EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2175 | 80 – 1000 MHz / 500 Watts

The 2175 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 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 compact modular design
- Suitable for CW, AM, FM and pulse (Consult factory for other modulation types)
- Embedded directional coupler – Eliminates the needs for external component
- 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 *(Note 3)*	BW	80		1000	MHz
Power Output CW *(Notes 1, 4)*	P_{SAT}	500			Watt
Power Output @ 1dB Gain Compression *(Note 2)*	P_{1dB}	300			Watt
Power Gain @ 1dB Gain Compression	G_{1dB}	60			dB
Input Power Range	P_{IN}	-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_{11}			-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_{OUT} = 500W	2^{ND}			-20	dBc
	3^{RD}			-10	
Spurious Signals	Spur			-60	dBc
Operating Voltage	V_{AC}	180	220	260	Volt
	V_{DC}	24	28	32	
Power Consumption @ 500W CW	P_D			2900	Watt

Notes: *1. CW measurement performed in MGC Mode (Manual Gain Control).*
2. P1dB measurements performed with AM 80% depth of modulation, 1 kHz modulation signal
3. Full instantaneous operation down 20MHz – consult factory for details.
4. The front RF connectors option output power is less by up to 0.50 dB due to added insertion loss of the RF cable routed to the front panel.

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	N-type, Female	RF INPUT / RF OUTPUT
RF Sample Connectors	SMA, Female	FWD / REV
Blanking / Gating Input Connector	BNC, Female	BLANKING
Cooling	Built-in forced air cooling system – front to rear	Airflow Direction

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ENVIRONMENTAL CHARACTERISTICS (Design to meet)

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	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 50ºC 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

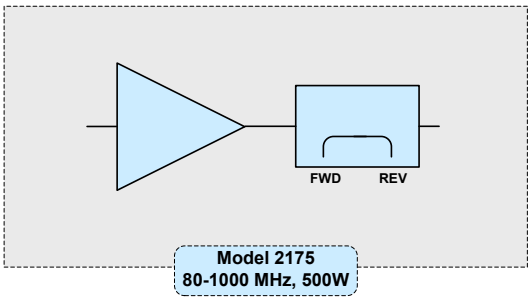
Pin #	Description	Specification
1	FWD Test Point	Forward detected power (analog voltage: 0-5 Volt)
2	REV Test Point	Reverse detected power (analog voltage: 0-5 Volt)
3	Summary Fault	Summary Fault: Active TTL Logic Low (≤0.7V) = Fault, (*Internally Pulled-High*)
4	Reserved	No Connection
5	Shutdown	Amplifier Disable: TTL Logic Low (≤0.7V), (*Internally Pulled-High*)
6	Aux P/S Test Point	+12.0V_{DC} ±2V (resettable 0.5amp fuse)
7	P/S System Test Point	+44.0V_{DC} ±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

2175-xxx
-001 180-260 VAC, 1-phase, 47-63 Hz, Rear RF Connectors
-002 28 VDC, Rear RF Connectors
-003 TBD
-004 TBD
Contact us for other available options

Standard Feature:
-LCD Control, Ethernet & Serial Comm
*-Main RF Connectors: **Input & Output** [N-type, F]*
-SMA-F Sample Ports: Forward & Reverse
-Blanking/Gating Port: BNC-F
-Rack Slides, Handles and Rackmount Bracket

