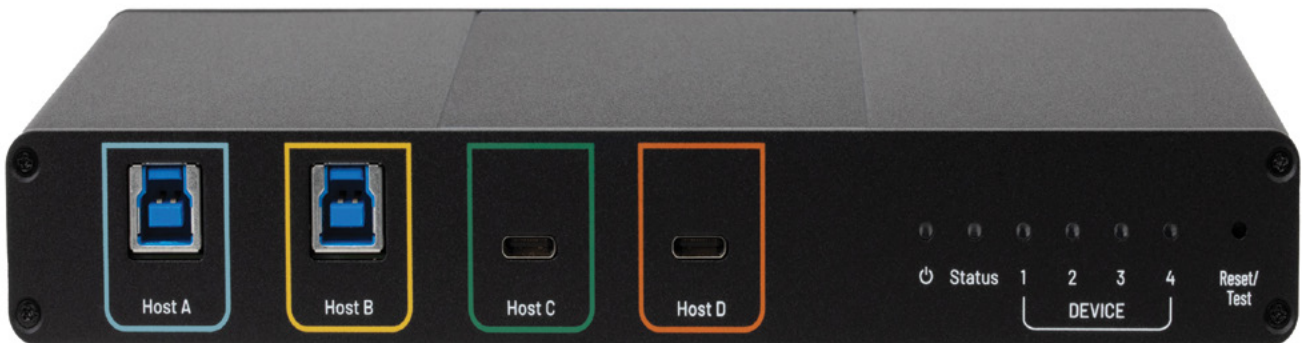# User Guide

ADI Icron™
AN ANALOG DEVICES BRAND

Polaris™ 7044
USB 3-2-1 Matrix

Thank you for purchasing the Polaris 7044 Matrix.

Please read this user guide thoroughly.

FCC Radio Frequency Interference Statement Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

CE Statement

We, Icron, an Analog Devices brand, declare under our sole responsibility that the Polaris™ 7044, to which this declaration relates, is in conformity with European Standards EN 55032, EN 55035, EN 61000 and RoHS Directive 2011/65/EU + 2015/863/EU.

Industry Canada Statement

This Class A digital apparatus complies with Canadian ICES-003.
CAN ICES-3 (A) / NMB-3 (A)

WEEE Statement

The European Union has established regulations for the collection and recycling of all waste electrical and electronic equipment (WEEE). Implementation of WEEE regulations may vary slightly by individual EU member states. Please check with your local and state government guidelines for safe disposal and recycling or contact your national WEEE recycling agency for more information.

Product Operation and Storage

Please read and follow all instructions provided with this product and operate for intended use only. Do not attempt to open the product casing as this may cause damage and will void the warranty. Use only the power supply provided with this product. When not in use, this product should be stored in a dry location between -20°C and 70°C.

Contents

Introduction

This guide provides product information for the Polaris™ 7044 Matrix, installation instructions, API and troubleshooting guidelines. The instructions in this guide assume a general knowledge of computer installation procedures, familiarity with cabling requirements and some understanding of USB devices.

NOTE: Notes provide additional useful information.

CAUTION: Cautions provide important information about an operational requirement.

Product Contents

Your Polaris 7044 Matrix system contains:
- Polaris 7044 Matrix
- 24V 2.71A International Power Adapter
- Country Specific AC Power Cord
- RS232 Mating Connector
- Default Values Label (to affix where desired)
- Quick Start Guide

NOTE: USB cables are not included.

Features

The Polaris 7044 allows for matrix switching of USB 3, 2, and 1 devices between four hosts and four devices. Any host can connect to any single or multiple devices. Control of the routing and features is available through an embedded webpage and API on the network and RS232 interface.

- Matrix Switching four Hosts and four Devices providing up to 24 configurations
- USB 3.1 5Gbps, backwards compatible to USB 2.0, 1.1, and 1.0 devices and speeds
- USB Device status. Check the connection and operating speed of each device port.
- RS232, Telnet, SSH API
- Webpage configuration (Http://)
- User and Administrator Level Accounts
- Installation Testing Function
- 15W of power (5V, 3A) available per USB-C Device Port
- 6W of power (5V, 1.2A) available per USB-A Device Port
- Color Blind Friendly Indications

