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ES1231.1-A
ETK Interface Board

User's Guide

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Document QH101301 R1.0.2 EN TTN F 00K 103 015

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1 Introduction

This section contains information about the basic features and applications of the ES1231.1-A ETK Interface Board (ETK = Emulator Test Probe). A block diagram is also included here to show the schematic layout of the interface board.

note

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.

1.1 Applications

The ES1231.1-A ETK Interface Board is designed for VME64x systems with 3 U height. It enables a very high-performance integration of the ETK into the ES1000 system for memory emulation and particularly data acquisition.

Thanks to a new block transmission mode, the ES1231.1-A is much faster than its predecessor models ES1200.1/ES1201.1.

Features

The ES1231.1-A has the following features and components:

- Motorola MPC555 40-MHz processor
  - 1 MByte SDRAM (32-bit, burstable)
  - 1 MByte Flash (16-bit)
- transfer rate of 8 MBit/s
- ‘single mode’ and ‘block mode’ data transfer from and to the ETK
- Data Acquisition Memory Controller (DAMC) for linking the ETK to the ES1000 system in real time
- automatic detection of the ETK type
- configuration of the ETK
- 16 independent acquisition time frames possible
- VME64x interface
- up to 4 serial ETK interfaces (e.g. four ES1231.1-A boards) can be operated simultaneously on an ES1000.

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- 16-MByte data acquisition memory on-board

note

ETAS is currently planning extending the data acquisition memory. Please get in touch with your contact in Sales for more details on planned availability.

- Update of firmware possible by means of connected PC

These features guarantee that the real-time requirements are fulfilled when the ES1000 is used.

The following figure shows the front panel of the ES1231.1-A.

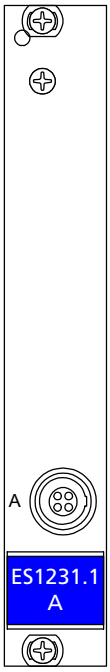


Fig. 1-1 Front View of the ES1231.1-A

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1.2 Block Diagram

Fig. 1-2 shows the block diagram of the ES1231.1-A with the major functional units.

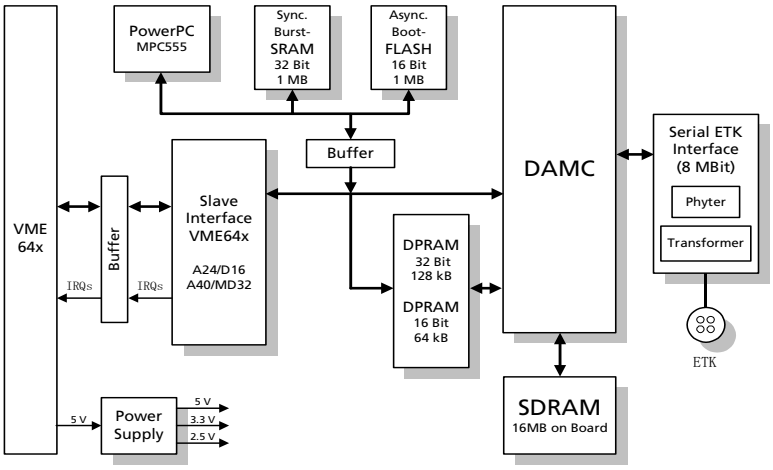


Fig. 1-2 Block Diagram of the ES1231.1-A

VME Slave Interface

The board has a VME slave interface which supports A24/D16 master board accesses. The A40/MD32 mode will also be supported in the future. The slave interface converts accesses to the VME bus into accesses to corresponding memory areas on the board.

Power Supply

The power supply makes voltages of 5 V, 3.3 V and 2.5 V available. ICs with a low supply voltage are generally used to keep the power consumption down.

PowerPC

The PowerPC and the connected memory modules can be addressed via the VME bus.

Data Acquisition Memory Controller (DAMC)

The Data Acquisition Memory Controller (DAMC) has a fast RISC processor designed for applications in real-time data acquisition and real-time addressing of external modules.

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Measurement data is given a time stamp. The RISC processor is controlled by interrupts and can also be addressed from the VME bus.

Data is exchanged via the memory connected to the DAMC. The connected memory (SDRAM) is also managed by the DAMC. The VME bus and the PowerPC can access this memory simultaneously.

