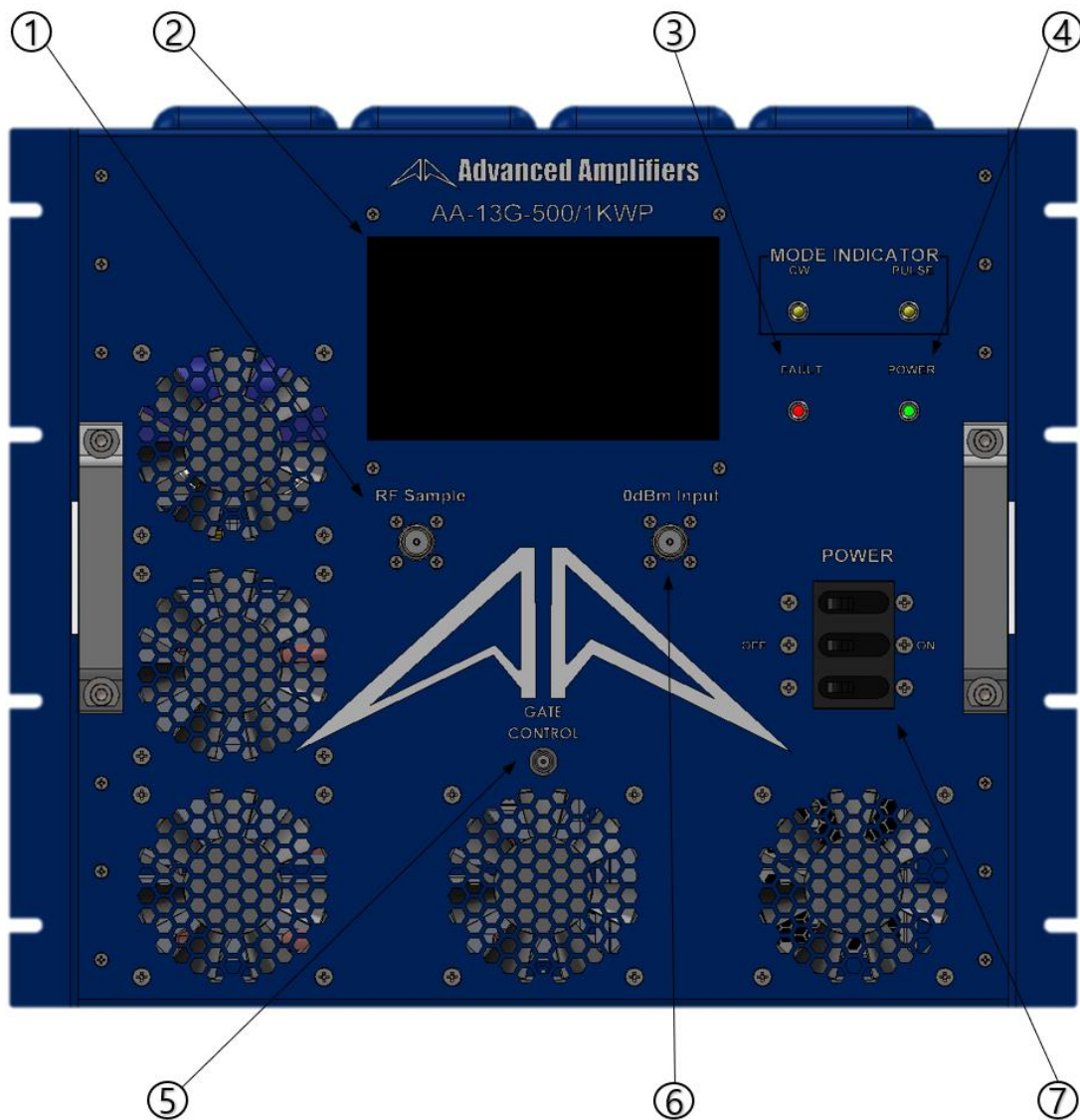


# **Advanced Amplifiers**

Instruction Manual Including Quick Start Guide  
Advanced Amplifiers  
Solid State RF Amplifier System

