

Solid State Broadband High Power Amplifier

2162
20 – 1000 MHz / 1000 Watts

The 2162 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 a single 5RU drawer including the forced air-cooling. Available operating voltage configurations are single-phase, three-phase AC up to 400Hz and 28 VDC.



SKU#: 2162-003

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, Pulse and some linear applications (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 +50°C)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	20		1000	MHz
Power Output CW (Notes 1, 4)	P _{SAT}	1000			Watt
Power Output @ 1dB Gain Compression (Notes 2, 4)	P _{1dB}	500			Watt
Power Gain @ 1dB Gain Compression	G _{1dB}	63			dB
Input Power for Rated P _{SAT}	P _{IN}		0		dBm
Input Power Range	P _{IN}	-3.0		+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 @ 54dBm/Tone, 1MHz Spacing	IM3		-20		dBc
Harmonics @ P _{OUT} = 1000W (Note 3)	2 ND			-20	dBc
	3 RD			-10	
Spurious Signals	Spur			-60	dBc
Operating Voltage (1-phase)	V _{AC}	180	220	260	Volt
Operating Voltage (3-phase) line-to-line	V _{AC}		208		Volt
Power Consumption @ 1000W CW	P _D			6000	VA

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. 20-50MHz second harmonic specs is -15dBc max.
 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	17.5 x 8.75 x 22	Inch
Weight	95	Pound
RF Connectors Input/Output	Input: N-type, Female Output: 7/16-DIN, Female (opt. SC, 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

Solid State Broadband High Power Amplifier

2162
20 – 1000 MHz / 1000 Watts
ENVIRONMENTAL CHARACTERISTICS (Qualification Data available for review)

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 – PA backs-off output power to a safe operating level – no system shutdown, “On Air” time is maximized	-
Thermal – Graceful Degradation	Ambient 50°C	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
RS232, default (RS422, factory configurable)	Serial Management of Device / Local Operator Access	D-Sub 9-position Male

SYSTEM I/O INTERFACE – 14-Position

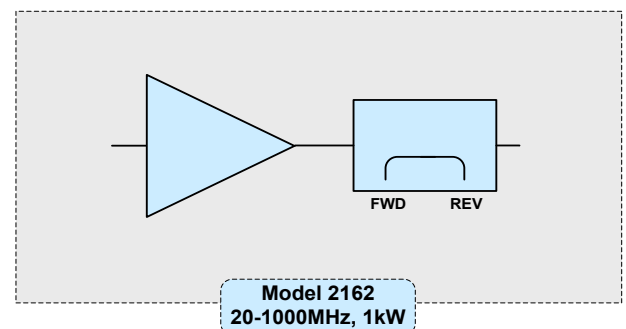
Pin #	Description	Specification
1	FWD Test Point	Forward detected power (analog voltage: 0-5 Volt)
2	REV Test Point	Reverse detected power (analog voltage: 0-5 Volt)
3	Summary Fault	Summary Fault: Active TTL Logic Low (≤0.7V) (Internally Pulled-High)
4	Reserved	No Connection
5	Shutdown	Amplifier Disable: TTL Logic Low (≤0.7V) (Internally Pulled-High)
6	Aux P/S Test Point	+12.0V _{DC} ±2.0V (resettable 0.5amp fuse)
7	Main P/S 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:
2162-xxx

-001	208 VAC, 3ph/Delta, 47-63 Hz, Rear RF Connectors
-003	180-260 VAC, 47-63 Hz, Rear RF Connectors
-004	28 VDC, Front RF Connectors <i>Note 4</i>
-005	28 VDC, Rear RF Connectors
-006	208 VAC, 3ph/Delta, 47-63 Hz, Front RF Connectors <i>Note 4</i>
-007	180-260 VAC, 47-63 Hz, Front RF Connectors <i>Note 4</i>
-008	380 VAC, 3ph/WYE, 47-63 Hz, Front RF Connectors <i>Note 4</i>
Contact us for other available options	

Standard Feature:

- LCD Control, Ethernet & Serial Comm
- Main RF Connectors: **Input** [N-type, F], **Output** [7/16-DIN, F]
- SMA-F Sample Port: Forward & Reverse
- Blanking/Gating Port: BNC-F
- Rack Slides, Handles and Rackmount Bracket

