



# **2810 NETWORK GATEWAY PRODUCT GUIDE**

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Cyclone P/N 800-2810

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### 1.1 INTRODUCTION

The 2810 Network Gateway is designed for demanding call processing/AIN applications and is typically installed between a telecommunications switch and application gateways. AIN applications facilitate calling services like local number portability, call following, and other advanced telephony services. The gateway can be populated with one or two multicore Xeon processors. The gateway also has an specialized IP Security Engine to accelerate encryption and decryption operations.

The main processor has four 1Gbit BaseT Ethernet ports.

As the 2810 is architected for high reliability systems and is typically installed in redundant configurations, there are numerous features to improve system up-time like two redundant hot swappable power supplies, a fault tolerant and field replaceable fan tray, field replaceable filters, and comprehensive system monitoring.

The 2810 is available in either dual AC or dual DC power supply configurations and is supported by VxWorks and Linux BSPs.

### 1.2 2810 FEATURES

- S5520UR Intel Mother Board Supportings:
  - Supports One or Two Quad Core Xeon Processors
    - 2.0 GHz Core Speeds
    - 4 Mbyte caches
    - Intel E5504 Xeon Processors
  - 8, 32, 64 or more GigaBytes DRAM (12 DIMMs)
  - 8 GByte Linux Boot Flash Drive
  - PCIe Expansion Slot
  - Four Gigabit Ethernet Ports
  - Console Serial Port
  - USB ports
  - Temperature Sensors
  - Fan Status Monitoring
  - Power Supply Status Monitoring
- IP Ssecurity Engine, Cavium CN1610-350-NHB-G
- Dual AC or DC Hot Swap Power Supplies 550 Watts Each
- N+1 Fans
  - Fans on Field Replaceable Module
  - Five Fans in N+1 configuration; system is properly cooled with any single fan failure.

## PRODUCT OVERVIEW



- Fan tray may be replaced while system is operating
- Air Filter
  - Field replaceable
  - Meets NEBS requirements
- Environmental Monitoring:
  - Fan failure
  - Power supply failure
  - Temperature out of Specification
- Cyclone Boot Loader
- Linux Support
- RackMounting Kit similar to 2800 System

Figure 1-1. 2810 Block Diagram

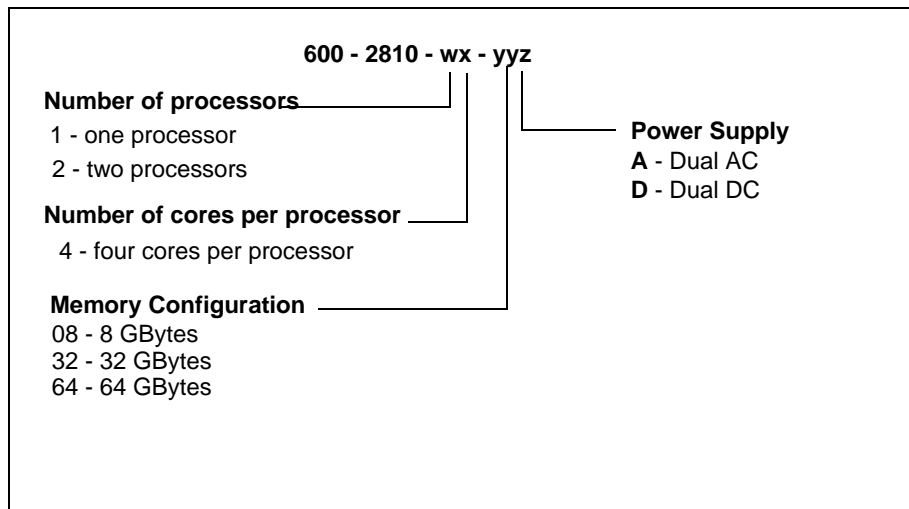
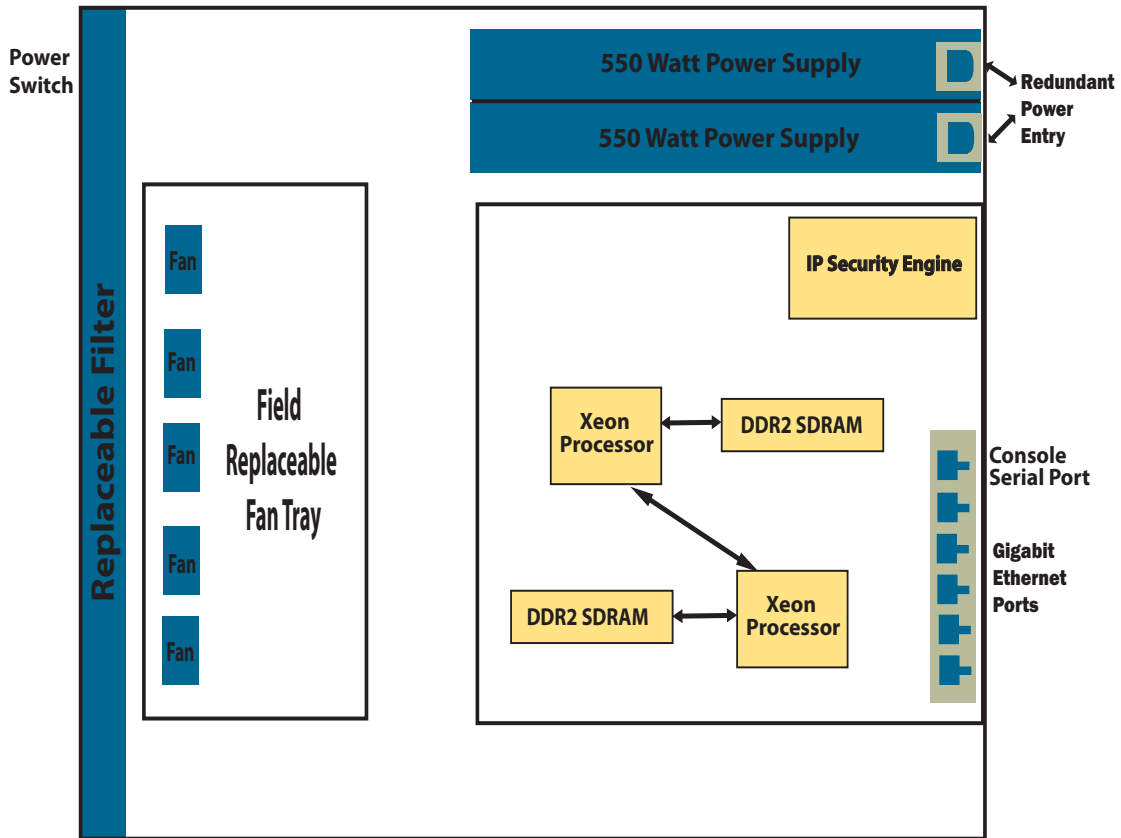


Figure 1-2. 2810 Part Numbering

1.3 SPECIFICATIONS

Table 1-1 lists the specifications for the 2810 Series Network Gateway. Cooling air input is on the front of the unit and the air exhaust is on the rear of the unit. Airflow should not be restricted; a minimum of one inch clearance on each side is required.

