DA-720 Series Windows Software User's Manual

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www.moxa.com/product



DA-720 Series Windows Software User's Manual

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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.

The following topics are covered in this chapter:

□ Software Components

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

System Initialization

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

The following topics are covered in this chapter:

Overview

Initializing User Settings

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:
 - (1) What's your home country/region?
 - (2) What's your preferred app language?
 - (3) What keyboard layout would you like to use?
 - (4) What time zone are you in?

Choose your answers and click Next.

2. Click Use Express settings.

Cat aging fact	
Get going last	
Change these at any time. Select Use Express settings to:	
Descensive your speech tuning 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.	
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.	
4-	
	Use Express setting

3. Provide User name, Password, and Password hint, and click Next to create a user account on the computer.

Create an accou	int for this	s PC		
If you want to use a password, choo	ose comething that	will be easy for you to	remember but bard for	
others to guess.	use something that	will be easy for you to	remember but hard tor	
Who's going to use this PC?				
User name				
Make it secure.				
Enter password				
Re-enter password				
Password hint				

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



Configuring the Serial Interface

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

The following topics are covered in this chapter:

- Overview
- Configuring Serial Interface Mode

Overview

The DA-720 supports three serial modes: **RS232**, **RS485-2-wire**, and **RS422/RS485-4-wire**. These modes can be configured either on 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 \rightarrow Moxa \rightarrow mxSetSerialInterface.

≡	Most used
	Snipping Tool
	🧭 Paint
	Intel® HD Graphics Control Panel
	М
	📕 Моха 🔷
	mxSetSerialInterface
	S
	Search
	🔅 Settings
	w
	Windows Accessories ~
8	Windows Administrative Tools 🛛 🗸
	Windows Ease of Access 🛛 🗸 🗸
ŝ	Windows PowerShell V
Ф	Windows System 🗸 🗸 🗸 🗸 🗸

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

🖳 Set Sei	rial I	—		×
Port: Mode:	COM1 COM1 COM2		~	
C	IK		Cancel	

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



4. Click **OK**.

Enabling Embedded Filters

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

The following topics are covered in this chapter:

Unified Write Filter

- > Overview
- > Configuring File-Based Write Filter

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.

Power Options
Event Viewer
System
Device Manager
Network Connections
Disk Management
Computer Management
Command Prompt
Command Bromet (Admin)
Command Prompt (Admin)
Task Manager
Task Manager Control Panel
Task Manager Control Panel File Explorer
Task Manager Control Panel File Explorer Search
Task Manager Control Panel File Explorer Search Run
Task Manager Control Panel File Explorer Search Run Shut down or sign out

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**.

Programs		- 🗆	×
Programs Control Panel Home System and Security Network and Internet Hardware and Sound Programs User Accounts Appearance and Personalization Clock, Language, and Region Ease of Access Final Region Ease of Access Programs Windows field box field box field up to the field of	dates adates	Search Control Panel	× م

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



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	st match						
ሴ	P**-	Comm Deskto	Command Prompt Desktop app					
			-	_				
ŝ	Œ	ŝ	ß		<u>⊳</u> ≼		11	
	cmd							
	ρ	[]]						

- 2. 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



4. 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	-	Х
Ч (icrosoft Windows [Version 10.0.10240] c) 2015 Microsoft Corporation. All rights reserved.		
0 - 0	:\Windows\system32>uwfmgr get-config nified Write Filter Configuration Utility version 10.0.10240 opyright (C) Microsoft Corporation. All rights reserved.		
С	urrent Session Settings		
3	ILTER SETTINGS Filter state: ON Pending commit: N/A Shutdown pending:No		
5	ERVICING SETTINGS Servicing State: OFF		
D	VERLAY SETTINGS Type: RAM Maximum size: 1024 MB Warning Threshold: 512 MB Critical Threshold: 1024 MB		
ф ф	OLUME SETTINGS olume 469e8113-0000-0000-0000-501f00000000 [C:] Volume state: Protected Volume ID: 469e8113-0000-0000-501f00000000		
0	File Exclusions: urrent Session Exclusions for Volume 469e8113-0000-0000-0000-501f00000000 [C:] C:\Program Files		
R	EGISTRY EXCLUSIONS *** No exclusions		
N	ext Session Settings		
	ILTER SETTINGS Filter state: ON Pending commit: N/A		
5	ERVICING SETTINGS Servicing State: OFF		
D	VERLAY SETTINGS Type: RAM 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 different functions of the DA-720 with examples.

The following topics are covered in this chapter:

Watchdog Function

> Enabling the Watchdog Function

LED Indicators

- > Displaying and Controlling the LED On/Off Status
- Serial Interface
 - > Displaying and Controlling the UART Mode

Relay Output

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

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	
C:\programs\example>watchdog Press "ENTER" in 10 seconds , 'q' to exit Press "ENTER" in 10 seconds , 'q' to exit Press "ENTER" 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 Controlling the LED On/Off Status

To display the status of the LEDs and to switch the LEDs On or Off, do the following:

1. 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.



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.

LED Test Program (0) Exit Program (1) Display LED (2) Set LED value
LED Test Program (0) Exit Program (1) Display LED (2) Set LED value
(0) EXIT Program (1) Display LED (2) Set LED value
(1) orspray Leb (2) Set LED value
(2) Set LLD Value
LED0 = Off
LED1 = Off
LED2 = Off
LED3 = Off
LED4 = Off
LEDS = 0++
(A) Evit Drogram
(d) Display LFD
(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:

1. 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:

1. 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.

