# User Manual


## VDM1000 Shutter Driver

## 14-0035

## Version 2.1

## 2011

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Carries CE/UL/CSA certifications

Version 2.1

2011

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## Warranty

LIMITED PRODUCT WARRANTY: All Products manufactured by VINCENT ASSOCIATES® (MANUFACTURER) are warranted to meet published specifications and to be free of defects in materials and workmanship as defined in the specifications for 365 days - one year - (WARRANTY PERIOD) from the date of original shipment of the product. DSS series shutters are additionally warranted to achieve two million cycles within the WARRANTY PERIOD (as defined in the CYCLE WARRANTY CRITERION). MANUFACTURER will, at its own option within the WARRANTY PERIOD, repair or replace without charge any listed item discovered to be defective excepting transportation charges. Burned out or otherwise damaged actuator coils are not covered under this warranty. Any defective product returned to the MANUFACTURER must follow the RETURN MATERIAL AUTHORIZATION PROCEDURE as defined below. This warranty does not extend to cover damage resulting from alteration, misuse, negligence, abuse, normal wear and tear, or accident. The MANUFACTURER will consider the return of unused equipment if returned within 30 days from the original date of shipment, subject to a 20% restocking charge. This offer does not apply to used or damaged equipment. This warranty extends only to the original purchase and is not available to any third party, including any purchaser assemblies or other Products of which the goods may become component equipment.

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## General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use the product only as specified.

Only qualified personnel should perform service procedures.

### Injury Precautions

- **Use included Power Supply (PS36) and proper Power Cord –** To avoid fire hazard, use only the power cord supplied with this product.
- **Avoid Electric Overload –** To avoid electrical shock or fire hazard, do not apply a voltage to a terminal that is outside the range specified for that terminal.
- **Avoid Electric Shock –** To avoid injury or loss of life, do not connect or disconnect line cord while it is connected to the line voltage.
- **Ground the Product** – This product is grounded through the VDM1000 DC input connector and when using the PS36 is grounded through the grounding conductor of the PS36 power cord. To avoid electrical shock, the grounding connector must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded. **DO NOT DEFEAT THE GROUND CONNECTION ON THE PS36 SUPPLIED LINE CORD.**
- **Access to On/Off Switch** – Due to the position of the unit's power switch at the rear panel, **do not** position the unit such that it is difficult to operate the on/off switch.
- **Do Not Operate Without Cover** – To avoid electric shock or fire hazard, do not operate this product with the cover removed.
- **Use Proper Fuse** – To avoid fire hazard, use only the fuse type and rating specified for this product.
- **Do Not operate in Wet/Damp Conditions** – To avoid electric shock, do not operate this product in wet or damp conditions.
- **Do Not Operate in an Explosive Atmosphere** – To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

## Product Damage Precautions

- **Use Proper Power Source** – Do not operate this product from a power source that applies more than the voltage specified. It is recommended to use the PS36 or equivalent DC Power Supply.
- **Provide Proper Ventilation –** To prevent product overheating, provide proper ventilation.
- **Do Not Operate with Suspected Failures –** If you suspect there is damage to this product, have it inspected by qualified service personnel.

## Safety Terms and Symbols

These terms appear in this manual

| | |
|---|---|
| ***WARNING*** | *Warning statements identify conditions or practices that could result in injury or loss of life.* |
| ***CAUTION*** | *Caution statements identify conditions or practices that could result in damage to this product or other property.* |

These symbols appear on the equipment

ATTENTION – Refer to user manual.

Direct Current – (VDC) Input Only

# Preface

This Manual provides information for the **VDM1000 Shutter Drive**r. The manual contains the following chapters:

- *Getting Started* contains a brief product description, information needed to power on the driver and a brief procedure to verify that it functions.
- *Operator Controls* provide an outline of the panel control functions and locations at the front and rear panels. This also includes the location and function of the input/output signals.
- *Operating Basics* gives further details to the operational features of the controller.
- *Specifications* are described for all input/output levels including other pertinent details and information required for the RS-232C interface.
- *Index* contains a full index.

*What follows is the complete operator's manual for the UNIBLITZ® N-CAS® **VDM1000 Shutter Driver**. Please read this manual completely before operating the unit. Due to the construction of this unit, Vincent Associates recommends that the unit be returned to the manufacturer for repair. There are no user-serviceable parts inside.*

# Getting Started

## Features

- CE/UL/CSA certifications.
- Microprocessor controlled
- RoHS Compliant
- Operates **N-CAS®** shutters purchased in a bi-stable or uni-stable configuration.
- 5-pin Female SwitchCraft locking shutter interface connector.
- **510A** shutter interconnect cable included for NS series shutters. (5-pin male SwitchCraft to 5-pin female SwitchCraft , 3 meters)

- Operates existing *UNIBLITZ* shutters such as CS, LS, VS and XRS series. The optional **710A** interconnect cable is required when connecting these shutter types. This cable is not included and can be purchased separately.
- Normally-open or normally-closed shutter operation in uni-stable mode.
- Indicators for power, driver, and SYNC status.
- Exposure determined by external pulse (BNC, TTL) or switch contact closure to the PULSE INPUT BNC.
- SYNC OUTPUT BNC can be selected for either active-low or active-high operation.
- PULSE INPUT BNC can be selected for either active-low or active-high operation.
- RS-232C input and output connection accessible via dual RJ45 jack.
- Input and output controllable via RS-232C interface.
- RS-232C input addressable via 8 selectable addresses.
- Up to 8 units can be controlled independently from one computer serial port.
- Units can be easily daisy-chained together with optional RJ45 cable, Model **810RJ** (not included).
- Status of electronic synchronization available from SYNC OUTPUT BNC (TTL) and can be read back from RS-232C interface.
- Synchronization system can be disabled via user-selectable FUNCTION switch.
- Selectable pulse energy for operation of 35 mm and larger aperture shutter devices.
- Selectable pulse high current duration for specific shutters via 8-position octal switch.
- Aluminum enclosure with air slots for ventilation.
- Internal fuse protection for all DC output voltages (including shutter).
- Operates on +36VDC, fuse protected.
- Power input to controller via 2.0 mm DC jack.
- +36V DC, 1.83A, external power supply, Model PS36 (included). Power input to supply 100-240 VAC 50/60 Hz. Power supply is UL/CE certified.
- Size (HWD): 1.96 x 4.34 x 7.23 in. (49.9 x 110.3 x 183.6 mm) controller
- Size (HWD): 1.80 x 3.00 x 5.8 in. (45.7 x 76.2 x 147.3 mm) power supply
- Weight (controller): 1.2 lbs (0.54kg)
- Weight (power supply): 1.1 lbs (0.50kg)

## Introduction

The **VDM1000** is the optimal driver for the new *UNIBLITZ* N-CAS , NS series shutters. It carries CE/UL/CSA certifications and conforms to the listed directives and standards. Please see the Specifications section elsewhere in this document for specific information. The driver has user-selectable FUNCTION switches allowing it to handle a variety of shutter configurations. It will operate an N-CAS shutter configured as uni-stable (normally open or normally closed), or bi-stable where no power is required to hold the shutter open or closed. In addition to this capability, the N-CAS drive circuit can be disabled, allowing the **VDM1000** to operate standard CS, LS, VS and XRS series shutters.

