Embedded Solutions

M78 - 4-Channel Digital Oscilloscope

- **4 analog input channels 50MS/s for each channel simultaneously**
- **Full oscilloscope functionality**
- **12 bits resolution**
- **16MB local memory**
- **64dB SNR at 3.58MHz**
- **Comprehensive trigger possibilities**
- **External trigger and clocking**
- **Flexible onboard signal conditioning**

The M78 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, PXI, 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.

The M78 is an M-Module for acquisition of up to four analog and eight digital signals with a wide bandwidth at a maximum resolution of 12 bits and a sampling rate of up to 50MS/s. A local 16MB RAM buffers the converted values. The buffer contents can be transferred to the host.

The M-Module has onboard input signal conditioning. This is implemented adding a small PCB, which guarantees maximum flexibility for manifold applications.

Variable trigger functions permit application of the M78 as a genuine digital storage oscilloscope and implementation of modular multichannel systems. Typical applications include simulators, analysis systems, high-speed data loggers or automotive diagnostic systems.

The M78 is software compatible with the 1-channel 12-bit/40-MHz oscilloscope M67.

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Technical Data

Analog Input
- 4 analog input channels
- Prepared for input conditioning adapter
- ±1V max. input range (without input conditioning adapter)

Analog Performance
- High SNR: >60dB @ max. sampling frequency (with external low jitter clock)
- Analog input bandwidth: >200MHz

General Purpose Inputs
- 2 digital GPIs per channel (GPI0..GPI7) (TTL/LVTTL)
- GPI0 is configurable as an external clock source (LVTTL recommended)
- GPI1 is configurable as an external trigger source (TTL/LVTTL)

Binary Outputs
- 4 outputs to control signal conditioning adapter or external hardware

Trigger
- Internal trigger, signal-sensitive with adjustable hysteresis function
- Free trigger positioning
- Rising or falling edge
- Programmable trigger delay
- External trigger
- Software trigger

Acquisition Clock
- External 10kHz..50MHz
- Internal low noise 48MHz
- Internally divided by FPGA (base: 48MHz)

System Clock
- FPGA Clock 100MHz
- SDRAM Clock 100MHz

Buffer
- 16MB memory
- Organized as a ring FIFO
- Width: 4 words
- 2 MSamples with four active channels
- 4 MSamples with two active channels
- 8 MSamples with one active channel
- Random access by the host

A/D Conversion
- 12 bits resolution, max. 50MS/s
- Track/hold
- Oversampling technology

Recording
- 12 ADC bits per channel
- Up to 8 external binary inputs

Peripheral Connections
- Via front panel on 4 shielded receptacle connectors
- Via carrier board (rear I/O)

M-Module Characteristics
- A08, D16, D32, INTA, IDENT, TRIGI

Electrical Specifications
- Supply voltage/power consumption:
  - +5V (4.85V..5.25V), tbd.
- MTBF: tbd. @ 50°C

Mechanical Specifications
- Dimensions: conforming to M-Module Standard
- Weight: 100g (incl. input adapter)

