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Shutter Systems

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VINCENT
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User Manual

VLM1/VLM1B Interface Module
For the FS Shutter Series

14-0055

Version 1.01

2021

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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

- **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 can be grounded through the **SHUTTER** connector, Pin #4 if required.
- **Use Proper Fuse** – To avoid fire hazard, use only the fuse type and rating specified for this product. The **VLM1/VLM1B** contain no user replaceable fuses.
- **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.
- **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.

Preface

This Manual provides information for the **VLM1/VLM1B Interface Module**. 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.
- *Operating Basics* gives further details to the operational features of the driver.
- *Specifications* are described for all input/output controls as well as operational features of the **VLM1/VLM1B**.

*What follows is the complete operator's manual for the **UNIBLITZ® VLM1/VLM1B Interface Module**. 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.*

Getting Started

Features

- Two different models available – the VLM1, this unit is housed and comes equipped with a Power Supply, USB/Power Cable, and Accessories. The VLM1B is an open frame printed circuit card suitable for OEM applications, the only accessory included is a 2mm micro screwdriver (also included with the VLM1). If required, the power supply and cable can be purchased separately for the VLM1B.
- RoHS Compliant
- Designed to provide a convenient device to interface the FS Shutter series to TTL signals or provide control through a USB com port.
- 5-Pin Phoenix Contact pluggable, spring cage type, SHUTTER interface connector. Wires are easily inserted into the connector using a small 2mm screwdriver, included. Dimension “a” is 10mm. See Figure #4 for the shutter wire installation procedure.

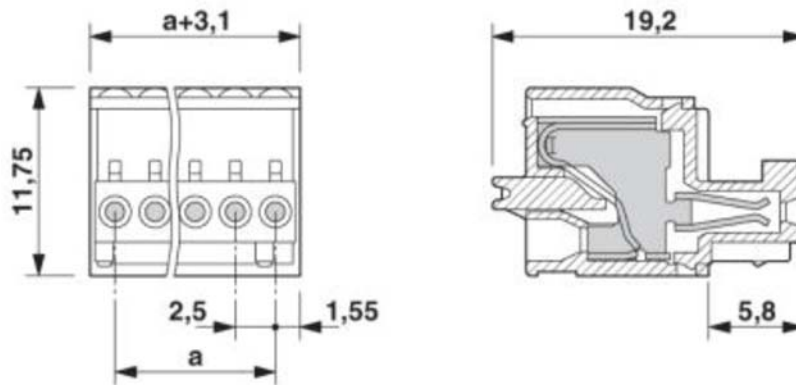


Figure 1: 5-Pin Pluggable Phoenix Connector

- Exposure determined by external pulse width (BNC,+5V TTL active-high/active-low selectable by board jumper)
- Internal fuse protection for SHUTTER Connector (Pin #1) and +5V Input (USB 2.0 Micro B) – both are resettable. For Sync System (SHUTTER Connector (Pin #5) Fast Acting – not serviceable.
- Power input to controller via USB 2.0 Micro B connector. Power can be sourced from a computer (0.5A min) or the supplied +5V Adapter (VLM1)
- The USB5, a +5VDC/1A External power supply (included with VLM1) is required for operation
- Size (VLM1): 1.39 x 4.50 x 3.69 inches (35.3 x 114.3 x 93.5 mm) – See Figure #7 for VLM1B Dimensions.
- Weight: VLM1 – 5.95 oz. (0.169 kg)
- Weight: VLM1B – 2.28 oz. (0.065 kg)

Introduction

The UNIBLITZ **VLM1/VLM1B** Interface Module is a convenient signal interface unit to control the UNIBLITZ FS shutter series from a +5V TTL control signal. The FS shutter requires only +5VDC to open and 0VDC to close – default position of the FS25/FS35 is closed. Although the interface circuit is quite simple, for those who do not wish to build their own interface, the **VLM1/VLM1B** is available.

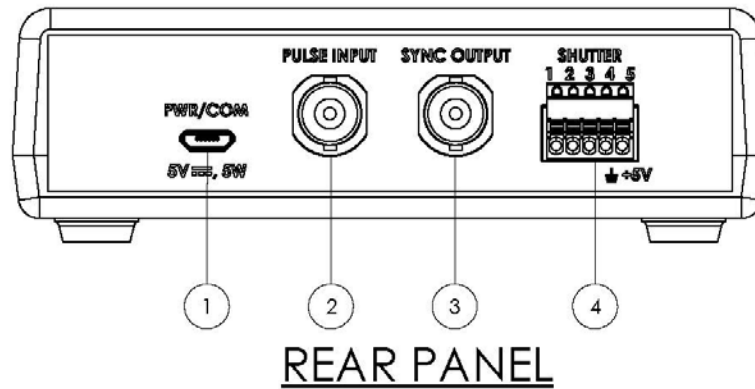
The FS shutters can be operated (activated open) simply by placing +5VDC (on the actuator coil's RED wire) and 0VDC (ground) on the actuator coil's BROWN wire. The **VLM1/VLM1B** provides the switching circuit, BNC interconnects, USB interface, etc., to easily operate any shutter in the FS series. Controlling the shutter from the front panel switch, from any +5V TTL signal, (the duration of this pulse is, approximately, the exposure time of the shutter), or a computer's USB port. See Figure #8, which provides the Schematic Diagram for additional information on the **VLM1/VLM1B** operation.

Note: Under certain circumstances two **VLM1/VLM1B** Interface Modules may be operated from one power supply. If the user requirement does not require that shutters open simultaneously, two drivers may be operated from one USB5, +5VDC/1A supply. For further information and guidance please discuss your specific application with a Vincent Associates technical representative.

