# 14-SLOT PXI MAINFRAME
# USER MANUAL

# MODEL 1461-14

## PUBLICATION NUMBER 980886

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# FOR YOUR SAFETY

Before undertaking any troubleshooting, maintenance or exploratory procedure, read carefully the **WARNINGS** and **CAUTION** notices.

**CAUTION**
**RISK OF ELECTRICAL SHOCK**
**DO NOT OPEN**

This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.

If this instrument is to be powered from the AC line (mains) through an autotransformer, ensure the common connector is connected to the neutral (earth pole) of the power supply.

Before operating the unit, ensure the conductor (green wire) is connected to the ground (earth) conductor of the power outlet. Do not use a two-conductor extension cord or a three-prong/two-prong adapter. This will defeat the protective feature of the third conductor in the power cord.

**CAUTION**
**SENSITIVE ELECTRONIC DEVICES**
DO NOT SHIP OR STORE NEAR
STRONG ELECTROSTATIC,
ELECTROMAGNETIC, MAGNETIC OR
RADIOACTIVE FIELDS

Maintenance and calibration procedures sometimes call for operation of the unit with power applied and protective covers removed. Read the procedures and heed warnings to avoid "live" circuit points.

Before operating this instrument:

1.  Ensure the proper fuse is in place for the power source to operate.

2.  Ensure all other devices connected to or in proximity to this instrument are properly grounded or connected to the protective third-wire earth ground.

If the instrument:

- fails to operate satisfactorily
- shows visible damage
- has been stored under unfavorable conditions
- has sustained stress

Do not operate until, performance is checked by qualified personnel.

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# Chapter 1

# GETTING STARTED

## Product Description

The Model 1461-14 is a 14-slot PXI Mainframe. The 1461-14 can accommodate fourteen 3U PXI modules. The Model 1461-14 fully complies with the PXIbus Specification Revision 2.1 (and earlier) requirements.

## Key Features

The key features of the 1461-14 include the following:

- PXI and CompactPCI module compatibility.

- Compact 3U-sized 14 slot chassis.

- Universal AC input: automatic voltage and frequency ranging, 440 Hz capability.

- Removable modular power-supply/fan assembly.

- Remote power and fan monitoring via a rear-panel connector.

- On/Off (Standby) power switch on the front panel for easy access.

- Available fan control module that can adjust fan speed based on module temperature, minimizes audible noise.

- Front-panel LED that can indicate power supply failure.

- Carrying handle for portability.

- Tilt feet for bench-top applications.

- Available rails for rack mount options.

# Items Shipped With The 1461-14

| Qty | Item |
|-----|------|
| 1 | Instruction Manual |
| 1 | Power Cord |

# Ordering Information

| Spares Ordering Information | | |
|---|---|---|
| **Model** | **Description** | **Part Number** |
| 1461-14 | 14-Slot PXI/Compact PCI 111.7mm Mainframe | 407865-014 |
| Option 04 | Rack Mount Ears, supplied in pairs | 407865-904 |
| Chassis Runners | For 19" chassis, supplied in pairs | 921394 |
| Filler Panel, Shielded | Shielded Filler Panel with EMI Gasket (to fill empty module slots) | 407865-925 |
| Filler Panel, Un-Shielded | Filler Panel, Non-EMI | 407865-926 |
| Fan Monitoring | Automatic Fan and Voltage Monitoring | 407865-927 |
| Rack Mount Ear | Extendable Rack Mount Ears | 407865-928 |
| ASFP | Application Specific Front Panel | 407865-929 |

# Chapter 2

# CONFIGURING THE 1461-14

## Using This Chapter

This section includes basic procedures to install and configure the 1461-14 mainframe. Use this chapter to:

- Review installation site considerations.

- Installing a PXI Controller.

- Install PXI modules or optional card guide covers and blanking plates.

- Connect the chassis/safety ground.

**Installation and configuration information for optional equipment is provided with the option.**

## AC Mains Power

When the standard 1461-14 is shipped, it is configured for 120 VAC operation.

Should it be necessary to replace the AC mains fuse, refer to Chapter 4: Removal and Replacement of the AC Mains Fuse.

## Site Considerations

The 1461-14 Mainframe is designed to be used freestanding (bench top) or in an instrument rack.

# Installing a PXI Controller

This section contains general installation instructions for installing a PXI controller in the 1461-14 chassis. Refer to your PXI controller user manual for specific instructions and warnings. To install a controller, follow these steps:

1. Make sure the power switch is in the Off (standby) position.

2. Install the controller into the system controller slot (red card guides) by first placing the controller edges into the front controller guides (top and bottom). Slide the controller to the rear of the chassis (making sure that the injector/ejector handle is pushed down.

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### CAUTION

**To avoid possible damage do NOT hot-plug install PXI modules (i.e., install with power on).**

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3. When you begin to feel resistance, push up on the injector/ejector handle to inject the controller fully into the chassis frame. Secure the controller front panel to the chassis using the controller front-panel mounting screws.

# Installing PXI Modules

To install a module, follow these steps:

1. Install a module into a chassis slot by first placing the module card edges into the front module guides (top and bottom). Slide the module to the rear of the chassis, making sure that the injector/ejector handle is pushed down.

2. When you begin to feel resistance, push up on the injector/ejector handle to fully inject the module into the chassis frame. Secure the module front panel to the chassis using the front-panel mounting screws.

# Optional Filler Panels

In order to optimize system performance, install optional filler panels (P/N 407865-925 or 407865-926) into unused slots. Secure with two captive mounting screws.  Reference Fig. 3-1 and Ordering Information, p.1-2.

# Connecting Chassis Ground

Connect the Chassis (Safety) Ground to an earth or the ground of one or more instruments in the system.  This ensures a common ground connection between instruments.

1. Connect a 16 AWG (1.3mm² or larger) wire to the 8-32 chassis (safety) grounding screw using a toothed grounding lug.  The wire insulation must be green with a yellow stripe or non-insulated (bare wire).

