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**MIT**

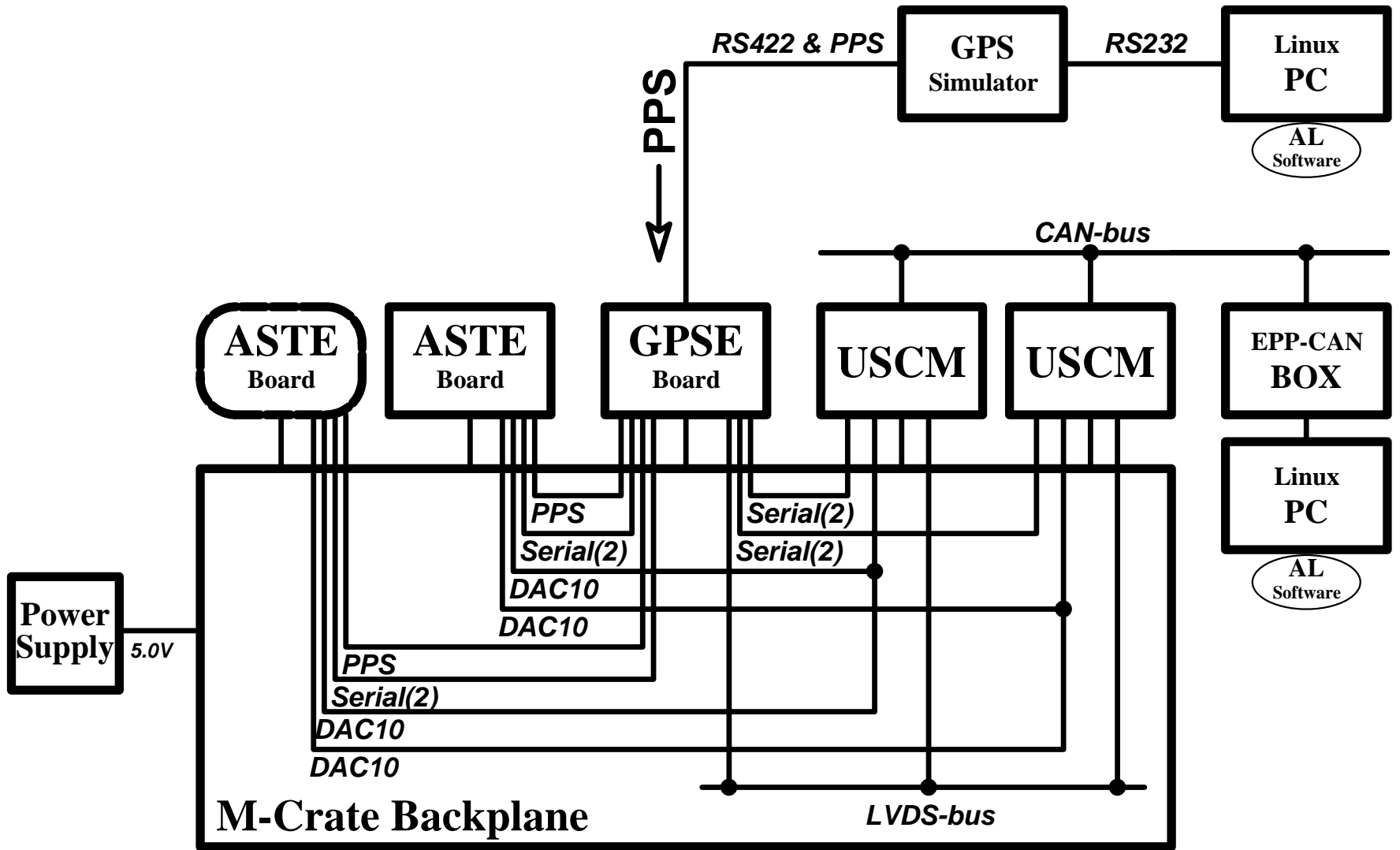
**TESTING**  
**ASTE BOARD**  
**AT CERN**

