

Troubleshooting

This chapter provides information about troubleshooting issues, if any, on the Cisco ASR 902 Router.

- Pinouts, on page 1
- LED Summary, on page 11

Pinouts

The following sections describe the pinouts for the Cisco ASR 902 Router interfaces:

BITS Port Pinouts

The table below summarizes the BITS port pinouts.

Table 1: BITS Port Pinouts

Pin	Signal Name	Direction	Description
1	RX Ring	Input	Receive Ring
2	RX Tip	Input	Receive Tip
3	—	—	Not used
4	TX Ring	Output	TX Ring
5	TX Tip	Output	TX Tip
6	—	—	Not used
7	—	—	Not used
8	—	—	Not used

GPS Port Pinouts

The platform is capable of receiving or sourcing GPS signals of 1 PPS & 10 MHz. These interfaces are provided by two mini-coax 50-Ohm, 1.0/2.3 DIN series connector on the front panel. Similarly there are two mini-coax 50-Ohm connectors provided in the front panel to output this 1PPS and 10MHz.

The table below summarizes the GPS port pinouts.

Table 2: GPS Port Pinouts

	10 MHz (Input and Output)	**1PPS (Input and Output)**
Waveform	Input—Sine wave Output—Square wave	Input—Rectangular pulse Output—Rectangular pulse
Amplitude	Input— > 1.7 volt p-p(+8 to +10 dBm) Output— > 2.4 volts TTL compatible	Input— > 2.4 volts TTL compatible Output— > 2.4 volts TTL compatible
Impedance	50 ohms	50 ohms
Pulse Width	50% duty cycle	26 microseconds
Rise Time	Input—AC coupled Output—5 nanoseconds	40 nanoseconds

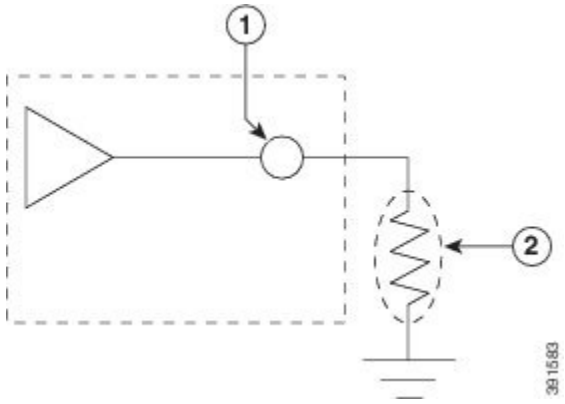
Table 3: GPS Port Pinout for ASR 900 RSP3

	10 Mhz (input and output)	**1PPS (input and output)**
Waveform	Input—Sine wave Output—Sine and Square wave	Input—Rectangular pulse Output—Rectangular pulse
Amplitude	Input— > 1.7 volt p-p(+8 to +10 dBm) Output— > 2.4 volts TTL compatible	Input— > 2.4 volts TTL compatible Output— > 2.4 volts TTL compatible
Impedance	50 ohms	50 ohms
Pulse Width	50% duty cycle	26 microseconds
Rise Time	Input—AC coupled Output—5 nanoseconds	40 nanoseconds

Time-of-Day Port Pinouts

To ensure proper signal integrity at the receiver, we recommend that you use a 50-ohm termination, as shown in the figure below. The output swing at 50-ohm load is guaranteed to be 2.9 V.

Figure 1: Terminating 1-PPS Signal



Label	Component
1	1-PPS SMB connector
2	External 50 ohm resistor

The table below summarizes the ToD/1-PPS port pinouts for ASR900-RSP2A.

Note This port requires the use of SHIELDED cable for GR-1089-core Intra-Bldg lightning surge protection. The RS422 interface is per industry-standard EIA-422 /RS422 specification.

Table 4: RJ45 1-PPS/ToD Port Pinouts

Pin	Signal Name	Direction	Description
1	RESERVED	Output	Do not connect
2	RESERVED	Input	Do not connect
3	RESERVED	—	Do not connect
4	GND	—	—
5	GND	—	—
6	RESERVED	—	Do not connect
7	TOD_N	Output or Input	Time of Day character
8	TOD_P	Output or Input	Time of Day character

Table 5: RS422 Pinout

Pin	Signal Name	Description
4	TXD+	RTS pin for RS232

Pin	Signal Name	Description
20	TXD-	DTR pin for RS232
5	RXD+	CTS pin for RS232
6	RXD-	DSR pin for RS232

Alarm Port Pinouts

The table below summarizes the external alarm input pinouts.

