

SDI 3G/HD/SD Distribution Amplifier

Rev E

Part Number

13-111-102-B (1x2)

13-111-104-B (1x4)

83-211-102-B (Dual 1x2)

83-211-104-B (Dual 1x4)

83-411-102-B (Quad 1x2)

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83-Series Product Part Number

13_{or}83 - X 1 1 - 1 X X - B

Number Of Channels

- 1: Single
- 2: Dual (Two DA's in One Brick)
- 4: Quad (Four DA's in One Brick)

DA Configuration

- | | |
|---------|----------|
| 02: 1x2 | 12: 1x12 |
| 04: 1x4 | 16: 1x16 |
| 08: 1x8 | |

Two Year Limited Warranty

All Video Accessory Corporation (VAC) products have a full two year limited warranty. Exclusions to the warranty include but are not limited to damage to external components, power LED failure where the product continues to function, and electrical damage due to lightning. The warranty shall be void if any alteration or repair of a VAC product is attempted by anyone not authorized by VAC. This warranty is expressly in lieu of all other warranties express or implied, including warranties of merchantability and fitness for use, and of all other obligations or liabilities on the part of VAC, and it neither assumes nor authorizes any other person to assume for it any liability in connection with the sale of this product. This warranty shall not apply to the product or any part thereof subjected to accident, negligence, alteration, abuse, or misuse. No warranty whatsoever is made with respect to accessories or parts supplied by anyone other than VAC, and this warranty shall extend only to the original purchaser of this product. The warranty provided in this article is exclusive and in lieu of, and buyer hereby waives, all other remedies, express or implied, arising by law or otherwise, including consequential damages, whether or not occasioned by negligence of VAC. This warranty shall not be extended, altered or varied except by written instrument signed by VAC and buyer, and shall only apply within the boundaries of the continental United States. Liability of VAC is limited to repair or replacement at the option of VAC. Warranty work is to be sent to VAC. Freight charges will be the responsibility of the purchaser.

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Document History

<u>REV</u>	<u>Date</u>	<u>Action</u>
A	Aug. 8, 2020	REV B DA initial release

1 Overview

The 13 and 83 Series Serial Digital Interface (SDI) 3G/HD/SD Distribution Amplifiers (DA's) included in this manual provide a way of distributing one SDI signal to two or four other devices. Dual and Quad DA's provide a way of distributing two or four SDI signals to two other devices for each SDI input. Each SDI input features adaptive cable equalization and re-clocking of data rates from 125Mbps to 2.97Gbps. The following SDI formats are supported:

Type	Standard	Rate	Range ¹
Standard Definition (SD-SDI)	SMPTE259M	270/360Mbps	400 meters
High Definition (HD-SDI)	SMPTE292M	1.5485Gbps	200 meters
High Definition (3G-SDI)	SMPTE242M	2.97Gbps	120 meters

Table 1: SMPTE Standard, Rate, and Range

The 13 & 83 Series units automatically detect the incoming serial data stream and suppress accumulated jitter by retiming to the recovered phase-locked data rate. All outputs cable drivers incorporate selectable slew rate control. SDI input and output connections are via high speed BNC connectors. The use of high quality connectors and cable (Belden 1694A or equivalent) is highly recommended to achieve optimum performance.

Universal Serial Bus (USB) port/interface (multiple) provides the unit maintenance interface. This permits the user to view and change the default configuration parameters, select specific inputs for system debug, and upgrade firmware. Internal non-volatile memory is used to hold the power up default settings.

The power connector is a 4 pin 3.5mm on-center header (Phoenix Contact #1897267) and mating power plug (Phoenix Contact #1847071) with screw flanges for vibration and shock resistance. External power source is isolated from the internal power and will operate correctly from 12-24 VAC or 10-34 VDC.

2 Status LED

A bi-color LED (green/yellow for each input channel) provides power and operational status. At power-on and during unit power on self-test: status LEDs will illuminate with both LEDs active. After self-test the LEDs momentarily turn OFF, followed by LEDs providing an indication of signal presence. Green indicates signal presence, Amber indicates no-signal. Dual and Quad units incorporate a LED per channel.

3 Power Requirements

This unit has an internal switching supply that isolates supply power from the internal power. The units will operate correctly from 12-24 VAC or 10-34 VDC. Units are equipped with full wave rectification on the power front end, so power may be applied to Pin 1 & 2 using either polarity.