2. Attach the opposite end of the wire to permanent earth ground earth (or to the ground of one or more instruments in the system) using toothed washers or a toothed lug.

Chassis (Safety)
Grounding Screw
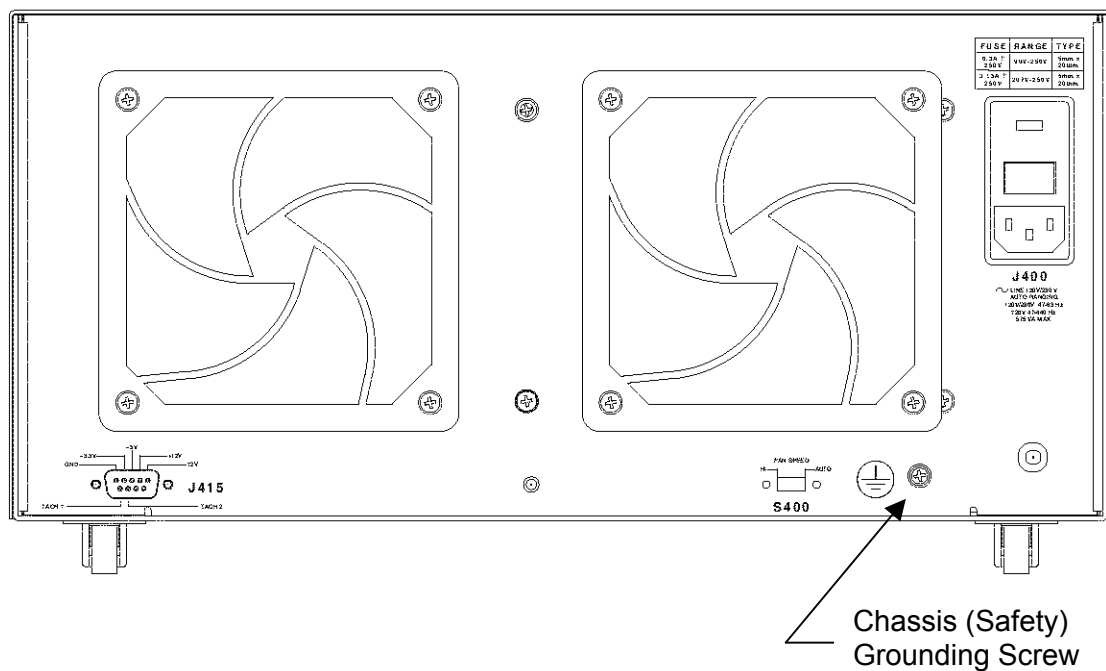
**Figure 2-1, Connecting Safety Ground**

# Chapter 3

# OPERATING THE 1461-14

## Using This Chapter

Use this Chapter to:

- Review front and rear panel user interfaces.

- Power the mainframe on/off.

- Reference pin connections for PXI P1 and P2 Connectors.

- Perform basic functional check of the mainframe PXI voltages.

