RICI 5000 Hardware User's Guide

RICI 5000 Hardware User's Guide

Mission-Critical Data Interoperability

SAFETY SUMMARY

All personnel involved in operation or maintenance of electronic equipment must be thoroughly familiar with the electronic equipment precautions contained in operator guides and maintenance manuals for the applicable equipment, as well as the safety rules and standards contained in Title 19, Code of Federal Regulations, Part 1910, Chapter XVIII, Occupational Safety and Health Standards.

DANGER

When equipment employs voltages that are dangerous and may be fatal if contacted by operating maintenance personnel, extreme caution must be exercised when working with that equipment. Hazard awareness dictates that equipment must always be viewed as an integral part of a system and not a component.

DO NOT SERVICE OR ADJUST EQUIPMENT ALONE. Under no circumstances should a person adjust or maintain equipment without the immediate presence or assistance of another person capable of rendering aid. Unless under direct supervision of a qualified person, no person shall operate or maintain equipment if not qualified.

DO NOT TAMPER WITH INTERLOCKS. Reliance on interlock circuits to remove power from the equipment is never to be assumed. Until operation of the interlock is verified, equipment is assumed to be in a hazardous mode of operation. Under no circumstances will any access gate, door, or interlock switch be removed, bypassed, or modified without authority and then only after observing proper tag-out procedures.

REPORT ALL HAZARDS. If at any time a hazard is detected, it is the responsibility of all personnel to report the hazard to ensure that it is corrected. If at any time a new or suspected new hazard is detected, particularly due to equipment installation, modification, or repair, report this condition to your supervisor so that the hazard will be investigated, publicized, or corrected as required.

CAUTION. Electronic components are sensitive to, and can be damaged by, electrostatic discharge (ESD). To prevent the possibility of ESD damage to the components, service personnel must establish personal grounding by using an ESD strap.

This equipment is not suitable for use in locations where children are likely to be present.

SAFETY INFORMATION

Warnings:

WARNING: This device contains voltages that are hazardous to human life and safety. No user serviceable parts within. Refer all servicing to qualified personnel only.

AVERTISSEMENT: Cet appareil contient des tensions qui sont dangereux pour la vie humaine et la sécurité. Il n'y a aucune pièce réparable à l'intérieur. Pour toute réparation, adressez-vous exclusivement à un personnel qualifié.

Fuse Replacement Caution:

CAUTION: Double pole/Neutral fusing.

ATTENTION: Système de fusible neutre/à double pôle.

Rating Information:

RICI 5000 Model 010-10:
Input Voltage: 100-240VAC
Input Current: 2.0A MAX
Input Frequency: 50−60Hz

RICI 5000 Modèle 010-10:
Tension d'entrée: 100-240VAC
Courant d'entrée: 2.0A MAX
Fréquence d'entrée: 50−60Hz

RICI 5000 Model 010-12:
Input Voltage: 12VDC (center positive)
Input Current: 2.0A MAX
Input Frequency: 50−60Hz

RICI 5000 Modèle 010-12:
Tension d'entrée: 12VDC (centre positif)
Courant d'entrée: 2.0A MAX
Fréquence d'entrée: 50−60Hz

Regulatory Compliance:

UL/CSA 60950-1, UL/CSA 62368-1
IEC/EN 60950-1, IEC/EN 62368-1
2014/35/EU
2011/65/EU
2014/30/EU

Verified to FCC Class B
Validé suivant FCC Classe B

CANADA – ICES-003 Issue 5, August 2012 for a Class B Device

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE: Cet équipement a été testé et est conforme aux exigences des limites du paragraphe 15 de la FCC Classe B, pour un appareil numérique. Ces limites sont définies pour assurer une protection raisonnable contre les interférences nuisibles dans une installation résidentielle. Cet équipement génère, utilise et peut émettre de l'énergie sous forme de rayonnement radio et, s'il n'est pas installé ni utilisé conformément aux instructions, il peut causer des interférences nuisibles aux communications radio. Cependant, il n'y a aucune garantie que des interférences ne se produiront pas dans le cadre d'une installation particulière. Si cet appareil provoque des interférences nuisibles à la réception radio ou télévision, ce qui peut être déterminé en mettant l'appareil hors tension puis sous tension, l'utilisateur est invité à essayer de corriger l'interférence par une ou plusieurs des méthodes suivantes:
- Réorienter ou déplacer l'antenne de réception.
- Augmenter la distance entre l'équipement et le récepteur.
- Connecter l'équipement à une prise sur un circuit différent de celui auquel le récepteur est connecté.
- Consulter le revendeur ou un technicien radio / TV

