



AERO VOICE™

AIRBORNE LOUDHAILER SYSTEMS

INSTALLATION & USER'S GUIDE

PSAIR12A
PSAIR22A
PSAIR42A



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TABLE OF CONTENTS

I.	Overview Of Aero Voice Public Address Systems Installation Considerations	Page 1
II.	Installation Quick Start & Checklist Standard Cable Connections Power For The Aero Voice System DC Power From Aircraft Batteries DC Power From Power Sonix 28 V Auxiliary Battery Pack Audio Controller/Remote Control Unit	Page 2
III.	Mounting The Amplified Speaker(s) PSAIR12 PSAIR22 PSAIR42	Page 6
IV.	Using The Aero Voice System Using the Power Sonix Remote Control Unit Interfacing With Cockpit Audio Controllers Live Microphone Pre-Recorded Messages, Tape/Digital Input Standard Sirens Custom Sirens/Sounds	Page 10
V.	Maintenance Routine Audio Testing Battery Maintenance & Charging	Page 13
VI.	Technical Specifications	Page 17
VII.	Limited 2-Year Warranty RMAs Power Sonix Support	Page 18
VIII.	Appendix: Drawings & Illustrations	
IX.	Your Dealer/Outfitter Info:	

Dealer Sales Contact Phone

Dealer Customer Service Contact Phone

Outfitter/Installation Service Contact Phone



Power Sonix Factory Support/RMAs Contact 304-267-7560

I.**Overview Of Aero Voice Public Address Systems**

Congratulations on your purchase of a Power Sonix public address system. Your aircraft is about to be equipped with the best performing airborne speech projection system in the world today. No other system is as light, as compact, as intelligible, as powerful or as economical as Power Sonix.

The Power Sonix "A" series of Loudhailer Systems was specifically developed for those who wish to recess their speakers and amplifiers inside the aircraft for a flush mount. The PSAIR12A, PSAIR22A, AND PSAIR42A consist of a single, high performance, class D amplifier, the PSAMP600, used to create a 300 or 600 watt system, and a PSAMP1200 for 1200 watts of power. The speaker kit, PS-SPK-300, consists of a single horn assembly with two X 150 watt speaker drivers for a total of 300 watts. To gain more powerful systems they are simply paralleled to the amplifier used. This configuration is in contrast to the non-A series that has the amplifier contained in the speaker chassis and can be mounted internally if there is space, but is often mounted outside the aircraft.

Installation Considerations:

The first thing that must be determined is where you will place the speaker array on your specific aircraft. Power Sonix recommends that the system be mounted in such a way as to project sound down and away from the aircraft at an angle that is consistent with the aircraft's mission requirements. At an angle of 45 degrees with the vertical, the peak intensity of the sound beam will hit the ground at a distance from the aircraft that is equal to the altitude of the aircraft. The distance out from the aircraft of peak intensity is the product of the tangent of the angle times the expected height of the aircraft during broadcast. Please note that there are two engineering bracket drawings for a single and dual horn in the Appendix, Figs. VII & VIII. These may be of some value in custom designing a recessed mount.

Once placement has been determined, the next consideration is what will power the PA system. Power can come from the DC voltage source on the aircraft or a Power Sonix 28V auxiliary battery pack. Stand alone battery packs have limited power and must be recharged. Consult with your dealer and maintenance chief to determine which is best for your needs.

A 45° angle enables the pilot and/or observer to maintain visual contact with the intended audience from a safe hovering position. Don't be concerned with being too far from your audience. Power Sonix systems have great range. If you are close, you can always reduce the volume.

The third major consideration is interfacing the audio signal sources with the Amplifier. You can use the cockpit headphone mic to deliver speech

through the cockpit audio controller to the amplifier. This requires that the cockpit audio controllers have an audio output for a PA system (many commercial controllers like Technisonics, Garmin and NAT do). See the operating manual of your controller to see how to integrate your existing equipment with Power Sonix PA Systems. We have provided an NAT AA-22 type cockpit controller interface drawing for Power Sonix Loudhailers in the Appendix, Fig.VI. Our engineering dept. is always available to help answer questions regarding this procedure....please feel free to call to expedite your installation.

Instead of the cockpit headphones, you can alternatively use a separate noise cancelling microphone (Power Sonix part # PSMIC) and the Power Sonix Remote Control Unit (PSRCU). The RCU is required in any instance where the existing cockpit audio controller does not support a public address system. In that case, it is the audio controller for the PA and has its own on/off switch.

The advantage to having the RCU, in addition to a supporting cockpit audio controller, is the convenience to do things quickly and easily in the air including; 1.) having someone without a headset speak into the system with a hand-held mic, 2.) the ability to plug a cassette tape, MP3 player, CD player or DVD player with pre-recorded messages/sounds into the RCU which delivers the digital signal to the amplified speaker array. If you intend to do these things with your existing audio controller, make sure that it has the necessary wiring interconnects available and consult your equipment user's manual.

The finish on the Remote Control Unit is anodized black. The speaker assemblies come standard in a powder-coated white or olive drab finish.

II.

Installation Quick Start: *Standard Cable Connections*

There are only a few connections that have to be made to make your Power Sonix system operational. All the wiring is factory installed and tested. Once the speaker mounting position is determined, measurements of the distance from the speakers to the power source, the amplifier and to the audio controller (either the cockpit audio controller or the Power Sonix Remote Control Unit) are made. Appropriate connectors and cables cut to length must be purchased separately to make the custom cables for your specific aircraft. Please be sure you have made these measurements and placed the order for these parts in advance of the installation date.

Illustration 1 depicts the PSAIR A-Series system cabling configuration. Each installer will make his own cables for the installation interface with power, speakers and remote controls. Accordingly, mating connectors for the amplifiers are not provided with System you purchase. A part number list for these mating connectors is given in the Appendix; Fig. IX.

Power Sonix Amplifiers are input protected against reverse polarity. Always apply positive voltage to Pin A of the input power connector from the 28 Volt DC power buss using a minimum of 16 gauge wire. 300 Watt systems should be fused at 15 amps, 600 watts at 30 amps and 1200 watt systems at 60 amps.

