



TARVOS-I PLUG REFERENCE MANUAL

AMB8465/2605056081001

VERSION 1.0

APRIL 9, 2019

Revision history

Manual version	HW version	Notes	Date
1.0	4.0	Initial version of the manual	April 2019

Abbreviations and abstract

Abbreviation	Name	Description
FSE	Field Sales Engineer	Support and sales contact person responsible for limited sales area
HIGH	High signal level	
LOW	Low signal level	
RF	Radio frequency	Describes everything relating to the wireless transmission.
UART		Universal Asynchronous Receiver Transmitter allows communicating with the module of a specific interface.
VDD	Supply voltage	

Contents

1	Introduction	4
1.1	Ordering information	4
2	Functional description	5
2.1	Taking into operation	5
2.1.1	Usage of CBUS pins	6
3	Regulatory compliance information	7
3.1	Important notice EU	7
3.2	EU Declaration of conformity	8
4	Important information	9
4.1	General customer responsibility	9
4.2	Customer responsibility related to specific, in particular safety-relevant applications	9
4.3	Best care and attention	9
4.4	Customer support for product specifications	9
4.5	Product improvements	10
4.6	Product life cycle	10
4.7	Property rights	10
4.8	General terms and conditions	10
5	Legal notice	11
5.1	Exclusion of liability	11
5.2	Suitability in customer applications	11
5.3	Trademarks	11
5.4	Usage restriction	11
6	License agreement for Würth Elektronik eiSos GmbH & Co. KG connectivity product firmware and software	13
6.1	Limited license	13
6.2	Usage and obligations	13
6.3	Ownership	14
6.4	Firmware update(s)	14
6.5	Disclaimer of warranty	14
6.6	Limitation of liability	15
6.7	Applicable law and jurisdiction	15
6.8	Severability clause	15
6.9	Miscellaneous	15

1 Introduction

The Tarvos-I is a radio sub module that provides wireless connectivity capabilities in the 868 MHz frequency band. The Tarvos-I Plug incorporates the Tarvos-I in a USB stick form factor enabling easy interfacing with any USB enabled device like personal computer or laptop. The Tarvos-I Plug allows quick set-up of a radio link between PC and any system with integrated Tarvos-I radio module.

1.1 Ordering information

WE order code	Former order code	Description
2605056081001	AMB8465	Radio dongle 868 MHz

Table 1: Ordering information

2 Functional description

The Tarvos-I Plug consists of Tarvos-I radio module along with an serial-to-USB adapter that enables direct connection to any USB compatible device. A FTDI serial-to-USB converter chip **FT232R** connects the USB interface of the Tarvos-I Plug to the UART pins of the integrated radio module. Besides UART, additional digital GPIO pins (CBUS) are connected to the radio module to provide special functions like reset. Figure 1 illustrates all the functional components of Tarvos-I Plug.