Operator Controls

VLM1/VLM1B Rear Panel Operator Connections

VLM1



VLM1B

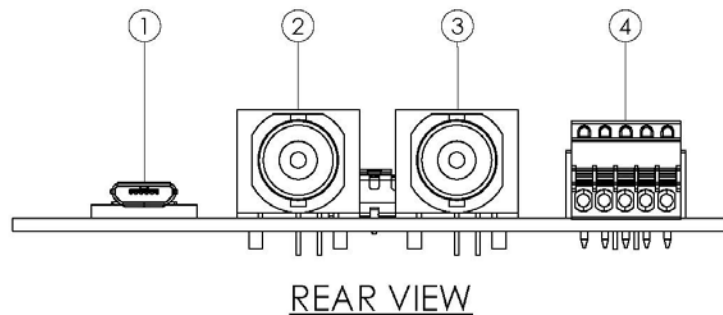
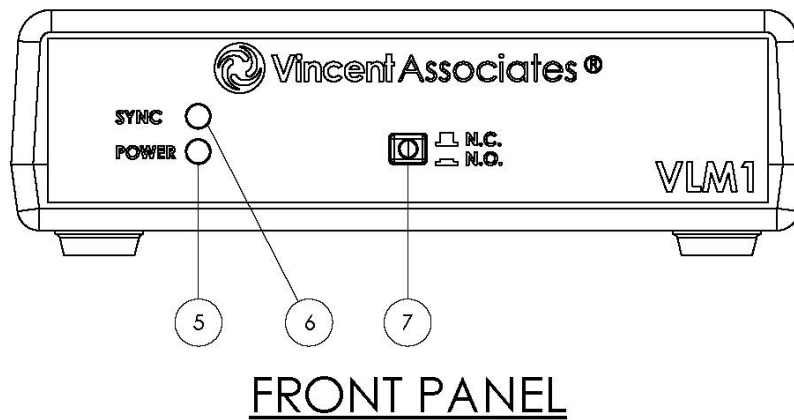


Figure 2: VLM1/VLM1B Rear Panel/View Layout

1. **PWR/COM:** USB/Power Input - +5VDC 0.5A min (USB5, +5VDC 1A wall adapter included). A USB interface cable (USB A 2.0 to USB Micro B) is also included for use the USB5 power supply, or the cable can be connected to a computer to supply power and data.
2. **PULSE INPUT:** BNC – For shutter control via a +5V TTL signal – pulse width determined exposure time. Active High or Active Low (default) is selectable with on-board jumper. See Figure #7.
3. **SYNC OUTPUT:** BNC – For shutters equipped with electronic sync systems. Provides a +5V TTL output signal, Active High (default) – or Active Low is selectable with on-board jumper (See Figure #7) – when the shutter transfers to the active state.
4. **SHUTTER:** 5-Pin Pluggable Spring Terminal Connector – For shutter termination and shutter sync system interface. The flying leads from the shutter (or the 510FS Extension Cable) will connect directly to these terminals. See Figure #1 for connector dimensions, Figure #4 for wire installation procedure, and the **External Output Characteristics** for pin designations. Plug can be removed by pulling straight out from the **VLM1** Rear panel or horizontal to the **VLM1B** PCB.

VLM1/VLM1B Front Panel Operator Controls/Indicators

VLM1



VLM1B

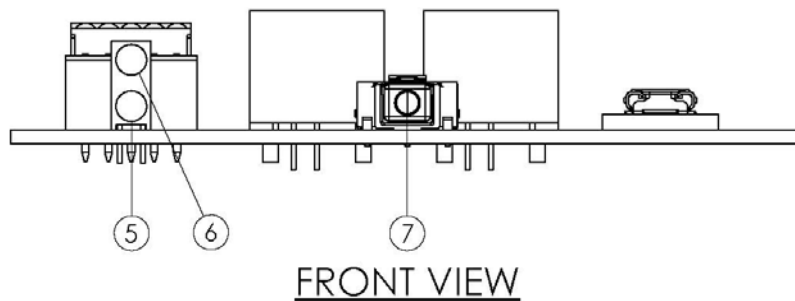


Figure 3: VLM1/VLM1B Front Panel/View Layout

5. **POWER** LED Power Indicator – GREEN LED Indicates the **VLM1/VLM1B** power status.
6. **SYNC** LED Sync Status Indicator – YELLOW LED Indicates the VLM1/VLM1B module's electronic output status. When the LED is illuminated the sync's status will indicate the shutter coil is Active and in the actuated state. (Please note that this LED and the SYNC Output will only activate if the shutter is equipped with the electronic sync and that the sync wires are connected properly to the unit.)
7. **N.C./N.O.** Manual Shutter Open/Close Switch with GREEN LED – Push the switch to open the shutter (place in the active state – for a Normally Open shutter the active state is activated close). Push the switch again to close the shutter. When in the coil active state, a GREEN LED, on the switch's push-button, will illuminate.

Start Up

CAUTION

Be sure to observe Electro-Static Discharge (ESD) anti-static unpacking procedures when removing the VLM1/VLM1B from the static shielding bag. Improper handling can result in destruction of the CMOS integrated circuits.

After unpacking your unit inspect for any defects. Upon inspection if a visible defect is found, or a part (or parts) are missing, notify Vincent Associates immediately.

