

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 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 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 ^(Note 3) | BW | 80 | | 1000 | MHz |
| Power Output CW ^(Note 1) | 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 20-300MHz/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. P_{1dB} 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 _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 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 |

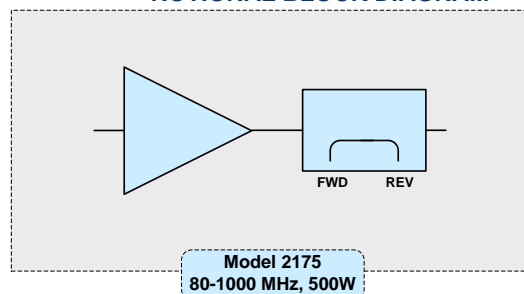
SYSTEM I/O INTERFACE CONNECTOR – 14-Position

| 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 _{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 |
| 9-11 | 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 |
| -003 180-260 VAC, 1-phase, 47-63 Hz, Front RF Connectors |
| -004 28 VDC, Front RF Connectors |
| Contact us for other available options; sales@empowerrf.com |
| Standard Feature: |
| -LCD Control, Ethernet & Serial Comm |
| -Main RF Connectors: Input & Output [Type-N, F] |
| -Sample Port: SMA-F [Forward & Reverse] |
| -Blanking/Gating Port: BNC-F |
| -Rack Slides, Handles and Rackmount Bracket |