C:\Users\moxa.MOXA-LT1NMIF0NH\Desktop\4.Relay\Relay.exe		×
RELAY Test Program (0) Exit Program (1) Display RELAY pin status (2) Set RELAY pin value		1
Input the value (0 is low, 1 is high) = 1 Set PELAY surgess		
RELAY Test Program		
(0) Exit Program		
 Display RELAY pin status Set RELAY pin value 		

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



System Recovery

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

The following topics are covered in this chapter:

- Recovery Environment
- Recovery Procedure
- Saving the System Image to the USB Drive

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

 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 brance	h of Clonezilla live
are based on Debian Install Notes: CloneZilla live is booted and run in live mode; no installation is required to use it.	
Download Path: <u>Clonezilla Live Stable at SourceForge</u>	
Pre Downloaded ISO ISO 2-21-14\donezilla-live-2.0.1-15-i686-pae-moxa-2.0.0	.iso
Show All Drives (Use with Care) Save ISO file 👽 MD5 Check	
Iype: USB Drive Drive: D:\ OK	Cancel

The boot files will be copied to your USB drive.

Tuxboot	_ D _ X
1. Downloading Files (Done)	
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-2.0.0
Source: EFI_disable\boot\unicode.pf2 (2500 KB)	
Destination: D: \EFI_disable \boot \unicode.pf2	
Extracted: 7 of 42 files	
	16%

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

Tuxboot		x
1. Downloading Files (Done)		
2. Extracting and Copying Files (Done)		
3. Installing Bootloader (Done)		
4. Installation Complete, Reboot (Current)		
After rebooting, select the USB boot option in the BIOS boot menu. Reboot now? Reboot Now	Exit	

 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.

	InsydeH20 Se	etup Utility	Rev. 3.5
Main Advanced	Security Power <mark>Boot</mark>	Exit	
UEFI Boot Quick Boot PXE Boot to LAN USB Boot ►EFI ►Legacy	<enabled> <enabled> <disabled> <enabled></enabled></disabled></enabled></enabled>	Enable/Di Function	isable UEFI Boot
F1 Help 1∔Se Esc Exit ↔Se	lect Item F5/F6 Cha lect Menu Enter Sel	nge Values F9 ect⊦SubMenu F10	Setup Defaults Save and Exit

3. Select Boot Type Order.

	InsydeH20 Setup Utility	Rev. 3.5
	Boot	
Boot Device Priority		Select Normal Boot Option Priority or
Normal Boot Menu	<normal></normal>	Advance Boot Option Priority
►Boot Type Order ►Hard Disk Drive		
PUSB		
F1 Help 14 Select It	em F5/F6 Change Values	F9 Setup Defaults
Esc Exit 🕂 🕂 Select Me	nu – Enter Select ► SubMenu	FIU Save and Exit

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



WARNING

An incorrect boot priority will lead to recovery failure.

	InsydeH20 Setup Utility	Rev. 3.5
	Boot	
Boot Type Order USB CD/DVD-ROM Drive Hard Disk Drive Others	Boot	
F1 Help î↓Selectite Esc Exit ↔SelectMen	m F5/F6 Change Values u Enter Select⊦ SubMenu	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.



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

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

```
Do NDT create partition table on the client handdisk!

//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

//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

//usr/share/drbl/sbin/ocs-functions: line 10739: warning: setlocale: LC_ALL: cannot change locale (en

//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)

//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-function
```

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



5. Wait for the process to finish.

Partclone v0.2.78 http://partclone.org	401)
Calculating bitmap Please wait done!	Jal)
Device size: 524.3 MB = 127999 Blocks	
Free Space: 189.0 MB = 46135 Blocks	
BIOCK SIZE. FOSD Byte	
Elapsed: 00:00:06 Remaining: 00:00:08 Rate: Current Block: 79394 Total Block: 127999	1.36GB/min
Data Block Process:	40.05%
	40.65%
IOTAL BLOCK Process:	62.03%

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



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.

	InsydeH20 Setup Utility	Rev. 3.5
	Boot	
Boot Type Order Hard Disk Drive CD/DVD-ROM Drive USB Others		+: Move Up -: Move Down
F1 Help 14 SelectIter Esc Exit ↔ SelectMen	n F5/F6 Change Values ⊔ Enter Select ► SubMenu	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)	
clomezilla live restore disk	
clonezilla live save disk	
Press [Tab] to edit outions	

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

[1] S.1419411 sd 0:0:1:00: [sdb] Attached SCSI disk [5] S.257277] sd 0:0:00: Attached scsi generic sg0 type 0 [5] S.2606601 st 1:0:00: Attached scsi generic sg2 type 5 Begin: Loading essential drivers ... [5] S.7725511 Atheros(R) L2 Ethernet Driver - version 2.2.3 [5] S.7745611 Copyright (c) 2007 Atheros Corporation. [5] S.6631561 Broadcom NetXtreme II S771x 1061gabit Ethernet Driver bnx2x 1.62.00-6 (2011/01/30) [6] 6.0059521 Btrfs Loaded [6] 6.0540551 device-mapper: ucvent: version 1.0.3 [6] 6.0597371 device-mapper: ioctl: 4.19.1-ioctl (2011-01-07) initialised: dm-devel@redhat.com dome. Begin: Hounting root file system ... [6] S.2039321 Uniform Multi-Platform E-IDE driver [6] 6.0818931 ide_generic: please use "probe_mask=0x3f" module parameter for probing all legacy ISA IDE ports [6] 6.8011411 NTFS driver 2.1.30 [Flags: R/W MODULE]. [6] 6.90124551 NTFS volume version 3.1. Begin: Running /scripts/live-premount ... done. [7] 7.4533691 aff: wodule is from the staging directory, the quality is unknown, you have been war med. [7] 7.4533691 aufs: module is from the staging directory, the quality is unknown, you have been war med. [7] 7.4533691 aufs: nodule is from the staging directory, the quality is unknown, you have been war med. [7] 7.4533691 aufs: version 4.0 (2009/01/31) Phillip Lougher Begin: Running /scripts/live-realpremout ... done. Begin: Running /scripts/live-realpremout ... done. Begin: Running /scripts/live-realpremout ... done. Begin: Running /scripts/live-toton ... done. done. Begin: Running /scripts/live-filesystem.squashfs" on "//filesystem.squashfs" via "/dev/loop0" done. Begin: Running /scripts/live-toton ... done. Begin: Configuring fstab ... done. Begin: Loading presed file ... done. Begin: Running /scripts/live-hotton ... done. Begin: Enconing autorking ... done. Begin: Running /scripts/live-hotton ..