Simple and straightforward Front Panel controls allow the **VDM1000** to be easy to use and configure. LED indicators indicate shutter status at a glance. A toggle switch allows easy selection of normally-open or normally-closed operation. Addressable RS-232C control is also available via the dual 8-pin RJ45 jack. Daisy-chain multiple **VDM1000** units together by connecting the RJ45 output of one controller to the RJ45 input of the next controller in the chain (using an **810RJ** cable). The unit's specific address in the chain is selected via the ADDRESS rotary octal switch allowing up to eight units to be individually controlled via one computer serial port.

The Rear Panel contains BNC connectors for PULSE INPUT as well as an output for the electronic synchronization, SYNC OUTPUT. The BNC connectors allow for quick termination of TTL command signals. Power is supplied to the **VDM1000** via 2.0 mm male jack from the plug of the external power supply, center terminal is positive. The PS36 Power supply is included with the **VDM1000** to provide power, however, an equivalent user-supplied power supply can also be used. The Shutter output is a female 5-pin push-lock SwitchCraft connector. A bank of user-selectable FUNCTION switches is accessible on the right side panel of the enclosure. These switches will set the **VDM1000** in a number of configurations to allow a number of shutter types to be driven. The right-side panel octal switch establishes pulse duration, and the FUNCTION switches control and pre-set the unit for the specific shutter used.

A 3-meter, 5-pin female to 5-pin male SwitchCraft push-lock shutter interconnect cable, Model **510A**, is also included with each unit.

## Start Up

After unpacking your unit inspect for any defects. If upon inspection a problem is found, or a part (or parts) is missing, notify Vincent Associates immediately.

**CAUTION**

*Be sure the line cord provided with the included PS36 power supply is being used. Please note that proper line cords are included for both Domestic (USA) and Overseas (EU). If the included EU line cord is not compatible, please use a line cord rated for 230VAC, minimum 1A, and minimum 0.75 $mm^2$ conductor size. The maximum cord length is 3 meters.*

After the initial inspection the unit is ready to use. To properly install and power on the **VDM1000,** perform this procedure:

1. Verify that the **VDM1000** power rocker switch is selected to the "0" position and the line end of the PS36 power supply's line cord is not connected to the AC line.
2. Connect the 2 mm power plug of the PS36 power supply to the DC power input of the **VDM1000**. Be sure the AC cord is inserted completely into the AC module receptacle of the PS36 power supply.
3. Connect the power end of the line cord to the AC line.
4. Power unit ON by rocking the power switch to the "1" position. Power LED indicator will illuminate.
5. Due to the position of the unit's power switch at the rear panel, **do not** position the unit such that it is difficult to operate the On/Off switch.

## Initial Operation and Testing

The **VD**M**1000** will operate from the supplied +36VDC, PS36 power supply or equivalent user-supplied power supply. The PS36 will operate from 100 to 240VAC (50/60Hz), this is automatically selected.

**CAUTION**

*Be sure power switch of the VDM1000 is in the off position before connecting PS36 power supply's AC plug to the line. Attach line cord to the unit first before plugging into the AC power source.*

See **Start Up** section for connection to power source. Insert the 5-pin male SwitchCraft connector of **510A** shutter interconnect cable into 5-pin female SwitchCraft receptacle at rear of unit labeled SHUTTER. Connect the 5-pin female connector of the Model **510A** shutter interconnect cable to 5-pin male connector on shutter to be driven.

Place POWER switch to the ON "1" position, the POWER LED will illuminate. Place the N.O./N.C. switch to the N.O. position. The shutter will open and remain open until the switch is returned to the N.C. position. The DRIVER LED will illuminate when this switch is in the N.O. position. The operation of the shutter described assumes that the FUNCTION switches are set up for the proper shutter used, uni-stable, bi-stable or CS, LS, VS or XRS types. Please see **FUNCTION Select** under GENERAL CHARACTERISTICS.

All *UNIBLITZ* drivers provide the circuitry necessary to support shutters equipped with the solid state synchronization option. Simply plug the shutter-interconnect cable into the driver. If your shutter is equipped with this option, the yellow LED, labeled SYNC, will illuminate when the shutter is in the open position. In addition, the SYNC OUTPUT BNC will change to the active state when the shutter is open. The absence of the solid state synchronization option will only inhibit the operation of the SYNC output and SYNC LED. The remainder of the **VDM1000** systems will not be affected. In addition, the synchronization system can be disabled by sliding the FUNCTION switch **E** to the upper position.

See SPECIFICATIONS and OPERATOR CONTROLS for additional operational information concerning other systems of the **VDM1000**.

Should the shutter and/or control not respond as described previously, be sure the DC power plug from the PS36 power supply is properly seated into the DC power input jack and connection to the shutter are made properly to the rear of the controller. Be sure the line cord is installed into the PS36 input power receptacle.

**CAUTION**

*Turn off the unit and remove the plug from the AC source before removing the dc power plug from the VDM1000*

Be advised, all fuses are internal to the unit. It is recommended that if a fuse blows, to return the unit for fuse replacement. Also, particular shutter units respond to different minimum pulse

widths. For example, a standard NS25S uni-stable shutter has a minimum exposure pulse of 13ms. If the exposure PULSE INPUT is set for an exposure pulse width less than 13ms, the shutter may not open fully. If the unit still does not operate properly, please notify Vincent Associates immediately.

# Operator Controls

## VDM1000 Front Panel Operator Controls

Please Refer to Figure 1.

1. **RS-232C** Dual RJ45 female jack.

   Provides access to the **VDM1000** RS-232C interface allowing the user to control functions via commands sent from a computer serial COM port. The INPUT jack accepts commands directly from a computer's serial port or from another **VDM1000** in the daisy-chain. The OUTPUT jack allows the controller to send commands to the next controller in the daisy-chain. Synchronization read back is only available when a single unit (talk/listen) is being controlled through the RS-232C input. If multiple units are daisy-chained, only commands sent will operate the chained devices (listen only).

2. **DRIVER** LED indicator.

   A green LED indicating when the internal shutter driver circuit input has an active signal present.

3. **SYNC** LED indicator.

   Indicates status of Solid State Synchronization output. This yellow LED is illuminated when shutter's electronic sync is activated. Functions only if the shutter used is equipped with the Solid State Synchronization system.

4. **POWER** LED indicator.

   A green LED indicating that power is being provided to the unit.

5. **N.O./N.C**. Toggle switch.

   The N.O./N.C switch acts to invert the shutter operation. The position of this switch determines shutter status BEFORE a trigger signal is received by **VDM1000**. In the N.C. position the shutter will be activated open by an input pulse signal. In the N.O. position the shutter will be activated closed.

6. **ADDRESS** Select switch.

   Rotation of the 8-position octal rotary switch selects the active RS-232C address of the unit. See **ADDRESS Select** under GENERAL CHARACTERISTICS.