**Table 1-1. 600-2810 Specifications**

<b>Physical</b>	Height	1.72 inches
	Width	17 inches
	Depth	20 inches
	Other	19 inch rack mountable
	Weight	22 lbs
	Shipping Dimensions	25" wide x 23" deep x 10" high
<b>Electrical - AC version</b>	<b>(600-2810-xx-xx-A0)</b>	
	Voltage:	100 - 240 Vac +/- 10%
	Current (typ) @ 115 VAC	1.7A
	Current (max) @115 VAC	4.7A
	Current (max) @ 264VAC	2.0A
	In Rush Current @132VAC	20A max. per module
	In Rush Current @ 264VAC	40A max. per module
	In Rush Current	<32A
	Power Dissipation:	682 BTU/hr.
	Frequency:	47-63 Hz
<b>Electrical - DC version</b>	<b>(600-2810-xx-xx-D0)</b>	
	Voltage:	-36 to -72 Vdc
	Current (typ) -48 VDC	4.2 Amps
	Current (max) -36-72 VDC	16-7.9 Amps
	Current (max) -48 VDC	12 Amps
	Current (max)	3.6A
	In Rush Current @ -48 VDC	30A Max
	Power Dissipation:	682 BTU/hr.
<b>Environmental</b>	Operating Temperature	0 to 35 Degrees Celsius
	Relative Humidity	0% to 95% (non-condensing)
	Storage Temperature	-20 to 85 Degrees Celsius

1.4 REGULATORY COMPLIANCE

1.4.1 Safety

UL/CSA-609501-1, EN60950-1, IEC 609501-1, 2nd Edition, CE, CB Scheme with all country deviations



**1.4.2 RF/EMC**

<b>Electromagnetic Emissions</b>	
<p>FCC CFR47 Part 15 Class A</p> <p>CUL C22.2 No. 950</p> <p>CE Marking ICES-003</p>	<p><u>Note:</u> This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.</p> <p><u>Caution:</u> Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.</p> <p>This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communication.</p> <p>The equipment or subassembly is suitable for connection to intrabuilding or non exposed wiring or cabling only.</p> <p>Le present apparall numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de las classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.</p>

<b>Standard Number</b>	<b>Standard Name</b>	<b>Standard Date</b>
EN55022	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement- Incorporates A1: 10/2007	2006
EN55024	Information technology equipment - Immunity characteristics - Limits and methods of measurement - Incorporates Amendment A2: 01/2003	1998
CNS13438	CNS13438, Class A: Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment. CNS13438: Reference CISPR22 Class A.	2006

Standard Number	Standard Name	Standard Date
CISPR22	Information technology equipment- Radio disturbance characteristics - Limits and methods of measurement - Ratified European Text;	2006
EN61000-3-2	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current greater than or equal to 16 A per phase) - IEC 61000-3-2:2005	2006
EN61000-3-3	Electromagnetic Compatibility (EMC) - Part 3-3 Limits - Limitation of Voltage Changes, Voltage Fluctuations and Flicker in Public Low-Voltage Supply Systems, for Equipment with Rated Current $\leq 16$ A per Phase and Not Subject to conditional connection.	2008

**1.4.3 Immunity**

EN55024/CISPR24

**1.4.4 Telecommunications**

NEBS Certification Requirements to NEBS Level-3 Criteria

GR-63-CORE Issue 3, March 2006

GR-1089-CORE Issue 5, May 2011

EN300-386 Harmonized European Telecom ERM and EMC Requirements (where a subset of NEBS)

EN300-019 Telecom Environmental (Where a subset of NEBS)

Anatel (Brazil) Certification

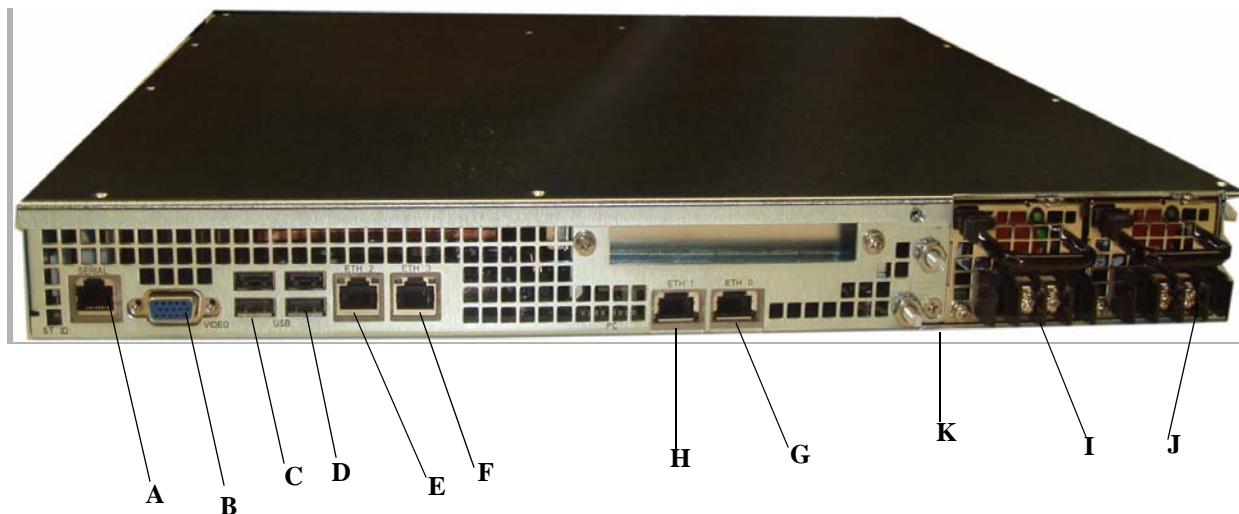
**1.4.5 Other**

Restriction of Hazardous Substances (RoHS) labeled, per WEEE (Waste Electrical and Electronics Equipment) directive (2002/95/EC)

**1.4.6 Markings**

CE, FCC, ICES-003, UL/cUL, RoHS, Anatel Brazil

**2.1 PHYSICAL CONFIGURATION**



**Figure 2-1. 600-2810 Rear Panel (DC Unit)**

Figure 2-1 shows a rear view of the 2810 unit. Table 2-1 identifies each item.

**Table 2-1. 600-2810 Rear Panel Description**

A	Serial Port A
B	Video
C	Dual USB Port Connector
D	Dual USB Port Connector
E	NIC Port 2 (1 Gb)
F	NIC Port 3 (1 Gb)
G	NIC Port 0 (1 Gb)
H	NIC Port 1 (1 Gb)
I	Power Supply 0
J	Power Supply 1
K	Earthing Ground Stud Locations

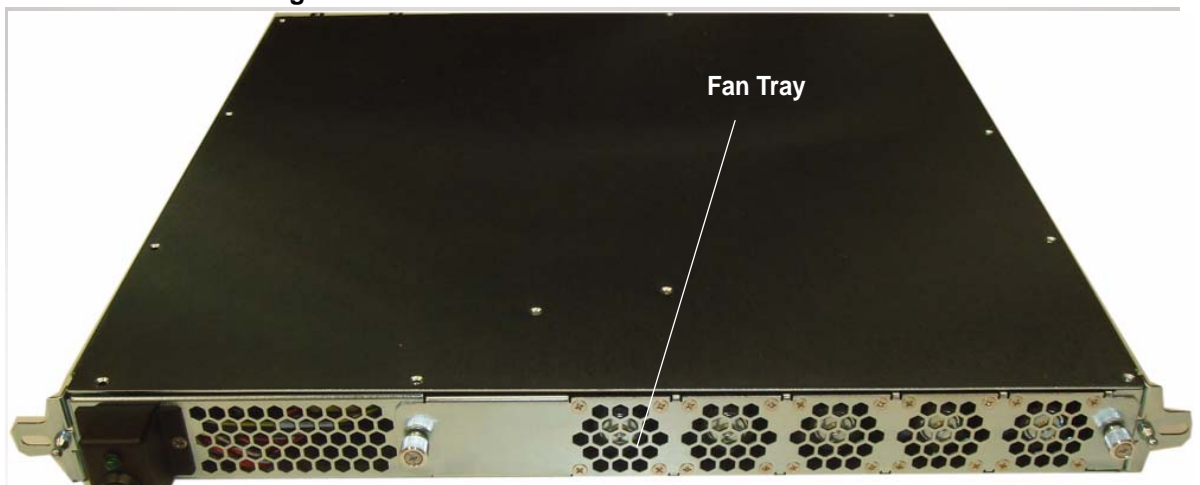
Figure 2-2. 600-2810 Rear Panel (AC Unit)



