UNIBLITZ®
Shutter Systems
1.800.828.6972

User Manual

V880

OEM Multifunctional Shutter Driver

14-0450

Version 1.00

2023

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Revision Table

Version 1.00 – 2023

2/2/23 STP New Driver – Replaces D880C, Operates all Shutters – Rev c

Vincent Associates, a Division of VA, Inc.
803 Linden Ave.
Rochester, NY 14625

Tel: 585-385-5930
Fax: 585-385-6004

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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 work on or near unit while it is connected to the DC power source.
- **Ground the Product** – Before making connections to the input or output terminals of the V880, ensure that the power supply used is properly grounded. **DO NOT DEFEAT THE POWER SUPPLY GROUND CONNECTION USED TO OPERATE THE V880.**
- **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 may 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.*

Introduction

The **V880** is a multi-function OEM drive system available for ***UNIBLITZ*** shutter units. The **V880** replaces the D880C driver in fit, form, and function. The one major difference is that the D880C is a constant current drive while the **V880,** in D880C Emulation Mode, is a constant voltage drive. The advantage of the **V880's** constant voltage drive is that the shutter's actuator coil tends to produce less heat rise. The two additional **V880** modes (10.7V and 18V) are similar to the settings of the VED24 driver and contain some expanded drive pulse durations. Overall, its unique design provides on-board selection to operate all shutter devices within the ***UNIBLITZ*** line of products.

The versatility of the **V880** allows it to operate all apertures in the ***UNIBLITZ*** line. Dwell time is only limited to the shutter's mechanical ability and not to the charge of a capacitor.

The **V880**, as with all our shutter drivers, provides a low voltage output that allows a number of different external triggering methods. This, in addition to the 12-pin pluggable input/output connector, gives the user a distinct benefit when implementing the unit into a specific application. For embedded OEM applications, the 12-pin pluggable header can be removed to reveal a 12-position header on 0.100 centers. The user can then install any connector that can be soldered into that position. Additionally, if there is a need for just the shutter to be connected to the board, a 6-pin Harwin connector is available (near the 12-pin pluggable connector) This will allow connection of the shutter coil and electronic sync. If the shutter is equipped with dual syncs, this connector will allow both to be connected into the drive system. The Sync outputs are provided at the 12-pin pluggable connector at the pins denoted in **Figure #4**. The pin out for the Harwin connector can be found in **Table #5**.

Please read the entire manual carefully and pre-set all of the control switches before attempting to operate the unit.

V880 Features

- Open-frame printed circuit card suitable for OEM applications – same footprint along with added functionality surpasses that of the D880C.
- Operates all ***UNIBLITZ*** shutters that can be configured to operate with a low voltage driver.
- RoHS compliant.
- 12-pin pluggable I/O terminal strip connector for wire termination. For further flexibility, the 12-pin pluggable connector and socket can be removed, and the user can take advantage of an in-line connection utilizing 0.100 on center connector – user provided.
- If required, the shutter, when terminated to a 6-pin Harwin female connector can be plugged into the 6-pin Harwin male receptacle and bypass the 12-pin plug. Power supply and I/O connections (i.e., Trigger - Exposure Pulse and the Sync Outputs) must still be made through the 12-pin pluggable connector.
- The unit is configured with two Sync outputs for shutters equipped with a dual synchronization systems.
- **510P** shutter interconnect cable included. 5-Wire Pigtail to 5-Pin Female Switchcraft Connector – 3M.
- Exposure determined by external pulse source for pulse width determined exposure time. Exposure pulse must be greater than the pulse duration set on the Control Timing Settings – see **Table #3**.
- Operates from user-supplied +24 VDC (1.5A Min) power supply. User can also purchase the optional PS24 Power Supply
- Employs a drive system which is selectable via on-board switches to allow operation with any ***UNIBLITZ*** shutter type that can be configured to operate with a low voltage driver.
- Small size allows the unit to be integrated into many spatially critical OEM applications.
- **V880** Dimensions: 0.75 x 3.25 x 4.0 inches (1.91 x 8.26 x 10.16 cm) HWD. These dimensions do not include TS1. With TS1 in place, Depth (D) increases to 4.55 inches (11.56 cm). See **Figure #4, Page #30.**

Operating Instructions

Operation and Connections

CAUTION

Be sure to observe Electro-Static Discharge (ESD) anti-static unpacking and handling procedures at all times when handling the V880. Improper handling can result in destruction of the CMOS integrated circuits located on the board surface.

The **V880** provides the circuitry necessary to efficiently drive any ***UNIBLITZ*** shutter device. By selecting the proper switch settings (**see Tables #1, #2, and #3**) and providing the unit with the correct initiating control signal, the shutter can be made to open and close on command. The circuitry is designed to provide ***UNIBLITZ*** shutters a lifetime that can be up to five times more than the standard capacitive discharge type.

Prior to the connection of input/output signals to the **V880,** remove the pluggable I/O connector (TS1) from the printed circuit board unit and set printed circuit board unit aside. The TS1 connector can be removed by grasping hold of both sides and pulling it away from the printed circuit board. A slight rocking motion from side to side will aid in the plug's removal. Make all connections to TS1 connector plug prior to mating it with the printed circuit board unit.

Typical connections will include a +24 VDC power supply and the user specified shutter unit. Additional connections will be determined by the type of triggering needed for your particular application. See **Figure #1** to determine your particular controlling method.

Reference **Figures #2 and #3**, respectively, for proper connections to **V880**.

Power Supply Connection

Connect the power supply as follows:

CAUTION	***Failure to connect the power supply properly will result in damage to the V880 and/or power supply.***

1. Connect the (+) positive wire of the power supply to PIN #1 of TS1.
2. Connect the (-) return wire of the power supply to PIN #2 of TS1.

