FIGURE 4.3-3

RIU STATE DIAGRAM

80ES-11-018

RIU STATE DIAGRAM
FIGURE 4.3-2
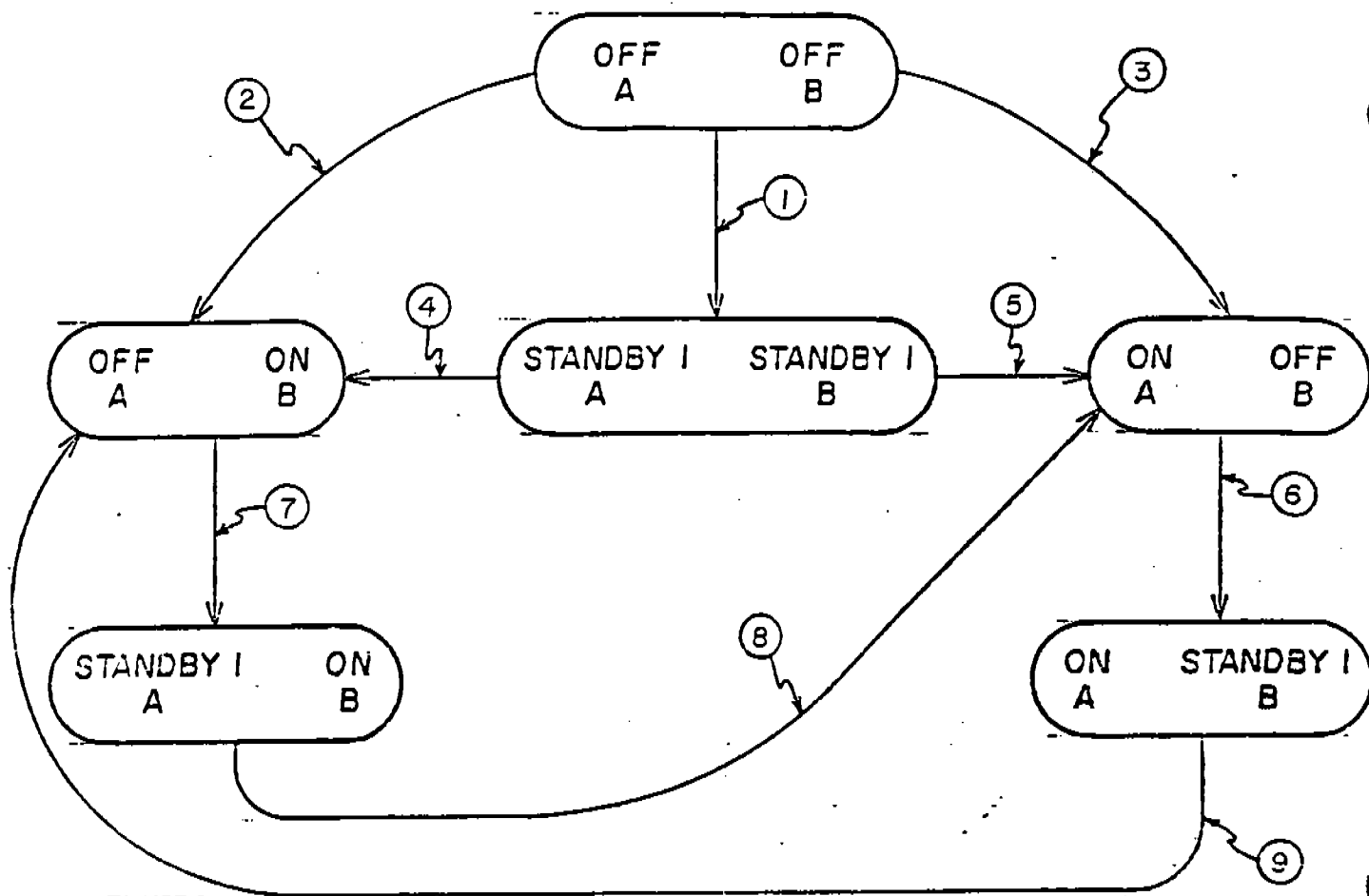
TRANSITION	COMMAND SEQUENCE
① OFF, OFF — SI, S'	YSTBYI-A, YSTBYI-B
② OFF, OFF — OFF, ON	YSTBYI-B, YSTBY2-B
③ OFF, OFF — ON, OFF	YSTBYI-A, YSTBY2-A
④ SI, SI — OFF, ON	YSTBY2-B
⑤ SI, SI — ON, OFF	YSTBY2-A
⑥ ON, OFF — ON, SI	YSTBYI-B
⑦ OFF, ON — SI, ON	YSTBYI-A
⑧ SI, ON — ON, OFF	YSTBY2-A
⑨ ON, SI — OFF, ON	YSTBY2-B

