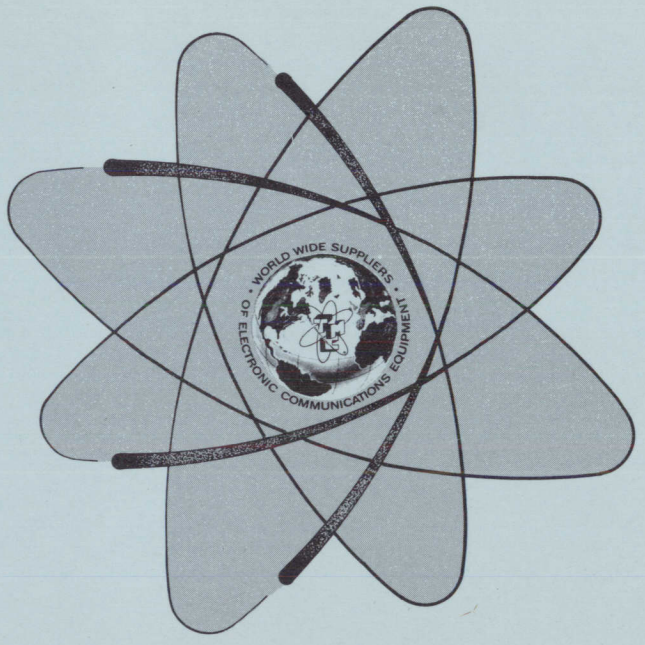
TECHNICAL MANUAL

for

GENERAL PURPOSE TRANSMITTER

MODEL GPTR-1KC



THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

Printed in U.S.A.

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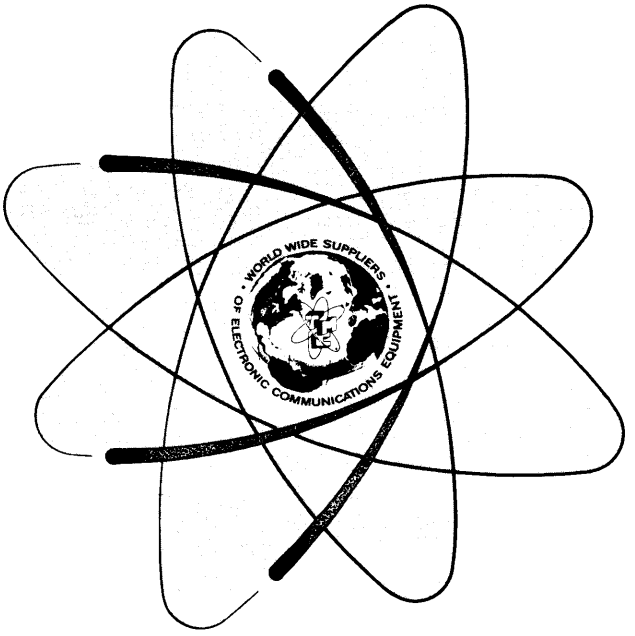

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NOTICE

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.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By

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SECTION 1

GENERAL INFORMATION

1-1. FUNCTIONAL DESCRIPTION

The Technical Materiel Corporation of Mamaroneck, New York, designed and manufactured the Model GPTR-1KC General Purpose Transmitter. A predominant feature of the design is the provision for the operation of the essential controls of the transmitter from a remote site. The transmitter will provide an output of (1 KW peak envelope power) on one of four predetermined crystal controlled carrier frequencies. It will transmit in AME (amplitude modulation equivalent), SSB (single sideband) modes. In the sideband modes the transmitter will operate on either the upper or lower sideband.

The operating modes of the GPTR-1KC transmitter in relation to the emission classification is shown in table 1-1.

TABLE 1-1. EMISSION CLASSIFICATION FOR THE GPTR-1KC

Operating Mode	Abbreviation	Emission Code
Amplitude Modulation Equivalent	AME	A3H
Upper Sideband	USB	A3J
Lower Sideband	LSB	A3J

The ADC-5A Analog Digital Control system provides the remote control capability for the transmitter. The system consists of a AX5213 Remote Programmer with an associated tone generating unit and the AX5190 Decoder which translates the tone signals to control settings in the transmitter.

In addition the decoder sends back indications of the transmitter status to the remote site.

The exciter generates 100 mw PEP (peak envelope power) which is raised to the 50 watt average power level by the HFL-100C amplifier. The TMA-1KC amplifier completes the amplification of the rf signal to 1 KW PEP.

1-2. PHYSICAL DESCRIPTION

The GPTR-1KC transmitter is housed in a single 4 foot cabinet (See figure 2-1). The main modular units that make up the system are slide mounted for ease of maintenance. The modulars are linear power amplifier,. TMA-1KC, Fan Assembly AX5210, High Gain Amplifier HFL-100C, exciter SME-5C, Decoder AX5190, RF switching AX5212 and main AC circuit breaker panel. Two fans are mounted on top of cabinet to exhaust heat from cabinet.

1-3. REFERENCE DATA

The technical characteristics of the GPTR-1KC transmitter are shown in table 1-2. Table 1-3 lists the power amplifying tube complement of the system.

TABLE 1-2. TECHNICAL SPECIFICATIONS

Operating Frequencies:	Preselected between 2.0 and 26.0 MHz on four crystal controlled channels.
Frequency Stability:	Maximum deviation is $\pm$ Hz over an ambient temperature range of $\overline{0}$ to 50C with temperature controlled crystal oscillators.
Modes of Operation:	Three switch selected modes as shown in table 1-1.
Power Output:	1000 watts PEP.
Output Impedance:	50 ohms, unbalanced.
VSWR:	Maximum of 2:1 operating 3:1 without damage to transmitter.
Tuning:	Channelized manual or remote.
ALDC:	Automatic load and Drive Control circuit improves linearity, limits distortion, and maintains a relatively constant output level during high modulation peaks and load changes.
Spurious Response:	At least 40 db down from full PEP output.
Power Requirement:	Approximately 1.8 Kw (dependent on optional equipment incorporated) at 110/220 volt, single phase, 50/60 Hz.

TABLE 1-2. TECHNICAL SPECIFICATIONS (cont)

Eniironmental Limitations:	Operating -0 to 50 C with up to 90 percent humidity.
Features:	Safety interlocks, overload protection, fused power inputs, forced air cooling, monitored inputs and outputs.
Size:	23 inches wide, less than 4-½ ft. high 2 ½ ft. deep (max.). Mounted in customer selected standard cabinet.
Weight:	Less than 200 pounds. Actual weight depends on optional equipment incorporated.