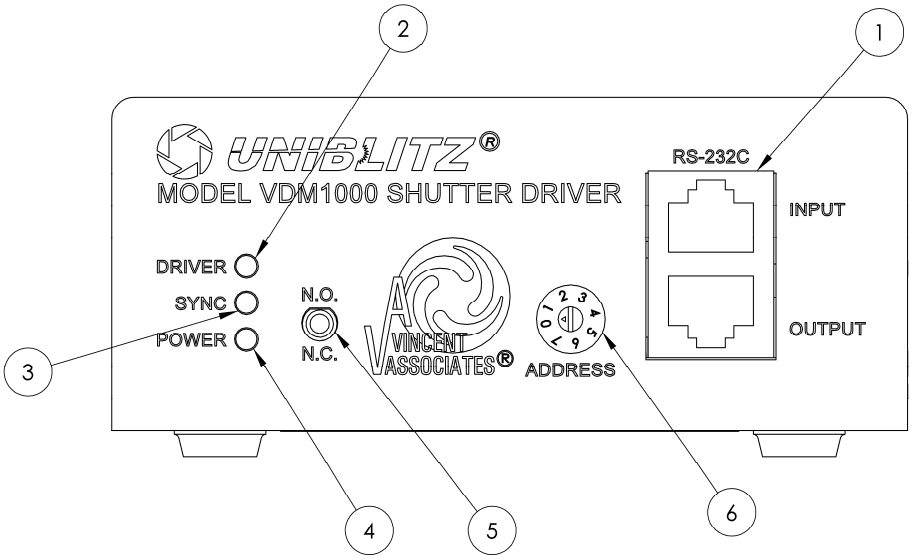


**Figure 1: VDM1000 Front Panel Operator Controls**

## VDM1000 Rear Panel Operator Controls

Please Refer to Figure 2:

1. **PULSE INPUT** BNC.

   Allows control of the shutter exposure and frequency from a TTL signal source. The pulse duration determines the shutter exposure interval. The frequency of the signal presented to this input determines the frequency of shutter exposures. This input can be set active-high or active-low by FUNCTION switch **A**. See **FUNCTION Select** under GENERAL CHARACTERISTICS.

2. **SYNC OUTPUT** BNC.

   This output is for shutters equipped with the Electronic Synchronization System option. The shutter's internal sync circuit sets the BNC output to an active state when the sync circuit becomes active. The output goes active when the shutter reaches 80% of full open, and goes to the inactive state when the shutter reaches 20% closed. The front panel SYNC LED illuminates when the shutter's electronic sync is active. This output can be disabled with FUNCTION switch **E**. The SYNC output can be set active-high or active-low by FUNCTION switch **B**. See **FUNCTION Select** under GENERAL CHARACTERISTICS.

3. **ON/OFF** Power Switch.

   Power switch – "0" is OFF, "1" is ON

4. **DC POWER** Connector.

   2 mm jack for power input. Center terminal is PLUS (+).

5. **SHUTTER** Output.

   A 5-pin SwitchCraft female push-lock type receptacle mates with the 5-pin SwitchCraft male plug of the **510A** (3 meter) interconnect cable included with the unit. Pin-out as follows, wire colors indicate **510A** cable and shutter wiring layout, respectively:

| Connector | Description | Shutter | 510A |
|---|---|---|---|
| Pin 1 | Shutter Actuator Drive Output | Red | Red |
| Pin 2 | Shutter Actuator Drive Output | Brown | Black |
| Pin 3 | +5.0VDC Power Supply Output | Blue | White |
| Pin 4 | SYNC Ground | Green | Green |
| Pin 5 | SYNC Detector Transistor Input | Yellow | Orange |
| Shell | Shutter Ground | Black | Drain |

**Table 1: 5-Pin SwitchCraft Female Receptacle Pin-Out**

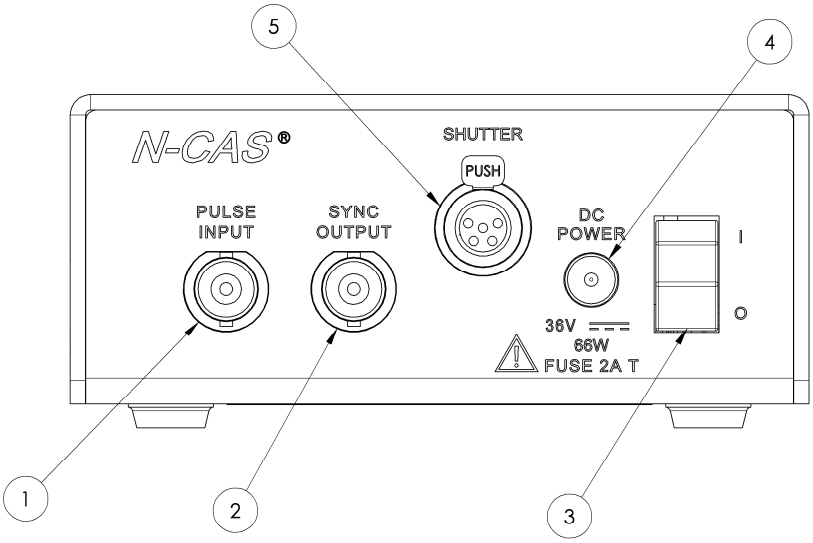


**Figure 2: VDM1000 Rear Panel Operator Controls and I/O**

## VDM1000 Right Hand Panel Operator Controls

Please refer to Figure 3.

1. **PULSE DURATION:** An 8-position octal switch that allows the selection of different pulse voltage durations in units of milliseconds (ms). See **PULSE DURATION Select** under GENERAL CHARACTERISTICS.

| | Pulse Duration Octal Switch Locations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Mode of Operation** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Uni-stable, low energy | 3/3 | 6/6 | 10/6 | 15/8 | 20/10 | 25/12 | 30/15 | 35/18 | (drive/return) |
| Uni-stable, high energy | 20/10 | 30/15 | 40/20 | 50/25 | 60/30 | 70/40 | 80/50 | 90/60 | (drive/return) |
| Bi-stable, low energy | 3/3 | 6/6 | 10/10 | 15/15 | 20/20 | 25/25 | 30/30 | 35/35 | (drive/return) |
| Bi-stable, high energy | 20/20 | 30/30 | 40/40 | 50/50 | 60/60 | 70/70 | 80/80 | 90/90 | (drive/return) |
| Return Disable, low energy | 3 | 6 | 8 | 10 | 12 | 15 | 20 | 25 | (drive only) |
| Return Disable, high energy | 20 | 25 | 30 | 35 | 50 | 70 | 90 | 120 | (drive only) |

**Table 2: VDM1000 Octal Switch Pulse Duration Settings**

2. **FUNCTION** Switches: Six edge actuated piano-DIP slide switches.
   a. Switch **A** is used to select the active state of the PULSE INPUT BNC connector.
   b. Switch **B** is used to select the active state of the SYNC OUTPUT BNC connector. See **FUNCTION Select** under GENERAL CHARACTERISTICS.
   c. Switch **C** allows the user to select between uni-stable and bi-stable modes for the NS series shutters. In the upper position switch **C** selects the bi-stable mode.
   d. Switch **D** allows the user to disable the Return Driver circuit. CS, LS, VS, and XRS series shutters do not require the Return Driver circuit, so when driving these types be sure to disable the return circuit. In the upper position switch **D** disables the return driver while the lower position enables the drive circuit for NS series shutters.
   e. Switch **E** allows the user to disable the electronic synchronization circuit. In the UP position it disables the electronic sync, which then shuts off the infrared emitter internal to the shutter, which in turn disables the SYNC OUTPUT.
   f. Switch **F** is used to select the proper pulse energy for the shutter being driven. Unless otherwise instructed by the actual shutter type used, switch to the HIGH (up) position for 35mm aperture and larger types, switch to the LOW (down) position for all other shutter types. See chart below and in **FUNCTION Select** section of GENERAL CHARACTERISTICS.