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1.   INTRODUCTION

In this section, you gain a general understanding of the RICI 5000 hardware, including its functionality, technical specifications, and environmental characteristics.

This user's manual provides hardware details about Sunhillo's Real-Time Interface and Conversion Item (RICI 5000) product. RICI 5000 is a versatile, modular platform designed for surveillance sensor data formatting, filtering, and protocol conversions.

1.1   Overview

RICI 5000 features the following:

■ TCP/IP and UDP/IP Serial to LAN protocol conversions.

■ Each unit features four (4) rear DB25 (EIA-530) serial ports.

■ Dual front panel Gigabit Ethernet ports.

■ 1U rack mountable or table-top compact design.

■ Rear M8 six (6) pin circular port for future expanded capabilities (capped on Revision E or later hardware).

1.1.1   How this Manual is Organized

Section 1   **Introduction** – Provides a brief overview of the RICI 5000 functionality, technical specifications, environmental characteristics, and the contents of this user's manual.

Section 2   **Rack Mount Installation** – Describes how to perform a rack mount installation of the RICI 5000.

Section 3   **Understanding the Hardware –** Provides description and functions of the RICI 5000 hardware.

Appendices   Supplemental information to support the contents of this document.

1.2   Physical Interfaces

RICI 5000's front panel (**Figure 1-1**) provides the following interface connections:

Figure 1-1: RICI 5000 Front Panel

- Two (2) Ethernet (**Eth0**, **Eth1**) Interfaces
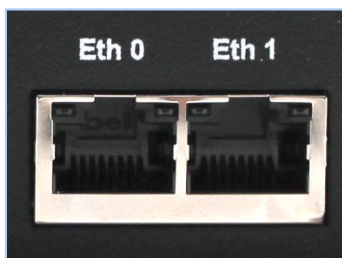
- One (1) Mini-USB (**Maint**) Maintenance Interface

The front panel's light emitting diodes (LED) indicate the status or activity of transmitting (**TD**) or receiving (**RD**) data on the four **J1 – J4** serial connections (**Figure 1-2**), the Ethernet connections (**Eth0** and **Eth1**, **Figure 1-3**), and **PWR** (power, **Figure 1-4**). When transmitting or receiving data, the **TD/RD**, **RD/TD**, and **SYNC** LEDs flash (**Figure 1-2**). When the power switch is in the right (**Off**) position (**Figure 1-4**), the **PWR** LED is off (**Figure 1-5**). When the power switch is in the left (**On**) position, the **PWR** LED is lit.
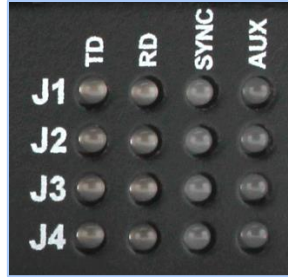
Figure 1-2: Status and Activity LEDs
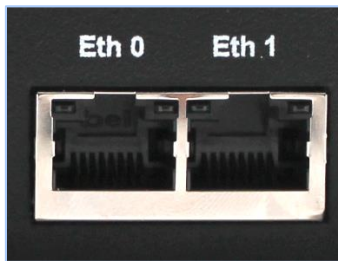
Figure 1-3: Ethernet Connections
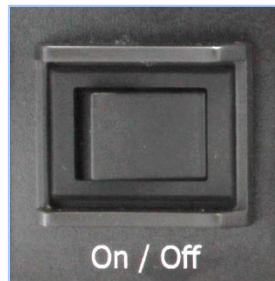
Figure 1-4: Power Switch

