DA-720 Series Windows Software User Manual

Version 3.0, December 2022

www.moxa.com/products



DA-720 Series Windows Software User Manual

The software described in this manual is furnished under a license agreement and may be used only in accordance with the terms of that agreement.

Copyright Notice

© 2022 Moxa Inc. All rights reserved.

Trademarks

The MOXA logo is a registered trademark of Moxa Inc. All other trademarks or registered marks in this manual belong to their respective manufacturers.

Disclaimer

- Information in this document is subject to change without notice and does not represent a commitment on the part of Moxa.
- Moxa provides this document as is, without warranty of any kind, either expressed or implied, including, but not limited to, its particular purpose. Moxa reserves the right to make improvements and/or changes to this manual, or to the products and/or the programs described in this manual, at any time.
- Information provided in this manual is intended to be accurate and reliable. However, Moxa assumes no
 responsibility for its use, or for any infringements on the rights of third parties that may result from its
 use.
- This product might include unintentional technical or typographical errors. Changes are periodically
 made to the information herein to correct such errors, and these changes are incorporated into new
 editions of the publication.

Technical Support Contact Information

www.moxa.com/support

Table of Contents

1.	Introduction	4
	Software Components	4
2.	System Initialization	6
	Overview	6
	Initializing User Settings	6
3.	Configuring the Serial Interface	8
	Overview	
	Configuring Serial Interface Mode	
4.	Enabling Embedded Filters	
	Unified Write Filter	
	Overview	10
	Configuring File-Based Write Filter	
5.	Examples	14
	Watchdog Function	
	Enabling the Watchdog Function	14
	LED Indicators	
	Displaying and Managing the LED On/Off Status	15
	Serial Interface	16
	Displaying and Controlling the UART Mode	16
	Relay Output	17
	Displaying the Relay Status and Changing the Status to High or Low	17
6.	System Recovery	18
	Recovery Environment	18
	Recovery Procedure	18
	Saving the System Image to the USB Drive	26
7.	DE-PRP-HSR-EF Expansion Module	
	Overview	29
	Installing the DE-PRP-HSR-EF Utility	29
	Configuring the Operation Mode	35
	Redefining DE-PRP-HSR-EF Ethernet Information	37
	PRP/HSR Supervision Frame	39
8.	DE-2-IRIGB-4-DIDO Expansion Module	42
	Overview	42
	Software Installation and Configuration	42
	System Requirements	42
	Installing the IRIG-B Driver	43
	Installing the IRIG-B Utility	45
	Using the IRIG-B Utility	47
	Using the mxIrigUtil Command	60

Thank you for buying Moxa's DA-720 panel computer. This model of the DA-720 comes with the Windows 10 Enterprise LTSB 2016 software platform, which provides a simple and familiar development environment for your various industrial applications needs.

Software Components

The Windows 10 Enterprise LTSB preinstalled on the DA-720 computer consists of the following:

Windows 10 Enterprise LTSB (by CTOS)

Core OS:

- 64-bit support
- Remote Client
- Remote Procedure Call

Applications and Services Development:

- .Net Framework 4.6
- Remote Desktop Protocol 10
- COM OLE Application Support
- COM+ Application Support
- MSMQ (message queuing)
- Work Folders Client

Internet Services:

- Internet Explorer 11
- IIS 10

File Systems and Data Storage:

- Windows Data Access Components
- Windows Backup and Restore

Diagnostics:

- Common Diagnostic Tools
- Problem Reports and Solutions

Graphic and Multimedia Tools:

- MPEG DTV-DVD Audio Decoder (MPEG-2, AAC)
- MPEG Layer-3 Audio Codecs (MP3)
- MPEG4 Decoders
- Windows Media Video VC-1 (WMV) Codecs
- DirectX and Windows Device Experience
- Create and play DVDs
- Photo Viewer
- Remote media streaming
- Windows Media Player
- Windows Mail
- Microsoft Print to PDF
- Internet Printing Client

- Windows Fax and Scan
- XPS Viewer
- XPS Services

Management:

- Group Policy Management
- Windows Management Instrument (WMI)
- Windows Update

Networking:

- Extensible Authentication Protocol (EAP)
- Internet Authentication Service
- Telnet Server
- Bluetooth
- Domain Services
- Network Access Protection
- Network and Sharing Center
- Quality of Service
- Remote Access Service (RAS)
- Telephony API Client
- Windows Firewall
- Wireless Networking

Security:

- Credential Roaming Service
- Credentials and Certificate Management
- Windows Authorization Manager (AzMan)
- Windows Security Center
- Active Directory Rights Management
- Security Base
- Encrypted File System (EFS)
- MS Antimalware
- Windows Defender

Embedded Features:

- Unified Write Filter (UWF)
- Message Box Default Reply
- Registry Filter
- The Microsoft Web Services on Devices API (WSDAPI) for .NET

Embedded Self-Health Diagnostics: SNMP-based remote scripting layer for monitoring, reporting, and control

This chapter covers the initial system settings on the DA-720 computer after you boot up the computer for the first time.

Overview

Like most laptop computers, you must first create a user account and configure the user account settings.

Initializing User Settings

- 1. When you boot the embedded computer for the first time, you will be asked the following four questions:
 - a. What's your home country/region?
 - b. What's your preferred app language?
 - c. What keyboard layout would you like to use?
 - d. What time zone are you in?

Choose your answers and click **Next**.

2. Click Use Express settings.

6	
Get going fast	
Change these at any time. Select Use Express settings to:	
Personalize your speech, typing, and inking input by sending contacts and calendar details, along	
with other associated input data to Microsoft. Let Microsoft use that info to improve the suggestion	
and recognition platforms.	
Let Windows and apps request your location, including location history, and use your advertising ID	
to personalize your experiences. Send Microsoft and trusted partners some location data to improve location services.	
location services.	
Help protect you from malicious web content and use page prediction to improve reading, speed up	
browsing, and make your overall experience better in Windows browsers. Your browsing data will be sent to Microsoft.	
Automatically connect to suggested open hotspots and shared networks. Not all networks are	
secure.	
Send error and diagnostic information to Microsoft.	
	Lico Exprost sott
с. С	Use Express sett

3. Enter the **username**, **password**, and **password hint**, and click **Next** to create a user account on the computer.

Create an acco	ount for ·	his PC			
If you want to use a password, c others to guess.	hoose something	that will be easy fo	r you to remember t	out hard for	
Who's going to use this PC?					
User name					
Make it secure.					
Enter password					
Re-enter password					
Password hint					

4. You can start using the DA-720 embedded computer once the user account is created.

Recycle Bin	
Intel® HD Graphics C	
ニ タ ロ	~ ₩ 4 <mark>8.844 PM</mark>

3. Configuring the Serial Interface

This chapter describes how to configure the serial interface on the DA-720 computer.

Overview

The DA-720 supports three serial modes: **RS232**, **RS485-2-wire**, and **RS422/RS485-4-wire**. These modes can be configured either on the COM1 or COM2 port.

Configuring Serial Interface Mode

To change the serial interface mode settings, do the following:

1. In the Start menu select **All apps > Moxa > mxSetSerialInterface**.

≡	Most used
	Snipping Tool
	🔿 Paint
	Intel® HD Graphics Control Panel
	М
	Моха ^
	mxSetSerialInterface
	S
	Search
	🗱 Settings
	w
	Windows Accessories ~
R	Windows Administrative Tools 🗸 🗸
	Windows Ease of Access ~
ŝ	Windows PowerShell V
Ф	Windows System 🗸 🗸 🗸 🗸 🗸 🗸
-	р _П

2. Select a **Port** for the serial interface.

🖳 Set Ser	ial I	—		×
Port:	COM1		~	
Mode:	COM1 COM2			
0	к		Cancel	

3. Select the specific **Mode** for the serial interface.

🖳 Set Ser	ial I —		×
Port:	COM1	~]
Mode:	RS232	~	
0	RS485 2 wi RS422 / RS RS232	res 6485 4 wires	h -

4. Click **OK**.

This chapter describes how to operate the embedded features on the DA-720 computer.

Unified Write Filter

Overview

What is UWF?

The Unified Write Filter (UWF) is a feature to protect physical storage media from data writes. UWF intercepts all write attempts to a protected volume and redirects those write attempts to a virtual overlay. This improves the reliability and stability of your device and reduces the wear on write-sensitive media, such as flash memory media like solid-state drives.

About UWF Overlay

UWF intercepts all modifications to any sector on a protected volume. A sector is the smallest unit that can be changed on a storage volume. Any time the file system attempts to modify a protected sector, UWF instead copies the sector from the protected volume to the overlay, and then modifies the overlay instead. If an application attempts to read from that sector, UWF returns the data from the overlay instead, so that the system maintains the appearance of having written to the volume, while the volume remains unchanged.

Source: www.microsoft.com

Configuring File-Based Write Filter

1. Enabling or Disabling the UWF Function

To enable the UWF function, do the following:

1. Select Control Panel in the Windows Start menu.



- 2. In the left panel, click Programs.
- 3. Click on the **Turn Windows features on or off** link under **Programs and Features**, select **Unified Write Filter** from the list, and click **OK**.

Control Panel Home	Programs and Features			
System and Security	Uninstall a program STURN Windows fe Run programs r Kundows Features		×	
Network and Internet Hardware and Sound	Default Proc			
Programs User Accounts	Set your default To turn a feature on, selec	t its check box. To turn a feature off, clear its cans that only part of the feature is turned on.	gram	
Appearance and Personalization Clock, Language, and Region Ease of Access	G Simple Network Simple TCPIP a Simple TCPIP a Model to JOCIES F Tehnet Client TFPP Client Unindew Ident Windows Ident Windows Powe	c Management Protocol (SNMP) ervices (c.e. echo, daytime etc) lie Sharing Support Ty Foundation 3.5 rShell 2.0 3: Activation Service Filter	~	
		OK Cancel		

4. Click **Restart now** to apply the changes.

F

	>	<
~	📷 Windows Features	
	NR I I I I I I I I I	
	Windows completed the requested changes.	
	Windows needs to reboot your PC to finish installing the requested changes.	
	Restart now Don't restart	

2. Configuring the UWF Overlay Settings

To configure the UWF overlay settings, do the following:

1. Type **cmd** in the Windows Start menu field and press Enter to open a terminal.

	Best m	natch					
ŵ	C:N_	Comm Deskto		rompt			
ŝ		ŝ	ß			1	
	cmd						
-	Q	[]]					

- Run the following command to protect the computer volume C: uwfmgr volume protect C:
- 3. Run the following command to enable UWF protection:

uwfmgr filter enable



 Run the following command to exclude files in the C:\Program Files folder from UWF protection: uwfmgr file Add-Exclusion C:\Program Files



5. Exit from the terminal and restart your computer for the changes to take effect.

```
Administrator: C:\Windows\System32\cmd.exe
                                                                                                                                                                      - 0
                                                                                                                                                                                     ×
licrosoft Windows [Version 10.0.10240]
c) 2015 Microsoft Corporation. All rights reserved.
C:\Windows\system∃2>uwfmgr get-config
Jnified ₩rite Filter Configuration Utility version 10.0.10240
Copyright (C) Microsoft Corporation. All rights reserved.
 urrent Session Settings
 ILTER SETTINGS
     Filter state: ON
Pending commit: N/A
     Shutdown pending:No
SERVICING SETTINGS
Servicing State: OFF
 VERLAY SETTINGS
     Type: RAM
Maximum size: 1024 MB
Warning Threshold: 512 MB
Critical Threshold: 1024 MB
/OLUME SETTINGS
/olume 469e8113-0000-0000-0000-501f00000000 [C:]
     Volume state: Protected
Volume ID: 469e8113-0000-0000-0000-501f00000000
     File Exclusions:
   rrent Session Exclusions for Volume 469e8113-0000-0000-0000-501f00000000 [C:]
C:\Program Files
REGISTRY EXCLUSIONS
*** No exclusions
 ext Session Settings
     Filter state:
     Pending commit: N/A
ERVICING SETTINGS
Servicing State: OFF
VERLAY SETTINGS
                                    RAM
      Type:
     Maximum size: 1024 MB
Warning Threshold: 512 MB
Critical Threshold: 1024 MB
```

After restarting your computer, you can check the UWF status by running the uwfmgr get-config command in a terminal.