   A summary of the DIP Switch FUNCTION settings is provided below.

| | Position | | |
|---|---|---|---|
| **Function** | **DIP Switch** | **Lower** | **Upper** |
| PULSE INPUT | A | active-low | active-high |
| SYNC OUTPUT | B | active-low | active-high |
| Bi-stable Mode | C | disabled | enabled |
| Return Driver | D | enabled | disabled |
| SYNC Sensor | E | enabled | disabled |
| Pulse Energy | F | 25 mm & under | 35 mm & over |

**Table 3: FUNCTION DIP Switch Settings**

Please see the table below for recommended function & octal switch settings for all available shutter series.

| Shutter Series | Function Switch[1] | | | | | | Octal Switch Pulse Duration |
|---|---|---|---|---|---|---|---|
| | A[2] | B[2] | C | D | E | F | |
| CS25 | N/A | N/A | Down | Up | Down | Down | 5 (15 msec) |
| CS35 | N/A | N/A | Down | Up | Down | Up | 0 (20 msec) |
| CS45 | N/A | N/A | Down | Up | Down | Up | 1 (25 msec) |
| CS65 | N/A | N/A | Down | Up | Down | Up | 4 (50 msec) |
| CS90 | N/A | N/A | Down | Up | Down | Up | 7 (120 msec) |
| DSS10 | N/A | N/A | Up | Down | Down | Down | 2 (10/10 msec)[3] |
| DSS20 | N/A | N/A | Up | Down | Down | Down | 5 (25/25 msec)[3] |
| DSS25 | N/A | N/A | Up | Down | Down | Down | 7 (35/35 msec)[3] |
| LS2 | N/A[2] | N/A | Down | Up | Down | Down | 0 (3 msec) |
| LS3 | N/A | N/A | Down | Up | Down | Down | 0 (3 msec) |
| LS6 | N/A | N/A | Down | Up | Down | Down | 0 (3 msec) |
| NS15B | N/A | N/A | Up | Down | Down | Down | 1 (6/6 msec)[3] |
| NS25B | N/A | N/A | Up | Down | Down | Down | 3 (15/15 msec)[3] |
| NS25S | N/A | N/A | Down | Down | Down | Down | 3 (15/8 msec)[3] |
| NS35B | N/A | N/A | Up | Down | Down | Up | 0 (20/20 msec)[3] |
| NS45B | N/A | N/A | Up | Down | Down | Up | 1 (30/30 msec)[3] |
| NS65B | N/A | N/A | Up | Down | Down | Up | 2 (40/40 msec)[3] |
| TS2S | N/A | N/A | Down | Down | Down | Down | 0 (3 msec) |
| TS6B | N/A | N/A | Up | Down | Down | Down | 0 (3/3 msec)[3] |
| VS14 | N/A | N/A | Down | Up | Down | Down | 1 (6 msec) |
| VS25 | N/A | N/A | Down | Up | Down | Down | 2 (8 msec) |
| VS35 | N/A | N/A | Down | Up | Down | Up | 0 (20 msec) |
| XRS1 | N/A | N/A | Down | Up | Down | Down | 0 (3 msec) |
| XRS6 | N/A | N/A | Down | Up | Down | Down | 1 (6 msec) |
| XRS14 | N/A | N/A | Down | Up | Down | Down | 7 (25 msec) |

**Table 4: Function & Octal Switch Settings for All Available Shutter Series**

[1] Switches A, B and E do NOT affect shutter performance

[2] N/A denotes Not Applicable

[3] Open/Close pulse duration

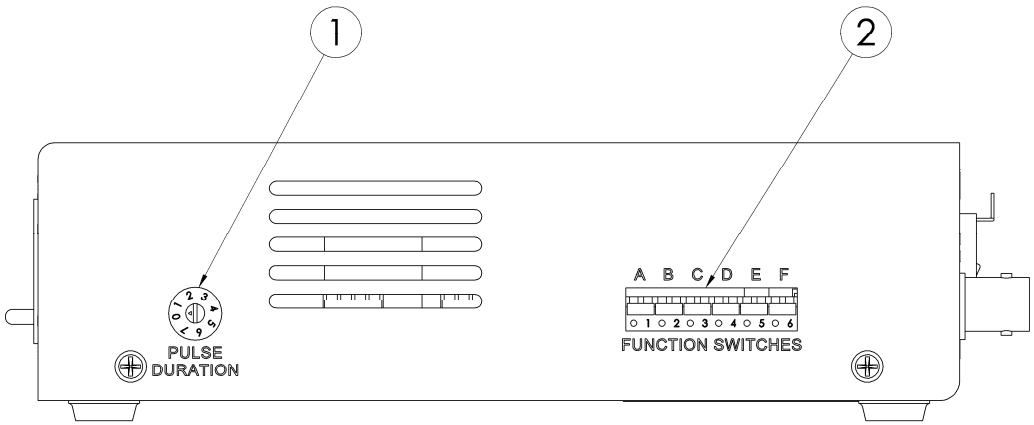


**Figure 3: VDM1000 Right Hand Panel Operator Controls**

# Notes

## Operating Basics

Refer to the section describing the **Initial Operation and Testing** for initial preparation to put the **VDM1000** into operation.

### Function Switches

There are six piano-DIP slide switches located at the right side panel and labeled FUNCTION.

For specific functions see **FUNCTION Select** under GENERAL CHARACTERISTICS.

The switch actuators can be moved to the up or down position with a small non metallic tool.

Be sure the power is off and disconnected from the unit before attempting to change the FUNCTION switch settings.

1. Switches **A** and **B** allow the user to select the active state of the BNC input and the BNC output, respectively. Switch A must be in lower (active-low) position to activate the input from a remote activate cable such as the **710R** (handheld) or the **710R/F** (foot

**CAUTION**

***Do not connect a 710R or 710R/F to the SYNC OUTPUT BNC. This will damage the SYNC OUTPUT.***

   activated).
2. Switch **C** is used to select either uni-stable or bi-stable mode for NS Series shutters.
3. Switch **D** is used to enable or disable the RETURN DRIVER circuit.
4. Switch **E** will allow the user to disable the electronic synchronization circuit. Slide switch to the up position to disable the electronic synchronization circuit. This shuts off the infrared emitter internal to the shutter, which in turn disables the SYNC OUTPUT BNC.
5. Switch **F** selects HIGH/LOW pulse energy. HIGH energy is required to operate the 35mm and larger aperture shutters. In the down (Lower) position the pulse energy is selected LOW. When the switch actuator is in the up (Upper) position, the pulse energy is selected HIGH.

**CAUTION**

***The HIGH energy setting must be used for only the 35mm and larger aperture shutters. Use the LOW position for all other UNIBLITZ shutters. Use of the HIGH position for shutter apertures smaller than 35mm will damage the shutter used and will void the limited warranty..***

## RS-232C Operation

The **VDM1000** inputs can be controlled via an RS-232C computer serial signal (COM port). From a computer's RS-232C serial port, connect a cable such as the **810RJ** (not supplied) or a user-constructed cable with connections as enumerated in the INPUT SPECIFICATIONS to the unit's RS-232C interface. The RS-232 input is configured in the ***null modem configuration***.

Connect the Tx (transmit) from the host to the Rx (receive) on the **VDM1000** control unit. All other lines are not used except for the Ground connection.

When using the **810RJ** cable, the **910RJF** adapter is required to connect the **VDM1000** to the host computer. The **910RJF** adapter is included as part of the **810RJ** cable assembly.

