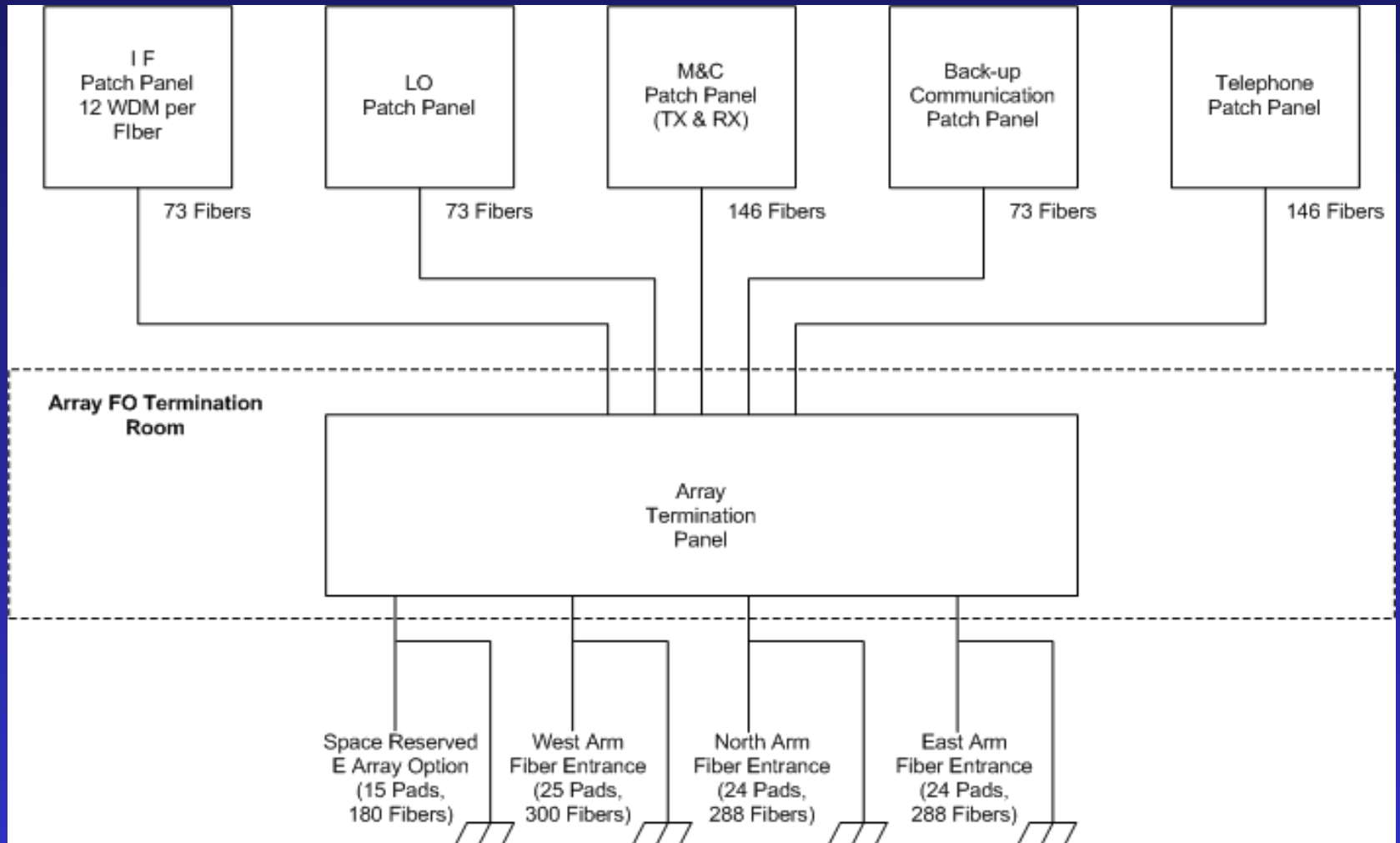# Fiber Tasks
Preliminary Design Review

December 5, 2001
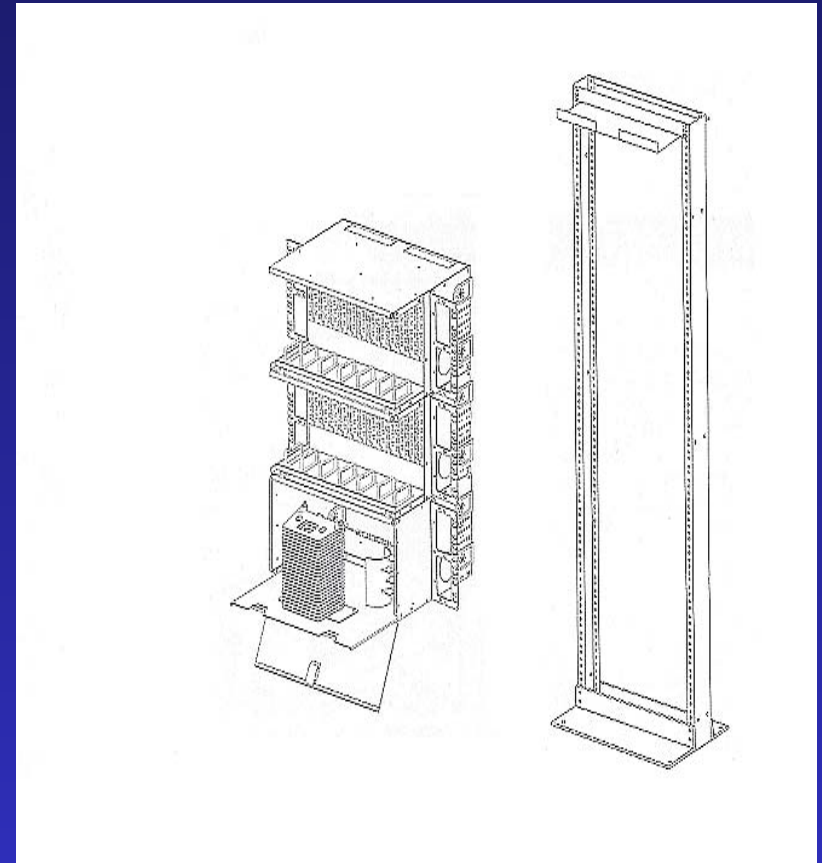
CB Main Distribution Frame

Patch Panels

- Similar to Termination Panel
- Located throughout the Control building

Phone System

- Two phones per antennas,
  - Vertex room and Pedestal
- Phone numbers remain with the antenna
- Will use the fiber system
- Will use COTS hardware

- Responsible for providing the Fiber from the Termination panel to Phone Room

Battery Backed-up Communication

- Similar to VLA WYE Monitor

- Un-interruptible power supply

MCB Network

- Standard Ethernet (two Fibers)
- COTS Network Router
- 1 Gbit/s to antennas
- 100 Mbit/s in the antennas
- Support ~48 nodes in each antenna
  - Two multi-mode fibers per node
  - Fiber to the Module
- Patch Panel will be located in the computer room

LO System

- Responsible for Lasers, Modulators, Fiber, Circulators, Receivers
  - Maybe integrated into the LO module
  - Phase stable system
- LO Patch panel
  - located in the Electronics Room
  - Fiber test equipment
- System Self-tests included

IF System

- Transmitters
- MUX-Fiber-DeMUX components
- Fiber Amplifiers
- Receivers
- Online monitoring

IF Transmitters

- Twelve Lasers – ITU spacing
- Automated Test
  - Output Power Measured at Each Laser (1% tap)
  - MCB accessible