To test the UWF protection:

- 1. After you enable UWF protection, create files both in the C:\Program Files and the C:\ folders.
- 2. Restart the computer.

Only the file that you created in the C:\Program Files should exist. The file that you created in the C:\ folder is erased.

To disable the UWF protection, open a terminal and run the uwfmgr filter disable command.

This chapter describes how to use the DA-720 functions with examples.

Watchdog Function

An executable file, **watchdog.exe** that enables the watchdog function, is provided in the software DVD that ships with the computer.

Enabling the Watchdog Function

To enable the watchdog function on your computer using the **watchdog.exe** file, do the following:

- Create c:\programs\example folder and copy the following files into the folder: mxdwg.dll: <Software DVD>\examples\DA720-W10-example\3.lib\mxwdg mxGeneralIo.dll: <Software DVD>\examples\DA720-W10-example\3.lib\MxGeneralIo Watchdog.exe: <Software DVD>\examples\DA720-W10-example\Release\x64\
- 2. Run Watchdog.exe.

You must press **Enter** every 10 seconds to prevent the system from restarting. If you want to stop the watchdog function and exit the program, type \mathbf{q} .

Administrator: C:\Windows\system32\cmd.exe	J
C:\programs\example>watchdog Press "ENTER" in 10 seconds , 'q' to exit Press "ENTER" in 10 seconds , 'q' to exit in 10 seconds	
, 'q' to exit Press "ENTER" in 10 seconds , 'q' to exitq	
C:\programs\example>_	
-	

LED Indicators

An executable file, **LED.exe** that displays and controls the status of the LEDs, is provided in the software DVD that ships with the computer.

Displaying and Managing the LED On/Off Status

To display the status of the LEDs and to switch the LEDs on or off, do the following:

- Copy the following files from the product software DVD: mxgpio.dll: <Software DVD>\examples\DA720-W10-example\3.lib\mxgpio\x64 mxGeneralIo.dll: <Software DVD>\examples\DA720-W10-example\3.lib\MxGeneralIo LED.exe: <Software DVD>\examples\DA720-W10-example\Release\x64\
- 2. Run LED.exe.

C:\Users\moxa.MOXA-LT1NMIF0NH\Desktop\1.LED\x64\LED\x64	1000	×
LED Test Program		-
(0) Exit Program		
(1) Display LED		
(2) Set LED value		

3. Select **1** to get the value of the current LED.

NOTE

The LED port numbers 0 to 5 are used to represent the LEDs 1 to 6 on the computer's front panel.

C:\Users\moxa.MOXA-LT1NMIF0NH\Desktop\1.LED\x64\LED.exe		×
LED Test Program		^
(0) Exit Program		
(1) Display LED		
(2) Set LED value		
LED0 = Off		
LED1 = Off		
LED2 = Off		
LED3 = Off		
LED4 = Off		
LED5 = Off		
LED Test Program		
(0) Exit Program		
(1) Display LED		
(2) Set LED value		

4. Select **2** to change the status (On, Off) of the current LED.



Serial Interface

An executable file, **UartMode.exe** that displays the status and controls the UART mode of the computer is provided in the software DVD that ships with the computer.

Displaying and Controlling the UART Mode

To display the status of the UART interface and to set the UART mode, do the following:

- Copy the following files from the product software DVD: mxsp.dll, SysInfo.dll, SysInfo.sys, SysInfoX64.sys: <Software DVD>\examples\DA720-W10-example\3.lib\mxsp\x64 mxGeneralIo.dll: <Software DVD>\examples\DA720-W10-example\3.lib\MxGeneralIo UartMode.exe: <Software DVD>\examples\DA720-W10-example\Release\x64\
- 2. Run UartMode.exe.



3. Type **2** to set the serial interface and follow the onscreen instructions.



4. Type **1** to display the current serial interface settings.



Relay Output

An executable file, **Relay.exe** that displays the relay status and helps you change its status is provided in the software DVD that ships with the computer.

Displaying the Relay Status and Changing the Status to High or Low

To display the relay status and to set the status to high or low, do the following:

- Copy the following files from the product software DVD: mxgpio.dll: <Software DVD>\examples\DA720-W10-example\3.lib\mxgpio\x64 mxGeneralIo.dll: <Software DVD>\examples\DA720-W10-example\3.lib\MxGeneralIo Relay.exe: <Software DVD>\examples\DA720-W10-example\Release\x64\
- 2. Run Relay.exe.



3. Type 2 to set the serial interface and follow the onscreen instructions.



4. Type **1** to display the current serial interface settings.



This chapter describes the Windows 10 Enterprise LTSB platform recovery process in the event of system instability.

Recovery Environment

The recovery environment consists of the DA-720 panel computer and a bootable USB disk that contains the recovery programs and system image file.

The hardware used includes a PC, a DA-720 computer, and a USB disk with the recovery programs.



NOTE

The USB disk should have at least 8 GB of free space.



Recovery Procedure

Step 1: Prepare your USB drive

1. Run the **tuxboot-windows-23.exe** program from the *<Software DVD>\recovery* folder, select the **Pre Downloaded** option, and then click on the ... button as shown below:



2. Browse to and select the CloneZilla ISO file from the *<Software DVD>*\recovery folder.



3. Select the **USB Drive** type and the **Drive**, and then click **OK** to continue.

Tuxboot	
On-Line Distribution donezilla_live_stable	▼ Update
Clonezilla	
Homepage: http://clonezilla.org/ Description: CloneZilla live is a distribution used for disk backup and imaging. The stable brand-	of Clopezilla live
are based on Debian	of clonezilla live
Install Notes: CloneZilla live is booted and run in live mode; no installation is required to use it. Download Path: Clonezilla Live Stable at SourceForge	
Download Path: <u>Cionezilia Live Stable at Sourcerorge</u>	
Pre Downloaded ISO ISO	iso
Show All Drives (Use with Care) Save ISO file 🛛 MD5 Check	
Type: USB Drive Drive: D:\ OK	Cancel

The boot files will be copied to your USB drive.

I' Tuxboot		x
1. Downloading Files (Done)		
3 Submetine and Convine Siles (Convert)		
2. Extracting and Copying Files (Current)		
3. Installing Bootloader		
4. Installation Complete, Reboot		
Extracting files, please wait		
Archive: D:\EXPC-1319-STS-W7E\ClonezillaFactory_2013-02-21-14\clonezilla-live-2.0.1-15-i68	6-pae-moxa-2	2.0.0
Source: EFI_disable \boot\unicode.pf2 (2500 KB)		
Destination: D: \EFI_disable \boot\unicode.pf2		
Extracted: 7 of 42 files		
	1/	6%

4. Once the boot files are copied, click **Exit** to stop the program.



 Manually copy the os_image directory from the <Software DVD>\recovery folder to the \home\partimag\ folder on the USB drive.

Step 2: Change the BIOS Settings

You will need to change the BIOS settings of your computer to enable it to boot from the USB disk.

- 1. Turn on the computer and press **F2** till you hear a beep and the BIOS setup menu is displayed.
- 2. Select the **Boot** tab and then select **Legacy**. Press **Enter** to continue.

	InsydeH2O Setup Utility	Rev. 3.5
Main Advanced Security	Power Boot Exit	
		Enable/Disable UEFI Boot
UEFI Boot	<enabled></enabled>	Function
Quick Boot	<enabled></enabled>	
PXE Boot to LAN	<disabled></disabled>	
USB Boot	<enabled></enabled>	
) EFI		
▶Legacy		
F1 Help 14 Select Item	n F5/F6 Change Values	F9 Setup Defaults
Esc Exit ↔ Select Menu		

3. Select Boot Type Order.

	InsydeH20 Setup Utility Boot	Rev. 3.5
Boot Device Priority		Select Normal Boot Option Priority or
Normal Boot Menu	<normal></normal>	Advance Boot Option Priority
▶Boot Type Order ▶Hard Disk Drive ▶USB		
Fl Help 1∔Selectl Esc Exit ↔SelectMe	tem F5/F6 Change Values enu Enter Select⊩SubMenu	F9 Setup Defaults F10 Save and Exit

4. Select the USB disk and then press "+" to move it to the first boot device position.

WARNING

 \wedge

An incorrect boot priority will lead to recovery failure.

	InsydeH2O Setup Utility Boot	Rev. 3.5
Boot Type Order		
USB CD/DVD-ROM Drive Hard Disk Drive Others		
F1 Help 1↓Selectite Esc Exit ↔SelectMer	—	F9 Setup Defaults F10 Save and Exit

5. Press **F10** and then press **Enter** to save and exit the BIOS setup.

Step 3: Restore the system from USB drive

Connect the USB disk to any of the DA-720's USB ports and then reboot the computer. The system will boot from the USB disk and the **System Save & Restore** utility is displayed.

1. In the utility window, select the **clonezilla live restore disk** option.

clomezilla live restore disk clomezilla live save disk	

2. Wait for the USB drive boot process to finish.

Command (m for help): The partition table has been altered. Calling ioctl() to re-read partition table. Syncing disks.	
Warning: Unable to open /dev/sr0 read—write (Read—only file system). /dev/sr0 has been opened read only.	-
Warning: Unable to open /dev/sr0 read-write (Read-only file system). /dev/sr0 has been opened read only. Disk /dev/sda: 20 GiB, 21474836480 bytes, 41943040 sectors Units: sectors of 1 * 512 = 512 bytes Sector size (logical/physical): 512 bytes / 512 bytes I/O size (minimum/optimal): 512 bytes / 512 bytes Disklabel type: dos Disk identifier: 0x469e8113	
Device Boot Start End Sectors Size Id Type /dev/sda1 2048 1026047 1024000 500M 7 HPFS/NTFS/exFAT /dev/sda2 1026048 41943039 40916992 19.5G 7 HPFS/NTFS/exFAT	
Disk /dev/sdb: 14.8 GiB, 15846080512 bytes, 30949376 sectors Units: sectors of 1 * 512 = 512 bytes Sector size (logical/physical): 512 bytes / 512 bytes I/O size (minimum/optimal): 512 bytes / 512 bytes Disklabel type: dos Disk identifier: 0x00000000	
Device Boot Start End Sectors Size Id Type /dev/sdb1 * 2048 30949375 30947328 14.8G c W95 FAT32 (LBA)	
Disk /dev/loop0: 208.9 MiB, 218980352 bytes, 427696 sectors Units: sectors of 1 * 512 = 512 bytes Sector size (logical/physical): 512 bytes / 512 bytes I/O size (minimum/optimal): 512 bytes / 512 bytes	

3. Enter **y** to continue the restore process.

Do NOT create partition table on the client harddisk! /usr/share/drbl/sbin/ocs-functions: line 10757: warning: setlocale: LC_ALL: cannot change locale (en
) /usr/share/drbl/sbin/ocs-functions: line 10739: warning: setlocale: LC_ALL: cannot change locale (en
) /usr/share/drbl/sbin/ocs-functions: line 10739: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 10739: warning: setlocale: LC_ALL: cannot change locale (en)
perl: warning: Setting locale failed. perl: warning: Please check that your locale settings: LANGUAGE = (unset), LC_ALL = "en", LANG = "en_US.UTF-8" are supported and installed on your system. perl: warning: Falling back to a fallback locale ("en_US.UTF-8"). Activating the partition info in /proc done!
Getting /dev/sda1 info /usr/share/drbl/sbin/ocs-functions: line 3632: warning: setlocale: LC_ALL: cannot change locale (en) /usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en) Getting /dev/sda2 info /usr/share/drbl/sbin/ocs-functions: line 3632: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en) ************************************
The image was created at: 2016–0907–1744 WARNING!!! WARNING!!! WARNING!!! WARNING. THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL BE LOST:
######################################