If the host contains a 25-Pin D-sub or an 8-Pin Mini-DIN, check the computer's user manual to find the proper corresponding pin-outs. A cable will need to be constructed or a proper adapter purchased to connect the **810RJ** to the host. In most cases the corresponding 25-Pin D-Sub pin out and MAC 8-Pin Mini-DIN are as follows:

| Function | Name | RJ45 Input | RJ45 Output | IBM DB-9M | IBM DB-25M | MAC Mini-DIN-8F |
|---|---|---|---|---|---|---|
| **Rx** | Receive Data | 5 | 5 | 2 | 3 | 5 |
| **Tx** | Transmit Data | 6 | 6 | 3 | 2 | 3 |
| **GND** | Signal Ground | 4 | 4 | 5 | 7 | 4 |

**Table 5: VDM1000 RS-232C Pin-Outs**

All other pins are not used. Be sure to connect the Tx pin (Pin 3) from the IBM 9-Pin D-Sub or Pin 2 from the 25-Pin D-Sub male connector to the Rx pin (Pin 5) of the **VDM1000** RJ45 INPUT jack for proper operation. Connect all other functions as indicated above.

By sending the proper commands, the unit will respond by activating the proper function. The **RS-232C Test Program** listed below will allow operation of the **VDM1000** from the computer keyboard.

## Daisy-Chain Configuration

Up to eight **VDM1000** units can be daisy-chained together through the same serial port using a Model **810RJ** cable for each controller in the chain. Figure 4 illustrates connecting two controllers from a single serial port. Once connected, each unit will require a unique address in the chain. This is accomplished by adjusting the octal switch beneath the Dual RJ45 connector on the front panel to the desired address. See **ADDRESS Select** under GENERAL CHARACTERISTICS in the SPECIFICATIONS section for a complete listing of the command range for each octal switch position. The specific *local* command range set will decode commands sent via the serial port. A set of *global* commands is also available to control all units connected to the serial port.

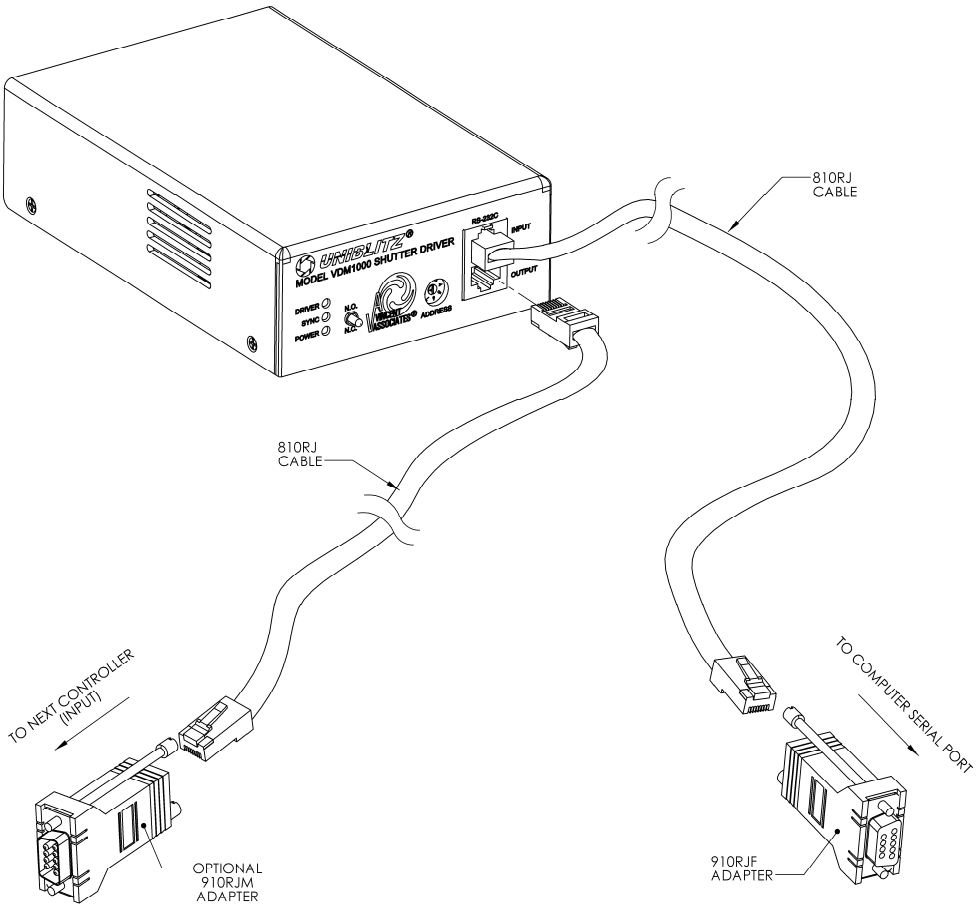


**Figure 4: VDM1000 Shutter Driver Daisy-Chain Cable Configuration**

The following is a test program written to test the input commands to the RS-232C interface of the **VDM1000** controller. This program and LabView programs (not listed) are available by downloading from the **RESOURCES** section of our web site (www.*uniblitz*.com), request via e-mail (vincentassociates*@uniblitz*.com), or calling (800) 828-6972. Other programs may be available, please contact technical support for further information.

**RS-232 Test Program**

```
REM PROGRAM TO SEND DECIMAL COMMANDS TO RS232 SERIAL INTERFACE.
REM WRITTEN BY RICHARD ST.LOUIS, VINCENT ASSOCIATES.
REM 1ST VERSION 3/26/2008


CLS 0
K = -1
WHILE K
        OPEN "COM1:9600,N,8,1,CS0,DS0" FOR RANDOM AS #1
        J = 64
        C$ = "X"

MENU:    PRINT
               PRINT
               PRINT
               PRINT "WAITING FOR KEYSTROKE COMMAND  "
               PRINT "TYPE:"
               PRINT "          VDM1000            "
               PRINT "         ---------           "
               PRINT "     O - OPEN Shutter         "
               PRINT "     C - CLOSE Shutter        "
               PRINT "     Y - SYNC State Check     "
               PRINT
               PRINT "     S - SET Octal Switch Address "
               PRINT "        (Current Decimal Range:"; J - 1; "-"; J + 1; ")"
               PRINT "        (Current Octal Address Value = "; C$; ")"
               PRINT
               PRINT "     Q - QUIT Program         "
               PRINT
               PRINT

START: A$ = INKEY$
               IF A$ = "O" OR A$ = "o" THEN
                        PRINT #1, CHR$(J);
                        PRINT "SHUTTER OPEN COMMAND SENT"
                        GOSUB TIMEOUT
                        GOTO MENU
               ELSEIF A$ = "C" OR A$ = "c" THEN
                        PRINT #1, CHR$(J + 1);
                        PRINT "SHUTTER CLOSE COMMAND SENT"
                        GOSUB TIMEOUT
                        GOTO MENU
```

```
            ELSEIF A$ = "Y" OR A$ = "y" THEN
                PRINT #1, CHR$(J - 1);
                PRINT "SYNC State Check COMMAND SENT"
                GOSUB TIMEOUT
                GOTO MENU
            ELSEIF A$ = "Q" OR A$ = "q" THEN
                K = 0
                PRINT "PROGRAM TERMINATED"
            ELSEIF A$ = "S" OR A$ = "s" THEN
                INPUT "ENTER OCTAL ADDRESS 0 - 7 or X: ", B$
                GOSUB ADDRESS
                GOTO MENU
            ELSE GOTO START
            END IF
WEND
END

TIMEOUT:    FOR I = 1 TO 100000: NEXT I
                CLS 0
                RETURN

ADDRESS:    IF B$ = "X" OR B$ = "x" THEN
                                J = 64
                                C$ = "X"
                                ELSEIF B$ = "0" THEN
                                J = 128
                                C$ = "0"
                                ELSEIF B$ = "1" THEN
                                J = 144
                                C$ = "1"
                                ELSEIF B$ = "2" THEN
                                J = 160
                                C$ = "2"
                                ELSEIF B$ = "3" THEN
                                J = 176
                                C$ = "3"
                                ELSEIF B$ = "4" THEN
                                J = 192
                                C$ = "4"
                                ELSEIF B$ = "5" THEN
                                J = 208
                                C$ = "5"
                                ELSEIF B$ = "6" THEN
                                J = 224
                                C$ = "6"
                                ELSEIF B$ = "7" THEN
```

```
                    J = 240
                    C$ = "7"
                    ELSE J = 64
                          C$ = "X"
END IF
PRINT "STARTING DECIMAL # =", J - 1
GOSUB TIMEOUT
CLS 0
RETURN
```

