Discrete Output Signal Conditioning Card

User Manual

CQ9517-HPDO-16

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1. Introduction

This document describes the design and operational aspects of the Concurrent Real-Time CQ9517-HPDO-16 Configurable Discrete Output Signal Conditioning Board.

2. Product Description

2.1 Overview

The Discrete Output Signal Conditioner is a board with 16 digital circuits that are designed to be a front end to Concurrent Real-Time digital output device, such as a WC-CP-FIO Programmable FPGA Card, or other discrete digital output interfaces. The board is designed to be installed into a CCRT Signal Workbench General Purpose Signal Conditioning (GPSD) chassis HS000-SIGWB-8. The board requires a power supply with +5VDC. Output signals of +15VDC and/ or a user supply of up to +60VDC/ +42VAC RMS can be supplied to source outputs. The output selections are supplied through a bi-directional solid-state relay with a maximum on-resistance of 60mΩ. Each channel is fused at 0.5A. The output switches can be driven by 3.3V logic signals that are 5V tolerant or by differential LVDS level signals.

2.2 Picture

Picture 1 is a picture of the Workbench mount board assembly. CQ9517-HPDO-16

Picture 1

Figure 1 shows a block diagram of the board identifying the I/O connectors. Figure 2 is a functional block diagram of a typical channel.

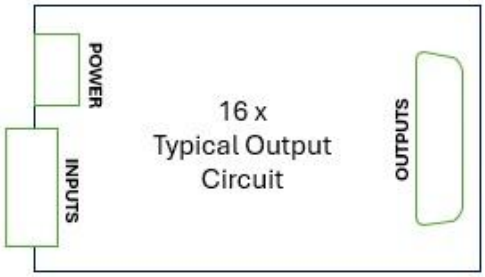


Figure 1

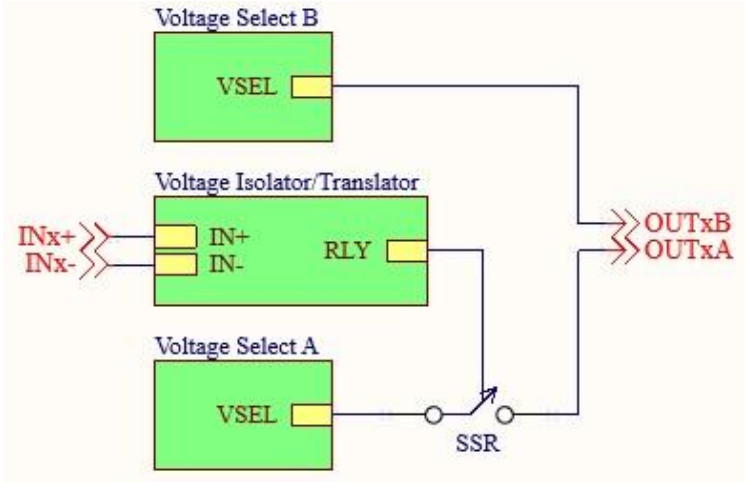


Figure 2

2.3 Assembly Diagram

Figure 3 is an assembly drawing of the board showing the locations of the jumpers used to set up the functionality of the circuit. The jumpers with the CHx labels select the type of input used to drive the solid state relay (SSR) for each channel. These are in the 'Voltage Isolator/Translator' block of Figure 2. The OUTxB jumpers select the Output B voltage. The jumpers labeled RLYx show the OUTxA voltage selection. To use the LVDS level translators, set jumper J2 to position 3P3. J6 may be used to connect the ground of the circuitry to chasis ground. Warning: be careful connecting to chassis ground.