Figure 2-3. 600-2810 Front Panel with Bezel



Figure 2-4. 600-2810 Front Panel without Front Bezel



**2.1.1 2810 Power Supply Switch**

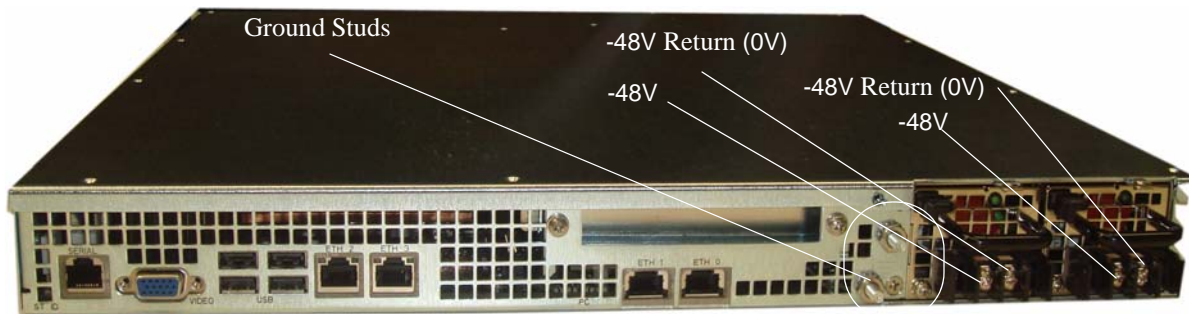
The 600-2810-xx has a single power switch. This switch enables and disables both power supplies. The switch is a push button type. Depressing the switch for four seconds will cause the gateway to power on or off. The power switch does not disable the supply from the power mains. See Installation Guidelines in Chapter 3 and Safety Information in Appendix A.

**2.2 CONNECTORS**

**2.2.1 Power Connector**

There are two power supply connectors on the rear right hand side of the 2810.

**2.2.1.1 DC Power Connections (600-2810-xx-xxD)**



**Figure 2-5. DC Power Connections**

**2.2.1.2 DC Power Supply Cable**

Power cable should be composed of two, 36" long 18 gauge wires.

The studs on the DC supply Power entry terminal strips are #6 screw size. Ring Lugs for #6 studs should be used.

See section 2.2.2 for the ground studs. Some installations include the ground wire in the power supply cable. Some installations treat the earthing/grounding separately.

The color code for wire gauge for 600-2810-xx for DC power mating connector is as follows:

Red	-48VDC
Black	48VDC Return

**2.2.1.3 AC Power Connectors (600-2810-xx-xxA)**

The AC power connector is a 3-pin connector. See Figure 2-6

The Power Connector is a standard IEC type recessed power receptacle.

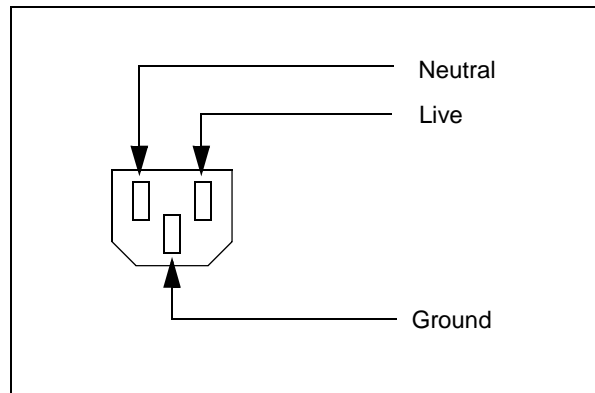


Figure 2-6. AC Power Connector



#### 2.2.1.4 AC Power Supply Cable

- **Rating:** In the U.S. and Canada, cords must be UL (Underwriters Laboratories, Inc.) Listed/CSA (Canadian Standards Organization) Certified type SJT, 18-3 AWG (American Wire Gauge). Outside of the U.S. and Canada, cords must be flexible harmonized (<HAR>) or VDE (Verband Deutscher Elektrotechniker, German Institute of Electrical Engineers) certified cord with 3 x 0.75 mm conductors rated 250 VAC.
- **Connector, Wall Outlet end:** Cords must be terminated in grounding-type male plug designed for use in your region. The connector must have certification marks showing certification by an agency acceptable in your region and for U.S. must be Listed and rated 125% of overall current rating of the gateway.
- **Connector, gateway End:** The connectors that plug into the AC receptacle on the gateway must be an approved IEC (International Electrotechnical Commission) 320, sheet C13, type female connector.
- **Cord length and flexibility:** Cords must be less than 4.5 meters (14.8 feet) long.

**2.2.2 Earthing Ground Stud**

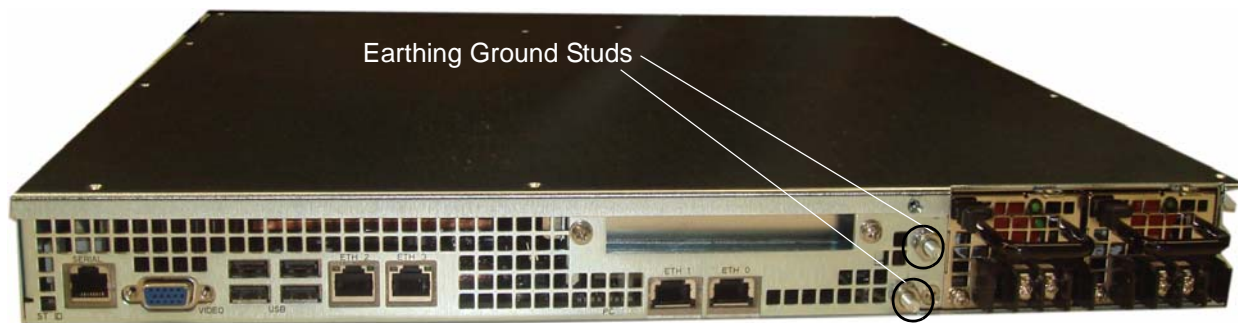
Earthing ground stud connection required for DC installations. There are two #10-32 threaded studs (with hex nuts, flat washers and star washers included) attached to the chassis. Ring lugs should be used to attached chassis ground to the ground studs. Table 2-4 shows AMP/Tyco part numbers for typical ring lugs for #10 studs.

Only one of the ground studs must be connected to ground. The second stud is an optional connection to ground. There are two acceptable methods bringing ground to the chassis. Organizations differ on which method they prefer.

1. Include the ground wire (usually Green and White colored) with the -48 power wires of section 2.2.1.2. The ground wires are connected to the Earthing Ground Studs. We have included two studs, one for each power cable to the two power supplies.
2. The power supplies are wired with -48V power as described in section 2.2.1.2. The Earthing Ground Studs are connected to ground separately from the incoming power. Many times directly to the frame of the rack (assuming the frame is grounded). In this case, only one ground wire is required and the second stud is an optional connection to ground.

**Table 2-2. Ring Lugs for #10 Studs**

Wire Gauge	AMP/Tyco Part
14-16 AWG Green and White	320630
10-12 AWG Green and White	36161



**Figure 2-7. Earthing Ground Stud Location**

**2.2.3 Console Connector**

The Console Connector is an RJ45 (8 positions) phone jack. The console port is an RS-232 serial port. The connector assignment is as shown in Table 2-3. Normal system operation does not require a connection to the console port.

Diagnostic or debug activity may require connecting to console port. A cable connecting the console port to a standard DB9 connector is available from Cyclone Microsystems (P/N 530-2012-02). A terminal (or PC running a terminal emulation program) should be set up for any baud rate up to 115K baud, 8 bits, no parity and 1 stop bit.

