Readout Board Specifications

Andrew Peck, Daniel Spitzbart

February 17, 2022

1 Readout Board Specifications

Modification Date: 2022-02-17 17:59

This document is missing 31 pieces of information concerning 33 specifications.

A pdf version of this document can be found here. Please check the timestamp to ensure it is up to date.

Contents

2 Specifications

2.1 Description

The readout board will be designed in 3 different flavors, called the RB-3, RB-6, and RB-7, where the suffix number represents the number of "full-modules" that the readout board services.

The readout board consists of one or more lpGBTs, a GBT-SCA, a VTRX+, a number of linPOL12 regulators, and associated connectors / passive components required to interface with the external systems.

- **Spec:** Each RB will have 1 GBT-SCA
- **Spec:** Each RB will have 2 lpGBTs
- **Spec:** Each RB will have 1 VTRX+
- **Spec:** Each RB will have 6 linPOL12s

2.2 Interfaces

2.2.1 Power Board

The interface to the power board will consist of:

- **Spec:** The power board interface will use connector part number UNKNOWN.
- **Spec:** The pinout of these connectors is UNKNOWN.
- **Spec:** The placement of these connectors is UNKNOWN.
- **Spec:** The quantity of these connectors is UNKNOWN.

2.2.2 Module

1. Signal Interface The signal interface to the module will consist of:
    - **Spec:** The module will use connector part number UNKNOWN.
    - **Spec:** The pinout of the module connectors is UNKNOWN.
    - **Spec:** The placement of these connectors is UNKNOWN.
2. BV Interface The signal interface to the module will consist of:
    - **Spec:** The BV to module interface will use connector part number UNKNOWN.
    - **Spec:** The pinout of these connectors is UNKNOWN.
    - **Spec:** The placement of these connectors is UNKNOWN.

2.2.3 Fiber Optic

The fiber optic interface to CMS is through a VTRX+. The readout board will host both the VTRX+, as well as the MT Ferrule that is required to connect between the VTRX+ and a "naked fanout".

- **Spec:** The size of the cutout for the MT ferrule is UNKNOWN.
- The location of the cutout for the MT ferrule is:

  - **Spec:** RB-3: UNKNOWN.
  - **Spec:** RB-6: UNKNOWN.
  - **Spec:** RB-7: UNKNOWN.

2.2.4 Low Voltage

The readout board will connect to the low voltage supply to receive ~8V power.

- **Spec:** The part number for the LV connector is UNKNOWN.
- **Spec:** The pinout for the LV connector is UNKNOWN.
- **Spec:** The placement for the LV connector is UNKNOWN.

2.3 Signal Connectivity

2.3.1 I2C

- **Spec:** The GBT-SCA will provide one I2C connection for each module.
- **Spec:** All ETROCs in a module will share an I2C master.
- **Spec:** The readout board will provide strong I2C pull-ups.
  - It is assumed that the modules will not, and have only weak pull-ups.

2.3.2 SCA IO

2.3.3 Uplink E-links

2.3.4 Downlink E-links

2.3.5 Clocking

2.3.6 VTRX

2.4 Monitoring

The readout board will monitor the following analog channels:

	RB-3	RB-6	RB-7
Sensor Bias Voltage	UNKNOWN	UNKNOWN	UNKNOWN
ETROC Low Voltage	UNKNOWN	UNKNOWN	UNKNOWN
VTRX +2.5V RX	1	1	1
VTRX +2.5V TX	1	1	1
GBTX +1.5VD	1	1	1
GBTX +1.5VA	1	1	1
RB Low Voltage	1	1	1
VTRX RSSI	1	1	1
VTRX Temperature	1	1	1
Temperature Sensors	UNKNOWN	UNKNOWN	UNKNOWN

- **Spec:** Bias voltage monitoring will be through a resistive voltage divider

  - It is formed of two 50Mohm resistors (HVC1206T5005JET) and one 82k resistor (RR0510P-823-D) with accuracy of 0.5% for each resistor.
  - The divider 82/100000=0.00082, providing a nominal monitoring range of 0-1219 volts.
  - The bias voltage will be monitored by the GBT-SCA.

2.5 Low Voltage Distribution

- **Spec:** The readout board will provide four 47 uF capacitors connected to each 1.2V ETROC supply.
  - There will be no additional filtering.
- **Spec:** Analog and digital power for the ETROC will not be distinguished.
- **Spec:** The low voltage will be ganged such that UNKNOWN ETROCs share a common power supply.

2.6 Bias Voltage Distribution

- **Spec:** Bias voltage will be a maximum of UNKNOWN volts.
- The bias voltage granularity will be:
  - **Spec:** UNKNOWN channels for an RB-3
  - **Spec:** UNKNOWN channels for an RB-6
  - **Spec:** UNKNOWN channels for an RB-7
- **Spec:** The readout board will provide a filter for each bias voltage channel consisting of a 200 ohm resistor and 1500 pF capacitor.

2.7 Mechanics

2.7.1 Outer Dimensions

1. Connector Placements

2.8 Component List