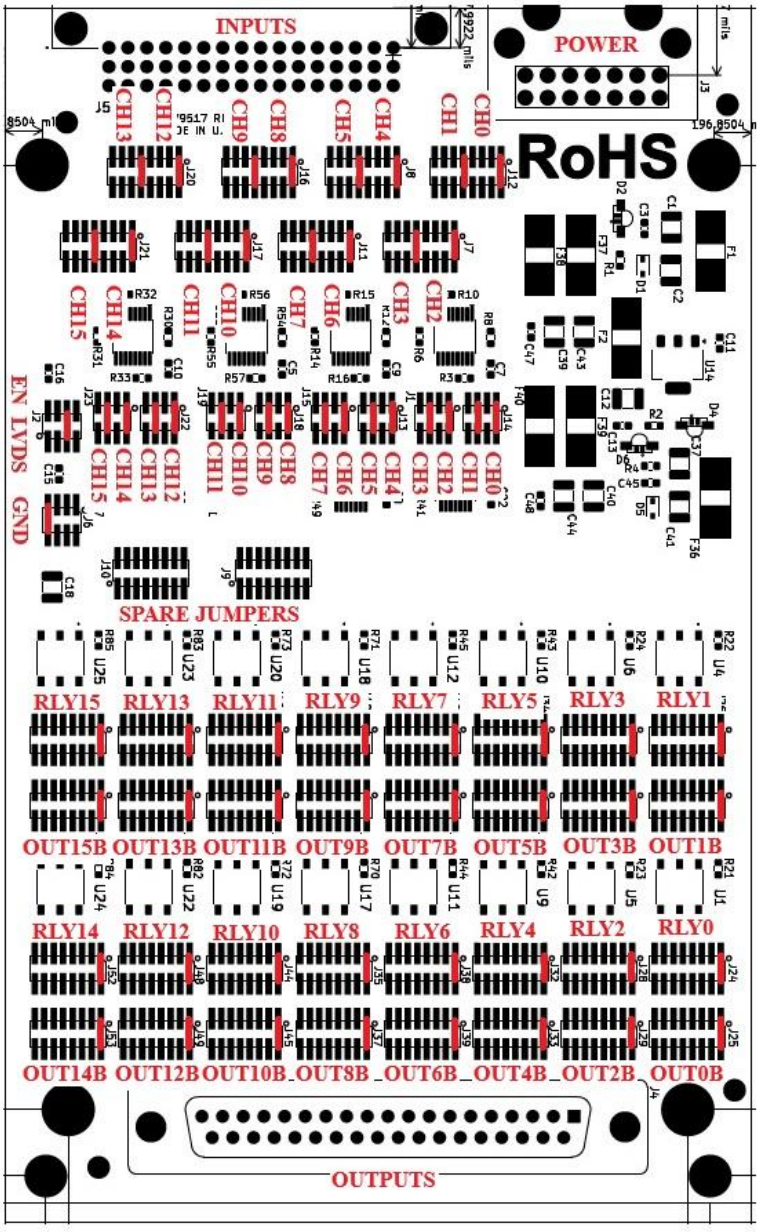


Figure **3**

3. Setup and Functional Detail

The following sections show the detailed circuitry and describe how to set up the circuitry.

3.1 LVDS Enable

If the LVDS buffers are used, they need to be enabled using jumper block J2. Setting the jumper between pins 1 and 2 disables the LVDS buffers and setting the jumper between pins 3 and 4 enables the buffers. ***Make sure that a jumper is in one of these positions.***

3.2 Voltage Isolator/Translator

Figure 4 shows the interface from the DIN-48 input connector. The input can be LVDS, or 3.3V logic signals. The jumper on J2 enables the LVDS drivers. J2 must have a jumper in one of the two valid positions. The 3.3V logic inputs are 5V tolerant. ***Note the orientation of J2.*** Figure 5 shows the jumper to connect system ground to chassis ground.

