ETAS

DRIVING EMBEDDED EXCELLENCE

ETAS XETK-S21.0 Emulator Probe for the JDP MPC57xx Microcontroller Family

User Guide

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XETK-S21.0B - User Guide R08 EN - 07.2021

Contents

1 About this Document

1.1 Classification of Safety Messages

The safety messages used here warn of dangers that can lead to personal injury or damage to property:

DANGER

indicates a hazardous situation with a high risk of death or serious injury if not avoided.

WARNING

indicates a hazardous situation of medium risk, which could result in death or serious injury if not avoided.

CAUTION

indicates a hazardous situation of low risk, which may result in minor or moderate injury if not avoided.

NOTICE

indicates a situation, which may result in damage to property if not avoided.

1.2 Presentation of Instructions

The target to be achieved is defined in the heading. The necessary steps for his are in a step-by-step guide:

Target definition

1. Step 1
2. Step 2
3. Step 3

> Result

1.3 Typographical Conventions

Hardware

Bold	Menu commands, buttons, labels of the product
Italic	Emphasis on content and newly introduced terms

1.4 Presentation of Supporting Information

NOTE

Contains additional supporting information.

2 Basic Safety Notices

This chapter contains information about the following topics:

2.1 General Safety Information

Please observe the Product Safety Notices ("ETAS Safety Notice") and the following safety notices to avoid health issues or damage to the device.

NOTE

Carefully read the documentation (Product Safety Advice and this User Guide) that belongs to the product prior to the startup.

ETAS GmbH does not assume any liability for damages resulting from improper handling, unintended use or non-observance of the safety precautions.

2.2 Requirements for Users and Duties for Operators

The product may be assembled, operated and maintained only if you have the necessary qualification and experience for this product. Incorrect operation or operation by users without sufficient qualification may lead to injuries or death or property damages.

General Safety at Work

The existing regulations for safety at work and accident prevention must be followed. All applicable regulations and statutes regarding operation must be strictly followed when using this product.

2.3 Intended Use

An ETK is an electronic component that is installed in a vehicle control unit (ECU) to read data from the ECU or write data to the ECU.

Application Area of the Product

This product was developed and approved for automotive applications. For use in other application areas, please contact your ETAS contact partner.

Requirements for Operation

The following requirements are necessary for safe operation of the product:

- Use the product only according to the specifications in the corresponding User Guide. With any deviating operation, the product safety is no longer ensured.
- Observe the regulations applicable at the operating location concerning electrical safety as well as the laws and regulations concerning work safety!
- Do not apply any voltages to the connections of the product that do not correspond to the specifications of the respective connection.
- Connect only current circuits with safety extra-low voltage in accordance with EN 61140 (degree of protection III) to the connections of the product.
- The power supply for the product must be safely disconnected from the supply voltage. For example, use a car battery or a suitable lab power supply.
- Use only lab power supplies with double protection to the supply system.
- Ensure that the connections of the power supply are easily accessible.
- The module does not have an operating voltage switch.
  - Switch on the product by connecting the power supply cable with the power supply or by switching on the power supply.
  - Switch off the product by disconnecting it from the power supply or by switching off the power supply.

DANGER

Connect the power cord only with a vehicle battery or with a lab power supply! A connection to power outlets is prohibited.

- Route the power cord in such a way that it is protected against abrasion, damages, deformation and kinking. Do not place any objects on the power cord.

- Never apply force to insert a plug into a socket. Ensure that there is no contamination in and on the connection, that the plug fits the socket, and that you correctly aligned the plugs with the connection.

- Do not use the product in a wet or damp environment.

- Do not use the product in potentially explosive atmospheres.

- Keep the surfaces of the product clean and dry.

Potential Equalization

CAUTION

Danger from inadvertent current flow!

Depending on the design, the shield of the Ethernet cables can be connected with the housing of the module. Install the products only on components with the same electrical potential or isolate the products from the components.

Requirements for the technical State of the Product

The product is designed in accordance with state-of-the-art technology and recognized safety rules. The product may be operated only in a technically flawless condition and according to the intended purpose and with regard to safety and dangers as stated in the respective product documentation. If the product is not used according to its intended purpose, the protection of the product may be impaired.

Maintenance and Cleaning

The product is maintenance-free. Use a lightly moistened, soft, lint-free cloth for cleaning the product. Ensure that no moisture can enter. Never spray cleaning agents directly onto the product. Do not user any sprays, solvents or abrasive cleaners which could damage the product.

Transport and Installation

CAUTION

The ETK can be damaged or destroyed!

Some components of the ETK board may be damaged or destroyed by electrostatic discharges. Please keep the ETK in its storage package until it is installed.

The board should only be taken from its package, configured, and installed at a work place that is protected against static discharge.

CAUTION

During installation and removal, ECU and ETK must be in a de-eenergized state!

CAUTION

Risk of short circuiting the internal signals of the ETK!

When you mount the ETK to the ECU, you must ensure that the screws and washers used will not penetrate the ETK printed circuit board.

CAUTION

Differences in case ground potentials can cause high currents to flow through the shields of the cables that connect various system modules.

Ensure that the module mounting surfaces are at the same electrical potential or insulate the modules from their mounting surfaces.

Cabling

Use exclusively ETAS cables at the connections of the product! Adhere to the maximum permissible cable lengths! Observe the assignment of the cables to the connectors! Detailed information about cabling is located in the ETK User Guides.

2.4 Identifications on the Product

Fig. 2-1 Adhesive Label (Example: Label for XETK-S14.0)

The following symbols are used for identifications of the product:

Symbol	Description
	The User Guide must be read prior to the startup of the product!
	Symbol for WEEE, see chapter 2.5 on page 12
	Marking for CE conformity, see chapter 2.6 on page 12)
	Marking for UKCA conformity, see chapter 2.7 on page 12)
	Symbol for China RoHS, see chapter on page 13
	Symbol for China RoHS, see chapter on page 13
	Symbol for electrostatic sensitive components
XETK-S14.0A	Product designation (example)
F 00K 110 722	Order number of the product (example)
SN: yyxxxxx	Serial number (7-digit)
XXXX/YY	Product version
ZZZZ	Year of manufacture
ETAS GmbH, PO Box 300220, 70442 Stuttgart, Germany	Manufacturer's address

NOTE

For symbols and product information one or several adhesive labels can be used.

2.5 Taking the Product Back and Recycling

The European Union has passed a directive called Waste Electrical and Electronic Equipment, or WEEE for short, to ensure that systems are setup throughout the EU for the collection, treating and recycling of electronic waste.

This ensures that the devices are recycled in a resource-saving way representing no danger to health or the environment.

Fig. 2-2 WEEE-Symbol

The WEEE symbol (see Fig. 2-2 on page 12) on the product or its packaging shows that the product must not be disposed of as residual garbage.

The user is obliged to collect the old devices separately and return them to the WEEE take-back system for recycling. The WEEE directive concerns all ETAS devices but not external cables or batteries.

For more information on the ETAS GmbH Recycling software, contact the ETAS sales and service locations.

2.6 CE Conformity

With the CE mark attached to the product or its packaging, ETAS confirms that the product corresponds to the product-specific, applicable directives of the European Union.

The CE Declaration of Conformity for the product is available upon request.

2.7 UKCA Conformity

With the UKCA mark attached to the product or its packaging, ETAS confirms that the product corresponds to the product-specific, applicable standards and directives of Great Britain.

The UKCA declaration of conformity for the product is available on request.

2.8 RoHS Conformity

European Union

The EU Directive 2011/65/EU limits the use of certain dangerous materials for electrical and electronic devices (RoHS conformity).

This product does not contain any of the restricted substances specified in the EU Directive 2011/65/EU or exceeds the maximum concentrations stipulated therein. For individual electronic components used in our products, there are currently no equivalent alternative substances, which is why we make use of the exceptions 7A and 7C-I in Annex III of this Directive.

ETAS confirms that the product corresponds to this directive which is applicable in the European Union.

China

ETAS confirms that the product meets the product-specific applicable guidelines of the China RoHS (Management Methods for Controlling Pollution Caused by Electronic Information Products Regulation) applicable in China with the China RoHS marking affixed to the product or its packaging.

2.9 Declarable Substances

European Union

Some products from ETAS GmbH (e.g. modules, boards, cables) use components with substances that are subject to declaration in accordance with the REACH regulation (EU) no.1907/2006.
Detailed information is located in the ETAS download center in the customer information "REACH Declaration" (www.etas.com/Reach). This information is continuously being updated.

2.10 Use of Open Source Software

The product uses Open Source Software (OSS). This software is installed in the product at the time of delivery and does not have to be installed or updated by the user. Reference shall be made to the use of the software in order to fulfill OSS licensing terms. Additional information is available in the document "OSS Attributions List" at the ETAS website www.etas.com.

3 Introduction

This chapter contains information about the following topics:

3.1 Applications

The XETK-S21.0 is an emulator probe for the Freescale MPC57xx and for the STMicroelectronics EM57xx microcontroller family. It is a typical serial XETK designed for use with the JTAG portion of the Nexus debug interface (IEEE/ISTO 5001).

NOTE

For supported MPC57xx microcontrollers, refer to chapter 7.1.3 on page 34.

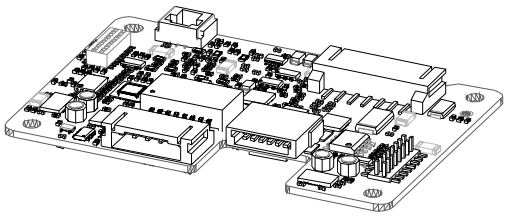


Fig. 3-1 XETK-S21.0

	XETK-S21.0
XETK ECU interface connectors	12 pin ERNI plus 7 pin JST
Power supply for ED devices (VDDS-BRAM)	min. 1.25 V
SBRAM sense	Yes, on board or external sense
Pinless triggering	Yes
Timer triggering	Yes

The XETK-S21.0 supports the standard full duplex 100Base-T Ethernet interface and can be connected directly or via ES51x/ES59x/ES600 modules to the PC. No additional ETAS modules are required for the access to the ECU. The XETK-S21.0 can be used for rapid prototyping applications (bypass) as well as for measurement and calibration applications.

3.2 Features

- Measurement interface:
  - 3.3 V JTAG output levels, 5.0 V tolerant JTAG input
  - Configurable JTAG interface clock speed: 20 MHz, 40 MHz, 50 MHz

> **NOTE**
>
> The max. allowed JTAG clock depends on the core frequency of the microcontroller. Max. clock speed is typically 1/4 of the core frequency.

