

PONA 3000 Series High Power EDFA User's Guide



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Safety Information

Power Requirements

The system can operate from an AC power source that supplies 85 V AC to 265 V AC 50/60 Hz or a DC power source that supplies -36 to -60 V DC..

Safety Instructions

The following safety instructions must be observed whenever the unit is operated, serviced, or repaired. Failure to comply with any of these instructions or with any precaution or warning contained in the user's manual is in direct violation of the standards of design, manufacture, and intended use of the unit. ORTEL assumes no liability for the customer's failure to comply with any of these safety requirements.

Before Initializing and Operating the Unit

- ☒ Inspect the unit for any signs of damage, and read the user's manual thoroughly.
- ☒ Install the unit as specified in the **Getting Started** section.
- ☒ Ensure that the unit and any devices or cords connected to it are properly grounded.

Operating the Unit



Warning

To avoid the risk of injury or death, always observe the following precautions before initializing the unit:

- If using a voltage-reducing autotransformer to power the unit, ensure that the common terminal connects to the earthed pole of the power source.
- Use only the type of power cord supplied with the unit.
- Connect the power cord only to a power outlet equipped with a protective earth contact. Never connect to an extension cord that is not equipped with this feature.
- Willfully interrupting the protective earth connection is prohibited.
- Never look into the end of an optical cable connected to an optical output device that is operating. Laser radiation is invisible, and direct exposure can severely injure the human eye. For more information, see the user's manual of the laser source in use.
- Turning off the power to the device does not always block the externally supplied radiation to the connector at the output of the unit.
- Do not use the unit outdoors.
- To prevent potential fire or shock hazard, do not expose the unit to any source of excessive moisture.
- Do not operate the unit when its covers or panels have been removed.
- Do not interrupt the protective earth grounding. Any such action can lead to a potential shock hazard that can result in serious personal injury.
- Do not operate the unit if an interruption to the protective grounding is suspected. In this case, ensure that the unit remains inoperative.
- Use only the type of fuse specified by the manufacturer as appropriate for this unit. Do not use repaired fuses, and avoid any situations that can short-circuit the fuse.
- Unless absolutely necessary, do not attempt to adjust or perform any maintenance or repair procedure when the unit is opened and connected to a power source.
- Repairs are to be carried out only by a qualified professional.
- Do not attempt any adjustment, maintenance, or repair procedure to the unit's internal mechanism if

	immediate first aid is not accessible. • Disconnect the power cord from the unit before adding or removing any components. • Operating the unit in the presence of flammable gases or fumes is extremely hazardous. • Do not perform any operating or maintenance procedure that is not described in the user's manual. • Some of the unit's capacitors can be charged even when the unit is not connected to the power source.
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Safety Symbols

The following symbols and messages can be marked on the unit (Table 1). Observe all safety instructions that are associated with a symbol.

Table 1: Safety Symbols

Symbol	Description
	Laser safety. See the user's manual for instructions on handling and operating the unit safely.
	See the user's manual for instructions on handling and operating the unit safely.
	Electrostatic discharge (ESD). See the user's manual for instructions on handling and operating the unit safely.
	Frame or chassis terminal for electrical grounding within the unit.
	Protective conductor terminal for electrical grounding to the earth.
WARNING	The procedure can result in serious injury or loss of life if not carried out in proper compliance with all safety instructions. Ensure that all conditions necessary for safe handling and operation are met before proceeding.
CAUTION	The procedure can result in serious damage to or destruction of the unit if not carried out in compliance with all instructions for proper use. Ensure that all conditions necessary for safe handling and operation are met before proceeding.

Getting Started

The PONA 3000 Series Optical Amplifier provides optical isolation on the input and output of the gain block for stable, low noise operation. The input and output optical signal power levels are detected for monitoring and control. The input optical signal is amplified with active gain control for a constant output power level, or with active output power control for constant gain mode. The PONA 3000 Series Optical Amplifiers also provide monitors and associated alarms for all vital characteristics. The optical output of the PONA 3000 Series Optical Amplifiers can be split into several ports by an optional internal splitter.

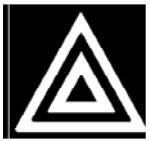
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The PONA 3000 Series includes: AC/DC Power Supply, Front Panel, Optical Splitters, network card, and all necessary connectors.

