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Centellis CT Series 16000
User's Manual

P/N 209298 Edition B
July 1998

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Using This Manual

This preface provides information on the standard production and format features of the manual, including its structure, layout conventions, and any related documents.

Audience of the Manual

This user's manual is intended for users of the Centellis CT Series 16000 system family.

Overview of the Manual

This manual provides a comprehensive guide to your Centellis CT Series 16000 system.

IMPORTANT



Take a moment to examine the manual's "Table of Contents" to see how this document is structured. This will aid you in the future when looking for specific information.

This manual includes:

- an introductory overview of the Centellis CT Series 16000 (Section 1, "Introduction")
- installation instructions, detailed information on modules, controls, and system connections, and chassis power-up procedures (Section 2, "System Setup and Operation")
- chassis backplane information, connectors, and pin-out assignments for the Centellis 16000 (Section 3, "Configuration and Connections")
- rack mount installation guidelines (Section 4, "Rack Mounting")
- power requirements and equipment specifications (Section 5, "Requirements and Specifications")
- a copy of the Force Computers Product Error Report.

Publication History

Revision	Date	Writer	Description
AA	June 1998	G. A. Osika	Pre-release
AB	July 1998	G. A. Osika	First Release

Special Message Icons and Notes

There are three levels of iconicized notes used in this manual. These notes are described below via typical layout examples.

Always read and follow the safety notes whenever they appear in the manual. Failure to follow these instructions can result in personal injury or equipment damage.

WARNING



Danger: personal injury or equipment damage possible.

CAUTION



Warning: no danger to people, but equipment damage or loss of data possible.

IMPORTANT



Special Message: important product features, instructions, and user tips and information.

1.0 Introduction

1.1 General Information

The Centellis CT Series 16000 is a CompactPCI, rackmountable system chassis that offers a cost-effective CompactPCI environment suitable for the U.S., European, and Asian marketplaces. The chassis's rugged construction and integral mounting points provide the high quality and versatility necessary for peak product performance.

The Centellis CT Series 16000 system chassis accommodates a main processor board (three 6U CompactPCI slots) and supports 14 standard 6U CompactPCI slots in numerous user-implemented I/O configurations.

1.2 Manual Overview

This document describes the features and functions of the Centellis CT Series 16000 system chassis. This section (Section 1) includes a brief overview of the hardware (chassis and mechanical modules) and the software applications for the Centellis CT Series 16000. Installation instructions, cautionary notes, and information on how to handle the Centellis CT Series 16000 system chassis are outlined in Section 2 of this manual. Section 3 provides an overview of the chassis layout and a description of the interconnections within the chassis. Section 4 supplies information on rack-mounting the chassis. Section 5 provides important safety notes and warnings, product operational and mechanical specifications, and all relevant regulatory agency approvals.

1.3 General Description

The Centellis CT Series 16000 is an aluminum chassis designed primarily for mounting in a standard 19- or 23-inch equipment rack. The chassis encases a slotted subchassis containing a 16-slot CompactPCI backplane. The CompactPCI backplane has 14 open 6U slots after the CPU board is installed. The chassis contains an integrated peripheral tray with space for one front-accessible 5-1/4" half-height disk drive and one internal 3-1/2" half-height disk drive. Two 300 watt AC power supplies with individual on/off switches and 110VAC/230VAC voltage switches provide system power. System cooling is handled by a three-fan tray module. The chassis has EMI/RFI-tight front and rear covers, and rear panel I/O with installed 80mm rear transition boards.

Convertible mounting ears are provided for rack mounting. The mounting ears can be attached either flush to the front of the chassis or at a chassis midpoint recess.

Figure 1 shows the internal component modules located at the front of the Centellis CT Series 16000 chassis; Figure 2 shows the modules located at the rear of the chassis.

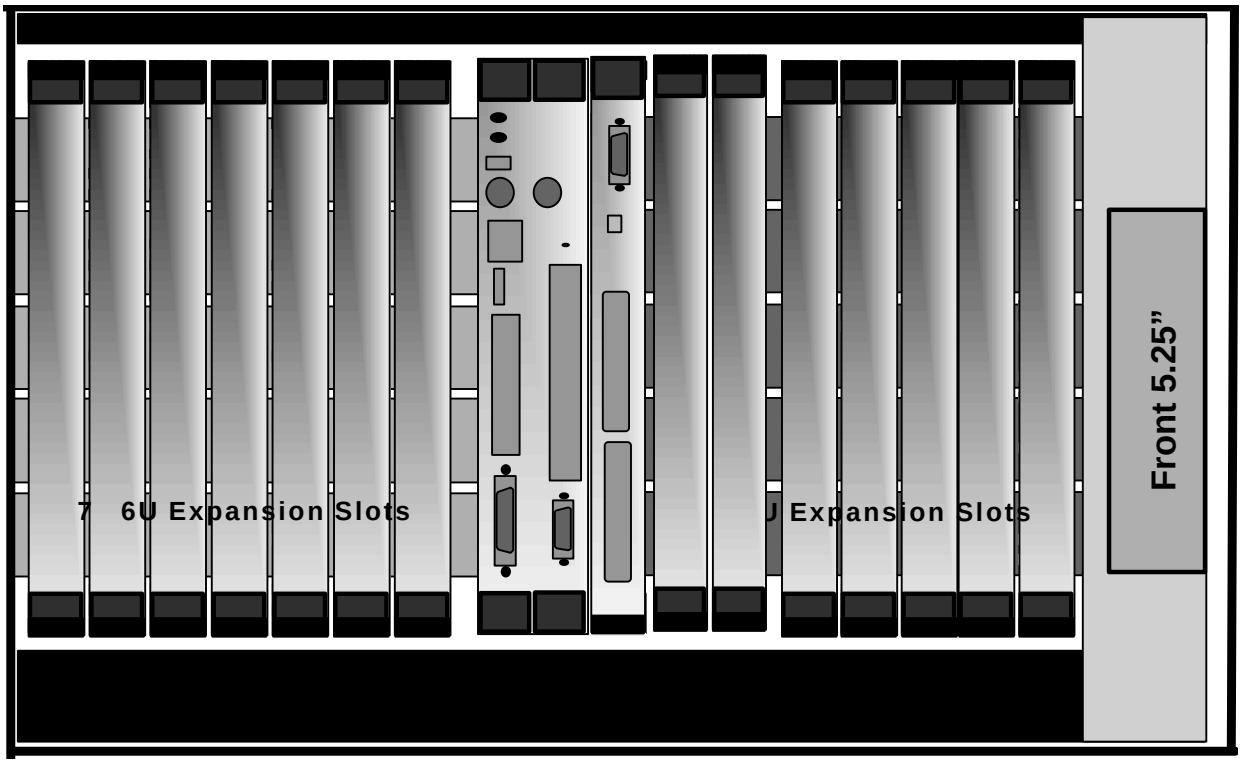


Figure 1: Centellis Internal Modules (Chassis Front View)

