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	AE User Port (based on C3) : Pin Descriptions	Rev. date 30-Oct-06	Rev. B 02

**Products: Power Generators with C3 Technology
(manufactured since September 2002)**
Subject: AE User Port – Pin Layout and Description


The following table provides the connector pin-outs for the user port connector on the generator.

Connector Type 25-pin D subminiature, shielded, female.

Pin Number		Signal Name	Signal Type	Signal Description
Signal	Ret			
1	-	RETURN for pin 12 and pin 14		See pin 12 or pin 14 respectively.
2	15	REFLECTED POWER MONITOR	Analog Output	This 0 V to 10 V signal provides a linearly scaled readback of reflected power as measured at the generator output. 0 V to 10V = 0 to max. power as specified in data sheet Note : Pin15 must be grounded.
3	16	FORWARD/LOAD POWER MONITOR	Analog Output	This 0 V to 10 V signal provides a linearly scaled readback of the forward power (or load power) as measured at the generator output. This pin represents forward or load power, depending on the active power regulation mode selected. (See description of pin 8 for information on changing the regulation mode.) 0 V to 10V = 0 to max. power as specified in data sheet Note: pin 16 must be grounded.
4	17	RF POWER ON	Digital Input	This signal enables or disables RF output. To enable RF output, apply a positive voltage of 4 V to 30 V to this pin. To disable RF output, apply a voltage of 1.5 V or less or an open connection. Note: Pin 17 must be grounded. Note: Before the CESAR generator can deliver power, the interlocks must be satisfied. (See pin 10)
5	18	SETPOINT	Analog Input	This 0 V to 10 V signal sets the RF output set point. Depending on the regulation mode, the set point refers to either forward or load power or to DC Bias Voltage. 0 V to 10V = 0 % to 100% power. For DC Bias regulation the scaling of the set point must be the same as for the DC Bias signal (See pin 7).

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Pin Number		Signal Name	Signal Type	Signal Description
Signal	Ret			
6	19	FORWARD POWER / DC BIAS REGULATION	Digital Input	Use this signal to select DC bias or RF power regulation mode. To regulate on DC bias input, apply a positive voltage of 4 V to 30 V to this pin. To regulate on forward or load power, apply a voltage of 1.5 V or less or an open connection. See pin 8 for switching between forward and load power regulation.
7	20	DC BIAS INPUT	Analog Input	This 0 V to 10 V signal closes the control loop around external components in the RF path. Typically, this is used for DC bias regulation as a scaled representation of the DC bias measured at the match network. The voltage divider inside the match network must scale down the DC bias voltage to a maximum of 10 V.
8	21	FORWARD / LOAD POWER REGULATION	Digital Input	Use this signal to select forward or load power regulation mode. To regulate on load power, apply a positive voltage of 4 V to 30 V to this pin. This selection changes the power monitor signal (pin 3) from forward power to load power, too. To regulate on forward power, apply a voltage of 1.5 V or less or an open connection. Note: Load power equals forward power minus reflected power.
9	-	RETURN for pin 22		See pin 22.
10	23	INTERLOCK LOOP	Interlock	These pins are part of a series interlock string, which must be closed to enable RF power in the generator. A contact resistance of 15 ohms or less across these pins will close the loop. Pin 10 is connected to +15 V of the CESAR generator via a current limiting circuit.
11	-	RETURN for pin 24		See pin 24.
12		nc		
13	21	+15V Supply	Supply	A nominal +15 VDC output referenced to ground, auxiliary supply for external use (50 mA maximum).
14	1	SETPOINT STATUS	Digital Output	When the CESAR generator is out of set point, a low impedance (opto coupler output, 8 mA maximum) is created between this pin and return pin 1.
15	-	RETURN for pin 2		See pin 2.
16	-	RETURN for pin 3		See pin 3.
17	-	RETURN for pin 4		See pin 4.
18	-	RETURN for pin 5		See pin 5.
19		DC GROUND	Chassis Ground	DC ground connection common to chassis ground.
20	-	RETURN for pin 7		See pin 7.
21		DC GROUND	Chassis Ground	DC ground connection common to chassis ground.
22	9	OVERTEMP	Digital Output	When an internal overtemperature condition is detected, a low impedance (opto coupler output, 8 mA maximum) is created between this pin and return pin 9.
23	-	RETURN for pin 10		See pin 10.

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Pin Number		Signal Name	Signal Type	Signal Description
Signal	Ret			
24	11	INTERLOCK SATISFIED	Digital Output	When the interlocks are satisfied, a low impedance (opto coupler output, 8 mA maximum) is created between this pin and return pin 11.
25	19	BLANKING/PULSE	Pulse Input	<p>When Pulse Mode is set to "External" this pin allows you to blank / pulse the RF power. Choose the appropriate level for RF on in the Pulse Pin Configuration in the front panel menu.</p> <p>When Pulse Mode is set to "Internal" this pin allows you to switch between internal pulsing and CW operation. Choose the appropriate function and level in the Pulse Pin Configuration in the front panel menu.</p>

AE User Port Electrical Characteristics

The 25-pin user port of the CESAR power generator provides analog and digital signals for control and monitoring of the generator functions:

Analog Outputs

The analog read-back signals from the generator (pins 2 and 3) are driven by operational amplifiers. These devices are capable of driving high-capacitance loads such as those expected in shielded interface applications. The user's receiver must present a 10k ohm (or greater) impedance to these signals. The read-back signals, which represent the forward and reflected power as measured at the output of the generator.

Analog Input

The set point and DC bias signal from the user (pins 5 and 7) are a 0 V to 10 V scaled analog signals.

Digital Outputs


The status signals provided by the generator (pins 12, 14, 22 and 24) are opto-coupled with NPN transistor outputs. The collector and emitter of each transistor are provided to the user interface. Each transistor can provide a maximum of 8 mA of collector current and may be operated with a collector-to-emitter voltage of up to 30 V.

Digital Inputs

Pins 4, 6, 8 and 10 are opto-coupled. The user's signal drives the LED in the opto-coupler through a 4.7 kOhm resistor. A signal level of 4 V to 30 V applied to the input pin activates the signal.

Pulse Input

The pulse input is a high speed opto-coupled input. The user's signal drives the LED in the opto-coupler through a 1.2 kOhm resistor. A signal level of 3 V to 12 V applied to the input pin activates the signal.

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Interlock

The interlock signals (pins 10 and 23) provide the RF power to enable the RF power generation by the Power Generator. Pin 10 is tied to the generator's +15 V supply. Connecting pin 10 to pin 23 closes the loop, enabling RF power.

Interface Cabling Requirements

The cable used to connect the generator's 25-pin user port to the system controller must be a shielded, 25-wire I/O cable. Twisted-pair wiring is highly recommended but is not mandatory. Signal losses should be minimized by keeping the cable length as short as possible. The maximum recommended cable length between the generator and the controller is 10 m (33 feet). To minimize interference from adjacent electrical equipment, the EMI shield in the cable must be terminated to the metal shells of the cable's D connectors. Additionally, the chassis of the Power Generator must be tied to a local earth ground through an adequately sized grounding strap.

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