CARMA 2.5GHz Correlator Revision CDR

- Completes the 4GHz CARMA Correlator
- COBRA parts obsolescence
- Increase the correlator performance
  - More spectral channels
  - Add spectral modes; 250MHz and 125MHz
  - Increase SNR (4-bit modes)
- Based on experience of the COBRA design
- Reuse as much infrastructure as possible
Design Changes:

- 1GHz digitizer
- 1GHz clock generator
- FPGAs
- Processor
- Operating system
1GHz digitizer and clocks:

- Atmel AT84AD001B digitizer
- Analog Devices AD9956 AgileRF PLL
- Same digitizer as BWRC project
- All 8-bits LVDS routed to FPGAs
- Dual-channel device
FPGAs:

- Altera Stratix II FPGAs
- High-speed LVDS digitizer interface
- LVDS for front-panel transport
- All 8-bits from digitizer enables more modes
- One CARMA Correlator board has as many FPGA logic-elements as 10 COBRA Correlator boards.
- Power estimate: 60W to 70W total per board (which is what a COBRA board dissipates)
Processor:

- PowerPC instruction set
- High I/O bandwidth; PCI, local-bus, memory
- Multi-channel DMA
- IEEE-754 FPU
- Same instruction set as BWRC processors
Operating system:

- Linux
- Real-time requirements 'softened' by the use of DMA and buffering
- Linux has real-time patches/kernels
- Can always switch to a true RTOS
Development:

- **GDA Technologies:**
  - engineering/hardware development

- **Flomerics:**
  - thermal analysis and heatsink design

- **Denx Engineering:**
  - U-Boot bootloader and Linux support

- **Hawkins:**
  - Hardware design
  - System controller VHDL, Linux Driver

- **Rauch:**
  - Correlator VHDL

- **Costa:**
  - Control software
The SZA Correlator System
A COBRA Digitizer Board
A COBRA Correlator Board