

Revision 0.B Release Date November 5, 2007

This data sheet applies to models 4662, 4978

Revision Notes Updated Mechanical information. Revised Specification (formal production release)

Technical Specifications Summary

Frequency Range:	470 - 680 MHz	Gain:	14dB
P1dB:	325 Watts	Efficiency:	38%
Class:	AB	Temperature Range:	-10 to 55°C
Supply Voltage:	32.0V	Max VSWR:	3:1

Amplifier General Description

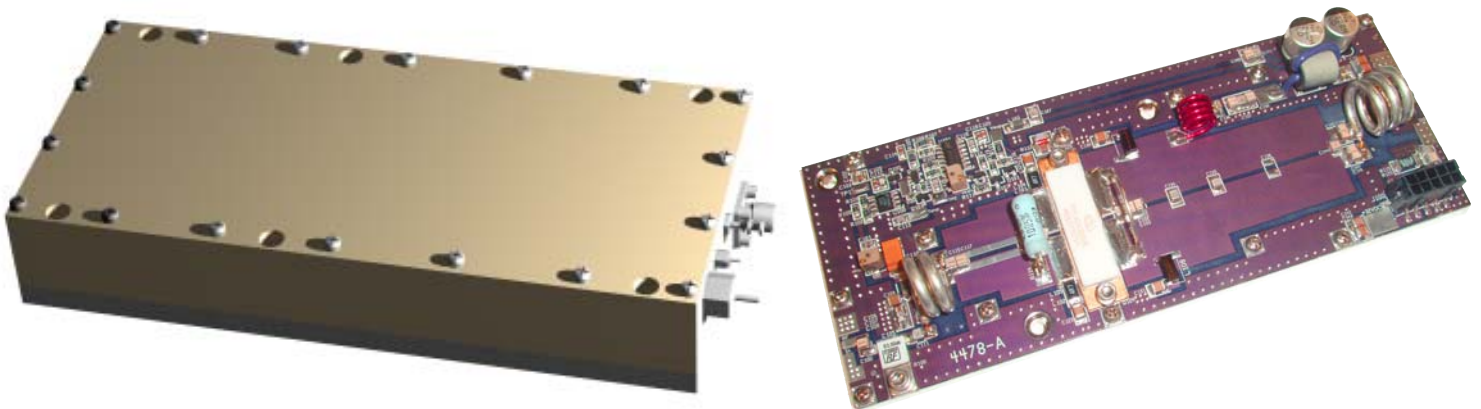
This ultra high performance pallet offers industry leading power density for broadcast television in the UHF frequency range. Using the latest generation LDMOS high power transistors, a minimum of 265W linear power is achieved for analog broadcast television, and an incredible 90W for ATSC broadcast standard. With a typical 14dB gain and excellent repeatability, integration is simplified by reducing the number of stages required.

On board circuitry includes a temperature compensated bias system and automatic high temperature shutdown. Safety features include temperature compensated bias, which prevents damage to the amplifier as the baseplate temperature increases. A high temperature safety circuit will disable the amplifier at an approximate baseplate temperature of 60°C. The alarm output is an open collector output that may be chained between all output amplifiers to provide simultaneous shutdown and monitoring. The pallet amplifier is constructed using all military grade components and a copper baseplate which allows high temperature operation from this very power dense amplifier.

For higher frequency operation, please refer to P250-UHF-14-B which offers operation from 650 - 860MHz. The PA25-UHF-40 makes an excellent driver for one or two pallets of either band.

Estimates for Digital power assume limited precorrection using ATSC standard. Advanced predistortion systems and / or DVB formats can have a significant impact on digital power performance.