- Pin 1** Power IN1 (Supply Connection +V)
- Pin 2** Power IN2 (Supply Connection -V)
- Pin 3** AGND/Circuit Ground (**Same as SDI BNC Shields**)
- Pin 4** CGND/Chassis Ground (Ground for ESD Protection)

Figure 1

¹ Maximum length/range using Belden 1694A Cable per SD/HD SDI equalizer specification.

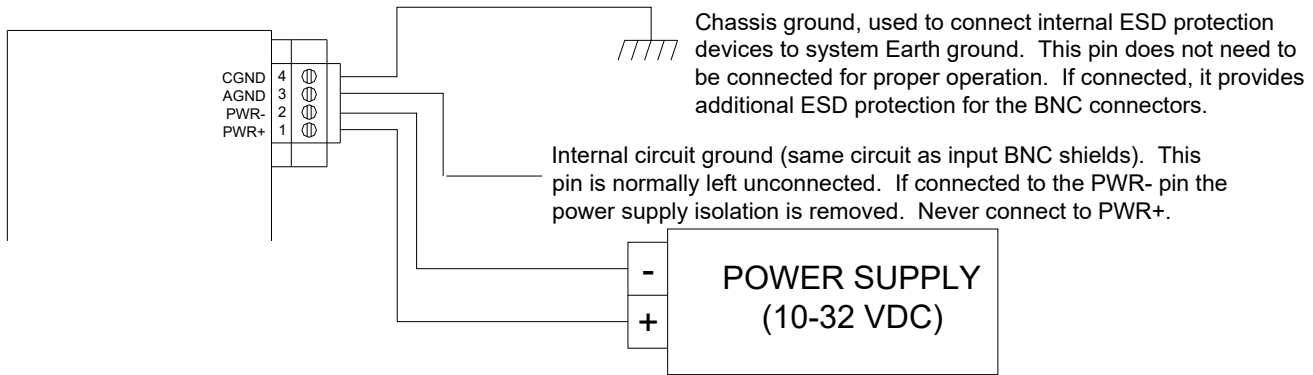


Figure 2

Circuit ground (AGND/Pin-3) is the internal circuit ground reference. It is NOT the input voltage return path of pins 1 and 2. The user has the option of floating internal circuits, with respect to any system ground, by not connecting to this pin. The user also has the option to connect the circuit ground to the chassis ground or the input power ground (or both). This power connector pin-out permits the user to define the grounding environment the unit is used in.

Chassis ground (CGND/Pin-4) is the electrical return path for all Electro-Static Discharge (ESD) protection devices. Chassis ground does not need to be connected for proper operation. Secondary ESD protection connections exist between the input and output video signals and internal circuit ground.

The power connector (J7) is a 4 pin 3.5mm center header (Phoenix Contact #1897267). Each unit is shipped with the mating power plug (Phoenix Contact #1847071). The screw flange feature of this connector has shown increased performance for high vibration and shock resistance.

4.0 Maintenance Mode Commands

These units have a USB port to permit the user to retrieve information, change parameters, and select specific inputs for system debug. The intent of this port is for it to be connected to a laptop computer and use HyperTerminal to communicate with the internal processor. The USB port uses a Silicon Labs CP2102N USB-to-UART (RS232) bridge IC. HyperTerminal must be configured as shown below using the virtual Comm port formed by the CP2102N. The drivers for the CP2102N can be downloaded from the Silicon Labs web site.

8 bit data
9600 baud
1 stop
No parity
XON/OFF flow control

The unit should be powered ON before the USB cable is plugged in. Once the laptop connects to the CP2102 HyperTerminal can be started and the comm port configured. At unit power up the user can enter the Maintenance Mode by entering NO when asked if the user wants to download new code. Once the unit is up and running, any key will indicate to the code that the user wants to enter Maintenance Mode. Two CR characters are required to enter the Maintenance Mode. If the two characters are not received within 30 sec., the unit will time out and jump back to the RUN mode. While in the Maintenance Mode, if no key activity is detected for 30 sec., the code will jump to the RUN mode.

