

## Solid State Broadband High Power Amplifier

**2185**
**960-1215 MHz / 10kW Pulsed**

The 2185 system is comprised of three LRU drawers including the integrated control drawer. The amplifier sub-drawer boosters employed in this system features multiple 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. Each LRU drawer is constructed within one single 3RU including the integral forced air-cooling fans.

The amplifier system includes a built-in control and monitoring system, with protection functions that preserve maximum output 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 multilevel 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.



SKU#: 2185-001

Empower RF's ISO9001:2008 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state class AB design
- Suitable for instantaneous pulse operation.
- Compact Modular design and scalable architecture
- 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    | Nominal | Max  | Unit |
|--|------------------|--------|---------|------|------|
| Operating Frequency                                | BW               | 960    |         | 1215 | MHz  |
| Peak Power Output – Pulsed                         | P <sub>SAT</sub> | 10,000 |         |      | Watt |
| Gain @ Nominal Pout                                | G <sub>1dB</sub> | 74     |         |      | dB   |
| Input Power for rated output power                 | P <sub>IN</sub>  | -2     | 0       | +2   | dBm  |
| Pulse Width  | PW               | 1      |         | 25   | uSec |
| Duty Cycle   | DC               | 0.1    | 0.1     | 2.5  | %    |
| Pulse Repetition Frequency                         | PRF              | 1      | 1       | 25   | kHz  |
| Gain Flatness @ Pulsed P <sub>SAT</sub>            | ΔG               |        |         | ±0.5 | dB   |
| Gain Adjustment Range (Optional)                   | VVA              | 15     |         |      | dB   |
| Input Return Loss                                  | S <sub>11</sub>  |        |         | -10  | dB   |
| Noise Figure @ maximum gain                        | NF               |        |         | 15   | dB   |
| Harmonics @ pulsed P <sub>SAT</sub> = 10,000 watts | 2 <sup>nd</sup>  |        | -12     |      | dBc  |
|  | 3 <sup>rd</sup>  |        | -16     |      |      |
| Spurious Signals                                   | Spur             |        |         | -70  | dBc  |
| Operating Voltage – (1-phase)                      | V <sub>AC</sub>  | 180    | 220     | 260  | Volt |
| Power Consumption @ 10,000 W Pulsed                | P <sub>D</sub>   |        |         | 1950 | Watt |

### MECHANICAL SPECIFICATIONS

| Parameter                          | Value                              | Unit  |
|------------------------------------|------------------------------------|-------|
| Dimensions W x H x D (each drawer) | 19 x 5.25 x 22                     | Inch  |
| Weight                             | 450                                | Pound |
| RF Connector Input                 | SMA, Female                        |       |
| RF Connector Output                | 7/16 DIN, Female                   |       |
| RF Sample Connectors               | SMA, Female                        |       |
| Blanking input                     | BNC, Female                        |       |
| Cooling                            | Built-in forced-air cooling system |       |

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### ENVIRONMENTAL CHARACTERISTICS:

| Parameter  | Symbol           | Min | Typ | Max    | Unit |
|--|------------------|-----|-----|--------|------|
| Operating Ambient Temperature*   | T <sub>A</sub>   | -10 |     | +50    | °C   |
| Non-operating Temperature  | T <sub>STG</sub> | -35 |     | +75    | °C   |
| Relative humidity (non-condensing)   | RH               |     |     | 95     | %    |
| Altitude (MIL-STD-810F)  | ALT              |     |     | 10,000 | Feet |
| Shock / Vibration (MIL-STD-810F, Shock Method 516.5, Vibration Method 514.5) | SH / VI          |     |     |        |      |

\*Graceful degradation above +50° C

### PROTECTIONS

| Parameter                      | Specification   | Unit |
|--------------------------------|---|------|
| Input Overdrive                | +14 dBm, Automatic Recovery   | Max  |
| Load VSWR Protection           | 3:1 @ all load phase & amplitude continuous, fold back to safe operation up to ∞:1 VSWR, Automatic Recovery | -    |
| Thermal – Graceful Degradation | Ambient 75°C, Automatic Recovery  | 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 (default) RS-422 (optional) | Serial management of device / local operator access | D-sub 9-position, male |

