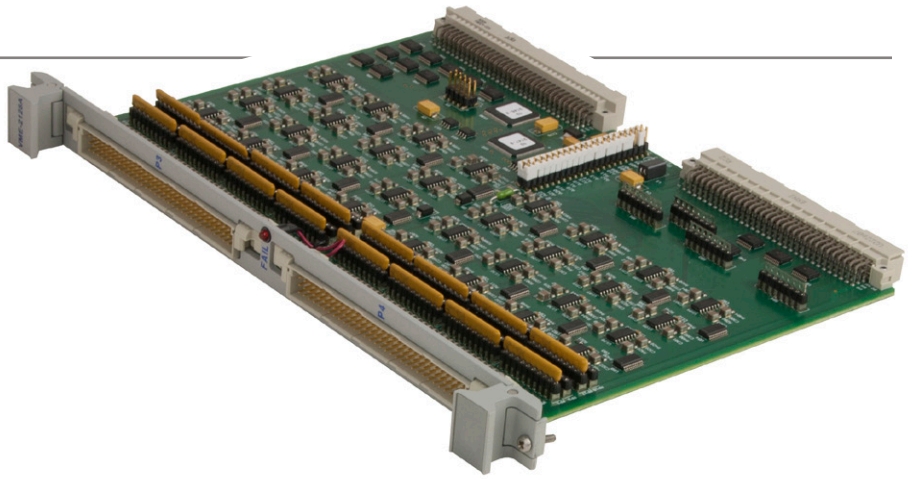


# VME-2128A* Specifications

## *128-bit High-Voltage Digital Output Board with Built-in-Test*

Features:

- 128 bits of high-voltage outputs
- High-current drivers (600 mA sink)
- Automatic surge current shutdown protection
- Thermal shutdown protection
- High breakdown voltage (55 V)
- Output clamp diodes for inductive flyback protection
- Compatible with Intelligent I/O Controllers
- Built-in-Test logic for fault isolation
- VMEbus compatible (ANSI/IEEE STD 1014-1987 IEC 821 & 297)
- A24:A16:D32/D16/D08 (EO): slave 39/3D:29/2D:6U form factor
- Optional pull-up resistors for electronic switch outputs
- Front panel with fail LED
- Sockets are provided for warming resistors, which are supplied by the user
- Optional fuse as resettable or normal

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# VME-2128A* Specifications *128-bit High-Voltage Digital Output Board with Built-in-Test*

| Ordering Options | | | | | | | |
|---|---|---|---|---|---|---|---|
| Feb. 16, 2015 800-9310002128-000 A | | A | B | C | D | E | F |
| VME-2128A | – | | | 1 | | 0 | |

A = Pull-Up Resistors/Output Voltage/Absolute Maximum Voltage
0 = No Pull-Up Resistors Installed (55 V Absolute Maximum)
1 = 270 Ω /5 V/6 V
2 = 1,500 Ω /12 V/14 V
3 = 6,800 Ω /24 V/30 V
4 = 27 k Ω /48 V/55 V
9 = Reserved
B = User Ground Connection
0 = No P2 User Ground Connection
1 = 26 P2 User Ground Connections**
C = SIP Sockets
0 = Reserved
1 = SIP Sockets at Pull-Up Resistor Locations
D = Fuse type
0 = Normal Fuse
1 = Polyswitch resettable device
E = 0 (Options reserved for future use)
F = Special sales order
0 = Without conformal coating
1 = With conformal coating

| Recommended Connector Components for Cabling to P3 and P4 | | |
|---|---|---|
| Style | Description | I/O Connectors |
| 96-pin IDC | Mating Connector (96-pin Mass Terminated) | ERNI No. 913 031 |
| | 0.033-inch Ribbon Cable (96-pin Mass Terminated) | ERNI No. 913 049 |
| 96-pin Discrete Wire | Mating Connector (96-pin Discrete) | Harting No. 09 03 096 3214 |
| | Female Crimp Contacts (96-pin Discrete) | Harting No. 09 02 000 8484 |
| | Connector Shell Housing (for 96-pin Connectors) | Harting No. 09 03 096 0501 |
| Both | PC Board Connector Part Number | ERNI No. 913 216 |

*The Harting crimp tool part number is 09 99 000 0075.
** A1C option is recommended for new applications.