TWO STATES ARE NECESSARY

1st   ON, SI $\Rightarrow$ YSTBYI-A ⎫
                         YSTBY2-A ⎬
                         YSTBY2-B ⎭

2nd   SI, ON $\Rightarrow$ YST3YI-B ⎫
                         YSTBY2-B ⎬
                         YSTBYI-A ⎭

door aperture wheel and polarizer. See
Table 3.6.6-1.

2.4.4.6 The FOS entrance door must be allowed 7
sec. to close. (No other mechanism move
command will be accepted during this
time.)

Section	Restriction

3.4.4.2 The following FOS commands must not
arrive at the FOS microprocessor any more
frequently than 50 milliseconds apart
(time are double for slow clock rate).

3.4.4.3 The following mechanism and/or lamp
lifetimes cycles should not be exceeded:

Filter/Grating Wheel	54,000 90° rotations (per motor)
Aperture Wheel	30,000 rotations averaging 90°
Polarizer	100,000 increments (22.5°)
Entrance Door	20,000 cycles (open-close)
Calibration Lamp	500 hours

Use of mechanisms must be managed so as to not exceed
1/5 of each of the above limits for each year of the
planned 5 year mission.

3.4.4.4 Disable FOS housekeeping processor
(MPROCNTL/30/12) before microprocessor
reset command (YRESET-A or -B) and
re-enable it (MPROCNTL/30/64) 135 seconds
later.

These constraints and restrictions, plus various

temperature limits and other operational limitations
will be monitored and implemented by the missions
operations people at GSFC and not by observers.

4.7.2 Future CARD Items. The following include anomalies
detected in engineering testing of the FOS, and are expected to be
included in the CARD in the near future.

1. Do not use a fine delay of o (zero) in the synchronous
start mode. Reference NCR L-011, 3 Dec 1984. The FOS
microprocessor gets hung up in a begin acquisition loop.

NOTE: The CARD is under continual revision and some limitations
have been transferred to the Operations Limitations Document
(OLD), STP-G-OPS-0001.

5.   CALIBRATION AND MAINTENANCE.

4.4   Routine FOS Orbital Operations.

4.4.1 Mode I Target Acquisition.

4.4.2 Mode II Target Acquisition.

4.4.3 Mode III Target Acquiistion.

4.4.4 Routine Observation Modes.

4.5 Observational Good Practices.

4.5.1 Filter/Grating Wheel Positioning. The FGWA
positions accurately only if turned TBS.

4.6 Uses of SSM Flags.

4.7 Instrument Constraints and Restrictions and
Operational Limitations.

4.7.1 Review of the Constraints and Restrictions Document
(CARD). This section is a quick summary of known constraints,
restrictions and operational limitations, abstracted from the
CARD, SMO-1020, which should be consulted for details. The
sections are numbered as in the latest CARD. Only normal
operations are considered here, not retrieval or refurbishment.