  - Pinless startup protocol for XETK recognition and data acquisition triggering
- Calibration:
  - Microcontroller capability of internal Flash emulation can be used
  - XETK powers Emulation Device RAM (for calibration purpose)
  - Supports “Start on Any Page”
- Debugger interface:
  - XETK provides additional connector for external debug hardware
  - simultaneously use XETK and debugger
- Supports special coldstart mechanism (“Calibration Wake Up”):
  - Calibration Wake Up: Wake up mechanism to wake up the power supply of the ECU via the Calibration Wake up pin
  - Pull CalWakeUp until Startup Handshake: duration of the Wake up mechanism is configurable
- ECU flashing via XETK
  - Braindead flashing under ProF control
- Permanent storage of configuration in EEPROM
- Fast Ethernet Interface:
  - Direct connection to PC
  - Open XCP on Ethernet Protocol
  - Supports a variety of standard applications
- “ETK Drivers and Tools” update to support ETAS software tools (INCA, XCT)
- Firmware update (programming of the logic device) through HSP software service packs; removal of XETK or ECU is not necessary
- Mounting possibilities inside or on top of ECU
- Temperature range suitable for automotive application

For more technical data on the XETK-S21.0 consult the chapter “Technical Data” on page 33.

4 Hardware Description

This chapter contains information about the following topics:

4.1 Architecture

Fig. 4-1 shows the block diagram of the XETK-S21.0.

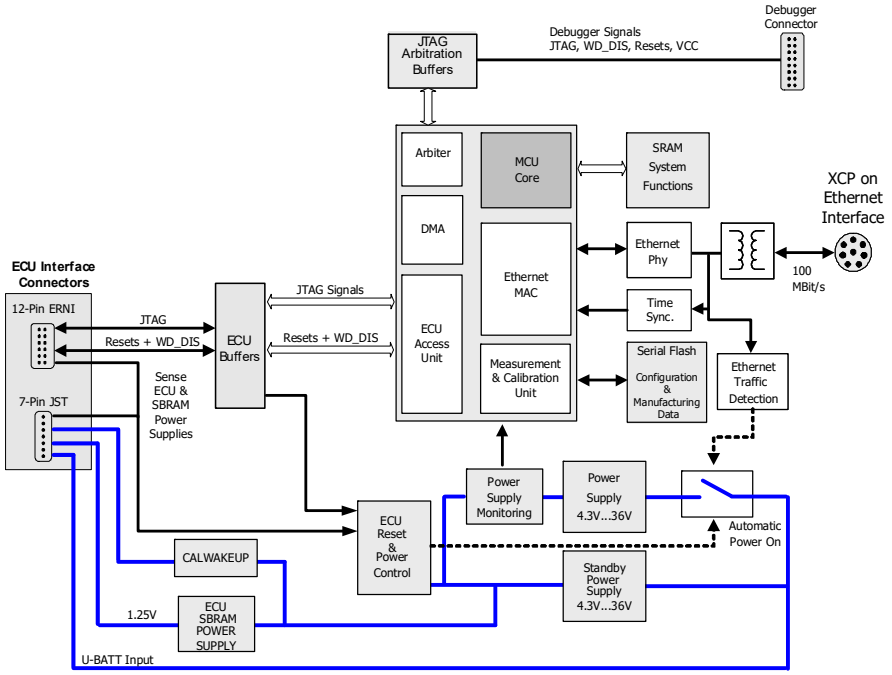


Fig. 4-1 XETK-S21.0 Architecture

While the microcontroller accesses the program data (not the program code) out of the data emulation memory provided by the microcontroller, the content of the data emulation memory can simultaneously be modified by the calibration and development system through the XETK Ethernet interface. This process enables adjustments of parameters, characteristic lines and maps

through the calibration and development system. Using an additional measurement data memory area, the ECU microcontroller can provide data to the calibration and development system by buffering the data (DISTAB13) and triggering the XETK to read the data via JTAG. The XETK then reads, buffers, processes and sends this measured data to the PC.

If no additional measurement data memory is available, the XETK-S21.0 can alternatively read the data to be measured directly from the microcontroller's memory. This process is Triggered Direct Measurement (TDM) with DISTAB13.

The 100 Mbit/s XETK Ethernet interface provides communication with the PC.

The power supply for the XETK-S21.0 is provided by a switch mode power supply, to minimize power dissipation.

4.2 ECU Interface

The XETK-S21.0 is connected via connectors CON6 and CON7 to the ECU with two adapter cables (refer to Fig. 4-2 on page 17). The pin definition depends on the application and the microcontroller type. In general the ECU interface consists of

- 1 ECU voltage line, which is not used for XETK power supply, but only for detection of the ECU status, therefore the power consumption on this line is negligible (refer to chapter 4.5 on page 20)
- 1 Reset line which allows the XETK to control the system reset of the ECU
- 1 Reset line which allows the XETK to monitor the system reset of the ECU
- 5 Debug line interfaces for the communication between the XETK-S21.0 and the microcontroller
- 2 ground lines for proper shielding of the ECU interface lines.

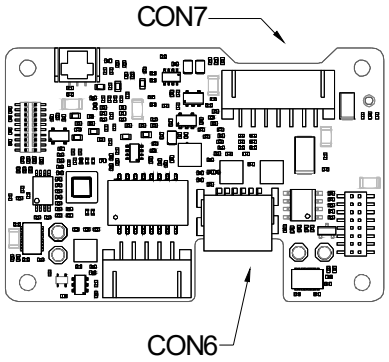


Fig. 4-2 Location of the ECU Interfaces

4.3 XETK Ethernet Interface

The XETK Ethernet interface can be directly connected to the PC via CON5 (refer to Fig. 4-3). No additional ETAS module is required for the access to the ECU.

The interface is a standard full duplex 100Base-TX Ethernet interface using the XCP protocol. The XETK Ethernet interface is integrated in the ETAS IP world with automatic IP management and supports the open automotive "Universal Measurement and Calibration" standard "XCP on Ethernet" (TCP/IP, UDP/IP). The open XCP on Ethernet interface allows for connecting to the XETK-S21.0 with third party application software.

NOTE

The XETK Ethernet interface is not compatible with the ETK interfaces in modules like e.g. ES910, ES590, ES591, ES592, ES593-D, ES595, ES1232-A. The XETK Ethernet interface is compatible with the ECU interface of the ES910 module and the Ethernet interfaces of the ES51x/ ES592/ ES593-D/ ES595/ ES600 modules.

NOTE

Please see chapter 7.1.2 on page 33 for additional information regarding PC requirements for the Ethernet interface.

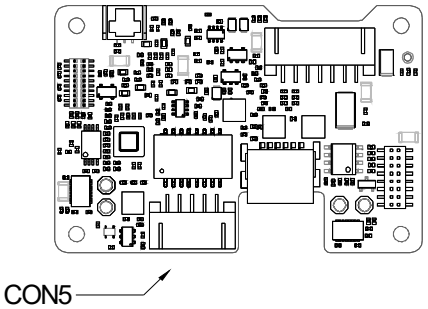


Fig. 4-3 Location of the XETK Ethernet Interface connector (CON5)

4.4 Debug Interface

The XETK-S21.0 features a JTAG debugging interface connector CON1 (Samtec 16 pin). This connector can be used to attach debug tool (e.g. Lauterbach or PLS debugger). It is recommended to use the ETAS Debug - Adapter (e.g. ETAF11 or AS_ETAF13) to connect the debugger to the XETK.

NOTE

When using the XETK-S21.0 and ETAF11, the debug tool will not be able to control the watchdog timer disable pin or monitor the /ESR0 signal provided by the XETK-S21.0 at CON1. The AS_ETAF13 enables the usage of the watchdog timer disable pin and /ESR0 signals.

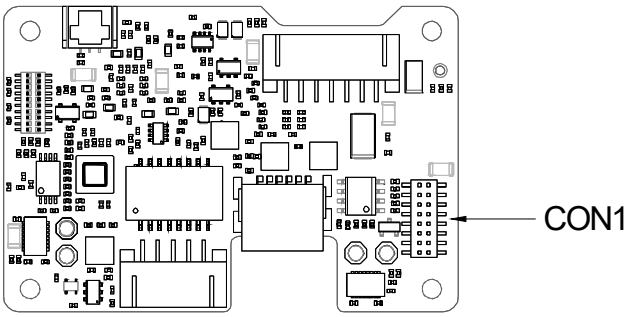


Fig. 4-4 Location of the Debugger Interface (XETK-S21.0)

By using the debug interface at the ECU board for serial ETK connection, it is not available for debugging tools anymore. Arbitration mechanisms are required to simultaneously work e.g. with measurement and calibration tools as well as with debugging tools. The XETK-S21.0 provides a hardware arbitration unit for the JTAG interface. This enables parallel use of tools for debugging and ETAS tools for measurement and calibration.

4.5 Power Supply

The XETK-S21.0 requires a permanent power supply. It is typically powered directly from the car battery. The input voltage may vary between 4.3 V and 36 V. In case of higher input voltages to the XETK, additional voltage protection is required. The XETK-S21.0 will also accept voltage dips down to 3V, for a maximum duration of 15ms (for additional details of low voltage operation, see ISO standard 16750)

From the input battery voltage, the XETK-S21.0 creates all necessary voltages through switching power supplies on the XETK-S21.0. The power supply of the ECU is not affected by the XETK-S21.0. An automatic switch ensures that the power supply of the XETK-S21.0 is automatically switched on and off when the XETK enters and leaves its standby (sleep) mode.

The XETK-S21.0 can be supplied with power through the seven pin connector, CON7. The through-hole solder pad CON4 can be used additionally to connect a power supply U_{Batt2}.

The power supply on CON4 must use the GND of CON7 pin 3.

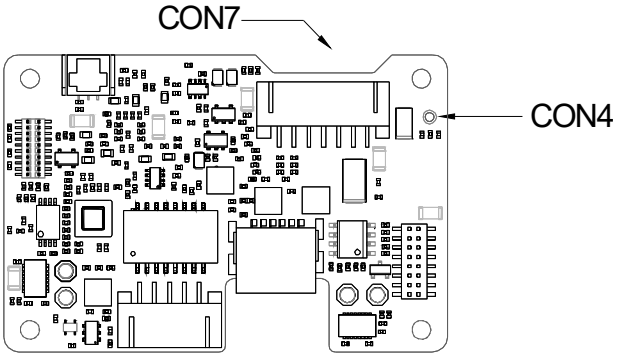


Fig. 4-5 Location of the XETK-S21.0 Power Supply Connectors

4.6 ECU Voltage Supervisor

The ECU voltage (VDDP) is monitored by the XETK to recognize whether the ECU is switched on or off. Additionally the ECU RAM standby voltage (VDDS-BRAM) is monitored to determine if the standby RAM content is still valid. These two signals are only used for monitoring therefore the load current is negligible.

NOTE

The XETK-S21.0 only allows switching between reference page and working page if there is a valid voltage at the sense pin and the working page has been initialized by the calibration and development system.

The XETK-S21.0 provides two opportunities to supply and supervise the ECU RAM standby voltage:

A The XETK-S21.0 monitors the VDDSBRAM supply on board the XETK. The microcontroller's standby power supply pin must be connected to the XETK pin VDDSBRAM.

B The XETK-S21.0 monitors the VDDSBRAMsense pin, provided by the ECU connection. The microcontroller's standby power supply pin must be connected to the XETK pin VDDSBRAMsense. The microntroller's standby power supply may be provided by the ECU or by the XETK.

4.7 Status LEDs

There are three LEDs displaying the operating status of the XETK-S21.0 (Fig. 4-6 on page 22).

