

Solid State Broadband High Power Amplifier

2162 – BBS2E4AUT

20 – 1000 MHz / 1000 Watts

The BBS2E4AUT (SKU 2162) is suitable for multi-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 5RU drawer including the forced air-cooling. The system comes standard to operate from 180-260VAC single phase or can be ordered optionally with a three phase AC supply.



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, IPV6) allows ease of access with the benefit of multi-level security. The control system core supports hardware encryption, 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

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	20		1000	MHz
Power Output CW ^(Note 1)	P _{SAT}	1000			Watt
Power Output @ 1dB Gain Compression ^(Note 2)	P _{1dB}	500			Watt
Power Gain @ 1dB Gain Compression	G _{1dB}	63			dB
Input Power for Rated P _{SAT}	P _{IN}		0		dBm
Input Power Range	P _{IN}	-3.0		+3.0	dBm
Gain Flatness / Leveled (ALC)	ΔG			±3.5/±1.0	dB
Gain Adjustment Range	VVA	20			dB
Input Return Loss	S ₁₁			-10	dB
Noise Figure @ maximum gain 20-300MHz/300-1000MHz	NF			20/15	dB
Third Order Intercept Point 2-Tone @ 54dBm/Tone, 1MHz Spacing	IP3		+64		dBm
Harmonics @ P _{OUT} = 1000W (without Harmonic Suppression Filters)	2 nd			-20	dBc
	3 rd			-10	
Spurious Signals	Spur			-60	dBc
Operating Voltage – (single Φ)	V _{AC}	180	220	260	Volt
Operating Voltage – (3 Φ)	V _{AC}		208		Volt
Power Consumption @ 1000W CW	P _D			6000	Watt

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

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MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions W x H x D	17.5 x 8.75 x 22	Inc
Weight (Without Harmonic Suppression Filters)	95	lb.
RF Connectors Input/Output	Input: Type-N, Female Output: Type-7/16-DIN, Female (optional Type-SC, Female)	
RF Sample	Type-SMA, Female	
Blanking Input	Type-BNC, Female	
Cooling	Built in forced-air cooling system	

ENVIRONMENTAL CHARACTERISTICS (Qualification Data available for review)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T _C	-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	At 3:1 – 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	

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 (Standard) RS-422 (optional)	Serial Management of Device / Local Operator Access	D-Sub 9-position Male