Polaris 7044 Unit

Front Faceplate
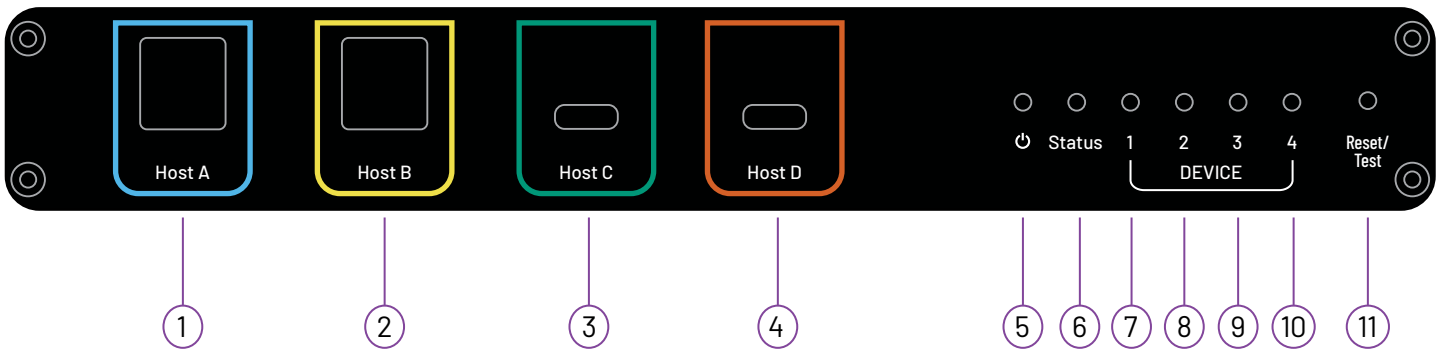
Back Faceplate
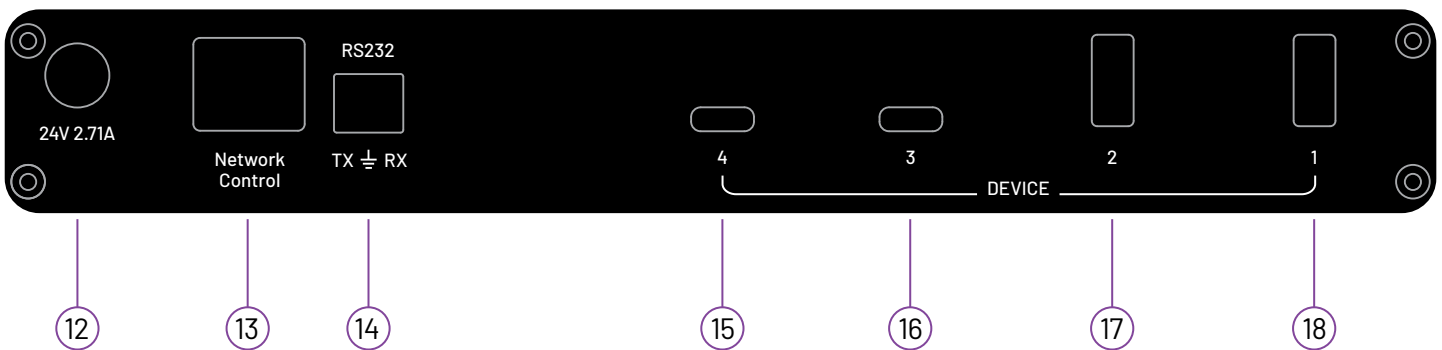
ITEM	TYPE	DESCRIPTION
1	Host "A" Port	Upstream USB-B port (3.1 5Gbps) for a host connection.
2	Host "B" Port	Upstream USB-B port (3.1 5Gbps) for a host connection.
3	Host "C" Port	Upstream USB-C port (3.1 5Gbps) for a host connection. Supports USB data only.
4	Host "D" Port	Upstream USB-C port (3.1 5Gbps) for a host connection. Supports USB data only.
5	Power LED	LED is SOLID ON when DC is supplied to the Polaris unit. LED is OFF when there is no power applied to the Polaris unit.
6	Status LED	LED is SOLID ON when the system is functioning normally. LED BLINKS when the system is updating firmware. LED is OFF when the system is initially booting.

ITEM	TYPE	DESCRIPTION
7	Device 1 LED	LED is SOLID ON when routing is made to Device 1. LED will display BLUE, YELLOW, GREEN, or RED depending on if the routing is made to Host A, B, C, or D respectively. LED is OFF if not routing to Device 1.
8	Device 2 LED	LED is SOLID ON when routing is made to Device 2. LED will display BLUE, YELLOW, GREEN, or RED depending on if the routing is made to Host A, B, C, or D respectively. LED is OFF if not routing to Device 2.
9	Device 3 LED	LED is SOLID ON when routing is made to Device 3. LED will display BLUE, YELLOW, GREEN, or RED depending on if the routing is made to Host A, B, C, or D respectively. LED is OFF if not routing to Device 3.
10	Device 4 LED	LED is SOLID ON when routing is made to Device 4. LED will display BLUE, YELLOW, GREEN, or RED depending on if the routing is made to Host A, B, C, or D respectively. LED is OFF if not routing to Device 4.
11	Reset/Test Button	Factory Reset and Test mode button. Refer to page 8 for more details. See Testing Function section on page 8 for more detail. See Factory Reset section on page 8 for more detail.
12	DC Power IN	Locking connector for the included 24V 2.71A power adapter.
13	Network Interface	100Mbps interface for internal webpage and network (SSH, TELNET) APIs. Connect to a network for network-based control.
14	RS232 Interface	Configurable baud rate RS232 interface for control with APIs.
15	Device 4 Port	USB-C Port supporting up to USB 3 5Gbps. 15W of power available 5V 3A. Supports USB data only.
16	Device 3 Port	USB-C Port supporting up to USB 3 5Gbps. 15W of power available 5V 3A. Supports USB data only.
17	Device 2 Port	LED BLINKS when the system is updating USB-A Port supporting up to USB 3 5Gbps. 6W of power available 5V 1.2A.
18	Device 1 Port	USB-A Port supporting up to USB 3 5Gbps. 6W of power available 5V 1.2A.