4. Enter **y** to confirm again.

```
betting /dev/sda1 info...
/usr/share/drbl/sbin/ocs-functions: line 3632: warning: setlocale: LC_ALL: cannot change locale (en)
Setting /dev/sda2 info...
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
Ausr/share/drbl/sbin/ocs-functions: line 3632: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale (en)
/usr/share/drbl/sbin/ocs-functions: line 3645: warning: setlocale: LC_ALL: cannot change locale
//starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/starkers/sta
```

5. Wait for the process to finish.

Partclone	
Starting to restore image (-) to device (/dev Calculating bitmap Please wait done! File system: NTFS Device size: 524.3 MB = 127999 Blocks Space in use: 335.3 MB = 81864 Blocks Free Space: 189.0 MB = 46135 Blocks Block size: 4096 Byte	//sda1)
Elapsed: 00:00:06 Remaining: 00:00:08 – Rate: Current Block: 79394 – Total Block: 127999	: 1.36GB/min
)ata Block Process:	40.65%
Fotal Block Process:	62.03%

6. Select (0) Poweroff to power off the computer.

nee S	Software Labs, NCHC, Taiwan	
	Now you can choose to:	
	poweroff Poweroff reboot Reboot	
	cmd Enter command line prompt rerun1 Start over (image repository /home/partimag, if mounted, will be umounted) rerun2 Start_over_(keep_image_repository_/home/partimag_mounted)	
	<0k>	

7. Remove the USB drive after the computer has been powered off.

Step 4: Change the BIOS Settings to Boot from the Original Disk

Now you will need to change the boot priority so that the computer can boot from the original disk.

As the system reboots, press F2 to enter the BIOS setup menu.

1. Select **Hard Disk Boot Priority** and then press + to move to the first boot device position, and then press **Enter**. Make sure the hard disk has first boot priority.

	InsydeH2O Setup Utility	Rev. 3.5
	Boot	
Boot Type Order Hard Disk Drive CD/DVD-ROM Drive USB Others		+: Move Up -: Move Down
F1 Help 1↓Selectite Esc Exit ↔SelectMen		F9 Setup Defaults F10 Save and Exit

2. Press F10 and then press Enter to save and exit BIOS settings.

Step 5: Reboot the Computer

You need to wait about 10 to 15 minutes for the system to restart two times automatically, since the system configuration files will be initiated while booting up for the first time. **Do not turn off the computer or shut down the computer** while the system is restarting; otherwise, the IIS service will be terminated. When the operating system has successfully launched, you will need to restart your computer so that the new settings can be activated.

Saving the System Image to the USB Drive

You may also save the current system image to the USB drive for system recovery in case the system crashes. Before saving the system image to the USB drive, we suggest you remove all files under **\home\partimag** on the USB drive. In addition, change the BIOS settings to make the USB drive the first boot priority.

When the system boots up, do the following:

1. Select clonezilla live save disk.

Moxa System Save & Restore Utility (V2.4.0-0)
clonezilla live restore disk
clonezilla live save disk

2. Wait for the USB drive boot process to finish.

[5.141941] sd 0:0:1:0: [sdb] Attached SCSI disk [5.257277] sd 0:0:0:0: Attached scs: generic sg0 type 0 [5.25961] sd 0:0:1:0: Attached scs: generic sg1 type 0 [5.259668] sr 1:0:0:0: Attached scs: generic sg2 type 5 Begin: Loading essential drivers ... [5.772551] Atheros(R) L2 Ethernet Driver - version 2.2.3 [5.774561] Copyright (c) 2007 Atheros Corporation. [5.863196] Broadcom NetXtreme II 5771x 10Gigabit Ethernet Driver bnx2x 1.62.00-6 (2011/01/30) [6.005932] Btrfs Loaded [6.0540951] device-mapper: uevent: version 1.0.3 [6.659737] device-mapper: ioctl: 4.19.1-ioctl (2011-01-07) initialised: dm-devel@redhat.com dome. Begin: Running /scripts/init-premount ... dome. Begin: Running /scripts/init-premount ... dome. Begin: Running /scripts/init-premount ... dome. [6.301809] ide_generic: please use "probe_mask=0x3f" module parameter for probing all legacy ISA IDE ports [6.801141] NTFS driver 2.1.30 [Flags: R/W MODULE]. [6.914295] NTFS volume version 3.1. Begin: Running /scripts/live-premount ... done. [7.331969] AFI: utf0 is not a recommended IO charset for FAT filesystems, filesystem will be cas e sensitive? [7.479098] aufs: module is from the staging directory, the quality is unknown, you have been war med. [7.479098] aufs: version 4.0 (2009/01/31) Phillip Lougher Begin: Running /scripts/live-pealprenount ... done. Begin: Mounting "/live/image/live/filesystem.squashfs" via "/dev/loop0" done. dome. Begin: Running /scripts/live-bottom Begin: Configuring fstab ... done. Begin: Running /scripts/live-bottom Begin: Configuring networking ... done. Begin: Loading presed file ... done. Begin: Running /scripts/live-bottom done. INIT: version 2.88 booting Using makefile-style concurre

3. Enter **y** to continue.



4. Wait for the process to finish.

5. Select **(0) Poweroff** so that the computer will power off when the process is finished.



Overview

The DE-PRP-HSR-EF Ethernet Redundancy expansion module is compliant with the latest standardized redundancy protocols for industrial automation networks, such as IEC 62439-3 Clause 4 (Parallel Redundancy Protocol, PRP) and IEC 62439-3 Clause 5 (High availability Seamless Redundancy, HSR). PRP/HSR ensures high-availability of the system and data integrity for mission- critical applications in electrical substation and/or process automation systems that require zero- recovery-time redundancy. The DE-PRP-HSR-EF comes with two 10/100/1000BaseT(X) and 100/1000BaseSFP slot combo ports for PRP/HSR redundant protocol communications.

Moxa's DA-720 Series industrial computer coupled with the DE-PRP-HSR-EF module is the ideal solution for power substation automation and for deploying in process automation systems.

Installing the DE-PRP-HSR-EF Utility



NOTE

The DE-PRP-HSR-EF utility are supported on Windows 10.

- Connect a monitor, keyboard, and a mouse to the target computer.
 For more information, see the DA-720 Series Embedded Computer Hardware Manual.
- 2. Turn on the computer.
- 3. Download the DE-PRP-HSR-EF driver from Moxa's support website at https://www.moxa.com/en/support to the DA-720 computer.
- 4. Double-click MxPrpHsrSetup-1.2.0.exe to start the installation process.

5. Installation process will show the welcome page. Click **Next**.

ry Setup - MxPrpHsr	- 🗆 X
	Welcome to the MxPrpHsr Setup Wizard
HOW	This will install MxPrpHsr 1.2.0 on your computer. It is recommended that you close all other applications before continuing. Click Next to continue, or Cancel to exit Setup.
	Next Cancel

6. Accept the license agreement. Click **Next**.

ense Agreement Please read the following important information before continuing.		((0))
Please read the following License Agreement. You must accept the terms of this agreem continuing with the installation.	ient before	2	
MOXA SOFTWARE NOTICE		1	•
copyright (c) 2021 Moxa Inc. All rights reserved.			
This software — Moxa PRP HSR is copyrighted and owne Inc., or any of its affiliates (collectively referred to as "Moxa").	d by Mo	oxa	
Unless otherwise provided herein or agreed by Moxa, not (a) modify, distribute, alter, tamper with, repair, or otherwise	-		
derivative works of the Software, (b) reverse engineer, disassemble, or	decomp:	ile ,	
I accept the agreement			
○ I do not accept the agreement			

7. Click **Install** to continue.

dung - MxPrpHsr		_		×
Ready to Install Setup is now ready to begin installing MxPrpHsr on your computer				(I)
Click Install to continue with the installation.				
	Back	Install	C -	ncel
	Back	Install	Ca	ncei

8. Click **Finish** to complete the installation. The Moxa PRP Service is installed on the computer.

r Setup - MxPrpHsr	- 🗆 X
	Completing the MxPrpHsr Setup Wizard
HOM	Setup has finished installing MxPrpHsr on your computer. The application may be launched by selecting the installed shortcuts. Click Finish to exit Setup.
	Finish

9. After finishing the installation, the Moxa PRP Ethernet Information utility will run automatically.

•	Moxa PPRHSI	R Ethernet Information		_	×
	PRP Ethernet	Connection Settings			
	PRP Index 0	Name PRPEthernet #1	Location PCI bus 19, device 0, function	New Name	
	New Ethernet (Connection Name			
			Apply		



ΝΟΤΕ

If a new PRP card in installed on the computer or removed from the computer, the **Moxa PRP Ethernet Information utility** will run automatically when the computer reboots. Use the utility to configure the new card.

10. The utility sets a default name for each card, which can be changed. In the example below, the PRP Index represents the PRP index switch selection and the location of the PRP expansion card, which can be obtained from the device manager.

To change the default name for an expansion card, click on the entry for the card in the utility window, change the default name, and click **Apply**.

Moxa PPRHS	R Ethernet Information		-		×
PRP Ethernet	Connection Settings				
PRP Index	Name	Location	New Name		
0	PRPEthernet #1	PCI bus 19, device 0, function	PRPEthernet #	1	
New Ethernet	Connection Name PRF	Ethernet #1			
		Apply			

11. You will be prompted to restart the computer.

12. After the computer is restarted, the Moxa PRP Service will run.

🔍 Services File Action View	v Help				_	
Þ 🔿 🔽 🖬	🗟 📑 🛛 🖬 🖿 🖬 🖬					
🐊 Services (Local)	Services (Local)					
	Moxa PRP HSR	Name	Description Statu	s Startup Type	Log On As	
		Alicrosoft Store Install Service	Provides inf	Manual	Local Syste	
	Stop the service	Microsoft Windows SMS Router Service.	Routes mes	Manual (Trigger Start)	Local Service	
	Restart the service	Moxa PRP HSR	Moxa PRP Runr	ing Automatic	Local Syste	
		🐘 Moxa Serial Interface	Moxa Serial Runn	ing Automatic	Local Syste	
	Description:	🖏 mxIrigSyncTime	Sync. Time f Runn	ing Automatic	Local Syste	
	Moxa PRP HSR	Natural Authentication	Signal aggr	- Manual (Trigger Start)	Local Syste	
		Net.Tcp Port Sharing Service	Provides abi	Disabled	Local Service	
		🔍 Netlogon	Maintains a	Manual	Local Syste	
		Network Connected Devices Auto-Setup	Network Co	Manual (Trigger Start)	Local Service	
		Network Connection Broker	Brokers con Runn	ing Manual (Trigger Start)	Local Syste	
		Network Connections	Manages o	Manual	Local Syste	
		🥋 Network Connectivity Assistant	Provides Dir	Manual (Trigger Start)	Local Syste	
		A Network List Service	Identifies th Runn	ing Manual	Local Service	
		Network Location Awareness	Collects an Runn	ing Automatic	Network S	
		Network Setup Service	The Networ	- Manual (Trigger Start)	Local Syste	
		Artwork Store Interface Service	This service Runn	ing Automatic	Local Service	
		🐘 NPort Secure Service	NPort Secur Runn	ing Automatic	Local Syste	
		🖏 Offline Files	The Offline	Manual (Trigger Start)	Local Syste	
		OpenSSH Authentication Agent	Agent to ho	Disabled	Local Syste	
		Q Optimize drives	Helps the c	Manual	Local Syste	
		Arental Controls	Enforces pa	Manual	Local Syste	
		Payments and NFC/SE Manager	Manages pa	Manual (Trigger Start)	Local Service	

13. The DE-PRP-HSR-EF card uses the same Intel® Ethernet driver as the onboard Ethernet adapters. All expansion cards installed on the computer are shown as individual Ethernet adapters.

