TECHNICAL MANUAL

for

GENERAL PURPOSE TRANSMITTER

MODEL HFTM-1KJ

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, CANADA

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MAMARONECK, N.Y. OTTAWA, CANADA

PRINTED IN U.S.A.

IN1044 23 MARCH 1971

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

CHANGE NO. 1

INSTRUCTION BOOK CHANGE NOTICE

Date February 1, 1972

Manual affected: General Purpose Transmitter Model HFTM-1KJ IN 1044

Please make the following pen and ink corrections as indicated below:

1. On page 3-2, TABLE 3-1:

   a. Change Step 15 to read: Adjust HFLM-1K PA BIAS control to 210-230 ma on PLATE METER.

   b. Change Step 16 to read: Push HFLM-1K PLATE METER SELECT switch up and adjust 2ND AMP for indication of 220 - 240 ma on PLATE meter.

   c. Change Step 17 to read: Adjust HFLM-1K 1ST AMP BIAS control (underneath TLAM-1K chassis) for 60 - 70 ma indication on PLATE meter.

NOTE

The RF Amplifier tube quiescent current values specified are for optimum distortion in SSB operation. When operating in FSK or CW modes quiescent currents may be set for values lower than specified.

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By

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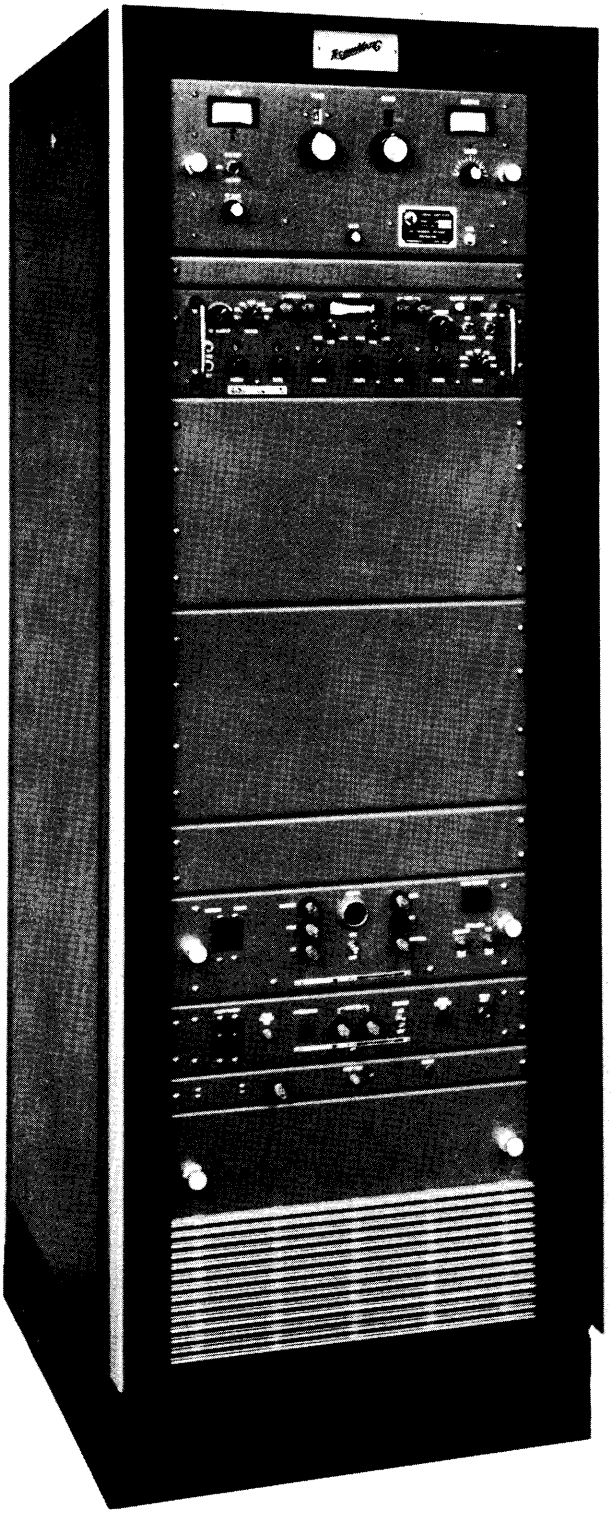


Figure 1-1. HFTM-1KJ General Purpose Transmitter

SECTION 1

GENERAL INFORMATION

1-1. FUNCTIONAL DESCRIPTION.

This manual presents operating and maintenance instructions for the General Purpose Transmitter, Model HFTM-1KJ, designed and manufactured by The Technical Materiel Corporation, Mamaroneck, New York. This manual includes a general description of the equipment; installation and operating procedures; principles of operation; maintenance and troubleshooting data; and a parts list.

General Purpose Transmitter, Model HFTM-1KJ (figure 1-1), hereinafter referred to as the HFTM-1KJ, or the transmitter, consists of a solid state, multimode, exciter, MMX(M)-2, used in conjunction with a high frequency linear power amplifier, HFLM-1K. The exciter is capable of providing CW (continuous wave), AM (amplitude modulation), SSB (single sideband) including AME (amplitude modulated equivalent) full carrier, FSK (frequency shift keyer), FAX (facsimile) and optional ISB (independent sideband) modes of operation. The high frequency linear power amplifier amplifies the exciter output to provide 1 kilowatt (PEP) and average throughout the frequency range of 1.5 to 30 MHz. The transmitter is readily adaptable for shipboard, aircraft, and land installations. Table 1-1 lists the transmitter components as they appear in figure 1-1.

NOTE

Essentially, the HFLM-1K consists of all the components illustrated in figure 1-1 with the exception of the MMX(M)-2 multimode exciter (third component from the top).

TABLE 1-1. COMPONENTS OF GENERAL PURPOSE TRANSMITTER HFTM-1KJ

NOMENCLATURE	COMMON NAME
MMX(M)-2	Multimode Exciter
HFLM-1K	High Frequency Linear Power Amplifier

1-2. PHYSICAL DESCRIPTION.