Triggering Methods

Determine the method of triggering to be used. Please refer to **Figure #2**, This drawing illustrates three typical methods of triggering the **V880**.

- **Simple Switch Contact Closure**: Connect a switch or relay contact as shown in **Figure #2**. The shutter will open and remain open for as long as the switch is in the closed position.
- **External Pulse Source**: A pulse source can be provided from:
  - Pulse generator
  - Single bit from a computer parallel port
  - Any equivalent pulse sources.

  A common ground or signal return connection must be maintained.

  By connecting a pulse source as shown in **Figure #2**, the shutter will remain open as long as the pulse remains in the high state. When using this method of control, be sure to note the Minimum Exposure Time (MET) of the shutter. If the pulse width input is less than the MET, the shutter may only open partially or not at all. This is true for all triggering methods. Be advised, this driver uses a PIC type microprocessor to derive the minimum pulse widths. Therefore, the minimum trigger input pulse width must be greater than the pulse setting selected for proper operation.
- **Transistor Switch Closure:** Similar to the mechanical switch closure, the exception is that the correct polarity must be maintained, and all grounds must be common. When using the NPN type or an equivalent type of transistor shown, such as an opto-isolator, the collector lead of the transistor must be connected to the +5.0VDC (PIN 4) of the **V880** and the emitter lead must be connected to the trigger input (PIN 10). Also be sure that the driving circuit ground is connected to the ground (PIN 11) of the **V880**. If using an equivalent transistor type the maximum input current is 1 mA.

Start Up

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

After the initial inspection the unit is ready to use. To properly install and power on the **V880,** perform this procedure. ***First see Operation and Connection on **Page #9***. Then proceed to the Start Up instructions below:

1. ***Without a Power Connection*** be sure that the Function Switches are set and selected for the shutter to be used. Changing switch positions while powered (other than the Control Timing Selections – using the Rotary Knob or Hex Switch S1 – can causse irreparable damage to the device. See **Table #1** for the switch settings based on the shutter to be used with the controller.
    a. You will note that there are 14 (Uni-stable) devices (with the exception of the NS25S) that can be set to either the D880C (emulation) Mode or the VED24 Mode. The shutters will operate somewhat differently in each of these modes. In the D880C Mode the Peak current (at cold coil) is limited to 1.2A, in the VED24 Mode the peak current is set by the 18V power supply connection and will provide a Peak current (at 12 ohm cold coil) of 1.5A. This Peak current will be set for a duration selected by the Time Select and Pulse Duration switches. FYI, the higher peak current (in the VED24 Mode) will allow the shutter to operate at faster open times. Although the D880C Mode will operate the shutter slightly slower. If fast speed is not required, the D880C Mode should provide a longer lifetime. The "E" damp modification for the shutter is required for either the D880C Mode or the VED24 Mode. Please note the 10.7V VED24 Mode is not recommended for uni-stable shutter devices.
2. Now connect the 12-Pin Pluggable connector to the **V880**. The connector can only be inserted in one direction into the socket and the connection requires a bit of force to reconnect. If it is possible to have the power supply, that is supplying the +24VDC to the device, in the off position when reconnecting the 12-pin terminal strip, this would also be highly recommended.
3. Please check all connections and switch settings prior to powering on your power supply.
4. The device is now ready to accept signals to operate shutter connected. *****PLEASE NOTE, IN ORDER TO HAVE THE ON-BOARD PROCESSOR RESPOND (AND OPERATE THE SHUTTER), THE EXPOSURE PULSE INPUT TO THE DEVICE MUST BE GREATER IN DURATION THAN THE "CONTROL TIMING SELECTION" SELECTED.*****
    a. For example, if you have selected Range #1 on Switch S4-3 and #5 on the Rotary Select Switch S1, the Exposure Pulse sent to the controller must be greater than 10msec.

Initial Operation and Testing

The **V880** will operate from a supplied +24 VDC power supply.

CAUTION	*Be sure to connect the power to the **V880** once all switch settings have been completed. Power should be disconnected when connecting wires or changing select switches.*

See **Start Up** section for connection to power source. Connect the wires from the **510P** cable (included with the controller) to the 12-pin pluggable connector as per the connection diagram on **Figure #4.** Connect the 5-pin female connector of the **510P** shutter interconnect cable to 5-pin male connector on shutter to be driven or use the proper optional adapter to interconnect to your shutter.

Be sure the power to the **V880** has been removed. Set the FUNCTION OPERATOR CONTROL switches for the intended shutter. The following tables to be set based on the shutter series model you intend to use with the **V880**. see **Tables #1, #2, and #3** on **Pages #17 and #18**.

Once the switch settings are complete and power is returned to the board, the **GREEN POWER LED – LD4** – will illuminate. Place an input signal into the PULSE INPUT, Pin #10 (on the 12-pin pluggable connector) The active state of this signal is selectable. This active state can be active high or active low depending on switch positions of S2-1. The shutter will open and remain open until the signal is removed. When a trigger signal is present, the **GREEN DRIVER LED – LD3** – will illuminate. When the signal is removed, the DRIVER LED will extinguish. The operation of the shutter assumes that the FUNCTION switches are configured for the proper shutter used; Uni-stable or Bi-stable. See **Table #1 - #3** for shutter switch settings.

The **V880** driver provides the circuitry necessary to support shutters equipped with the electronic synchronization option. If your shutter is equipped with this option, the **YELLOW SYNC LED – LD1** will illuminate when the shutter changes to the open position. In addition, the SYNC OUTPUT Pin #12 (on the 12-pin pluggable connector) will change to the active state when the shutter is open. (This active state can be active high or active low depending on switch positions of S2B.) The absence of the electronic synchronization option on the shutter will only inhibit the operation of the SYNC output and SYNC LED. The remainder of the **V880** systems will not be affected.