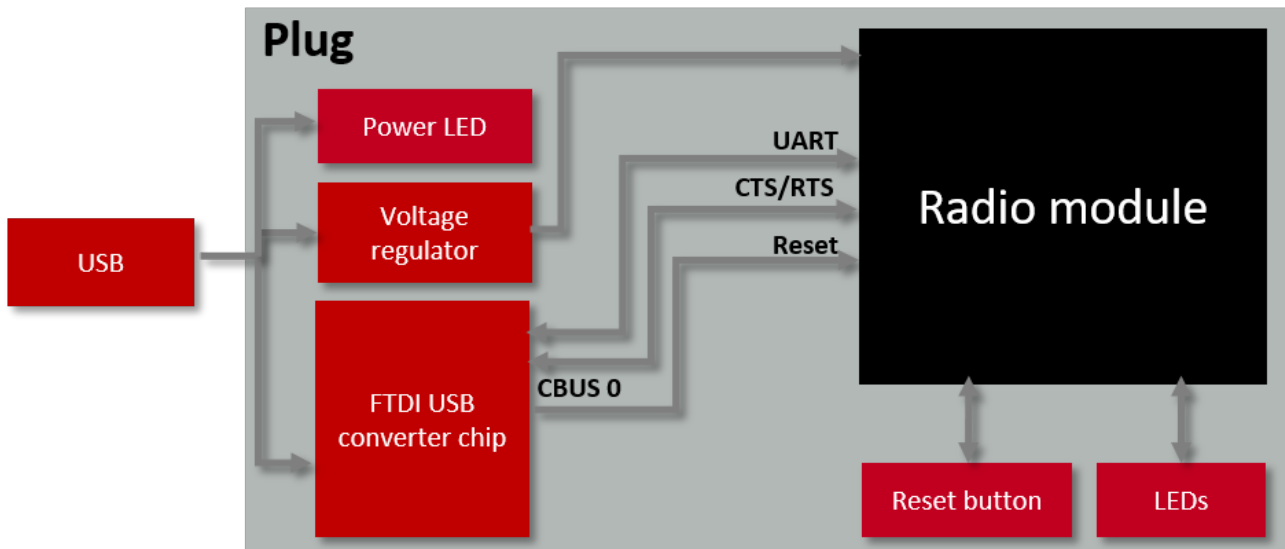


Figure 1: Block diagram of the Tarvos-I Plug

2.1 Taking into operation

To use the Tarvos-I Plug, the VCP driver of FTDI has to be installed by following the installation guides of FTDI:

<https://www.ftdichip.com/Drivers/VCP.htm>



It is recommended to restart the PC after installation of drivers.

On proper installation of the drivers, the module appears as a virtual COM port on the PC. This COM port can be opened in any serial emulator program to communicate with the radio module. The radio module responds to commands in a specific format. Please refer to the corresponding user manual for the complete description of the command set.

2.1.1 Usage of CBUS pins

To switch the CBUS pins high or low and thus to use the provided pins functions of the Tarvos-I radio module, the D2XX driver of FTDI has to be used. This driver is part of the previous mentioned VCP driver installation.

Examples codes for "how to use the D2XX driver within your own software tool" can be found in the software example section of:

<https://www.ftdichip.com/Support/SoftwareExamples/CodeExamples.htm>

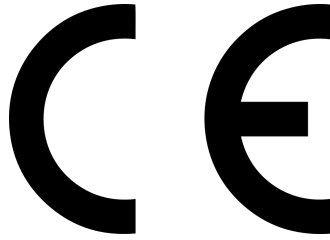
3 Regulatory compliance information

3.1 Important notice EU

The use of RF frequencies is limited by national regulations. The Tarvos-I Plug has been designed to comply with the R&TTE directive 1999/5/EC and the RED directive 2014/53/EU of the European Union (EU).

The Tarvos-I Plug can be operated without notification and free of charge in the area of the European Union. However, according to the R&TTE / RED directive, restrictions (e.g. in terms of duty cycle or maximum allowed RF power) may apply.

3.2 EU Declaration of conformity



EU DECLARATION OF CONFORMITY

Radio equipment: 2605056081001

The manufacturer: Würth Elektronik eiSos GmbH & Co. KG
Max-Eyth-Straße 1
74638 Waldenburg

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the declaration: 2605056081001

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation: Directive 2014/53/EU and 2011/65/EU.

Following harmonised norms or technical specifications have been applied:

EN 300 220-1 V3.1.1 (2017-02)
EN 300 220-2 V3.1.1 (2017-02)
EN 301 489-1 V2.2.0 (Draft)
EN 301 489-3 V2.1.1 (Final draft)
EN 62479 : 2010
EN 60950-1: 2006 + A11: 2009 + A1: 2010 + A12: 2011 + A2: 2013

i.A. G. Exler

Trier, 14th of June 2018
Place and date of issue

4 Important information

The following conditions apply to all goods within the wireless connectivity product range of Würth Elektronik eiSos GmbH & Co. KG :

4.1 General customer responsibility

Some goods within the product range of Würth Elektronik eiSos GmbH & Co. KG contain statements regarding general suitability for certain application areas. These statements about suitability are based on our knowledge and experience of typical requirements concerning the areas, serve as general guidance and cannot be estimated as binding statements about the suitability for a customer application. The responsibility for the applicability and use in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to the customer to evaluate, where appropriate to investigate and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for the respective customer application or not. Accordingly, the customer is cautioned to verify that the documentation is current before placing orders.