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.

	Choose mode
Now you ca	an choose to:
reboot	Reboot
rerun1 rerun2	Start over (image repository /home/partimag, if mounted, will be umounted) Start_over_(keep_image_repository_/home/partimag_mounted)
	2045

DE-PRP-HSR-EF Expansion Module

This chapter describes how to operate the DE-PRP-HSR-EF card on a DA-720 computer, and includes information on configuring the DE-PRP-HSR-EF function using the configuration utility.

The following topics are covered in this chapter:

Software Installation

- Installing the DE-PRP-HSR-EF Utility
- > Checking the PRP/HSR Related Service and Program

Configuring the DE-PRP-HSR-EF

- Setting the Operating Mode
- Getting the DE-PRP-HSR-EF Status
- Getting the FPGA Version
- > Getting the Status of the Supervision Frame
- Configuring Alert Notifications

API Reference

- > Overview
- API Functions
 - Set Operating Mode
 - Get RX/TX Counters

Software Installation

Installing the DE-PRP-HSR-EF Utility

1. Extract the DE-PRP-HSR_V1.0_Utility.zip file and run WinPcap-4-1-3.exe to install the **WinPcap** setup package.



- Obtain the MxPrpSetup.msi file on the DE-PRP-HSR-EF Software CD/DVD or download the file from Moxa's support website at http://www.moxa.com/support/download_center.asp. Then, save the file on the DA-720 computer.
- 3. Double-click on the MxPrpSetup.msi file to start the installation process.



4. Click the **Next** button on the welcome screen.

儼 MxPrpSetup	_		×
Welcome to the MxPrpSetup Setup Wizard			
The installer will guide you through the steps required to install MxPrpSetup	on your	computer	
WARNING: This computer program is protected by copyright law and interr Unauthorized duplication or distribution of this program, or any portion of it, or criminal penalties, and will be prosecuted to the maximum extent possible	national t may resu e under th	reaties. It in sever ne law.	e civil
Cancel < Back	(<u>N</u> ex	t>

5. Accept the default installation directory or click **Browse** to select one and Click **Next**.

🖟 MxPrpSetup	_		×
Select Installation Folder			
The installer will install MxPrpSetup to the following folder.			
To install in this folder, click "Next". To install to a different folder, enter it be	low o	r click ''Bro	owse".
<u>F</u> older:			
C:\Program Files\M0XA\MxPrpSetup\		B <u>r</u> owse.	
		<u>D</u> isk Cos	t
Install MxPrpSetup for yourself, or for anyone who uses this computer:			
Everyone			
◯ Just <u>m</u> e			
Cancel < <u>B</u> ack		<u>N</u> e	xt >

6. Click **Next** to continue.

體 MxPrpSetup			_		×
Confirm Installation					5
The installer is ready to install MxPrpSetup or) your computer.				
Click "Next" to start the installation.					
	Cancel	< <u>B</u> ack		<u>N</u> e:	кt>

Click **Close** to complete the installation.
 The Moxa PRP Service will be installed on the computer.

🖟 MxPrpSetup		-	- [×
Installation Complete				
MxPrpSetup has been successfully installe	d.			
Click "Close" to exit.				
Please use Windows Update to check for	any critical updat	es to the .NET Fran	nework.	
	Cancel	< <u>B</u> ack		<u>C</u> lose

Checking the PRP/HSR Related Service and Program

Programs and Features						- 🗆	\times
$\leftrightarrow \rightarrow \neg \uparrow \overline{0} \rightarrow Control F$	Panel > Programs > Programs and Features			~	・ Ö Search Program	ns and Features	٩
Control Panel Home View installed updates	Uninstall or change a program To uninstall a program, select it from the list and then	click Uninstall, Change, or Repair.					
off	Organize ▼ Uninstall Change Repair Name Uninstall this program. ♥ Intel(R) Manageability Engine Firmware Recovery Ag R Intel® Control Center M Intel® Graphics Driver Intel® Management Engine Components ■ Intel® Management Engine Components ■ Microsoft Visual C+2010 x6R Redistributable - 10.0 Winforcosoft Visual C+2010 x6R Redistributable - 10.0 Winforcosoft Visual C+2013 Redistributable - 10.0	Publisher Intel Corporation Intel Corporation Intel Corporation Intel Corporation Microsoft Corporation Microsoft Corporation Microsoft Corporation MOXA Riverbed Technology, Inc.	Installed On 2/9/2017 2/9/2017 2/9/2017 2/9/2017 2/9/2017 2/9/2017 2/9/2017 2/9/2017	Size 58.0 MB 1.46 MB 74.2 MB 20.4 MB 13.8 MB 11.1 MB 20.5 MB 301 KB	Version 1.10.26660 1.2.1.1011 10.18.10.4425 9.5.15.1730 10.0.40219 12.0.40649.5 1.0.0 4.1.0.2980		•
	MOXA Product version: 1.0.0 Size: 301 KB						