Prior to the connection of input/output signals to the **VLM1/VLM1B**:

1. Be sure that the power supply is disconnected.
2. Set N.C./N.O. switch to the N.C. position (that is in the out position/LED built into the switch actuator should be off when the supply is connected).
3. Connect the RED wire of the FS Shutter's actuator coil to Terminal #1 of the SHUTTER connector and the BROWN wire of the FS Shutter's actuator coil to Terminal #2 of the Shutter connector. See Figure #4 for method of inserting (connecting) the actuator coil's wires to the **VLM1/VLM1B's** SHUTTER spring terminal block connector. If the shutter is equipped with an electronic sync, the remaining three wires can be connected as shown in Figure #5. This figure also shows an overview of all of the **VLM1/VLM1B's** connections for proper operation of an FS Shutter.
4. When using the +5V/1A power supply connect the power supply to the **VLM1/VLM1B** with the USB A 2.0 to USB Micro B Cable (both are included with the **VLM1**). When Using a laptop or a computer, be sure the USB port you are using can source 0.5A minimum and then using the same cable, connect to the **VLM1** or **VLM1B**.
5. Plug in the power supply (If being used to power the unit.)
6. Connect an input exposure signal, +5V TTL to the input BNC, if desired – default – Active Low.
7. A push of the N.C./N.O. switch will cause the shutter to open. The switch push-button's GREEN LED will also illuminate indicating that a signal has been provided to the input switching MOSFET amplifier. See **VLM1/VLM1B** schematic diagram in Figure #8.

Extending the Shutter Interconnection

For those applications that require an extended interconnect length between the FS shutter and the **VLM1/VLM1B**, an optional cable can be purchased, the 510FS. This cable will provide up to a 10ft (3m) cable length between the FS Shutter and the **VLM1** or **VLM1B**.

The shutter must be modified to include the -5M option. The -5M option consists of a 6-inch harness terminated to a 5-Pin male connector added to your FS shutter. This connector will mate with the 5-Pin Female connector on the 510FS cable. The opposite end of the 510FS contains a pigtail end that will interconnect with the SHUTTER connector on the **VLM1/VLM1B**. The pigtail wire color layout is the same as the colors indicated in Figure #5. It is recommended that this -5M upgrade is included with the purchase of your FS shutter.

Terminal Block Wire Installation

The following illustrates the Terminal Block Wire Installation procedure for the **VLM1** or the **VLM1B** (not shown):

1. Be sure wire is stripped to length as shown.
2. Push desired wire terminal actuator in using 2mm screwdriver provided (as shown)
3. Slide wire into access hole below the terminal actuator.
4. Release the terminal actuator.
5. Wire should be connected – a slight pull on the wire (with the wire remaining stable and connected) should indicate the wire is properly connected.
6. Connect the remainder of the wires as required.
7. For shutter operation, RED wire from actuator coil must connect to Terminal #1 and BROWN wire from actuator coil must connect to Terminal #2.