# 1461-14 Front Panel



**Figure 3-1, 1461-14 Front View**
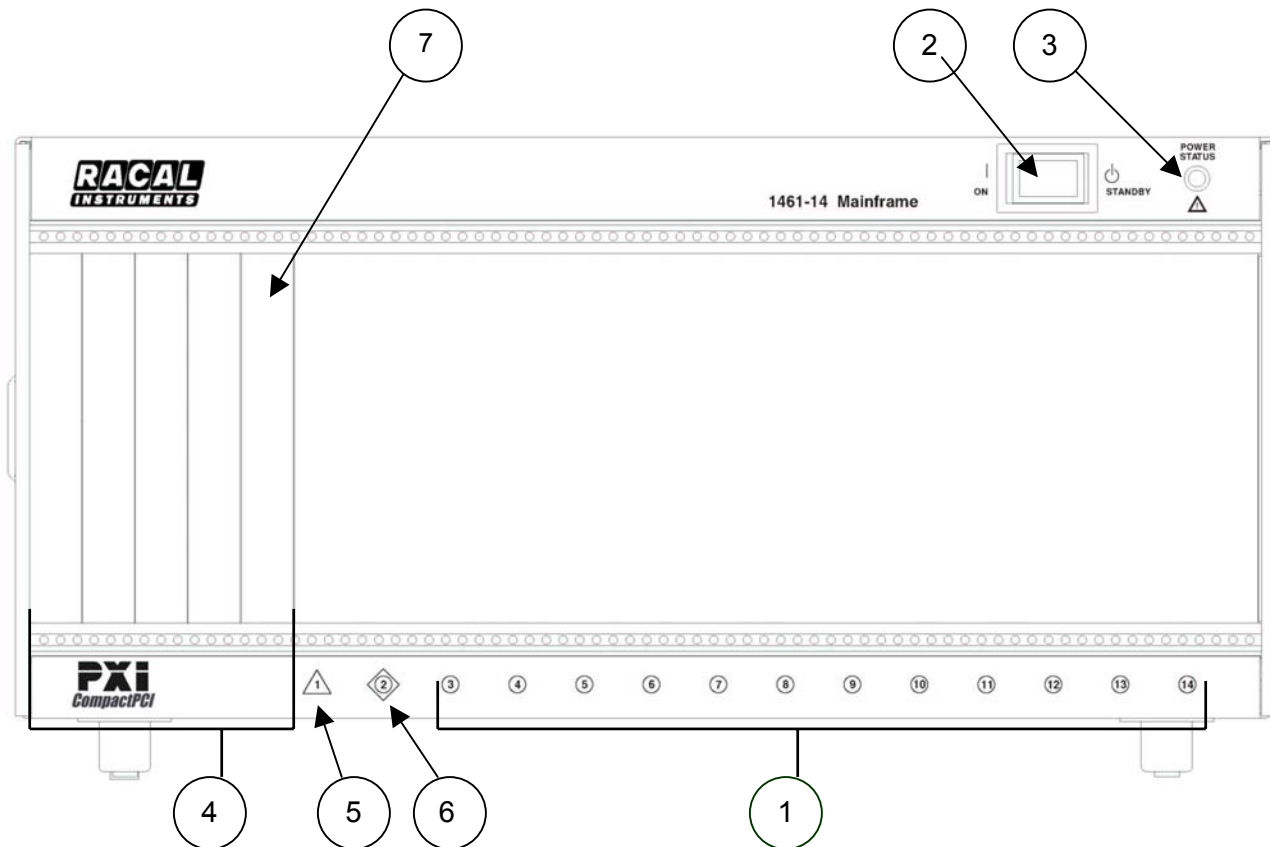
| | |
|---|---|
| 1. Peripheral slots. | 2. On/Off (Standby) Power Switch (S100) |
| 3. Power LED. | 4. Controller Expansion Slots. |
| 5. System Controller Slot. | 6. Star Trigger Slot. |
| 7. Blanking Panel. | |
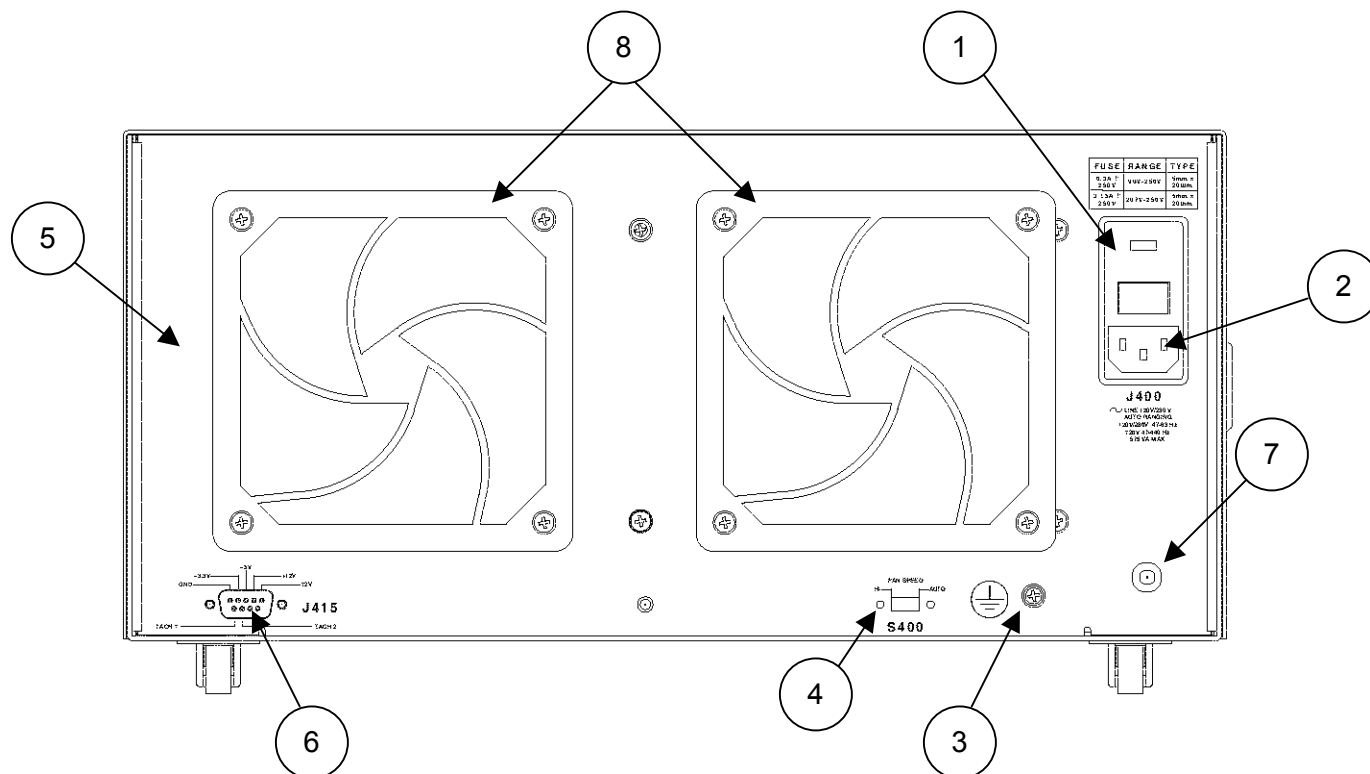
# 1461-14 Rear View



| 1. | Fuse Location. | 2. | Universal AC Inlet (J400). |
|---|---|---|---|
| 3. | Chassis Ground Screw. | 4. | Fan Speed Selector Switch (S400). |
| 5. | Modular Supply/Fan Assembly. | 6. | Fan and Voltage Monitoring Connector (J415). |
| 7. | PXI_CLK10 IN BNC. | 8. | Snap On Filter Cover. |

**Figure 3-2, 1461-14 Rear View**

# Power The Mainframe ON/OFF

Refer to Figures 3-1 and 3-2 and the description below.

1. Set front panel Standby switch S100 to the "O" or off position.

2. Connect the AC Power cord at J400 to the AC power source. Note the power supply fan will operate at all times with the AC power applied to the unit.

3. Turn the chassis on by setting the front panel switch S100 to the "I" or ON position.

4. Observe that the front panel LED indicator turns Green.

## Backplane Connections

The following tables 3-1 through 3-6 define the P1(J1) and P2(J2) connector pinout for the System Controller slot, Star Trigger Slot and Peripheral slot.

