%</p>

^aSome of the values listed are approximate.

1-4. EQUIPMENT SUPPLIED.

Table 1-3 lists all major equipment supplied. Spare parts are not included in the table.

Table 1-3. Equipment Supplied

CRATE NO.	CONTENTS	QTY.	DESIGNATION		FUNCTION
			TMC P/N	SYM	
	Telephone remote control	1			Monitor and remotely control, in conjunction with a remote control unit, an automated four channel transmitter-receiver.
	Remote control unit	1			Remotely control, in conjunction with a telephone remote control, an automated four channel transmitter-receiver.
	Cables: 1. Ac input 2. Remote	1 1			Ac input cable for remote control unit. Connect remote control unit and transmitter-receiver.

1-5. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

Table 1-4 lists equipment required but not supplied to install the remote control system. These non-specialized items are not supplied, since an equipped maintenance shop should contain them. Maintenance and test equipment listed are for isolating a fault to a specific equipment.

Table 1-4. Equipment Required But Not Supplied

EQUIPMENT	PURPOSE
1. Screw Drivers, Flat Blade, assorted sizes	Installation
2. Screw Drivers, Phillips-Blade, assorted sizes	Same as 1
3. Case cutter	Unpacking
4. VOM (volt-ohm-meter)	Testing

SECTION 2
INSTALLATION

2-1 INITIAL INSPECTION.

The TPCA system has been tested and calibrated at the factory before shipment. When it arrives at the operating site, inspect the packaging case and its contents immediately for possible damage. Unpack the equipment carefully. Inspect all packing material for parts that may have been shipped as loose items. With respect to damage for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and furnishing of replacement parts.

2-2. POWER REQUIREMENTS.

Unless otherwise specified, the TPCA is wired at the factory for 115-volt, 50 to 60 cycle, single phase operation. For 230-volt operation, make the necessary wiring changes for power transformer TF312 (located in Remote Control Unit TPCK-1) as shown in figure 2-1. In addition, change the TPCK fuse to one half its rated value.

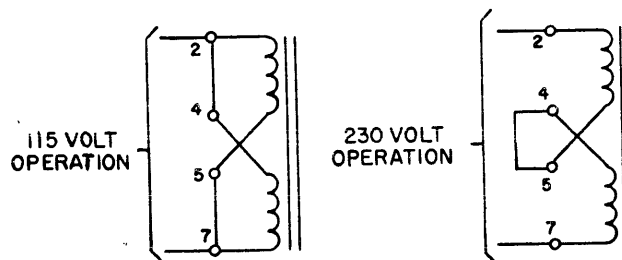


Figure 2-1. Power Transformer Wiring,
115-vs 230 Volt Operation.

2-3. INSTALLATION PROCEDURE.

Proceed as follows.

(a) Ensure that the external transmitter-receiver and antenna coupler have been properly modified for use with the TPCA system.

(b) Ensure that 115/230 volt, 50 to 60 cycle, single phase power is available.

(c) Place Telephone Remote Control TPC -1 on a flat surface such as a desk. Make certain that the handset is mounted in the cradle and that the volume control is at its maximum counterclockwise position.

(d) Mount Remote Control Unit TPCK-1 in a standard 19-inch rack; secure the TPCK-1 to the rack.

(e) Refer to the diagrams provided at the rear of this book, and proceed as follows:

1. Connect the multiple -conductor cable between the TPC-1 and jack J102 of the TPCK-1.
2. Connect the power cable between jack J103 on the TPCK-1 and the a-c power source.
3. Connect cable between jack J101 of the TPCK-1 and the associated transmitter-receiver (terminal boards TB1500, TB1501 of the TTR-10).

SECTION 3

OPERATOR'S SECTION

3-1. CONTROLS AND INDICATORS.

Tables 3-1 and 3-2 list controls and indicators associated with the telephone remote control and remote control unit. The numbers in the first columns of tables 3-1 and 3-2 correspond to the callouts on figures 3-1 and 3-2, respectively.

TABLE 3-1. CONTROLS AND INDICATORS, TPC

NO.	CONTROLS AND INDICATORS	FUNCTION
1	Volume Control	Adjust listening level of loudspeaker on telephone remote control.
2	USB and LSB pushbuttons *	USB pushbutton permits upper sideband of the selected fixed-frequency to be selected for transmitting or receiving. LSB pushbutton permits lower sideband of selected fixed-frequency to be selected for transmitting or receiving. When pushbutton is pressed, it lights.
3	CH1, CH2, CH3, and CH4 pushbuttons*	Selects one of four fixed transmit/receive frequencies on the controlled transmitter receiver. When pushbutton is pressed, it lights.
4	Transmit/Receive Switch	When hand set is used, switch permits operator to transmit (talk) or receive (listen). Spring Switch (oadec) is pressed to talk into hand set mouthpiece; and

*Only one button may be pushed at a time.

TABLE 3-1. CONTROLS AND INDICATORS, TPC (CONT)

NO.	CONTROLS AND INDICATORS	FUNCTION
4 (cont)		released to listen to hand set earpiece.
5	Hand set Cradle Switch	When hand set is lifted off cradle, speaker is disconnected; hand set ear-piece becomes active.

TABLE 3-2. REMOTE CONTROL UNIT, CONTROLS AND INDICATORS

NO.	CONTROLS AND INDICATORS	FUNCTION
1	AC line fuse	Protects a-c line and input. When lit, fuse has blown.
2	Power Lamp	When lit, indicates primary power applied.
3	ON/OFF switch	ON position applies primary power to unit. OFF position disconnects a-c power.

