FREQUENCY DEVICES™, INC.

# Model VM8DAC

## 8 Channel VME Module

## Low Noise Digital to Analog Converter

VM8DAC VMEbus digital to analog converter (DAC) boards from Frequency Devices Inc. offer eight channels of precision low distortion/low noise, digital to analog converters that operate with a sample clock frequency derived from a master external clock and a programmable time base divider. The boards are available in a single width B-size (6U) VME form factor that conforms to VMEbus Revision C.1 as an A32/D32 Data Transfer Bus Slave.

VM8DAC boards provide high (24-bit) and low (16-bit) resolution data access to on-board DAC's. The boards interpret the received parallel data from the VMEbus as binary-2's complement. This data is serialized and transferred to any selected DAC channel at a fixed master time base where it is converted to analog signals at a software programmable sampling rate. The DAC channels may be configured to 16,384, 8,192, 4,096, or 2,048 samples per second.


### Features/Benefits

- Eight discrete channels with programmable sampling that provide a 24- bit DAC stage for each channel offers the user versatile and convenient digital to analog conversion.
- Outputs synchronized to the front panel external clock allow for multi-card synchronicity.
- Designed for Real Time Operating Systems (RTOS) to provide minimal pipeline delay (less than 5 microseconds). i.e. Linux or Vx Works.
- Interrupt free operation provides glitch energy of <5nV-sec and extremely low noise density ($\leqq$100nV/$\sqrt{Hz}$ ).
- VME backplane is galvanically isolated from the analog section to reduce system integration problems.

### VM8DAC Ordering Guide

To order, simply specify the part number below.

## VM8DAC-8



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# Specifications

**25°C and Rated Power Input**

# 8 Channel Low Noise Digital to Analog Converter

**Module Size/Dimensions**

| | | |
|---|---|---|
| 1. | Standard 6U VME, single slot module | 9.17" X 6.3", (233mm X 160 mm) |
| 2. | Weight | ~ 1 lb. |

**Connectors**

| | | |
|---|---|---|
| 3. | Input clock connector | Lemo EPG.OB.302.HLN |
| 4. | Analog output connector | Male DB25 |
| 5. | Matching output connector | Female DB25 |

**External Clock Input**

| | | |
|---|---|---|
| 6. | Configuration | Differential, TTL compatible |
| 7. | Isolation | Transformer isolated |
| 8. | Frequency | $2^{22}$ Hz (4.194305 MHz) |

**Analog Output**

| | | |
|---|---|---|
| 9. | Number of channels per board | 8 |
| 10. | Analog output configuration | Differential |
| 11. | Minimum output load | 500 ohm |
| 12. | Maximum output voltage | +/- 10V into 10 kΩ |
| 13. | Output amplifier 3 dB bandwidth | >50KHz |
| 14. | Output impedance | 50 Ω per leg |
| 15. | Anti-image filter | None |
| 16. | Inter-channel crosstalk | < -90dB (frequencies less than 50KHz) |

**DAC Specifications**

| | | |
|---|---|---|
| 17. | Number of bits | 24 bits |
| 18. | Binary number format | Binary 2's complement |
| 19. | Sampling rate | 16,384, 8192, 4096, 2048 samples per second |
| 20. | Bipolar zero error | ±2% F.S. maximum |
| 21. | Bipolar zero error drift | ± 5 ppm of FS/ °C |
| 22. | Glitch energy | < 5nV-sec |
| 23. | Output-referred noise | <100nV/$\sqrt{Hz}$ (40 Hz to 8192 Hz with FS 1000 Hz sine wave) |
| 24. | Amplitude match and accuracy | ± 0.1 dB |
| 25. | Harmonic spikes | <-100 dB (referred to a full scale output signal ) |
| 26. | Output settling time to 1% | < 5 microseconds (From output clock edge) |

**Power Requirements**

| | | |
|---|---|---|
| 27. | From the + 5V VME backplane supply | 1.0 A Max. |
| 28. | From the +/- 12V VME backplane supply | 1.0 A |

**VME Interface**

| | | |
|---|---|---|
| 29. | Interface configuration | A32/D32 VME Data Transfer Bus (DTB) Slave |
| 30. | Address modifier lines decoding | Full decode (0x09, 0x0A, 0x0D, and 0x0E valid) |
| 31. | Data word size | Long word (Quad Byte) and aligned word (Double Byte) |
| 32. | Bus cycle compatibility | AO, RMW, bus cycles address pipelining |
| 33. | Addressing modes | A32 (Extended) addressing only |

**Environmental**

| | | |
|---|---|---|
| 34. | Operating Temperature range | 0°C to +70°C |
| 35. | Storage Temperature range | -25°C to +85°C |
| 36. | Humidity | 0-95% non-condensing |





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