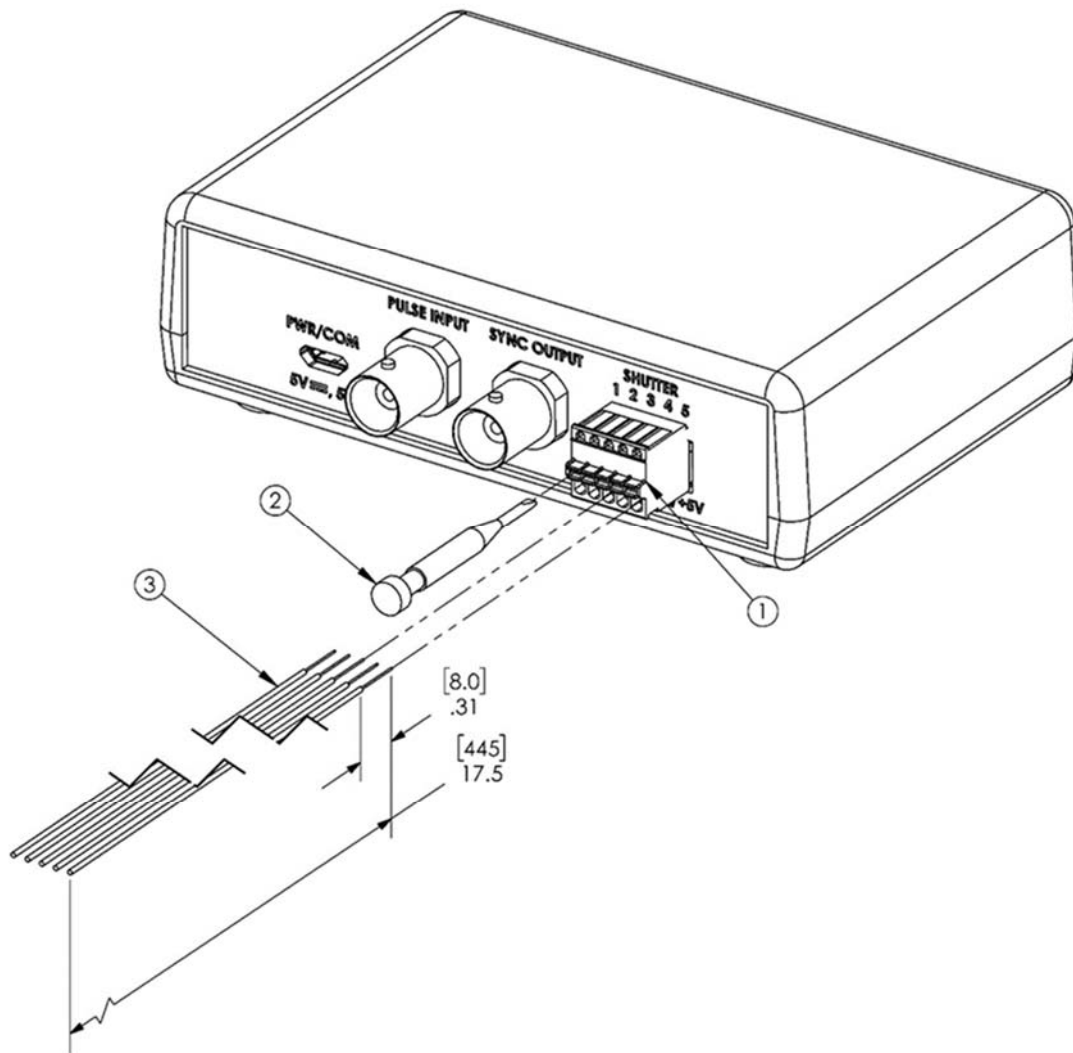


Figure 4: VLM1/VLM1B SHUTTER Wire Installation Diagram

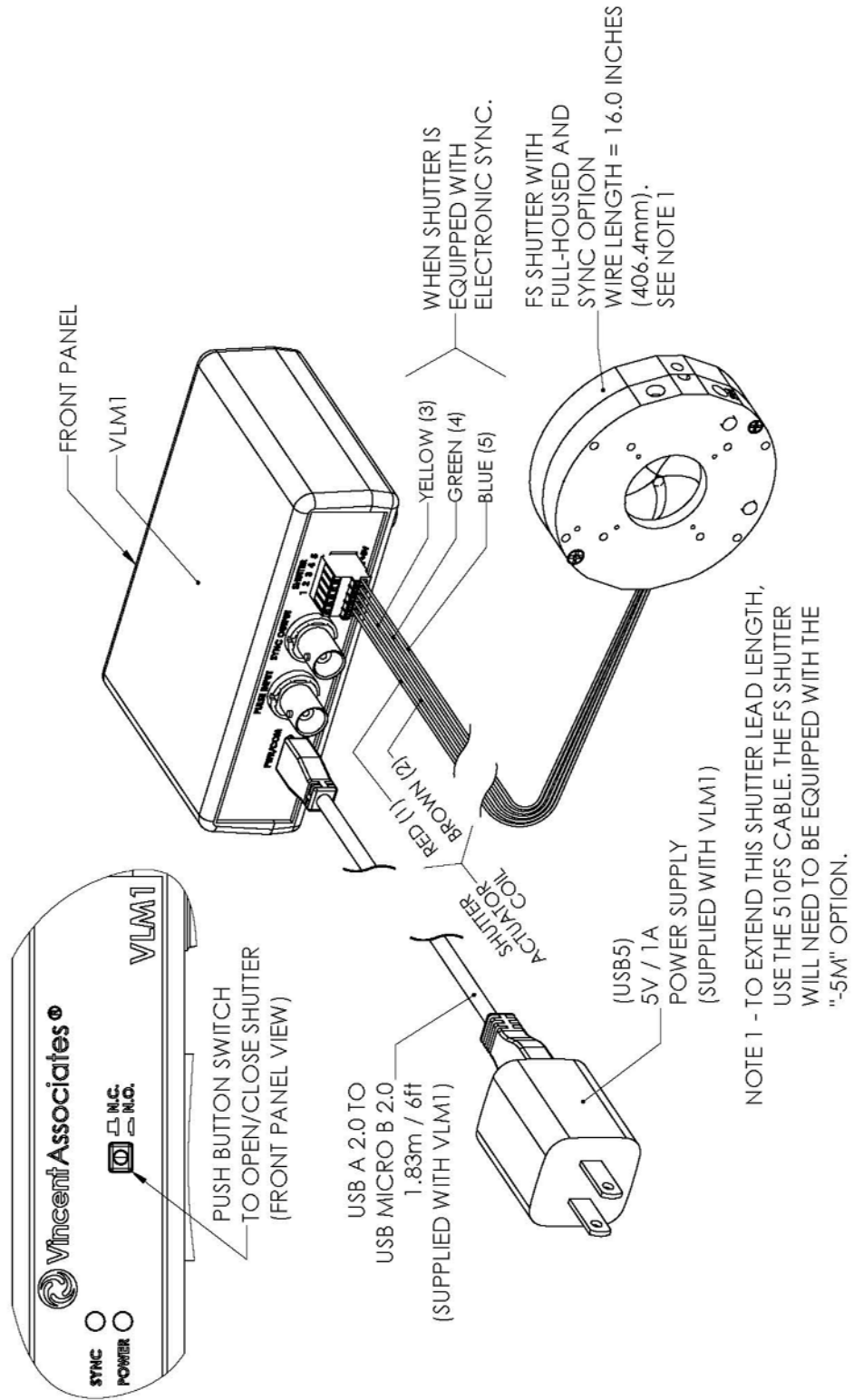


Figure 5: VLM1 to FS Series Shutter - Interconnection Diagram

Operating Basics

Initial Operation and Testing

The **VLM1/VLM1B** provides the circuitry necessary to operate an FS Series shutter from a TTL signal. Connect your FS Shutter to the SHUTTER output connector as described in START UP and as shown in Figure #5. If your shutter is equipped with the Electronic Synchronization system, connect all five wires, otherwise, the two wires are all that are required to be connected.

When the power supply cable is connected to the **VLM1/VLM1B**'s PWR/COM port and the power supply is connected to an AC source (via the AC module provided or the USB COM port of a computer), the Green POWER LED will illuminate. Pushing the N.C./N.O. switch, the shutter will open and the GREEN LED of the N.C./N.O. switch will illuminate indicating the output MOSFET amplifier has been activated.

This device also supports an FS device equipped with an Electronic Synchronization circuit. Therefore, when the shutter opens and if so equipped (and connected) the Yellow LED will illuminate, indicating the Sync system is active. Additionally, the SYNC OUTPUT BNC will change from 0V to +5V TTL Active High and remain high as long as the Shutter is active (Active High – default setting). If you wish this output to be Active Low, reposition the internal Jumper as shown in Figure #7 on the main board.

When the **VLM1/VLM1B** receives an Active Low TTL control signal (0V) on the PULSE Input BNC, the shutter will open and when the pulse returns to +5V the shutter will close. The TTL control pulse controls a MOSFET switch that in turn controls the FS Series Shutter from the +5VDC supply.