3-2. OPERATING PROCEDURES.

- a. Set up TPCA, transmitter-receiver and/or other related equipments as indicated in table 3-3.
- b. Place ON/OFF switch of TPCK at ON; POWER lamp should light.
- c. Gradually rotate VOLUME control of TPC clockwise until audible click is heard.
- d. Select desired sideband by pressing either LSB or USB pushbutton of TPC. When sideband is selected, corresponding pushbutton lights.

Table 3-3. Preliminary Settings

UNIT	CONTROL	SETTING
Telephone remote control TPC	Volume control	Fully counterclockwise
	LSB, USB, CH1, CH2, CH3, and CH4 push-buttons	All up. If one is down, gently press another until one that is down pops up.
	Transmit/receive Switch	Released (receive position)
	Handset Cradle Switch	Down (handset properly seated in cradle)
Remote Control unit TPCK-1	ON/OFF Switch	OFF
Transmitter-receiver and other related equipment	(refer to appropriate manuals)	Equipment controls positioned to respond to the TPCA.

e. Select desired fixed-frequency channel by pressing TPC CH 1, CH 2, CH 3, or CH 4 pushbutton of TPC; adjust VOLUME control for desired speaker level. When desired channel is selected, corresponding pushbutton lights.

f. To transmit, lift TPC handset from cradle; then, hold down transmit/receive switch on handset; and after approximately five seconds, talk clearly into the mouthpiece. When finished speaking, release transmit/receive switch.

g. To receive, replace the TPC handset in the cradle and listen to loud-speaker or handset earpiece.

h. To turn off TPCA, place POWER switch of TPCK at OFF, and the VOLUME control of TPC fully ccw.

