

## SECTION 1 DESCRIPTION

### 1.1 GENERAL

The HF-80 Solid-State 1-kW Power Amplifier-Power Supply consists of 1-kW Power Amplifier HF-8023 (hereafter called power amplifier) and Power Supply HF-8031 or HF-8032. It provides a full 1-kW rf power output over the frequency range of 1.600 to 29.999 MHz.

#### NOTE

When referring to both Power Supply HF-8031 and Power Supply HF-8032, power supply will be used as a common name.

The HF-80 Solid-State 1-kW Power Amplifier-Power Supply is totally compatible with operator-attended installations or fully automated remote communications stations. It is normally used with Exciter HF-8010( ), Exciter HF-8014( ), or Receiver-Exciter HF-8070( ).

This equipment is intended for use in attended or unattended fixed ground or shipboard installations, but may also be used in controlled environment

#### CAUTION

This equipment contains electrostatic discharge sensitive (ESDS) devices. Special handling methods and materials must be used to prevent equipment damage.

### 1.2 EQUIPMENT SUPPLIED

Equipment supplied in the HF-80 Solid-State 1-kW Power Amplifier-Power Supply is listed and described in table 1-1. The HF-80 Solid-State 1-kW Power Amplifier-Power Supply includes either Power Supply HF-8031 or Power Supply HF-8032.

Equipment supplied in the power amplifier is displayed in figure 1-1 and listed and described in table 1-2. Equipment supplied in the power supply is displayed in figure 1-2 and listed and described in table 1-3.

description

Table 1-1. HF-80 Solid-State 1-kW Power Amplifier-Power Supply,  
Equipment Supplied.

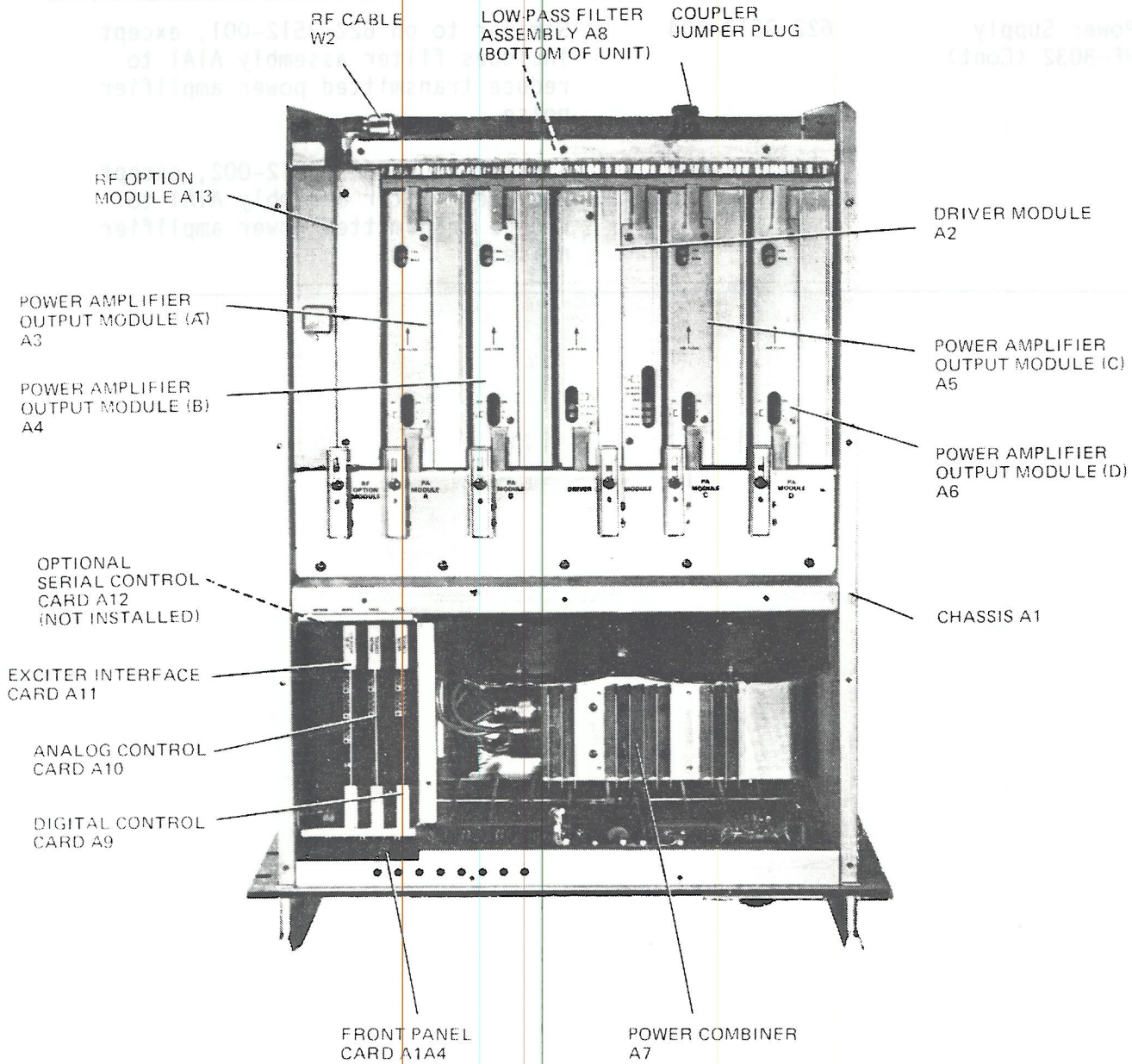
NOMENCLATURE	PART NUMBER	DESCRIPTION/FUNCTION
1-kW Power Amplifier HF-8023	622-3490-001	Solid-state 1-kW power amplifier. Operates from 1.600 to 29.999 MHz. Tr relay not installed.
	622-3490-002	Similar to pn 622-3490-001, except includes tr relay.
	622-3490-006	Similar to pn 622-3490-002, except operates at a different tune power level, and allows external monitoring of forward and reflected power.
Power Supply HF-8031	622-3491-001	Capable of supplying all voltages required by the power amplifier. Operates from 208-, 220-, 230-, 240-V ac, single-phase, 43- to 67-Hz input power.
	622-3491-003	Similar to pn 622-3491-001, except includes filter assembly A1A1 to reduce transmitted power amplifier noise.
Power Supply HF-8032	622-3512-001	Capable of supplying all voltages required by the power amplifier. Operates from 208-, 220-, 230-, 240-V ac, 3-phase, 43- to 67-Hz input power.
	622-3215-002	Capable of supplying all voltages required by the power amplifier. Operates from 208-, 220-, 230-, 240-V ac, 3-phase, 43- to 67-Hz or 380- to 420-Hz input power. The power supply provides automatic changeover between 47 to 63 Hz and 380 to 420 Hz, with no operator or installation changes required.
(Cont)		

Table 1-1. HF-80 Solid-State 1-kW Power Amplifier-Power Supply, Equipment Supplied (Cont).

NOMENCLATURE	PART NUMBER	DESCRIPTION/FUNCTION
Power Supply HF-8032 (Cont)	622-3512-004	Similar to pn 622-3512-001, except includes filter assembly A1A1 to reduce transmitted power amplifier noise.
	622-3512-005	Similar to pn 622-3512-002, except includes filter assembly A1A1 to reduce transmitted power amplifier noise.



