Microsoft Windows 10 IOT Enterprise LTSC2019

Syslogic User's Manual

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Content

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The product is intended for measurement, control and communications applications in industrial environment. The products must be installed by specially trained people. The strict observation of the installation guideline is mandatory.

The use of the product in systems in which life or health of persons is directly dependent (e.g. life support systems, patient monitoring systems, etc.) is not allowed.

1 Introduction

Windows 10 IOT Enterprise LTSC 2019 is based on Windows 10 Version 1809. In fact, both Operating Systems are based on the same binaries.

Windows 10 IOT Enterprise LTSC 2019 is enhanced with special tools to target the needs of embedded systems that run continuously. While a desktop OS like Windows 10 is optimized for maximum user interaction, an embedded OS is the opposite. Embedded systems often run in environments where few user interactions are desired. Embedded systems often supervise safety critical facilities and thus need to be very robust, reliable and autonomous.

This user manual covers some tools and techniques that help to reduce possible software and hardware breakdowns concerning the operation of Windows 10 IOT Enterprise LTSC 2019 on an IPC in an industrial environment. It details some embedded features that can be configured. Basic knowledge of Windows operating systems is required.

For detailed information refer to Microsoft documentation of Windows 10 IOT Enterprise.

https://www.microsoft.com/en-us/WindowsForBusiness/windows-iot

1.1. Supported Hardware

This release of Windows 10 IOT Enterprise LTSB 2016 supports the following systems from Syslogic:

Syslogic products	Product features
COMPACT8	Syslogic Industrial Computer Series 8
PROTOUCH-8	Syslogic Projected Capacitive Display Series 8
COMPACT81	Syslogic Industrial Computer Series 81
PROTOUCH-81	Syslogic Projected Capacitive Display Series 81
OEM81	Syslog OEM Series 81

Table 1 – Supported Hardware

1.2. Notation within this document

Keys to buttons to be selected are noted with square bracket.

[ctrl] Press CTRL key

Commands to be entered somewhere are noted as followed:

dir Enter "dir" to the command shell

Input to be replaced by the user is noted with square brackets:

[name] Enter your name instead of "[name]"

2 Getting Started

This chapter will give you a "quick start" on how to get Windows 10 IOT Enterprise running on an Intel Atom based system from Syslogic. The same procedure applies for all Systems.

2.1. Booting Windows 10 IOT Enterprise

If you do not have a CompactFlash card with a fully installed Windows 10 IOT Enterprise image, please read chapter 4 on how to install the system files.

Open the service cover of your industrial PC (IPC) and plug the flash card into the corresponding socket. Close the IPC and connect a USB keyboard, mouse and a monitor. Power the device and Windows 10 IOT Enterprise should start loading. If the device doesn't boot from the drive inserted press [DEL] while the BIOS is starting to select the correct drive or change the BIOS setting to boot from the flash.

2.2. User and Password Settings

The Syslogic Windows 10 IOT Enterprise image is configured for auto logon, i.e. if the system starts, the default user "Admin" is automatically logged on.

Default User:

W10IOTE auto logon User:	Admin
W10IOTE auto logon Password:	netipc
W10IOTE auto logon Group:	Administrators

Backup User:

Do not use this user profile for daily use.

W10IOTE backup User:	Administrator
W10IOTE backup Password:	netipc
W10IOTE backup Group:	Administrator

By default, the user Administrator is disabled. To enable this user run the following command with elevated privileges: **net user Administrator /enable:yes**

Refer to 3.8.1 to change the Auto Login User.

2.3. Desktop

On the desktop, the following items can be found:

Disable UWF on and commits changes to drive C:\. A reboot is required

Enables UWF on drive C:\. A reboot is required.

Shows the status of the UWF.

Starts Sysprep. Refer to chapter 4.2.

3 Windows 10 IOT Enterprise Features

The software included in our Windows 10 IOT Enterprise LTSC 2019 image is based on Windows 10 LTSC 2016. This long-term servicing channel (LTSC) of Windows 10 does not include all features included in the current branch (CB). LTSC images will not contain most in-box Universal Windows Apps (for example, Microsoft Edge, Cortana, the Windows Store, the Mail and Calendar apps) because the apps or the services that they use will be frequently updated with new functionality and therefore cannot be supported on PCs running the LTSC OS.

