

**An Introduction to the Mark IV Data Acquisition System
for Mark III Users**

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Most of the Field System SNAP Commands remain unchanged when upgrading a Mark III Data Acquisition System to Mark IV. The Field System Documentation clearly marks which hardware a SNAP Command description covers (except **vcnn**). For Example, there are three descriptions for the enable command, as listed in the **SNAP Commands Table of Contents**:

enable - enable record tracks (Mark III drive)
enable - enable record tracks (VLBA drive)
enable - enable record tracks (Mark IV drive)

The FS reads two lines of the *equip.ctl* file to determine what kind of hardware you have:

```
* VLBI equipment
mk4      type of rack (mk3, vlba, vlbag, mk4, vlba4, or none)
mk4      type of recorder (mk3, mk3b, vlba, vlba2, mk4, s2, vlba4, or none)
```

The Mark IV Recorder can read all 36 heads, so **Read Heads** should be set to **all** in the *head.ctl* file.

The Mark IV formatter is slow to respond, so the formatter timeout in *matad.ctl* should be changed to 225 centi-seconds (FM=92,225).

Note that the Mark IV System uses VLBA track numbers. A VLBA or Mark IV track number equals the Mark III track number plus three. Consequently, odd Mark III tracks are even Mark IV track numbers and vice-versa. Also Mark IV group numbers equal Mark III group numbers minus one, and the Mark IV groups include additional tracks. See the **Track Assignment Tables** in the **System Setup and Tests** manual (<http://lupus.gsfc.nasa.gov/fsdoc/manuals/setupsys.html>).

The Mark IV formatter clock is set with the *fmset* program. After setting or resetting the formatter time, issue a **sy=run setcl offset &** command to reset the Field System time to the formatter time. Note that the latest documentation for *fmset* is dated September 1, 1997, and can be found at <http://lupus.gsfc.nasa.gov/fsdoc/manuals/fmset.html>, or in <ftp://gemini.gsfc.nasa.gov/pub/fs/docs/fmset.ps> or [fmset.ps.gz](ftp://gemini.gsfc.nasa.gov/pub/fs/docs/fmset.ps.gz). (Note also that GSview can display and print .ps.gz files.)

With the Mark IV Tape Recorder, the bypass signals are taken from the output of the write driver, so the recording mode must be fully enabled in order to get a clean bypass signal to the Decoder. To enable bypass mode while the tape is stopped, set up the desired reproduce tracks with the **repro** command, **enable** the desired head stack, and then issue the command

st=for,0,on. I have written a **bypass** procedure that enables all heads on both stacks for diagnostics purposes. Please see the **bypass** procedure in the listing at the end of this document.

The latest version of the **Narrow Track Calibration Manual** is dated January 1, 1996 and can be found at <http://lupus.gsfc.nasa.gov/fsdoc/manuals/ntrack.html> or at <ftp://gemini.gsfc.nasa.gov/pub/fs/docs/ntrack.ps.gz>. The calibration manual does not mention Mark IV, but the procedure is identical to the Mark III calibration procedure, except the *4hdcalsnp* schedule is used instead of *hdcalsnp*. The default copy of this schedule is distributed in */usr2/fs/st.default/sched/4hdcalsnp*. If you haven't done so already, you'll have to copy it to */usr2/sched/hdcalsnp* before using it.

Here is an annotated list of those SNAP Commands that change when upgrading from Mark III to Mark IV. See the **Field System SNAP Commands Manual** for a complete description of each of these commands.

Rack-related SNAP Commands:

form - formatter setup (Mark IV rack)

Since the Mark IV recorder does not include group enables, some of the traditional Mark III mode names used in the formatter mode have numbers appended to them to distinguish which sub-pass, group, or track is being recorded.

form4 - formatter control and monitor (Mark IV rack)

This command is a simple feed-through to the Mark IV formatter. Refer to the **Mark IV Formatter Vocabulary Manual** for a description of all valid commands and their syntax.

<ftp://dopey.haystack.edu/pub/mark4/DAS/mk4vocab.text>

trackform - sampler assignments (Mark IV, VLBA rack)

This command specifies the how the samplers will be assigned in the next **form=...** command that uses either mode **m** or **v**. Please note that although heads are specified as recorder heads, this command assigns the samplers to heads in the formatter.

tracks - recorder head enables (Mark IV, VLBA rack)

This command specifies which recorder heads will be enabled in the next **form=...** command that uses either mode **m** or **v**. Please note that although heads are specified as recorder heads, this command actually enables the corresponding heads in the formatter. Recorder enables (enable command) must also be turned on for data to be recorded. Note that a Mark IV head number equals the Mark III head number plus three. Consequently, odd Mark III heads are even Mark IV head numbers and vice-versa. See the **Track Assignment Tables** in the **System Setup and Tests** manual.

vcnn - video converter (Mark III, Mark IV rack)

The 0.25 and 1.0 MHz filters have been replaced with 16 and 8 MHz filters.