**Table 3-1 P1 (J1) Connector Pinouts for the System Controller Slot**

| 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[0] | ACK64# | GND |
| 23 | GND | 3.3V | AD[4] | 5V | 5V | AD[2] | GND |
| 22 | GND | AD[7] | GND | AD[6] | AD[6] | AD[5] | GND |
| 21 | GND | 3.3V | AD[9] | M66EN | M66EN | C/BE[0]# | GND |
| 20 | GND | AD[12] | GND | AD[11] | AD[11] | AD[10] | GND |
| 19 | GND | 3.3V | AD[15] | GND | GND | AD[13] | GND |
| 18 | GND | SERR# | GND | PAR | PAR | C/BE[1]# | GND |
| 17 | GND | 3.3V | IPMB_SCL | GND | GND | PERR# | GND |
| 16 | GND | DEVSEL# | GND | STOP# | STOP# | LOCK# | GND |
| 15 | GND | 3.3V | FRAME# | GND | GND | TRDY# | GND |
| 12-14 | | | | Key Area | | | |
| 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]# | GND | 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 | REQ0# | GND | 3.3V | CLK0 | AD[31} | GND |
| 5 | GND | BRSVP1A5 | BRSVP1B5 | RST# | GND | GNT0# | GND |
| 4 | GND | IPMB_PWR | HEALTHY | 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 3-2 P2 (J2) Connector Pinouts for the System Controller Slot**

| Pin | Z | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| 22 | GND | GA4 | GA3 | GA2 | GA1 | GA0 | GND |
| 21 | GND | CLK6 | GND | RSV | RSV | RSV | GND |
| 20 | GND | CLK5 | GND | RSV | GND | RSV | GND |
| 19 | GND | GND | GND | SMB_SDA | SMB_SCL | SMB_ALERT# | GND |
| 18 | GND | PXI_TRIG3 | PXI_TRIG4 | PXI_TRIG5 | GND | PXI_TRIG6 | GND |
| 17 | GND | PXI_TRIG2 | GND | PRST# | REQ6# | GNT6# | GND |
| 16 | GND | PXI_TRIG1 | PXI_TRIG0 | DEG# | GND | PXI_TRIG7 | GND |
| 15 | GND | PXI_BRSVA15 | GND | FAL# | REQ5# | GNT5# | GND |
| 14 | GND | AD[35] | AD[34] | AD[33] | GND | AD[32 | GND |
| 13 | GND | AD[38] | GND | V(I/O) | AD[37] | AD[36 | GND |
| 12 | GND | AD[42] | AD[41} | AD[40 | GND | AD[39 | GND |
| 11 | GND | AD[45] | GND | V(I/O | AD[44] | AD[43 | GND |
| 10 | GND | AD[49] | AD[48] | AD[47 | GND | AD[46 | GND |
| 9 | GND | AD[52] | GND | V(I/O | AD[51] | AD[50 | GND |
| 8 | GND | AD[56] | AD[55} | AD[54 | GND | AD[53 | GND |
| 7 | GND | AD[59] | GND | V(I/O | 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/O | C/BE4# | PAR64 | GND |
| 4 | GND | V(I/O) | PXI_BRSVB4 | C/BE[7]# | GND | C/BE[6]# | GND |
| 3 | GND | CLK4 | GND | GNT3# | REQ4# | GNT4# | GND |
| 2 | GND | CLK2 | CLK3 | SYSEN# | GNT2# | REQ3# | GND |
| 1 | GND | CLK1 | GND | REQ1# | GNT1# | REQ2# | GND |

**Table 3-3 P1 (J1) Connector Pinouts for the Star Trigger Slot**

| 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[0] | 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 | IPMB_SCL | IPMB_SDA | GND | PERR# | GND |
| 16 | GND | DEVSEL# | GND | V(I/O) | STOP# | LOCK# | GND |
| 15 | GND | 3.3V | FRAME# | IRDY | BD_SEL | TRDY# | GND |
| 12-14 | Key Area | | | | | | |
| 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 | BRSVP1A5 | BRSVP1B5 | RST# | GND | GNT# | GND |
| 4 | GND | IPMB_PWR | HEALTHY | 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 3-4 P2 (J2) Connector Pinouts for the Start Trigger Slot**

| Pin | Z | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| 22 | GND | GA4 | GA3 | GA2 | GA1 | GA0 | GND |
| 21 | GND | PXI_LBR0 | GND | PXI_LBR1 | PXI_LBR2 | PXI_LBR3 | GND |
| 20 | GND | PXI_LBR4 | PXI_LBR5 | PXI_STAR0 | GND | PXI_STAR1 | GND |
| 19 | GND | PXI_STAR2 | GND | PXI_STAR3 | PXI_STAR4 | PXI_STAR5 | GND |
| 18 | GND | PXI_TRIG | PXI_TRIG | PXI_TRIG | GND | PXI_TRIG6 | GND |
| 17 | GND | PXI_TRIG2 | GND | RSV | PXI_CLK10_IN | PXI_CLK10 | GND |
| 16 | GND | PXI_TRIG1 | PXI_TRIG0 | RSV | GND | PXI_TRIG7 | GND |
| 15 | GND | PXI_BRVA15 | GND | RSV | PXI_STAR6 | PXI_LBR6 | GND |
| 14 | GND | AD[35] | AD[34] | AD[33] | GND | AD[32] | GND |
| 13 | GND | AD[38] | GND | V(I/O) | AD[37] | AD[36] | GND |
| 12 | GND | AD[42] | AD[41] | AD[40] | GND | AD[39] | GND |
| 11 | GND | AD[45] | GND | V(I/O) | AD[44] | AD[43] | GND |
| 10 | GND | AD[49] | AD[48] | AD[47] | GND | AD[46] | GND |
| 9 | GND | AD[52] | GND | V(I/O) | AD[51] | AD[50] | GND |
| 8 | GND | AD[56] | AD[55] | AD[54] | GND | AD[53} | GND |
| 7 | GND | AD[59] | GND | V(I/O) | 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/O) | C/BE[4]# | PAR64 | GND |
| 4 | GND | V(I/O) | PXI_BRSVB4 | C/BE[7]# | GND | C/BE[6}# | GND |
| 3 | GND | PXI_LBR7 | GND | PXI_LBR8 | PXI_LBR9 | PXI_LBR10 | GND |
| 2 | GND | PXI_LBR11 | PXI_LBR12 | UNC | PXI_STAR7 | PXI_STAR8 | GND |
| 1 | GND | PXI_STAR9 | GND | PXI_STAR10 | PXI_STAR11 | PXI_STAR12 | GND |