AMP2103P-LC (AA-13G-500/1KWP)  
0.8 – 3.2 GHz, 1000 Watt Pulse, 500W CW, 60 dB Min



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## SAFETY INSTRUCTIONS

### BEFORE USING THIS EQUIPMENT

Read this manual and become familiar with safety markings and instructions.  
Inspect unit for any sign of external damage. Do not use this equipment if there is physical damage or missing parts.  
Verify the input AC voltage to the main power supply

**For a system with a digital controller option – DO NOT USE OR CONNECT a PoE enabled ethernet switch to a system. Our digital controller does not support PoE connection and will cause permanent damages to a controller unit.**

### INTENDED USE

This product is intended for general laboratory use in a wide variety of industrial and scientific applications.

### RF OUTPUT LOAD & PROPER GROUNDING REQUIRED

The RF output connector must be connected to a load before the AC switch is on.  
AC & RF power must be off before disconnecting the output load or other components.  
The main power source to the equipment must have an uninterrupted safety ground that has sufficient size to the power cord.

### REPAIR & MAINTENANCE

All repair or maintenance work must be performed by a factory authorized technician in order to extend the operating life of this equipment and not to void any outstanding warranty.

### FORCED AIR COOLING

This equipment requires forced air cooling. All air inlets and outlets must be cleared and free of blocking at all time. Insufficient air flow will result in damaged equipment.

### SAFETY SYMBOLS



This symbol is marked on the equipment when it is necessary for the user to refer to the manual for important safety information. This symbol is indicated in the Table of Contents to assist in locating pertinent information.



Dangerous voltages are present. Use extreme care.



The caution symbol denotes a potential hazard. Attention must be given to the statement to prevent damage, destruction or harm.



This symbol indicates protective earth terminal.

## SPECIFICATIONS

### ELECTRICAL SPECIFICATIONS: 50Ω, 25°C

| Parameter                       | Specification            | Notes   |
|---------------------------------|--------------------------|---|
| Operating Frequency Range       | 0.8 - 3.2 GHz            |   |
| Power Output @ Pulse            | 1000 Watt Typ            | Peak Pulse                                    |
| Pulse Characteristics           | <b>Width</b>             | <b>Droop/O-shoot</b><br>1 dB Typ <sup>3</sup> |
|                                 | up to 560μS              |   |
| Power Output CW                 | <b>Duty</b>              | CW  |
|                                 | up to 10%                |   |
| Power Gain                      | <b>PRF</b>               |   |
|                                 | up to 10kHz              |   |
| Power Output CW                 | 500 Watt Min             |   |
| Power Gain                      | 60 dB Min                | 0dBm or less for rated Pout                   |
| Gain Adjustment Range           | 20 dB Min                | Local or remote                               |
| Power Gain Flatness             | 4.0 dB p-p Max           | Constant input power                          |
| Input Return Loss               | -10 dB Max               |   |
| Harmonics                       | <-20 dBc Typ             | At rated output power                         |
| Spurious                        | -60 dBc Max              | Non-harmonics                                 |
| Output Power On/Off Ratio       | -80 dB Typ               | TTL Gate Control                              |
| Operating Voltage               | 120/208 VAC, 3-Phase     | Option: 220 VAC Nom, 1-Phase                  |
| Power Consumption CW / Pulse    | 5500 / 2500 Watts Max    | At rated Pout                                 |
| Input Power Protection          | +10 dBm Max <sup>1</sup> |   |
| Load VSWR Protection            | 4 : 1: Max <sup>2</sup>  | Foldback @ preset limit                       |
| Sample Port Coupling (optional) | -60 dB                   | N-Female                                      |