As shown in figure 1-1, the transmitter consists of a single equipment cabinet, 72 inches high by 25-1/4 inches wide by 30 inches deep, which houses all the components which comprise the HFLM-1K power amplifier in addition to the MMX(M)-2 exciter (third panel from the top). The HFLM-1K consists of a two-stage broadband linear amplifier, power amplifier and associated power supplies and control circuits. Primary power and external input connections to the transmitter are made through either of two access holes in the bottom rear and side of the equipment cabinet. Power for the MMX(M)-2 is provided via the power distribution panel located in the HFLM-1K. RF power is routed through a directional coupler mounted in the HFLM-1K to the output connector (J8001) located at the top, rear of the HFLM-1K. Heavy, high voltage components of the HFLM-1K are mounted on a chassis bolted to the base of the equipment cabinet. The MMX(M)-2 and all other components of the HFLM-1K are panel mounted in the equipment cabinet for easy access.

1-3. REFERENCE DATA.

Table 1-2 lists the technical characteristics of the equipment. Table 1-3 lists the power tube complement of the transmitter.

TABLE 1-2. TECHNICAL SPECIFICATIONS

Frequency Information	
Range	2 to 30 MHz is Standard; 1.5 to 30 MHz is Optional
Stability Synthesized	One part in 10^8 per day is Standard
Operational	
Modes	CW(A1), AM(A3), AME(A3H), USB(A3A), LSB, two-channel ISB(A3B), FSK(F1, A7J) and FAX(F4, A7J) capability is available
Carrier Suppression	Continuously adjustable throughout the range of -55 db up to full output by front panel control
Power Output	1000 watts PEP and AVERAGE (CW) continuous, key-down service
Output Impedance	50 ohms nominal unbalanced; 70 ohms nominal Optional
VSWR	Maximum of 2:1 without degrading performance
Tuning	Manual
ALDC	Automatic Load and Drive Control to improve linearity, limit distortion, and maintain a relatively constant output level during high modulation peaks and load changes. Front panel control allows adjustment of the level at which the ALDC takes effect.
Power Distortion and Noise Ratings	
Spurious Signals	At least 50 db down from full PEP output
Noise Level	At least 50 db down from full PEP output
Unwanted Sideband	Better than 50 db rejection referenced to full PEP output
Intermodulation	Distortion products are at least 35 db below either tone of a standard two-tone test at full rated PEP
Audio	
Sideband Response	±1.5 db, 250-3040 Hz
Input	1) Two independent 600-ohm channels, balanced or unbalanced. -20 dbm to +5 dbm input will permit full power output. 2) Built-in microphone preamplifier for low level dynamic microphone. Front panel selection and jack. Mike input -55 db into 47K ohms with front panel jack.
Keying Information	
CW	Key jack on front panel and terminals on rear apron allow up to 300 WPM carrier keying, dry contact.
FSK	50 to 100 baud with neutral or polar keying
FAX	+1 to +10 VDC will provide a linear shift of 800 Hz
Installation and Environmental Data	
Environmental	Operates 0 to +50° C with up to 90% relative humidity
Cooling	High capacity, filtered, forced air
Primary Power	230 VAC, 50/60 Hz, Single Phase

TABLE 1-3. TRANSMITTER POWER TUBE COMPLEMENT

REFERENCE DESIGNATION	PART NUMBER OR TYPE	FUNCTION
V1201	8233	1st RF Amplifier
V1202	4CX350A	2nd RF Amplifier
V1301	8576	Power Amplifier

SECTION 2

INSTALLATION

2-1. INITIAL UNPACKING AND INSPECTION.

The HFLM-1KJ was assembled, calibrated and tested at the factory before shipment. Inspect all packages for possible damage during transit. With respect to damage to the equipment for which the carrier is liable, The Technical Materiel Corporation will assist in describing methods of repair and furnishing of replacement parts. Carefully unpack each crate as indicated by the packing list provided with the transmitter shipment. Inspect all packing materials for parts that may have been shipped as loose items (cabinet hardware, connectors, technical manuals, etc.).

2-2. POWER REQUIREMENTS.

The HFTM-1KJ requires a single phase source of 230 vac, 50/60 Hz at approximately 17 amperes.

2-3. INSTALLATION.

A minimum number of assemblies, subassemblies, components and hardware have been disassembled from the equipment and separately packaged, thus reducing the possibility of equipment damage in transit. The method of disassembly and separate packaging also permits realistic equipment handling.

Cables, wires, and other miscellaneous items that are disconnected during equipment disassembly are tagged and taped to the equipment. The information on a given tag indicates the designated terminal on a component to which the tagged item must be connected. Make sure all cables and wires have been connected as designated on tags and that all packing material, tags and tape have been removed before sealing-up the cabinet or section of the cabinet with a front panel drawer.

Refer to the technical manual for Model HFLM-1K Linear Power Amplifier for detailed procedural steps required to install HFLM-1K components in the equipment cabinet. Install the MMX(M)-2 in the equipment cabinet and fasten the front panel to the rack with four screws and four washers (supplied). Connect the MMX(M)-2 to HFLM-1K using appropriate cables (supplied). Refer to figure 7-1 for electrical interconnection of all HFTM-1KJ components. With the unit fully assembled, install the cabinet in the desired location leaving a minimum two foot clearance on the top and all sides for maintenance and installation purposes.

2-4. PRE-OPERATIONAL CHECK.

Although the transmitter has been aligned and thoroughly checked against the manufacturer's specifications prior to shipment, it is necessary to ensure correct installation and proper operation by referring to the applicable technical manual to perform the high voltage transformer check of the HFLM-1K and initial checkout of the MMX(M)-2.

SECTION 3

OPERATOR'S SECTION

3-1. GENERAL.

The controls of the MMX(M)-2 provide rapid transmitter rf frequency selection of AM, USB, LSB, or ISB (optional) intelligence in the 1.5 to 30 MHz transmission range. Tuning is accomplished manually in 100 Hz increments using MMX(M)-2 controls. The HFLM-1K provides continuous adjustment of rf output power.

3-2. OPERATING CONTROLS.

