

Revision 0.a Release Date Jan 2008

Revision Notes Initial Release

## Technical Specifications Summary

Frequency Range:	1.5 - 30 MHz	Gain:	Variable (Radio Dependent)
P1dB:	3000 Watts CW	Efficiency:	25% (system)
Class:	AB	Temperature Range:	-20 to 55°C
Supply Voltage:	220V / 1 Phase	Max VSWR:	5:1

## Amplifier General Description

This 3kW broadband HF solid state amplifier offers modular simplicity and excellent performance. Based on our P300-2-30-18 MOSFET Pallet amplifier, in production for over 10 years, and our PAB control system, this amplifier offers ruggedness and reliability.

Integrated into this amplifier are high efficiency switching power supplies in an n+1 configuration. Twelve hot swappable power supplies have 10% headroom, and two additional online spares ensure uninterrupted high power operation. Up to two individual power supplies can fail before the system's maximum power is affected (CW mode). Our PAB series controller will keep the system operational in the event of power supply or amplifier failure at highest possible power levels.

The system design features 4.8kW of silicon to achieve 3kW output power - the end result is an extremely robust amplifier capable of driving poor loads safely. In-phase isolated combiners at the amplifier and system level allow operation even if individual pallet amplifiers are damaged. Our driver chain uses full class A linear amplifiers, and output stages offer Class AB linear amplifiers for an ideal balance between efficiency and linearity. This system is suitable for use in AM and FM communications systems.

The PAB controller monitors all individual amplifiers, combiners, input power, output power, reflected power, temperatures and reports status on front panel and to the primary controller. The Primary Controller monitors all of the amplifier blocks as well as the power supplies, and reports status on all components on an easy to use 7" touch panel interface.

This amplifier is provided in a 30U ruggedized rack standard. Room for the radio is on top, and may be optionally ordered.

## Amplifier Picture



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Parameter	Min	Typ	Max	Units	Notes
Frequency	1.5		30	MHz	
P1dB	2750	3000			W, CW
Psat		3100		W,CW	Software limited to 3050W
Output VSWR			2:1		For full rated power delivered
Output VSWR			3:1		Power gracefully reduced from 2:1
Maximum VSWR			5:1		Amplifier is disabled above this VSWR
IMD3			-30	dBc	For 2 tones, 10kHz spacing, 5kW PEP
Power Input		22		dBm	Radio dependent, up to 100W CW
Gain		40		dB	Set to match radio parameters
Gain Variation		±1.5		dB	ALC off
Vsupply		48		V, DC	For internal RF Modules, Fans
Drain Current			180	A, DC	3000W O/P 1:1 VSWR
Power Consumption			7	kVA	AM, SSB
Efficiency		45		%	Module - DC
Input VSWR			1.5:1		
Insertion Phase Variation		±5		°	Unit to unit
Spurious			-60	dBc	* Contribution from amplifier
Harmonic Distortion			-60	dBc	After LPF

All specifications valid for 50 Ω load.

Parameter	Min	Typ	Max	Units	Notes
Form Factor	19" IEC Rackmount Cabinet 30U Height, 1 Cabinet - 59" H 22" Wide, 32" Depth				
Weight		610		lbs	
Operating Temperature	-20		55	°C	
Storage Temperature	-30		85	°C	
Altitude	0		10000	Ft ASL	Derate Max Operating Temperature to 40°C linearly from 8000 Ft to Max
Relative Humidity	5		95	%	Non condensing
Shock	Designed to meet MIL-883-C Method 516.2 Proc 2				
Vibration	Normal Truck Transport				
Control Connector	RJ-45 10B-t Ethernet				Control, Communications, Status
Mains AC Connector	Hard wire				
RF Input Connector	N-Female				If no radio installed
RF Output Connector	7/8 EIA-Flange				