🛧 😰 « Network and Ir	nternet > Network Connections ~	ڻ ت			2
Organize 🔻					(
lame	Status	Device Name			
🖗 Ethernet	moxa.com	Intel(R) I210 Gigabit Network Connection			
Ethernet 2	Network cable unplugged	Intel(R) I210 Gigabit Network Connection #2			
Ethernet 3	Network cable unplugged	Intel(R) I210 Gigabit Network Connection #3			
Ethernet 4	Network cable unplugged	Intel(R) I210 Gigabit Network Connection #4			
Ethernet 5	Network cable unplugged	Intel(R) I210 Gigabit Network Connection #5			
Ethernet 6	Network cable unplugged	Intel(R) I210 Gigabit Network Connection #6			
PRPEthernet #1	Unidentified network	Intel(R) I210 Gigabit Network Connection #7	(PRPEther	net #1)	
Ethernet 7	Network cable unplugged	Realtek PCIe GbE Family Controller			
Ethernet 8	Network cable unplugged	Realtek PCIe GbE Family Controller #2			
Ethernet 9	Network cable unplugged	Realtek PCIe GbE Family Controller #3			
Ethernet 10	Network cable unplugged	Realtek PCIe GbE Family Controller #4			
Ethernet 11	Network cable unplugged	Realtek PCIe GbE Family Controller #5			
Ethernet 12	Network cable unplugged	Realtek PCIe GbE Family Controller #6			
Ethernet 13	Network cable unplugged	Realtek PCIe GbE Family Controller #7			
Ethernet 14	Network cable unplugged	Realtek PCIe GbE Family Controller #8			

14. You can also confirm the name change of the expansion card by checking the Ethernet adapter names in the **Device Manager**.

🛃 Device Manager	_	×
File Action View Help		
✓ ∄ WIN-G2QK1RQ05V8		
> I Audio inputs and outputs		
> 📮 Computer		
> Disk drives		
> 🙀 Display adapters		
> 🙀 Uispiay adapters		
> m IDE ATA/ATAPI controllers		
> = Keyboards		
Mice and other pointing devices		
> Monitors		
> 🗇 MOXA Embedded		
V 💭 Network adapters		
Intel(R) I210 Gigabit Network Connection		
Intel(R) I210 Gigabit Network Connection #2		
Intel(R) I210 Gigabit Network Connection #3		
Intel(R) I210 Gigabit Network Connection #4		
Intel(R) I210 Gigabit Network Connection #5		
🕎 Intel(R) I210 Gigabit Network Connection #6		
🕎 Intel(R) I210 Gigabit Network Connection #7 (PRPEthernet #1)		
📮 Realtek PCIe GbE Family Controller		
📮 Realtek PCIe GbE Family Controller #2		
📮 Realtek PCIe GbE Family Controller #3		
📮 Realtek PCIe GbE Family Controller #4		
🕎 Realtek PCIe GbE Family Controller #5		
🚍 Realtek PCIe GbE Family Controller #6		
🚍 Realtek PCIe GbE Family Controller #7		
🚍 Realtek PCIe GbE Family Controller #8		
🚽 WAN Miniport (IKEv2)		
🖵 WAN Miniport (IP)		
🚍 WAN Miniport (IPv6)		
🚍 WAN Miniport (L2TP)		
🚍 WAN Miniport (Network Monitor)		
🛃 WAN Miniport (PPPOE)		
WAN Miniport (PPTP)		
WAN Miniport (SSTP)		
> 📮 Ports (COM & LPT)		
> 🖻 Print queues		
> Processors		
> P Security devices		
> P Software components		
Software devices		
> 🥁 Storage controllers		
> 🏣 System devices > 🏺 Universal Serial Bus controllers		
Y Oniversal Serial Dus Controllers		

Configuring the Operation Mode

You can use the **Moxa PRP Settings utility** to set the operating mode (PRP or HSR) for a DE-PRPHSR-EF expansion card.

1. Run the **Moxa PRP Settings utility** from the Start menu.

	Recently added	
	Moxa PRP Settings	
	Moxa PRP Ethernet Information	
	1	
	Intel	
	М	
	Moxa PRP HSR New	
	Moxa PRP Ethernet Information New	
al 's In a 14 85	Moxa PRP Settings	
	Moxa Serial Interface	~
alan (*) 1917 - January 1917 - January	S	
8	Search	
	🗱 Settings	
	W	
	Windows Accessories	
ŝ	Windows Administrative Tools	
Φ	Windows Ease of Access	
	Windows PowerShell	
	ク III	

2. Select the expansion card. If more than one DE-PRP-HSR expansion cards are installed on the computer, use the **Module Index** (0 to 1) drop-down menu to select the card that you want to configure.

🔠 Moxa PRPHSR Set	tings	—		×
Module Index 0	~			
PRP/HSR Mode PRP	~			
Fiber Speed Mode 1000Base	~		Apply]

3. From the **PRP/HSR Mode** drop-down list, select an option.

🐻 Moxa PRPHSR Settings		—		\times
Module Index 0	~			
PRP/HSR Mode PRP	~			
PRP HSR Fiber Speed Mode				
1000Base	\sim		Apply	

- 4. From the **Speed Mode** drop-down list, select an SFP module judge speed option.
 - 1000Base: the service force SFP module speed for 1000 BASE-X, it can only detect 1000BASE-X SFP module.
 - 100Base: the service force SFP module speed for 100 BASE-FX, it can only detect 100BASE-FX SFP module.

🐻 Moxa PRPHSR Settings		—		\times
Module Index 0	~			
PRP/HSR Mode PRP	~			
Fiber Speed Mode 1000Base	~		Apply	
1000Base 100Base				

5. click Apply.
Redefining DE-PRP-HSR-EF Ethernet Information

The **Moxa PRP Ethernet Information utility** can be used to redefine the DE-PRP-HSR-EF Ethernet information in the system.

1. Run Moxa PRP Ethernet Information utility from the Start Menu.

	Recently added	
	Moxa PRP Settings	
에이 _문 드니 다가 도난 바	Moxa PRP Ethernet Information	
	I	
	Intel	
	M	
	Moxa PRP HSR New	
	Moxa PRP Ethernet Information New	
	Moxa PRP Settings	
	Moxa Serial Interface	
	S	
8	Search	
	🗱 Settings	
	W	
	Windows Accessories	
ŝ	Windows Administrative Tools	
Ċ	Windows Ease of Access	
	Windows PowerShell	
	오 탈 🦪	

- 2. In the utility screen, select the expansion card.
 - > **PRP Index:** Select the target PRP card index (the index set by the switch in the expansion card).
 - > **Location:** PCI bus location of the target PRP card.
 - Name: Type the network connection name of target PRP card. In this example, we are redefining the name of the card.
 - > New Name: The new name to set.

•	💿 Moxa PPRHSR Ethernet Information 🛛 🗖 🗆									
	PRP Ethernet Connection Settings									
	PRP Index	Name	Location	New Name						
	0	PRPEthernet #1	PCI bus 19, device 0, function	PRPEthernet #1						
	New Ethernet (Connection Name PRPEth	ernet #1							
	Apply									

After the Ethernet information has been successfully redefined, a message is shown. Click **OK**.



3. Restart the computer.

	R Ethernet Informati				_)
PRP Index 0	Name PRPEthernet #1		Location PCI bus 19, device 0, function	11	New Name PRPEthernet #	#1	
	_	Setting I	nformation >	×			
New Ethernet	Connection Name	1	Please Restart the Computer.				
			ОК				

PRP/HSR Supervision Frame

The supervision frame of DE-PRP-HSR-EF expansion card is based on WinPcap. Before you start sending the PRP/HSR supervision frame, you must download and install the WinPcap tool from https://www.winpcap.org/ and check the supervision frame.

To check the PRP/HSR supervision frame, do the following:

- 1. Install WinPcap on DA-720.
- 2. Install MxPrpHsrSetup-1.2.0.exe.
- 3. Wait for the Moxa PRP Service to initialize.
- 4. The Moxa PRP/HSR Supervision Sender service will start running.

ng Task Manager FileptionsView				_		×
Processes Performance App history Startup Use	rs Details S	ervices				
^	0%	13%	3%	0%		
Name	CPU	Memory	Disk	Network		
Microsoft OneDrive (32 bit)	0%	3.6 MB	0 MB/s	0 Mbps		~
> 📑 Microsoft Software Protection Platform Ser	0%	3.5 MB	0 MB/s	0 Mbps		
> 🔒 Microsoft Windows Search Indexer	0%	4.7 MB	0 MB/s	0 Mbps		
Moxa PRP/HSR Supervision Sender	0%	1.0 MB	0.1 MB/s	0 Mbps		
> 📑 MxPrpSvc	0%	7.0 MB	0 MB/s	0 Mbps		
Plcon startup utility (32 bit)	0%	0.8 MB	0 MB/s	0 Mbps		
> PresentationFontCache.exe	0%	3.2 MB	0 MB/s	0 Mbps		
📧 Runtime Broker	0%	6.9 MB	0 MB/s	0 Mbps		
🔎 Search	0%	27.9 MB	0 MB/s	0 Mbps		
🔎 Search Background Task Host	0%	7.6 MB	0 MB/s	0 Mbps		
SmartScreen	0%	3.1 MB	0 MB/s	0 Mbps		
> 🖶 Spooler SubSystem App	0%	4.2 MB	0 MB/s	0 Mbps		
\bigoplus Windows Defender notification icon	0%	2.3 MB	0 MB/s	0 Mbps		
> 💽 Windows Modules Installer	0%	1.0 MB	0 MB/s	0 Mbps		
💽 Windows Modules Installer Worker	0%	1.4 MB	0 MB/s	0 Mbps		~
○ Fewer details					<u>E</u> nd ta	ask

- 5. Install the Wireshark tool on a PC and run the tool with the "hsr_prp_supervision" filter to wait for the PRP supervision frames.
- 6. Connect port A or port B of the DE-PRP-HSR-EF to the Ethernet port of the PC.
- 7. Use the Moxa PRP Settings utility to set the PRP/HSR mode.

