EVLA Front-End CDR

Vertex Cabin Infrastructure
All-New Vertex Cabin Infrastructure

1. EMI/RFI Shielded Front End Rack
2. New duality for subsystems, A or B “sides”
3. A & B Pump request boxes, DC distribution boxes, AC distribution boxes (Scott-T)
4. P Band bulkhead connector panel
5. Cable Tray for RF & Control cables
Original VLA F Rack

† Open Frame with F14 modules, AC & DC power supplies, RF downconverter
† Noise Diode (Cal) Timing Box (in back)
† Pump Request Box (in back)
† Vacuum Pump
† Monitor & Control Data Set
VLA F Rack
FE Modules, Power Supplies
New Front End Rack

- EQUIPTO shielded cabinet with added RF absorber panels (≈ 20 dB more attenuation)
- F.E. ~ Interface modules, DC power supplies, DC distribution/Control cable connector panel, Cal timing reference box
- Extras ~ F.O. connector panel, DTS modules, Utility module
F Rack New Features

♦ No AC power, uses -48 VDC main supply
♦ Contains 2 types of bins/modules, transition and EVLA
♦ One DC power supply for all F.E. modules and DC distribution voltages to card cages
♦ Interfaces with new (EVLA) and old (VLA) card cages
♦ Vacuum pumps located in feed-cone segment
Transition Bin & EVLA Bin modules
Transition Bin
New and Old Modules

Transition Bin
- P302 DC Power Supply
- F320 Transition Interface
- F14 VLA Front End Interface

P302  F320  F14 #1  F14 #2

M303  F317  F317  M304
Transition Bin
P302 Power Supply

- F Rack & receiver DC power supply
- Supplies +17 V, –17 V, + 7 V, & + 32 V for DC distribution boxes A & B → new card cage
- Voltages are regulated in the EVLA receivers or routed through the F14 modules for old card cage
- Microprocessor equipped (MIB)
Transition Bin
Monitor and Control

- F320 Transition Interface (new)
- Provides Ethernet interface to the monitor and control system of transition receivers through the F14 modules
- Controls the feed heaters and Iridium filters
- Microprocessor equipped (MIB)
Transition Bin
Original M & C

- VLA F14 modules (3 receivers each)
- Original interface for old card cage on the transition receivers
- Routes ± 15 VDC to VLA style Card Cage
- Routes + 15 VDC and noise source control for the 74 MHz and P band receivers
EVLA Bin
All New Modules

- M303 Utility Module
- F317 EVLA receiver interface, 5 receivers each
- M304 Slot ID Memory
EVL A Bin
M303 Utility Module

» Monitors Antenna tilt angle (~5° of stow)
» Future feed heater control (post F320)
» Provides the feed heater current monitor
» Reports air handler fan status (2-speeds)
» Provides MIB reset control (LO/IF & FE)
» Allows for future environmental monitoring
EVLA Bin
Monitor & Control

~ Two F317 EVLA receiver interface modules
~ Provides monitor and control of new EVLA style card cages
~ Each module can interface with five receivers
~ One DB-50 cable per receiver vs. 2 DB-25 cables
~ Microprocessor equipped (MIB)
EVLA Bin
M304 Slot ID Memory

• Provides Internet Protocol address for all MIB-equipped F.E. modules by slot assignment
• Each M304 is uniquely programmed for its respective antenna (not interchangeable)
• Allows for a maximum of 11 individual slot IDs
• Six unused IDs allows for expandability
F Rack DC Power & EMI/RFI Connector Panel
F Rack DC Power & EMI/RFI Connector Panel

- -48 VDC Input Power Filter/On-Off switch
- Filtered Barrier Strip DC distribution (A&B)
- M&C cable connectors (DB-50)
- Utility Module I/O port (DB-50)
- 74 MHz/P Band power & control port (DB-15)
- Feed heater control cable port (DB-15)
- CWVR control cable port (DB-25)
DC Distribution Box

- One pair (A & B) in each Antenna
- Distributes P302 DC +17 V, −17 V, +7 V, and +32 V (EVLA)
- Each voltage fused
- 5 Output Ports
Pump Request Box

- One pair (A & B) in each Antenna
- Request logic signal powers vacuum pump via SSR
- 5 input ports with LED indicators
Darrell Hicks
EVLA Front-End CDR – Vertex Cabin Infrastructure
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A Group
S, C, X, Ku

B Group
L, K, Ka, Q