CORRELATOR SOFTWARE DESIGN

Why do we view the correlator as an independent system?
What is the correlator software system?
What does it interface to?
WHAT IS THE CORRELATOR SYSTEM

Must Include
Collect data from the hardware integrators
Convert data to output format
Write data to an archive device
Document data being written

May Include
Technician interface to diagnose hardware
Interface to a real-time data processing facility
Data processing before archiving - interference excision, evaluation of calibrators, etc.

Does Not Include
Control of antennas, LO system, or IF system
Control of delay lines
WHAT GOES IN THE OUTPUT

Format = u,v FITS

Advantages - Well defined set of tables given in VLBA correlator memo 108

Disadvantages - Not well defined for multi-volume data sets. Actions are clumsy for truncated observations. Ordering of tables is sometimes a problem.
SUBARRAY = OUTPUT STREAM

Output may be streamed directly to an archive device, or may be staged to intermediate storage.

EACH SUBARRAY

Has a Timed Sequence of Setups

Each Setup Has

Number of basebands per antenna being processed
Polarization processing selection
Number of spectral channels for each baseband
Integration time

And Has Ancillary Information

Source description
Frequency declaration
WHAT MUST THE CORRELATOR KNOW?
The absolute time.
A description of subarrays, with limit parameters
A timed sequence of setups for each subarray
A timed sequence of subarray affiliation for each sampler
Ancillary data to be written to the archive streams - flags, system temperatures, other calibration information, weather
HOW DO WE GET DATA FROM THE CORRELATOR ON THE FLY?

Sniffer Port Properties

Operates at lower priority than the archive stream. If correlator computers become too busy, or if receiving system is not ready in time to receive a buffer, data is lost.

Data format on the stream is exactly the same as on archive streams, with possible addition of sequence number to tell when data is lost.

Sniffer Port Definition

To reduce data quantities, the sniffer port might want to decimate in time (either averaging or simple decimation), basebands, channels, or sources (to select calibrators only, say).