Mu3e
Front End Controller Board
Front End Controller Board

Data Sheet
Revision: 0.0 – Release date: November 2020

General Description

The FEC is a Management Board on one euroboard developed at PSI.

The board is controlled with a µC from SILICON LABS Typ: C8051F120 and there is a connection to the isolated Ethernet RJ45 connector through a 10BASE-T controller CS8900A from CIRRUS LOGIC.

RS-485, is a standard which defines the electrical charateristics of drivers and receivers for use in serial communications systems. Electrical signaling is balanced and multi point systems are suported.

Biasing and termination values are not specified in the RS-485 standard. Ideally, the two ends of the cable will have a termination resistor connected across the two wires. Without termination resistors, signal reflections off the unterminated end of the cable can cause data corruption. Termination resistors also reduce electrical noise sensitivity due to the lower impedance. The value of each termination resistor should be equal to the cable characteristic impedance (typically, 120 Ohm for twisted pairs).

Features

- 20V DC, 8V … 36V
- 5V, 3.3V, for control
- RS-485
- Half duplex link
- Fiber adapter
- Enable isolated Input
- Status isolated Output
- Watchdog timer on board
- Ethernet and RS485 operation
- Ethernet 10BASE-T
- Support DHCP
- Monitoring of voltage, temperature
- SPI master bus for backplane
- 1-wire digital thermometer
- SAMTEC QTH serie connectors
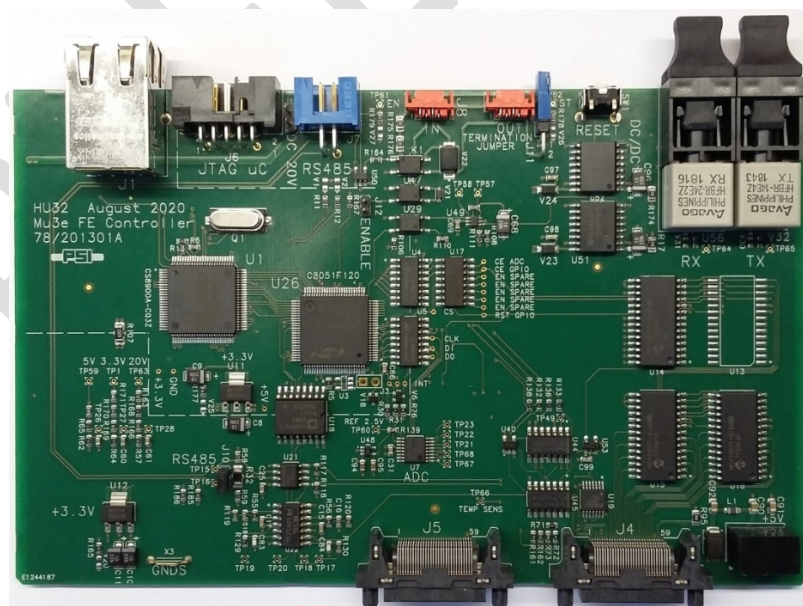
Applications