Section	Constraint
2.4.4.1	No HV on unless FOS internal pressure $<10^{-5}$ torr
2.4.4.2	No illumination $> 10^5$ cts/sec/diode (equivalent $m_v = 5$).
2.4.4.3	Critical commands, requiring PI consent, arm and fire pin-pullers for entrance

YTDLCT		A	Test Discrete Logic Command
YTDOOR		S	Test Door Parameters and Point
YTDRCT		A	Test Discrete Relay Command (Non-Powered)
YTDN	1	L	Test Discriminator Noise
YTHDR		S	Test Science Data Header Transfer (YSNHDR)
YTHKAP	1	L	Test Housekeeping-Application Processor
YTHV		S	Test HV Power Supply
YTICAL	1	L	Test Internal Calibration
YTINAP	1	L	Test Initialization-Application Processor
YTLFFT		L	Long Form Functional Test (Shell)
YTMECH		S	Test Mechanisms
YTMICR		S	Test CEA Microprocessor
YTNORM		S	Test Normal Modes of Detector
YTOFAP	1	L	Test Turn-Off Application Processor
YTOFF		A	Turn Off
YTON		A	Turn On
YTONAP			Turn On Application Processors
YTRNMD		A	Transition Mode
YTSDAC	1	L	Test Science Data Acquisition
YTSDAP	1		Test Science Data Storage-Application Processor
YTSDRO	1	L	Test Science Data Readout
YTSET		A	Test Serial Telemetry
YTSFFT		S	Short Form Functional Test (Shell)
YTSMC		S	Test Serial Command Responses
YTSP			Test Science Processing-Applicaton Processor
YTTAAP	1	L	Test Target Acquisition Application Processor
YTTAG		S	Time Tag Mode Test
YVXSCL	1		Test X-Scale
YXDEFL		S	Y-Deflection Test
YYDEFL		S	Y-Deflection Test

NOTES: 1 = Procedure not in VAP 10/10/83

2 = Procedure not identified for VAP 10/10/83

A = Aliveness test group

S = SFFT group

L = LFFT group

Table 5.2-1
FOS TEST PROCEDURES LIST
8/7/84

Bill - Loan
at your mtg-
draft. I took
out YCTACQ &
YTSTRS ~ *p~*

NAME	NOTE		FUNCTION
YANA		–	Analog Telemetry Display Page
YAPCH		S	Aperture Compare Predicted/Actual Degrayed Values
YAPCH3		S	Aperture Check Stick/Glitch
YCAPC	2		Check Aperture Calibration (with STOS)
YCBKG	2		Count Background RTCS
YCNORM	2		Configure Normal for Sci. Data
YCQL			Commands Quick-Look
YCRSTR		S	Cross-Strap Test
YCTTAG	2		Time Tag Mode
YCWAVC	2		Check Wavelength Calibration (with STOS)
YDETIN		A	Detectors Initialization
YFIXED		–	Fixed Mode Display Page
YFOCUS		S	Focus Trim – X/Y Deflection Test
YHVPRM		S	HV Parameter Printout
YLIMIT			Limit Turn On/Off
YPLCH		S	Polarizer Check Predicted/Actual Degrayed Values
YPLCH3		S	Polarizer Check Stick/Glitch
YSDFMT			Science Data Format Processing in CEA
YSDPAR		–	Science Data Parameters Display Page
YSTAT		–	Status Display Page
YT15MZ	1	L	Test 1.5 MHz Microprocessor Mode
YTALIV		A	Test Aliveness (Shell)
YTAMAP	2		Test Aperture Mapping (with STOS)
YTANAL		A	Test Analog HR Telemetry
YTASAP	1	L	Test Autonomous Safing-Application Processor
YTBIL		A	Test Bi-Level Status Check
YTBKG		S	Test Background – Dark Count
YTBRST	1	L	Detector Burst Test