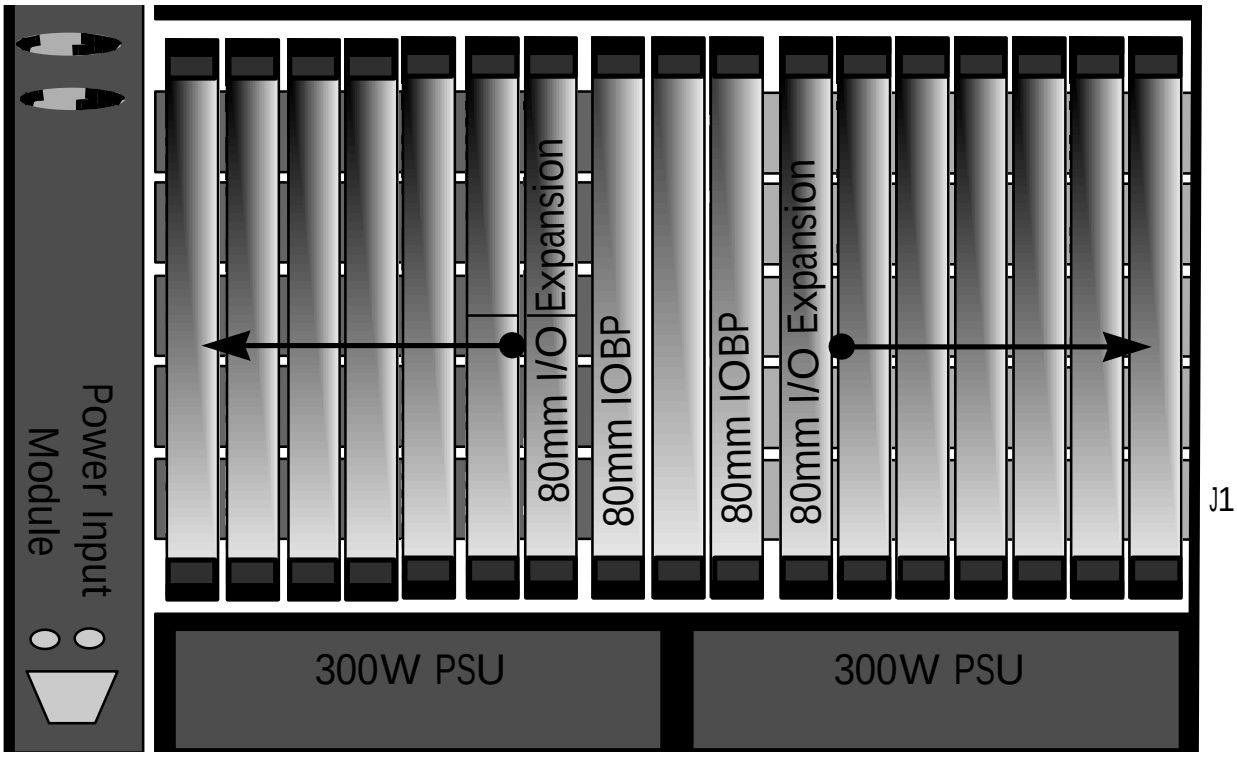


Figure 2: Centellis Internal Modules (Chassis Rear View)

1.4 System Features

CompactPCI and the H.110 CT bus, the primary technologies of the Centellis CT Series 16000, provide high-speed performance, manageability, and flexibility for growing telephony applications. Key hardware and software features include:

- 16-slot CompactPCI Backplane
  - Secondary H.110 CT bus
  - 14 6U I/O expansion slots
  - Passive (non-active) components
  - Integrated alarms on power backplane
- I/O Connectivity
  - 80 mm rear I/O transition boards
  - Configurable front or rear CPU I/O connectivity, including VGAand SCSI
- Power Supply
  - Two rear-serviceable 300W modules
  - Load sharing (with system power up to 300W)
  - Hot swappable (with system power less than or equal to 300W)
  - 110/220 VAC voltage user-selectable
  - Switched, fused, and filtered AC system input
- Chassis
  - Aluminum chassis
  - Size: 17" W x 17" D 15.75(9U) H (432 mm x 432 mm x 400 mm)
  - 19" or 23" equipment rack mounting via chassis mounting ears
  - Front-flush or midpoint recessed rack mounting
- Integrated Peripheral Tray
  - One front-accessible 5.25" drive bay
  - One internal 3.5" drive bay
- Fan Tray Module
  - Three 12VDC brushless fans
  - 110 CFM (cubic feet per minute)/fan (330 CFM total) air draw
  - Front-to-back cooling airflow
  - Front-serviceable
  - No monitoring or sensing

1.5 Chassis Modular Components

The Centellis CT Series 16000 chassis contains four functional hardware modular components. Each component mounts in or to the Centellis chassis frame.

The modular components of a Centellis CT Series 16000 chassis are:

- One card cage with a CompactPCI backplane
- One serviceable fan tray holding three cooling fans
- Two power supply assemblies
- One Integrated Peripheral Tray holding two disk drives

1.6 System Applications

The Centellis CT Series 16000 system chassis was designed as a CompactPCI platform for a variety of embedded applications. Users can install up to 14 6U CompactPCI boards into the chassis. System chassis configurations can include 3.5" hard disk drives and a CD-ROM drive.

Applications for the Centellis CT Series 16000 include:

- Telephony applications, including voice and FAX processing
- WLL applications for SS7 execution
- Firewall applications for data filtering
- Other applications with additional intelligent I/O or real-time processing boards

1.7 CompactPCI Backplane Architecture

The Centellis CT Series 16000 chassis contains a 16-slot CompactPCI backplane. Two backplane slots for the system CPU subdivide the remaining 6U user I/O expansion slots into two independent 7-slot segments. (Although 17 slots physically exist, a third CPU slot is an inactive "dummy" slot.) Figure 3 shows a sample CPCI backplane layout diagram.

The J4 connector on the I/O expansion slots supports an integrated H.110 Computer Telephony bus. This provides the backplane's time division multiplexing capability. The H.110 bus is wired to slots A1 thru A7 and B10 thru B16.

The CPCI backplane is a passive backplane; it holds no active components.

