EVLA MIB Software

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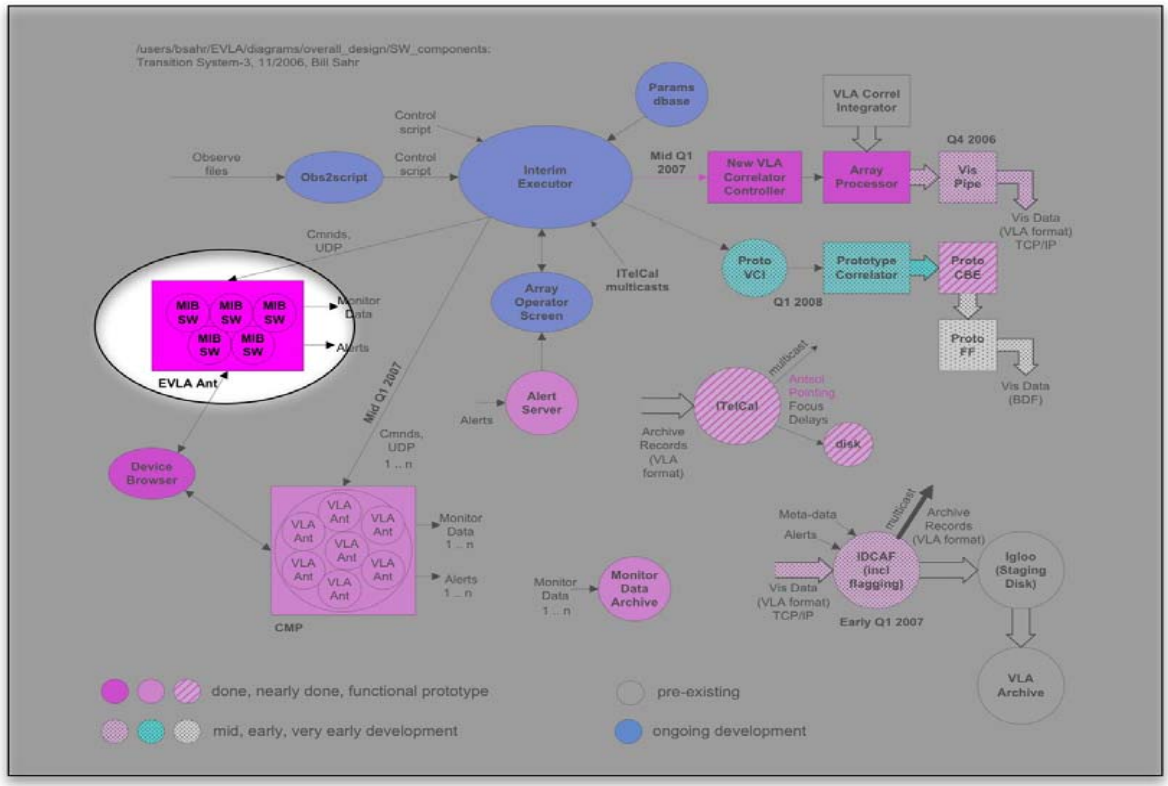
MIB Software

- Reviewed during MIB CDR 10/04
- Documentation on web. ICD's, Framework developers guide, etc.
- Underlies the transition and final M&C system

