

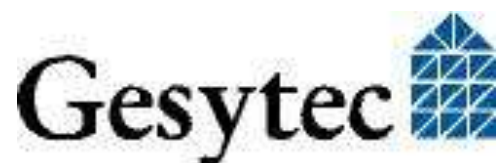


USB Socket Interface⁺ User Manual

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This manual ...

... provides you with all the information which you will require to use the Easylon® USB Socket Interface+.

However, this manual will neither explain aspects of Echelon's® LONWORKS® technology, nor details of the ISO/IEC 14908 standard on which this product is based, nor Echelon's Microprocessor Interface Program (MIP). The drivers of the USB Socket Interface+ have been developed in compliance with the driver specifications of the Echelon Corporation. Details of these are as well not described in this documentation. For further information on the LONWORKS technology please refer to the extensive documentation provided by Echelon.

After a general presentation of the Easylon USB Socket Interface+ in Chapter 1, Chapter 2 describes the necessary steps to install the module.

Chapter 3 gives the technical specifications of the device.

Chapter 4 provides some information on the usage of the Interface+ as virtual MIP network node.

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1

Product Information

This manual describes the Easylon USB Socket Interface⁺

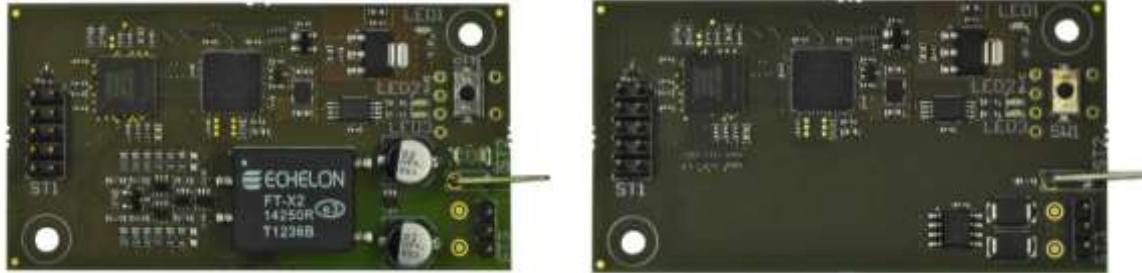


Figure 1-1 Easylon USB Socket Interface⁺ FT-X2 and EIA-485

1.1 Variants

The following variants of the Easylon USB Socket Interface⁺ are described in this documentation.

Order Code	Type Code	Network Interface Type	Remark
P.V20503	LVM.DBA	EIA-485	extended temperature
P.V10506	LVM.FBA	FTX	
P.V20506	LVM.FAA.	FTX	extended temperature

Table 1-1 Variants and order-codes

1.2 Scope of Delivery

- Easylon USB Socket Interface⁺ module
- Technical short information
- Installation and documentation CD with
 - 32/64 bit driver for Windows² XP / Vista / 7 / 8 / Server 2003 / 2008 / 2008R2 / 2012
 - Easylon RNI Software for remote LONWORKS access
 - EasyCheck diagnosis utility for Easylon interfaces
 - Documentation in Adobe Acrobat .PDF format
 - Sample design for a carrier board (Gerber and Step files)

¹ Modification of connectors on request

² A Linux driver is available in source code on demand

1.3 Overview

The Easylon USB Socket Interface+ realizes an IEC14908 compliant LON-USB connection as a plug-in module, to be integrated into OEM devices. The module is a network interface link between a PC and a control network according to the abovementioned standard respectively the LONWORKS specifications.

As an Easylon Interface+ the network interface provides up to eight logical driver interfaces thus realizing the parallel access of several applications to the network either in MIP or LNS compatible mode.

USB connection to the CPU board is made by a 10pin connector designed according the ASUS standard. Power supply uses this connector as well. The Easylon USB Socket Interface+ is a so called high speed USB device according to USB standard 2.0, however compatible with USB 1.1.

An Evaluation Kit available to the Easylon USB Socket Interface+ which allows easy access to connections and signals of the board.

Concerning the LON connection the module is available in different transceiver variants. Additionally to the FT-X2 transceiver there is an EIA-485 variant. Service button and traffic LED are implemented.