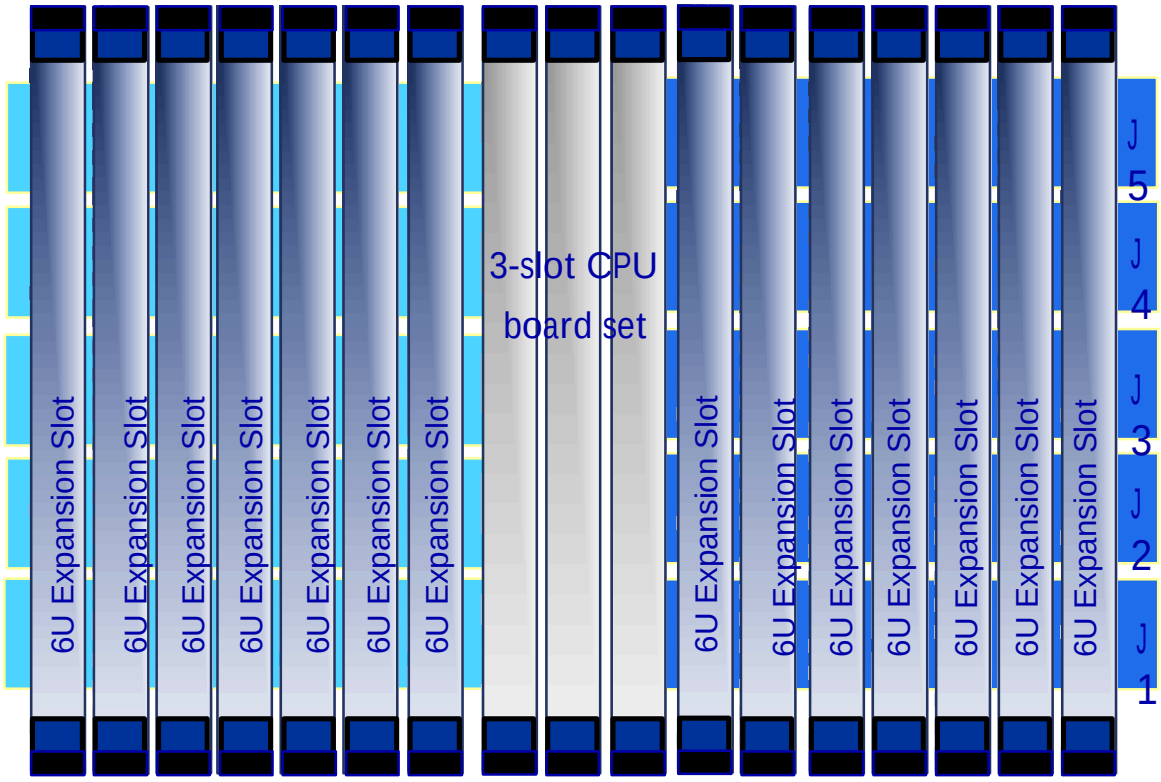


Figure 3: Centellis Backplane Layout Drawing

2.0 System Setup and Operation

2.1 General Information

This section describes the set up and usage of the 16000 chassis and its component modules. Included are important warnings and safety notes, pre-installation information, a description of the front and back panels, power supply specifications, power up procedures, and chassis identification information.

2.2 Warnings and Safety Information

WARNING



This section contains several important check points which must be observed before the chassis is powered on. In addition, warnings and important safety information will be included throughout this manual for specific equipment and operating situations.

- Follow all warnings and instructions marked on the equipment.
- To allow for sufficient cooling of the card cage slots, do not exceed an 18 watt limit per CompactPCI slot. As to the power consumption of the components used, see the respective technical specifications. Furthermore, make sure that the individual output currents of the separate sources are not exceeded.
- Ensure that the CPU card is properly installed between the two seven-slot I/O segments. The board contains special ejectors (the handles). To guarantee proper installation, the board must be plugged in, the handles on the front panel firmly locked, and all screws must be tightened to the card cage.
- Adequate space must always exist around the fans and the air inlets and outlets for successful airflow. Insufficient cooling may cause the system to crash and result in serious hardware damage.
- This equipment generates, uses and can radiate radio frequency energy. If not installed correctly and used in accordance with the instruction manual, it may cause interference to radio communications. It has been tested and found to comply with the limits of a Class A computing device pursuant to Subpart B of Part 15 of FCC Rules. When operating the system when not in compliance with these instructions and rules, or in the case of interference from radio stations, the user will be required to take whatever measures (e.g. EMI measurements) necessary to correct the disturbances at the user's expense.
- Use ferrite bead on the following cables: parallel, serial, Ethernet, mouse, and keyboard. Wind the cable around the ferrite bead one full turn.
- FORCE COMPUTERS, Inc. is not responsible for regulatory compliance or malfunction of any user-modified product.

CAUTION



ESD PRECAUTIONS - Static Destroys Products

- The chassis contains static-sensitive devices. Good static control procedures should be used when installing, removing, and handling all components. Use an antistatic wrist strap at all times. Never touch the board components with any conductive objects.

2.3 Pre-Installation Instructions

Upon receipt of your Centellis CT Series 16000 system, check the attached packing slip to verify that the equipment that was ordered was correctly shipped and received in full. Contact Force Computers if any discrepancy exists among the original purchase order, the packing slip, and the received equipment.

Visually inspect the product for any physical damage. The product was shipped from Force Computers manufacturing in working condition; any product damage must be immediately reported to the shipping agent.

Save the shipping carton and enclosed packing material in case the system must be reshipped in the future.

2.4 Chassis Front Description

The Centellis chassis is shipped with two 7-slot 6U front panels that cover the 14 user I/O expansion slots. An installed CPCI-723 module separates the panels into two 7-slot CPCI segments. Use a small Phillips screwdriver to remove the panels. An installed peripheral tray panel for a 5.25" drive bay fills the far right end of the chassis. A pluggable fan tray panel with air intake grillwork is attached to the bottom of the chassis via thumb screws.

Figure 4 shows the external front panels of the Centellis chassis.

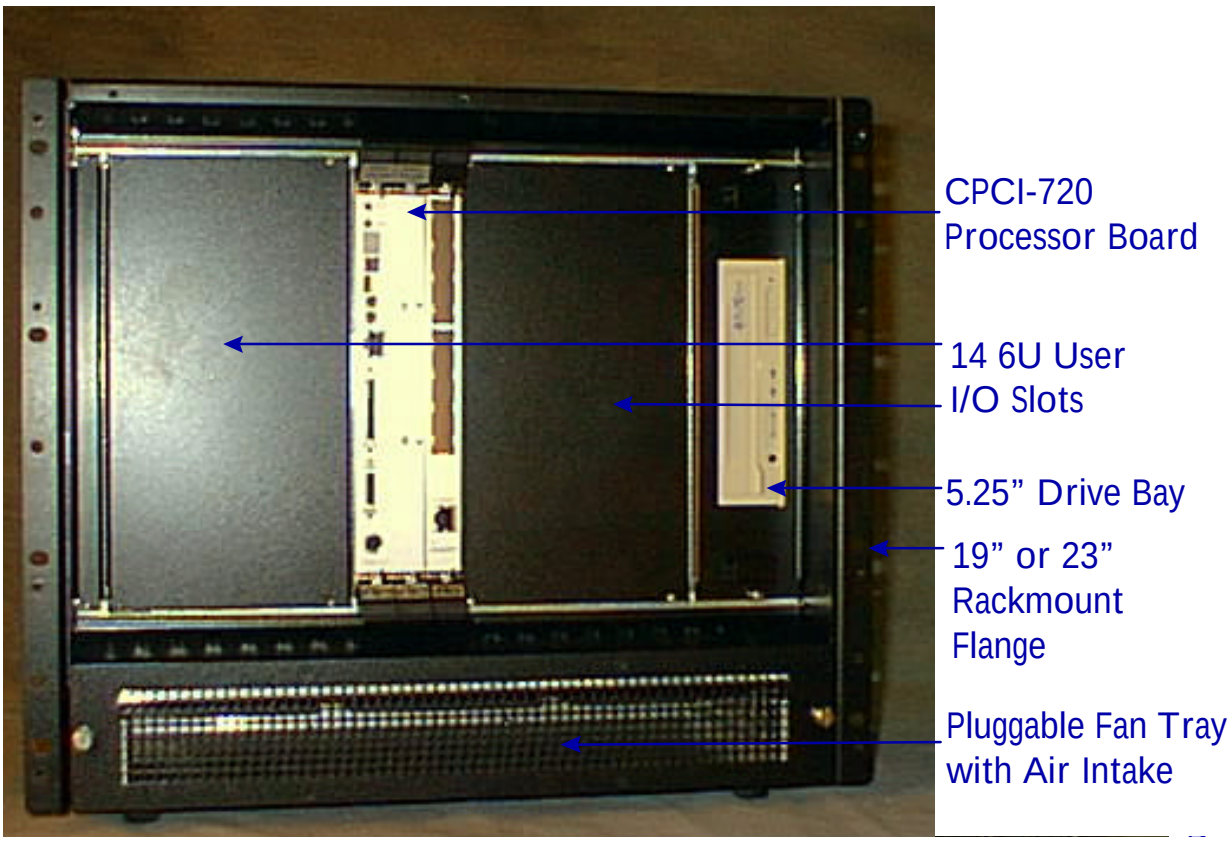


Figure 4: Centellis Front Panels

2.5 Chassis Rear Description

The back of the Centellis 16000 chassis contains two seven-slot user I/O segments, two 80mm transition boards, two hot swappable power supplies, and a power connector (with chassis On/Off and AC switches). Figure 5 shows the rear of the chassis and the rear-accessible modules.

