

Solid State Broadband High Power Amplifier

2173 – BBS2E3KRR
20 – 500 MHz / 500 Watts

The BBS2E3KRR (SKU 2173) is suitable for octave bandwidth high power CW, modulated, and pulse applications. This amplifier utilizes high power LDMOS devices that provide wide frequency response, high gain, high peak power capability, and low distortions. Exceptional performance, long-term reliability and high efficiency are achieved by employing advanced broadband RF matching networks and combining techniques, EMI/RFI filters, and all qualified components. The amplifier is constructed within one single 3RU drawer including the forced air-cooling. The system comes standard to operate from 180-260VAC single phase.



The amplifier includes a built-in control and monitoring system, with protection functions which preserve high availability. Remote management and diagnostics are via an embedded web server allowing network managed site status and control simply by connecting the unit's Ethernet port to a LAN. Using a web browser and the unit's IP address (IPV4) allows ease of access with the benefit of multi-level security. The control system core runs an embedded OS (Linux), has a built-in non-volatile memory for event recording, and factory setup recovery features. The extended memory option allows storage of control parameters and event logs.

Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state linear design
- Suitable for CW, AM, FM and pulse (Consult factory for other modulation types)
- Compact Modular design
- 50 ohm input/output impedance
- Built-in Control, Monitoring and Protection functions
- High reliability and ruggedness
- Optional harmonic and spurious suppression via external switched filter bank (quoted separately)

ELECTRICAL SPECIFICATIONS over temperature conditions (-10 to +50°C)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	20		500	MHz
Power Output CW ^(Note 1)	P _{SAT}	500			Watt
Power Output @ 1dB Gain Compression ^(Note 2)	P _{1dB}	400			Watt
Power Gain @ 1dB Gain Compression	G _{1dB}	57			dB
Input Power for Rated P _{SAT}	P _{IN}		0		dBm
Gain Flatness / Leveled ALC	ΔG			±3.0/±1.0	dB
Gain Adjustment Range	VVA	20			dB
Input Return Loss	S ₁₁			-10	dB
Noise Figure @ maximum gain	NF		10	15	dB
Third Order Intercept Point 2-Tone @ 51dBm/Tone, 1MHz Spacing	IM3		-20		dBc
Harmonics @ P _{OUT} = 500W (without Harmonic Suppression Filters)	2 ND			-20	dBc
	3 RD			-10	dBc
Spurious Signals	Spur			-60	dBc
Operating Voltage (1-phase)	V _{AC}	180	220	260	Volt
Power Consumption @ 500W CW	P _D			2900	Watt

Notes:
 1. CW measurement performed in MGC Mode (Manual Gain Control).
 2. P_{1dB} measurement performed with CCDF method, IS-95, 1MHz BW.

MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions W x H x D	17.5 x 5.25 x 22	Inch
Weight (Without Harmonic Suppression Filters)	68	Pound
RF Connectors Input/Output	Type-N, Female	-
RF Sample	Type-SMA, Female	-
Blanking Input	Type-BNC, Female	-
Cooling	Built-in forced air cooling system	-

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ENVIRONMENTAL CHARACTERISTICS (Qualification Data available for review):

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T _A	-10		+50	°C
Non-operating Temperature	T _{STG}	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Shock / Vibration - MIL-STD-810F Shock Method 516.5, Vibration Method 514.5	SH / VI				

PROTECTIONS:

Parameter	Specifications	Unit
Input Overdrive	+10 dBm	Max
VSWR protection @ P _{OUT} = 500W	At 3:1 or higher – PA backs-off output power to a safe operating level – no system shutdown, “On Air” time is maximized	-
Thermal – Graceful Degradation	Ambient 50°C	Min
Default Data Recovery	Factory Default Calibration Recovery	

OPTIONAL HARMONIC FILTERS: (Configurable per Customer Requirement. Example shown below):

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	Band 1	20		30	MHz
	Band 2	30		45	
	Band 3	45		67	
	Band 4	57		100	
	Band 5	100		150	
	Band 6	150		225	
	Band 7	225		335	
	Band 8	335		500	
Harmonics @ Rated P _{SAT}	2 ND			-60	dBc
	3 RD			-60	

COMMUNICATION INTERFACES:

Function	Utility	Connector
Ethernet	Network management of device / web interface	RJ45
USB	Mass storage / Expansion Bus	USB 1.x/2.0 compatible
RS-232, RS-422 (optional)	Serial management of device / local operator access	D-Sub 9-position Male