Recorder-related SNAP Commands:

enable - enable head stack (Mark IV drive)

Stack to be enabled. May be **s1** (stack1), **s2** (stack2), or null.

parity - measure and check parity errors

Heads must be between 0 and 35, or specified as 9-head VLBA groups (**g0**, **g1**, **g2**, **g3**), or 8-head Mark IV groups (**v0**, **v1**, **v2**, **v3**), or as 7-head Mark III groups (**m0**, **m1**, **m2**, **m3**).

repro - set up reproduce heads (Mark IV drive)

Mark IV head number equals the Mark III head number plus three. Consequently, odd Mark III heads are even VLBA or Mark IV head numbers and vice-versa. See the **Track Assignment Tables** in the **System Setup and Tests** manual.

The standard Mark IV station procedures can be found in the file */usr2/fs/st.default/proc/4station.prc* on your Field System computer. Here is a listing of some other useful Mark IV procedures. A file containing these procedures can be downloaded from <ftp://dopey.haystack.edu/pub/mark4/DAS/mark4.prc>.

```
define bypass          000000000000
"bypass - 2 december 1998 - dls
"sets up the formatter and recorder for bypass mode
"with signals on all 64 heads
form4=/rate 4000
"/con 211 enables all 64 heads on two stacks:
form4=/con 211
repro=byp,17,18
enable=s1,s2
st=for,0
endif
```

```
define sta             000000000000
"displays the formatter status.
"See mk4vocab.text for an explanation of what the response means.
form4=/status
endif
```

```
define unloader       000000000000
"same as the standard procedure,
"except it runs at 80 ips to minimize tape tangling
"recommended for thin tape.
"unloading 135 ips tangles thin tape.
!+5s
enable=
tape=off
st=rev,80,off
endif
```

```

define check2m1      90000000000000
"checks 32 tracks at 80 ips,
"for checking tapes recorded at 80 or 160 ips in VLBA modes
check=*, -tp, -hd
decode=a, crc, byte
parity=, , ab, off, v0, v1, v2, v3
st=rev, 160, off
!+18s
et
!+5s
!*
st=for, 80, off
!+3s
repro=raw, 2, 3, 80
parity
repro=byp, 4, 6
!*+35.80s
et
!+3s
check=*, tp, hd
endif

```

```

define check2m2      90000000000000
"checks 32 tracks at 80 ips
"for checking tapes recorded at 80 or 160 ips in VLBA modes
check=*, -tp, -hd
decode=a, crc, byte
parity=, , ab, off, v0, v1, v2, v3
st=for, 160, off
!+18s
et
!+5s
!*
st=rev, 80, off
!+3s
repro=raw, 2, 3, 80
parity
repro=byp, 4, 6
!*+35.80s
et
!+3s
check=*, tp, hd
endif

```

```

define check2c1      000000000000
"checks 14 tracks at 80 ips
"same as the standard procedure, except at 80 ips, for checking
" tapes recorded at 80, or 160 ips in Mode B or Mode C
check=*, -tp, -hd
decode=a, crc, byte
parity=, , ab, on, m0, m2
fastr=7.5s
!+6s
!*
st=for, 80, off
!+4s
repro=raw, 4, 6
parity
repro=byp, 0, 0
!*+22.9s
et
!+3s
check=*, tp, hd
endif

```

```

define check2c2      000000000000
"checks 14 tracks at 80 ips
"same as the standard procedure, except at 80 ips, for checking
" tapes recorded at 80, or 160 ips in Mode B or Mode C
check=*, -tp, -hd
decode=a, crc, byte
parity=, , ab, on, m1, m3
fastf=7.5s
!+6s
!*
st=rev, 80, off
!+4s
repro=raw, 5, 7
parity
repro=byp, 0, 0
!*+22.90s
et
!+3s
check=*, tp, hd
endif

```

The useful Mark IV procedures listed on the previous pages can be found at
`ftp://dopey.haystack.edu/pub/mark4/DAS/mark4.prc`

Other relevant files and documents can be found in the following locations:

Field System Manuals:

HTML:

`http://lupus.gsfc.nasa.gov/fsdoc/manuals.html`

`ftp://dopey.haystack.edu/pub/mark4/fs/fsdoc/manuals.html`

PostScript:

`ftp://gemini.gsfc.nasa.gov/pub/fs/docs/`

The *form4* command syntax:

`ftp://dopey.haystack.edu/pub/mark4/DAS/mk4vocab.text`

The following Mark IV files can be found on any Field System Computer:

Calibration Schedule `/usr2/fs/st.default/sched/4hdcab.snp`

Standard Procedures `/usr2/fs/st.default/proc/4station.prc`