For detailed functions of all operating controls and indicators of the HFTM-1KJ, refer to the applicable HFLM-1K and MMX(M)-2 technical manuals.

3-3. STARTING CONTROL SETTINGS.

Generally, before main power is applied, all operating controls should be set to OFF or maximum counterclockwise position. Set the MMX(M)-2 ON/STANDBY switch to STANDBY. Starting control settings are provided in the basic operating procedure presented in paragraph 3-4.

3-4. OPERATING PROCEDURE.

Typical operation of the HFTM-1KJ is provided in table 3-1 which illustrates the manual tuning procedure for CW (carrier only) operation. Once the exciter has been adjusted for the desired type of intelligence and emission mode, the application of drive must be carefully adjusted to avoid exceeding the PEP rating of the transmitter. Refer to table 3-2 for typical control settings to be used as a guide for tuning.

TABLE 3-1. TRANSMITTER OPERATING PROCEDURE

STEP	OPERATION	NORMAL INDICATIONS
1	Place HFLM-1K MAIN POWER breaker to the ON position.	PA Blower must operate and MAIN POWER ON must illuminate. Interlock lamp lights (provided that all safety interlocks are closed and the time delay cycle has been completed).
2	Set MMX(M)-2 ON/STANDBY switch to STANDBY and set HFLM-1K EXCITER ON/OFF switch to ON.	MMX(M)-2 STANDBY indicator illuminates.
3	Place HFLM-1K SCREEN and PLATE breaker to ON position.	No indications.
4	Place HFLM-1K ALARM ON/OFF switch to OFF position.	With alarm switch in the ON position and high voltage removed, audible high voltage alarm sounds.
5	Set HFLM-1K RF GAIN to minimum.	No indications.

NOTE

The HFTM-1KJ is equipped with protective overload circuitry. Additionally, the PA plate current meter has an overload indicator which can be adjusted to trip at a value set by the operator. Should an overload occur, the meter face illuminates.

TABLE 3-1. TRANSMITTER OPERATING PROCEDURE (CONT)

STEP	OPERATION	NORMAL INDICATIONS
6	Adjust HFLM-1K overload indicator (adjustment screw located directly below the meter face of the PLATE current meter) for 600 ma.	HFLM-1K PLATE current overload indicator indicates 600 ma.
7	Set MMX(M)-2 to desired frequency.	Frequency indicated on MMX(M)-2 front panel readouts.
8	Set MMX(M)-2 METER switch to RF, MODE switch to CW, and EXCITER ON/PTT switch to EXCITER ON.	No indications.
9	Set MMX(M)-2 ON/STANDBY switch to ON.	Red POWER indicator illuminates.
10	Set MMX(M)-2 CARRIER control to maximum clockwise.	No indications.
11	Adjust MMX(M)-2 RF OUTPUT control clockwise until monitor indicates a reading of 2.	MMX(M)-2 monitor reads 2, indicating at least 100 milliwatts output power from the exciter.
12	Select frequency BAND position by rotating the HFLM-1K BAND knob to a band within the desired frequency.	Window on HFLM-1K front panel indicates desired frequency band.
13	Adjust HFLM-1K PA Bias, 1ST AMP and 2ND AMP Bias for maximum bias. (1ST AMP adjustment located underneath TLAM-1K chassis is accessible by sliding TLAM-1K partially out of cabinet.)	PA, 1ST AMP and 2ND AMP Bias adjusted to maximum clockwise position.
14	Press HFLM-1K HIGH VOLTAGE switch to light indicator (it may be necessary to press HIGH VOLTAGE switch twice).	HIGH VOLTAGE switch and HIGH VOLTAGE ON indicator lamp illuminate RED when High Voltage is ON.
15	Adjust HFLM-1K PA Bias control to 150 ma on PLATE METER.	HFLM-1K PLATE meter indicates quiescent current of 150 ma.
16	Push HFLM-1K PLATE METER SELECT switch up and adjust 2nd AMP for indications of 200 ma on PLATE meter.	HFLM-1 PLATE meter indicates quiescent current of 200 ma when PLATE METER SELECT switch is pushed up.
	NOTE During initial tuning of the transmitter, RF output power will be increased or decreased with the HFLM-1K RF GAIN control.	
17	Adjust HFLM-1K 1ST AMP Bias control (underneath TLAM-1K chassis) for 70 ma (±10 ma) indication on PLATE meter.	HFLM-1K PLATE meter reads 70 ma (±10 ma) when PLATE METER SELECT switch is pushed down.
18	Replace TLAM-1K in cabinet and adjust HFLM-1K RF GAIN control clockwise slightly to cause a notable increase in PA PLATE current.	HFLM-1K PLATE meter indicates an increase in meter reading not to exceed 250 ma.

TABLE 3-1. TRANSMITTER OPERATING PROCEDURE (CONT)

STEP	OPERATION	NORMAL INDICATIONS
19	Adjust HFLM-1K TUNE control for a noticeable resonant dip in Plate current.	Rotation of the HFLM-1K TUNE control causes the KILOWATT OUTPUT meter to indicate output.
20	Adjust HFLM-1K LOAD control as necessary to produce a maximum reading on the KILOWATT METER.	HFLM-1K KILOWATT meter indicates a further increase in power output during loading process.
21	Readjust TUNE control to insure that the transmitter is at resonance. Repeat steps 19 and 20 as necessary.	KILOWATT meter indicates highest value when transmitter is properly tuned into antenna or load.
22	Rotate HFLM-1K RF GAIN control clockwise to increase output power to desired level. (Refer to HFLM-1K technical manual for ALDC adjustment.)	KILOWATT meter indicates average power output level.
23	Rotate RF GAIN control counterclockwise and press HIGH VOLTAGE switch to OFF.	KILOWATT meter indicates zero; HIGH VOLTAGE indicators go out, indicating the removal of High Voltage.

