Enhanced Wheel Speed Sensor Card

User Manual

CQ9512-WSS-4

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1. Introduction

This document describes the design and operational aspects of the Concurrent Real-Time CQ9512-WSS-4 Enhanced Wheel Speed Sensor Board.

2. Product Description

2.1 Overview

The Enhanced Wheel Speed Sensor Card is a board with four, wheel speed simulation circuits that are designed to be an interface to Concurrent Real-Time Simulation Workbench through a WC-CP-FIO Programmable FPGA Card with ICS-FPGA-2042 FPGA WB Enhanced Wheel Speed Sensor IP Installed. There are two variants of the card, The standard version is designed to be installed into a CCRT Signal Workbench General Purpose Signal Conditioning (GPSD) chassis HS000-SIGWB-8 The DIN variant is designed to be mounted on a DIN rail. The board requires a power supply of +15V. A CCRT Signal Workbench GPSD chassis HS000-SIGWB-8 supplies the +15V power. The DIN Mount variant of the card requires an external power supply, such as the CCRT CX-NPSC-PWR1.

2.2 Block Diagram

Figure 1 shows a block diagram of the board identifying the I/O connectors. Figure 2 shows a block diagram of the board showing the locations of the individual channel circuits.

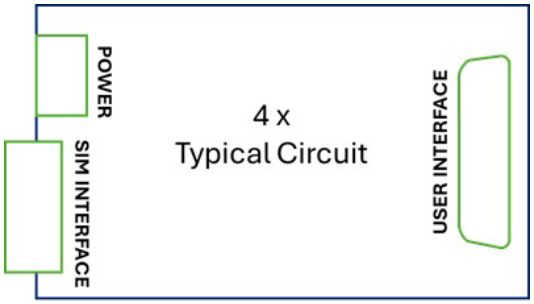


Figure 1

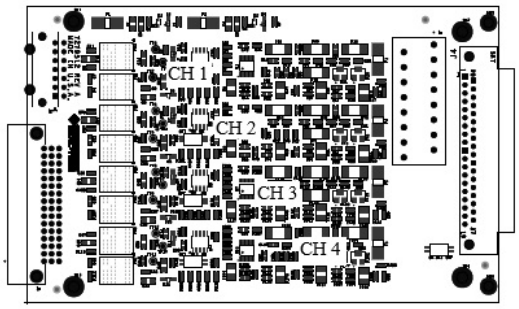
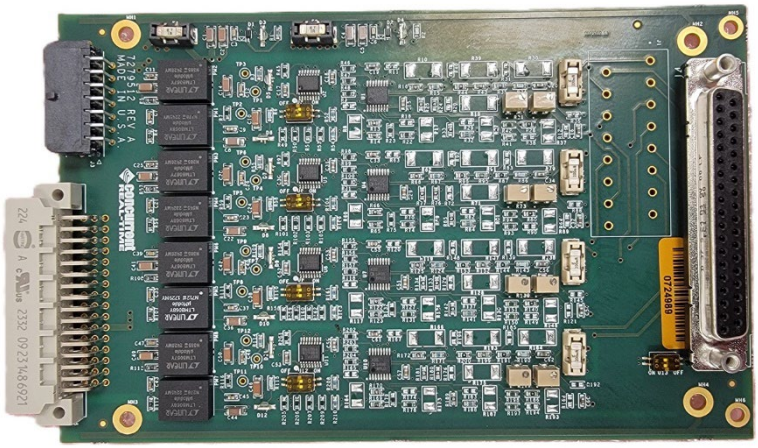