Installation Guide

Requirements

To complete the installation, you will also require the following items that are not included with this system:

- ▶ Up to four USB compatible computers (hosts) with a USB compliant operating system
- ▶ Up to four USB compatible device(s)

Preparing Your Site

Before installing Polaris 7044, you will need to prepare your site:

1. Place the computers where desired and set them up.
2. Place your USB Devices where desired and set them up.
3. Place Polaris in the desired location.
4. Assemble the power adapter and country specific power cord together and connect them into a suitable AC outlet.
5. Using appropriate USB A-B and USB C cables, connect the hosts and devices to the appropriate ports.

Checking the Installation

1. On the Polaris unit, check that the Power and Status LEDs are SOLID ON.

2. For Windows users (10 and 11), open Device Manager to confirm that the system has been installed correctly. Expand the entry for Universal Serial Bus controllers by clicking the "+" sign. If installed correctly, you should find a single instance of "Generic SuperSpeed USB Hub" listed.

   To open Device Manager in Windows:
   Open the Start Menu, right click on "Computer" then select: Device Manager

3. For macOS users, open the System Profiler to confirm that Polaris has installed correctly. In the left-hand column under Hardware, select "USB" and inspect the right-hand panel. If installed correctly, you should find it listed as a single instance of "Hub" under the USB SuperSpeed Bus.

   To open System Profiler in macOS™:
   Open the Finder, select Applications, then open the Utilities folder and double click on the System Profiler icon.

4. If Polaris is not detected correctly or fails to detect, please consult the Troubleshooting section in this guide.

Connecting a USB Device and Compatibility

1. Install any software required to operate your USB device. Refer to the documentation for the USB device, as required.
2. Connect the USB device to the device port on Polaris.
3. Create a routing from a host to that device using API, GUI or test function.
4. Check that the device is detected and installed properly in the operating system.

Polaris 7044 complies with USB 2.0 and USB 3 5Gbps specifications governing the design of USB devices. However, there is no guarantee that all USB devices or hosts will be compatible as there several different characteristics that may impact the operation of USB devices. The system acts as a single generic hub from the device and host perspective.

Testing Function

You can use the test/factory reset button to validate the installation. A short press of less than one second will enter test mode which will cycle through the upstream ports connecting them to all downstream ports after each subsequent button press. For example, first button press, Host A goes to Devices 1 through 4; second button press, Host B goes to Devices 1 through 4, etc. Subsequent button presses should be two seconds or less in duration.

Factory Reset

Factory Reset can be performed via the test/reset button on the front faceplate by holding the button down for 10 seconds. You can also reset the device via API or the web interface. After a factory reset, the device will return to these default settings.

Default Factory Settings

Default Values:
1. RS232 set to 9600 baud; 8-bit 1 Stop; No Parity.
2. IP set to Static with the following parameters:
     (a) IP: 192.168.0.254
     (b) Subnet Mask: 255.255.255.0
     (c) Gateway: 192.168.0.1
     (d) Port: 23
3. Auto Switching Off
4. GUI, Network API, and RS232 Interfaces Unlocked

Default User Account Credentials:
Username: USER
Password: USER
Default Administrative Account Credentials:
Username: ADMIN
Password: ADMIN

The system's MAC Address is listed on the bottom enclosure label and varies unit to unit.

API

The following commands can be used on the RS232 and network interfaces via SSH or TELNET.

All responses end in Carriage Return (0x0D), <CR>, and a line feed (0x0A), <LF> unless otherwise noted. Account levels are used for SSH and GUI interfaces where Login credentials are required. All responses when interface is locked will return:

LOCKED<CR><LF>

All unknown responses when revived will return:

NAK<CR><LF>

DESCRIPTION	ACCOUNT LEVEL	COMMAND	EXAMPLES
Switch USB input to one output	User/Admin	**User:** C<space>I<input>O<output> **Input:** 0 – Clear all Host Connections A – Host A B – Host B C – Host C D – Host D **Output:** 1 - Device 1 2 - Device 2 3 – Device 3 4 – Device 4 **Response:** SWITCH-I<Input>O<output>	**Command:** C IBO4<CR><LF> **Response:** SWITCH-IBO4<CR><LF> Switches Host B to Output 4 To Clear all, Set input to 0 C IBO4

