EVLA MONITOR AND CONTROL HARDWARE REQUIREMENTS
BASIC REQUIREMENTS

• All Monitors/Controls Available Online
• Fieldbus
• Data Rates
• Timing Requirements
• RFI Requirements
• MIB Requirements
• Transition Requirements
FIELDBUS

• 1 Gigabit Full Duplex Switched Ethernet Between Control Building and Antennas
• 100 Megabit Full Duplex Switched Ethernet to EVLA Modules
WHY ETHERNET?

- COTS Equipment Available
- Maintainable Due To Widespread Commercial Use
- Large Packet Size => Low Overhead
- Protocols Built Into Operating Systems
- High Data Rates
WHY ETHERNET?

- Allows Same Fieldbus for Entire Monitor and Control System
- Slot Addressing Scheme Possible
- Convenient to Place Control Computer On Any Part of the Network
- Indeterminacy is Not a Problem Because of Using a Switched Network
DATA RATES

• Maximum Monitor Data Rate From EVLA Antenna Estimated At 200 Kbits/Second
• Maximum Monitor Data Rate From EVLA Module is 128 Kbits/Second
• Maximum Command Data Rate is Much Slower
TIMING

REQUIREMENTS

• Commands Must Be Implemented Within 100 µs of Intended Implementation Time
• Monitor Response Time is 10 – 100 ms
• Monitor Data Must Be Gathered, Time Stamped, Sent to an Archive
TIMING REQUIREMENTS

• Monitor and Control System Must Keep Absolute Time to Resolution of Better Than 10 ms
• Accuracy of Absolute Time Must be Within 10 ns
RFI REQUIREMENT

• Design for Minimum Emission of RFI
• Some Choices Driven By This Requirement
MODULE INTERFACE BOARD (MIB)

- Interfaces Fieldbus To Module
- Must Be Small In Size
- Must Be As Simple As Possible
- Ability to Implement Some Control Tasks Pertaining to Module Being Controlled
- Must Implement the Fieldbus Protocol
MODULE INTERFACE BOARD (MIB)

- Must Implement Module Communication Protocols
- A MIB Is Not Specific To a Module – It Obtains its Software From The Module
- Must be Able to Send Monitor Data Periodically, or On Demand
TRANSITION REQUIREMENTS

- VLA and EVLA Monitor and Control Systems Must be Used Concurrently During EVLA Construction
- A Combination of Old and New Modules Must Be Supported During Construction
- Prohibit or At Least Minimize Use of VLA Modules in EVLA Antenna
OTHER REQUIREMENTS

- Telephone System – VOIP
- Antenna Control Unit (ACU) – Servo System
- Utility Module