TABLE 3-2. TYPICAL TRANSMITTER TUNING CHART

FREQUENCY (MHz)	BAND ((MHz)	TUNE CONTROL COUNTER READINGS	LOAD CONTROL*	PLATE CURRENT (MA)
2.3	2.0—2.6	131	4.0	380
2.8	2.6—3.0	138	4.0	380
4.0	3.0—5.0	109	0	320
6.0	5.0—8.0	101	6.8	340
8.0	8.0-12.0	104	6.8	400
11.0	8.0-12.0	078	6.2	340
14.0	12.0-16.0	078	2.2	360
16.0	16.0-24.0	094	1.2	340
20.0	16.0-24.0	078	1.8	450
24.0	24.0-30.0	082	1.0	420
28.0	24.0-30.0	072	1.0	520

*Maximum counterclockwise position is LOAD control setting of 0; maximum clockwise is setting of 12.

3-5. EMERGENCY OPERATION.

Under emergency conditions, when a failure of the MMX(M)-2 has occurred, CW keying of the HFLM-1K can be accomplished by connecting a signal generator to the input of the HFLM-1K. Keying of the signal generator will provide emergency CW transmission at the signal generator frequency.

NOTE

The signal generator frequency and output power should be within the range normally provided by the MMX(M)-2.

SECTION 4

PRINCIPLES OF OPERATION

4-1. OVERALL BLOCK DIAGRAM ANALYSIS.

Figure 4-1 is an overall block diagram of the HFTM-1KJ which consists of an MMX(M)-2 Multimode Exciter driving an HFLM-1K Linear Power Amplifier. The MMX(M)-2 provides at least 100 milliwatts of rf power to the HFLM-1K within the operating range of 1.5 to 30 MHz in any one of the following modes: AM, AME (carrier reinserted), SSB, ISB, CW, FSK, or FAX. The HFLM-1K provides linear amplification of the MMX(M)-2 rf output and provides one kilowatt PEP within the operating frequency range of the transmitter. The transmitter rf output is applied to a transmitting antenna which matches the 50 ohm output impedance of the HFLM-1K.

The HFLM-1K provides an ALDC (Automatic Load and Drive Control) feedback voltage to the MMX(M)-2 which prevents the rf output of the transmitter from exceeding a preset level. The ALDC circuit in the MMX(M)-2 automatically compensates for high modulation peaks and load changes, providing a relatively constant output level, in addition to limiting distortion and improving linearity.

Primary power, 230 vac, 50/60 Hz is applied to the HFLM-1K; power for the MMX(M)-2 is obtained via the EXCITER ON/OFF switch located on the HFLM-1K.

4-2. FUNCTIONAL ASSEMBLY SECTIONS.

Refer to the associated technical manuals for detailed principles of operation for the MMX(M)-2 Multimode Exciter and the HFLM-1K High Frequency Linear Power Amplifier.

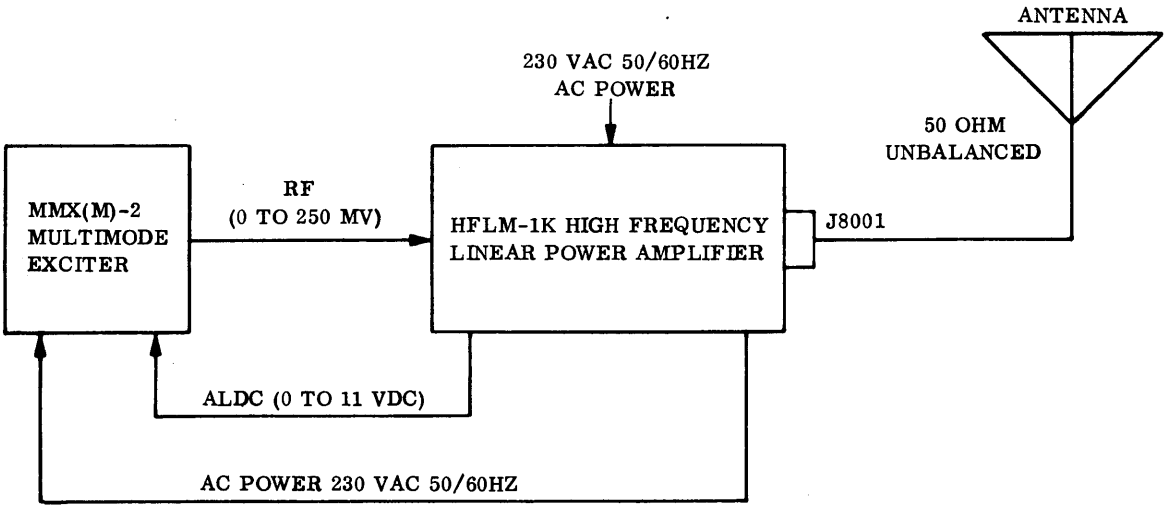


Figure 4-1. HFTM-1KJ Overall Block Diagram

SECTION 5

MAINTENANCE AND TROUBLESHOOTING

5-1. INTRODUCTION.

The HFTM-1KJ has been designed for long term, trouble-free operation. When it becomes necessary to perform alignment and/or adjustments to the equipment, it is recommended that technicians perform the necessary operations outlined in the associated HFLM-1K and MMX(M)-2 technical manuals. The following maintenance aids are provided for troubleshooting and replacement of parts.

a. Overall block diagram (Section 4, figure 4-1)

b. Component location diagrams (figures 5-1 and 5-2)

c. Interconnection diagram (Section 7, figure 7-1)

5-2. TEST EQUIPMENT REQUIRED.

Table 5-1 lists the test equipment required for maintaining and troubleshooting the transmitter. Refer to the MMX(M)-2 and HFLM-1K technical manuals for additional equipment required to maintain and troubleshoot these two components.

TABLE 5-1. TEST EQUIPMENT REQUIRED

EQUIPMENT	TYPE
Signal Generator	Hewlett-Packard Model 606A, or equivalent
VTVM	Hewlett-Packard Model 410B, or equivalent
Multimeter	Simpson Model 260, or equivalent
Oscilloscope	Tektronix, Model 541A, or equivalent

5-3. OPERATOR'S MAINTENANCE PROCEDURE.

a. Refer to transmitter operating procedure (Table 3-1).

b. Refer to troubleshooting (paragraph 5-5).

c. Refer to maintenance procedures described in the HFLM-1K and MMX(M)-2 technical manuals.