Should the shutter and/or driver not respond as described previously indicated, be sure the DC power is active. The **GREEN POWER LED – LD4** will illuminate with the presence of the +24VDC. A voltmeter can also be used to determine if +24VDC is present on the 12-pin pluggable terminal Pin #1 with respect to the GND or Return Pin #2. Be sure that the Input Exposure Trigger pulse has a greater duration than the drive Control Timing Selection setting. There are also two replaceable fuses on board. One fuse interrupts the power (F1) and one interrupts the power to the shutter coil (F2). The best method to determine if the fuses may be blown is to **FIRST REMOVE THE POWER FROM THE DRIVER** and check the fuse's resistance. A very high resistance usually indicates that the fuse is blown and requires replacement (see **Fuse Replacement – Pages #14 and #15**), a low (or 0 ohm) resistance indicates the fuse is good. Be advised, removing the fuse prior to checking it with an Ohm Meter

is a more accurate check. Both Syncs (Sync #1 and Sync #2) can be disabled by switch S4-4. Both Syncs will either be enabled or disabled – you cannot disable them individually.

Additionally, particular shutter units respond to different minimum pulse widths. For example, a standard DSS35B shutter (equipped with Teflon blades) has a minimum exposure pulse of 45 msec. If the exposure or pulse width presented to the **V880's** Exposure Trigger pulse is less than 45 msec, the shutter may not open fully. If the unit still does not operate properly when the proper pulse width is presented to the PULSE INPUT (TS1, Pin #10), please notify Vincent Associates

Fuse Replacement

CAUTION

*Remove the power from **V880** before performing any fuse replacement on the unit. There are only two user replaceable fuses located on the **V880** device.*

There are two user replaceable fuses on the **V880** driver. One protects the Power input, and one protects the Shutter output. Replacements can be purchased from a component supplier.

1. Power Fuse F1, 2A Time Delay – Littelfuse #454002.0 (or equivalent).
2. Shutter Fuse F2, 1A Time Delay – Littelfuse #454001.0 (or equivalent).

Please follow the procedure in **Figure #1** to remove and inset new fuses into the F1 or F2 fuse holders. Use a small flat (non-serrated) Needle Nose plier.

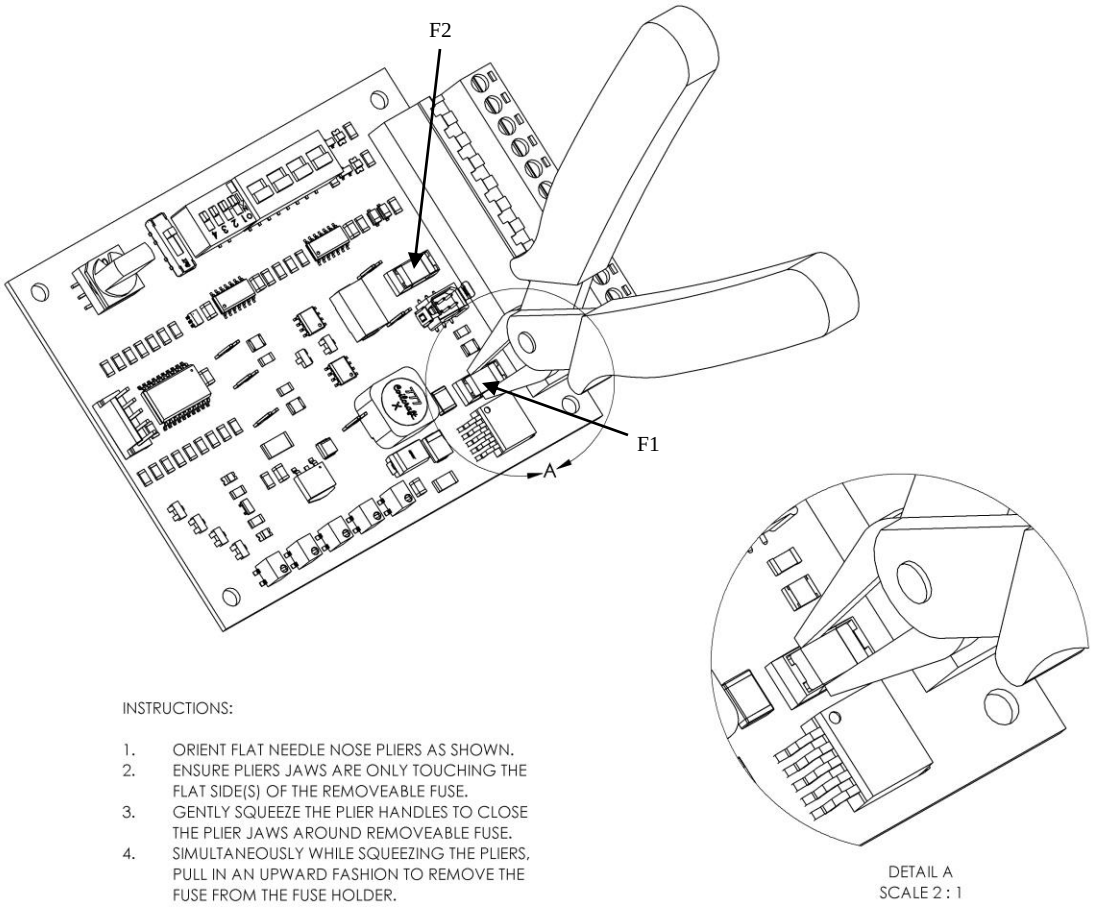

Figure 1: Fuse Locations and Removal

These are the instructions listed in **Figure #1** `to remove the fuse from the surface mount fuse holder. When re-installing the replacement fuse it is preferable to use your fingers to gently re-install the fuse.

