

Overview:

The AOD Amplifier is a high power three output RF amplifier designed to be used with the Harris H-902 Wideband UV Acousto-Optic Deflector (AOD). Each output is delayed 5nS from the adjacent channel. The AOD amplifier is offered in a compact 1U chassis as well as in a higher power 2U chassis. Features of the amplifier include:

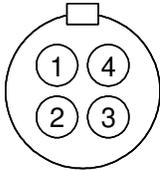
- 200MHz operation
- High power output stages
- High linearity
- Adjustable linearity / power (2U)
- Adjustable gain
- RF power monitoring with programmable overpower limit
- Temperature monitoring
- USB / optional Ethernet control
- Alarm output



Connections and Indicators

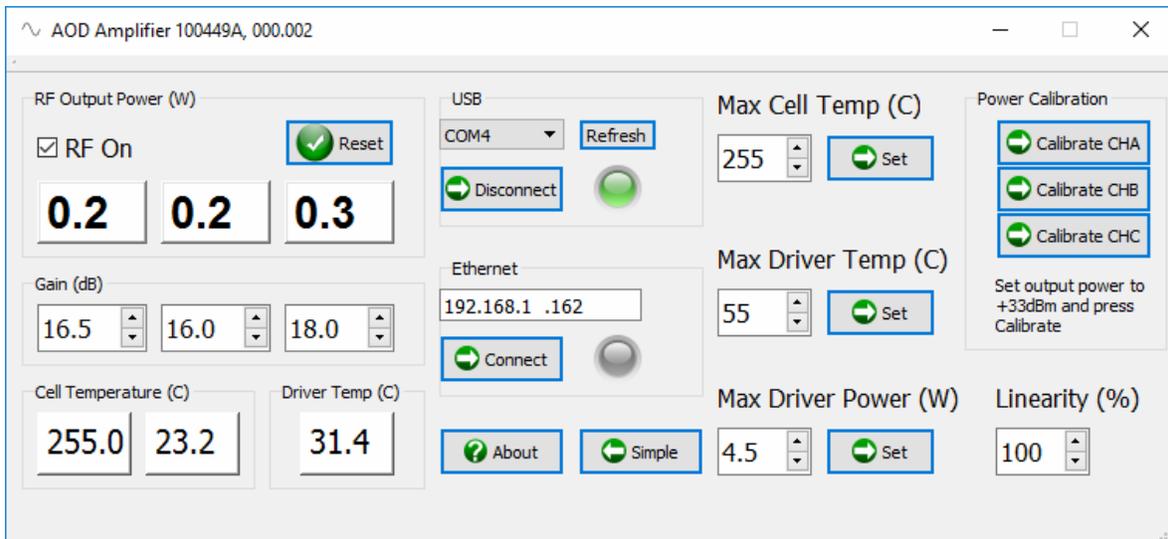
Connection	Description
Power switch	Main on/off switch.
Alarm output	3.3V logic level, high indicates an RF over power condition and/or the RF outputs are off.
RF In	RF input, +10dBm max.
RF Out A	Amplified RF output.
RF Out B	Amplified RF output, delayed 5nS from RF Out A.

Connection	Description
RF Out C	Amplified RF output, delayed 5nS from RF Out B.
LED	Green= normal, Red= RF Off, G/R flashing= temperature limit reached.
Ehernet	For computer control.
Program button	Recessed programming button under Ethernet port. See the software programming guide for more information.
USB	For computer control.
Therm	Thermistor connection to the AO cell. The recommended mating connector is Lemo, FGG.0B.304.CLAD52 and the recommended thermistor type is Omega ON-950-44005-30. Thermistor A should be connected to pins 1 and 2, and thermistor B should be connected to pins 3 and 4.



Operation

The AOD Amplifier is monitored and controlled using the supplied Windows application shown below. The user can use either a USB port or optional Ethernet connection. Upon launching the application or pressing the “Refresh” button, the software will search for the amplifier and populate the USB dropdown list accordingly. Press either the USB or Ethernet connect button to connect to the amplifier. Upon connection, all settings and measurements in the interface will be populated. Note, only one interface (either USB or Ethernet) should be connected at the same time.