Amplifier Picture



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Parameter	Min	Typ	Max	Units	Notes
Frequency	470		680	MHz	Operation possible to 700MHz
P1dB	325			W	Amplifier is rated for 200W CW Maximum
Power	265	300		W, PEP	For 2 tones, 1MHz spacing, -40dBc
IMD3		-42		dBc	For 2 tones, 1MHz spacing, 250W PEP
Power Input		10		W, Pk Sync	For 250W Pk Sync Output
Gain	13	14		dB	At 250W PEP / Pk Sync
Vsupply		32		V, DC	
Drain Current		13		A, DC	For SLB, 250W Pk Sync
Input Return Loss			-10	dB	
Insertion Phase Variation		±5		°	Unit to unit
Gain Variation			±1	dB	
F2 Second Harmonic		-45	-25	dBc	
F3 Third Harmonic		-45	-30	dBc	
Baseplate Operating Temperature	-10		55	°C	
Video Parameters					
Maximum Analog Power			300	W, Pk Sync	
IMD Performance		-56	-54	dBc	250W Pk Sync, FFR NTSC
Differential Gain Error (Abs)		3	5	%	250W Pk Sync
Differential Phase Error (Abs)		2	5	°	250W Pk Sync
Sync Compression		8	12	%	250W Pk Sync
Digital Power		90		W, Avg	
M.E.R.	33			%	90W, w p/c
Shoulders			-36	dBc	90W, w p/c ATSC

Physical Dimensions 2.5" x 6.4" x 1.0" / 64mm x 163mm x 25mm

Weight 1.4 Pounds / 0.9 kG

All specifications valid for load impedance 50 Ω, V_{sup} = +32VDC, I_{dq} = 2.4A

Absolute Maximum Ratings

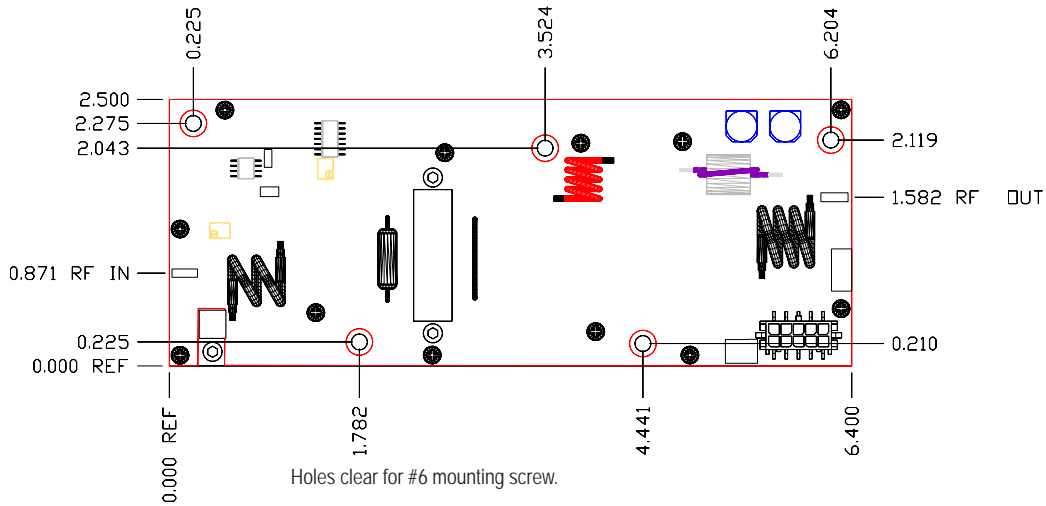
Parameter	Value	Units	Notes
Maximum Output Power	200	W, Avg	Peak power may exceed this level
Maximum Operating Voltage	34	V, DC	
Stable Operating Voltage	28 - 34	V, DC	Specifications degrade below 32V
Maximum Bias Current, Q100	3.6	A, DC	Do not adjust.
Maximum Drain Current	16	A, DC	Derate Linearly to 15A above 45°C, total pallet
Load Mismatch Survival	5 : 1		Derate Max Pout to 175W Average linearly above 45°C
Storage Temperature	-40 to 105	°C	
Maximum Operating Baseplate Temp	55	°C	