Absolute Maximum Ratings

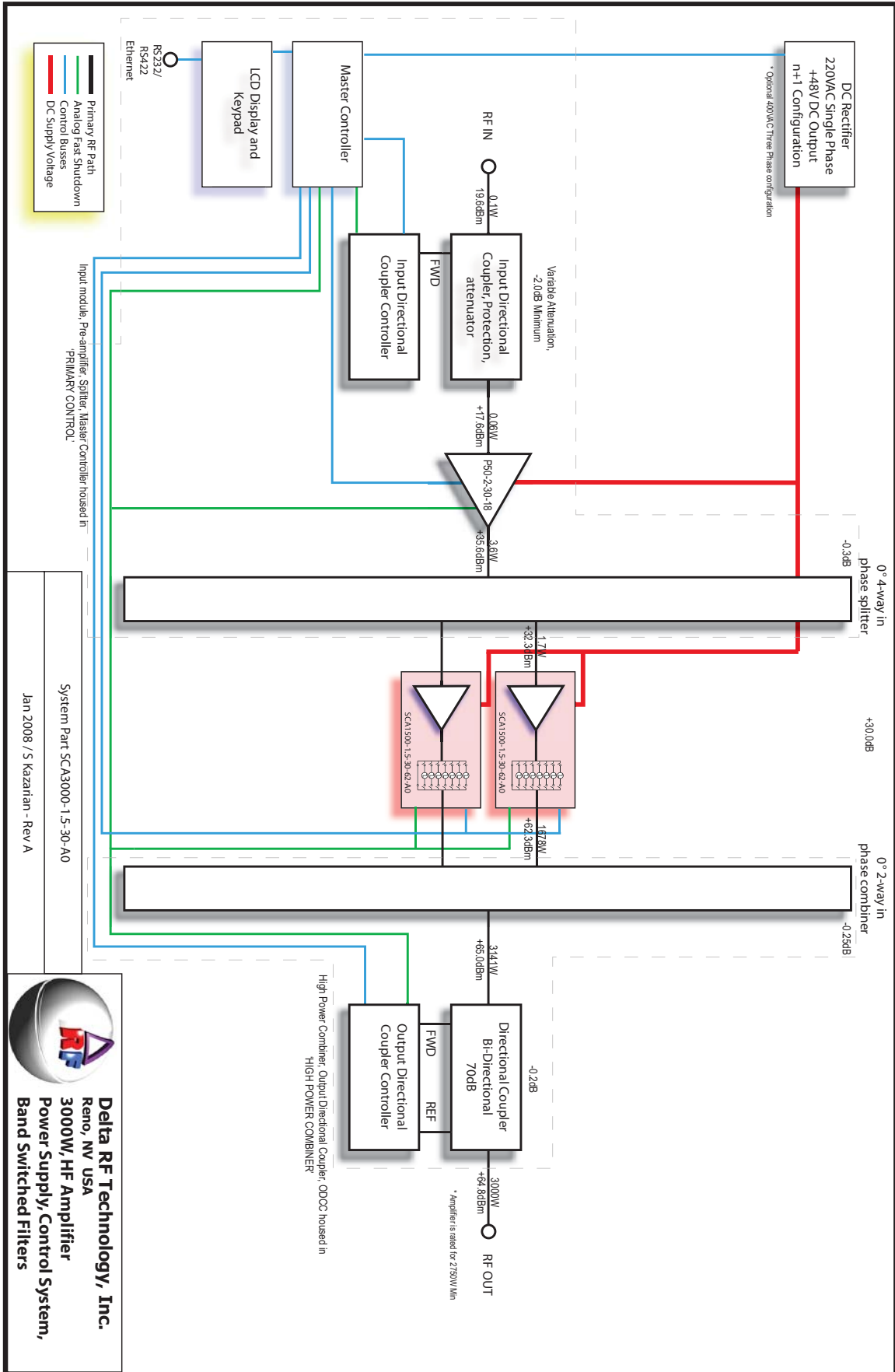
Parameter	Value	Units	Notes
Operating Voltages	180 - 248	V AC	Single Phase, 47 - 63 Hz
Maximum Power Consumption	10500	W	
Maximum Current	20	AAC	220V / ea leg
Maximum Input Power	30	dBm	For normal operation at max power
Maximum Input Power	40	dBm	No amplifier damage
Load mismatch survival	$\infty : 1$		

