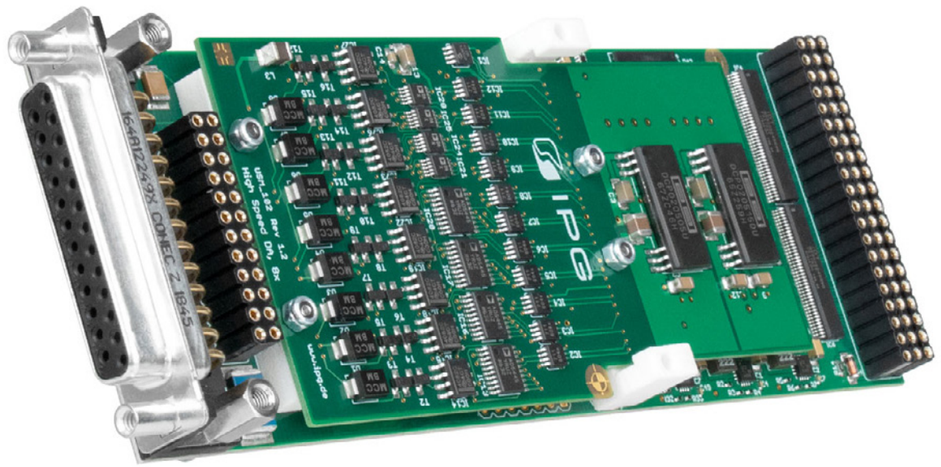
M402 – Engine Signal Generator



Crankshaft and Camshaft Signal Generation

- 4 identical angle based analog output ports, linked to a common base angle
- Each channel usable as crankshaft and camshaft signal
- Crankshaft angle resolution: 0.0055 deg
- Crankshaft rotation speed resolution: 0.0144 rpm
- Maximum crankshaft rotation speed: 50,000 rpm
- 4 arbitrary waveforms for each channel, each defined by 64k 12bit-words
- Fast switching between the waveforms
- Weighted intermixing of any number of tables of a channel
- Adjustable smooth phase shift adaptation
- Software configurable pre-scaler for camshaft rotation speed
- Sample rate: up to 8.85MHz

Knock Signal Generation

- 4 time based analog output ports
- Triggered by crankshaft angle or by user software
- Adjustable gain for each trigger moment and for each knocking sensor output
- Up to 12 trigger angles are configurable for each working cycle
- 4 user definable signal waveforms, each defined by 64k 12-bit-words
- Fast switching between different waveforms
- Sample rate: 1 MHz
- Duration: up to 65,5ms starting at each trigger moment
- Configurable noise generation for each knock signal

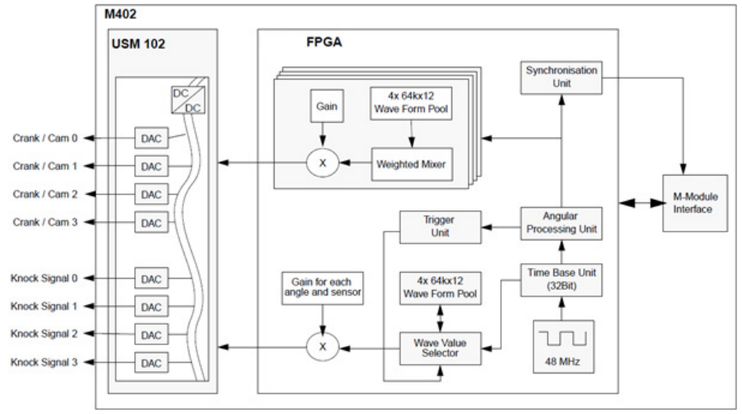
General Features

- Output voltage range: -10V .. +10V
- Output voltage resolution: 12bit, corresponding to 4,8mV
- 20mA output current per channel without external supply
- Up to 85mA output current per channel with external supply (optional)
- Galvanic isolation
- Synchronization with M402 and M403 modules via M-Module bus
- In the field hardware upgrade by updating the FPGA

Use Cases

- Emulating rotation speed signals of cam- or crankshaft
- Enabling test of electric motors due to rotation speed signals of up to 50,000 rpm
- Testing fail-safe mechanismns by simulation of missing teeth

Block Diagram



Technical Data

Output channels	• 4 angle based analog output ports usable as crankshaft / camshaft signals • 4 time-based analog output ports usable asknocking signals
Output voltage range	-10V .. +10V
Output voltage resolution	12bit (corresponds to 4,8mV)
Rotation speed range	0 .. 50000 rpm
Update rate for knocking and noise signals	1MHz
Crank angle resolution	Up to 0,0055deg depending on rotation speed
Address space	• A08D16 • A24D32
Buffer size per channel	256 events
Available connectors	25 Pin SubD connector, female

Order Information

Order Number	IO-M402

Alternatives

M403	For aquiring engine signals