TABLE 1-3. TUBE COMPLEMENT

Unit	Reference Designation	Part Number or Type	Function
HFL-100C	V101	12HG7*	1st Amplifier's
	V102	12HG7*	
	V103	4CX350	2nd RF Amplifier
TMA-1KC	V101	8163*	Power Amplifier
	V102	8163*	Power Amplifier

*Operated in parallel

1-4. OTHER PUBLICATIONS

Technical manuals have been prepared for the several individuals units which comprise the Model GPTR-1KC transmitter. Perusal of these publications prior to working with or on the transmitter is strongly recommended. Specific detail pertinent to the installatiin, operation or repair of the modular units is often found in these presentations.

SECTION 2

INSTALLATION

2-1. RECEIVING AND INSPECTION

Experienced personnel in the TMC test facility have ascertained that the GPTR-1KC met all operational requirements prior to shipment. The transmitter was then partially disassembled and the modular units separately packed. Separate packaging increases the ease with which the transmitter components are handled and reduces the possibility of damage in transit. Fragile parts, power amplifier tubes, for instance, are often removed and afforded special protection. Wiring harnesses are usually secured to the interior of the cabinet.

Upon arrival at the installation site the contents of each crate or carton should be carefully examined to be sure that the equipment sustained no damage in shipping. A claim against the carrier should be filed if damage for which he is responsible is discovered. Assistance in rectifying such damage will be provided by The Technical Materiel Corporation by describing repair methods and recommending replacement parts.

A packing list is provided with each shipment. Review it carefully to be certain that all material has been received. Carefully inspect all packing material so that no parts or equipment such as hardware, cables or connectors are discarded.

2-2. POWER REQUIREMENTS

The transmitter will operate from a 110 or a 220 volt single phase power source. Each unit is factory wired to accommodate the voltage level indicated by the customer. A change in source voltage level will require that the transformer primary windings be rewired. The internal interconnection diagram in the unit technical manuals show the necessary wiring changes which should be made prior to installation. The protective fuses must also b e changed. The power source must be capable of supplying up to 1.8 Kw.

2-3. INITIAL INSTALLATION

a. GENERAL DISCUSSION. Due consideration must be given as to the placement of the transmitter cabinet. Since the GPTR-1KC is an air-cooled system adequate ventilation must be provided. Convenience of operation and the relationship to associated equipment must also be considered. Clearance to allow the modular units to be extended on the slide mountings and easy access to the rear of the transmitter are necessary.

Before starting to reassemble the transmitter all packing material should be removed from the cabinet and wiring harness.

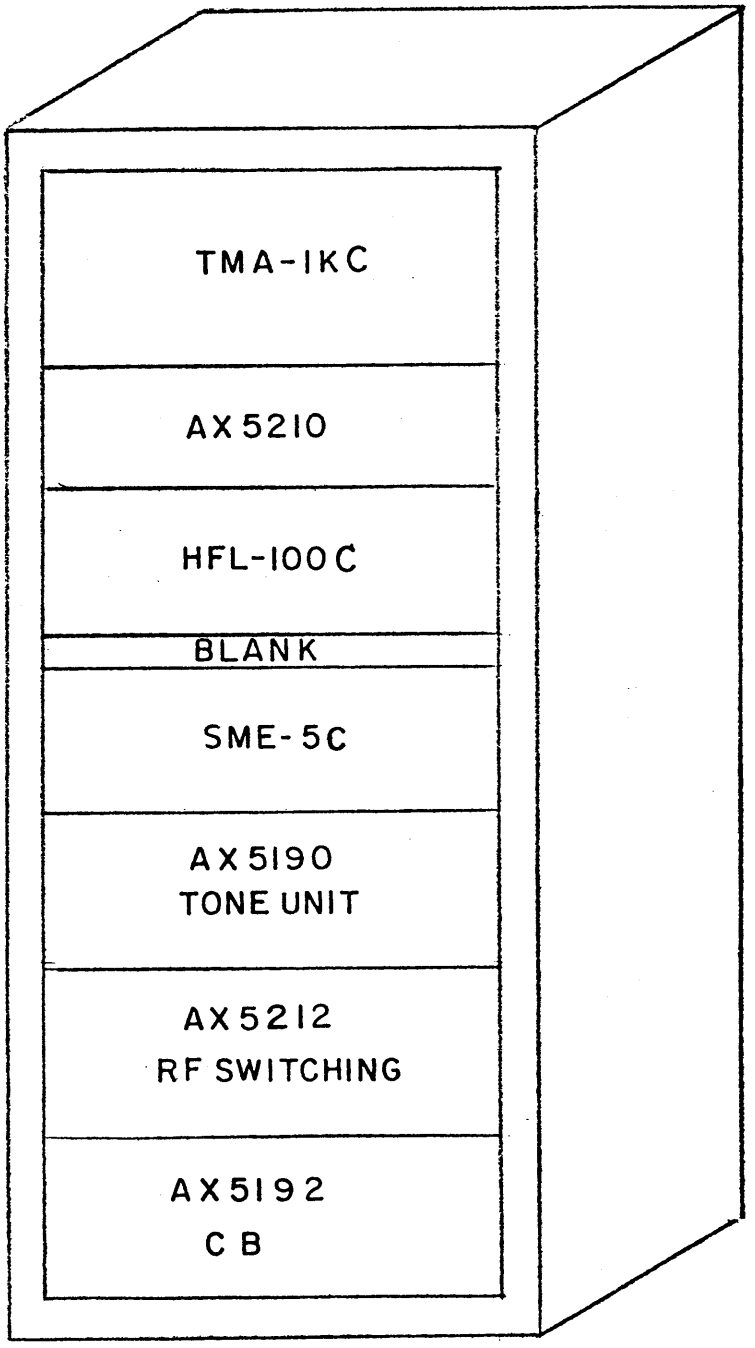

FIG. 2-1 MODULAR COMPONENTS

b. UNIT INSTALLATION. The tracks for the slide mountings which support the modular components of the transmitter are already mounted in the cabient. It is therefore, a simple task to slide the units into the correct position as shown in figure 2-1.

The circuit breaker panel is not usually disassembled from the cabinet nor are the blank panels which occupy the space of unicorporated optional equipment. Care must be exercised when positioning the units to avoid any entanglement with installed wiring. When the units are in place, they should be firmly secured by means of the panel locks, or with the mounting hardware supplied.

c. ELECTRICAL CONNECTIONS. A standard wiring harness has been installed in the GPTR-1KC cabinet. This harness makes provision for the installation of the available optional equipment most commonly added to the basic transmitter configuration, namely an ATSA-3 Antenna Tuning System and a TIS Tone Intellignece System. If not initially incorporated, these equipments can be easily added at a later date with a minimum of additional wiring,

An interface panel mounted at the rear of the transmitter cabinet is provided to support the mating jacks for unit interconnections and for most of the external connections to be made to the transmitter. The layout of this panel showing the locations of these connections is shown in figure 2-2.

