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### EVLA Front-End CDR

#### EVLA Front-End Production Plans

Brent Willoughby



# EVLA Receiver schedule



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# EVLA Receiver schedule







**FE Production Goals** 



- Maintain EVLA production schedule by utilizing in-house manpower mainly for RECEIVER design, prototyping, testing, and installation
- Outsource production whenever possible
- Outsourcing is loosely defined and includes various shops and sites within N.R.A.O.



### Production decisions



- Competitive bid for 'standard' parts using our purchasing department
- Small quantities, highly specialized, and rush orders are produced on a case by case basis
- Prototype components produced with engineering requirements and restraints as the driving force...usually in-house



FE subsystems



- Feeds
- Receivers
- Receiver Control systems
- 'FE' Rack
- Interconnect



#### Interconnect



- Control cables purchased from outside sources
- M&C cables purchased commercially
- Heliax cables presently fabricated in house, future plans to outsource
- Stainless steel semi-rigid coax Dewar cables outsourced
- .141 coax semi formable cables outsourced
- DC distribution box cables will be outsourced to VLBA technicians



### Construction, storage, and test areas



- Dewar components will be warehoused in the VLA dry storage warehouse
- Completed FE racks are stored in the AOC mechanical room
- Interconnect cables and electronics enclosures are stored in the AOC mechanical room
- Presently enough Lab assembly/testing space for 8 technicians and engineers
- Small Micro-assembly lab area for fabrication of Ka and Q IF components
- Screen room capable of cooling up to 4 receivers with an additional 7 stations in the lab area...(3 helium compressors)
- 2 EVERETT style SOIDA receiver test stations and 1 or 2 older style SOIDA receiver test stations

## Receiver construction and maintenance area



## Rack, Card cage, Receiver maintenance area





Micro-Assembly Lab





Cascade Microtech Wafer Probe Station and accessories can work up to 50 GHz with PNA

Also used as a Work Station for MMIC Module Micro-Assembly

Brent Willoughby



#### West Bond Wire Bonder







Receivers



- Dewar plates typically fabricated at VLA machine shop
- Dewar cans typically fabricated at Green bank machine shop
- Dewar cold plates typically fabricated in house plating done in Albuquerque shops
- Assorted Dewar and IF components fabricated in house (windows, waveguide etc..)



# Specialized receiver components



- Electroforming is required for some high precision waveguide components
- Ka and Ku Phase shifter and W/G transitions
- E-forming will be done at CDL whenever possible
- OMT for X and C band TBD



Electroformed K band Waveguide components



Partially complete Electroformed Ka Band Phase Shifter.



systems



- Printed circuit Boards are fabricated & populated outside
- To include:
  - Card cage Control, Bias, Mother/Daughter cards
  - Voltage regulator/Cal driver cards
  - AC relay cards



### Receiver control

systems



- All "Enclosures" are fabricated outside
- Will be assembled by technicians at various VLBA Sites
  - Card cages
  - AC relay box
  - Voltage regulator box
  - DC distribution box
  - Pump request box



FE rack



- The Front end rack is actually a 'hybrid' that includes Receiver control modules, Utility modules, Transition modules, Power supplies, and the DTS
- Bins are recycled from VLA antennas so production tracks Antenna outfitting
- Future plans to outsource Rack responsibilities to the CRYO group

#### FE/Receiver construction

#### manpower assignments

Front	End	Group	Tasking	Matrix	
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### **Backup Slides**

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#### Feed Production



- Q band Using original feed
- K band new throat section ... Green Bank machine work
- L band new feed ... Throat section and rings machined at G'bank, lamination outsourced to an ABQ shop
- X band new feed ... ..2 prototypes complete production TBD
- C band new feed ... outsourced Wisconsin and New Mexico
- Ka band new feed ... TBD
- S band new feed ... TBD... similar to L band production scheme
- Ku band new feed ... TBD





#### Before lamination

luction Plans