5 Specifications:

SDI/Video Signal:

Format:	SMPTE259M (SD: 270/360 Mbps) SMPTE292M (HD:1.48 Gbps) SMPTE242M (3G: 2.97 Gbps)
BR _{Min/Max} (Data Rate)	125/2970 Mbps
V _{SDI-IN} (CM input range)	800mV _{p-p} (400-800mVp-p) Do not exceed 1Vp-p
V _{SDI-OUT} (CM Output Voltage)	800mV _{p-p} (720-880mVp-p)
V _{TH} (Carrier Detect Voltage)	1.3V
Z _{Term} (Termination)	75Ω (AC-Coupled)
I/O Connectors	BNC

Maintenance Interface (USB):

Data Type	ASCII/Text
Data Format	9600bps, 8bit, 1 Stop, No Parity
Flow Control	XON/XOFF (Required for Firmware Update)

Status LED:

Green (Indicates uP is running)
Yellow (Used to display control mode at power-up)

Power:

V _{sup(AC)}	12-24VAC
V _{sup(DC)}	10-34VDC (either polarity on PWR connector)
Mating Plug	Phoenix Contact #1847071
Wire Range	28-16 AWG
Specified Torque ⁴	Terminal/M2: 0.22-0.25Nm Flange/M2.5: 0.40-0.50Nm

Supply Current:

Part Number:	Pwr	12Vdc	28 Vdc
13-111-102-A	4W	<340mA	<125mA
13-111-104-A	3W	<290mA	<100mA
83-211-102-A	3W	<300mA	<110mA
83-211-104-A	6W	<600mA	<220mA
83-411-102-A	6W	<600mA	<220mA

Environmental/Mechanical:

Operating Temperature	-40°C to +85°C
Package	UL 94V-O & UL 94 5VA rated.
Mounting	6-32 threaded inserts (2)

Dimensions:

Part Number:	Dimensions	Weight	Mechanical
13-111-102-A	4.4" x 2.2" x 0.65"	8oz	Figure 3
13-111-104-A			Figure 4
83-211-102-A			Figure 5
83-211-104-A	4.4" x 2.2" x 1.40"	14oz	Figure 6
83-411-102-A			Figure 7

⁴ Phoenix Contact indicates that Torque specified under DIN EN 60947-1 is sufficient to secure connections, however recommended those listed.