1. In the Windows Programs and Features window, check the software version.

2. Check if the network adapter is renamed correctly.

names should h chown bolo The rk h. +h

Device Manager	-	
Action View Help		
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Mice and other pointing devices		
> Monitors		
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Intel(R) Gigabit Network Connection (PRPHSREthernet #2)		
Intel(R) I210 Gigabit Network Connection		
🚽 Intel(R) I210 Gigabit Network Connection #3		
🚽 Intel(R) I210 Gigabit Network Connection #4		
Intel(R) I210 Gigabit Network Connection #6		
🚍 Realtek PCIe GBE Family Controller		
Realtek PCIe GBE Family Controller #2		
Realtek PCIe GBE Family Controller #4		
🛫 Realtek PCIe GBE Family Controller #5 🗇 Realtek PCIe GRE Family Controller #6		
Realtek PCIe GBE Family Controller #7		
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OK

Cancel

3. Check if the network connections are renamed correctly based on the network adapter name.

😰 Network Conne	ections								-		×
$\leftarrow \rightarrow \land \uparrow$	Network Connections >						~ Ö	Search Netw	ork Cor	nections	R
Organize 🔻	Disable this network device	Diagnose this connection	Rename this co	nnection	View status of this connection	Change	e settings of thi	s connection		-	?
Name	^	Status	D	evice Name			Connectivity			Network	Category
Ethernet 10 Ethernet 11 Ethernet 12 Ethernet 13 Ethernet 13 Ethernet 23 Ethernet 24 Ethernet 24 Ethernet 24 Ethernet 4 Ethernet 5 Ethernet 5 Ethernet 5		Network cable unplug Network cable unplug	gged Rd gged Rd gged Rd gged Rd gged Rd gged Rd gged In gged Rd gged In gged In	ealtek PCle G ealtek PCle G ealtek PCle G ealtek PCle G ealtek PCle G tel(R) 1210 G ealtek PCle G tel(R) 1210 G tel(R) 1210 G tel(R) 1210 G tel(R) 1210 G tel(R) 1210 G	BE Family Controller #7 BE Family Controller #3 BE Family Controller #3 BE Family Controller #3 BE Family Controller #2 gabit Network Connection #2 gabit Network Connection #3 gabit Network Connection #3 gabit Network Connection #5 gabit Network Connection #6 BE Family Controller #6 BE Family Controller #6 BE Family Controller #6		Internet acce	55		Private n	etwork
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PRPHSREthen	net #1	Unidentified network	ln .	tel(R) Gigabit	Network Connection (PRPHSREth	nernet #1)	No network a	ICCESS		Public ne	etwork
₩ PRPHSREthen	net ≢2	Unidentified network	i In	tel(R) Gigabit	Network Connection (PRPHSREth	nernet #2)	No network a	iccess		Public n	:twork
16 items 1 item	selected										> ==

4. Wait for 1 minute to confirm that the PRP/HSR service is running continuously without stopping.

Services					- 🗆	\times
File Action View	<u>H</u> elp					
(= =) 📰 🛤	Q 📑 🛛 📰 🕨 🔳 II IÞ					
🐊 Services (Local)	Services (Local)					
	Moxa PRP Service	Name	Description	Status	Startup Type	Log ^
	Stop the service Restart the service Description: Retrieve relative information on Moxa PRP/HSR Module Card	Intel(R) ME Service Interactive Services Detection Internet Connection Sharin IP Helper IPsec Policy Agent KDC Proxy Server service (K KtmRm for Distributed Tran Link-Layer Topology Discov Local Session Manager Microsoft (R) Diagnostics H Microsoft Account Sign-in Microsoft Account Sign-in Microsoft Passport Microsoft Passport Microsoft Passport Microsoft Software Shadow	Intel® Man Enables use Provides ne Provides tu Internet Pro KDC Proxy S Coordinates Creates a N Core Windo Diagnostics Enables use Manages A Manages In Provides pr Manages so	Running Running Running	Automatic (D Manual Manual (Trig Automatic Manual (Trig Manual Manual (Trig Manual Manual (Trig Manual Manual (Trig Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual	Loc Loc Loc Net Loc Loc Loc Loc Loc Loc Loc Loc
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		Network Connection Broker	Brokers con	Running	Manual (Trig	Loc Y
	Extended Standard					

5. Check if the **PRPSuperVisionFrame.exe** is running correctly.

r⊠ Task Manager File Options View			-		×
Processes Performance Users Details	Services				
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> I MxPrpSvc	0%	3.8 MB			
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🕞 Windows Shell Experience Host	0%	16.2 MB			~
Fewer <u>d</u> etails				End t	ask

Configuring the DE-PRP-HSR-EF

You can use the Moxa PRP Settings utility to set the operating mode on the DE-PRP-HSR-EF.

Setting the Operating Mode

- 1. Open the Moxa PRP Settings utility from the Start menu.
- If more than one DE-PRP-HSR-EF is installed on the computer, select the index (1 to 3) of the DE-PRP-HSR-EF that you want to configure from the Module Index drop-down list.

🖳 MOXA PRP/HSR S	—		\times
Module Index]		
PRP/HSR Mode]	Apply	

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

MOXA PRP/HSR Settings	
Module Index	
PRP/HSR Mode	
	Apply
HSR	MYMUS PR

4. Wait for the service to make the changes.

Getting the DE-PRP-HSR-EF Status

To get the counter value, do the following:

- 1. Run the **GetRXCounters.exe** program from the DE-PRPHSR_V1.0_example.zip file.
- 2. Get RX count values from the internal ports, port A and port B

Administrator: C:\Windows\system32\cmd.exe	_	×
C:\x64\Release>GetRXCounters.exe Enter the boardIndex: 0 Select Port to configure: 2: Port0, 4: Port1, 8: Port2 2		^
portSel = 2 Select counter value to get:		Ø
: RX GOOD OCTETS		1
: RX ERR		2
: RX WRONGLAN		3
: RX DUPLICATE		
0 rxCounter = 0x4802		
C:\x64\Release>		
		~

3. Get the TX count value.



Getting the FPGA Version

1. Execute the GetFPGAVersion.exe program



2. Check if the read status and the firmware version are correct.

Getting the Status of the Supervision Frame

Open **Wireshark** using the hsr_prp_supervision filter and check if the Supervision frame is sent correctly.

