Electronics Division
Manufacturing Goals

• Out-source board assemblies
• Build modules in-house as needed
• Ready the facility for manufacturing
• ESD protected facility
• Production success stories
Outsource Circuit Cards
- Board Vendor Provides:

- Fully assembled boards/cables
- Some assemblies tested
  - Flying probe tests
  - NRAO test fixtures
- ESD packaged and labeled
- Scheduled deliveries
- Hazardous chemical handling
In-house Module Assembly Preparation

- Trained staff
- Same team that built the prototypes
- Complete assembly drawings
- New soldering stations
- Test equipment & computers in place
Planning for Small Production Runs

- Goal is to produce 28 identical antennas
- Small quantity builds, 5-10 at a time
- In-house module assembly and test
- VLBA cable and small parts assembly
Inventory Control

- New and old warehouse managed by Skip Lagoyda, Business Manager
- Control of high dollar items
- PeopleSoft software re-order mechanisms
### CDL / EVLA Coordination

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Attributes of In-house Module Assembly

- Minimize module storage problems
- Tight engineering control
- Improve the design
- Fast turn-around time
- Distributed parts inventory
ESD Preparation

- 12 ESD stations including floor mats
- ESD totes and parts bins
- ESD shoes and wrist straps
- Humidity controlled facility
Solder & Flux Compatibility, and Quality Issues

- Trained staff
- Some components only available in lead-free.
- Can be used with ‘leaded’ solder.
- May require higher soldering temperatures, 20 to 30 degrees higher (Fahrenheit).
Mother Board Approach

- More robust design
- Easy to assemble
MIB Quality

• 1400 MIBs required for the project
• 34 in each antenna - in every type of module

• Turn-key solution
  – Large quantity buys lowered price per board
  – 100% flying probe – 100% electrical test
  – 99% yield (last run of 100 boards)
Design for Manufacturability

- 300 pin transponder
- Easy assembly
- 10GHz circuits

Changed vendor to save $400K without a design change
Conclusion

• Ready to maintain production schedule
• Looking for cost savings
• Utilized every NRAO asset
• Manufactured for a 20 year life