ALC & Detector Information

Parameter	Min	Typ	Max	Units	Notes
Detector Type	Logarithmic Amplifier, RMS				
ALC Modes	Constant Gain (ALC Disabled) Constant Power				
Input Attenuator Range	0 - 10dB, continuous				Can be programmed for discreet power levels
Forward Power Accuracy		±63	±125	Watts	3000W, 50Ω
Reflected Power Accuracy		±30	±63	Watts	300W, 50Ω
Input Power Accuracy		±2.0		dBm	
Forward Power Trip - Hardware	3100		3250	Watts	50Ω
Reflected Power Trip - Hardware	500		625	Watts	Referenced to 50Ω
Forward Power Trip - Software		3050		Watts	50Ω
Reflected Power Trip - Software		375		Watts	Referenced to 50Ω
Voltage - Driver, PA, PS		2	5	%	
Current - Driver, PA, PS		2	5	%	

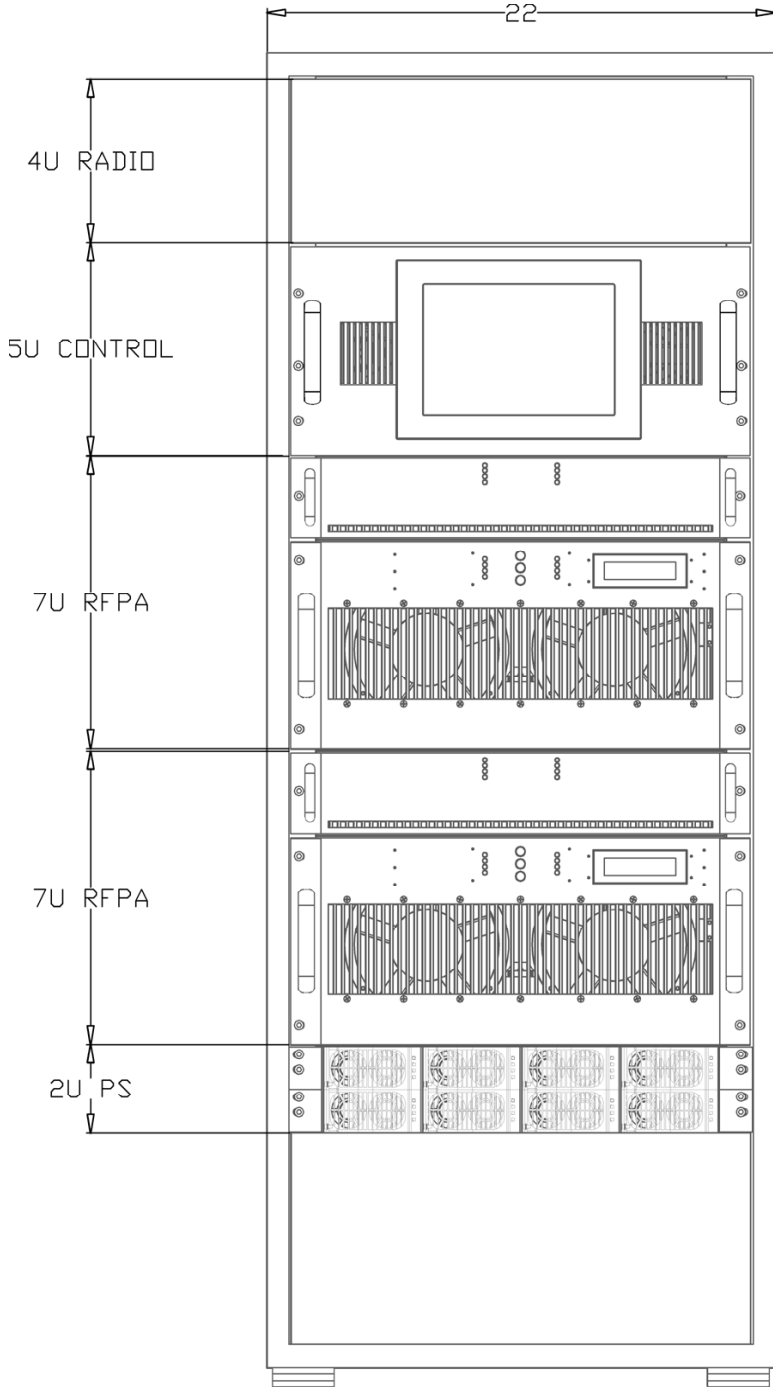
- ◆ Standard Communications 10 Base-T Ethernet, Telnet interface. Windows based program optional.
- ◆ Optional RS-422, RS-232 Serial and / or Parallel interface
- ◆ Output Connector 7/8- EIA Flange
- ◆ Input Connector N-Female if no radio installed
- ◆ Interface Connector, RJ-45
- ◆ BITE Functions include Current, Voltage, Temperature, VSWR, Input Power, Output Power, Power Supply
- ◆ 14 Pin Serial / Parallel interface Bus - For integration with exciter / radio
- ◆ All interconnect RF and IO cables included
- ◆ Airflow from front of PA / PSU units and exhausts through the top of the rack
- ◆ AC Inputs are direct wire connections






