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).