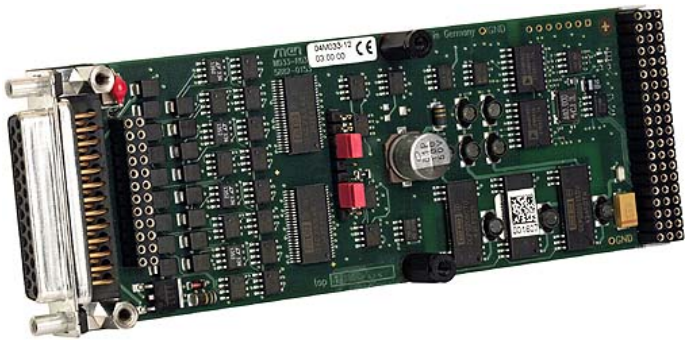
M33 – 8 Analog Outputs

- **8 current or voltage outputs**
- **12 bits resolution**
- **10 µs acquisition/conversion time**
- **Simultaneous channel update**
- **Optical isolation**
- **-40 to +85°C screened versions**

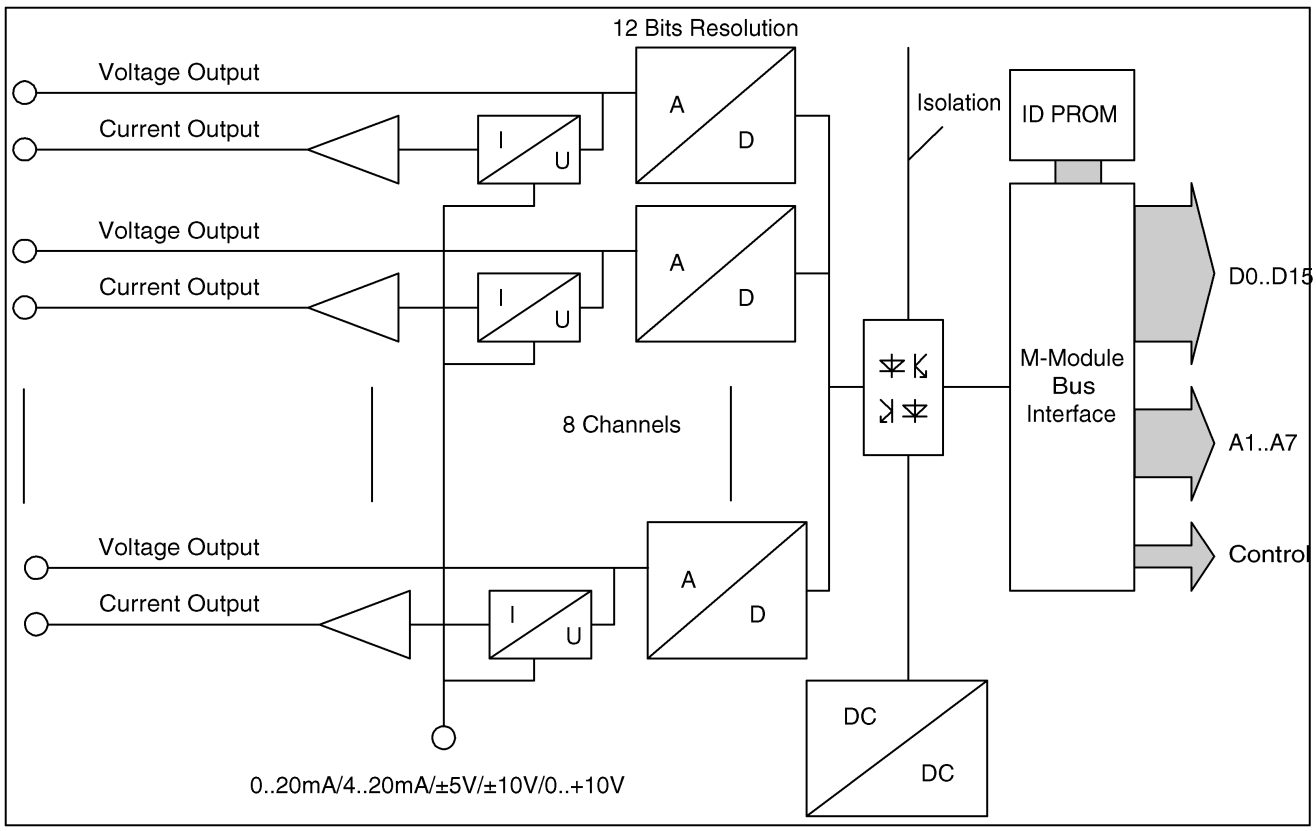


The mezzanine card M33 is a highly flexible M-Module for analog output signals. The isolated supply voltages can be generated by an on-board DC/DC converter. The output voltage range can be set to 0..10V, -5..+5V or -10..+10V for each channel by software. In addition, the current outputs can be used with 0..20mA or 4..20mA. The output load is driven to ground.