Figure 1-5: Power LED

RICI 5000's rear panel (**Figure 1-6** through **Figure 1-9**) provides the following interface connections:

Figure 1-6: RICI 5000 Model 010-10 Rear Panel (100-240VAC), Revision D or Earlier

Figure 1-7: RICI 5000 Model 010-10 Rear Panel (100-240VAC), Revision E or Later

Figure 1-8: RICI 5000 Model 010-12 Rear Panel (12VDC), Revision D or Earlier

Figure 1-9: RICI 5000 Model 010-12 Rear Panel (12VDC), Revision E or Later

■ **100-240 VAC or 12VDC**—Depending upon model requested, power is supplied through a 100-240AC (**Figure 1-6** and **Figure 1-7**) or 12VDC (center positive, locking barrel connection, **Figure 1-8** and **Figure 1-9**), respectively.

> **Note**
>
> The external direct plug-in power supply should be used as the disconnect device for the entire system. This power supply must remain accessible at all times.

- **Serial Ports**—Four RS-232/422 (EIA-530) serial ports labeled **J1** – **J4**. Each port can be individually configured for asynchronous or synchronous operation (see *SUN2353 - SureLine Core User's Guide* for more information. MPS users should also reference *SUN2298 – MPS Wan Protocol User's Guide*. All documents can be found on the Sunhillo Website.).

> **Note**
>
> EIA-530, sometimes referred to as TIA-530-A or RS-530, is a balanced serial interface standard that uses a 25-pin connector.

- **M8 6-pin Circular Port**—For future expanded capabilities, labeled **J5**.

> **Note**
>
> Revision E or later hardware has a capped **J5** port.

1.2.1   Installing the Rubber Feet

For desktop use, the RICI 5000 ships with a package of four rubber feet (PN 33020001: Feet, Rubber, 0.50 dia x 0.25) that can be installed in the openings under the unit.

Figure 1-10: Rubber Foot

For rack mount installation (refer to Section **2**), the rubber feet are not used.

1.3   Technical Specifications

RICI 5000's technical specifications are broken down into physical, electrical, environmental, thermal, and agency approval and compliance components, which are detailed in the subsections that follow.

1.3.1   Physical Specifications

Table 1-1: Physical Specifications

Specification	Single Unit	1U Chassis
Height	1.61 in./41.00 mm	1.75 in./44.45 mm
Width	7.31 in./185.68 mm	17 in./431.8 mm
Depth	9.17 in./233.00 mm	9.25 in./234.95 mm
Weight	3.0 lbs./1.36 kg (Model 010-10) 2.5 lbs./1.13 kg (Model 010-12)	3.0 lbs./1.36 kg (unpopulated) 6.0 lbs./2.72 kg (with Model 010-10) 5.5 lbs./2.49 kg (with Model 010-12)

Figure 1-11 provides a visual representation of the physical dimensions of a single unit.

Figure 1-11: Single Unit Dimensions

Figure 1-12 provides a visual representation of the physical dimensions of the populated 1U chassis.

Figure 1-12: Populated 1U Chassis Dimensions

1.3.2 Electrical Specifications

Table 1-2: Electrical Specifications

Specification	Model 010-10	Model 010-12
Power Requirements	100-240VAC, 50-60Hz, 2.0A Max	12VDC (center positive), 2.0A Max
Power Usage	12W Max	10W Max
Power Cord Length	6ft/1.83m	Not to exceed 32ft/10m

1.3.3 Environmental and Thermal Test Specifications

Table 1-3: Environmental and Thermal Test Specifications

Test Method[1]	Storage	Operational
500.5 – Altitude	0-40,000 ft	50,000 ft
501.5 – High Temperature	159.8°F/71°C	122°F/50°C
502.5 – Low Temperature	-76°F/-60°C	32°F/0°C
Exhaust Air Temperature Rise (performed during the Operational High and Low Temperature Tests, 501.5 and 502.5, Procedure II)	N/A	122°F/50°C and 32°F/0°C
507.5 - Humidity	32-140°F/0-60°C, 10-95% RH, 11 days	32-122°F/0-50°C, 10-95%RH, 6 days