**Table 2-3. External RJ-45 Serial A Port Pin-out**

Pin	Signal Name	Description
1	SPB_RTS	RTS (request to send)
2	SPB_DTR	DTR (Data terminal ready)
3	SPB_OUT_N	TXD (Transmit data)
4	GND	Ground
5	SPB_RI	RI (Ring Indicate)
6	SPB_SIN_N	RXD (receive data)
7	SPB_DSR_DCD	Data Set Ready/Data Carrier Detect
8	SPB_CTS	CTS (clear to send)

## 2.2.4 Ethernet Port Connectors

The line interface of the Gigabit Ethernet ports is a shielded RJ45 (modular phone type) connector. The connector conforms to the 10/100/1000BaseT specification. 10Base-T and 100Base-Tx mode, only two pairs are used, one for transmit and one for receive. In 1000Base-T mode, all four pairs are used.

### 2.2.4.1 Intra-Building Interfaces

All Ethernet ports are SELV only. All Ethernet ports are suitable for connection within a building only and are not intended for direct connection to TNV-1 (exposed plant leads/external digital network). All digital ports need to connect to the protected side of CSU/DSU.

**Table 2-4. Ethernet Port Connector**

Pin	Signal (10/100Base-T)	Description (10/100Base-T)	Signal (1000Base-T)	Description (1000Base-T)
1	TX+	Output	TP0+	Input/Output
2	TX-	Output	TP0-	Input/Output
3	RX+	Input	TP1+	Input/Output
4	-	Not Used	TP2+	Input/Output

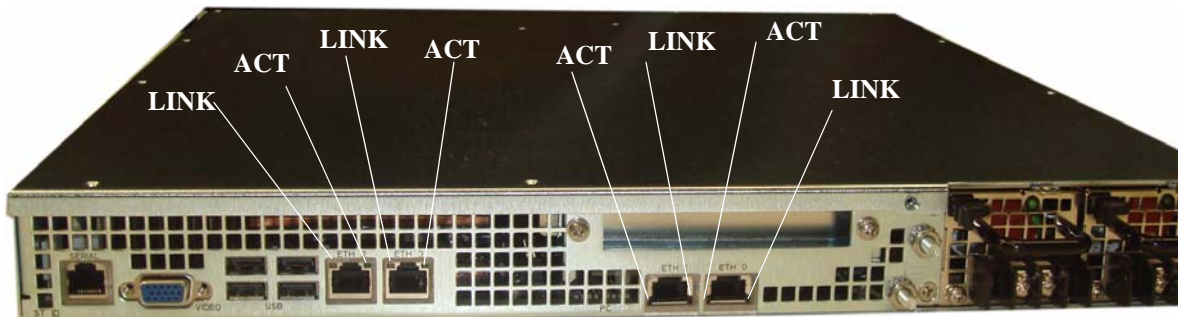


Pin	Signal (10/100Base-T)	Description (10/100Base-T)	Signal (1000Base-T)	Description (1000Base-T)
5	-	Not Used	TP2-	Input/Output
6	RX-	Input	TP1-	Input/Output
7	-	Not Used	TP3+	Input/Output
8	-	Not Used	TP3-	Input/Output

**2.2.5 Ethernet Port LEDs**

Each Ethernet port has one green and one multi-color LED built into it's RJ45 connector. The "LINK" (link valid) LED indicates, when lit, that the port is attached to a functional ethernet network. The "ACT" (activity) LED indicates, when lit, that there is transmit or receive activity on the link. During normal operation, the "LINK" LED is on and the "ACT" LED blinks.

**Figure 2-8. Ethernet Port 1-3 LEDs )**



**2.2.6 Video Support**

The gateway board includes a video controller in an on-board Server Engines\* Integrated Baseboard Management Controller along with 8 MB of video DDR2 SDRAM. The SVGA subsystem supports a variety of modes, up to 1600 x 1200 resolution in 8/16 bpp modes under 2D. It also supports both CRT and LCD monitors up to 85 Hz vertical refresh rate.

The video is accessed using a standard 15-pin VGA connector found on the back of the gateway. The on-board video controller can be disabled using the BIOS Setup utility or when an add-in video card is detected. The system BIOS provides the option for dual-video operation when an add-in video card is configured in the system

**Table 2-5. VGA Connector**

Pin	Signal Name	Description
1	V_IO_R_CONN	Red (analog color signal R)
2	V_IO_G_CONN	Green (analog color signal G)
3	V_IO_B_CONN	Blue (analog color signal B)
4	TP_VID_CONN_B4	No connection
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	TP_VID_CONN_B9	No connection
10	GND	Ground
11	TP_VID_CONN_B11	No connection
12	V_IO_DDCDAT	DDCDAT
13	V_IO_HSYNC_CONN	HSYNC (horizontal sync)
14	V_IO_VSYNC_CONN	VSYNC (vertical sync)
15	V_IO_DDCCLK	DDCCLK

The above table details the pin-out definition of the VGA connector.

### 2.2.7 USB 2.0 Support

The USB controller functionality integrated into ICH10R provides the gateway with an interface to the 4 external USB 2.0 ports. Both ports are high-speed, full-speed and low-speed capable.

### 2.2.8 Power Supply Status LEDs

Green on these LEDs indicates the respective supply is operating correctly. The 2810 system will operate properly with one working supply.

### Before You Begin

Before working with your gateway product, pay close attention to the safety instructions provided in this manual. See **Appendix A, “Safety Information”**.

#### 3.1 CONSIDERATIONS

##### 3.1.1 Equipment Rack Precautions

###### 3.1.1.1 Anchor The Equipment Rack

The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more gateways are installed. The equipment rack must be installed according to the manufacturer's instructions. You must consider the weight of all devices installed in the rack.

###### 3.1.2 Grounding the Equipment Rack

To avoid the potential for an electrical shock hazard, you must include a third wire safety ground conductor with the rack installation. If the gateway power cord is plugged into an outlet that is part of the rack, then you must provide proper grounding for the rack itself. If the gateway power cord is plugged into a wall outlet, the safety ground conductor in the power cord provides proper grounding only for the gateway. You must provide additional, proper grounding for the equipment rack and other devices installed in it.

###### 3.1.3 Temperature

The operating temperature of the gateway, when installed in an equipment rack, must not go below 5°C (41°F) or rise above 35°C (95°F). Extreme fluctuations in temperature can cause a variety of problems in your gateway.

###### 3.1.4 Ventilation

The equipment rack must provide sufficient airflow to the front of the gateway to maintain proper cooling. It must also include ventilation sufficient to exhaust a maximum of 494 BTU.

###### 3.1.5 System References

All references to left, right, front, top, and bottom assume that you are facing the front of the gateway, as it would be positioned for normal operation.

### 3.1.6 Prerequisite Tools and Supplies

- No. 2 Phillips screwdriver.
- Ensure the availability of at least 1.75 inches of vertical space (slightly more vertical space than the mounting bracket) to accommodate the 2810 Series Network Gateway.

## 3.2 INSTALLATION INSTRUCTIONS

### 3.2.1 Install Rack Mounted Rails

The rack-mounting kit allows you to mount your 2810 Series Network Gateway into a standard 19-inch equipment rack.

Unpack the two rails supplied with the gateway. The rails ship from Cyclone Microsystems adjusted for a 22 inch depth cabinet. If your rack is different depth, loosen the two inside screws to adjust the rail to the needed depth. Retighten the screws. Left rail and right rails are discerned by observing the raised vertical tabs with threaded hole. The raised vertical tabs mount to the back of the gateway.

Mount the rails to the vertical rack posts using two #10-32, 1/2 inch Phillips Pan Head Screw and two mating G-Style Clip on nut on both the front and back of each rail section.

### 3.2.2 Install the Gateway into a Rack

Gently slide the gateway onto the rails and fasten the rear gateway retaining screw on both rails.

On the front of the gateway use two #10-32, 1/2 inch Phillips Pan Head Screw and two mating G-Style Clip on nuts to secure both the left and right rack mount ear tabs of the gateway to the front vertical rack posts.