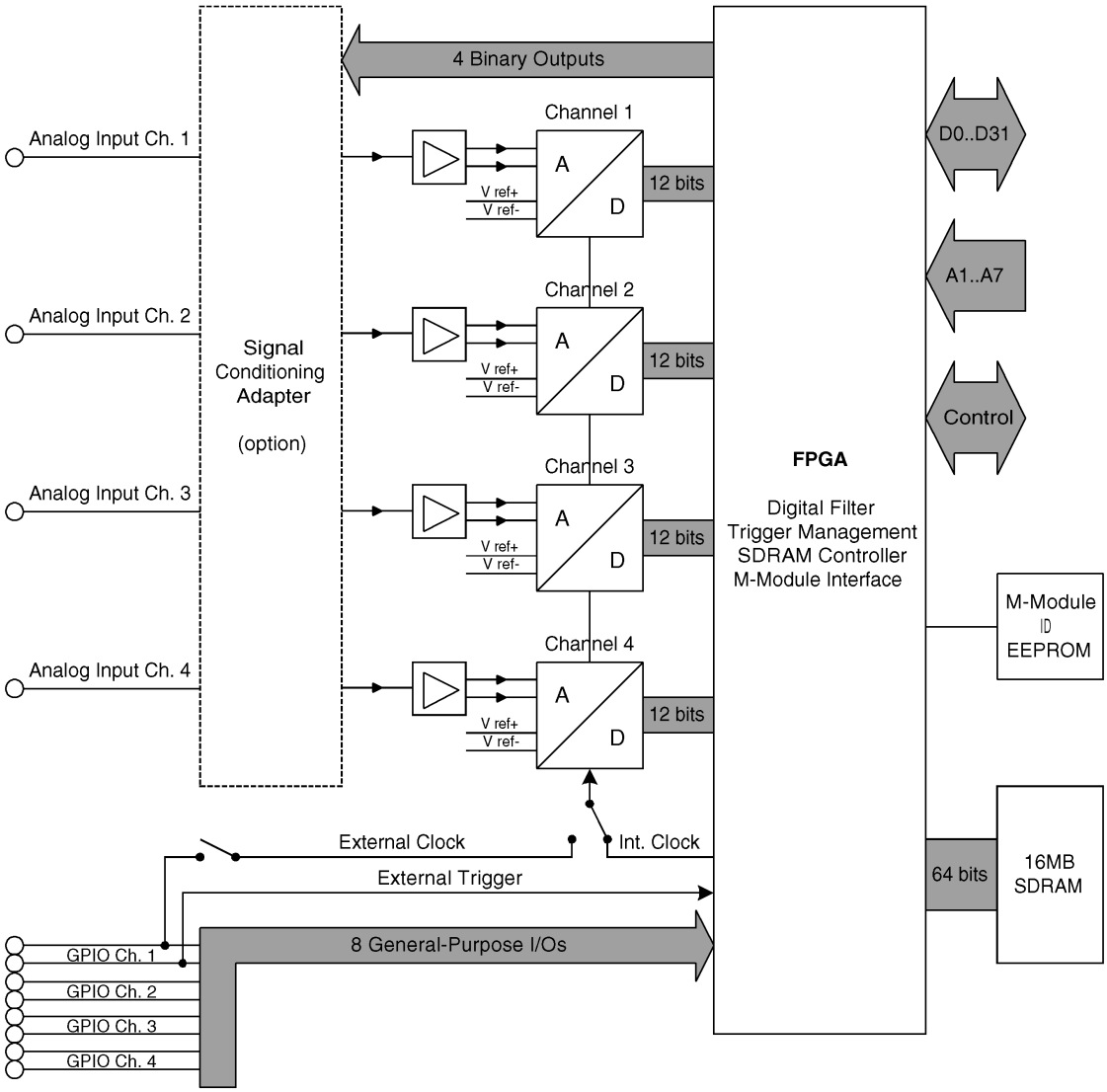
Environmental Specifications
- Temperature range (operation):
  - 0..+60°C
  - Industrial temperature range on request
  - Airflow: min. 10m³/h
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300m to + 3,000m
- Shock: 15g/11ms
- Bump: 10g/16ms
- Vibration (sinusoidal): 2g/10..150Hz

Safety
- PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers

EMC
- Tested according to IEC1000-4-2 (ESD) and IEC1000-4-4 (burst) with regard to CE conformity

Software Support
- MEN Driver Interface System (MDIS for Windows, Linux, VxWorks, QNX, RTX, OS-9)

Diagram



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Related Products

Standard Hardware

04M078-00	M78, M-Module, 4-channel digital oscilloscope, 40-MHz 12-bit A/D converter, incl. adapter for 1MHz filter signal conditioning, temperature range: 0..+60°C

Please refer to our M-Module compare chart for a selection of further instrumentation functions.

Accessories

05M000-17	25 mounting screw sets to fix M-Modules on carrier boards

Software

To use MDIS4 low-level drivers, you also need one of the MDIS4 system packages available for Windows®, Linux, VxWorks®, QNX®, RTX or OS-9 (MDIS4 = MEN Driver Interface System).

Documentation

20M000-00	M-Module draft specification, Rev. 3.0
20M078-00	M78 user manual
21APPN001	Application Note: MDIS4 under LabWindows®/CVI

For the most up-to-date ordering information and direct links to other data sheets and downloads, see the M78 online data sheet under www.men.de. --> Click here!

Germany
MEN Mikro Elektronik GmbH
Neuwieder Straße 5-7
90411 Nuremberg
Phone +49-911-99 33 5-0
Fax +49-911-99 33 5-901
E-mail info@men.de
www.men.de

France
MEN Mikro Elektronik SA
18, rue René Cassin
ZA de la Châtelaine
74240 Gaillard
Phone +33 (0) 450-955-312
Fax +33 (0) 450-955-211
E-mail info@men-france.fr
www.men-france.fr

UK
MEN Micro Ltd
Whitehall, 75 School Lane
Hartford, Northwich
Cheshire UK, CW8 1PF
Phone +44 (0) 1477-549-185
Fax +44 (0) 1477-549-178
E-mail info@menmicro.co.uk
www.menmicro.co.uk

USA
MEN Micro, Inc.
PO Box 4160
Lago Vista, TX 78645-4160
Phone (512) 267-8883
Fax (512) 267-8803
E-mail sales@menmicro.com
www.menmicro.com

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