4.2 Customer responsibility related to specific, in particular safety-relevant applications

It has to be clearly pointed out that the possibility of a malfunction of electronic components or failure before the end of the usual lifetime cannot be completely eliminated in the current state of the art, even if the products are operated within the range of the specifications. The same statement is valid for all software and firmware parts contained in or used with or for products in the wireless connectivity product range of Würth Elektronik eiSos GmbH & Co. KG . In certain customer applications requiring a high level of safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health, it must be ensured by most advanced technological aid of suitable design of the customer application that no injury or damage is caused to third parties in the event of malfunction or failure of an electronic component.

4.3 Best care and attention

Any product-specific datasheets, manuals, application notes, PCN's, warnings and cautions must be strictly observed in the most recent versions and matching to the products firmware revisions. This documents can be downloaded from the product specific sections on the wireless connectivity homepage.

4.4 Customer support for product specifications

Some products within the product range may contain substances, which are subject to restrictions in certain jurisdictions in order to serve specific technical requirements. Necessary information is available on request. In this case, the field sales engineer or the internal sales person in charge should be contacted who will be happy to support in this matter.

4.5 Product improvements

Due to constant product improvement, product specifications may change from time to time. As a standard reporting procedure of the Product Change Notification (PCN) according to the JEDEC-Standard, we inform about major changes in hard- or firmware. In case of further queries regarding the PCN, the field sales engineer, the internal sales person or the technical support team in charge should be contacted. The basic responsibility of the customer as per section 4.1 and 4.2 remains unaffected.

4.6 Product life cycle

Due to technical progress and economical evaluation we also reserve the right to discontinue production and delivery of products. As a standard reporting procedure of the Product Termination Notification (PTN) according to the JEDEC-Standard we will inform at an early stage about inevitable product discontinuance. According to this, we cannot ensure that all products within our product range will always be available. Therefore, it needs to be verified with the field sales engineer or the internal sales person in charge about the current product availability expectancy before or when the product for application design-in disposal is considered. The approach named above does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

4.7 Property rights

All the rights for contractual products produced by Würth Elektronik eiSos GmbH & Co. KG on the basis of ideas, development contracts as well as models or templates that are subject to copyright, patent or commercial protection supplied to the customer will remain with Würth Elektronik eiSos GmbH & Co. KG. Würth Elektronik eiSos GmbH & Co. KG does not warrant or represent that any license, either expressed or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, application, or process in which Würth Elektronik eiSos GmbH & Co. KG components or services are used.

4.8 General terms and conditions

Unless otherwise agreed in individual contracts, all orders are subject to the current version of the "General Terms and Conditions of Würth Elektronik eiSos Group", last version available at www.we-online.com.

5 Legal notice

5.1 Exclusion of liability

Würth Elektronik eiSos GmbH & Co. KG considers the information in this document to be correct at the time of publication. However, Würth Elektronik eiSos GmbH & Co. KG reserves the right to modify the information such as technical specifications or functions of its products or discontinue the production of these products or the support of one of these products without any written announcement or notification to customers. The customer must make sure that the information used corresponds to the latest published information. Würth Elektronik eiSos GmbH & Co. KG does not assume any liability for the use of its products. Würth Elektronik eiSos GmbH & Co. KG does not grant licenses for its patent rights or for any other of its intellectual property rights or third-party rights. Notwithstanding anything above, Würth Elektronik eiSos GmbH & Co. KG makes no representations and/or warranties of any kind for the provided information related to their accuracy, correctness, completeness, usage of the products and/or usability for customer applications. Information published by Würth Elektronik eiSos GmbH & Co. KG regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof.

5.2 Suitability in customer applications

The customer bears the responsibility for compliance of systems or units, in which Würth Elektronik eiSos GmbH & Co. KG products are integrated, with applicable legal regulations. Customer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of Würth Elektronik eiSos GmbH & Co. KG components in its applications, notwithstanding any applications-related information or support that may be provided by Würth Elektronik eiSos GmbH & Co. KG. Customer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences lessen the likelihood of failures that might cause harm and take appropriate remedial actions. The customer will fully indemnify Würth Elektronik eiSos GmbH & Co. KG and its representatives against any damages arising out of the use of any Würth Elektronik eiSos GmbH & Co. KG components in safety-critical applications.

