ALFA IF/LO System

Lisa Wray
Edgar Castro
Electronics Division
ALFA Receiver System

Front End
- 7 element feed array
- corcal available
- 40 dB gain
- Bandpass filter module

Downconverter
- Single frequency downconversion
- RF: 1225-1525 MHz
- IF: 150-450 MHz
- Power monitor
- Fiber optic converter

Buffer & Distribution
- Divide signal to accommodate n backends simultaneously
- Goal: High isolation between backends and monitor

ALFA IF/LO System
Downconverter
upstairs, after dewar and bandpass filter module

- Single mixer conversion
- RF = 1225 to 1525 MHz, IF = 150-450 MHz
- LO either high-side: 1375+300 or low side: 1375-300
- 34 dB gain
- 58 dB dynamic range, limited by noise floor of fiber transmitter on low end (-45 dBm) and compression of fiber transmitter on high end (+13 dBm)
More Downconverter info

upstairs, after dewar and bandpass filter module

- Measured $T_{eff} = 750K$ (contributes 0.075K to $T_{sys}$)
- Anacom fiber optic transmitter: -130dBm/Hz noise floor (-43 dBm for 500 MHz)
- Fiber link is low-loss

- Small light-weight surface mount design

- Modular card cage
Buffer + Distribution

Downstairs

- Receive signals from fiber optic cable, put on coax
- Provide enough buffering to isolate backends
- Provide distribution network for backends
- Monitoring: one path dedicated to monitoring
More on Buffer + Distribution

• Divide signal to accommodate n backends ... how many?
  - WAPP is the dedicated backend
  - Others: Pulsar, Extragalactic, Galactic, SETI

• Monitor
  - 14 IFs brought out to control room
  - Slow Sample (fixed tau) and record for debugging/
    problem solving
Acknowledgements

- Bill Sisk
- Ganesh
- Dudes in receiver section