Windows 10 IOT Enterprise LTSC installations fully support the Universal Windows Platform. For apps from other Independent Software Vendors (ISV) contact the ISV to confirm if they will provide long-term support for their specific apps.

For more information about the different servicing models please refer to:

https://technet.microsoft.com/itpro/windows/manage/introduction-to-windows-10-servicing

In compare to Windows Embedded Standard 7, Windows 10 IOT Enterprise is not a component reduced operating system. It contains all the components like the standard Windows 10 LTSC.

Because the current branch includes feature upgrades not available in the LTSC branch, an application might run well in the current branch but run into problems on Windows 10 IOT Enterprise LTSC 2019. In this case looking to the list of installed packages in each of the both branches will help to figure out the root of the problem. Microsoft provides a tool to manage the package and modules included in a Windows 10 operating system. This tool is called DISM.

For more information about DISM please refer to:

http://msdn.microsoft.com/en-us/library/dd371719%28v=VS.85%29.aspx

Some helpful commands:

Add a package:	**dism /online /add-package /packagepath:[Path and Filename]** [Path and File] has to be replaced by a Path and filename of a cab file or a directory containing a cab file. Make sure all depending packages are already installed.
Remove a package:	**dism /online /remove-package /packagename:[name of the package]** A list of installed Packages is located in the UTILITIES/CURRENT_VERSION/Packages.txt. Replace [Name] by the full name of the package to the console including revision index.
Help adding drives:	**dism /online /add-driver /?**
Help removing drives	**dism /online /remove-driver /?**

3.1. Default Configuration

- Firewall: enabled
- Windows Defender: enabled
- Auto logon: enabled
- UWF: installed, disabled
- Languages: English language support
- DHCP: enabled
- Computer name: random
- Graphics driver: Intel ® HD Graphics

3.2. Graphics Driver

Intel is modifying its graphic driver constantly. It's suggested to visit Intel's website from time to time for new driver versions.

Installed driver on the system is Intel HD Graphics Driver. To configure the driver, use a right-click and open the Graphic Properties.

3.2.1. Backlight Control for Protouch-8 devices

The brightness of the displays can be controlled by the following options:

- Use slider located in control panel-> Power Options.
- Right Click on Desktop-> Display settings: Use slider Adjust brightness level
- Use standard Windows API for controlling backlight. There are several examples available on the web. A good example can be found here:

  http://www.codeproject.com/Articles/236898/Screen-Brightness-Control-for-Laptops-and-Tablets

3.3. Ethernet Driver

Intel is modifying its network drivers regularly, therefore it is suggested to visit Intel's website from time to time for new driver versions.

3.4. Security

To get a secure system it is required to configure the features provided properly. Main security features are a working firewall and antivirus software.

3.4.1. Windows Firewall

Windows firewall is installed and activated by default. Two modifications have been made to speed up system development.

- Allow Ping — The system responds to ping commands from outside.
- Enable Remote Desktop — It is possible to connect to the device by remote desktop.

3.4.2. Antivirus software

Antivirus software is always an important subject of any Windows system. This is valid for Windows 10 IOT Enterprise as well.

Windows 10 IOT Enterprise is protected by Microsoft Windows Defender.

When enabling the Unified Write Filter (UWF) it is recommended to find solutions for the following issues:

- Typically, antivirus software uses a daily growing database of virus definitions. Any change written to the file system may be forwarded to RAM by the write filter. Is there enough RAM available?
- Embedded systems typically get quite old. How long will it be possible to get new virus definitions without any upgrade of the installed antivirus software? Who will upgrade the software if required?
- Rebooting the system with the virus definition stored in RAM only, will end in losing the definition and requires downloading the virus definitions again.

If not using antivirus software, make sure that the system remains safe and free of any unwanted modifications. Some important points are:

- Use a user with no elevated privileges as a default user.
- Prevent user from surfing the Web or receiving emails on the embedded System.
- Do not start not required services.
- Use write-filters as UWF.
- Use keyboard-filter
- Check group policy to further lock down the system
- Do not allow running any code from a device (any USB drives or similar) connected to the system or already installed software on the system using AppLocker.
- Do not allow any unwanted connection by any communication protocol (network vulnerability…) using firewall.
- If possible, reboot the system regularly to reset unwanted changes.
- Allow code running only from known folders or if they are signed.
- Sign updated packages, allow only installing signed updates.