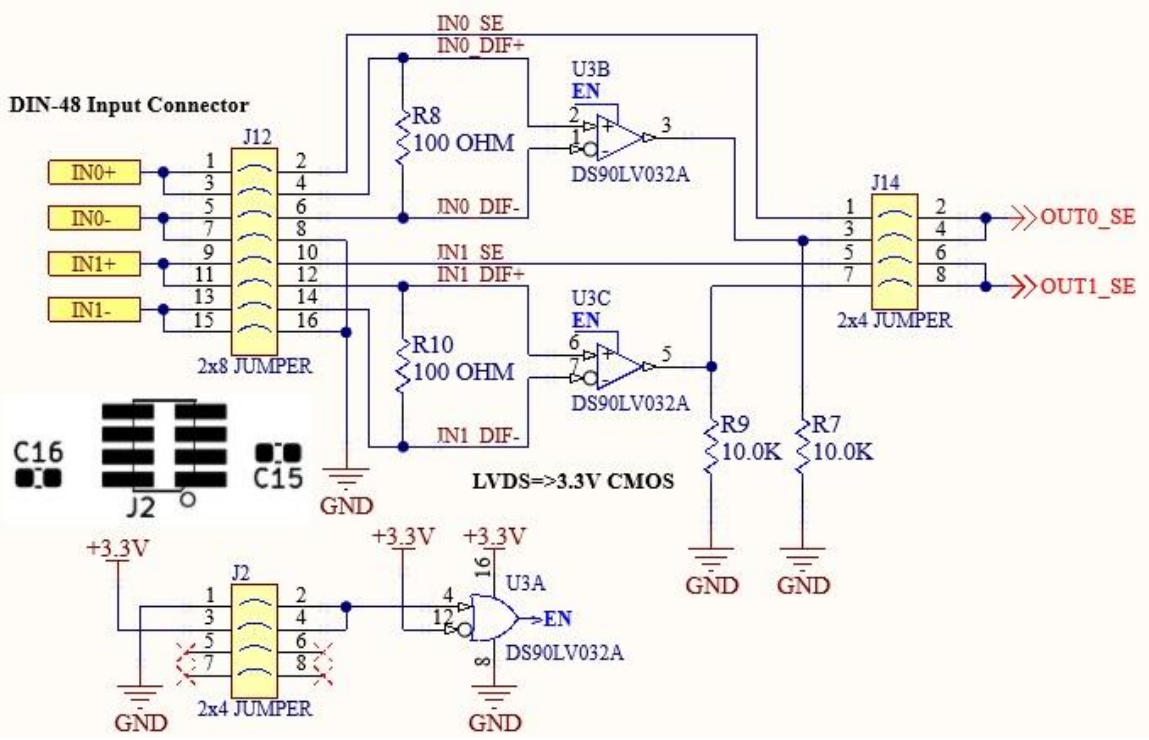


Figure 4

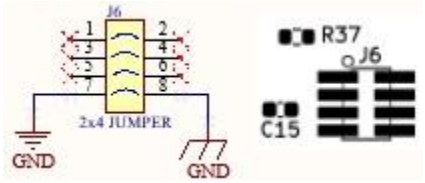


Figure 5

3.3 Output Voltage Drive

Figure **6** shows how the output drive is delivered. The OUT0B terminal provides one side of the power delivered to the load. OUT0A is the switched side of the power for the load. This interface can switch AC or DC power. The switch is rated at 60VDC max. That would allow up to 42VAC to be switched as well.