### 3.2.3 Connect Gateway to Earthing Ground

To avoid the potential for an electrical shock hazard, you must reliably connect an earthing ground conductor to the gateway. The earthing ground conductor on the DC power configuration is a #10 earthing ground stud on the front panel. The earthing ground stud provides proper grounding only for the gateway. You must provide additional proper grounding for the rack and other devices installed in it. See Section 2.2.2 Earthing Ground Stud for information on the ring lugs and wire gauge.

### 3.2.4 Connecting DC Power

Connection with a DC (Direct Current) source should only be performed by trained service personnel. The gateway with DC input is to be installed in a Restricted Access Location in accordance with articles 110-26 and 110-27 of the National Electric Code, ANSI/NFPA 70. The DC source must be electrically isolated by double or reinforced insulation from any hazardous AC source. The DC source must be capable of providing up to 250 watts of continuous power per feed pair.

Mains DC power disconnect: You are responsible for installing a properly rated DC power disconnect for the gateway system. This mains disconnect must be readily accessible, and it must be labeled as controlling power to the gateway. The UL Listed circuit breaker of a centralized DC power system may be used as a disconnect device when easily accessible and should be rated minimum 20A. To remove all power to the gateway, first turn the unit off and then disconnect both power supply cables.

Grounding the gateway: This gateway is intended for installation with an isolated DC return (DC-I) and is to be installed in a Common Bonding Network (CBN) per NEBS GR-1089.

### **3.2.5 Connecting AC Power**

The plugs on the power supply cables are considered the mains disconnect for the gateway and must be readily accessible when installed. If the individual gateway power supply cable plugs will not be readily accessible for disconnection then you are responsible for installing a power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire rack, not just to the gateway(s). To remove all power to the 2810, first turn unit off and then remove both power supply cable plugs.

## **3.3 INSTALLATION GUIDELINES**

The following guidelines and instructions apply to the 600-2810-xx-D and the 600-2810-xx-A.

1. This unit is for use only in a Restricted Access Location (RAL).
2. Do not connect or disconnect the power supply connector (Section 2.2.1) under load.
3. The DC power supply cord must be protected against physical damage.
4. Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T<sub>ma</sub>) specified by the manufacturer.
5. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
6. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
8. Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
9. Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

10. Ethernet Cabling Warning: The intra-building port(s) of the equipment or subassembly is suitable for connection to intrabuilding or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly **MUST NOT** be metalically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of primary Protectors is not sufficient protection in order to connect these interfaces metalically to OSP wiring.

**4.1 PERIODIC MAINTENANCE**

The only element of the 2810 unit requiring periodic maintenance is the air filter, located on the front of the unit. The filter should be replaced or cleaned every 12 months in normal operating environments. It should be replaced or cleaned more often in dusty environments. The filter may be washed with water.

The replacement of air filter or fan can be done without turning off the power supplies. The air filter assembly is located on the front of the FEP unit. Replacement filters can be purchased from Cyclone Microsystems, Cyclone part number 370-R1606.

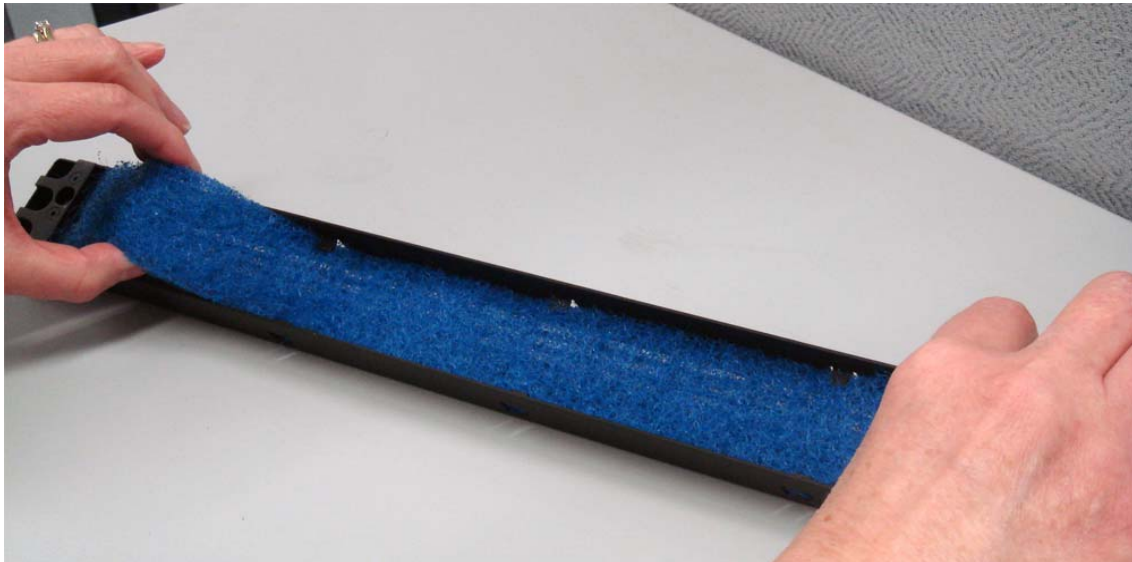
**Table 4-1. Air Filter Replacement**

1	Remove Front Bezel by Pulling on Finger Holes
2	Remove Air Filter by Pinching Filter Material
3	Wash Filter in Water
4	Install Clean or New Filter in Bezel by Pinching Filter Material and Inserting under Retaining Tabs
5	Reinstall Bezel on System by Pressing Bezel onto Mounting Studs



**Figure 4-1. Air Filter Replacement**

Figure 4-2. Pinching Filter Material





## CHAPTER 5 SERVICEABLE COMPONENTS

### 5.1 SERVICEABLE COMPONENTS

All of the Field Replaceable Units (FRU) of an FEP are serviceable from the front of the unit without the need to dismount an installed FEP from its rack. Table 6-1 lists all the field replaceable units and the associated CLEI codes and Cyclone part numbers.

**Table 5-1. CLEI Number and Barcode**

Cyclone Part Number	Qty	Description	CLEI Number	ECI Code Barcode
<b>600-2810-xx-xxA</b>	1	2810 AC Carrier Grade Gateway		
370-R1604	2	AC Power Supply	ANP1AAAAAA	181942
370-R1602	1	Fan Tray	ANC5AARDAA	181944
370-R1607	1	Bezel Filter Assembly		
370-R1606	1	Filter (only)	ANPQABXPAA	181946
<b>600-2810-xx-xxD</b>	1	2810 DC Carrier Grade Gateway		
370-R1605	2	DC Power Supply	ANP1AABAAA	181943
370-R1602	1	Fan Tray	ANC5AARDAA	181944
370-R1607	1	Bezel Filter Assembly		
370-R1606	1	Filter (only)	ANPQABXPAA	181946

### 5.2 FAN TRAY REMOVAL AND INSTALLATION

The cooling fans of the 2810 are serviceable from the front of the unit. The FEP does NOT have to be removed from its rack to service the fans. The Fan tray maybe removed and installed while the system is running.

Figure 5-1. Fan Tray Replacement



Figure 5-2. 600-2810 Fan Tray Removal



**Table 5-2. Fan Tray Removal and Installation**

<b>I</b>	<b>Removal</b>
1	Remove Front Bezel by Pulling on Finger Holes (se Figure 5-1)
2	Remove Fan Tray by loosening thumb screws and pulling tray out of chassis
	<b>Installation</b>
1	Insert Fan Tray and hand tighten thumb screws
2	Reinstall Front Bezel by pressing it into place

**5.3 POWER SUPPLY REMOVAL AND INSTALLATION**

The power supplies of the 2810 are serviceable from the rear of the unit. The 2810 does NOT have to be removed from its rack to service the power supplies. The 2810 will operate with one power supply installed. Since the power supplies are designed to hot swap, they can be removed or installed without switching off the power.

**5.3.1 Power Supply Removal**

Remove the power cable from the supply you wish to remove. Pull supply from unit by pushing lever to right while pulling on supply handle.