Attention: An external supply is needed with 8 current outputs!

The M33 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


12 Bits Resolution
Voltage Output
Current Output
Voltage Output
Current Output
Voltage Output
Current Output
A
D
I
U
8 Channels
Isolation
ID PROM
M-Module
Bus
Interface
D0..D15
A1..A7
Control
DC
DC
0..20mA/4..20mA/±5V/±10V/0..+10V

Technical Data

D/A Conversion	■ 8 channels ■ 12 bits ■ DAC conversion time 10µs ■ ±5 LSB gain ■ Simultaneous update of all channels possible
Voltage Output	■ Output current: 5mA max. ■ Output linearity: ±1 LSB ■ Accuracy: ±0.2%, ±1 LSB differential ■ Voltage ranges: 0..10V; -5V..+5V; -10V..+10V ■ Voltage output stable up to 1µF capacitive load
Current Output	■ Accuracy: ± 0.5% ■ Current range: 0..20mA; 4..20mA ■ Max. output voltage 10V ■ Load resistance range: 0..500 Ohm
Slew Rates for Voltage Output	■ 0V..+10V mode: switch from 0V to +10V; slew rate (SR) = 4V/µs ■ -5V..+5V mode: switch from -5V to +5V; slew rate (SR) = 4V/µs ■ -10V..+10V mode: switch from -10V to +10V; slew rate (SR) = 4V/µs
Peripheral Connections	■ Via front panel on a shielded 25-pin D-Sub receptacle connector ■ Via carrier board (rear I/O)
M-Module Characteristics	■ A08, D16, IDENT
Electrical Specifications	■ Isolation voltage: 500V DC ■ Supply voltage/power consumption: □ +5V (4.85V..5.25V), 480mA quiescent current, 600mA with 8 channels voltage output, 650mA with 4 channels current output □ External supply voltage +24V: 15.6V..30V ■ MTBF: 200,000h @ 50°C (derived from MIL-HDBK-217F)
Mechanical Specifications	■ Dimensions: conforming to M-Module Standard ■ Weight: 80g
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 range (operation): max. 95% non-condensing ■ Relative humidity range (storage): max. 95% non-condensing ■ Altitude: -300m to + 3,000m ■ Shock: 15g/11ms ■ Bump: 10g/16ms ■ Vibration (sinusoidal): 2g/10..150Hz ■ Conformal coating on request
Safety	■ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
EMC	■ Tested according 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®) ■ For more information on supported operating system versions and drivers see Downloads.

Configuration & Options

Standard Configurations

Article No.	Channels	Operation Temperature
04M033-10	4	0..+60°C
04M033-11	4	-40..+85°C
04M033-12	8	0..+60°C
04M033-13	8	-40..+85°C

Options

Channels	■ 4 or 8
Operation Temperature	■ 0..+60°C ■ -40..+85°C

Ordering Information

Standard M33 Models	**04M033-10**	4 analog outputs, 0..+60°C
	04M033-11	4 analog outputs, -40..+85°C screened
	04M033-12	8 analog outputs, 0..+60°C
	04M033-13	8 analog outputs, -40..+85°C screened
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 potentially available separate software packages from MEN.	
	13M033-06	MDIS4/2004 / MDIS5 low-level driver sources (MEN) for M33
Software: Windows®	This product is designed to work under Windows®. See below for potentially available separate software packages from MEN.	
	13M033-70	MDIS4/2004 / MDIS5 Windows® driver (MEN) for M33
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.	
	13M033-06	MDIS4/2004 / MDIS5 low-level driver sources (MEN) for M33
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.	
	13M033-06	MDIS4/2004 / MDIS5 low-level driver sources (MEN) for M33
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.	
	13M033-06	MDIS4/2004 / MDIS5 low-level driver sources (MEN) for M33

For operating systems not mentioned here contact MEN sales.

Documentation	Compare Chart analog I/O M-Modules » Download	
	20M000-00	M-Module Draft Specification, Rev. 3.0
	20M033-00	M33 User Manual

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