---

[1] MIL-STD-810G – Department of Defense Method Standard for Environmental Engineering Considerations and Laboratory Tests

1.3.4 Agency Approvals and Compliance

Table 1-4: Agency Approvals and Compliance

Designation	Description
USA EMC Compliance	Federal Communications Commission (FCC), Part 15, Class B
UL/CSA 60950-1	Information Technology Equipment-Safety – Part 1: General Requirements
UL/CSA 62368-1	Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements
IEC/EN 60950-1	Information Technology Equipment-Safety – Part 1: General Requirements
IEC/EN 62368-1	Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements
2014/35/EU	Low Voltage (LVD) Directive
2011/65/EU	Restriction of the use of certain Hazardous Substances (RoHS 2) Directive
2014/30/EU	Electromagnetic compatibility (EMC) Directive
EN 55022 CISPR 22	Information Technology Equipment – Radio disturbance characteristics – Limits and methods of measurement
EN 55024 CISPR 24	Information Technology Equipment – Immunity characteristics – Limits and methods of measurement
EN 55032 CISPR 32	Emissions for Multimedia Equipment
CANADA – ICES-003	CANADA – ICES-003 Issue 5, August 2012 for a Class B Device

1.4 Additional Product Information

For additional information on RICI 5000 or Sunhillo's other products, contact Sunhillo Corporation at:

📞	**Phone**:	856.767.7676 (Toll Free: 844.977.7676) **Sales** (phone option, press 1) **Technical Support** (phone option, press 2)
🖨	**Fax**:	856.767.9557 (ATTN: Marketing)
🌐	**Web**:	www.sunhillo.com
🌐	**Support Website**:	support.sunhillo.com
✉	**Email**:	sales@sunhillo.com
📍	**Mail**:	Sunhillo Corporation ATTN: Marketing 444 Kelley Drive West Berlin, NJ 08091-9210 USA

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Section

2

2. RACK MOUNT INSTALLATION

In this section, you learn how to rack mount the RICI 5000.

The RICI 5000 is designed either as a desktop unit, or, with the rubber feet removed (see Section **1.2.1**), for use in a 1U mounting sleeve, either alone or in a pair. When rack mounting, all parts are shipped with the RICI 5000 Dual Rack Mount Sleeve Kit (PN 010-U-RMS).

2.1 Parts List

Table 2-1 indicates the parts list for the RICI 5000 Dual Rack Mount Sleeve Kit.

Table 2-1: RICI 5000 Dual Rack Mount Sleeve Kit Parts List

Item	Quantity	Image
Rack Mounting Sleeve (PN A010-U-RMS)	1	
Outer Sleeve Blank Panel – Right Hand (PN 40001037) (added on per order basis)	1	
Outer Sleeve Blank Panel – Left Hand (PN 40001011) (added on per order basis)	1	

Item	Quantity	Image
Mounting Ear, Standard 1U (PN 40000484)	2	
Rack Mounting Hardware (PN 130020)	1	
Machined Screw	4	
Lock Washer	4	
Flat Washer	4	
Retainer (Cage) Nut	4	
Screw, #4-40 x ¼", Flat Phillips (PN 301440250FPB)	8	
Center Mount Ear (PN 40001035)	2	
Outer Mount Ear (PN 40001036)	2	

2.2 Required Tools

The following tools are required for assembly:

■ Phillips-head screwdriver

2.3 Installation

To install the RICI 5000 in the 1U mounting sleeve, follow these steps:

1. If applicable, remove the Outer Sleeve Blank Panel from either the right (PN 40001037) or left (PN 40001011) of the Rack Mounting Sleeve (PN A010-U-RMS), depending upon which side you will be installing the RICI 5000.