1 Units with optional digital monitor and control, for basic units <10 Sec without damage

2 Units with optional digital monitor and control, for basic units <1 minute at rated Pout

3 Droop <1dB Typ @100usec, overshoot & droop >1dB Typ @ 560μsec

### ENVIRONMENTAL CHARACTERISTICS

| Parameter                     | Specification                 | Notes          |
|-------------------------------|-------------------------------|----------------|
| Operating Ambient Temperature | 0 to +50 °C                   |                |
| Storage Temperature           | -40 to +85 °C                 |                |
| Relative Humidity             | up to 95 %                    | Non-condensing |
| Altitude                      | 3000 meters                   |                |
| Shock & Vibration             | Normal transport <sup>4</sup> |                |

4 MIL Spec available for quotation

### MECHANICAL SPECIFICATIONS

| Parameter  | Specification   | Notes                               |
|--|---|-------------------------------------|
| Dimensions W x H x D   | 482 x 398 x 750 mm  | 9U, excluding handles               |
| Weight   | 60 Kg. Typ  |                                     |
| RF Connectors Input/Output/Sample  | N-Female / 716 DIN / N-Female   | Front or rear panel                 |
| Gate Control   | BNC Female  | Front panel                         |
| Interface Connector  | 9-Pin D-Sub   | Rear panel                          |
| AC Power   | IEC 60320-C14   | Or equivalent                       |
| Cooling: Built in Quiet-Cool   | Close circuit Air-liquid cooling  |                                     |
| <b>STANDARD:</b> Digital Monitor & Control (DMC)<br>FWD, REV, VSWR, GAIN, ALC, V & I, TEMP,<br>Optional Safety Interlock (INT) | Ethernet RJ-45 TCP/IP, RS422/485, USB<br>GPIB Interface<br>Open=STBY/Short=RFON | IEEE rear panel<br>BNC-F rear panel |

### AVAILABLE SPECIAL OPTIONS

| Parameter                       | Specification        | Notes               |
|---------------------------------|----------------------|---------------------|
| Option FRS: Forward RF Sample   | -60dB, Type N-Female | Front or rear panel |
| Option RRS: Reflected RF Sample | -50dB, Type N-Female | Front or rear panel |

## OPERATING INSTRUCTIONS & GENERAL INFORMATION

### INTRODUCTION

Advanced Amplifiers is an amplifier equipment and services company supporting commercial and government organizations worldwide.

Headquartered in San Diego, California, the company utilizes its global network of resources to effectively serve and support customer requirements.

As a unique original equipment manufacturer of power amplifiers ranging from 10KHz to 40GHz with various output power levels for CW & pulse testing applications, we can also fully support custom designs and manufacturing requirements for both small and large volume procurements. We bring decades of combined experience in the RF field for numerous applications including and not limited to, EMI/EMC, communications, and various commercial and industry standards.

With our in-house capabilities and fully equipped testing facilities, Advanced Amplifiers is committed to provide the best in RF products with industry leading quality and lead times.

### INCOMING INSPECTION

Inspect unit for any sign of external damage. Do not use this equipment if there is physical damage or missing parts. Inspect all front and rear panel connectors for damage. Inspect fans and their airways for any damage or blockings. For a unit with a digital controller option, the USB and ethernet interface and commands list is in the second part of the manual.

### RF & AC CABLE CONNECTION

RF Input and Output connectors are outlined in the specifications table. Use the standard AC cable that was supplied by the manufacturer or higher power rating cables than the manual specifies. Refer to the front and rear panel description page for the location of RF and AC connectors.

**For a system with a digital controller option – DO NOT USE OR CONNECT a PoE enabled ethernet switch to a system. Our digital controller does not support PoE connection and will cause permanent damages to a controller unit.**

### RF TURN ON PROCEDURE

Connect RF input to an RF generator. Connect a suitable load for the power rated and continuous operation to the output connector. Turn on the AC switch, display will show STANDBY. Optionally, connect the unit to a digital control Software or Ethernet connection. Set the RF generator to nominal 0dBm and set the desired frequency in the specified range. Select Gain or ALC and set to the desirable output power level then press the ONLINE button. Use the front panel LCD gain adjust or the remote function to adjust the output power on the power meter and the LCD screen to desired levels.