NOTIONAL BLOCK DIAGRAM



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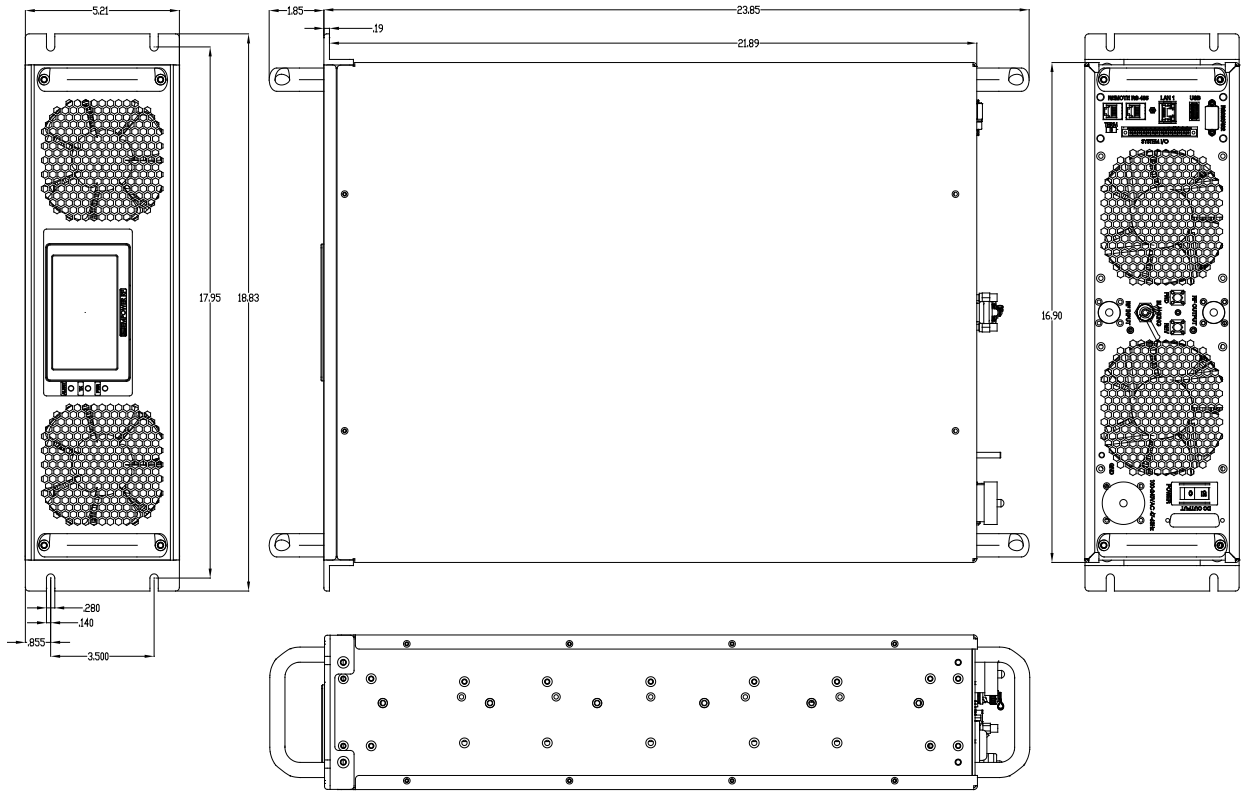
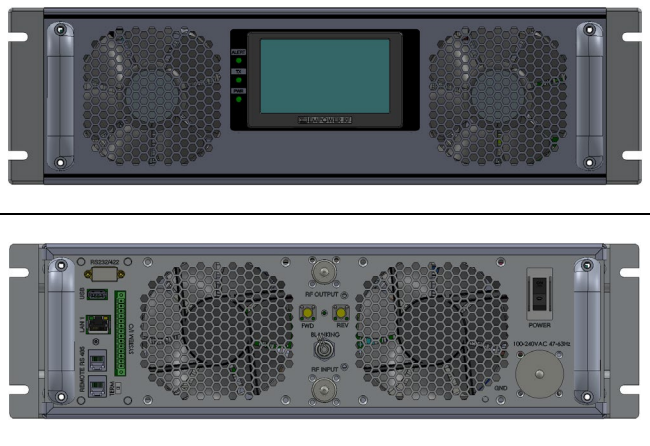
MECHANICAL OUTLINE



Rear RF connectors



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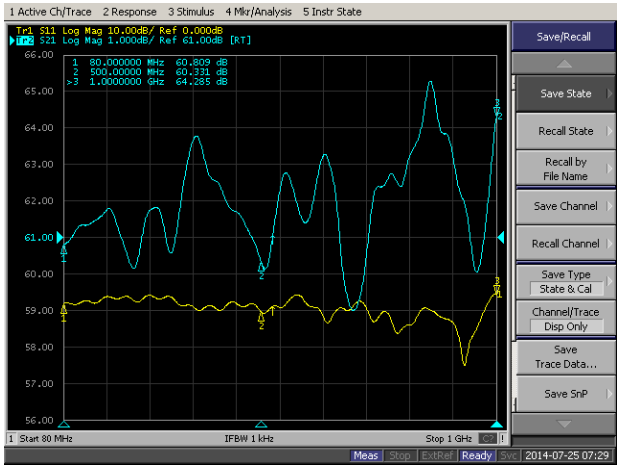
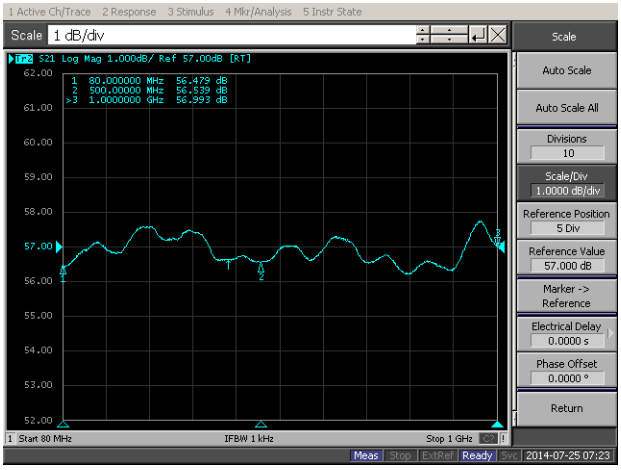
TYPICAL PERFORMANCE

Plot 1 – Small Signal Gain and Flatness
Top Curve: Small Signal Gain @ P_{IN} = -30dBm
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} = 0dBm
Reference: 57dB, 1dB/div.



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