DESCRIPTION	ACCOUNT LEVEL	COMMAND	EXAMPLES
Switch USB input to Multiple Outputs	User/Admin	**User:** C<space>I<input>O<output> **Input:** 0 – Clear all Host Connections A – Host A B – Host B C – Host C D – Host D **Output:** 1 – Device 1 2 – Device 2 3 – Device 3 4 – Device 4 **Response:** SWITCH-I<Input>O<output>,<output>..	**Command:** C IBO4<CR><LF> **Response:** SWITCH-IBO4,2<CR><LF> Switches Host B to Output 4 and 2 To Clear all, Set input to 0
Query USB Input	User/Admin	**User:** INPUT<space>-?<space><output> **Output:** 1 – Device 1 2 – Device 2 3 – Device 3 4 – Device 4 **Response:** SWITCH-I<Input>O<output>	**Command:** INPUT -? 4<CR><LF> **Response:** SWITCH-IBO4<CR><LF>
Query USB Output	User/Admin	**User:** OUTPUT<space>-?<space><input> **Input:** A B C D **Response:** SWITCH-I<Input>O<output>,<output>	**Command:** OUTPUT -? B<CR><LF> **Response:** SWITCH-IBO4,2<CR><LF>

DESCRIPTION	ACCOUNT LEVEL	COMMAND	EXAMPLES
Auto Switching State	Admin	SETAUTOSWITCH<space><state> States: 1 to enable 0 to disable Response: SETAUTOSWITCH-<state>	Command: SETAUTOSWITCH 1<CR><LF> Response: SETAUTOSWITCH-1<CR><LF>
QUERY Auto Switch	User/Admin	GETAUTOSWITCH<space>-? Response: GETAUTOSWITCH-<state> States: 1 to enabled 0 to disabled	Command: GETAUTOSWITCH -?<CR><LF> Response: GETAUTOSWITCH-1<CR><LF>
LOCK GUI	Admin	GUILOCK<space><state> States: 1 to enabled 0 to disabled	Command: GUILOCK 1<CR><LF> Response: GUILOCK-1<CR><LF>
QUERY GUI LOCK	Admin	UILOCK<space>-? Response: GUILOCK-<state> States: 1 to enabled 0 to disabled	Command: GUILOCK -?<CR><LF> Response: GUILOCK -1<CR><LF>
Set RS232 Baud Rate	Admin	BAUD<space><SPEED> Acceptable Values: 115200, 57600, 38400, 19200, 9600, 4800, 2400 Response: BAUD-<SPEED>	Command: BAUD 115200 <CR><LF> Response: BAUD-115200<CR><LF>
Query Firmware Version	User/Admin	FWVERSION<space>-? Response: FWVERSION-<version>	Command: FWVERSION -?<CR><LF> Response: FWVERSION-1.0.0<CR><LF>

DESCRIPTION	ACCOUNT LEVEL	COMMAND	EXAMPLES
System Reboot	Admin	REBOOT **Response:** Rebooting system...	**Command:** REBOOT<CR><LF> **Response:** Rebooting system...<CR><LF>
Reset System to Factory Defaults **Causes immediate reboot after prompt!**	Admin	**USER:** FACTORYRESET<CR><LF> **Response:** RESET TO FACTORY DEFAULT Y/N? <CR><LF> **USER:** Y<CR><LF>	**Command:** **FACTORYRESET<CR><LF>** **Response:** RESET TO FACTORY DEFAULT Y/N? <CR><LF> **Command:** Y<CR><LF>
Get USB Device Speed	User/Admin	GETUSBSPEED<space><PORT><CR><LF> GETUSBSPEED<space><PORT><CR><LF> GETUSBSPEED<space><PORT><CR><LF> Port: Device 1: 1 Device 2: 2 Device 3: 3 Device 4: 4 Response Examples: No connection: Device <PORT> – Not Connected USB version 2: Device <PORT> – High speed (version: USB 2) USB version 3: Device <PORT> – Super speed (version: USB 3)	**Command:** GETUSBSPEED 2<CR><LF> **Response:** Device 2 – High speed (version: USB 2) <CR><LF>

DESCRIPTION	ACCOUNT LEVEL	COMMAND	EXAMPLES
SET-IP Enter a Host name, and TYPE (DHCP or STATIC)	Admin	SET-IP<space> <HOSTNAME><space> <IP-TYPE><CR><LF> **Response:** Static Network Configuration applied. IP Address: <IP address> Subnet Mask: <Subnet mask> Gateway Address: <Gateway address><CR><LF> IP TYPE = S for Static D for DHCP	**USER Example:** SETIP MLK-INSTRUCTOR S<CR><LF> **Response (if S):** (if No Static IP set) No static IP set. Use SETSTATICIP command to configure IP address. (if No Subnet set) No Subnet Mask set. Use SETSUBNET command to configure Subnet mask. (if No Gateway address set) No Gateway address set. Use SETGATEWAY command to configure Gateway address. (If all addresses are set) Static Network Configuration applied. IP Address: <IP address> Subnet Mask: <Subnet masks> Gateway Address <Gateway address<CR<<LF> **Response (if D):** DHCP Network Configuration applied. <CR><LF>