**5.3.2 Power Supply Installation**

Seat the new supply into the opening and push unit engaged. Power cables may now be connected to this supply.

**5.4 BATTERY REPLACEMENT AND DISPOSAL**

The 2810 contains a Lithium-ion battery.

**CAUTION**

**RISK OF EXPOSITION IF BATTERY REPLACED BY INCORRECT TYPE**

**DISPOSE OF USED BATTERIES BY PROPERLY RECYCLING**

## CHAPTER 6 RELIABILITY PREDICTIONS

### 6.1 METHODOLOGY

Reliability predictions were completed using the Bellcore 5 reliability standard developed by AT&T Bell Laboratories. Component failure rates are calculated based on technology, stress levels, gate or transistor density (ICs), package style, and quality level. Failure rates provided by the component manufacturer have been used in some cases, where available. Failure rates are expressed in FITs, which is failures per billion hours. Mean Time Between Failures (MTBF) is the inverse of the failure rate and is the average time between failures.

### 6.2 ASSUMPTIONS

- Ambient input air temperature does not exceed 30 deg. C.
- Ground, Fixed, Controlled Environment
- Components are Quality Level I.
- Component stress levels do not exceed rated limits (i.e. power dissipation, junction temperature, etc.). In other words, components are used within specification limits. The parts count prediction assumes parts are used at a maximum of 50% of rated electrical stress.
- Component failure could result in FEP failure (except for the power supplies that are configured in parallel redundancy). However, Telcordia's architecture uses FEPs in parallel redundancy.

### 6.3 CONFIGURATION

Item	Part Number	Failure Rate 30° C	MTBF 30° C (hrs)	Mission FIT	Mission MTBF (hrs.) 30° C
<b>600-2810-xxx-xA</b>					
Motherboard	241-R1010	9,259.3	108,000	9259.3	108,000
Fans N+1	370-R1602	5,797.6	172,485	2898.8	344,970
AC Power Supply N+1	370-R1604	2,332.0	167,709	2981.4	335,418
Total				<b>15139.4</b>	<b>66,053</b>
<b>600-2810-xxx-xD</b>					
Motherboard	240-R1010	9,259.3	108,000	9259.3	108,000
Fans N+1	370-R1602	5,797.6	172,485	2898.8	344,970
DC Power Supplies N+1	370-R1605	2,332.0	187,371	2668.5	374,742
Total				<b>14826.6</b>	<b>67,447</b>

### **7.1 OVERVIEW**

Cyclone Microsystems is a commercial manufacturer of Single Board Computers, Intelligent Communication Controllers and Communications Systems. Our standard repair cycle for in-warranty or out-of-warranty repair is two weeks. Most of our FEP customers require 24 by 7 support that is far in excess of Cyclone Microsystems' current or anticipated capabilities. Consequently, we highly recommend that FEP customers pursue high availability support from a support organization or pursue an on-site sparing policy in conjunction with a Cyclone Microsystems Expedited Repair Program. Please contact a Cyclone sales representative for a program proposal.

### **7.2 HARDWARE**

Cyclone Microsystems, Inc. (Cyclone) for the period set out below, warrants that its standard products will be free from defects in workmanship or material under normal use and service. Cyclone's obligation under this warranty shall not arise until the Buyer returns the defective product, freight prepaid, to Cyclone. The only responsibilities of Cyclone under this warranty are at its option to replace or repair, without charge, any defective component of such products.

### **7.3 SOFTWARE AND FIRMWARE**

Cyclone warrants that Software and Firmware supplied shall conform to the then current published documentation applicable to such programs. Cyclone, for the effective period of the warranty set out below, will upon written notice from the Buyer documenting the symptoms or the defect, expend its best efforts to resolve software bugs and/or fault. This service shall be without extra charge, and at Cyclone's option may include on-site visit(s) if in its opinion the conditions justify such visit(s).

### **7.4 EFFECTIVE PERIOD OF WARRANTY**

One year from date of delivery.

### **7.5 REPAIRED OR REPLACEMENT PRODUCT (OUT-OF-WARRANTY)**

Cyclone Microsystems, for a period of 30 days, warrants that its out-of-warranty products that are repaired or replaced shall be free from defects in workmanship or material under normal use and service.

Any repair or replacement shall not extend the period within which the warranty can be asserted.

The above warranties do not extend to and shall not apply to:

- Products which have been repaired or altered by other than Cyclone, unless the Buyer has properly altered or repaired the products in accordance with procedures previously approved, in writing, by Cyclone; or
- Products which have been subject to misuse, neglect, accident or improper installation; or

## WARRANTY



- Products not manufactured by Cyclone.

**The foregoing warranty and remedies are exclusive and are made in lieu of all other warranties express or implied, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for use. Cyclone neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale, installation or use of its products, and Cyclone makes no warranty whatsoever for products not manufactured by Cyclone or with respect to any non-standard products which have been subject to misuse, neglect, accident, or have been modified by the Buyer. Cyclone shall have no liability for incidental or consequential damages of any kind arising out of the sale, installation, or use of its products.**

### 7.6 SERVICE POLICY

Out-of-Warranty repair will be accomplished expeditiously at a charge published on the current price schedule plus shipping. A full description of the failure must be enclosed with the product.

Shipments arriving at Cyclone without a Return Material Authorization (RMA) number will not be accepted and will be returned to the customer at his cost regardless of warranty status.

#### Return Procedures

Upon determining that repair is required, the customer must:

- Call Cyclone Customer Support at (203) 786-5536 for a RMA number. Please have ready:
  - The serial number of the board (s)
  - The reason for return
- Enclose a detailed description of the failure with the failed unit in a static-shielded protective container.
- Ship unit to: Cyclone Microsystems, 2 Mountain View Drive, Shelton, CT 06484, Attn: RMA number
- The RMA is valid for 30 days after issue.

### A.1 POWER

The power button on the system does not turn off system power. To remove power from the system, you must unplug each power supply cable from the wall outlet or power supply.

The power supply cable is considered the disconnect device to the main (AC) power. The socket outlet that the system plugs into must be installed near the equipment and must be easily accessible.

### A.2 IF AC POWER SUPPLIES ARE INSTALLED

The plug on the power supply cable are considered the mains disconnect for the gateway and must be readily accessible when installed. If the individual gateway power supply cable plugs will not be readily accessible for disconnection then you are responsible for installing a power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire rack, not just to the gateway(s). To remove all power to the 2810, first turn the unit off and then remove both power supply cable plugs.

Grounding the rack installation: To avoid the potential for an electrical shock hazard, you must include a third wire safety ground conductor with the rack installation. If the gateway power cord is plugged into an AC outlet that is part of the rack, then you must provide proper grounding for the rack itself. If the gateway power cord is plugged into a wall AC outlet, the safety ground conductor in the power cord provides proper grounding only for the gateway. You must provide additional, proper grounding for the rack and other devices installed in it. This system is intended for connection to a Common Bonding Network (CBN) as defined by NEBS GR-1089.

**Warning:** Do not attempt to modify or use an AC power cord set that is not the exact type required. You must use a power cord set that meets the following criteria:

- **Rating:** In the U.S. and Canada, cords must be UL (Underwriters Laboratories, Inc.) Listed/CSA (Canadian Standards Organization) Certified type SJT, 18-3 AWG (American Wire Gauge). Outside of the U.S. and Canada, cords must be flexible harmonized (<HAR>) or VDE (Verband Deutscher Elektrotechniker, German Institute of Electrical Engineers) certified cord with 3 x 0.75 mm conductors rated 250 VAC.
- **Connector, Wall Outlet end:** Cords must be terminated in grounding-type male plug designed for use in your region. The connector must have certification marks showing certification by an agency acceptable in your region and for U.S. must be Listed and rated 125% of overall current rating of the gateway.
- **Connector, Gateway End:** The connectors that plug into the AC receptacle on the gateway must be an approved IEC (International Electrotechnical Commission) 320, sheet C13, type female connector.
- **Cord length and flexibility:** Cords must be less than 4.5 meters (14.8 feet) long.