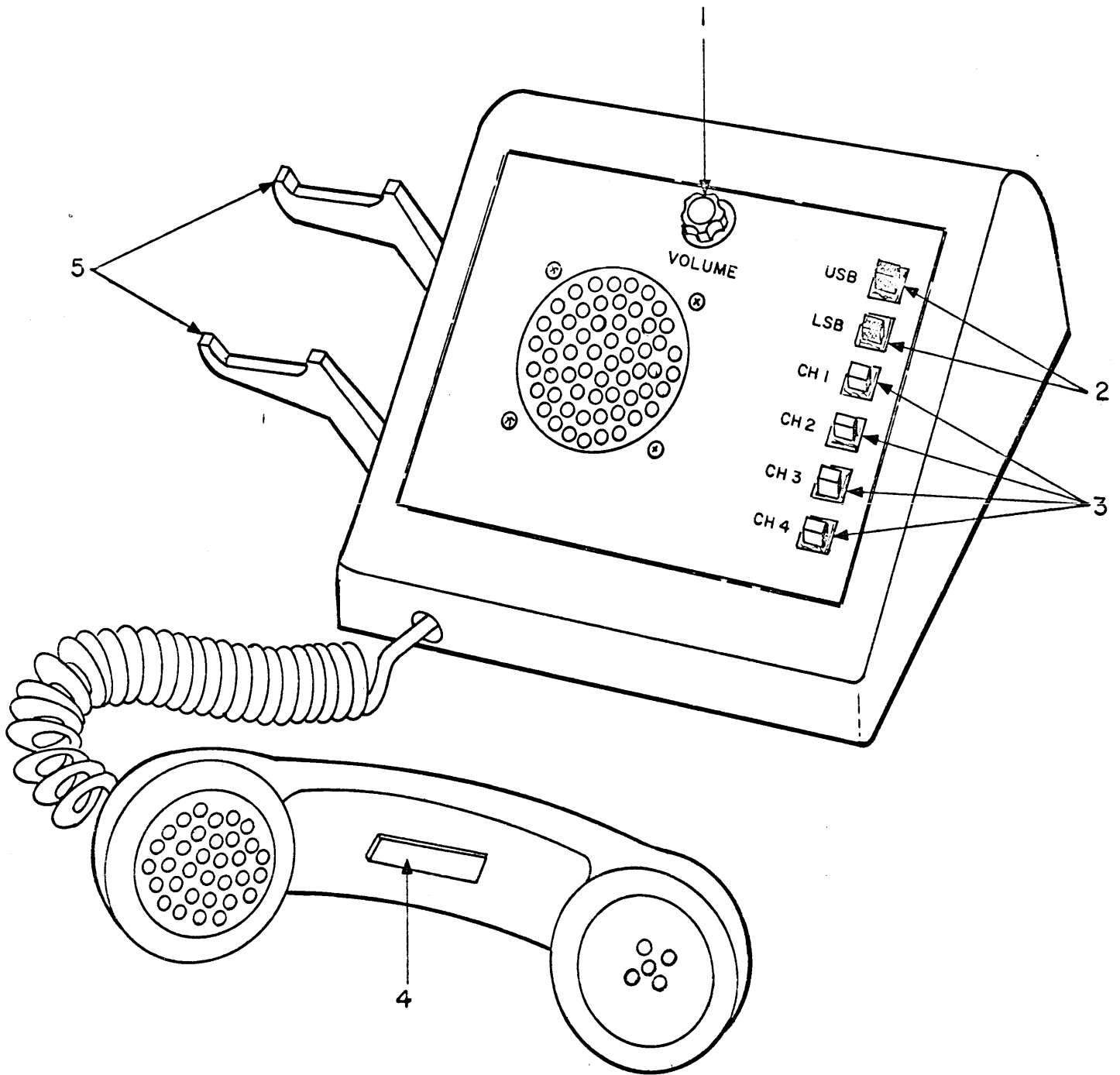


Figure 3-1. Remote Telephone Control, Controls And Indicators

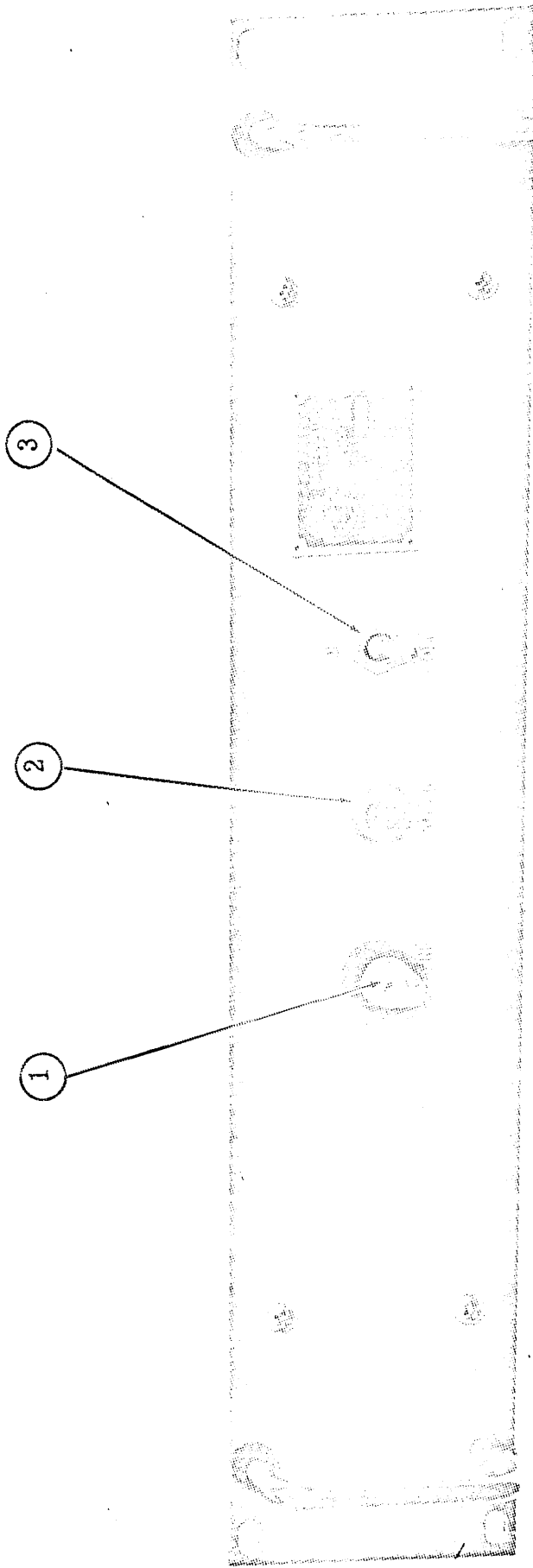


Figure 3-2 Tone Demodulator Control and Indicator

PARTS LIST

INTRODUCTION

The parts list presented in this section is a cross-reference list of parts identified by a reference designation and TMC part number. In most cases, parts appearing on schematic diagrams are assigned reference designations in accordance with MIL-STD-16. Wherever practicable, the reference designation is marked on the equipment, close to the part it identifies. In most cases, mechanical and electro-mechanical parts have TMC part numbers stamped on them.

To expedite delivery when ordering any part, specify the following:

- a. Generic name.
- b. Reference designation.
- c. TMC part number.
- d. Model and serial numbers of the equipment containing the part being replaced; this can be obtained from the equipment nameplate.

For replacement parts not covered by warranty (refer to warranty sheet in front of manual), address all purchase orders to:

The Technical Materiel Corporation
Attention: Sales Department
700 Fenimore Road
Mamaroneck, New York

PARTS LIST

TRANSMITTER-RECEIVER TELEPHONE CONTROL,
MODEL TPC-1

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