For Ordering Information, Call:

1-800-322-3616 or 1-256-880-0444 • FAX (256) 882-0859

Email: support@abaco.com

Web Address: www.abaco.com

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Specifications subject to change without notice.

## Functional Characteristics

**Introduction:** The VME-2128A* board is capable of delivering 128 channels of high voltage and/or high current sink outputs. The VME-2128A open collector output drivers are capable of supporting output voltages from 5 to 48 VDC. A unique feature of the VME-2128A board is the Built-in-Test (BIT) logic, which allows the user, under software control, to verify the operation of each channel.

**Compliance:** This product complies with the VMEbus specification (ANSI/IEEE STD 1014-1987 IEC 821 and 297) with the following mnemonics: A24:A16:D32/D16/D08 (EO): Slave: 39/3D:29/2D:6U form factor.

**Output Connector Type:** Two 96-pin female connectors are used with this board. For mass terminations (IDC), an ERNI IDC DIN connector and 0.033-inch 30 AWG ribbon cable are recommended.

The ERNI order numbers are:
96-pin connector 913 031
96-conductor 0.033-inch cable 913 049

For discrete wire use, Harting connectors are recommended. This connector consists of a contact housing with female crimp-on contacts.

Harting order numbers are:

96-pin connector - 09 03 096 3214
Female crimp-on contacts - 09 02 000 8484
Crimp tool (for stripped wire) - 09 99 000 0075

The discrete wire connector needs a shell housing that has holding levers. We recommend the Harting housing. Its order number is 09 03 096 0501. This housing will latch the discrete wire cable to the board connector and provide a strain relief.

**I/O Organization:** Sixteen output ports, eight bits wide for a total of 128 inputs, addressable to any address within the short supervisory and/or short non-privileged or the standard supervisory and/or standard non-privileged I/O map.

**Addressing Scheme:** Thirty-two bytes individually addressable on 8-, 16-, or 32-bit boundaries. A Board ID Register is located at the base address of the board. A Control and Status Register (CSR) is stacked above the ID Register. The sixteen input bytes are placed above the CSR. Twenty jumpers establish the base address of the board. Another jumper is used for standard or short I/O accesses. The following address map shows the relative locations of all the registers used by the board.

# VME-2128A* Specifications *128-bit High-Voltage Digital Output Board with Built-in-Test*

**Address Map:**

| Decoded Address | | | | Register Name |
|---|---|---|---|---|
| Address bits | | | | Description |
| A4 | A3 | A2 | A1 | |
| 0 | 0 | 0 | 0 | Board ID |
| 0 | 0 | 0 | 1 | Control and Status Register (CSR) |
| 0 | 0 | 1 | 0 | Not Used |
| 0 | 0 | 1 | 1 | Not Used |
| 0 | 1 | 0 | 1 | Not Used |
| 0 | 1 | 1 | 0 | Not Used |
| 0 | 1 | 1 | 1 | Not Used |
| 1 | 0 | 0 | 0 | Output Data Word (16 bits) 0 |
| 1 | 0 | 0 | 1 | Output Data Word (16 bits) 1 |
| 1 | 0 | 1 | 0 | Output Data Word (16 bits) 2 |
| 1 | 0 | 1 | 1 | Output Data Word (16 bits) 3 |
| 1 | 1 | 0 | 0 | Output Data Word (16 bits) 4 |
| 1 | 1 | 0 | 1 | Output Data Word (16 bits) 5 |
| 1 | 1 | 1 | 0 | Output Data Word (16 bits) 6 |
| 1 | 1 | 1 | 1 | Output Data Word (16 bits) 7 |

**Output Drivers:** The output drivers provide the user with thermal and inrush current shutdown protection. The inrush current protection will allow up to 990 mA of surge current before shutting down the driver. This current is determined by the type and number of bulbs used. For example, two 40 mA 28 V filament bulbs may have as much as 960 mA ((40 mA x 2) x 12 = 960 mA) of cold filament inrush current. If the inrush current of the external circuitry will exceed the 990 mA limit, then warming resistors should be used. These resistors should draw approximately 10% of the rated (warm) current of the bulb or bulbs in use. For the example above, this current would be 8 mA ((40 mA x 2) x .1 = 8 mA). SIP sockets are provided on the board for these warming resistors. These resistors must be the bussed type with pin 1 being common. The sockets have pin 1 grounded.

