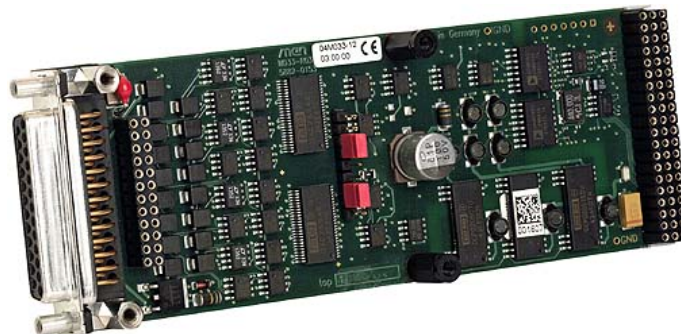


## M33 – 8 Analog Outputs

- 8 current or voltage outputs
- 12 bits resolution
- 10  $\mu$ s 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.

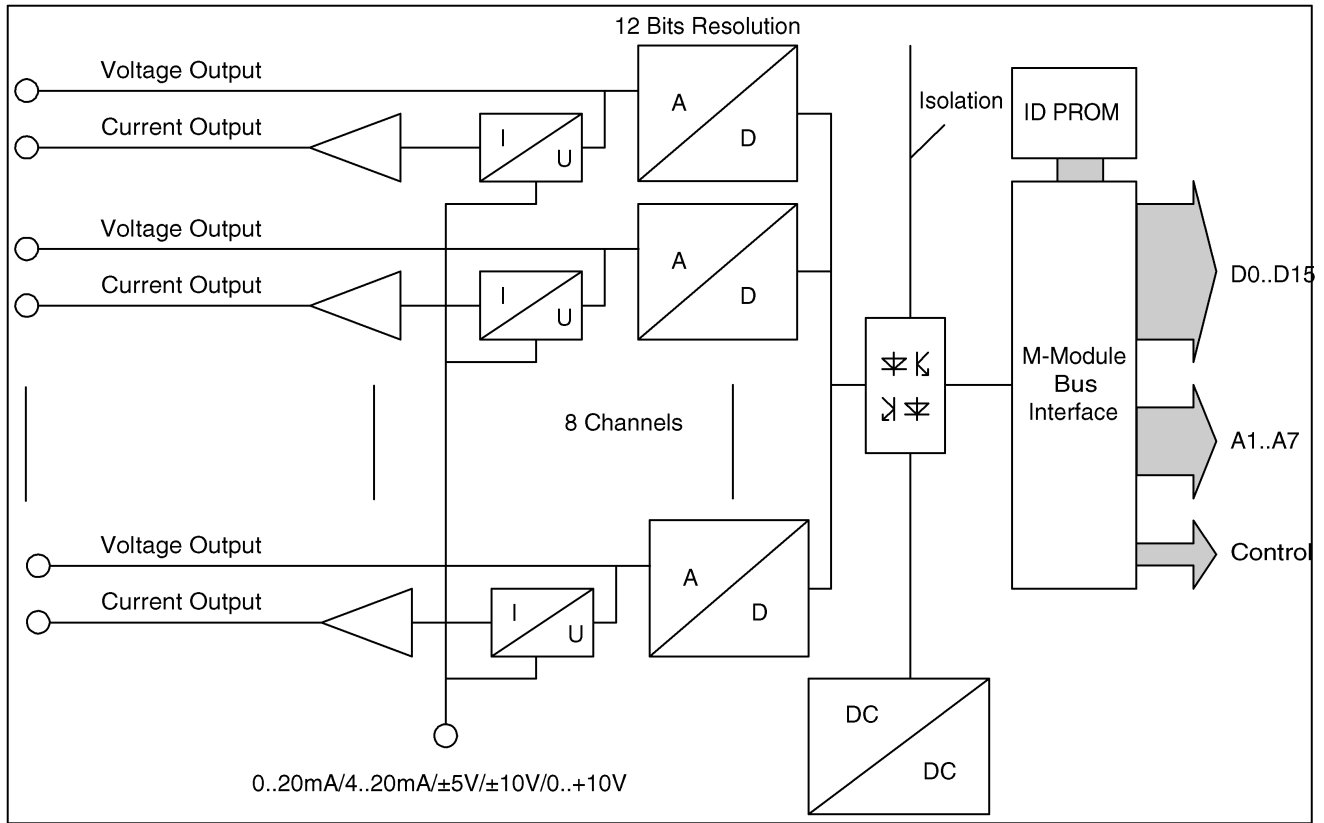
The output voltage range can be set to 0..10V, -5..+5V or -10..+10V for each channel by software. In addition,