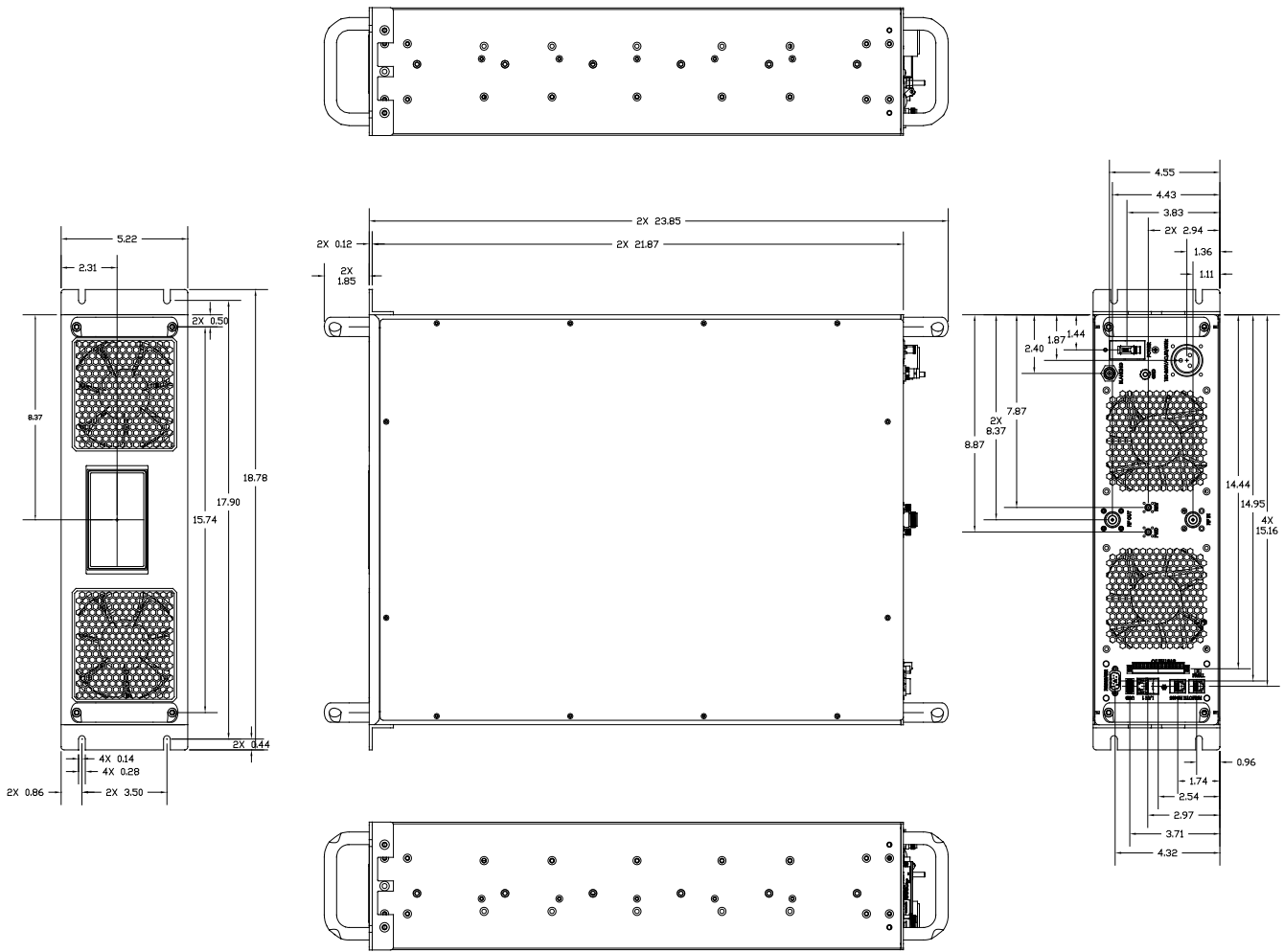
SYSTEM I/O CONNECTOR – 14-pin

Pin #	Description	Specifications
1	FWD Test Point	Forward detected power (analog voltage: 0 – 5 Volt)
2	REV Test Point	Reverse detected power (analog voltage: 0 – 5 Volt)
3	Summary Fault	Summary Fault: Active TTL Logic Low ($\leq 0.7V$) = Fault (Internally Pulled-High)
4	VVA control (Optional)	Gain control/Monitor: Analog Voltage Range 0-5V Gain Control: 0V= Max. Attenuator, 5V= Min. Attenuator
5	Shutdown	Amplifier Disable: TTL Logic Low ($\leq 0.7V$) (Internally Pulled-High)
6	Aux P/S Test Point	+12.0V _{DC} $\pm 2V$ (resettable 0.5amp fuse)
7	PSS Test Point	+44.0V _{DC} $\pm 4.8V$ (resettable 0.5amp fuse)
8	GND	Ground
9	Open drain control	Site management utility (reserved)
10	Open drain control	Site management utility (reserved)
11	Open drain control	Site management utility (reserved)
12	Digital I/O (configurable)	Site management utility (reserved)
13	Digital I/O (configurable)	Site management utility (reserved)
14	GND	Ground

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OUTLINE DRAWING



Note – Outline does not includes optional external filter drawer (Quoted Separately)