**Electronic Switch Option:** Optional pull-up resistors are available to place the output drivers in an electronic switch configuration. These switch outputs are operated from user-supplied power via the P2 connector†.

† For new applications, it is recommended the P2 user ground connection be ordered. The VMIACC-0132 provides no. 10 terminals for connecting VEXT and user GND.

**Data Polarity:** A logic ***one*** written to an output bit will turn ON the drive transistor. This yields an output of logic ***zero***. Thus, a logic ***one*** asserts the output. This data polarity is called positive true.

**Built-in-Test:** This board is designed with internal Built-in-Test logic that supports testing of all the onboard active components except the output drivers. All Output Data Registers have read-back capability. Thus, the user can monitor the data written to this board and determine if it is functioning properly. A front panel Fail LED is provided to help in isolating a faulty board.

This LED is illuminated at power up and can be extinguished under program control upon the successful completion of user-defined diagnostic software.

**Warning:** The user-supplied voltage should not be applied to the board unless +5 VDC is present on the board.

Physical/Environmental Specifications

**Dimensions:** Double Eurocard (6U)

| | |
|---|---|
| Height | 9.2 in. (233.4 mm) |
| Depth | 6.3 in. (160 mm) |
| Thickness | 0.8 in. (20.3 mm) |

**Power Requirements:** 3.0 A (typical) at +5.0 VDC

The user must supply power to the output drivers. This power requirement is determined by the user load. Connections can be made at either the front panel (P3 or P4) or at P2. To facilitate connections made at P2, Abaco Systems offers the VMIACC-0132* P2 Power Accessory that is recommended, but not required.

**Temperature:**
Operating: -40 °C to +85 °C
Storage: -55 °C to +105 °C

**Cooling:** Forced air convection

**Humidity:** Operating: relative humidity 5% to 95%, noncondensing
Storage: relative humidity 5% to 95%, noncondensing

**MTBF:** Contact Factory

**Compliance:** RoHS

# VME-2128A* Specifications *128-bit High-Voltage Digital Output Board with Built-in-Test*

## Output Description

**Incandescent Lamp Driver:** High incandescent lamp turn-on/inrush current can destroy semiconductor lamp drivers and contributes to poor lamp reliability. However, lamps with steady state current ratings up to 600 mA can be driven without the need for warming or current limiting resistors.

When an incandescent lamp is initially turned ON, the cold lamp filament is at minimum resistance and would normally allow a 10x to 12x inrush current. The high inrush current is sensed by an internal sense resistor. The load current is limited to approximately 1 A by the shunting transistor sensing the output current through the sense resistor. During this short transition period, the output driver is driven in a linear fashion. As the lamp warms up, the filament resistance increases to its maximum value. The output driver then goes into saturation and applies the full supply voltage to the lamp. However, inrush currents of 1 A or more will force the driver into foldback current limiting. To avoid this problem, a warming or current limiting resistor should be used in the lamp circuitry.

**Inductive Load Driver:** Bifilar (unipolar) stepper motors can be driven directly. The internal kickback diodes prevent damage to the output transistors by suppressing the high-voltage spikes that occur when turning OFF an inductive load.

**Fault Conditions:** In the event of a shorted load, shorted winding, or stalled motor, the load current will attempt to increase. As described above, the drive current to the output stage is diverted (limiting the load current to about 1 A), causing the output stage to go linear. As the junction temperature of the output stage increases, the thermal limit circuit will become operational, further decreasing the drive current. The load current (junction temperature) is then a function of ambient temperature, state of remaining drivers, supply voltage, and load resistance. If the fault condition is corrected, the output driver will return to its normal saturated condition. Short circuit protection is provided for each output for supply voltages up to 36 V.