6 Mechanical

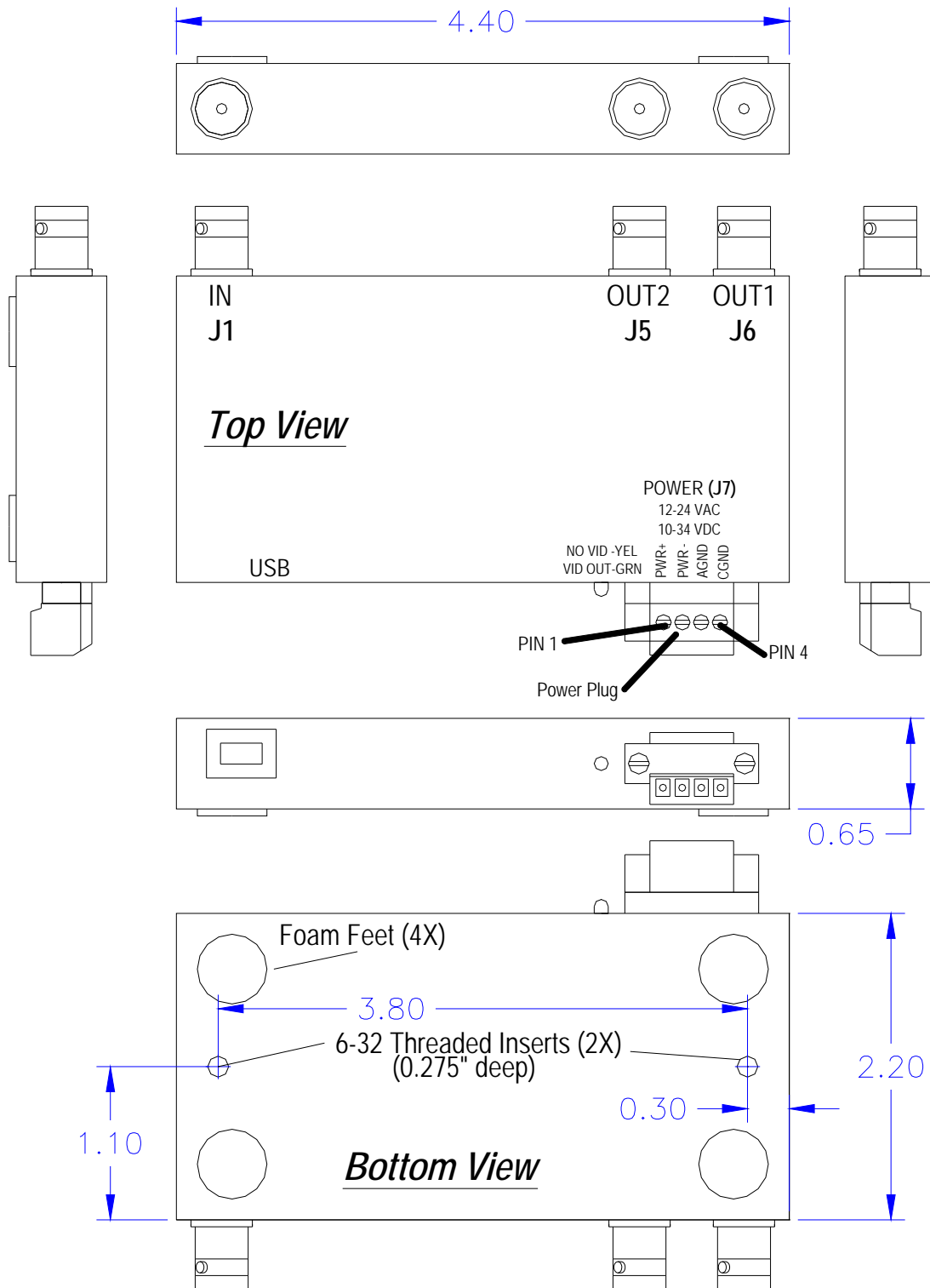


Figure 3: 13-111-102-B (1x2 SDI DA)