Serial ETK Interface

The serial ETK interface is dc decoupled from the board. Three different modes guarantee high performance to ensure that the ever increasing data volume can be dealt with in the future:

- the 8-MBit 'single mode' guarantees compatibility to all previous ETKs,
- the much faster 8-MBit 'block mode' offers increased performance which is particularly useful with bypass applications in ASCET-SD and when high demands are made of the amount of data during data acquisition in INCA.

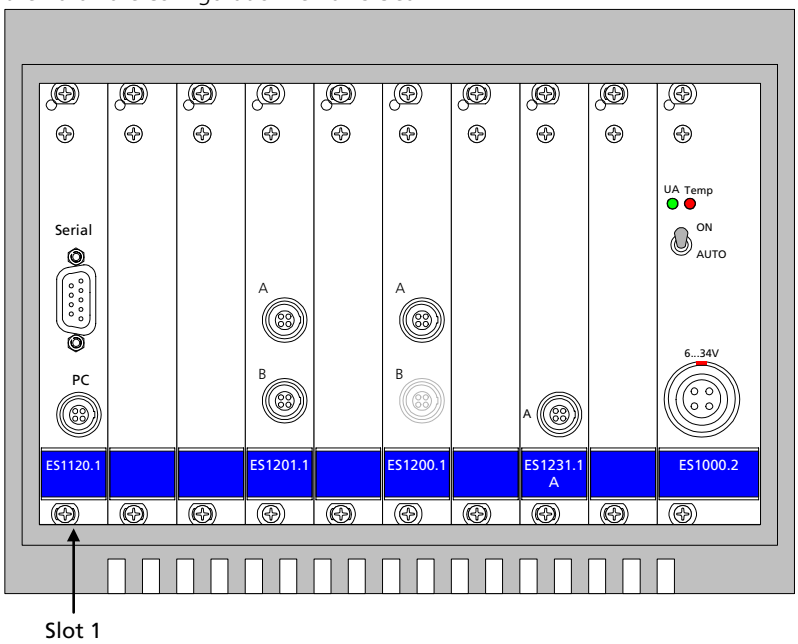
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2 Setup Hints

Please read the following section carefully as an addition to the "ES1231.1-A ETK Interface Board" User's Guide.

2.1 Recommended Layout when using Several ETK Interfaces

If you are using several different ETK interfaces in your ES1000.2 system, please observe the order of installation shown in the figure below to ensure the hardware configuration remains clear.



Slot 1 is for the system controller; otherwise you can install the boards in any slot providing you observe the following order:

ES1201.1 slot no. < ES1200.1 slot no. < ES1231.1-A slot no.

The following is also true for the ES1200.1 and ES1201.1:

ID1 slot number < ID2 slot number

note

Please note that there must not be more than four ETK ports in the system. Further, there can only be one ES1200.1 in the system.

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2.2 Parameterizing the Hardware Configuration (HWC)

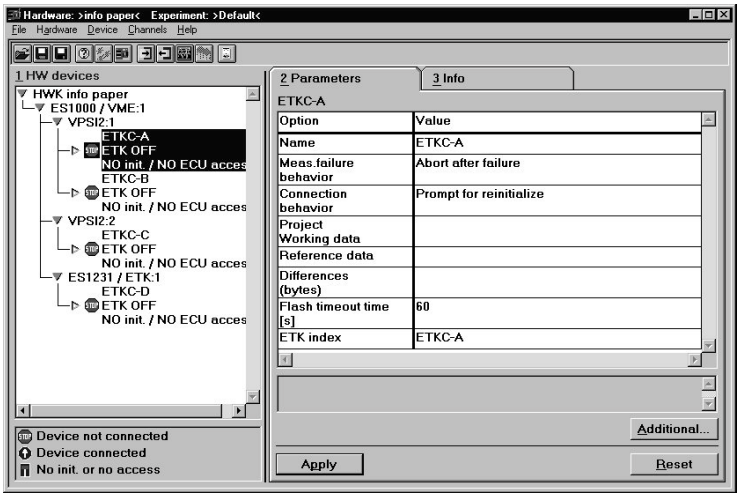
It is recommend to have the HWC generated automatically. Use the menu **Hardware →Search for Hardware** for this.

If you want to organize or change your HWC manually, you must note how the ETK Controller (ETKC) counts as well as observing the order of installation in the ES1000.2 system recommended above:

- Starting from the left, the ETK ports are referred to as ETKC-A through ETKC-D. The system controller can operate a maximum of 4 ETK controllers.
- The ETK ports are always numbered consecutively by the system controller.
- This numbering has to be reflected exactly in the HWC.

The **ETK index** parameter can be selected accordingly in the HWC with the ETKC device. The following table shows a sample configuration as specified in the HWC shown below.

