RF Power Amplifier

PA3-2AB-AIR

Installation and Operation

Manual DV PA3-2AB-AIR-1
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I. PRODUCT DESCRIPTION

The PA3-2AB-AIR-1 model is a mobile Air Band AM VHF RF power amplifier intended for use in the mobile applications. This amplifier can deliver 50 watts CW (100 watts PEP) of RF power when driven with 7 watts CW and it will cover the frequency range from 118-138 MHz.
The mobile amplifier is designed to be installed in the interior of a car or in the trunk.
The PA3-2AB-AIR-1 can be also use as an amplifier module for VHA AM GTA transceivers.
The amplifier's dimensions are: 7.5"L x 2.2"H x 3.7" W (see figure 1).

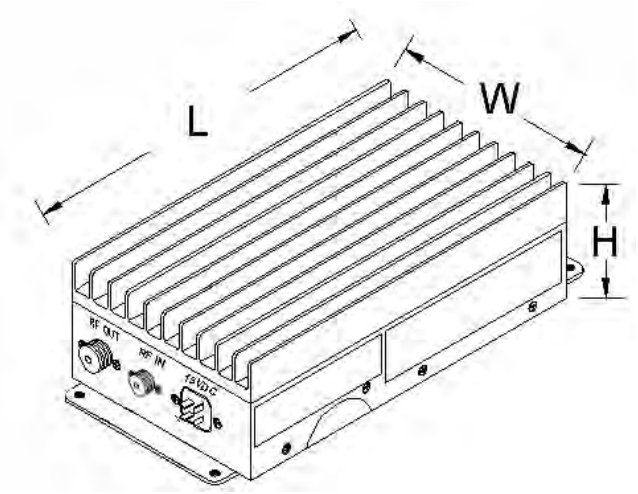


Figure 1. Package dimensions.

II. GENERAL SPECIFICATIONS

The general specifications for the VHF amplifier are shown in this section.

			Typ	Max	Unit	Condition
Frequency Range	BW	118		138	MHz	
Operating bandwidth within range	OBW		20		MHz	
Input Power	P_{IN}	6	7.5	10	Watt	CW
Output Power	P_{OUT}		50		Watt	CW or 100 W PEP@ M=100%
Gain	G	6	7	8	dB	
Output Flatness	ΔP_{OUT}			±1.0	dB	
Duty Cycle	D			40	%	per EIA/TIA-603-C
Harmonic Emissions	Har	-67	-62		dBc	P_{OUT} = 100 W PEP
Spurious Emissions	Spur	-75	-70		dBc	P_{OUT} = 100 W PEP
Operating Voltage	V_{DD}		24	29.8	Volt DC	
Supply Current	I_{DD}		2.5	3.0	Amp DC	Avg @ P_{OUT} = 100 W PEP
Input VSWR	S11			2.1	VSWR	
Operating Mode	Mode		**AM / FM / CW**			
Impedance, Input	Z_{IN}		50		Ω	
Impedance, Output	Z_{OUT}		50		Ω	
Modulation Linearity	THD		3%	5%		@ M =90%
Receive Path Insertion Loss	IL		0.6	1.0	dB	
COR Attack Time	T_{ATK}		1.0	2.0	mS	

ENVIRONMENTAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Operating Temperature	T_O	-20		+60	°C	
Storage Temperature	T_S	-40		+85	°C	
Operating Humidity	H_O	0		85	%	relative, non-condensing
Storage Humidity	H_S	0		95	%	relative, non-condensing

MECHANICAL PROPERTIES

Parameter	Value	Units	Limits	Condition
Dimensions	7.5" W x 2.2" H x 3.7" D	inch	max	
Weight	4	lb	max	
RF Connectors In /Out	BNC / TNC"			
Cooling	Convection			
Vibration	Sinusoidal, 0.35mm -5G, 10 – 150 Hz		max	IEC/EN 60068-2-6
Random Vibration	From 20 to 500Hz - 5G		max	IEC/EN 60068-2-64
Shock	Half-Sine, 11ms(±.5ms) – 15G, in each plane		max	IEC/EN 60068-2-27

III. OPTIONS

The Air Band VHF Mobile Power Amplifiers are available with several options: input, output, frequency ranges and configurations, cases, special logos, etc., when specified at the time of order. We work closely with you, our customer, to develop products that are in complete compliance with your needs and specifications.

IV. CAUTION!

EXPENSIVE COMPONENTS MAY BE DESTROYED IF THE AMPLIFIER IS TURNED ON IN A DAMAGE CONDICTION.