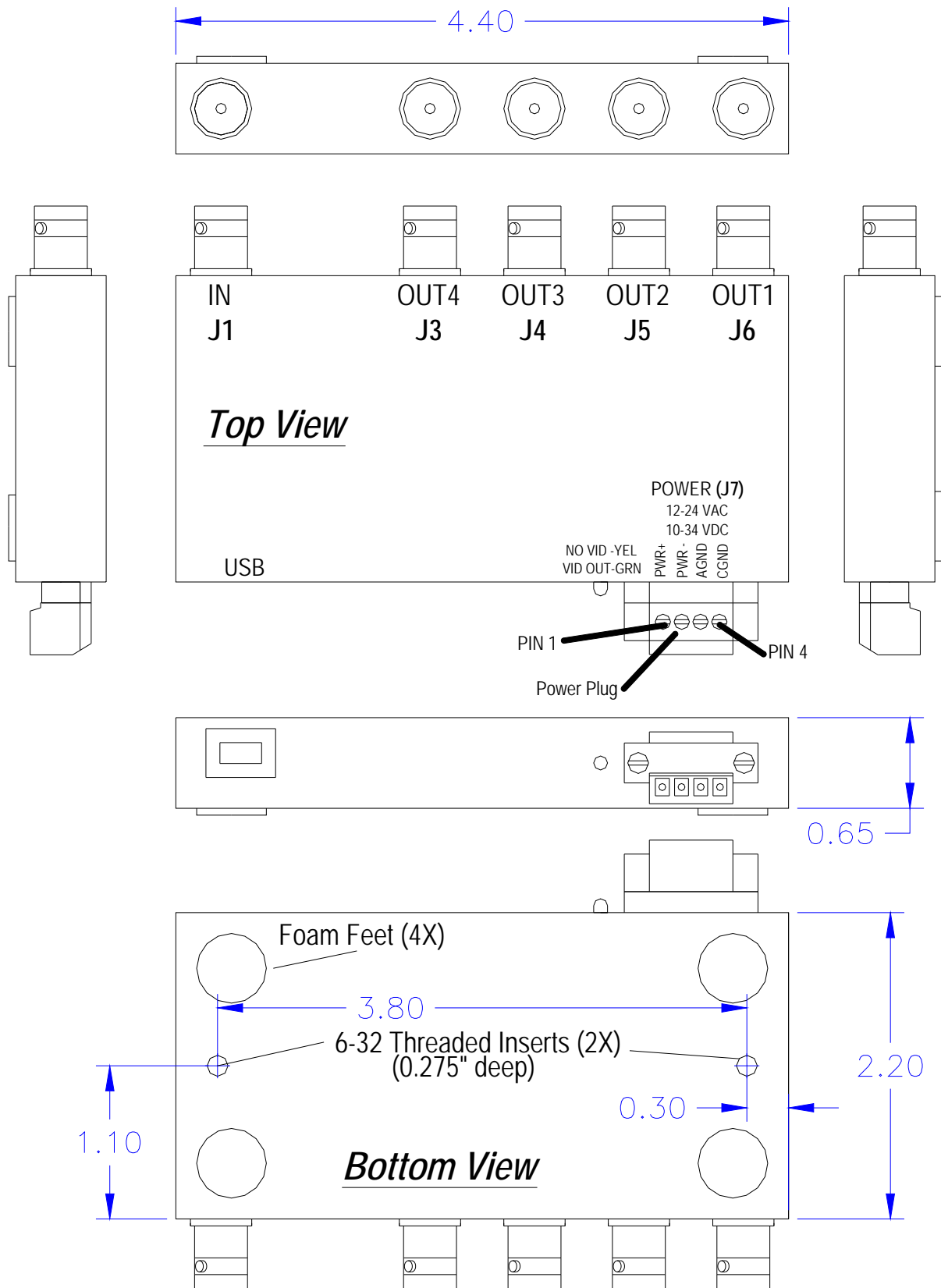


Figure 4: 13-111-104-B (1x4 SDI DA)