2. If applicable, remove all four rubber feet from the bottom of the RICI 5000.
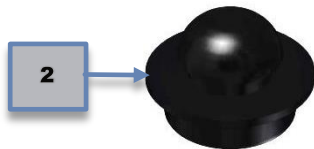
3. Remove each Side Cover Enclosure (PN 40001043) from the left and right sides of the RICI 5000.
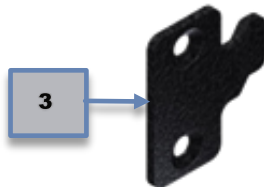
4. Slide a Mount Ear rack mounting bracket onto each side of the RICI 5000 unit. If installing in the left side of the Rack Mounting Sleeve, make sure the half rack mounting bracket (Center Mount Ear, PN 40001035) goes on the right side of the unit when viewing from the front:

If installing on the right side of the Rack Mounting Sleeve, make sure the half rack mounting bracket (Center Mount Ear) goes on the left side of the RICI 5000 unit when viewing from the front.

If installing a second RICI 5000 unit, install the rack mounting brackets on the opposite sides of the second unit.

5. Secure each Mount Ear rack mounting bracket in place using the #4-40 x ¼", Flat Phillips set of screws.

6. Slide the RICI 5000 into the desired side of the Rack Mounting Sleeve. If installing a second RICI 5000, slide that unit into the other side of the Rack Mounting Sleeve.
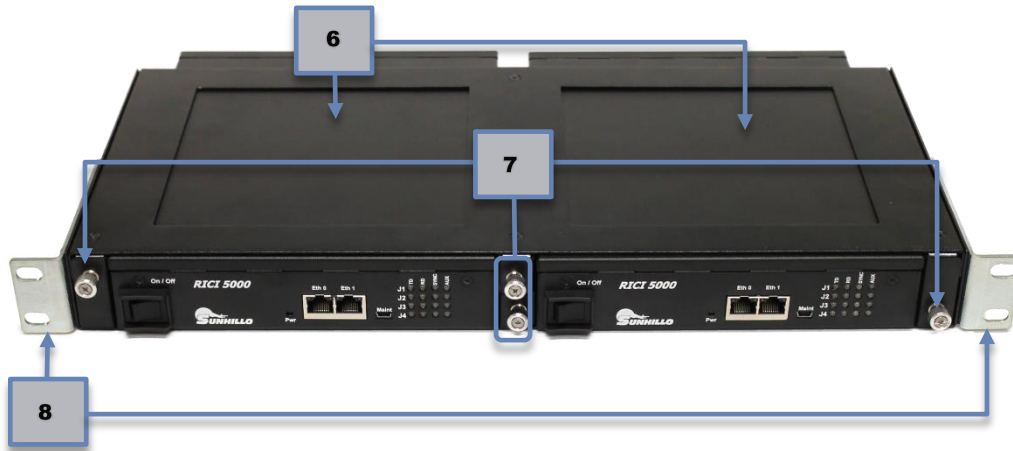
7. Secure the RICI 5000(s) into the Rack Mounting Sleeve by tightening the captive screws on the front of the mounting brackets.

8. Secure the Mounting Ear (PN 40000484) to the Rack Mounting Sleeve using the Rack Mounting Hardware (PN 130020). To accomplish this, slide a Lock Washer and a Flat Washer onto a Machined Screw, then insert the Machined Screw (and washers) into the Rack Mounting Sleeve. Secure the Machined Screw (and washers) into the Retainer (Cage) Nut. Repeat until both Mounting Ear sides are secured.

9. Slide the Rack Mounting Sleeve into the 1U unit.

10. Secure the Rack Mounting Hardware ears to the 1U unit.

3.   UNDERSTANDING THE HARDWARE

In this section, you gain a deeper understanding of the RICI 5000's hardware functions.

The RICI 5000's hardware consists of a series of interface connections on the front and back of the device, power options, and activity LEDs. The various hardware components are described in more detail in the sections that follow.

3.1   Interface Connections

The RICI 5000's interface connections include the rear panel connections, the front panel connections, and power. Each of the interface connections is described in the subsections that follow.