If the requirement is to operate the shutter from a switch contact closure, follow this procedure (this is when the active setting of the PULSE Input BNC is active low – the default setting):

1. Connect a wire from pin #4 of the **SHUTTER connector**, this is the Ground connection. Or short the outer shell of the BNC to the center contact of the BNC. (This is the same action as indicated when using the 710R or 710R/F as described below.)
2. Switch the 0V (Ground) to the BNC center contact. The shutter will open.

The shutter will open and remain open for as long as the switch contact is depressed. When 0V is removed from the input, the shutter will close. This is the same action that will occur when the Front Panel pushbutton is depressed.

After connecting the shutter and the TTL signal, the shutter's exposure can be controlled via a TTL square pulse input, the Front Panel pushbutton, or the USB COM port.

Exposure time is determined by PULSE Input signal duration in the Low(0V) position (Active Low). This is referred to as Pulse Width Determined Exposure Time.

The **VLM1B** can be easily integrated into OEM applications where a +5VDC power supply is available.

Note that when a remote activate cable, the 710R (see <https://www.uniblitz.com/products/710r-handheld-remote-cable/>) or the 710R/F (see <https://www.uniblitz.com/products/710rf-foot-activated-remote-cable/>) can be plugged directly into the PULSE INPUT BNC only. Depressing the switch on either cable will active the shutter to the open position. The Active state of this input must be Active Low. If the state is active high, then +5V will be required to switch the shutter to the active state and 0V

deactivates. The 710R or the 710R/f cannot be used when the Pulse Input BNC is reconfigured for Active High.

CAUTION

Do not plug the remote cable into the SYNC Output BNC, this could cause irreparable damage.

BNC I/O Active State Selection

To set the active state of the PULSE Input and SYNC Output, you must access the unit's printed circuit board. For the **VLM1**, remove the screws holding the top and bottom housing halves together. Slide the top housing cover off by pulling straight up. Note the jumper locations on the PCB located behind each of the BNC modules. JMP1/JMP2 is for the PULSE Input and JMP3/JMP4 is for the SYNC Output. You can change the PULSE Input active state to Active high by moving the jumper from JMP1 (A-L) to JMP2 (A-H). This is the same for the SYNC Output moving the jumper from JMP3 (A-H) to JMP4 (A-L). See Figure #7 for these jumper locations. For the VLM1, replace the housing top half ensuring the front and rear panel lines up with the vertical slots in the top cover. Replace the screws to secure the top and bottom case halves together.

The procedure for changing the jumpers is the same for the VLM1B.

Please be sure the power is disconnected before attempting to change the jumpers.

Please read the entire manual carefully before attempting to operate the unit.

Fuse Information

The **VLM1/VLM1B** are protected by resettable fuses on the +5V Input Power (**PWR/COM** connector) and Shutter Actuator Coil (A) connection (**SHUTTER** Pin #1).

CAUTION

Please note that a standard fast blow fuse protects the +5V Output (SHUTTER Pin #5) – this is not user serviceable (F3 is soldered to the main PCB) see Figure #7 for fuse location.

If a fault occurs when the power supply is connected to the unit or when the shutter was operating and then stops, it could be that the on-board resettable fuses have entered a fault condition. This fault condition acts similar to the action of a blown fuse. Since the fuses' open circuit condition is due to an increase in internal temperature (causing a resistance increase in the circuit path), to reset them please remove the unit from power and allow the unit to cool for 5-10 minutes. Upon restoration of power the unit should return to normal operation. The unit uses two [Bel Fuse resettable surface mount PTC](#) fuse devices. This link will explain in detail the operation of these fuses in addition to what is described herein. The SHUTTER Output Pin #1 uses a 0.35A, 16V PTC resettable fuse (F2). The PWR/COM Input uses a 0.5A, 24V PTC resettable fuse (F1). The +5V Output (SHUTTER Output) Pin #5 uses a 125mA, 125V F-A fuse (F3, non-serviceable).