**Table 3-5 P1 (J1) Connector Pinout for the Peripheral Slot**

| 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[0] | 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 | IPMB_SCL | IPMB_SDA | GND | PERR# | GND |
| 16 | GND | DEVSEL# | GND | V(I/O) | STOP# | LOCK# | GND |
| 15 | GND | 3.3V | FRAME# | IRDY | BD_SEL | TRDY# | GND |
| 12-14 | Key Area | | | | | | |
| 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 | BRSVP1A5 | BRSVP1B5 | RST# | GND | GNT# | GND |
| 4 | GND | IPMB_PWR | HEALTHY | 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 3-6 P2 (J2) Connector Pinouts for the Peripheral Slot**

| Pin | Z | A | B | C | D | E | F |
|-----|------|------------|------------|-----------|-----------|------------|------|
| 22 | GND | GA4 | GA3 | GA2 | GA1 | GA0 | GND |
| 21 | GND | PXI_LBR0 | GND | PXI_LBR1 | PXI_LBR2 | PXI_LBR3 | GND |
| 20 | GND | PXI_LBR4 | PXI_LBR5 | PXI_STAR0 | GND | PXI_LBL1 | GND |
| 19 | GND | PXI_LBL2 | GND | PXI_LBL3 | PXI_LBL4 | PXI_LBL5 | GND |
| 18 | GND | PXI_TRIG3 | PXI_TRIG4 | PXI_TRIG5 | GND | PXI_TRIG6 | GND |
| 17 | GND | PXI_TRIG2 | GND | RSV | PXI_STAR | PXI_CLK10 | GND |
| 16 | GND | PXI_TRIG1 | PXI_TRIG0 | RSV | GND | PXI_TRIG7 | GND |
| 15 | GND | PXI_BRVA15 | GND | RSV | PXI_LBL6 | PXI_LBR6 | GND |
| 14 | GND | AD[35] | AD[34] | AD[33] | GND | AD[32] | GND |
| 13 | GND | AD[38] | GND | V(I/O) | AD[37] | AD[36] | GND |
| 12 | GND | AD[42] | AD[41] | AD[40] | GND | AD[39] | GND |
| 11 | GND | AD[45] | GND | V(I/O) | AD[44] | AD[43] | GND |
| 10 | GND | AD[49] | AD[48] | AD[47] | GND | AD[46] | GND |
| 9 | GND | AD[52] | GND | V(I/O) | AD[51] | AD[50] | GND |
| 8 | GND | AD[56] | AD[55] | AD[54] | GND | AD[53} | GND |
| 7 | GND | AD[59] | GND | V(I/O) | 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/O) | C/BE[4]# | PAR64 | GND |
| 4 | GND | V(I/O) | PXI_BRSVB4 | C/BE[7]# | GND | C/BE[6}# | GND |
| 3 | GND | PXI_LBR7 | GND | PXI_LBR8 | PXI_LBR9 | PXI_LBR10 | GND |
| 2 | GND | PXI_LBR11 | PXI_LBR12 | UNC | PXI_LBL7 | PXI_SLBL | GND |
| 1 | GND | PXI_LBL9 | GND | PXI_LBL10 | PXI_LBL11 | PXI_LBL12 | GND |

# Basic Functional Check

The functional check consists of checking the 1461-14 power supply voltages to the PXIbus limits at the J415 Rear Panel Monitor connector using a digital voltmeter.

Referring to Table 3-8 and Figure 3-1 connect one lead of the voltmeter to a supply pin. Connect the reference lead of the voltmeter to a ground pin. Compare each voltage reading to the values listed in Table 3-7.

**Table 3-7 Power Supply Voltages at the P1 and P2 Connectors**

| J415 Measurement Location (PIN) | Supply | Acceptable Voltage Range |
|---|---|---|
| +3.3V | +3.3V | 3.15V to 3.45V |
| +5V | +5V | 4.75V to 5.25V |
| -12V | -12V | -12.6 to 11.4V |
| +12V | +12V | 11.4V to 12.6V |
| GND | Logic Ground | |

If the voltages are within the specified ranges, the mainframe complies with the PXI voltage limit specifications.

Check the fan operation by connecting an oscilloscope to the TACH1 (and TACH2) outputs using the GND to connect the scope ground. The fan speed should measure 400Hz with S400 in the Hi Speed position.

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# Chapter 4
# MAINTENANCE

</div>

**What's In This Chapter**

This chapter provides information regarding calibration and procedures for inspecting and cleaning the 1461-14, removing and replacing mainframe components, and isolating problems to the module level.

**Calibration**

The 1461-14 does not require calibration. To verify proper operation see the Basic Functional Check section in Chapter 3.

**Service Strategy**

The service procedures in this manual provide removal and replacement procedures to repair the 1461-14 to the module level. Module level repairs are accomplished by exchanging faulty modules with known good modules or parts.  No component-level repair is provided in this manual.

**Service Interval**

Clean the fan filters (optional) at a maximum interval of six months. Depending upon the amount of usage and ambient dust levels in the operating environment, the filters may require more frequent cleaning.

Clean dust from the mainframe exterior (and interior) as needed, based on the operating environment. Periodic cleaning reduces instrument breakdown and increases reliability.

**Preparation**

The information in this section is designed for use by qualified service personnel.  Read the *For Your Safety* at the front of this manual and Service Strategy before attempting any procedures in this chapter.  Refer to Chapter 3 Operating The 1461-14 for information on the location of controls, indicators, and connectors used with the mainframe.

---

*CAUTION*

**CAUTION**
SENSITIVE ELECTRONIC DEVICES
DO NOT SHIP OR STORE NEAR
STRONG ELECTROSTATIC,
ELECTROMAGNETIC, MAGNETIC OR
RADIOACTIVE FIELDS

**Many components within the mainframe are susceptible to static discharge damage. Service the mainframe only in a static-free environment. Observe standard handling precautions for static-sensitive devices while servicing the mainframe. Always wear a grounded wrist strap, or equivalent, while servicing the mainframe.**

---

# Inspection and Cleaning

The mainframe is inspected mechanically and electrically before shipment. It should be free of marks or scratches and should meet or exceed all electrical specifications. To confirm this, inspect the mainframe for physical damage incurred during transit. Retain the mainframe packaging if reshipment is necessary.