3.1.1   Rear Panel Connections

The rear panel connections consist of four serial ports, an M8 6-pin Circular Port, and a power connector. The serial port and M8 6-pin Circular Port connections are described in the subsections that follow.

3.1.1.1   Serial Ports

There are four serial port connectors – labeled J1 through J4 – on the rear panel of the RICI 5000 (**Figure 1-6** through **Figure 1-9**). These connectors use DB25 cables and support serial radar data throughput between 2.4K and 64K bits per second (bps).

| Note |
| --- |
| The serial interfaces on Sunhillo products are typically rated at 2 KV Human Body Model (HBM) to protect against Electrostatic Discharge (ESD). It is the user's responsibility to add additional protection against lightning strikes by adding external serial line lightning suppression devices to shunt the electrical surges associated with a lightning strike and protect the equipment against damage. |

Table 3-1 lists the RS-232 and RS-422 serial port signals (pinouts) for connectors J1 through J4.

Table 3-1: RS-232/422 Serial Ports Signals/Pinouts

RS-232 Pinouts			Additional RS-422 Pinouts		
Pin	Signal	Mnemonic	Pin	Signal	Mnemonic
1	Frame Ground	FG			
2	Transmit Data	TDA	14	Transmit Data	TBD
3	Receive Data	RDA	16	Receive Data	RDB
4	Request To Send	RTSA	19	Request To Send	RTSB
5	Clear To Send	CTSA/B	13	Clear To Send	CTSB
6	Data Set Ready	DSRA	22	Data Set Ready	DSRB
7	Signal Ground	GND			
8	Carrier Detect	CDA	10	Carrier Detect	CDB
15	Transmit Clock	TCA	12	Transmit Clock	TCB
17	Receive Clock	RCA	9	Receive Clock	RCB
18	Local Loopback (not supported)				
20	Data Terminal Ready	DTRA	23	Data Terminal Ready	DTRB
21	Remote Loopback	RL			
24	External Clock	EXT_CLKA	11	External Clock	EXT_CLKB
25	Test Mode	TM			

Figure 3-1 shows the locations of the pins on the DB-25 serial port connector.
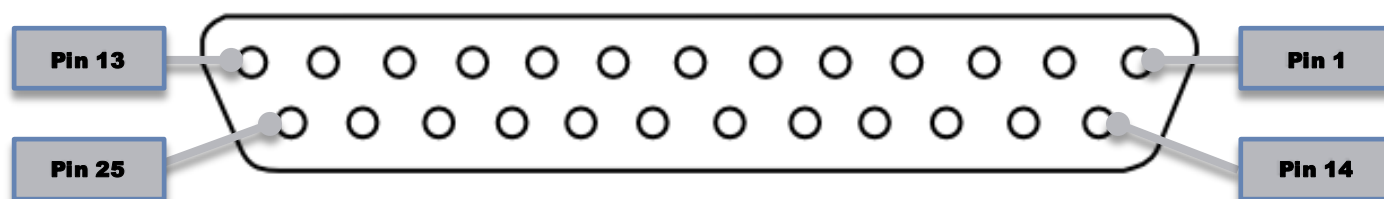
Figure 3-1: DB-25 Connector Pins

3.1.1.2 M-8 6-pin Circular Port

An M-8 6-pin Circular Port is located on the right side of the unit between the serial port connectors and power connection (**Figure 1-6** through **Figure 1-9**). This port, labeled **J5**, is intended for future expanded capabilities and is capped on Revision E or later versions of the hardware.

3.1.2 Front Panel Connections

The font panel connections consist of two Ethernet port connections and one Mini-USB maintenance port (Maint). These connections are described in the subsections that follow.

3.1.2.1   Ethernet Ports

Two Ethernet port connections are located on the center right of the RICI 5000 front panel (**Figure 1-1**). These connections support Category 5 10/100/1000 Ethernet cables, which provide an interface to a LAN's switch, router, or hub.

