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Find the *ETAS ES1222.2-A* at our website: *Click HERE*

ES1222.2-A
CAN + K-Line Board
User's Guide

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1 Introduction

This section contains information about the basic features and applications of the ES1222.2-A board. A block diagram shows the schematic layout of the board.

note

Some components of the 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 storage package, configured and installed at a work place that is protected against static discharge.

1.1 Features

The ES1222.2-A board has four CAN interfaces as well as a K-Line and L-Line interface. A VME64x interface enables integration to VMEbus systems, such as the ES1000 system. The board makes it possible to access serial ECU interfaces.

The ES1222.2-A board has the following features:

- CAN interface
  - 4 independent, dc decoupled CAN buses
  - CAN protocol V2.0a (standard identifier)
  - CAN protocol V2.0b (extended identifier)
  - CAN Calibration Protocol V2.0/V2.1 (standardized ASAP1a CCP)
  - ISO high-speed physical layer
  - baud rates of up to 1 MBit/s can be set using software
  - KWP2000 on CAN
- K-Line and L-Line
  - conforms to ISO 9141-2 requirements for diagnostic testers
  - transfer rates of up to 250 kBaud
  - protocols: McMess, KWP2000, Keyword71
- Intel 82C527 and Dallas DS87C520 communication controllers
- Motorola MPC555 with 40 MHz to reduce the system processor load
  - 1 MByte SRAM
  - 1 MByte Flash

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- independent bus systems for communication controllers and MPC555
- integrated programming module for generating programming voltage for Flash EPROMs in ECUs
- ES1222.2-A board firmware can be updated using the BDM interface
- firmware update of the ES1222.2-A is possible in the ES1000 system via the PC
- extended temperature range for use in the vehicle (-40 °C to + 85 °C)
- VME64x interface
- connectors suitable for motor vehicles

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The following figure shows you the front panel of the ES1222.2-A board.

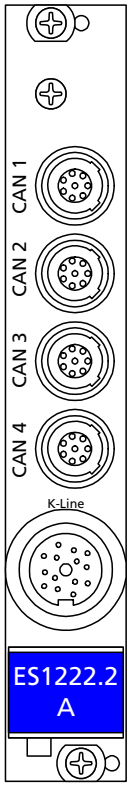


Fig. 1-1 ES1222.2-A Front Panel

1.2 Applications

You can use the ES1222.2-A board for the following tasks:

- connecting external devices using the CAN interface with VMEbus systems
- ECU calibration using CANbus and/or diagnostic interface
- ECU diagnostics
- flash programming of ECUs
- measuring external measurands using Ipetronik modules

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- recording and acquiring communication data in one or more CAN networks
- simulation of CAN interfaces in CAN networks

1.3 Block Diagram

The following block diagram shows how the ES1222.2-A board works.

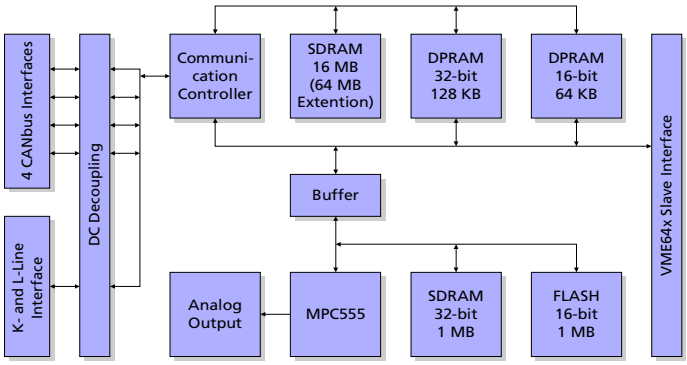


Fig. 1-2 Block Diagram

Both the communication controller and the MPC555 microprocessor have their own bus system. The two bus systems are connected via a buffer.

The VME64x interface contains the buffers for data and address lines as well as the interrupt logic.

The two dual-ported RAMs can be accessed both from the VMEbus and the communication controller.

The communication controller makes four CAN interfaces available as well as the K-Line and L-Line interfaces. Their signals are routed to the connectors on the front panel via dc decoupling.

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2 Hardware

This chapter contains a detailed functional description, information on hardware configuration and the connectors, and the technical data of the ES1222.2-A board.

2.1 Functional Description

This section gives you a detailed overview of the features of the ES1222.2-A board. You will find information on the following subjects:

- interfaces
- CANbus data acquisition
- analog output
- Ipetronik modules
- updating the firmware
- connectors

2.1.1 Interfaces

The ES1222.2-A board has four CANbus interfaces and a serial K-Line and L-Line interface for connecting VMEbus systems with external devices.

