New Shielded Room

IF Data Transmission Fibers From Fiber Patch Panel Twelve 10.24 Gigabit/Sec Optical Links Per Antenna

ANT-01 ANT-02 ANT-26 ANT-27

Erbium Doped Fiber Amplifiers (only A-Array)

Passive 12 Channel WDM Optical Demultiplexer

WIDAR EVLA Correlator

(For full detail see WIDAR Correlator documentation)

3-Phase AC Power

WIDAR CORRELATOR
-48 VDC
Battery Backup Power System

From LO Master Rack
128 MHz
TC Fiber

Station Board

D352 Deformatter
CH 21
CH 23
CH 25
96 bit IF Data Deformatters
Input Chip
Delay Module 0
Delay Module 1
Filter Bank 0
Filter Bank 1
Wideband Correlator
VSI Chip 0
VSI Chip 1
X-Bar Output 0
X-Bar Output 1
Timing
Top
Middle
Bottom
CMIB

Crossbar Board

X-Bar FPGA
X-Bar FPGA

Baseline Board

8X8 Correlator Matrix
Long Term Accumulators
Outputs
Inputs
X-Bar Fanout Phasing
Gigabit Ethernet
CMIB

Correlator Backend & Archive

COTS CPU (x8)

New for VLITE

V-Lite Data Transmission Fiber Pair From Fiber Patch Panel 10 Gigabit/Sec Optical Ethernet

ANT-01 ANT-02 ANT-26 ANT-27

Patch Panel

Ant A Ant B Ant C Ant D Ant E Ant F Ant G Ant H Ant I Ant J

DFX Node 0 Local Storage
DFX Node 1
DFX Node 2
DFX Node 3
DFX Node 4
DFX Node 5

Infiniband Switch

NRL Correlator Backend, Fast Transient Backend & Archive

VLITE Processing System

(For full detail see VLITE documentation)

P351-1 LO / RTP Supply 2W Module (1 per rack)
MIB
7.5 VDC +17.5 VDC -17.5 VDC -7.5 VDC
48 VDC
OUT 500W IN + IN - (x6)

Power Distribution Board 1 per rack

Parallels two P351's for redundant operation

Supplies Power to: L352(x10), L353(x10), L355, M304(x2)

P351-2 LO / RTP Supply 2W Module (1 per rack)
MIB
7.5 VDC +17.5 VDC -17.5 VDC -7.5 VDC
48 VDC
OUT 500W IN + IN - (x6)

M304-1 Module ID Memory
Provides Slot ID to P351-1, L352 (x5) L353 (x5)

M304-2 Module ID Memory
Provides Slot ID to P351-2, L352 (x5) L353 (x5)

L352 - Round Trip Phase Measurement (1 per antenna)

2W Module

8 MHz
200 Hz Ref
Digital Phase Monitor
200 Hz
MIB
Analog Board
10KHz LPF
VCO 512 MHz
512 MHz+200 Hz
512 MHz
IF LO RF
PLL
Fiber Receiver
Integrated Package
Thermally Isolated Enclosure
DC Power: 10W (allow .25A @ 54.2 VDC)

L353 - LO Transmitter System (1 per antenna)

2W Module

512 MHz
DC Bias Adj +/- 300mv
SYNC ~500mv pp
512 MHz to Antenna Inverted during sync
SYNC
Logic & Driver
MIB
Analog Board
LASER
Modulator
Integrated Package
DC Power: 10W (allow .25A @ 54.2 VDC)

RT Phase Fibers from Antennas

LO/Ref Fibers to Antennas

L355 - Digital Timing Dist. – PCB in Rack

DC Power ~2W (allow 0.1A @54.2V)

8 MHz LVDS 10 Copies to L352 + 2 Spare
200 Hz LVDS 10 Copies to L352 + 2 Spare
SYNC PULSE LVDS 10 Copies to L353 + 2 Spare
Visual Activity Indicator
512 MHz+200 Hz 0dBm 10 Copies to L352
512 MHz +7dBm 10 Copies to L353
512 MHz+ 200Hz Dist
512 MHz Dist

1:12 Splitters in Back of 3 Racks

One Rack Shown

REF X-MIT / ROUND TRIP MEASUREMENT RACKS
Rack 1: Ant 1-10, Rack 2: Ant 11-20, Rack 3: Ant 21-28

