

# Solid State Broadband High Power Amplifier

**2175**
**80 – 1000 MHz / 500 Watts**

The SKU 2175 is suitable for multi-octave bandwidth high power CW, modulated, and pulse applications. This amplifier utilizes high power LD MOS 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. Available operating voltage configuration are single phase 180-260 VAC up to 400Hz and 28 VDC.



SKU#: 2175-001

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 ISO9001:2015 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 <i>(Note 3)</i>	BW	80		1000	MHz
Power Output CW <i>(Note 1)</i>	P <sub>SAT</sub>	500			Watt
Power Output @ 1dB Gain Compression <i>(Note 2)</i>	P <sub>1dB</sub>	300			Watt
Power Gain @ 1dB Gain Compression	G <sub>1dB</sub>	60			dB
Input Power Range	P <sub>IN</sub>	-3.0	0	+3.0	dBm
Gain Flatness / Leveled (ALC)	ΔG			±3.5/±1.0	dB
Gain Adjustment Range	VVA	20			dB
Input Return Loss	S <sub>11</sub>			-10	dB
Noise Figure @ maximum gain 80-300MHz/300-1000MHz	NF			20/15	dB
Third Order Intermodulation 2-Tone @ 51dBm/Tone, 1MHz Spacing	IM3		-20		dBc
Harmonics @ P <sub>OUT</sub> = 500W	2 <sup>ND</sup>			-20	dBc
	3 <sup>RD</sup>			-10	
Spurious Signals	Spur			-60	dBc
Operating Voltage	V <sub>AC</sub>	180	220	260	Volt
	V <sub>DC</sub>	24	28	32	
Power Consumption @ 500W CW	P <sub>D</sub>			2900	Watt

**Notes:**

1. CW measurement performed in MGC Mode (Manual Gain Control).
2. P<sub>1dB</sub> measurements performed with AM 80% depth of modulation, 1 kHz modulation signal
3. Full instantaneous operation down 20MHz – consult factory for details.

## MECHANICAL SPECIFICATIONS

Parameter	Value	Unit
Dimensions W x H x D (excludes connectors, handles and brackets)	17 x 5.25 x 22	Inch
Weight	68	Pound
RF Connectors Input/Output	Type-N, Female	-
RF Sample Connectors	Type-SMA, Female	-
Blanking Input Connector	Type-BNC, Female	-
Cooling	Built-in forced air cooling system	-

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**ENVIRONMENTAL CHARACTERISTICS (Design to meet)**

Parameter	Symbol	Min	Typ	Max	Unit
Operating Ambient Temperature	T <sub>A</sub>	-10		+50	°C
Non-operating Temperature	T <sub>STG</sub>	-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	Specification	Unit
Input Overdrive	+10 dBm	Max
VSWR Protection	At ~3:1 Load – PA backs-off output power to a safe operating level – no system shutdown, “On Air” time is maximized	-
Thermal Shutdown	Above 50°C ambient	-
Default Data Recovery	Factory Default Calibration Recovery	-

**COMMUNICATION INTERFACES**

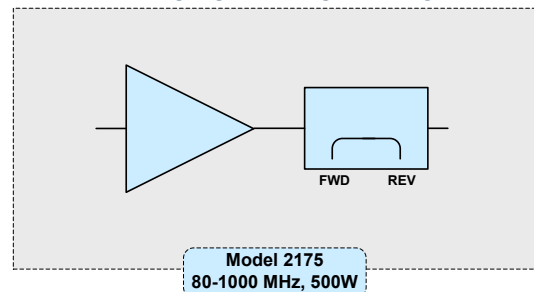
Function	Utility	Connector
Ethernet	Network Management of Device / Web Interface	RJ45
USB	Mass Storage / Expansion Bus	USB 1.x/2.0 compatible

**SYSTEM I/O INTERFACE CONNECTOR – 14-Position**

Pin #	Description	Specification
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, ( <i>Internally Pulled-High</i> )
4	N/C	No Connection (reserved)
5	Shutdown	Amplifier Disable: TTL Logic Low ( $\leq 0.7V$ ), ( <i>Internally Pulled-High</i> )
6	Aux P/S Test Point	+12.0V <sub>DC</sub> $\pm 2V$ (resettable 0.5amp fuse)
7	P/S System Test Point	+44.0V <sub>DC</sub> $\pm 4.8V$ (resettable 0.5amp fuse)
8	GND	Ground
9-11	Open drain control	Site management utility (reserved)
12&13	Digital I/O (configurable)	Site management utility (reserved)
14	GND	Ground

