

## ARRAY-CONTROL TEXT STREAM

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This memo describes the text stream which will be used to transmit the observing parameters from the VLBA central computer to the station computers. This will be a human-readable stream of printable ASCII characters, so it could be prepared on other computers.

The purpose of the text stream is to load the station computers with the observer-supplied parameters for each observation, as well as any centrally-computed parameters. The blocks of observing parameters which comprise an observing program are typically transmitted well in advance of the commencement of the observing program, and are stored in the station computers. During the observing program, these blocks are used, in sequence, to control the array. A simple looping construct is provided to permit a sequential group of blocks to be repeatedly executed until a time condition is satisfied.

This text stream is the only method provided for user-supplied array control parameters to be entered into the station computers.

The text stream has the following general format:

```
variableA = valueA, variableB = valueB
variableC = (subscriptC1, valueC1), (subscriptC2, valueC2),
.
.
!* COMMENT (may begin and end anywhere in the line) *!
!* A comment is terminated by an end-of-line if the
!* star-bang digraph is missing, as on the line above. *!
.
.
!NEXT!                !* End of first observing block. *!
variableL = valueL    !* Beginning of second block. *!
variableK = (subscriptK5, valueK5), variableP = valueP,
.
.
!NEXT!
!BEGIN LOOP!        !* This block is the beginning of a loop *!
.
.
!NEXT!
.
.
!LOOP BACK!        !* Loop back to closest previous BEGIN LOOP. *!
!NEXT!
.
.
!NEXT!
!BEGIN LOOP!        !* Loops must NOT be nested. *!
```

```

.
.
!LOOP BACK!
!NEXT!
.
.
!QUIT!           !* End of text stream. *!

```

The length of lines is arbitrary, subject to the limitations of buffer sizes. These sizes are not yet determined, but will definitely be large enough to permit lines of 255 characters plus one end-of-line delimiter.

The syntax of the "variable = value" pairs is discussed in detail in the documentation for the module LDSTRUCT. (Software documentation is located in VAX3:[VLBSOFT.DOC].) Commas and blanks are mostly optional (if a human can unambiguously determine what is meant, so can the parser), but the format shown is strongly recommended for readability.

The variable names are those user-supplied items described in VLB Memo # 505. Minimum matching is used to scan the list of names -- only the number of characters required to ensure uniqueness need be supplied. For example, "si" would be expanded to "sideband," but "epoch" must be spelled out in full, since only its last character distinguishes it from "epochd." The variable names are case-insensitive -- either upper or lower case, or even mixed case, may be used.

Values may be specified in any form which is consistent with the item which is to be loaded. Integers require a digit string which does not contain a decimal point. Floats and doubles require a digit string which may optionally contain a decimal point and/or an exponent (example: 1.23e-4). Digit strings may contain leading minus signs where meaningful. Angles may be expressed in radians, arc-measure, or time measure (example: ra = 1h2m34.56s, dec = -17d16'15.8"). (The documentation for module FANGLE discusses in great detail the allowed forms for angle-strings.) Character-string values are arbitrary, and will be truncated (on the right) if they are longer than the space allotted for the item.

Value-strings may not contain the exclamation point character. (If this restriction is too severe, we could permit exclamation points within quoted strings. Comments invited.) The exclamation point is used to delimit meta-commands which organize the text stream into the observing blocks, and set up the internal values for proper looping. All currently proposed meta-commands are shown above.

Variables which are not set will retain their values from the previous block. Variables which have never been set will either default to values which will be discussed in a future memo, or be flagged as an error. For instance, it is presumably meaningless to have an observing program which never specifies a source position.

The loops are relatively simple constructs. They may not be nested. A loop can be exited only when a time criterion is satisfied, and this may occur at any block within the loop.

An example of a complete observing program follows (courtesy of B. Clark):

```

!* Setup for four recorded channels *!

nchan=4
fe = (1,6cm) , (2,6cm) , (3,6cm) , (4,6cm)      !* 6cm front end *!
ifchan = (1,A) , (2,A) , (3,A) , (4,A)          !* IF channel (RCP) *!
clock = (1,32) , (2,32) , (3,32) , (4,32)      !* 32 MHz sample rate *!
baseband = (1,1) , (2,1) , (3,2) , (4,2)       !* Two baseband channels, *!
sideband = (1,1) , (2,-1) , (3,1) , (4,-1)     !* upper and lower sidebands *!
bbfilters = (1,16) , (2,16) , (3,16) , (4,16)  !* 16MHz BW all channels *!
bbsynth = (1,600) , (2,600) , (3,632) , (4,632) !* 64 MHz contiguous recorded *!
bits = (1,1) , (2,1) , (3,1) , (4,1)          !* One-bit recording *!

!* Setup for receiver *!

azcolim = 1.3. elcolim = 0.85                   !* Collimation, arcminutes *!
focus = 11.7, rotation = 177.5                !* Focus rotation settings *!
synth = (1,4000)                                !* A synthesizer 4 GHz *!

!* Begin observing schedule *!

date = 52863
sname = 3C286
ra = 13h28m63.287s                               !* J2000 coordinates *!
dec = 34d08'22.23"
flux = 12.3
stop = 12h00m                                     !* Observe until this UT *!

!NEXT!

!BEGIN LOOP!
laststop 17h24m                                   !* loop termination time *!
sname = 3C274
ra = 12h28m17.263. dec=12d22'17.8"
thisduration = 20m                               !* 20 minutes on this source *!
flux = 75

!NEXT!
sname = 2C273
ra = 12h27m18.345s, dec=02d18'05.7"
thisduration = 2m                               !* and 2 minutes on this one *!

!LOOP BACK!

```