It also has a communication controller for data exchange via the serial interfaces. This guarantees high data transfer rates.

Serial CANbus Interface

The ES1222.2-A board has four CANbus interfaces. The CANbus signals are routed to four 8-pin connectors, CAN1 to CAN4, on the front panel. The connection to the external device has a maximum transfer rate of 1 MBit/s (ISO high-speed). The following CAN protocols are supported:

- CAN protocol V2.0a standard identifier (11 bit identifier)
- CAN protocol V2.0b extended identifier (29 bit identifier)
- KWP2000 on CAN

The four CANbus interfaces support the ASAP1a protocol to guarantee ECU calibration, and the acquisition and monitoring of CANbus communication data in the vehicle bus.

If you use the ES1222.2-A board for ECU calibration via the CANbus channels, the ASAP1a protocol has to be implemented in the ECU.

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Serial Diagnostic Interface

There is a 14-pin K-Line connector on the front panel of the ES1222.2-A board for connecting the K-Line and L-Line of the ECU diagnostic interface. The system's control software determines the functionality of the K-Line interface of the ES1222.2-A board.

The transfer rate can be a maximum of 250 Bit/s. The transfer rate and system frequency are set using the control software. The interface supports the following calibration and diagnostic protocols:

- McMess
- Keyword71
- KWP2000

If you use the ES1222.2-A board for ECU calibration with the K-Line, certain protocols have to be implemented in the ECU:

Function	Protocol
Measuring and calibration	McMess or KWP2000 calibration protocol
Diagnostics	Keyword71 and KWP2000 diagnostic protocols
ECU programming using flash memory	KWP2000 diagnostic protocol

VME64x Interface

The board has a VME64x interface. The system controller identifies and configures the address ranges and interrupts once the VMEbus system has been switched on.

The board can be configured for AutoSlot detection in accordance with the VME64x specification or the ETAS specification.

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2.1.2 CANbus Data Acquisition

The ES1222.2-A board makes flexible recording and acquisition of communication data possible, which is exchanged between ECUs in a CAN network.

Data from up to four individual CAN busses can be acquired and recorded. If CANbus data is acquired using interfaces such as the KWP2000 or CCP, the data is acquired synchronously to the ECU data. The number and configuration possibilities of the CAN bus and its messages are prescribed by the relevant control software.

By configuring with jumpers JP1-JP3, you can connect two CAN buses in parallel on the ES1222.2-A board. For more information on the configuration of jumpers JP1-JP3, please refer to the section "Jumpers JP1-JP3" on page 13.

2.1.3 Analog Output

The ES1222.2-A board has an analog output voltage on the K-Line connector for programming ECUs. The output voltage varies between 3 V and 24 V with a resolution of 12 bits.

2.1.4 Ipetronik Modules

The Ipetronik modules have a CANbus interface. The various Ipetronik modules can be connected in series and connected to the ES1000 using a CANbus of the ES1222.2-A board.

note

For more details on the support of Ipetronik modules, please consult the ETAS product catalog or contact ETAS directly.

The following modules are supported:

- SIM_VIN (voltage measurement - 8 channels)
- SIM_SENS (voltage measurement with sensor supply - 8 channels)
- SIM_DMS (strain gauge - 8 channels)
- SIM_CNT (universal counter - 4 channels)
- SIM_Thermo (thermocouple temperature measurement - 8 channels)

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2.2 Firmware Update

The firmware of the ES1222.2-A CAN + K-Line board can be updated using a service software running on the connected PC while the board is mounted in the ES1000 system.

2.2.1 Connectors

There are four connectors on the front panel for CANbus-signal transmission and one connector for the K-Line and L-Line. The four connectors, CAN1-CAN4, are 8-pin Lemo sockets. There is also a 14-pin K-Line connector available (also a socket) for the signals of the K-Line and L-Line.

2.3 Hardware Configuration

The following sections contain information on the configuration of the hardware using jumpers.

The following figure shows you the position of the jumpers on the ES1222.2-A board.

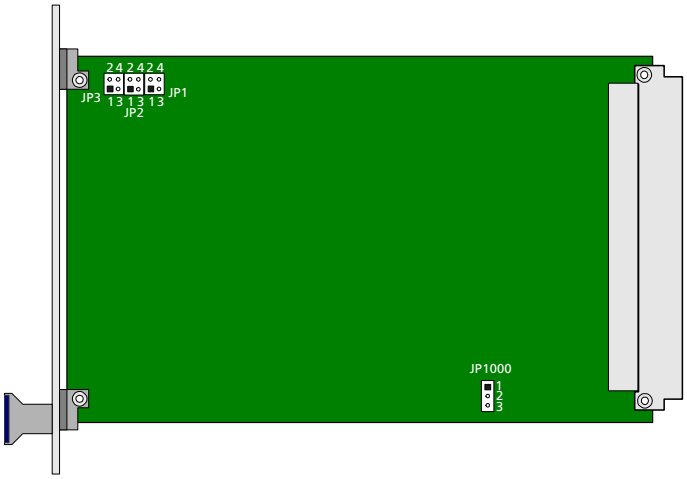


Fig. 2-1 Position of the Jumpers

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2.3.1 Jumpers JP1-JP3

You use jumpers JP1-JP3 to configure the parallel connection of the CAN buses.