- Manual Optical Power Measurements
  - Can be measured at the MUX output

IF Patch Panel

- Located in the Correlator room

- Includes De-MUX hardware

- Includes Fiber Amplifiers

- Manual Test Equipment
  - Full Signal Communication Analyzer

Rack Mount EDFA

- MCB adjusted Gain of each amplifier
- Also measures in/out optical power

OSICS module

IF Communication Analyzer

- IF Patch Panel
  - Manual measurements during reconfiguration

- Complete Diagnostic
  - Jitter
  - Q Factor
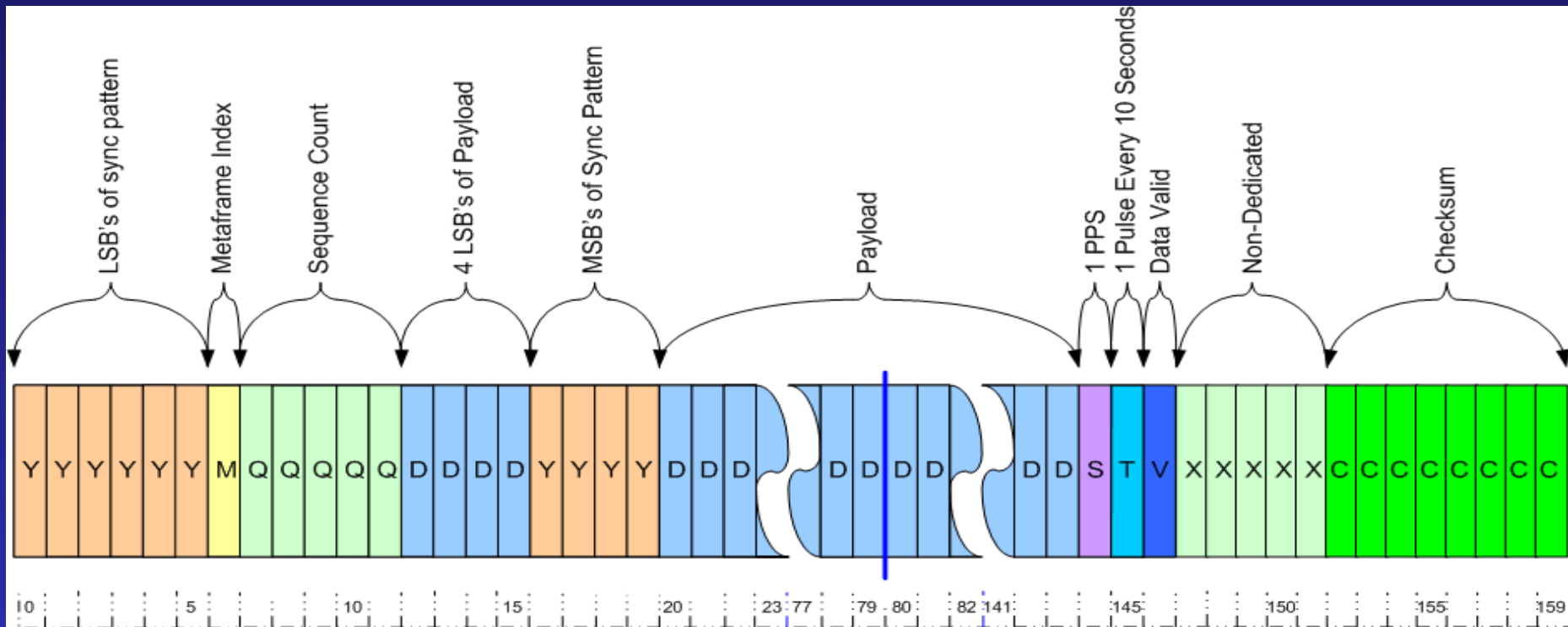 - Noise Margin
  - Rise / Fall times

IF System On Board Tests

- Test Patterns Generated at each Transmitter
- Nine Test Patterns
  - No Sync, alternating 1/0, all Ones, all Zeros
  - Parity Errors