DS101 thru DS106	Integral part of Telephone-Handset, TMC part number HS102.	
LS101	LOUDSPEAKER, PERMANENT MAGNET: operating frequency range 200-5,000 cps; voice coil impedance 3.2 ohms; nominal input wattage 1 watt, peak 2 watts; 2-17/32" square x 1-19/32" deep.	LS106
P101	CONNECTOR, PLUG, ELECTRICAL: 14 number 16 male pin type contacts, nominal contact current rating 17.0 amps, 500 V RMS.	PL212-1
R101	RESISTOR, FIXED, COMPOSITION: 3.3 ohms, +5%; 1 watt.	RC32GF3R3J
R102	RESISTOR, FIXED, COMPOSITION: 1,000 ohms, +5%; 2 watts.	RC42GF102J
R103	Same as R102.	
R104	ATTENUATOR, VARIABLE: L pad resistive type; input and output impedance 4 ohms, max. continuous current rating 4 watts, peak audio rating 15 watts; 0 to 36 db attenuation; continuously variable.	RV107L4

POWER SUPPLY, REMOTE CONTROL
UNIT, MODEL TPCK-1

C101	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100,000 uuf, +80% -20%; 500 WVDC.	CC100-32
CR101	SEMICONDUCTOR DEVICE, DIODE: silicon, diffused junction; peak reverse working voltage 300 V; repetitive peak reverse working voltage 360 V; average rectified forward current 750 ma from -65°C to +50°C; surge current, one cycle 20 amps; operating ambient and storage temperature range -65°C to +175°C; hermetically sealed, welded case.	1N4366
CR102 thru CR104	Same as CR101.	