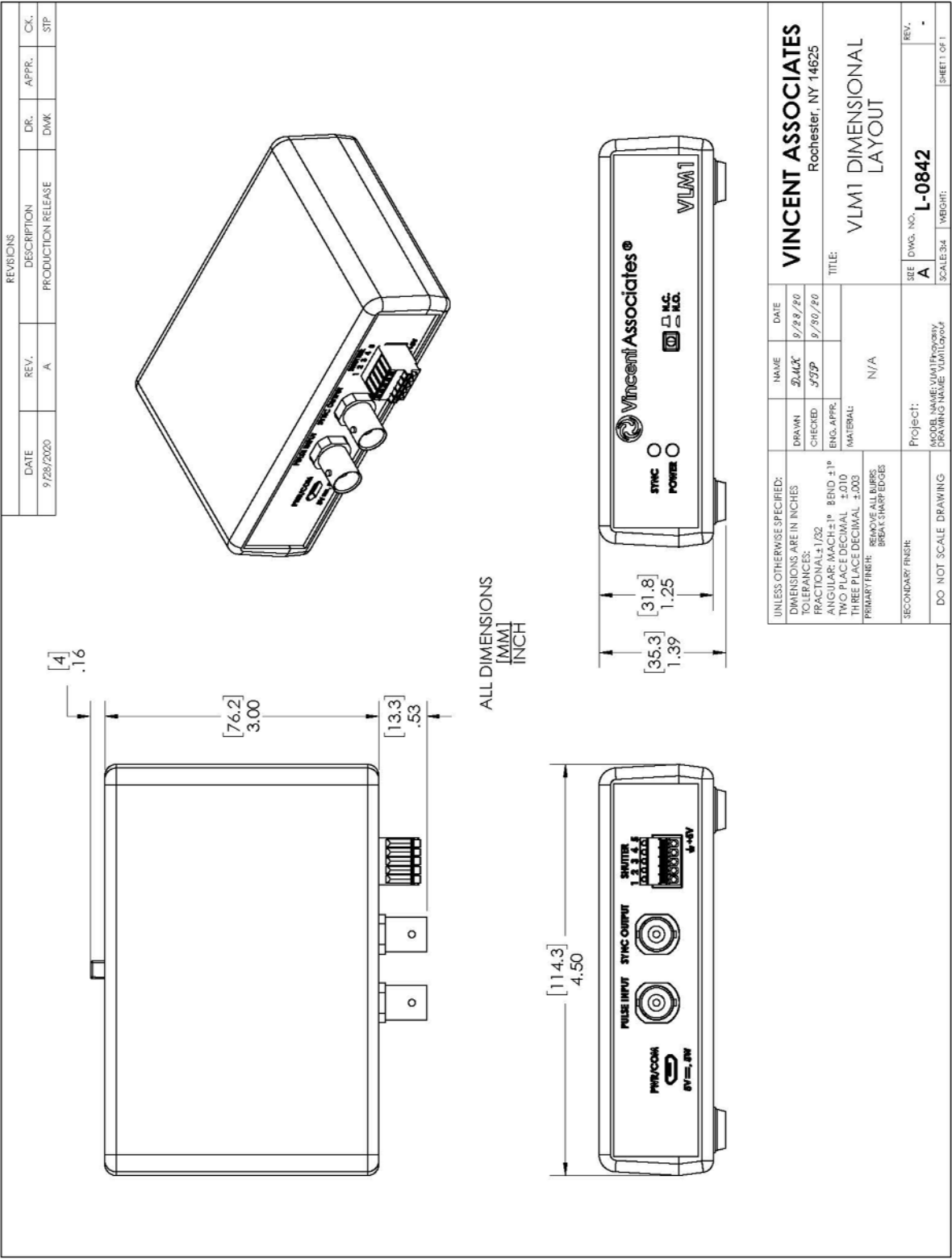


Figure 6: VLM1 Dimensional Layout

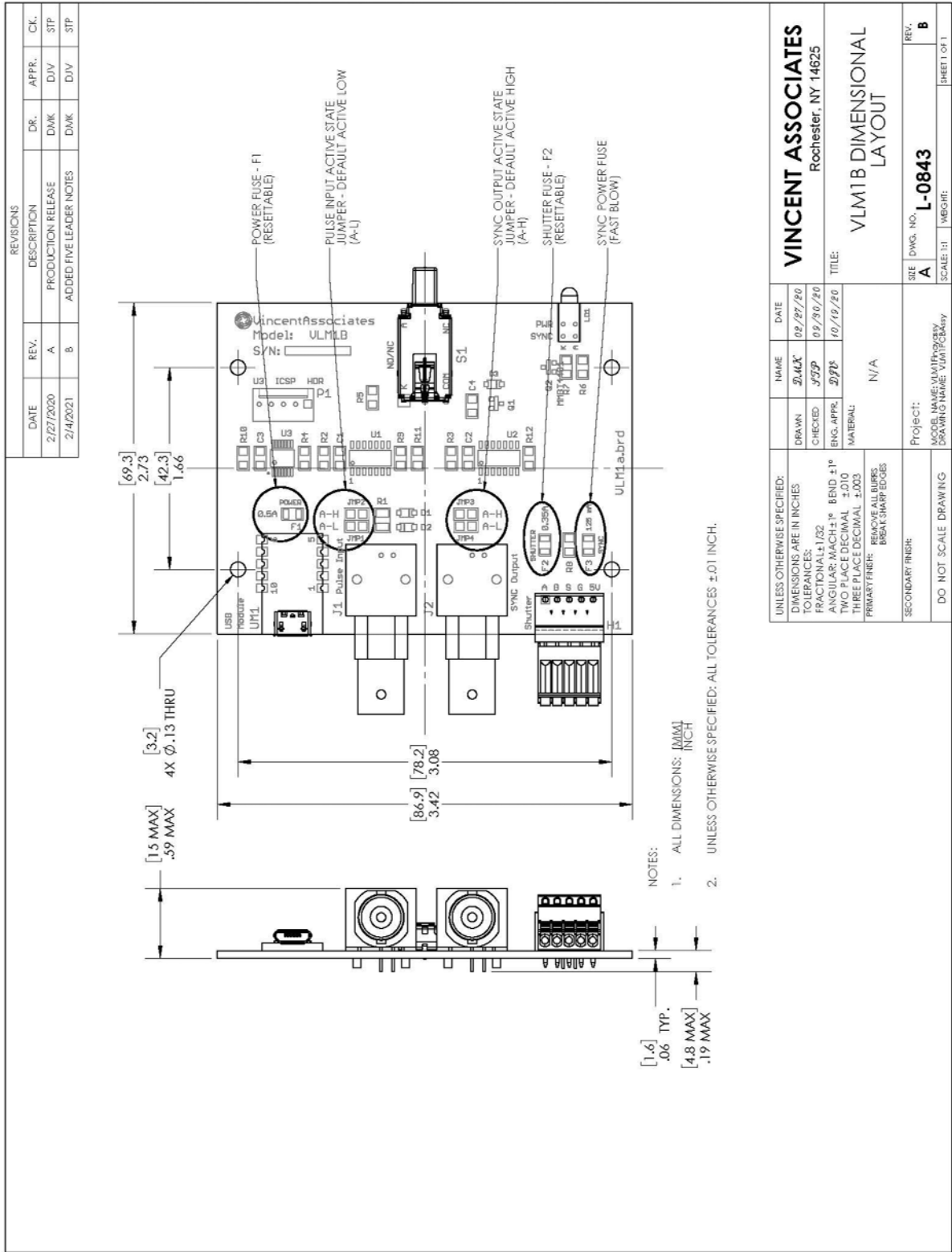


Figure 7: VLM1B Dimensional Layout - Fuse/Jumper Locations

USB Operation

The **VLM1/VLM1B** can also be controlled via a serial command from a computer's USB port (configured as a virtual COM port). A USB cable is included with the controller. Once the device is connected to a computer (or USB Hub*), in most instances, the driver for the USB interface will be installed. If this connection does not occur, a USB driver program can be downloaded from:

<http://www.ftdichip.com/Drivers/CDM/CDM%20v2.12.04%20WHQL%20Certified.exe>

This USB driver is also included on the Flash Drive which is included with your **VLM1/VLM1B** controller. In fact, in addition to the link above, the USB driver can be found on the same Flash Drive that this PDF User Manual is located – This user manual is also available for download at www.uniblitz.com. (*Each VLM1/VLM1 unit connected to a USB Hub will require a minimum of 0.5A each for operation.)

Once communication is established, the shutter can be commanded to the open state by sending the ASCII "@" symbol. The shutter will close by sending a capital "A" symbol. See USB Commands in the "External Input Characteristics".

Testing the communication can be accomplished with a terminal emulation program such as Termite 3.1, found at http://www.compuphase.com/software_termite.htm. (Termite 3.1 is copyrighted software that is free for personal and commercial use. You may use it and distribute it without limitations. You may however not remove or conceal the copyright. There are no guarantees or warranties whatsoever; use it at your own risk.)

Maintenance

Proper care and maintenance of the **VLM1/VLM1B** should be taken as with any sensitive electronic instrument.

There are no user-serviceable parts on the **VLM1/VLM1B**. The +5VDC input on the PWR/COM connector and the Shutter Fuse on SHUTTER connector Pin#1 are resettable.

It is highly recommended that if a problem is suspected with the unit that it be returned to the factory for checkout, proper adjustments, and calibration. Failure to do this may damage the unit's circuitry and/or functionality and will void the factory warranty.

Inspection

Inspect the **VLM1/VLM1B** for damage, wear, and missing parts. If the unit appears to show signs of damage, it 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 on the board.

If there is a significant build-up of dust or other material, follow the cleaning procedure below.

Cleaning Procedure

1. Do not use any tools to brush or scrape away accumulated materials.
2. Do not use any liquids to clean the board.
3. Simply use low-pressure air to blow away any dust or use a lint free cloth.
4. There is no other cleaning required.

Specifications

System Characteristics

Name	Description
VLM1/VLM1B Interface	Allows the FS Series Shutter to be operated from a TTL signal source for user/computer control of an FS shutter
Power Supply Requirements	+5V 0.5A min (USB5 - 1A wall adapter included – VLM1 Only). A USB interface cable (USB A 2.0 to USB Micro B) is included (VLM1 only) for use with the USB5 Power Supply, or it can be connected to a computer to supply power and data. Computer USB must be able to supply a min of 0.5A. (See VLM1/VLM1B schematic in Figure #8.)

External Input Characteristics

Name	Description																		
PULSE INPUT BNC	Active High/Active Low input. On-board jumper selectable. Default - Active Low. (See BNC I/O Active State Selection .) TTL Compatible: Minimum High Level - +2.0VDC Maximum low Level - +0.8VDC Max Trigger Voltage on Input - +10.0VDC																		
Power Requirements PWR/COM	PWR/COM - Micro B Connector - +5VDC 0.5A min (USB5 - 1.0A wall adapter included with the VLM1)																		
USB Requirements PWR/COM	USB 2.0 - Driver should automatically load – Link to driver is supplied (see USB Operation) if computer will not load proper driver required. Two input ASCII commands recognized for shutter open and shutter closed: @ - Open, A - Close. USB - Serial UART Interface protocol settings: Baud Rate 9600, 8 Data bits No Parity, No Flow Control																		
USB Serial Commands	<table><tr><th>Command</th><th>Decimal</th><th>HEX</th><th>Octal</th><th>Binary</th><th>ASCII</th></tr><tr><td>Open</td><td>64</td><td>40</td><td>100</td><td>01000000</td><td>@</td></tr><tr><td>Close</td><td>65</td><td>41</td><td>101</td><td>01000001</td><td>A</td></tr></table>	Command	Decimal	HEX	Octal	Binary	ASCII	Open	64	40	100	01000000	@	Close	65	41	101	01000001	A
Command	Decimal	HEX	Octal	Binary	ASCII														
Open	64	40	100	01000000	@														
Close	65	41	101	01000001	A														

External Output Characteristics

Name	Description
SYNC OUTPUT BNC	74HCT04A Direct Output, ~4.5VDC at 4mA max - V _{OH} SYNC Output operational only with FS shutter equipped with Sync System Active High/Active Low output. On-board jumper selectable. Default - Active High. See BNC I/O Active State Selection .
SHUTTER OUTPUT 5-Pin Pluggable Spring Terminal Connector	Pin #1 - Shutter actuator coil RED wire Pin #2 - Shutter actuator coil BROWN wire (Shutter state switched with internal MOSFET amplifier. +5VDC switched across shutter coil with active TTL signal on PULSE INPUT BNC. See VLM1/VLM1B Schematic in Figure #8, on page #22) Pin #3 - Shutter YELLOW wire - Sync Output Pin #4 - Shutter GREEN wire - Sync Ground Pin #5 - Shutter BLUE wire - Sync +5VDC (Fused with 125mA, Fast Acting Fuse - not serviceable.)