Each network segment cable length may be up to 100 meters. Auto-negotiation and auto-crossover are supported. **Figure 3-2** shows the Ethernet pinout locations and **Table 3-2** provides the pinout descriptions.
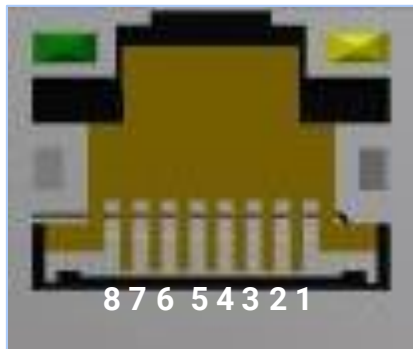
Figure 3-2: Ethernet Pinout Locations

Table 3-2: Ethernet Pinout Descriptions

Pin	Signal	Description
1	BI_DA+	Bi-directional pair A+
2	BI_DA-	Bi-directional pair A-
3	BI_DB+	Bi-directional pair B+
4	BI_DC+	Bi-directional pair C+
5	BI_DC-	Bi-directional pair C-
6	BI_DB-	Bi-directional pair B-
7	BI_DD+	Bi-directional pair D+
8	BI_DD-	Bi-directional pair D-

3.1.2.2   Mini-USB Maintenance Port

For ease of updating software, transferring configuration files, and updating the OS, a Mini-USB maintenance port (**Maint**) is located near the center right of the front panel (**Figure 1-1**). A typical use for the **Maint** port is to attach a terminal and view power on diagnostic messages.

3.2   Powering on the RICI 5000

Ensure that external power is operational and is supplied to the RICI 5000 before switching on the unit. Locate the power (**PWR**) switch on the front of the RICI 5000, and switch it to the **ON** position to power on the unit (**Figure 1-4**). The green **PWR** LED (**Figure 1-5**) will illuminate.

The RICI 5000 performs a Power-On Self Test (POST) each time the unit is powered on or rebooted. RICI 5000 system components tested during POST are as follows:

- Ethernet ports 0 and 1

- **J1** – **J4** serial ports (in internal loopback)

The PASS/FAIL results of POST are logged into a system log named *POST_LOG.log*, which resides on the RICI 5000 in a *.tar* file.

If a test fails during POST, the remaining tests are still run. The bank of LEDs is used to display the status of POST. Refer to **Appendix A** for a description of the display patterns for the error codes and test in progress status on the LEDs. If all POST tests passed, the letters **O K** will blink twice on the bank of LEDs. If a POST test encounters a failure, a unique error code is displayed, which will blink 20 times. Only the first error encountered is displayed. Once POST is complete, the RICI 5000 operational software initiates regardless of whether or not there were any errors.

3.3   Activity LEDs

The RICI 5000's activity LEDs on the front panel indicate serial and Ethernet port activity. Serial and Ethernet port activity LEDs and how to reset the RICI 5000 are described in the subsections that follow (see *SUN2353 - SureLine Core User's Guide* for more information. MPS users should also reference *SUN2298 – MPS Wan Protocol User's Guide*. All documents can be found on the Sunhillo Website.).

3.3.1   Ethernet Port Activity

Each of the two Ethernet ports (**Eth0** and **Eth1**) is equipped with two status LEDs. The LED on the left is a bi-color green and orange Speed LED, and the other LED on the right is a yellow Link LED (**Figure 3-3**).
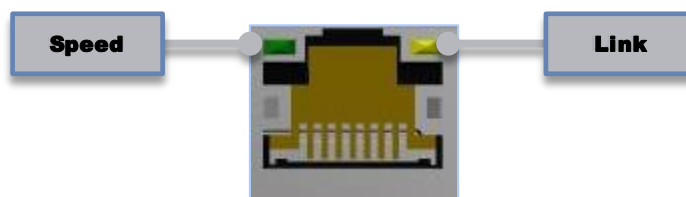
Figure 3-3: Ethernet Port LEDs

The status description for the Speed LED is shown in **Table 3-3**.