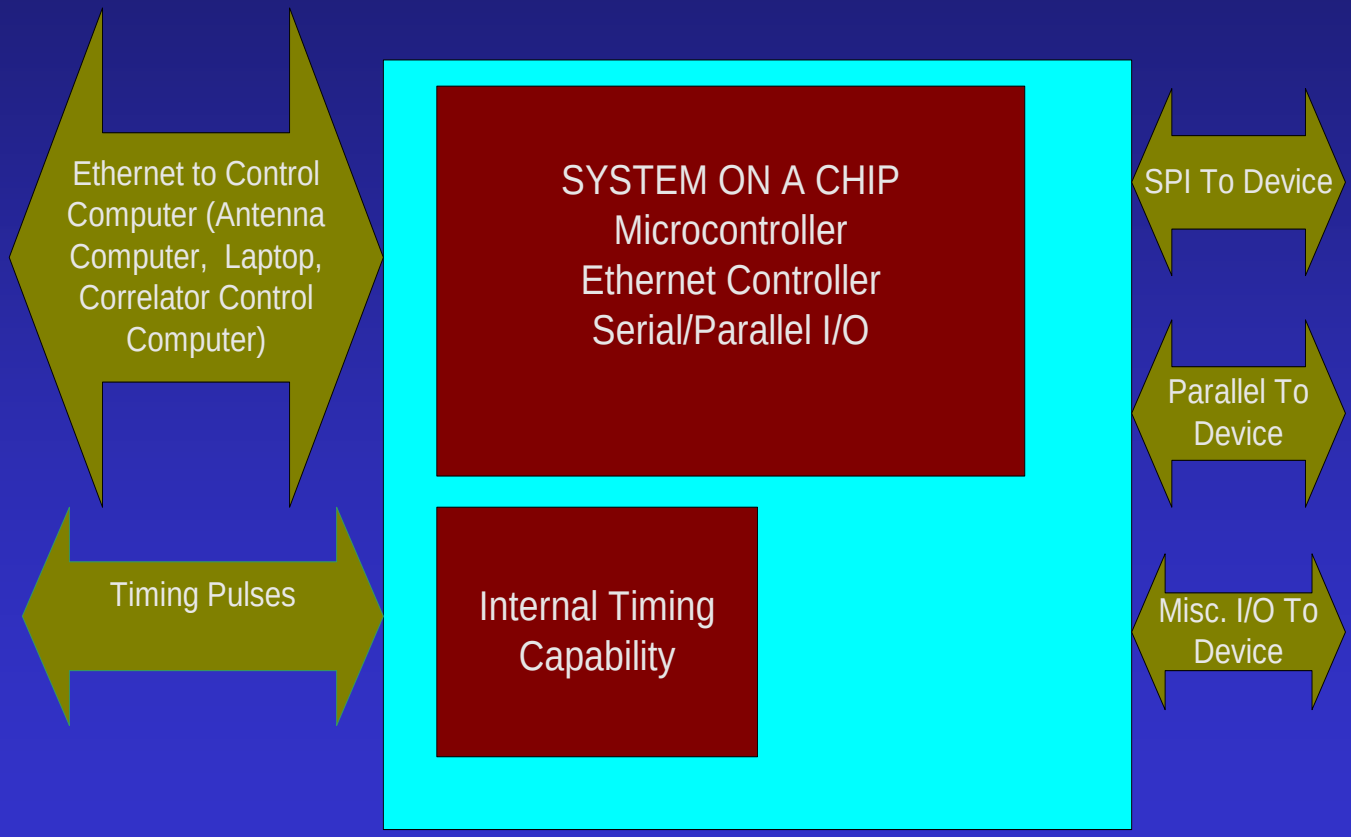
MIB Software



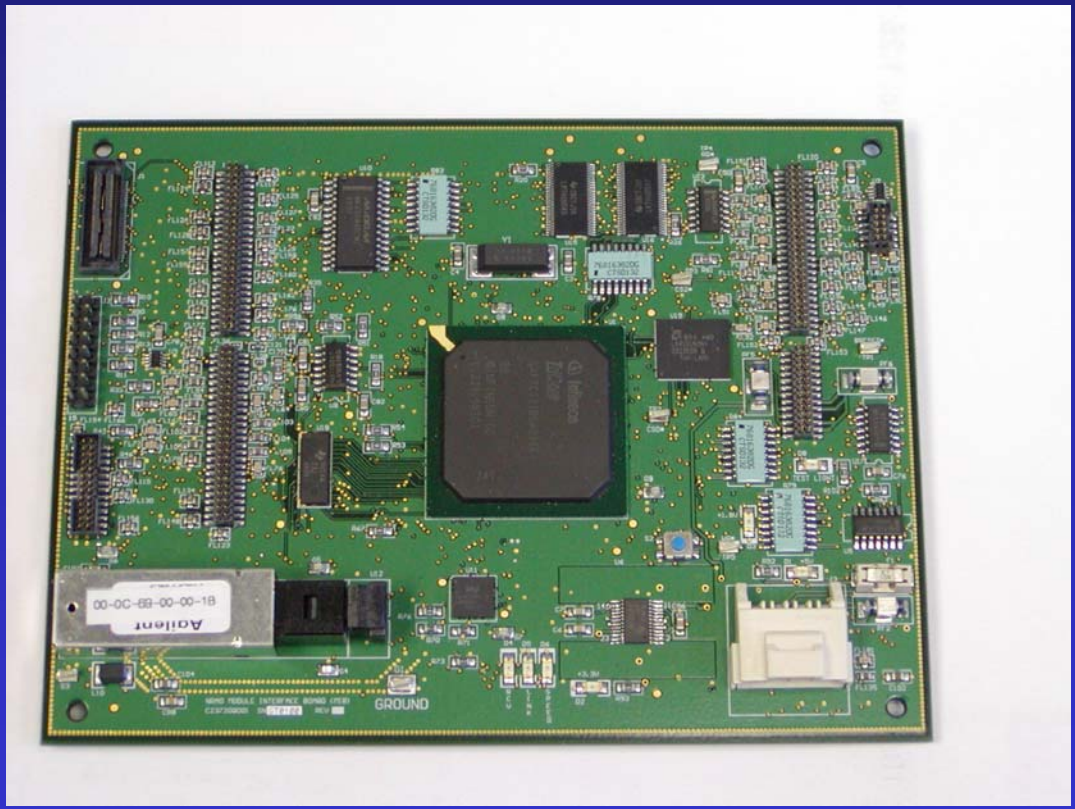
MIB Hardware

- Module Interface Board
  - Lowest level processing unit in the M&C system
  - Installed in any module requiring ‘intelligence’
  - Custom board based on Infineon TC11IB microprocessor
    - 1.5 Mbytes Internal RAM
    - RFI Quiet, subsurface clock lines, use internal memory
    - SPI, GPIO for inter-module communication
    - 100 Mb/s (optical) Ethernet for external communication
  - ~ 30 MIB’s / antenna + others in control bldg/lab

Module Interface Board (MIB)



Top Side Of MIB



MIB Software

- General
  - Systems Software
    - RTOS (Nucleus)
    - Network Stack
    - Bootloader
  - MIB Framework
    - Generic for all MIB's
  - Module Specific SW

MIB Framework Software

- Overview
  - Rationale for MIB Framework
    - Motivated by parallel HW development converging on one SW developer.
    - Maximize Code reuse
    - Rapid Code Development (< 1 day for simple modules)
    - Abstract module HW differences using data driven design