- Mu3e Front-end controller

Picture

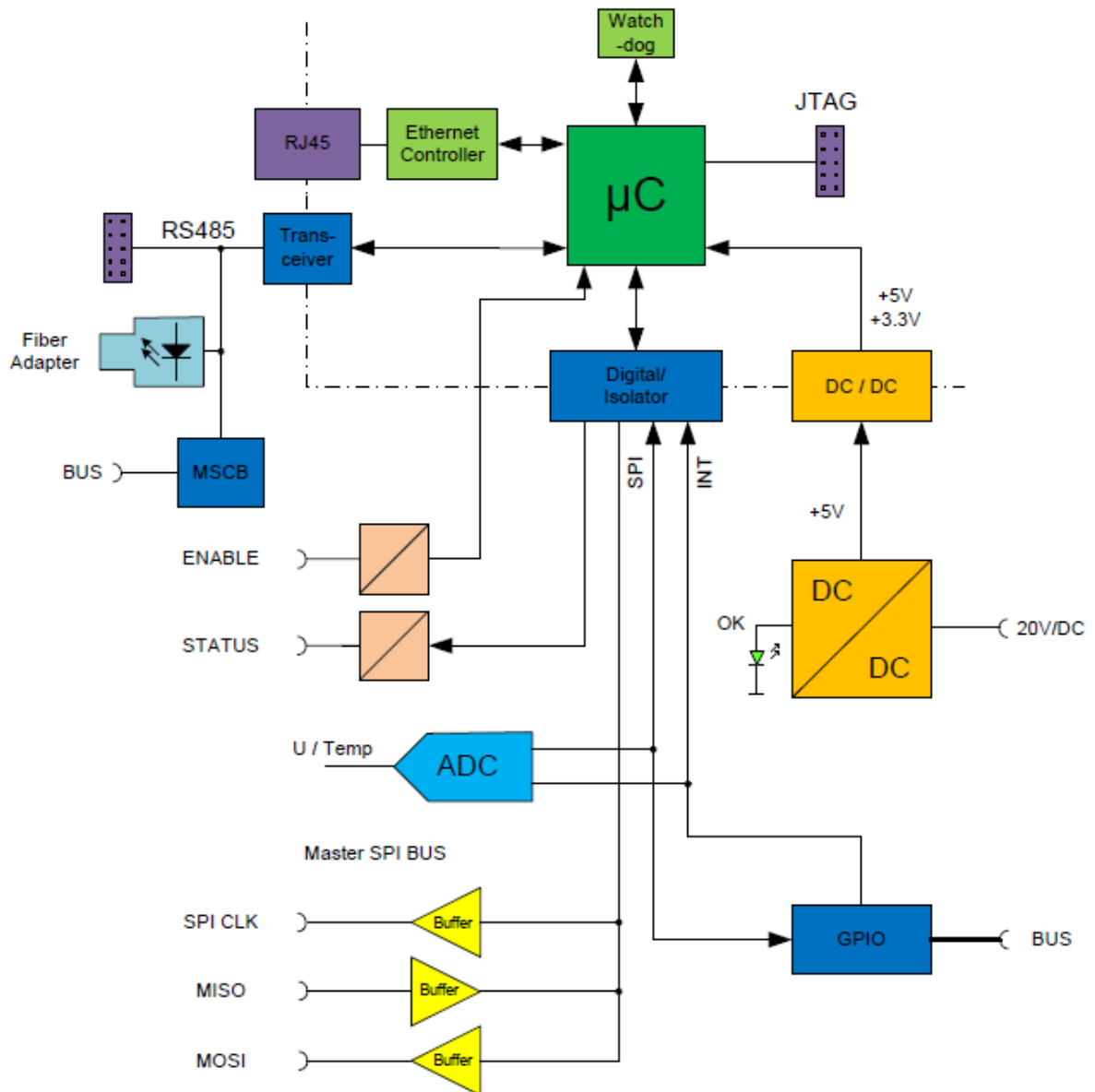Figure 1: Crate Management Board

Block Diagram

Figure 2: Front-end controller Board block circuit

Board description

The FE-C-B is a Front-end controller Board on one euroboard developed at PSI. A DC/DC converter produces from 20V, 5V DC for control. The board is controlled with a µC from SILICON LABS Typ: C8051F120 and there is a connection to the isolated Ethernet RJ45 connector through a 10BASE-T controller CS8900A from CIRRUS LOGIC.