3.5. Reliability

Windows 10 IOT Enterprise gives some features to improve the reliability of the system. These features are the Unified Write Filter (UWF), Shell Launcher, Keyboard Filter and Assigned Access. An Overview of the different features can be found at

https://technet.microsoft.com/en-us/itpro/windows/manage/lockdown-features-windows-10

From this webpage, it is possible to find further descriptions for each feature mentioned and examples how to configure them.

Make sure the system is protected adequately. Especially if the system is connected to any network it is important to have a good concept. Use Anti-Virus and Firewall Software if required.

3.5.1. Unified Write Filter

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.

For more information about the Unified Write Filter, refer to:

https://msdn.microsoft.com/en-us/library/windows/hardware/mt572001(v=vs.85).aspx

All configuration settings for UWF are stored in the registry. UWF automatically excludes these registry entries from filtering. To configure Unified Write Filter, use the command line tool uwfmgr.exe. For more information about the command line tool for configuring UWF, see the example or the page

https://msdn.microsoft.com/en-us/library/windows/hardware/mt572002(v=vs.85).aspx

Example:

uwfmgr volume protect C:	to protect volume c:
uwfmgr file add-exclusion C:\Users\Admin\Documents	Add files or directories as exclusions. The file / or files in this directory will not get deleted when the system reboots
uwfmgr get-config	shows the configuration of the UWF
uwfmgr help	shows how to use the command line tool

A description how to apply Windows updates to UWF-protected devices can be found on the following page:

https://msdn.microsoft.com/en-us/library/windows/hardware/mt571988(v=vs.85).aspx

It is important, to regularly update UWF-protected devices if possible, to make sure, that the system has the last critical, security and driver updates installed.

Issues when using Antivirus-Software with enabled UWF

When enabling the UWF on a drive and the Antivirus-Software is installed on this drive and enabled, the RAM can run out of memory as the growing database of the Software fills it. The system would freeze after some time. Therefore, the Antivirus-Software should be disabled (refer to chapter 3.4.2) or the folders and files belonging to the Software should be excluded by the UWF.

3.5.2. Shell Launcher

Shell Launcher may replace the default Windows 10 shell with a custom shell. You can use any application or executable as your custom shell, such as a command window or a custom dedicated application. It is also possible to select a different shell for different users or different user groups.

Note that you cannot use Shell Launcher to launch a Universal Windows app as a custom shell. To run a Universal Windows app please refer to 3.4.4.

For more information about the Shell Launcher please refer to:

https://msdn.microsoft.com/en-us/library/windows/hardware/mt571994(v=vs.85).aspx

To configure the Shell Launcher, useful examples can be found on the same webpage.

3.5.3. Keyboard Filter

You can use Keyboard Filter to suppress undesirable key presses or key combinations. Normally, a customer can use certain Microsoft Windows key combinations like Ctrl+Alt+Delete or Ctrl+Shift+Tab to alter the operation of a device by locking the screen or using Task Manager to close a running application. This may not be desirable if your device is intended for a dedicated purpose.

The Keyboard Filter feature works with physical keyboards, the Windows on-screen keyboard, and the touch keyboard. Keyboard Filter also detects dynamic layout changes, such as switching from one language set to another, and continues to suppress keys correctly, even if the location of suppressed keys has changed on the keyboard layout.

For more information about the Keyboard Filter please refer to:

https://msdn.microsoft.com/en-us/library/windows/hardware/mt587088(v=vs.85).aspx

3.5.4. Assigned Access

You can use assigned access to set up single-function devices, such as restaurant menus or displays at trade shows. If an account is configured for assigned access, a Windows app of your choosing runs above the lockscreen for the selected user account. Users of that account cannot access any other functionality on the device.