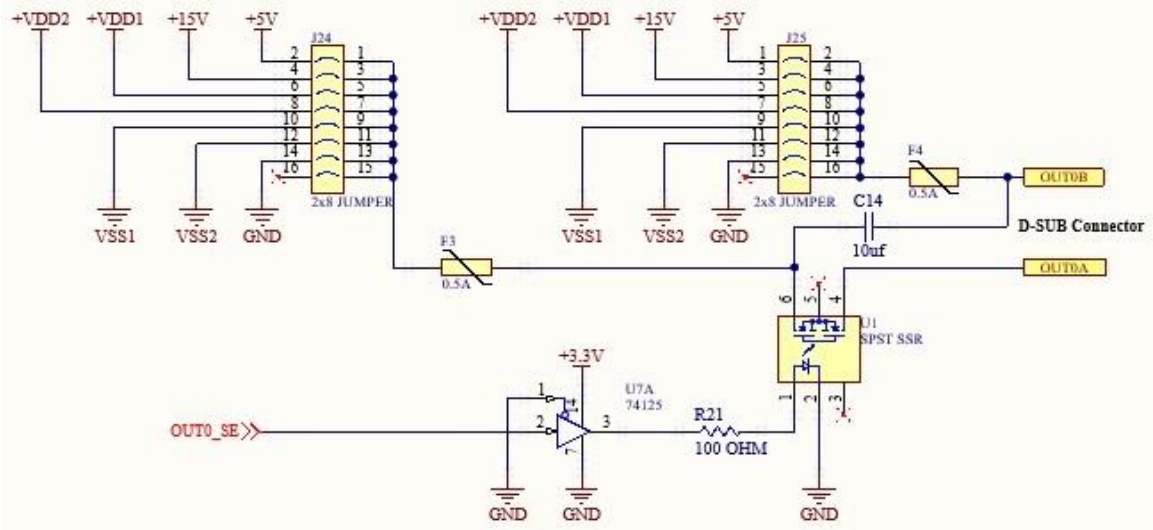


Figure 6

4. Power Consumption

Power consumption depends on the load but the maximum total power consumption is less than 1 watt for the +5V supply with all channels being used.

5. Timing

The turn on propagation delay through the opto coupler can be as long as 5mS, typically less than 1mS. The turn off time is typically less than 1mS. Delays on the output circuit would be mainly due to the off-board load impedance.

6. Physical Characteristics

The Analog Input Signal Conditioner Board is a 100mm X 160mm card that can be mounted on a DIN rail or in a 3U Signal Workbench chassis, HS000-SIGWB-8.

7. External Connectors

7.1 Analog Output Connector

The user connects to the board outputs through J4, 37-pin D-Sub connector. The board inputs use a standard 3-row DIN style connector J5. The board can be installed into to a Signal Workbench chassis or a discrete wire harness can supply input signals. The following are the connector as viewed when looking at the board:

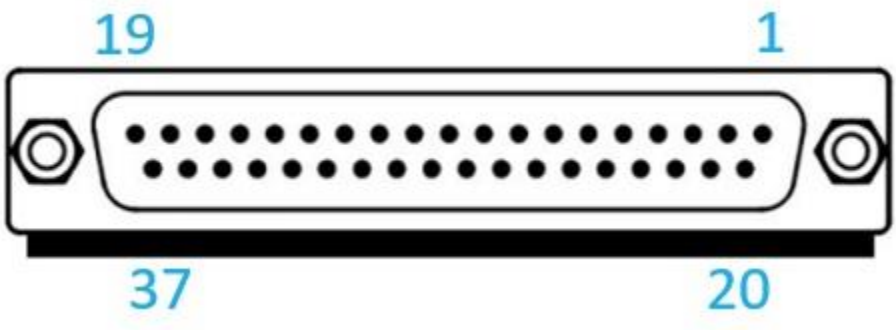
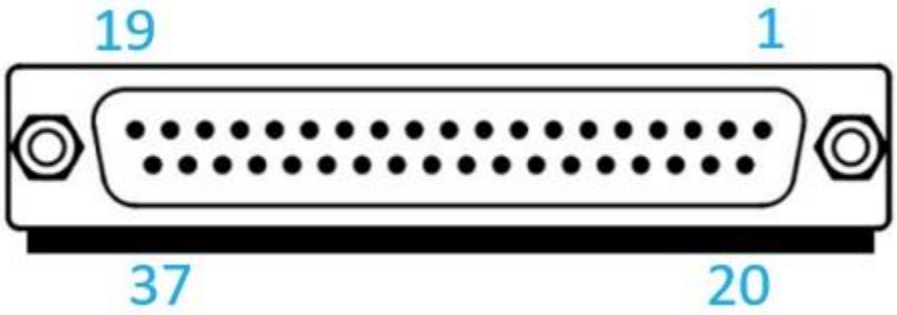


Figure 7

DB37 Pin Assignment for CQ9517-HPDO-16		
Pin Number	Name	Description
1	OUT0A	Switched output 0.
20	OUT0B	Unswitched Output 0.
2	OUT1A	Switched output 1.
21	OUT1B	Unswitched Output 1.
3	OUT2A	Switched output 2.
22	OUT2B	Unswitched Output 2.
4	OUT3A	Switched output 3.
23	OUT3B	Unswitched Output 3.
5	OUT4A	Switched output 4.
24	OUT4B	Unswitched Output 4.
6	OUT5A	Switched output 5.
25	OUT5B	Unswitched Output 5.
7	OUT6A	Switched output 6.
26	OUT6B	Unswitched Output 6.
8	OUT7A	Switched output 7.
27	OUT7B	Unswitched Output 7.