5.3 Trademarks

AMBER wireless is a registered trademark of Würth Elektronik eiSos GmbH & Co. KG. All other trademarks, registered trademarks, and product names are the exclusive property of the respective owners.

5.4 Usage restriction

Würth Elektronik eiSos GmbH & Co. KG products have been designed and developed for usage in general electronic equipment only. This product is not authorized for use in equipment where a higher safety standard and reliability standard is especially required or where a failure of the product is reasonably expected to cause severe personal injury or death, unless the parties have executed an agreement specifically governing such use. Moreover,

Würth Elektronik eiSos GmbH & Co. KG products are neither designed nor intended for use in areas such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network etc. . Würth Elektronik eiSos GmbH & Co. KG must be informed about the intent of such usage before the design-in stage. In addition, sufficient reliability evaluation checks for safety must be performed on every electronic component, which is used in electrical circuits that require high safety and reliability function or performance. By using Würth Elektronik eiSos GmbH & Co. KG products, the customer agrees to these terms and conditions.

6 License agreement for Würth Elektronik eiSos GmbH & Co. KG connectivity product firmware and software

Agreement between You and Würth Elektronik eiSos GmbH & Co. KG

The following terms of this license agreement for the usage of the Würth Elektronik eiSos GmbH & Co. KG wireless connectivity product firmware are a legal agreement between you and Würth Elektronik eiSos GmbH & Co. KG and/or its subsidiaries and affiliates (collectively, "Würth Elektronik eiSos "). You hereby agree that this license agreement is applicable to the product and the incorporated software and firmware (collectively, "Firmware") made available by Würth Elektronik eiSos in any form, including but not limited to binary, executable or source code form.

The Firmware included in any Würth Elektronik eiSos wireless connectivity product is purchased to you on the condition that you accept the terms and conditions of this license agreement. You agree to comply with all provisions under this license agreement.

6.1 Limited license

Würth Elektronik eiSos hereby grants you a limited, non-exclusive, non-transferable and royalty-free license to use the Firmware under the conditions that will be set forth in this license agreement. You are free to use the provided Firmware only in connection with one of the products from Würth Elektronik eiSos to the extent described in this license agreement. You are not entitled to change or alter the provided Firmware.

You are not entitled to transfer the Firmware in any form to third parties without prior written consent of Würth Elektronik eiSos .

You are not allowed to reproduce, translate, reverse engineer, read out, decompile, disassemble or create derivative works of the incorporated Firmware in whole or in part.

No more extensive rights to use and exploit the Firmware granted to you.

6.2 Usage and obligations

The responsibility for the applicability and use of the Würth Elektronik eiSos wireless connectivity product with the incorporated Firmware in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to you to evaluate and investigate, where appropriate, and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for your respective application or not.

You are responsible for using the Würth Elektronik eiSos Product with the incorporated Firmware in compliance with all applicable product liability and product safety laws. You acknowledge to minimize the risk of loss and harm to individuals and bear the risk for failure leading to personal injury or death due to your usage of the product.

Würth Elektronik eiSos ' products with the incorporated Firmware are not authorized for use in safety-critical applications, or where a failure of the product is reasonably expected to cause severe personal injury or death. Moreover, Würth Elektronik eiSos ' products with the incorporated Firmware are neither designed nor intended for use in areas such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train

control, ship control), transportation signal, disaster prevention, medical, public information network etc. You shall inform Würth Elektronik eiSos about the intent of such usage before design-in stage. In certain customer applications requiring a very high level of safety and in which the malfunction or failure of an electronic component could endanger human life or health, you must ensure to have all necessary expertise in the safety and regulatory ramifications of your applications. You acknowledge and agree that you are solely responsible for all legal, regulatory and safety-related requirements concerning your products and any use of Würth Elektronik eiSos' products with the incorporated Firmware in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by Würth Elektronik eiSos. **YOU SHALL INDEMNIFY WÜRTH ELEKTRONIK EISOS AGAINST ANY DAMAGES ARISING OUT OF THE USE OF WÜRTH ELEKTRONIK EISOS' PRODUCTS WITH THE INCORPORATED FIRMWARE IN SUCH SAFETY-CRITICAL APPLICATIONS.**

6.3 Ownership

The incorporated Firmware created by Würth Elektronik eiSos is and will remain the exclusive property of Würth Elektronik eiSos.