DESCRIPTION	ACCOUNT LEVEL	COMMAND	EXAMPLES
GET IP	Admin	GETIP **Response:** IP:<IP Address><CR><LF> SUBNET:<Subnet Mask><CR><LF> GATEWAY: <Gateway><CR><LF>	**Command:** GETIP<CR><LF> **Response:** IP: <IP address> SUBNET: <Subnet> GATEWAY: <Gateway Address>
SET STATIC IP	Admin	SETSTATICIP<space><value><CR><LF> **Response:** IP<space>Address<space>set<space>to<space><value>"Use the Command SETIP to apply configuration."<CR><LF>	**Command:** SETSTATICIP 192.168.0.254<CR><LF> **Response:** IP Address set to 192.168.0.254. Use the Command SETIP to apply configuration. <CR><LF>
SET GATEWAY	Admin	SETGATEAWAY<space><value><CR><LF> **Response:** GATEWAY<space>Address<space>set<space>to<space><value>"Use the Command SETIP to apply configuration." <CR><LF>	**Command:** SETGATEWAY 192.168.0.1<CR><LF> **Response:** Gateway Address set to 192.168.0.1. Use the Command SETIP to apply configuration. <CR><LF>
SET SUBNET	Admin	SETSUBNET<space><value><CR><LF> **Response:** Subnet<space>Mask<space>set<space>to<space><value>"Use the Command SETIP to apply configuration." <CR><LF>	**Command:** SETSUBNET 255.255.255.0<CR><LF> **Response:** Subnet mask set to 255.255.255.0 Use the Command SETIP to apply configuration. <CR><LF>

DESCRIPTION	ACCOUNT LEVEL	COMMAND	EXAMPLES
SET RS232 Control – Cannot be performed through RS232 Interface	Admin	SETCONTOL<space>SERIAL<space><STATE> **States:** 1 = RS232 Control on 0 = RS232 Control off R**esponse:** SETCONTROL-SERIAL-<state>	**Command:** SETCONTROL SERIAL 1<CR><LF> **Response:** SETCONTROL-SERIAL-1<CR><LF>
SET NETWORK Control – Cannot be performed through network API	Admin	SETCONTOL<space>IP<space><STATE> **States:** 1 = RS232 Control on 0 = RS232 Control off R**esponse:** SETCONTROL-IP<state>	C**ommand:** SETCONTRO SERIAL 1<CR><LF> **Response:** SETCONTROL-IP-1<CR><LF>
Query Control	Admin	CONTROL<space>-? R**esponse:** CONTROL-SERIAL-1 CONTROL-IP-1 **Control:** Serial – RS232 IP – Network **State:** 1 – Control On 0 – Control Off	**Command:** CONTROL -?<CR><LF> **Response:** Response: (if Serial Control is enabled, no display if disabled) CONTROL-SERIAL-1 (if Network Control (SSH) is enabled, no display if disabled) CONTROL-IP-1
RESPONSE	User/Admin	Automatic Response to attempt to control switcher via RS232 or API when GUI active	NAK<CR><LF>

DESCRIPTION	ACCOUNT LEVEL	COMMAND	EXAMPLES
SET SSH Control- Cannot be performed through SSH Interface	Admin	SETCONTROL<space>SSH <space> <STATE> States: 1 = SSH Control on 0 = SSH Control off **NOTE:** Enabling SSH will disable Telnet and close any active telnet sessions! **Response:** SETCONTROL-SSH-<state>	**Command:** SETCONTROL SSH 1<CR><LF> **Response:** SETCONTROL-SSH-1<CR><LF>
Help	User/Admin	HELP	**Command:** HELP<CR><LF> **Response:** List of commands and syntax (similar to other terminal help commands)

ADMINISTRATOR and USER ID and Password

User ID:

User ID is up to 16 characters long, no character exemptions allowing for all symbols, numbers, and characters.