Table 3-3: Ethernet Speed LED

Ethernet Speed LED	
Speed LED	**Description**
Flashing Orange	Operating as a 10Mbps Connection
Flashing Green/Orange	Operating as a 100Mbps Connection
Flashing Green	Operating as a 1000Mbps (Gigabit) Connection

The status description for the Link LED is shown in **Table 3-4**.

Table 3-4: Ethernet Link LED

Ethernet Link LED	
Link LED	**Description**
Off	No Link Established
Solid Yellow On	Link Established

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A.   POST LED STATUS INDICATORS

Each time the RICI 5000 is powered on, POST will perform a series of tests and display the results on the bank of LEDs. This Appendix depicts how the LEDs for each row (**J1** - **J4**) and column (**TD**, **RD**, **SYNC, AUX**) are lit – green, red, or off (shown in grey in each diagram) – during the test and error code for each test. Only the first error code, if multiple occur, is displayed on the LEDs. The error codes will blink 20 times before the RICI 5000 continues with startup.

Ethernet Port Tests

Eth0 Test Error Codes

Test Failure:	**T**	**R**	**S**	**A**		Test Utility Missing:	**T**	**R**	**S**	**A**
J1	🟢	🟢	🔴	⚪		**J1**	⚪	⚪	🔴	⚪
J2	⚪	⚪	⚪	⚪		**J2**	⚪	⚪	⚪	⚪
J3	⚪	⚪	⚪	⚪		**J3**	⚪	⚪	⚪	⚪
J4	⚪	⚪	⚪	⚪		**J4**	⚪	⚪	⚪	⚪

Eth1 Test Error Codes

Test Failure:	**T**	**R**	**S**	**A**		Test Utility Missing:	**T**	**R**	**S**	**A**
J1	⚪	⚪	⚪	⚪		**J1**	⚪	⚪	⚪	⚪
J2	🟢	🟢	🔴	⚪		**J2**	⚪	⚪	🔴	⚪
J3	⚪	⚪	⚪	⚪		**J3**	⚪	⚪	⚪	⚪
J4	⚪	⚪	⚪	⚪		**J4**	⚪	⚪	⚪	⚪

J1 – J4 Communications Internet Loopback Test

The examples that follow depict the LED settings for the **J1** communications internal loopback test. The LED settings are identical for **J2** – **J4**, except that the LEDs are aligned with the port under test, i.e., **J2**, **J3**, or **J4**.

Test in Progress: **T R S A**   Test Failure: **T R S A**

	T	R	S	A
J1	🟢	🟢	⚪	⚪
J2	⚪	⚪	⚪	⚪
J3	⚪	⚪	⚪	⚪
J4	⚪	⚪	⚪	⚪

	T	R	S	A
J1	🟢	⚪	🔴	⚪
J2	⚪	⚪	⚪	⚪
J3	⚪	⚪	⚪	⚪
J4	⚪	⚪	⚪	⚪

No Failures – POST Complete

No Failures – POST (OK) Complete

	T	R	S	A
J1	🟢	🟢	🟢	⚪
J2	🟢	⚪	🟢	⚪
J3	🟢	⚪	🟢	⚪
J4	🟢	🟢	🟢	⚪

	T	R	S	A
J1	🟢	⚪	🟢	⚪
J2	🟢	🟢	⚪	⚪
J3	🟢	🟢	⚪	⚪
J4	🟢	⚪	🟢	⚪

B.   ACRONYMS

The acronyms in the table that follows were used throughout the body of this document.

Acronym	Expansion
ACP	Azimuth Change Pulse
ARP	Azimuth Reference Pulse
AUX	Auxiliary
BPS	Bits Per Second
BTU	British Thermal Unit
FCC	Federal Communications Commission
LAN	Local Area Network
LED	Light Emitting Diode
Mbps	Megabits Per Second
NIC	Network Interface Card
POST	Power On System Test
PWR	Power
RD	Receiving
RICI	Real-Time Interface and Conversion Item
TD	Transmitting
UL	Underwriters Laboratories
USB	Universal Serial Bus
VAC	Voltage in Alternating Current
VDC	Voltage in Direct Current

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