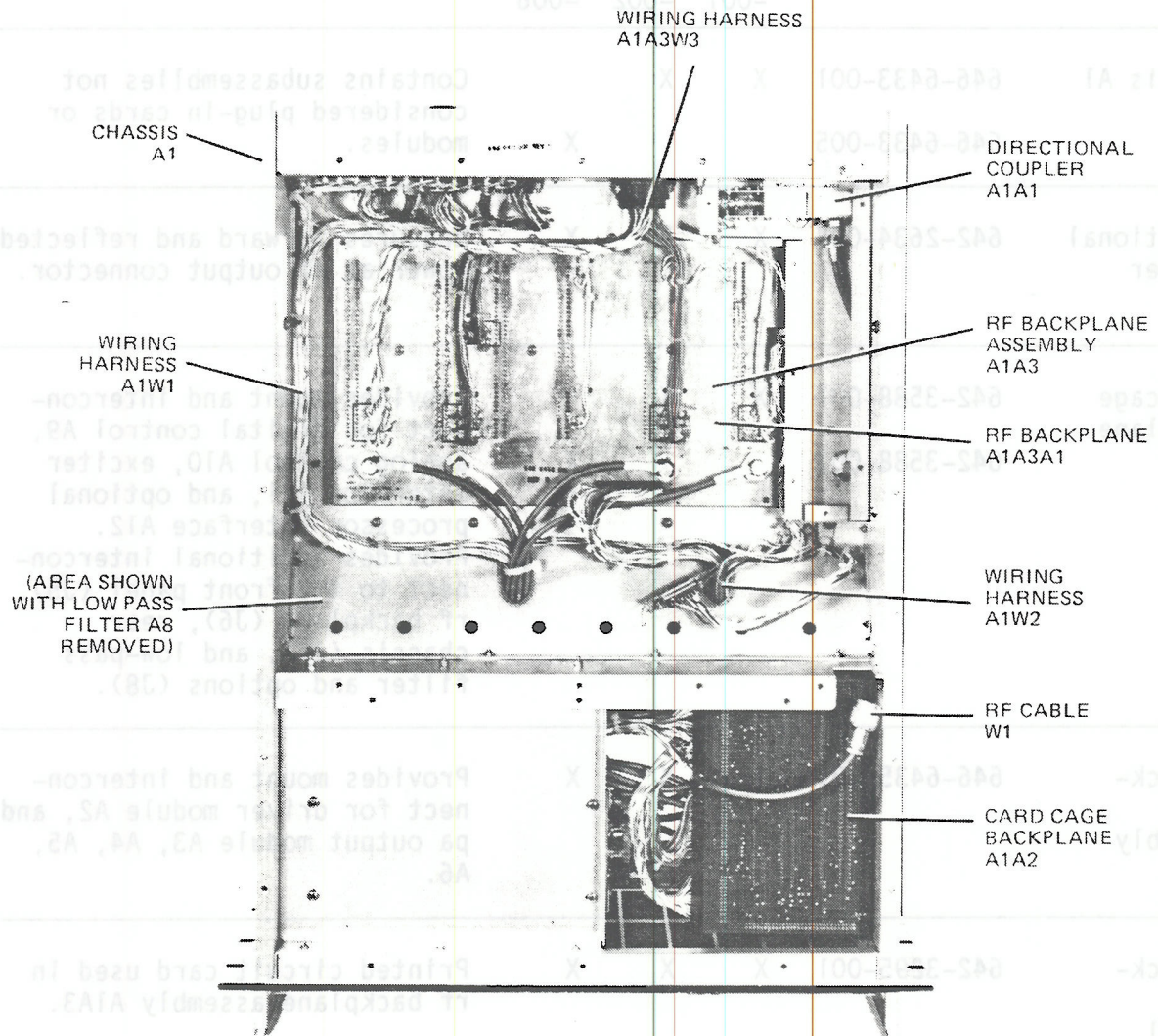
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1-kW Power Amplifier HF-8023, Assembly and Subassembly Locations  
Figure 1-1 (Sheet 1 of 2)





TPA-5455-017

1-kW Power Amplifier HF-8023, Assembly and Subassembly Locations  
Figure 1-1 (Sheet 2)

description

Table 1-2. 1-kW Power Amplifier HF-8023, Equipment Supplied.

ASSEMBLY/SUBASSEMBLY		1-kW POWER AMPLIFIER HF-8023 622-3490-( )			DESCRIPTION/FUNCTION
NOMENCLATURE	PART NUMBER	-001	-002	-006	
Chassis A1	646-6433-001	X	X		Contains subassemblies not considered plug-in cards or modules.
	646-6433-005			X	
Directional coupler A1A1	642-2634-002	X	X	X	Measures forward and reflected power at rf output connector.
Card cage backplane A1A2	642-3588-001	X	X		Provides mount and interconnect for digital control A9, analog control A10, exciter interface A11, and optional processor interface A12. Provides additional interconnect to the front panel (J5), rf backplane (J6), rear chassis (J7), and low-pass filter and options (J8).
	642-3588-003			X	
Rf back-plane assembly A1A3	646-6435-001	X	X	X	Provides mount and interconnect for driver module A2, and pa output module A3, A4, A5, A6.
Rf back-plane A1A3A1	642-3295-001	X	X	X	Printed circuit card used in rf backplane assembly A1A3.
Wiring harness A1A3W3	646-6438-001	X	X	X	Provides additional interconnect to the rear chassis (W3J5), card cage backplane (J11), and power combiner (J7, J8, J9, J10).
Front panel card A1A4	642-3586-001	X	X		Contains front panel indicators, controls, and adjustments.
	642-3586-002			X	



Table 1-2. 1-kW Power Amplifier HF-8023, Equipment Supplied (Cont).

ASSEMBLY/SUBASSEMBLY		1-kW POWER AMPLIFIER HF-8023 622-3490-( )			DESCRIPTION/FUNCTION
NOMENCLATURE	PART NUMBER	-001	-002	-006	
Wiring harness AIW1	646-6436-001	X	X		Interconnects chassis A1 with connectors J1, J2, J3, J4, P8, and terminal board TB1.
	646-6436-004			X	
Wiring harness AIW2	646-6437-001	X	X	X	Interconnects chassis A1 with connectors P1, P2, P3, P9, and P10.
Driver module A2	646-6407-001	X	X	X	Amplifies 100-mW exciter rf to four equal amplitude 20-W signals for input to the power amplifier output module.
Power amplifier output module A3	646-6406-001	Note 1	Note 1		Amplifies nominal 20-W rf input to a nominal 280-W level. Includes pa module card part no 642-3116-001.
	646-6406-002	Note 2	Note 2	X	Amplifies nominal 20-W rf input to a nominal 280-W level. Includes pa module card part no 642-3116-002.
Power amplifier output module A4	646-6406-001	Note 1	Note 1		Same as A3
	646-6406-002	Note 2	Note 2	X	
Power amplifier output module A5	646-6406-001	Note 1	Note 1		Same as A3
	646-6406-002	Note 2	Note 2	X	
Power amplifier output module A6	646-6406-001	Note 1	Note 1		Same as A3
	646-6406-002	Note 2	Note 2	X	



description

Table 1-2. 1-kW Power Amplifier HF-8023, Equipment Supplied (Cont).