There is no security enforcement (e.g. no requirement for minimum # characters, must have symbols etc.).
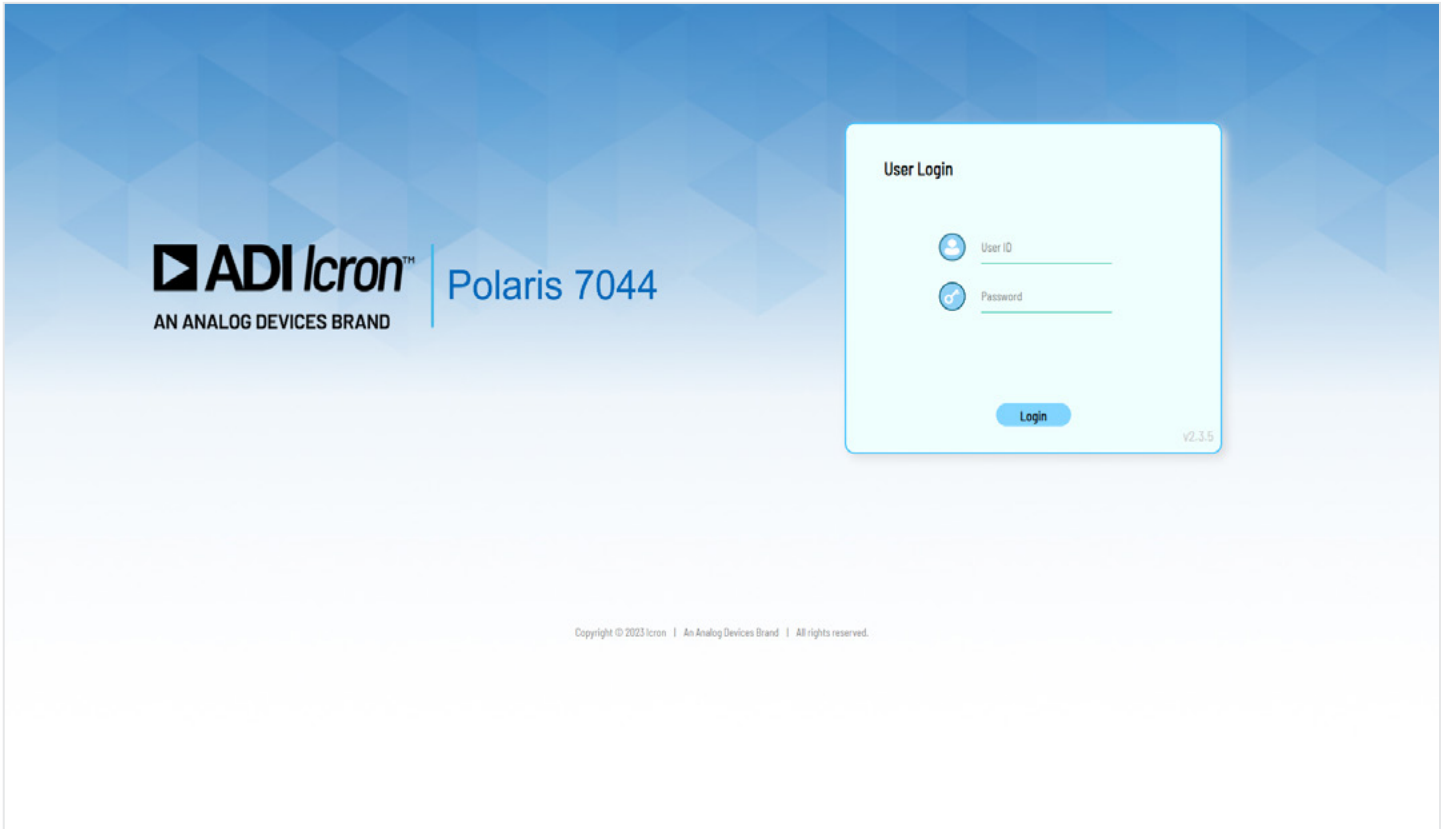
Password:

Password is up to 16 characters long, no character exemptions allowing for all symbols, numbers, and characters.

Webpage

The web page can be accessed by entering the IP address (192.168.0.254) in a browser's search function. If successful the user will be presented with the login screen.

Login Screen:

The Login screen displayed at access requests prompts for a password and has the option to save password. After entering the password, you can click the return key or simply press the Login Button to proceed to the next page.

Users can attempt to enter a user ID and password 5 times before the system locks out for 5 minutes (regardless of new access or page refresh) and no password attempts can be entered during that time. The following text will display in red type at the top of the page.

"Incorrect User ID or Password entered too many times. Please wait 5 minutes and try again. If you have forgotten the credentials, please factory reset the device."

USB Switching Tab

This tab encompasses the main functionality of the product. The user can direct which upstream port (labelled A, B, C, D) connects to which downstream port (labelled 1,2,3,4). Active connections are with the appropriate color. Inactive connections are either blank or grayed out. It is also enough to use standard radio buttons for this selection.

Routings corresponds to front faceplate LED color, BLUE for A, AMBER for B, and GREEN for C, RED for D.

Users can click unselected, buttons to form new connections. If a downstream port is already connected to an upstream port, then the previous connection is broken in favor of the new connection. As an example, if the user selects "A2" then "C2" is unselected. Users can click the highlighted active button to break a connection.

Hosts with no active connection (no USB VBUS detected) will display text "Disconnected", "N/C" or "Not Connected" but remain functional in the UI; user can change settings regardless of the connectivity state.

To push changes, press the "**Apply**" button.

USB Info

There is a status row at the top of the page detailing the device connection status for devices connected to downstream ports 1, 2, 3 and 4. Device status is updated periodically or when the page is refreshed.
The status can be any of the following:

DISPLAYED STATUS	DEFINITION
NC	No Device Connected
3	USB 3 Device Connected
3, 2	USB 3 and 2 Device Connected
2	USB 2 Device Connected