Table 6: External Alarm Input Pinouts

Pin	Signal Name	Description
1	ALARM0_IN	Alarm input 0
2	ALARM1_IN	Alarm input 1
3	—	No connect
4	—	No connect
5	—	No connect
6	—	No connect
7	—	No connect
8	COMMON	Alarm common

T1/E1 Port Pinouts

The table below summarizes the pinouts of the cable (Tyco part number 2163442-1, Cisco part number 72-5184-01) used to connect the T1/E1 interface module to the rear of the patch panel.

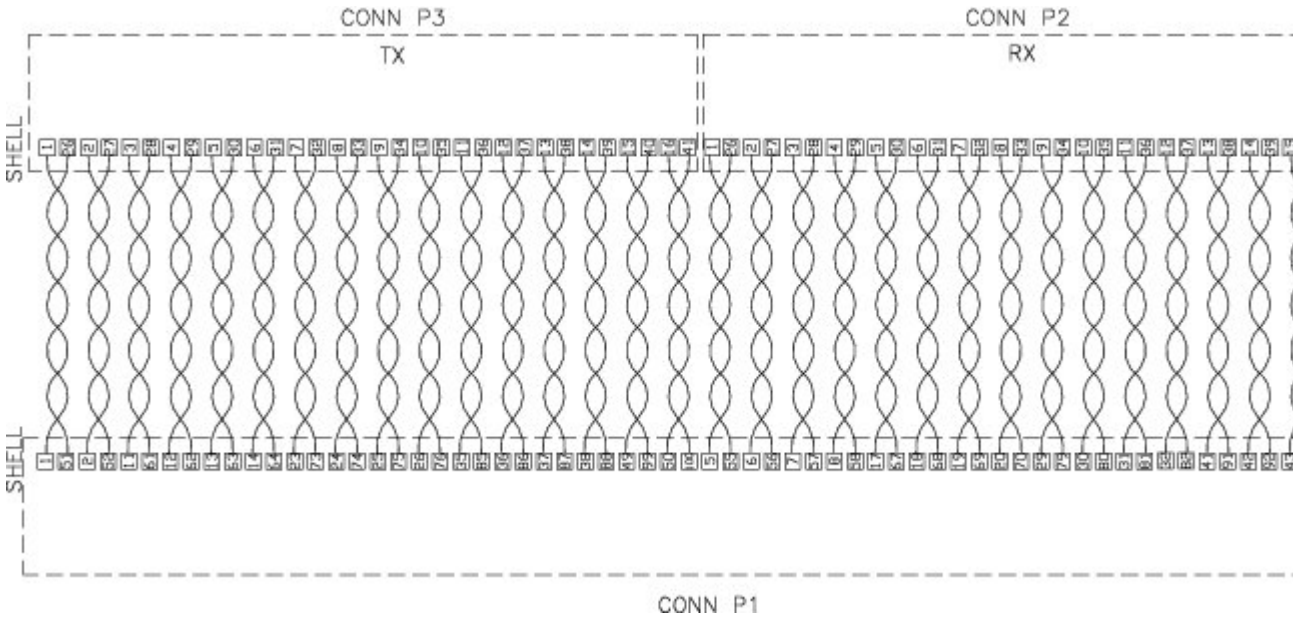
Table 7: T1/E1 Interface Pinouts

Line	Board Pin	Signal Name	Telco TX	Jack Pin	Board Pin	Signal Name	Telco RX	Jack Pin
Line 0	88	TX_RING_P1	39	1	92	RX_RING_P1	39	4
	38	TX_TIP_P1	14	2	42	RX_TIP_P1	14	5
Line 1	87	TX_RING_P2	38	1	91	RX_RING_P2	38	4
	37	TX_TIP_P2	13	2	41	RX_TIP_P2	13	5
Line 2	76	TX_RING_P3	35	1	80	RX_RING_P3	35	4
	26	TX_TIP_P3	10	2	30	RX_TIP_P3	10	5