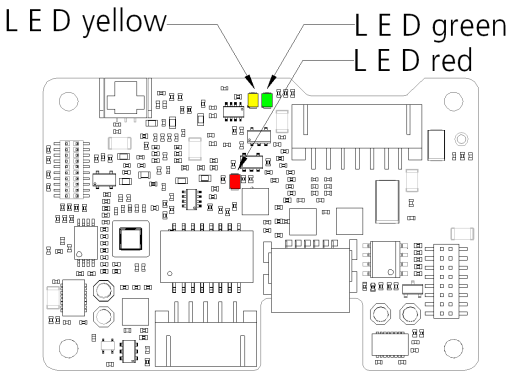


Fig. 4-6 Status LEDs of the XETK-S21.0

LED	State	Definition
Red	On	XETK-S21.0 is supplied with power and active (i.e. the ECU is switched on or the 100 Mbit/s link to the calibration system is established)
Green	Off	Working page may be different from reference page. Calibration and development system has downloaded data since the last power failure. Switching between the Reference Page and Working Page is possible.
	On	Power supply has dropped under selected threshold: - data retention of the calibration data manager in the ECU is no longer ensured - as soon as the XETK-S21.0 switches on again, the ECU switches to the Reference Page. Green LED stays on until the calibration and development system downloads data into the calibration data memory. Otherwise switching to the Working Page is not possible.
Yellow	Flashing	Communication active
	On	100 Mbit/s link to calibration system established

4.8 Data Emulation and Data Measurement

The XETK-S21.0 is a serial XETK using JTAG as the primary microcontroller interface. Typical of all serial (X)ETKs, the RAM used for data emulation and data measurement is not accessible by the XETK until the microcontroller is powered up and the startup handshake is performed.

Serial XETKs use the ETAS two page concept, consisting of both a Reference and a Working page.

The Reference Page is located in the ECU flash and can not be modified by a simple write access. All changes to the Reference Page must be done via Flash programming.

The Working Page is located within the microcontroller's ED RAM. The Working Page may be a portion of or the entire size of the ED RAM. The ED RAM used for the emulation of calibration data must not be used by the ECU software directly as general purpose RAM. It is recommended that the ED RAM is permanently powered by the XETK or ECU. The XETK/INCA has the complete control over the RAM used as Working Page and it's contents. When enabling data emulation, the XETK establishes a basic start-up configuration of the data in the Working Page by copying the corresponding data in the Flash to the emulation space.

To enable calibration, the Working Page must be activated. The process of switching from the Reference Page to the Working Page and vice versa is known as page switching.

The XETK-S21.0 supports Protocol Based page switching for all supported microcontrollers. Page switching is done in microcontroller software by switching the overlay memory on (Working Page) and off (Reference Page) using microcontroller overlay registers. The XETK-S21.0 does not directly control the microcontroller overlay registers. Instead the XETK-S21.0 and microcontroller software use a simple communication method with a shared mailbox in RAM. The XETK uses this mailbox to request and monitor page switching; the microcontroller software is responsible to service this mailbox and perform the page switches. Using an overlay modification description, also in RAM, the XETK provides the necessary information of how the overlay registers need to be modified to realize the page switch which is requested.

The XETK-S21.0 can access both the Reference Page and the Working Page, regardless of which is active from the microcontroller’s point of view.

Another important restriction is that no access to the memory is possible, while the ECU is not running. To enable a cold start measurement in spite of this restriction, the cold start measurement procedure is defined to give the user the feeling of a parallel XETK.

4.9 JTAG Interface

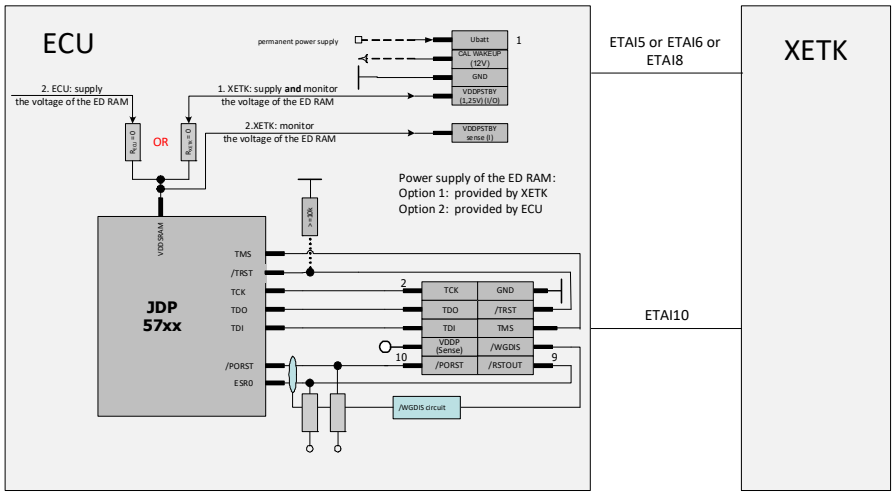


Fig. 4-7 Equivalent Circuitry of the ECU JTAG Interface (ECU)

The ECU part of the JTAG XETK interface is depicted in Fig. 4-7.

The XETK-S21.0 incorporates 22 Ohm series resistors for the TMS, TCK, TDI and /TRST lines on the ECU interface. Hence, no additional termination resistors are required on the ECU for these signals.

Additionally, if a pull down resistor is present on the line /TRST, the ECU must use a value no smaller than 10K ohm as shown in Fig. 4-7 on page 24.

4.10 Trigger Modes: Overview

The XETK-S21.0 supports the following trigger modes:

- Pinless triggering
- Timer triggering

The trigger mode "Pinless Triggering" uses the microcontroller's internal Development Trigger Semaphore (DTS) for triggering. See also chapter "Pinless Triggering" on page 25.

The trigger mode "Timer Triggering" uses four internal timers of the XETK for triggering. See also chapter "Timer Triggering" on page 26.

4.11 Pinless Triggering

4.11.1 Startup Handshake

The JTAG Data Communication (JDC) register is used to generate process the XETK startup handshake. The ECU must ensure that all memory ECC initialization has been completed prior to the start-up handshake.

For further information on ECC initialization, please refer to the microcontroller's reference manual.

4.11.2 XETK Trigger Generation

To generate triggers, the ECU software sets bits by writing the associated trigger index in the "DTS_SEMAPHORE" register.

NOTE

The selective setting of trigger bits is accomplished in hardware by the microcontroller and does not require a Read-Modify-Write sequence by the ECU software.

Each bit of the "DTS_SEMAPHORE" corresponds to an XETK hardware trigger. Within the XETK's configuration and/or A2L file, bit 0 corresponds to hardware trigger 1 and bit 31 corresponds to hardware trigger 32.

NOTE

Only the index 0 to 31 corresponding to the first 32 triggers are supported by the XETK-S21.0

The XETK periodically polls (reads) "DTS_SEMAPHORE" via JTAG. The polling rate is configurable, with 50 µs default. The XETK then starts acquisition of appropriate measurement data based on which bits of the register are set.

Active bits in "DTS_SEMAPHORE" are automatically cleared by the microcontroller when the register is read by XETK.

4.12 Timer Triggering

The trigger mode "Timer Triggering" uses four internal timers of the XETK-S21.0 for triggering. A configurable period is used for triggering.

The time intervals between trigger events are in accordance with the configured timer values. This values and their resolution have to be defined in the XETK's configuration and/or A2L file. Available settings are:

- Minimum time interval 100 µs
- Maximum period duration 1 s
- Timer resolution 1 µs

The timers trigger the XETK in an asynchronous manner to the microcontroller software. Variables assigned to a measurement raster using a timer trigger are acquired from their original locations in RAM via JTAG.

NOTE

If variables are measured from ECC protected memories, the ECU software must ensure the proper initialization of these locations. A time-out period can be set in the XETK configuration to allow for the ECU to initialize the memories before the measurement begins.

4.13 Reset

The requirement for the XETK-S21.0 reset mechanism is to ensure that power-up and power-down behavior of ECU is clean and smooth. The XETK-S21.0 normally drives /PORST low during XETK power up or upon INCA request.

The signals /PORST and /ESR0 of the microcontroller are used by the XETK-S21.0 to detect when the ECU is in reset.

The XETK-S21.0 senses the switched ECU power supply. This allows it to detect when the ECU is off and forward this information to INCA. In addition, it allows the XETK to enter the power save mode with the calibration system unplugged.

4.14 Pull CalWakeUp until Startup Handshake

The XETK has the ability to wake up the ECU by applying voltage to the CalWakeUp pin of the ECU connector. This allows the XETK to configure a measurement while the ECU is off.

When waking up the ECU via the CalWakeUp pin, it can be configured if the pin is driven high until the microcontroller core voltage (VDDP) is high or if the pin should be driven high until the start-up handshake between ECU and XETK is complete.

5 Installation

This chapter contains information about the following topics:

CAUTION

Some components of the interface board may be damaged or destroyed by electrostatic discharges. Please keep the board in its storage package until it is installed.

The board should only be taken from its package, configured, and installed at a work place that is protected against static discharge.

5.1 Connection to the ECU

CAUTION

Risk of short circuiting the internal signals of the XETK!

When you mount the XETK to the ECU, you must ensure that the screws and washers used will not penetrate the XETK printed circuit board.

For connecting the XETK-S21.0 to the ECU two XETK adapter cables are recommended:

- at CON6 adapter ETAI10
- at CON7 adapter ETAI5 or ETAI6 or ETAI8

The adapter cables are to be ordered separately (refer chapter “Ordering Information” on page 58).

The suitable connectors JST-7 and Samtec-10 (see Fig. 5-2 for additional connector details) should have been populated onto the ECU PCB for adapters ETAI10 and ETAI5/ ETAI6/ ETAI8.