Refer to the Controller manual for detailed operating instructions of the local and remote controller.

### RF TURN OFF PROCEDURE

Decrease the RF drive from the RF generator to below -20dBm and press STANDBY on the LCD or via the control software. Turn off AC switch on the front panel. Disconnect any unnecessary cable connections.

## **DECLARATION OF CE CONFORMITY**

We, Advanced Amplifiers Corp, declare under our sole responsibility that the product to which this declaration relates is in conformity with the following standard(s) or other normative document(s):

Council Directive 98/37/EC on the Safety of Machinery Directive

Council Directive 2014/35/EC on Low Voltage Equipment Safety

## **LIMITED WARRANTY**

Advanced Amplifiers warrants those goods delivered hereunder, at the time of delivery, will be free from defects in workmanship and material and will conform to the requirements of the purchase order. Seller's liability hereunder shall be limited to the repair or replacement of defective goods F.O.B. factory of which Seller is modified in writing by Buyer within three (3) years following delivery thereof to Buyer, and in no event will Seller be liable for incidental, special or consequential damages. (Note: One (1) year warranty for moving parts such as fans and power supplies). The foregoing warranty is in lieu of all other warranties express or implied (except as to title), including any implied warranty of merchantability or suitability for purpose or against infringement.

## **CONTACT INFORMATION**

Please send all inquiries to:  
Advanced Amplifiers

10401 Roselle Street  
San Diego, CA 92121

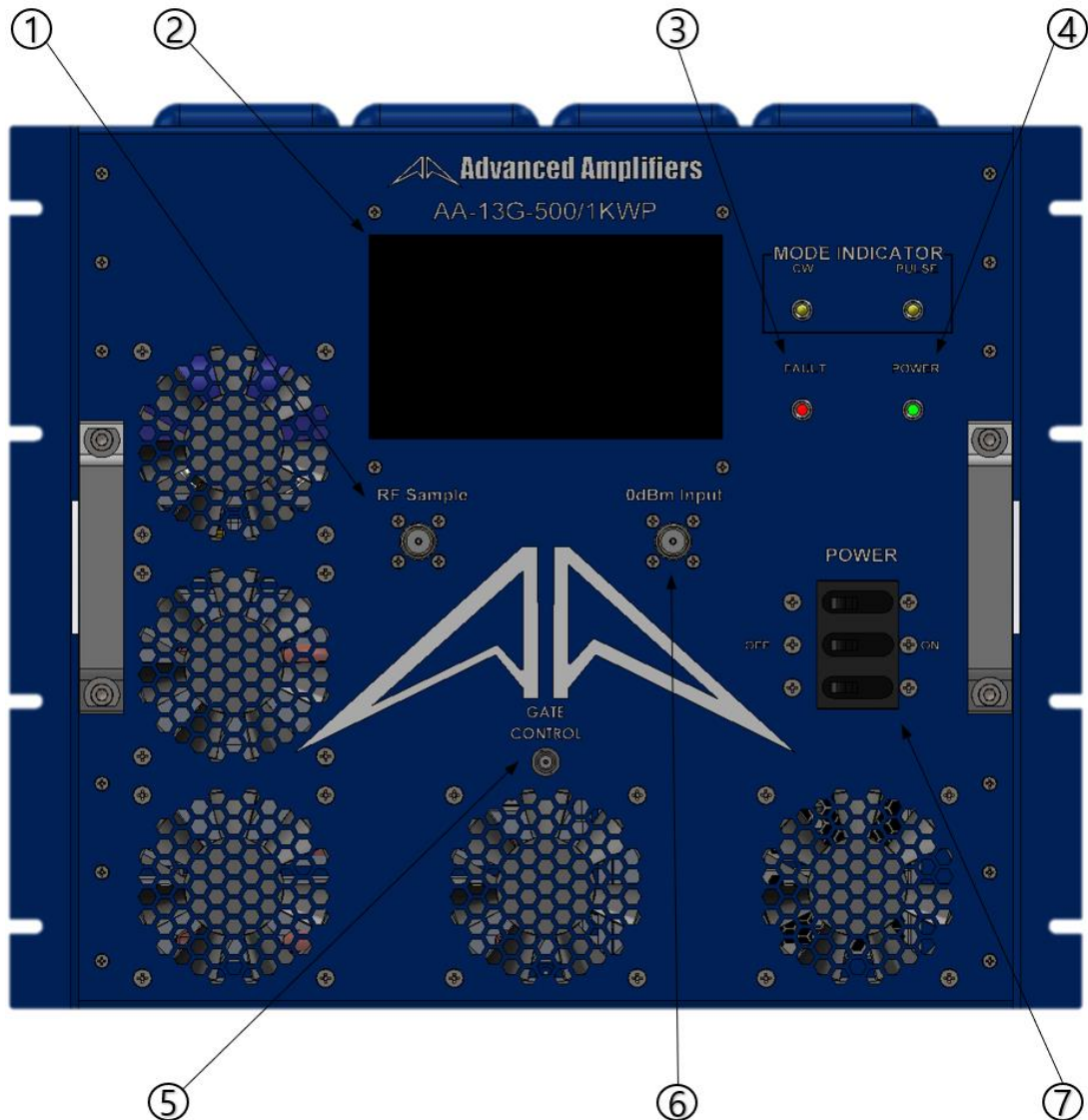
WEB: [WWW.ADVANCEDAMPLIFIERS.COM](http://WWW.ADVANCEDAMPLIFIERS.COM)  
EMAIL: [SALES@ADVANCEDAMPLIFIERS.COM](mailto:SALES@ADVANCEDAMPLIFIERS.COM)

