Universal Carrier Sytstem with 4 Slots for MAX-Modules

SORCUS

MAX4*box*   Preliminary Datasheet (4/07)

Special Features

- **Universal Carrier System** enables many different systems based on X-Bus modules

- **4 Slots for MAX Modules,** e.g. CPU, digital und analog I/O, CAN, PROFIBUS, etc.

- **Various Additional Slots** (2 for CF cards, 2 for MMC-/SD cards, 1 for USB, e.g. for standard extensions like Flash, hard disk, WLAN, Bluetooth, GPS, GSM/GPRS, etc).

- **Features Added by CPU Module X-MAX-400:**
  - 10/100 Mbit LAN interface and RJ45 connector
  - 1 USB Host, 1 USB OTG and 1 USB device (more possible by adding an external USB hub)
  - Serial RS-232 interface
  - 400 MHz ARM CPU
  - 32 MByte RAM
  - 32 MByte Flash (usable as flash file system)
  - RTC including battery backup

- **CAN-Bus Interface**, galvancally, isolated

- **40 I/O Signals** from each I/O-Module, available on 3 HD-Sub-44 connectors (female)

- **6 Opto-isolated I/Os** (3 inputs and 3 outputs provided by the carrier board)

- **8 LEDs**, software programmable

- **LAN-Link and LAN-Data, LED**

- **Watchdog,** various sleep modes

- **CEoX® On-board** (= Windows CE licence with SORCUS real time extensions OsX), in preparation

- **Drivers for Windows and Linux PCs incl.**

- **Stand-alone Operation Possible** by storing programs in the on-board flash, with automatic start-up function

- **Power Supply 8...60V DC,** incl. 42V (automotive) and PoE (48V Power over Ethernet)

- **Application Examples:** Stand alone data logger, remote control system, mobile control unit, mobile data acquisition system (with wireless connection), Gateway (CAN >> WLAN and LAN, CAN >> PROFIBUS, CAN >> serial and LAN)

- **Metal Enclosure, only 138 x 121 x 37 mm³** (without cards and connectors)

Fig. 1: MAX4*box* Front View

Fig. 2: MAX4*box* Rear View

General Description

The MAX4*box* is a universal carrier system for MAX modules. It can be adopted to nearly all data acquisition, control and communication tasks by the user by just plugging-in different MAX modules. Additionally, 2 slots for CF cards, 2 slots for MMC/SD cards and 2 USB slots are provided by the box. To increase the number of USB slots, a USB hub can be connected externally, e.g. standard memory cards, WLAN, GSM, GPS, etc.

MAX Modules for nearly all Applications

Besides the great number of available MAX modules (more than 100 types), it is also possible to integrate the MAX4*box* into field bus systems and to connect it to a PLC. Most interfaces are galvanically isolated. For example, the following examples of modules each provide individually isolated interfaces of various types, e.g., X-CAN-2Li provides 2 CAN and 2 LIN interfaces or X-DPS-2i provides 2 PROFIBUS DP interfaces or X-COM-8i provides 8 RS-232 or 8 RS-485/RS-422 interfaces, or X-SH16-8i provides 8 analog inputs that can be sampled simultaneously with 1 Msps sample rate per channel. Additionally, modules with digital process inputs and outputs are available, e.g. X-OPT-io with 20 optically isolated digital inputs resp. outputs, avaliable with the following combinations (the first number giving the nubmber of inputs, the second number giving the number of outputs: 20/0, 16/4, 12/8, 8/12, 4/16 and 0/20. Additionally, there are modules available with counters and incremental interfaces, and also some with SSI interfaces to connect incremental encoders (synchroneous serial interface).

Also analog inputs and outputs are available with up to 20 channels and resolution of up to 16 bits. Some of the modules can acquire data with up to several megasamples per second, also continuously. Additionally, a special sensor interface module X-AD20-4i is available with 4 channels for direct connection of strain gauges, thermocouples, Pt100, Pt100, NTC, ICP®, +/-10V or 20 mA. Of course, each channel of this module is individually isolated.

Guaranteed LongTerm Deliverability

The MAX4*box*, the MAX modules and the software concept of the system considers long term deliverability. For example, each module provides an FPGA (Field Programmable Gate Array) with the interface to the X-Bus®. Therefore, it is easy to replace discontinued chips on each module very easily. Additionally, an adaptation of the software driver (so called Module-Device-Driver MDD) makes it unnecessary to adapt or even recompile the application program provided by user. The new driver is automatically installed when the system is powered on, so the user interface is absolutely unchanged, when the hardware of a module has to be changed.

The Software of the MAX4*box*

The software in the MAX4*box* is based on SORCUS standard libraries, like the real time multi tasking operating sytem OsX with the accompanying drivers. In addition, Windows CE is available. A real time extension for CE is in preparation, which will be compatible with OsX (called CEoX®). For the development under Windows CE and CEoX®, the free of charge standard Microsoft development tool can be used. All operating systems are based on the same driver concept with the above mentioned MDDs.

The Power Supply

The MAX4*box* provides various possibilities for the power supply. A supply voltage between 8 and 60V DC is requiered. Additionally, the supply can be provided by PoE (Power over Ethernet) via the RJ-45 connector.

Connectivity

Besides the 100 Mbit Ethernet with RJ-45, which can also be used with PoE (Power over Ethernet), a serial RS-232 and a CAN bus interface (isolated) is provided. The USB OTG interface can be used as host as well as device. More other interfaces can be provided by adding CF cards and SD cards, e.g. GPS.

Operating temperature

The MAX4*box* can be operated in a temperature range from –40 to +85°C, as long as the plugged-in MAX modules and the CF cards resp. SD cards are desigend for this temperature range. A ventilator is provided to control the temperature.

Application Examples

a) **Monitoring system** for up to 60 analog inputs with connection via CF card with GSM/GPRS and storing the data on a 4 GB CF card. The acquired data can be buffered in the on board RAM in a ring buffer.
b) **Bridge from LAN to serial** with 24 serial interfaces can be provided, RS-232, RS-422 or RS-485.
c) **Bridge from CAN to WLAN** with 2 additional CAN bus interfaces and 20 analog inputs and 4 analog outputs with WLAN by a CF card and GPS by another CF-Card.
d) **PLC:** 2 PROFIBUS DP channels, 20 analog inputs, 16 digital isolated inputs and 4 isolated outputs.

Custom Design

The enclosure of the MAX4*box* can be delivered in all colours (see RAL table). In addition, the front and rear panel can be designed by the user with customized connectors.

MAX4*basis*-OEM

The pc board of the MAX4*box* is available as an OEM product. The HD-Sub-44 connectors and other connectory are not soldered in. The signals are available on soldering pads, where the user can solder in cables and use his own connectors. The pc board is provided with 6 holes for fixing it in an own enclosure.

Table 1.: Ordering information

Product	Ordering Number	Operating Temperature	Status (4/07)
MAX4box	HM-4614	-40...85°C	Prototype Test
MAX4box-OEM	HM-4618	-40...85°C	Prototype Test