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USB Auto Switching Tab

Auto Switch Setup
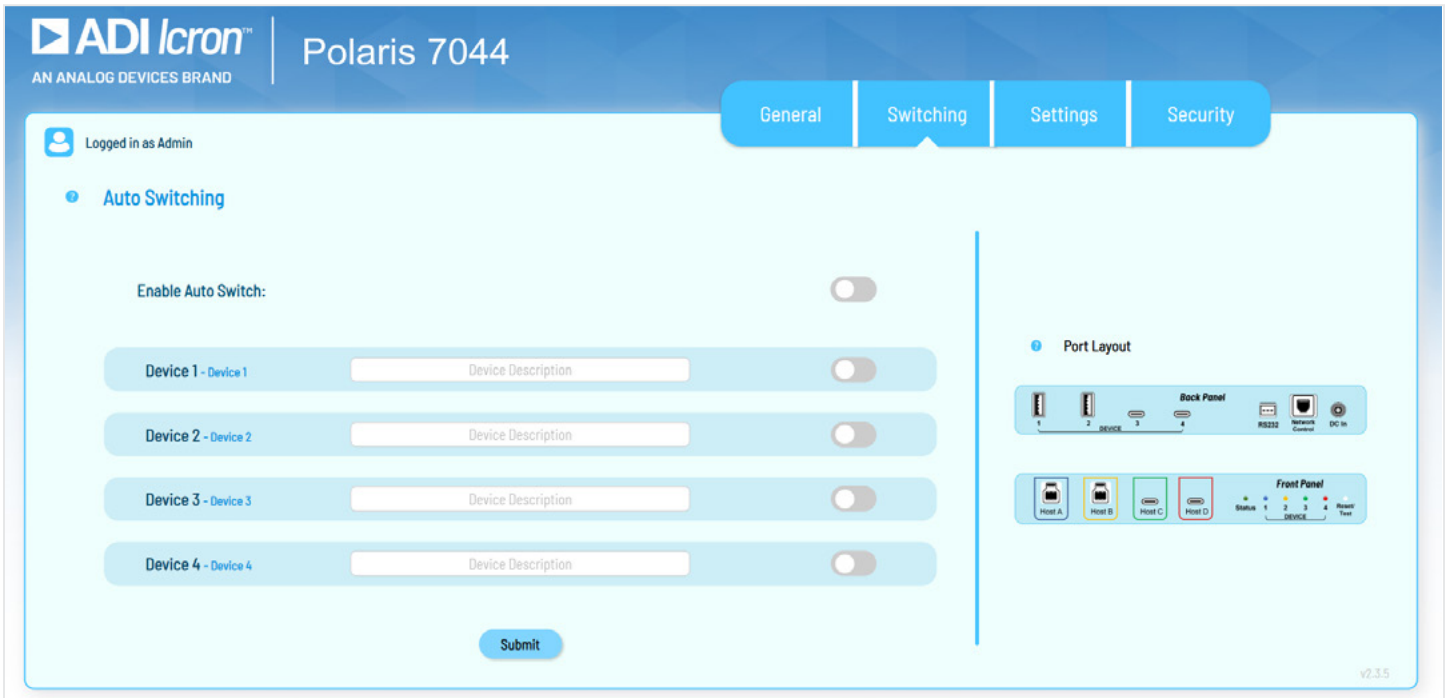
This tab specifies which downstream ports should auto switch to the most recent connection if the setting is enabled. At the top of the tab's context, a check box is used to enable/disable this feature. Below the check box, buttons are used to select downstream ports which should auto switch. Selected ports are highlighted. To apply changes to Polaris, press the "Submit" button.

Settings Tab

In the Settings tab, Administrators can:

▶ Lock out the GUI
  » This disables the functionality of the webpage
▶ Lock out the hardware "HW Lockout" preventing the Reset/Test button from functioning
▶ Set the RS232 baud rate
▶ Configure the network settings
  » Change from Static Network address Acquisition to DHCP
  » Configure the static IP
    - IP Address, Subnet Mask, and Gateway
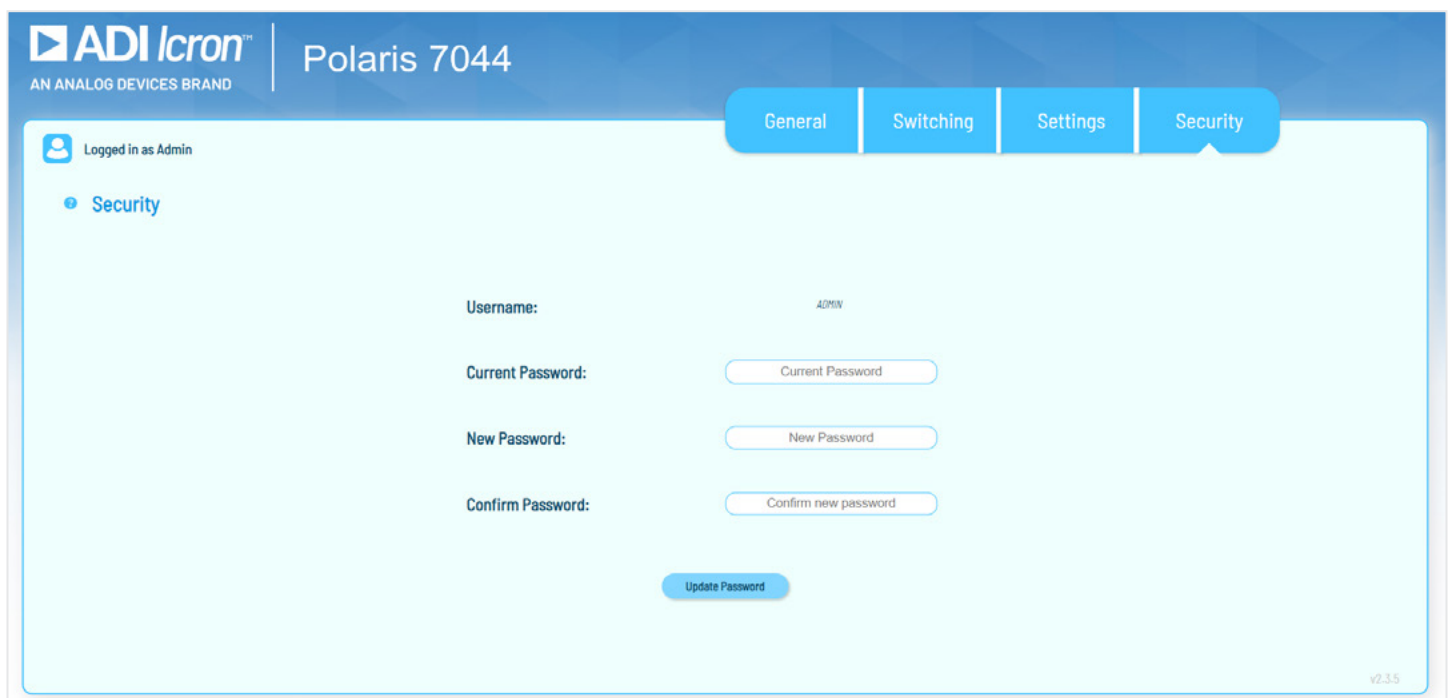▶ Name the Device and host Ports for tracking purposes.