General Characteristics

Name	Description
POWER LED Indicator	GREEN LED illuminates when power is connected.
SYNC Active Indicator	YELLOW LED illuminates when the attached FS Shutter's Sync is active. SYNC Output BNC will be active when the LED is illuminated. FS Shutter used must have the Electronic Synchronization option installed for this LED to operate.
Shutter Active Indicator	A GREEN LED located on the N.C./N.O. push button switch illuminates when the Shutter is in the active state. This button will also illuminate when the push button is depressed and locked in the N.O. position.
Fuse Requirements	No user serviceable fuses. +5VDC on the PWR/COM connector and the SHUTTER output Pin #1 utilize resettable fuses. See Fuse Information .
Operating Temperature	5°C to 40°C (41°F to 104°F)

General Characteristics (cont.)

Storage Temperature	-20°C to 55°C (-4°F to 131°F)
Size (HWD)	VLM1 - 1.39 x 4.50 x 3.69 inches (35.3 x 114.3 x 93.5 mm) VLM1B - 0.59 x 3.42 x 2.73 inches (15.0 x 86.9 x 69.3 mm)
Weight	VLM1 - 5.95 oz (0.169 kg) VLM1B - 2.28 oz (0.065 kg)
Accessories (supplied)	USB5 - 5V, 1A, 5W, AC Power Supply (VLM1 Only) USB Cable - USB A 2.0 to USB Micro B, 6ft. For Power or Computer Connection. (VLM1 Only) Micro Screwdriver - Flat Blade screwdriver for interconnection to 5-Pin spring terminal SHUTTER connection.
Accessories (optional)	710R - Remote hand-held trigger cable for connection to PULSE Input BNC. (Input must be set to active-low.) 710R/F - Remote foot-switch activated trigger cable to PULSE Input BNC. (Input must be set to active-low.) 510FS - 10 Ft (3m) Extension cable, between FS Shutter and the VLM1/VLM1B SHUTTER Connector. FS Shutter utilized must include the "-5M" connector/harness option. See Extending the Shutter Interconnection .

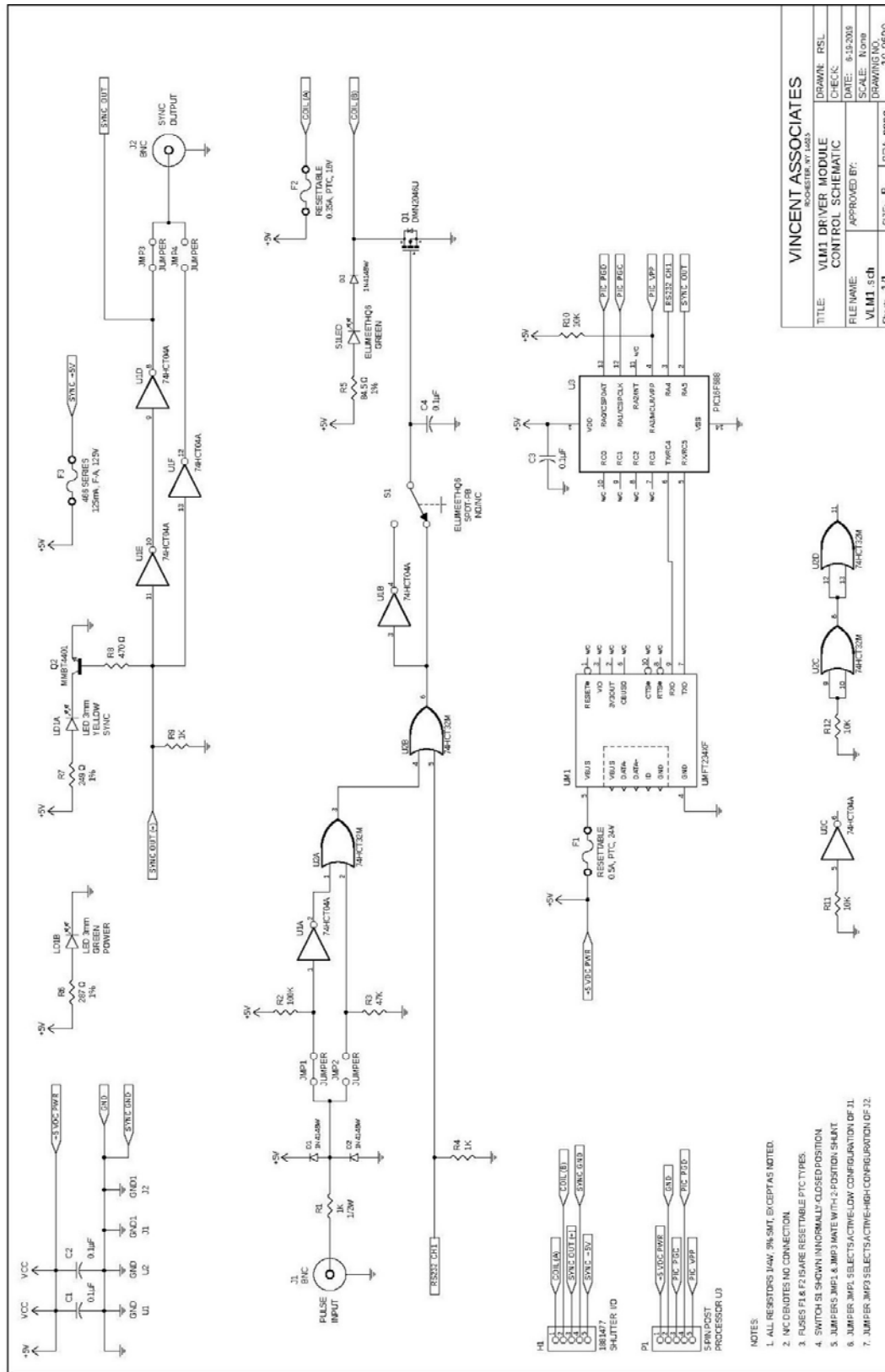


Figure 8: VLM1/VLM1B Schematic Diagram



Notes