## Trigger Cautions and Trouble Shooting Tips

1. The **VDM1000** system's capability can be greatly enhanced by external control as described previously, however, extreme care must be taken to ensure that high voltages (see SPECIFICATIONS) are not inadvertently switched into external control inputs. Also, note that large negative voltages can cause irreparable damage to the unit's internal circuitry. Exercise extreme caution.
2. As noted previously, a visual inspection of a fuse is usually NOT an adequate test to determine if a fuse failure has occurred. Use a DMM (Digital Multi-Meter) or equivalent test device to determine fuse continuity.
3. Particular shutter units respond to different minimum pulse widths. For example, a standard VS25 shutter (with Teflon shutter blades) has a minimum exposure pulse of 6 msec. If the exposure or pulse width presented to the VDM1000's PULSE INPUT is less than 6 msec, the shutter may not open fully. If the unit still does not operate properly, when using the proper pulse width, please notify Vincent Associates immediately.
4. When operating shutters with a larger aperture than 25mm (35 mm or larger), please be sure that the FUNCTION slide switch **F** is positioned to the Upper position. Failure to make this change will result in the shutter not opening fully when triggered or opening fully and immediately returning to the closed position thereby risking failure or loss of capture.
5. When operating shutters with a 25mm aperture or smaller, please be sure that FUNCTION slide switch **F** is in the Lower position. Use of the Upper position for 25 mm and smaller aperture devices could cause irreparable damage to the shutter used and WILL void the shutter's limited warranty.

## Dimensions

The overall dimensions of the VDM1000 Shutter Controller and Power Supply are shown below in Figures 5 and 6, respectively.