- MCB controlled

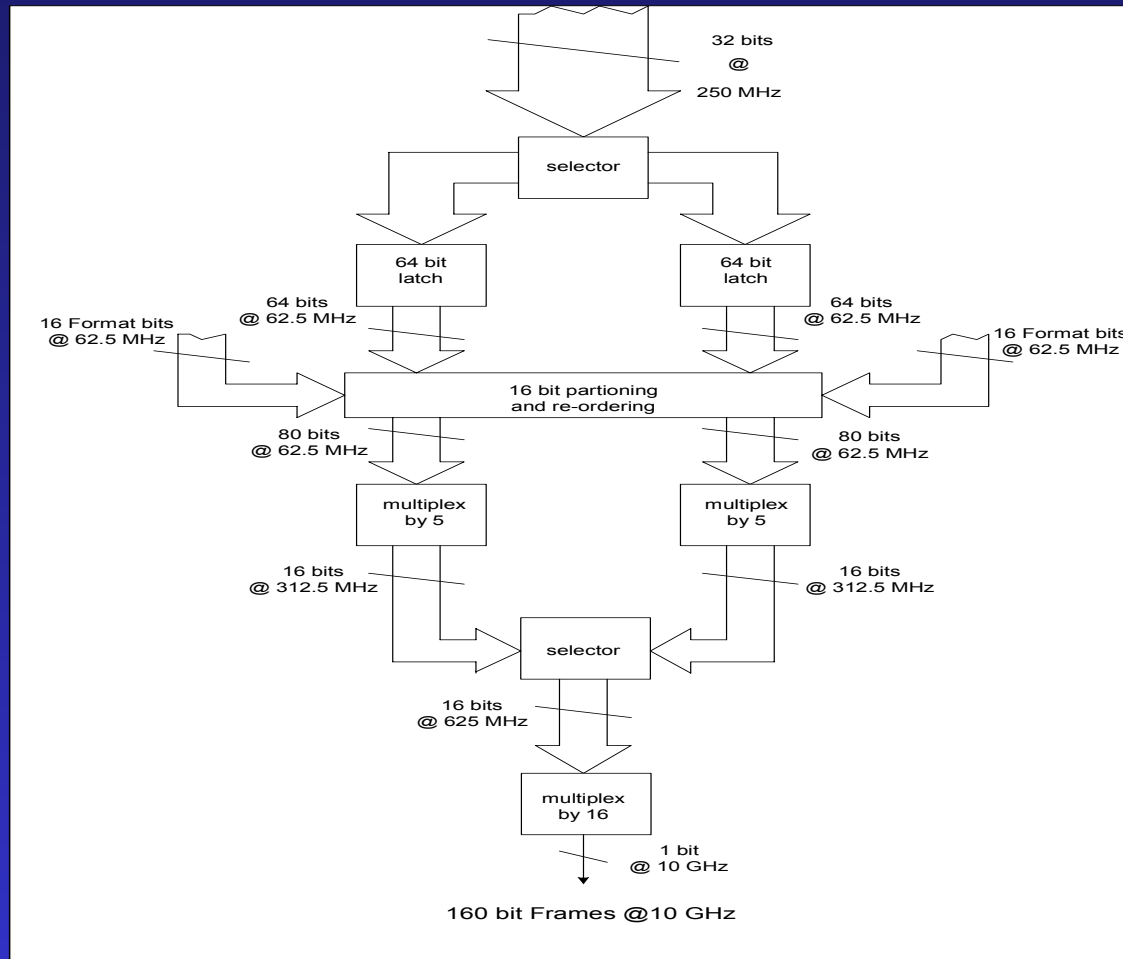# Proposed Frame Format

- EVLA Memo #33

Divided Sync Word

- Required to Identify Correct 1/2 Sequence

- 10 Bits long,
  - 6 bit identify Start-of-Frame
  - Barker Sequence - equal Ones versus Zeros

- Three Stage Synchronization Process

Sync Implementation

Three Stage Synchronization

- Stage 1 - Search bits for frame pattern

- Stage 2 – Monitor for "Correct" sync

- Stage 3 – If two "Bad" frames in a row

   or 2-out-of-8 fames are "Bad"

   Then Start Search Again

Timing Signals

- Metaframe Index

- Metaframe Sequence Count

- 1 PPS

- 1 Pulse per 10 seconds

Data Valid Signal

- Initiated at the antenna
  - Toggle Switch
  - MCB controlled
- Passed to correlator

Check Sum - BER

- Each 19 bits Generate a check Sum

- Provides continuous Bit-Error-Rate Performance Monitoring

- Only odd # of errors per 19 bits Detected

- Flags Correlator when over threshold

Scrambling

- Frame Synchronous Scrambling
  - Select pattern is modulo 2 added
  - Entire frame – except sync bits

- Pattern results in
  - Equal number of Ones/Zeros providing
    - Balance ac content, sufficient transitions
    - Minimize low frequency content

Conclusion

- Five systems will be supported

- On Board Tests Incorporated (MCB)

- Patch Panels will have test equipment

- IF Data Format will support Growth

Next Topic

IF Signal Path