Jumper	Pin	Meaning
JP1	1-2 and 3-4 closed	CAN1 connected with CAN2
JP1	Open	No function
JP2	1-2 and 3-4 closed	CAN2 connected with CAN3
JP2	Open	No function
JP3	1-2 and 3-4 closed	CAN3 connected with CAN4
JP3	Open	No function

2.3.2 Jumper JP1000

The JP1000 jumper specifies the VMEbus AutoSlot detection of the board.

Jumper	Pin	Meaning
JP1000	1-2 closed	ETAS VMEbus AutoSlot detection
JP1000	2-3 closed	VMEbus AutoSlot detection in acc. with VME64x specification

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2.4 Pin Assignment

The following section contains details of the assignment of the pins on the front panel.

2.4.1 Lemo CAN1-CAN4

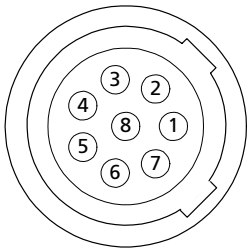


Fig. 2-2 Lemo Connector - CAN1 to CAN4

Pin	Signal
1	Reserved
2	CAN low
3	CAN GND
4	Reserved
5	Reserved
6	CAN GND
7	CAN high
8	Reserved

Tab. 2-1 Lemo Pin Assignment - CAN1 to CAN4

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2.4.2 K-Line/L-Line

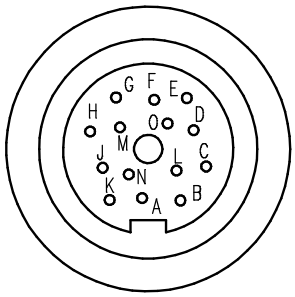


Fig. 2-3 K-Line/L-Line Connector

Pin	Signal
A	KL. 15
B	ECU GND
C	ECU GND
D	K-Line
E	L-Line
F	Reserved
G	Reserved
H	Vpp
I	Reserved
J	Reserved
K	Reserved
L	Reserved
M	Reserved
N	Reserved
O	UBD

Tab. 2-2 K-Line Pin Assignment

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2.5 Technical Data

This section contains the technical data of the ES1222.2-A board in tabular form.

Electrical Data

Power supply voltage	+5 V (via VME backplane)
Input current	Max. 2 A

Processor

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

Memory

On-board	16 MByte
Memory extension	Planned

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Interfaces

K-Line interface	K-Line and L-Line in acc. with ISO 9141-2 250 Bit/s can be set via software dc decoupled from the VMEbus
CANbus interface	4 independent interfaces Physical layer ISO high-speed to 1 MBit/s dc decoupled from the VMEbus

Electrical Data of the K-Line Interface

Output voltage of the K-Line plug's analog output	3 V bis 24 V
Resolution	12 Bit
Output current	max. 50 mA

note

The K-Line interface is not sustained-short-circuit-proof against U_{Batt} !

Environmental Conditions

Temperature range	-40 °C to +85 °C
Relative humidity	0 to 95%, no condensation

Mechanical Data

Circuit board	100 mm x 160 mm
Front panel	Height: 3 U Width: 4 HP

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2.6 Accessories and Order Numbers

This section provides you with an overview of the accessories currently available for the ES1222.2-A together with their order numbers.

2.6.1 CAN Interface Cable (ES1222-A)

Lemo 1B - 9-pin SUB-D socket, 2 m

Abbrev	Order No.
K106	F 00K 001 271

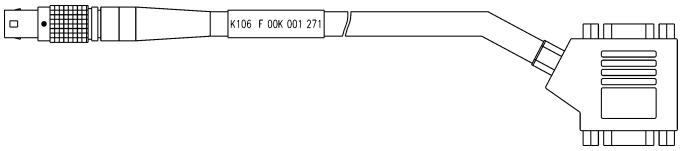


Fig. 2-4 CAN Interface Cable (ES1222-A)