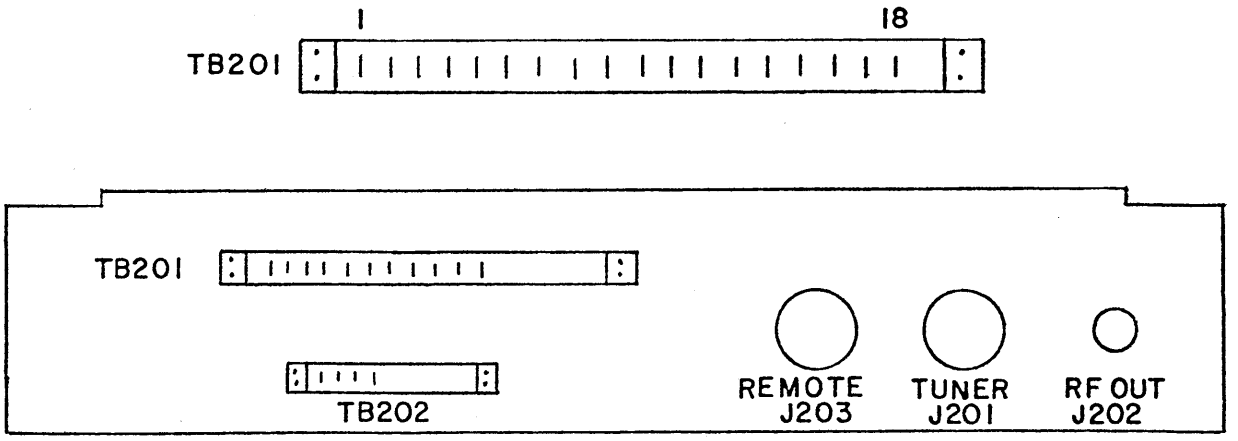

Figure 2-2, Interface Panel
(Rear GPTR-1KC)

WARNING

BEFORE MAKING ANY ELECTRICAL CONNECTIONS TO THE TRANSMITTER BE CERTAIN THAT NO CONNECTION HAS BEEN MADE TO ANY POWER SOURCE AND THAT THE POWER SUPPLY JACK IS TAGGED TO PREVENT ACCIDENTAL USE.

(1) Internal Connections. Reference to the internal interconnection diagram, figure 2-2, will assist the installer in properly making the connections required. The terminal boards and jacks at the rear of the modular units have been marked with the appropriate "TB" or "J" number. Connectors on the wiring harness have been similarly identified. Check the numbers carefully for, unless all optional equipment is installed, some connectors will not be used.

(2) External Connections. After completing all of the external connections described in the paragraphs which follow, primary power must be supplied to the transmitter through the connector located at the lower left rear corner of the equipment cabinet. A plug (PL190-NG) which mates with this connector is furnished as a "loose item" to facilitate the fabrication of this power cable.

Mating connectors for the terminal boards and jacks on the interface panel where the external connections to the transmitter are made are also furnished as "loose items". These items are used to terminate the control and signal cables which must be fabricated by the customer.

The customer fabricated cabling carrying the operational and control signals terminates at TB201 and TB202 on the interface panel. Shielded wire (except as noted) should be used to fabricate this cable. The proper connections are shown in table 2-1 and table 2-2.

TABLE 2-1. CONNECTIONS TO TERMINAL BOARD TB201

Terminal No.	Signal Input
1	Upper and Lower Sideband (600 ohm)
2	----
3	Upper and Lower Sideband (600 ohm)
4	Shields (ground)
5	
6	
7	Lower Sideband (600 ohm)
8	Ground

TABLE 2-1. CONNECTIONS TO TERMINAL BOARD TB201 (cont)

Terminal No.	Signal Input
9	
10	
11	
12	
13	
14	Ground
15	PTT (need not be shielded)
16	PTT ground (need not be shielded)
17	External interlocks (need not be shielded)
18	External ground (need not be shielded)

TABLE 2-2. CONNECTIONS TO TERMINAL BOARD TB202

Terminal No.	Signal
9	Remote Inputs
10	Remote

2-4. REMOTE CONTROL UNIT

After unpacking and completing the initial physical inspection of the AX5213 remote programmer, initial operational checks are usually conducted at the transmitter site. When these tests are finished the cabinet containing the control unit and the associated tone package (send/receive) is placed in the location from which it is desired to control the transmitter operation.

A power source of 220 volts must be available at the remote station to energize the control unit. Two pair of 600 ohm transmission lines may be used to interconnect the remote control unit (AX5213) and the GPTR-1KC transmitter. See table 2-1 and 2-2 of this manual for further information. (See Technical Manual ADC-5A).

2-5. FINAL INSPECTION

After all electrical connections have been completed the transmitter should be visually inspected to be sure of the following:

a. The interlocks are operable. The interlocks on the GPTR-1KC transmitter are located on the TMA-1KC linear power amplifier unit, and must close when the top and bottom protective covers are secured in place.

b. All electrical connections have been properly made and that the connectors are mechanically secure in the correct positions.

c. The protective top and bottom cover are securely affixed to each modular unit and that the units are secured in the cabinet with panel locks or mounting hardware.

d. The rear cabinet panel is in place and secured with the mounting hardware provided.

e. The antenna system or equivalent dummy load is properly connected to the rf output connector of the transmitter system.

SECTION 3

OPERATORS SECTION

3-1. INTRODUCTION

The GPTR-1KC transmitter will provide one kilowatt PEP (peak envelope power) in any of three operating modes. This section gives instructions for tuning, operating and monitoring the transmitter. These instructions consider only the basic transmitter. Should any of the available optional equipment be added the procedures must be modified to include the operation of the additional units. Reference to the individual technical manuals for the added equipment will assist the operator in making these modifications. Under normal conditions the transmitter automatically channelizes to a frequency band to accommodate the selected carrier frequency and any compatible additional equipment will also be automatically controlled.

3-2. OPERATING CONTROLS AND SEQUENCE

The individual technical manual for each modular component of the transmitter shows the location and function of each control and indicator. The operator must be knowledgeably familiar with this information before attempting to adjust or operate the GPTR-1KC.

These instructions present an approved sequence of operation. It is important that such a sequence be habitually followed to prevent undue stress on system components.