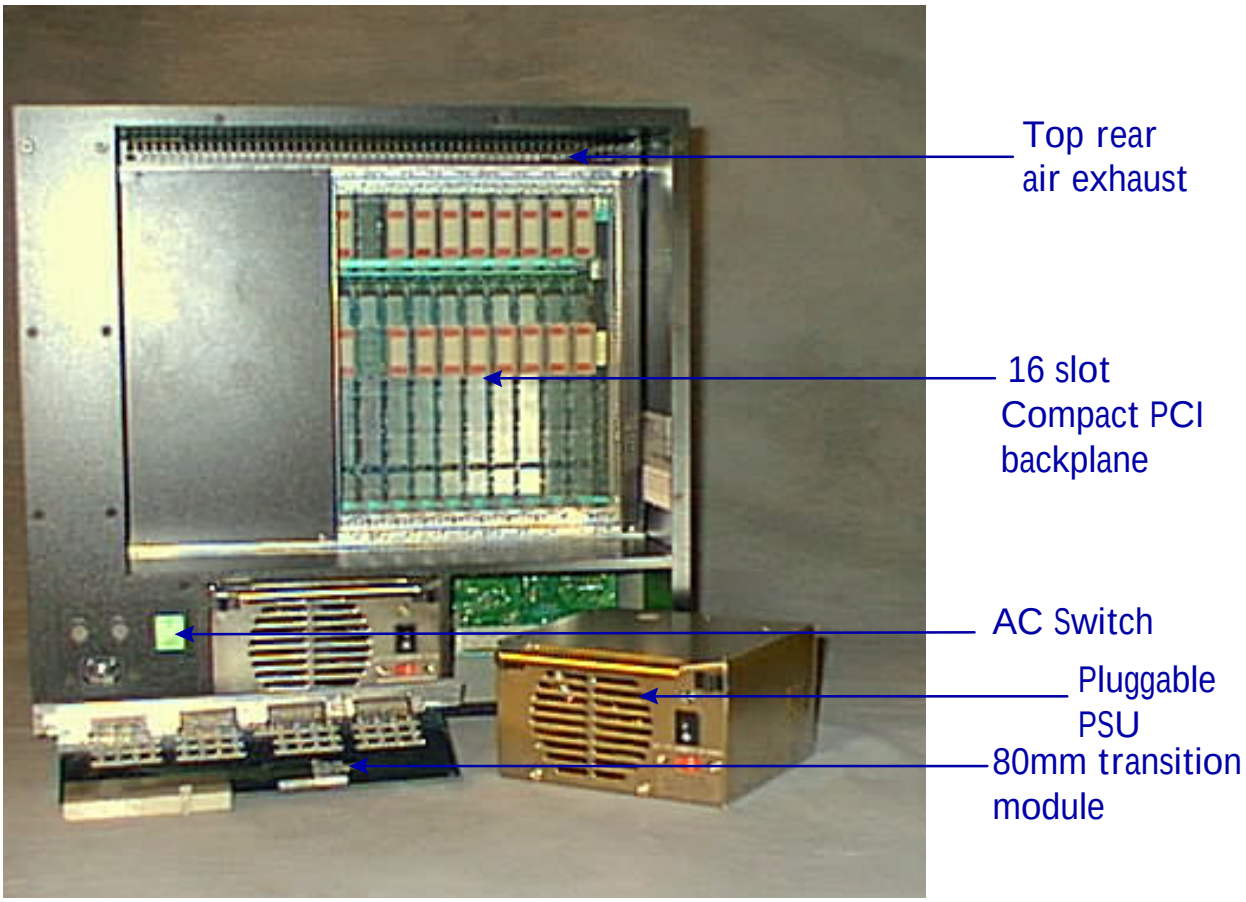


Figure 5: Centellis Back Panels

2.6 Power Controls

The Centellis CT Series 16000 chassis has one AC input power connector and an on/off power switch located at the lower left back of the chassis. The " | " symbol at the top of the green switch indicates the on position; the " O " on the bottom half of the switch indicates the off position. Two user-replaceable 7A fuses are provided to the left of the power switch. The unit's power cord is detachable. See Figure 6 for an illustration of these controls.

Input voltage for the two AC power supplies is selectable via external slide switches.

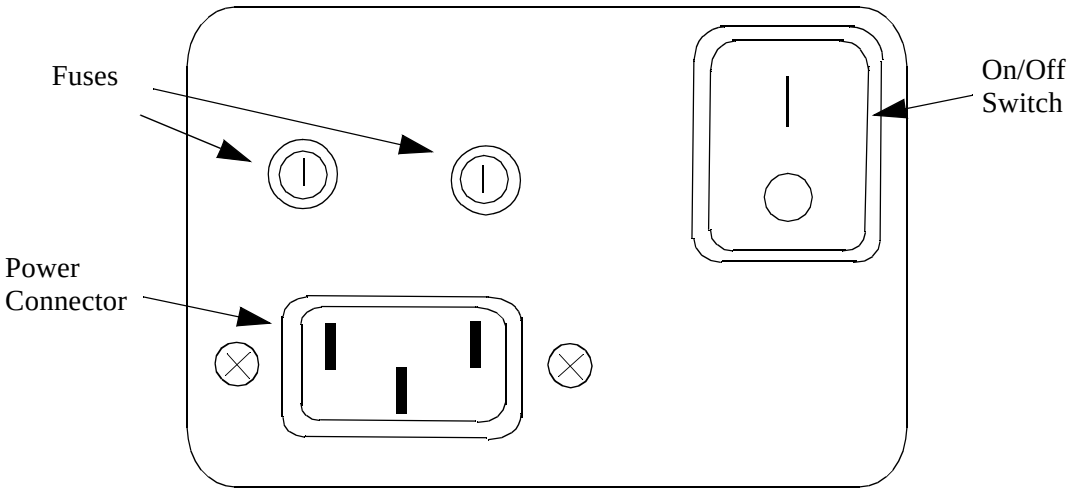


Figure 6: Chassis Power Controls (Lower Left, Rear)

IMPORTANT

The socket outlet that the system is connected to must be installed near the equipment and readily accessible.

2.7 Board Switches

The switches of installed boards are always accessible from the front of the chassis. Consult the appropriate CPU board hardware user's manual to adjust the board switches.

CAUTION

With the exception of lithium batteries installed on a board in this system, the Centellis system is designed to be maintenance-free. The lithium battery in the RTC/NVRAM provides a data retention capability of ten years (actual battery use); after this usage period, the Ethernet address, the host ID address, and all other RTC/NVRAM contents may be lost.

Contact Force Computers before ten years of actual battery use have elapsed.

There is a danger of explosion if the battery is incorrectly replaced. Replace the

battery only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Force Computers strongly suggests that only authorized service personnel exchange the RTC/NVRAM and the lithium battery.

2.8 CompactPCI Slots

CompactPCI boards can be installed in or removed from the system chassis after one or both of the 7-slot 6U front panels are removed. If all seven slots in a segment are not occupied by CPCI boards, however, a 6U blank panel (with EMI gasket) must be installed in each unoccupied slot. All slots of the chassis must be either occupied by a board or closed off with a covering panel to maintain the EMI integrity of the system. The chassis holds up to fourteen CPCI 6U boards.