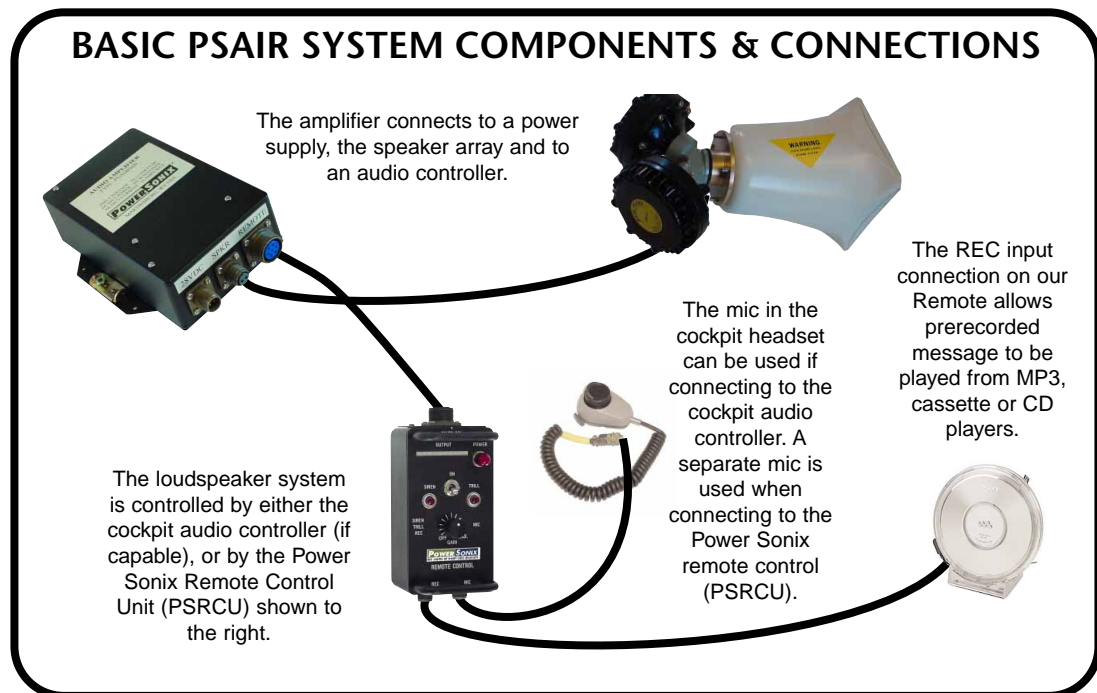


Illustration 1 - Basic System Connections

Power Connections For The Aero Voice System

The source power source MUST be 24-32 VDC (i.e. nominal 28 V aircraft supply). **NOTE: THESE SYSTEMS ARE NOT DESIGNED TO OPERATE WITH MORE THAN 32 VOLTS.**

Using AIRCRAFT DC POWER - As noted before, connectors and cable for DC power must be ordered separately. Positive on pin A.

Using AUXILIARY BATTERY POWER - This requires a Power Sonix 28 Volt NiCad battery pack (PSBAT28 or PSBAT28SCU) and Power Sonix power cable PSCBL-BAT in the length appropriate for your aircraft.

Please consult with your dealer, outfitter and maintenance crew chief to determine the power configuration that best meets your needs on your aircraft. The current load of other aircraft equipment such as cameras and searchlights, which might be used simultaneously with the Loud Hailer, needs to be evaluated when using aircraft DC power. Please contact Power Sonix Engineering, Dept. for any questions regarding any installation issues.

FAA Field Inspection

Once installed, an FAA **Form 337 Field Test** must be conducted to get your modification approved. There is no cost from the FAA for this test. After you schedule the inspection with your nearest FAA Field Office, you just have to make the aircraft and a pilot available. This is standard procedure and any FAA licensed maintenance or overhaul facility will take care of this for you.

(Note: Military and State and Local Government Law Enforcement agencies may not be subject to the N Classification modification requirements of the FAA. However, it is always a good practice to thoroughly test the aircraft after any major modification, including the addition of externally mounted loudspeakers, searchlights, cameras etc.).

Using the Power Sonix Aero Voice System

Operating the voice Amplifier system is relatively simple. However, certain techniques, some of which will be gained by experience, should be developed to obtain the most favorable results. The system possesses the capability of high quality voice transmission over long distances and for long periods of time. However, effective utilization of these features depends, to a great extent, upon proper operating procedures.

To successfully project the voice over long distances, it is necessary to develop a microphone technique different from the normal conversational manner. Talk clearly and distinctly, separating each word with noticeable pauses. Keep the voice volume high with the top of the microphone touching the upper lip so that the speech is as close to the microphone as possible. Words should be spoken with clear enunciation and a commanding voice for maximum sound projection

Microphone Options And Operation

Users may utilize an existing cockpit headset microphone connected to a cockpit audio controller provided that the controller has appropriate connectors to receive the cable from the Power Sonix amplified speaker assembly . Alternatively, users can employ the Power Sonix/Shure noise-cancelling microphone (PSMIC) by connecting it to either a mic jack on the cockpit audio controller or to the mic jack on the Power Sonix Remote Control Unit (PSRCU). Always hold the PSMIC against the upper lip and speak strongly in clear enunciation.

On the PSMIC, the "Gain" control is adjusted clockwise from OFF. If troubled with feedback it may be necessary to reduce the input "Gain" control or preferably, improve the sound shielding of the microphone position. This can be done by closing windows and eliminating a direct audio air medium back to the microphone from the speakers.

Remote Control Unit

The Power Sonix Remote Control Unit (PSRCU) can independently control all aspects of the loudspeaker system. This component is required if your cockpit audio controller does not have the capacity to interface with the Aero Voice system and its connecting cables. Please contact Power Sonix (tech@powersonix.com) to determine the necessary wiring connections to use a specific cockpit controller. We will need a wiring diagram of the controller output connector and its electrical specifications to interface the two systems.

The Remote has an audio input connector for a microphone and one for an audio recording device such as a tape cassette recorder, MP3 player, CD player or DVD player. These devices can deliver standardized and studio quality pre-recorded messages to the Aero Voice loudspeakers. The large connector on top of the Remote is used to connect it to the amplified speaker array (using cable PSCBL-RCU).



Power Sonix systems are not intended to play hi-fidelity music. If the recorded sound is music, it is advisable to operate at a reduced "Gain" control setting. Failure to reduce the gain setting may cause excessive power to be dissipated in the speaker units and result in failure of the speaker voice coils due to overheating.

The red Push-To-Test (PTT) power light will show that DC power is connected when depressed. It is also an indicator that the system is on when the power toggle switch is turned on. The ten element bar graph shows the level of power being delivered to the speakers from the amplifier. It also has one element lit when no signal is applied and serves as a secondary power on indicator.

