EMPOWER
RF SYSTEMS, INC.

Solid State Broadband High Power Amplifier

2241 — 9.0 – 10.2 GHz / 1000 Watts Pulsed

The 2241 is suitable for pulse and CW application in the X-band frequency. This amplifier utilizes high power GaN on SiC 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 400Hz and 28 VDC.

SKU#: 2241-001

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 Pulse and CW applications
- 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 +50ºC)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	9.0		10.2	GHz
Power Output – Peak Pulse	P_{SAT_PK}	1000			Watt
Power Output CW *(Note 1)*	P_{SAT}	200			Watt
Pulse Width @ Duty Cycle = 20%	P_{WIDTH}	1		500	µSec
Duty Cycle	DC	0.5		20	%
Pulse Repetition Frequency	PRF	0.5		25	kHz
Power Gain @ Rated Peak P_{OUT}	G_P	65			dB
Pulse Droop @ 500 µSec Pulse Width	P_{DROOP}		1.2	1.5	dB
Modulated Pulse Rise/Fall Time (10/90%)	T_{RISE}/T_{FALL}		70/70	150/150	nSec
Input Power for Rated P_{SAT_PEAK}	P_{IN}		-5	0	dBm
Input Return Loss	S_{11}			-10	dB
NPO – Noise Power Output	Enable			-10	dBm/MHz
	Disable			-06	
Harmonics @ P_{OUT_PULSE} = 1000W_{PK}	2^{ND}		-25		dBc
	3^{RD}		-30		
Spurious Signals	Spur			-60	dBc
Operating Voltage	V_{AC}	100		240	Volt
Power Consumption @ 1000W_{PK}	P_D			1300	VA

Note: ***1. CW measurement performed in MGC Mode (Manual Gain Control)***

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	Type-N, Female	RF IN RF OUT
RF Sample Connectors	Type-SMA, Female	Forward /Reverse
Blanking Input Connector	Type-BNC, Female	BLANKING
Cooling	Built-in forced air cooling system – (front to rear)	Airflow Direction

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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 Shutdown	Ambient 50ºC	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 standard RS-422 (factory configurable)	Serial management of device / local operator access	D-Sub 9-position Male

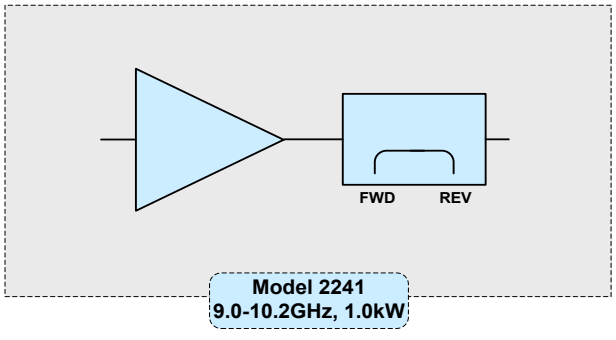
SYSTEM I/O INTERFACE – 14-Position

Pin #	Description	Specification
1	N/C	No Connection (reserved)
2	N/C	No Connection (reserved)
3	Summary Fault	Summary Fault: Active TTL Logic Low (≤0.7V), (*Internally Pulled-High*)
4	N/C	No Connections (reserved)
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

2241-xxx
-001 100-240VAC, 1-phase, 47-63 Hz, Rear RF Connectors
-002 100-240VAC, 1-phase, 47-63 Hz, Rear RF Connectors, *NO LCD Screen*
-003 TBD
-004 TBD
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 Ports: SMA-F [Forward & Reverse]* *-Blanking/Gating Port: BNC-F* *-Rack Slides, Handles and Rackmount Bracket*

NOTIONAL BLOCK DIAGRAM



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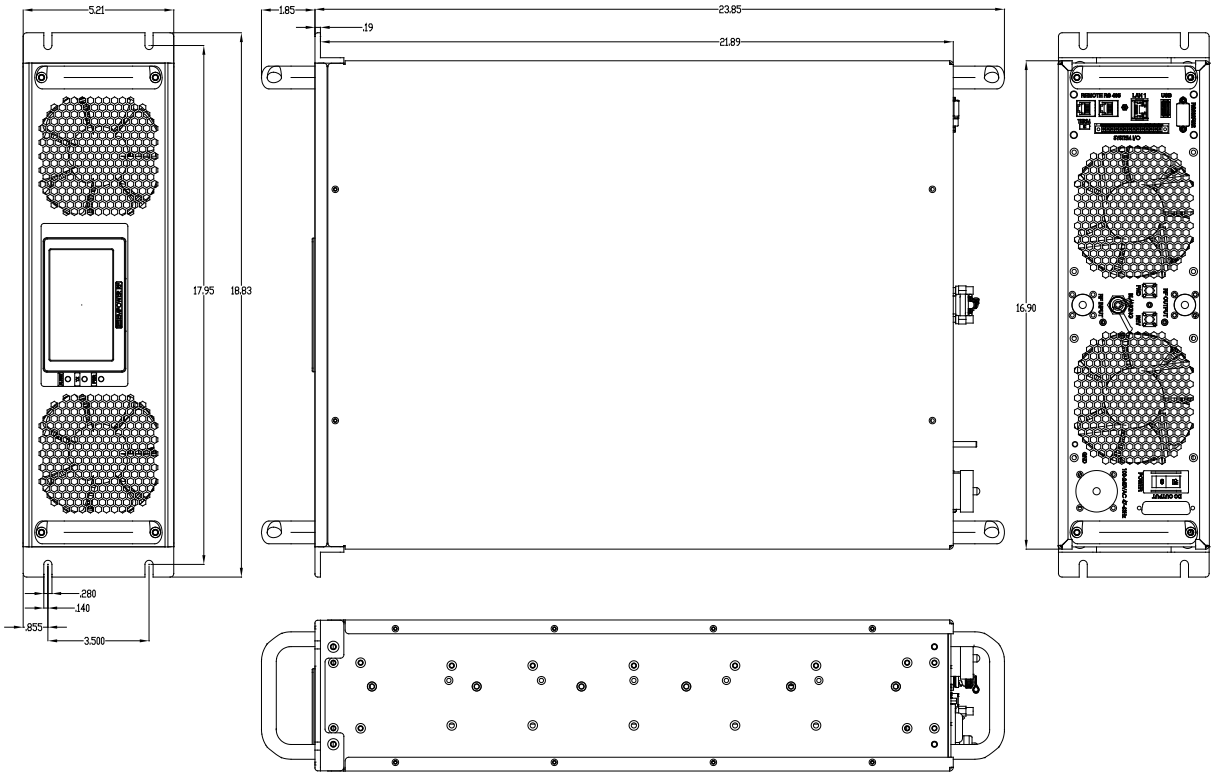
MECHANICAL OUTLINE – (with LCD and Rear RF connectors)



Front and Rear Views

With rear RF connectors