Before Initializing and Operating the Unit

- Inspect the unit for any signs of damage.
- Read the user's manual thoroughly, and become familiar with all safety symbols and instructions to ensure that the unit is operated and maintained safely.

Initial Inspection

**Warning**

- To avoid electrical shock, do not initialize or operate the unit if it bears any sign of damage to any portion of its exterior surface, such as the outer cover or panels.

Check that the unit and contents are complete:

1. Wear an anti-static wrist strap and work in an electrostatic discharge (ESD) controlled area.
2. Inspect the shipping container for any indication of excessive shock to the contents, and inspect the contents to ensure that the shipment is complete.
3. Inspect the unit for structural damage that can have occurred during shipping.

Note: Keep the packaging.

Immediately inform Ortel and, if necessary, the carrier if the contents of the shipment are incomplete, if the unit or any of its components are damaged or defective, or if the unit does not pass the initial inspection.

Operating Environment

In order for the unit to meet the warranted specifications, the operating environment must meet the following conditions for temperature and humidity.

Temperature

The unit can be operated in the temperature range of -0 to 50°C (standard) or -40 to 65°C for custom orders.

Humidity

The unit can be operated in environments with up to 85% humidity, non-condensing (-40 to 85 °C). Do not expose it to any environmental conditions or changes to environmental conditions that can cause condensation to form inside the unit.

**Warning**

- Do not use the unit outdoors.
- To prevent potential fire or shock hazard, do not expose the unit to any source of excessive moisture.

Storing and Shipping

To maintain optimum operating reliability, do not store the unit in locations where the temperature falls below -40°C or rises above 85°C. Avoid any environmental condition that can result in internal condensation. Ensure that these temperature and humidity requirements can also be met whenever the unit is shipped.

Claims and Repackaging

Immediately inform Ortel and, if necessary, the carrier, if

- The contents of the shipment are incomplete
- The unit or any of its components are damaged or defective
- The unit does not pass the initial inspection

In the event of carrier responsibility, Ortel will allow for the repair or replacement of the unit while a claim against the carrier is being processed.

Returning Shipments to Ortel

Ortel only accepts returns for which an approved Return Material Authorization (RMA) has been issued by Ortel sales personnel. This number must be obtained prior to shipping any material to Ortel. The owner's name and address, the model number and full serial number of the unit, the RMA number, and an itemized statement of claimed defects must be included with the return material.

Ship the return material in the original shipping container and packing material. If these are not available, typical packaging guidelines are as follows:

1. Wear an anti-static wrist strap and work in an ESD controlled area.
2. Wrap the unit in anti-static packaging. Use anti-static connector covers, as applicable.
3. Pack the unit in a reliable shipping container.
4. Use enough shock-absorbing material (10 to 15 cm or 4 to 6 in on all sides) to cushion the unit and prevent it from moving inside the container. Pink poly anti-static foam is recommended.
5. Seal the shipping container securely.
6. Clearly mark FRAGILE on its surface.
7. Always provide the model and serial number of the unit and, if necessary, the RMA number on any accompanying documentation.

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8. Please contact the RMA department, using the contact information at the beginning of this document, to provide an RMA number and a shipping address.

Unpacking

1. Inspect the shipping boxes for any obvious damage.
2. Unpack the unit from all packaging boxes.
3. Inspect the appearance of the unit for any shipping damage.
4. In case of damage, document and inform the shipping company and your local representative.
5. Save the shipping boxes and their inserts for any future reshipment for upgrade or repair.

NOTE: In the event of a reshipment back to the manufacturer, any additional damage caused by not using the original boxes will be considered the responsibility of the customer.

PONA Mounting and Power Connection

1. Mount the unit into a 19-inch wide rack or cabinet.
2. Turn the unit power supply switch located on the rear panel off.
3. Turn the key switch located on the front panel to the OFF position.
4. AC powered models: Plug the power cord supplied with the Unit into the three-prong connector on the rear panel and place the other end of the power cord into a 100-240 VAC, 50-60 Hz power source (e.g. wall socket).
5. DC powered models: Slightly loosen the screws labeled -48V and -48V RTN. Place a wire under the screw labeled "-48V RTN" and tighten the screw. Attach the opposite end of the wire to a ground terminal on a -48V DC power supply (-36 to -60V). Place a wire under the screw labeled "-48V" and tighten the screw. Attach the opposite end of the wire to a -48V terminal on a -48V DC power supply. Turn on the DC power supply.
6. Turn the unit power switch to the ON position.

