MASSACHUSETTS INSTITUTE OF TECHNOLOGY

HAYSTACK OBSERVATORY

WESTFORD, MASSACHUSETTS 01886

Telephone: *978-692-4764*
Fax: *781-981-0590*

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TO: Mark 4 Development Group

FROM: Alan R. Whitney

SUBJECT: Sequence of operations in task execution

Following is a strawman sequence of operations for executing a correlator task. The sequence numbers are tied to the accompanying diagram.

Definitions:

.ivex	global correlator initialization vex file
.evex	global experiment vex file
.cvex	correlator configuration vex file
.svex	experiment schedule vex file
.lvex	experiment log file
.task	task file

1.Initialize correlator

1.a

From:	opera
To	Conductor
Message	
Message Contents	Ivex key
Action:	Operator enters name of ivex key
Comments	

1.b

From:	Conductor
To	Corr_man
Message	
Message Contents	ivex key
Comments	Initialize correlator

1.c

From:	Conductor
To	SU_man
Message	
Message Contents	ivex key list of station units
Comments	Initialize specified SU's

1.d

From:	Corr_man
To	conductor
Message	
Message Contents	Success or failure of correlator initialization
Comments	

1.e

From:	SU_man
To	conductor
Message	
Message Contents	Success or failure of SU initializations
Comments	

2. Initiate task stream

From:	opera
To:	conductor
Message	
Message Contents	.task filename
Action:	Operator enters .task filename
Comments	

3. Get scan to be processed

Action by:	conductor
Action:	read and parse .task file to get evex, svex, cvex keys, and station list for a single task
Comments	

4. Create root file

4.a. Request genaroot to create root file

From:	Conductor
To:	genaroot
Message:	
Message Contents	ivex, evex, svex, cvex keys station list (AP length, mirror overrides)
Action:	Genaroot extracts all relevant portions ivex, evex, svex, cvex, lvex files and concatenates them to create the root.
Comments	

4.b. Acknowledge root file creation done

From:	Genaroot
To:	conductor
Message:	
Message Contents	Root filename
Action:	
Comments	Conductor will parse root file to get the general scan information.

5. Station unit setup

5.a. Send SU setup request to SU_man

From:	Conductor
To:	SU_man
Message:	
Message Contents	Root filename
Action:	
Comments	SU_man has responsibility to configure SU's, mount tape, position heads and tape

5.a.1. Read and parse root for SU setup parameters.

Action by	SU_man
Action:	Read and parse root file for SU setup information, including log information (VSN, footage, head position, tape start/stop times)
Comments	

5.a.2. Get tape library positions

Get tape library position only if required tape not already mounted

From	SU_man
To:	Library server
Message:	
Message Contents	VSN
Action:	With VSN in hand, send message to library server for library position information; Initially, the A900 tape-library data base will be used
Comments	

5a.3 Send message to operator to mount tape

From	SU_man
To:	Operator interface
Message:	
Message Contents	VSN Library slot A priori tape position for start of scan
Action:	Operator mounts tape; SU_man is automatically notified when bar code is successfully read
Comments	

5.b Confirm SU setup

From:	SU_man
To:	Conductor
Message:	
Message Contents	For each participating: Station Unit Table
Action:	Confirms all SU's configured, all tapes properly positioned, ready to go
Comments	Note that multiple station may occur on single tape.

Station Unit Table

The Station Unit Table specifies the channel name and associated station code for each physical output channel of each participating SU. The format of the Station Unit Table is

	Bytes	Comment
Task ID	4	Unique Task ID assigned by conductor
#Station Unit Arrays	1	# of participating SU's

Unused	3	
N x Station Unit Arrays	N x 171	

Table 1: Station Unit Table

where each Station Unit Array is

	Bytes	Comment
SU#	1	
VSN	8	
Status	1	
Pass#	1	
16 x SU Channel Array	160	In order by physical SU output channel#

Table 2: Station Unit Array

where SU Channel Array is

	Bytes	Comment
Channel name	8	ASCII ('X2R'); as defined in $FREQ section of .svex file
Station code	1	1-char ASCII station code
Status	1	Active/inactive