PIN	FUNCTION
A	SWITCHED POWER
B	GROUND/SHIELD
C	+ VOLTAGE
D	- SIGNAL
E	+ SIGNAL
F	RELAY
G	METER SIG. (0-5V)

*Remote Control Unit PSRCU
PIN Function Chart*

The "Gain" dial indicates the power or volume that the speakers are putting out. For safety reasons, it is best to keep the "Gain" in the "Off" position until you are ready to begin your broadcast. If any feedback occurs, it may be necessary to reduce the input "Gain" control or preferably, improve the sound shielding of the microphone.

When a siren sound is needed, a separate siren switch is pushed to activate the sound. Press the switch for the sound (siren wail or trill) you wish to broadcast. Pressing the switch while the siren is broadcasting will turn the siren OFF again. Custom siren sounds can be permanently encoded onto a chip inside the Remote Control Unit for a moderate fee. Each custom sound would replace one of the two standard sirens factory installed. This requires sending the PSRCU unit back to Power Sonix for modification along with a digital recording of the sound you wish to use and, if applicable, a decision on which of the existing sirens you want to replace.

Other Accessories

If auxiliary power is needed, Power Sonix offers a 28 volt battery with or without a State Of Charge Unit. We also supply a convenient AC Battery Charger to charge the 28 volt battery during routine maintenance.



28V Battery with State of Charge Unit (PSBAT28SCU)



AC Battery Charger (PSACCHARGE)

Maintenance

Routine testing of the loudspeaker equipment should be incorporated into the maintenance or flight-ready checklist. Simple troubleshooting can be conducted in the hanger. Power Sonix Tech Support is always available via phone to assist in the installation and troubleshooting. Any major issues with your equipment would require an RMA for factory servicing.

Amplifier Checks - When normal operation is impaired the following possibilities should be checked:

- a. Press the "Press To Test" (PTT) light to make sure power is available (if using the Power Sonix Remote Control Unit PSRCU)
- b. Check the input Polarity of the DC supply. Make sure sufficient voltage is available, and that excessive voltage is not applied; (no greater than 32 volts DC)
- c. Check any cable for shorts or opens. DC resistance on the drivers is approximately 2.2 ohm.
- d. Battery may not be properly connected. The PTT light does not indicate until pressed.
- e. Power Switch off. PTT light does not indicate until pressed.
- f. No DC power to Remote Control Unit. PTT light does not indicate normally or when pressed.
- g. Make sure the signal source is not shorted or connected to any noise source.
- h. The Amplifier may be faulty. This will require factory maintenance. The amplifier will automatically reset when reapplying power after a fault condition due to a short is experienced.

Power Supply Checks - The battery voltage should measure between 24 and 32 volts unloaded and 1/2 to 1 volt lower under load. Check the proper polarity.

Loudspeaker And Cable Checks - Testing of loudspeakers and cables may, to some extent, be done visually. All connections should be free from dirt, moisture and open or shorted conditions. All receptacle threads should be thoroughly engaged. A continuity meter may be used to establish the state and correctness of wiring. An ohmmeter touched across the loudspeaker inputs should cause an audible click sound.

Precautions In Maintenance - To avoid serious damage to system components while undergoing troubleshooting or testing, please read these warnings carefully before initiating test procedures.

CAUTION: Do not operate the system from an inadequate power supply or a shop supply, giving rise to high voltage transients.

CAUTION: A grounded test probe from a AC powered meter or Scope placed across the output will short the output to ground and trigger the shutdown circuitry. All test equipment should be isolated from ground potential.

Amplifier/Speaker Maintenance - The amplifier and speaker should be kept clean and free from exposure to static charge accumulation and debris. There are no serviceable parts inside our Class D amplifiers.

CAUTION: Tampering with the amplifier board itself will void your warranty.

Specifications for the PSAMP600 and PSAMP1200 are given in the Appendix, Figures II & IV respectively.

Speaker Driver Maintenance - No maintenance of the speaker driver is required. Should a driver fail while under warranty, please return it to Power Sonix for replacement. If out of warranty, please call Power Sonix to purchase a new driver.

Speaker Driver Replacement

A loudspeaker driver may fail due to several causes.

(1) The coil or its terminals may short to the mounting and cause the amplifier to cut off. This is apparent (once the leads of the suspected driver are separated from other drivers of the speaker assembly) by a continuity test from a lead to the chassis ground.

(2) A voice coil short (not likely) showing zero ohm between voice coil leads will also cause the amplifier to cut off.

(3) A voice coil open-circuit (more likely) will show with an ohmmeter check between leads. No sound will result when the ohmmeter is applied.

(4) A noisy driver results when the voice coil rubs against the magnetic gap. Noise can best be localized to a single driver unit by connecting each unit singly and energizing each with the amplifier output.

Check each driver for a short or an "open". A short is evidenced by less than 1 ohm resistance and an "open" by any resistance over 3 ohm. The correct reading should be approximately 2.2 ohm.

When replacing a faulty driver in your installation, connect the leads to the terminals at the rear. Observe the color code to preserve the speaker polarity.

IMPORTANT - RED TO #1 TERMINAL, BLACK TO #2 TERMINAL

Resetting Protective Circuit

The Power Sonix PSAMP600 and PSAMP1200 amplifiers are designed with self-protecting circuitry to interrupt the operation whenever harmful conditions exist which might endanger the amplifier components.

Such a condition might be an excessive load current or an output short. Once the protective circuit is activated, the flow of power is stopped in the affected channel and no further operation is possible without corrective action. If the trouble was due to a temporary or transitory cause, operation may be resumed by simply turning the power switch OFF, wait 5 seconds to allow the internal circuitry to reset, then turn back to ON.

Summary of Care And Precautions

The Power FETs of this system are subject to damage when exposed to excessive heat, voltage, and current for even short periods of time. The design incorporates a protective circuit which disables the amplifier when safe operating currents are exceeded.

Warranty

Power Sonix, Inc. offers a Two-Year Limited Warranty on all parts and assemblies against defects. This warranty does not include damage caused by negligence, misuse of the equipment, gunfire, exposure to excessive heat or fire, accidents or acts of God. The warranty is void if there is unauthorized access to the amplified speaker assembly or electronic components. Any repair or service required under this warranty will be authorized via an RMA if an initial telephone tech support call cannot remedy the situation in the field.

The Warranty Card must be filled out and submitted to Power Sonix to effect your warranty. The installation service provider should record the date and place of installation on the Warranty Card. The warranty period begins when the equipment is installed.