3-3. PRELIMINARY CONTROL SETTINGS

Before applying any power to the transmitter the operator must be certain that the antenna or suitable dummy load is either connected directly to TMA-1KC output J104 or through antenna switching AX5212. If antenna switching (AX5212) is used, the operator must be familiar with its rf switching facilities (read text on AX5212). The position of the controls in accordnace with table 3-1 must be verified by the operator as the first step in transmitter use.

TABLE 3-1. PRELIMINARY CONTROL SETTINGS

Modular Unit	Control	Setting
Circuit Breaker J201	Main CB	ON
SME-5C	USB	OFF
	LSB	OFF
	MODE	SSB
	CHANNEL	1
	ON/OFF SWITCH	ON
HFL-100C	AC	ON
	HV	OFF
	Local Remote Switch	Remote
	IP/RF sw	IP
TMA-1KC	Manual/Remote Switch	Remote

TABLE 3-1. PRELIMINARY CONTROL SETTINGS (cont)

Modular Unit	Control	Setting
	AC Switch	ON
	HV Switch	OFF

3-4. OPERATING PROCEDURES

The GPTR-1KC is a four channel pretuned transmitter. It can be controlled at a local station or remotely controlled via telephone 600 ohm lines. The AX5213 programmer duplicates essential controls on the transmitter. Intelligence inputs (audio) are also made from a remote site.

All tunable components of the GPTR-1KC are pretuned and are selected by RF band switches and Ledex. Channel programming of Ledex's is slaved to SME-5C program card which supplies voltage back to TMA-1KC, HFL-100C and AX5212 switch for Notch homming signals.

Initial Checks. With system set up as in table 3-1 the following steps shuuld be checked:

a. Top fans should be on.
b. AX5210 fans should be on.
c. TMA AC should be on, tube filaments, fans, band indicator (one channel should be lite), etc.
d. HFL-100C AC should be on, band indicator should be lite (1 only).
e. Main AC indicator should be lite.
f. 1 Channel indicator on AX5212 antenna switch should be lite.
h. SME-5C AC should be on, PTT light should be off.

NOTE: Bandswitches in TMA-1KC and HFL-100C will not rotate. If PTT line is grounded- also HFL-100C, will not change bands with its high voltage off.

SECTION 4

PRINCIPLES OF OPERATION

4-1. GENERAL INFORMATION (Overall Schematic Diagram, Figure 4-4)

Technical Materiel Corporation's Model GPTR-1KC transmitter was designed to be tuned and operated from a remote station some distance from the transmitter location. To accomplish this a Mode ADC-5 Analog Digital Control System has been incorporated into a type GPT transmitter system.

4-2. SYSTEM OPERATION (System Block Diagram, Figure 4-1)

HFL HV ON and Bandswitching Change (See Figure 4-2)

Step 1 - After initial check out is completed turn on HFL HV (PTT OFF). HV should not come on with HFL-100C LOCAL/REMOTE Switch in Remote position, but should come on in Local position. With switch in local position, press band button to check operation of HFL-100C.Ledex.

Step 2 - Switch HFL LOCAL/REMOTE Switch to remote HV should be OFF. By turning TMA-1KC MANUAL/REMOTE switch to manual HFL-100C HV should come on. If it does not check to see if top and bottom cover interlocks on TMA-1KC are completed.

After HFL-100C HV has been turned on in Remote position turn OFF AC switch in TMA-1KC for 5 seconds and then turn AC back on. HFL-100C HV should be off until time delay in TMA-1KC has timed out approximately 30 seconds.

TMA HV ON and Channel Change

Put TMA-1KC MANUAL/REMOTE switch in manual position with HV OFF. Check band switch operation by pressing band button. Each time button is depressed band should advance one step in channels 1 to 4. When in channel 4, pressing band button one time should automatically program around to channel 1.

Turn TMA-1KC HV ON. HV should be on only in manual position. To get HV on in Remote it will be necessary to put jumper on interface panel TB201 from terminal 17 to 18. This jumper will be removed when transmitter is going to be operated with remote control. Turn off TMA, HFL before attempting to put this jumper on.

With HFL and TMA in Remote position and jumper on interface HV in both units should come on after time delay has timed out.

CHANNEL SELECTION FROM SME-5C

It should now be possible to control all channelization of TMA, HFL, antenna switching by rotating SME channel switch, channels 1 through 4.

PTT and IDLE CURRENT INITIAL CHECKS (See figure 4-3)

When PTT line is ungrounded idle current of TMA-1KC is approximately 25 ma, and HFL-100C Ip is close to cut off (0 ma) before grounding PTT line switch SME to SSB mode channel to one USB ON and LSB OFF. With push-to-talk grounded TMA idle current should be approximately 180-200 ma HFL idle (Ip) should be 100 ma if this is not true refer to HFL-100C and TMA-1KC text for correct set

up procedures. *Note: With PTT grounded TMA-1KC and HFL-100C Ledex's should not rotate.

RF OPERATION (RF output 1 KW PEP)

RF levels of each channel are preset for full RF output with -20 dbm of 1 KHz audio signal at input terminals TB201 1 and 2 USB 3 and 5 LSB. Follow step by step procedure to assure proper adjustments.

LEVEL ADJUSTMENTS

(1) Turn OFF both HFL-100C and TMA-1KC HV. Connect audio generator with 600 ohm output to USB input TB201 terminals 1 and 2 using shielded pair. Ground shield TB201 terminal 4. Set audio output level to approximately -20 dbm.

(2) Set up SME controls as follows (for USB operation)

a. Channel (1)
b. Mode (SSB)
c. Lower Sideband (OFF)
d. Upper Sideband Line one
e. Meter Switch USB
f. Upper Sideband Level R4 completely CCW
g. Lower Sideband Level R3 completely CCW

(3) Remove top cover from SME-5C check position of R6, R7 Line 1, Line 2, level adjustments These are located on A20 card AF Amplifier. These adjustments should be turned completely CCW for maximum audio input. All further audio level adjustment will be made at front panel level controls (Refer to SME-5C text).

Adjust 4 RF gain controls completely ccw for minimum RF gain (R12). These are located on 4 RF channel cards A10795.

(4) Remove ALDC connector to J127.

(5) Adjust front panel audio level controls (LSB R3) USB R4 to 3/4 full cw rotation. It is important to keep audio level as low as practical for linear operation.

Check audio level on SME meter (M1) for USB and LSB. Meter should be adjusted to read -5dbm (relative reading).