Table 1



DB37 Pin Assignment for CQ9517-HPDO-16		
Pin Number	Name	Description
9	OUT8A	Switched output 8.
28	OUT8B	Unswitched Output 8.
10	OUT9A	Switched output 9.
29	OUT9B	Unswitched Output 9.
11	OUT10A	Switched output 10.
30	OUT10B	Unswitched Output 10.
12	OUT11A	Switched output 11.
31	OUT11B	Unswitched Output 11.
13	OUT12A	Switched output 12.
32	OUT12B	Unswitched Output 12.
14	OUT13A	Switched output 13.
33	OUT13B	Unswitched Output 13.
15	OUT14A	Switched output 14.
34	OUT14B	Unswitched Output 14.
16	OUT15A	Switched output 15.
35	OUT15B	Unswitched Output 15.
17	N/C	No Connect
36	GND	Circuit GND
18	GND	Circuit GND
37	GND	Circuit GND
19	GND	Circuit GND

Table 2

7.2 Discrete Output Connector

Figure **8** shows the discrete output board input connector and Table **3** shows the pin assignment, looking into the connector with the PCB below the connector body.

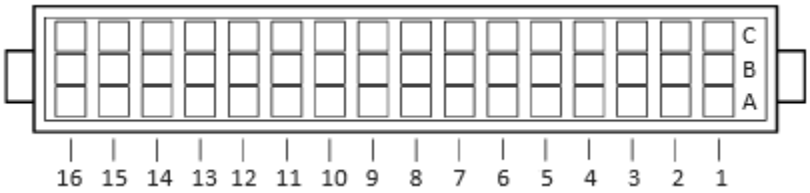


Figure 8

DIN48 Pin Assignment for CQ9517-HPDO-16							
Pin Num	**Name**	**Pin Num**	**Name**	**Description**	**Pin Num**	**Name**	**Description**
A1	IN15+	B1	IN15-	Input 15	C1	N/C	No connect
A2	IN14+	B2	IN14-	Input 14	C2	N/C	No connect
A3	IN13+	B3	IN13-	Input 13	C3	GND	System ground
A4	IN12+	B4	IN12-	Input 12	C4	GND	System ground
A5	IN11+	B5	IN11-	Input 11	C5	GND	System ground
A6	IN10+	B6	IN10-	Input 10	C6	+5V	+5V Supply
A7	IN9+	B7	IN9-	Input 9	C7	+15V	+15V Supply
A8	IN8+	B8	IN8-	Input 8	C8	N/C	No connect
A9	IN7+	B9	IN7-	Input 7	C9	VDD1	+Alt supply1
A10	IN6+	B10	IN6-	Input 6	C10	VDD1	+Alt supply1
A11	IN5+	B11	IN5-	Input 5	C11	VSS1	-Alt supply1
A12	IN4+	B12	IN4-	Input 4	C12	VSS1	-Alt supply1
A13	IN3+	B13	IN3-	Input 3	C13	VDD2	+Alt supply2
A14	IN2+	B14	IN2-	Input 2	C14	VDD2	+Alt supply2
A15	IN1+	B15	IN1-	Input 1	C15	VSS2	-Alt supply2
A16	IN0+	B16	IN0-	Input 0	C16	VSS2	-Alt supply2

Table 3

7.3 Power Connector

Power connector pin assignment. Figure 9 is a view of the power connector looking into the pins on the PCB with the key on the top. Power can be supplied to the circuitry through this connector when not using it in a Signal Workbench chassis.

Figure 9

Table 4 shows the pin names and descriptions of the signals in the power connector.

Pin	Signal Name	Description	Pin	Signal Name	Description
1	VSS2	-Alt supply2	8	VDD2	+Alt supply2
2	VSS2	-Alt supply2	9	VDD2	+Alt supply2
3	VSS1	-Alt supply1	10	VDD1	+Alt supply1
4	VSS1	-Alt supply1	11	VDD1	+Alt supply1
5	GND	System Ground	12	N/C	No connect
6	GND	System Ground	13	P15V	+15V
7	GND	System Ground	14	P5V	+5V Supply

Table 4