Return Merchandise Authorization

To send equipment back for warranty or out-of-warranty service, please call Power Sonix to obtain a Return Merchandise Authorization, RMA. The RMA number provided **MUST BE** clearly marked on the shipping label. We will not accept equipment that does not have an RMA.

Ship equipment to:

Power Sonix, Inc.
122 South Church St.
Martinsburg, WV 25401 USA
RMA#

(Telephone number for Shipper's Reference (304) 267-7560)

Contact Information

For sales, customer service or technical assistance, call us at our headquarters in Martinsburg, WV, USA at 304-267-7560. Our Fax number is 304-267-8691. Emails for company departments are as follows:

Sales	sales@powersonix.com
Customer Service	customerservice@powersonix.com
Technical Support	tech@powersonix.com



LIMITED WARRANTY

All communications equipment manufactured by Power Sonix Inc. is warranted to be free of defects in Materials or Workmanship under normal use for a period of two years from Date of Purchase by the end user. Warranty does not apply to equipment not installed by a factory approved and authorized facility in accordance with Technisonic published installation instructions or which has been repaired or altered in any way as to affect performance, or which has been subjected to improper installation, which has been used for purposes other than intended, or which has been involved in any accident, fire, flood, immersion or subjected to any other abuse. Expressly excluded from this warranty are charges relating to removal of equipment from the aircraft or charges relating to reinstallation. Power Sonix will repair or replace (at Power Sonix's option) any defective part found to be faulty during the Warranty Period. Faulty equipment must be returned to Power Sonix (or it's authorized Warranty Depot) with transportation charges prepaid. Repaired (or replacement) equipment will be returned to the customer with freight charges collect. If the failure of a part occurs within the first 30 days of service, Power Sonix will return the repaired or replacement equipment prepaid. Power Sonix reserves the right to make changes in design, or additions to, or improvements in it's products without obligation to install such additions and improvements in equipment previously manufactured. This Warranty is expressly in lieu of all other warranties expressed or implied, including any implied warranty of merchantability or fitness, and of all other obligations or liabilities on the part of the seller.



Please fill out the Warranty Information Card below, and return the **original** to Power Sonix, Inc., 122 South Church St., Martinsburg, WV 25401-1819 USA. Keep a copy for your records.

Equipment Owner:

Company/Agency Name: _____

Contact Name: _____

Address: _____

City: _____ State/Prov: _____ Country: _____ Postal Code/ZIP: _____

Telephone: _____ Fax: _____

Email: _____

Power Sonix Model Numbers: _____

Equipment Serial Numbers: _____

Installing Agency/Outfitter:

Company/Agency Name: _____

Contact Name: _____

Address: _____

City: _____ State/Prov: _____ Country: _____ Postal Code/ZIP: _____

Telephone: _____ Fax: _____

Email: _____

Aircraft/Vessel/Vehicle Registration Number: _____

Installation Completion Date (Start of Warranty Period): _____

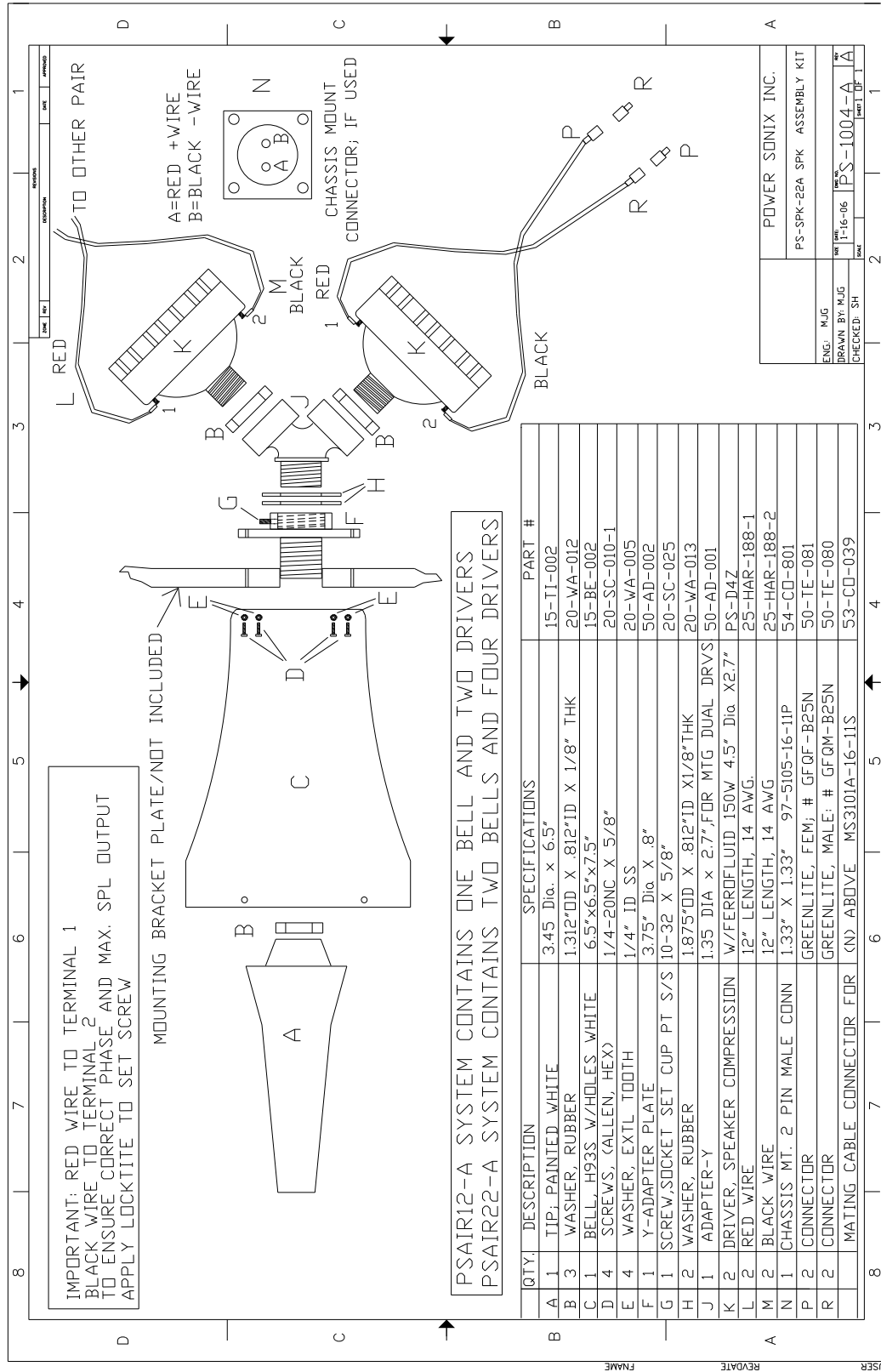


FIGURE I.