8. Check the supervision frame using the Wireshark tool.

PRP Supervision Frame

_		g from 區加			01.11	· •	1 1.12	T 1		-		
							phony Wirel					
		•		G 9 🗢	- 😫 🕯	1	🗏 Q Q (₹.₩				
hs	r_prp_st	apervision										
		Time		Source				Destination		Protocol	Length Info	
	3133	1038.71	14345	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 PRP	<pre>Supervisior</pre>
	3137	1040.72	29941	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 PRP	<pre>Supervisior</pre>
	3140	1042.74	45453	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 PRP	<pre>Supervisior</pre>
	3146	1044.70	61089	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 PRP	<pre>Supervisior</pre>
	3150	1046.77	76562	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 PRP	<pre>Supervision</pre>
	3153	1048.79	92191	MoxaTec	h_00:e5:	0f		Iec_00:01	:00	HSR/PRP	66 PRP	Supervision
	3158	1050.80	07634	MoxaTec	h_00:e5:	0f		Iec_00:01	:00	HSR/PRP	66 PRP	Supervision
	3162	1052.82	23302	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP		<pre>Supervisior</pre>
	3165	1054.83	38905	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 PRP	Supervision
	3172	1056.85	54444	MoxaTec		:0f		Iec_00:01				Supervision
	3181	1060.03	30294	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 HSR	Supervision
	3185	1062.04	41793	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 HSR	Supervision
	3189	1064.05	57315	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 HSR	Supervision
	3192	1066.07	72794	MoxaTec	h_00:e5:	:0f		Iec_00:01	:00	HSR/PRP	66 HSR	Supervision
	3196	1068.08	88432	MoxaTec	h_00:e5:	0f		Iec_00:01	:00	HSR/PRP	66 HSR	Supervision
	3202	1070.10	04012	MoxaTec	h_00:e5:	0f		Iec_00:01	:00	HSR/PRP	66 HSR	Supervision
	3208	1072.11	19585	MoxaTec	h_00:e5:	0f		Iec_00:01	:00	HSR/PRP	66 HSR	Supervision
E	3211 rame	1074.13 3172: 6 et II, 1	35104 6 byte Src: M	MoxaTec s on wire oxaTech_0	h_00:e5 e (528 b 00:e5:0f	:0f its), 66 (00:90:		Iec_00:01 Iec_00:01 tured (528 bit f), Dst: Iec_(:00 ts) on int	HSR/PRP		
E	3211 rame thern SR/PR 0000	1074.13 3172: 6 et II, 2 P Super	35104 6 byte Src: M vision	MoxaTec s on wire	h_00:e5: e (528 b: 00:e5:0f 09 Part : h: 0	:0f its), 66 (00:90:		Iec_00:01	:00 ts) on int	HSR/PRP		
E	3211 rame thern SR/PR 0000	1074.13 3172: 6 et II, 2 P Super	35104 6 byte Src: M vision	MoxaTec s on wire oxaTech_0 (IEC6243 = Pat 001 = Ver	h_00:e5: e (528 b: 00:e5:0f 09 Part : h: 0	:0f its), 66 (00:90:		Iec_00:01	:00 ts) on int	HSR/PRP		Supervision
E	3211 rame thern SR/PR 0000 Sequ	1074.13 3172: 6 et II, 9 P Super 0 0 0000 0 Jence nu	35104 6 byte Src: M vision 0000 00 umber:	MoxaTec s on wire oxaTech_0 (IEC6243 = Pat 001 = Ver	h_00:e5: (528 b) 00:e5:0f 9 Part h: 0 sion: 1	0f its), 66 (00:90: 3)	e8:00:e5:0	Iec_00:01	:00 ts) on int	HSR/PRP		
E	3211 rame thern SR/PR 0000 Sequ TLV	1074.13 3172: 6 et II, 9 P Super 0 0 0000 0 Jence nu	35104 6 byte Src: M vision 0000 00 umber: PRP Noc	MoxaTec s on wire oxaTech_0 (IEC6243 = Pati 001 = Ver 483	h_00:e5: (528 b) 00:e5:0f 9 Part h: 0 sion: 1	0f its), 66 (00:90: 3)	e8:00:e5:0	Iec_00:01	:00 ts) on int	HSR/PRP		
E	3211 rame thern SR/PR 0000 Sequ TLV TLV	1074.13 3172: 6 et II, 5 P Super 0 6 0000 @ uence nu type: F length:	35104 6 byte Src: M vision 0000 00 umber: 2RP Noc : 6	MoxaTech s on wire oxaTech_@ (IEC6243 = Path 001 = Vers 483 de (Duplin	h_00:e5: e (528 b) 00:e5:0f 09 Part 1 h: 0 sion: 1 cate Dis	(0f (00:90: 3)	e8:00:e5:0	Iec_00:01 tured (528 bit f), Dst: Iec_(:00 ts) on int	HSR/PRP		
E	3211 rame thern SR/PR 0000 Sequ TLV TLV Sour TLV	1074.11 3172: 60 et II, 5 P Superro 9 9 . 0000 6 Jence nu type: F length: rce MAC type: F	6 byte Src: M vision 	MoxaTech s on wire oxaTech_@ (IEC6243 = Path 001 = Vers 483 de (Duplin	h_00:e5: (528 b) 0:e5:0f 9 Part 5 Sion: 1 cate Dis ech_00:e	e0f its), 66 (00:90: 3) ccard) (: 5:0f (00	e8:00:e5:0 20) 0:90:e8:00:	Iec_00:01 tured (528 bit f), Dst: Iec_(:00 ts) on int	HSR/PRP		
E	3211 rame thern SR/PR 0000 Sequ TLV TLV Sour TLV	1074.13 3172: 6 et II, 5 P Super 0 0 0000 6 uence nu type: F length: cce MAC	6 byte Src: M vision 	MoxaTech s on wire oxaTech_@ (IEC6243 = Path 2001 = Ver: 483 de (Duplia ss: MoxaTe	h_00:e5: (528 b) 0:e5:0f 9 Part 5 Sion: 1 cate Dis ech_00:e	e0f its), 66 (00:90: 3) ccard) (: 5:0f (00	e8:00:e5:0 20) 0:90:e8:00:	Iec_00:01 tured (528 bit f), Dst: Iec_(:00 ts) on int	HSR/PRP		
E	3211 rame SR/PR 0000 Sequ TLV TLV Sour TLV TLV	1074.13 3172: 6 et II, 5 P Superro 0.0000 6 uence nu type: F length: cce MAC type: F length:	35104 6 byte Src: M vision 	MoxaTech s on wire oxaTech_@ (IEC6243 = Path 2001 = Ver: 483 de (Duplin ass: MoxaTr ancy Box N	h_00:e5: (528 b: 10:e5:0f 19 Part : h: 0 sion: 1 cate Dis ech_00:e MAC Addr	0f its), 66 (00:90: 3) ccard) (3 5:0f (00 vess (30)	e8:00:e5:0 20) 0:90:e8:00:	<pre>Iec_00:01 tured (528 bit f), Dst: Iec_(</pre>	:00 ts) on int	HSR/PRP		
E	3211 rame SR/PR 0000 Sequ TLV TLV Sour TLV TLV RedE TLV	1074.13 3172: 6 et II, 9 P Super 9 9 0000 6 uspece nu type: F length: Sox MAC type: E	6 byte Src: M vision 2000 00 umber: PRP Noc : 6 Addres Redunda : 6 Addres End of	MoxaTech s on wire oxaTech_@ (IEC6243 = Path 2001 = Ver: 483 de (Duplin ass: MoxaTr ancy Box N	h_00:e5: (528 b: 10:e5:0f 19 Part : h: 0 sion: 1 cate Dis ech_00:e MAC Addr	0f its), 66 (00:90: 3) ccard) (3 5:0f (00 vess (30)	e8:00:e5:0 20) 0:90:e8:00:)	<pre>Iec_00:01 tured (528 bit f), Dst: Iec_(</pre>	:00 ts) on int	HSR/PRP		
E ⁻	3211 rame thern SR/PR 0000 Sequ TLV TLV Sour TLV Sour TLV RedE TLV TLV	1074.13 3172: 6 et II, 9 P Super 9 9 0000 e uspere nu type: F length: Sox MAC type: E length:	6 byte Src: M vision 2000 00 umber: 2RP Noc : 6 Addres Redunda : 6 Addres End of : 0	MoxaTec s on wire oxaTech_c (IEC6243 = Pati 301 = Ver 483 de (Dupli ss: MoxaTech ss: MoxaTech ss: MoxaT TLVs (0)	h_00:e53 e (528 b) 00:e5:0f 99 Part : h: 0 sion: 1 cate Dis ech_00:e MAC Addr ech_00:e	(00:90: (00:90: 3) (card) (: 5:0f (00 (5:0f (00)	e8:00:e5:0 20) 0:90:e8:00:) 0:90:e8:00:	<pre>Iec_00:01 tured (528 bit f), Dst: Iec_(</pre>	:00 ts) on int	HSR/PRP		
H:	3211 rame thern SR/PR 0000 Sequ TLV TLV Sour TLV TLV RedE TLV TLV Sour TLV Sour SS-Mo	1074.13 3172: 6 et II, 5 P Superr 9 0000 @ uence nut type: F length: cce MAC type: F length: 30x MAC type: E length: nitorin	4 byte 5 c: M 5 c: M 5 c: M 6 byte 5 c 6 dollars 6 Addres 6 Addres 6 Addres 6 addres 7 c d 7 c	MoxaTec s on wire oxaTech @ (IEC6243 = Path 2001 = Ver: 483 de (Duplin ss: MoxaTe ancy Box I ss: MoxaTe	h_00:e53 e (528 b) 00:e5:0f 99 Part : h: 0 sion: 1 cate Dis ech_00:e MAC Addr ech_00:e	(00:90: (00:90: 3) (card) (: 5:0f (00 (5:0f (00)	e8:00:e5:0 20) 0:90:e8:00:) 0:90:e8:00:	<pre>Iec_00:01 tured (528 bit f), Dst: Iec_(</pre>	:00 ts) on int	HSR/PRP		
E ⁻	3211 rame thern SR/PR 0000 Sequ TLV TLV Sour TLV TLV RedE TLV TLV Sour TLV Sour SS-Mo	1074.13 3172: 6 et II, 9 P Super 9 9 0000 e uspere nu type: F length: Sox MAC type: E length:	4 byte 5 c: M 5 c: M 5 c: M 6 byte 5 c 6 dollars 6 Addres 6 Addres 6 Addres 6 addres 7 c d 7 c	MoxaTec s on wire oxaTech_c (IEC6243 = Pati 301 = Ver 483 de (Dupli ss: MoxaTech ss: MoxaTech ss: MoxaT TLVs (0)	h_00:e53 e (528 b) 00:e5:0f 99 Part : h: 0 sion: 1 cate Dis ech_00:e MAC Addr ech_00:e	(00:90: (00:90: 3) (card) (: 5:0f (00 (5:0f (00)	e8:00:e5:0 20) 0:90:e8:00:) 0:90:e8:00:	<pre>Iec_00:01 tured (528 bit f), Dst: Iec_(</pre>	:00 ts) on int	HSR/PRP		
E H	3211 rame thern SR/PRI 0000 Sequ TLV TLV TLV Sour TLV TLV RedE TLV TLV SSS-Moi SSC	1074.13 3172: 60 et II, 5 P Super 9 0000 6 Jence nu type: F length: 30x MAC type: E length: nitorin, Port: 8	35104 6 byte Src: M vision 2000 00 amber: PRP Noc : 6 Addres Redunda : 6 Addres End of : 0 g ethe 306	MoxaTec s on wire oxaTech_0 (IEC6243 = Pati 201 = Ver 483 de (Dupli ancy Box H ancy Box H ss: MoxaTr TLVs (0) rnet trai	h_00:e5: (528 b: 00:e5:0f 19 Part : h: 0 sion: 1 cate Dis ech_00:e MAC Addr ech_00:e .ler, Sou	0f its), 66 (00:90: 3) ccard) (: 5:0f (00 ress (30 :5:0f (00 unce Por	e8:00:e5:0 20) 0:90:e8:00:) 0:90:e8:00: +t: 806	<pre>Iec_00:01 tured (528 bin f), Dst: Iec_0 :e5:0f) :e5:0f)</pre>	:00 ts) on intr 20:01:00 (0	HSR/PRP		
	3211 rame SR/PR Sequ Sequ TLV TLV Sour TLV TLV TLV Sour TLV TLV Sour CLV TLV CLV CLV CLV CLV CLV CLV CLV C	1074.13 3172: 6 et II, 5 P Superr 9 6 0000 & ence nu type: F length: ccc MAC type: E length: 30x MAC type: E length: nitorin Port: 8 L 15 4e	6 byte Src: M vision 2000 00 umber: PRP Noc 6 Addres Redunda 6 Addres 6 addres 7 0 g ethe 306	MoxaTec s on wire oxaTech_@ (IEC6243 = Patl 201 = Ver 483 de (Dupli ss: MoxaTe ancy Box I ss: MoxaT TLVs (0) rnet trai 00 00 90 90	<pre>h_00:e5:0 0:e5:0f 09 Part h: 0 sion: 1 cate Dis ech_00:e MAC Addr ech_00:e .ler, Sou e8 00</pre>	0f its), 66 (00:90: 3) ccard) (: 5:0f (00 ress (30 cs:0f (00 urce Por e5 0f 86	e8:00:e5:0 20) 0:90:e8:00:) 0:90:e8:00: +t: 806 8 fb 00 01	<pre>Iec_00:01 tured (528 bit f), Dst: Iec_(:e5:0f) :e5:0f)N</pre>	:00 ts) on intr 20:01:00 (0	HSR/PRP		
· E· · H: · V:	3211 rame : thern. SR/PR/ 0000 Sequ TLV TLV Sour TLV TLV TLV TLV Sour CO Sour Sou	1074.11 3172: 60 et II, 9 P Super P	35104 6 byte 5rc: M vision 2000 00 umber: 2RP Noc 6 Addres Redunda 8 Cedunda 8 Cedunda 8 Cedunda 9 C 10 C 10 Cedunda 10 C 10 C 10 C 10 10 10 10 10 10 10 10 10 10 10 1	MoxaTec s on wire oxaTech (IEC6243 = Pati 301 = Ver 483 de (Dupli ss: MoxaTr TLVs (0) rnet trai 00 00 90 90 e8 00	h_00:e5: (528 b) (0:e5:0f 9 Part 1 19 Part 1 19 Part 1 10 cate Dis ech_00:e MAC Addr ech_00:e .ler, Sou e8 00 e5 0f	ef its), 66 (00:90: 3) ccard) (3 5:0f (04 ess (30 5:0f (04 unce Por e5 0f 8 1e 06 04	e8:00:e5:0 20) 0:90:e8:00:) 0:90:e8:00: +t: 806 8 fb 00 01 0 90 e8 00	<pre>Iec_00:01 tured (528 bit f), Dst: Iec_0 :e5:0f) :e5:0f)</pre>	::00 ts) on int 20:01:00 (0	HSR/PRP		
• E • H: • V:	32111 rame SR/PR SR/PR TLV TLV TLV Sour TLV TLV RedE TLV TLV SSS-Moi SSSS-Moi SSSS-Moi SSSS-Moi SSSSS-Moi SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	1074.1: 3172: 6 et II, 3 P Super P	35104 6 byte Src: M vision 2000 00 amber: PRP Noc 6 Addres c 6 Addres c 6 Addres c 0 g ethe 306 00 01 06 00 00 00	MoxaTec s on wire oxaTech_C (IEC6243 = Pati 001 = Ver 483 ie (Duplinistics: MoxaTr ss: MoxaTr ss: MoxaTr TLVs (0) rnet train 00 00 90 90 80 00 00 00 90	h_00:e5: (528 b): (0:e5:0f 9 Part 1 ision: 1 cate Dis ech_00:e MAC Addr ech_00:e ler, Sou e8 00 e5 0f 00 00	eof its), 66 (00:90: 3) card) (: 5:0f (04 ess (30) 5:0f (04 urce Por e5 0f 84 1e 06 00 00	e8:00:e5:0 20) 0:90:e8:00:) 0:90:e8:00: +t: 806 8 fb 00 01 0 90 e8 00 0 90 e8 00	<pre>Iec_00:01 tured (528 bit f), Dst: Iec_0 :e5:0f) :e5:0f)N</pre>	:00 ts) on intr 20:01:00 (0	HSR/PRP		
· E· · H: · V:	32111 rame SR/PRI SR/PRI Sequ TLV Sour TLV Sour TLV RedE TLV TLV SS-Moi SS-MOI	1074.1: 3172: 6 et II, 3 P Super P	35104 6 byte Src: M vision 2000 00 amber: PRP Noc 6 Addres c 6 Addres c 6 Addres c 0 g ethe 306 00 01 06 00 00 00	MoxaTec s on wire oxaTech (IEC6243 = Pati 301 = Ver 483 de (Dupli ss: MoxaTr TLVs (0) rnet trai 00 00 90 90 e8 00	h_00:e5: (528 b): (0:e5:0f 9 Part 1 ision: 1 cate Dis ech_00:e MAC Addr ech_00:e ler, Sou e8 00 e5 0f 00 00	eof its), 66 (00:90: 3) card) (: 5:0f (04 ess (30) 5:0f (04 urce Por e5 0f 84 1e 06 00 00	e8:00:e5:0 20) 0:90:e8:00:) 0:90:e8:00: +t: 806 8 fb 00 01 0 90 e8 00	<pre>Iec_00:01 tured (528 bit f), Dst: Iec_0 :e5:0f) :e5:0f)</pre>	:00 ts) on intr 20:01:00 (0	HSR/PRP		