V. OPERATING PRECAUTIONS

CAUTION:

This amplifier produces RF voltages that can cause painful and dangerous burns. Use caution! Connect and disconnect all RF connections with the drive power and DC power off.

DRIVE POWER:

RF power transistors, although quite rugged in most respects, are easily damage by overdrive. Be careful not to overdrive the amplifier even momentarily (before applying any drive signal please check table I for details). Higher-than-rated drive power may destroy the transistors and **VOID ANY WARRANTY**.

SUPPLY VOLTAGE:

The maximum operating voltage is 29.8 VDC. When using the DC power supply make sure that it is not adjusted above 29.8 volts. If it is possible for the voltage to go above 29.8 Volts for any reason, including failure of the power supply, install a “crowbar” circuit to prevent damage to the amplifier in the event of excess voltage.

CASE TEMPERATURE

High power can mean high temperatures. Mount the amplifier where air can freely circulate over it and where clothing, blankets, etc. will not accidentally be placed over it. Keep duty cycle below limits.

TERMINATIONS

The efficiency of this amplifier will degrade if it is operates into anything but a 50 Ω load. Lowered efficiency may mean any or all of the following: lower power output, increased current drain, higher operating temperature, and reduced life time.

VI. INSTALLATION

The PA3-2AB-AIR amplifier installation is illustrated in figure 2. Mount the amplifier as close to the antenna as practical. Keep coaxial cable runs short, avoiding sharp bends and pinching. Avoid loose connectors at the ends of the coaxial cables. The antenna should be matched to an SWR better than 1.5:1 for best results. Higher SWR will degrade the performance of the amplifier.

Mount the amplifier away from the sources of heat, and where air can freely circulate around it. Avoid mounting the amplifier in the engine compartment or near the exhaust pipe system.

It is also important to securely fasten the unit. An improperly mounted piece of equipment is subjected to damage as it moves about and can cause serious injuries in an accident. Use bolts through the holes in the amplifiers flange to fasten the unit to a secure mounting surface (see figure 2).

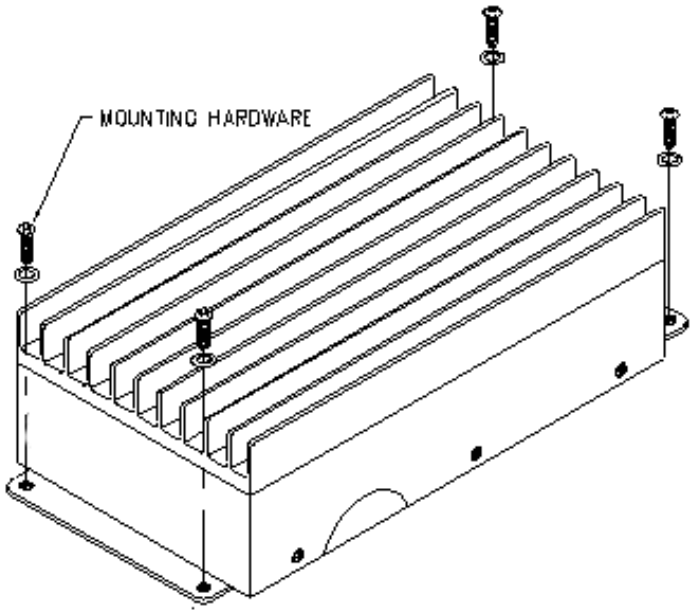


Figure 2. Amplifier installation
(for refenrce only)

Wire the DC power connector (Cinch 4 pin female) directly to the battery if possible. Do not use the present vehicle wiring. Use #12 AWG if possible and certainly no lighter than #14 AWG. To avoid a possible fire, or other possible damage, make sure a fuse or circuit breaker is installed at the battery end of the wire.

Attach DC input wires in accordance to the diagram in figure 3. If wires are too large for the holes, solder them to the sides of the blades.

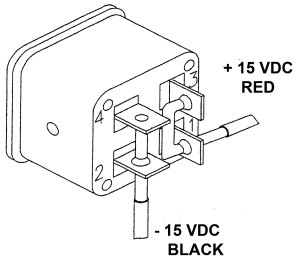


Figure 3. DC Connector Internal Wiring

Connect the antenna to the **"RF OUT"** terminal with a 50Ω coaxial cable and a TNC male connector according to figure 4.

Turn off your radio transceiver. Connect it to the **"RF INPUT"** terminal with a 50Ω coaxial cable and a BNC male connector.