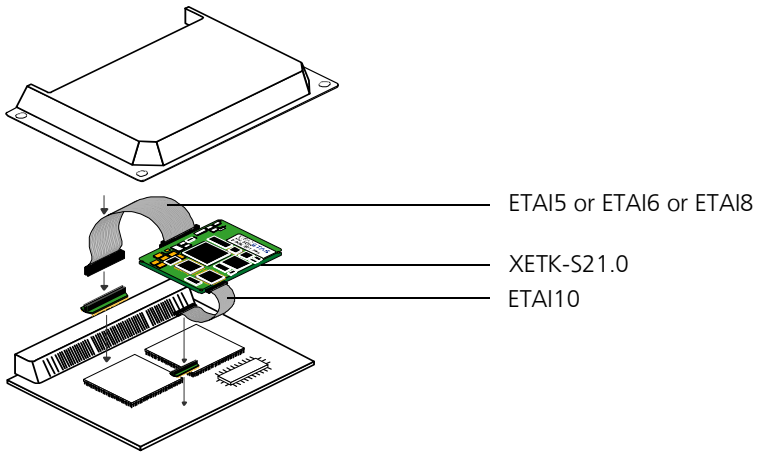


Fig. 5-1 XETK-S21.0 Connection to the ECU

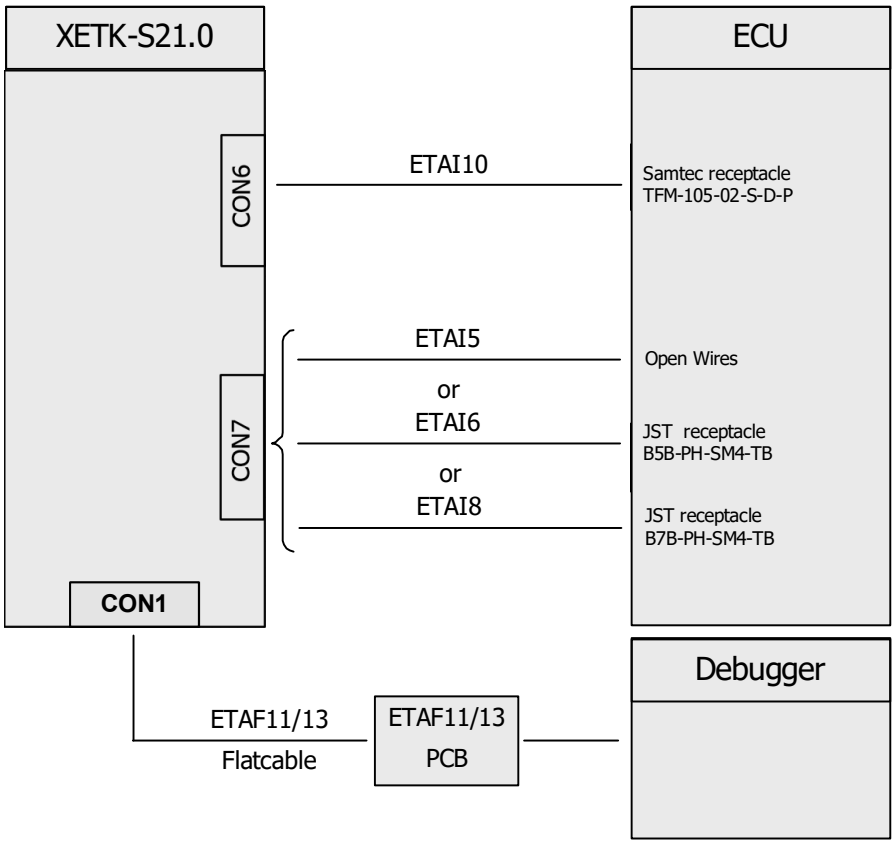


Fig. 5-2 XETK-S21.0 Connection to the ECU

5.2 Wiring

5.2.1 XETK Ethernet Interface

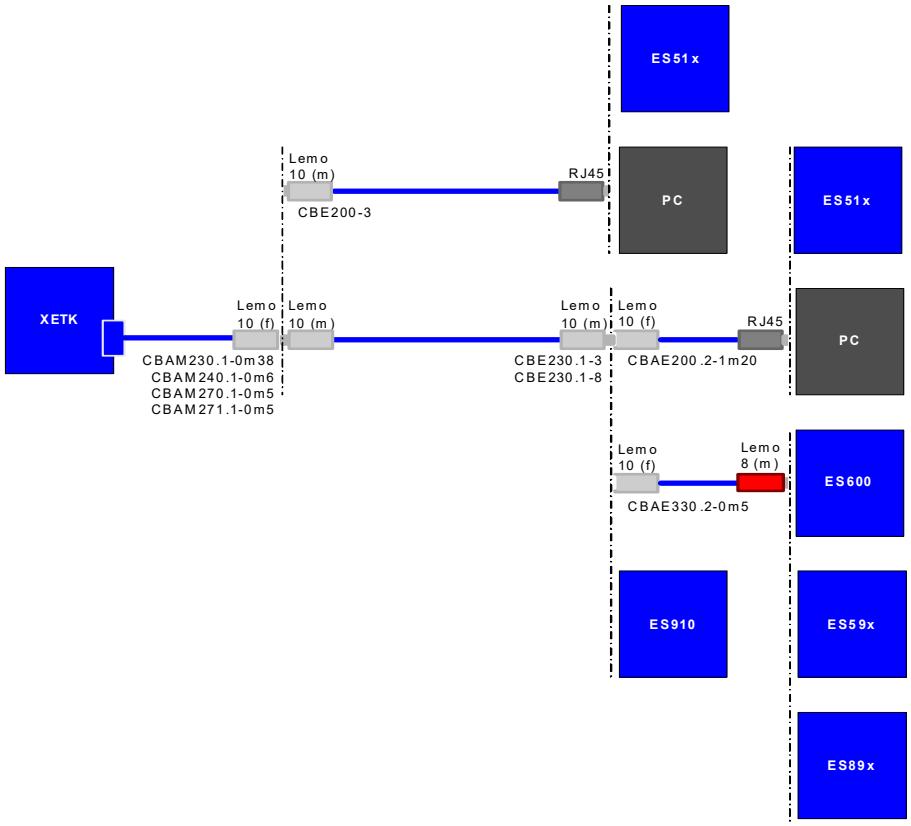


Fig. 5-3 Wiring - XETK Ethernet Interface

The XETK Ethernet interface can be directly connected to the PC. No additional ETAS module is required for the access to the ECU.

NOTE

The XETK Ethernet interface is compatible with the Ethernet interfaces of the ES51x/ES59x/ES600/ES910 module.

5.2.2 Power Supply

The XETK-S21.0 needs a permanent power supply (refer chapter “Power Supply” on page 20). Refer to figures Fig. 5-4, Fig. 5-5, or Fig. 5-6 for recommendations on permanent power supply connection."Permanent Power Supply inside ECU available

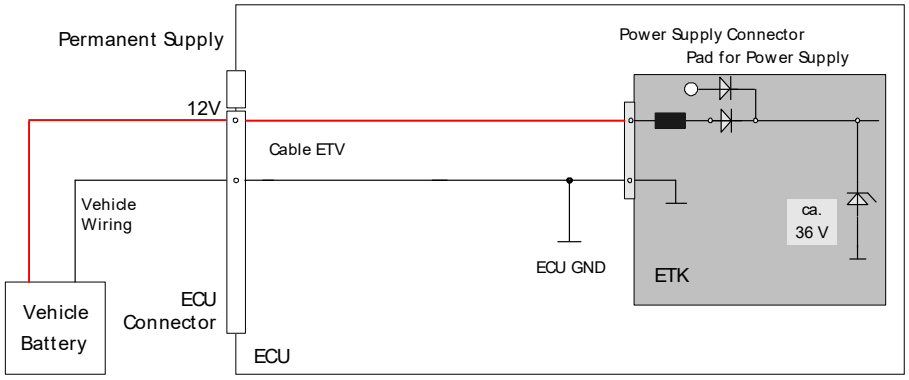


Fig. 5-4 Permanent Power Supply inside ECU available

Permanent Power Supply inside ECU not available

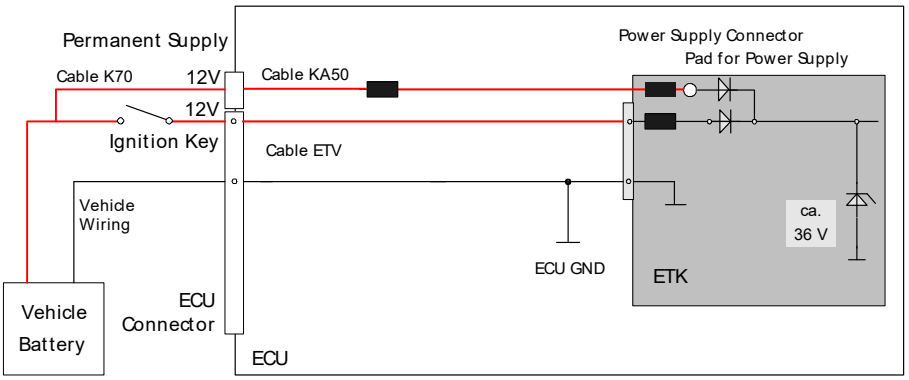


Fig. 5-5 Permanent Power Supply inside ECU not available

Isolated Power Supply inside ECU

The XETK-S21.0 does not require a galvanically isolated power supply. For special applications ETAS offers the isolated power supply ETP2.

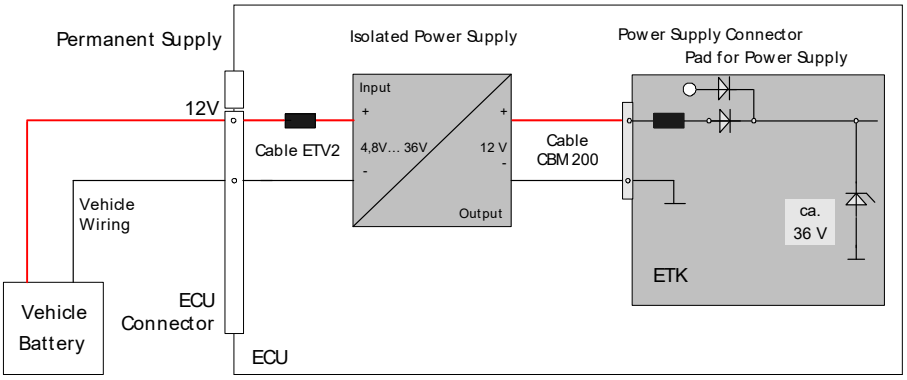


Fig. 5-6 Isolated Power Supply inside ECU

6 XETK Configuration

This chapter contains information about the following topics:

6.1 Overview

As already mentioned in previous chapters, some project-specific adjustments are necessary. Configuration data is stored permanently in a serial Flash.

Generating a valid configuration data set is supported by the "(X)ETK Configuration Tool" (XCT Tool). The XCT Tool contains information on all available XETKs. The user is supported through a graphical interface.

The configuration is done in two steps:

A Generation of the special address offset for the emulation and measurement data memory.

The location of data areas, measured data output areas, trigger segment addresses etc. are familiar to the ECU software developer, or can be generated automatically. If an ECU description database (ASAP, ...) with the corresponding input exists, these inputs can be downloaded from this database. If necessary, a plausibility check is performed.

B Connection of the XETK to the ECU.

The ECU hardware developer defines the connection of the XETK to the ECU. The corresponding signals usually have to be adjusted for each microcontroller. All inputs are checked for plausibility, to make sure that a valid configuration is generated.

The "(X)ETK Configuration Tool" can create the following output:

A Direct XETK configuration

B Storage of the configuration in a data file

C The corresponding ASAP2 input

The most important outputs are the entries for the ASAP2 file. All A2L definitions necessary for configuring an ETK will be created. These are:

- Overlay Region definitions
- Memory Segment definitions
- XETK configuration features
- Raster definitions

If these parameters are entered correctly in the corresponding ECU description file, it guarantees that every time the calibration system is started, the XETK is checked for the appropriate configuration. If necessary, the XETK will be configured appropriately to the corresponding project.

6.2 Configuration Parameter

The XCT Tool provides support concerning hardware configuration parameters and their possible values.

They are described for the different (X)ETK types in the help document of the "(X)ETK Configuration Tool".

Starting the "XCT Tool" help

1. Start the XCT Tool.

   The main window of the XCT tool opens.

2. Select in the menu bar ? → **Contents**.

   The XCT Tool help window opens.