Table 3: SU Channel Array

5.c Position Tapes to first TOT in scan

From:	Conductor
To:	SU_man
Message:	
Message Contents	
Action:	Position and peak heads, if necessary; find first TOT within scan recording interval; back up tape as necessary to prepare for synchronization
Comments	

5.d Confirm Tape TOT and ready to synchronize

From:	SU_man
To:	Conductor
Message:	
Message Contents	TOT position of each participating tape
Action:	Position and peak heads, if necessary; find first TOT within scan recording interval; back up tape as necessary to prepare for synchronization
Comments	

6. Correlator setup

6.a Send corr setup request

From:	Conductor
To:	Corr_man
Message:	
Message Contents	Root filename; Station Unit Table; Force correlator reconfig flag (optional)
Action:	
Comments	Note that multiple stations may occur on single tape

6.a.1 Read and parse .cvex file

Action by:	Corr_man
Action:	Parse relevant sections of root file. Using this information plus information passed from conductor, corr_man can fully configure correlator.
Comments	Corr_matches channel names to determine correlation pairs; for cross-polarization processing, L/R pairs are identified by last char of channel name

6.a.2 Confirm correlator setup

From:	Corr_man
To:	conductor
Message:	
Message Contents	For each participating correlator board: Snake Head Table Block Allocation Table
Action:	
Comments	

Snake Head Table

The Snake Head Table identifies the head block in each snake on each correlator board. A maximum of 136 snakes may reside on a single correlator board:

		Bytes	Comment
Slice 0	4 x Board Snake Array	4352	In segment order
Slice 1	4 x Board Snake Array	4352	
Slice 2	4 x Board Snake Array	4352	
Slice 3	4 x Board Snake Array	4352	

Table 4: Correlator Snake Table

Each Board Snake Array consists of 136 entries, as follows:

	Bytes	Comment
Index#	2	Unique for each snake in task
Mirrored index#	2	Primary snake # being mirrored (relevant only if this is a mirror snake)
Head blk#	1	First block in snake (chip#*16+block#); Block order within chip is B2,B3,A0,A1,A2,B1,B0,A3)
Mode	1	Auto|cross validity_on|validity_off Primary|mirror Compare|nocompare Always_save|save_on_miscompare|no_save
Ref SU/Chn	1	SU#*16+chan# (physical)
Rem SU/Chn	1	SU#*16+chan# (physical)

Table 5: Board Snake Array

Block Allocation Table

The Block Allocation Table defines the snakes on each board

		Bytes	Comment
Slice 0	4 x Board Block Array	4096	In segment order
Slice 1	4 x Board Block Array	4096	
Slice 2	4 x Board Block Array	4096	
Slice 3	4 x Board Block Array	4096	

Table 6: Block Allocation Table

Each Board Block Array consists of 256 entries, corresponding to the 256 correlator blocks on each correlator board.

	Bytes	Comment
Next block	1	Pointer to next block in snake; tail block points to head block.
Static parms	3	Block static parameters

Table 7: Board Block Array

7. Set ROT clock

At this point, the TOT position of each participating tape is known, and synchronization can be achieved simply by appropriately setting ROT and instructing the participating SU's to syncrhonize to it.

From:	Conductor
To:	ROT_man
Message:	
Message Contents	ROT set time and rate
Action:	
Comments	

7.a Set ROT and Broadcast to SU's

From:	ROT_man
To:	Broadcast to SU's participating in task (e.g. SU 'subarray') and to CUCC's
Message:	
Message Contents	ROT set time and rate
Action:	Set ROT clock on next SYSTICK
Comments	Synchronizes ROT in the SU subarray. ROT_man must then confirm that all subarray ROT clocks are properly set.

7.b Confirm ready to start correlation

From:	ROT_man
To:	Conductor
Message:	
Message Contents	Confirm ROT is set and ticking in SU subarray
Action:	
Comments	

8. Initiate tape sync and start of correlation

8.a

From:	Conductor
To:	SU_man
Message:	
Message Contents	Go!
Action:	
Comments	Start tapes on ROTq (as necessary), download polynomials, synchronize tapes, start scan

8.b

From:	Conductor
To:	Corr_man
Message:	
Message Contents	Configure correlator and start correlation
Action:	
Comments	