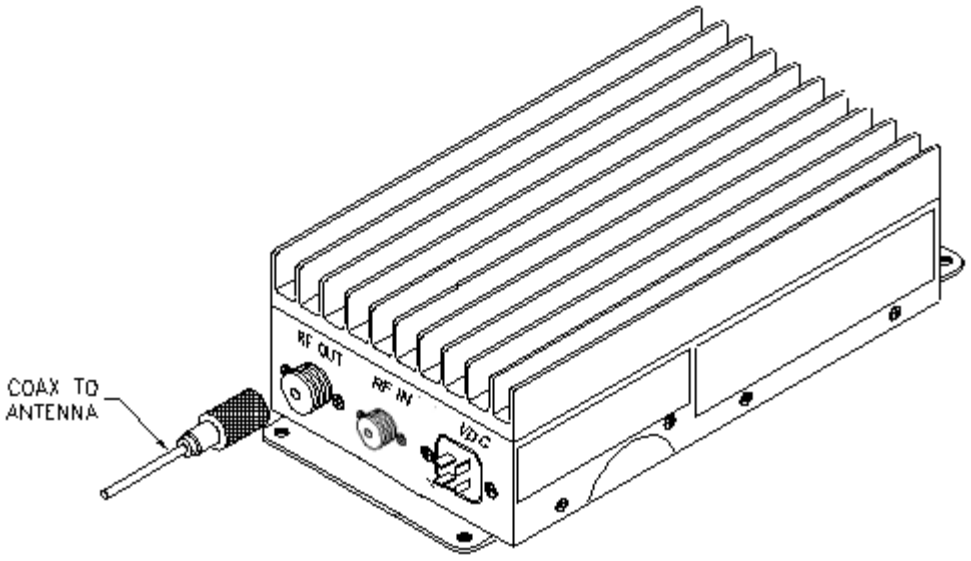
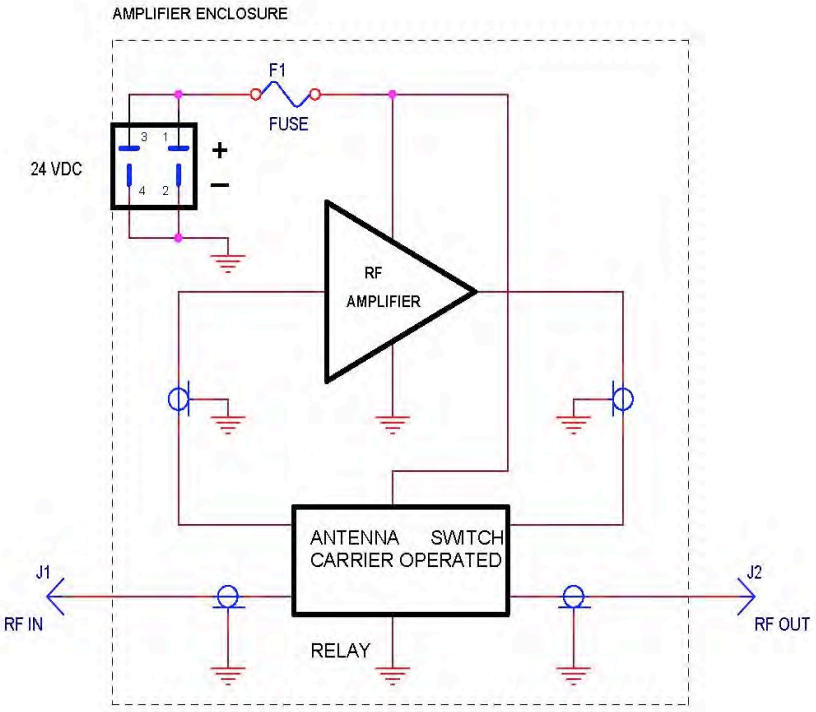


Figure 4. Antenna Connection
(for reference ony)

MOBILE CONFIGURATION

BLOCK DIAGRAM



VII. WARRANTY

BECKER AVIONICS has tested and found this unit to function properly and to operate within the parameters of its stated specifications.

BECKER AVIONICS warrants that this product is free from defects in material and workmanship. If found to be defective within two (2) years from the date of purchase, the factory will, at its discretion, either repair or replace the unit at no cost, provided the unit is delivered by the owner to the factory intact. The warranty does not apply to any product which as been subjected to misuse, neglect, accident, improper installation or used in violation of the instructions furnished by **BECKER** nor does it extend to units which have been repaired or altered outside our service department, nor where the serial number has been removed, defaced or changed.

VIII. SERVICE

For service on this amplifier, contact:

BECKER AVIONICS
Customer Service Department
Phone: (954) 450-3137
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