3. Choose **Reference to User Interface** → **(X)ETK Hardware Configuration Parameters**.

4. Choose the topic **XETK-S21.0**.

   The topic **XETK-S21.0** contains information about the XETK-S21.0 hardware configuration parameters and their possible values.

7 Technical Data

This chapter contains information about the following topics:

7.1 System Requirements

7.1.1 ETAS Compatible Hardware

Compact Hardware: ES51x, ES592, ES593-D, ES595, ES600, ES910 (INCA)

7.1.2 PC with one Ethernet Interface

A PC with one open Ethernet interface (1 Gbit/s or 100 Mbit/s, full duplex) with RJ-45 connection is required. Ethernet interfaces that are implemented with an additional network card in the PC must feature a 32-bit data bus.

NOTE

Half Duplex mode and Half Duplex Ethernet interfaces are not supported.

Requirement to ensure successful initialization of the module

NOTE

It is imperative you disable the function which automatically switches to power-saving mode on your PC network adapter when there is no data traffic on the Ethernet interface!

To deactivate the power saving mode

Choose in Windows System Control Center / Device Manager / Network Adapter the used network adapter by double-click. Deactivate the "Allow the computer to turn off this device to save power" option in the "Power Management" register. Confirm your configuration.

The manufacturers of network adapter have different names for this function.

Example:

- "Link down Power saving"
- "Allow the computer to turn off this device to save power"

7.1.3 Software Support

The configuration instructions for the XETK-S21.0B under INCA and HSP are contained in the relevant software documentation.

- MPC57xx: Freescale microcontroller device
- EMU57xx: STMicroelectronics microcontroller device

You need following software versions to support the XETK-S21.0:

Use case: Measurement & Calibration, ECU Flash Programming

Microcontroller	INCA	INCA-MCE	HSP	ETK Tools
MPC5744K(-ED), SPC/EMU574K72	V7.1.7	V2.0	V10.7.0	V4.0.3
MPC5746M(-ED), SPC/EMU57EM80	V7.1.7	V2.0	V10.7.0	V4.0.3
MPC5777A(-ED), SPC/EMU57HM90xy	V7.1.7	V2.0	V10.7.0	V4.0.3
MPC5746R(-ED)	V7.1.7	V2.0	V10.7.0	V4.0.3
SPC/EMU58NE84	V7.1.7	V2.0	V10.9.0	V4.0.5
SPC/EMU58NN84	V7.2.2	V2.0	V11.2.0	V4.1.3
MPC5746C	V7.2.6	V2.0	V11.6.0	V4.1.7
SPC58xG	V7.2.13	V2.0	V11.13.0	V4.1.14

Use case: Rapid Prototyping

Microcontroller	INTECRIO	ASCET	HSP	Method
MPC5744K (-ED), SPC/EMU574K72	V4.6	V6.4	V10.11	SBB V2.1
	V4.5	V6.3	V10.7	HBB (DISTAB13)
MPC5746M (-ED), SPC/EMU57EM80	V4.6	V6.4	V10.11	SBB V2.1
	V4.5	V6.3	V10.7	HBB (DISTAB13)
MPC5777M (-ED), SPC/EMU57HM90xy	V4.6	V6.4	V10.11	SBB V2.1
	V4.5	V6.3	V10.7	HBB (DISTAB13)
MPC5746R (-ED)	V4.6	V6.4	V10.11	SBB V2.1
	V4.5	V6.3	V10.7	HBB (DISTAB13)
SPC/EMU58NE84	V4.6	V6.4	V10.11	SBB V2.1
	V4.5	V6.3	V10.9	HBB (DISTAB13)
SPC/EMU58NN84	V4.6	V6.4	V11.2	SBB V2.1
	V4.5	V6.3	V11.2	HBB (DISTAB13)
MPC5746C	V4.6	V6.4	V11.6	SBB V2.1
	V4.5	V6.3	V11.6	HBB (DISTAB13)
SPC58xG	V4.6	V6.4	V11.13	SBB V2.1
	V4.5	V6.3	V11.13	HBB (DISTAB13)

Operating the XETK-S21.0 with older software versions is not possible.

7.2 Data Emulation and Measurement Memory

7.2.1 Data Emulation Memory and Microcontroller Support

The XETK-S21.0 uses a portion of or up to the entire size of the ED RAM, to emulate data in internal flash. The following table lists the supported microcontrollers, the size of the ED RAM, and states if the ED RAM is capable of being powered using a standby supply.

Microcontroller	Max. ED RAM	Standby powered
MPC5744K (-ED)	1 Mbyte (32 x 32 KByte)	Yes
EMU574K72xy	1 Mbyte (32 x 32 KByte)	Yes
MPC5746M (-ED)	1 Mbyte (32 x 32 KByte)	Yes
EMU57EM80xy	1 Mbyte (32 x 32 KByte)	Yes
MPC5777M (-ED)	2 Mbyte (32 x 64 KByte)	Yes
EMU57HM90xy	2 Mbyte (32 x 64 KByte)	Yes

Microcontroller	Max. ED RAM	Standby powered
MPC5746R(-ED)	1 Mbyte (32 x 32 KByte)	Yes
EMU58NE84	2 Mbyte (32 x 64 KByte)	Yes
EMU58NN84	2 Mbyte (32 x 64 KByte)	Yes

7.2.2 Measurement Data Memory

Item	Characteristics
Location	Typically located within the emulation memory when using DISTAB13 hooks. Measurement data memory can be located in internal RAM if the entire ED RAM is needed for calibration.

7.3 Configuration

Item	Characteristics
Configuration	Project-specific configuration for - different microcontrollers or - memory configurations stored in EEPROM
Update	Logic devices updated using HSP software

7.4 XETK Ethernet Interface

Item	Characteristics
Connection	- 100 MBit/s Ethernet, Full Duplex - PC Card 32 bit
Protocol	XCP on TCP/IP or UDP/IP
IP address	Dynamic (standard, for INCA) or static (e.g. for Rapid Prototyping) by using the XETK Configuration Tool (default IP address: 192.168.40.16)
Cable length	max. 30 m / 100 ft
Ethernet Interface	DC decoupling

NOTE

To ensure successful initialization of the network card of your PC, refer to chapter 7.1.2 on page 33

7.5 Environmental Conditions

Item	Characteristics
Temperature range (operation)	- 40 °C to +110 °C - 40 °F to +230 °F
Overvoltage category (AC mains supply)	II

7.6 Power Supply

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Permanent power supply (car battery)	U_{Batt}	Vehicle usage [1)]	4.3 [all values ±0%]	12	36	V
Standby current [2)]	I_{STBY}	U_{Batt} = 12 V; ECU off; no load from ECU; T = 20 °C		35	40	mA
Operating current	I_{Batt}	U_{Batt} = 12 V; I = 0 mA at pin ECU_SBRAM; T = 20 °C		135	200	mA
Operating current	I_{Batt}	U_{Batt} = 12 V; I = 600 mA at pin ECU_SBRAM; T = 20 °C		240	300	mA
Power dissipation	P_{Batt}	U_{Batt} = 12 V; I = 0 mA at pin ECU_SBRAM; T = 20 °C		1.62		W
Power dissipation	P_{Batt}	U_{Batt} = 12 V; I = 600 mA at pin ECU_SBRAM; T = 20 °C		2.88		W

1) The XETK-S21.0 implements reverse voltage protection in the same range and may be used only with central load dump protection.
24 V vehicles require U_{Batt} disturbing pulse reduction to 12 V vehicle system.
12 V vehicles don't require special disturbing pulse reductions.
2) if I = 0 mA at pin VDDSBRAM

NOTE

The XETK-S21.0 will accept permanent power supply voltage dips (for additional details of 3 V low voltage operation, see ISO standard 16750).

7.7 Test Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Reset delay 1 [1)]	t_{Reset1}	U_{Batt} = 12 V VDDP = 0 V ↑ 3.3 V/ 5.0 V without transferring FPGA	29		40	ms
Reset delay 2 [2)]	t_{Reset2}	U_{Batt} = 0 V ↑ 12 V transfer FPGA	200		340	ms

[1)] Delay of ECU reset through the XETK without transferring the FPGA (U_{Batt} present, VDDP will be switched on)

[2)] max. delay of ECU reset through the XETK (U_{Batt} and VDDP will be switched on)

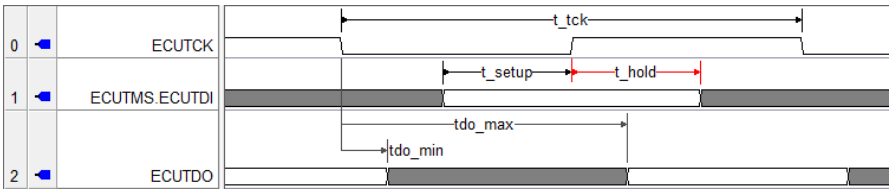
7.8 JTAG Timing Characteristics

The following diagrams show the timings the XETK-S21.0 can process.

NOTE

JTAG timing parameters in this chapter refer to the JTAG interface (CON6) of the XETK-S21.0. The JTAG wiring to the ECU (ETAI10) must be taken into account additionally.
All timings are measured at a reference level of 1.5 V. Output signals are measured with 20 pF to ground and 50 Ω to 1.5 V.

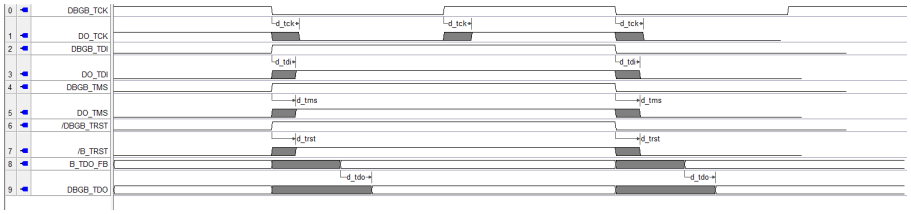
7.8.1 JTAG Timing Diagram



7.8.2 JTAG Timing Parameters

Parameter	Symbol	Value [ns]	Comment
JTAG Clock Period (ETK --> Target)	t_{tck}	50	20 MHz Nexus JTAG Clock Frequency
		25	40 MHz Nexus JTAG Clock Frequency
		20	50 MHz Nexus JTAG Clock Frequency
TMS/TDI Set-Up Time (ETK --> Target)	t_{setup}	7 (min.)	Minimum 5 ns required for microcontroller
TMS/TDI Hold Time (ETK --> Target)	t_{hold}	7 (min.)	Minimum 5 ns required for microcontroller
TDO clock-to-out time (Target --> ETK)	t_{do_min}	2.25 (min.)	Minimum 2.25 ns required by microcontroller specification
	t_{do_max}	16 (max)	Maximum 16 ns by microcontroller specification

7.8.3 Debugger Arbitration Timing Diagram



7.8.4 Debugger Arbitration Timing Parameters

Parameter	Value [ns]
d_tck (Debugger --> XETK)	9
d_tdi (Debugger --> XETK)	9
d_tms (Debugger --> XETK)	9
d_trst (Debugger --> XETK)	9
d_tdo (XETK --> Debugger)	9