(6) Turn on TMA-1KC and HFL-100C HV and ground PTT line starting with channel 1. Carefully adjust with insulated tool RF gain control cw to obtain 600 watts output out of transmitter into load. Repeat this for remaining three channels. If output cannot be achieved readjust audio level to obtain correct output (*Note: Be sure that TMA-1KC output stages are correctly tuned).

(7) Replace ALDC connector into SME-5C and adjust corresponding channel ALDC to reduce RF output of each channel to 500 watts (Check local ALDC by putting TMA-1KC manual/remote switch to manual and adjusting ALDC knob for adjustment.

(8) For USB operation it is only necessary to switch USB OFF and LSB to Line one and readjust LSB audio level to obtain full output.

(9) For AME switch mode to AME with audio input turned OFF, adjust carrier level for 250 watts output. (Carrier adjust in SME-5C is located inside of unit R7).

OVERLOADS

TMA-1KC and HFL-100C overloads have been explained in detail in their texts. It is necessary to fully understand all protective circuits in this system. If a overload appears in HFL-100C it will also cause TMA-1KC to overload. + voltage appears on TB101 when HFL-100C is overloaded. Overload lite in HFL-100C will designate HFL-100C overload.

When TMA-1KC has overloaded for any reason HFL-100C is forced into standby by grounding terminal 14 of TB101 on HFL-100C.

OVERLOAD SETTINGS

HFL-100C	300 ma
TMA-1KC	300 ma with RF Indicator not lite
TMA-1KC	600 ma with RF Indicator lite
SWR	3:1 miss-match

RF indicator should be adjusted so that indicator will lite with 150-200 watts output.

REMOTE CONTROL OPERATION

Refer to remote control text for full understanding of its operation.

a. Connect audio lines to 9, 10 of TB202 from remote programmer
b. Remove jumper on TB201 17, 18
c. Check AC input cable connector J203 for tightness
d. Set all switches to remote on SME-5C HFL, TMA
e. Connect AC to remote programmer AX5213

Check out each function of remote control and readback as per text. (*Note: HV switches in TMA-1KC and HFL-100C must be left on at all times for remote operation).

MICROPHONE OPERATION

Transmitter has facilities for carbon, dynamic or low impedance microphones, when operating at remote site. A linear amplifier is included with switching control for type of mike required (See remote text). A carbon mike and dynamic mike input is also located on AX5212 antenna switching unit. These feed directly into SME-5C mike inputs. (See SME-5C text)

When operating with voice input transmitter RF output peaks must be maintained at 1 KW PEP. This is accomplished by careful audio adjustment and ALDC control. KW output of transmitter should not drive above 200-250 watts on voice peaks.