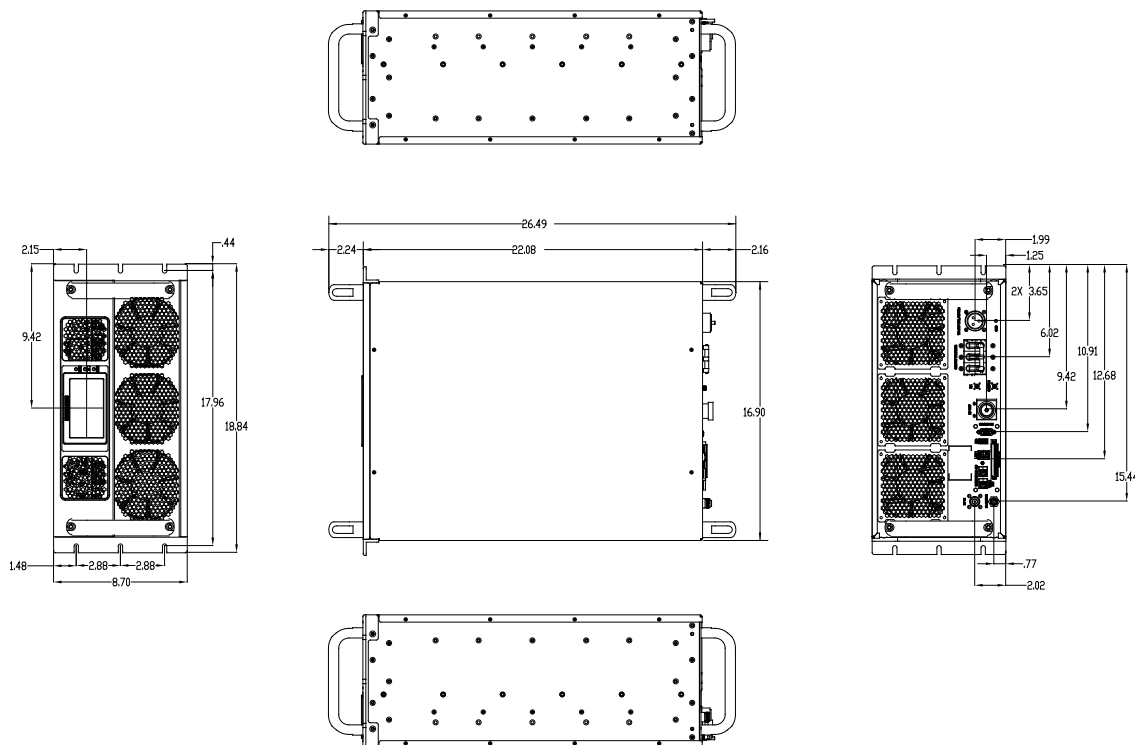
NOTIONAL BLOCK DIAGRAM


Solid State Broadband High Power Amplifier

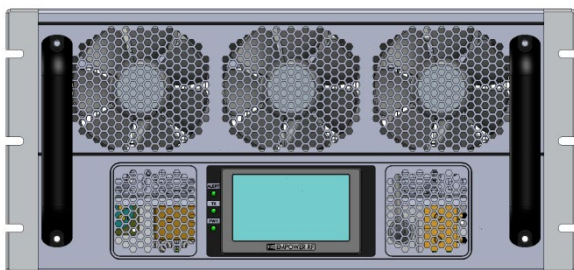
2162

20 – 1000 MHz / 1000 Watts

MECHANICAL OUTLINE (2162-003 shown)



2162-003 – Front and Rear View

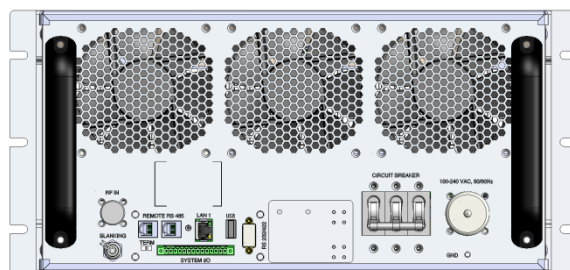


With Rear RF Connectors

2162-007 Front and Rear View



With Front RF Connectors



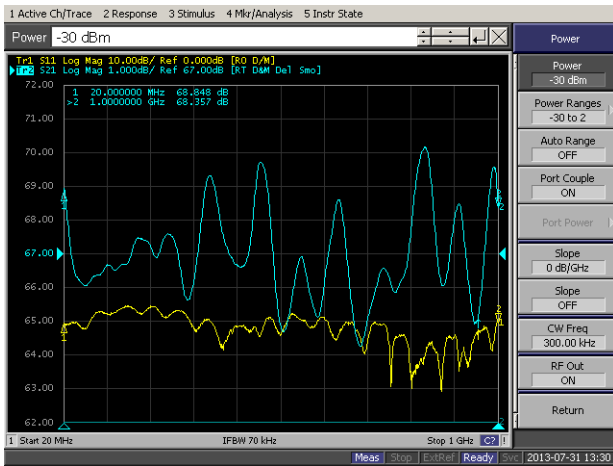
Solid State Broadband High Power Amplifier

2162

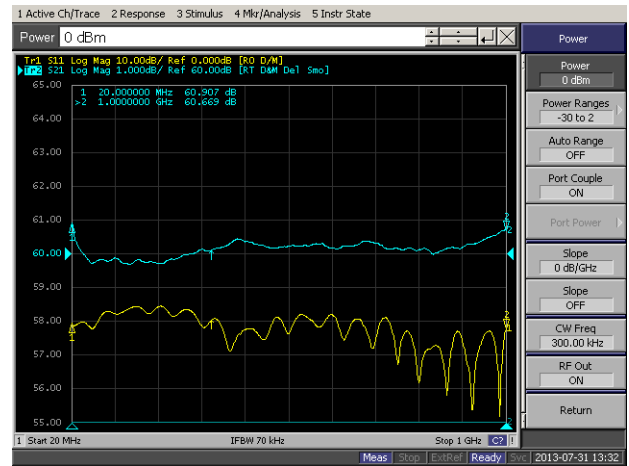
20 – 1000 MHz / 1000 Watts

TYPICAL PERFORMANCE

Plot 1 – Small Signal Gain and Flatness
 Top Curve: Small Signal Gain @ $P_{IN} = -30\text{dBm}$
 Reference: 67dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



Plot 2 – Output Power @ 1000W ALC Mode
 Top Curve: Mode ALC @ 60dBm, $P_{IN} = 0\text{dBm}$
 Reference: 60dB, 1dB/div.
 Bottom Curve: Input Return Loss
 Reference: 0dB, 10dB/div.



Plot 3 – Gain Adjustment Range @ $P_{IN} = -30\text{dBm}$
 Top Curve: Maximum Gain
 Middle Curve: Minimum Gain
 Reference: 40dB, 10dB/div.
 Bottom Curve: Input Return Loss @ Minimum Gain
 Reference: 0dB, 10dB/div.