Features, Auxillary Functions

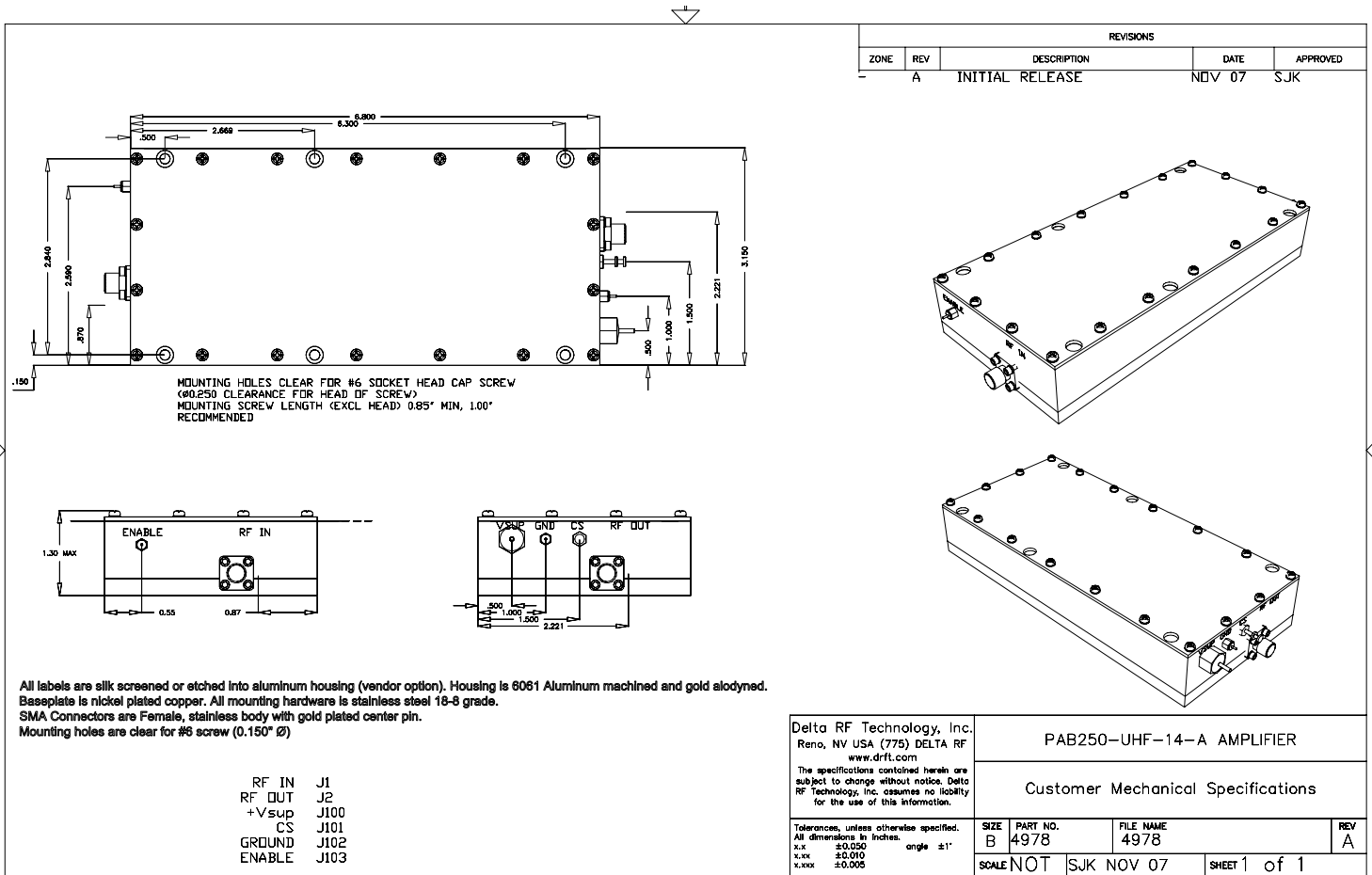
- ◆ Temperature Compensated Bias
- ◆ Temperature Controller - Analog Temperature Output
- ◆ High Temperature Alarm with Automatic PA Disable
- ◆ Amplifier Enable
- ◆ Current Sense
- ◆ Connectorized Power