### Electrical Specifications per Output Channel:

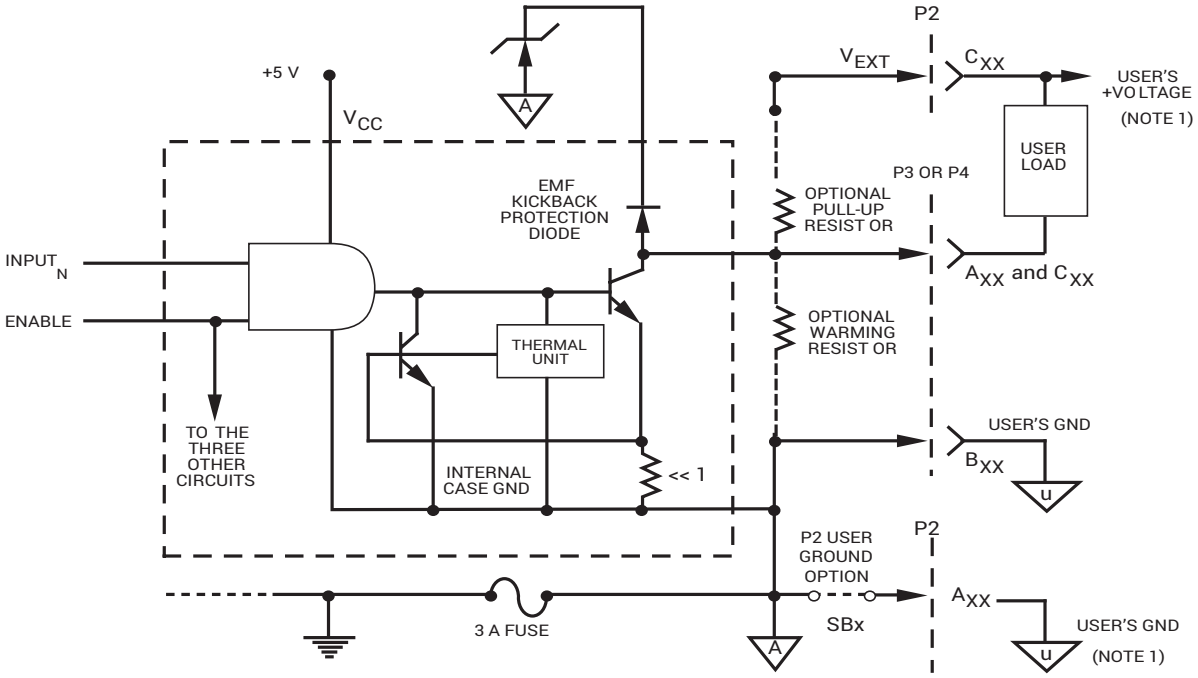
| Electronic Switch Option (Open Collector with Pull-Up Resistor) | | | | | |
|---|---|---|---|---|---|
| Output Voltage | RP Min | IOH Max | IOH | IOL Max | **Absolute Max Output Voltage** |
| 5 V | 270 Ω | 22.6 mA | 8.5 mA at $V_{out}$=2.5 V | 600 mA | 6 V |
| 12 V | 1.5k Ω | 9.7 mA | 3.9 mA at $V_{ou}$t=6 V | 600 mA | 14 V |
| 24 V | 6.8k Ω | 4.6 mA | 1.8 mA at $V_{out}$=12 V | 600 mA | 30 V |
| 48 V | 27 Ω | 2.3 mA | 0.9 mA at $V_{out}$=24 V | 600 mA | 55 V |

| Open-Collector Option (No Pull-Up Resistors Installed) | | |
|---|---|---|
| IOL | VOL Typ | **VOL Max** |
| 300 mA | 0.20 V | 0.7 V |
| 500 mA | 0.55 V | 1.5 V |

## Trademarks

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# VME-2128A* Specifications *128-bit High-Voltage Digital Output Board with Built-in-Test*




Note 1: The VMIACC-0132 is available to provide $V_{EXT}$ and user GND connections via the P2 backplane connector.