6.   REAL-TIME MONITORING.

6.1   Activities Requiring R⁻ Monitoring and Possible Intervention. (TBD)

Needs tot

6.2   Routine Engineering Monitoring.

6.2.1   High Priority/Health & Safety. Vital quantities are reported on display page YMSPG; see s

6.2.1.1   Electronics Temperature Limits.

ID	COMPONENT	TURN ON	OPERATING	NON-OPERATING
YCPSTMP	Central Power Supply	−50 to 60	−40 to 60	−50 to 60
YPAMATMP YPAMBTMP	Charge Amplifier			
YSIGTMP	Analog Signal Proc.			
YCEATMP	Central Electronics Assembly			
YHVTMP	HV Power Supply	−40 to 40	−24 to 40	−50 to 60
YPMFBTMP YPMFATMP YXYDFTMP	Digicon	−45 to 40	−40 to 40	−50 to 40
YPCATMP YPCBTMP	Photocathode		−32 to −8	
Y1OBTMP Y2OBTMP Y3OBTMP Y4OBTMP	Optical Bench		10 to 22	

There are in addition a number of procedures which set up headers
in the CEA for the various tests. These are of the form YH_ _ _ _.

Spectrograph. An attempt has been made to prioritize the list, though all are important.

Nominal Range

1)	YHTRRPI	Heater Relay Position Indicator
2)	YIONRPI	Ion Gauge Relay Position Indicator
3)	YINTPRES	Internal Pressure (millitorr)
4)	YLSRPI	Logic Supply Relay Position Indicator
5)	Y5VLPSV	5 Volt Loic Supply Voltage
6)	YQSRPI	Quiet Supply Relay Position Indicator
7)	Y8VQPSV	8 Volt Quiet Supply Voltage
8)	YPCATMP	Photocathode A Temperature
9)	YPCBTMP	Photocathode B Temperature
10)	YARIUTMP	A RIU Temperature
11)	YBRIUTMP	B RIU Temperature
12)	YRIUAS2	RIU A Status
13)	YRIUBS2	RIU B Status
14)	Y1BUSRPI	Common Bus Relay 1 Status
15)	Y2BUSRPI	Common Bus Relay 2 Status
16)	YDOOR	Entrance Port Position
17)	YHVRPI	High Voltage Power Supply Relay Position Indicator
18)	YHVVLT	High Voltage
19)	YCEATMP	Central Electronics Assembly Temperature
20)	YPMFATMP	Perm Magnet Focus Temperature – A Side
21)	YPMFBTMP	Perm Magnet Focus emperature – B Side
22)	YPAMATMP	Pre-amp Temperature – A Side
23)	YPAMBTMP	Pre-amp Temperature – B Side
24)	YCPSTMP	Central Power Supply Temperature
25)	YSIGPTMP	Signal Processor Temperature
26)	Y1SDFPRT	Science Data Port 1
27)	Y2SDFPRT	Science Data Port 2
28)	Y3SDFPRT	Science Data Port 3
29)	Y4SDFPRT	Science Data Port 4
30)	Y1OATMP	Optical Area 1 Temperature
31)	Y2OATMP	Optical Area 2 Temperature
32)	Y1OBTMP	Optical Bench Area 1 Temperature

Note the operational limits on the photocathode, which may ease the "FHST heating after second year" problem.

6.2.2 Configuration Change Monitoring.

6.2.2.1 In Hold Mode:

YHTRRPI-ON	0	Heater relay on
M05K031S-INCM	10	KH enabled for cmds, not execution
YSDIP	0	No dump in progress
YAMCIP	0	Auto memory clear
YCLKMON		Verify 3MHz recommended default clock speed

Verify "FIXED TLM" in header

6.2.2.2 In Operate Mode (Power on, no activity):

YLSRPI-ON	0	Logic supply relay
Y5VLPSV	4.9-5.1V	5 volts supply
YQSRPI-ON	0	Quiet supply relay
Y8VQPSV	7.9-8.1V	Quiet supply
YHTRRPI-ON	0	
YHVRPI-OFF	1	
YHVVLT		Reading ´floats´ when supply not powered
YRIP	1	CEA ´resting in peace´
YDOOR	Closed	
M05K031S	EXCM	HK enabled for execution & cmds