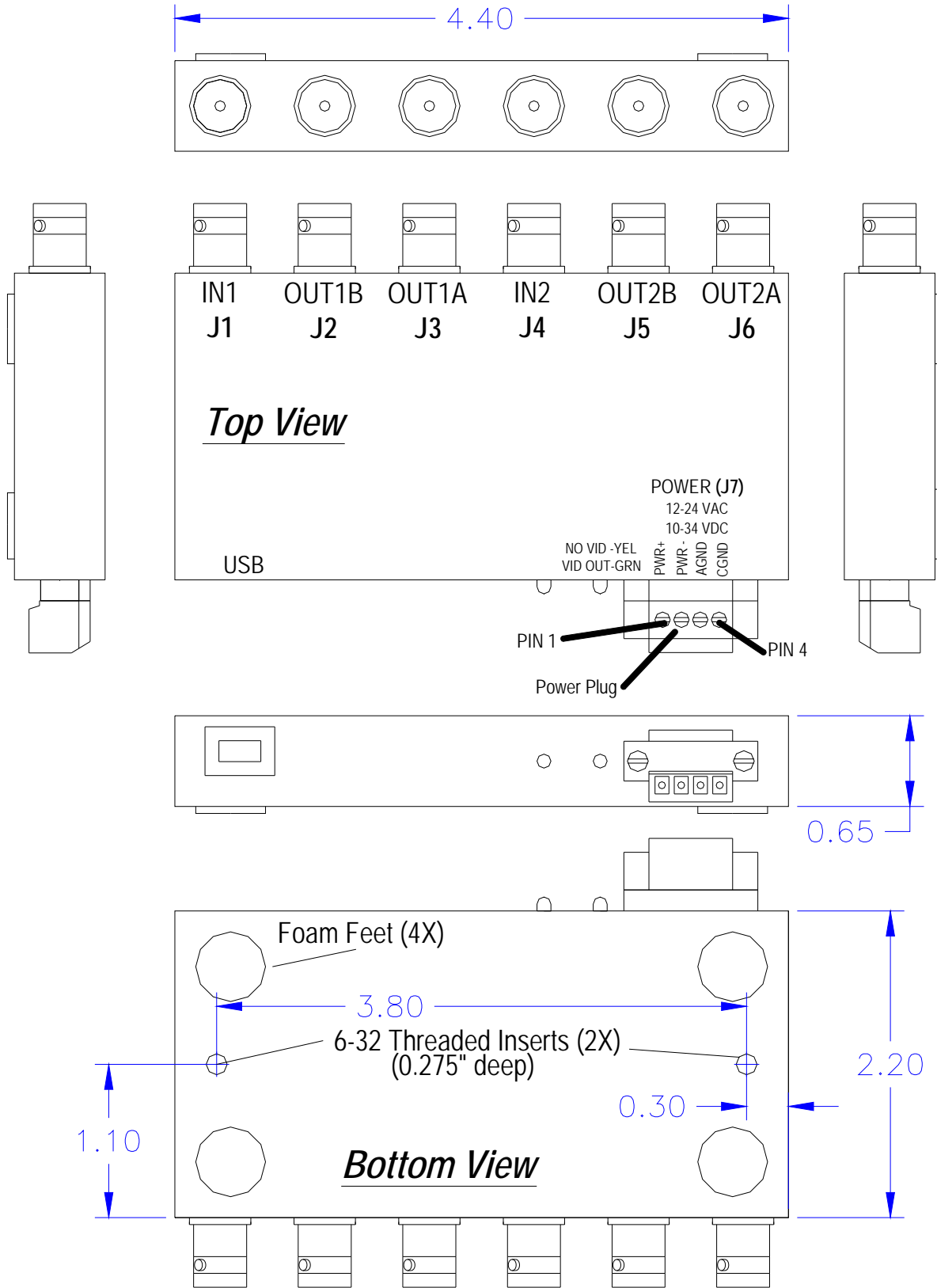


Figure 5: 83-211-102-B (Dual 1x2 SDI DA)

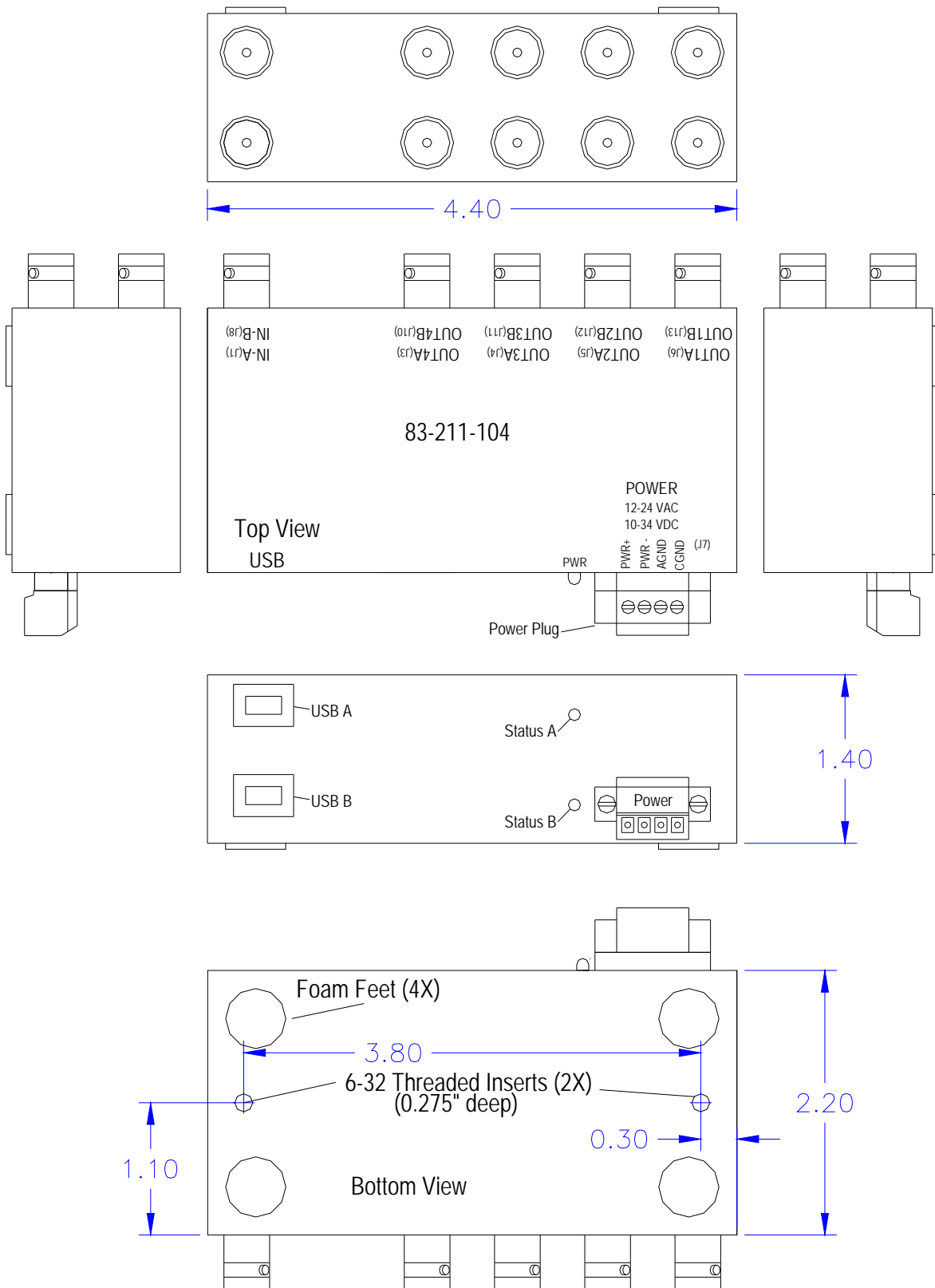


Figure 6: 83-211-102-B (Dual 1x4 SDI DA)