### SYSTEM I/O CONNECTOR – 14 pin

| Pin # | Description                     | Specification  |
|-------|---------------------------------|--|
| 1     | FWD (TP)                        | Forward detected power (analog voltage: 0 – 5 Volt)                |
| 2     | REV (TP)                        | Reverse detected power (analog voltage: 0 – 5 Volt)                |
| 3     | Summary Fault                   | Summary fault: TTL “High” (Logic 1) = fault                        |
| 4     | VVA control ( <b>Optional</b> ) | Gain control/monitor   |
| 5     | Shutdown                        | Amplifier Disable: TTL “Low” (Logic 0)<br>(Internally Pulled-high) |
| 6     | +AuxPS                          | +44 VDC ±4 VDC (resettable 0.5amp fuse)                            |
| 7     | VDD (TP)                        | +44 VDC ±4 VDC (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

**2185-001, -00X, -00X,**

**-001** 180-260VAC, 1-phase, MIL-STD DC Connector, Rear RF Connectors

### Standard Features:

- LCD Control, Ethernet & Serial Comm
- Type-N Female Input & 7/16(DIN) Female Output
- Rear SMA Sample Ports, Forward & Reverse
- BNC Female Blanking/Gating Port
- Rack Slides, Handles and Rackmount Bracket

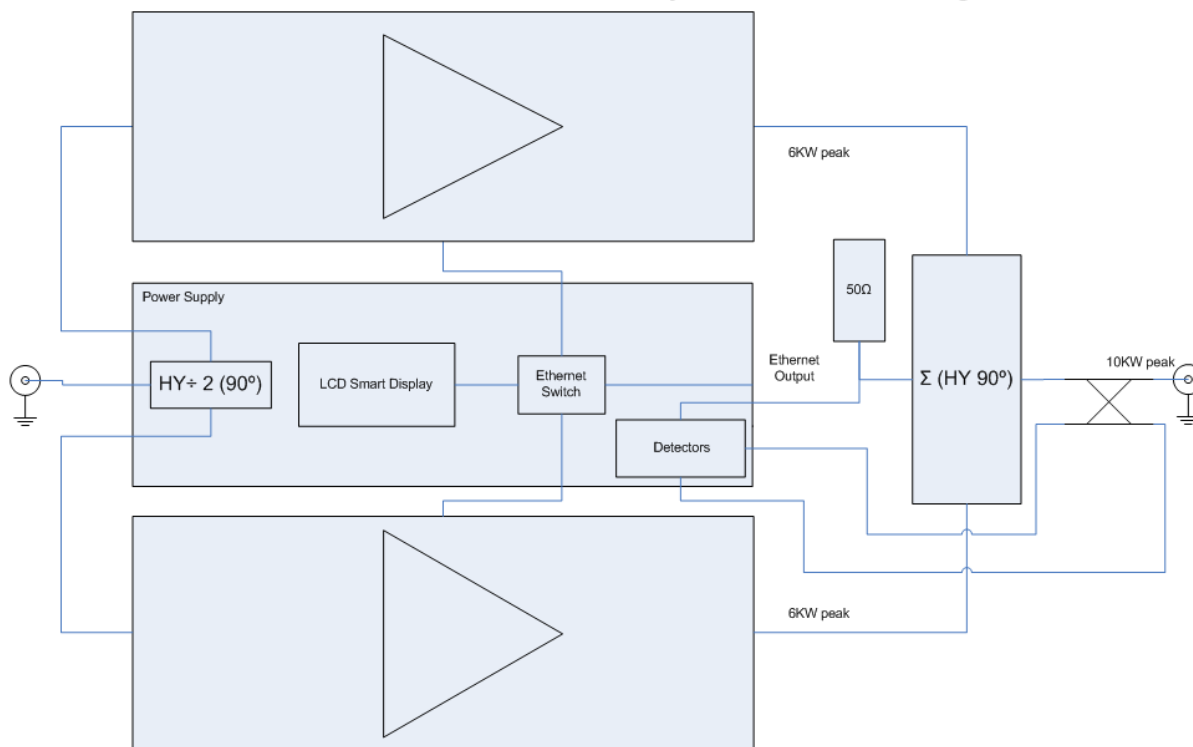
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### HIGH-LEVEL SYSTEM BLOCK DIAGRAM

### 10 KW PEAK, 1000 to 1200 MHz System Block Diagram



#### Notes:

The Empower L-Band 10KW, SSPA will consist of 2 x dual deck 3U chassis and one 3U power supply, EIA 19" Standard.

In the Control/Power Supply 3U chassis will host the the 2 way 90° splitter and the Ethernet Switch. We could also build the Detectors inside the PS and the smart display.

The combiner and dual directional coupler are assembled directly to the rear of the units using blind mate connector. The isolated load detector can stir the phase adjustment of one of the units to reduce the PA unbalance. The detectors are also located in the power supply and would be connected to the Smart Display by the I/O interface.