As an OEM module a certain flexibility with respect to customer specific requirements is observed, e.g. with respect to the connector types or positions. The respective module may therefore be different from the description in this documentation.

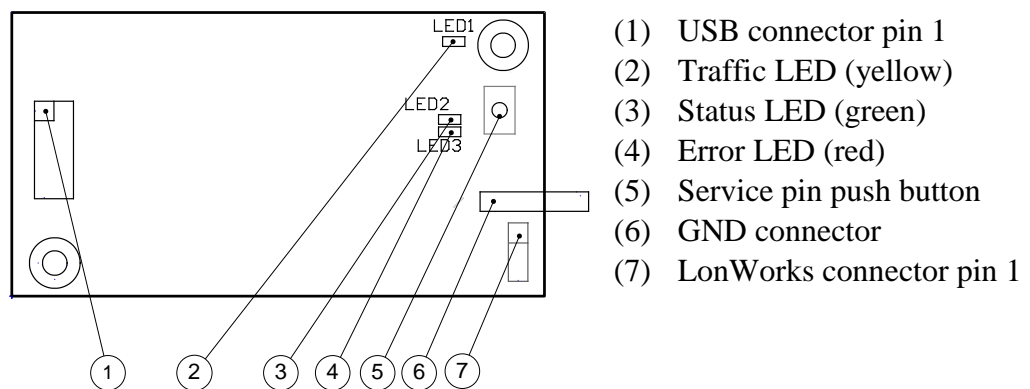


Figure 1-2 Module components

1.3.1 VNI (Virtual Network Interface)

With VNI Echelon defined a transparent mode of operation for LonWorks interfaces. In this mode LonTalk packets are not preprocessed on the interface device, but the PC realized the complete network access. Thus the applications running

on the PC receives and sends the messages. VNI interfaces overcome several limitations of the conventional interfaces using MIP or NSI firmware. For instance they offer an increased performance. Easylon Interfaces⁺ are compatible with the Echelon VNI interfaces and can be used with LNS based software such as LonMaker for Windows without problems.

1.3.2 MIP

The Neuron Chip used on the conventional network interface requires a firmware to realize the interface functionality. The de facto standard was the MIP firmware. Many applications still use the functionality of this firmware, which realizes layers 3–5 of the LonTalk protocol, namely network, transport and session. Using the drivers of the Easylon VNI Interfaces (Interface⁺) up to 8 logical MIP interfaces can be used with one interface card, i.e. an Easylon VNI Interface replaces 8 standard MIP interface cards.

2 Installation

Please check the delivered items. You must find the Easylyon USB Socket Interface+ and an installation CD, containing drivers and this documentation.

2.1 Hardware Installation

Please refer also to the manual describing the device into which you want to insert the Easylyon USB Socket Interface+. Turn off power, open the device and plug the USB module into a suitable USB socket. Please observe chapter “3.4 Connector Pin Assignment”. Restart the PC after the module has been installed and insert the Drivers & Documentation CD in order to get the appropriate driver.

2.2 Driver Installation

Drivers for different operating systems are available for the Easylyon USB Socket Interface+. Currently these are Windows XP, Vista, 7 and 8 and the Windows Server OS 2003, 2008, 2008 R2 and 2012. The drivers support both, the 32 and the 64 bit version of these operating systems. Latest driver versions you can download via the Easylyon Support pages of our web site: www.gesytec.com. A Linux driver is available in source code on request.

Installation for different operating systems is described in the following sections.

Windows operating systems section 2.2.1

16-Bit driver under 32-bit Windows section 2.2.2

This section also describes in short the diagnosis utility „EasyCheck“, which can be installed separately from CD.

2.2.1 Driver for Windows Operating System (WDM Drivers)

This section describes installation and setup of the Easylyon Interface card drivers for the Windows operating system from XP onwards.

The setup program is using the same WDM driver (Windows Driver Model) for all operating systems.

Note: For installation you can either use the Windows assistant or the program FastUpd.exe for manual installation, which is much more straightforward (cf. chapter 2.2.1.2).

The latter is especially helpful if you are running Windows 7 and later or have to install several instances of the driver.

2.2.1.1 Installation using the Windows Assistant

After the Easylon Interface+ has been mounted Windows will recognize the new device and start the hardware assistant.