4662 Pallet Mechanical Specifications



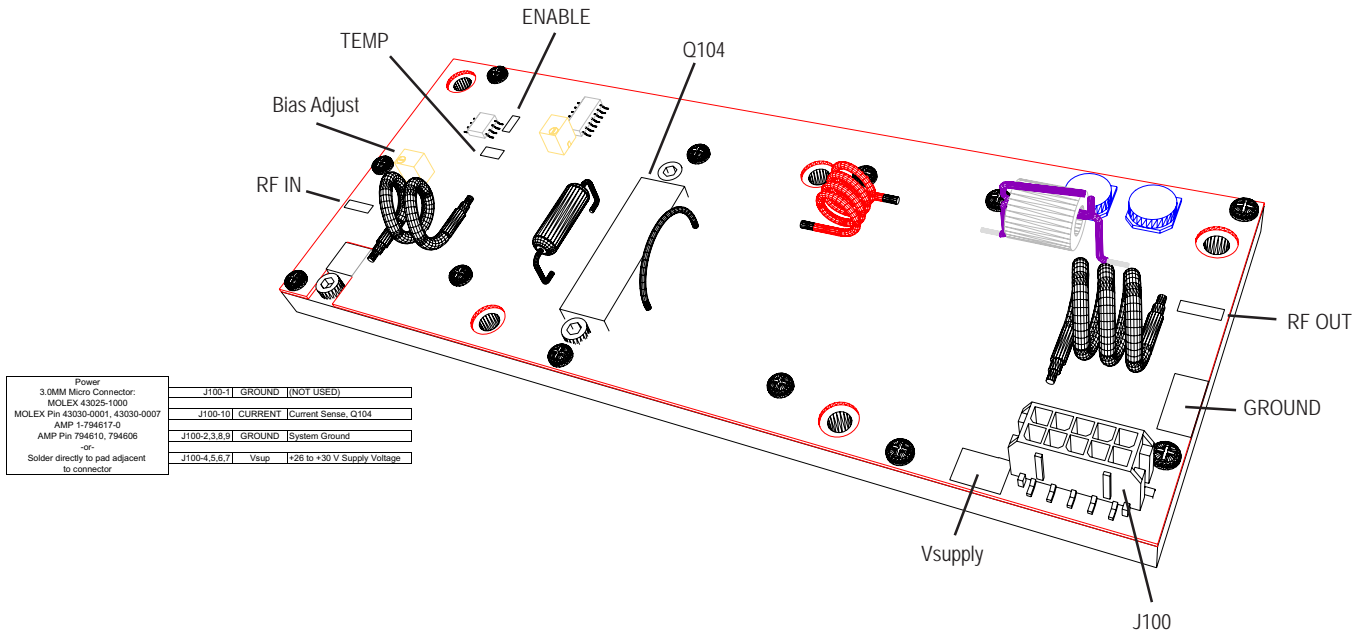
4978 Module Mechanical Specifications



All labels are silk screened or etched into aluminum housing (vendor option). Housing is 6061 Aluminum machined and gold alodined. Baseplate is nickel plated copper. All mounting hardware is stainless steel 18-8 grade. SMA Connectors are Female, stainless body with gold plated center pin. Mounting holes are clear for #6 screw (0.150" Ø)

- RF IN J1
- RF OUT J2
- +V_{sup} J100
- CS J101
- GROUND J102
- ENABLE J103





This pallet amplifier is designed for operation of up to 175W average power or 200W absolute maximum with reduced baseplate temperature at elevated ambient air temperatures. The high power density of the amplifier will not safely allow prolonged operation above this average power level - the built in security features will disable the amplifier. The transistors used in this design are capable of high peak power so long as the average power does not exceed ratings. This allows digital television signals with high peak power to be used so long as the average power remains below absolute maximum ratings.