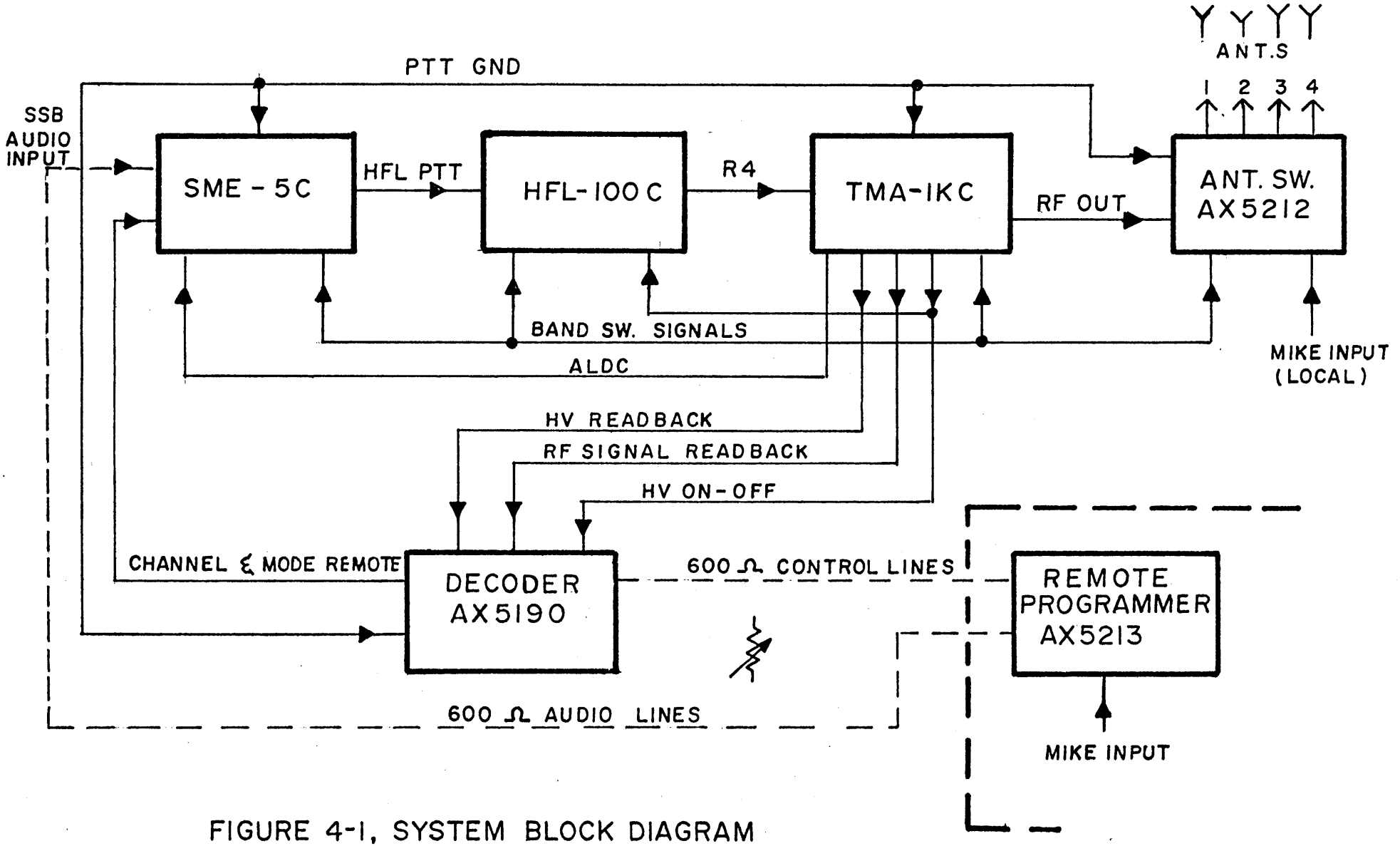

FIGURE 4-1, SYSTEM BLOCK DIAGRAM
GPTR-IKC

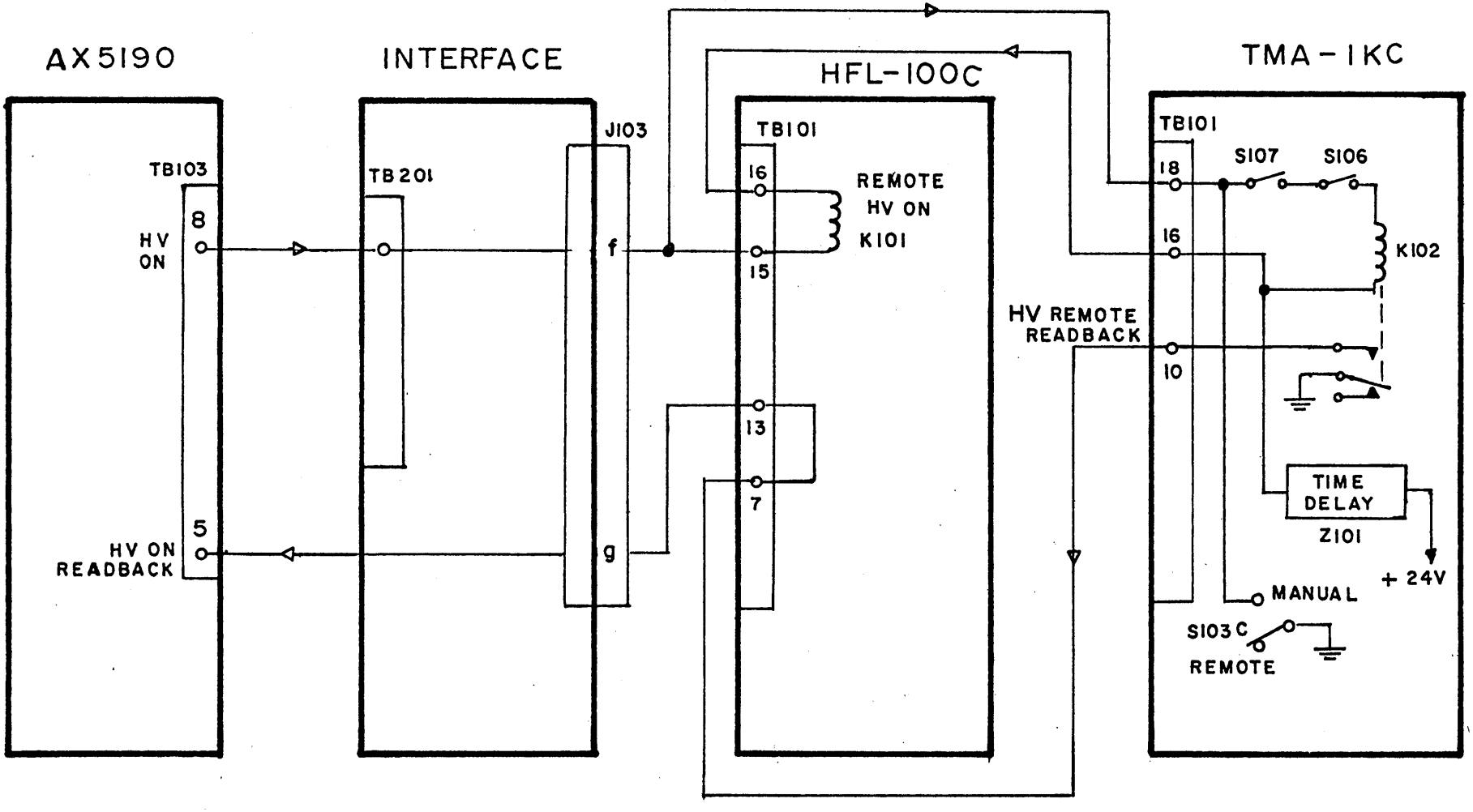

FIGURE 4-2, HV ON / OFF CONTROL

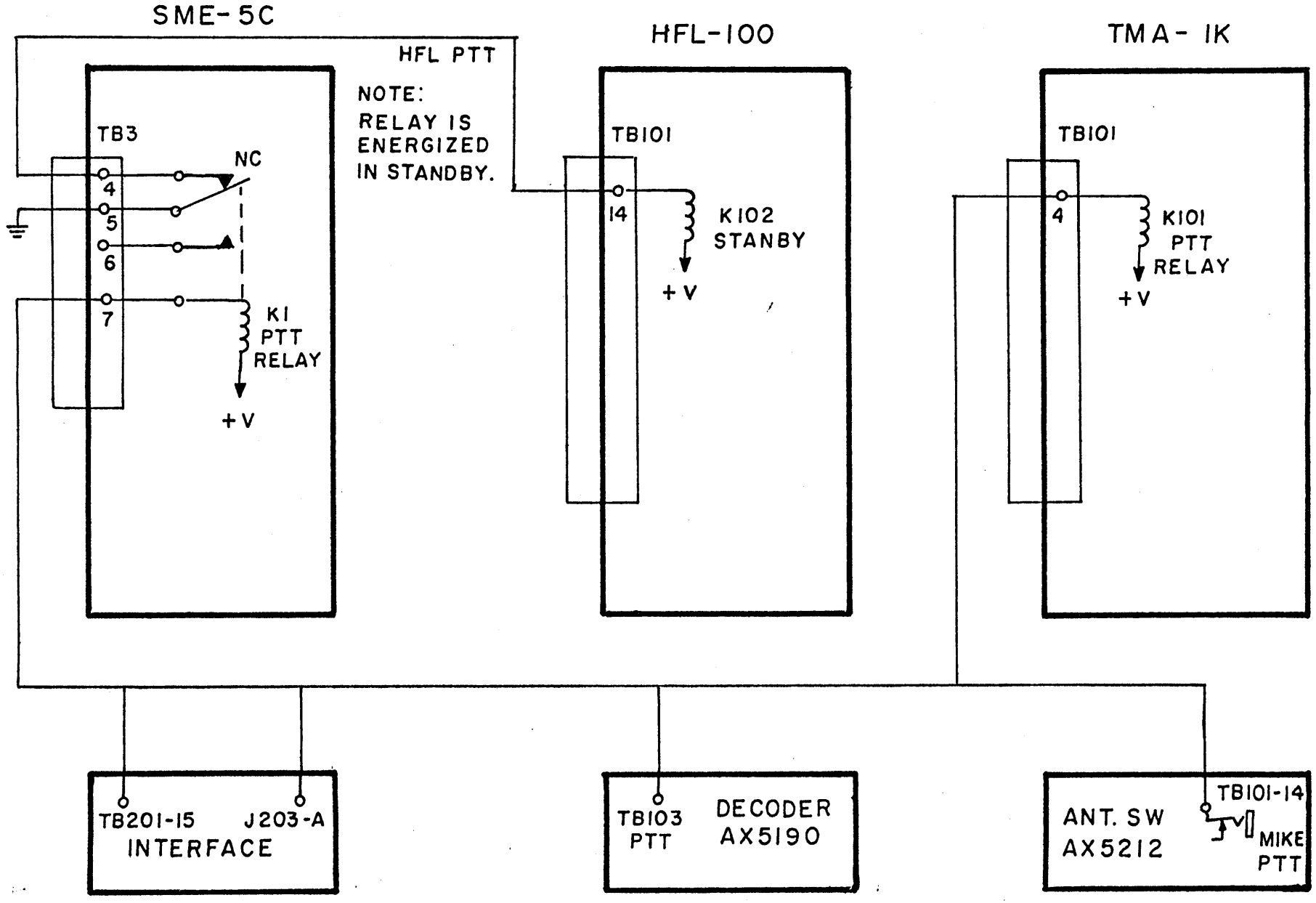

FIGURE 4-3, PUSH TO TALK (PTT)

REVISIONS						
E.M.N.NO	DRAFT	CHKD	ZONE	LTR	DESCRIPTION	DATE	APPROVED
				X1	REVISED (PROGRAM REMOTE SECTION)		
	GDL			X2	UPDATED	3-11-77	

AC STRIP

TOP FANS

PANEL FANS AX 5210

220V AC

AC CKT BKR PANEL

AC

S201

SME P104-A

SME P104-C

EXT INTLK

J204 AC IN

TO PROGRAM SITE

INTERFACE

TB201

USB
GND
LSB
GND
KEY
FSK
CONT GND
PTT

SME TB1-1
SME TB1-3
SME TB1-7
SME TB1-9
SME TB1-8
SME TB3-2
SME TB2-5
SME TB-6
SME TB2-1
SME TB3-7
SME TB3-8
TMA TB101-18
INTFC J203-g
GND

TB202

REMOTE CONTROL INPUT

J203 P110

SME TB103-7
SME J119-A
SME J119-B
SME J119-L
SME J119-D
SME J119-N
SME J119-2
TMA TB101-3
HFL TB101-13
INTFC TB201-17

AX5190 TB103
AX5190 TB101
AX5190 TB101
AX5190 TB101
AX5190 TB101
AX5190 TB101
AX5190 TB103
AX5190 TB103
AX5190 TB103
AX5190 TB103

SME-5C

TBI

INTFC TB201-1
INTFC TB201-3
RF SW TB101-10
RF SW TB101-6
RF SW TB101-8
INTFC TB201-5
INTFC TB201-7

L1
DYNAMIC MIC
CARBON MIC
GND
L2

TB2

INTFC TB201-13
INTFC TB201-10
INTFC TB201-11

KEYED GND
GND
20 OR 60MA
GND

TB3

INTFC TB201-9
HFL-100 TB101-14
INTFC J203-A
INTFC TB201-15
RF SW TB101-14
INTFC TB201-16

CW KEY
GND
REC
COM
PTT
GND

PI04

S301-4
GND
S301-2

J14 AC IN

PI13

TMA PI12

J127 ALDC IN

J128 RF OUT

PI11

HFL-100 J101

PI15

AME/SSB CHAN 2
CHAN 3
CHAN 4

COM

J119

INTFC J203-C
INTFC J203-D
INTFC J203-E
INTFC J203-F
INTFC J203-M
INTFC J203-P
INTFC J203-R
INTFC J203-b

