Established 1981

Advanced Test Equipment Rentals
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6900K6 Series

20 Watt Power Amplifier

Features

- *IEEE-488*
- *CIIL/MATE Compatible*
- *Talker and Listener*
- *Interface Built-In*

Description

The 6900K6 Series are GPIB controllable versions of the popular CPI 6900K4 series low power commercial TWT amplifiers.

CPI 6900K6 series TWT amplifiers are manufactured with the same quality as all CPI amplifiers and are backed by CPI's worldwide 24-hour customer support network that includes 9 regional factory service centers. Quality, reliability and product support are integral parts of your CPI power amplifier.

Selection Guide

Rated Output Power (Watts)	Model #	Frequency Range (GHz)	Small Signal Gain at Rated Power (dB)
20	VZC-6961K6	4-8	35 min.
	VZX-6981K6	8-12.4	40 min.
	VZU-6991K6	12.4-18	40 min.
	VZM-6991K6	8-18	40 min
	VZV-2776K6	4-18	35 min.

These units can function as either a GPIB Listener or a Talker; i.e., the TWTA can be controlled by the external computer and report on its status.

When addressed as a Listener, the TMA causes the amplifier to take some action such as turning high voltage ON.

When addressed as a Talker, the amplifier sends back information on its operating or fault condition.

Local operation is possible by enabling the front panel controls; however, incoming Bus commands will override the front panel unless an internal safety switch has been set to prevent it.

Two control languages are included; CPI Simplified Language (CSL) and a version of the Air Force's Control Interface Intermediate Language (CIIL). An internal switch allows quick selection of language.

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Specifications

Refer to CPI 6900K4 Series data sheets for detailed specifications of the basic unit. This data sheet covers only those specifications which apply to the interface itself.

Listener Functions

- High Voltage On/Off
- Fault Reset
- Heater On/Off

Talker Functions

- Heater Power ON
- HV ON
- Summary Fault
- Interlock Fault
- Heater Time Delay
- Standby
- Helix Fault
- Thermal Fault

Data Interface

IEEE Std. 488-1978. Driver and receiver circuits are fully Bus compatible. Receivers contain Bus terminating resistors and have 500 mV hysteresis. Drivers are open collector devices, capable of driving up to 14 other Bus compatible devices. Power up/down protection is included to prevent transmitting invalid data to the Bus or holding the Bus when power is off.

Format

Sixteen lines, eight for data and eight for control and status messages. Data transfer is byte serial using a three-wire handshake per IEEE-488 Standard.

Address Capability

Unit recognizes 31 primary addresses (address 0 through 30) or 31 secondary addresses with a fixed primary address of 17 (address 1700 through 1730).

Interface Handshake Repertoire:

Function	Code	Comments
Source Handshake	SH1	Implemented
Acceptor Handshake	AH1	Implemented
Talker	T5	Implemented
Extended Talker	TE5	Implemented
Listener	L3	Implemented
Extended Listener	LE3	Implemented
Service Request	SR1	Implemented
Parallel Poll	PP1	Implemented
Remote/Local	RL0	Not Implemented
Device Clear	DC1	Implemented
Device Trigger	DT1	Implemented
Controller	C0	Not Implemented
Bus Driver	E1	Open Collector

Language

CPI Simplified Language (CSL)

A simplified version of CIIL. All commands enclosed in brackets are deleted. In addition, the SRQ function is enabled allowing serial and parallel polling as well as the "D" command status request.

Control Interface Intermediate Language (CIIL)

Compatible per proposed MATE System Control Interface Standard No. 2806763 Rev. B. Several non-CIIL approved noun modifiers have been defined as required by a TWTA. CIIL required commands are indicated herein enclosed by brackets [ ].

Listener Operation Codes and Statements

Function Op-Code	Noun	Modifier
FNC = Function	SGC = Signal Conditioner	GAIN = Gain
CHØ = Channel Ø		VLST = Standby
SET = Set		VLON = Voltage ON
RST = Reset		
STA = Status		

Set-Up Statements

Set-Up to Standby

FNC [SGC :CHØ SET GAIN 50 SET] VLST CR [LF]

If this command is received during the ON mode, high voltage will be switched OFF and the amplifier placed in Standby; i.e., heater ON, high voltage OFF.