2.6.2 CAN Interface Cable (ES1222-A)

Lemo 1B - Lemo 0S

Abbrev.	Order No.
K107	F 00K 001 272

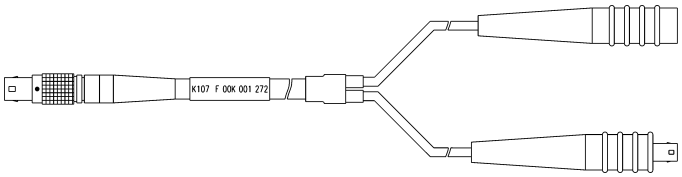


Fig. 2-5 CAN Interface Cable (ES1222-A)

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2.6.3 CAN Interface Cable

Lemo 2-pin connector - Lemo 2-pin socket, 2 m

Abbrev.	Order No.
K15	Y 261 A24 263

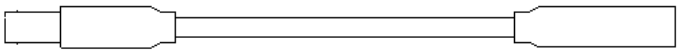


Fig. 2-6 CAN Interface Cable

2.6.4 CAN Termination Plug 120 Ohm

Abbrev.	Order No.
KS1	Y 261 A24 264



Fig. 2-7 CAN Termination Plug 120 Ohm

2.6.5 CAN Termination Connector

DSUB, 120 Ohm

Abbrev.	Order No.
KS2	F 00K 000 620

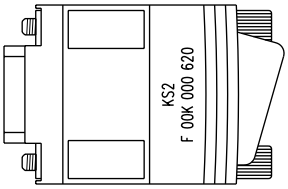


Fig. 2-8 CAN Termination Connector

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2.6.6 CAN Interface Cable SIC - DSUB

2 m

Abbrev.	Order No.
K95	F 00K 000 384

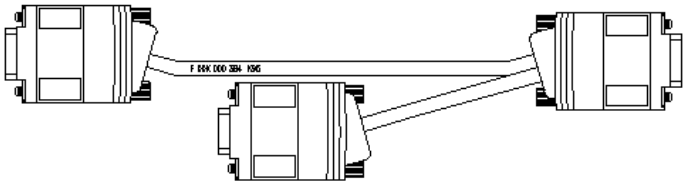


Fig. 2-9 CAN Interface Cable SIC - DSUB

2.6.7 VCAN Interface Adapter

9-pin SUB-D - Lemo jack/connector

Abbrev.	Order No.
KA21	Y 261 A24 513

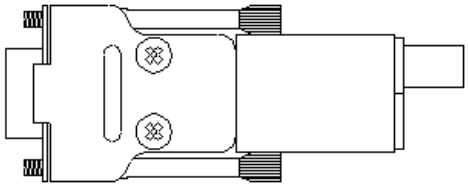


Fig. 2-10 VCAN Interface Adapter

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2.6.8 K-Line Interface Cable (KIC, MAC2)

14-pin round connector - 14-pin round connector, 3 and 8 m

Abbrev.	Order No.	Length
K78	F 00K 000 579	3 m
K96	F 00K 000 383	8 m

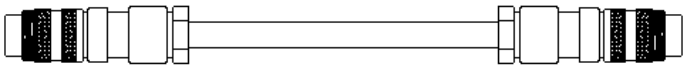


Fig. 2-11 K-Line Interface Cable (KIC, MAC2)

2.6.9 Cable Adapter (KIC, MAC2, SIC)

14-pin cable box - cluster plug, 0.2 m

Abbrev.	Order No.
KA45	F 00K 000 581

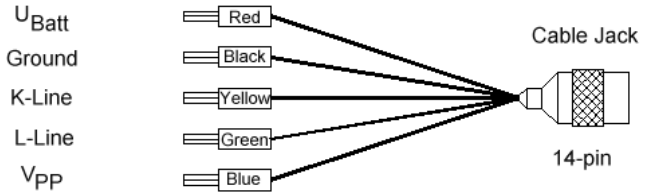


Fig. 2-12 Cable Adapter (KIC, MAC2, SIC)

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2.6.10 Cable Adapter

Connecting cable CARB connector - 14-pin jack, 0.2 m

Abbrev.	Order No.
K72	F 00K 000 372

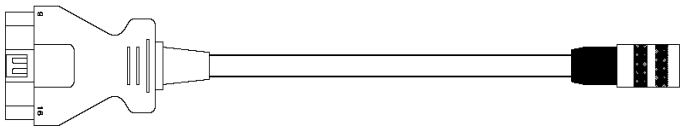


Fig. 2-13 Cable Adapter

2.6.11 Cable Adapter for K-Line Extension

14-pin jack - 14-pin jack, 0.2 m

Abbrev.	Order No.
KA18	Y 261 A24 405



Fig. 2-14 Cable Adapter for K-Line Extension

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3 Glossary

ASAP	Activity Group for the Standardization of Application Systems.
CAN	Controller Area Network
CCP	CAN Calibration Protocol
DMS	Strain gauge

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