HSR Supervision Frame

🔬 🛞 🔝 🔚 🗙	Capture Analyze Statistics Telephony Capture Analyze Statistics Telephony			
r_prp_supervision				
Time	Source	Destination	Protocol 1	length Info
3165 1054.838905	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 PRP Supervision
3172 1056.854444	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 PRP Supervision
	MoxaTech_00:e5:0f			
3185 1062.041793	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3189 1064.057315	<pre>MoxaTech_00:e5:0f</pre>	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3192 1066.072794	<pre>4 MoxaTech_00:e5:0f</pre>	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3196 1068.088432	<pre>MoxaTech_00:e5:0f</pre>	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3202 1070.104012	<pre>MoxaTech_00:e5:0f</pre>	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3208 1072.119585	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3211 1074.135104	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3222 1076.150654	1 MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3227 1078.166251	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3230 1080.181814	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3234 1082.197383	MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 HSR Supervision
3239 1084.212621	MoxaTech 00:e5:0f	Iec 00:01:00	HSR/PRP	66 HSR Supervision
3244 1086.228421	MoxaTech 00:e5:0f	Iec 00:01:00	HSR/PRP	66 HSR Supervision
7244 1000.220421				
3256 1088.244045	MoxaTech 00:e5:0f	Iec 00:01:00	HSR/PRP	66 HSR Supervision
3256 1088.24404 3266 1090.259591 rame 3181: 66 by	MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte	Iec_00:01:00 Iec_00:01:00 scaptured (528 bits) on interf :e5:0f), Dst: Iec_00:01:00 (01:		66 HSR Supervision 66 HSR Supervision
3256 1088.244045 3266 1090.259591 rame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervisio	MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3)	<pre>Iec_00:01:00 s captured (528 bits) on interf :e5:0f), Dst: Iec_00:01:00 (01:</pre>	HSR/PRP	
3256 1088.244045 3266 1090.259593 rrame 3181: 66 by thernet II, Src: high-availability SR/PRP Supervisio 0000	MoxaTech_00:e5:0f MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0	<pre>Iec_00:01:00 s captured (528 bits) on interf :e5:0f), Dst: Iec_00:01:00 (01:</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervise 0000 0000 0000	MoxaTech_00:e5:0f MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1	<pre>Iec_00:01:00 s captured (528 bits) on interf :e5:0f), Dst: Iec_00:01:00 (01:</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability JSR/PRP Supervise 00000000 0000 Sequence number	MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484	<pre>Iec_00:01:00 s captured (528 bits) on interf :e5:0f), Dst: Iec_00:01:00 (01:</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability (SR/PRP Supervisi 0000	MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484	<pre>Iec_00:01:00 s captured (528 bits) on interf :e5:0f), Dst: Iec_00:01:00 (01:</pre>	HSR/PRP	
3256 1088.24404 3266 1090.259591 rame 3181: 66 by thernet II, Src: ligh-availability ISR/PRP Supervisio 0000 0000 0000 Sequence number TLV type: HSR N TLV length: 6	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 loded (23)</pre>	<pre>Iec_00:01:00 s captured (528 bits) on interf :e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5)</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 imame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervise 0000 0000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 lode (23) ress: MoxaTech_00:e5:0f (00:90:6</pre>	<pre>Iec_00:01:00 s captured (528 bits) on interf :e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5)</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: tigh-availability SR/PRP Supervise 0000 0000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 loded (23)</pre>	<pre>Iec_00:01:00 s captured (528 bits) on interf :e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5)</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervise 0000 0000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun TLV length: 6	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 lode (23) tess: MoxaTech_00:e5:0f (00:90:e ddancy Box MAC Address (30)</pre>	<pre>Iec_00:01:00 s captured (528 bits) on interf t:e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5) e8:00:e5:0f)</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervisi 00000000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun TLV type: Redun TLV length: 6 RedBox MAC Addr	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 tode (23) ress: MoxaTech_00:e5:0f (00:90:e dancy Box MAC Address (30) ress: MoxaTech_00:e5:0f (00:90:e </pre>	<pre>Iec_00:01:00 s captured (528 bits) on interf t:e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5) e8:00:e5:0f)</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervise 0000 0000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun TLV length: 6 RedBox MAC Addr TLV type: End of	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 tode (23) ress: MoxaTech_00:e5:0f (00:90:e dancy Box MAC Address (30) ress: MoxaTech_00:e5:0f (00:90:e </pre>	<pre>Iec_00:01:00 s captured (528 bits) on interf t:e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5) e8:00:e5:0f)</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervisi 00000000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun TLV type: Redun TLV length: 6 RedBox MAC Addr	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 tode (23) ress: MoxaTech_00:e5:0f (00:90:e dancy Box MAC Address (30) ress: MoxaTech_00:e5:0f (00:90:e </pre>	<pre>Iec_00:01:00 s captured (528 bits) on interf t:e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5) e8:00:e5:0f)</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervise 0000 0000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun TLV length: 6 RedBox MAC Addr TLV type: End of	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 tode (23) ress: MoxaTech_00:e5:0f (00:90:e dancy Box MAC Address (30) ress: MoxaTech_00:e5:0f (00:90:e </pre>	<pre>Iec_00:01:00 s captured (528 bits) on interf t:e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5) e8:00:e5:0f)</pre>	HSR/PRP	
3256 1088.24404 3266 1090.259591 rame 3181: 66 by thernet II, Src: ligh-availability USR/PRP Supervise 00000000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun TLV length: 6 RedBox MAC Addr TLV type: End c TLV type: End c	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 lode (23) ress: MoxaTech_00:e5:0f (00:90:a idancy Box MAC Address (30) ress: MoxaTech_00:e5:0f (00:90:a if TLVs (0)</pre>	<pre>Iec_00:01:00 is captured (528 bits) on interf i:e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5) e8:00:e5:0f) e8:00:e5:0f)</pre>	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervise 0000 0000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun TLV length: 6 RedBox MAC Addr TLV type: End oc TLV length: 0 00 01 15 4e 00 0	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 tode (23) ress: MoxaTech_00:e5:0f (00:90:e dancy Box MAC Address (30) ress: MoxaTech_00:e5:0f (00:90:e f TLVs (0) 11 00 00 90 e8 00 e5 0f 89 2f 6</pre>	<pre>Iec_00:01:00 is captured (528 bits) on interf ie5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5) e8:00:e5:0f) e8:00:e5:0f) e0:34N</pre>	HSR/PRP	
3256 1088.24404 3266 1090.259591 rame 3181: 66 by thernet II, Src: ligh-availability USR/PRP Supervise 00000000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun TLV length: 6 RedBox MAC Addr TLV type: End c TLV type: End c	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 lode (23) ress: MoxaTech_00:e5:0f (00:90:e dancy Box MAC Address (30) ress: MoxaTech_00:e5:0f (00:90:e f TLVs (0) 1000 09 0e8 00 e5 0f 89 2f 0 0 01 01 e4 10 06 00 90 e8 00 e </pre>	Iec_00:01:00 s captured (528 bits) on interf 1:e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5) e8:00:e5:0f) e8:00:e5:0f) e8:00:e5:0f) 20 34N/.4 e5 0f .)	HSR/PRP	
3256 1088.24404 3266 1090.25959 rame 3181: 66 by thernet II, Src: ligh-availability SR/PRP Supervise 0000 0000 0000 Sequence number TLV type: HSR N TLV length: 6 Source MAC Addr TLV type: Redun TLV length: 6 RedBox MAC Addr TLV type: End o TLV length: 0 RedBox MAC Addr TLV length: 0 00 01 15 4e 00 0 03 29 88 fb 0	<pre>MoxaTech_00:e5:0f tes on wire (528 bits), 66 byte MoxaTech_00:e5:0f (00:90:e8:00 Seamless Redundancy (IEC62439 on (IEC62439 Part 3) = Path: 0 0001 = Version: 1 :: 484 tode (23) tess: MoxaTech_00:e5:0f (00:90:e dancy Box MAC Address (30) tess: MoxaTech_00:e5:0f (00:90:e f TLVs (0) th 00 00 90 e8 00 e5 0f 89 2f 0 0 01 01 e4 17 06 00 90 e8 00 e8 00 e5 0f 00 00 00 00 00 </pre>	Iec_00:01:00 s captured (528 bits) on interf i:e5:0f), Dst: Iec_00:01:00 (01: Part 3 Chapter 5) e8:00:e5:0f) e8:00:e5:0f) e8:00:e5:0f) 00 34N	HSR/PRP	