Optical Connections and Unit Verification

1. Clean all fiber patch cords before connecting.



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Cleaning Guidelines

Fiber Patch cord connectors

- Remove the fiber connector dust cap and wipe the fiber connector tip with a dry lint-free cloth (such as *Kimwipes*). Inspect for scratches or debris on connector surface by using a fiberscope.
- If no scratches or debris are found the connector is now clean and ready for connection. If debris or scratches are found then repeat the fiber patch cord connector cleaning guidelines.

Fiber Bulkhead connectors

- Compressed air may be used to clean fiber bulkhead connectors. Use compressed air with at least the following specifications:
 - Non-residue, inert gas for precision dust removal
 - Ultra-filtered to < 0.2 microns
 - Recommended for optical systems
- Using compressed air as listed above, remove the bulkhead dust cover and hold the can of compressed air about 6 inches from the connector. After spraying a few short bursts into the bulkhead the connector is clean and ready for connection.
- If compressed air is not available, the PONA's fiber bulkhead connector can be cleaned by 2.5 mm cotton swap or connector plate may be removed to clean the internal fiber patch cords.

Note: CAUTION: Use caution when handling fibers. Do not exceed fiber manufacturers pulling tension or bend radius specifications when removing fiber bulkhead connector plate.

- To remove the PONA optical connector plate, remove the screw on the far left of the optical plate and remove the screw on the far right of the optical plate. Do not remove the screws on the optical bulkhead connector.
 - Slowly remove the optical connector plate from the rear panel and disconnect each fiber connector from the bulkhead mounted on the plate
 - Clean each fiber connector.
2. Make sure the laser key switch on the front panel is in the OFF position.
 3. Connect a fiber patch cord from the output of the transmitter to an optical power meter.
 4. Turn the transmitter laser key switch to the ON position and use a serial port connection to make sure the parameters are set for proper operation.
 7. Using the optical power meter verify the transmitter optical power is within specification.
 6. Turn the transmitter laser key switch to the OFF position.
 7. Remove the optical patch cord from the power meter and plug the patch cord input optical connector.
 8. Connect a patch cord from the output to an optical power meter.
 9. Turn the laser key switches on the transmitter and PONA front panel to the ON position.

Note: Using the optical power meter verify the optical output of the PONA is within specification.

Note: Difference in patch cords may result in slightly different optical power measurements.

10. Turn off the key switch.



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11. Remove the patch cord from the optical power meter and plug the patch cord into the fiber for the link being deployed.
12. Turn the key switch to the ON position.

