

GLAST Large Area Telescope:

4.1.7 Engineering Models

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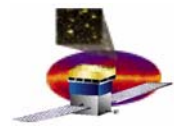
For CAL-TKR Engineering Tower Test (1)

- ❑ The principle was written up and released/distributed by Mike Huffer
 - ❑ [LAT-TD-00861-01 \(July 2002\), Test-Stand Architecture Redux](#)
- ❑ Following are some slides to summarize (and update) the plan



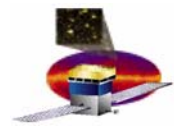
For CAL-TKR Engineering Tower Test (2)

- What will be supplied for engineering tower test:
 - Tower Electronics Module
 - Tower Power-Supply Module
 - VME crate with
 - PPC604 EGSE CPU
 - LAT Communication Board
 - VME Transition Board
 - 28-V spacecraft (bench) supply, 110V input
 - Cables between TEM and rest of DAQ (not from TEM to front-end electronics, responsibility of sub-system)
 - Software
 - No monitoring beyond what is digitized on tower: CAL/TKR/TEM temperatures, voltages, currents



For CAL-TKR Engineering Tower Test (3)

- ❑ Tower Electronics Module EM1
 - ❑ Final interfaces to tracker and calorimeter including power (when Tower Power Supply Board is attached, see next slide)
 - ❑ Flight-like functionality (control, trigger and event data taking)
 - ❑ includes digitization of sub-system temperatures
 - ❑ Have 18 TEM boards in hand, being tested
 - ❑ Have software drivers
 - ❑ Aluminum enclosure for TEM in fabrication



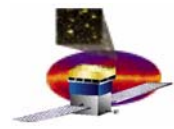
For CAL-TKR Engineering Tower Test (4)

- ❑ Tower Power Supply Module (EM1)
 - ❑ Final interfaces to TEM and LAT Power-Distribution Unit (which supplies 28-V). Power Distribution Unit is prototyped on VME Transition Board
 - ❑ Contains DC/DC converters to provide
 - ❑ 1.5V TKR
 - ❑ 2.5 V analog and digital TKR
 - ❑ 0-150V Bias to TKR. The set point is programmed via a register on the TEM (already in software which was distributed)
 - ❑ 3.3V analog and digital CAL
 - ❑ 0-100V Bias to CAL. The set point is programmed via a register on the TEM (already in software which was distributed)
 - ❑ 3.3V DAQ (TEM)
 - ❑ Transition Board has additional capability (does not need to be used): it enables changing of all normally fixed supply voltages to TEM, CAL, TKR (1.5V, 2.5V, 3.3V, all +/- 10%) under program control
 - ❑ Prototype Power Supply Module in integration at SLAC
 - ❑ Aluminum enclosure in fabrication



For CAL-TKR Engineering Tower Test (5)

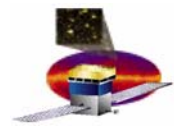
- ❑ 28-V Master Power Supply already at SLAC
- ❑ LAT Communication Board (LCB)
 - ❑ VME LCB/COM Board is used in present EGSE stations
 - ❑ Will be replaced with PCI-Interface LCB EM1 (PMC plug-in card on VME PPC604 EGSE CPU)
 - ❑ Closer to final LCB (interface and full flight-like functionality)
 - ❑ Transparent to EGSE user (no change in user software), just replace VME card with PMC (PCI Mezzanine Card) plug-in card on existing CPU
 - ❑ In design, scheduled to have prototype late December
 - ❑ Takes care of communication using LAT protocol to TEM (via Transition Card)
 - ❑ Commanding and read-back
 - ❑ Event data acquisition



For CAL-TKR Engineering Tower Test (6)

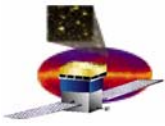
- ❑ **VME Transition Board**
 - ❑ **EM1 Functionality of**
 - ❑ **LAT Fan-Out/Fan-In unit**
 - ❑ **Global Trigger**
 - ❑ **Power-Distribution Unit**
 - ❑ **Command from LCB is fanned-out on this board to TEM**
 - ❑ **Hosts 20-MHz system clock, also fanned-out to TEM and LCB**
 - ❑ **Receives command response from TEM and forwards to LCB**
 - ❑ **Receives trigger inputs from TEM and generates trigger messages (back to TEM)**

 - ❑ **Prototype in hand, being integrated**



For CAL-TKR Engineering Tower Test (7)

- Software (on PPC604 CPU)
 - Drivers for
 - LCB (includes front-end drivers)
 - Transition board
 - TEM
 - Interface to I&T software



Other DAQ EM's (not used for tower EM test)

- **Spacecraft Interface Board (SIB)**
 - Prototype board with cPCI interface (in ACTEL) and MIL1553 interface in test at NRL
 - Next prototype will include LVDS (event-data) interface to spacecraft (when interface is defined, in development with SC vendor)
- **CPU**
 - BAE RAD750 cPCI Engineering module already in test at NRL since Spring 02
 - PPC603e back-up cPCI board in debugging stage at NRL
- **Event-Builder**
 - EM1 in design, prototype in early Spring 03
- **ACD Electronics Module**
 - Version to support one full ACD FREE already in use at GSFC
 - Version with full functionality and interface to 12 ACD FREE's in design, prototype in December 02