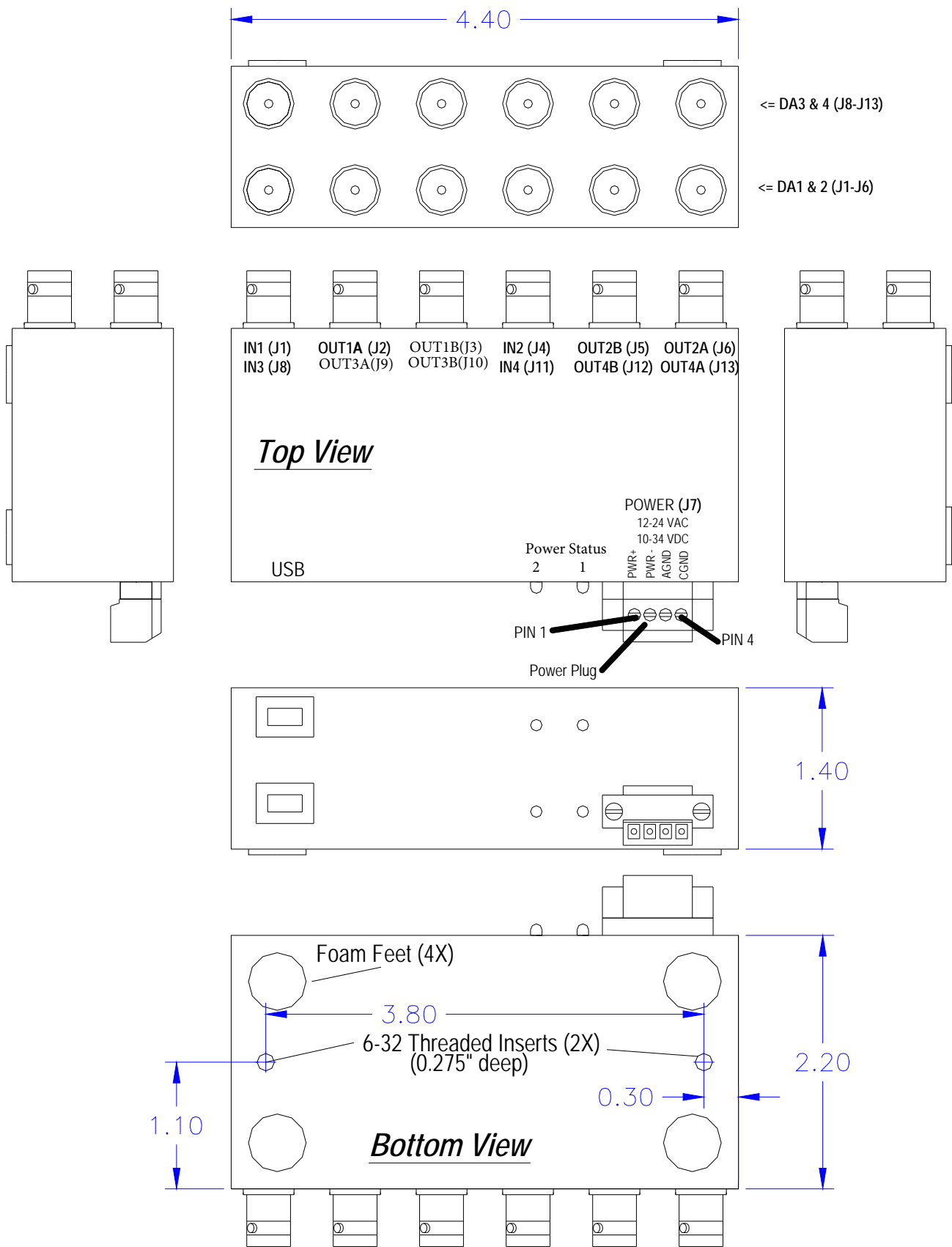


Figure 7: 83-411-102 (Quad 1x2 SDI DA)