The P250-UHF-14-A amplifier requires an adequate heatsink for proper operation. This heatsink must be capable of dissipating the maximum heat generated. In the case of 250W Pk Sync operation, this is approximately 300W of heat. Use of proper heatsink compound and proper amount is critically important to long term operation and high reliability. Amplifiers require 0.30" minimum spacing in the short dimension between amplifiers. Use all attachment points using stainless hardware and applying appropriate torque. Direct some airflow over the top of the amplifier - minimal airflow is recommended, strong airflow is not required.

Use teflon insulated wire of at least 12 gauge wire for both positive and ground, or use the Delta RF supplied wiring harness and use solder connections at all attachment points. Multiple voltage supply wires are acceptable.

Apply supply voltage with the amplifier disabled or the exciter power reduced or both. Due to its high gain, the amplifier is sensitive to overdrive and can be damaged if overdriven. By starting the amplifier disabled, the exciter power will settle before amplifier is enabled and reduce chance of overdrive. Monitor on board temperature alarm. In the event of cyclic shutdown, cooling must be improved.

NOTE: The amplifier requires +5V (TTL COMPATIBLE) signal at 'ENABLE' pad to enable amplifier. Without this voltage - i.e. if amplifier has nothing attached to this point - the amplifier *will not operate*. Also, the amplifier will not operate until the Vsup has reached 25.0 V DC. Below this voltage, the bias circuitry is automatically disabled to prevent damage to the amplifier.

IMPORTANT: This amplifier is sensitive to overdrive and may be damaged by careless application of input power. Please consider that a 1.5dB spike in input power when operating at 250W Pk sync translates to a 100+ watt spike in output power. This additional power is too much heat for the transistor and will result in the destruction of the output device. Older, lower power models, are not as sensitive to this overdrive as the magnitude of the power increase is much lower. **The customer should make use of the ENABLE line feature** of this amplifier to delay enabling the amplifier until the exciter, modulator, or other RF source has stable output power. **It is the customer's responsibility to ensure output power does not exceed ratings.** Warranty will be voided in cases of overdrive. Delta RF will be pleased to provide schematics for a simple power up delay function.

Please consult the factory with any integration questions.



Ordering Information:

Order Code	Description	DRFT Reference
P250-UHF-14-A	250W UHF Television Broadband Pallet Amplifier	4662
PAB250-UHF-14-A	250W UHF Television Broadband Amplifier Module	4978

Options

-A11	SMA Female Connectors In / Out	0201
-A12	Heat Sink Option	0202
-A13	Heat Sink Option with DC Fan, pre wired	0203
-A14	Ruggedized for vibration	0204
-A15	Wire harness, 1' length, 10 wires for pallet amplifier only (NON-FM)	0205
-A16	Wire harness, customer specified length for pallet amplifier only	0206
-T2	Extended Burn In	0271
-T3	Extended Data Collection	0272

Standard Pallet Options:

SMA Female Connectors, Input and Output. Stainless Body, Gold Center pin, 4-hole SMA bolted to pallet amplifier edge through bottom two holes located at amplifiers RF IN and RF OUT locations. All stainless steel hardware.

Enclosure- all aluminum machined enclosure available for most pallet amplifiers. Alodined aluminum, alloy 6061-T6. SMA Female input and output RF connectors. Supply voltage and ground through solder / feedthrough connections. Module must be bolted to appropriate heatsink.

Heat Sink - aluminum extruded heat sink, black anodized. Pallet amplifier or module will be bolted to heatsink. Customer will be required to provide adequate airflow.

Heat sink with fan - aluminum extruded heat sink as above, with included fan bolted to push air through the heat sink. Depending on heat requirements, a second fan may also be provided on the output of the unit.

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.

Power Connector - a 10 pin molex connector is used on all standard pallet amplifiers to supply +Vsup and Ground connections, as well as hi-side current shunts for current monitoring. Delta RF offers the mating connector with 1' wires - Red (Vsup), Black (Ground), Yellow (Current monitor). All wires are 18 gauge teflon insulated wires. Customer may optionally specify wire length and wire color.

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 average power and Voltage Conditions. Report shows pass/fail criteria. All amplifiers include this test.

Extended burn in - 8-hour burn in at average rated power 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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