6.2.3 Engineering Routine Processing. (TBD)

6.2.4 Engineering Telemetry Display Pages. The following is a list of 35 parameters that are considered to be the most critical to monitor during flight operations of the Faint Object

```
YANA           000/00/00/00                        0    0

** A TEMFS **              ** B TEMPS **              ** ELEC/MECH TEMFS **
YFCAIPF      NODATA C       YPCBTMP     NODATA C       YSIGPTMP    NODATA C
YEAHAIMP     NODATA C       YFAHBIMP    NODATA C       YCEATMP     NODATA C
YFMFAIMP     NODATA C       YHHFBTMP    NODATA C       YHVTMP      NODATA C
YAHIUTMP     NODATA C       YFRIUTMP    NODATA C       YCPSTMP     NODATA C
Y1CATMP      NODATA C       Y1CBTMP     NODATA C       YDDCATMP    NODATA C
Y2CATMP      NODATA C       Y2CBTMP     NODATA C       YAPERTMP    NODATA C
YXYDFIMP     NODATA C       Y3CBTMP     NODATA C       YFCLRTMF    NODATA C
YFGMPTMP     NODATA C       Y4CPTMP     NODATA C       YFGMATMP    NODATA C
** CURRENT **              ** VOLTAGE **             ** STATUS **
YFVCUR       NODATA MU      YHVVLT      NODATA KV      YHVRPI      NO DATA
YCLSCUR      NODATA MA      YCALVLT     NODATA V       YCALRPI     NO DATA
YXDEFCUR     NODATA MA      YDSCRVLT    NODATA V       YHTHRPI     NO DATA
YYDEFCUR     NODATA MA      YBVOFSV     NODATA V       YQSRPI      NO DATA
YTHMFCUR     NODATA MA      Y5VLFSV     NODATA V       YLSRPI      NO DATA
*******************************************************************

15:53:52<CRT11> SH YFIXED
```

```
YETA1          000/00/00/00                        0    0

* FOWER SUPPLY/ HEATER    YFAHAIMP    NODATA C       YPAMBTMP    NODATA C
-VRFI        NO DATA       YHVVLT      NODATA KV      YHVCUR      NODATA MU
YCALRFI      NO DATA       YCALVLT     NODATA V       YCLSCUR     NODATA MA
YLSRFI       NO DATA       YSVLFSV     NODATA V       YHVTMP      NODATA C
YCSRFI       NO DATA       YBVOFSV     NODATA V       YCPSTMP     NODATA C
YFIRRFI      NO DATA       YSIGPIMP    NODATA C       YCEATMP     NODATA C
Y1BUSRFI     NO DATA       Y2BUSRFI    NO DATA        YCALSELM    NO DATA
    **** CMD/SCIENCE INTERFACE STATUS ****            YERRPNTR    NODATA
Y1SDFFRI     NO DATA       Y3SDFRI     NO DATA        YRIUAS2     NO DATA
Y2SDFRT      NO DATA       Y4SDFPRT    NO DATA        YRIUBS2     NO DATA
    **** MECHANISM STATUS                YPLRZFO1    NODATA        YPLRZPO2    NODATA
YFGWAFCS     NO DATA       YFGWASIH    NO DATA        YFGMATMP    NODATA C
YLDCR        NO DATA       YENTFRFI    NO DATA        YDDCRTMP    NODATA C
YAPERFO1     NODATA        YAFRFRE1    NO DATA        YAPERTMP    NODATA C
YAPERFO2     NODATA        YFCLFRFI    NO DATA        YPCLRTMP    NODATA C
*******************************************************************

15:54:25<CRT11> SH YAPPG1
```

FIGURE 6.2.4-1

33) Y2OBTMP   Optical Bench Area 2 Temperature

34) Y3OBTMP   Optical Bench Area 3 Temperature

35) Y4OBTMP   Optical Bench Area 4 Temperature

The display pages ∧used in ~~VAP casting~~ *to be* *the STOCC* are shown in Figures 6.2.4.1
through 6.2.4.4. The definition of telemetry quantities to be
sampled, the engineering units and the alarm limits are to be
found in the ~~~~ *Project* Data Base, ~~and will be given here in a future~~
~~release.~~ The names and general functions of the pages are as
follows:

Chanel to stoc names

YANA   Analog temperatures, currents, voltages & status

YSTAT   Status of power supplies, CEA/SDF cross-strapping
              & mechanisms

YFIXED   Fixed (hold) mode power supply & mechanisms status;
              electronics, optics & mechanism temperatures

YAPPG1   Application processor status report (mostly eng.
              word 9)

YSDPAR   Science data parameter status report

YMSPG   Miscellaneous engineering page

MVCUS2   Bus power, SI C&DH status

MVS12S   Quantities expected by CUS & DF in both formats

```
YSLPAR          000/00/00/00                        0     0

  ** X **                    ** Y **            ** DETECTION PARAMETERS **
YXDAC      NC DATA        YYDAC      NC DATA        YISICHNL    NO DATA
YXPITCH    NC DATA        YYPITCH    NC DATA        YNUMCHNL    NO DATA
YXBASE     NC DATA        YYBASE     NC DATA        YOVRSCAN    NO DATA
YXDEFCUR     NODATA MA    YYDEFCUR     NODATA MA    YMSLICES    NO DATA
YXSTEPS    NC DATA        YYSTEPS    NC DATA        YINTMODE    NO DATA
YXDACERR   NC DATA        YYDACERR   NC DATA        YINTEG      NO DATA
YDRLACER   NC DATA        YDDACERR   NC DATA        YFCCUSRB    NO DATA
     **** SYSTEM PARAMETERS ****        **** CEA STATUS  YRIP       NC DATA
YACGSYNC   NC DATA        YPTANS     NC DATA                  YCPIP      NC DATA
YHRDSLIN   NC DATA        YHEADCYC   NC DATA                  YNDAIP     NC DATA
YLINSFRM   NC DATA        YDATALIM   NC DATA                  YHMIP      NO DATA
YFUMPACK   NC DATA        YNCISELM   NC DATA                  YAMCIP     NO DATA
MCSJ005B   NC DATA        YLIVEHI      NODATA MS              YSCIP      NO DATA
YMCLEARS   NC DATA        YDEADHI      NODATA MS              YOVRLITE   NC DATA
    ***********************************************          YRANGE     NO DATA

15:54:10<CRT11> SM YSTAT
```

```
YPSPG           000/00/00/00                        0     0

YSVLPSV     NODATA V      YCEA1HP      NODATA C     YHIP        NC DATA
YSVOPSV     NODATA V      YCFSIHP      NODATA C     YSCIP       NO DATA
YLSHFI     NC DATA        AB TP PI   NC DATA        YAMCIP      NO DATA
YCSRPJ     NC DATA        YBRIUTHP     NODATA C     P05J005B    NO DATA
YH1KRFI    NC DATA        YPMFB1HP     NODATA C     YHRDSLIN    NC DATA
YFVRFI     FC DATA        YPCBTHP      NODATA C     YLINSFRM    NO DATA
YHVVLI      NODATA KV     YFAKBTHP     NODATA C     YMDPPADR    NO DATA
YFVCUR      NODATA HU     YCLSCUR      NODATA HA    YPLRZP01    NODATA
YCALHFI    NC DATA        YFCCUSRH   NC DATA        YPLRZP02    NODATA
M10J1300    NO DATA       YSIGPTHP     NODATA C     YFGRAPOS    NO DATA
YFIRS1     FC DATA        Y1ACHP     NC DATA        YLIVEHI     NODATA
YFTOSI     NC DATA        YRIURS2    NC DATA        YDEADHI     NODATA
Y1SLFFRI   NC DATA        YTAMAX     NC DATA        YNUMCHNL    NO DATA
Y2SDFFRI   NC DATA        YTAMIN     NC DATA        YGVRSCAN    NO DATA
Y3SLFFRI   NC DATA        YMCLEARS   NC DATA        YOVRLITE    NO DATA
Y4SDFFRI   NC DATA        YXSTEPS    NC DATA        YYSTEPS     NO DATA

15:55:04<CRT11> STOL OF
```