Four IO expander control all boards in the backplane with board select, power ON, plugin, INIT, RESET, ATTENTION and SPI. A master SPI bus and MSCB bus controls all boards in the backplane. The bus is driven with multipoint LVDS transceivers SN65MLVD205D from Texas Instruments. The MSCB bus controls all boards. MAX1253B (U7) from MAXIM-IC monitors ADC with internal temperature sensor. These devices independently monitor the input channels without microprocessor and generate an interrupt on when any variable exceeds user-defined limits. The device monitors the current at the power 5V, 3.3V and temperature at the board.
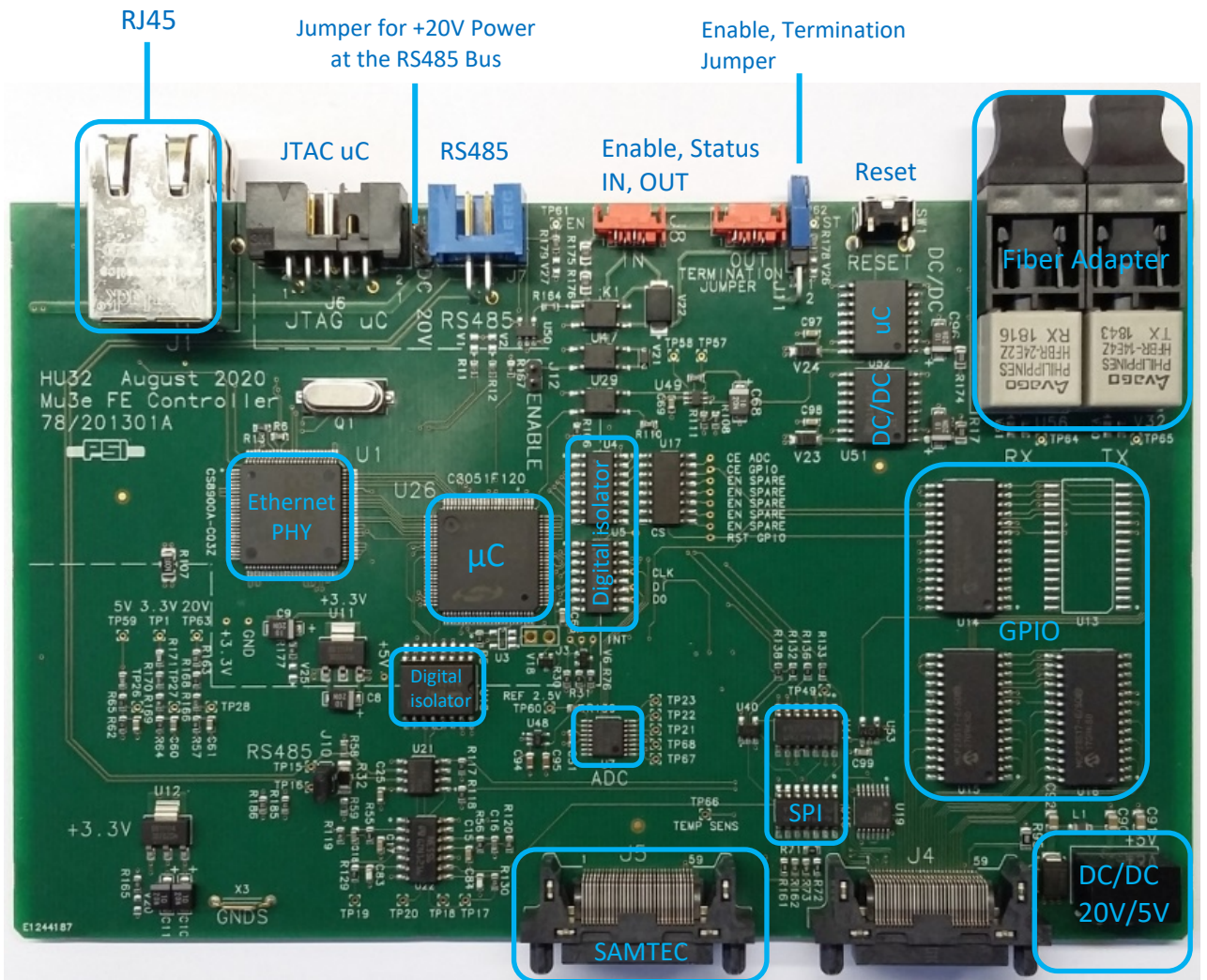
Figure 3: Front End Controller Board PCB Rev. A

Interfaces

The following interfaces are available on the CMB:

Interface	Data Rate	Purpose
Fiber adapter	-	External connection
RS485	-	External connection
MSCB	-	Backplane connection
SPI	-	Backplane connection
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Backplane interface		Backplane interface featuring - SPI for commands and configuration - MSCB for commands
10M Ethernet	10Mbit/s	Gigabit Ethernet connection for standalone operation: - UDP command interface (ASCII command line and binary command interface) - UDP event data transmission