PSAMP600

ELECTRICAL AND MECHANICAL SPECIFICATIONS

Electrical Specifications:

Input Voltage:	24-32 Volts D.C.
Maximum Power Out:	600 Watts rms.
Max. current:	25 Amperes rms.
Overload Protection:	30 Amperes rms. (Shutdown)
Sensitivity:	1 volt rms @1 KHz.
DC-DC Converter	5 Volt DC, Output Isolated.
Output Impedance:	.05 ohm.
Total Harmonic Distortion:	1%
Gain:	52 dB
Efficiency:	95 %

Mechanical Specifications:

Dimensions:	4.70" X 8.48" X 2.20" (11.94 cm. X 21.54 cm. X 5.59cm.)
Mounting Plate:	7.38" X 6.20" (18.75 cm. X 15.75 cm.)
Weight:	2.5 lbs. (1.1 Kg)

FIGURE II.

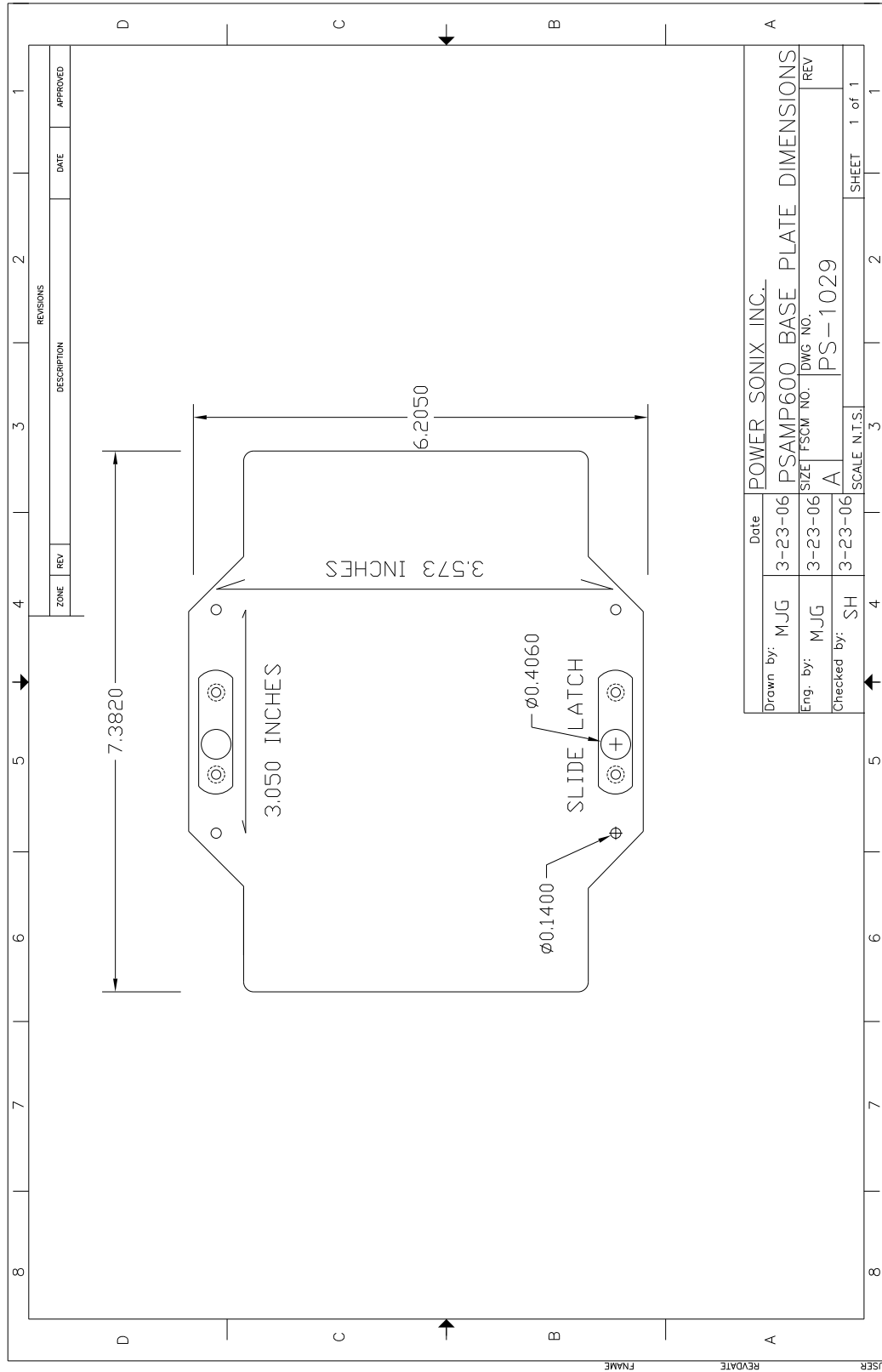


FIGURE III.

PSAMP1200

ELECTRICAL AND MECHANICAL SPECIFICATIONS

Electrical Specifications:

Input Voltage:	24-32 Volts D.C.
Maximum Power Out:	1200 Watts rms.
Max. current:	50 Amperes rms. TOTAL
Overload Protection:	60 Amperes rms. (Shutdown)
Sensitivity:	1 volt rms @1 KHz.
DC-DC Converter:	5 Volt DC, Output Isolated.
Output Impedance:	.05 ohm.
Total Harmonic Distortion:	1%
Gain:	52 dB
Efficiency:	95 %

Mechanical Specifications:

Dimensions:	6.25" X 10.25" X 2.20" (15.9 cm. X 26.0cm. X 5.59cm.)
Mounting Plate:	7.25" X 10.25" (18.4cm. X 26.0cm.)
Weight:	5.5 lbs. (2.5 Kg)

FIGURE IV.

