

Solid State Broadband High Power Amplifier

2191
20 – 1000 MHz / 100 Watts

The 2191 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 configurations are single-phase 100-240 VAC up to 400 Hz and 28 VDC.



SKU#: 2191-001

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 class AB compact modular design
- Suitable for CW, AM, FM and pulse (Consult factory for other modulation types)
- Embedded directional coupler – Eliminates the need 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 +40°C)

| Parameter | Symbol | Min | Typ | Max | Unit |
|---|------------------|------|-----|-----------|------|
| Operating Frequency | BW | 20 | | 1000 | MHz |
| Power Output CW <i>Notes 1, 3</i> | P _{SAT} | 80 | 100 | | Watt |
| Power Output @ 1dB Gain Compression <i>Note 2</i> | P _{1dB} | 60 | 80 | | Watt |
| Power Gain @ 1dB Gain Compression | G _{1dB} | 49 | | | dB |
| Input Power Range | P _{IN} | -3.0 | 0 | +3.0 | dBm |
| Small Signal Gain Flatness / Leveled (ALC) | ΔG | | | ±3.5/±1.0 | dB |
| Gain Adjustment Range @ P _{IN} = -30dBm | 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 Distortion 2-Tone @ 44dBm/Tone, 1MHz Spacing | IM3 | | -20 | | dBc |
| Harmonics @ P _{OUT} = 80W | 2 ND | | | -20 | dBc |
| | 3 RD | | | -14 | |
| Spurious Signals | Spur | | | -60 | dBc |
| Operating Voltage | V _{AC} | 100 | | 240 | Volt |
| | V _{DC} | 24 | 28 | 32 | |
| Power Consumption @ 80W CW | P _D | | | 750 | VA |

Notes:
 1. CW measurement performed in MGC Mode (Manual Gain Control).
 2. P_{1dB} measurement performed with CCDF Method, IS-95, 1MHz BW.
 3. 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 | 65 | 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 * | | +40 | °C |
| Non-operating Temperature * | T _{STG} | -20 * | | +85 | °C |
| Relative Humidity (non-condensing) | RH | | | 95 | % |
| Shock / Vibration - MIL-STD-810F Shock Method 516.5, Vibration Method 514.5 | SH / VI | | | | |

Note: [*] Consult Empower RF for application conditions below -10°C / -20°C temperatures (Operational / Non-operational).

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

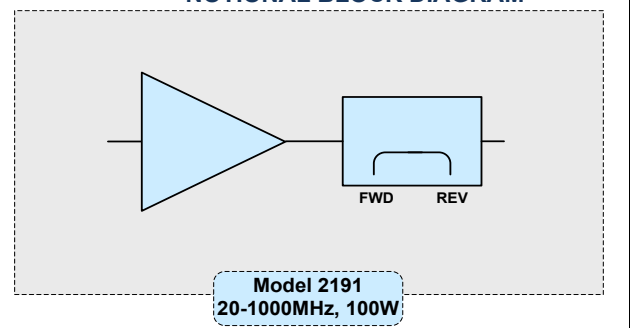
| Function | Utility | Connector |
|--|---|------------------------|
| Ethernet | Network Management of Device / Web Interface | RJ45 |
| USB | Mass Storage / Expansion Bus | USB 1.x/2.0 compatible |
| RS232, default [RS422, factory configurable] | Serial management of device / local operator access | D-Sub 9-position Male |

SYSTEM I/O INTERFACE CONNECTOR – 14-Position

| Pin # | Description | Specification |
|-------|----------------------------|--|
| 1 | Reserved | No Connection |
| 2 | Reserved | No Connection |
| 3 | Summary Fault | Summary Fault: Active TTL Logic Low ($\leq 0.7V$) = Fault, (<i>Internally Pulled-High</i>) |
| 4 | Reserved | No Connection |
| 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 2.0V (resettable 0.5amp fuse) |
| 7 | Main P/S 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

| 2191-xxx |
|--|
| -001 100-240VAC, 1-ph, 47-63 Hz, Rear RF Connectors |
| -002 28VDC, Rear RF Connectors |
| -003 100-240VAC, 1-ph, 47-63 Hz, Front RF Connectors <small>NOTE 3</small> |
| -004 28VDC, Front RF Connectors <small>NOTE 3</small> |
| Contact us for other available options |
| Standard Features: |
| -LCD Control, Ethernet & Serial Comm |
| -Main RF Connectors: Input & Output [N-type Female] |
| -RF Sample Ports: Forward & Reverse [SMA Female] |
| -Blanking/Gating Port: BNC Female |
| -Rack Slides, Handles and Rackmount Brackets |