Line	Board Pln	Signal Name	Telco TX	Jack Pin	Board Pin	Signal Name	Telco RX	Jack Pin
Line 3	75	TX_RING_P4	34	1	79	RX_RING_P4	34	4
	25	TX_TIP_P4	9	2	29	RX_TIP_P4	9	5
Line 4	100	TX_RING_P5	41	1	94	RX_RING_P5	41	4
	50	TX_TIP_P5	16	2	44	RX_TIP_P5	16	5
Line 5	99	TX_RING_P6	40	1	93	RX_RING_P6	40	4
	49	TX_TIP_P6	15	2	43	RX_TIP_P6	15	5
Line 6	86	TX_RING_P7	37	1	82	RX_RING_P7	37	4
	36	TX_TIP_P7	12	2	32	RX_TIP_P7	12	5
Line 7	85	TX_RING_P8	36	1	81	RX_RING_P8	36	4
	35	TX_TIP_P8	11	2	31	RX_TIP_P8	11	5
Line 8	64	TX_RING_P9	31	1	68	RX_RING_P9	31	4
	14	TX_TIP_P9	6	2	18	RX_TIP_P9	6	5
Line 9	63	TX_RING_P10	30	1	67	RX_RING_P10	30	4
	13	TX_TIP_P10	5	2	17	RX_TIP_P10	5	5
Line 10	52	TX_RING_P11	27	1	56	RX_RING_P11	27	4
	2	TX_TIP_P11	2	2	6	RX_TIP_P11	2	5
Line 11	51	TX_RING_P12	26	1	55	RX_RING_P12	26	4
	1	TX_TIP_P12	1	2	5	RX_TIP_P12	1	5
Line 12	74	TX_RING_P13	33	1	70	RX_RING_P13	33	4
	24	TX_TIP_P13	8	2	20	RX_TIP_P13	8	5
Line 13	73	TX_RING_P14	32	1	69	RX_RING_P14	32	4
	23	TX_TIP_P14	7	2	19	RX_TIP_P14	7	5
Line 14	62	TX_RING_P15	29	1	58	RX_RING_P15	29	4
	12	TX_TIP_P15	4	2	8	RX_TIP_P15	4	5
Line 15	61	TX_RING_P16	28	1	57	RX_RING_P16	28	4
	11	TX_TIP_P16	3	2	7	RX_TIP_P16	3	5

The figure below shows the wiring schematic of the cable used to connect the T1/E1 interface module to the rear of the patch panel.

Figure 2: Wiring Schematic of Cable Between T1/E1 Interface and Patch Panel



G.703/FXS/FXO Interface Module Pinout

Table 8: FXO RJ11 Pinout

Pin	Signal Name	Direction	Description
1	NC	-	-
2	Ring	Analog	Ring audio
3	Tip	Analog	Tip audio
4	NC	-	-

Table 9: FXS RJ45 Pinout

Pin	Signal Name	Direction	Description
1, 2, 3	NC	-	-
4	Ring	Analog	Ring audio
5	Tip	Analog	Tip audio
6, 7, 8	NC	-	-

Table 10: G.703 RJ48C Pinout

Pin	Signal Name	Direction	Description
1	Rx_Tip	Input	G.703 64 Kbps Co-Directional receive tip signal
2	Rx_Ring	Input	G.703 64 Kbps Co-Directional receive ring signal
3	NC	-	-
4	Tx_Tip	Output	G.703 64 Kbps Co-Directional transmit tip signal
5	Tx_Ring	Output	G.703 64 Kbps Co-Directional transmit ring signal
6, 7, 8	NC	-	-

Serial Interface Modules Pinouts

The following sections summarize the pinouts on the 14-port serial interface module when used with the cable types specified in Connecting Serial Cables .

DB-9 Connector Pinouts

The table below summarizes the pinouts for each serial interface type when using a DB-9 connector.

Table 11: DB-9 Pinouts

Pin	Standard DB-9	Direction	Description	RS-485	IRIG-B
1	NC	Output	Unused	NC	NC
2	RxD	Input	Receive	NC	NC
3	TxD	Output	Transmit	-	IRIG-B- (RS232)
4	DTR	Output	DTR	TxD-	IRIG-B- (RS485)
5	GND	-	GND	GND	GND
6	DSR	Input	DSR	RxD	NC
7	RTS	Output	RTS	TxD+	IRIG-B+
8	CTS	Input	CTS	RxD+	NC
9	NC/GND		Unused or Ring	NC	NC

Note Twisted pairs are 2-5, 6-8, 4-7.

Note The X.21, V.35, RS-485, EIA-449, EIA-530, and IRIG-B standards are not currently supported by software.