General Information and Specifications

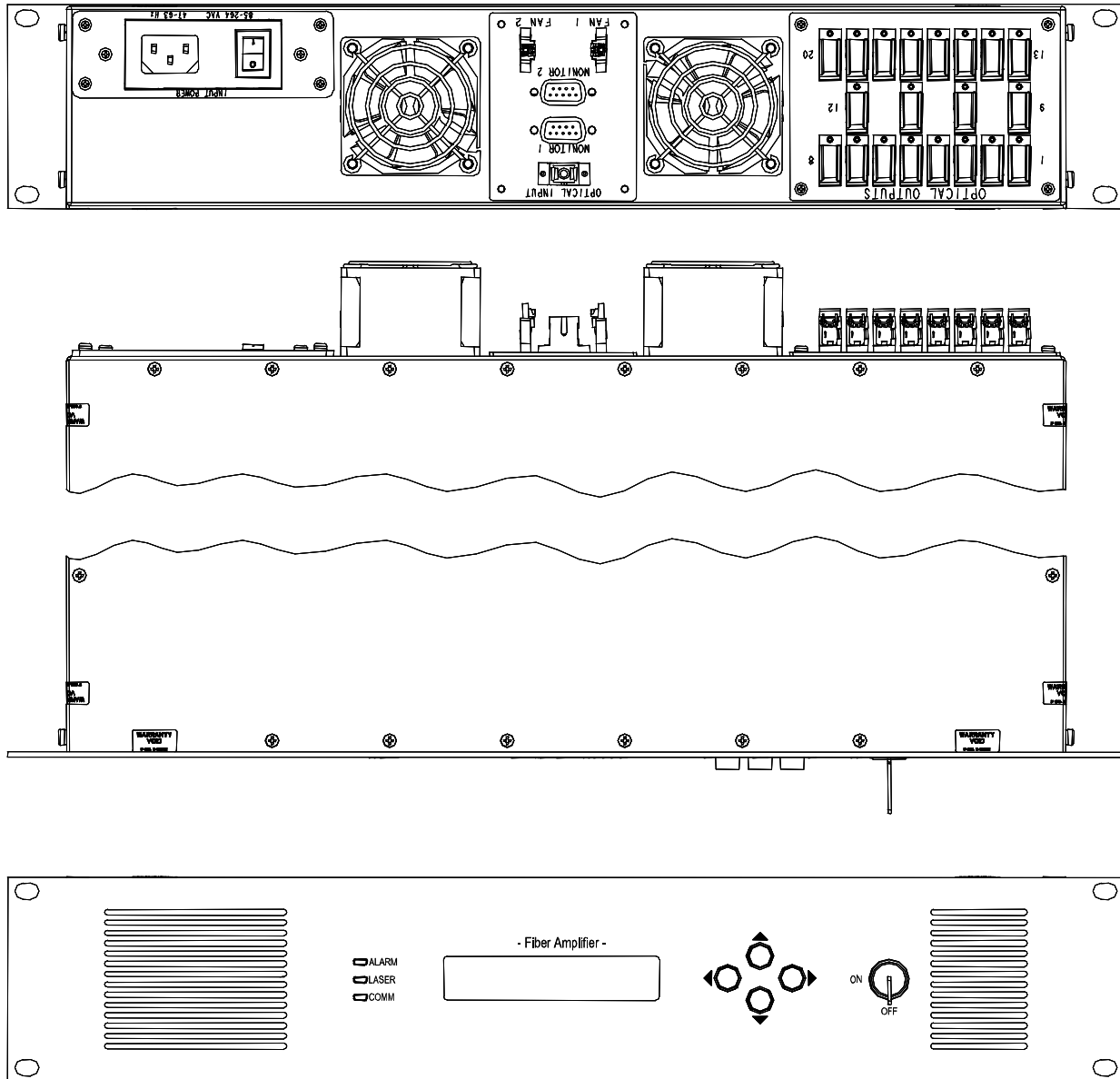
The Ortel PONA 3000 Series Fiber Optical Amplifier Module is an ideal building block for OEM system integrators. The family of PONA 3000 Optical Amplifiers is designed to meet the most demanding noise performance requirements of CATV and FTTx applications, and performs all functions required of an optical amplifier for system integration. PONA 3000 Series Optical Amplifiers provide optical isolation on the input and output of the gain block for stable, low noise operation. The input and output optical signal power levels are detected for monitoring and control. The input optical signal is amplified with active gain control for a constant output power level, or with active output power control for constant gain mode. The PONA 3000 Series Optical Amplifiers also provide monitors and associated alarms for all vital characteristics. The optical output of the PONA 3000 Series Optical Amplifiers can be split into several ports by an optional internal splitter.

The PONA 3000 Series includes: AC/DC Power Supply, Front Panel, Optical Splitters, network card, and all necessary connectors.

PONA 3000 Series Fiber Optical Amplifier Module. shows the PONA 3000 Series Fiber Optical Amplifier Module.

Figure iv - 1: PONA 3000 Series Fiber Optical Amplifier Module.

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Key Features

- Full Function High Power Fiber Optical Amplifier Ready for Integration
- Low Noise Figure (Typ < 6 dB)
- Total Input Power Range: -10 dBm to +12 dBm
- Total Output Power: +27 dBm to +35 dBm (optical output power splitter is optional for these units)
- Standard RS-232 Communications (RS-485, I²C, or SNMP are optional)
- Low Electrical Power Consumption
- Input/Output Isolation > 40/40 dB
- Polarization Dependant Gain < 0.1 dB
- Polarization Mode Dispersion < 0.5 ps

Specifications

Specifications for the PONA 3000 Series Fiber Optical Amplifier Module.