7.9 Electrical Characteristics

7.9.1 ECU Interface Characteristics

Parameter	Symbol	Condition [1]	Min	Typ	Max	Unit
CalWakeup Output Voltage	CALWAKEUP	U_{Batt} = 6 - 18 V; load 0 - 50 mA	U_{Batt} - 1 V		U_{Batt}	V
ECU Power Supply Supervision Voltage (3.3 V selected)	VDDP	VDDP ↑	2.48	2.58	2.68	V
		VDDP ↓	2.33	2.43	2.53	V
	I_{VDDP}	VDDP = 3.3 V			200	µA
ECU Power Supply Supervision Voltage (5.0 V selected)	VDDP	VDDP ↑	2.98	3.08	3.18	V
		VDDP ↓	2.83	2.93	3.03	V
	I_{VDDP}	VDDP = 5.0 V			300	µA
ECU Standby RAM Supervision Voltage (1.25 V selected)	VDDSBRAM / VDDS-BRAM_SENSE	VDDSBRAM ↑	1.00	1.10	1.20	V
		VDDSBRAM ↓	1.02	1.12	1.22	V
	$I_{VDDSBRAM}$	VDDSBRAM = 1.25 V			73	µA
ECU Standby RAM Output Voltage(1.25V) [2]	VDDSBRAM	max. 600 mA load	1.19	1.25	1.33	V

[1]: VDDP ↑: ECU Power Supply off → ECU Power Supply on
VDDP ↓: ECU Power Supply on → ECU Power Supply off
VDDSBRAM ↑: ECU Standby RAM Power off → ECU Standby RAM Power on
VDDSBRAM ↓: ECU Standby RAM Power on → ECU Standby RAM Power off
[2]: Current drawn from XETK VDDSBRAM supply must not exceed 600 mA

7.9.2 ECU Interface Connector CON6

Signal	Pin Type	V_{OH} (min) [V]	V_{OH} (max) [V]	V_{IL} (max) [V]	V_{IH} (min) [V]	V_{IH} (max) [V]	Leakage current [µA]	Additional Load by XETK (typ) [pF] [1]
TDI, /TRST	O	2.2	3.3	-	-	-	+/-44	12
TMS, TCK	O	2.2	3.3	-	-	-	+/-44	12
TDO	I			0.8	2	5.5	+/-44	12
/PORST	XIOD[2]	-	-	0.8	2	5.5	+/-3	10
/ESR0	I	-	-	0.8	2	5.5	+/-3	10
/WDGDIS	XO	2.2	3.3	-	-		+/-22	6
/EVTI	O[3]	-	-	-	-	-	-	-
EVTO	I[3]	-	-	-	-	-	-	-

Pin Type: I: Input, X: Tristate, O: Output, OD: Open Drain

[1] Adapter cable and Samtec connector not considered; PCB 1 pF/cm
[2] Open Drain FET; I_{Dmax} = 0.2 A
[3] Signals not connected to logic on XETK, pass through to debugger

7.9.3 Debugger Interface Connector CON1

Signal	Pin Type	V_{OH} (min) [V]	V_{OH} (max) [V]	V_{IL} (max) [V]	V_{IH} (min) [V]	V_{IH} (max) [V]	Leakage current [µA]	Additional Load by XETK (typ) [pF] [1]
TDI, /TRST	I			0.8	2	5.5	+/-3	10
TMS, TCK	I			0.8	2	5.5	+/-3	10
TDO	O	2.3	3.3	-	-	-	-	15
/PORST	I/O[2]	-	-	0.8	2	5.5	+/-3	10
/ESR0	O	2.0	2.5	-	-	-	-	10
/WDGDIS	I			0.8	2	5.5	+/-3	10
/EVTI	I[3]	-	-	-	-	-	-	-
EVTO	O[3]	-	-	-	-	-	-	-

Pin Type: I: Input, X: Tristate, O: Output, OD: Open Drain

[1] Adapter cable and Samtec connector not considered; PCB 1 pF/cm
[2] Open Drain FET; I_{Dmax} = 0.2 A
[3] Signals not connected to logic on XETK, pass through to debugger

7.10 Pin Assignment

7.10.1 ECU Interface Connector CON6

Pin	Signal	Direction	Comment
A1	/TRST	Out	JTAG signal
A2	TCK	Out	JTAG signal
A3	/EVTO	In	Debugger event signal (currently unused)
A4	TDI	Out	JTAG signal
A5	TDO	In	JTAG signal
A6	/WDGDIS	Out	Watchdog disable signal
B1	/EVTI	Out	Debugger event signal (currently unused)
B2	GND		Signal Ground
B3	TMS	Out	JTAG signal
B4	/PORST	BiDir	ECU Reset signal (open drain) for Reset assertion and supervision
B5	VDDP (Sense)	In	Sense for Switched power supply of ECU (ignition)
B6	/ESR0	In	ECU Reset signal for supervision

7.10.2 Interface and Power Supply Connector CON7

Pin	Signal	Direction	Comment
1	UBATT	In	Power supply (permanent)
2	CALWakeup	Out	Wakeup functionality (12 V output) [1)]
3	GND	-	Ground
4	VDDSBRAM	Out	Backup voltage (1.25 V) of ECU standby RAM provided by the XETK[2)]
5	Reserved	-	N.C.
6	VDDS-BRAM_-SENSE	In	VDDSBRAM_SENSE, optional[3)]
7	Reserved	-	N.C.

[1)] if not implemented, do not connect
[2)] XETK can be configured to monitor its supply of VDDSBRAM; voltage is sensed on board XETK.
[3)] XETK can be configured to monitor VDDSBRAM provided by either ECU or XETK on this dedicated sense pin.

7.10.3 Debugger Interface Connector CON1

Pin	Signal	Direction	Comment
1	TMS	In	JTAG Signal
2	VREF	Out	Target supply for sensing
3	TDO	Out	JTAG Signal
4	GND		Signal Ground
5	/WDGDIS	In	Watchdog disable signal
6	GND		Signal Ground
7	TDI	In	Debugger event signal (currently unused)
8	/PORST	Bidir	ECU Reset signal (open drain) for Reset assertion and supervision
9	/TRST	In	JTAG Signal
10	/EVTO	Out	Debugger event signal
11	TCK	In	JTAG Signal
12	GND		Signal Ground
13	/EVTI	In	Debugger event signal
14	/BREQ	In	Bus Request to XETK
15	/BGRANT	Out	Bus Grant from XETK
16	/ESR0	Out	ECU Reset signal for supervision

7.11 Mechanical Dimensions

The reference measure for all drawings is millimeters.

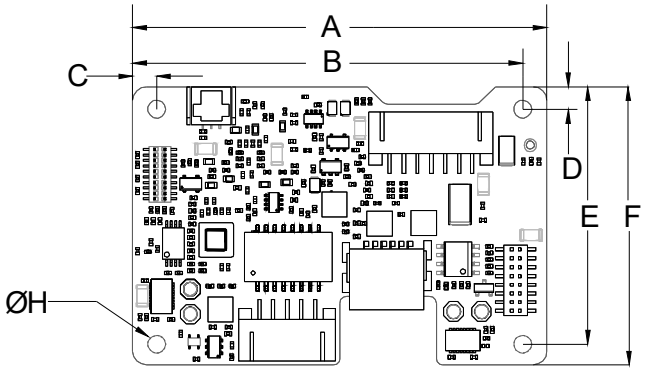


Fig. 7-1 XETK-S21.0 Dimensions - Top View

Item	**Dimension** [Millimeters]	Tolerance [Millimeters]	**Dimension** [Inches]	Tolerance [Inches]
A	60.00	+/- 0.20	2.362	+/- 0.008
B	56.50	+/- 0.20	2.224	+/- 0.008
C	3.50	+/- 0.10	0.138	+/- 0.004
D	3.25	+/- 0.10	0.128	+/- 0.004
E	37.25	+/- 0.20	1.466	+/- 0.008
F	40.25	+/- 0.20	1.585	+/- 0.008
H	2.60	+/- 0.20	0.102	+/- 0.008

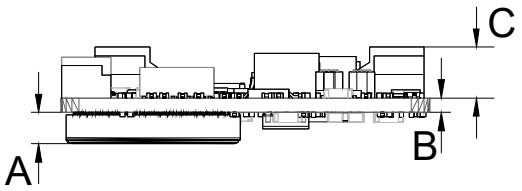


Fig. 7-2 XETK-S21.0 Dimensions - Side View

Item	**Dimension** [Millimeters]	Tolerance [Millimeters]	**Dimension** [Inches]	Tolerance [Inches]
A	3.43	+/- 0.20	0.135	+/- 0.008
B	1.57	+/- 0.16	0.062	+/- 0.006
C	5.51	+/- 0.10	0.217	+/- 0.004

8 Cables and Accessories

This chapter contains information about the following topics:

8.1 ECU Adapter Cable

8.1.1 CBAM230 Adapter Cable

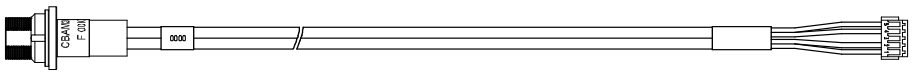


Fig. 8-1 CBAM230 Adapter Cable

XETK ECU Adapter Cable, 100 MBit/s, suitable for ECU flush mounting (M12), 0.38 m length, shield connected to socket. Usable for ECUs with shielded housing.

Product	Length	Order Number
CBAM230.1-0m38	0.38 m	F 00K 105 791

8.1.2 CBAM240 Adapter Cable

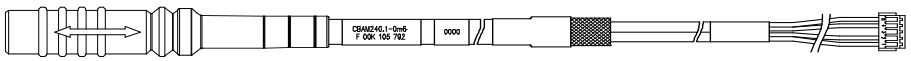


Fig. 8-2 CBAM240 Adapter Cable

XETK ECU Adapter Cable, 100 MBit/s, shield connected to ECU-housing (lead-through diameter for cable: 10 mm), 0.6 m length, shield bare for cable gland, isolated to the XETK. Usable for ECUs with shielded housing.

NOTE

The hardware for mounting ECU adapter cables is not included in the cable delivery, they need to be ordered separately. For detailed information on mounting accessories contact ETAS technical support.

Product	Length	Order Number
CBAM240.1-0m6	0.6 m	F 00K 105 792

8.1.3 CBAM271 Adapter Cable

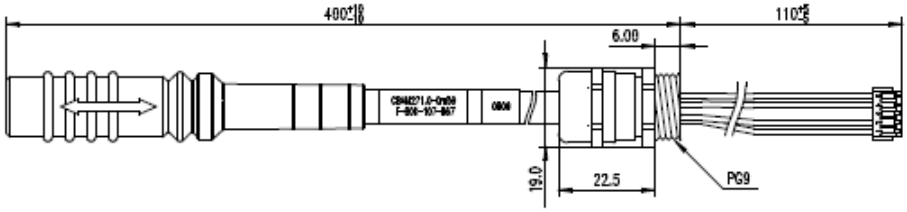


Fig. 8-3 CBAM271 Adapter Cable

XETK ECU Adapter Cable, 100 Mbit/s, pre-assembled into PG9 screwing, shield on ECU- housing, Lemo 1B PHE - JST PHR (10fc-5fc), 0.5 m length. Fits for ETKS_C3 case.

