

USCM & M-Crate [Status May 7, 2002]

Item	Comments
Cryo-Cooler electronics	Preferred solution: CCDB & USCM in its own box (See CC report)
General monitoring	Magnetic field Temperature sensors Pressure sensor Humidity sensor [Ground operation only] Accelerometer
LAS electronics	W. Wallraff & W. Karpinski
Star Tracker	<p>Summary by A. Biland & comments by A. Lebedev (AL):</p> <p>ASTE (star-tracker electronics) will be connected to a USCM by RS-232 (one RS232 line to each of the 2 redundant USCM, both lines can be used to read positions AND program download)</p> <p>Only one USCM should be active at a given time</p> <p>AL> however both USCM may run simultaneously. Only one USCM will send AL> command to ASTE at a time - but next command may come from the other AL> USCM. If the second USCM sends the command while the command from the AL> first USCM is not fully processed then the old command is cancelled.</p> <p>The only other connection to the outside world for ASTE will be a line (most probably LVDS, several physical lines for redundancy) for a 'clock reset' command</p> <p>AL> It is worthwhile to mention that ASTE should have this clock at all!</p> <p>AL> Resolution of the clock, stability, capacity (32 bits?), etc...</p> <p>After a 'clock reset', ASTE will immediately save the current clock into a memory and reset its clock to zero</p>

ASTE will run permanently and always keep a set of positional parameters plus the internal time when the picture was taken in an internal memory, so that it can always deliver a valid answer when USCM sends a 'give me data' command.

If USCM will ask for data too often, it will receive the same data-set several times (identifiable from identical ASTE-time)

ASTE will also keep house-keeping (HK) data in internal memory to be read out with a 'give me HK' command from USCM

Question: Shall the 'clock reset' time be included in HK-data or shall there be a special 'give me clock' command ?

AL> I think 'clock reset' time should be included in positional parameters

AL> record:

AL> "Clock was reset at ... and now it reads ...".

Program updates (typically 500kB) will be uploaded via USCM and RS232

Open Questions to ASTE:

- what was the intention of additional digital lines ?
- can same RS232 line be used for program and data ?

PS: I think to keep the precision in the specs requested by Roberto et.al. is only possible when the cameras are mounted in the Tracker structure itself. Since space is very restricted there, the cameras need to have a very small footprint. Could a camera design as implemented in the new 'Minolta Dimage X' be useful for us ? (they implemented a 3x optical zoom that stays completely inside a very small camera)

http://www.minoltaeurope.com/pe/digital_photography.html

Clock Synchronization

Summary by A. Biland & comments by A. Lebedev (AL):

- i) There exists a GPS board somewhere to be used as 'master clock'
AL> a) GPS board will be in M-Crate (former M-Box) - current thinking
AL> b) important to mention that this 'master clock' is absolute time(UTC)
 - ii) there can be several secondary clocks for different tasks
(trigger, star-tracker,) if needed
Each electronics containing a clock will always add a 'local time'
stamp to its data
 - iii) there will be a dedicated line (most probably LVDS, several physical
lines combined for redundancy) between the GPS board and all
boards containing a clock
 - iv) USCM handling the GPS board will send a 'synchronize' comand
(initiated by JDCx or ground control or ?) to GPS
GPS will immediately copy actual time into internal memory
and send fan out the 'clock reset' command to all secondary clocks
 - v) when receiving the 'clock reset' command, all local times have
IMMEDIATELY to be copied into local memory and the local clock
be reset
 - vi) it is the responsibility of higher level control logic to make
sure to read the 'clock reset times' of all clocks (through the
USCMs handling the boards containing clocks)
AL> Trigger module will deliver its 'clock reset time' via AMS-Wire,
AL> no USCM involved
- Looking into this scheme, I propose we should also add a reset-counter
to each clock (that at each 'reset' will be copied to internal memory
and then incremented). This counter should together with the local time

	<p>be added to the data. At power up, this counter should be initialized to zero.</p>
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	<p>I do not expect all these counters to be in perfect sync for the whole running time of the experiment, but it would still ease the handling of data offline / identification of problems in case something goes wrong</p>
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