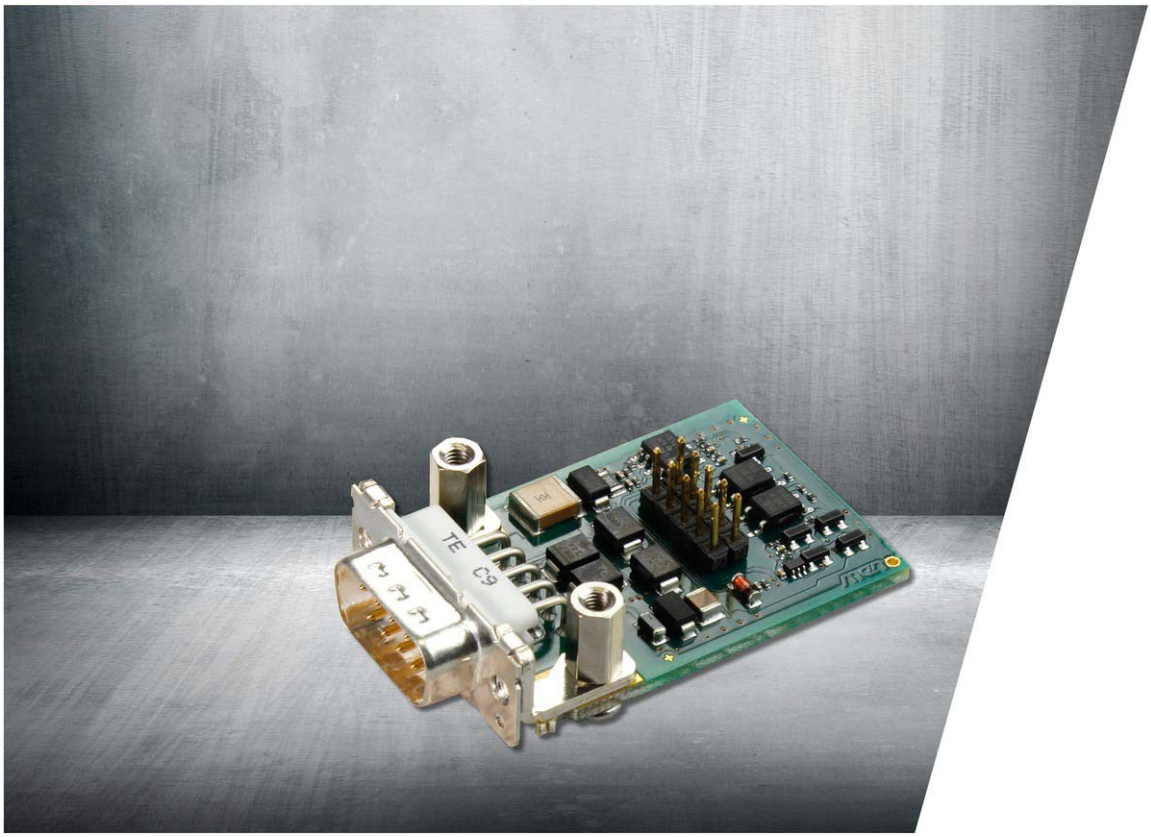
20SA24M00- E1 • 2016-02-03

SA24M

IBIS Master SA-Adapter



User Manual

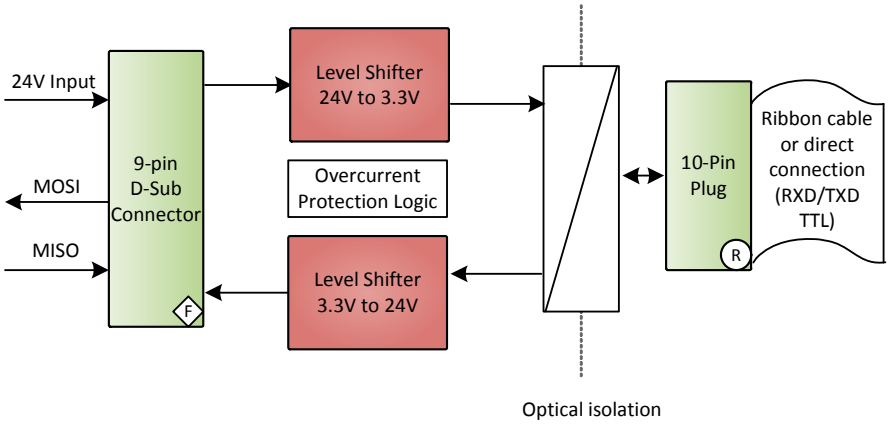
SA24M – IBIS Master SA-Adapter

The SA24M provides one IBIS master interface with an external 24V supply. While a fieldbus master controls the data traffic, the data transfer between master and slave participants is initiated only by the master.