5-4. PREVENTIVE MAINTENANCE.

In order to prevent equipment failure due to dust, dirt or other destructive elements, it is suggested that a schedule of preventive maintenance be set up and adhered to. At periodic intervals, the equipment should be pulled out on its slides for internal cleaning and inspection. The wiring and all components should be inspected for dirt, dust, corrosion, grease or other harmful conditions. Remove dust with a soft brush or vacuum cleaner. Remove dirt or grease with any suitable cleaning solvent. Use of carbon tetrachloride should be avoided due to its highly toxic effects. Trichlorethylene or Methyl Chloroform may be used, providing the necessary precautions are observed. For detailed preventive maintenance procedures, refer to the applicable HFLM-1K and MMX(M)-2 technical manuals.

WARNING

WHEN USING TOXIC SOLVENTS, MAKE CERTAIN THAT ADEQUATE VENTILATION EXISTS. AVOID PROLONGED OR REPEATED BREATHING OF THE VAPOR. AVOID PROLONGED OR REPEATED CONTACT WITH SKIN. FLAMMABLE SOLVENTS SHALL NOT BE USED ON ENERGIZED EQUIPMENT OR NEAR ANY EQUIPMENT FROM WHICH A SPARK MAY BE RECEIVED. SMOKING, "HOT-WORK", ETC. IS PROHIBITED IN THE IMMEDIATE AREA.

CAUTION

When using trichlorethylene, avoid contact with painted surfaces, due to its paint-removing effects.

5-5. TROUBLESHOOTING.

Troubleshooting the HFTM-1KJ consists of isolating faults to either the MMX(M)-2 Exciter or the HFLM-1K Power Amplifier. Refer to the associated technical manuals for detailed troubleshooting procedures of the MMX(M)-2 and HFLM-1K. Refer to operator's section for normal indications.

a. Disconnect the MMX(M)-2 rf output from the HFLM-1K and connect the MMX(M)-2 to a 50 ohm, 1 watt, non-inductive dummy load. Use an oscilloscope to monitor the exciter output, referring to the MMX(M)-2 technical manual for normal indications.

b. Use an ohmmeter to check for continuity of interconnect cabling between the MMX(M)-2 and HFLM-1K. (Refer to figure 7-1, sheet 2.)

c. Disconnect the MMX(M)-2 and connect a signal generator to the HFLM-1K input. Operate the HFLM-1K into a dummy load (if available) and monitor the HFLM-1K meters for proper operation. (Refer to table 3-1 and the HFLM-1K technical manual for normal indications.)