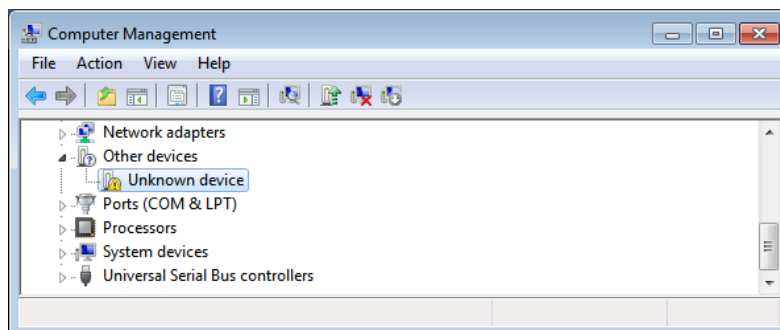
If Windows should not find the driver on the “Drivers and Documentation” CD or the driver should be elsewhere, please select the appropriate drive and select the setup file “LvXLvu.inf” and the driver “Gesyttec Lvuwdm Driver” from the “LvXLvu “ directory.

Windows 7

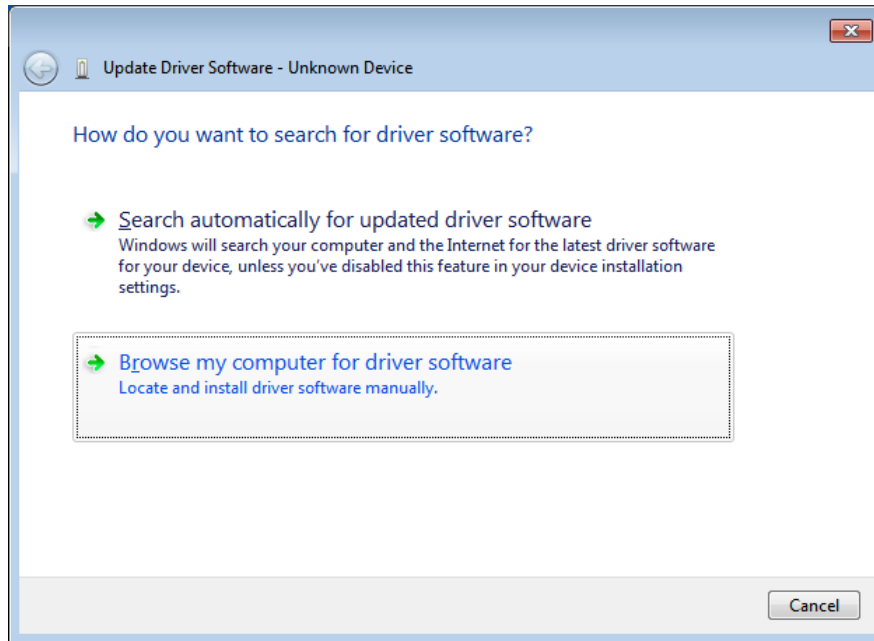
Windows 7 systems connected to the Internet directly start looking for a driver at Windows Update and therefore ignore the CD. Consequently the installation using the assistant will fail and manual settings are required.

You can either follow the steps described in 2.2.1.2 “Manual Installation and Update” or proceed as follows:

Open the Device Manager (e.g. via the control panel).



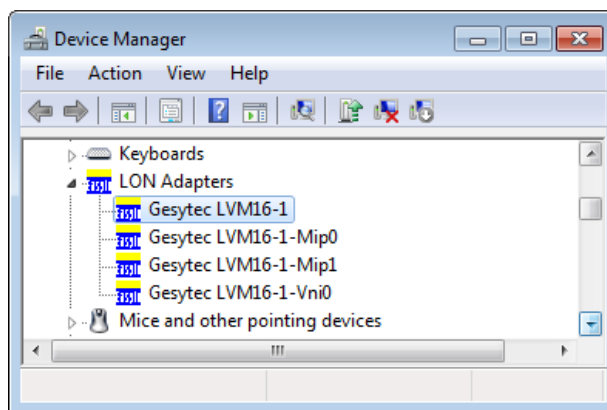
Right click on the entry for the unknown device and select “Update Drivers”.



Select “Browse my computer” and indicate the drive with the “Drivers & Documentation” CD. Finally give permission for the Gesytec driver setup.