RJ-45 Connector Pinouts

The table below summarizes the pinouts for each serial interface type when using an RJ-45 connector.

Table 12: RJ45 Pinout

Pin	Standard DB-9	Direction	Description	RS-485	IRIG-B
1	RTS	Input	Ready to send	RxD+ (RS485)	NC
2	DTR	Input	DTR	RxD- (RS485)	NC
3	TxD	Input	Transmit	NC	NC
4	GND		Signal ground	Gnd	Gnd
5	GND		Signal ground	Gnd	Gnd
6	RxD	Output	Receive data	-	IRIG-B (RS232)
7	DST	Output	DSR	TxD-	IRIG-B- (RS485)
8	CTS	Output	CTS	TxD+	IRIG-B+ (RS485)

Note Twisted Pairs are: 1-2, 3-6, 4-5, 7-8.

Note The X.21, V.35, RS-485, EIA-449, EIA-530, and IRIG-B standards are not currently supported by software.

Management Ethernet Port Pinouts

A single management copper Ethernet port supporting 10/100/1000Base-T operation exists on each RSP. There is no direct access to the CPU of the other RSP. The Management Ethernet port uses a standard RJ45 jack.

Note This is not a data plane port.

The table below summarizes the Management Ethernet port pinouts.

Table 13: Management Ethernet Port Pinouts

Pin	Signal Name
1	TRP0+
2	TRP0-
3	TRP1+
4	TRP1-
5	TRP2+
6	TRP2-
7	TRP3+
8	TRP3-

USB Console Port Pinouts

Two individual Type A USB connectors are used for the USB console and USB mass storage. One USB 2.0 Type A receptacle is provided on the RSP front panel for providing console access to ROMMON, Cisco IOS-XE, and diagnostics. This USB 2.0 Type A receptacle operates as a USB peripheral only for connections to an external host PC. This receptacle requires the use of a Type A-to-Type A connector instead of a standard USB cable.

Note The use of the USB console is mutually exclusive with the RS232 console/AUX port. When a USB cable is inserted, access is automatically switched to this port.

The other single USB 2.0 Type A receptacle is provided on the RSP front panel for inserting external USB mass storage devices such as standard USB flash drives. It is used to load images, store configurations, write logs, and so on, and supports up to 12 Mbps of operation.

The table below summarizes the USB console port pinouts.

Table 14: Single USB Console Port Pinout

Pin	Signal Name	Description
Al	Vcc	+5 VDC (500 mA)

Pin	Signal Name	Description
A2	D-	Data -
A3	D+	Data +
A4	Gnd	Ground

Note The USB console port supports +5 VDC input, and operates as a USB peripheral device.

USB Flash or MEM Port Pinouts

The table below summarizes the USB flash or MEM port pinouts.

Table 15: Single USB Flash or MEM Port Pinouts

Pin	Signal Name	Description
A1	Vcc	+5 VDC (500 mA)
A2	D-	Data -
A3	D+	Data +
A4	Gnd	Ground

Note USB TYPE-A receptacle is used.

Note The USB flash or MEM port +5VDC is output. Cisco ASR 902 Router provides power for USB flash or MEM port. This port operates as a USB host device.

Fiber-Optic Specifications

The specification for optical fiber transmission defines two types of fiber: single mode and multimode. Within the single-mode category, three transmission types are defined: short reach, intermediate reach, and long reach. Within the multimode category, only short reach is available. For information about optical SFP modules, see the documentation for the SFP module at: http://www.cisco.com/en/US/partner/products/hw/modules/ps5455/prod_installation_guides_list.html.

LED Summary

The following sections describe the meanings of the LEDs on the Cisco ASR 902 Router:

RSP LEDs

ASR900-RSP LED

Table 16: ASR900-RSP LEDs

LED	Color/State	Description (two LEDs for each port)
Power (PWR)	Off	Disabled/no power to RSP
	Green	Power rails on RSP in range
Status (STAT)	Off	Disabled/power down
	Red	Failure to boot (lit at reset)
	Yellow	Rommon booted
	Green	IOS booted and running
Active (ACT)	Off	Not available
	Yellow	Standby (indicates standby RSP)
	Green	Active (indicates active RSP)
Management port (MGMT)	Off	No connection
	Green	Connected with no activity
	Flashing green	Connected with activity
Sync status (SYNC)	Off	Not enabled
	Yellow	Free run
	Flashing yellow	Holdover
	Green	Locked to source
USB flash (MEM)	Flashing green	USB activity
BITS	Off	Out of service/not configured
	Amber	Fault or loop condition
	Green	In frame/working properly

ASR900-RSP2 and ASR900-RSP3 LED Information

The PWR and STAT LEDs are available on the front panel. These LEDs provide power on the board (PWR) and overall router health (STAT) status. During power up state, these LEDs provide booting status and report errors.