AMS TIM Meeting at CERN, Geneva, July 2006

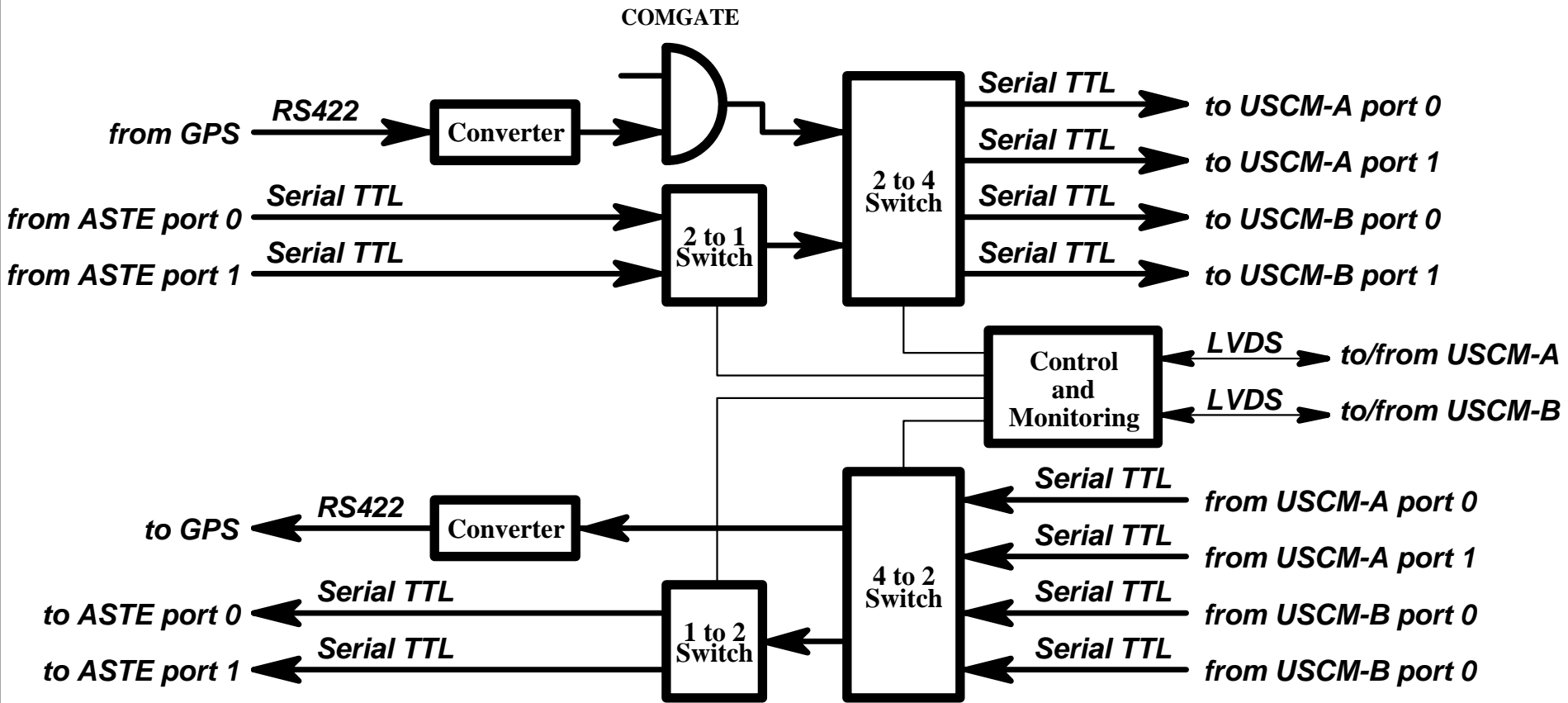
# COMPONENTS UNDER TEST

- ASTE prototype board (from Paolo)
  - Test of communication
  - Test of local clock reset by PPS
  - Test of DSP switching on/off **(not done)**
  - Test of Dallas sensor readout **(not done)**
- GPSE EM (produced by Volker)
  - Test of communication
  - Test of compatible PPS generation (int & ext)
- M-Crate backplane (provided by Waclaw)
  - Test of correct control lines layout

# ASTE Tests (1)



# GPSE: Serial Commutator



./GPSE-2 @ localhost.localdomain

USCM JMDC Tx Rx RUN Flash  
 F F N/B 3 A A GPSE-2 Commander A. Lebedev 02-Jun-06

Which USCM? A Port 0 2400 Port 0 INITIALIZE GPS Port 1 19200 Port 1 OPEN TM

| Control & Status Register |                        |   | USCM Serial Ports Outputs |                      |   |
|---------------------------|------------------------|---|---------------------------|----------------------|---|
| 0                         | EPOCH Gate Auto Close  | 0 | 0                         | USCM A Port 0 to GPS | 0 |
| 1                         | COM Gate Auto Open     | 0 | 0                         | USCM A Port 1 to GPS | 0 |
| 2                         | COM Gate Auto Close    | 0 | 0                         | USCM B Port 0 to GPS | 0 |
| 3                         | EPOCH Gate Status      | 0 | 0                         | USCM B Port 1 to GPS | 0 |
| 4                         | COM Gate Status        | 0 | 0                         | USCM A Port 0 to AST | 0 |
| 5                         | USCM A Power Status    | 0 | 1                         | USCM A Port 1 to AST | 1 |
| 6                         | USCM B Power Status    | 0 | 0                         | USCM B Port 0 to AST | 0 |
| 7                         | GPS DWTO Status        | 0 | 0                         | USCM B Port 1 to AST | 0 |
| 8                         | PPS Gate Port A Status | 0 | Command: W R              |                      |   |
| 9                         | PPS Gate Port B Status | 0 | USCM Serial Ports Inputs  |                      |   |
| 10                        | GPS Output Polarity    | 0 | 0                         | GPS to USCM A Port 0 | 0 |
| 11                        | GPS Input Polarity     | 0 | 0                         | GPS to USCM A Port 1 | 0 |
| 12                        | AST Serial Port        | 0 | 0                         | GPS to USCM B Port 0 | 0 |
| 13                        | AST Output Polarity    | 0 | 0                         | GPS to USCM B Port 1 | 0 |
| 14                        | AST Input Polarity     | 0 | 0                         | AST to USCM A Port 0 | 0 |
| 15                        | GPSE Power Bit         | 0 | 0                         | AST to USCM A Port 1 | 0 |
| Command: W R              |                        |   | 0                         | AST to USCM B Port 0 | 0 |
| Command: W R              |                        |   | 0                         | AST to USCM B Port 1 | 0 |