ES1201.1 Port A	ETKC-A
ES1201.1 Port B	ETKC-B
ES1200.1 Port A	ETKC-C
ES1200.1 Port B	not assembled
ES1231.1-A Port A	ETKC-D



The description of the ETK ports in the HWC has to correspond **exactly** to where the hardware is installed.

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3 Technical Data

The following sections contain information on:

- VMEbus interface
- connection to the ETK
- electrical and mechanical data
- operating conditions
- firmware update

3.1 VMEbus Interface

The ES1231.1-A communicates with the ES1130 Simulation Controller or the ES1120 System Controller via the VME bus. A VME64x interface has been implemented to ensure high system performance.

The processor board has direct access to the Data Acquisition Memory Controller (DAMC) via the VMEbus. The DAMC is responsible for the communication between ETK and ES1231.1-A. Interrupts control the data transfer between the master CPU and ES1231.1-A.

It is possible to manipulate or preprocess the large amounts of data with the local CPU (MPC555). The local CPU can also be accessed via the VME bus.

In addition to the A24/D16 modes, which make it possible to work with existing boards, an A40/MD32 access (multiplexed address and data accesses, VME64 extension) is used. The maximum bus transfer rate with A40/MD32 access in block mode is approx. 40 MByte/s. A high data transfer rate can be attained using the VME bus together with the ES1120 System Controller.

Type	Slave
Access types	A24:D16; A40:MD32
Interrupters	16 interrupters; level and vector can be programmed
Configuration	Auto-ID configuration

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3.2 Interface Cable: ES1231.1-A to ETK

3.2.1 "A" Connector

The "A" connector contains the lines for the ETK interface. A four-pin Lemo socket (1B dimensions) is used as a connector.

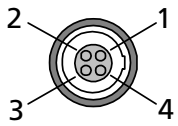


Fig. 3-1 "A" Connector

Pin	Function	Pin	Function
1	TX+	3	RX+
2	TX-	4	RX-

Fig. 3-2 "A" Connector Pin Assignment

3.2.2 ETK Interface Cable CBM 150

A special cable is needed to connect the ES1231.1-A to the ETK.

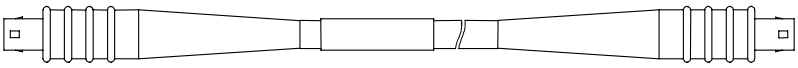


Fig. 3-3 ETK Interface Cable CBM150

The following table shows the available types of this cable and their ordering numbers.

Ordering Designation	Abbreviation	Ordering Number
Cable Lemo 1B FFG - Lemo 1B FFG (4mc-4mc, 3m)	CBM150-3	F-00K-102-556
Cable Lemo 1B FFG - Lemo 1B FFG (4mc-4mc, 5m)	CBM150-5	F-00K-102-557
Cable Lemo 1B FFG - Lemo 1B FFG (4mc-4mc, 10m)	CBM150-10	F-00K-102-553
Cable Lemo 1B FFG - Lemo 1B FFG (4mc-4mc, 15m)	CBM150-15	F-00K-102-554
Cable Lemo 1B FFG - Lemo 1B FFG (4mc-4mc, 20m)	CBM150-20	F-00K-102-555

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3.3 Firmware Update

The firmware of the ES1231.1-A ETK Interface board can be updated using a service software running on the connected PC while the board is mounted in the ES1000 system.

3.4 Electrical and Mechanical Data

Processor

Processor	Motorola PowerPC MPC555, 40 MHz
Memory	1 MByte SRAM (32-bit, burstable) 1 MByte Flash (16-bit)

Data Acquisition Memory

On-board	16 MByte
Memory Extension	Planned

VMEbus Interface

Type	Slave
Address and data lines	A24:D16, A40:MD32
Interrupters	16 interrupters; level and vector can be programmed
Configuration	Auto-ID configuration
Connector	160-pin DIN 41612

ETK Interface

Transfer rates	8 MBit/s (single mode/block mode)
Connector	4-pin Lemo, 1B dimensions
Cable	Double-shielded, twisted pair

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Power Supply

Power consumption (standard/maximum)	5 W/7 W

Mechanical Data

Circuit board	100 x 160 mm²
Front panel	Height: 3 U Width: 4 HP (20.4 mm)

3.5 Environmental Conditions

Ambient temperature during operation	-40 °C to +85 °C
Storage temperature	-55 °C to +85 °C
Relative humidity	0 to 95 %, no condensation

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