ZS13x0, Automotive Ethernet Converter

User Manual

1.1, January 2025

Table of Contents

Chapter 1. Revision History

Revision	Date	Comment
1.0	Oct 2024	Initial Revision.
1.1	Jan 2025	Added product code to document title.

Chapter 2. Introduction

Automotive Ethernet Converter comes in two variants: ZS1320 and ZS1330.

ZS1320, is a media converter to convert between 100BASE-T Ethernet network and 100BASE-T1 networks.

ZS1330, is a media converter to convert between 1000BASE-T Ethernet network and 1000BASE-T1 networks.

Applications

- Interact with automotive ethernet from a desktop PC for the development and testing of automotive ECUs.
- Simulate automotive ECU nodes.
- Perform diagnostics of automotive ECUs.
- Monitoring of automotive ECU nodes.
- Test automation of automotive systems.

2.1. Specification

The Ethernet Converter has the following specification.

Parameter	Value
Power Input	USB Bus Powered
Command Port	USB Serial Interface (Type Mini-B)
Automotive Connector	TE MATEnet Connector
Programming Interface	Serial Command
Power Consumption	<350mA @ Idle State
ZS1320	
Ethernet Speed	100 Mbps
Automotive PHY	TI DP83TC811
ZS1330	
Ethernet Speed	1000 Mbps
Automotive PHY	TI DP83TG720

2.2. Package Contents

2.2.1. ZS1320

- 1x 100BASE-T1 Ethernet Media Converter
- 1x USB Cable
- 1x Automotive Ethernet Cable (1 meter)

2.2.2. ZS1330

- 1x 1000BASE-T1 Ethernet Media Converter
- 1x USB Cable

- 1x Automotive Ethernet Cable (1 meter)

2.3. Features

The Ethernet Converter has the following key features:

- 100/1000BASE-T1 PHY connected to a 10/100/1000 Standard Ethernet PHY.
- USB bus powered (mini-USB).
- Manual selection of Master / Slave through press button.
- Automatic selection Master / Slave.
- LED indications for both PHYs.
- RJ-45 connector for standard PHY.
- TE MATEnet connector for automotive PHY.

2.4. Ordering Information

2.4.1. ZS1320

- Product Name: ZS1320, Ethernet Media Converter, 100Base-T1
- Model No: ZS-ETH-SPE-100

2.4.2. ZS1330

- Product Name: ZS1330, Automotive Ethernet Converter, 1000Base-T1
- Model No: ZS-ETH-SPE-1000

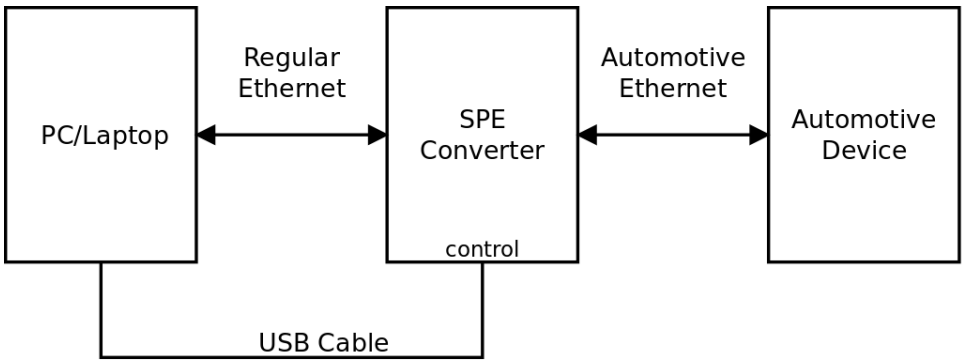
Chapter 3. Device Usage

3.1. Operation

Ethernet Converter control interface is detected as a USB serial device in a PC. It has built-in command engine which accepts the commands through serial interface. The built-in commands in Ethernet Converter facilitates configuring the Ethernet PHYs and checking their status.

The following diagram shows how the Ethernet Converter can be connected to the PC and the ECU.

Figure 3.1. Connection Diagram



3.2. Master / Slave Selection

- The device is in automatic selection (AUTO) by default.
- The mode selection button can be pressed to switch between AUTO, MASTER and SLAVE modes.
- The selected mode is indicated by AUTO, MASTER and SLAVE LEDs.
- If the AUTO LED is blinking then it indicates that the automatic master and slave detection is in progress.
- Once MASTER or SLAVE is selected, then the AUTO LED glows solid, and the corresponding MASTER or SLAVE LED indication lights up as well.
- The mode is preserved across device resets or during power interruptions.