Table iv-1: Specifications

Property	Symbol	Limit	PONA Models						Comment
Product Code			3027	3030	3032	3033	3035	3037	
Performance									note 1
Operating Input Power	Pin (dBm)	Max	+12	+12	+12	+12	+12	+12	
Operating Output Power	Pin (dBm)	Min	-10	-10	-10	-10	-10	-10	
Output Power	Po (dBm)		27.0	30.0	32.0	33.0	35.0	37.0	Nominal (note 2)
Noise Figure	NF (dB)	Typ/Max	5.5/6.0	5.5/6.0	5.5/6.0	5.5/6.0	5.5/6.0	5.5/6.0	note 3
Static Gain Flatness	GF (dB)	Max	+/-2.0	+/-2.0	+/-2.0	+/-2.0	+/-2.0	+/-2.0	note 4
Dynamic Gain Flatness	(dB)	Max	+/-2.50	+/-2.50	+/-2.50	+/-2.50	+/-3.00	+/-3.00	note 5
Output Power Stability	(dB)	Max	+/-0.2	+/-0.2	+/-0.2	+/-0.2	+/-0.2	+/-0.2	note 6
Power Consumption	Psys (W)	Max	20 15	35 20	45 25	55 30	65 40	70 45	50 C Case (Premium) 50 C Case (Economy) note 7
Remnant pump power to output	Prp (dBm)	Nom	<-30	<-30	<-30	<-30	<-30	<-30	

Notes

1. Unless stated otherwise, all specifications apply over the full temperature range and humidity.
2. Depending on the fibre optic patchcord interface, the measured value can vary up to 0.5 dB less than the actual value (measured before splitters).
3. Measured @ 25° C and $\lambda = 1557$ nm, Σ Pin = 0 dBm
4. Measured with a swept Probe Signal (Pp), where Pp = 0 dBm @ 25°C.
5. Measured with a swept Probe Signal (Pp), and a fixed Tone Signal (Pt) @ 1557 nm; (Pt = Pp + 20 dB; Pt + Pp = 0 dBm) @ 25°C
6. Stability over polarization and temperature.
7. Premium version - PONA with cooled, Telecordia qualified pumps
Economy version - PONA with uncooled pumps

Physical

Physical Parameters shows the Physical Parameters.

Table iv-2: Physical Parameters

General Property	Requirement	Comments
Operating Wavelength	1545 ~ 1562 nm	Standard
Operating Case Temperature	0° C to 50° C -40° C to 65° C	Standard Custom (available by special order)
Storage Temperature	-40° C to 85° C	Standard
Operating Humidity	20% to 85%	Non-condensing
Voltage Supply Range	85 VAC to 265 VAC 50/60 Hz -36 to -60 V DC	AC version DC version Redundant power supply is available for the 2U configuration by PONA 3000 by customer request
Optical Connectors	See ordering information	User specified
Dimensions in inches	19.0"W X 14.76"D X 1.72:"H 19.0"W X 14.76"D X 3.44:"H	19" Rack Mounted, 1U 2U (optional, depending on customer request for the number of optical output ports and redundant power supply).

Qualification

- FCC: Subpart B. Part 15, class "A" Unintentional Radiators
- CE: EN50083-2, 19995 with Amendment 1, which incorporates EN 55013 Radiated and Conducted Emissions
- EN 61000-4-3 Radiated Immunity
- EN 55020 Conducted Immunity
- EN 61000-3-2 Harmonics
- All components meet Telecordia GR-1312 and GR-486 standards (Except pumps in Economy Class).
- EN 61000-3-2 Harmonics
- Fit Rate: 90% level of confidence < 2000 @ 30°C Premium PONA 3037
90% level of confidence < 3500 @ 30°C Economy PONA 3037

PONA LED Alarms

Table 1-1 shows the PONA controls and indicators

Table 1-1: PONA Controls and Indicators

Item	Label	Function
1	Alarm	Green (no alarm) - indicates that adequate optical input power and output power are present
		Flashing Green (waiting temp) - indicates the pump is waiting for the laser temperature to stabilize
		OFF (configured OFF) - indicates the pump mode parameter is in OFF mode (rather than constant current or power)
		Steady Yellow (minor alarm) - indicates that one or more parameters is near an operational limit without affecting the operation of the unit. Also, it can indicate the key switch is in the OFF position. Flashing Yellow (no alarms) – indicates that the laser currents fluctuates to maintain the Constant Power Mode of the PONA
		Red (major alarm) - indicates that one or more parameters is outside an operational limit, which can affect the operation of the PONA
2	Laser Key Switch	ON - indicates pump is enabled and can provide optical amplification. The LED remains yellow indicating the pump is in a steady state (otherwise, it can indicate the pump is dead)
		OFF - indicates pump is OFF. The yellow LED is not lit.