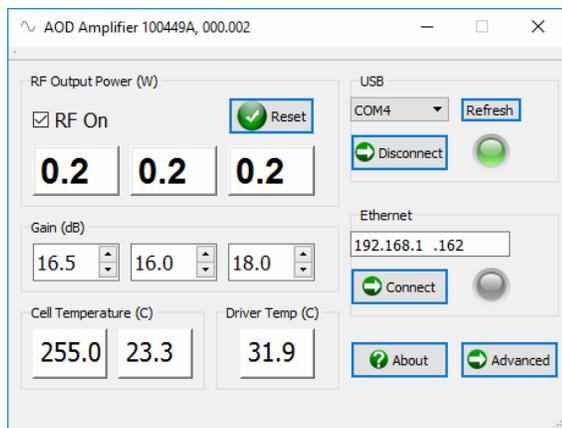


User Interface Fields

Control	Description
USB area	The refresh button searches for connected devices and refreshes the port list. Select the desired port and press connect to use USB. The LED indicates the connection.
Ethernet area (if supplied)	Enter the desired IP address and press connect to use the Ethernet connection. The LED indicates the connection. See the software programming guide for information on changing the IP address.

Control	Description
RF On button	Turns the RF output amplifiers on/off. Disabling the amplifiers reduces the power dissipation by approximately 150W in the higher power unit assuming a linearity setting of 100%.
Reset button / indicator	This icon changes from a green check mark (normal) to a red exclamation mark when there has been an over power shut down event or the RF output power has been manually turned off. To clear the fault and turn the RF power on, correct any over power condition and press the button.
RF power	Displays the RF output power of each path in W.
Gain settings	Allows the user to adjust the gain of each path from 0dB to 31.5dB in 0.5dB steps. These gain settings are factory adjusted for an overall gain of 36dB. These values are retained between power cycles.
Cell temperature	Reports the two temperature sensor values on the AOD.
Driver temperature	Reports the temperature of the power amplifiers.
Simple / Advanced button	Pressing advanced expands the window to reveal the advanced controls described below.
Max Cell Temp	Allows the user to set the cell temperature that will cause a warning indication. This value is retained between power cycles.
Max Driver Temp	Allows the user to set the driver temperature that will cause a warning indication. This value is retained between power cycles.
Max Driver Power	Allows the user to set the maximum RF output power (at each output). This value is retained between power cycles.
Calibrate Buttons	Pressing the calibrate button calibrates the RF output power sensor relative to 2W. This value is retained between power cycles.
Linearity	High power (2U) model only. Allows the user to adjust the RF power amplifiers bias point. Higher values result in better linearity, higher gain, and higher power dissipation.

Protection Features:



Since the AOD can be damaged with excessive RF drive levels and the AOD amplifier is capable of producing RF levels up to 15W, protection features have been implemented. A fast acting over power shutdown circuit is included to turn off the output amplifiers in the event any RF power level exceeds the max power setting. Upon a fault condition the RF outputs are latched off and the alarm output goes to a logic high; a manual reset must be performed to clear the fault. The recommended over power setting is 4.5W. In order for the over power protection circuit to function correctly, each power sensor must be accurately calibrated. A setting of zero will disable the over power protection feature.

Since the AOD can also be damaged by excessive temperatures, it incorporates two temperature sensors which are monitored by the AOD amplifier. The amplifier also includes a temperature sensor

for the internal RF circuitry. If the temperature of any sensor exceeds the maximum setting, the front panel LED will flash red/green and the color of the temperature reading will turn red. An over temperature condition does not correct itself; it is up to the user to correct the condition before damage occurs. Clearing the “RF On” check box will reduce both the driver and AOD power dissipation.

Calibration

The AOD Amplifier power sensors must be calibrated to ensure proper readings and correct operation of the over power protection circuitry. To calibrate the sensor, adjust the RF output power to 2W and press the corresponding calibrate button. This value will be stored in NV memory and retained across power cycles. Note, it may be necessary to disable the over power protection circuitry during calibration as described above.

Gain Setting

The AOD Amplifier is factory set for an overall gain of 36dB but can be changed by the user if desired. Care should be observed when configuring the gain, as flatness may be reduced with settings beyond 36dB.

Linearity (Higher Power Model Only)

With the higher power 2U model, the software interface allows the user to adjust the RF power amplifier linearity in terms of 0 to 100%. A value of zero turns the RF amplifiers completely off reducing their power dissipation and gain to zero. A setting of 100% maximizes gain and linearity and increases the combined power dissipation to approximately 150W. The recommended range for linearity during normal operation is 70 to 100%.

Revision and Compatibility Table

Date	Firmware	Software	Description
8/10/2018	0.3	0.4	Added support for 100473A (1U AOD Driver), Change to alarm logic.
12/7/2017		0.3	Added code so that GUI remembers the last IP address and restores it upon startup.
5/24/2017	0.2	0.2	Increased temperature measurement resolution to 0.1°C
3/15/2017	0.1		Added 0xFF termination to all responses
1/4/2017	0.0	0.0	Initial release