If this command is received when the heater is OFF, the heater will be switched ON and the amplifier will switch to Standby at the end of the Heater Time Delay period.

Set-Up to ON

FNC [SGC :CHØ SET GAIN 50 SET] VLON CR [LF]

If this command is received when the amplifier is in Standby, the High Voltage will be switched ON.

If this command is received when the amplifier is still in Heater Time Delay, High Voltage will be switched ON at the end of the delay period.

If this command is received when the heater is OFF, the heater will be switched ON and the amplifier will switch to High Voltage ON at the end of the Heater Time Delay period.

Language, *cont.*

Reset Statement **RST [SGC :CHØ] CR [LF]**

Upon receipt of this command, the High Voltage is switched OFF. If it is ON the heater is switched OFF and any faults reset.

Status Statement **STA [SGC] CR [LF]**

Upon receipt of this command, the TMA prepares a current status response. This command must be issued before addressing the TMA as a Talker.

Status Messages when addressed as a Talker:

Command Accepted: **[Space] CR LF**

Fault: **FØ7TWTA:[fault message] CR LF**

Priority	Fault Messages
1	SYNTAX ERROR
2	THRM OVERLOAD
3	HELX OVERCURRENT
4	INTERLOCK FAULT
5	DUTY CYCLE TRIP
6	PRF TRIP
7	GRID FAULT
8	SUMMARY FAULT

Heater Time Delay: **FØ6TWTA:AMP TIMING CR LF**

Mechanical & Environmental

Same as 6900K4 Series.

Special 488 Functions

Device Clear/Selected Device Clear: Causes all relays to de-energize and then assume initial pattern. Additionally, Device Clear and Selected Device Clear output a clear pulse on the Clear lines, initialize the program flags and pointers and clear memory.

IFC: IFC clears all Bus Interface functions and, if CLEAR switch on rear panel is on, will cause all relays to de-energize and then assume PROM programmed initial pattern and generate a clear pulse on the Clear lines.

SRQ (CSL mode only): Generates a Service Request

Interrupt (SRQ) when external data is received if not addressed as a talker. SRQs can be completely inhibited by depressing the front panel SRQ INHIBIT switch. The SRQ signal is reset when the TWTA is addressed to talk or when Serial Polled.

Serial Poll Response: The TMA responds to a serial poll by placing an 8-bit character on the Bus data lines. The bit assignments are:

DI0 1	Heater Time Delay
DI0 2	Standby
DI0 3	HV ON
DI0 4	Zero
DI0 5	Command not executed, syntax error causes RSV bit (DI0 7) to be set.
DI0 6	Summary Fault
DI0 7	RSV
DI0 8	Zero

Parallel Poll Response: The TMA responds to a parallel poll by placing the Ready Status condition in the bit selected by the PPE command. The bit is a logic ‘1’ if the RDY light is on, logic ‘0’ if off. The Ready Status is determined by the Summary Fault condition; i.e. Not Summary Fault = Ready.

Special 488 Functions, *cont.*

Status Request:

Syntax: D CR LF
Response: D n n n (Where n represents a status character) *

Character	Bit	Definition
1	–	ASCII D
2	3	Heater Time Delay
	2	High Voltage ON
	1	Standby
	Ø	Mains Power ON
3	3	Interlock Fault
	2	Thermal Fault
	1	Helix Fault
	Ø	Summary Fault
4	3	Remote
	2	Grid Fault
	1	Frequency Trip
	Ø	Duty Cycle Trip

* A three-character argument is returned in response to the summary status query. Each character contains 4 bits of information. The bits are represented in ASCII hexidecimal notation (00H-0FH).

Controls and Indicators

Controls:
Mains Power ON/OFF
Front Panel Enable
Reset
Standby
Operate
CIIL Enable: Internal switch. Disables service request interrupt
Address Switches: Talk, Listen and Secondary Address switches (MTA, MLA, MSA)

Indicators:
Mains Power ON
Filament ON
Standby
Operate
Summary Fault
Helix Fault

Note: Characteristics and operating values are based on performance tests. These figures may change without notice as a result of additional data or product refinement. Please contact CPI before using this information for system design.

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