IBIS is a fieldbus used in public transport vehicles. It is based on a UART structure and can therefore be combined with MEN boards that support any kind of UART interfaces together with SA-Adapter slots.

SA-Adapters are small universal boards providing the physics for legacy serial I/O, fieldbus interfaces and other small I/O functions. One serial line is provided per adapter, which can be plugged directly to the CPU board as a mezzanine. Alternatively, the adapter can be connected to the front panel via ribbon cable. The SA concept allows to add additional I/O interfaces to many of MEN's CPU boards and box PCs, enhancing flexibility with regard to the line transceivers and isolation requirements. Whether a specific SA-Adapter (or a mix of different SA-Adapters) fits on a specific CPU board is determined by a combination of mechanical, performance, FPGA and operating system criteria and needs to be verified for every board configuration requested.

Diagram



F Front R Rear B Onboard SA SA-Adapter™ Options

Technical Data

Interfaces

- IBIS master on front connector
  - External 24V power supply on front connector for IBIS signal level
  - Standard IBIS data rate (1200 bit/s) up to standard UART data rate (up to 9600 bit/s)
- Serial TTL Interface on 10-pin SA-Adapter connector

Installation

- As a piggy-back board directly on a carrier board
- Via ribbon cable

Peripheral Connections

- Via front panel on a shielded 9-pin D-Sub receptacle connector

Electrical Specifications

- Isolation voltage:
  - 750V DC or 500V AC between isolated side and digital side
- Supply voltage/power consumption:
  - Digital side +5V (-3%/+5%), 10 mA typ. (25 mA max.)
  - Isolated side +24V (-30%/+25%), 10mA typ. (110 mA max., when loopback on pin 1/2)
- MTBF: tbd @ 40°C according to IEC/TR 62380 (RDF 2000)

Mechanical Specifications

- Dimensions: 32mm x 42mm
- Weight:
  - 18g (Master)

Environmental Specifications

- Temperature range (operation):
  - -40..+85°C (qualified)
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300m to + 3,000m
- Shock:
  - 50 m/s², 30 ms (EN 61373)
  - 15 g, 11 ms (EN 60068-2-27)
- Vibration (function): 2.02 m/s², 5 Hz to 150 Hz (EN 61373)
- Vibration (lifetime): 11.44 m/s², 5 Hz to 150 Hz (EN 61373)
- Conformal coating

Safety

- Flammability
  - UL 94V-0

EMC

- EN 50121-3-2 (conducted disturbance)
- IEC 61000-4-4 (burst)
- IEC 61000-4-6 (conducted disturbances)

Product Safety

Electrostatic Discharge (ESD)

Computer boards and components contain electrostatic sensitive devices. Electrostatic discharge (ESD) can damage components. To protect the board and other components against damage from static electricity, you should follow some precautions whenever you work on your computer.

- Power down and unplug your computer system when working on the inside.
- Hold components by the edges and try not to touch the IC chips, leads, or circuitry.
- Use a grounded wrist strap before handling computer components.
- Place components on a grounded antistatic pad or on the bag that came with the component whenever the components are separated from the system.
- Only store the board in its original ESD-protected packaging. Retain the original packaging in case you need to return the board to MEN for repair.

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MEN products are no ready-made products for end users. They are tested according to the standards given in the Technical Data and thus enable you to achieve certification of the product according to the standards applicable in your field of application.

RoHS

Since July 1, 2006 all MEN standard products comply with RoHS legislation.

Since January 2005 the SMD and manual soldering processes at MEN have already been completely lead-free. Between June 2004 and June 30, 2006 MEN's selected component suppliers have changed delivery to RoHS-compliant parts. During this period any change and status was traceable through the MEN ERP system and the boards gradually became RoHS-compliant.

WEEE Application

The WEEE directive does not apply to fixed industrial plants and tools. The compliance is the responsibility of the company which puts the product on the market, as defined in the directive; components and sub-assemblies are not subject to product compliance.
In other words: Since MEN does not deliver ready-made products to end users, the WEEE directive is not applicable for MEN. Users are nevertheless recommended to properly recycle all electronic boards which have passed their life cycle.