**Available Options**

<b>2175-xxx</b>
<b>-001</b> 180-260 VAC, 1-phase, 47-63 Hz, Rear RF Connectors
<b>-002</b> 28 VDC, Rear RF Connectors
<b>-003</b> TBD
<b>-004</b> TBD
Contact us for other available options; <a href="mailto:sales@empowerrf.com">sales@empowerrf.com</a>
<b>Standard Feature:</b>
-LCD Control, Ethernet & Serial Comm
-Main RF Connectors: <b>Input &amp; Output</b> [Type-N, F]
-Sample Port: SMA-F [Forward & Reverse]
-Blanking/Gating Port: BNC-F
-Rack Slides, Handles and Rackmount Bracket

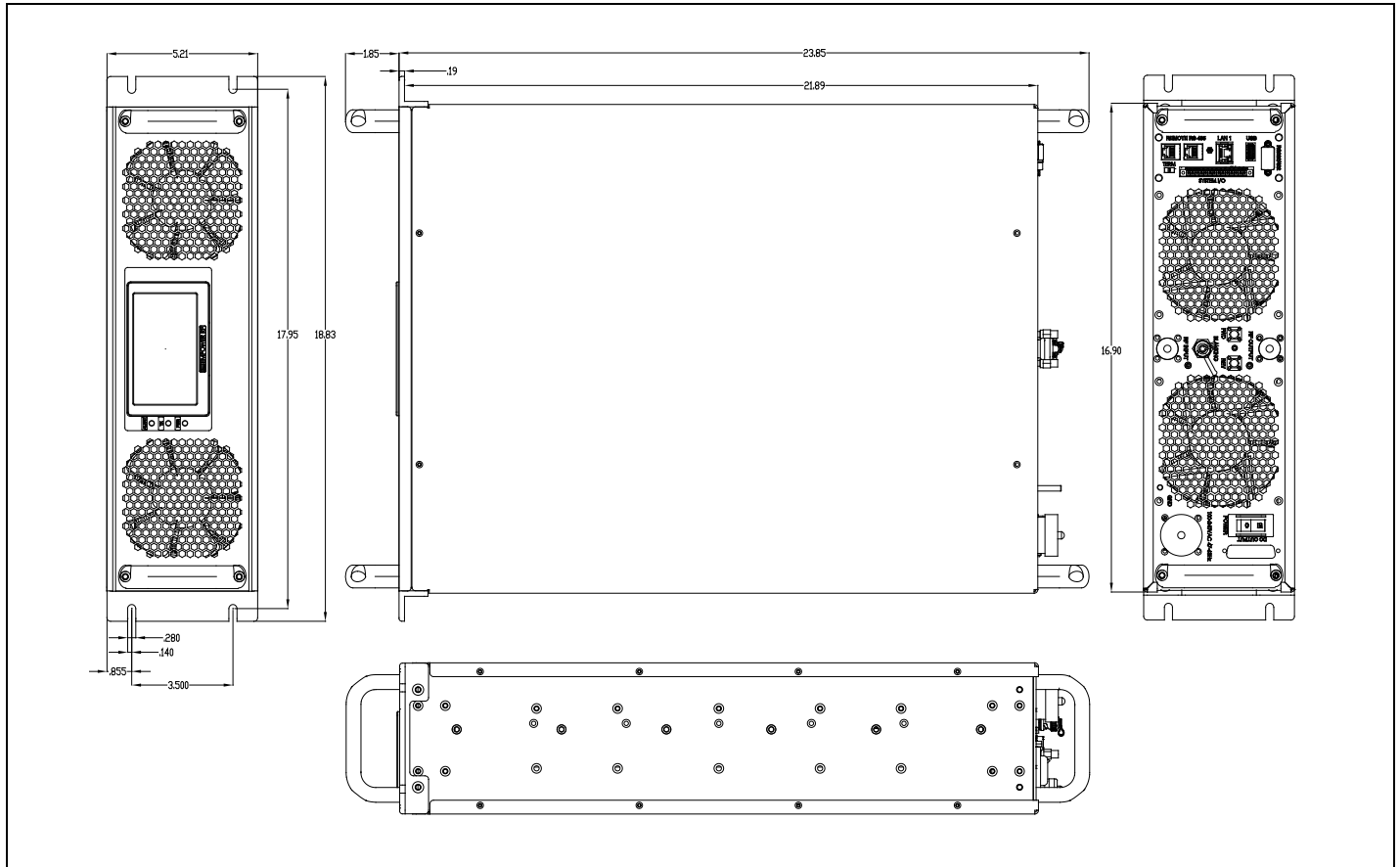
**NOTIONAL BLOCK DIAGRAM**


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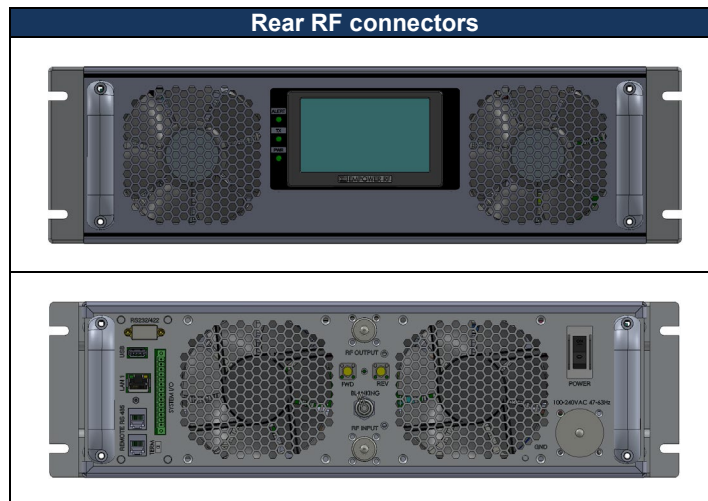