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



## Technical Data

<b>D/A Conversion</b>	<ul style="list-style-type: none"> <li>■ 8 channels</li> <li>■ 12 bits</li> <li>■ DAC conversion time 10µs</li> <li>■ ±5 LSB gain</li> <li>■ Simultaneous update of all channels possible</li> </ul>
<b>Voltage Output</b>	<ul style="list-style-type: none"> <li>■ Output current: 5mA max.</li> <li>■ Output linearity: ±1 LSB</li> <li>■ Accuracy: ±0.2%, ±1 LSB differential</li> <li>■ Voltage ranges: 0..10V; -5V..+5V; -10V..+10V</li> <li>■ Voltage output stable up to 1µF capacitive load</li> </ul>
<b>Current Output</b>	<ul style="list-style-type: none"> <li>■ Accuracy: ± 0.5%</li> <li>■ Current range: 0..20mA; 4..20mA</li> <li>■ Max. output voltage 10V</li> <li>■ Load resistance range: 0..500 Ohm</li> </ul>
<b>Slew Rates for Voltage Output</b>	<ul style="list-style-type: none"> <li>■ 0V..+10V mode: switch from 0V to +10V; slew rate (SR) = 4V/µs</li> <li>■ -5V..+5V mode: switch from -5V to +5V; slew rate (SR) = 4V/µs</li> <li>■ -10V..+10V mode: switch from -10V to +10V; slew rate (SR) = 4V/µs</li> </ul>
<b>Peripheral Connections</b>	<ul style="list-style-type: none"> <li>■ Via front panel on a shielded 25-pin D-Sub receptacle connector</li> <li>■ Via carrier board (rear I/O)</li> </ul>
<b>M-Module Characteristics</b>	<ul style="list-style-type: none"> <li>■ A08, D16, IDENT</li> </ul>
<b>Electrical Specifications</b>	<ul style="list-style-type: none"> <li>■ Isolation voltage: 500V DC</li> <li>■ Supply voltage/power consumption: <ul style="list-style-type: none"> <li>□ +5V (4.85V..5.25V), 480mA quiescent current, 600mA with 8 channels voltage output, 650mA with 4 channels current output</li> <li>□ External supply voltage +24V: 15.6V..30V</li> </ul> </li> <li>■ MTBF: 200,000h @ 50°C (derived from MIL-HDBK-217F)</li> </ul>
<b>Mechanical Specifications</b>	<ul style="list-style-type: none"> <li>■ Dimensions: conforming to M-Module Standard</li> <li>■ Weight: 80g</li> </ul>
<b>Environmental Specifications</b>	<ul style="list-style-type: none"> <li>■ Temperature range (operation): <ul style="list-style-type: none"> <li>□ 0..+60°C</li> <li>□ Industrial temperature range on request</li> <li>□ Airflow: min. 10m³/h</li> </ul> </li> <li>■ Temperature range (storage): -40..+85°C</li> <li>■ Relative humidity range (operation): max. 95% non-condensing</li> <li>■ Relative humidity range (storage): max. 95% non-condensing</li> <li>■ Altitude: -300m to + 3,000m</li> <li>■ Shock: 15g/11ms</li> <li>■ Bump: 10g/16ms</li> <li>■ Vibration (sinusoidal): 2g/10..150Hz</li> <li>■ Conformal coating on request</li> </ul>
<b>Safety</b>	<ul style="list-style-type: none"> <li>■ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers</li> </ul>
<b>EMC</b>	<ul style="list-style-type: none"> <li>■ Tested according to EN 55022 (radio disturbance), IEC1000-4-2 (ESD) and IEC1000-4-4 (burst)</li> </ul>
<b>Software Support</b>	<ul style="list-style-type: none"> <li>■ MEN Driver Interface System (MDIS for Windows®, Linux, VxWorks®, QNX®, OS-9®)</li> <li>■ <a href="#">For more information on supported operating system versions and drivers see Downloads.</a></li> </ul>

## Configuration & Options

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### 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

<b>Standard M33 Models</b>	<b>04M033-10</b>	4 analog outputs, 0..+60°C
	<b>04M033-11</b>	4 analog outputs, -40..+85°C screened
	<b>04M033-12</b>	8 analog outputs, 0..+60°C
	<b>04M033-13</b>	8 analog outputs, -40..+85°C screened
<b>Miscellaneous Accessories</b>	<b>05M000-00</b>	M-Module cable, 2m, with 25-pin D-Sub plug/housing to pig tail
	<b>05M000-17</b>	25 mounting screw sets to fix M-Modules on carrier boards
<b>Software: Linux</b>	This product is designed to work under Linux. See below for all available separate software packages.	
	<b>13MD05-90</b>	MDIS5 System (and Device Driver) Package (MEN) for Linux. This software package includes most standard device drivers available from MEN.
<b>Software: Windows®</b>	This product is designed to work under Windows®. See below for all available separate software packages.	
	<b>13M033-70</b>	MDIS4/2004 / MDIS5 Windows® driver (MEN) for M33
<b>Software: VxWorks®</b>	This product is designed to work under VxWorks®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	<b>13M033-06</b>	MDIS4/2004 / MDIS5 low-level driver sources (MEN) for M33
<b>Software: QNX®</b>	This product is designed to work under QNX®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	<b>13M033-06</b>	MDIS4/2004 / MDIS5 low-level driver sources (MEN) for M33
<b>Software: OS-9®</b>	This product is designed to work under OS-9®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	<b>13M033-06</b>	MDIS4/2004 / MDIS5 low-level driver sources (MEN) for M33
For operating systems not mentioned here <a href="#">contact MEN sales</a> .		
<b>Documentation</b>	Compare Chart analog I/O M-Modules » <a href="#">Download</a>	
	<b>20M000-00</b>	M-Module Draft Specification, Rev. 3.0
	<b>20M033-00</b>	M33 User Manual

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