1. Orient flat needle nose pliers as shown in Figure #1
2. Ensure pliers jaws are only touching the flat side(s) of the removable fuse
3. Gently squeeze the plier handles to close the plier jaws around the removable fuse
4. Simultaneously, while squeezing the pliers, pull in an upward fashion to remove the fuse from the fuse holder.
5. Replace with a new fuse using your fingers. Gently push the replacement fuse into the fuse holder.

See **Figure #3** for the **V880** driver's Fuse, LED, connector, and control switches drawing.

V880 Operating Modes

The modes of the **V880** are similar to the VED24, however, the **V880** has expanded timing ranges to operate all shutters and to also emulate and replace D880C controllers in existing applications. The D880C emulation mode uses constant voltage in place of constant current to reduce the heating of the shutter coil in some applications. The following modes are controlled by S3, three position Mode Switch. See **Tables #1, #2, and #3** along with **Figures #3 and #4**.

CAUTION

*Remove the power from **V880** before changing the position on switch S3 to prevent damage to onboard circuits and/or possibly causing a fault to the supply fuse.*

18V VED Mode – This mode is similar to the VED24 driver. This mode to be selected for all Uni-stable shutters and the Bi-stable, NS65. This Mode sets the **V880** power supply to a peak shutter operational voltage of +18.0V. Each shutter will have duration selection set by Switches S4-3 (Selectable between Timing Range #1 and #2) and the Pulse Duration Rotary Switch. This provides 32 timing selection, 16 per each Range. See **Tables 1-3**.

HCA (D880C Mode) – This is the D880C Emulation mode. Power supply in this mode is set to +18VDC. The Peak Current in this mode is preset to 1.2A into a 12 ohm load. The hold current is preset to 0.3A and the circuit will switch to this level at the conclusion of the peak current duration. The Peak Current Duration is set by Switches S4-3 (Selectable between Timing Range #1 and #2) and the Pulse Duration Rotary Switch. This provides 32 timing selection, 16 per each Range. See **Tables 1-3**.

10.7V VED Mode – This mode is similar to the VED24 driver. This mode to be selected for all Bi-stable shutters, including the TS2B and the ES6B. The exception is for the NS65, for the NS65, please select the 18V Mode. This Mode sets the **V880** power supply to a peak shutter operational output voltage of +10.7V. Each shutter will have duration selection set by Switches S4-3 (Selectable between Timing Range #1 and #2) and the Pulse Duration Rotary Switch. This provides 32 timing selection, 16 per each Range. See **Tables 1-3**.

V880 Function Operator Controls

Please see the **Tables #1 - #3** below for recommended Function & Octal switch settings to provide device status and timing values for all available shutter series. ***Please remove power before making switch changes.***

Shutter Series	18V/HCA/10.7 Mode Switch Switch S3 18V= (VED Mode) HCA= (D880C Mode) 10.7V= (VED Mode)		Bi-Stable/ Uni-stable Switch S4-1 B=Bi-Stable U=Uni-Stable	Uni-stable Return Enable Switch S4-2 E=Enable D=Disable	Time Select Range #1/#2 Switch S4-3 1=Time Range #1 2=Time Range #2		Pulse Duration Rotary Switch Switch S1 Range 1-9, A-F		Sync Enable Switch S4-4 E=Enable D=Disable (Sync#1/Sync#2)
ES6B	10.7V		B	D	1		5		X
DSS10	10.7V		B	D	1		7		X
DSS20	10.7V		B	D	1		8		X
DSS25	10.7V		B	D	1		F		X
DSS35	10.7V		B	D	2		1		X
NS15B	10.7V		B	D	1		7		X
NS25B	10.7V		B	D	1		7		X
NS35B	10.7V		B	D	1		D		X
NS45B	10.7V		B	D	1		B		X
NS65B	18V		B	D	2		6		X
NS25S	10.7V		U	E	1		D		X
	D880C Mode	VED24 Mode			D880C Mode	VED24 Mode	D880C Mode	VED24 Mode	
VS14	HCA	18V	U	D	1	1	4	5	X
VS25	HCA	18V	U	D	1	1	6	7	X
VS35	HCA	18V	U	D	1	1	F	D	X
LS2	HCA	18V	U	D	1	1	0	0	X
LS3	HCA	18V	U	D	1	1	1	0	X
LS6	HCA	18V	U	D	1	1	1	2	X
CS25	HCA	18V	U	D	1	1	6	7	X
CS35	HCA	18V	U	D	1	1	F	B	X
CS45	HCA	18V	U	D	2	1	3	D	X
CS65H	HCA	18V	U	D	2	2	5	5	X
CS90H	HCA	18V	U	D	2	2	A	7	X
XRS6	HCA	18V	U	D	1	1	7	5	X
XRS14	HCA	18V	U	D	1	1	E	D	X
XRS25	HCA	18V	U	D	1	1	D	B	X

X=Don't Care

Table 1: Function & Hexadecimal Switch settings for Available Shutter Series

V880 Function Operator Controls (cont.)

Exposure Pulse Input	Primary Sync Output	Secondary Sync Output	Terminal Pin #9 Status
Switch S2-1	Switch S2-2	Switch S2-3	Switch S2-4
Pulse Input	Primary Sync (PRI.)	Secondary Sync (SEC.)	
P-I = Active High	S-O = Active High	S-O = Active High	SYNC2 = Sync #2 Output
A-L = Active Low	A-L = Active Low	A-L = Active Low	G = Ground

Table 2: V880 Control Logic Setting Selections

Hex Switch (S1) S1 Knob Setting	Time Range #1 (msec)	Time Range #2 (msec)
0	3	40
1	4	45
2	5	50
3	6	55
4	8	60
5	10	65
6	12	70
7	15	75
8	18	80
9	20	85
A	22	90
B	25	95
C	28	100
D	30	110
E	33	120
F	35	130

Table 3: V880 Control Timing Setting Selections (Hexadecimal Rotary Switch)

Miscellaneous

Repeat Exposures

The repeat exposure specification listed in this manual is limited by the type of shutter used. At higher frequencies (above 10 Hz) heat can build up in the shutter coil especially if the shutter is subject to limited air flow. This can cause premature shutter failure. Additionally, the exposure pulse input to the controller must be greater than the Control Timing Setting. Also, the time between exposures must be greater than the Control Timing setting as well.