Final Steps

After successful completion of the installation the device manager will show the interface under „LON Adapters“.



Here you will find a „Gesytec LVMx-y...“ entry, with x designating the number of the USB host controller and y the port. If hubs have been cascaded the respective port numbers are given as well.

If, after the installation the green LED does not blink an error has occurred in the Easyton USB Socket Interface+ installation. In that case, please restart the PC.

The device is now ready to access the LONWORKS network.

2.2.1.2 Manual Installation and Update

The easiest way to install the driver is to ignore the hardware assistant and run

FastUpd.exe

from the “Driver/LvxLvu” folder of the CD-ROM.

If the “Drivers & Documentation” CD interface has opened in your browser you may access the driver setup as well via “Products” “Easylyon USB Socket Interface+” and selecting the button for the operating system.

The same program you will use to update an existing driver.

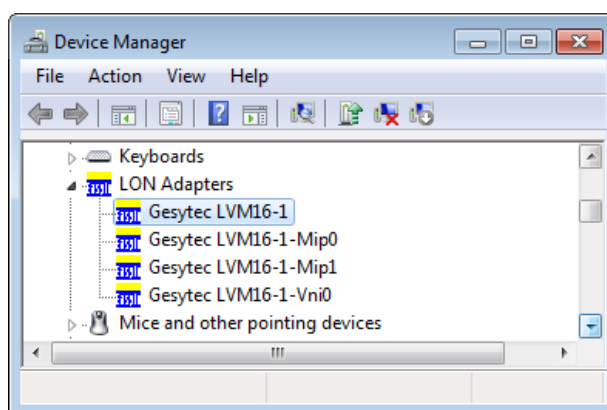
2.2.1.3 Driver Instances

The driver consists of a basic part for the interface hardware “LVMx-y”³ and of up to eight logical VNI drivers „LVMx-y-Vni z “ and up to eight logical MIP drivers „LVMx-y-Mip z “. These driver instances can be used like independent network interfaces.

For each logical driver instance an individual node-id (unique identification corresponding to the Neuron-ID) is used. VNI and MIP drivers with the last digit z will be assigned the same node-id. There is a maximum of 8 node-id available for each interface device.

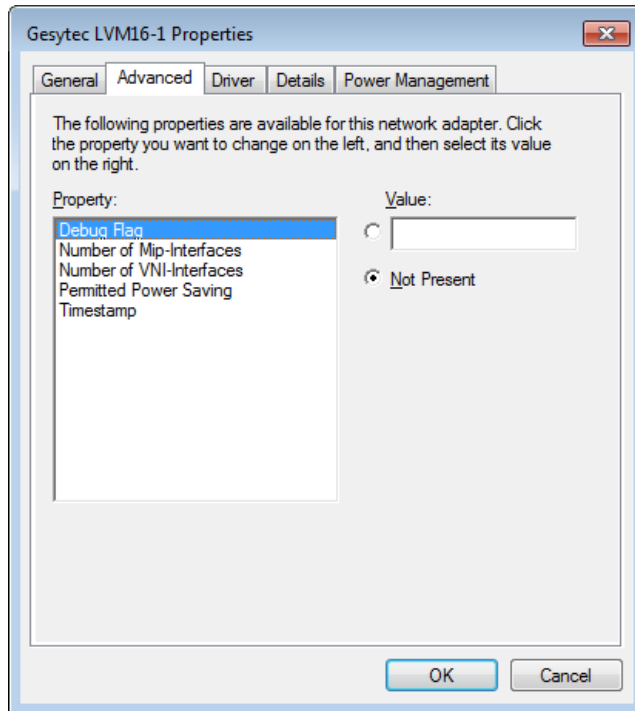
2.2.1.4 Settings

There are further settings available for the Easylyon USB Socket Interface+ which may be helpful in certain operating conditions. They can be found in the “LON Adapters” section of the device manager. Select the properties of the desired device.



The „Advanced Properties“ offer the following settings:

³ x is designating the number of the USB host controller and y the port. If hubs have been cascaded the respective port numbers are given as well.



Debug Flag

The value comprises a DWORD in hexadecimal notation of different flags for debug purposes. Usually it is set to 0 (not existing). Setting the single bits will turn on special debug features. In the current driver versions bits 1 and 3 are used.