ASSEMBLY/SUBASSEMBLY		1-kW POWER AMPLIFIER HF-8023 622-3490-( )			DESCRIPTION/FUNCTION
NOMENCLATURE	PART NUMBER	-001	-002	-006	
Power combiner A7	646-7120-001	X	X	X	Combines outputs from four power amplifier modules into one output.
Low-pass filter assembly A8	646-6400-002	X	X	X	Attenuates harmonics of the four combined power amplifier modules.
Digital control card A9	642-3592-001	X	X	X	Tune cycle, faults, and monitoring logic circuits.
Analog control card A10	642-3593-001	X	X	X	Pa protection circuits.
HF-80 interface card A11	635-0745-001	X	X	X	Provides interface between the power amplifier and HF-80 type exciters or receiver-exciter.
671U-4 interface card A11	637-2798-001				Provides interface between the power amplifier and Receiver-Exciter 671U-4( ).
671U-9 interface card A11	637-2799-001				Provides interface between the power amplifier and Receiver-Exciter 671U-9( ).
Coaxial jumper module A13	646-6430-001	X			Provides rf connection from directional coupler A1A1 rf output to ANT RF (J8).

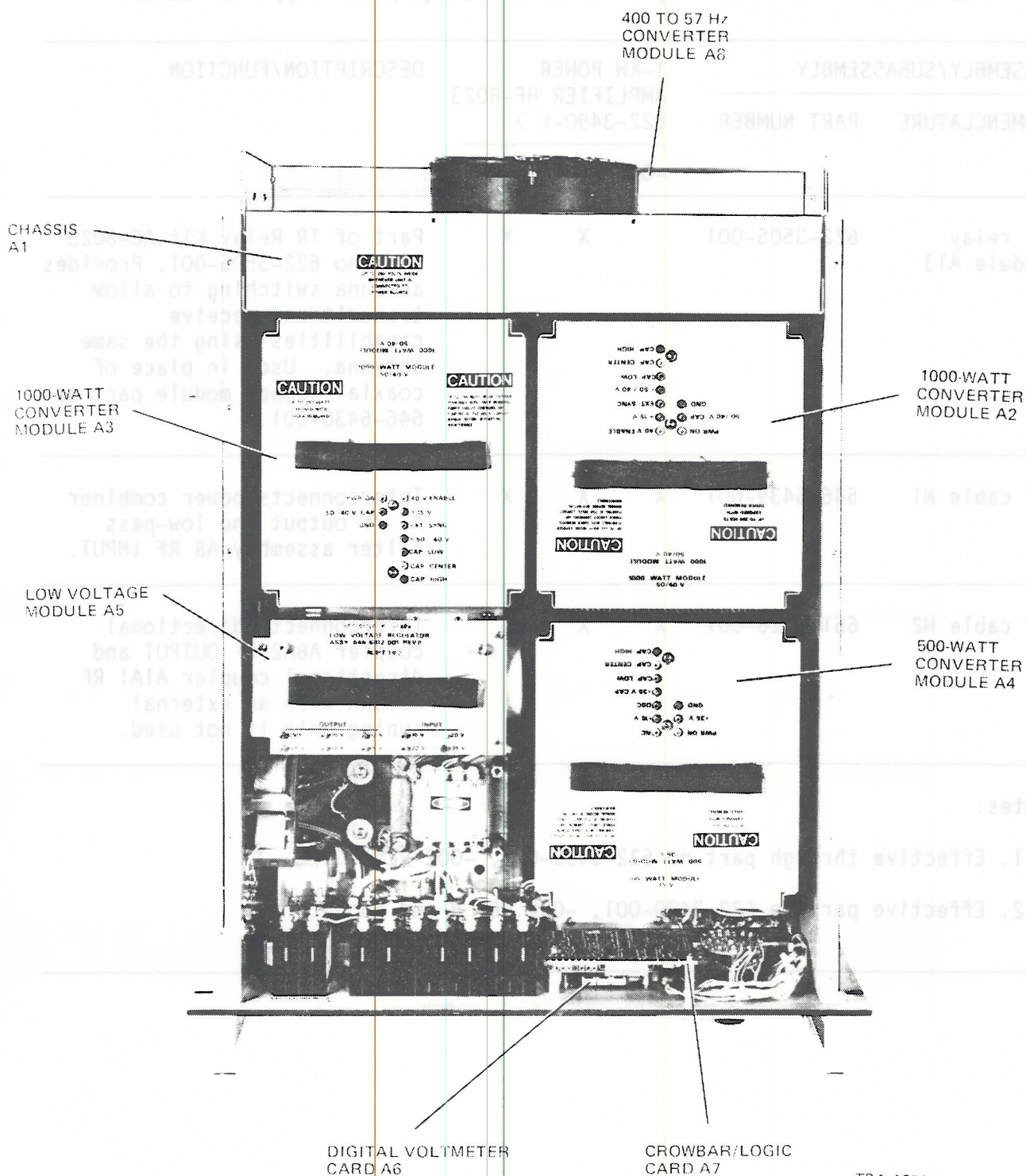
Table 1-2. 1-kW Power Amplifier HF-8023, Equipment Supplied (Cont).

ASSEMBLY/SUBASSEMBLY		1-kW POWER AMPLIFIER HF-8023 622-3490-( )			DESCRIPTION/FUNCTION
NOMENCLATURE	PART NUMBER	-001	-002	-006	
Tr relay module A13	622-3505-001		X	X	Part of TR Relay Kit AC-8023 part no 622-3505-001. Provides antenna switching to allow transmit and receive capabilities using the same antenna. Used in place of coaxial jumper module part no 646-6430-001.
Rf cable W1	646-6439-001	X	X	X	Interconnects power combiner A7 rf output and low-pass filter assembly A8 RF INPUT.
Rf cable W2	651-4426-001	X	X	X	Interconnects directional coupler A8A2 RF OUTPUT and directional coupler A1A1 RF RETURN when an external tuning unit is not used.