PARTS LIST (CONT)

POWER SUPPLY, REMOTE CONTROL UNIT,
MODEL TPCK-1

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
CR105	SEMICONDUCTOR DEVICE, DIODE: silicon; 600 V max. peak inverse voltage; 0.75 max. DC forward amperes at 150°C.	1N547
DS101	LAMP, NEON: 105/125 volts, 1/25 watt; miniature bayonet base T-3-1/4 bulb.	BI100-51
DS102	Non-replaceable item. Part of XF101.	
F101	FUSE, CARTRIDGE: 1 amp; time lag; 1-1/4" long x 1/4" dia.; slow blow.	FU102-1
J101	CONNECTOR, RECEPTACLE, ELECTRICAL: 24 number 20 socket type contacts, rated for 7.5 amperes, 500 V RMS.	JJ200-3
J102	CONNECTOR, RECEPTACLE, ELECTRICAL: 14 number 16 socket type contacts, rated for 17.0 amperes, 500 V RMS.	JJ200-1
J103	CONNECTOR, RECEPTACLE, ELECTRICAL: AC; 2 male contacts rated for 250 V at 10 amps, 125 V at 15 amps; polarized; twist lock.	JJ175
R101	RESISTOR, FIXED, COMPOSITION: 220,000 ohms, $\pm 5\%$; 1/2 watt.	RC20GF224J
R102	RESISTOR, FIXED, COMPOSITION: 10 ohms, $\pm 5\%$; 2 watts.	RC42GF100J
R103	Non-replaceable item. Part of XF101.	
S101	SWITCH, TOGGLE: SPST; 28° angle of throw; solder lug terminals.	ST12A
S102	SWITCH, ROTARY, SOLENOID: 2 section, 4 throw position, 30° angle of throw, solid silver alloy non-shortening type contacts; current rating 5 to 7 amps resistive; 2.5 amps resistive at 24 VDC (break); 0.5 amps resistive at 115 VDC (break); coil rated for 110 ohms, $\pm 10\%$, 115 VDC; 200 V RMS dielectric strength.	SW378

PARTS LIST (CONT)

POWER SUPPLY, REMOTE CONTROL UNIT,
MODEL TPCK-1

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
T101	TRANSFORMER, POWER: primary- 115/230 VAC, 50/60 cps, 1 phase; secondary- 123 V RMS, center tap at 61.5 V, current rating 1.1 amps; 7 solder lug type terminals; grey metal case.	TF312
XDS101	LIGHT, INDICATOR: with red frosted lens; for miniature bayonet base T-3-1/4 bulb.	TS106-1
XF101	FUSEHOLDER: lamp indicating; accommodates cartridge fuse 1-1/4" long x 1/4" dia. ; 90 to 300 V, 20 amps; neon lamp type with 220K ohm lamp resistor; clear transparent flat sided knob; black body; consists of DS102, R103.	FH104-3