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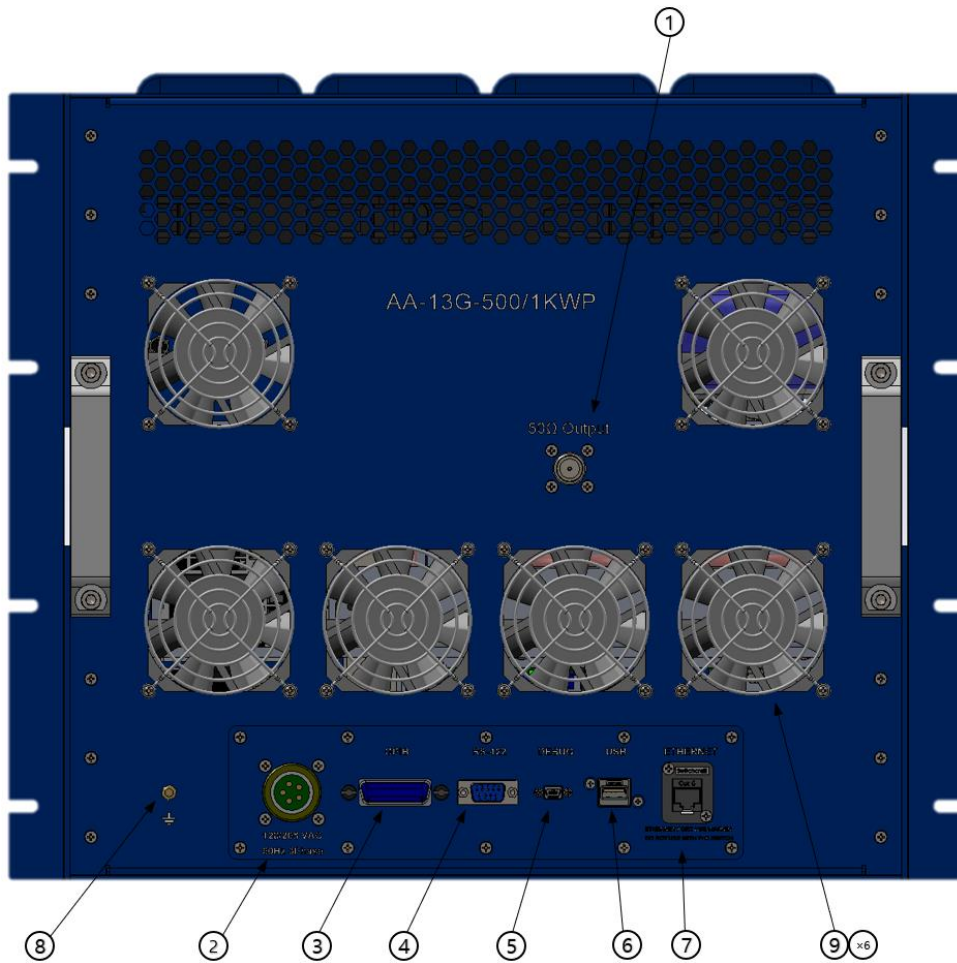
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## FRONT & REAR PANEL DESCRIPTIONS