## Notes:

1. Effective through part no 622-3490-001, -002 REV G.
2. Effective part no 622-3490-001, -002 REV H and above.

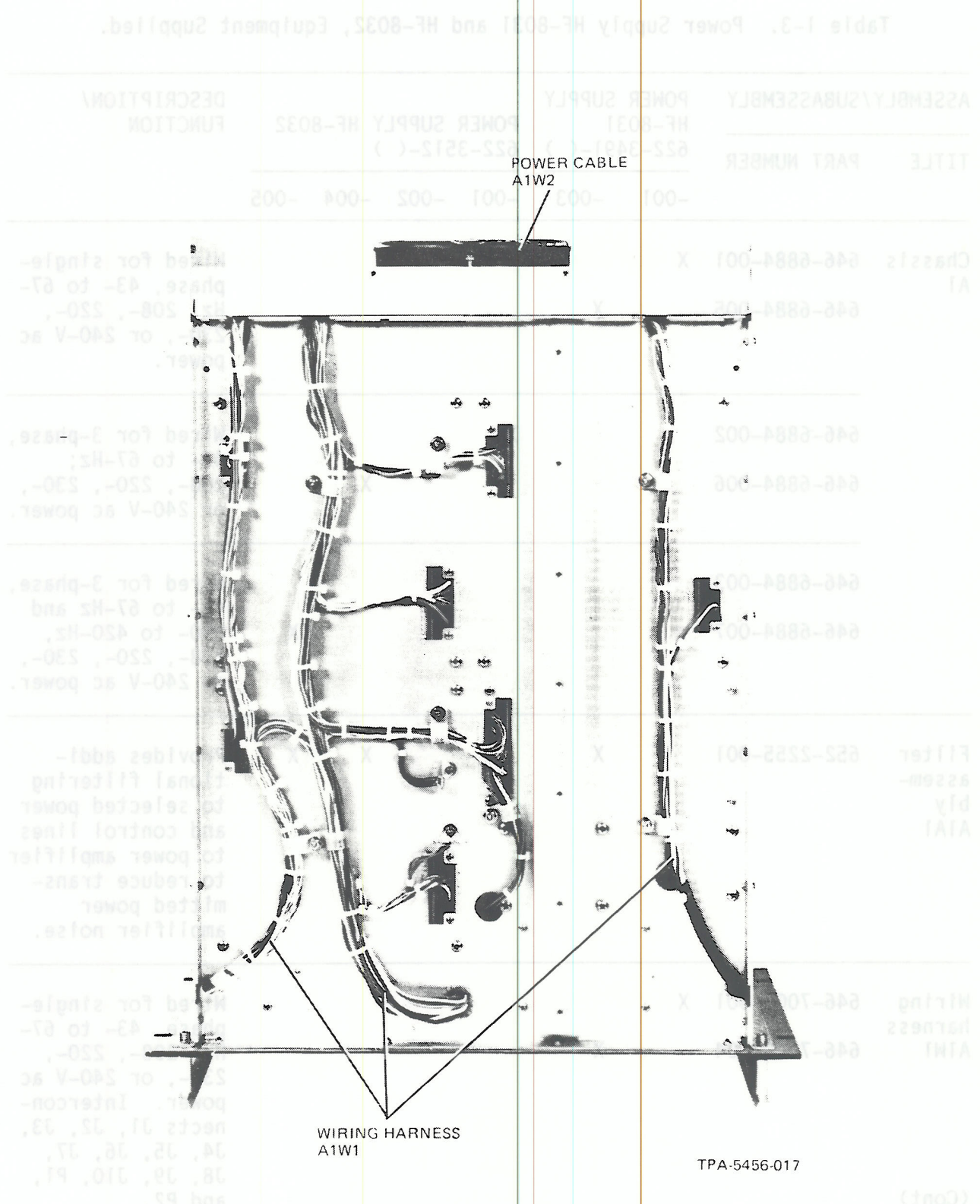
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Power Supply HF-8031 and HF-8032, Assembly and Subassembly Locations  
Figure 1-2 (Sheet 1 of 2)





Power Supply HF-8031 and HF-8032, Assembly and Subassembly Locations  
Figure 1-2 (Sheet 2)

description

Table 1-3. Power Supply HF-8031 and HF-8032, Equipment Supplied.

ASSEMBLY/SUBASSEMBLY		POWER SUPPLY HF-8031 622-3491-( )		POWER SUPPLY HF-8032 622-3512-( )				DESCRIPTION/ FUNCTION
TITLE	PART NUMBER	-001	-003	-001	-002	-004	-005	
Chassis A1	646-6884-001	X						Wired for single- phase, 43- to 67- Hz, 208-, 220-, 230-, or 240-V ac power.
	646-6884-005		X					
	646-6884-002			X				Wired for 3-phase, 43- to 67-Hz; 208-, 220-, 230-, or 240-V ac power.
	646-6884-006				X			
	646-6884-003				X			Wired for 3-phase, 43- to 67-Hz and 380- to 420-Hz, 208-, 220-, 230-, or 240-V ac power.
	646-6884-007					X		
Filter assem- bly A1A1	652-2255-001		X		X	X		Provides addi- tional filtering to selected power and control lines to power amplifier to reduce trans- mitted power amplifier noise.
Wiring harness A1W1	646-7000-001	X						Wired for single- phase, 43- to 67- Hz, 208-, 220-, 230-, or 240-V ac power. Intercon- nects J1, J2, J3, J4, J5, J6, J7, J8, J9, J10, P1, and P2.
	646-7000-004		X					
(Cont)								

Table 1-3. Power Supply HF-8031 and HF-8032, Equipment Supplied (Cont).

ASSEMBLY/SUBASSEMBLY		POWER SUPPLY						DESCRIPTION/ FUNCTION
		HF-8031 622-3491-( )		POWER SUPPLY HF-8032 622-3512-( )				
TITLE	PART NUMBER	-001	-003	-001	-002	-004	-005	
Wiring harness A1W1 (Cont)	646-7000-002 646-7000-005			X	X			Wired for 3-phase, 43- to 67-Hz, or 380- to 420-Hz, 208-, 220-, 230-, or 240-V ac power. Interconnects J1, J2, J3, J4, J5, J6, J7, J8, J9, J10, P1, and P2.
Power cable A1W2	009-1840-060 009-1801-060	Note 1 Note 2	X	Note 1 Note 2	Note 1 Note 2	X	X	Interconnects blower B1 to 230- V ac line.
1000- watt conver- ter module A2	646-6883-001	X	X	X	X	X	X	Converts rectified ac power line voltage to pro- grammable dc power (50/40 V).
1000- watt conver- ter module A3	646-6883-001	X	X	X	X	X	X	Same as A2
500- watt conver- ter module A4	646-6882-001	X	X	X	X	X	X	Converts rectified ac power line voltage to 35 V dc.



# description

Table 1-3. Power Supply HF-8031 and HF-8032, Equipment Supplied (Cont).

ASSEMBLY/SUBASSEMBLY		POWER SUPPLY HF-8031 622-3491-( )		POWER SUPPLY HF-8032 622-3512-( )				DESCRIPTION/ FUNCTION
TITLE	PART NUMBER	-001	-003	-001	-002	-004	-005	
Low-voltage module A5	646-6812-001	X	X	X	X	X	X	Series regulators: +28 V, +5 V, +15 V, +12 V, and -12 V.
Digital volt-meter card A6	642-3197-001	X	X	X	X	X	X	Digital readout of dc voltages.
Crow-bar/logic card A7	642-3579-001	X	X	X	X	X	X	Control logic for crowbars and monitors.
400- to 57-Hz converter module A8	651-4140-001				X		X	Converts 400-Hz input power to 57-Hz blower power.
Power line cable	647-2547-001	X	X					Wired for single-phase ac power. Includes strap for voltage selection.
	647-2547-002			X	X	X	X	Wired for 3-phase ac power. Includes strap for voltage selection.

## Notes:

1. Effective through part no 646-6884-XXX, REV L.
2. Effective part no 646-6884-XXX REV M and above.

### 1.3 ASSOCIATED EQUIPMENT

Associated equipment required for operation of the HF-80 Solid-State 1-kW Power Amplifier-Power Supply, but not supplied as a part of it, is listed in table 1-4.

### 1.4 ACCESSORIES

Accessories available for use with the HF-80 Solid-State 1-kW Power Amplifier-Power Supply are listed in table 1-5.

#### NOTE

Part numbers shown with a -( ) for the part number suffix have two or more accessory types with different part number suffixes. Refer to the function and/or characteristics for the part number ending and associated differences and/or characteristics.

