

# **MINOS Near Detector Front End Electronics Master Clock Controller (MCC) Printed Circuit Board review**

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## **I. MCC**

### **A. General Description**

- Picture of module provided (mcc.jpg)
- Schematics Provided in PDF File  
(mcc\_schematics.pdf)
- Connector Types
  - (2) 96-pin DIN male backplane connectors, 3M 7296-50C2-TH
  - (6) Right angle PCB mount LEMO connectors
  - (1) 10 pin header, 3M 2510-6003UB
- Connector pinouts available within schematics.

## I. MCC (Cont.)

### B. Mechanical Description

- No Special Subrack Requirements
- Board Size: 280mm x 9U standard VME
- Board Thickness: 0.062” Standard, No Edge Milling
- Stiffeners: 3 horizontal, 1 vertical
- Warpage: Standard Acceptable
- Chamfers: Not Required, Not Specified
- Clearances: DRC 8 mill traces, 8 mil spacing
- Non-circuitry areas bare
- ESD Protection: None (Not Available in Crate)
- Front Panel:
  - Painted, anodized aluminum with silkscreen
  - Ejector Handles with holdings screws
  - LEDs present with labeling
  - Connectors not isolated from front panel
- Keying: None
- Test & Repair:
  - Standard Test stand, with Open Side Panel
  - Test points on PCB for GND and signal monitoring
  - Full Checkout & Support from FNAL/ANL

## I. MCC (Cont.)

### C. Electrical Description

- Power Pins and protection:
  - (3) VCC pins, (8) GND pins on J1
  - 2.6A Polyswitch resettable fuse, 0.75A average current draw from VCC.
  - 1N5908 transorb
- I/O Connector Types
  - 6 Front panel LEMO input connectors: 5 TTL MIBS/TCLK signals, 1 RF repeater signal
  - 10 pin header with keyed shroud for JTAG download of Altera PLDs and FPGAs.
  - J1 Backplane: 96-pin DIN; TTL, Power, & Ground
  - J2 Backplane: 96-pin DIN; custom differential LVDS cable bus to distribute clock and timing signals
- Power Distribution: Use Power Planes, Meets IPC Industry Standards
- Air Flow: Crates have integral bank of six fans.