Figure 2

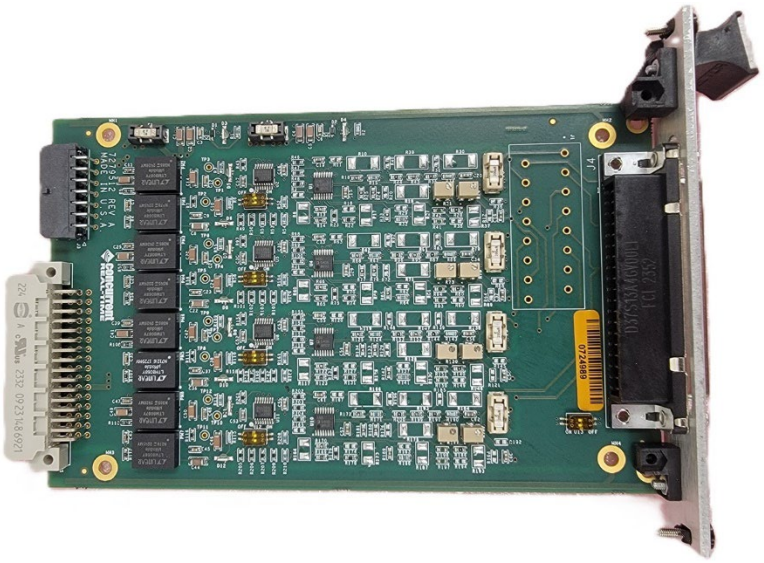
3. Picture

Picture **1** is a picture of the DIN mount board assembly.



Picture 1

Picture 2 is a picture of the Signal Workbench Chassis mount board assembly.



Picture **2**

4. General Operation

The following sections show the general operation of a typical Wheel Speed Sensor Circuit. Each circuit is galvanically isolated from the control circuitry as well as from each of the other three sensor circuits.

4.1 Typical circuit schematic.

Figure 3 shows the schematic of a typical circuit. The user signal VCCx is supplied by the external circuit. Current from the input flows through a resistor pull down through muxes to the user signal return, GND_CHx. The galvanically isolated digital control IN2 determines whether to use the 12V mux or the 5V mux and IN0 and IN1 select which current setting in the selected mux to apply. In3 can connect or disconnect the circuit for 0 current/ Open Collector simulation.

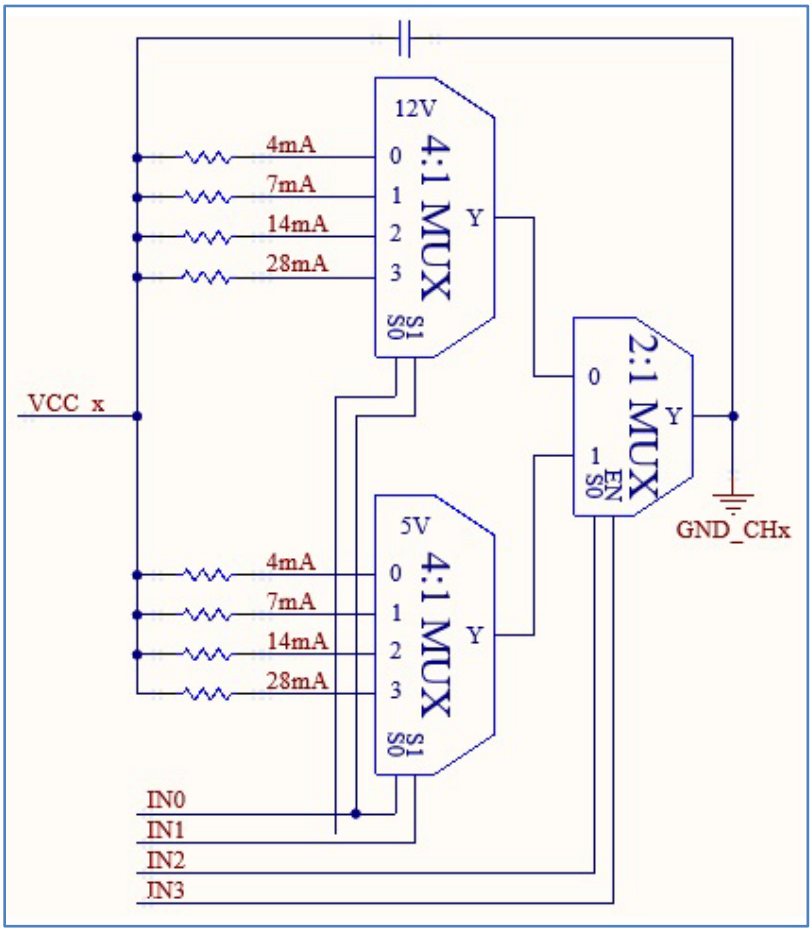


Figure 3

4.2 Initial Configuration Setup

Figure **4** locates a pair of DIP switches present in each of the four channels. The upper switch in the figure is Sw1. These are used to select initial and default conditions of the hardware, when the FPGA board is not controlling the channel. Dip switch 1 selects the upstream voltage range that drives the current limit resistors, 12V (ON) or 5V (OFF). Dip switch 2 selects whether the current limit selection is Active (ON) or Inactive (OFF) by default.