### 1.5 OPTIONS

Options available for the HF-80 Solid-State 1-kW Power Amplifier-Power Supply are listed in table 1-6.

### 1.6 EQUIPMENT SPECIFICATIONS

Specifications for the HF-80 Solid-State 1-kW Power Amplifier-Power Supply are listed in table 1-7.

Table 1-4. Associated Equipment.

EQUIPMENT	TYPE	FUNCTION	CHARACTERISTICS
Exciter	Rockwell International HF-8010( )	Transmit and control input signals to the HF-80 Solid-State 1-kW Power Amplifier-Power Supply.	Provides 100-mW, 2-channel ISB transmit input signal in the 1.6- to 29.999-MHz range. Provides control and monitor functions to the HF-80 Solid-State 1-kW Power Amplifier-Power Supply.
	Rockwell International HF-8014( )	Similar to Exciter HF-8010( ).	Similar to Exciter HF-8010( ), except 4-channel ISB.
Receiver-exciter	Rockwell International HF-8070( )	Similar to Exciter HF-8010( ).	Similar to Exciter HF-8010( ), except includes hf receiver circuits.
	Rockwell International 671U-4( )	Similar to Exciter HF-8010( ). Requires special power amplifier interface card (A11).	Similar to Exciter HF-8010( ), except includes hf receiver circuits.
	Rockwell International 671U-9( )	Similar to Exciter HF-8010( ). Requires special power amplifier interface card (A11).	Similar to Exciter HF-8010( ), except includes hf receiver circuits.
Antenna coupler	Rockwell International HF-8040( )	Automatic antenna coupler for matching power amplifier rf output to various whip and long-wire antennas.	Provides antenna matching for various whip or long-wire antennas to a 50-ohm unbalanced rf termination with vswr not exceeding 1.3:1.



Table 1-4. Associated Equipment (Cont).

EQUIPMENT	TYPE	FUNCTION	CHARACTERISTICS
Preselector	Rockwell International HF-8060 or equivalent	Automatically tuned bandpass filter for installation where transmit and receive antennas cannot be separated by large distances. (Used with exciters or receiver-exciters for improved transmit spurious signal and noise suppression.)	Provides front-end selectivity and overload protection for receivers, improving cross modulation and out-of-band intermodulation performance. Provides additional selectivity between the exciter rf output and the power amplifier rf input.
Bandpass filter	Rockwell International HF-8061 or equivalent	Automatically tuned bandpass filter used on power amplifier output in hf communications where several systems are operating simultaneously on nearby frequencies.	Capable of continuously handling rf power of up to 1500 watts at the tuned frequency.
	Rockwell International HF-8062 or equivalent	High-speed, digitally tuned low-pass filter to reduce undesirable transmitted noise from the output spectrum.	Contains eight automatically selected bandpass filters for the 1.6- to 30-MHz frequency range. Stopband attenuation of not less than 25 dB. Capable of handling an rf input power of 1100 W pep or average.
Antenna	Any	Transmit rf output signal, or transmit/receive rf output/rf input signals.	Less than 1.3:1 vswr for 50-ohm systems. (Other antenna types require Antenna Coupler HF-8040( ).)

Table 1-4. Associated Equipment (Cont).

EQUIPMENT	TYPE	FUNCTION	CHARACTERISTICS
Headphone	Any	Provide headphone monitoring of the audio signal (sidetone or received signal).	Standard 600-ohm headphones.
Microphone	Any	Provide audio input for voice transmissions.	200-ohm dynamic cardioid microphone.
CW key	Any	Key and modulate exciter for CW transmissions.	Hand-operated CW key.
FSK modem	Any	Provide FSK signals for RTTY operation.	Low-impedance audio input.

Table 1-5. Accessories.

EQUIPMENT	PART NUMBER	FUNCTION	CHARACTERISTICS
Preselector Control Cable AC-8060	622-3456-( )	Includes preselector cable 637-9286-( ), receive coaxial cable 638-4634-( ), and transmit coaxial cable 638-4635-( ).	Interconnects power amplifier, an HF-80 type preselector, and an HF-80 type exciter or receiver-exciter. -001, 1.5 m (5 ft) long -003, 3 m (10 ft) long -004, 4 m (13 ft) long -015, 15.2 m (50 ft) long -030, 30.5 m (100 ft) long



Table 1-5. Accessories (Cont).

EQUIPMENT	PART NUMBER	FUNCTION	CHARACTERISTICS
Cable Kit AC-8071A	622-3507-( )	Includes power amplifier-power supply power cable part no 647-2545-( ) and power amplifier-power supply control cable part no 647-2546-( ).	Interconnects power amplifier and power supply to form the HF-80 Solid-State 1-kW Power Amplifier-Power Supply. -001, 1.5 m (5 ft) long -002, 2.4 m (8 ft) long
Cable Kit AC-8072A	622-3508-( )	Includes power amplifier-exciter control cable part no 647-2225-( ) (W3), receive rf cable part no 647-2821-( ) (W4), and exciter rf cable part no 647-2820-( ) (W5).	Interconnects power amplifier and an HF-80 type exciter or receiver-exciter. -001, 2.3 m (7.5 ft) long -003, 3.0 m (10 ft) long -005, 6.1 m (20 ft) long -008, 7.6 m (25 ft) long -015, 15.2 m (50 ft) long -030, 30.5 m (100 ft) long
Cable Kit AC-8073A	622-3509-( )	Includes power amplifier-coupler control cable part no 647-2553-( ) and coupler rf cable part no 647-2554-( ).	Interconnects power amplifier and an HF-80 type antenna coupler. -001, 7.6 m (25 ft) long -006, 6.1 m (20 ft) long -015, 15.2 m (50 ft) long -030, 30.5 m (100 ft) long -060, 61 m (200 ft) long
Connector Kit AC-8130A	622-3510-( )	Includes connectors required to construct cable for the HF-80 solid-state 1-kW transmitter or transceiver systems. Part no 622-3510-002 includes preselector connectors; part no 622-3510-001 does not.	Includes mating connectors for each of the following HF-80 types of equipment: exciter or receiver-exciter, power supply, 1-kW power amplifier, exciter control or receiver-exciter control, antenna coupler, and preselector.



description

Table 1-5. Accessories (Cont).

EQUIPMENT	PART NUMBER	FUNCTION	CHARACTERISTICS
Crimp Tool Kit AC-8131	622-3492-001	Tool kit used with System Connector Kit AC-8130A part no 622-3510-001, -002.	Contains two crimp tools with positioner and four plastic insertion/extraction tools.
Cable Retractor CA-8011	622-3420-001	Cable retractor for power ampli- fier and power supply when installed in 19- inch equipment rack.	Provides automatic retrac- tion of interconnecting cables for slide-mounted equipment.
Slide Mounting Kit CA-8031	622-3419-( )	Slide mounting kit for power amplifier and power supply when installed in Equipment Cabinet CA-8020 or CA-8020A.	Provides mounting support for power amplifier and power supply for easy access.  -001, 610-mm (24-in) slide -002, 711-mm (28-in) slide
Slide Mounting Kit CA-8033	622-3527-002	Slide mounting kit for power amplifier and power supply when when installed in Equipment Cabinet CA-8020, CA-8020A, CA-8020B, and CA-8036.	Provides mounting support for power amplifier and power supply for easy access.
Transportable Cabinet CA-8035B	622-3501-( )	Watertight fiber- glass case for power amplifier and power supply	Stackable case, watertight covers (front and back) with a built-in shock isolated mounting frame.