🙆 Cap	turing from 區域連線 [Wireshark 1.10.8 (v1.10.8-2-g	52a5244 from master-1.10)]				-	٥	×
<u>File</u>	dit <u>View Go</u> <u>Capture</u> <u>Analyze</u> <u>Statistics</u> Tel	ephony <u>I</u> ools Internals <u>H</u> elp						
0 6	▲ ■ ▲ B B X 2 Q + +	🌢 🐺 👱 । 🔲 📑 । ପ୍ର୍ପ୍ 🖻	🚟 🔟 🥵 🔆 🗮					
Filter:	hsr_prp_supervision	🗸 Expression Clear App	oly Save					
No.	Time Source 1 0.00000000 MoxaTech_00:e5:0f	Destination Iec_00:01:00	Protocol HSR/PRP	Length Info 66 PRP_Supervision				
	2 1.09354400 MoxaTech_00:e5:0f	Broadcast	ARP	66 who has 192.168.127.254?	Tell 192.168.127.64			
	3 2.01503500 MoxaTech_00:e5:0f	Broadcast	ARP	66 who has 192.168.127.254?	Tell 192.168.127.64			
	4 2.01572000 MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 PRP Supervision				
	5 3.01503900 MoxaTech_00:e5:0f	Broadcast	ARP	66 who has 192.168.127.254?	Tell 192.168.127.64			
	6.4.03150600 MoxaTech 00:e5:0f	Tec. 00:01:00	HSP/PRP	66 PRP Supervision				
	7 6.04712200 MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 PRP Supervision				
	8 0.77042000 ASUSTERC_02.41.3e	broadcasc	AKE	42 who has 192.100.31.234?	Tell 192.168.31.59			
	9 7.68788800 AsustekC_02:4f:3e	Broadcast	ARP	42 who has 192.168.31.254?	Tell 192.168.31.59			
	L0 8.06276400 MoxaTech_00:e5:0f	Iec_00:01:00	H5R/PRP	66 PRP Supervision				
3	1 8.68783700 Asustekc_02:4f:3e	Broadcast	ARP	42 who has 192.168.31.254?	Tell 192.168.31.59			
1	12 9.83477300 AsustekC_02:4f:3e	Broadcast	ARP	42 who has 192.168.31.254?	Tell 192.168.31.59			
	13 10.0777030 MoxaTech_00:e5:0f	Iec_00:01:00	HSR/PRP	66 PRP Supervision				
1	4 10.6872340 Asustekc 02:4f:3e	Broadcast	ARP	42 who has 192,168,31,254?	Tell 192,168,31,59			

00 00 90 e8 00 e5 0f 88 fb 00 0	1N	
90 e8 00 e5 07 le 06 00 90 e8 0 00 00 00 00 00 00 00 00 00 00 00 0 00 00	4j.4	
	00 00 90 e8 00 e5 0f 88 fb 00 02 90 e8 00 e5 0f 1e 06 00 90 e8 00 90 e8 00 e5 0f 1e 06 00 90 e8 00 90 00 <td>00 00 90 e8 00 e5 0f 88 fb 00 01</td>	00 00 90 e8 00 e5 0f 88 fb 00 01

Configuring Alert Notifications

Setting Custom Actions

- 1. Connect the PRP/HSR card with a RedBox.
- 2. Stop the Moxa PRP/HSR service.
- 3. Check if the relay output is set to high.

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File Home Share	View			~ 🕐
← → ~ ↑ <mark> </mark> « Lo	cal Disk (C:) > Program Files > MOXA > Mx	PrpSetup >	マ Ö Search M	ЛхРг , р
🕂 Downloads 🖈 ^	Name	Date modified	Туре	Size ^
🔮 Documents 🖈	AlertNotification	10/19/2017 8:12 PM	File folder	
📰 Pictures 🛛 🖈	Log	10/19/2017 8:09 PM	File folder	
DE-SATA	💿 Ethernet_Settings.ico	3/21/2017 10:53 AM	lcon	36
MxPrpSetup	InvertFiberSDFromPin.exe	10/12/2017 8:10 PM	Application	1
Performance	🚳 mxgpio.dll	10/12/2017 8:10 PM	Application extens	12
SW RAID1	🚳 mxprp.dll	9/25/2017 7:15 PM	Application extens	2
	💿 MxPrpInfo.exe	9/5/2017 7:38 PM	Application	1,10
a OneDrive	MxPrpInfo.exe.config	9/5/2017 7:35 PM	CONFIG File	
This PC	📟 MxPrpSetting.exe	9/5/2017 7:38 PM	Application	2
	MxPrpSetting.exe.config	9/5/2017 7:36 PM	CONFIG File	
Desktop	MxPrpSvc.exe	10/19/2017 8:16 PM	Application	2
Documents	MxPrpSvc.exe.config	9/5/2017 7:36 PM	CONFIG File	
🕂 Downloads	MxPrpSvc.InstallState	10/18/2017 9:50 AM	INSTALLSTATE File	
b Music	📟 PCI.ico	3/20/2017 6:08 PM	lcon	
Pictures	PrpHsrConfiguration.ini	10/18/2017 8:19 PM	Configuration sett	
Videos	📓 PrpHsrSequenceNr0.ini	10/19/2017 9:14 PM	Configuration sett	
Local Disk (C·)	PrpHsrSequenceNr1.ini	10/19/2017 9:14 PM	Configuration sett	
	PrpHsrSequenceNr2.ini	10/19/2017 8:18 PM	Configuration sett	
Intel	PRPSupervisionFrame.exe	10/12/2017 8:10 PM	Application	3
PerfLogs	SetGpioLed.exe	10/12/2017 8:10 PM	Application	1
Program Files	CatulCDMada ava	10/12/2017 0.10 DM	Application	1 ×
23 items 1 item selected			Activate V	Vincews
			Go to Setting	s to activat