### FRONT PANEL VIEW



| No. | Title        | Function  |
|-----|--------------|---|
| 1   | RF SAMPLE    | N Female, RF SAMPLE Connector.<br>SAMPLE PORT MUST BE TERMINATED AT ALL TIME.   |
| 2   | LCD DISPLAY  | Touch screen LCD Display, System Control LCD Panel.   |
| 3   | FAULT LED    | System Fault LED: Turn ON an LED when Over-Temp, Ext. Shutdown.   |
| 4   | POWER LED    | Turn On a LED when Power Supply On.   |
| 5   | GATE CONTROL | CW mode – a TTL-high of 3.3-5.0vdc is applied to allow RF amplification.<br>Pulse mode – a TTL-high/TTL-low Pulse signal at the required rep-rate and pulse width is applied to allow RF amplification. |
| 6   | 0dBm INPUT   | N Female, RF INPUT Connector.   |
| 7   | POWER SWITCH | System Power Switch.  |

**REAR PANEL VIEW**


| No.   | Title                                | Function  |   |                                      |
|---|--------------------------------------|---|---|--------------------------------------|
| 1   | 50Ω OUTPUT                           | N Female, 50Ω OUTPUT Connector.   |   |                                      |
| 2   | AC POWER CONNECTOR                   | AC Power Input 120 ~ 208VAC, 60Hz 3Phase, MS3102E MIL Connector.  |   |                                      |
| 3   | GPIB                                 | IEEE-488 GPIB Interface Connector, Female.  |   |                                      |
| 4   | RS-422                               | System RS-422 Communication / Gating Signal Female 9-Pin D-Sub Connector.<br><table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-right: 1px dashed black;">                     P1 TX-<br/>                     P2 TX+<br/>                     P3 RX+<br/>                     P4 RX-<br/>                     P5 GND (RS-422)                 </td> <td style="width: 50%;">                     P6 N/C<br/>                     P7 N/C<br/>                     P8 N/C<br/>                     P9 N/C                 </td> </tr> </table> | P1 TX-<br>P2 TX+<br>P3 RX+<br>P4 RX-<br>P5 GND (RS-422) | P6 N/C<br>P7 N/C<br>P8 N/C<br>P9 N/C |
| P1 TX-<br>P2 TX+<br>P3 RX+<br>P4 RX-<br>P5 GND (RS-422) | P6 N/C<br>P7 N/C<br>P8 N/C<br>P9 N/C |   |   |                                      |
| 5   | DEBUG                                | System Controller Debugging Female Connector.<br><b>Port access required factory authorization.</b>   |   |                                      |
| 6   | USB                                  | USB Communication Connector, Type A Female.   |   |                                      |
| 7   | ETHERNET                             | Ethernet Communication Female Connector, RJ-45.<br><b>For a system with a digital controller option – DO NOT USE OR CONNECT a PoE enabled ethernet switch to a system. Our digital controller does not support PoE connection and will cause permanent damages to a controller unit.</b>  |   |                                      |
| 8   | GND                                  | Frame Ground.   |   |                                      |
| 9   | Cooling FAN                          | System Outlet Cooling FAN.  |   |                                      |



**SYSTEM OUTLINE VIEW**

