

ALPHA 2100

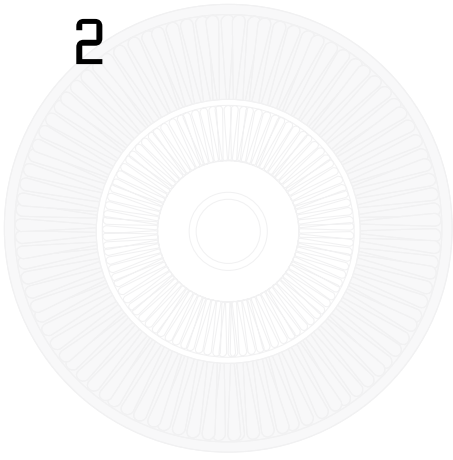
HF DUMMY LOAD

OPERATING MANUAL

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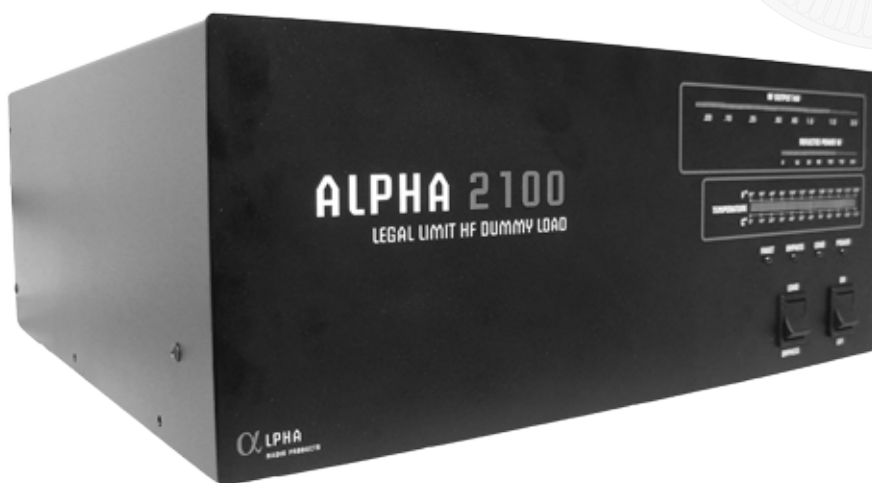
ALPHA 2100 OPERATING MANUAL

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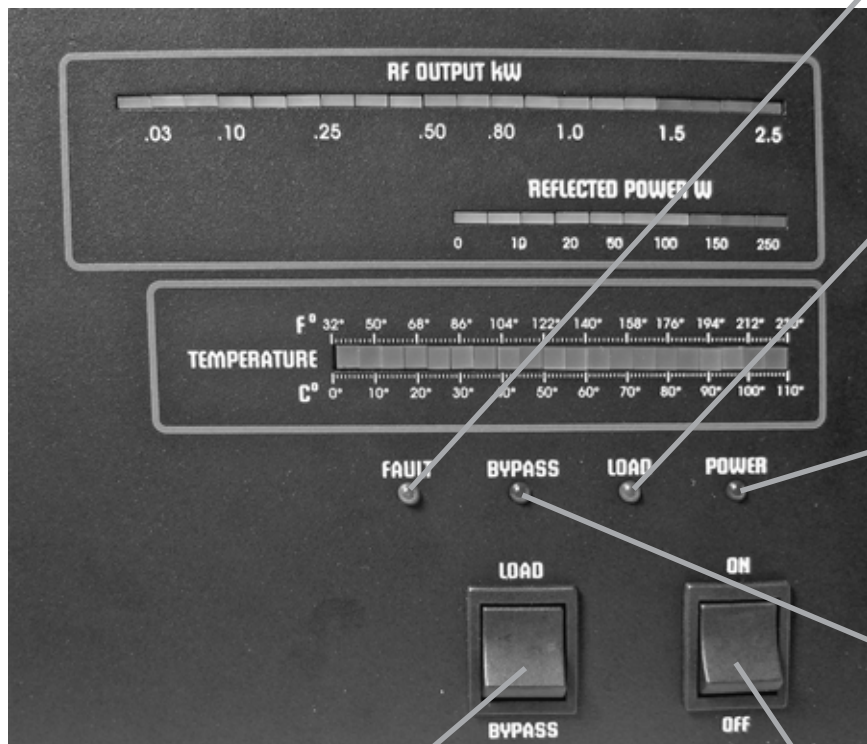
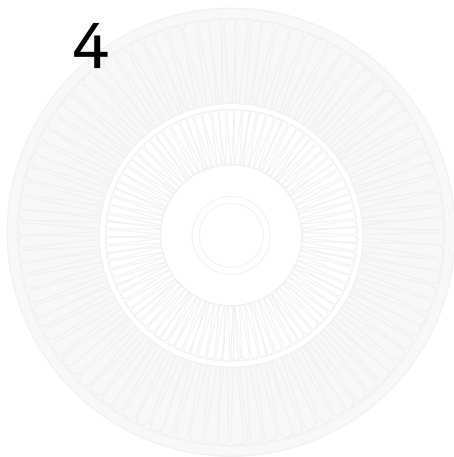