4. Add the relay output program to **AlertNotification.cmd** located in the **AlertNotification** folder.



5. Check the current status of the relay using the **RelaySample.exe** test program.

(The RelaySample.exe program is available in the DA-720-Win10_V1.0_Example.zip under the examples folder)

RELAY Test Program (0) Exit Program (1) Display RELAY pin status (2) Set RELAY pin value 1 Status = HIGH RELAY Test Program (0) Exit Program
(2) Set RELAY pin value 1 Status = HIGH RELAY Test Program (0) Exit Program
1 Status = HIGH RELAY Test Program (θ) Exit Program
Status = HIGH RELAY Test Program (0) Exit Program
RELAY Test Program (0) Exit Program
(0) Exit Program
(*) 1112 ****
(1) Display RELAY pin status
(2) Set PELAV pin value
(2) Set RELAT PIN Value

- 6. Start the Moxa PRP/HSR service.
- 7. Disconnect all connections on port A and port B
- 8. Check if the relay output is set to low



API Reference

Overview

The Moxa PRP/HSR API provides a set of C functions for communicating with hardware devices. The Moxa PRP/HSR API supports the following tasks:

- Setting the operating mode (PRP/HSR).
- Getting RX/TX counters

API Functions

Set Operating Mode

SetPrpMode	Set the operating mode to PRP mode.
SetHHsrMode	Set the operating mode to HSR mode.

SetPRPMode

int SetPrpMode(UINT8 slaveAddr);

Parameters

slaveAddr : The system management bus (smbus) slave address.

Return Value

Return value(ret) is zero on success, a negative error code on failure.

ret = 0 : Success

ret = -1: Error

Description

The SetPRPMode function is used to set the operating mode to PRP mode.

Example

```
#include "stdafx.h"
#include <windows.h>
#include "mxprp.h"
bool CheckMxPrpService();
#define LED_INDEX_PRP 0
```

```
int _tmain(int argc, _TCHAR* argv[])
   int boardIndex = 0;
   int ledIndex = LED INDEX PRP;
   UINT8 slaveAddr = 0 \times 0;
   bool isServiceExist = false;
   isServiceExist = CheckMxPrpService();
   if(isServiceExist==true)
       printf("mxPrpService is running, to run this program, please stop the
mxPrpService\n");
       printf("Exit the program\n");
       return 0;
   if(argc < 2)
       /* Get user selection for smbus slave address */
       printf("Enter the boardIndex:\n");
       scanf("%d", &boardIndex);
   else
       boardIndex = _wtol(argv[1]);
   slaveAddr = SMBUS SLAVE ADDRESS
   slaveAddr += (UINT8)boardIndex;
   /* Set the PRP mode */
   SetPrpMode(slaveAddr);
   /* Set the link mode */
   SetLinkSpeedMode(slaveAddr);
   /* Set the module led*/
   ConfigureGpioMode(slaveAddr, ledIndex);
   SetLedValue(slaveAddr, ledIndex);
   return 0;
bool CheckMxPrpService()
   bool isServiceExists = false;
   HANDLE hMutex;
   hMutex = CreateMutex(
      NULL, // default security descriptor
      FALSE, // mutex not owned
      TEXT("Global\\MxPrpSvcMutex")); // object name
   if (hMutex == NULL)
```

```
    printf("CreateMutex error: %d\n", GetLastError() );
    }
else
    {
        if ( GetLastError() == ERROR_ALREADY_EXISTS )
        {
            isServiceExists = true;
        }
        else
        {
            isServiceExists = false;
            /* No service is running, now we can close the mutex and run our program
*/
            CloseHandle(hMutex);
        }
    }
    return isServiceExists;
}
```

SetHSRMode

int SetHsrMode(UINT8 slaveAddr);

Parameters

slaveAddr : The smbus slave address.

Return Value

Return value (ret) is zero on success, a negative error code on failure.

ret = 0 : Success ret = -1: Error

Description

The SetHSRMode function is used to set the operating mode to HSR mode.

Example

```
#include "stdafx.h"
#include <windows.h>
#include "mxprp.h"
bool CheckMxPrpService();
#define LED_INDEX_HSR 1
```

```
int _tmain(int argc, _TCHAR* argv[])
   int boardIndex = 0;
   int ledIndex = LED INDEX HSR;
   UINT8 slaveAddr = 0x0;
   bool isServiceExist = false;
   isServiceExist = CheckMxPrpService();
   if(isServiceExist==true)
       printf("mxPrpService is running, to run this program, please stop the
mxPrpService\n");
       printf("Exit the program\n");
       return 0;
   if(argc < 2)
       /* Get user selection for smbus slave address */
       printf("Enter the boardIndex:\n");
       scanf("%d", &boardIndex);
   else
       boardIndex = _wtol(argv[1]);
   slaveAddr = SMBUS SLAVE ADDRESS
   slaveAddr += (UINT8)boardIndex;
   /* Set the HSR mode */
   SetHsrMode(slaveAddr);
   /* Set the link mode */
   SetLinkSpeedMode(slaveAddr);
   /* Set the module led*/
   ConfigureGpioMode(slaveAddr, ledIndex);
   SetLedValue(slaveAddr, ledIndex);
   return 0;
bool CheckMxPrpService()
   bool isServiceExists = false;
   HANDLE hMutex;
   hMutex = CreateMutex(
      NULL, // default security descriptor
      FALSE, // mutex not owned
      TEXT("Global\\MxPrpSvcMutex")); // object name
```

```
if (hMutex == NULL)
{
    printf("CreateMutex error: %d\n", GetLastError() );
}
else
{
    if ( GetLastError() == ERROR_ALREADY_EXISTS )
    {
        isServiceExists = true;
    }
    else
    {
        isServiceExists = true;
    }
    else
    {
        isServiceExists = false;
        /* No service is running, now we can close the mutex and run our program
*/
        CloseHandle(hMutex);
    }
    return isServiceExists;
}
```

