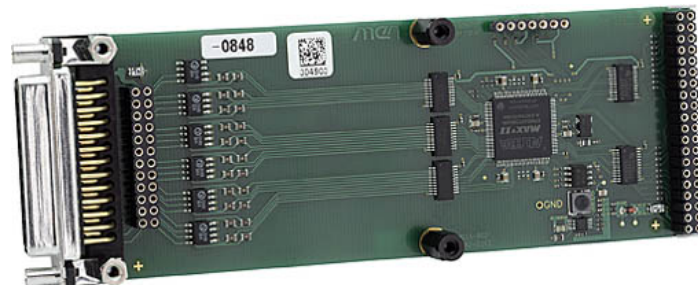# M11 – 16-bit TTL I/O Interface

- **18 TTL inputs/outputs**
- **4 handshake lines**
- **Programmable timer**
- **24 bits resolution**
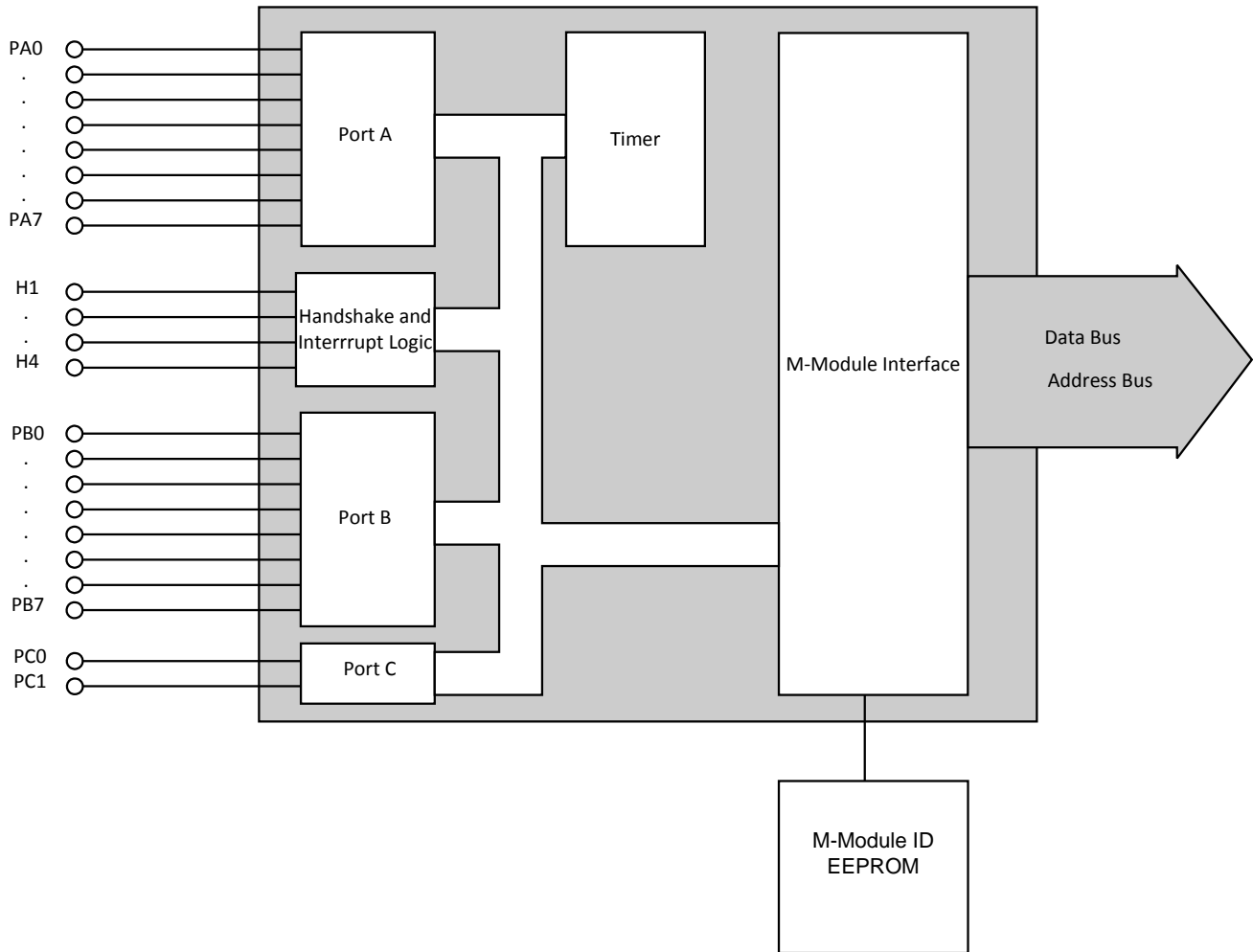- **-40 to +85°C with qualified components**

The M11 mezzanine card is a TTL I/O M-Module with 16 lines (Ports A and B) that can be used separately as two ports with 8 bits each or together as a 16-bit port. Control of the I/O lines is via the four handshake lines.