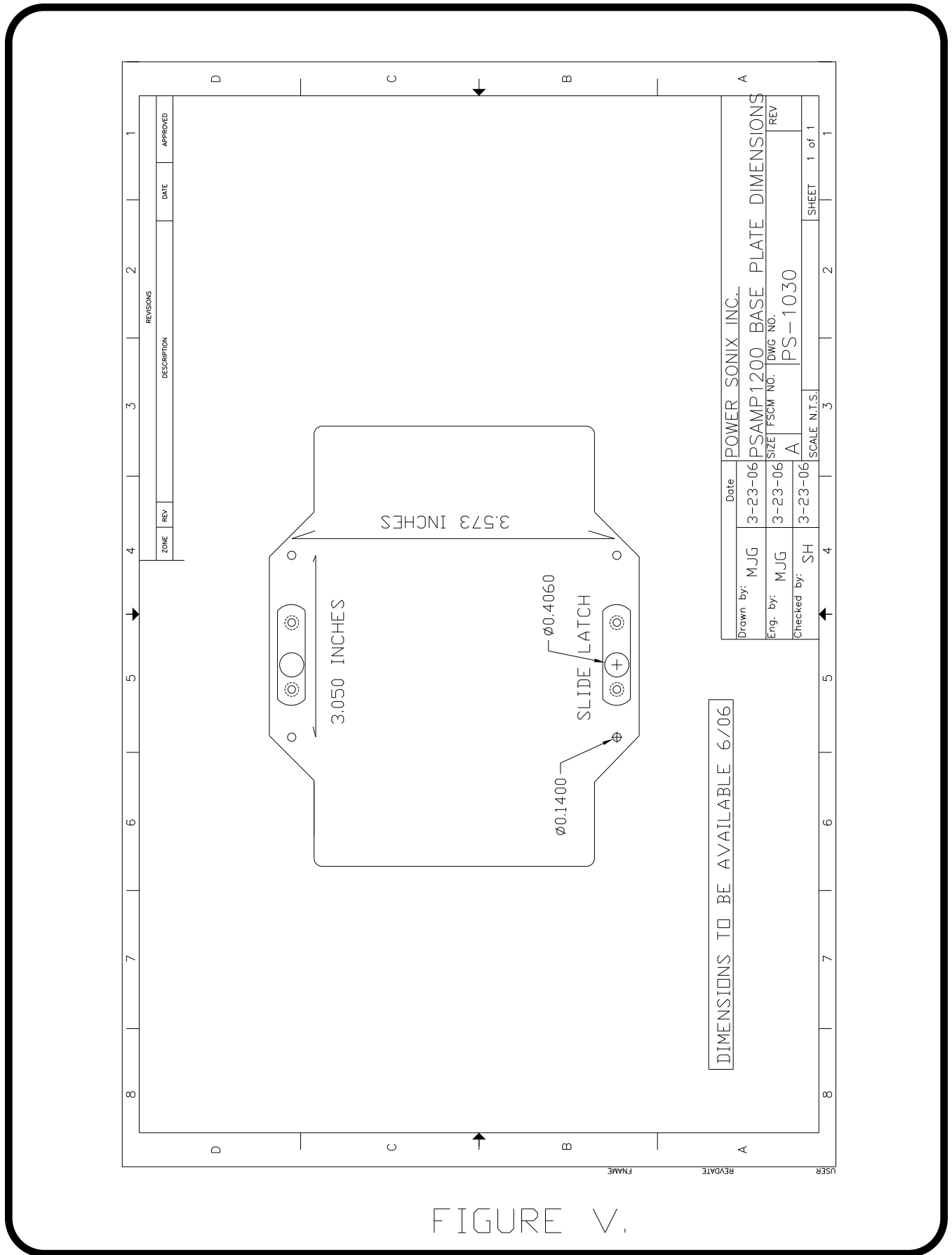


FIGURE V.