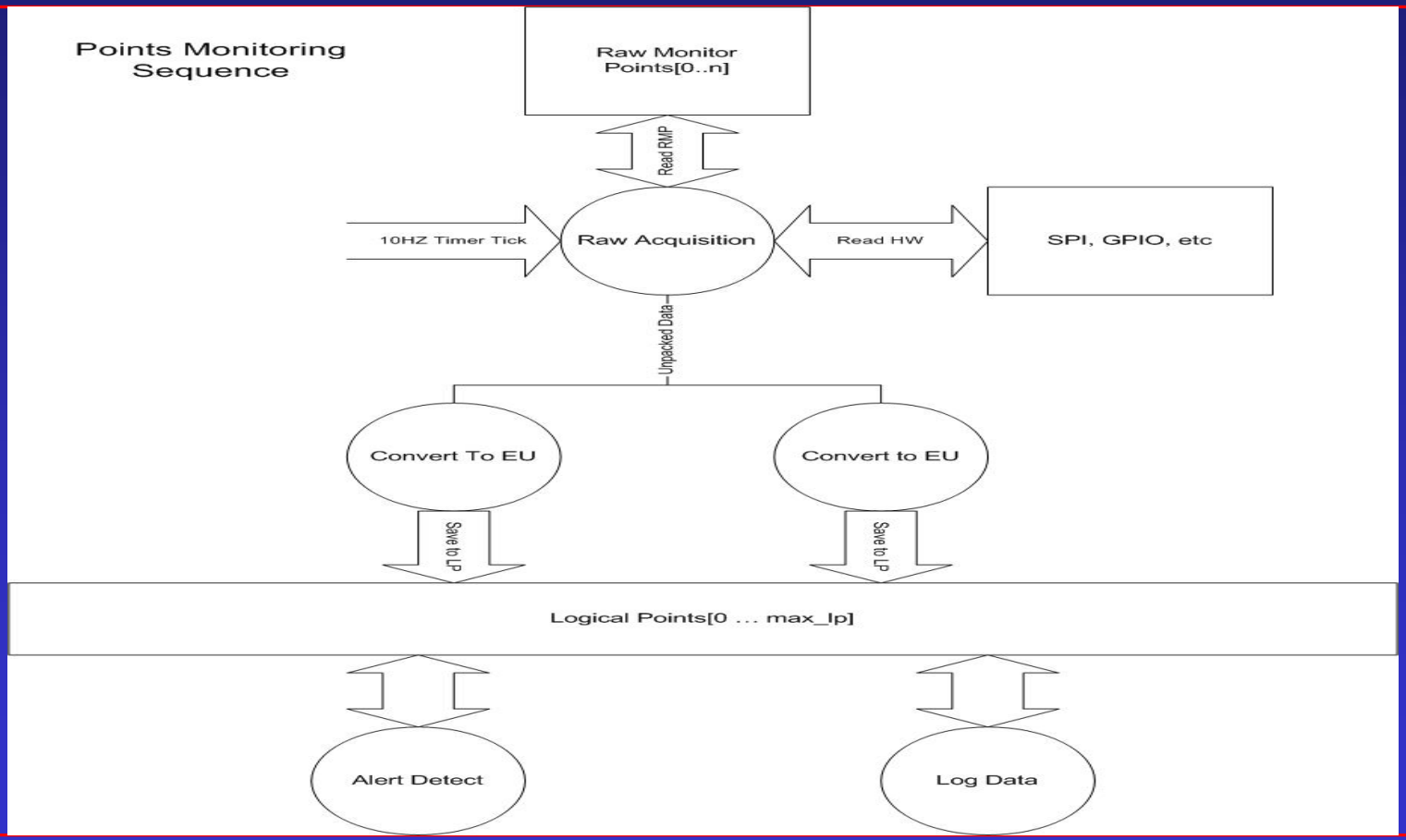
MIB Framework Software

- Overview
  - Framework design considerations
    - SPI, GPIO for module communication
    - Ethernet for external communication
    - Execute from Internal memory
    - Field up-gradable software
    - High reliability
    - Hard real-time

MIB Framework Software

- Data Structures
  - Logical Points
    - Global, memory resident DB
    - Array of structures which characterize an I/O point for a device
    - Monitor or Control, Analog vs Digital
    - Defines Alert criteria, conversion type, logging intervals
    - Accessible through command line
    - Initialized from XML Flash File
  - Raw Monitor Points
    - Contain HW specific details
    - describes origin/ destination of data
    - defined in module specific files

MIB Framework Software



MIB Framework Software

- Functional Components
  - Service Port
    - command interface over UDP/ TCP
  - Deferred Command Execution
    - queues commands for later execution, synchronized to heartbeat, if present.
  - Code Loading
    - allow remote, ‘background’ loading of new software to flash memory.
  - Points Monitoring
    - monitors hardware, scales data to EU, generates alerts
  - Time Management
    - manages wall time via NTP and heartbeat pulse

MIB Framework Software

- Functional Components (cont)
  - –Watchdog
    - strokes watchdog timer, manages reset counters, alerts operator when reset
  - – Data Logging
    - Described in Data Port ICD
    - Data wrapped in XML messages, sent via Multicast
    - Archive Data
      - – periodic, rate adjustable per point.
    - Alert Data
      - – asynchronously, for in/out of alert conditions
    - Observe Data
      - – used by real-time components of M&C system
  - – Module SW
    - contained in module specific directory.

MIB Software

- Future Challenges
  - Automated builds
  - En masse software releases
  - Automated code loading

MIB Framework Software

- Commands (via Service Port)
  - Interface documented in SP ICD
  - Simple ASCII interface
  - via TCP (Telnet) or UDP
  - ‘get’ or ‘set’
  - three tier data hierarchy
  - Use of XML formatted output
  - time deferred (queued)

MIB Framework Software

- Service Port demo via Telnet

Questions?