8. DE-2-IRIGB-4-DIDO Expansion Module

Overview

The DE-2-IRIGB-4-DIDO expansion card for the DA-720 Series industrial computer features 4 digital inputs and 4 digital outputs and provides precision timing information using IRIG-B input signals.

Software Installation and Configuration

This section describes how to install driver and utility for the DE-2-IRIGB-4-DIDO on an embedded computer running Windows 10 (64-bit), and how to configure the software settings. The following topic are covered:

- System requirements
- Installing the IRIG-B Driver
- Installing the IRIG-B Utility
- Using the IRIG-B Utility
- Using the mxIrigUtil Command

System Requirements

- OS: Windows 10
- .Net framework 3.5
- Microsoft Visual C++ Redistributable x64

Installing the IRIG-B Driver

- 1. Download the DE-2-IRIGB-4-DIDO driver from Moxa's support website at https://www.moxa.com/en/support to the DA-720 computer.
- 2. Double-click DA-IRIG-B Driver_1.0_2014121916_Setup.exe to start the installation process.
- 3. Installation process will show the welcome page. Click Next.



4. Select Install for anyone using this computer and click Next.

*

NOTE

Before you select **Install just for me**, make sure that you understand how this option might affect the operation for other users on the embedded computer.

🌐 DA-IRIG-B Driver Setup			_		×
6	Choose Users Choose for which u	isers you want to	install DA-IRIG	-B Driver.	
Select whether you want computer. Click Next to co		ver for yourself o	only or for all us	ers of this	
Install for anyon	e using this computer				
◯ Install just for m	e				
		< Back	Next >	Cance	el l

5. Accept the default destination folder or click **Browse** to select one; then, click **Install**.

🌍 DA-IRIG-B Driver S	etup		_		\times
6	Choose Inst Choose the f	all Location older in which to install D	A-IRIG-B Dri	ver.	
		llowing folder. To install ir stall to start the installation		folder, cli	ck
Destination Folder	: (x86)\Moxa\DA-IRIG	-B Driver	Brov	vse]
Space required: 3.3N Space available: 452					
		< Back	Install	Can	cel

6. When the installation process is complete, click **Finish**.

🌍 DA-IRIG-B Driver Setup	- 🗆 ×
	Completing DA-IRIG-B Driver Setup
	DA-IRIG-B Driver has been installed on your computer. Click Finish to close Setup.
	< Back Finish Cancel

Installing the IRIG-B Utility

You can use the IRIG-B utility to view the status information and configure the signal type for the DE-2-IRIGB-4-DIDO module.

- 1. Download the DE-2-IRIGB-4-DIDO utility from Moxa's support website at https://www.moxa.com/en/support to the DA-720 computer.
- 2. Double-click **DA-IRIG-B Utility_1.2_2018062211_Setup.exe** to start the installation process.
- 3. Installation process will show the welcome page. Click Next.

🌐 DA-IRIG-B Utility Setup	– 🗆 X
	Welcome to DA-IRIG-B Utility Setup
	Setup will guide you through the installation of DA-IRIG-B Utility.
	It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
	Click Next to continue.
	Next > Cancel

4. Select Install for anyone using this computer and click Next.

•

NOTE

Before you select **Install just for me**, make sure that you understand how this option might affect the operation for other users on the embedded computer.

🌍 DA-IRIG-B Utility Setup				_		Х
6	Choose Users Choose for whic	h users you wan	it to install	DA-IRI(G-B Utility.	
Select whether you want to computer. Click Next to cor		Utility for yourse	elfonly or f	for all us	ers of this	
Install for anyone	e using this compute	er				
◯ Install just for me	2					
		< Back	Next	>	Cance	el 🛛

5. Accept the default destination folder or click **Browse** to select one; then, click **Install**.

🌍 DA-IRIG-B Utility Se	etup		_		\times
6	Choose Inst Choose the f	all Location older in which to install D)A-IRIG-B Uti	lity.	
		lowing folder. To install i itall to start the installati		folder, clic	k
Destination Folder	(x86)\Moxa\DA-IRIG	-8 Utility	Brow	NSe	
Space required: 92.0 Space available: 452.					
		< Back	Install	Cano	cel

6. When the installation process is complete, click **Finish**.

🌍 DA-IRIG-B Utility Setup	- 🗆 ×
	Completing DA-IRIG-B Utility Setup
	DA-IRIG-B Utility has been installed on your computer. Click Finish to close Setup.
	< Back Finish Cancel

Using the IRIG-B Utility

After you install the IRIG-B utility on your embedded computer running Windows 10, you start the IRIG-B utility from the start menu (click **Moxa > mxIrigbCardConf**) to configure the DE-2-IRIGB-4-DIDO.



Time Sync. Condition	Input		
Sync. to internal RTC Source:	Port:	TTL	~
Free run 🗸 🗸			
Sync. internal RTC to system time period per 0	Polarity:	Normal	~
	IRIG-B Party M	Node:	
Set system time to interna RTC		Even	~
IRIG-B Status	Output		
TTL: Off Line	Output		
DIFF: Off Line	Contract		
Time: 2015/07/19 18:44:16	Signal Type:	TTL	~
Timezone (Hour): +8	Polarity:	Normal	~
Time Quality: Normal operation	Mode:	From DIFF In	~
	Internal RTC o	utput	
Digital Out			
☑ 3 ☑ 2 ☑ 1 ☑ 0	IRIG-B party mode:		
Digital In		Even	~

Configuring Time Synchronization Settings

In the IRIG-B utility, you can set the DE-2-IRIGB-4-DIDO module to synchronize the RTC using one of the following time input sources:

- External IRIG-B signal
- Internal independent 25 MHz reference clock

Time Input Source

Depending on the input port that you want to use, select **Free run, TTL In** or **DIFF In** (Differential In).

From the Sync. to internal RTC Source drop-down list, select a time input source that you want to use.

Moxa IRIG-B Card Configure Utility (DE2-IR	IIGB-4DIO) — 🗆 🗙
Time Sync. Condition Sync. to internal RTC Source: Free run Free run Free run TTL In DIFF In Set system time to internal RTC IRIG-B Status TTL: Off Line DIFF: Off Line Time: 2022/08/29 15:50:34 Timezone (Hour): +0	Input Port: TTL Polarity: Normal IRIG-B Parity Mode: Even Output Signal Type: TTL Polarity: Normal Mode: From DIFE In
Time Quality: Normal operation ○ LSP ○ LS ○ DSP ○ DST Digital Out ☑ 3 ☑ 2 ☑ 1 ☑ 0 Digital In ☑ 3 ☑ 2 ☑ 1 ☑ 0	Internal RTC output IRIG-B parity mode: Even Apply Cancel

Synchronizing with System Time

You can synchronize the RTC time with the system time. In the IRIG-B utility, select the **Sync. internal RTC to system time** check box and enter the number of seconds to synchronize the time.

Moxa IRIG-B Card Configure Utility (DE2-IRIGB-4DIO) — 🗆 🗙		
Time Sync. Condition Sync. to internal RTC Source: Free run ✓ Sync. internal RTC to	Port: TTL ~	
System time period per 5 second	Polarity: Normal ~ IRIG-B Parity Mode: Even ~	
IRIG-B Status TTL: Off Line DIFF: Off Line	Output Signal Type: TTL ~	
Time: 2022/08/30 10:25:12 Timezone (Hour): +0 Time Quality: Normal operation	Polarity: Normal ~ Mode: From DIFF In ~	
O LSP O LS O DSP O DST Digital Out ☑ 3 ☑ 2 ☑ 1 ☑ 0	IRIG-B parity mode:	
Digital In ☑ 3 ☑ 2 ☑ 1 ☑ 0	Apply Cancel	

Configuring IRIG-B Input/Output Parameters

You can use the IRIG-B utility to configure the IRIG-B parameters that the DE-2-IRIGB-4-DIDO module supports.

Input Signal Type

Depending on the input port that you want to use, select **TTL** or **DIFF** (Differential).

From the **Port** drop-down list select an option and click **Apply** to make the changes take effect.

Moxa IRIG-B Card Configure Utility (DE2-I	RIGB-4DIO) — 🗆 🗙
Time Sync. Condition Sync. to internal RTC Source:	Port: TTL V
Free run V	TTL DIFF
system time period per 0	Polarity: Normal ~
Set system time to internal RTC	Even ~
IRIG-B Status TTL: Off Line DIFF: Off Line	Output
DIFF: Off Line Time: 2022/08/29 15:35:29	Signal Type: TTL 🗸
Timezone (Hour): +0	Polarity: Normal ~ Mode: From DIFF In ~
Time Quality: Normal operation	
○ LSP ○ LS ○ DSP ○ DST	Internal RTC output
Digital Out	IRIG-B parity mode:
Digital In ☑ 3 ☑ 2 ☑ 1 ☑ 0	Apply Cancel

Input Polarity Mode

Depending on the input signal, you may need to configure the polarity mode to **Normal** or **Inverse**. From the **Polarity** drop-down list select an option and click **Apply** to make the changes take effect.

Moxa IRIG-B Card Configure Utility (DE2-I	RIGB-4DIO) — 🗆 🗙
Time Sync. Condition Sync. to internal RTC Source: Free run Sync. internal RTC to system time period per second Set system time to internal RTC	Input Port: TTL ✓ Polarity: Normal IRIG-B Parity Mc Normal Inverse
IRIG-B Status TTL: Off Line DIFF: Off Line Time: 2022/08/29 15:36:52	Output Signal Type: TTL ~
Timezone (Hour): +0 Time Quality: Normal operation O LSP O DSP O DST	Polarity: Normal ✓ Mode: From DIFF In ✓ Internal RTC output
Digital Out 3 2 1 0 Digital In	IRIG-B parity mode:
	Apply Cancel

Input Parity Mode

Depending on your country, you may need to configure the parity mode. For example, in China, select the **Odd** parity mode.

From the **IRIG-B Parity Mode** drop-down list box select an option and click **Apply** to make the changes take effect.