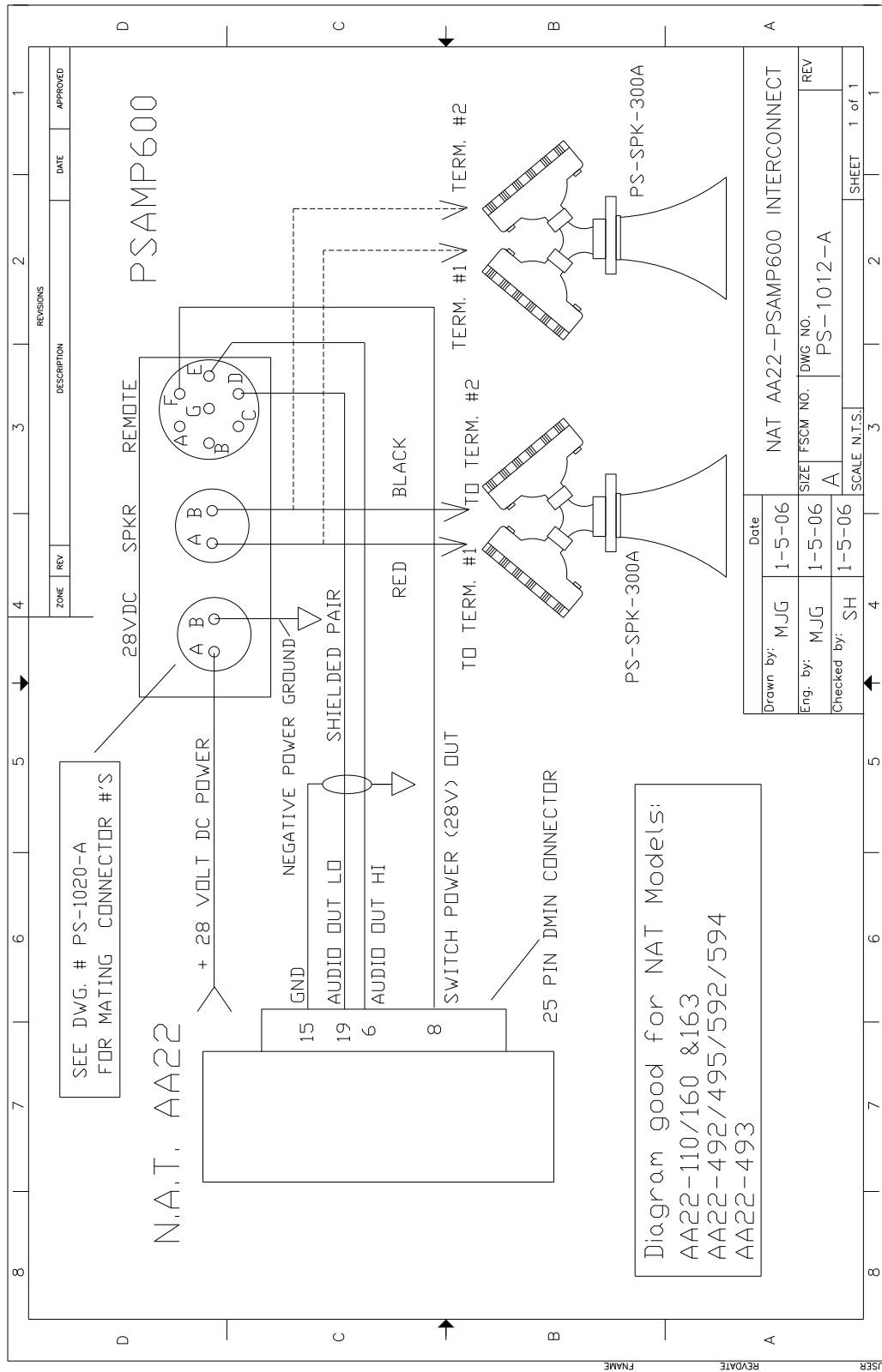


FIGURE VI.

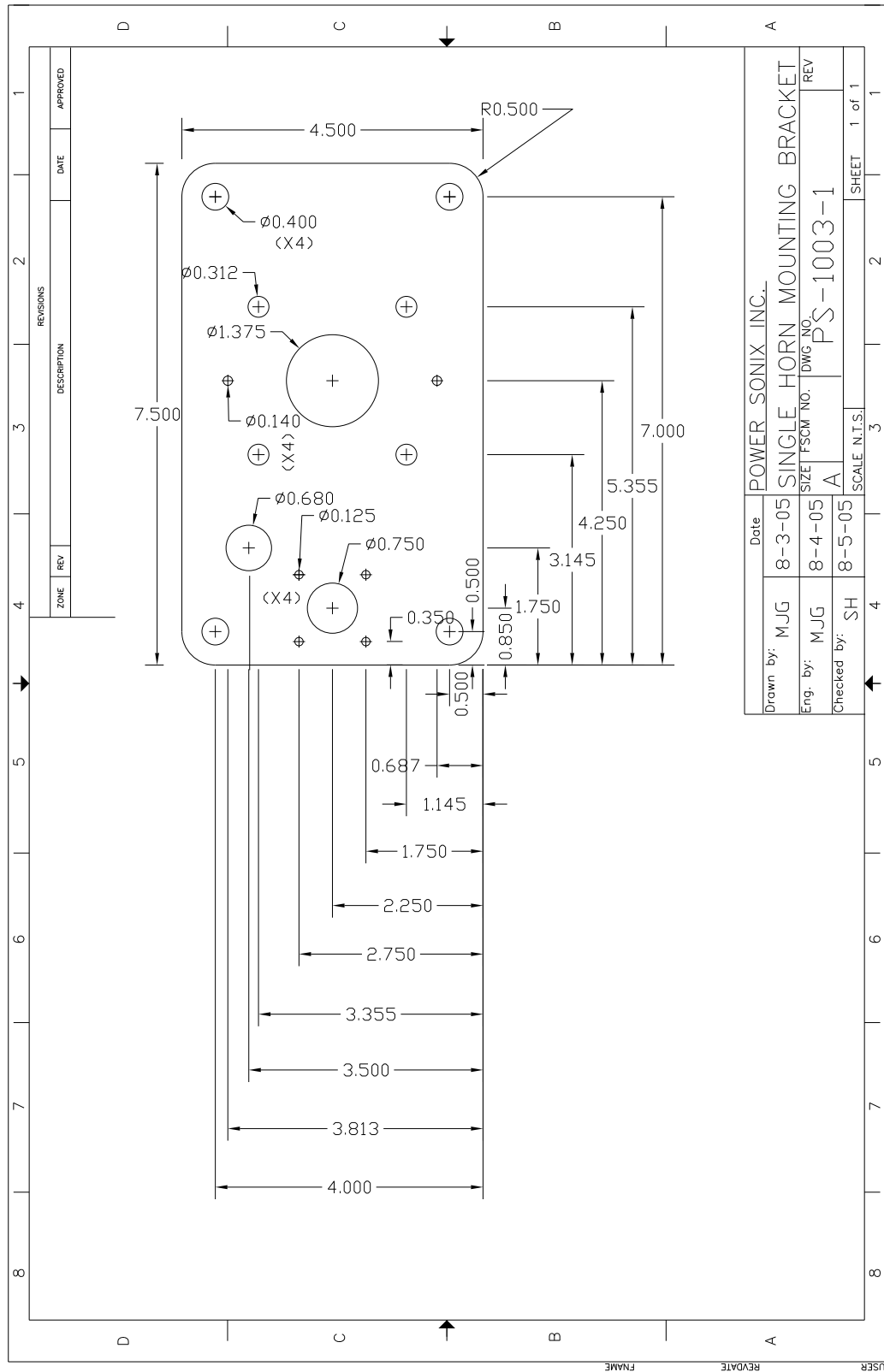


FIGURE VII.