Note The digital code signing functionality validates the integrity and authenticity of the ROMMON image before booting it.

Table 17: A900-RSP2 and A900-RSP3 LED

PWR LED State	STAT LED State	Indication	Comment
Light Green	Red	Power is OK and the field-programmable gate array (FPGA) is nfigured successfully, but FPGA image validation failed.	Image validation failed. System is in hung state.
Flashing Light Green and Green alternatively	Off	FPGA configured and core validated successfully. FPGA image passed the control to micro-loader to boot ROMMON.	System is up with ROMMON. Both the FPGA image is validated successfully, but the booted ROMMON (primary or secondary) is undetermined.
	Amber	The digital code signing functionality reported upgrade FPGA image validation error and is continuing with the FPGA image.	System is up with ROMMON. FPGA image is validated successfully, but the booted ROMMON (primary or secondary) is undetermined.
	Red	The digital code signing functionality reported failure in the ROMMON image validation.	FPGA is up but both primary and secondary ROMMON failed. System is in hung state.
Green	Off	IOS is successfully booted	IOS writes into FPGA register to indicate that it has booted, FPGA stops flashing PWR LED and turns Green. Software now controls the STAT LED.

Interface Module LEDs

The table below summarizes the LEDs for the interface modules.

The Status LED is amber for the 10-Gigabit Ethernet ports when operating in WAN mode for the following:

- 8x1 Gigabit Ethernet SFP + 1x10 Gigabit Ethernet SFP+ Interface Module
- 8x1 Gigabit Ethernet RJ45 + 1x10 Gigabit Ethernet SFP+ Interface Module
- 2x10 Gigabit Ethernet SFP+ Interface Module

Table 18: Interface Module LEDs

	Color/State	Description
Power (PWR)	Off	Disabled/No power to IM
	Green	Enabled and power rails on IM in range
Status (STAT)	Off	Disabled/Power-down
	Red	Failure (On at reset)
	Flashing Red	Booting (if local CPU)
	Green	Operational
Link status (L)	Off	Inactive or no connection
	Amber	Fault/Loop condition
	Green	OK with activity or no activity
Speed (S)	Off	Inactive port status
	Green	Activity or no activity

OC-3/OC-12 Interface Module LEDs

The table below summarizes the LEDs for the OC-3 interface module.

Table 19: OC-3 Interface Module LEDs

LED	Color/State	Description
Power (PWR)	Off	Disabled/No power to IM
	Green	Enabled and power rails on IM in range
Status (STAT)	Off	Disabled/Power-down
	Red	Failure (on at reset)
	Amber	Booting (if local CPU)
	Green	Operational
Carrier/Alarm (C/A)	Green	SFP receiving good remote signal
	Yellow	Remote or local alarm activated
Active/Loopback(A/L)	Green	SFP ready and operating normally
	Yellow	SFP port in loopback state

T1/E1 Interface Module LEDs

The table below summarizes the LEDs for the T1/E1 interface module.

Table 20: T1/E1 Interface Module LEDs

LED	Color/State	Description (Two LEDs for Each T1/E1 Port)
Active	Green	Active
	Blinking green	Standby
	Off	Operationally down; card is disabled or shut down
Port	Green	All ports up
	Blinking green	All ports up and one or more ports in a loopback state
	Amber	One or more configured ports are down
	Blinking amber	One or more configured ports are down and at least one configured port is in a loopback state
	Off	All ports disabled or shut down

14-Port Serial Interface Module LEDs

The table below summarizes the LEDs for the serial interface module.