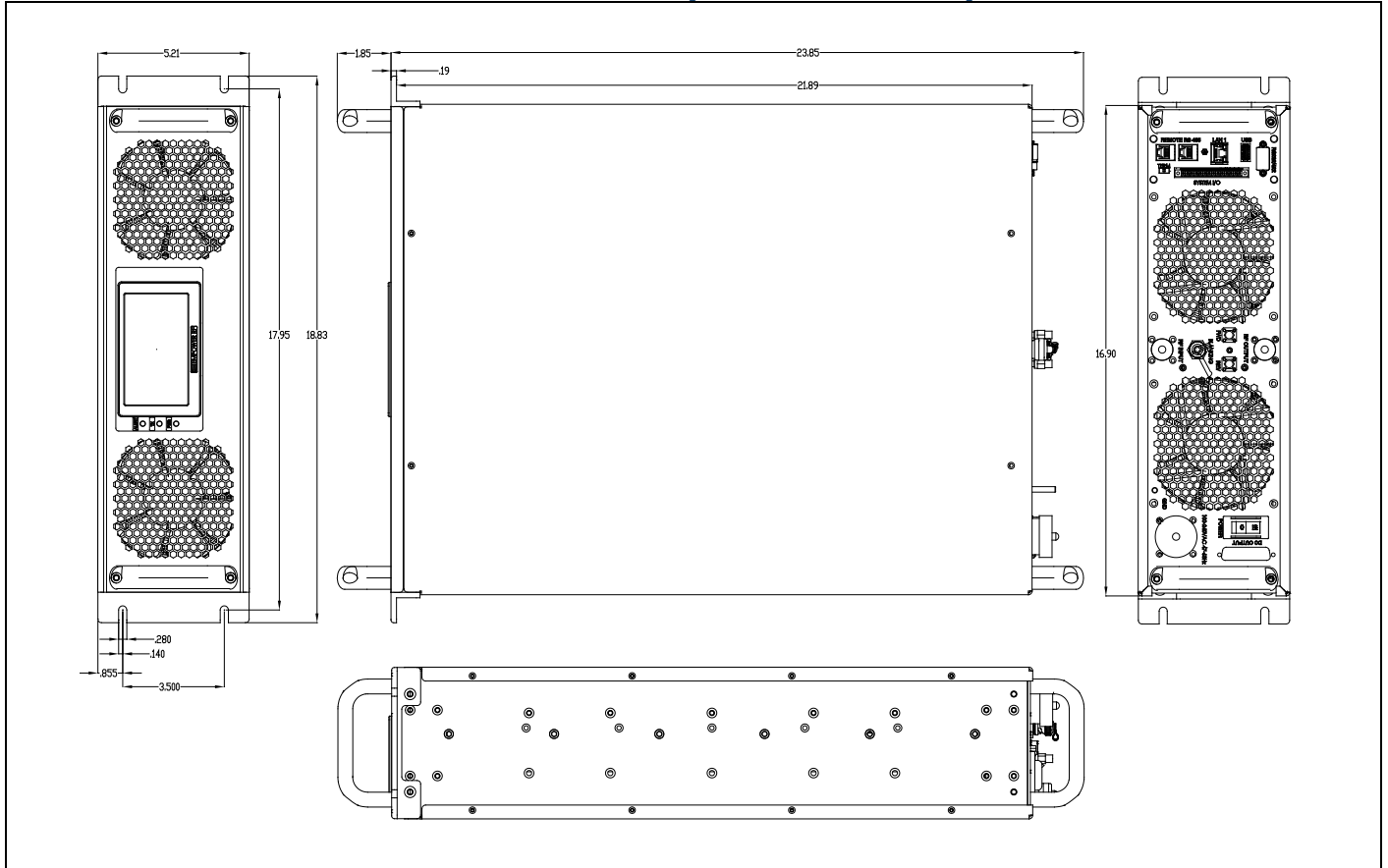
NOTIONAL BLOCK DIAGRAM


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MECHANICAL OUTLINE [with rear RF connectors]



Front and Rear Views