For more information about the Assigned Access feature please refer to:

https://msdn.microsoft.com/en-us/library/windows/hardware/mt620040(v=vs.85).aspx

How to configure Assigned Access can be found here:

https://msdn.microsoft.com/en-us/library/windows/hardware/mt620043(v=vs.85).aspx

3.6. Audio Support

3.6.1. Audio Volume Control

Most of Syslogic Hardware does not support any audio outputs. Therefore, audio volume control is disabled in the taskbar notification area. If Audio Output is required connect a USB Audio device to the system and enable the audio volume control in the taskbar by right-click on the taskbar-> Settings-> Turn system icons on or off-> Volume to On.

3.7. Language Packages

By default, only English is installed as a platform and desktop language.

3.7.1. Selecting another Desktop Language

There are 2 ways to change the current language or install a new language.

In the start menu, the Settings application will open the new settings interface. Select "Time & language" and then "Region & language" to open the settings page for the language which allows to download new languages and selecting a new desktop language.

Also, using the control panel allows you to load new languages and selecting a new desktop language.

3.8. Tools

3.8.1. Set Auto Login

The command Netplwiz in the System32 Folder allows you to select the user to logon at startup. The tool changes the settings in the registry and stores the password in a safe place (not visible in the registry).

Set Auto Login User: **Netplwiz.exe**

3.9. Wake on LAN

Windows 10 Iot Enterprise and the Hardware support Wake on LAN. This means that it is possible to wake up the system from sleep by sending a Magic Paket to the MAC address of the corresponding ethernet interface. The MAC address can be found by using the command **ipconfig -all** and looking for the physical address of the device. To send magic packets, multiple different tools can be found free for downloading.

4 Installing Windows 10 IOT Enterprise

4.1. Overview

Windows 10 IOT Enterprise is delivered on your IPC or TFT if ordered. Please capture an image if desired using any third-party imaging tool.

4.2. Capturing a System Image

To capture an image of an actual system, insert the flash disk to the computer and use a byte or file image tool. Before capturing an image, it is important to run Sysprep. Using Sysprep before capturing the image will guarantee proper functionality of the UWF and other features. To execute Sysprep use the icon Sysprep available from the desktop.

Run Sysprep before capturing an image:

Disable Write Filter before running Sysprep!

Run Sysprep before capturing an image of a Windows 10 IOT Enterprise image.
Do not restart the image before capturing the image.

Run Sysprep before sending Image for production

Run Sysprep before sending an Image to Syslogic for production. If not executed, Syslogic will not be able to deploy the image correctly.

4.2.1. Capture Image

After Sysprep has been executed and the system has stopped, remove the flash drive from the target and capture an Image using either a File image or a Byte Image on any other personal computer.

4.2.2. Deploy an Image

The IPC/W10ELTSC19-81A-64 provides one Byte Image of Windows 10 IOT Enterprise configured for COMPACT8 and PROTOUCH-8 located in the folder /IMAGE. Deploy the image using any byte image tool on a standard computer.

- Remove the flash from the target device and connect it to a personal computer.
- Extract the Image File located on IPC/W10ELTSB16E-8A in the folder IMAGE.
- Write the extracted image using a byte image tool to the drive.
- Now you can configure the partitions. Especially check if the whole size of the flash is used.
- Remount the flash to the target device.

5 Installing new Windows 10 or Windows 10 IOT Enterprise

Most system drivers are provided through Windows or can be downloaded from the manufacturer's web page. For details on Hardware refer to the corresponding manual.

Some drivers that are not provided automatically are located on IPC/W10ELTSC19-A81-64 Memory drive in the folder DRIVERS. Keep in mind that drivers are updated and improved continuously. Therefore, check for the manufacturers web page for the newest revisions.

6 Reduce Start and Shutdown Time of Windos 10 IOT Enterprise

To reduce the start and shutdown time of Windows 10 IoT, not needed services and components of Windows should be deactivated.

7 Release Information

Product	Changes
W10ELTSB19-81A-64 v1.0	First Release

References

- Microsoft Developer Network

  http://msdn.microsoft.com/en-us/library/ff795587%28v=WinEmbedded.0%29.aspx

- IPC/COMPACT8-SL user documentation

  (Document Order code: DOC/IPC_SL8-E), available at www.syslogic.com

- Microsoft Windows Sysinternals Tools & Website

  http://technet.microsoft.com/en-US/us-us/sysinternals/bb545021.aspx

8 Contact

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