The Alpha 2100 is a state-of-the-art dummy load/wattmeter suitable for use as a station accessory or lab instrument. It has the following features:

- Fully "dry" with forced air cooling. No oil or other liquid coolant.
- Can be left in-line in "bypass" mode for normal station operation, and the dummy load selected by pushing a switch.
- Built-in wattmeter which shows forward and reflected power
- Load temperature is shown on front panel using a digital temperature sensor
- Fans come on when temperature rises, and shut off when load has cooled
- Adjustable SWR trip feature allows radio-amp key line to be interrupted to protect amp
- Temperature trip interrupts amp key line if load temperature is too high, to protect load
- Automatic selection of line voltage for 110/240V ac lines
- Attractive front panel to match modern station layouts
- All features accessible remotely through serial port
- Easy firmware upgrade via serial port

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Fault LED. When lit this indicates that the unit has detected a fault condition, either a high reflected power or excessive load temperature. In both cases the connection between Key In and Key Out will be interrupted. This condition persists until the Key line is released (radio is un-keyed).

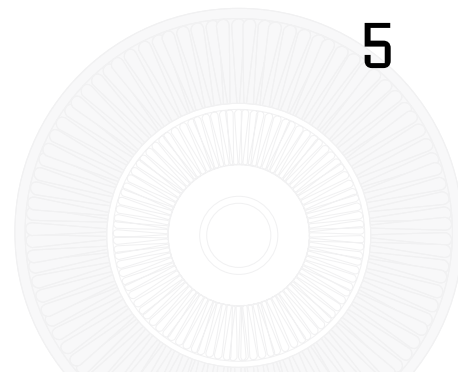
Load LED. When lit, this indicates that the connected RF source is being applied to the internal dummy load, either as a result of local (front panel) control, or as a result of receipt of the correct serial command.

Power LED. This is lit when power is applied on the unit is turned on.

Bypass LED. When lit, this indicates that the connected RF source is now switched through to the second (RF OUT) connector on the rear of the unit, either as a result of local (front panel) control, or as a result of receipt of the correct serial command.

Bypass/Load switch. This switch allows the user to connect the rf source to either the internal dummy load or to an external antenna or other load. The state of the switch is shown by the BYPASS and LOAD LEDs. If the unit is commanded remotely via the serial interface, the LEDs may not correspond to the switch position. However, if the switch is actuated, the 2100 assumes that local control is now required and will link the LOAD/BYPASS functions to the switch. By this means, the unit automatically accommodates to local or remote control.

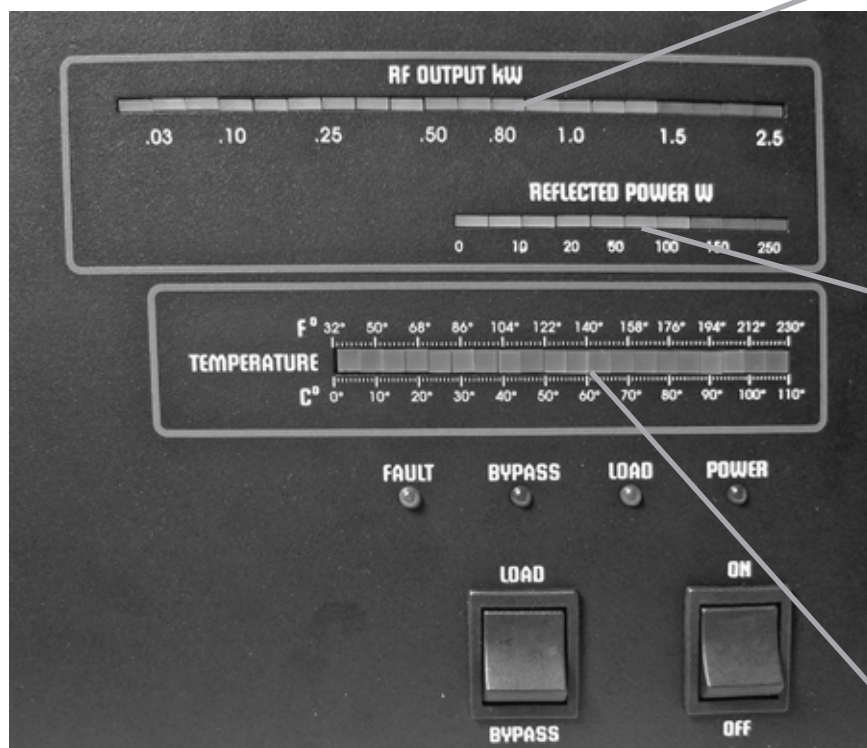
On/Off switch. Turns the unit on or off by switching the ac line. This feature cannot be remotely operated. If the unit is in a remote installation, turn this switch to the "ON" position and leave it there.