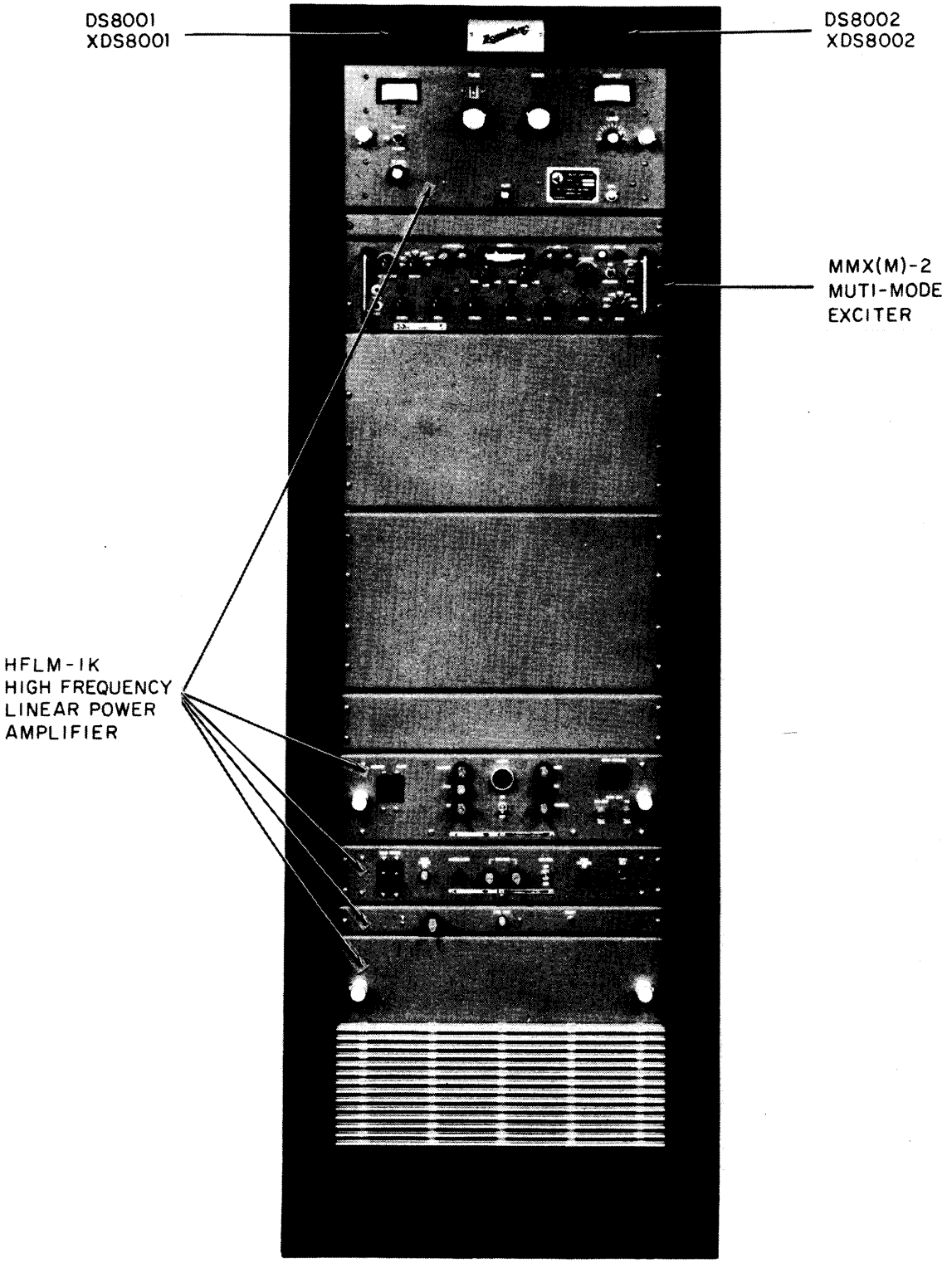


Figure 5-1. HFTM-1KJ Component Locations, Front View

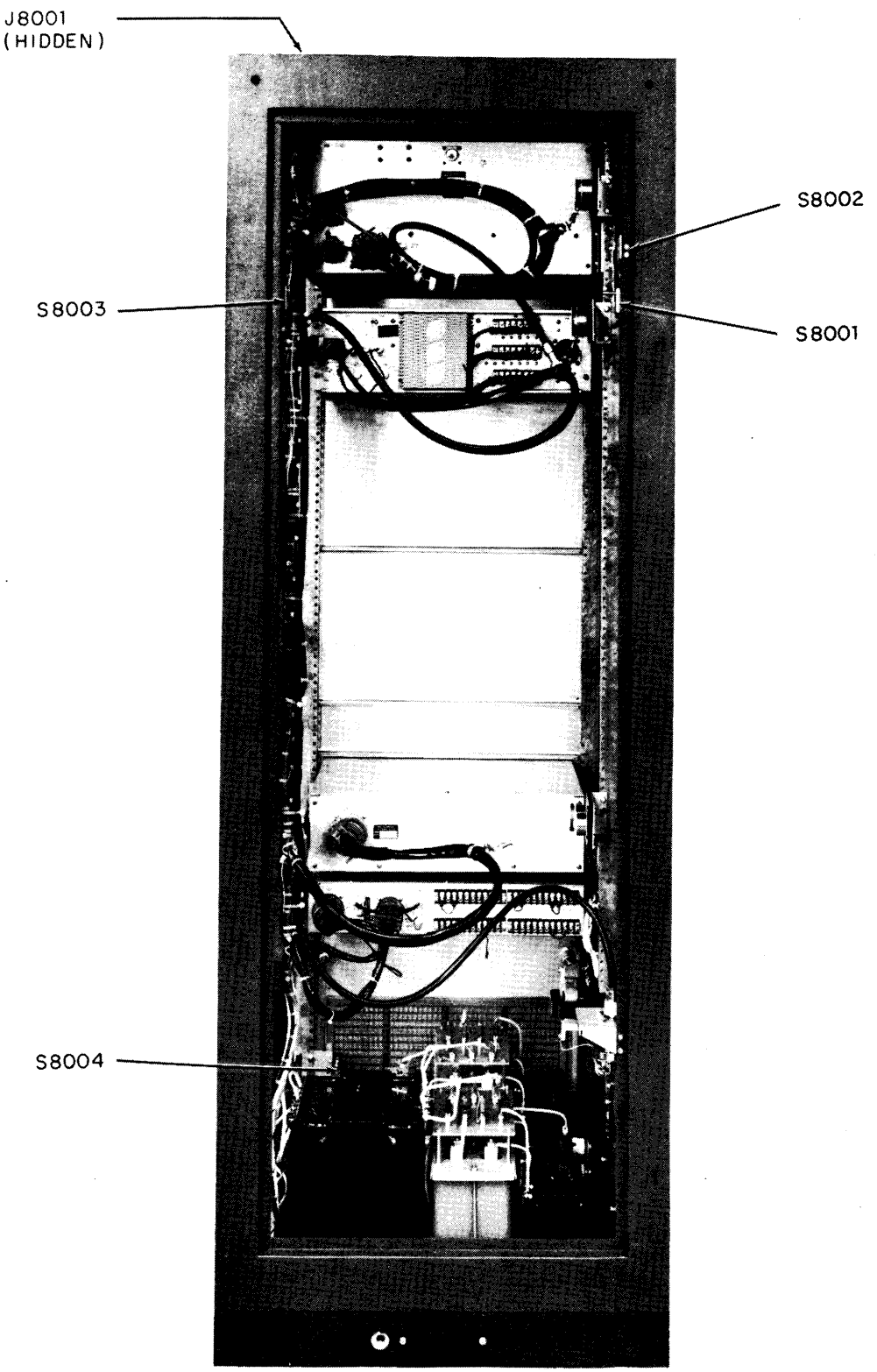


Figure 5-2. HFTM-1KJ Component Locations, Rear View

SECTION 6

PARTS LIST

6-1. INTRODUCTION.

Reference designations have been assigned to identify all Subassembly/PC Card parts of the equipment. They are used for marking the equipment and are included on drawings, diagrams, and in the parts list. The letters of a reference designation indicate the kind of part (generic group), such as resistor, capacitor, unit, subassembly, PC card, transistor, integrated circuit, resistor, capacitor tube, electron tube, etc. The number differentiates between parts of the same generic group. Sockets associated with a particular plug-in device, such as electron tubes or lamps, are identified with a reference designation.which includes the reference designation of the plug-in device. For example, the socket for lamp DS8001 is designated XDS8001. Column 1 lists the reference designations of the various parts in alphabetical and numerical order. Column 2 gives the names and describes the various parts. Major part assemblies are listed in their entirety; subparts of a major assembly are listed in alphabetical and numerical order with reference to the major assembly. Column 3 lists each Technical Materiel Corporation part number.