NOTIONAL BLOCK DIAGRAM

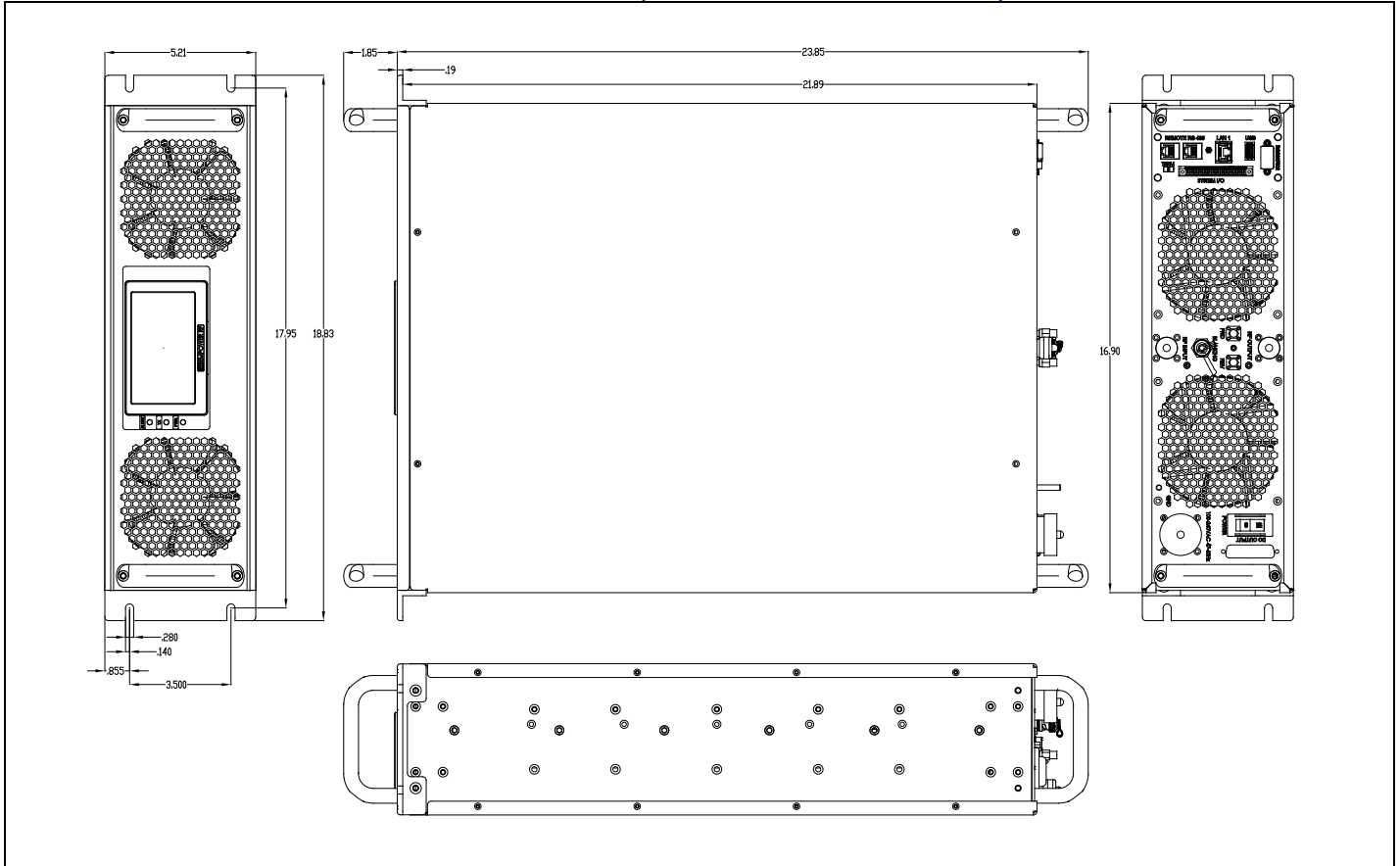


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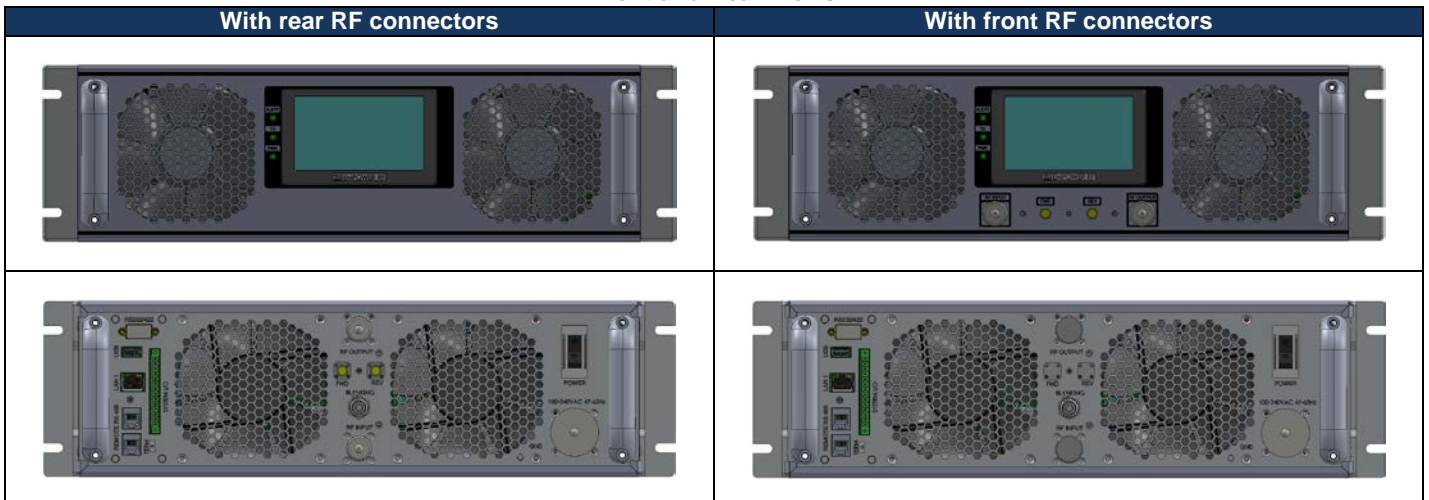
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OUTLINE DRAWING - (Shown with rear RF connectors)



Front and Rear Views



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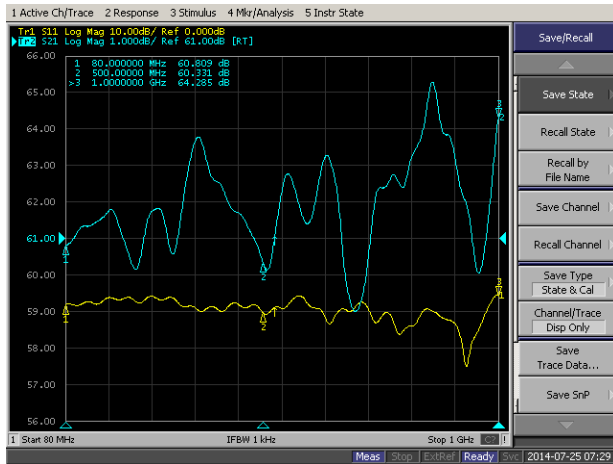
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TYPICAL PERFORMANCE

Plot 1 – Small Signal Gain and Flatness

Top Curve: Small Signal Gain @ $P_{IN} = -30\text{dBm}$
 Reference: 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.