3.3. Link Status Indications

LED	Color	Pattern	Indication
Automotive PHY LED	Green	Off	Link Down
		Solid	Link Up
		Blinking	Link Activity
Standard Ethernet Connector LED, Left	-	Off	10 Mbps Data Rate
	Orange	Solid	100 Mbps Data Rate
	Green	Solid	1000 Mbps Data Rate
Standard Ethernet Connector LED, Right	Amber	Off	Link Down
		Solid	Link Up
		Blinking	Link Activity

3.4. Device Setup

- Power-on the Ethernet Converter through a USB Mini-B cable.
- The command port of Ethernet Converter can be accessed by a PC, using the USB Mini-B cable.
- In Windows OS, the Ethernet Converter will be detected as a COM port under [Ports COM and LPT] section of the Device Manager. If the device is not detected properly, the driver can be downloaded from the site http://www.ftdichip.com/Drivers/VCP.htm.

Chapter 4. Command Interface

4.1. Serial Port Setting

In order to establish serial communication between the Ethernet Converter and the control PC, the following serial parameters has to be configured.

Parameter	Value
Baud Rate	115200
No. Bits	8
Stop bit	1
Parity	No
Flow Control	No

4.2. Command Line Interface

The Ethernet Converter is designed to accept requests through serial commands. Each command should end with Carriage Return (`\r`). Commands are not case sensitive.

4.3. Command List

Version Command. Checks the device version.

Command `V`

Response
```
1.0.0
OK
```

Read Command. Reads the contents of the standard registers of regular and automotive PHY in hexadecimal format.

Command `R:<phy-id>:<register-addr>`

Response
```
<register-value>
OK
```

`phy-id` `0` for regular PHY, `1` for automotive PHY

`register-addr` PHY register address in hex to read from

`register-value` the read PHY register value

Write Command. Write a 16-bit hexadecimal value to the standard registers of regular and automotive PHY.

Command `W:<phy-id>:<register-addr>:<register-value>`

Response `OK`

`phy-id` `0` for regular PHY, `1` for automotive PHY

`register-addr` PHY register address in hex to read from

`register-value` the written PHY register value

Master Command. Puts the automotive PHY into `Master` mode.

Command `M`

Response `OK`

Slave Command. Puts the automotive PHY into `Slave` mode.

Command `S`

Response `OK`

Auto-Detect Command. Puts the automotive PHY into `Auto-Detect` mode.

Command `A`

Response `OK`

Check Mode Command. Displays the current mode of the automotive PHY.

Command `C`

Response

```
<mode>
OK
```

Possible values for `<mode>` is provided below:

1. Master
2. Slave
3. Auto-Master
4. Auto-Slave
5. Auto-Detect

Appendix A. Limited Hardware Warranty

The warranties provided by Zilogic Systems in this Limited Hardware Warranty apply only to Hardware Products you purchase for your use, and not for resale. The term "Hardware Product" means a computing device with a specific function and limited configuration ability.

A.1. LIMITED HARDWARE WARRANTY

Zilogic Systems warrants that the hardware components of its Hardware Product shall be free from material defects in design, materials, and workmanship and will function, under normal use and circumstances, in accordance with the documentation provided, for a period of one (1) year from the date of purchase of the Hardware Product.

Your sole and exclusive remedy, and Zilogic Systems' sole and exclusive liability for defective hardware components, shall be that Zilogic Systems, subject to the terms and conditions of this Section, and solely upon confirmation of a defect or failure of a hardware component to perform as warranted, shall at its sole option, either repair or replace the nonconforming hardware component. All replacement parts furnished to you under this warranty shall be refurbished and equivalent to new, and shall be warranted as new for the remainder of the original warranty period. All defective parts, which have been replaced, shall become the property of Zilogic Systems. All defective parts that have been repaired shall remain your property.

A.2. EXCLUSIONS

The foregoing warranties and remedies shall be void as to any Hardware Products damaged or rendered unserviceable by one or more of the following: (1) improper or inadequate maintenance by anyone other than Zilogic Systems or Zilogic Systems' authorized engineers, (2) interfacing supplied by anyone other than Zilogic Systems, (3) modifications, alterations or additions to the Hardware Products by personnel not certified by Zilogic Systems or Zilogic Systems' authorized engineers to perform such acts, or other unauthorized repair, installation or other causes beyond Zilogic Systems' control, (4) unreasonable refusal to agree with engineering change notice programs, (5) negligence by any person other than Zilogic Systems or Zilogic Systems' authorized engineers, (6) misuse, abuse, accident, electrical irregularity, theft, vandalism, fire, water or other peril, (7) damage caused by containment and/or operation outside the environmental specifications for the Hardware Products, (8) alteration or connection of the Hardware Products to other systems, equipment or devices (other than those specifically approved by Zilogic Systems) not in accordance to the board and on-board device specifications (9) any use that is inconsistent with the user manual supplied with the Hardware Product. The warranty period is not extended if Zilogic Systems repairs or replaces a warranted product or any parts. Zilogic Systems may change the availability of limited hardware warranties, at its discretion, but any changes will not be retroactive.