REFERENCE SYMBOL	DESCRIPTION	TMC PART NO.
DS8001	LAMP, Incandescent	BI110-7
DS8002	Same as DS8001	
J8001	ADAPTER, HN	UG1019/U
S8001	SWITCH, Interlock	SW230
S8002	Same as S8001	
S8003	Same as S8001	
S8004	SWITCH, Interlock	SW260
XDS8001	SOCKET, Indicator	TS184
XDS8002	Same as XDS8001	

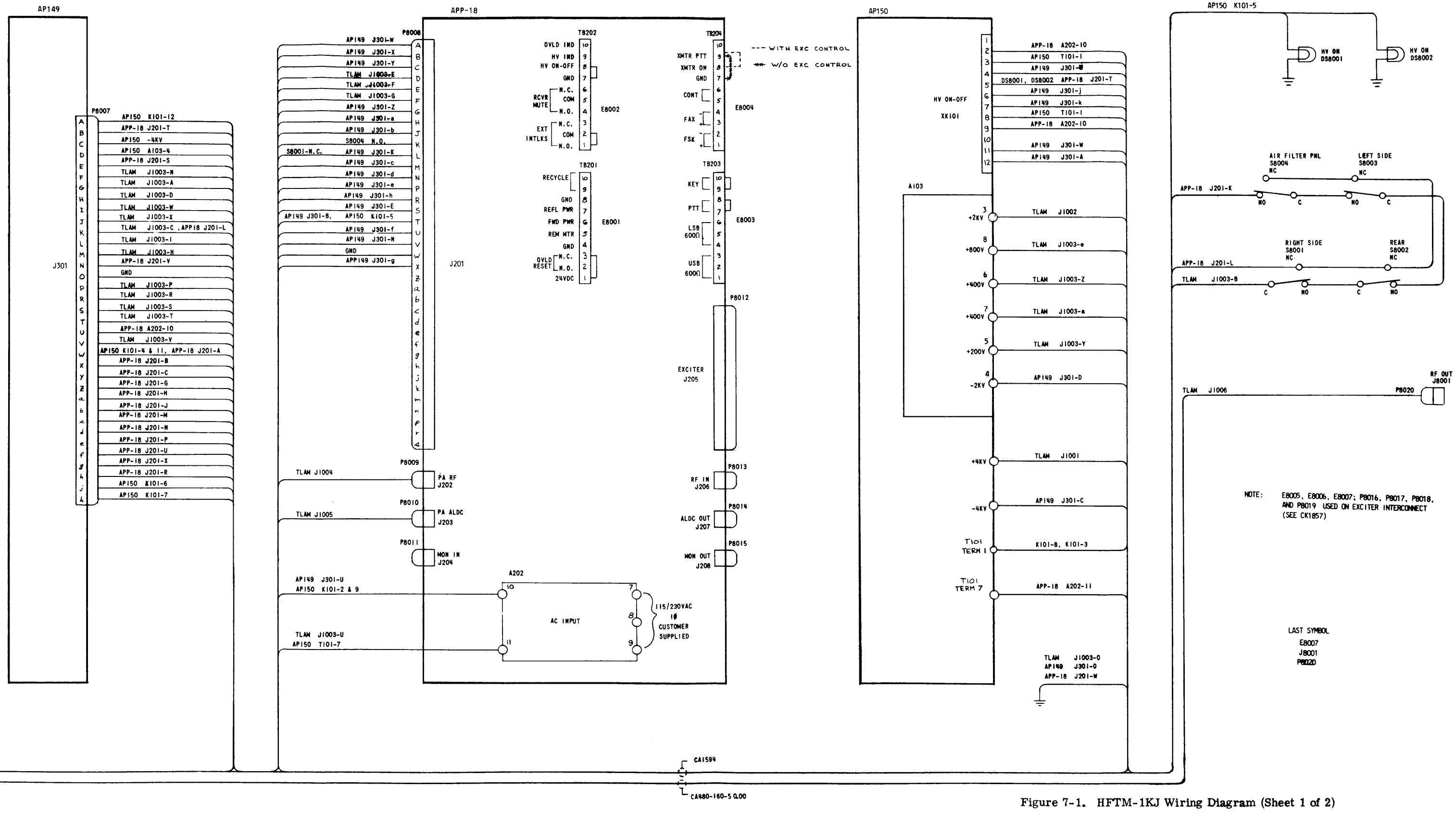
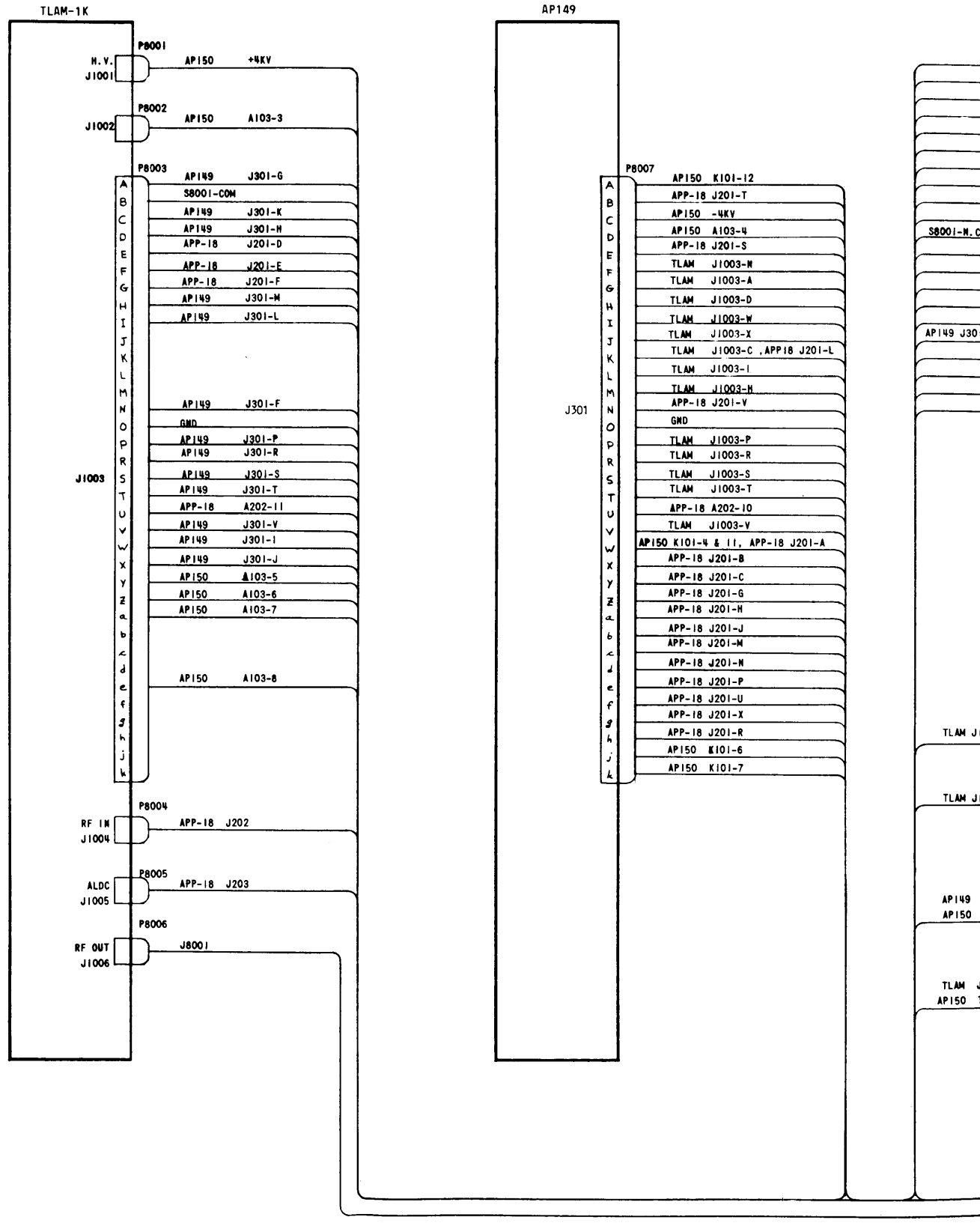