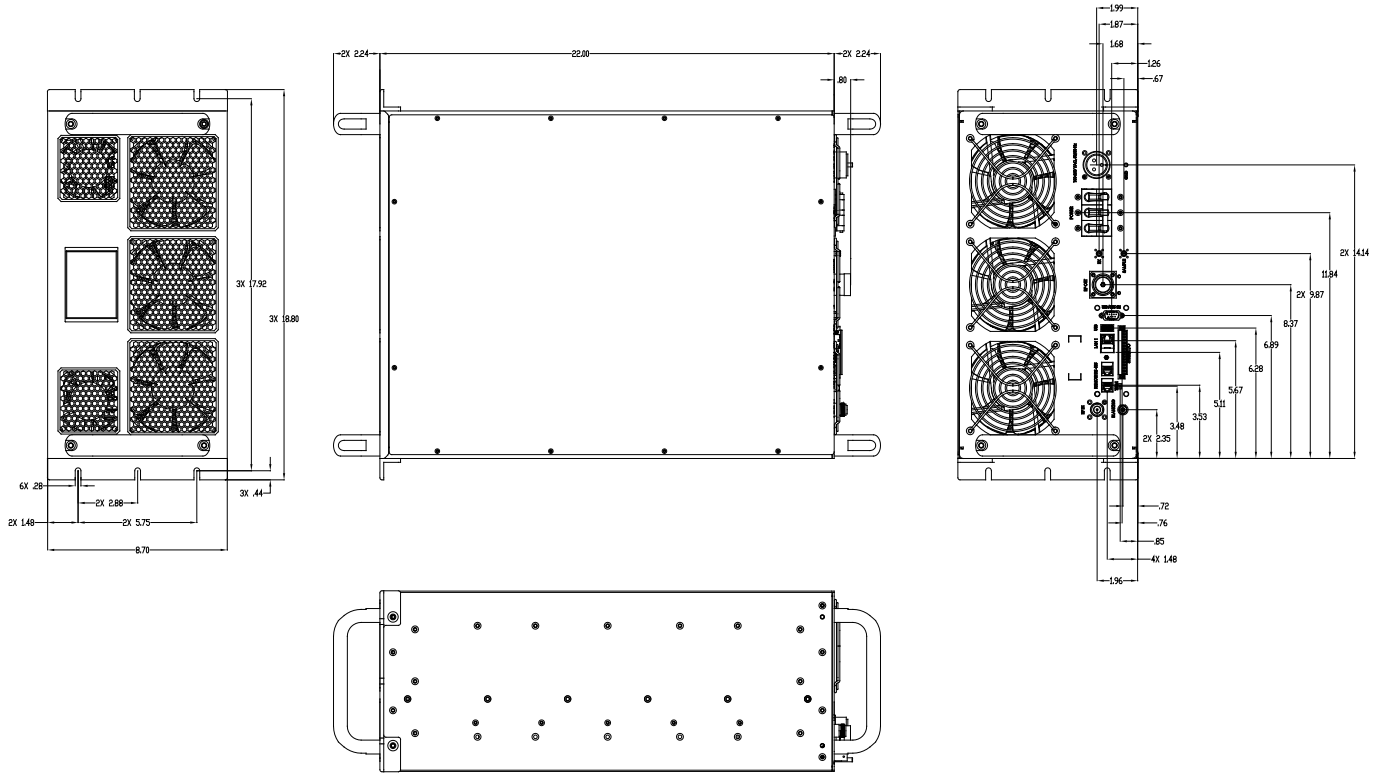
SYSTEM I/O INTERFACE – 14-Position

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 ($\leq 0.7V$) (Internally Pulled-High)
4	VVA control	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	P/S System 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



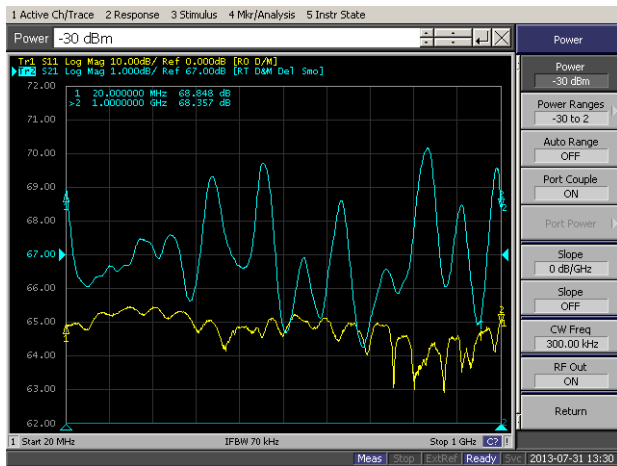
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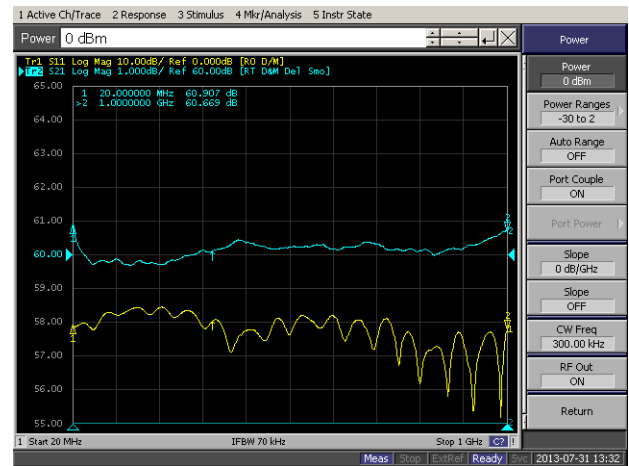
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TYPICAL PERFORMANCE

Plot 1 – Small Signal Gain and Flatness
 Top Curve: Small Signal Gain @ $P_{IN} = -30\text{dBm}$
 Reference: 67dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



Plot 2 – Output Power @ 1000W Leveled
 Top Curve: Mode ALC @ 60dBm, $P_{IN} = 0\text{dBm}$
 Reference: 60dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range
 Top Curve: Maximum Gain @ $P_{IN} = -30\text{dBm}$
 Middle Curve: Minimum Gain @ $P_{IN} = -30\text{dBm}$
 Reference: 40dB, 10dB/div.
 Bottom Curve: Input Return Loss @ Minimum Gain
 Reference: 0dB, 10dB/div.