3	Display/Next	Push this button to change the LCD to the next display mode. If there is a current alarm, this button cycles to the next of the currently active alarms. Any new arriving alarms always cause the display to change. If there are no pending alarms, the next key allows cycling through the following live-updating data: • Laser cur - shows the laser current in mA. • bk facet - shows the back facet current in uA. • TEC cur - shows the TEC current in mA. • las temp - shows the temperature of the laser in degrees C • Unit temp - shows the temperature of the pump case in degrees C. • Out power - shows the composite output optical power in dBm • Descriptor - shows the 16 character configured descriptor (the name of the unit). • Serial number - shows the 16 character factory set serial number. Start up messages and the revision level of the firmware in the unit is shown as the unit powers up.
4	Display Adjust	When there are no alarms and the display is showing constant cur, the UP and DOWN arrows raise or lower the laser current output in the increments of 1mA. Adjustments, which would directly trigger alarms or cause laser current to exceed configured limits, are not allowed. RESET returns the either the constant power or constant current setting back to the factory-preset level.
5	(none)	LCD that displays status information. Can be used with Display/Next button.
6	Optical	Connection locations for the input fiber and out fiber with the proper type of optical connector (FC/APC, SC/APC, or E2000/APC) for the purchased model.
7	Serial Port	Reserved for factory diagnostics. Do not use without consulting technical support.
8	1/0	On/Off switch for AC powered units. Allows the unit to be fully shut off (that is no electrical power entry).
9	Input Power	IEC AC power plug with in-line fuse holder for connection to a standard three-prong UL approved power plug.
10	Ground	PONA chassis ground lug. Should be attached to chassis ground of DC-48V power supply.
11	Input Power	Input power connections for -48V DC input.
12	1/0	On/Off switch for DC powered units. Allows the unit to be fully shut off (that is, no electrical power entry)
13	Fuse 2A	Fuse holder for -48V DC units. Push holder in and turn 1/4 turn to the left to release fuse.

Table 1-2 shows the alarms and descriptions:

Table 1-2: Alarms and descriptions

Alarm	Description
Laser Temp Hi	Alarm or warning for hi limit
Laser Temp Low	Alarm or warning for low limit
Laser Current Hi	Alarm or warning for high limit
Laser Current Lo	Alarm or warning for low limit
Unit Temp Hi	Alarm or warning for high limit
Unit Temp Hi	Alarm or warning for lo limit
+5 Volt H Alarm	A fixed value alarm set at 5.5 volts (no warning)
+5 Volt Lo Alarm	A fixed value alarm set at 4.5 volts (no warning)
Opt In Pwr Hi	Alarm or warning for high limit
Opt In Pwr Lo	Alarm or warning for low limit. The pump shuts off during any time the input optical power is found to be below the low alarm limit.
Opt Out Pwr Hi	Alarm or warning for high limit
Opt Out Pwr Lo	Alarm or warning for low limit
3V Pwr Bad	There is no settable parameter for this error condition. The alarm occurs when the internal 3.3 volt power is read as either more than 0.1 volt too high or too low
Keyswitch Off	The keyswitch is found in the off position. This alarm causes the pump to shut down

1.1. Serial Reporting of Alarms

The PONA serial port is used to give the user information about the status of PONA. Among this information are live updates as alarms occur or if they all go away. Status information can spontaneously appear at power up and other times. The serial port uses full duplex RS 232 at 19200 BAUD, 2 stop bits, one start bit and no parity. There is no protocol and all inbound and outbound messages are viewable ASCII meant at a human rate of transfer. Each time a new alarm is found to occur, the following message format is sent:

There is a start of line prompt character (either of \$?>#) followed by a space either the string ALARM: followed by one space OR the string WARN: followed by two spaces - a 32 characters, space padded right justified string describing the alarm. The following are potential strings that can be sent out for different alarm conditions:

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Laser 1 Temp Hi, Laser 1 Temp Low, Laser 1 Cur Hi, Laser 1 Current Low, Laser 2 Temp Hi, Laser 2 Temp Low, Laser 2 Cur Hi, Laser 2, Laser 3 Temp Hi, Laser 3 Temp Low, Laser 3 Cur Hi, Laser 3 Current Low, Unit Temp Hi, Unit Temp Low, +5 Volt HI, +5 Voltage In LO, Opt In Pwr HI, Optical Power Input LO, Optical Power Output HI, Optical Power Output LO, 3v Pwr out of range, Keyswitch OFF.

The string "value:" appears followed by a right justified 6-character rendering of the current value that triggered the alarm event. The string "limits:" appears following by the related alarm and warning limited right justified to 6 characters each and separated by a comma, and the entire alarm message is terminated by a carriage return sequence".

The following are some examples of alarm occurrences reported:

- ALARM: Unit Temp Low value:-21.34 limits: -15.00, -20.00
- ALARM: Keyswitch OFF
- WARN: Laser Temp Hi value: 26.32 limits: 26.50, 27.00

Note: Alarms early on soon after start up can usually be ignored.

The string "last Alarm or Warning went away" appears when the final alarm present has gone away.

The only way to know which alarms are current at any point in time is to send the serial interface the character's'. This generates a list of current alarms followed by a line of pump state status.

Similarly, the PONA serial port is used to give the user information about the PONA settings.

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Serial Port

After powered up:

After the PONA has been powered up, the following is sent to the serial port of the PONA:

Enter Parameter number - or hit ? for list: e

1	Descriptor	PONA 3035	2	Part number	Eng. Demo
3	PmpCur Setpt 1	mA 220.00	4	PmpCur Setpt 2	mA 3450.00
5	PmpCur Setpt 3	mA 3450.00	6	PmpCur Setpt 4	mA 3000.00
7	PmpCur Setpt 5	mA 3000.00	8	PmpCur Setpt 6	mA 3000.00
9	PmpCur Hi Lim 1	mA 360.00	10	PmpCur Hi Lim 2	mA 3500.00
11	PmpCur Hi Lim 3	mA 3500.00	12	PmpCur Hi Lim 4	mA 3500.00
13	PmpCur Hi Lim 5	mA 3500.00	14	PmpCur Hi Lim 6	mA 3500.00
15	EDFA Pwr Setpt	dBm 20.00	16	EDFA Pwr deadB	dBm 0.05
17	PmpTem Setpt	C 25.00	18	PmpTem tolerance	C 0.50
19	PmpTem Hi Lim	C 27.00	20	PmpTem Lo Lim	C 23.00
21	Pump1 Control mode	CONST CUR	22	Pump2 Control mode	CONST CUR
23	Pump3 Control mode	CONST CUR	24	Pump4 Control mode	CONST PWR
25	Pump5 Control mode	CONST PWR	26	Pump6 Control mode	CONST PWR
27	Pmp1 Cur Hi MAJ	mA 360.00	28	Pmp1 Cur Hi MIN	mA 350.00
29	Pmp1 Cur Lo MIN	mA 15.00	30	Pmp1 Cur Lo MAJ	mA 5.00
31	Pmp2 Cur Hi MAJ	mA 3500.00	32	Pmp2 Cur Hi MIN	mA 3500.00
33	Pmp2 Cur Lo MIN	mA 0.00	34	Pmp2 Cur Lo MAJ	mA 0.00
35	Pmp3 Cur Hi MAJ	mA 3500.00	36	Pmp3 Cur Hi MIN	mA 3500.00
37	Pmp3 Cur Lo MIN	mA 0.00	38	Pmp3 Cur Lo MAJ	mA 0.00
39	Pmp4 Cur Hi MAJ	mA 3500.00	40	Pmp4 Cur Hi MIN	mA 3500.00
41	Pmp4 Cur Lo MIN	mA 0.00	42	Pmp4 Cur Lo MAJ	mA 0.00
43	Pmp5 Cur Hi MAJ	mA 3500.00	44	Pmp5 Cur Hi MIN	mA 3500.00
45	Pmp5 Cur Lo MIN	mA 0.00	46	Pmp5 Cur Lo MAJ	mA 0.00
47	Pmp6 Cur Hi MAJ	mA 3500.00	48	Pmp6 Cur Hi MIN	mA 3500.00
49	Pmp6 Cur Lo MIN	mA 0.00	50	Pmp6 Cur Lo MAJ	mA 0.00
51	I TEC 1 Hi MAJ	mA 1000.00	52	I TEC 2 Hi MAJ	mA 2500.00
53	I TEC 3 Hi MAJ	mA 2500.00	54	I TEC 4 Hi MAJ	mA 2500.00
55	I TEC 5 Hi MAJ	mA 2500.00	56	I TEC 6 Hi MAJ	mA 2500.00
57	Pump Tem Hi MAJ	C 27.00	58	Pump Tem Hi MIN	C 26.50
59	Pump Tem Lo MIN	C 23.50	60	Pump Tem Lo MAJ	C 23.00
61	InPwr Hi MAJ	dBm 12.20	62	InPwr Hi MIN	dBm 12.10
63	InPwr Lo MIN	dBm -10.10	64	InPwr Lo MAJ	dBm -10.20
65	OutPwr Hi MAJ	dBm 21.00	66	OutPwr Hi MIN	dBm 20.80
67	OutPwr Lo MIN	dBm 18.20	68	OutPwr Lo MAJ	dBm 18.00
69	UnitTem Hi MAJ	C 60.00	70	UnitTem Hi MIN	C 58.00
71	UnitTem Lo MIN	C 5.00	72	UnitTem Lo MAJ	C 0.00
73	InPwr Coef A	0.26	74	InPwr Coef B	0.14
75	InPwr Coef C	10.01	76	InPwr Coef D	6.99
77	OutPwr Coef A	-0.04	78	OutPwr Coef B	-0.12
79	OutPwr Coef C	3.19	80	OutPwr Coef D	12.40
81	Pump 1 Out Zero	-0.08	82	Pump 1 Out Span	1.06
83	Temp 1 Out Zero	-0.10	84	Temp 1 Out Span	1.06
85	Pump 2 Out Zero	-0.07	86	Pump 2 Out Span	1.05
87	Temp 2 Out Zero	-0.10	88	Temp 2 Out Span	1.05
89	Pump 3 Out Zero	-0.06	90	Pump 3 Out Span	1.04
91	Temp 3 Out Zero	-0.11	92	Temp 3 Out Span	1.06
93	Pump 4 Out Zero	-0.08	94	Pump 4 Out Span	1.06

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95	Temp 4 Out Zero	-0.11	96	Temp 4 Out Span	1.05
97	Pump 5 Out Zero	-0.06	98	Pump 5 Out Span	1.06
99	Temp 5 Out Zero	-0.09	100	Temp 5 Out Span	1.05
101	Pump 6 Out Zero	-0.07	102	Pump 6 Out Span	1.06
103	Temp 6 Out Zero	-0.11	104	Temp 6 Out Span	1.06
105	# up steps for pwr	9.00	106	Gain Setpoint1 dBm	1
107	All pumps control	ON	108	Delay befor pumpOn	9

When the PONA receives the character "a" - the information similar to the following about read values will be sent out to the PONA serial port:

```
# a
laser1cur      229.492 mA
laser2cur      3100.586 mA
laser3cur      3111.572 mA
laser4cur      1665.039 mA
laser5cur      1701.660 mA
laser6cur      1669.922 mA
bk facet1      800.781 uA
bk facet2      179.443 uA
bk facet3      323.486 uA
bk facet4       86.670 uA
bk facet5      118.408 uA
bk facet6      180.664 uA
TEC 1 cur      122.070 mA
TEC 2 cur      947.266 mA
TEC 3 cur      722.656 mA
TEC 4 cur      344.238 mA
TEC 5 cur      427.246 mA
TEC 6 cur      373.535 mA
las1 temp      25.160 degC
las2 temp      25.116 degC
las3 temp      25.008 degC
las4 temp      25.464 degC
las5 temp      24.791 degC
las6 temp      25.029 degC
unit temp      32.746 degC
in power       1.583 dBm
out pwr        20.041 dBm
ref 2.5v       2.482 Volts
```