Bit 1: LON telegrams at the interface from and to the USB bus are shown in debug output.

Bit 3: CREATE and CLOSE) of the driver are displayed in the debug output.

Note The debug output for instance can be displayed using the DebugView program, which is freely available at www.sysinternals.com.

Number of Mip-Interfaces

The number of virtual MIP-Interfaces can be set here (0 – 8, default = 2).

Number of VNI-Interfaces

The number of virtual VNI-Interfaces (Interfaces⁺) can be set here (0 – 8, default = 1).

ATTENTION There are 8 node-IDs available for each interface device. These have to be assigned appropriately to the applications using the device either as VNI or as a MIP interface. If, for example, a VNI application is using the instance LVMx-y-Vni0 with its corresponding node-id, a MIP application must not use the instance

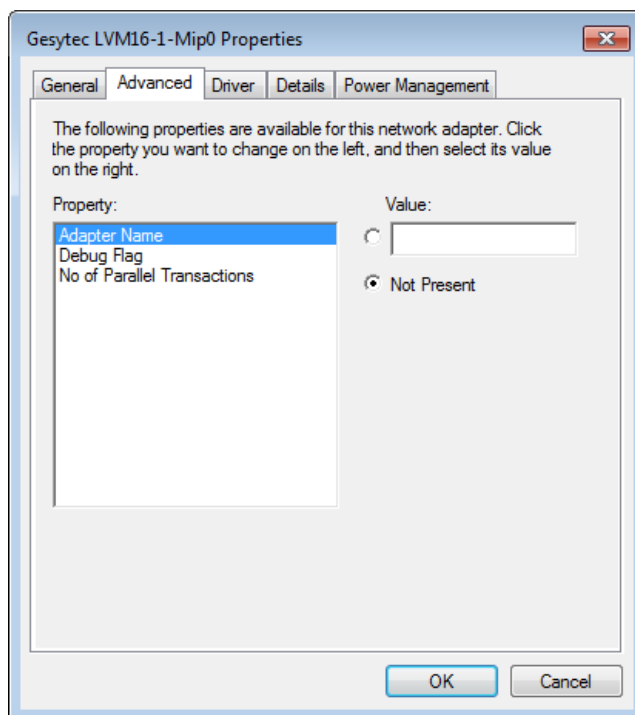
LVMx-y-Mip0.

VNI applications (e.g. LNS) usually generate a node-id of their own, which will then be additional to the 8 standard node-id belonging to the interface device.

Permitted Power Saving

Usually the LON USB adapter allows a standby mode with applications running (Standby). At certain conditions however, (e.g. LON USB adapter using a hub under Windows 2000) the current supply to the USB adapter will be shortly interrupted during return from the standby mode by the hub. Under such conditions the standby mode must be turned off (None).

Parameters for logical instance



Adapter Name

An arbitrary name can be chosen freely (e.g. building 7).

NOTE This name must not be used by another instance. If the name is already in use, the device will not start (code 10).

Debug Flag

This field contains a DWORD in hexadecimal notation of different flags for debug purposes. Usually it is set to 0 (= not existing). By setting the single bits certain debug features can be turned on. At the moment the bits 0, 1 and 3 are used:

Bit 0: LON telegrams at the interface from and to the application are displayed in the debug output.

- Bit 1: Telegrams at the interface between PC and interface hardware are displayed in the debug output.
- Bit 3: CREATE and CLOSE of the driver are displayed in the debug output.

No of Parallel Transactions

By default the Easylon MIP driver will handle 16 parallel transactions. This feature can be turned off by setting the value to 1.

2.2.1.5 De installation

WDM drivers are de installed using the “Device Manager”. Among “LON Adapters” select the “Gesyttec LVMx-yy” driver and click “de-install”.

2.2.2 Windows and 16 Bit Applications

The Windows driver for the 32 bit Windows versions also provides a 16 bit interface. (Unfortunately Microsoft does not support this in the 64 bit versions.) To use it, the following entry has to be made in the file „config.nt“, usually found in the windows\system32 directory:

```
Device=%SystemRoot%\system32\lpxdos.exe -Llvu1-2-Mip0
```

The 32 bit LON device used is specified by the optional –L or /L parameter:

/Lname

name =

lvu1-2-Mip0 for device LVU at USB host controller 1 and
with port number 2 at USB root hub

Note: Two subsequent “l” characters have to be entered, one indicating the parameter -L, the second as first character of the name: –Llxxxx

The 16 bit LON device used is specified by the following optional parameter:

/Dn

with *n = 1...9* for LON1 to LON9

Without this parameter, the interface will be assigned the first unused name starting with “LON1”.