Get RX/TX Counters

GetRxCounter	Get the RX counters from hardware device
GetTxCounter	Get the TX counters from hardware device

GetRxCounter

int GetRxCounter(UINT8 slaveAddr, UINT8 portSel, unsigned short counterOffset, unsigned short *rxCounter);

Parameters

slaveAddr :	The smbus slave address.
portSel:	Port select, interlink, port A or port B.
counterOffset:	Counter address offset.
rxCounter:	The RX counter value.

Return Value

Return value(ret) is zero on success, a negative error code on failure.

ret = 0 : Success

Description

The GetRXCounter function is used to obtain the RX counter of the interlink ports, port A and port B.

Example

```
#include "stdafx.h"
#include <windows.h>
#include "mxprp.h"
bool CheckMxPrpService();
unsigned short ReverseBytes (unsigned short value);
unsigned int GetRxGoodOctets(UINT8 slaveAddr, UINT8 portSel);
unsigned int GetRxErrOctets(UINT8 slaveAddr, UINT8 portSel);
unsigned int GetRxWrongLan(UINT8 slaveAddr, UINT8 portSel);
unsigned int GetRxDuplicate(UINT8 slaveAddr, UINT8 portSel);
int _tmain(int argc, _TCHAR* argv[])
    UINT8 portSel = 0;
   UINT8 funcSel = 0;
   unsigned short counterOffset = 0;
   unsigned int rxCounter = 0x0;
   int boardIndex = 0;
   UINT8 slaveAddr = 0 \times 0;
    bool isServiceExist = false;
    isServiceExist = CheckMxPrpService();
    if(isServiceExist==true)
        printf("mxPrpService is running, to run this program, please stop the
mxPrpService\n");
        printf("Exit the program\n");
        return 0;
    /* Get user selection for smbus slave address */
    printf("Enter the boardIndex:\n");
    scanf("%d", &boardIndex);
    slaveAddr = SMBUS SLAVE ADDRESS;
    slaveAddr += boardIndex;
    /* Configure Counter Control bit to 1 to update the values in counter registers
    printf("Select Port to configure: 2: Port0, 4: Port1, 8: Port2\n");
    scanf("%d", &portSel);
    printf("portSel = %d\n", portSel);
    /* Get the counter value */
    printf("Select counter value to get:\n \
                                         0: RX GOOD OCTETS\n \
                                         1: RX ERR\n \
                                         2: RX WRONGLAN\n \
                                         3: RX DUPLICATE\n \
                                         \n");
    scanf("%d", &funcSel);
```

```
switch(funcSel)
   case 0:
       rxCounter = GetRxGoodOctets(slaveAddr, portSel);
       break;
   case 1:
       rxCounter = GetRxErrOctets(slaveAddr, portSel);
       break;
   case 2:
       rxCounter = GetRxWrongLan(slaveAddr, portSel);
       break;
   case 3:
       rxCounter = GetRxDuplicate(slaveAddr, portSel);
       break;
   default:
       break;
   printf("rxCounter = 0x%x\n", rxCounter);
   return 0;
unsigned int GetRxGoodOctets(UINT8 slaveAddr, UINT8 portSel)
   unsigned int rxCount = 0;
   unsigned short rxCountLow = 0;
   unsigned short rxCountHigh = 0;
   unsigned short recvData = 0x0;
    /* Get low part of RX counter */
   GetRxCounter(slaveAddr, portSel, (short)CNT CFG REG OFFSET RX GOOD OCTETS L,
&recvData);
   rxCountLow = ReverseBytes(recvData);
   /* Get high part of RX counter */
   GetRxCounter(slaveAddr, portSel, (short)CNT CFG REG OFFSET RX GOOD OCTETS H,
&recvData);
   rxCountHigh = ReverseBytes(recvData);
   /* Combine low part and high part data */
   rxCount = (unsigned int) (rxCountHigh << 16) + rxCountLow;</pre>
   return rxCount;
unsigned int GetRxErrOctets(UINT8 slaveAddr, UINT8 portSel)
   unsigned int rxCount = 0;
   unsigned short rxCountLow = 0;
   unsigned short rxCountHigh = 0;
   unsigned short recvData = 0x0;
```

```
/* Get low part of RX counter */
   GetRxCounter(slaveAddr, portSel, (short)CNT CFG REG OFFSET RX ERR L,
&recvData);
   rxCountLow = ReverseBytes(recvData);
   /* Get high part of RX counter */
   GetRxCounter(slaveAddr, portSel, (short)CNT CFG REG OFFSET RX ERR H,
&recvData);
   rxCountHigh = ReverseBytes(recvData);
   /* Combine low part and high part data */
   rxCount = (unsigned int) (rxCountHigh << 16) + rxCountLow;</pre>
   return rxCount;
unsigned int GetRxWrongLan(UINT8 slaveAddr, UINT8 portSel)
   unsigned int rxCount = 0;
   unsigned short rxCountLow = 0;
   unsigned short rxCountHigh = 0;
   unsigned short recvData = 0 \times 0;
    /* Get low part of RX counter */
   GetRxCounter(slaveAddr, portSel, (short)CNT CFG REG OFFSET RX WRONGLAN L,
&recvData);
   rxCountLow = ReverseBytes(recvData);
   /* Get high part of RX counter */
   GetRxCounter(slaveAddr, portSel, (short)CNT CFG REG OFFSET RX WRONGLAN H,
&recvData);
   rxCountHigh = ReverseBytes(recvData);
   /* Combine low part and high part data */
   rxCount = (unsigned int)(rxCountHigh << 16) + rxCountLow;</pre>
   return rxCount;
unsigned int GetRxDuplicate(UINT8 slaveAddr, UINT8 portSel)
   unsigned int rxCount = 0;
   unsigned short rxCountLow = 0;
   unsigned short rxCountHigh = 0;
   unsigned short recvData = 0x0;
    /* Get low part of RX counter */
   GetRxCounter(slaveAddr, portSel, (short)CNT CFG REG OFFSET RX DUPLICATE L,
&recvData);
   rxCountLow = ReverseBytes(recvData);
   /* Get high part of RX counter */
   GetRxCounter(slaveAddr, portSel, (short)CNT CFG REG OFFSET RX DUPLICATE H,
&recvData);
   rxCountHigh = ReverseBytes(recvData);
```

```
/* Combine low part and high part data */
   rxCount = (unsigned int) (rxCountHigh << 16) + rxCountLow;</pre>
   return rxCount;
unsigned short ReverseBytes(unsigned short value)
   return (unsigned short)((value & 0xFFU) << 8 | (value & 0xFF00U) >> 8);
bool CheckMxPrpService()
   bool isServiceExists = false;
   HANDLE hMutex;
   hMutex = CreateMutex(
      NULL, // default security descriptor
      FALSE, // mutex not owned
      TEXT("Global\\MxPrpSvcMutex")); // object name
   if (hMutex == NULL)
      printf("CreateMutex error: %d\n", GetLastError() );
   else
     if ( GetLastError() == ERROR ALREADY EXISTS )
           isServiceExists = true;
      else
            isServiceExists = false;
            /* No service is running, now we can close the mutex and run our program
           CloseHandle(hMutex);
   return isServiceExists;
```