Nevertheless, MEN is registered as a manufacturer in Germany. The registration number can be provided on request.

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About this Document

This user manual is intended only for system developers and integrators, it is not intended for end users.

It describes the hardware functions of the board, connection of peripheral devices and integration into a system. It also provides additional information for special applications and configurations of the board.

The manual does not include detailed information on individual components (data sheets etc.). A list of literature is given in the appendix.

History

Issue	Comments	Date
E1	First issue	2016-02-03

Conventions

Indicates important information or warnings concerning situations which could result in personal injury, or damage or destruction of the component.

Indicates important information concerning electrostatic discharge which could result in damage or destruction of the component.

Indicates important information or warnings concerning proper functionality of the product described in this document.

The globe icon indicates a hyperlink that links directly to the Internet. When no globe icon is present, the hyperlink links to specific information within this document.

Italics	Folder, file and function names are printed in *italics*.
Mono	A `monospaced` font type is used for hexadecimal numbers, listings, C function descriptions or wherever appropriate. Hexadecimal numbers are preceded by "0x".
Comment	Comments embedded into coding examples are shown in green text.
IRQ# /IRQ	Signal names followed by a hashtag "#" or preceded by a forward slash "/" indicate that this signal is either active low or that it becomes active at a falling edge.
In/Out	Signal directions in signal mnemonics tables generally refer to the corresponding board or component, "in" meaning "to the board or component", "out" meaning "from the board or component".

Contents

Figures

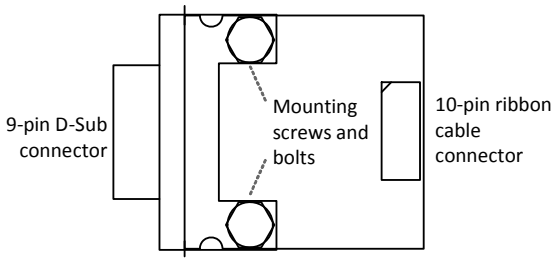
Tables

1 Getting Started

This chapter gives an overview of the board and some hints for first installation in a system.

1.1 Map of the Board

Figure 1. Map of the board – top view



1.2 Integrating the Board into a System

You can use the following check list to install an SA-Adapter on a carrier for the first time and to test proper functioning of the adapter.

- Power-up the system.
- Test the system without the SA-Adapter.
- If O.K., power-down the system.
- Install the adapter on the carrier as described in the respective carrier's user manual. This user manual only provides some examples of installation!
- For 19" systems: insert the carrier board into the system again.
- Power-up the system.
- Install SA-Adapter-dependent driver software.
- Start a suitable test program and test functioning of the SA-Adapter.

1.3 Examples of Installation on a Carrier Board

Generally, there are two ways of installing an SA-Adapter in the system – directly or via ribbon cable, both times using the 10-pin connector. This depends on the position of the 10-pin connector on the carrier. If you must use ribbon cable connection, you might need an additional front panel with special holes to make the SA-Adapter's D-Sub connector available at the front.

The following figures show the principle of how to install an SA-Adapter in your system. Please refer to your carrier user manual for a detailed installation description in any case! Installation may vary considerably and MEN will not give any warranty on carriers and SA-Adapters if installation in a user's system differs from the description in the carrier's user manual.

Figure 2. Direct connection to a carrier (example)

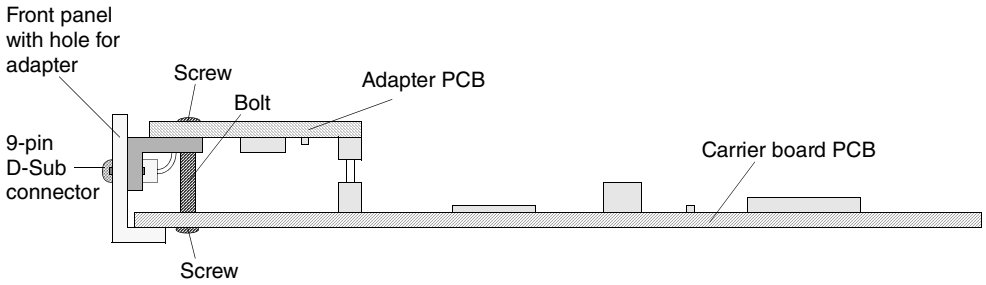
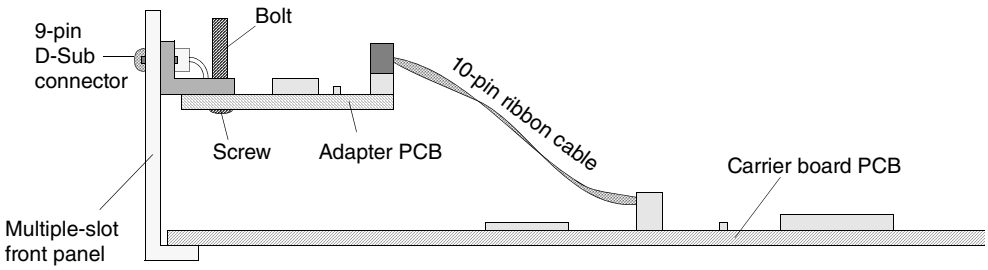