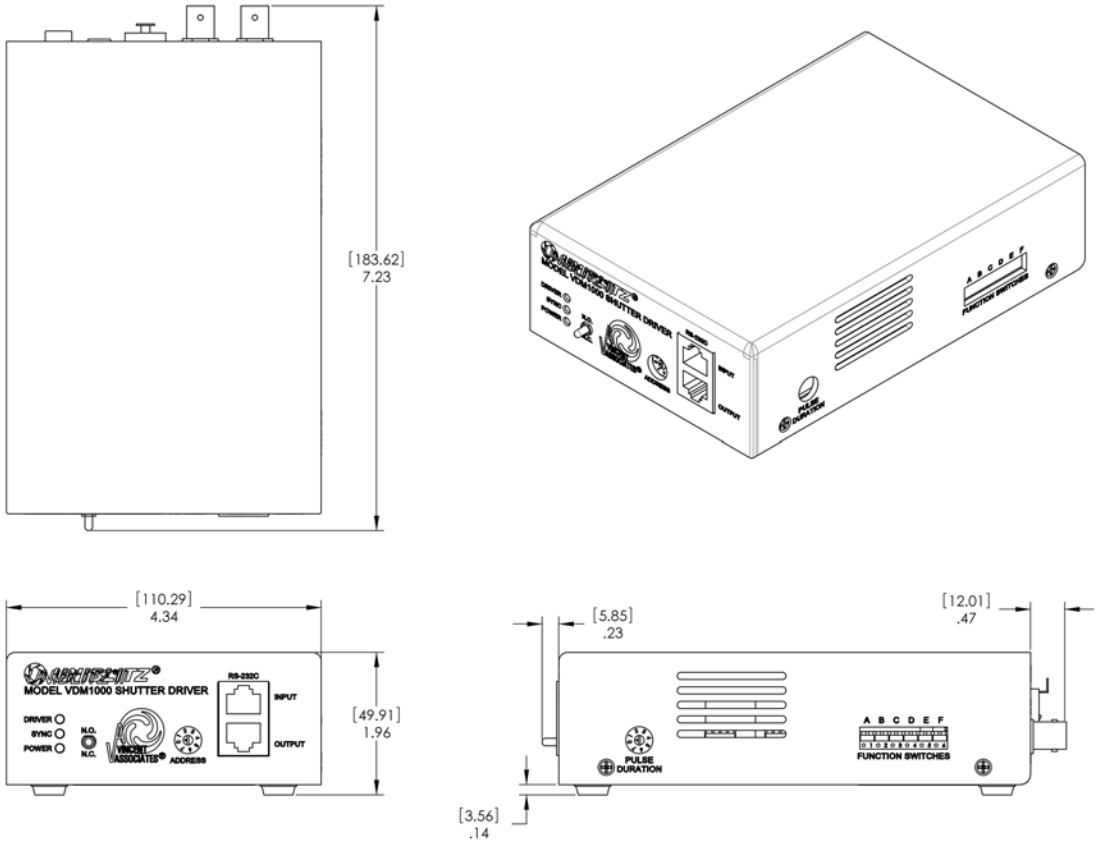


**Figure 5: Overall VDM1000 Dimensions**

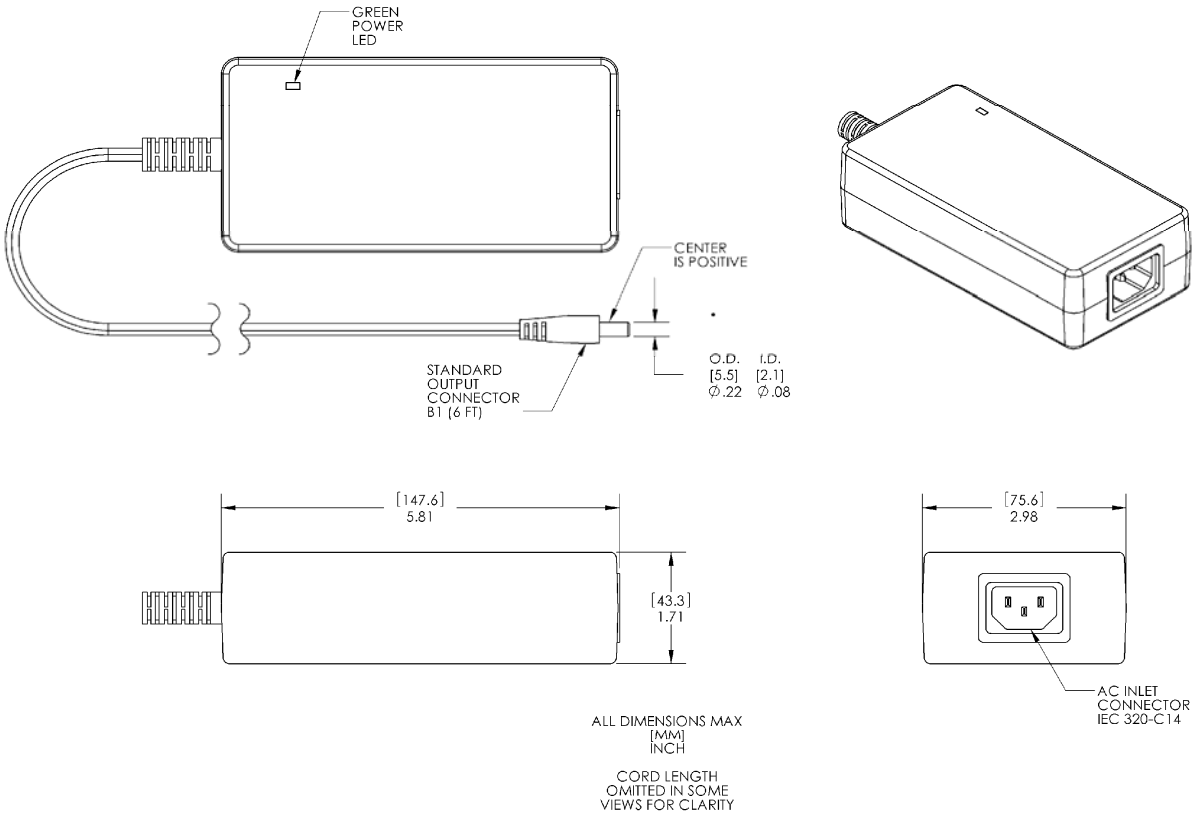


**Figure 6: Overall PS36 Power Supply Dimensions**

## Maintenance

Proper care and maintenance of the unit should be taken as with any electronic instrument.

With the exception of line and shutter fuse replacement, there are no user-serviceable parts outside or inside of the **VDM1000**.

There is no service to be performed by the user other than exterior inspection for visible damage of the case and line cord and exterior cleaning.

Although the stability of the timing and drive voltage is assured and calibrated prior to shipment, it may become necessary to make some minor adjustments to the operating systems of the **VDM1000** over time.

***WARNING***

*It is highly recommended that if you suspect a problem with your unit, that it be returned to the factory for proper adjustments and calibration. The unit's complicated circuitry will be damaged and/or not function as specified if inadvertently adjusted improperly.*

## General Care

Perform routine inspection of the **VDM1000** on a regular basis.

Inspect the outer case for any signs of visible damage.

Pay particular attention to the condition of the power supply line cords. If there are any signs of damage or deterioration, replace immediately with an approved line cord.

Follow the Exterior inspection and Cleaning Procedures below.

## Inspection and Cleaning

### Inspection – Exterior

Inspect the outside of the **VDM1000** for damage, wear, and missing parts. A device that appears to have been dropped or shows other signs of exterior damage should be checked thoroughly to verify correct operation and performance. If damage is suspected, please return the unit to the factory for repair – there are no user-serviceable parts.

### Cleaning Procedure – Exterior

1. Remove loose dust on the outside of the **VDM1000** with a lint free cloth.

***CAUTION***

*To prevent getting moisture inside the unit during external cleaning, use only enough liquid to dampen the cloth or applicator.*

2. Remove remaining dirt with a lint free cloth dampened in a general purpose detergent-and-water solution. Do not use abrasive cleaners.

3. Avoid the use of chemical cleaning agents that might damage the painted finish of the controller's housing. Use only a dry, lint free cloth to wipe down the unit. **DO NOT USE ALCOHOL TO CLEAN THE PANELS – THIS WILL REMOVE THE SCREEN PRINTING FROM THE PANELS**. Before using any other type of cleaner, consult your factory representative.

### Inspection – Interior

Do not attempt to open the case of the **VDM1000**. There are no other user-serviceable parts inside the case.

### Cleaning Procedure – Interior

Do not attempt to open the case of the **VDM1000**. There are no other user-serviceable parts inside the case.

# Specifications

## System Characteristics

| Name | Description |
|---|---|
| Repeat Exposure | • 10 ms minimum between exposures for 25 mm (aperture diameter) and smaller shutters<br>• 20 ms minimum for 35 mm aperture and larger shutters |
| | |
| Shutter Drive | • Continuously variable frequency of exposures from DC to the shutter's maximum rate<br>• Maximum peak pulse power: 91 W<br>• Pulse voltage: +33 VDC<br>• Pulse current: 2.75 A (test conditions: standard 5 Volt, 12 ohm coil cycled with 20 ms exposure at 5 Hz) |
| | |
| Power Supply | • External tabletop switching supply<br>• Output: +36 VDC, 1.83A, 66W<br>• Input: 100-240 VAC, 50/60 Hz, 1.5A<br>• IEC type inlet<br>• Output: 2 mm DC plug, Center is positive |

## External Input Characteristics

| Name | Description |
|---|---|
| PULSE INPUT<br>(BNC)<br>Rear Panel | • Active-low or active-high selectable with FUNCTION switch **A**<br>• Input impedance: 4.7K ohms<br>• Maximum source current: 100 µA<br>• Maximum sink current: 1µA<br>• Minimum pulse width determined by applicable shutter<br>• Maximum pulse width unlimited<br>• TTL compatible:<br>- Minimum high-level: +2.0 VDC<br>- Maximum low-level +0.8 VDC |
| | |
| RS-232C INPUT<br>(Upper RJ45 Jack)<br>Front Panel | • Baud rate 9600<br>• 8 Data bits<br>• 1 Stop bit<br>• No Parity<br>• No flow control<br>• "Null-modem" type input<br>• 3 input commands recognized<br>• 2 output read-backs available (requires SYNC sensor of applicable shutter to be present)<br>• 1 global, 8 local address locations for commands (see **ADDRESS Select** specification for octal-switch settings of local address locations)<br>• Command transmission time: 0.94 ms. See sample RS-232 test program. |

**RS-232 Global Address Code Locations**

| Commands | Decimal | HEX | Octal | Binary | ASCII | |
|---|---|---|---|---|---|---|
| Check-Sync | 63 | 3F | 077 | 00111111 | ? | (receive data) |
| Open | 64 | 40 | 100 | 01000000 | @ | (receive data) |
| Close | 65 | 41 | 101 | 01000001 | A | (receive data) |
| Indicates SYNC On | 74 | 4A | 112 | 01001010 | J | (transmit data) |
| Indicates SYNC Off | 75 | 4B | 113 | 01001011 | K | (transmit data) |

## External Output Characteristics

| Name | Description |
|---|---|
| SYNC OUTPUT<br>(BNC)<br>Rear Panel | • Active-low or active-high selectable with FUNCTION switch **B**<br>• Source impedance: 1K ohms<br>• Maximum source current: 6.8 mA<br>• Maximum sink current: 25 mA<br>• Maximum low-level: +0.5 VDC<br>• Minimum high-level: +4.5 VDC. This output becomes active when applicable shutter is equipped with electronic synchronization sensor. |
| | |
| RS-232C OUTPUT<br>(Lower RJ45 Jack)<br>Front Panel | • Baud rate 9600<br>• 8 Data bits<br>• 1 Stop bit<br>• No Parity<br>• No flow control<br>• DTE type output<br>• This output provided for daisy-chain application of up to 8 VDM1000 (or VCM/VRM series) controllers. |