6.4 Firmware update(s)

You have the opportunity to request the current and actual firmware for a bought wireless connectivity Product within the time of warranty. However, Würth Elektronik eiSos has no obligation to update a modules firmware in their production facilities, but can offer this as a service on request. The upload of firmware updates falls within your responsibility, e.g. via ACC or another software for firmware updates. Firmware updates will not be communicated automatically. It is within your responsibility to check the current version of a firmware in the latest version of the product manual on our website. The revision table in the product manual provides all necessary information about firmware updates. There is no right to be provided with binary files, so called "firmware images", those could be flashed through JTAG, SWD, Spi-Bi-Wire, SPI or similar interfaces.

6.5 Disclaimer of warranty

THE FIRMWARE IS PROVIDED "AS IS". YOU ACKNOWLEDGE THAT WÜRTH ELEKTRONIK EISOS MAKES NO REPRESENTATIONS AND WARRANTIES OF ANY KIND RELATED TO, BUT NOT LIMITED TO THE NON-INFRINGEMENT OF THIRD PARTIES' INTELLECTUAL PROPERTY RIGHTS OR THE MERCHANTABILITY OR FITNESS FOR YOUR INTENDED PURPOSE OR USAGE. WÜRTH ELEKTRONIK EISOS DOES NOT WARRANT OR REPRESENT THAT ANY LICENSE, EITHER EXPRESS OR IMPLIED, IS GRANTED UNDER ANY PATENT RIGHT, COPYRIGHT, MASK WORK RIGHT, OR OTHER INTELLECTUAL PROPERTY RIGHT RELATING TO ANY COMBINATION, MACHINE, OR PROCESS IN WHICH THE WÜRTH ELEKTRONIK EISOS' PRODUCT WITH THE INCORPORATED FIRMWARE IS USED. INFORMATION PUBLISHED BY WÜRTH ELEKTRONIK EISOS REGARDING THIRD-PARTY PRODUCTS OR SERVICES DOES NOT CONSTITUTE A LICENSE FROM WÜRTH ELEKTRONIK EISOS TO USE SUCH PRODUCTS OR SERVICES OR A WARRANTY OR ENDORSEMENT THEREOF.

6.6 Limitation of liability

Any liability not expressly provided by Würth Elektronik eiSos shall be disclaimed. You agree to hold us harmless from any third-party claims related to your usage of the Würth Elektronik eiSos ' products with the incorporated Firmware. Würth Elektronik eiSos disclaims any liability for any alteration, development created by you or your customers as well as for any combination with other products.

6.7 Applicable law and jurisdiction

Applicable law to this license agreement shall be the laws of the Federal Republic of Germany. Any dispute, claim or controversy arising out of or relating to this license agreement shall be resolved and finally settled by the court competent for the location of Würth Elektronik eiSos ' registered office.

6.8 Severability clause

If a provision of this license agreement is or becomes invalid, unenforceable or null and void, this shall not affect the remaining provisions of the agreement. The parties shall replace any such provisions with new valid provisions that most closely approximate the purpose of the agreement.

6.9 Miscellaneous

This license agreement constitutes the entire understanding and merges all prior discussions between the parties relating to this license agreement.

No ancillary verbal agreements have been made and no such agreements shall be valid. Any additions and amendments to this license agreement shall require the written form in order to be binding.

We recommend you to be updated about the status of new firmware, which is available on our website or in our data sheet, and to implement new firmware in your device where appropriate. In case only firmware is provided, we expressly exclude the automatic receipt of PCN information. Thus, new firmware will also not be provided automatically.

By ordering a wireless connectivity Product, you accept this license agreement in all terms.

List of Figures

1	Block diagram of the Tarvos-I Plug	5
---	--	---

List of Tables

1	Ordering information	4
---	--------------------------------	---



more than you expect



**Internet
of Things**



**Monitoring
& Control**



**Automated Meter
Reading**

Contact:

Würth Elektronik eiSos GmbH & Co. KG
Division Wireless Connectivity & Sensors

Rudi-Schillings-Str. 31
54296 Trier
Germany

Tel.: +49 651 99355-0
Fax.: +49 651 99355-69
www.we-online.com/wireless-connectivity



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Wurth Electronics:](#)

[2605056081001](#)