AME
SSB
LSB LI
USB LI

J120

CHAN 1
CHAN 2
CHAN 3
CHAN 4

HFL-100 E102-11
HFL-100 E102-10
HFL-100 E102-9
HFL-100 E102-8

HFL-100C

SME J128

J128 J101 J103 PI11

RF IN
RF OUT
TMA-IK J103

J102 DC CONTROL

E102 TB101

TMA-IK TB101-2
TMA-IK TB101-8
TMA-IK TB101-10
TMA-IK E101-11
SME J120-E
TMA-IK E101-12
SME J120-D
TMA-IK E101-13
SME J120-C
TMA-IK E101-14
SME J120-B
INTFC J203-f
SME-5 TB3-4
TMA-IK E101-18
TMA-IK TB101-16

STANDBY OVLD
OVLD TRIP
CHAN 4
CHAN 3
CHAN 2
CHAN 1
STAND BY
HV TD
HVTD

P110 TO AC STRIP

TMA-IKC

HFL-100 PI11

PI09 J103 RF IN

J104 ALDC OUT

PI12 SME-5 PI13

E101 TB101

HFL-100 TB101-2
INTFC J203-C
RF SW TB101-14 *
HFL-100 TB101-5
HFL-100 TB101-7
RF SW TB101-4 *
HFL-100 TB101-8
RF SW TB101-3 *
HFL-100 TB101-9
RF SW TB101-2 *
HFL-100 TB101-10
RF SW TB101-1 *
HFL-100 TB101-11
HFL-100 TB101-16
RF SW TB101-12 *
HFL-100 TB101-15
INTFC TB201-17

STAND BY OVLD
REMOTE R.F. IND
PTT
HFL OVLD
REMOTE HV RDBK
CHAN 4
CHAN 3
CHAN 2
CHAN 1
HV T.D
+24V OUT
REMOTE INTLK

J101 AC IN
S301-2
GND
S301-4

J105 RF OUT
AX5212 J101

TO AC STRIP P206

INTFC J203-b
INTFC J203-4
INTFC J203-5
INTFC J203-A
INTFC J203-a
INTFC J203-R
INTFC J203-C
INTFC J203-D
INTFC J203-E
INTFC J203-F

TBI03
COM
HV ON RDBK
RF PWR
PTT
HV ON

TBI01
LSB LI
USB LI
LSB RDBK
USB RDBK
RCVR SIG
AME/SSB
CHAN 2
CHAN 3
CHAN 4

CK2146

DECODER (AX5190)

SME-5TB3-7 TMATBI01-4
TMA TB101-17
SME-5TBI-4
SHIELD
SME-5TBI-5
TMA J105

TBI01
14 13 12 11 10 9 8 7 6 5 4 3 2 1

PTT
+24V IN
DYNAMIC MIKE
GND
CARBON MIKE
CHAN 4
CHAN 3
CHAN 2
CHAN 1

J101 RFIN

J102 ANT1
J103 ANT2
J104 ANT3
J105 ANT4

RF SWITCHING (AX5212)