Figure 7-1. HFTM-1KJ Wiring Diagram (Sheet 1 of 2)


TLAM-1K
P8001
H.V.
J1001
AP150 +4KV
P8002
J1002
AP150 A103-3
P8003
J1003
AP149 J301-G
S8001-COM
AP149 J301-K
AP149 J301-H
APP-18 J201-D
APP-18 J201-E
APP-18 J201-F
AP149 J301-M
AP149 J301-L
AP149 J301-F
GND
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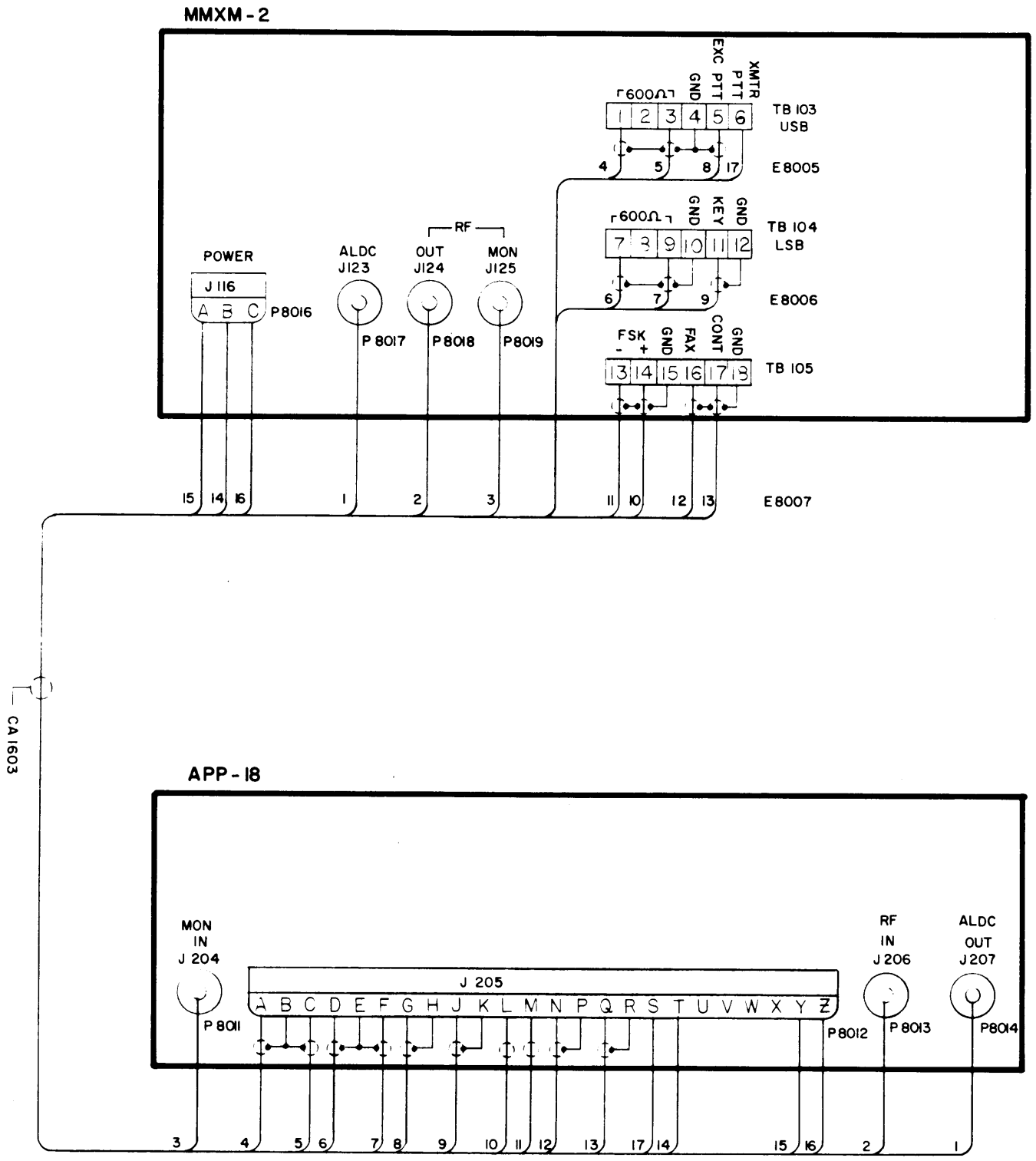

Figure 7-1. HFTM-1KJ Wiring Diagram (Sheet 2 of 2)