Please contact the factory for specific information concerning shutter modifications and/or drive modifications that may be necessary to operate shutters at their maximum frequency. Note that the shutter output is fuse protected by on board fuse, **F2**. See **Page #14** for more information.

CAUTION

Please note that the V880 drive unit is capable of driving only one shutter. Attempting to drive multiple shutters will damage the V880 drive unit and/or shutter. This can also overload the power and/or the shutters may not operate to published specifications.

Multiple Simultaneous Shutter Operation

Under certain circumstances multiple **V880** drive units can be operated from one power supply. If the user's requirements do not necessitate shutters to open simultaneously, two drivers may be operated from one supply. It would be advisable to discuss the particular application with one of our technical support representatives.

Synchronization

The **V880** can be used to operate the Electronic Synchronization system if the Electronic Sync option is available with the selected shutter. The Electronic Sync will provide a signal directly from the shutter mechanism through the **V880** controller. Please see **Figure 3**.

When the shutter opens to 80% of full aperture the electronic Sync Output (Pin 12) will provide > 3.5VDC with the shutter in the open position (Logic 1), and < 0.5VDC with the shutter closed (Logic 0).

A unique feature of the **V880,** either a standard shutter with a single Sync or a shutter equipped with a dual electronic Sync (presently, a specialized version of the DSS10B), can be interfaced through the on-board 6-pin Harwin connector, H1. See more information on this on **Page #17**. Please note the power supply and the trigger signals will still need to be connected through (TS1) the 12-pin removable pluggable I/O connector (P1). The Sync outputs will also be connected through TS1. When Sync #2 is active, LED – LD2 will illuminate ORANGE.

External Low Voltage Power Supply Input (Optional)

The **V880** derives its shutter voltages from an external +24VDC power supply via an on-board step-down switching regulator operating at 150KHz.

Model 510P Cable Layout

The table below shows the layout of the **510P** cable supplied with the **V880**. There is also a reference to the pin-out of the WirePro 7-Pin connector. (For the 710P cable, all wire colors are the same, the exceptions, the White wire (C) connects to TS1 Pin#3 and the Orange wire (E) connects to TS1 Pin #5.)

5-Pin Switchcraft Female Connector	Function	510P Wire Color	V880 Pin Number	Wire Pro 7-Pin Number (Ref)
1	Shutter Coil	Red	7	A
2	Shutter Coil	Black	8	B
N/C	Sync Control (RES)	N/C	3	C
4	Ground (circuit)	Green	6	D
5	Sync Out +	Yellow	5	E
3	+5.0VDC	Blue	4	F
N/C	Not Used	Drain	9	H

Table 4: 510P Cable Layout for the V880

Harwin H1 Connector Pin out

The table below shows the layout for the optional H1 male connector. The female mating plug would be connected to the shutter. This connector is used if the customer wishes to have the shutter connected to the **V880** independent of the TS1 connector. This could allow for a quick disconnect, if necessary. It also has the capability to flow through the output of a secondary Sync (SYNC2) if the shutter is so equipped. This allows dual Sync output from the connected shutter to be connected to the **V880** Sync input circuits, and the Sync outputs to be routed through TS1.

6-Pin Harwin Male Connector	Function	Wire Color
1	Shutter Coil	Red
2	Shutter Coil	Black
3	+5.0VDC	Blue
4	Ground (+5.0V Return)	Green
5	Sync1 Out +	Yellow
6	Sync2 Out +	White

Table 5: 6-Pin Harwin Connector Layout

Maintenance

CAUTION

Be sure to observe Electro-Static Discharge (ESD) anti-static unpacking and handling procedures at all times when handling the V880. Improper handling can result in destruction of the integrated circuits located on the board surface.

There are no user-serviceable parts on the **V880,** with the exception of the fuse replacement. See **Page #14**.

Observe proper handling, static protocol, and care and maintenance of the **V880**. It is a sensitive electronic instrument. Do not switch any switches (with the exception of the timing selection – S1) without first removing the power. Failure to observe this could result in damage to VR1, the Step Down Switching Regulator.

Although the stability of the drive voltage is checked and calibrated prior to shipment, it may become necessary to make some minor adjustments to the operating systems of the **V880** over time.

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.

NOTES

Specifications

V880 System Characteristics

Name	Description
Repeat Exposure	Minimum time between exposures is determined by shutter used and drive pulses selected
Shutter Drive	• Continuously variable exposure frequency from DC to the shutter's maximum rate. • Drive pulses for all shutters derived from on-board PIC processor and selected by on-board switches and Hexadecimal rotary switch • Bi-stable driver – H-Bridge Control. +18.0V and +10.7V, devices such as ES, DSS, and NS series devices. Drive system similar to the VED24. • Uni-stable driver – ½ H-Bridge. +18.0 V for CS, LS, VS, and XRS series devices. Drive system similar to the VED24. • D880C Emulation Mode – Constant voltage drive system which emulates the Uni-stable D880C driver. High current – 1.2A, Hold current – 300mA. Peak current duration selected by on-board switches and Hexadecimal rotary switch.
Power Supply	• +24 VDC regulated ±2% • 1.5 A, minimum • User Supplied or Purchase Optional PS24