**Delta RF Technology, Inc.**  
Reno, NV USA  
3000W, HF Amplifier  
Power Supply, Control System,  
Band Switched Filters





**Master Control:**

- \* Monitors system performance - Output Power, Reflected Power, Radio Status, System Temperature
- \* Handles all status requests, logging and reporting
- \* Allows for continuous power output control or discrete output power level
- \* Advanced Error Trapping - to module level within each amplifier
- \* Zoom in on status of each individual amplifier to module level, including
  - Power Amplifier
  - Power Supplies
  - Power Amplifier Combiner
  - Efficiency
  - Temperatures

**Individual Amplifiers:**

## Front Panel Displays:

- \* Forward Power (watts)
- \* Reflected Power (watts)
- \* Input Power (watts)
- \* Up-time (d h m)
- \* Event Log
- \* PA voltages, Driver Voltage, PA Currents, Driver Current, PA Temperatures, Driver Temperature
- \* Chassis Temperature
- \* Module Serial Numbers

## Error Trapping:

- \* Output Power too high (power reduced 3dB, second trip disabled)
- \* Reflected Power too high (2:1, power reduced 3dB, second trip disabled)
- \* Input Power too high (disabled)
- \* PS Failure (Over voltage, PS Failure, PS Fan Failure)
- \* Fan Failure (reduce output power 3dB, if temp continues to rise, power off)
- \* Overtemperature (reduce output power 3dB, if temp continues to rise, power off)
- \* Too many password attempts (can only be re-enabled through front panel)

## Other front panel functions:

- \* Enter password for operation
- \* Disable / Enable remote control
- \* Amplifier On / Off
- \* Calibrate Directional Couplers
- \* Change Password - Remote and Front Panel
- \* Set system time and date

## Remote Control Functions: (9600/8/N/1)

- \* ON - Enables Amplifier
- \* OFF - Disables Amplifier, and resets error condition
- \* STATUS - Displays complete amplifier and module status, including power levels, voltages, currents, temperatures
- \* LOG - lists last log entry
- \* LOG xx - lists xx log entries - up to 1000

Please note - this is an abbreviated list, please refer to complete PAB series SCD which covers all possible functions.



*Ordering Information:*

Order Code	Description	DRFT Reference
SCA3000-1.5-30-A0	Self Contained HF Amplifier, 3kW, 1.5 - 30 MHz	4831
<b>Options</b>		
-A14	Ruggedized for vibration and harsh environment	0204
-T2	Extended Burn In	0271
-T3	Extended Data Collection	0272

*Standard Options:*

**Ruggedized** - all screws have threadlocking compound applied, and all flying components are staked and attached to base. Designed to withstand MIL-STD-810E 514.4 Category 8.

*Testing Options:*

**Standard** - includes power test and brief burn - in under laboratory conditions. Printed test report gives graph of Gain and Input Return Loss at rated P1dB and Voltage Conditions. Report shows pass/fail criteria. All amplifiers include this test.

**Extended burn in** - 8-hour burn in at P1dB with standard test run at completion. Unit is monitored during test and any discrepancy reported. Standard test data is included.

**Extended data collection** - Standard data is run and included. Detailed data is taken point by point giving the customer 25 - 70 frequency points, depending on the amplifier model. For each frequency point, data is generated to include gain, input power, input return loss, current, second harmonic, third harmonic, efficiency, audio distortion.

Other tests available - Vibration, Temp cycling, Shock. Please inquire.

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