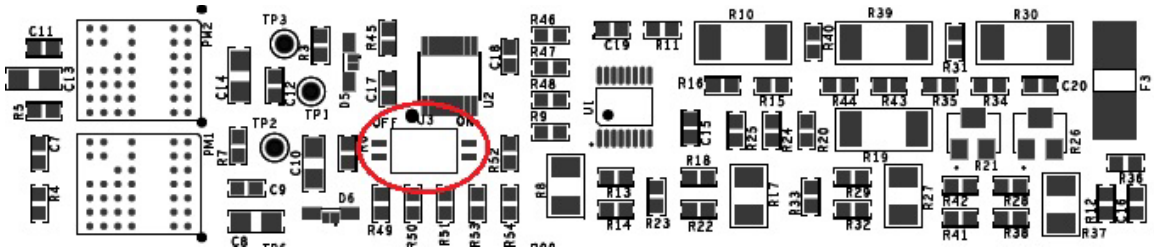


Figure 4

4.3 Power Distribution

Figure 5 shows the power distribution. The power for each channel is galvanically isolated from the common power and from the other channels. The isolated 24V power supplies the solid state mux and is available to drive the current for the outputs if necessary. No more than 100mA should be used from any isolated 24V supply.

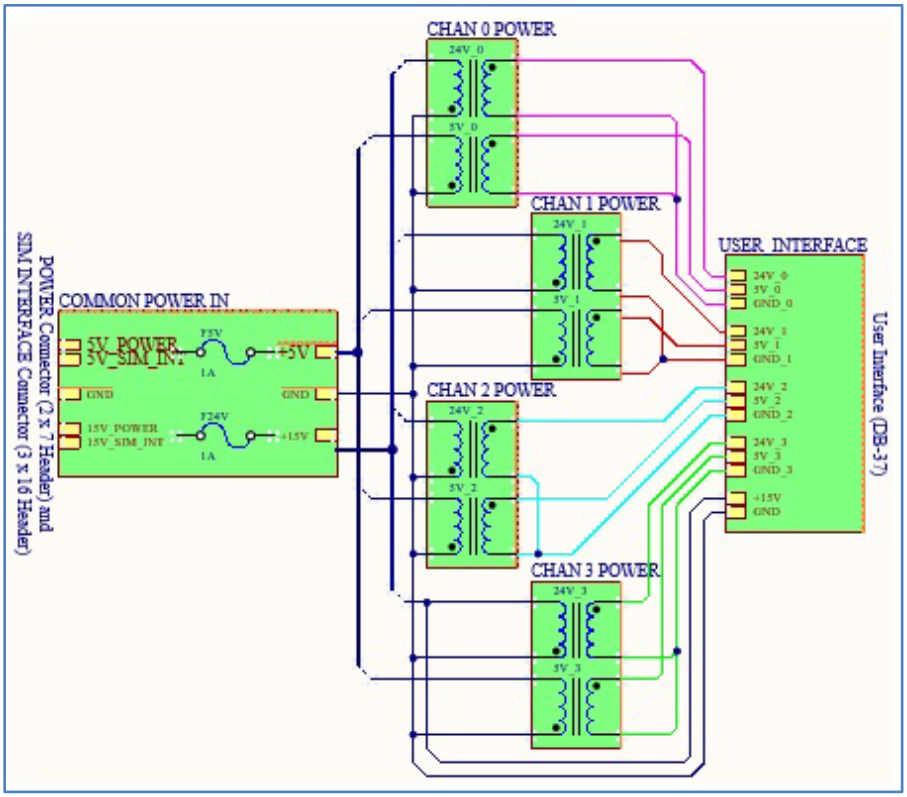


Figure 5

5. 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. Power consumption depends on load, but the maximum total power consumption is no more than 10 watt for the +15V supply with all channels being used.