Cleaning procedures consist of exterior and interior cleaning of the mainframe and cleaning fan filters. Refer to your module user documentation for information on cleaning the individual PXIbus modules.

---

*CAUTION*

**Always power off the mainframe and disconnect the power cord before cleaning or servicing the mainframe.**

---

# Interior Cleaning

Use a dry, low-velocity stream of air to clean the interior of the mainframe. Use a soft-bristle brush for cleaning around components. If you must use a liquid for minor interior cleaning, use a 75% isopropyl alcohol solution and rinse with deionized water.

# Exterior Cleaning

Clean the exterior surfaces of the mainframe with a dry lint-free cloth or a soft-bristle brush. If any dirt remains, wipe with a cloth moistened in a mild soap solution. Remove any soap residue by wiping with a cloth moistened with clear water. Do not use abrasive compounds on any part of the mainframe.

---

---

*CAUTION*

**Avoid getting moisture inside the mainframe during exterior cleaning - use just enough moisture to dampen the cloth.**

**Do not wash the front or rear panel connectors or switches. Cover these components while cleaning the mainframe.**

**Do not use chemical cleaning agents; they may damage the mainframe. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.**

---

# Cleaning The Fan Filters

The fan filter is easily removed from the rear of the mainframe as shown in Figure 4-1.
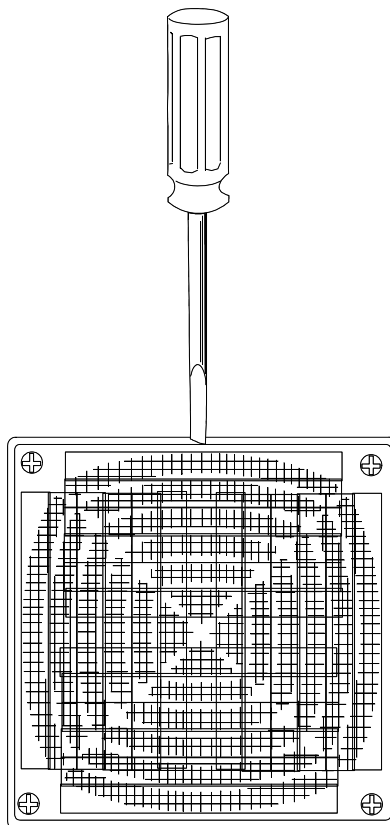
**Figure 4-1, Cleaning The Fan Filter**

---

1.  Pry off the plastic grill retaining the supply fan filter. Use a flat blade screwdriver if necessary.

2.  Remove the supply fan filter towards the rear.

3.  Clean the supply fan filter by washing in mild soap solution, vacuuming or blowing air through the filter. Rinse the filter with water and dry before replacing it in the mainframe.

# Modular Component Removal and Replacement

The following procedures describe how to remove and replace module-level components of the 1461-14 Mainframe. Perform these procedures only as necessary as part of installation (e.g. fuse replacement), mainframe service, or repair.  See Troubleshooting p.4-7 for assistance in fault isolation.

---

### *CAUTION*

**Always power off the mainframe and disconnect the power cord before cleaning or servicing the mainframe.**

---

# Tools Required

The only tools required to disassemble the 1461-14 chassis  to the module level are a medium flat blade and Phillips screwdriver.

# Removal and Replacement of The AC Mains Fuse

Complete the steps below while referring to Figure 4-2.

1.  Ensure AC mains input (J400) is disconnected.

2.  At F400 open fuse holder rear cover and remove fuse holder assembly

3.  To replace fuse, insert the fuse carrier and fuse assembly into the fuse housing opening for F400 on power supply, close cover.

---

### *WARNING*

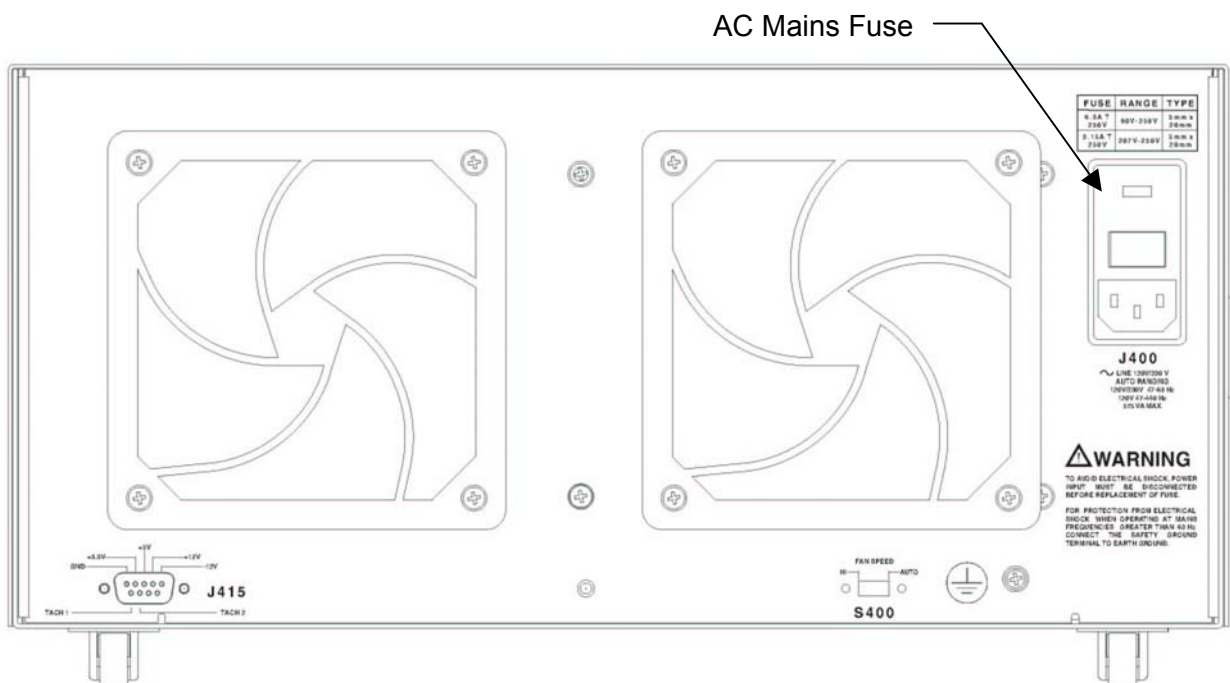**To avoid electrical shock, the AC mains power input must be disconnected before replacement of the fuse.**

---

AC Mains Fuse



**Figure 4-2 Removing and Replacing The AC Mains Fuse**

---

# Trouble-shooting the 1461-14

To troubleshoot the 1461-14 PXIbus mainframe to its component module level use Table 5-1 and Understanding the 1461-14 in Chapter 4.