A.3. HARDWARE RETURN PROCEDURES

If a Hardware Product or one of its component parts does not function as warranted during the warranty period, and such nonconformance can be verified by Zilogic Systems, Zilogic Systems, at its election, will provide either return and replacement service or replacement with a refurbished part/unit for the Hardware Product under the type of warranty service Zilogic Systems designates for that Hardware Product. A defective Hardware Product or one of its component parts may only be returned to Zilogic Systems upon Zilogic Systems' prior written approval. Any such approval shall reference an RMA number issued by an authorized Zilogic Systems service representative. If

you do not register the Hardware Product with Zilogic Systems, you may be required to present proof of purchase as evidence of your entitlement to warranty service. The Hardware Product's serial number will be required for all RMA cases.

Transportation costs, if any, incurred in connection with the return of a defective item to Zilogic Systems shall be borne by You. Any transportation costs incurred in connection with the redelivery of a repaired or replacement item to You by Zilogic Systems shall be borne by Zilogic Systems; provided, however, that if Zilogic Systems determines, in its sole discretion, that the allegedly defective item is not covered by the terms and conditions of the warranty or that a warranty claim is made after the warranty period, the cost of the repair by Zilogic Systems, including all shipping expenses, shall be reimbursed by You.

A.4. HARDWARE REPLACEMENT PROCEDURES

Zilogic Systems will attempt to diagnose and resolve your problem over the phone or e-mail. Upon determination of the hardware issue is related to a malfunction of one of the Hardware Product components, an RMA process will be initiated by Zilogic Systems.

For Warranty Replacement service, it is required that you deliver the faulty unit to a location Zilogic Systems designates, and provide courier name and tracking number to Zilogic Systems. After the Faulty unit is returned to Zilogic Systems, Zilogic Systems will use commercially reasonable efforts to ship the replacement hardware within fourteen (14) business days. Actual delivery times may vary depending on availability of the spares and customer's location.

A.5. ADDITIONAL RESPONSIBILITIES

You agree:

- To provide Zilogic Systems or its partner with sufficient and safe access to your facilities to permit Zilogic Systems to fulfill its obligations.
- To ship back the faulty Hardware Product (or replaceable unit) suitably packaged, quoting the RMA number, to the Zilogic Systems designated location.
- You shall ship the faulty Hardware Product once Zilogic Systems approves the RMA and provide the courier name and tracking number.
- To securely erase from any Hardware Product you return to Zilogic Systems for any reason all programs and data not provided by Zilogic Systems with the Hardware Product. You acknowledge that in order to perform its responsibilities under this Limited Hardware Warranty, Zilogic Systems may ship all or part of the Hardware Product or its software to third party locations around the world, and you authorize Zilogic Systems to do so.

A.6. LIMITATION OF LIABILITY

Zilogic Systems' development kits are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, not in applications where failure or malfunction of a Zilogic Systems product can resonably be expected to result in personal injury, death or severe property or environmental damage.

NOTWITHSTANDING ANYTHING ELSE IN THIS AGREEMENT OR OTHERWISE, NEITHER ZILOGIC SYSTEMS NOR ITS SUPPLIERS WILL BE LIABLE WITH RESPECT TO ANY SUBJECT MATTER OF THIS AGREEMENT UNDER ANY CONTRACT, NEGLIGENCE, STRICT LIABILITY, OR OTHER LEGAL OR EQUITABLE THEORY, REGARDLESS OF WHETHER ZILOGIC SYSTEMS OR ITS SUPPLIERS WERE ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, FOR: (i) ANY PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOST DATA OR LOST PROFITS; OR (ii) FOR COSTS OF PROCUREMENT OF SUBSTITUTE GOODS, TECHNOLOGY OR SERVICES; OR (iii) FOR ANY CLAIMS BASED ON ANY ERROR,

DEFECT OR NONCONFORMITY IN THE PRODUCTS OR SERVICE, FOR ANY AMOUNT IN EXCESS OF THE PRICE PAID TO ZILOGIC SYSTEMS FOR SUCH DEFECTIVE PRODUCT(S) OR SERVICE; OR (IV) FOR ALL OTHER CLAIMS NOT RELATED TO AN ERROR, DEFECT OR NONCONFORMITY IN THE PRODUCTS, ANY AMOUNTS IN EXCESS IN THE AGGREGATE OF THE AMOUNT PAID TO ZILOGIC SYSTEMS HEREUNDER DURING THE THREE (3) MONTHS PRECEDING THE DATE THE CAUSE OF ACTION AROSE.

WARRANTY DISCLAIMER. EXCEPT AS STATED HEREIN, ZILOGIC SYSTEMS MAKES NO WARRANTIES WITH RESPECT TO any PRODUCT, license or SERVICE AND DISCLAIMS ALL Statutory or IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, or arising from a course of dealing or usage of trade and any WARRANTIES OF NONINFRINGEMENT. ZILOGIC SYSTEMS DOES NOT WARRANT THAT THE ZILOGIC SYSTEMS PRODUCT(s) WILL MEET any REQUIREMENTS or THAT THE OPERATION OF ZILOGIC SYSTEMS PRODUCTS WILL BE UNINTERRUPTED OR ERROR FREE.