2.2.3 EasyCheck – Quick Interface Diagnosis

In addition to the drivers, the test utility “EasyCheck” can be installed in the respective program directory (default: : \Easylon\Lpx). The program checks inter-

face and software environment and displays information, from which can be concluded on the reasons for problems in connection with the interface.

The program “EasyCheck” runs an analysis of the system’s software. It will open the selected interface, check the driver version and display it. By sending a “query status” command the communication with the hardware is tested. Using the “read memory” command the utility will show if the device is running MIP or NSI firmware. Properly installed Easylon Interfaces will send a corresponding answer.

3 Technical Description

3.1 Network Interface

Easylon Interface+ cards are using an FPGA for accessing the control network. For which sufficient RAM is available as network buffer for transmit and receive. For use in protocol analysis each packet received is transmitted to the application with timestamp of 1 ms accuracy. The FPGA is connected to the computer bus.

Eight node-ids are available on the interface for identification within the control network (cf. “Driver Instances”). The interface status is signaled by a status LED. The Service push button is read by the driver software (Figure 1-2).

3.2 USB Interface

The Easylon USB Interface+ has been developed according to USB 2.0 standard, high speed. It can as well operate at USB 1.1 interfaces.

3.3 LED Signals

Position cf. Figure 1-2

Staus LED	Green	blinking:	in normal operation
Error LED	Red	blinking ON	firmware is loaded error, e.g. after reset
If both LEDs are off, the module is out of operation			
Traffic LED	yellow		signals network traffic

3.4 Connector Pin Assignment

USB connector

PIN	Description
1	+5 Volt
2	+5 Volt
3	USB -
4	-
5	USB +
6	-
7	GND
8	GND
9	-
10	-

Table 3-1 Pin assignment of 10 pin USB connector

LON connector

PIN	MNEMO	Description
1	RT +	LON data +
2	GND	ground
3	RT -	LON data -

Table 3-2 Pin assignment of 3pin LON connector

Pin 1 position cf. Figure 1-2

3.5 Technical Specifications

USB Interface

Type	USB slave interface accord. to high speed USB standard 2.0
Connector	10 pin 2 row edge connector

Network Interface

Transceiver	FT-X2, electrically isolated EIA-485, not electrically isolated, 1.25 Mbps max.
Connector	3 pin edge connector

Power Supply

Power Supply	5 V DC +/-10%, externally via USB connector
Power Consumption	< 100 mA, typically

Operating Conditions

Temperature	
Operation	0 °C – +70 °C (only for FTX version)
extended range	-40 °C – +85 °C
Storage	-40 °C – +85°C
Humidity	90%, no condensation

Display and Operation

service push button
traffic LED (yellow)
status LED (green)
error LED (red)

Dimensions

Board	69.34 x 36.96 [mm]
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For easy integration a step file of the board is available.

Conformity

RoHs	2011/65/EU
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4 Programming Information

4.1 LONWORKS Network Node

Being an IEC14908 compatible interface device the Easylon Interface+ card can be used as a network node in a LONWORKS network. The Interface+ can realize one or more virtual MIP interfaces. As the external interface file (.xif) required for using the device as a network node can only be created for a specific application an example .xif file is provided. This must be adapted with the XIF editor prior to usage. The file can be found on the “Drivers & Documentation” CD.

Network Interface	Transmission Rate	XIF –File
TP/FT for virtual MIP interfaces	78 kbps	lolv075f.xif

Table 4-1 Network access and .xif files

4.2 Registry Key

The driver of the Easylon USB Socket Interface+ makes an entry in the registry database for each found device, according to Echelon’s guidelines. You will find this entry at:

\\HKEY_LOCAL_MACHINE\Software\LonWorks\DeviceDrivers.

For each Easylon USB Socket Interface+ you will find a key with the device name (Gesytex LVMx-y...) and a character value with the driver name.

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