Table 1-5. Accessories (Cont).

EQUIPMENT	PART NUMBER	FUNCTION	CHARACTERISTICS
Equipment Cabinet CA-8020	622-3417-( )	Rack-mounting cabinet enclosure for HF-80 equipment with standard EIA mounting configurations.	Standard EIA gray cabinet, 1417.6-mm (55.81-in) high. Part no 622-3417-001 does not have floor anchors, part no 622-3417-002 includes floor anchors.
Equipment Cabinet CA-8020A	622-3437-( )	Rack-mounting cabinet enclosure for HF-80 equipment with standard EIA mounting configuration	Standard EIA gray cabinet, 1773.2 mm (69.81 in) high. Part no 622-3437-001 does not have floor anchors, part no 622-3437-002 includes floor anchors.
Extender Card TS-8022	622-3430-001	Extends A9, A10, A11, and A12 circuit cards from the power amplifier chassis for testing and troubleshooting.	Universal power amplifier extender card.

Table 1-6. Options.

EQUIPMENT	PART NUMBER	FUNCTION
Serial Control Card AC-8020	622-3482-001	Provides access to digital and analog monitor information, and control of the power amplifier, independent of the exciter, for diagnostic fault isolation when used with processor control.
TR Relay Kit AC-8023	622-3505-001	Permits transmit and receive capability with one antenna in a 1-kW transceiver installation.
CTD 500 Interface Card A11	638-6351-002	Provides interface between power amplifier and Standard Radio and Telefon AB CTD-500 Exciter.



description

Table 1-7. Equipment Specifications.

CHARACTERISTIC	SPECIFICATION
Electrical	
Frequency range	1.600 to 30.000 MHz
Rf output power	1000 watts pep $\pm 0.5$ dB with two or more equal amplitude tones. 1000 watts average $\pm 0.5$ dB with 1-tone continuous duty into a 50-ohm resistive load.  Transient peak power output 2200 watts nominal when rf input drive is stepped from 0 volt to +10 dB of overdrive during power amplifier key on conditions in high-power mode. In low-power (500 W) mode, the transient peak power output is 1500 watts nominal under the same conditions.
Rf output load impedance	50-ohm unbalanced with a maximum vswr of 1.3:1 for full rated output power.
Rf input power	0.100 watt maximum required for rated rf output power. Capable of 2 watts average rf input power without damage.
Rf input impedance	50-ohm unbalanced, with a maximum vswr of 1.3:1
Tuning time for one complete tune sequence	350 ms (0.350 seconds) maximum (after receipt of key signal and rf drive). Does not include time required for external tuning units.
Tune fault	Indicated if power amplifier tune cycle (including external tuning units) is incomplete 10* seconds after receipt of key signal and rf drive. (*Can be strapped for up to 20 seconds if required.)
Key control time	
Keyline grounded	Output rf power level within $\pm 1$ dB of steady state level within 10 ms after system keyline is grounded.
Keyline ungrounded	Output rf power level reduced by at least 50 dB within 5 ms after system keyline is ungrounded.



Table 1-7. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
Gain variation	The variation in overall rf power gain of the power amplifier between any two frequencies in the 1.600- to 30.000-MHz range shall not exceed 4.0 dB.
Rf output inter-modulation distortion	The odd order intermodulation distortion products of the rf output signal at rated peak envelope power shall be at least 30 dB below either tone of a 2-tone, equal amplitude test signal. (The intermodulation distortion and all spurious emissions of the 2-tone test signal generator shall be at least 50 dB below either tone.)
Rf output harmonic content	Second and higher order harmonic output shall be at least 55 dB below the fundamental power output measured into a 50-ohm resistive load at any output power level up to rated power.
Modulation products from the power supply in the power amplifier rf output	<p>Modulation products in the power amplifier output signal are below the rated power output:</p> <p>By at least 65 dB when measured in a 10-Hz bandwidth at any frequency between 100 Hz and 6 kHz from the carrier frequency.</p> <p>By at least 70 dB when measured in a 10-Hz bandwidth at any frequency between 6 kHz and the power supply switching frequency (approximately 20 kHz) from the carrier frequency.</p> <p>By at least 65 dB when measured in a 3-kHz bandwidth at any frequency between the power supply switching frequency (approximately 20 kHz) and 200 kHz from the carrier frequency.</p>
Rf output wide-band noise	Output noise measured in a 3-kHz bandwidth is at least -40 dBm with rf input of power amplifier keyed and terminated in 50 ohms.

Table 1-7. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION																		
Control and protection																			
Internal gain control (IGC)	<p>A fast acting internal gain control loop protects the rf amplifier circuits from damage in the event of any abnormal condition existing on the following inputs:</p> <ul style="list-style-type: none"><li>a. Automatic level control</li><li>b. Vswr sensors</li><li>c. Collector dissipations</li><li>d. Heat sink temperature</li><li>e. Tune power controls</li></ul> <p>The IGC circuit controls gain with an rf pin diode attenuator before the first amplifier stage.</p>																		
Automatic level control (ALC)	<p>ALC output operates from 10-kilohm source impedance with a no-load charge time constant less than 0.5 ms to the external load and shunt specified by the interface card (A11) used in the power amplifier. Source impedance to reverse polarity shall be not less than 1 megohm. ALC threshold is switched for high- and low-power levels. This threshold is defined as -0.1 volt (across specified ALC load) at 0.5 dB below rated rf output power. Low-power ALC threshold is defined as -0.1 volt (across specified ALC load) at 3.5 dB below rated rf output power. ALC output is only present during the operate step of the tune sequence. The following chart defines the ALC output characteristics.</p> <table><tr><th rowspan="2">INTERFACE CARD A11</th><th rowspan="2">EXTERNAL PARALLEL LOAD</th><th colspan="2">MINIMUM ALC VOLTAGE AT +1 DB RF OUTPUT FROM ALC THRESHOLD</th></tr><tr><th>HIGH PWR</th><th>LOW PWR</th></tr><tr><td>635-0745-001 (HF-80)</td><td>27 k<math>\Omega</math>, 6.8 <math>\mu</math>F</td><td>-4.7 V dc</td><td>-3.2 V dc</td></tr><tr><td>637-2798-001 (671U-4)</td><td>4.7 k<math>\Omega</math>, 1.1 <math>\mu</math>F</td><td>-5.3 V dc</td><td>-3.6 V dc</td></tr><tr><td>637-2799-001 (671U-9)</td><td>100 k<math>\Omega</math>, 2.2 <math>\mu</math>F</td><td>-5.8 V dc</td><td>-3.9 V dc</td></tr></table>	INTERFACE CARD A11	EXTERNAL PARALLEL LOAD	MINIMUM ALC VOLTAGE AT +1 DB RF OUTPUT FROM ALC THRESHOLD		HIGH PWR	LOW PWR	635-0745-001 (HF-80)	27 k $\Omega$ , 6.8 $\mu$ F	-4.7 V dc	-3.2 V dc	637-2798-001 (671U-4)	4.7 k $\Omega$ , 1.1 $\mu$ F	-5.3 V dc	-3.6 V dc	637-2799-001 (671U-9)	100 k $\Omega$ , 2.2 $\mu$ F	-5.8 V dc	-3.9 V dc
INTERFACE CARD A11	EXTERNAL PARALLEL LOAD			MINIMUM ALC VOLTAGE AT +1 DB RF OUTPUT FROM ALC THRESHOLD															
		HIGH PWR	LOW PWR																
635-0745-001 (HF-80)	27 k $\Omega$ , 6.8 $\mu$ F	-4.7 V dc	-3.2 V dc																
637-2798-001 (671U-4)	4.7 k $\Omega$ , 1.1 $\mu$ F	-5.3 V dc	-3.6 V dc																
637-2799-001 (671U-9)	100 k $\Omega$ , 2.2 $\mu$ F	-5.8 V dc	-3.9 V dc																