GetTxCounter

int GetTxCounter(UINT8 slaveAddr, UINT8 portSel, unsigned short counterOffset, unsigned short *rxCounter);

Parameters

slaveAddr :	The smbus slave address.
portSel:	Port select, interlink, port A or port B.
counterOffset:	Counter address offset.
rxCounter:	The RX counter value.

Return Value

Return value(ret) is zero on success, a negative error code on failure.

ret = 0 : Success

Description

The GetTXCounter function is used to obtain the TX counter of the interlink port, port A and port B.

Example

```
Example#include "stdafx.h"
#include <windows.h>
#include "mxprp.h"
bool CheckMxPrpService();
unsigned short ReverseBytes(unsigned short value);
unsigned int GetTxOctets(UINT8 slaveAddr, UINT8 portSel);
int _tmain(int argc, _TCHAR* argv[])
   UINT8 portSel = 0;
   UINT8 funcSel = 0;
   unsigned short counterOffset = 0;
   unsigned int txCount;
   int boardIndex = 0;
   UINT8 slaveAddr = 0 \times 0;
   bool isServiceExist = false;
   isServiceExist = CheckMxPrpService();
   if(isServiceExist==true)
       printf("mxPrpService is running, to run this program, please stop the
mxPrpService\n");
       printf("Exit the program\n");
       return 0;
```

```
/* Get user selection for smbus slave address */
   printf("Enter the boardIndex:\n");
   scanf("%d", &boardIndex);
   slaveAddr = SMBUS SLAVE ADDRESS;
   slaveAddr += boardIndex;
   /* Configure Counter Control bit to 1 to update the values in counter registers
   printf("Select Port to configure: 2: Port0, 4: Port1, 8: Port2");
   scanf("%d", &portSel);
   /* Get TX count */
   txCount =GetTxOctets(slaveAddr, portSel);
   printf("txCount = %d\n", txCount);
   return 0;
unsigned int GetTxOctets(UINT8 slaveAddr, UINT8 portSel)
   unsigned int txCount = 0;
   unsigned short txCountLow = 0;
   unsigned short txCountHigh = 0;
   unsigned short recvData = 0x0;
    /* Get low part of TX counter */
   GetTxCounter(slaveAddr, portSel, (short)CNT CFG REG OFFSET TX OCTETS L,
   txCountLow = ReverseBytes(recvData);
   /* Get high part of TX counter */
   GetTxCounter(slaveAddr, portSel, (short)CNT_CFG_REG_OFFSET_TX_OCTETS_H,
&recvData);
   txCountHigh = ReverseBytes(recvData);
   /* Combine low part and high part data */
   txCount = (unsigned int) (txCountHigh << 16) + txCountLow;</pre>
   return txCount;
unsigned short ReverseBytes (unsigned short value)
   return (unsigned short)((value & 0xFFU) << 8 | (value & 0xFF00U) >> 8);
bool CheckMxPrpService()
   bool isServiceExists = false;
   HANDLE hMutex;
   hMutex = CreateMutex(
      NULL, // default security descriptor
      FALSE, // mutex not owned
      TEXT("Global\\MxPrpSvcMutex")); // object name
```

```
if (hMutex == NULL)
{
    printf("CreateMutex error: %d\n", GetLastError() );
}
else
{
    if ( GetLastError() == ERROR_ALREADY_EXISTS )
    {
        isServiceExists = true;
    }
    else
    {
        isServiceExists = false;
        /* No service is running, now we can close the mutex and run our program
*/
        CloseHandle(hMutex);
    }
    return isServiceExists;
}
```