"Fault condition" referenced in the PROBLEM column of Table 4-1 occurs when the monitored system status function (Voltage, Temperature, or Fan) is outside of its specified tolerance. For information on status indicators and tolerance limits refer to Specifications in Appendix A.

## Table 4-1 Troubleshooting

| PROBLEM | POSSIBLE CAUSES | WHAT TO DO |
|---|---|---|
| Unit does not Power On | • 1461-14 mainframe not connected to power source. | • Make sure that the 1461-14 is connected to a live electrical outlet and the AC power switch is on. Try operating another piece of equipment from this outlet. |
| | • Blown AC Mains Fuse. | • Unplug AC mains power and check the fuse. See "Removal and Replacement of the AC Mains Fuse" in Chapter 5. |
| | • Power supply protections are active causing the supply to be "shutdown". | • Refer to "Power Supply Protections" in Chapter 4.<br><br>• Cycle power to clear fault. If fault persists remove installed PXI modules (cycle power) until fault is cleared. |
| | • Faulty AC wiring or bad front panel AC Power Switch | • Verify integrity of AC wiring to AC Power switch and the switch itself. Contact customer service. |
| Voltage alarm condition (RED Flashing LED illuminated). | • Faulty PXI module installed or voltage fault occurred | • Cycle power.<br><br>• If fault persists remove installed PXI modules until fault indication is cleared. |
| | • PXI supply is out of tolerance | • Perform Basic Functional Check procedure from Chapter 3. |

# Chapter 5

# PRODUCT SUPPORT

## Product Support

Racal Instruments has a complete Service and Parts Department. If you need technical assistance or should it be necessary to return your product for repair or calibration, call 1-800-722-3262. If parts are required to repair the product at your facility, call 1-949-859-8999 and ask for the Parts Department.

When sending your instrument in for repair, complete the form in the back of this manual.

For worldwide support and the office closes to your facility, refer to the Support Offices section on the following page.

## Warranty

Use the original packing material when returning the 1461-14 to Racal Instruments for calibration or servicing. The original shipping crate and associated packaging material will provide the necessary protection for safe reshipment.

If the original packing material is unavailable, contact Racal Instruments Customer Service for information.

# Support Offices

## RACAL INSTRUMENTS

### United States

(Corporate Headquarters and Service Center)
4 Goodyear Street, Irvine, CA 92618
Tel: (800) 722-2528, (949) 859-8999; Fax: (949) 859-7139

5730 Northwest Parkway Suite 700, San Antonio, TX 78249
Tel: (210) 699-6799; Fax: (210) 699-8857

### Europe

(European Headquarters and Service Center)
18 Avenue Dutartre, 78150 LeChesnay, France
Tel: +33 (0)1 39 23 22 22; Fax: +33 (0)1 39 23 22 25

29-31 Cobham Road, Wimborne, Dorset BH21 7PF, United Kingdom
Tel: +44 (0) 1202 872800; Fax: +44 (0) 1202 870810

Via Milazzo 25, 20092 Cinisello B, Milan, Italy
Tel: +39 (0)2 6123 901; Fax: +39 (0)2 6129 3606

Technologie Park, Friedrich Ebert Strasse, 51429 Bergisch Gladbach, Germany
Tel: +49 (0) 2204 844200; Fax: +49 (0) 2204 844219

### REPAIR AND CALIBRATION REQUEST FORM

To allow us to better understand your repair requests, we suggest you use the following outline when calling and include a copy with your instrument to be sent to the Racal Instruments Repair Facility.

Model_____Serial No._____Date_____

Company Name_____Purchase Order #_____

Billing Address_____
City

State/Province          Zip/Postal Code          Country

Shipping Address_____
City

State/Province          Zip/Postal Code          Country

Technical Contact_____Phone Number (    )_____
Purchasing Contact_____Phone Number (    )_____

1. Describe, in detail, the problem and symptoms you are having. Please include all set up details, such as input/output levels, frequencies, waveform details, etc.

_____
_____
_____
_____

2. If problem is occurring when unit is in remote, please list the program strings used and the controller type.

_____
_____
_____

3. Please give any additional information you feel would be beneficial in facilitating a faster repair time (i.e., modifications, etc.)

_____
_____
_____

4. Is calibration data required?      Yes   No    (please circle one)

Call before shipping          Ship instruments to nearest support office.
Note: We do not accept
"collect" shipments.

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# Appendix A

# SPECIFICATIONS

## Specifications

This chapter contains the complete specifications for the 1461-14 Mainframe.