Table 1-7. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION																					
Transmitter gain control (TGC)	TGC output source impedance is not more than 1 kilohm and minimum load impedance is 48.7 kilohms. Source impedance to reverse polarity shall be not less than 1 megohm. TGC output switched for high- or low-power output, the TGC output level is adjustable from 0 to -8 V dc at rf output levels of 500 to 1000 watts. When switched for low-power output, the TGC output level is adjusted from 0 to -8 V dc at rf output levels of 100 to 500 watts. The TGC output level is linear with respect to rf output power above a silicon diode gate level.																					
Primary power requirements	<p>1-kW Power Amplifier HF-8023 and Power Supply HF-8031: 208, 220, 230, or 240 V ac <math>\pm 10\%</math>, single-phase, 47 to 63 Hz</p> <p>Equipment shall not be damaged when subjected to primary power line transients of: <math>\pm 20\%</math> of nominal for a duration of 2 s max. <math>\pm 50\%</math> of nominal for a duration of 50 ms max.</p> <p>Maximum power consumption and typical power consumption under various conditions are listed as follows.</p> <table><tr><th>CONDITION</th><th>INPUT POWER CONSUMED</th><th>POWER FACTOR</th></tr><tr><td>Maximum power consumption</td><td>3200 W</td><td>0.66</td></tr><tr><td>Standby (control voltages on)</td><td>135 W (typical)</td><td>0.75</td></tr><tr><td>Operate (unkeyed)</td><td>300 W (typical)</td><td>0.75</td></tr><tr><td>Operate (keyed, no rf drive)</td><td>470 W (typical)</td><td>0.66</td></tr><tr><td>Two-tone test at 1-kW pep</td><td>2150 W (typical)</td><td>0.66</td></tr><tr><td>Single-tone CW at 1-kW</td><td>3100 W (typical)</td><td>0.66</td></tr></table>	CONDITION	INPUT POWER CONSUMED	POWER FACTOR	Maximum power consumption	3200 W	0.66	Standby (control voltages on)	135 W (typical)	0.75	Operate (unkeyed)	300 W (typical)	0.75	Operate (keyed, no rf drive)	470 W (typical)	0.66	Two-tone test at 1-kW pep	2150 W (typical)	0.66	Single-tone CW at 1-kW	3100 W (typical)	0.66
CONDITION	INPUT POWER CONSUMED	POWER FACTOR																				
Maximum power consumption	3200 W	0.66																				
Standby (control voltages on)	135 W (typical)	0.75																				
Operate (unkeyed)	300 W (typical)	0.75																				
Operate (keyed, no rf drive)	470 W (typical)	0.66																				
Two-tone test at 1-kW pep	2150 W (typical)	0.66																				
Single-tone CW at 1-kW	3100 W (typical)	0.66																				
(Cont)																						



Table 1-7. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION																					
Primary power requirements (Cont)	<p>1-kW Power Amplifier HF-8023 and Power Supply HF-8032: 208, 220, 230, or 240 V ac <math>\pm 10\%</math>, 3-phase, 47 to 63 Hz or 380 to 420 Hz.</p> <p>Equipment shall not be damaged when subjected to primary power line transients of: <math>\pm 20\%</math> of nominal for a duration of 2 s max. <math>\pm 50\%</math> of nominal for a duration of 50 ms max.</p> <p>Maximum power consumption and typical power consumption under various conditions are listed below when operated on 60-Hz power (applicable to Power Supply HF-8032 part no 622-3512-001, -002, -004, and -005).</p> <table><tr><th>CONDITION</th><th>INPUT POWER CONSUMED</th><th>POWER FACTOR</th></tr><tr><td>Maximum power consumption</td><td>3200 W</td><td>0.75</td></tr><tr><td>Standby (control voltages on)</td><td>135 W (typical)</td><td>0.77</td></tr><tr><td>Operate (unkeyed)</td><td>300 W (typical)</td><td>0.78</td></tr><tr><td>Operate (keyed, no rf drive)</td><td>470 W (typical)</td><td>0.74</td></tr><tr><td>Two-tone test at 1-kW pep</td><td>2150 W (typical)</td><td>0.75</td></tr><tr><td>Single-tone CW at 1-kW</td><td>3100 W (typical)</td><td>0.77</td></tr></table>	CONDITION	INPUT POWER CONSUMED	POWER FACTOR	Maximum power consumption	3200 W	0.75	Standby (control voltages on)	135 W (typical)	0.77	Operate (unkeyed)	300 W (typical)	0.78	Operate (keyed, no rf drive)	470 W (typical)	0.74	Two-tone test at 1-kW pep	2150 W (typical)	0.75	Single-tone CW at 1-kW	3100 W (typical)	0.77
CONDITION	INPUT POWER CONSUMED	POWER FACTOR																				
Maximum power consumption	3200 W	0.75																				
Standby (control voltages on)	135 W (typical)	0.77																				
Operate (unkeyed)	300 W (typical)	0.78																				
Operate (keyed, no rf drive)	470 W (typical)	0.74																				
Two-tone test at 1-kW pep	2150 W (typical)	0.75																				
Single-tone CW at 1-kW	3100 W (typical)	0.77																				
(Cont)																						

Table 1-7. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION																					
Primary power requirements (Cont)	<p>Maximum power consumption and typical power consumption under various conditions are listed below when operated on 400-Hz power (applicable only to Power Supply HF-8032 part no 622-3512-002 and -005).</p> <table><tr><th>CONDITION</th><th>INPUT POWER CONSUMED</th><th>POWER FACTOR</th></tr><tr><td>Maximum power consumption</td><td>3200 W</td><td>0.75</td></tr><tr><td>Standby (control voltages on)</td><td>135 W (typical)</td><td>0.68</td></tr><tr><td>Operate (unkeyed)</td><td>300 W (typical)</td><td>0.69</td></tr><tr><td>Operate (keyed, no rf drive)</td><td>470 W (typical)</td><td>0.76</td></tr><tr><td>Two-tone test at 1-kW pep</td><td>2150 W (typical)</td><td>0.94</td></tr><tr><td>Single-tone CW at 1-kW</td><td>3100 W (typical)</td><td>0.94</td></tr></table>	CONDITION	INPUT POWER CONSUMED	POWER FACTOR	Maximum power consumption	3200 W	0.75	Standby (control voltages on)	135 W (typical)	0.68	Operate (unkeyed)	300 W (typical)	0.69	Operate (keyed, no rf drive)	470 W (typical)	0.76	Two-tone test at 1-kW pep	2150 W (typical)	0.94	Single-tone CW at 1-kW	3100 W (typical)	0.94
CONDITION	INPUT POWER CONSUMED	POWER FACTOR																				
Maximum power consumption	3200 W	0.75																				
Standby (control voltages on)	135 W (typical)	0.68																				
Operate (unkeyed)	300 W (typical)	0.69																				
Operate (keyed, no rf drive)	470 W (typical)	0.76																				
Two-tone test at 1-kW pep	2150 W (typical)	0.94																				
Single-tone CW at 1-kW	3100 W (typical)	0.94																				
Power supply protection	<p>A single, gauged, multipole magnetic circuit breaker shall interrupt the main power line to the power supply. Power Supply HF-8031: 30 A, 2-pole Power Supply HF-8032: 25 A, 3-pole</p> <p>Individual power supply circuits shall be protected by front panel mounted, magnetic circuit breakers.</p> <p>Low voltage: 3.0 A, 2-pole Power Supply HF-8031 part no 622-3491-001 and -004, and Power Supply HF-8032 part no 622-3512-001 and -004 5.0 A, 2-pole Power Supply HF-8032 part no 622-3512-002 and -005</p>																					
(Cont)																						