Figure 1. VME-2128A Output Description

# VME-2128A* Specifications *128-bit High-Voltage Digital Output Board with Built-in-Test*

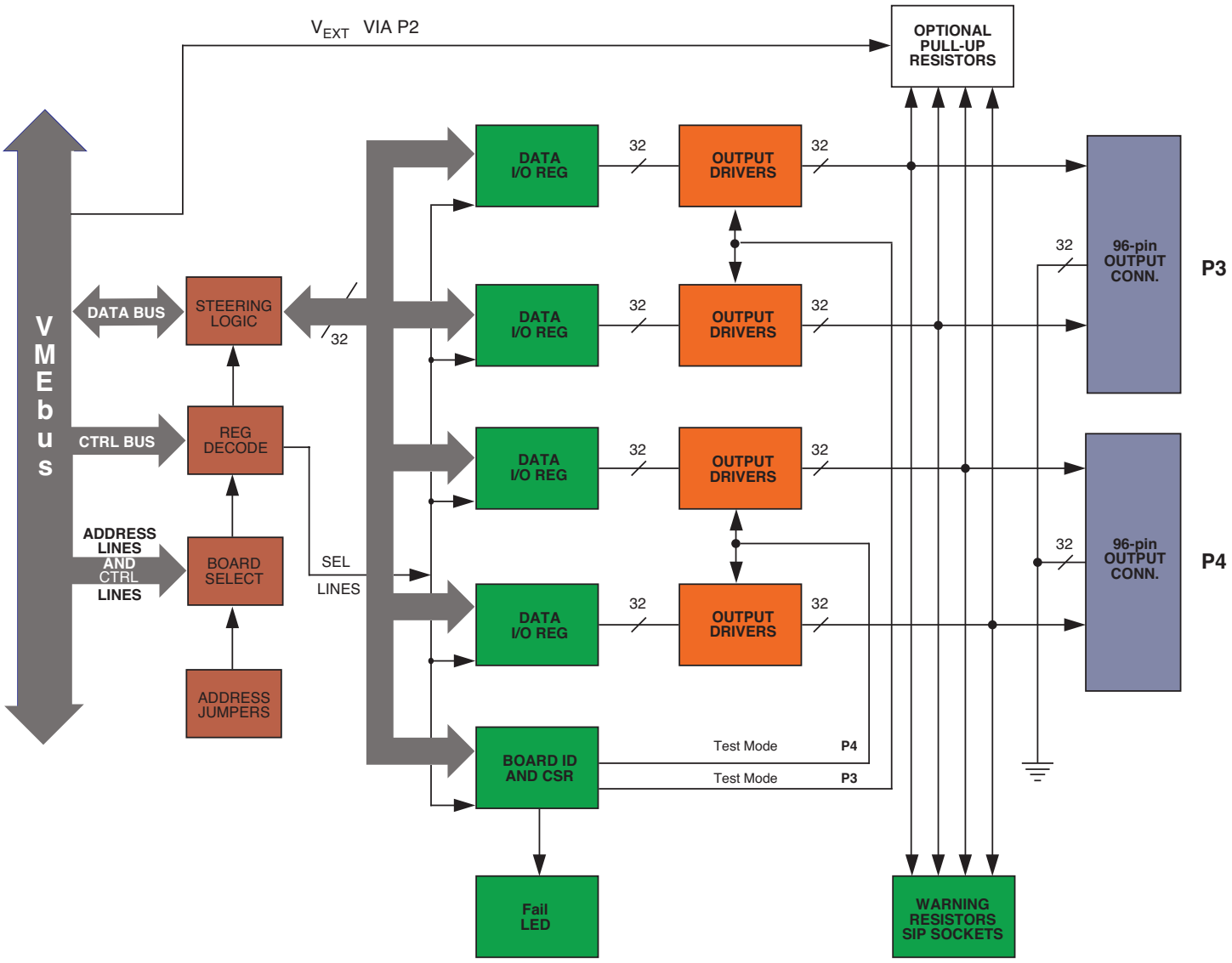



Figure 2. VME-2128A Functional Block Diagram

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