### A.3 IF DC POWER SUPPLIES ARE INSTALLED

Connection with a DC (Direct Current) source should only be performed by trained service personnel. The gateway with DC input is to be installed in a Restricted Access Location in accordance with articles 110-26 and 110-27 of the National Electric Code, ANSI/NFPA 70. The DC source must be electrically isolated by double or reinforced insulation from any hazardous AC source. The DC source must be capable of providing up to 250 watts of continuous power per feed pair.

Mains DC power disconnect: You are responsible for installing a properly rated DC power disconnect for the gateway system. This mains disconnect must be readily accessible, and it must be labeled as controlling power to the gateway. The UL Listed circuit breaker of a centralized DC power system may be used as a disconnect device when easily accessible and should be rated no more than 5 amps. To remove all power to the gateway, first turn the unit off and then disconnect both power supply cables.

Grounding the gateway: This gateway is intended for installation with an isolated DC return (DC-I) and is to be installed in a Common Bonding Network (CBN) per NEBS GR-1089.

To avoid the potential for an electrical shock hazard, you must reliably connect an earth grounding conductor to the gateway. The earth grounding conductor on the DC power configuration is a #10 earthing ground stud on the front panel. The earthing ground stud provides proper grounding only for the gateway. You must provide additional, proper grounding for the rack and other devices installed in it. See section 2.2.2 Earthing Ground Stud for information on ring lugs and wire gauge.



## Appendix B

### SERVER SAFETY INFORMATION

## English

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### Equipment Safety Information

*This document applies to Cyclone Gateway Chassis (pedestal and rack-mount) and installed peripherals. To reduce the risk of bodily injury, electrical shock, fire, and equipment damage, read this document and observe all warnings and precautions in this guide before installing or maintaining your Cyclone gateway product.*






*In the event of a conflict between the information in this document and information provided with the product or on the website for a particular product, the product documentation takes precedence.*

*Your gateway should be integrated and serviced only by technically qualified persons.*

*You must adhere to the guidelines in this guide and the assembly instructions in your server manuals to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL Listing and other regulatory approvals of the product, and may result in noncompliance with product regulations in the region(s) in which the product is sold.*

### Equipment Warnings & Cautions

*To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following safety instructions and information. The following safety symbols may be used throughout the documentation and may be marked on the product and / or the product packaging.*

<b>CAUTION</b>	Indicates the presence of a hazard that may cause minor personal injury or property damage if the CAUTION is ignored.
<b>WARNING</b>	Indicates the presence of a hazard that may result in serious personal injury if the WARNING is ignored.
	Indicates potential hazard if indicated information is ignored.
	Indicates shock hazards that result in serious injury or death if safety instructions are not followed.
	Indicates hot components or surfaces.
	Indicates do not touch fan blades, may result in injury.
	Indicates to unplug all AC power cord(s) to disconnect AC power

## Intended Application Uses

*This product was evaluated as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations. The suitability of this product for other product categories and environments (such as medical, industrial, residential, alarm systems, and test equipment), other than an ITE application, may require further evaluation.*

## Site Selection

*The system is designed to operate in a typical office environment. Choose a site that is:*

- *Clean, dry, and free of airborne particles (other than normal room dust).*
- *Well-ventilated and away from sources of heat including direct sunlight and radiators.*
- *Away from sources of vibration or physical shock.*
- *Isolated from strong electromagnetic fields produced by electrical devices.*
- *In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppresser and disconnect telecommunication lines to your modem during an electrical storm.*
- *Provided with a properly grounded wall outlet.*
- *Provided with sufficient space to access the power supply cord(s), because they serve as the product's main power disconnect.*

## Equipment Handling Practices

*Reduce the risk of personal injury or equipment damage:*

- *Conform to local occupational health and safety requirements when moving and lifting equipment.*
- *Use mechanical assistance or other suitable assistance when moving and lifting equipment.*
- *To reduce the weight for easier handling, remove any easily detachable components.*

## Power and Electrical Warnings



### **CAUTION**

*The power button, indicated by the stand-by power marking, DOES NOT completely turn off the system AC power, 5V standby power is active whenever the system is plugged in. To remove power from system, you must unplug the AC power cord from the wall outlet. Your system may use more than one AC power cord. Make sure all AC power cords are unplugged. Make sure the AC power cord(s) is/are unplugged before you open the chassis, or add or remove any non hot-plug components.*

*Do not attempt to modify or use an AC power cord if it is not the exact type required. A separate AC cord is required for each system power supply.*

*The power supply in this product contains no user-serviceable parts. Do not open the power supply. Hazardous voltage, current and energy levels are present inside the power supply. Return to manufacturer for servicing.*

*When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing it from the gateway.*

*To avoid risk of electric shock, turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the gateway before opening it.*

## **Power Cord Warnings**

*If an AC power cord was not provided with your product, purchase one that is approved for use in your country.*



### **CAUTION**

*To avoid electrical shock or fire, check the power cord(s) that will be used with the product as follows:*

- *Do not attempt to modify or use the AC power cord(s) if they are not the exact type required to fit into the grounded electrical outlets*
- *The power cord(s) must meet the following criteria:*
  - *The power cord must have an electrical rating that is greater than that of the electrical current rating marked on the product.*
  - *The power cord must have safety ground pin or contact that is suitable for the electrical outlet.*
- *The power supply cord(s) is/are the main disconnect device to AC power. The socket outlet(s) must be near the equipment and readily accessible for disconnection.*
- *The power supply cord(s) must be plugged into socket-outlet(s) that is /are provided with a suitable earth ground.*

## **System Access Warnings**



### **CAUTION**

*To avoid personal injury or property damage, the following safety instructions apply whenever accessing the inside of the product:*

- *Turn off all peripheral devices connected to this product.*
- *Turn off the system by pressing the power button to off.*
- *Disconnect the AC power by unplugging all AC power cords from the system or wall outlet.*
- *Disconnect all cables and telecommunication lines that are connected to the system.*
- *Retain all screws or other fasteners when removing access cover(s). Upon completion of accessing inside the product, refasten access cover with original screws or fasteners.*
- *Do not access the inside of the power supply. There are no serviceable parts in the power supply. Return to manufacturer for servicing.*
- *Power down the gateway and disconnect all power cords before adding or replacing any non hot-plug component.*
- *When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing the power supply from the gateway.*



### **CAUTION**

*If the gateway has been running, any installed processor(s) and heat sink(s) may be hot. Unless you are adding or removing a hot-plug component, allow the system to cool before opening the covers. To avoid the possibility of coming into contact with hot component(s) during a hot-plug installation, be careful when removing or installing the hot-plug component(s).*



### **CAUTION**

*To avoid injury do not contact moving fan blades. If your system is supplied with a guard over the fan, do not operate the system without the fan guard in place.*

## **Rack Mount Warnings**

*The equipment rack must be anchored to an unmovable support to prevent it from tipping when a gateway or piece of equipment is extended from it. The equipment rack must be installed according to the rack manufacturer's instructions.*

*Install equipment in the rack from the bottom up, with the heaviest equipment at the bottom of the rack.*

*Extend only one piece of equipment from the rack at a time.*

*You are responsible for installing a main power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the gateway(s).*

*To avoid risk of potential electric shock, a proper safety ground must be implemented for the rack and each piece of equipment installed in it.*

## **Electrostatic Discharge (ESD)**



### **CAUTION**

*ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground -- any unpainted metal surface -- on your gateway when handling parts.*

*Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the gateway, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.*

# Other Hazards

## Battery Replacement



### **CAUTION**

*There is the danger of explosion if the battery is incorrectly replaced. When replacing the battery, use only the battery recommended by the equipment manufacturer.*