Moxa IRIG-B Card Configure Utility (DE2-I	RIGB-4DIO)	– 🗆 X
Time Sync. Condition Sync. to internal RTC Source: Free run Sync. internal RTC to system time period per 0 second	Input Port: Polarity:	TTL ~
Set system time to internal RTC	IRIG-B Parity I	Even ∽ Even
TTL: Off Line DIFF: Off Line	Output	Odd None
Time: 2022/08/29 15:41:42 Timezone (Hour): +0	Signal Type: Polarity: Mode:	TTL ~ Normal ~
Time Quality: Normal operation	Internal RTC o	
Digital Out 3 2 1 0 Digital In	IRIG-B parity n	node: Even ~
		Apply Cancel

Output Signal Type

Depending on the output port that you want to use, select **TTL** or **Differential** (DIFF).

From the **Signal Type** drop-down list box select an option and click **Apply** to make the changes take effect.

Moxa IRIG-B Card Configure Utility (DE2-IF	RIGB-4DIO) — 🗆 🗙
Time Sync. Condition Sync. to internal RTC Source: Free run Sync. internal RTC to System time period per second Set system time to internal RTC IRIG-B Status	Input Port: TTL Polarity: Normal IRIG-B Parity Mode: Even Output
TTL: Off Line DIFF: Off Line Time: 2022/08/30 11:03:11 Timezone (Hour): +0 Time Quality: Normal operation O LSP O LS DSP DST	Output Signal Type: TTL Polarity: Differential Mode: From DIFF In Internal RTC output
Digital Out ☑ 3 ☑ 2 ☑ 1 ☑ 0 Digital In ☑ 3 ☑ 2 ☑ 1 ☑ 0	IRIG-B parity mode: Even ✓ Apply Cancel

Output Polarity Mode

Depending on the output signal, you may need to configure the polarity mode to **Normal** or **Inverse**.

From the **Output Polarity** Mode drop-down list box select an option and click **Apply** to make the changes take effect.

Moxa IRIG-B Card Configure Utility (DE2-II	RIGB-4DIO) — 🗆 🗙
Time Sync. Condition Sync. to internal RTC Source: Free run Sync. internal RTC to system time period per Set system time to internal RTC IRIG-B Status TTL: Off Line DIFF: Off Line	Input Port: TTL Polarity: Normal IRIG-B Parity Mode: Even Output
Time: 2022/08/30 11:04:43 Timezone (Hour): +0 Time Quality: Normal operation O LSP LS DSP DST	Signal Type: TTL Polarity: Normal Normal Inverse Internal RTC output
Digital Out ☑ 3 ☑ 2 ☑ 1 ☑ 0 Digital In ☑ 3 ☑ 2 ☑ 1 ☑ 0	IRIG-B parity mode: Even ~ Apply Cancel

Output Mode

Depending on the output signal source, you may need to configure the mode to "From TTL In", "From DIFF In" or "IRIG-B from internal RTC".

From the **Output Mode** drop-down list box select an option and click Apply to make the changes take effect.

Moxa IRIG-B Card Configure Utility (DE2-I	RIGB-4DIO) —	×
Time Sync. Condition Sync. to internal RTC Source: Free run Sync. internal RTC to system time period per 0 second Set system time to internal RTC	Polarity: Normal Normal	-
IRIG-B Status TTL: Off Line DIFF: Off Line Time: 2022/08/30 11:05:10 Timezone (Hour): +0 Time Quality: Normal operation O LSP DSP DST	Output Signal Type: TTL Polarity: Normal Mode: From DIFF In Internal RTC out IRIG-B from internal RTC	-
Digital Out ☑ 3 ☑ 2 ☑ 1 ☑ 0 Digital In ☑ 3 ☑ 2 ☑ 1 ☑ 0	IRIG-B parity mode: Even Apply Cancel	

IRIG-B Parity Mode

Depending on your country, you may need to configure the parity mode. For example, in China, select **Odd** parity mode.

From the **IRIG-B parity mode** drop-down list box select an option and click **Apply** to make the changes take effect.

Moxa IRIG-B Card Configure Utility (DE2-I	RIGB-4DIO) — 🗆 🗙
Time Sync. Condition Sync. to internal RTC Source: Free run Sync. internal RTC to system time period per 0 second Set system time to internal RTC	Input Port: TTL ✓ Polarity: Normal ✓ IRIG-B Parity Mode: Even ✓
IRIG-B Status TTL: Off Line DIFF: Off Line Time: 2022/08/30 11:05:46 Timezone (Hour): +0 Time Quality: Nomal operation O LSP LS DSP DST	Output Signal Type: TTL ~ Polarity: Normal ~ Mode: From DIFF In ~ Internal RTC output
Digital Out ☑ 3 ☑ 2 ☑ 1 ☑ 0 Digital In ☑ 3 ☑ 2 ☑ 1 ☑ 0	IRIG-B parity mode: Even Odd Apply Cancel

Check IRIG-B Status

You can check the current IRIG-B status and time information in this utility.

- TTL: TTL status (Normal/Off Line/Frame Error/Parity Error)
- **DIFF:** DIFF status (Normal/Off Line/Frame Error/Parity Error)
- Time: The time of input source
- Timezone (Hour): The timezone of input source
- Time Quality: Time Correction accuracy
- LSP: Leap second pending at the end of minute
- LS: Leap second type
- **DSP:** Daylight saving time change pending at end of minute
- **DST:** Daylight saving time in effect

Moxa IRIG-B Card Configure Utility (DE2-I	RIGB-4DIO)	- 🗆	×
Time Sync. Condition Sync. to internal RTC Source: Free run Sync. internal RTC to system time period per second Set system time to internal RTC URIC R States	Input Port: Polarity: IRIG-B Parity N	TTL Nomal Mode: Even	
IRIG-B Status TTL: Off Line DIFF: Off Line Time: 2015/07/19 18:44:16 Timezone (Hour): +8 Time Quality: Normal operation O LSP O LS O DSP O DST	Output Signal Type: Polarity: Mode: Internal RTC o	TTL Normal From DIFF In	>
Digital Out ☑ 3 ☑ 2 ☑ 1 ☑ 0 Digital In ☑ 3 ☑ 2 ☑ 1 ☑ 0	IRIG-B parity n	node: Even Apply Car	v

Configuring Digital Input and Output Status

The DE-2-IRIGB-4-DIDO module features four digital outputs and four digital inputs. You can use IRIG-B utility configure the digital output and digital input status.

To control a **digital output**, select or clear the associated check box. The following table shows the signal and logic state for the check box.

Check box	Signal	Logic
Selected	High	1
Not selected	Low	0

To read status from a **digital input**, select or clear the associated check box. The following table shows the signal and logic state.

Check box	Signal	Logic
Selected	High	1
Not selected	Low	0

Moxa IRIG-B Card Configure Utility (DE2-I	RIGB-4DIO) — 🗆 🗙
Time Sync. Condition Sync. to internal RTC Source: Free run Sync. internal RTC to system time period per second Set system time to internal RTC IRIG-B Status	Input Port: TTL Polarity: Normal IRIG-B Parity Mode: Even
TRIG-B status TTL: Off Line DIFF: Off Line Time: 2015/07/19 18:44:16 Timezone (Hour): +8 Time Quality: Normal operation O LSP O LSP DST	Output Signal Type: TTL Polarity: Normal Mode: From DIFF In Internal RTC output
Digital Out ☑ 3 ☑ 2 ☑ 1 ☑ 0 Digital In ☑ 3 ☑ 2 ☑ 1 ☑ 0	IRIG-B parity mode: Even ✓ Apply Cancel

Using the mxIrigUtil Command

The mxIrigUtil command is available in the destination folder that you selection during the installation process. The list of available parameters and options for the mxIrigUtil command is the same in Linux and Windows.

To display the help information, in a command line window, enter the mxIrigUtil command without a parameter.

File path: C:\Program Files (x86)\Moxa\DA-IRIG-B Utility\
Usage: mxIrigUtil -f function_id [-p parameters] [-c] [-h]
Show the utility information if no argument apply.
-h: Show this information.
-c: Indicate the n-the IRIG-B Card.
-f: Pass function id argument to execute specific functionality.
-p: Parameters for each function, use comma to pass multiple variable

The following table describes the function IDs.

Function ID	Function description	Parameters
0	Display the hardware device ID. For example, Hardware ID = 1 (DA_IRIGB_4DIO_PCI104)	N/A
1	Display current internal RTC time.	N/A
2	Set internal RTC time	-p yyyy,MM,dd,hh,mm,ss Where yyyy is the year (2000 – 2099). MM is the month (1- 12). dd is the day of the month (1-31). hh is the hour of the day (0 -23). mm is the minute (0-59). ss is the second (0- 59). Default value is 2014,01,01,00,00,00 if no argument.
3	Display the RTC synchronization source.	N/A
4	Set the RTC synchronization source.	-p Source Source: 0(free run (Internal RTC)), 1(port 0 /Fiber input), 2(port 1 input) Default value is 2 if no argument.
5	Display IRIG-B signal status. Possible statuses are: 0-Normal 1-Off Line 2-Frame Error 3-Parity Error	-p Source Source: 1(port 0/Fiber input), 2 (port 1 input) Default value is 2 if no argument.
6	Display IRIG-B input parity check mode. Possible modes are: 0-Even 1-Odd 2-None	-p Source Source: 1(port 0/Fiber input), 2 (port 1 input) Default value is 2 if no argument.
7	Set IRIG-B input parity check mode	-p Source, Mode Where Source: 1(port 0/Fiber input), 2 (port 1 input) Mode: 0 (Even), 1 (Odd), 2 (None) Default value is 2,0 if no argument.
8	Display IRIG-B Output Parity Check Mode	N/A
9	Set IRIG-B Output Parity Check Mode	-p Mode Mode: 0 (Even), 1 (Odd) Default value is 0 if no argument.
10	Display pulse per second width (ms)	N/A
11	Set pulse per second width (ms)	-p Width

Function ID	Function description	Parameters
		Width: [0-999] (width: 0-999 ms) Default value is 0 if no
		argument.
		-p Port
12	Display input signal type	Port: 0(port 0/Fiber input), 1(port 1 input) Default value is 1
		if no argument.
		-p Port, Type, Inverse
		Port: 0(port 0/Fiber input), 1(port 1 input) Type: 0(TTL),
13	Set input signal type	1(Differential)
		Inverse: 0 (no inverse), 1(inverse). Default value is 1,1,0 if
		no argument.
		-p Port
14	Get output signal type	Port: [1-4] (output port[1-4]) Default value is 1 if no
		argument.
		-p Port, Type, Mode, Inverse
		Port: [1-4] (output port[1-4]) Type: 0(TTL), 1(Differential)
		Mode: 0(From Port 0/Fiber Input Port), 1(From Port 1
15	Set output signal type	Input), 2(From IRIG-B encode(Internal RTC)), 3(From PPS
		encode)
		Inverse: 0(No inverse), 1(Inverse) Default value is 1,1,2,0 if
		no argument.
		-p Port
16	Display digital output	Port: 0(DO0), 1(DO1), 2(DO2), 3(DO3)
		Default value is 1 if no argument.
	Set digital output	-p Port, Level
17		Port: 0(D00), 1(D01), 2(D02), 3(D03)
		Level: 0(low), 1(high) Default value is 0,0 if no argument.
18	Display digital input	-p Port
		Port: 0(DI0), 1(DI1), 2(DI2), 3(DI3) Default value is 0 if no argument.
	Display FPGA firmware build	
19	date	N/A
	uale	

For example, if you want to set the IRIG-B RTC time to 2014/01/01 03:25:00, enter the following command.

mxIrigUtil -f 2 -p 2014,1,1,3,25,0