NOTES

* -THIS SYMBOL DENOTES NEW CABLE HARNESS

CK2135
SCHEMATIC, DIAGRAM (OVERALL)

Figure 4-4

QTY / UNIT	MODEL USED ON	ASS'Y NO.
1	GPTR-1KC	~
APPLICATION	CODE	

SECTION 5

MAINTENANCE

5-1. INTORDUCTION

During the design phase of the Model GPTR-1KC transmitters, due consideration was given to elimination of shutdowns caused by equipment failure. Providing that the operating limitations are recognized and adhered to, long-time trouble free operation may be expected when the recommended preventive maintenance schedule is followed. The Technical Materiel Corporation recommends that only technicians familiar with the equipment and knowledgeable of normal solid-state troubleshooting techniques be allowed to adjust or service the equipment. Technical manuals which have been prepared for each of the modular units of the system should be consulted for details about each of these components. Reference to the block diagram (figure 4-1, 4-2, 4-3) and to the interconnecting diagram (figure 2-3) will assist the technician in solving any system problem which might arise. Schematic diagrams for each of the system components are furnished in the individual technical manuals.

5-2. TEST EQUIPMENT

TABLE 5-1. TEST EQUIPMENT

Equipment	Type
Signal Generator:	Hewlett-Packard Model 606A or 606B or equivalent.
VTVM:	Hewlett-Packard Model 410B or equivalent.
Multimeter:	Simpson Model 260, or equivalent.
Oscilloscope:	Tekronix Model 541A, or equivalent.

Additional test equipment which may be necessary is listed in the individual technical manuals for system components.

5-3. PREVENTIVE MAINTENANCE

Preventive maintenance may be defined as those regularly scheduled inspections and minor repairs which are designed to minimize the possibility of major breakdowns. Much of the preventive maintenance program may well fall with the scope of the operator's responsibility. The time spent on a daily effort to eliminate dust and dirt and a weekly internal inspection to discern deteriorated components is well invested. A program designed to discover potential sources of trouble, and immediate correction of minor flaws will result in the maximum "in service" time for the GPTR-1KC transmitter.

Each of the units is provided with monitoring instrumentation. The normal indications are given in the individual technical manuals. The reason or cause for abnormal indications shuuld be immediately investigated and any erroneous condition rectified. Daily care assures less major repair.

5-4. CORRECTIVE MAINTENANCE

A good preventive maintenance program performed on schedule will make little corrective maintenance necessary. If in spite of all precautionary measures a failure occurs the cause should be determined so that recurrence may be prevented. It is therefore, suggested that only a trained technician familiar with the equipment perform corrective maintenance.

WARNING

High voltages will be encountered at several locations in the GPTR-1KC transmitter. Extreme caution is mandatory when servicing the transmitter or its components.

The operator and technicians working with the transmitter must know the locations within the units where high potentials exist. Source power should be removed from the transmitter before any leads or cables are disconnected.

WARNING

When source power is removed, unplug the main power input connector and tag to prevent an inadvertant reconnection.

If a failure occurs do not overlook the simple solutions to the problem. Even experienced technicians often miss what might seem to be "obvious"; blown fuses, source power failure, signal input missing, loose connections and the like.

When simple solutions fail, isolate the fault to a specific modular unit. Then troubleshooting that component as directed in the unit technical manual.

The use of the diagrams and drawings durnished, combined with normal troubleshooting techniques, and logical reasoning should enable the technician to locate the defective part and replace it.

NOTE

Only identical or electrically equivalent parts should be used when making replacements.

Parts lsits, and identifying drawings when required are furnished in each individual technical manual.

5-5. MODULAR UNIT ISOLATION

Should it be necessary to check-out an individual unit it may be advisable to isolate it from the other components of the transmitter, and test it as an entity. The following paragraphs will assist the technician with such a procedure. Refer to figure 2-3 for system interconnections and references designations of the connectors.

a. The SME-5C Exciter

(1) Set all switches to an off position and remove P104 from J14.

(2) Disconnect P113 from J127 (ALDC IN).

(3) Remove E103 from TB1, E104 from TB2 and E105 from TB3.

(4) Disconnect P105 from J120.

(5) Disconnect P114 from J128 (RF OUT).

NOTE

The control signals to J119 may be simulated by external ground signals.

b. HFL-100C Amplifier

(1) Set all switches to the OFF position and disconnect P101 from the power source.

(2) Remove P203 from J103 (RF OUT).

(3) Remove P201 from J101 (RF IN).

(4) Connect a 50 ohm resistive dummy load or antenna system to J103.

(5) Connect an rf signal generator to J101.

(6) Provide primary power to P101 independent of the transmitter.

(7) Refer to the HFL-100C technical service manual for power distribution data and the operators manual for normal indications.

c. The TMA-1KC Power Amplifier

NOTE

The TMA-1KC requires a 50 watt rf input. It is suggested that a properly adjusted HFL-100C amplifier be used as this source.

(1) Place all switches in an off position and remove P101 from J101 (AC IN).

(2) Remove P205 from J105 (RF OUT).

(3) Connect a 1 KW, 50 ohm, noninductive dummy load to J105.

(4) Disconnect P109 from J103 (RF IN).

(5) Remove the connections (E101) from TB101.

(6) Disconnect P102 from J102.

(7) Disconnect P112 from J104 (ALDC OUT).

(8) Connect a 12 inch jumper wire to TB101-17.

NOTE

This jumper may be used during operational tests to provide 24 volt bandswitching signals at TB101.

(9) Provide primary power to J101 (AC IN) independent of the transmitter.

(10) Connect a 50 watt rf source to J103 (RF IN) independent of the transmitter harness.

(11) Provide a ground connection to terminal 18 of TB101.

(12) Refer to the technical service manual prepared for the TMA-1KC for maintenance data.

SECTION 6

PARTS LIST

The parts lists presented in this section provide a cross reference between the reference designation of the part and the TMC part number. The reference designation is used to identify a part on assembly drawings, and schematic diagrams. Wherever practical, they are also marked on the equipment adjacent to the part.

The letter of the reference designator identifies the generic group to which the part belongs; eg: resistor (R), capacitor (C), switch (S).

Complete identification will expedite delivery when ordering renewal parts. The following information should be given for each part:

Description
*Reference designation
TMC part number
* *Assembly number
Equipment model number
Equipment serial number

This information is available from the equipment nameplate, and the parts lists in this section.

To simplify the task of ordering renewal parts, an order form has been included at the end of this section. The information requested in the preceding list which has been marked with an asterisk should be included in the description column.