V880 External Input/Output Characteristics - TS1 Connector

Name	TS1	Function	Description
Signal Input (Exposure Control)	10	Input impedance	4.7K ohms
		Max. input voltage	+20 VDC (100% duty cycle).
		Min input voltage necessary to ensure triggering	+1.5 VDC
		Nominal input trigger voltage	+5 VDC logic signal (TTL or CMOS)
		Min pulse width	Determined by shutter used
		Max. pulse width	Determined by exposure time desired
		Input signals	Can be provided from most pulse sources or from mechanical/electronic switch contact closures, see Figure #2, Page 29
Power Requirements	1	Operating a shutter to max frequency response (determined by shutter used).	+24 VDC/1.5 ADC Min
		Single exposures or for low frequency requirements	1.5 ADC/50ms
Electronic Sync #2 Output, LED – LD2, Illuminates ORANGE when active. Default is (G) Ground position	9	Electronic Sync #2 Output or Ground Switch selected Ground or Sync Out #2 Selected by Switch S2-4	Provides output for shutter equipped with second electronic sync system • <0.5 VDC when the shutter is deactivated • >3.5 VDC when shutter is activated • Active-high or active low selection by Selection Switch S2-3
Sync Control	5	Electronic Synchronization System	Connects to detector of shutter's synchronization sensor (if so equipped).

V880 External Input/Output Characteristics - TS1 Connector (cont.)

Name	Pin	Function	Description
Shutter Output	7	Shutter (A) Send	Shutter drive output follows input exposure signal.
	8	Shutter (B) Return	Shutter drive output return will follow input exposure signal
Low Voltage Supply Output	4	Remote switching/external Sync circuit bias	+5.0VDC at 50mA available to the user for use in remote switching into signal input and for external Sync circuit biasing. Fuse protected – 125mA max – non-replaceable
Electronic Sync #1 Output, LED - LD1 Illuminates YELLOW when Active	12	Output for shutter equipped with electronic sync	Provides output for shutter equipped with a single, primary, electronic sync. System. • <0.5VDC when the shutter is deactivated • >3.5VDC when the shutter is activated. • Active-high or active-low selection by Selection Switch S2-2.
Sync Control	3	Electronic Synchronization System	75Ω Resistor source connection for IR Sync Systems. Connects to emitter of shutter's synchronization sensor (if so equipped)

Sync and Shutter connections can also be made through 6-Pin Harwin Connector for a convenient method to disconnect the shutter only. The Harwin connector also allows input for shutters equipped with dual Electronic Syncs.

V880 General Characteristics

Name	Description
Input/Output Connector	12 pole in-line pluggable terminal strip, TS1. Wire size - 12AWG max
TS1 Connections	• Pin 1 Input +24 VDC (Regulated/1.5A Min) • Pin 2 Passive Power Ground • Pin 3 Output Sync Resistor (75Ω) • Pin 4 Output +5.0VDC (Regulated); Blue wire 510P • Pin 5 Input Sync control; Yellow wire of 510P • Pin 6 Passive Sync Ground; Green wire of 510P • Pin 7 Output Shutter (A); Red wire of 510P • Pin 8 Output Shutter (B); Black wire of 510P • Pin 9 Passive Ground when switch S2-4 in G position • Pin 9 Output Electronic Sync#2 output when switch S2-4 in the SYNC 2 position • Pin 10 Input Trigger (Exposure) input • Pin 11 Passive Signal Return Ground • Pin 12 Output Electronic Sync#1 output Notes: 1. TS1 connections: Proper switch selection must be made for proper shutter operation. Please see Tables #2 through #3 showing switch connections for shutter used 2. Pins 3,4,5,6: Used only when shutter is equipped with electronic sync. 3. Pin 9: Used for shutter frame grounding or Sync #2 output - switch selectable. 4. Pin 12: Active-high or active-low output when electronic sync is activated, switch selectable. 5. Pin 10: Trigger input: Minimum voltage 1.5 VDC, maximum voltage 20 VDC, active-high/active low - switch selectable. 6. TS1 plug is removable.

V880 General Characteristics (cont'd)

Name	Description
PULSE DURATION Select	16-position hexadecimal switch allows selection of a number of pre-programmed open / close pulse durations in units of msec. • Two sets of timing pulses are available depending on the setting of switch S4-3. • For Pulse Duration Switch Locations, see Figure #3 on page #29 and Table #3 on pages #17 and #18.
Fuse Requirements	Only two serviceable fuses, F1 and F2. See Figure #1 and replacement procedure on pages #14 and #15. Recommended Replacement Fuses: Power Fuse F1, 2A Time Delay – Littelfuse #454002.0 (or equivalent). Shutter Fuse F2, 1A Time Delay – Littelfuse #454001.0 (or equivalent)
Operating Temperature	5° C to 40° C (41° F to 104° F)
Storage Temperature	-20° C to 55° C (-4° F to 131° F)
Size (HWD) Dimensions with TS1 installed	0.75 x 3.25 x 4.55 inches 1.91 x 8.26 x 11.56 cm
Weight	2.6 oz. (.074 kg)
Supplied Accessories	User's Manual (Driver Files) on USB Flash Drive. **510P** Shutter interconnect cable, 5-wire Pigtail to 5-pin female SWC, 3 meters. See Table #4 on page #20 and Figure #4 on page #30 for proper connection to TS1.
Optional Accessories	**PS24** +24 VDC, 40W UL/CE Power Supply, 100 – 240 VAC, 50/60 Hz. **701A-S5** Adapter for shutters used equipped with a 7-Pin Male Wire-Pro Connector