Table 21: Cisco ASR 902 Router Serial IM LEDs

LED Label	Color/State	Meaning
Power (PWR)	Green	All power rails are within spec.
	Red	Disabled
	Off	No Power
Operating Status (STAT)	Red	Failure
	Yellow	Booting (if IM has a local CPU)
	Green	Operational
	Off	No Power

LED Label	Color/State	Meaning
68-Pin Connector LEDs	Green	At least one of the 4 ports is in an up state.
	Blinking Green	At least one of the 4 ports is passing traffic
	Solid Yellow	All four ports are successfully initialized and in a down state
	Blinking Yellow	At least one of the port has failed
	Off	All the ports are not enabled (at POR)
12-in-1 Connector LEDs	Green	Port is passing traffic
	Solid Yellow	Port successfully initialized and in a down state
	Blinking Yellow	Port has failed
	Off	Not Enabled (at POR)

4-Port C37.94 Interface Module LEDs

The table below summarizes the LEDs for the C37.94 interface module.

Table 22: Cisco ASR 902 Router C37.94 IM LEDs

LED Label	Color/State	Description
Power (PWR)	Green	All power rails are within spec.
	Red	Disabled
	Off	No Power
Operating Status (STAT)	Red	Failure
	Yellow	Booting
	Green	Operational
	Off	No Power
Rx LEDs	Green	Link up with activity
	Solid Yellow	Fault/Error/Alarm/No Sync
	Off	Link Down

LED Label	Color/State	Description
Tx LEDs	Green	Link up with activity
	Solid Yellow	Fault/Error/Alarm
	Off	Link Down

G.703/FXS/FXO Interface Module LEDs

The following table summarizes the LEDs for the G.703/FXS/FXO interface module.

Table 23: Cisco ASR 903 Router G.703/FXS/FXO IM LEDs

LED Label	Color or State	Description
Power (PWR)	Green	All power rails are within spec.
	Red	Disabled
	Off	No Power
Operating Status (STAT)	Red	Failure
	Yellow	Booting
	Green	Operational
	Off	No Power
Port Bi-color LEDs	Green	IM-FPGA Link/In-Frame, working properly
	Solid Yellow	Fault or Loop condition
	Off	Out of Service or not configured (default state)

Power Supply LEDs

The tables below summarize the power supply LEDs for the AC and DC power supplies.

Table 24: AC Power Supply LEDs (A900-PWR-550-A) and (A900-PWR-1200-A)

LED	Color/State	Description
Input OK	Off	No input voltage
	Amber	Input voltage out of range
	Green	Input voltage within acceptable operating range

LED	Color/State	Description
Output Fail	Off	Disabled/Forced Shut down/No input power
	Red	Power supply fault (internal failure such as over temperature)
	Green	Operational

Table 25: DC Power Supply LEDs (A900-PWR-550-D and A900-PWR-550-D-E)

LED	Color/State	Description
Input Power (PWR)	Off	No input voltage
	Amber	Input voltage out of range
	Green	Input voltage within acceptable operating range
Status (STAT)	Off	Disabled/Power-down/No power
	Red	Power supply fault (internal failure)
	Green	Operational

Table 26: DC Power Supply LEDs (A900-PWR-1200-D)

LED	Color/State	Description
Input OK	Off	No Input Voltage
	Amber	Input voltage out of range
	Green	Input voltage within acceptable operating range
Output Fail	Off	Disabled/Forced Shut down/No input power
	Red	Power supply fault (internal failure such as over temperature)
	Green	Operational
	Blinking Red	Output ORING FET Failed

Fan Tray LEDs

The table below summarizes the fan tray LEDs.

Note A major alarm condition indicates the failure of a single fan in the fan tray; a critical alarm indicates the failure of multiple fans. In the event that a single fan fails, the Cisco ASR 902 Router software adjusts the fan speed to prevent excessive heat within the chassis.

Table 27: Fan Tray LEDs

LED	Color/State	Description
Status (TEMP)	Off	Disabled/Power down
	Amber	Over temperature
	Green	OK
Fan (FAN)	Green	Fan rotation in range
	Amber	Single Fan fault
	Red	Two or more fan faults
Minor (MIN)	Off	No minor alarm
	Amber	Minor alarm
Major (MAJ)	Off	No major alarm
	Red	Major alarm
Critical (CRIT)	Off	No critical alarm
	Red	Critical alarm (defaults to ON upon RSP reset)

Alarm Conditions

The table below summarizes the meaning of the alarm conditions on the Cisco ASR 902 Router.

Table 28: Alarm Condition Summary

Alarm Type	Alarm Meaning
Critical	Power supply OIR
	Port in down state
	Environmental sensor threshold exceeded (voltage, temperature)
	IM OIR
	IM crash
Major	RSP failure
Info	Port administratively shut down