

NATIONAL RADIO ASTRONOMY OBSERVATORY  
SOCORRO, NEW MEXICO  
VERY LARGE ARRAY PROGRAM

VLA COMPUTER MEMORANDUM NO. 149

SOURCE CHANGE TIMING

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The timing of events at source change time is highly dependent on a number of things. However, it is nice to have an example in hand. We have done this informally several times, but have never written the results in savable form.

This memo is based on timings on December 17. There were 14 antennas in the sole subarray, 18 in the system. Source changes were at C-band, looking at the same source (no slew time). Even with the same parameters, the timing varied somewhat. The numbers below marked with an asterisk were determined several times, and a range is given. The other numbers are interpolations between the starred ones, except the startup of CHECK which is deterministic. The interpolations make use of estimated program load times (8 turns per track of disk residence area), FORTRAN read times (2 card images per turn) and command send times (3 waveguide cycles per command string sent by program CTLGO). The results were fudged, by at most 0.<sup>S</sup>3, to make a smooth progression between the measured times.

Timings are in units of the 52 1/12 ms waveguide cycle. Cycle 0 by definition occurs on the integer 10 seconds IAT immediately following the specified stop time.

Seconds	WG Cycles	
0	0*	Integration completed, data transmission to CORA begins.
.05	1*	Stop time detected, task NEW activated.

.52	10	Task NEW initiates the load of the first of its overlays, NE2.
.73	14*	Completion of write of last 10 seconds data by Task G10 to mag tape and disk.
1.25	24	NE2 begins execution; calculates and updates sidereal time.
2.60	50	NEW overlay NCARD begins search of disk for proper observing file and card image.
4.17	80* (range 75-84)	NEW overlay NSCB sets "Source Change in Progress" bit of Subarray Control block.
4.22	81	NSCB sends Master LO frequency commands.
4.84	93	NSCB sends first LO (F3) frequency commands.
6.25	120	NEW overlay NEPH begins precession calculations.
8.07	155	NEW overlay NANT begins renewing antenna location descriptors, decides which azimuth wrap to use. Puts rough antenna positions in Antenna Control blocks - antenna slew starts.
8.49	163	NANT sends filter select commands to baseband IF receiver (T5) modules.
9.95	191	NEW overlay NIF begins processing ROT file.
10.00	192	Integration of 10 <sup>S</sup> complete - correlator sends data to CORA.
10.05	193	G10 discards data because of "Change in Progress" bit.
10.52	202	NIF sends subreflector rotation command.
10.68	205	NIF sends focus command.
10.83	208	NIF sends front end band select ('321) command.
10.99	211	NIF sends gain commands to splitter and converter modules.
11.30	217	NIF begins processing IF file.
13.23	254* (range 248-263)	NEW overlay NIS sets "suppress data taking until antennas on source" bit.

13.28	255	NIS sets antenna position commands and phase rotator parameters into the Antenna Control blocks. Task NEW completes execution.
20.00	384	End of integration interval.
20.05	385	Task G10 discards last 10 seconds data because of the "suppress data taking until antennas on source" bit. Looks at antenna positions to see if the "suppress data taking until antennas on source" bit should be reset. Criterion: some antenna within $1.4^\circ$ in both axes.
20.31	390	Task CHK begins flagging operations on antennas with new setup data. Criterion for antennas on source: El within $1/3$ , Az within $1/3/\cos(E1)$
22.9	440 (wild guess)	Checking operation Complete.
30.00	576	End of integration.
30.05	577*	First data record write begins.