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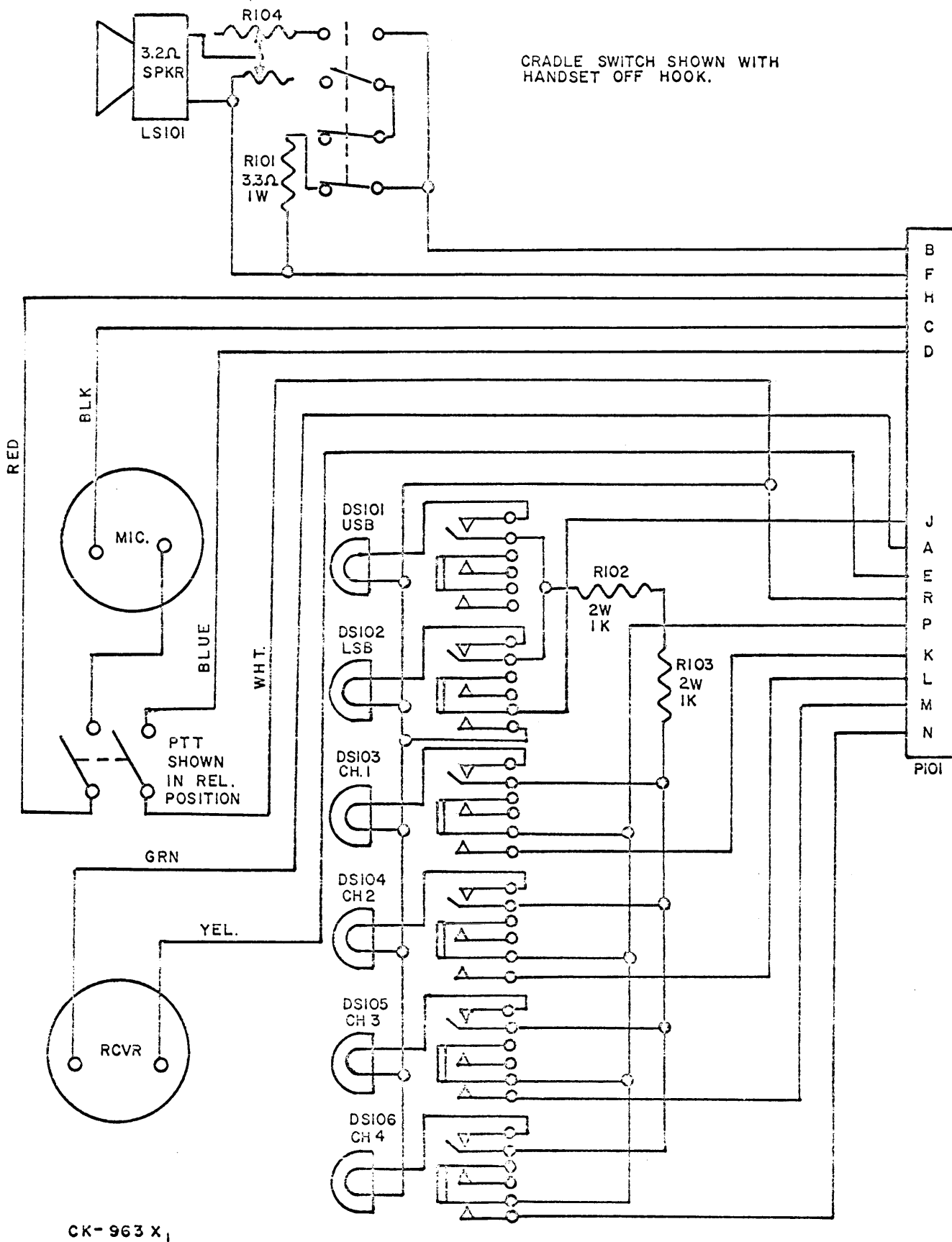
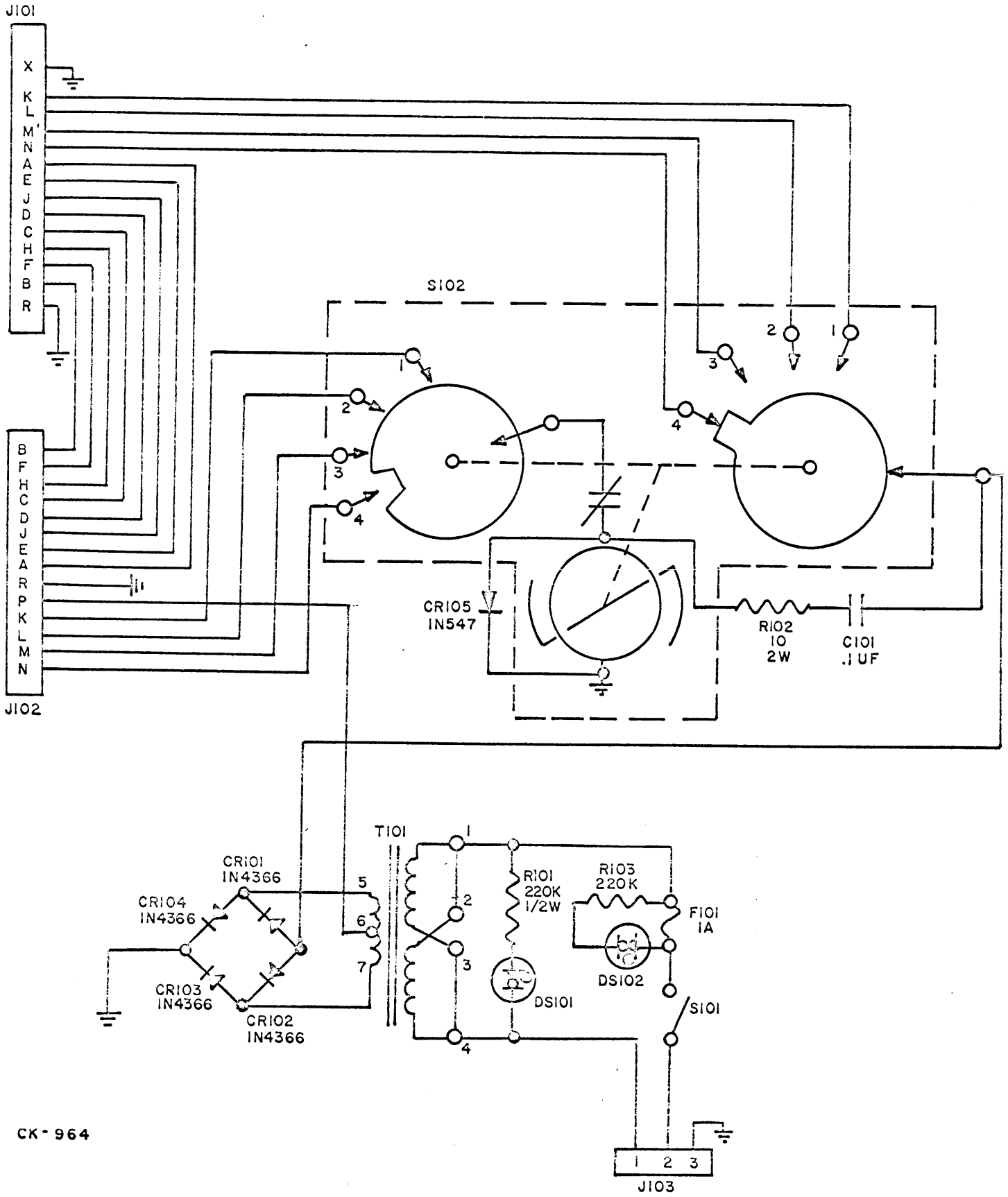