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## MECHANICAL OUTLINE



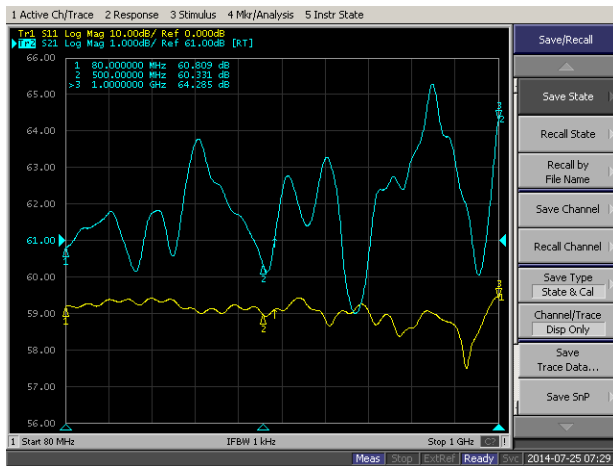
## Rear RF connectors



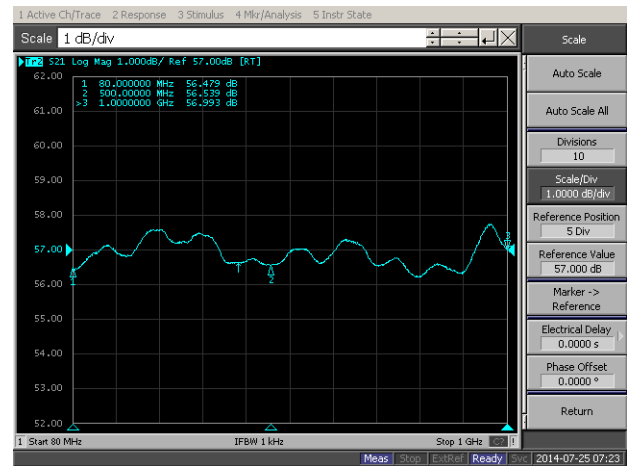
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**TYPICAL PERFORMANCE**
**Plot 1 – Small Signal Gain and Flatness**

Top Curve: Small Signal Gain @  $P_{IN} = -30\text{dBm}$   
 Reference: 61dB, 1dB/div.  
 Bottom Curve: Input Return Loss  
 Reference: 0dB, 10dB/div.


**Plot 2 – Output Power @ 500W Leveled**

Top Curve: Mode ALC @ 57dBm,  $P_{IN} = 0\text{dBm}$   
 Reference: 57dB, 1dB/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: 30dB, 10dB/div.  
 Bottom Curve: Input Return Loss @ Minimum Gain  
 Reference: 0dB, 10dB/div.