2.9 Integrated Peripheral Tray

The chassis contains an integrated peripheral tray that holds one external (front-accessible) 5.25" half-height disk drive and one internal 3.5" disk drive. The 5.25" disk drive bay normally holds a CD-ROM drive (SCSI or IDE), but it can be used for a tape backup device. The 3.5" disk drive bay accommodates either a SCSI or IDE 3.5" hard disk drive.

There are eight possible combinations of SCSI and IDE CD-ROM and hard disk drives that can be installed in the peripheral tray. Table 1 shows these different combinations.

Table 1: Peripheral Tray Disk Drive Combinations

CD-ROM Drive	Hard Disk Drive
IDE	SCSI (Narrow)
IDE	SCSI (Wide)
IDE	IDE
SCSI (Narrow)	SCSI (Narrow)
SCSI (Narrow)	IDE
SCSI (Narrow)	SCSI (Wide)
IDE	none
SCSI (Narrow)	none
none*	none

* If none, use the EMI cover plate.

To install either a 5.25" CD-ROM or a 3.5" hard disk drive in the peripheral tray:

1. Unscrew the two thumb screws on the face plate of the peripheral tray, and pull the tray out of the chassis.
2. Install the CD-ROM or the hard disk drive to the peripheral tray.

- For hard disk drives, mount the drive onto the HDD mounting bracket with a 6/32" x 1/4" Phillips pan head screw, a #6 split lock washer, and a #6 flat washer at each of the four positions. Do not mount this assembly to the peripheral tray yet; OR
- For CD-ROM drives, align the four mounting screw holes on the peripheral tray and the CD-ROM. Attach the drive to the peripheral tray with four 3cm x 6cm pan head screws, four M3 split lock washers, and four M3 flat washers.

3. Attach one end of the flat ribbon cable (the end with two connectors close to each other) and one end of the power cable to the CD-ROM or hard disk drive.
4. For a hard disk drive, attach the completed drive/HDD mounting bracket assemblage to the peripheral tray with four 6/32" x 1/4' flat head screws.
5. Reinsert the peripheral tray with the attached drive(s) back into the chassis.
6. Remove the left rear panel, and attach the other end of the flat ribbon cable to the I/O boards. Route the cables together as directly as possible to avoid cable damage and to save space for other cables and boards. CAUTION: Pin 1 of the flat ribbon cable (red stripe) MUST match with Pin 1 of the connector.
7. Retighten the two thumb screws on the tray face plate to secure the tray to the chassis.

2.10 Power-up Procedures

This section explains how to connect chassis peripherals and power up the Centellis chassis. Note the following CAUTION statements before powering up the unit.

CAUTION



Connections between peripherals of the computer equipment must be made with low-voltage, shielded computer data cables.

CAUTION



Do not attach like devices to both the front CPU panel and the rear chassis panel as damage to components may result.

The Centellis 16000 has CPU board connectors at the front of the chassis as well as I/O connectors on the chassis back.

2.10.1 Connecting Chassis Peripherals

Peripheral components can be connected to the Centellis chassis at the CPU board in the front of the chassis, or at the transitional board (if installed) at the back of the chassis. Install the peripherals in the following order:

1. Connect an IBM PS/2-style keyboard into the keyboard connection.
2. Connect a PS/2-style mouse into the mouse connection.
3. If installing an optional SVGA compatible monitor, both the monitor and the Centellis chassis must be turned off. Connect the video cable to the video port connection.

2.10.2 Powering Up

1. Connect the power cable to the AC connector.
2. Turn on each power supply switch. (This is the black switch on each power supply.)
3. Turn on the green power switch at the back of the chassis. After a few seconds, a message will appear on the connected monitor.
4. Check that the fans work properly and that the LEDs on the boards, if available, indicate the run status.
5. To boot the installed operating system, see the operating system's user's manual.

2.11 Power Supplies

The Centellis CT Series 16000 chassis contains two 300W load-sharing power supplies. The power supplies are installed at the bottom rear side of the chassis. A green LED on the face of each power supply lights when a power supply is in use and functioning properly.

If either of the power supplies is malfunctioning, an audible beep will sound from the chassis combiner board. (The green LED on the bad power supply will not light.) This alarm continues until the bad power supply is replaced by a new, working power supply. Ensure that the replacement power supply's power switch is turned to the On position; if not, the alarm beep will continue.

A fifteen-prong connector on the back of the power supply connects to the chassis backplane.

See the Centellis Power Supply Installation Instructions (P/N 209652) for complete information on installing and removing the power supplies.

CAUTION



The power supplies are provided with input voltage selector switches. These switches must be set to the correct voltage for your voltage source (115V or 230V). Ensure that each power supply is set to the correct voltage.

WARNING



The power supplies must be serviced only by service personnel familiar with the hazards and dangers associated with switched mode power supplies.

3.0 Configuration and Connections

The Centellis CT Series 16000 is a CompactPCI-based system chassis designed for CompactPCI in an industrial environment. The 16000's modularity ensures easy operation, flexibility, and easy rack mounting. All module interconnections in the system are made via standard connectors.

The Centellis chassis contains the following modules:

- **Backplane and Card Cage**

  The Centellis CT Series 16000 chassis contains a backplane which supports up to fourteen 6U CompactPCI slots and a double-slot CPU board.

- **Power Supplies**

  The chassis is powered by two, rear-accessible 300-watt AC power supplies.

- **Integrated Peripheral Tray**

  The chassis contains an integrated peripheral tray that holds one 3.5" disk drive bay (for SCSI or EIDE hard disk drives) and one front-accessible 5.25" CD-ROM disk drive bay.

- **Fan Tray Module**

  There are three brushless DC fans for the chassis unit, and an additional cooling fan in each power supply.

3.1 Chassis Backplane Layout

The layered backplane for CompactPCI has continuous ground and power planes. The Centellis 16000 chassis backplane has inboard termination. Refer to CPCI Specification PICMG 2.0 D2.13 (April 14, 1997) for detailed information.

3.2 Connectors and Pin-outs

The Centellis CT Series 16000 chassis has a CPU card with both front panel connectors and rear I/O connectors. Table 2 lists the type of connectors located at both the front and rear of the chassis.

Table 2: Centellis CT Series 16000 System Connectors

Function	Quantity	Type
Serial I/O Com 1	1	9-pin
Ethernet (ENET 1)	1	RJ-45
Printer Port IEEE 1284	1	25-pin D-shell
Video (SVGA)	1	15-pin
PS/2 Mouse	1	PS/2
PS/2 Keyboard	1	PS/2

* A Serial I/O Com 2 connector is located at the rear of the chassis only.

3.2.1 Serial COM Port Devices

There are two serial com ports: Com 1 and Com 2. Com 1 is located on the front and rear panels of the Centellis chassis, while Com 2 is only found on the chasis rear. Serial devices that may be attached to these ports include printers, terminals, and modems. Figure 7 shows the pin configuration of the COM ports. Table 3 provides the function and signal type of each COM port connector pin.

CAUTION



Simultaneously using both the front and rear panel I/O connectors may cause system damage.

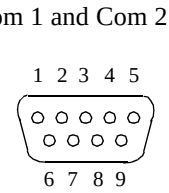


Figure 7: Serial COM Connector and Pins

Table 3: Rear COM1 & COM2 Serial Connector

Pin	Function	Descriptions
1	DCD	Data Carrier Detect
2	RxD	Receive Data
3	TxD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Send Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RIN	Ring Indicator

3.2.2 Ethernet Interface (RJ-45) Connector

The Ethernet Interface, an RJ-45 connector, provides both 10 Mbit (10Base-T) and 100 Mbit (100Base-TX) protocols. The Ethernet interface uses autosensing circuitry to switch between 10 Mbit and 100 Mbit operation. The connector pin-out is shown in figure 8, and the pin functions and signals are provided in Table 4. The connector also incorporates a yellow LED for data packet transfer and a green LED for indication of network packet traffic. A bi-color status LED on the front panel indicates 10 Mbit operation (Green) or 100 Mbit operation (Red).

