1-28-00

Subject: LTA minimum integration time
Date: Fri, 28 Jan 2000 17:07:52 -0500
From: Chuck Broadwell <cbroadwe@NRAO.EDU>
Organization: National Radio Astronomy Observatory
To: ldaddari@NRAO.EDU, demerson@NRAO.EDU, jwebber@NRAO.EDU
CC: rescoffi@NRAO.EDU, jpisano@NRAO.EDU, cbroadwe@NRAO.EDU, jgreenbe@NRAO.EDU

The minimum integration time for antennas in cross correlation mode is presently defined as 16.0 msec.

We (the correlator group) would like to find out if anyone thinks there is any more preferable minimum integration time that is:

1) reasonable for astronomers,
2) feasible for designers, and
3) more compatible with the 50 msec system timing reference.

The upper limit on the minimum integration time is limited by the 25 bit accumulator in the correlator chip at approximately 29 msec.

Although a longer minimum integration time of 20 or 25 msec would ease the burden on the correlator chip to LTA interface, I presently believe it **might** not be too un-reasonable to go as low as 10 msec, at least as far as the correlator hardware is concerned. (A value of 10 msec would also affect the VME system, since it would now need to work on 10 msec cycles instead of 16 msec, if it were to access a sub-set of the correlator results at the minimum integration rate.)

Values of either 10 or 25 msec would change the lowest common period for the (sytem timing reference, minimum integration time) from 400 msec to 50 msec.

Does anyone recommend we consider changing the spec from 16.0 msec to some other value in the range 10.0 to 25.0 msec?

Thanks,

Chuck

Subject: Re: LTA minimum integration time
Date: Fri, 28 Jan 2000 15:54:58 -0700 (MST)
From: "Larry D'Addario" <ldaddari@tuc.nrao.edu>
To: Chuck Broadwell <cbroadwe@NRAO.EDU>
CC: ldaddari@NRAO.EDU, demerson@NRAO.EDU, jwebber@NRAO.EDU, rescoffi@NRAO.EDU, jpisano@NRAO.EDU, jgreenbe@NRAO.EDU

Chuck Broadwell writes:
> *We (the correlator group) would like to find out if anyone thinks there*
> *is any more preferable minimum integration time that is:*
...
> *3) more compatible with the 50 msec system timing reference.*

This does not constitute a reason for change, since there is no significant incompatibility. The 16 msec and 50 msec periods have 400 msec in common, and this is short enough that it produces no restriction of which I'm aware. If there were a need to re-configure the correlator more often than every 400 msec, perhaps this would be a problem. Other things (at the antennas) will no doubt make the minimum useful re-configuration time much longer than this.

Nevertheless, if a reason is found that the correlator's minimum dump time and the slowest system timing reference must be related by smaller integers than 25:8, another possibility to to change the system tick to 48 msec (giving 3:1). This is a bit awkward at the moment because the 50 msec value is built into the antenna specification, but I think that the change could be made if necessary. Still, I'm opposed to making changes like this unless there's a really good reason, and I haven't yet heard one.

Before anyone gets too excited about such things, serious consideration must be given to the possibility that high-dynamic-range observations will all 64 antennas may force a minimum integrating time of 128x the correlator's minimum dump time (using Walsh function phase switching on both 1st and 2nd LOs, or shifted-m-sequence switching on 1st LO only), or about 2s. It is not yet known how important this will be, and thus whether we should provide the capability at all.

--Larry