Figure 7-1. Schematic Diagram, TPC-1



CK-964

Figure 7-2. Schematic Diagram, TPCK-1

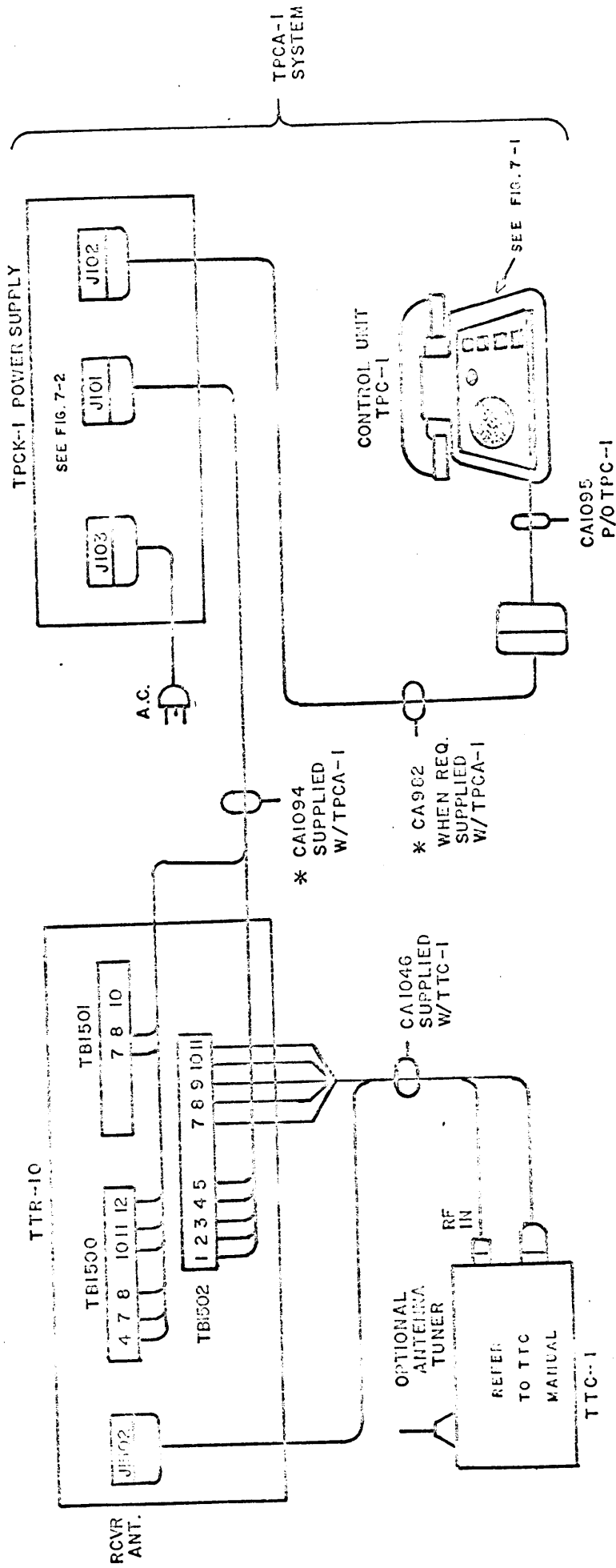
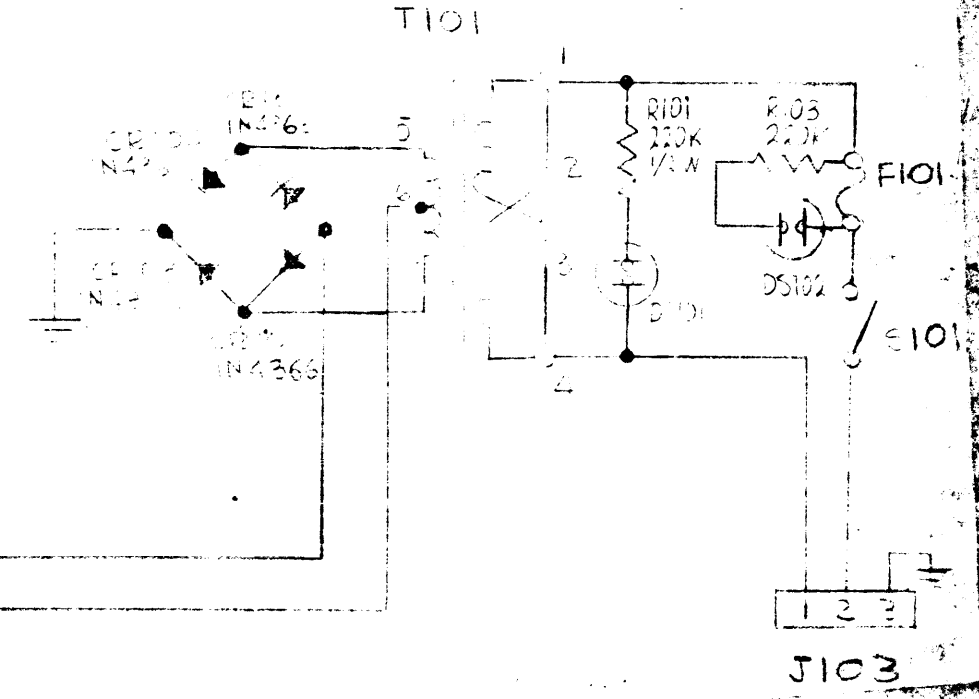
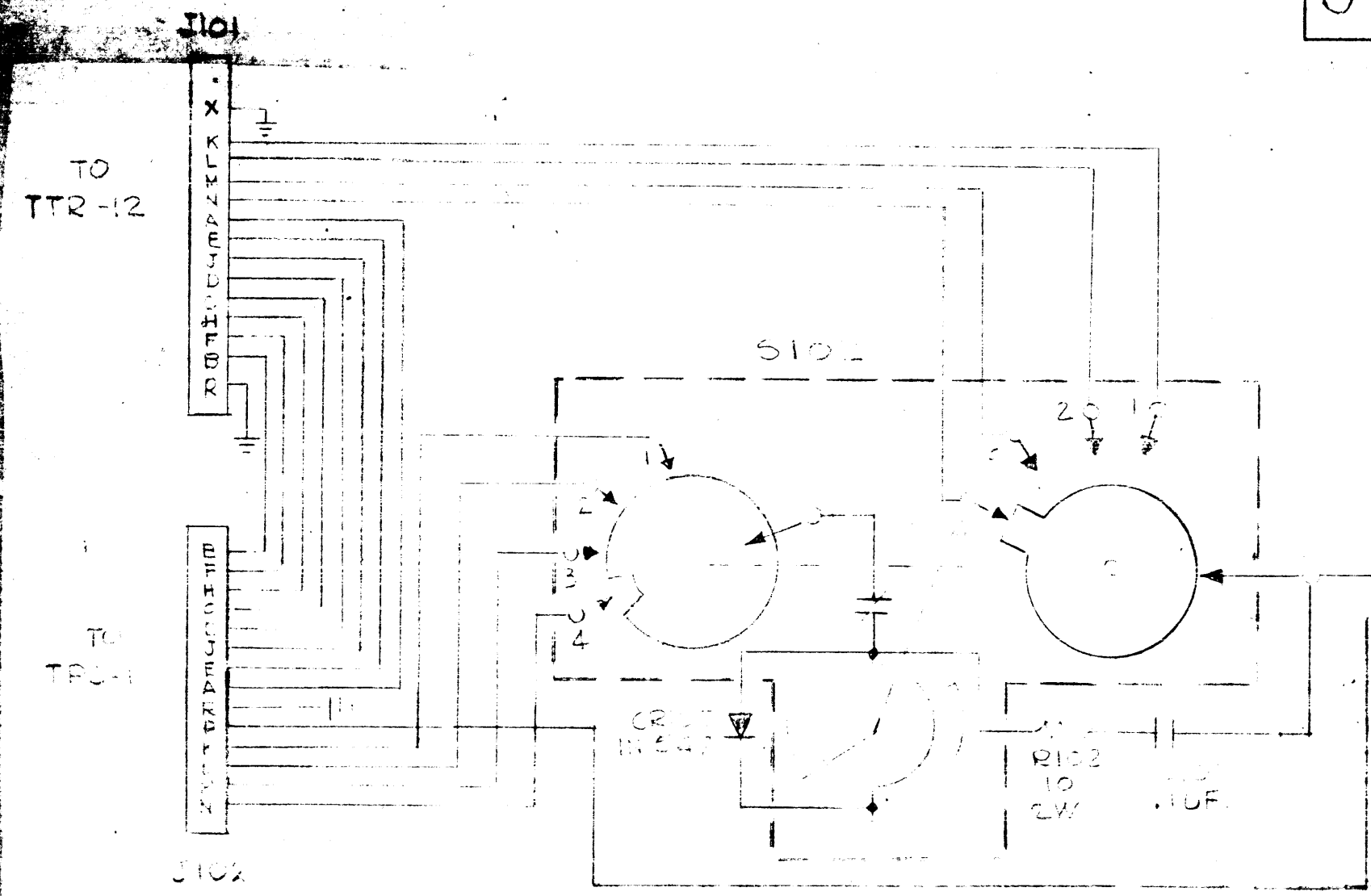