M351 – Generator Utility Module

M354 – Chiller Room Utility Module

M352 – Weather Station

M353 – Old Atmospheric Phase Interferometer (OAPI)

New Atmospheric Phase Interferometer (API) Refer to NRAO DWG# D23755K0001

L351 - Master Offset Generator

DC Power : 10W (allow 0.2A @54.2VDC)
2W Module
DDS FPGA DAC
64/10 MHz
VCO 64 MHz
64 MHz + 25 Hz
X8
MIB Analog Board PLL
256 MHz

L354 - LO Driver

3W Module (2S/1HS)
DC Power : 25W (allow 0.5A @54.2VDC)
512 MHz + 200 Hz +7dBm

L350 - Central Reference Generator and Distribution

3W Module
256 MHz +7dBm to L351
512 MHz +7dBm to L354
128 MHz Phase Locked Oscillator
5 MHz Tune 128 MHz Lock
X2
50 Ohm TTL
VLA Correlator
VLA L35
128 MHz +10dBm to WIDAR
TTL Lock Indicator - DB-50 LED in Backshell
20 Hz RS422 Distribution
20 Hz RS422 Distribution
20 Hz RS422 Distribution
Timecode Fibers to WIDAR
Optical X-mit
LVTTL RS422
Lock 20 Hz 0.1 Hz Timecode VLA Sync 128 MHz
8 MHz 8 MHz 8 MHz
5 MHz SYNC
200 Hz 200 Hz 200 Hz
SPI
SYNC SYNC SYNC
FPGA
8 MHz LVDS to L355
200 Hz LVDS to L355
SYNC PULSE LVDS to L355 (~30ns in length)
Unused
DC Power : 25W (allow 0.5A @54.2VDC)

L359 Uninterruptible 5MHz

2W Module
PLL
5 MHz -10 dBm
TCVCXO 5 MHz
5 MHz -2dBm
1 PPS TTL 50 Ohm

LO Master Bin 1

LO Master Bin 2

Master Rack Control Bin

128 MHz from L358

L356 Reference Select & 1PPS Timing
2W Module
FPGA
DIV 5M
1 PPS Distribution
5 MHz
5 MHz
5MHz Distribution
Analog Board
MIB
AUX2 AUX1 5 MHz +3dBm 5 MHz +3dBm
1 PPS TTL 50 Ohm
1 PPS TTL 50 Ohm
10 MHz
100 MHz

GPS NTP
GPS NTP
Rubidium Standard
MASER

UPS (outside rack)
RS232
RS422

L357 Switch / Monitor
2W Module
Rubidium Interface
Maser Interface
MIB
Analog Board
SPI
SPI to L358

Timing Rack

L358 Timing Switch PCB Mounted in Rack

128 MHz To WIDAR
128 MHz To WIDAR
Spare
128 MHz To L356
TC Fiber To WIDAR
TC Fiber To WIDAR

LO Master Rack

Fanout Buffer (x3)
SPARE LVDS
20 Hz RS422
20 Hz RS422
20 Hz RS422
SPARE RS422
20 Hz RS422 BIN 1
20 Hz RS422 BIN 2
8 MHz LVDS
200 Hz LVDS
SYNC LVDS
SPARE LVDS
SPARE LVDS

Switch Drivers
FPGA
SPI From L357

M304-1 Module ID Memory
Provides Slot ID to P350-1, L350-1 L351-1, L356

M304-2 Module ID Memory
Provides Slot ID to P350-2, L350-2 L351-2, L357

Power Supply Rack

230V 1-Phase 20A
-48VDC 60A Power Supply & Battery Tray
M350 Utility Module
-48VDC Feed

LO Master Rack Spans Bins 1 & 2

P350-1 - Reference Generator / Distribution Bin Pwr Supply
2W Module
MIB
+7.5 VDC +17.5 VDC -17.5 VDC -7.5 VDC
48 VDC
OUT 250W IN + IN - (x4) OUT 150W IN + IN - (x4)

Power Distribution Board

Parallels two P350's for redundant operation

P350-2 - Reference Generator / Distribution Bin Pwr Supply
2W Module
MIB
+7.5 VDC +17.5 VDC -17.5 VDC -7.5 VDC
48 VDC
OUT 250W IN + IN - (x4) OUT 150W IN + IN - (x4)

■ = EVLA M&C Network Connection

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VLA Expansion Project
CEB Electronics Block Diagram w/VLITE