PPS EPO Gate COM Gate GPS  
 SND OPN CLS OPN CLS RST Command: W R

0 Port 0  
 1 Port 1 BEGIN EPOCH

P 0

# ASTE BOARD COM. TEST

- Program aste-1 was used
- For ASTE board in slots 1 and 2
- 100 times:
  - Send 60 symbols to ASTE board
  - Receive, check and compare
- All 32 combinations of 2 ASTE serial ports and 2 serial ports of each of 2 USCMs were used
- Result – O.K.

# ASTE Communication Test

ASTE board in slot 1 of M-Crate backplane

| ASTE<br>port | --- TX ---<br>USCM | port | --- RX ---<br>USCM | port | Comment: |
|--------------|--------------------|------|--------------------|------|----------|
| 0            | A                  | 0    | A                  | 0    | Test OK  |
| 0            | A                  | 0    | A                  | 1    | Test OK  |
| 0            | A                  | 0    | B                  | 0    | Test OK  |
| 0            | A                  | 0    | B                  | 1    | Test OK  |
| 0            | A                  | 1    | A                  | 0    | Test OK  |
| 0            | A                  | 1    | A                  | 1    | Test OK  |
| 0            | A                  | 1    | B                  | 0    | Test OK  |
| 0            | A                  | 1    | B                  | 1    | Test OK  |
| 0            | B                  | 0    | A                  | 0    | Test OK  |
| 0            | B                  | 0    | A                  | 1    | Test OK  |
| 0            | B                  | 0    | B                  | 0    | Test OK  |
| 0            | B                  | 0    | B                  | 1    | Test OK  |
| 0            | B                  | 1    | A                  | 0    | Test OK  |
| 0            | B                  | 1    | A                  | 1    | Test OK  |
| 0            | B                  | 1    | B                  | 0    | Test OK  |
| 0            | B                  | 1    | B                  | 1    | Test OK  |
| 1            | A                  | 0    | A                  | 0    | Test OK  |
| 1            | A                  | 0    | A                  | 1    | Test OK  |
| 1            | A                  | 0    | B                  | 0    | Test OK  |
| 1            | A                  | 0    | B                  | 1    | Test OK  |
| 1            | A                  | 1    | A                  | 0    | Test OK  |
| 1            | A                  | 1    | A                  | 1    | Test OK  |
| 1            | A                  | 1    | B                  | 0    | Test OK  |
| 1            | A                  | 1    | B                  | 1    | Test OK  |
| 1            | B                  | 0    | A                  | 0    | Test OK  |
| 1            | B                  | 0    | A                  | 1    | Test OK  |
| 1            | B                  | 0    | B                  | 0    | Test OK  |
| 1            | B                  | 0    | B                  | 1    | Test OK  |
| 1            | B                  | 1    | A                  | 0    | Test OK  |
| 1            | B                  | 1    | A                  | 1    | Test OK  |
| 1            | B                  | 1    | B                  | 0    | Test OK  |
| 1            | B                  | 1    | B                  | 1    | Test OK  |

# ASTE BOARD PPS TEST#1

- Program aste-2 was used
- For ASTE board in slots 1 and 2
- For about 1 hour:
  - Request, receive, check and print ASTE timer message
  - Wait 1 sec
  - Send PPS, generated by GPSE, to ASTE board
  - (PPS should reset ASTE board local clock)
  - Request, receive, check and print ASTE timer message
- Analyze the output (LSB of ASTE clock =1ms)
- Result – O.K.

# ASTE BOARD PPS TEST#2

- Run GPS-simulator to generate PPS
- Program aste-3 was used
- For ASTE board in slots 1 and 2
- For about 1 hour:
  - Request, receive, check and print ASTE timer message
- Analyze the output (ASTE clock is reset indeed)
- Result – O.K.

# TESTS RESULTS

- GPSE serial commutator works as expected
- M-Crate backplane connections are O.K.
- ASTE local clock works as expected
- Not tested this time:
  - Switching on/off ASTE DSP with DAC signals
    - DAC signals are correctly delivered to ASTE DSP pin
    - No switching function in ASTE DSP “prototype” software
  - AST Dallas sensor readout
- Observation – ASTE DSP “prototype” software has some problems with initialization - **fixed**

# COLLATERAL RESULTS

- “Go” for production of GPSE board QM, FM, FS (with proper modifications not related to ASTE board).
- “Go” for production of M-Crate backplane QM, FM, FS (with proper modifications not related to ASTE board).

# FUTURE ASTE BOARD TESTS

- Test of DSP switching on/off
- Test of Dallas sensor readout
- More “realistic” ASTE DSP software:
  - ASTE board commanding and monitoring
  - ASTE board operations
- ASTE board control software development
- Tests with AST cameras (?)