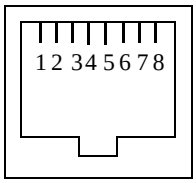


Figure 8: Ethernet Interface (RJ-45) Connector Pin-out

Table 4: Ethernet Interface (RJ-45)

Pin	Function	Signal
1	TX+	Transmit Data+
2	TX-	Transmit Data-
3	RX+	Receive Data+
4	GND	Ground
5	GND	Ground
6	RX-	Receive Data-
7	GND	Ground
8	GND	Ground

3.2.3 Keyboard Interface Connector

The Keyboard Interface allows interfacing to standard PS/2-style keyboard devices. The connector pin-outs are shown in Figure 9, and the pin functions are provided in Table 5. Keyboard connectors are located on the front and the rear panel of the chassis.

CAUTION

Using both the front-panel and rear-panel I/O connectors simultaneously may cause system damage.

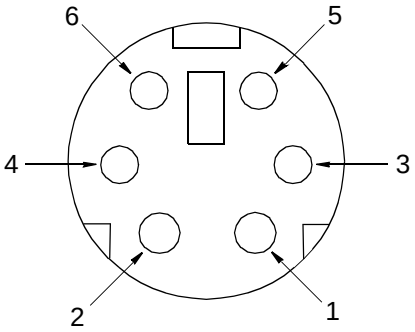


Figure 9: Keyboard Interface Connector Pin-out

Table 5: PS/2 Keyboard Interface

Pin	Function
1	KBDAT
2	No Connect
3	GND
4	Vcc (Fused)
5	KBCLK
6	No Connect

3.2.4 Mouse Port Connector

The Mouse Port Interface allows the hookup of PS/2-style mouse devices. The connector pin-outs are shown in Figure 10, and the pin functions are provided in Table 6. Mouse connectors are located on the front and read panels of the chassis.

CAUTION

Using both the front-panel and rear-panel I/O connectors simultaneously may cause system damage.

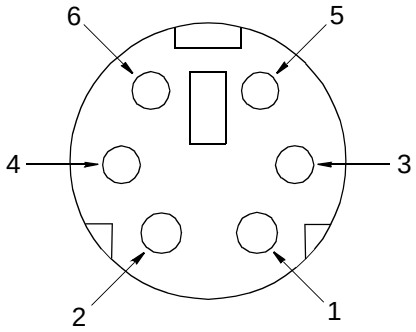


Figure 10: Mouse Port Connector Pin-out

Table 6: PS/2 Mouse Interface

Pin	Function
1	MSDAT
2	No Connect
3	GND
4	Vcc (Fused)
5	MSCLK
6	No Connect

3.2.5 IEEE 1284 Printer Port Connector

The IEEE 1284 printer port allows interfacing to standard printer functions. The connector adheres to the IEEE 1284-C specification. The connector pin-outs are shown in Table 7. AMP manufactures cable assemblies for interfacing between an IEEE-1284C connector and older Type

A (Centronics) and Type B (25-pin D-shell) printer connectors. Printer ports are located on the front and rear panels of the 16000 chassis.

CAUTION

Using both the front-panel and rear-panel I/O connectors simultaneously may cause system damage.

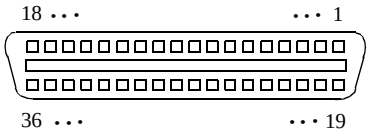


Figure 11: LPT1 IEEE 1284 Printer Port Connector Pin-out

Table 7: LPT1 IEEE 1284 Printer Port Interface

Pin	Function	Pin	Function
1	BUSY	19	GND
2	SLCT	20	GND
3	ACK-	21	GND
4	ERR-	22	GND
5	PE	23	GND
6	PPD0	24	GND
7	PPD1	25	GND
8	PPD2	26	GND
9	PPD3	27	GND
10	PPD4	28	GND
11	PPD5	29	GND
12	PPD6	30	GND
13	PPD7	31	GND
14	INIT-	32	GND
15	STB-	33	GND
16	SLIN-	34	GND
17	AFD-	35	GND
18	HLD	36	PLH

3.2.6 AC Power Connector

Figure 12 illustrates the chassis AC power connector located at the lower left rear of the chassis. Table 8 identifies the function of each power plug connector pin.

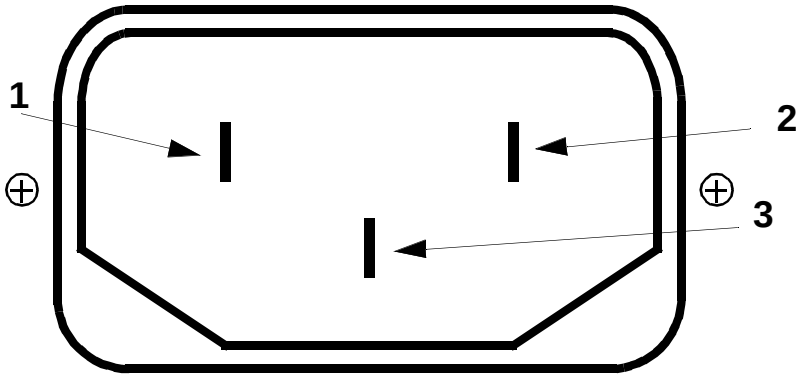


Figure 12: AC Power Connector

Table 8: AC Power Connector

Pin	Function
1	Neutral
2	Line
3	Chassis Ground

3.2.7 SVGA Video Port Rear-Panel Connector

The SVGA video port is only functional with the optional video card. Figure 13 and Table 9 provide pinout information for the video port.

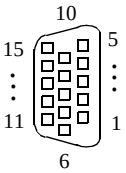


Figure 13: Video Graphics

Table 9: SVGA Video Interface

Pin	Function
1	Red
2	Green
3	Blue
4	Not Used
5	Ground
6	Red Return
7	Green Return
8	Blue Return
9	Key
10	Ground
11	Not Used
12	Not Used
13	Horiz. Sync.
14	Vert. Sync.
15	Not Used

3.3 SCSI Connections

SCSI allows the connection of the system unit to external storage units, such as hard disks, cartridge tapes, and compact disk drives. The Centellis CT Series 16000 chassis has a wide SCSI-2 connector (see Figure 14) on the rear panel.