NOTE

For mounting the cable, cut a PG9 thread into the ECU housing. For thin walled housings use a nut SM-PE 9. Available from Lapp, Order number: 52103210.

Product	Length	Order Number
CBAM271.1-0m5	0.5 m	F 00K 107 867

8.2 Combined Interface and Power Supply Cable

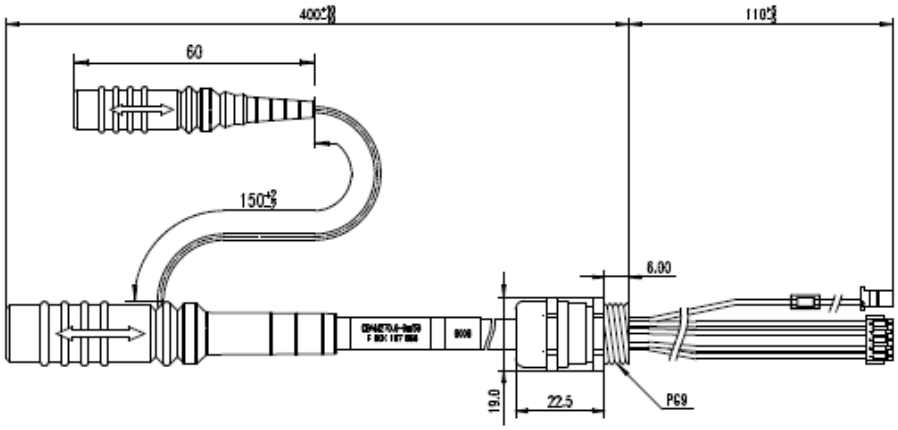


Fig. 8-4 CBAM270 Cable (0.5 m length)

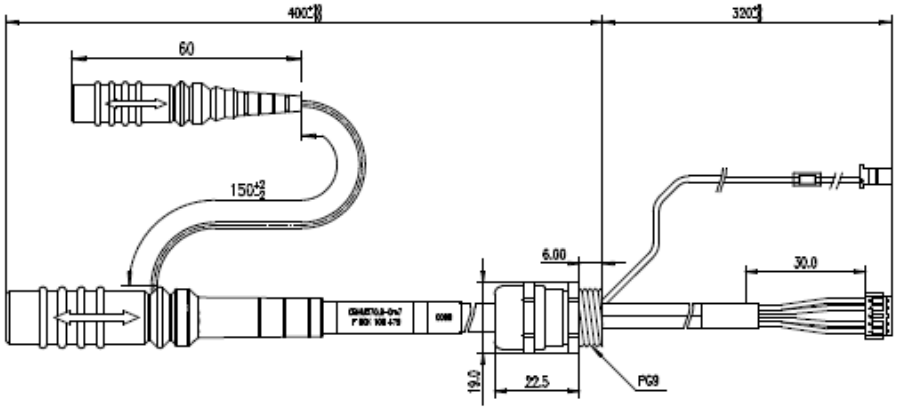


Fig. 8-5 CBAM270 Cable (0.7 m length)

XETK ECU Adapter and Power Supply Cable, pre-assembled into PG9 screwing, shield on ECU-Housing, Lemo 1B PHE - JST PHR (10fc-5fc) / Lemo 0B PHG - JST PAP (2fc-2fc), 0.5 m and 0.7 m length.

NOTE

For using the cable with an ETK with solder pad, cut the plug and solder the wire direct to the solder pad.

NOTE

It is recommended for safety reasons to connect the external permanent voltage and the switched voltage inside the ECU!

NOTE

For mounting the cable, cut a PG9 thread into the ECU housing. For thin walled housings use a nut SM-PE 9. Available from Lapp, Order number: 52103210.

Product	Length	Order Number
CBAM270.1-0m5	0.5 m	F 00K 107 866
CBAM270.1-0m7	0.7 m	F 00K 108 479

8.3 PC Interface Cable

8.3.1 CBE200-3 Cable

Fig. 8-6 CBE200-3 Cable

Product	Length	Order Number
CBE200-3	3 m	F 00K 104 373

8.3.2 CBAE200 Adapter Cable

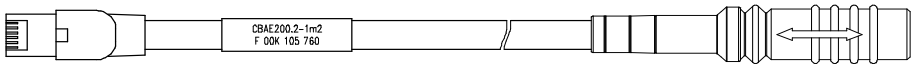


Fig. 8-7 CBAE200 Adapter Cable

Cable adapter to connect CBE230 cable to the PC over an RJ45 connector. The CBAE200.2-1m20 supports Gigabit Ethernet.

Product	Length	Order Number
CBAE200.2-1m20	1.20 m	F 00K 105 760

8.4 ETAS Module Interface Adapter Cable

8.4.1 CBE230 Cable

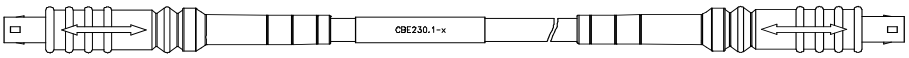


Fig. 8-8 CBE230 Cable

Gigabit Ethernet connection cable for ETAS devices. IP67 rated Lemo connectors on both sides. Gigabit Ethernet cable with power supply.

Product	Length	Order Number
CBE230.1-3	3 m	F 00K 105 757
CBE230.1-8	8 m	F 00K 105 758

8.4.2 CBAE330 Adapter Cable

Fig. 8-9 CBAE330 Adapter Cable

Gigabit to 100 MBit/s Ethernet Adapter for connection of CBE230 to ES600.

Cable adapter to connect CBE230 cable with the ES600. Power supply over the CBAE330.2 cable adapter is not supported.

Product	Length	Order Number
CBAE330.2-0m5	0.5 m	F 00K 105 759

8.5 Power Supply Cables

8.5.1 Cable K70

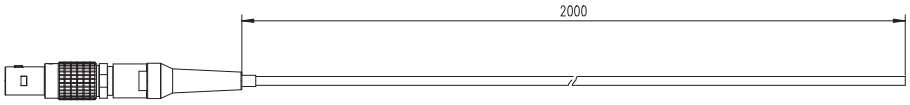


Fig. 8-10 Power Supply Cable K70

Dim	Millimeters	Inches
A	2000	78.74

8.5.2 Cable KA50

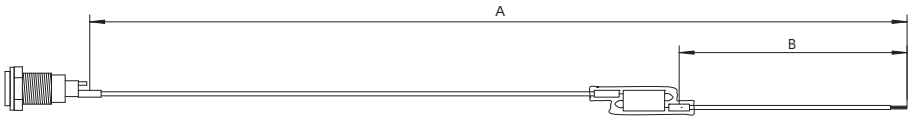


Fig. 8-11 Power Supply Cable KA50

Dim	Millimeters	Inches
A	200	7.87
B	50	1.97

8.6 ECU Interface Adapter

8.6.1 XETK - ECU Adapter ETAI5

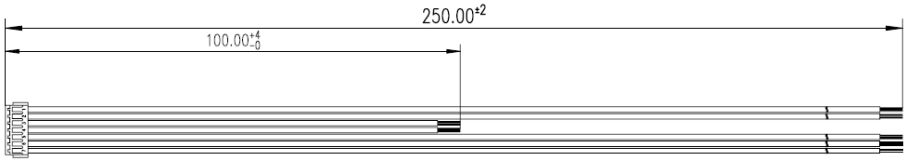


Fig. 8-12 XETK - ECU Adapter ETAI5

Dim	Millimeters	Inches
A	250	9.84

NOTE

See Fig. 5-2 on page 28 for details on mating connector to the ETAI5

8.6.2 XETK - ECU Adapter ETAI6

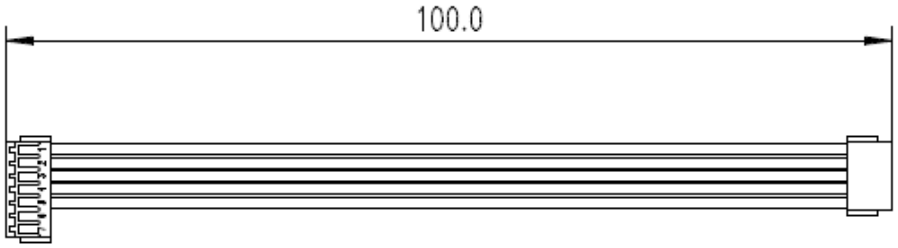


Fig. 8-13 XETK - ECU Adapter ETAI6

Dim	Millimeters	Inches
A	100.00	3.94

NOTE

See Fig. 5-2 on page 28 for details on mating connector to the ETAI6

8.6.3 XETK - ECU Adapter ETAI8

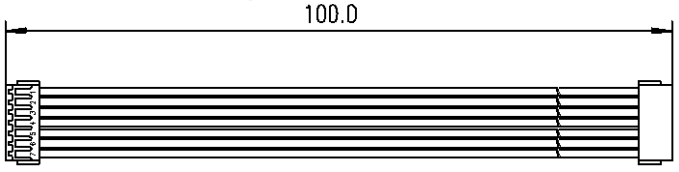


Fig. 8-14 XETK - ECU Adapter ETAI8

Dim	Millimeters	Inches
A	100.0	3.94

NOTE

See Fig. 5-2 on page 28 for details on mating connector to the ETAI8

8.6.4 XETK - ECU Adapter ETAI10

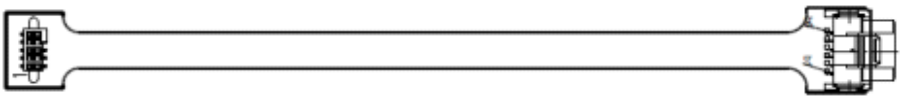


Fig. 8-15 XETK - ECU Adapter ETAI10

Dim	Millimeters	Inches
A	136	5.35

NOTE

See Fig. 5-2 on page 28 for details on mating connector to the ETAI10

8.6.5 Debug Adapter ETAF11

The ETAF11.0 adapts Unified Automotive Debug Cable for debugger connection. The ETAF11 bottom side is isolated (no parts and vias).