Depending on the operation mode, the four handshake lines generate an interlocked handshake, a pulsed handshake, interrupt inputs or simple inputs.

The M11 is based on the M-Module ANSI mezzanine standard. It can be used as an I/O extension in any type of bus system, i.e. CPCI, VME or on any type of stand-alone SBC. Appropriate M-Module carrier cards in 3U, 6U and other formats are available from MEN or other manufacturers.

Diagram

PA0
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PA7

H1
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H4

PB0
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.
.
PB7

PC0
PC1

Port A

Handshake and
Interrrupt Logic

Port B

Port C

Timer

M-Module Interface

Data Bus

Address Bus

M-Module ID
EEPROM

Technical Data

TTL I/O	■ 18 TTL inputs/outputs
68230 Parallel Interface Timer	■ Port modes include: □ Bit I/O □ Unidirectional 8-bit and 16-bit □ Bidirectional 8-bit and 16-bit ■ Programmable handshaking options ■ 24-bit timer ■ Five separate interrupt vectors ■ Separate port and timer interrupt service requests
Input Voltages and Currents	■ Input voltage "high" min. 2 V, max. 5 V ■ Input voltage "low" min. -0.3 V, max. 0.8 V ■ Input leakage current max. 10 µA
Output Voltages and Currents	■ Output current in "off-state" min. -0.1 mA, max. -1 mA ■ Output voltage "high" min. 2.4 V (load < -0.15 mA) ■ Output voltage "low" max. 0.5 V (load < 2.4 mA)
Peripheral Connections	■ Via front panel on a shielded 25-pin D-Sub receptacle connector ■ Via carrier board (rear I/O)
M-Module Characteristics	■ A08, D08, INTC, IDENT
Electrical Specifications	■ Supply voltage/power consumption: +5 V (4.85 V..5.25 V), 27 mA typically without driving external loads
Mechanical Specifications	■ Dimensions: conforming to M-Module Standard ■ Weight: 68 g
Environmental Specifications	■ Temperature range (operation): □ -40..+85°C □ Airflow: min. 10 m³/h ■ Temperature range (storage): -40..+85°C ■ Relative humidity range (operation): max. 95% non-condensing ■ Relative humidity range (storage): max. 95% non-condensing ■ Altitude: -300 m to +3,000 m ■ Shock: 15 g/11 ms ■ Bump: 10 g/16 ms ■ Vibration (sinusoidal): 2 g/10..150 Hz ■ Conformal coating on request
MTBF	■ tbd @ 40°C according to IEC/TR 62380 (RDF 2000)
Safety	■ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
EMC	■ Conforming to EN 55022 (radio disturbance), IEC1000-4-2 (ESD) and IEC1000-4-4 (burst)
Software Support	■ MEN Driver Interface System (MDIS for Windows®, Linux, VxWorks®, QNX®, OS-9®)

Ordering Information

Standard M11 Models	**04M011-02**	16-bit TTL I/O, -40..+85°C qualified
Miscellaneous Accessories	**05M000-00**	M-Module cable, 2m, with 25-pin D-Sub plug/housing to pig tail
	05M000-17	25 mounting screw sets to fix M-Modules on carrier boards
Software: Linux	This product is designed to work under Linux. See below for all available separate software packages.	
	13MD05-90	MDIS5 System (and Device Driver) Package (MEN) for Linux. This software package includes most standard device drivers available from MEN.
Software: Windows®	This product is designed to work under Windows®. See below for all available separate software packages.	
	13M011-70	MDIS4/2004 Windows® driver (MEN) for M11
Software: VxWorks®	This product is designed to work under VxWorks®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	13M011-06	MDIS4/2004 low-level driver sources (MEN) for M11
Software: QNX®	This product is designed to work under QNX®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	13M011-06	MDIS4/2004 low-level driver sources (MEN) for M11
Software: OS-9®	This product is designed to work under OS-9®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	13M011-06	MDIS4/2004 low-level driver sources (MEN) for M11

For operating systems not mentioned here contact MEN sales.

Documentation	Compare Chart binary I/O M-Modules » Download	
	20M000-00	M-Module Draft Specification, Rev. 3.0
	20M011-00	M11 User Manual

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