**Table A-1, AC Input Specifications**

| Characteristic | Description |
|---|---|
| Input Voltage Range | 90-250 VAC, 47-63Hz<br>120 VAC,47-440Hz |
| Power Consumption | 575 VA maximum |
| Fuse Rating<br><br>115VAC Operation<br>230VAC - 250 V Operation | <br><br>0.25 in x 1.25 in, Slow Blow, 6.3 A, 250 V<br>5 mm x 20 mm, T3.15 A, 250 V |
| Inrush Current | 35 A maximum, cold start |
| Power Disconnect | Rear Panel AC Power Switch |

**Table A-2, DC Output Power**

| Characteristic | Description |
|---|---|
| Useable Power | 790W |
| DC Current Capacity ($I_{MP}$) | **Voltage**      **Current**<br>+12 V      8 A<br>+5 V      50 A<br>+3.3 V      40 A<br>-12 V      4 A |
| DC Voltage Regulation | **Voltage**      **Tolerance, _V**<br>+12 V      <5%<br>+5V      <5%<br>+3.3V      <5%<br>-12 V      <5% |
| Maximum Load Ripple/Noise | **Voltage**      **Ripple/Noise**<br>+12 V      120 $mV_{pp}$<br>+5 V      50 $mV_{pp}$<br>+3.3 V      50 $mV_{pp}$<br>-12 V      120 $mV_{pp}$ |
| Protections | Over voltage protection<br>Over temperature protection<br>Over current protection<br>Short circuit protection<br>Over Power Protection<br>Reverse Voltage Protection |

**Table A-3, Cooling**

| Characteristic | Description |
|---|---|
| Cooling Capacity | 600W for 10° temperature rise in card cage, fans at maximum speed. |
| Cooling System | Forced air circulation (positive pressurization). |
| Mainframe Intake | Rear of mainframe |
| Module Exhaust | Top side of mainframe. |
| Fan Filter Access | Filter accessible from rear of the mainframe |

**Table A-4, Safety**

| Characteristic | Description |
|---|---|
| Safety Characteristics | EN61010-1:1993+A2:1995 |

**Table A-5, Environmental**

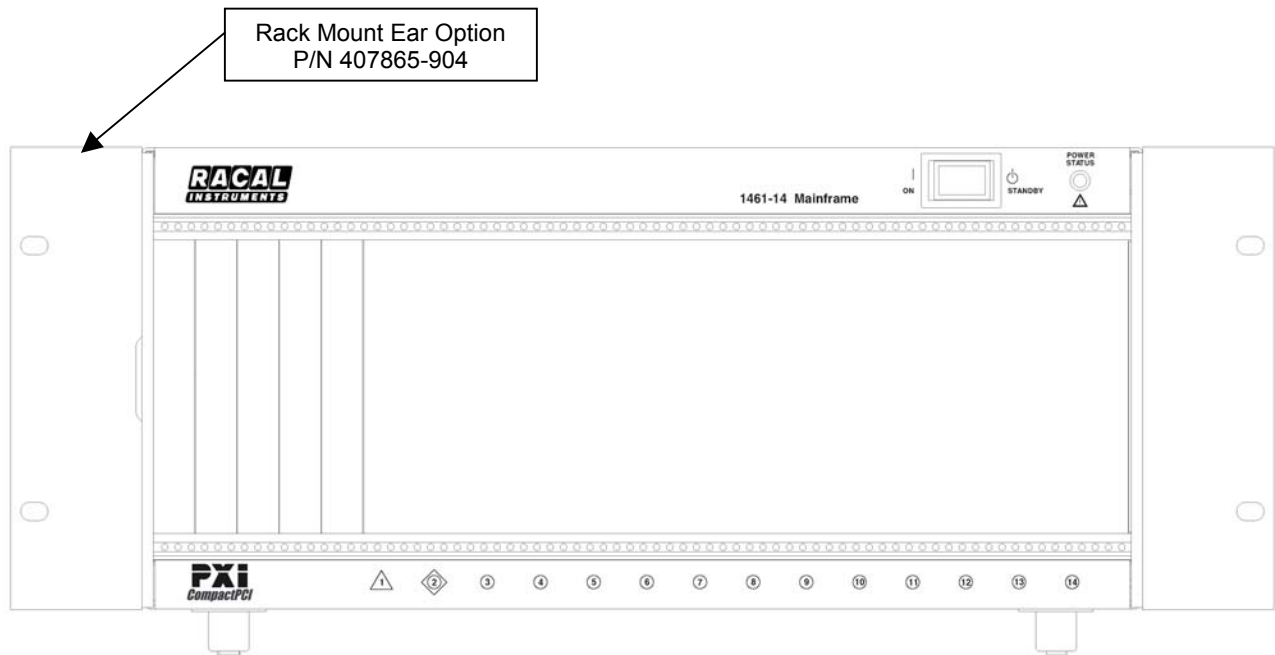| Characteristic | Description |
|---|---|
| Temperature<br>  Operating<br>  Non-operating | <br>$0^oC$ to $50^oC$<br>$-40^oC$ to $71^oC$ |
| Relative Humidity<br>  Operating<br><br>  Non-operating | <br>95+/-5% RH non condensing<br>75+/-5% RH above 30°<br>45+/-5% RH above 40°<br>95+/-5% RH at <50° |
| Altitude<br>  Operating<br>  Non-operating | <br>10,000 ft. (4570m)<br>15,000 ft. (12,190 m) |
| Random Vibration | 5-500Hz 2.1g$_{rms}$ |
| Functional Shock<br>  Operating | <br>Half sine, 30 g, 11 ms duration. |
| Electromagnetic Compatibility (EMC)<br><br>  Emissions<br><br>  Immunity | Emissions shall be within the limits specified by the following requirements:<br>EN 61326:1997+A1:1998 Class A, FCC Part 15 Class A limits for radiated emissions<br>EN 61326:1997+A1:1998 Class A |
| MTBF | 50,000 Hours |
| MTTR | < 10 minutes for major assemblies (Fan, Power Supply) |

**Table A-6, Backplane**

| Characteristic | Description |
|---|---|
| PCIbus CLK10 Distribution | Full differential: 250 ps maximum skew, $\pm$ 25 ppm. |

**Table A-7, Mechanical**

| Characteristic | Description |
|---|---|
| Overall Dimensions<br><br>Standard Mainframe (7U)<br>Height<br>Width<br>Depth | <br><br><br>6.96 in (17.7 cm)<br>15.06 in (38.3 cm)<br>16.75 in (42.6 cm) |
| Weight | 33 lbs. (14.97 kg) with no modules installed |

Rack Mount Ear Option
P/N 407865-904



**Figure A-1, View of 1461-14 With Rack Mount Ear Option**