*Dispose of batteries according to local ordinances and regulations.*

*Do not attempt to recharge a battery.*

*Do not attempt to disassemble, puncture, or otherwise damage a battery.*

## Cooling and Airflow



### **CAUTION**

*Carefully route cables as directed to minimize airflow blockage and cooling problems.*

*For proper cooling and airflow, operate the system only with the chassis covers installed.*

*Operating the system without the covers in place can damage system parts. To install the covers:*

- 1. Check first to make sure you have not left loose tools or parts inside the system.*
- 2. Check that cables, add-in boards, and other components are properly installed.*
- 3. Attach the covers to the chassis according to the product instructions.*

# 简体中文

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## 服务器安全信息

本文档适用于 Cyclone

服务器机箱（基座和机架固定件）和已安装的外设。为减少人身伤害、电击、火灾以及设备损坏的危险，请在安装或维护 Cyclone

服务器产品之前阅读本文档并遵循本指南中的所有警告和预防措施。






如果本文档中的信息与特定产品的随附信息或 Web 站点信息之间存在不一致，请以产品文档为准。

服务器须由合格的技术人员进行集成和维护。

必须遵守本指南的规定和服务器手册的装配指导，以确保符合现有的产品认证和审批。仅使用本指南中描述和规定的指定组件。使用其他产品 / 组件将使产品的 UL 认证和其他管理审批无效，并可能导致产品不符合销售地的产品法规。

## 安全警告与注意事项

为避免人身伤害与财产损失，安装本产品之前，请阅读以下所有安全指导和信息。下面所列的安全符号可能在整个文档中使用并可能标注于产品和 / 或产品包装之上。

<b>注意</b>	表示如果无视此“注意事项”，存在可能引起轻微人身伤害或财产损失的危险。
<b>警告</b>	表示如果无视此“警告”，存在可能引起严重人身伤害的危险。
	表示如果无视所示信息，即存在潜在的危险。
	表示如果不遵守安全指导，存在可导致严重伤害或死亡的电击危险。
	表示灼热组件或表面。
	表示请勿触摸风机叶片，否则可能致伤。
	表示拔下所有交流电线，断开交流电源

# 预期应用使用

根据评估，本产品为信息技术设备 (ITE)，可安装在办公室、学校、计算机房和类似的商业场所。本产品对于非 ITE 应用的其他产品种类和环境（如医疗、工业、住宅、报警系统和测试设备）的适用性尚有待进一步的评估。

# 场地选择

本系统专为在典型办公环境运行而设计。请选择符合以下条件的地点：

- 清洁、干燥，无气载微粒（而非一般的室内尘埃）。
- 通风良好，远离热源（包括直接日晒和散热器）。
- 远离振动源或物理震动。
- 与电气设备产生的强大电磁场隔离。
- 在易受闪电袭击的地区，我们建议将系统插入电涌抑制器并在闪电期间断开通信线路与调制解调器之间的连接。
- 提供正确接地的墙壁插座。
- 提供足够的空间，以便拿取电源供应线，因为这是本产品的主要电源断开器。

# 设备操作规范

减少人身伤害或设备受损的危险：

- 移举设备时遵守当地的职业健康与安全要求。
- 借助机械手段或其他合适的手段移举设备。
- 拆除一切易分离组件，以降低重量并方便操作。

# 电源与电气警告

## 注意事项

电源按钮（如待机电源标记所示）并不能完全关闭系统的交流电源，只要系统已接通电源，就存在 5V

待机电源。要从系统切断电源，须从墙壁电源插座中拔下交流电线。您的系统可能不止使用一根交流电线。请确保所有的交流电线都已拔下。打开机箱或增加或去除任何热插拔组件之前，确保交流电线已拔下。

若非所需的确切类型，请勿尝试修改或使用交流电线。系统的每个电源供应设备都需要一根单独的交流电线。

本产品的电源供应设备包含非用户维修部件。请勿打开电源供应设备。电源供应设备包含非常危险的电压级、电流级和能量级。请与生产商联系维修事宜。

替换热插拔电源供应设备时，请先拔下需替换的电源供应设备上的电源线，再将其从服务器上移除。

为避免电击，请在打开服务器之前，关闭服务器并断开服务器上连接的电源线、电信系统、网络和调制解调器。

## 电源线警告

如果产品未提供交流电线，请购买一根您所在国家批准使用的交流电线。

### 注意事项

为避免电击或火灾危险，请按如下所述对产品所用的电源线进行检查：

- 若非所需的符合接地插座的确切类型，请勿尝试修改或使用交流电线
- 电源线须符合以下标准：
  - 电源线的电气额定值须大于产品上标注的电流额定值。
  - 电源线须拥有适合插座的安全接地插头或触点。
- 电源线为交流电源的主要断开设备。插座须靠近设备并可随时断开。
- 电源线须插入所提供的拥有合适接地的插座。

## 系统使用警告

### 注意事项

为避免人身伤害或财产损失，无论何时检查产品内部，以下安全指导都适用：

- 关闭所有与本产品相连的外设。
- 按下电源按钮至关闭状态，关闭系统。
- 从系统或墙壁插座上拔下所有交流电线，断开交流电源。
- 断开与系统相连的所有线缆和通信线路。
- 卸除舱口盖时，保留所有螺钉及其他紧固件。完成产品内部检查之后，请用螺钉或紧固件重新固定舱口盖。
- 请勿打开电源供应设备。电源供应设备内没有可维修部件。请与生产商联系维修事宜。
- 增加或替换任何非热插拔组件之前，请关闭服务器电源并断开所有电源线。
- 替换热插拔电源供应设备时，请先拔下需替换的电源供应设备上的电源线，然后再从服务器上移除电源供应设备。

### 注意事项

如果服务器一直在运行，任何已安装的处理器和吸热设备都可能很热。除非要增加或移除热插拔组件，否则请待系统冷却后再开盖。为避免在热插拔组件安装过程中接触灼热组件，移除或安装热插拔组件时务须小心。





### 注意事项

为避免受伤，请勿触摸运转的风机叶片。如果系统的风机上配有防护装置，请勿卸下风机防护装置运行系统。

## 机架固定件警告

设备的机架须固定在稳固的支座上，以防从中安装服务器或设备时倒塌。须按照机架生产商提供的安装说明进行安装。

从下往上将设备安装在机架上，最重的设备安装在机架的最底层。

一次只从机架上安装一件设备。

您须负责安装整个机架装置的主要电源断开设备。此主要断开设备须随时可用，且须标明为控制整个装置（而不仅限于服务器）的电源。

为避免潜在的电击危险，须对机架及其上所安装的每一件设备实行正确的安全接地。

## 静电放电 (ESD)



### 注意事项

ESD 会损坏磁盘驱动器、主板及其他部件。我们建议您执行 ESD 工作站的所有步骤。如果没有 ESD

工作站，则采取一些静电放电保护措施，操作部件时，戴上与服务器上的机箱接地或任何未喷漆金属表面连接的防静电腕带。

操作主板时始终保持小心。它们可能对 ESD

非常敏感。拿持主板时只接触边缘。从保护包装中或从服务器上取出主板后，请将主板组件侧面朝上放置于无静电的接地表面上。请使用导电泡沫垫（若有），不要使用主板包装。请勿将主板在任何表面上滑动。

## 其他危险

### 替换电池

#### 注意事项

不正确替换电池可能导致爆炸危险。替换电池时，请只使用设备生产商推荐使用的电池。

请按当地法规处置电池。

请勿对电池充电。

请勿拆卸、刺穿或以其他方式损坏电池。

## 冷却和气流

### 注意事项

按照说明小心布置线缆，尽量减少气流阻塞和冷却问题。

为保证适当的冷却和气流，运行系统时请确保机箱盖已安装。未安装机箱盖即运行系统可能导致系统部件受损。安装机箱盖的步骤如下：

1. 首先检查并确保系统内没有遗留的未固定工具或部件。
2. 检查线缆、内插板和其他组件已正确安装。
3. 按产品说明安装机箱盖。