6. External Connectors

6.1 Analog Input Connector

Analog input connector pin assignment. Inputs are connected to connector J4, Figure 6, is with terminal blocks or DSub37 connector. Outputs use a standard DIN style connector J5 which can be connected to a backplane or cable depending on system requirements. The following are the connector as viewed when looking at the board:

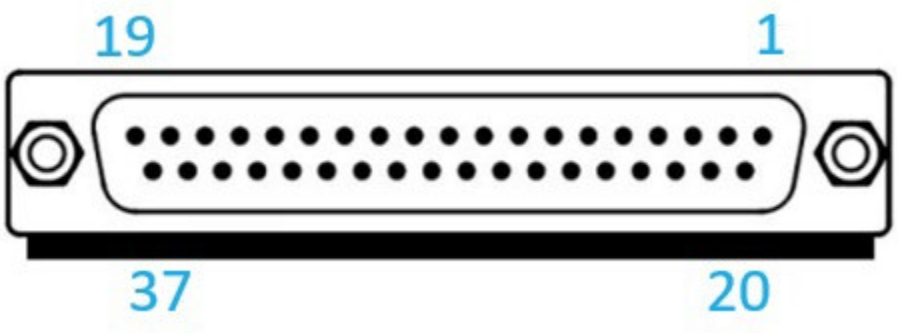


Figure 6

DB37 Pin Assignment for CQ9515-DI-16		
Pin Number	**Name**	**Description**
1	Channel 0 Sink.	Channel 0 current.
20	Chan 0 GND	Channel 0 current ground.
2	Chan 0 +24V	Channel 0 +24V Supply.
21	NC	No connect
3	Channel 1 Sink.	Channel 1 current.
22	Chan 1 GND	Channel 1 current ground.
4	Chan 1 +24V	Channel 1 +24V Supply.
23	NC	No connect
5	Channel 2 Sink.	Channel 2 current.
24	Chan 2 GND	Channel 2 current ground.
6	Chan 2 +24V	Channel 2 +24V Supply.
25	NC	No connect
7	Channel 3 Sink.	Channel 0 current.
26	Chan 3 GND	Channel 0 current ground.
8	Chan 3 +24V	Channel 0 +24V Supply.
27	NC	No connect

6.2 Wheel Speed Current Select Input Connector (Interface to FPGA)

Wheel speed current select connector pin assignment, looking into the connector with the PCB below the connector body.

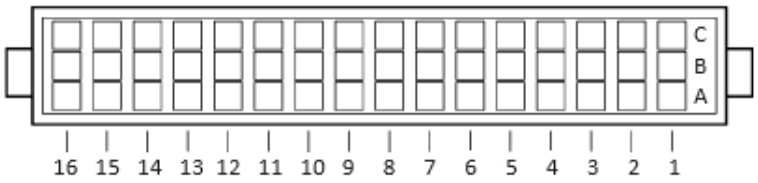


Figure 7

DIN48 Pin Assignment for CQ9515-AI-16							
Pin Num	**Name**	**Pin Num**	**Name**	**Description**	**Pin Num**	**Name**	**Description**
A1	CH0 SEL0	B1	GND	System ground	C1	N/C	No connect
A2	CH0 SEL1	B2	GND	System ground	C2	N/C	No connect
A3	CH0 SEL2	B3	GND	System ground	C3	GND	System ground
A4	CH0 SEL3	B4	GND	System ground	C4	GND	System ground
A5	CH1 SEL0	B5	GND	System ground	C5	GND	System ground
A6	CH1 SEL1	B6	GND	System ground	C6	+5V	+5V Supply
A7	CH1 SEL2	B7	GND	System ground	C7	+15V	+15V Supply
A8	CH1 SEL3	B8	GND	System ground	C8	N/C	No connect
A9	CH2 SEL0	B9	GND	System ground	C9	N/C	No connect
A10	CH2 SEL1	B10	GND	System ground	C10	N/C	No connect
A11	CH2 SEL2	B11	GND	System ground	C11	N/C	No connect
A12	CH2 SEL3	B12	GND	System ground	C12	N/C	No connect
A13	CH3 SEL0	B13	GND	System ground	C13	N/C	No connect
A14	CH3 SEL1	B14	GND	System ground	C14	N/C	No connect
A15	CH3 SEL2	B15	GND	System ground	C15	N/C	No connect
A16	CH3 SEL3	B16	GND	System ground	C16	N/C	No connect

6.3 Power Connector

Power connector pin assignment. Figure 8 is a view of the power connector looking into the pins on the PCB with the key on the top.

Figure 8

Table 1 shows the pin names and descriptions of the signals in the power connector.

Pin	Signal Name	Description	Pin	Signal Name	Description
1	No Connect		8	No Connect	
2	No Connect		9	No Connect	
3	No Connect		10	No Connect	
4	No Connect		11	No Connect	
5	GND	System Ground	12	No Connect	
6	GND	System Ground	13	P15V	Positive 15V
7	GND	System Ground	14	P5V	Positive 5V

Table 1