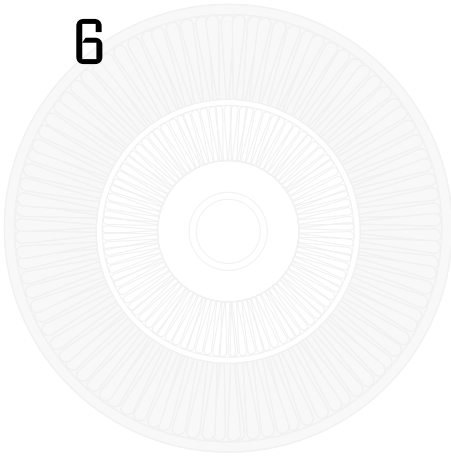
Forward power display. This displays the power level up to 2500 watts as a linear bar graph. This is a “quasi-peak” indication, with a fast attack/slow decay feature to improve visibility.

Reflected power display. This has two modes. Normally it displays the reflected power sensed by the wattmeter as a linear bar graph, similarly to the forward power display. If either of the “Trip Set” buttons on the rear panel is depressed, then it shows the current value of the reflected power trip set point.

Temperature display. This display has one LED lit, and gives the temperature, as shown on the Celsius and Fahrenheit scales. This shows the temperature of the load, and should be monitored to make sure the load does not overheat, especially if powers greater than 3,000 Watts are being applied to the load. Below 3,000 Watts the load should be able to operate continuously, unless the inlet air is much hotter than normal room temperature, or the airways in the heat exchanger have become obstructed for any reason.



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RF in. This connector should be connected to the RF power source (radio or amplifier).

AC power. This allows a standard power cord to connect the unit to the ac line. The unit automatically adapts to ac line voltages between 90 and 260 Volts ac, 50/60 Hz.

RF out. This connector can be left disconnected if only the dummy load feature is to be used, such as when an RF source is being bench-tested. If the 2100 is being used as a station accessory, then connect the antenna to this port.

Trip set switches. These switches allow the set point for the reflected power trip to be adjusted. By depressing the UP switch, the trip threshold is increased. Depressing the DOWN switch lowers the trip threshold. The trip threshold is saved in non-volatile memory and will be restored at power-up.

Key in. This connector should be connected to the keying line which would normally go from the radio to the amplifier, if the reflected power safety trip feature of the 2100 is to be used. If an amplifier with built-in safety features is used, this may optionally be left disconnected. For powers greater than 3,000 Watts, it is recommended that the safety trip be used, since it will trip the amplifier in the event the internal load overheats as well.

Serial port. This is a standard 9-pin serial port that allows for full remote operation and monitoring of the 2100. Use of this remote port is described in section xxx. The 2100 internal firmware can also be upgraded via this port using an external PC.

Key out. If the key line safety trip feature is to be used, this line should be connected to the amplifier with a suitable cable. If the trip feature is not being used, it should be left disconnected.