There are two specific applications:

- adapt the ECU-ETK connector to the Debugger
- adapt the ETK-Debugger connector to the Debugger

ETAF11 Flatcable

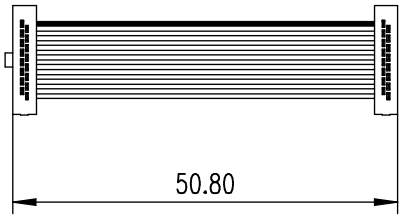


Fig. 8-16 ETAF11 Flatcable

ETAF11 Component Placement

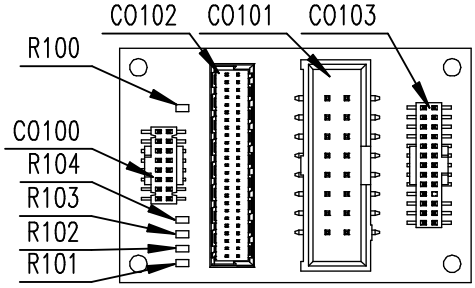


Fig. 8-17 ETAF11 Component Placement

ETAF11 PCB

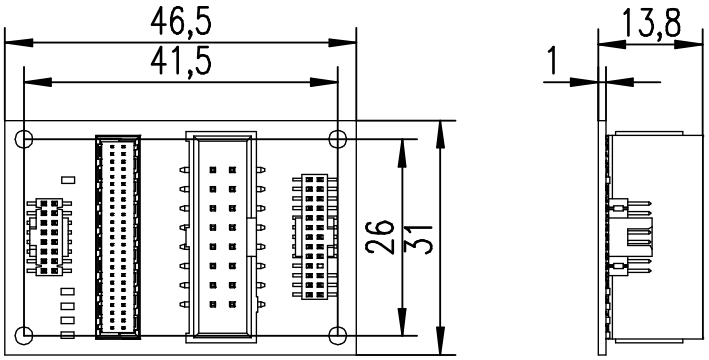


Fig. 8-18 ETAF11 - Mechanical Dimensions and Component Placement

8.6.6 Debug Adapter AS_ETAF13.0

The AS_ETAF13.0 adapts the Lauterbach Auto-26 cable (26 pin Samtec) to the XETK-S21.0 debug connector (16 pin Samtec). The board and the cable are delivered as one item.

AS_ETAF13.0 Debug Adapter

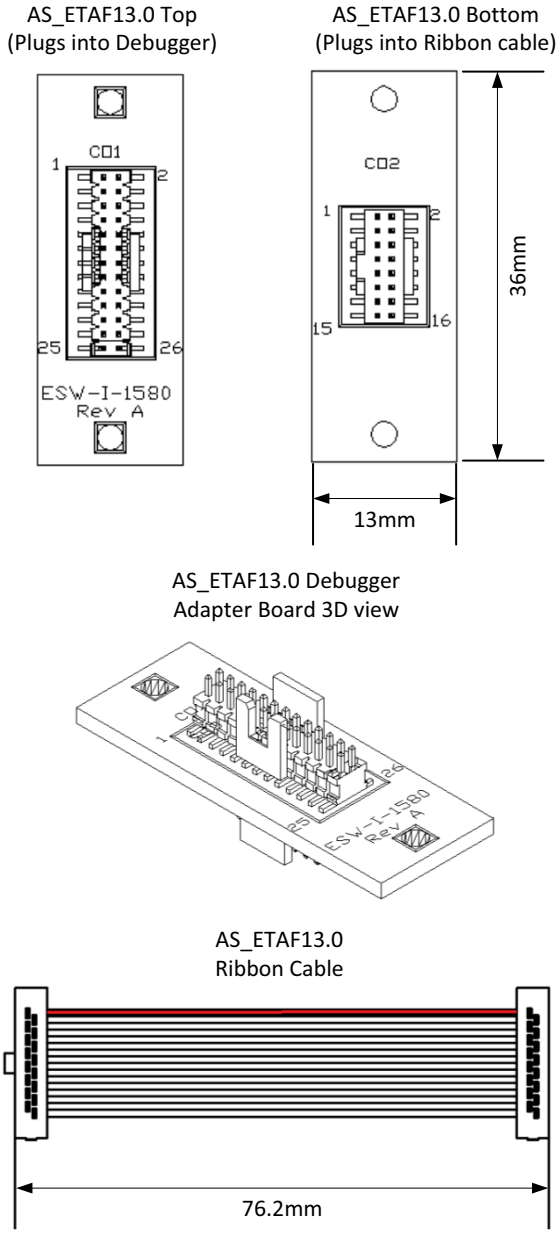


Fig. 8-19 AS_ETAF13.0 Debug Adapter

8.7 Water proof case ETKS_C3

For mounting the XETK-S21.0 on top of ECUs, an external case is available. It is small, robust and water proof (IP65).

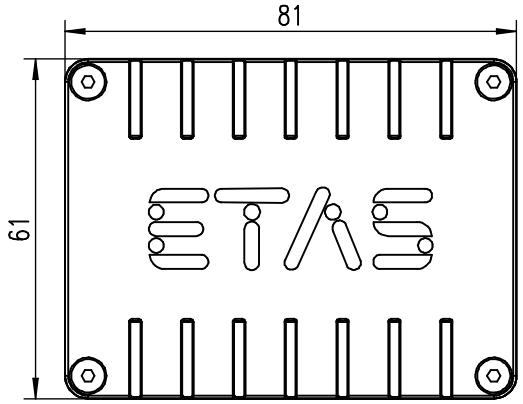


Fig. 8-20 ETKS_C3 Top View

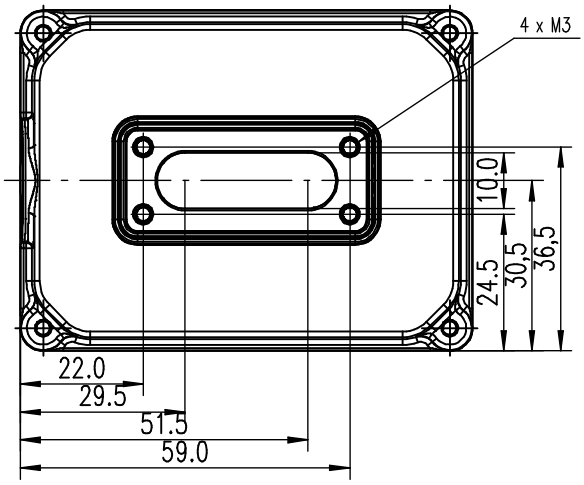


Fig. 8-21 ETKS_C3 Bottom View

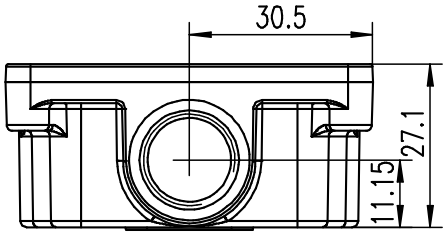


Fig. 8-22 ETKS_C3 Side View

9 Ordering Information

9.1 XETK-S21.0

Order Name	Short Name	Order Number
XETK-S21.0 Emulator Probe for the JDP MPC57xx Microcontroller Family	XETK-S21.0	F 00K 109 271

Package Contents

- XETK-S21.0 Emulator Probe for the JDP MPC57xx Microcontroller Family
- List "Content of this Package"
- ETK Safety Advice
- China-RoHS-leaflet_Compact_cn

9.2 XETK - ECU Adapter

Order Name	Short Name	Order Number
ETAI5 ETK ECU Adapter with short ED supply and GND lines, JST PHR - open wires (7fc - 2c+5c), 0m25	ETAI5	F 00K 106 773
ETAI6 ETK ECU Adapter, JST PHR - JST PHR (7fc - 5fc), 0m10	ETAI6	F 00K 107 195
ETAI8 XETK ECU Adapter, JST PHR - 7 to - JST PHR - 7(7fc - 7fc), 0m10	ETAI8	F 00K 107 757
ETAI10 ETK ECU Flex Adapter, Erni - Samtec (12fc - 10fc), 0m136	ETAI10	F 00K 107 954

9.3 Debug Adapter

Order Name	Short Name	Order Number
Debug Adapter from Debugger to ETK	ETAF11	F00K 107 682
Debug Adapter from Debugger to XETK-S2x	AS_ETAF13.0	F00K 110 451

9.4 Power Supply

Order Name	Short Name	Order Number
Isolated Power Supply Interface for XETK	ETP2	F 00K 104 010

9.5 Cables

Please contact your local ETAS representative for further cable information.

NOTE

The cables showed in chapter “Cables and Accessories” on page 47 are not included in the XETK-S21.0 delivery.

9.5.1 ECU Adapter Cables

NOTE

The hardware for mounting ECU adapter cable CBAM240.1 is not included in the cable delivery, they need to be ordered separately. For detailed information on mounting accessories contact ETAS technical support.

Order Name	Short Name	Order Number
XETK ECU Adapter Cable, 100 Mbit/s, Shield on ECU-Housing, Lemo 1B HME - JST PHE (10fc-5fc), 0m38	CBAM230.1-0m38	F 00K 105 791
XETK ECU Adapter cable, 100 Mbit/s, Lemo 1B HME - JST PHE (10fc-5fc), 0m6	CBAM240.1-0m6	F 00K 105 792
XETK ECU Adapter Cable, pre-assembled into PG9 screwing, shield on ECU- Housing, Lemo 1B PHE - JST PHR (10fc-5fc), 0m50	CBAM271.0-0m5	F 00K 107 867

9.5.2 Combined ECU Adapter and Power Supply Cables

Order Name	Short Name	Order Number
XETK ECU Adapter and Power Supply Cable, pre-assembled into PG9 screwing, shield on ECU-Housing, Lemo 1B PHE - JST PHR (10fc-5fc) / Lemo 0B PHG - JST PAP (2fc-2fc), 0m50	CBAM270.0-0m5	F 00K 107 866
XETK ECU Adapter and Power Supply Cable, pre-assembled into PG9 screwing, shield on ECU-Housing, Lemo 1B PHE - JST PHR (10fc-5fc) / Lemo 0B PHG - JST PAP (2fc-2fc), 0m70	CBAM270.0-0m7	F 00K 108 479

9.5.3 Ethernet Cables

9.5.3.1 PC Interface Cable

Order Name	Short Name	Order Number
Ethernet PC Connection Cable 1GBit/s, Lemo 1B FGE - RJ45 (10mc-8mc), 3 m	CBE200-3	F 00K 104 373
Ethernet Connection Adapter Cable 1 GBit/s, Lemo 1B PHE - RJ45 (10fc-8mc), 1m2	CBAE200-1m20	F 00K 105 760

9.5.3.2 ES600 / ES910 Interface Cable

Order Name	Short Name	Order Number
Ethernet Connection Cable 1 GBit/s, Lemo 1B FGE - Lemo 1B FGE (10mc- 10mc), 3 m	CBE230.1-3	F 00K 105 757
Ethernet Connection Cable 1 GBit/s, Lemo 1B FGE - Lemo 1B FGE (10mc- 10mc), 8 m	CBE230.1-8	F 00K 105 758

9.5.3.3 ES600 Interface Adapter Cable

Order Name	Short Name	Order Number
Ethernet Connection Adapter Cable 1 GBit/s to 100 MBit/s, Lemo 1B PHE - Lemo 1B FGF (10fc-8mc), 0m5	CBAE330.2-0m5	F 00K 105 759

9.5.4 Power Supply Cable

Order Name	Short Name	Order Number
External Power Supply Cable for XETKs, Lemo 0B FGG - open wires (2fc-1c), 2 m	K70	Y 261 A24 942
XETK Power Supply Cable for External Supply, with Filter Coil, Lemo 0B EGG - open wire (2fc-1c), 0m2	KA50	F 00K 000 940

9.6 Waterproof Case

Order Name	Short Name	Order Number
Water proof case, designed for ETK-S4.x, ETK-S6.x and ETK-S2x	ETKS_C3	F 00K 107 683

10 Contact Information

ETAS Headquarters

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ETAS Subsidiaries and Technical Support

For details of your local sales office as well as your local technical support team and product hotlines, take a look at the ETAS website:

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ETAS technical support	Internet:	www.etas.com/en/hotlines.php

Figures

Index

X