V880 Drawings and Diagrams

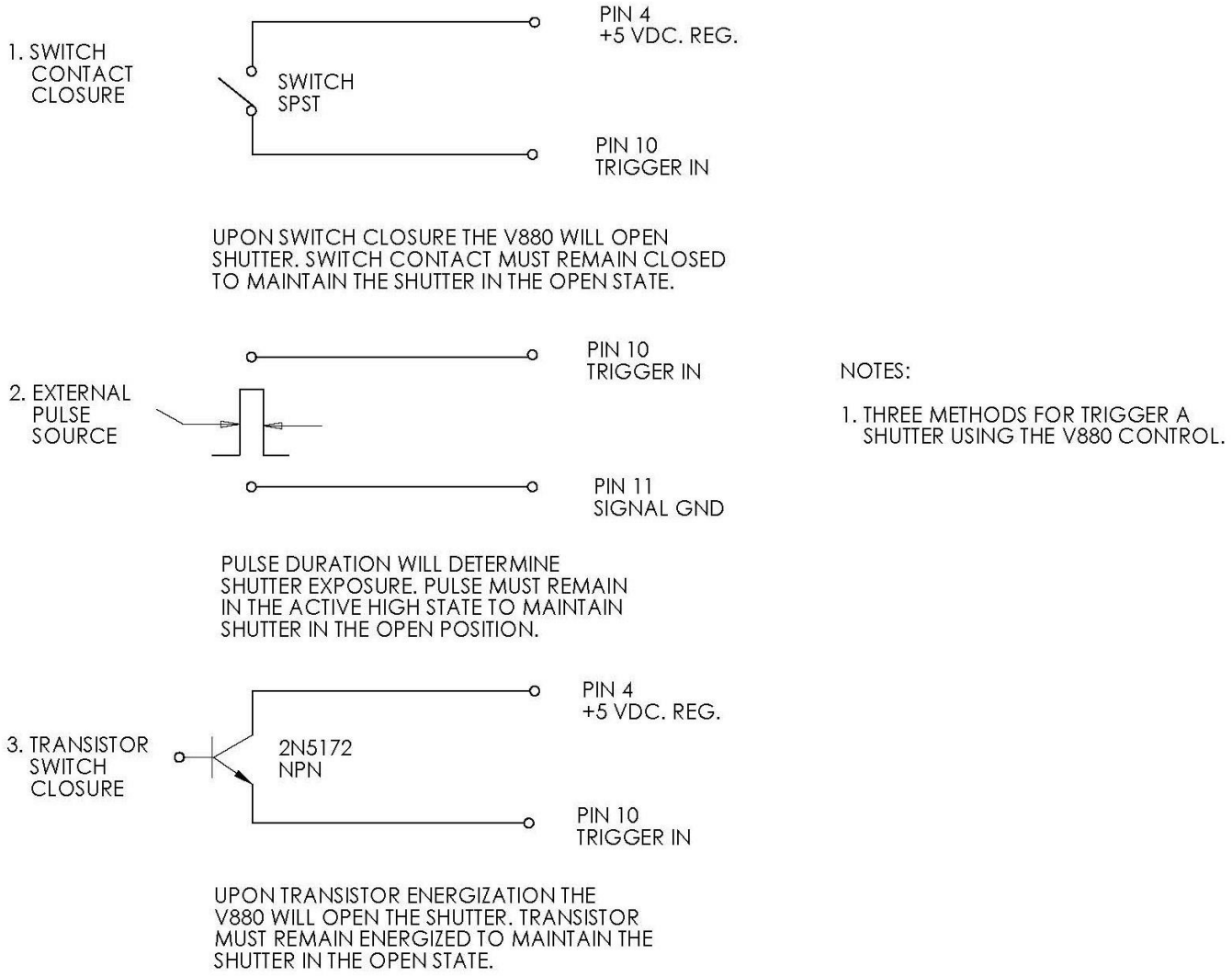

Figure 2: V880 Control Input Diagram Options

All of the triggering methods in **Figure #2** assume an Active High input on TS1 Pin #10. This is set by switch position of S2-1. S2-1 select switch must be set to the P-I setting. See **Table #1** found on **Page #17**.

