

# 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 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. 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) ( <i>Internally Pulled-high</i> )
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

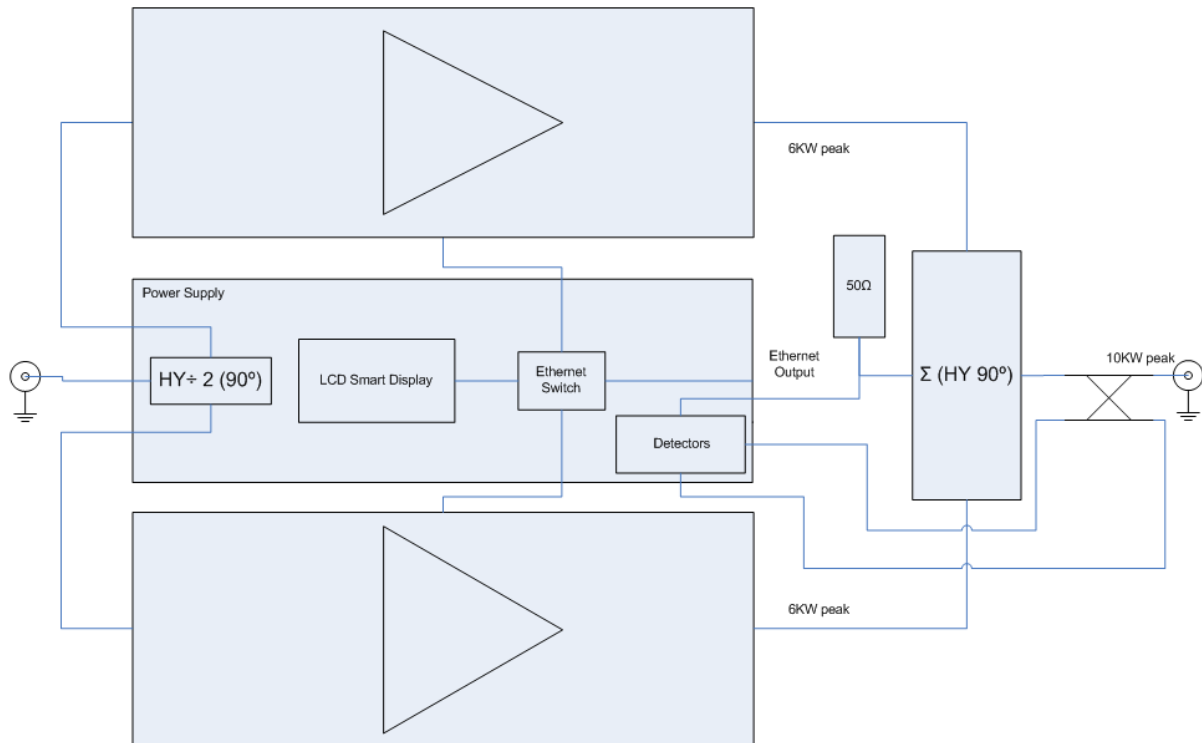
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## HIGH-LEVEL SYSTEM BLOCK DIAGRAM

### 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  $90^\circ$  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.