Figure 7-3. Interconnect Cabling Diagram, TPCA

CK964 B

REVISIONS

SYM	DESCRIPTION	DATE	E.M.N. NO.	DRAFT	CHKD	APPD
XI	PICTORIAL CLARIFIED	12-3-65	X.	GDL		
Z						
A	PIN A & B CON. DELETED, NO 5, 6, 7, R101, R103, DS102 ADDED J101 & J102 REVERSED, SYM CHART UPDATED	1-26-66	15656			
B	PIN X & R ADDED, CONN. FROM J101 TO T101 DELETED	2-9-66	15718			



- ~ LAST SYMBOLS ~
- C101
 - T101
 - CR105
 - J103
 - F101
 - DS102
 - S102
 - R103

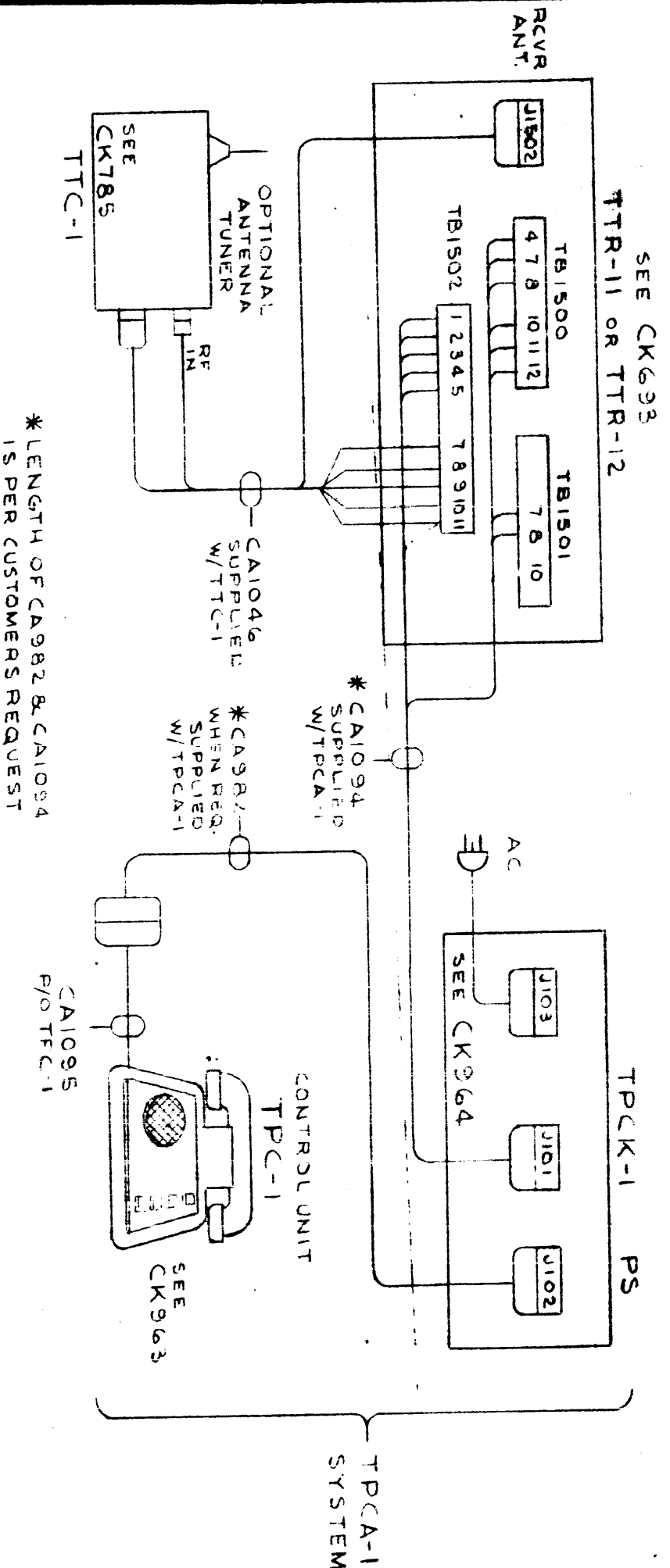
NOTES

1	TPCK-1	
QTY./UNIT	MODEL USED ON	ASSY. NO.
SCALE	CODE	

THE CONTENTS OF THIS DRAWING ARE THE EXCLUSIVE PROPERTY OF THE TECHNICAL MATERIEL CORP. ITS UNAUTHORIZED USE OR REPRODUCTION IN WHOLE OR IN PART IS STRICTLY FORBIDDEN.

QTY.	ITEM	PART NUMBER	DESCRIPTION	SYMBOL
ADDENDUM LIST OF MATERIAL				
MATERIAL			THE TECHNICAL MATERIEL CORP. MAMARONECK, NEW YORK	
FINISH			TITLE DIAGRAM SCHEMATIC REMOTE CONTROL UNIT	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES			DRAWN E. ANZA	DATE 9/28/65
DECIMALS X ± .05 XX ± .01 XXX ± .005			CHECKED J.L.	DATE 9/28/65
FRACTIONS ± 1/64 ANGLES ± 0° 30'			ELECT. DES.	DATE
TOLERANCES			MECH. DES.	DATE
			CK964 B	
			SHEET	

REQ. PER UNIT	MODEL	USED ON	ASSY. NO.	DATE	CK1079	B
1	TPC-1					
1	TPCA-1					
1	KIT-252					
1	KIT-278					



SYMBOL	DESCRIPTION	PART NO.	REQ. ITEM	REVISION	DATE	CH. NO.	DRAFTS	CHECKER	ENG. APP.
	THE TECHNICAL MATERIEL CORP. MAMARONECK NEW YORK								
B	PICTORIAL TPC-1 REAR VIEW CONN. FROM J101 TO TER. TB1502 DEL.	29-46	15718		12/16/63				
A	REVISED CONNECTIONS PER J101 & J102; ADD # NOTED REF.	15621	JL		12/16/63				
Ø	Ø R16 RELEASE FOR TTR				12/16/63				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE CHEMICALLY APPLIED OR PLATED FINISHES	SCALE	DATE	CH. NO.	DRAFTS	CHECKER	ENG. APP.			
DECIMALS ± .05 ± .01 MIN. ± .005	TOLERANCES	FRACTIONS ± 1/64 ANGLES ± 0° 30'	CODE						
FINISH & SPEC. NO.	TYPE & TEMPER	HEAT TREAT. SPEC.	MATERIAL						
ML	29/14/69		JL						
CK1079	FINAL APPROVAL								
B	DIAGRAM, INTERCONNECT								