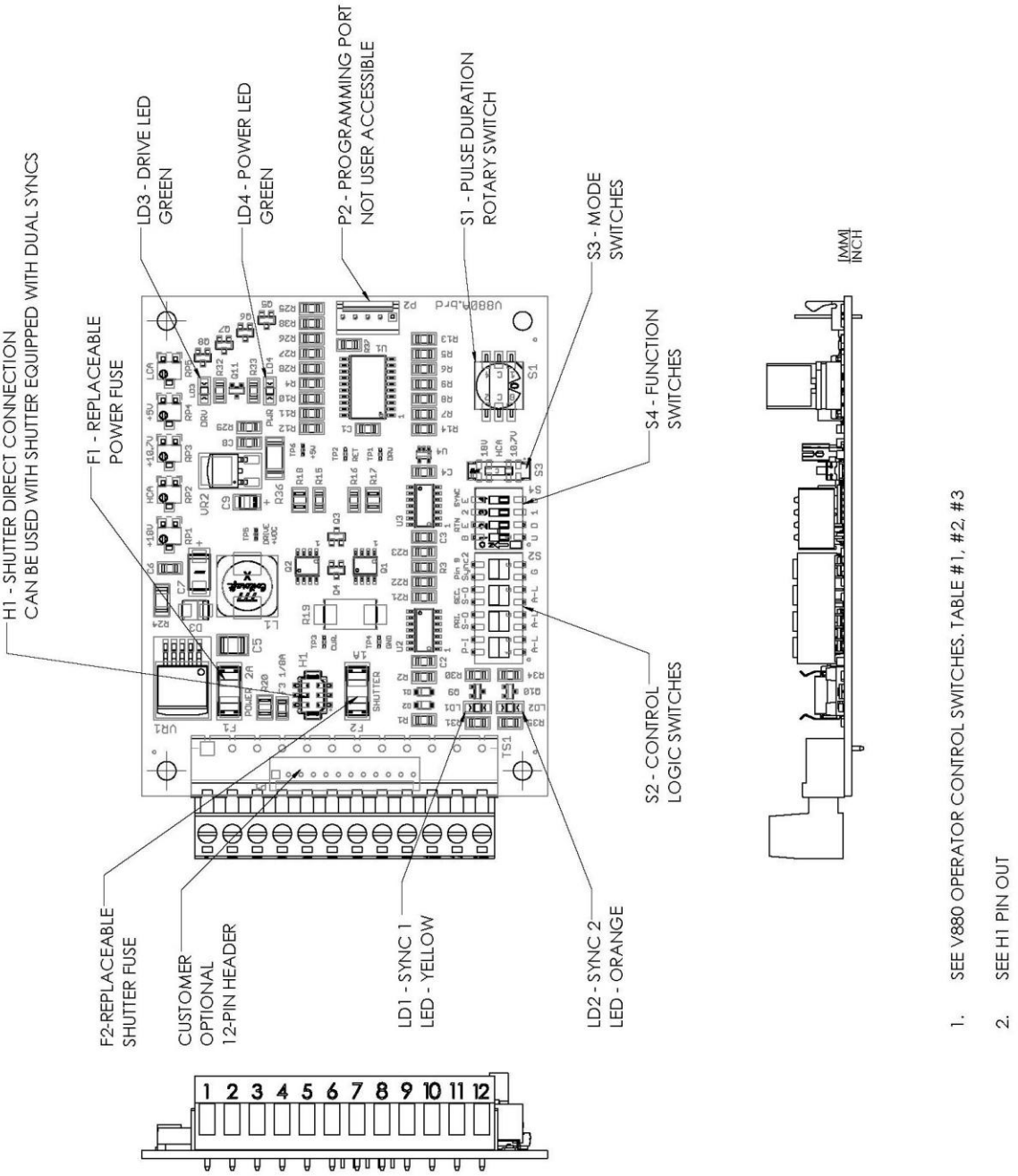

Figure 3: V880 Jumper/Connection Location and Layout Drawing

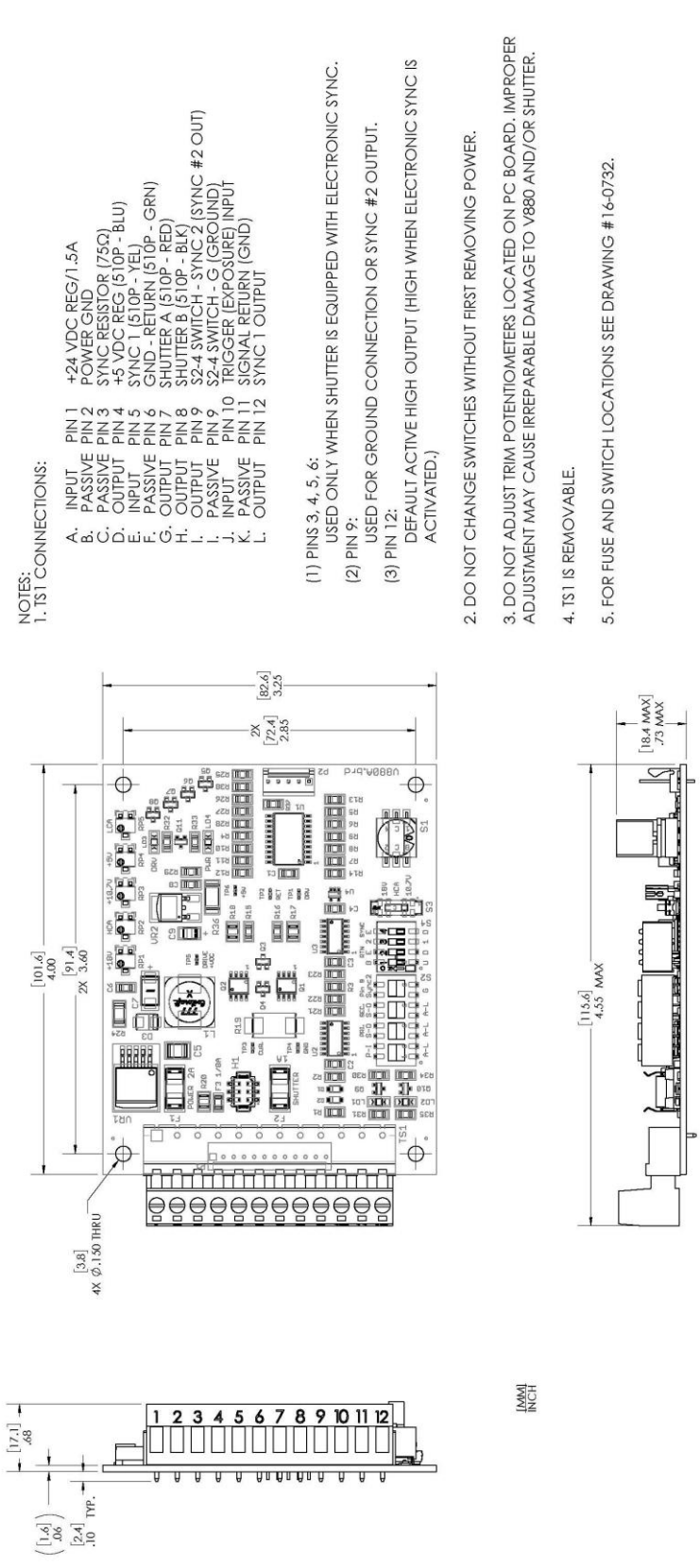

Figure 4: V880 Printed Circuit Board Outline and Connection Drawing