## General Characteristics

| Name | Description |
|---|---|
| POWER Indicator<br>Front Panel | • Green 3mm LED indicates when DC power is present. |
| | |
| DRIVER Indicator<br>Front Panel | • Green 3mm LED indicates when the shutter driver circuit is active.<br>• This LED will illuminate with or without the load of a shutter's actuator coil. |
| SYNC Indicator<br>Front Panel | • Yellow 3mm LED indicates when a shutter's electronic synchronization sensor is active.<br>• SYNC OUTPUT (BNC) will be active only when this LED is illuminated.<br>• Shutter used must have the electronic SYNC option installed. |
| | |
| ADDRESS Select<br>(Octal rotary-DIP switch)<br>Front Panel | • 8-position octal switch allows selection of individual (local) address locations for input commands sent by a computer's serial port.<br>• Output commands do not apply for local selections 0 to 8<br>• Used for daisy-chain application from one computer (host) serial port. |

| RS232C Commands | ADDRESS Switch Decimal Locations (x = don't care) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| Check-Sync | 63 | 127 | 143 | 159 | 175 | 191 | 207 | 223 | 239 | (Decimal) |
| Open | 64 | 128 | 144 | 160 | 176 | 192 | 208 | 224 | 240 | (Decimal) |
| Close | 65 | 129 | 145 | 161 | 177 | 193 | 209 | 225 | 241 | (Decimal) |
| Indicates SYNC On | 74 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | (Decimal) |
| Indicates SYNC Off | 75 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | (Decimal) |

## General Characteristics (cont'd)

| Name | Description |
|---|---|
| FUNCTION Select<br>(6-position piano DIP switch)<br>Right Side Panel | • A 6-position DIP switch used for configuration of different operating modes.<br>• Switch **A** allows selection of active-low or active-high state for the Pulse Input BNC.<br>• Switch **B** allows selection of active-low or active-high state for the SYNC Output BNC.<br>• Switch **C** enables the driver circuits for bi-stable operation, default is uni-stable operation.<br>• Switch **D** disables the return driver circuit (CS/LS/VS/XRS series shutters).<br>• Switch **E** disables the synchronization sensor of a shutter.<br>• Switch **F** allows the selection of additional pulse energy for the 35 mm and larger shutters. |
| | DIP Switch Position |
| Function | DIP Switch — Lower — Upper |
| PULSE INPUT | A — active-low — active-high |
| SYNC OUTPUT | B — active-low — active-high |
| Bi-stable Mode | C — disabled — enabled |
| Return Driver | D — enabled — disabled |
| SYNC Sensor | E — enabled — disabled |
| Pulse Energy | F — 25 mm & under — 35 mm & over |
| | |
| PULSE DURATION Select<br>(Octal Rotary Switch)<br>Right Side Panel | • 8-position octal switch allows selection of different pulse voltage durations in units of msec.<br>• Applies to Uni-stable, Bi-stable, and Return Disable modes of operation.<br>• Return driver durations do not apply to Return Disable mode. |
| | PULSE DURATION Switch Locations (values in msec) |

| Mode of Operation | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Uni-stable, low energy | 3/3 | 6/6 | 10/6 | 15/8 | 20/10 | 25/12 | 30/15 | 35/18 (drive/return) |
| Uni-stable, high energy | 20/10 | 30/15 | 40/20 | 50/25 | 60/30 | 70/40 | 80/50 | 90/60 (drive/return) |
| Bi-stable, low energy | 3/3 | 6/6 | 10/10 | 15/15 | 20/20 | 25/25 | 30/30 | 35/35 (drive/return) |
| Bi-stable, high energy | 20/20 | 30/30 | 40/40 | 50/50 | 60/60 | 70/70 | 80/80 | 90/90 (drive/return) |
| Return Disable, low energy | 3 | 6 | 8 | 10 | 12 | 15 | 20 | 25 (drive only) |
| Return Disable, high energy | 20 | 25 | 30 | 35 | 50 | 70 | 90 | 120 (drive only) |

## General Characteristics (cont'd)

| Name | Description |
|---|---|
| Power Requirements | +36 VDC, 66 Watts; accessible with 2 mm jack, located on rear panel. |
| | |
| Fuse Requirements<br>(Fuses are internal to unit) | one 2 Amp "T" Slo-Blo (Nano SMT) for +36 VDC<br>one 0.75 Amp "T" Slo-Blo (Nano SMT) for Shutter coil<br>one 0.25 Amp "F" fast-acting (1206 SMT) for +5V Sync |
| | |
| Operating Temperature | 5° C to 40° C (41° F to 104° F) |
| | |
| Storage Temperature | -20° C to 55° C (-4° F to 131° F) |
| | |
| Relative Humidity | 80% maximum |
| | |
| Altitude | up to 2000 m (6562 ft), Indoor use |
| | |
| Pollution | Degree 2 |
| | |
| Over-voltage | Category II |
| | |
| Size (HWD) | 1.96 x 4.34 x 7.23 in (49.9 x 110.3 x 183.6 mm) |
| | |
| Weight | Controller - 1.2 lbs (0.54kg)<br>Power Supply - 1.1 lbs (0.50kg) |
| | |
| Supplied Accessories with VDM1000 | • **510A** shutter cable (5-pin male SWC to 5-pin female SWC)<br>• +36 VDC external power supply<br>• (2) each AC line cord, IEC type, North America and Europe<br>• User's Manual (Disk) or USB Flash Drive<br>• Checklist |

## General Characteristics (cont'd)

| Name | Description |
|---|---|
| Optional Accessories | • **710A** shutter cable (7-pin female WPI to 5-pin male SWC)<br>• **710R** remote hand-held trigger cable (used with active-low BNC)<br>• **710R/F** remote foot-switch trigger cable (used with active-low BNC)<br>• **810RJ** RS-232C interconnect serial cable (RJ45 connections)<br>• **910RJF** female DB9 to RJ45 adapter (used with 810RJ and PC)<br>• **910RJM** male DB9 to RJ45 adapter (used with 810RJ & VMM driver)<br>• **701A-S5** Shutter Adapter Cable (7-pin female WPI to 5-pin male SWC)<br>• **701AR-S5** Shutter Adapter Cable with resistor (7-pin female WPI to 5-pin male SWC) |

## Applicable Certifications (CE/UL/CSA)

(The VDM1000 Shutter Driver has successfully completed and is compliant with the following tests performed at MET Laboratories, Inc.)

| Name | Description |
|---|---|
| Directive(s) | EMC, LOW VOLTAGE, UL, CSA |
| Applied Standards: | Application of Council Directive(s): EMC 89/336/EEC as amended by 92/31/EEC and 93/68/EEC<br>Standards to which Conformity is Declared: 61326:1997 + A1:1998 + A2:2001 + A3:2003 Class A<br>UL 61010-1/CSA C22.2 No. 61010-1, Second Edition: Safety of Electrical Equipment for Measurement, Control and Laboratory Use, Rev. October 28, 2008.<br>Title 47 of the Code of Federal Regulations (CFR), Part 15 Subpart B for a Class A digital device.<br>15.107 (a) Conducted Emission Limits for a Class A Digital Device<br>15.109 (a) Radiated Emission Limits for a Class A Digital Device<br>EN 61326-1: 2006, Electrical Equipment for Measurement, Control, and Laboratory Use.<br>• EN 61000-4-2:2001– Electrostatic Discharge Immunity<br>• EN 61000-4-3:2006 – Radiated Electromagnetic Field Immunity<br>• EN 61000-4-4:2004 – Electrical Fast Transient/Burst Immunity<br>• EN 61000-4-5:2006 – Surge Immunity<br>• EN 61000-4-11:2004 – Voltage Dips, Interruptions and Variations<br>• EN 61000-4-6:2007 – Conducted Radio-Frequency Immunity<br>• CISPR 11:2007 – Radiated Emissions – Class A<br>• CISPR 11:2007 – Conducted Emissions – Class A |

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