description

Table 1-7. Equipment Specifications (Cont).

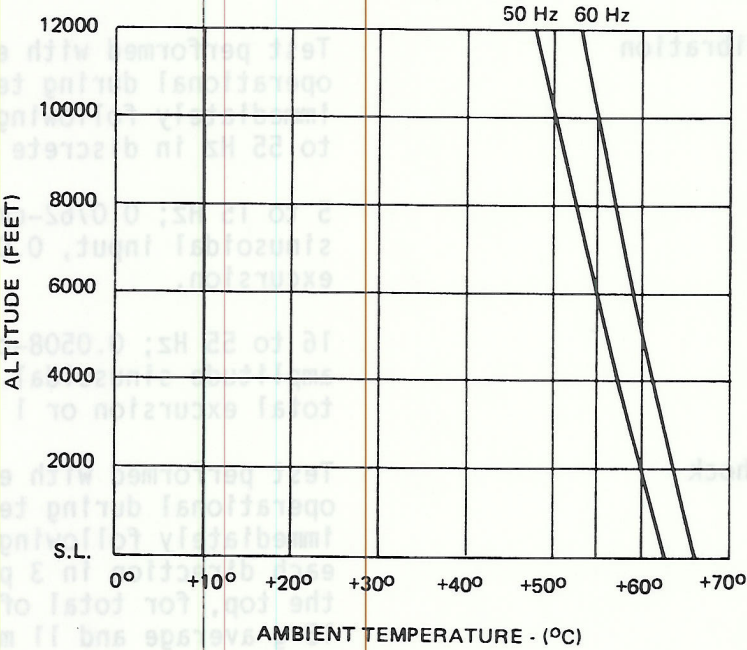
CHARACTERISTIC	SPECIFICATION
Power supply protection (Cont)	50/40 V dc A: 15 A, 1-pole 50/40 V dc B: 15 A, 1-pole 50/40 V dc C: 15 A, 1-pole 50/40 V dc D: 15 A, 1-pole 35 V dc: 15 A, 1-pole  Overvoltage protection circuits are incorporated in the power supply for all dc voltage supplies to the power amplifier.
Cooling	The power amplifier and power supply each contains internal blowers to supply adequate cooling of components and circuits. Air intake is filtered through an opening in the front panel and exhausted through an opening in the rear of the equipment. The air filter is 3/4-inch thick polyurethane foam.
Environmental	
Ambient temperature range	
Operating	-30 to +55 °C (-22 to +131 °F), continuous duty at rated output. See following charts for safe operating range of temperature versus altitude.
Nonoperating	-62 to +70 °C (-79 to +158 °F)
Altitude	
Operating	0 to 3048 m (0 to 10 000 ft) above sea level, continuous duty at rated output. See following charts for safe operating range of temperature versus altitude.
Nonoperating and storage	0 to 15 240 m (0 to 50 000 ft) above sea level



Table 1-7. Equipment Specifications (Cont).

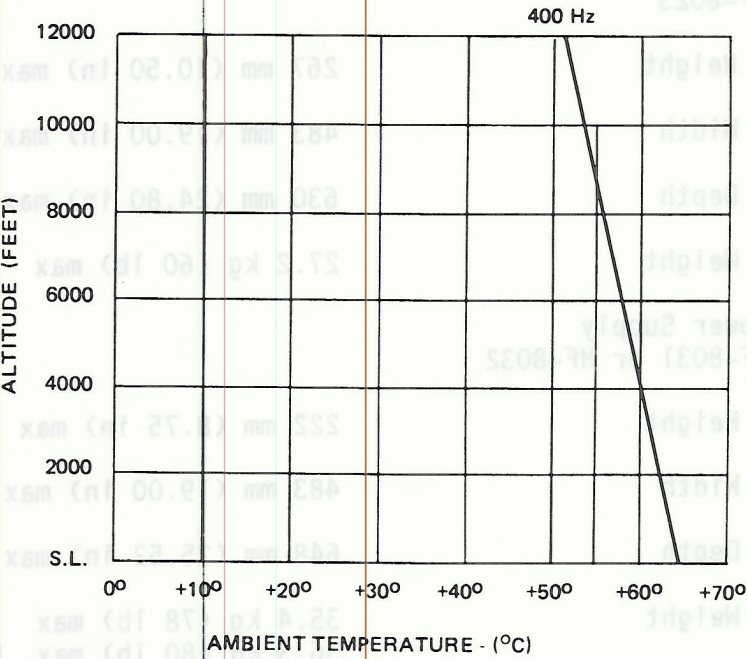
CHARACTERISTIC	SPECIFICATION
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50 to 60 Hz



TPA-5480-021

400 Hz



TPA-5480-021

description

Table 1-7. Equipment Specifications (Cont).

CHARACTERISTIC	SPECIFICATION
Ambient humidity range	0 to 95% relative humidity, no condensation
Vibration	<p>Test performed with equipment energized and operational during test and shall be operational immediately following test. Unit vibrated from 5 to 55 Hz in discrete intervals of 1 Hz as follows.</p> <p>5 to 15 Hz; 0.0762-cm (0.030-in) double amplitude sinusoidal input, 0.0762-cm (0.030-in) total excursion.</p> <p>16 to 55 Hz; 0.0508-cm (0.020-in) double amplitude sinusoidal input, 0.0508-cm (0.020-in) total excursion or 1 g, whichever is less.</p>
Shock	Test performed with equipment energized and operational during test and shall be operational immediately following test. Apply 3 impacts in each direction in 3 planes, except vertical from the top, for total of 15 impacts. Each impact 15 g average and 11 ms duration.
Physical	
1-kW Power Amplifier HF-8023	
Height	267 mm (10.50 in) max
Width	483 mm (19.00 in) max
Depth	630 mm (24.80 in) max
Weight	27.2 kg (60 lb) max
Power Supply HF-8031 or HF-8032	
Height	222 mm (8.75 in) max
Width	483 mm (19.00 in) max
Depth	648 mm (25.52 in) max
Weight	35.4 kg (78 lb) max 36.3 kg (80 lb) max, HF-8032 (622-3512-002, -005) only