Suggested station setup with Dummy Load

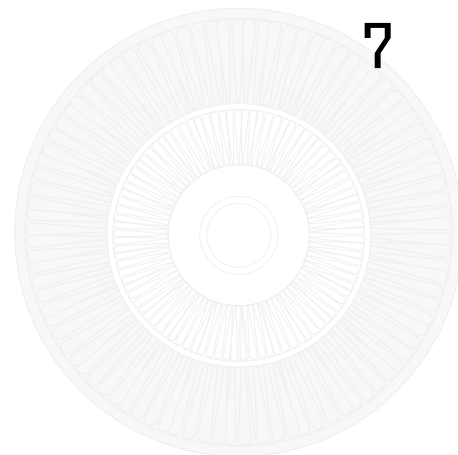
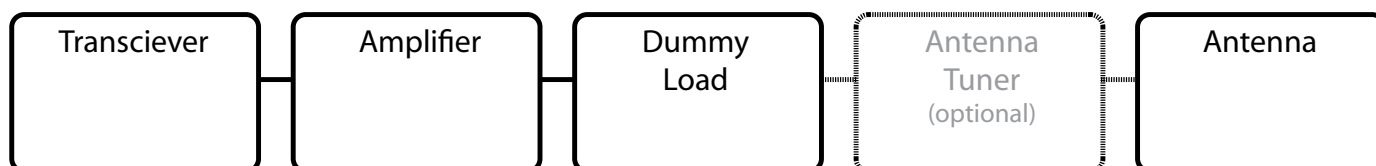


Figure 1 Station Setup



Set up and installation of the Alpha 2100

1. Carefully remove the Alpha 2100 from its box. If you are not comfortable lifting 50 lbs please have someone give you a hand.
2. When positioning your dummy load you **MUST** allow 4" of space between the back of the load and any other surface; the space must have unrestricted airflow. The dummy load must be placed on a hard flat surface to ensure adequate air flow through the intakes located on the underside of the load. If the Alpha 2100 will be in continuous use it must be canted up on its bail.
3. Plug the power cord into the back of the Alpha 2100 and attach the ground if one is available. The 2100 will work on 90V to 250V AC, inside of the United States the Alpha 2100 is shipped with a 110V AC cord.
4. Connect the amplifier or transceiver to the RF IN connector located on the back of the dummy load. Connect the antennae(s) or antennae tuner to the RF OUT connector.
5. For non-Alpha amplifiers attach your transceiver to the KEY IN jack and attach your amplifier to the KEY OUT jack.
6. You may attach a spectrum analyzer or an oscilloscope to the Alpha 2100 through the RF SAMPLE connector. The RF SAMPLE jack supplies a signal that is 40dBm below the amplifier output power.
7. You may attach the Alpha 2100 to computer through either the serial or USB connector, these connections allow for remote control and data monitoring.

Set up and installation of the Alpha 2100

The primary intended use for the Alpha 2100 is as an in-line station accessory. The following instructions cover its use in this mode.

In its powered down state the Alpha 2100 allows bypass of all signals, it is not necessary to power up or disconnect the unit if you do not desire to use it.

Standard Operation Procedure

1. When powering on the unit make sure that it is in BYPASS mode; the BYPASS LED should be lit when you power up the unit.
2. To tune your amplifier up at full power switch the Alpha 2100 from BYPASS to LOAD. The LOAD LED should be lit when you switch modes. Tune your amplifier into the dummy load, which will dissipate up to 6kW for a minute or 1500 W of continuous power. Once the amplifier is satisfactorily tuned switch the 2100 back into bypass mode and do some minor touch up tuning through your antenna, you are ready to transmit.

You may also use your Alpha 2100 as a piece of test equipment when calibrating or troubleshooting your transceiver or amplifier.

Specifications

Continuous power (indefinite)	1,500 Watts
Surge power (1 minute max)	6,000 Watts
SWR (DC-60 MHz)	<1.2:1
SWR (60-100MHz)	<1.6:1
Ac line voltage	90-260 Volts
RF Connectors	TypeN / UHF
Serial port connector	9-pin / USB type B
Key in/out connectors	RCA female
Size	
Weight	47 lbs.

Alpha 2100 Block Diagram

Block diagram Figure 2 shows the block diagram of the AP2100. At the heart of the unit is a frequency-compensated 50 Ohm load with integral fans. RF in to the instrument passes through a directional wattmeter and a load bypass unit to the output. By activating relays in the bypass unit, the RF in may be connected to the load. The forward and reflected power signals from the wattmeter are digitized in the controller and then displayed on the front panel. The temperature of the load is sensed by a digital temperature sensor, and this is displayed on the front panel. The temperature is also used to turn on power to the load's fans when required. The key line from the radio to an external amplifier can be routed through the 2100. The key trip module can interrupt this line, which allows the amplifier to be protected if high reflected power is sensed. A high speed serial port allows all monitored parameters to be displayed remotely, and all amplifier functions to be remotely controlled. This is particularly useful for remote stations.

Figure - Block Diagram