IMPORTANT

When using wide SCSI devices, the WIDE signal must be connected to ground. This signal is available on BP-J5B at pin-17 as illustrated in the section on alarm support for setting alarm priorities in the CPU-720 Technical Manual.*

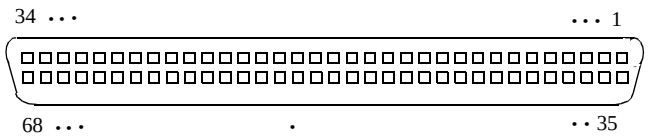


Figure 14: Wide SCSI Rear-Panel Connector

Table 10: Wide SCSI-2 Pin-out

Pin Number	Signal Name	Pin Number	Signal Name
1	Ground	35	SCD12*
2	Ground	36	SCD13*
3	Ground	37	SCD14*
4	Ground	38	SCD15*
5	Ground	39	SCDPH*
6	Ground	40	SCD0*
7	Ground	41	SCD1*
8	Ground	42	SCD2*
9	Ground	43	SCD3*
10	Ground	44	SCD4*
11	Ground	45	SCD5*
12	Ground	46	SCD6*
13	Ground	47	SCD7*
14	Ground	48	SCDPL*
15	Ground	49	Ground
16	Ground	50	WIDE
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	Ground	53	Ground
20	Ground	54	Ground
21	Ground	55	ATN*
22	Ground	56	Ground
23	Ground	57	BSY*
24	Ground	58	SACK*
25	Ground	59	SRST*
26	Ground	60	MSG*
27	Ground	61	SEL*

Table 10: Wide SCSI-2 Pin-out

28	Ground	62	CD*
29	Ground	63	SREQ*
30	Ground	64	IO*
31	Ground	65	SCD8*
32	Ground	66	SCD9*
33	Ground	67	SCD10*
34	Ground	68	SCD11*

Table 11: SCSI - Signal Descriptions

Signal	Descriptions
scd<0-15>	SCSI Data Bits 0 to 15
scdph*	SCSI Data Parity
atn*	Attention
bsy*	Busy
sack*	Acknowledge
srst*	Reset
msg*	Message
sel*	Select
cd*	Control/Data
sreq*	Request
io*	Input/Output
Termpwr	Termination Voltage
WIDE	Wide SCSI mode

3.3.1 SCSI Bus Cable Length Guidelines

The SCSI standard sets a maximum of 6.0 meters total length for all SCSI signals. The internal SCSI bus length on the Centellis system chassis is 0.68 meters maximum. For specific information about installing SCSI devices consult the manual that comes with the device.

3.3.2 SCSI Bus Termination

The Centellis CT Series 16000 system chassis automatically terminates the SCSI bus. This termination response can be overridden if a cable is plugged into the chassis rear connector. Users must supply termination on the SCSI segments external to the 16000.

3.4 CompactPCI Connector Pin Assignments

The CompactPCI bus is designed for 5V and 3.3V operation. Centellis CT Series 16000 chassis are preset for 5V operation.

3.4.1 J1/J2 Backplane CompactPCI Connector

The J1 and J2 connectors, combined, provide a 220-pin 2 mm x 2 mm female connector for the CompactPCI backplane interface. Blue keying is used on J1 to indicate 5V operation. Tables 12 and 13 provide the signal type of each J1 and J2 interface pin.

Table 12: J1 CompactPCI Interface

PIN	Z	A	B	C	D	E	F
25	GND	5V	REQ64#	ENUM	3.3V	5V	GND
24	GND	AD(1)	5V	V(I/O)	AD(O)	ACK64#	GND
23	GND	3.3V	AD(4)	AD(3)	5V	AD(2)	GND
22	GND	AD(7)	GND	3.3V	AD(6)	AD(5)	GND
21	GND	3.3V	AD(9)	AD(8)	M66EN	C/BE(0)#	GND
20	GND	AD(12)	GND	V(I/O)	AD(11)	AD(10)	GND
19	GND	3.3V	AD(15)	AD(14)	GND	AD(13)	GND
18	GND	SERR#	GND	3.3V	PAR	C/BE(1)#	GND
17	GND	3.3V	SDONE	SBO#	GND	PERR#	GND
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3V	FRAME#	IRDY#	GND	TRDY#	GND
14	KEY	KEY	KEY	KEY	KEY	KEY	KEY
13	KEY	KEY	KEY	KEY	KEY	KEY	KEY
12	KEY	KEY	KEY	KEY	KEY	KEY	KEY
11	GND	AD(18)	AD(17)	AD(16)	GND	C/BE(2)#	GND
10	GND	AD(21)	GND	3.3V	AD(20)	AD(19)	GND
9	GND	C/BE(3)#	IDSEL	AD(23)	GND	AD(22)	GND
8	GND	AD(26)	GND	V(I/O)	AD(25)	AD(24)	GND
7	GND	AD(30)	AD(29)	AD(28)	GND	AD(27)	GND
6	GND	REQ#	GND	3.3V	CLK	AD(31)	GND
5	GND	BRSV(B10)	BRSV(A11)	RST#	GND	GNT#	GND
4	GND	BRSV(A9)	GND	V(I/O)	INTP	INTS	GND
3	GND	INTA#	INTB#	INTC#	5V	INTD#	GND
2	GND	TCK	5V	TMS	TDO	TDI	GND
1	GND	5V	-12V	TRST#	+12V	5V	GND

Table 13: J2 CompactPCI Interface

PIN	Z	A	B	C	D	E	F
22	GND	RSV	RSV	RSV	RSV	RSV	GND
21	GND	RSV	GND	RSV	RSV	RSV	GND
20	GND	RSV	RSV	RSV	GND	RSV	GND
19	GND	RSV	GND	RSV	RSV	RSV	GND
18	GND	BRSV(B92)	BRSV(A94)	BRSVC18	GND	BRSVE18	GND
17	GND	BRSV(A92)	GND	PRST#	REQ6#	GNT6#	GND
16	GND	BRSV(A19)	BRSV(B93)	DEG#	GND	BRSVE16	GND
15	GND	BRSV(A14)	GND	FAL#	REQ5#	GNT5#(8)	GND
14	GND	AD[35]	AD[34]	AD[33]	GND	AD[32]	GND
13	GND	AD[38]	GND	V(I/0)	AD[37]	AD[36]	GND
12	GND	AD[42]	AD[41]	AD[40]	GND	AD[39]	GND
11	GND	AD[45]	GND	V(I/0)	AD[44]	AD[43]	GND
10	GND	AD[49]	AD[48]	AD[47]	GND	AD[46]	GND
9	GND	AD[52]	GND	V(I/0)	AD[51]	AD[50]	GND
8	GND	AD[56]	AD[55]	AD[54]	GND	AD[53]	GND
7	GND	AD[59]	GND	V(I/0)	AD[58]	AD[57]	GND
6	GND	AD[63]	AD[62]	AD[61]	GND	AD[60]	GND
5	GND	C/BE[5]	GND	V(I/0)	C/BE[4]#	PAR64	GND
4	GND	V(I/0)	BRSVB4	C/BE[7]	GND	C/BE[6]	GND
3	GND	INTA#	INTB#	INTC#	5V	INTD#	GND
2	GND	TCK	5V	TMS	TDO	TDI	GND
1	GND	5V	-12V	TRST#	+12V	5V	GND

Notes:
V(I/O) are 5V
NC = Not Connected

3.4.2 J3: Backplane I/O Connector

J3 is a user-defined I/O connector on the Centellis backplane. For pin-out information, consult the appropriate CompactPCI PICMG specifications.

3.4.3 J4 Backplane I/O Connector

The J4 connector is used for the H.110 bus. This connector is a 220-pin 2 mm x 2 mm female connector for a 2mm interface. Red keying is used on J4.

