

Electronic Systems Engineering

CC-USB Crate Controller

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GENERAL DESCRIPTION

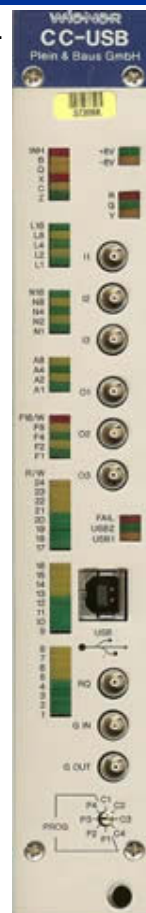
The CC-USB is a full-featured CAMAC Crate controller with integrated high speed USB interface. It supports Master and Slave operations with full CAMAC arbitration; as a master it accepts slaves. The CC-USB is FASTCAMAC compliant. The CC-USB internal FPGA can be programmed to operate as command sequencer with data buffering in a 22kB FIFO. Combined with front panel triggering via the CAMAC operation and data taking can be done without any PC or USB activity.

All CC-USB logic is controlled by the XILINX Spartan 3 FPGA. Upon power-up the FPGA boots from a flash memory. The configuration flash memory can be reprogrammed via the USB port, allowing convenient updates of the firmware. 4 memory sections allow upload and use of different firmware versions.

The integrated CAMAC data way display as well as additional user and status LED's for the controller and the USB port provide all necessary system information for monitoring, hardware control and debugging.

CC-USB Features

- high speed USB2 interface, auto-selecting USB2 / USB1, LED's for speed and status
- 3 pre-defined NIM, 3 user-programmable NIM (with LEMO connectors)
- 3 user-programmable LED's
- visual CAMAC data and status display with 54 red, green, and yellow LED's (N, F, A, Data, LAM, Q, X, C, Z)
- auxiliary crate controller support
- FASTCAMAC level 1 compatible
- programmable LAM mask
- direct USB-to-CAMAC calls (EASY-CAMAC)
- 1k x 16 bit CAMAC command stack for user definable / host-controlled readout modes
- readout triggered either via USB link, or by a programmable combination of LAM's, or by a start signal applied to a (programmable) NIM input
- 22-kByte pipelined data buffer (FIFO) with programmable level of transfer trigger
- Sustained readout rate in excess of 2.8 MByte/s
- Low power consumption, only +6V and -6V used



Read-out Modes

- single word transfer (16- or 24- bit)
- Q-stop (repeated readout of the same A and N until Q=0 is returned)
- Q-scan (repeated readout with A and N increment until Q=0 is returned)
- autonomous (intelligent) readout pursuant to user-programmed stack
- 1k of 16-bit stack memory
- conditional readout gated by 16-bit hit register (quadruple OR of 16-fold AND's of hit bits and programmable mask bits)
- optional (cycle-by-cycle) wait-for-LAM with programmable LAM timeout
- optional (cycle-by-cycle) skipping of S2 strobe (500ns cycles)
- stack supports Q-stop and address-scan mode entries

- stack supports FASTCAMAC mode entries
- optional readout of sub-addresses identified in a previously fetched address pattern
- block single-NAF write of up to 64 kWords (16- or 24-bit)
- block single-NAF read of up to 64 kWords (16- or 24-bit)

Technical Data

Packaging	double wide CAMAC module
Interface	USB2 / USB1 auto-detecting / ranging, Connector: USB type B
Inputs	3 user inputs, NIM level , LEMO pre-programmed (firmware 7504): I-1: trigger (with 24 bit trigger counter) I-2: 24 bit counter I-3: coincidence register
Outputs	3 programmable outputs for CAMAC, USB and DAQ signals, NIM level, LEMO default setting (firmware 7504): O-1: busy O-2: internal event trigger O-3: end of busy
Display	2 power LED's (+/-6V) 3 programmable User LED's (red, green, yellow) 3 USB status LED's (USB1, USB2, Failure) CAMAC data way display N, F, A, Data, LAM, Q, X, C, Z, I, B
Aux. Controller	Build in auxiliary crate controller support Front panel connectors for Grant In/Out and Request Rear side LAM grade connector
Firmware	Software upgradeable, 4 firmware locations Selection via 8 position switch (P=program, C-use)
Performance	CAMAC up to 3MB/s, FASTCAMAC / special modes up to 12MB/s

For assistance, contact [Help Desk](#), helpdesk@fnal.gov

Information compiled and maintained by W. Barker ; last modified on December 10th, 2008.

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