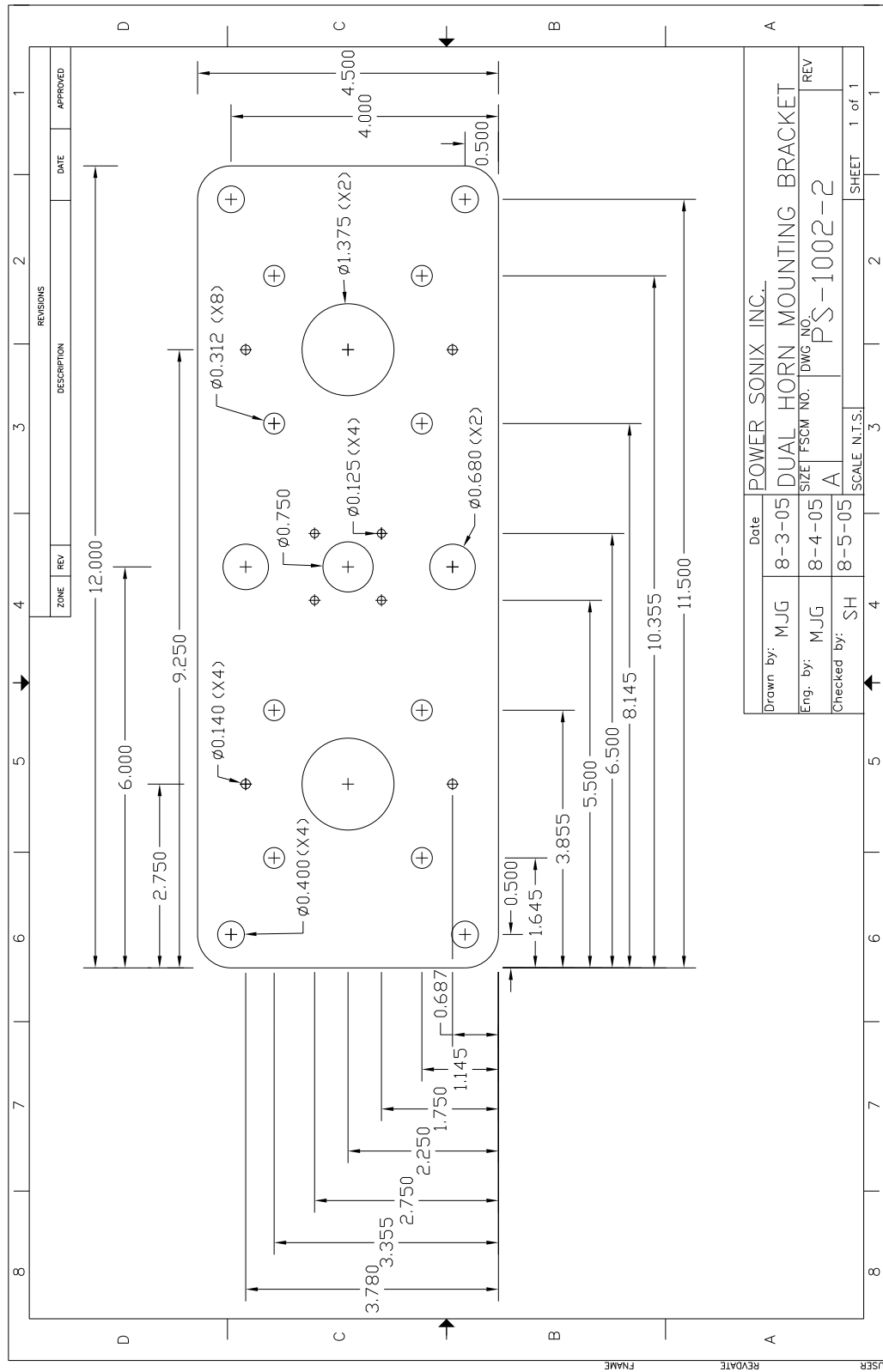


FIGURE VIII.

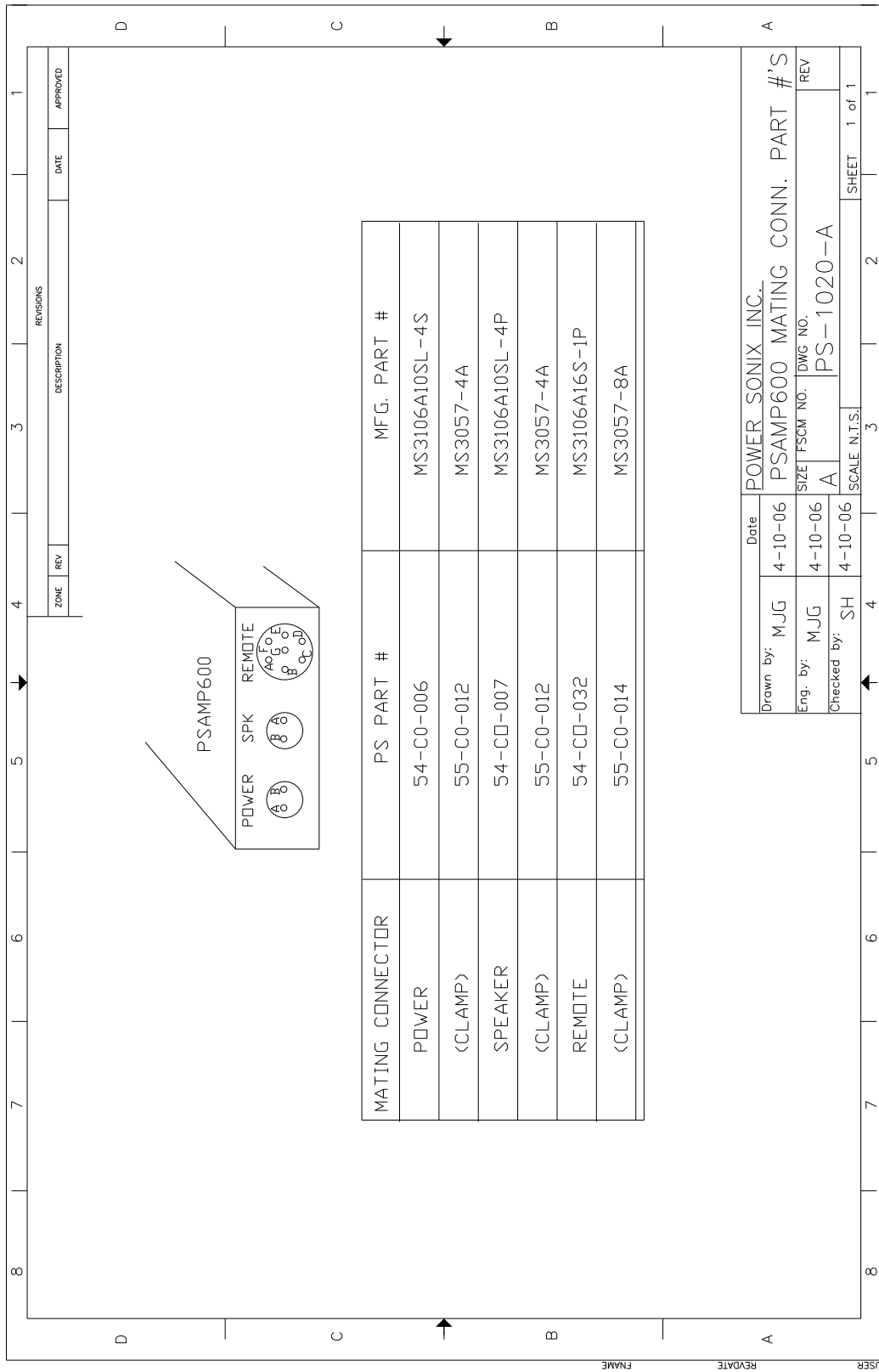


FIGURE IX.



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