Table 14: J4: CompactPCI Interface

Pin	Row Z	Row A		Row B		Row C		Row D		Row E		Row F	
25	Not Used	SGA4	M	SGA3	M	SGA2	M	SGA1	M	SGA0	M	FG	L
24	"	GA4	M	GA3	M	GA2	M	GA1	M	GA0	M	FG	L
23	"	+12V	M	/CT_Reset	M	/CT_EN	S	-12V	M	CT_MC	M	FG	L
22	"	RSVD	M	RSVD	M	RSVD	M	RSVD	M	RSVD	M	FG	L
21	"	-SELVbat	L	RSVD	M	RSVD	M	RSVD	M	-SELVbatRtn	L	FG	L
20	"	Not Used		Not Used		Not Used		Not Used		Not Used		NP	
19	"	Not Used		Not Used		Not Used		Not Used		Not Used		NP	
18	"	VRG	M	Not Used		Not Used		Not Used		Not Used	M	NP	
17	"	Not Used		Not Used		Not Used		Not Used		Not Used		NP	
16	"	Not Used		Not Used		Not Used		Not Used		Not Used		NP	
15	"	-Vbat	L	Not Used		Not Used		Not Used		Not Used	L	NP	
14 13 12	KEY AREA (keep unobstructed on backplane to ease routing constraints)												
11	"	CT_D29	M	CT_D30	M	CT_D31	M	V(I/O)	L	/CT_FRAME_A	M	GND	L
10	"	CT_D27	M	+3.3V	M	CT_D28	M	+5V	L	/CT_FRAME_B	M	GND	L
9	"	CT_D24	M	CT_D25	M	CT_D26	M	GND	L	/FR_COMP	M	GND	L
8	"	CT_D21	M	CT_D22	M	CT_D23	M	+5V	L	CT_C8_A	M	GND	L
7	"	CT_D19	M	+5V	M	CT_D20	M	GND	L	CT_C8_A	M	GND	L
6	"	CT_D16	M	CT_D17	M	CT_D18	M	GND	L	CT_NETREF_1	M	GND	L
5	"	CT_D13	M	CT_D14	M	CT_D15	M	+3.3V	L	CT_NETREF_2	M	GND	L
4	"	CT_D11	M	+5V	M	CT_D12	M	+3.3V	L	SCLK	M	GND	L
3	"	CT_D8	M	CT_D9	M	CT_D10	M	GND	L	SCLKx2	M	GND	L
2	"	CT_D4	M	CT_D5	M	CT_D6	M	CT_D7	M	GND	L	GND	L
1	"	CT_D0	M	+3.3V	M	CT_D1	M	CT_D2	M	CT_D3	M	GND	L

3.4.4 J5 Backplane I/O Connector.

J5 is a user-defined I/O connector on the Centellis backplane. For pin-out information, consult the appropriate CompactPCI PICMG specifications.

4.0 Rack Mounting

4.1 Chassis Installation

To install the Centellis CT Series 16000 chassis in a standard 19-inch or 23-inch equipment rack:

- Remove the two filler plates on the left and right sides of the front of the chassis.
- Attach the mounting bracket ears with a Phillips head screwdriver and screws on each side of the chassis.

WARNING



To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting the unit in a partially filled rack, use the lowest available open space in the rack. Always load the rack from the bottom to the top with the heaviest components at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

4.2 Ventilation and Airflow

Three throughput fans in the Centellis CT Series 16000, and a fan on each power supply, provide optimal chassis airflow. Adequate space must always exist around the fans and the air inlets and outlets for successful airflow. Allow at least 3-1/2" at the front and back of the chassis, and do not cover the side vents.

5.0 Requirements and Specifications

5.1 Chassis Identication

A system chassis identification label is attached to the lower right side of the chassis. The label provides the following chassis information:

- Serial number (bar coded)
- System name
- Operating voltage
- Operating voltage frequency
- Country of manufacture (origin)

5.2 Power Requirements

Power requirements and specifications for the power supplies and the integrated peripheral tray of the Centellis CT Series 16000 are provided in Tables 15 and 16.

5.2.1 Power Supplies

Table 15 provides complete operating and voltage specifications for the 300W power supplies used in the Centellis CT Series 16000 chassis.

Table 15: Power Supplies Specifications

Input Voltage:	115/230 VAC single phase
Input Frequency:	50/60 Hz
Input Current:	230V AC: IE = 3A 115V AC: IE = 6A
Output Power	300 Watts @ 43°C ambient temperature
Output Voltage:	DC Output Voltage +3.3 V @ 20A, +5.0V @ 30A +12 V @ 15A, -12V @ 1.5A
Efficiency:	>74% to 78% (5V)
Output Protection:	Current limit protection 105% to 150% rated output OVP for 3.3V @3.8V to 4.8V, and for 5V @ 5.6V to 7.0V
M.T.B.F.:	65,000 hours
Safety:	UL 1950, CAN/CSA C22.2 No. 950-95, EN60950
EMI	EN55022 Class A, FCC Rules Part 15 Subpart B Class A

5.2.2 Peripheral Tray Modules

Table 16 provides power consumption values for the peripheral tray modules.

Table 16: Power Consumption (Typical Values)

Device	+5V	+12V	-12V	+3.3
Hard Disk Drive	500 mA	1.2 A	N/A	N/A
CD-ROM	400 mA	1.8 A	N/A	N/A
Floppy Disk Drive	700 mA	N/A	N/A	N/A

5.3 Mechanical Specifications

Table 17 provides physical data on the Centellis chassis. The weight of the unit is for the base configuration (including power supplies, disk drives, and mounting brackets) but DOES NOT include the weight of any user-installed I/O boards..

Table 17: Physical Specifications

Specification	Value
Dimensions: Width x Depth x Height *NOTE: Width does not include 2 inches (5.1 centimeters) for two mounting brackets*	17 x 17 x 15.75 inches (43.2 x 43.2 x 40 centimeters)
Weight:	50 pounds (22.7 kilograms)

5.4 Environmental Requirements

Table 18 lists the tested environmental conditions for the Centellis CT Series 16000 chassis.

Table 18: Environmental Conditions

Vibration, Operating (w/o hard disk drive)	1.5g, 3 axis
Shock, Operating (w/o hard disk drive)	10g, 3 axis

5.5 Safety and Emissions Certification

The Centellis CT Series 16000 chassis is tested and certified to the following specifications:

- FCC part 15 Class A
- UL 1950 (Third Edition, 1995)
- CAN/CSA C22.2 No. 950-95
- EN 60950
- CISPR 22 Class A Emission
- Immunity, EN 61000-4 Series

CE declaration of conformity to:

- EMC Directive 89/336/EEC Class A
- Low Voltage Directive 73/23/EEC, I.T.E.

FCC NOTICE
INFORMATION FOR THE USER

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.

The following publication prepared by the federal Communications Commission maybe helpful:

> "How to Identify and Resolve Radio-TV Interference Problems"
> (Stock Number 004-000-00345-4).

Available exclusively from the Superintendent of Documents, Government Printing Office, Washington, DC 20402 (telephone 202-512-1800).

FCC WARNING: Changes or modifications not expressly approved by the party responsible for compliance to Part 15 of the FCC Rules could void the user's authority to operate the equipment.

INDUSTRY CANADA NOTICE
INFORMATION FOR THE USER

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Industry Canada.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur : "Appareils Numériques", NMB-003 édictée par le ministre des Communications du Canada.

Product Error Report

PRODUCT:	SERIAL NO.:
DATE OF PURCHASE:	ORIGINATOR:
COMPANY:	POINT OF CONTACT:
TEL.:	EXT.:
ADDRESS:	
PRESENT DATE:	
AFFECTED PRODUCT: ❑ HARDWARE ❑ SOFTWARE ❑ SYSTEMS	AFFECTED DOCUMENTATION: ❑ HARDWARE ❑ SOFTWARE ❑ SYSTEMS
ERROR DESCRIPTION:	

THIS AREA TO BE COMPLETED BY FORCE COMPUTERS:

DATE:

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RESPONSIBLE DEPT.: ❑ MARKETING ❑ PRODUCTION
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