Clicking "Apply" will push the changes to Polaris.

Firmware Update

There is an Update Firmware button which allows the administrator to update product firmware. The file for firmware updates is chosen via a separate button and dialog box. The user must confirm to update the firmware after the appropriate file is selected. Once started a new page will load telling the user to wait for the update to complete (two minutes) and then refresh the page.

If the update fails, the user will be notified with a dialog box stating, "Update Failed, Please Try Again".

If the update succeeds, the user will be notified with a new dialog box stating: "Update Successful".

Security Tab

The security tab is used to manage the ADMIN and USER account access including changing the current logged in user.

There is a "Change Password" field for the current user where the user can enter a new password after confirming the previous. A button is then pressed to set the new password.

Password can be set up to 16 characters long, no character exemptions allowing for all symbols, numbers, and characters.

There is no security enforcement (e.g. no requirement for minimum number of characters, must have symbols etc.).

Troubleshooting

If you are unable to resolve any issues, please contact Technical Support by visiting **icron.com/support**.

Specifications

Host Upstream Ports	2 x USB B Ports, 2 x USB-C Ports
Device Downstream Ports	2 x USB A Ports, 2 x USB-C Ports
Traffic Types	Supports all USB Traffic Types
Device Types	Supports all USB Device Types
Available Power	15W per USB-C Port, 6W per USB-A Port
Hub Tiers Used	1
Network	100BASE-T
Control	1 x RJ45, 1 x 3-Pin RS232
Power Supply	100-240V AC Input, 24V 2.71A DC Output
Enclosure Material	Black Anodized Aluminum
Dimensions (W x D x H)	212.5mm x 125mm x 30mm (8.37" x 4.92" x 1.18")
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-20°C to 70°C (-4°F to 158°F)
Operating Humidity	20% to 80% relative humidity, non-condensing
Storage Humidity	10% to 90% relative humidity, non-condensing
Certifications	FCC (Class A), CE (Class A), RoHS2/3 (CE), ICES-003 Issue 7, IEC 62368-1 4th ed.
Warranty	2-year

Contacting Technical Support or Sales

For technical support, visit **icron.com/support**. Please include the following information when reaching out for technical support:

- ▶ Description of the problem
- ▶ Part number and serial number
- ▶ Host computer(s) make and model
- ▶ Type of Operating System installed (e.g. Windows 10, macOS 11.1, etc.)
- ▶ Make and model of any USB device(s) attached to your application
- ▶ Description of the installation and relevant information about the USB device(s)

Product Return Shipping Instructions:

Package your product appropriately for safe shipment and mark the RMA number on the outside of the package. The package must be sent prepaid to Icron to the address listed below. We recommend that you insure your shipment or ensure your shipping method provides package tracking. The repaired or replaced item will be shipped to you, at Icron's expense, not later than thirty days after Icron receives the defective product.

Address the returned product to:

RMA Coordinator
Icron Technologies Corporation
4664 Lougheed Highway, Suite 221
Burnaby, BC Canada
V5C 5T5

For general inquiries or sales, visit **icron.com/contact**.

Technical Glossary

USB 3 and USB 2.0 Cables
USB cables have two distinct full-sized connectors. The Type A connector is used to connect the cable from a USB device to the Type A port on a computer or hub. The Type B connector is used to attach the USB cable to a USB device.

USB-C Cable
The Type-C connector is used to connect to both USB hosts and devices.

| USB Type A port | USB Type A connector | USB 3 Type A connector | USB Type B port | USB Type B connector | USB 3 Type B port | USB 3 Type B connector | USB Type C port | USB Type C connector |