Figure 3. Connection via ribbon cable (example)



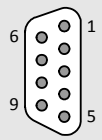
For fastening, you should always use the torx screws originally supplied with the SA-Adapter.

2 Connecting the Adapter

2.1 Peripheral Interface

You can connect peripherals to the SA-Adapter via the 9-pin D-Sub connector.

Table 1. Pin assignment of 9-pin D-Sub plug connector (master)



6	IBIS_MISO+	1	IBIS_MOSI+
7	IBIS_MISO-	2	IBIS_MOSI-
8	-	3	-
9	24V_GND	4	-
		5	24V_VCC

Connector types:

- 9-pin D-Sub plug according to DIN41652/MIL-C-24308, with thread bolt UNC 4-40
- Mating connector:
  9-pin D-Sub receptacle according to DIN41652/MIL-C-24308, available for ribbon cable (insulation piercing connection), hand-soldering connection or crimp connection

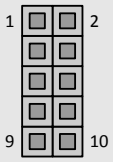
Table 2. Signal mnemonics of the IBIS interface

Signal	Direction	Description
IBIS_MISO	in/out	IBIS master in slave out
IBIS_MOSI	in/out	IBIS master out slave in
24V_VCC		24V power supply (only master), current-limited to 1.5A by a fuse
24V_GND		Ground

2.2 Host Interface

The SA-Adapter connects to the carrier board via a 10-pin plug connector.

Table 3. Pin assignment of the 10-pin ribbon-cable connector



1	GND	2	VCC
3	IBIS-TX	4	IBIS-RX
5	-	6	-
7	-	8	-
9	-	10	

Connector types:

- 10-pin plug, IDC ribbon-cable connector according to DIN41651/MIL-C-83503, plug connector with lock
- Mating connector:
  10-pin receptacle, available with or without tension relief for ribbon-cable connection, 1.27mm pitch

3 Functional Description

3.1 Power Supply

The power for the signal level of the SA24M is supplied via the external 24 V supply. The IBIS circuit on the master is supplied via the carrier board (+5 V).

3.1.1 Fuse Protection

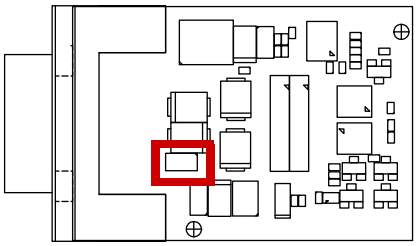
The external power supply of the IBIS master is protected by a fuse.

Fuses are not intended to be exchanged by the customer. Your warranty for the SA24M will cease if you exchange fuses on your own. Please send the product to MEN for repair if a fuse blows.

- Current rating: 1.5A
- Type: fast
- Size: 1206
- MEN part number: 5675-0001

The fuse is located on the top side of SA24M.

Figure 4. Position of fuse for power supply protection



3.2 IBIS Interface

The IBIS (Integrated Board Information System) interface is a serial interface which has been established as a standard in the transportation sector for the controlling of display modules. The data are transmitted with 1200 bit/s.

The SA24M, however, also supports the standard UART data rate of 9600 bit/s.

4 Appendix

4.1 Literature and Web Resources

SA24M product page with up-to-date information and downloads:
www.men.de/products/sa24m/

4.2 Product Identification

MEN user documentation may describe several different models and/or design revisions of the SA24M. You can find information on the article number, the design revision and the serial number on a label affixed to the board.

- **Article number:** Indicates the product family and model. This is also MEN's ordering number. To be complete it must have 9 characters.
- **Revision number:** Indicates the design revision of the product.

If you need support, you should communicate these numbers to MEN.

Figure 5. Product labels