Monitor points which provide control information.

mjk, 24 April 1986

At each antenna

- LEVEL :-

- GAIN (PSD) :- The outputs from these two units are combined to provide an estimate of T_{sys}. GAIN picks up the noise tube contribution, to provide the scale factor; LEVEL applies the scale factor to obtain T_{sys}. GAIN requires, as input, the 500 Hz signal which drives the noise tube.

  (The LEVEL control and the levels within the sampler are driven by the sampler statistics monitor, discussed below).

At the central site

- 4-bit, line correlator, LEVEL monitor.

- 4-bit, line correlator, GAIN (PSD). These two units together provide T_{sys}, needed at the array processor of the correlator. The PSD requires a "De-delayed" 500Hz signal; that is, a switching waveform which has been made wavefront-synchronized at the antenna.

- 4-bit, tied array, GAIN. Also needs de-delayed 500Hz. The function of this unit is to balance all the IFs prior to adding them together.

- Post tied-array tie point, LEVEL

- Post tied-array tie point, GAIN. Needed for T_{sys}. Needs the de-delayed 500Hz.

- Broadband Continuum and Line switched polarization correlator.

Measures the phase difference between the X and Y IF streams. This is passed to the array processor of the correlator in order to correct the conversion of cross-correlation functions to Stokes parameters. (The phase differences should be about 90 degrees)

- 64 Mhz continuum switched polarization correlator, as above.

- Switched analogue correlator. Monitors the phase difference between X and Y, for each IF pair, prior to the TIE-point. This unit will measure the departure from a 90 degree difference. The results have to be fed back to the LO fringe rotator.

  These three phase monitors will need the de-delayed 500 Hz.

- Switched analogue correlator operating on the tied-array signal. Presumably this will provide some estimate of the residual phase error between the X and Y signals.

- Sampler statistics?

  There are three sets of samplers: at the antenna: at the input to the line correlator (64 Mhz and below): at the LBA recorder. Level settings at the level control and the sampler will be adjusted on the basis on the noise statistics; the location of the statistician is not yet clear.

Additional points of concern - not properly monitor points, but more-or-less in the same category.

- 180 degree demodulators - at the input to the broadband continuum and line correlator, the 64 Mhz correlator, and the tied array (each IF). These all require de-delayed waveforms. These are the "lag independant orthogonal waveforms". Again, we offset by the delay, at the antenna, in order to have them in phase after the delay lines.

- Level control - is each level control unit self-contained, or need it concern itself about events upstream? (cf. AT/20.5/004 p.3)

  In general the downstream level control units do not care about the upstream settings. A problem arises if an abrupt level change occurs. If no information is transmitted downstream, then we could have an extended ripple effect. That is: during the first integration interval after the discontinuity all units will detect an error: during the second interval all units could attempt to correct for the error detected. But the conditions downstream will change because the upstream unit will have corrected itself, and so the downstream correction factor will be wrong.

  In essence, suppose that during the first interval we determine that the level has changed by ε_1 and ε_2, upstream and downstream respectively. During the second integration interval we should apply a correction factor of ε_1 upstream, and $(\varepsilon_2-\varepsilon_1)$ at the downstream unit. Hence we need to send ε_1 from the antenna to the central site.

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