FIGURE 6.2.4-3 (Cont'd)

YFIXED   000/00/00/00   0   0

********** FIXED MODE POWER SUPPLY STATUS **********

YHVVL1   NODATA KV   YCALVL1   NODATA V   YSVLPSV   NODATA
YHVCUR   NODATA MU   YCLSCUR   NODATA MA   YBVGPSV   NODATA
                                YCALSELR   NC DATA

**** FIXED TEMPS/MECHANISM STATUS ****

** MECH STATUS **   ** ELEC/OPTICS **   ** MECH TEMPS **

YFGWAFCS   NC DATA   YPCATMP   NODATA C   YFGMATMP   NODATA
YFGWASTR   TC DATA   YPCBTMP   NODATA C   YDCCRTMP   NODATA
YCOOK   NC DATA   Y2CHTMP   NODATA C   YAFERTMP   NODATA
YAPERFCS   NC DATA   YCEATMP   NCDATA C   YPCLRTMP   NODATA
YFLHZFCS   NC DATA
****

15:54:02<CRT11> SN YSDPAR

YAPFG1   000/00/00/00   0   0

YSFFLG   NC DATA   YONOFF   NC DATA   YICOLG   NC DAT
YFASST   NC DATA   YFINST   NC DATA   YFTCST   NO DAT
YFN2ST   NC DATA   YIAMIN   NC DATA   YFMAST   NO DAT
YFSDCT   NC DATA   YDFRST   NC DATA   YSTBUF   NO DAT
YFLGCT   NG DATA   YFL81   NC DATA   YFL169   NO DAT
YFL241   NC DATA   YFL322   NC DATA   YFM2FL   NO DAT
YSPK2   NC DATA   YCVCTR   NC DATA   YCVRLITE   NC DAT
YNDAIR   NC DATA   YSAFING   NC DATA   YSAFCR   NO DAT
YSPCTR   NC DATA   YAHITFCK   NC DATA   YMECHIOC   NO DAT
YFSCTR   NC DATA   YMFCCT   NC DATA   YMFECT   NO DAT
YDISC1   NC DATA   YSPFEIT1   NC DATA   YTAMAX   NO DAT
YFWCTR   NC DATA   YFIRMVER   NC DATA   YGIVUP   NO DAT
YSMEC1   NC DATA   YSMCEHNS   NC DATA   YIACMP   NO DAT
YERCTR   NC DATA   YERRCHK   NC DATA   YTAOIP   NO DAT
YKEEP   NC DATA   YENGSTAC   NC DATA   YTARXCTR   NC DAT
YSCCTR   NC DATA   YSELFCHK   NC DATA   YTAHYCTR   NO DAT

15:54:44<CRT11> SN YHSPG

FIGURE 6.2.4-2 (Cont'd)

6.3   Routine Monitoring with Science Data

6.4   Experience with Science-Affecting Failure/
      Degradation Modes

tmt
?.

```
MVCUS2          000/00/00/00                    0     0

***************************** POWER STATUS *******************************
 VOLTAGE                         CURRENT                    VOLTAGE
  BUS A        NODATA V           BUS A      NODATA A       CU/SDF A     NODATA V
  BUS B        NODATA V           BUS B      NODATA A       CU/SDF B     NODATA V

************************** SI C/DH STATUS ********************************

  PCU A      NO DATA      C/ST/C A    NO DATA        MEM 0,4     NO DATA
  PCU B      NO DATA      C/ST/C B    NO DATA        MEM 1,5     NO DATA
                                                     MEM 2,6     NO DATA
  REG A      NO DATA      MEM 1357    NO DATA        MEM 3,7     NO DATA
  REG B      NO DATA      MEM 0246    NO DATA

  FIU A      NO DATA      SUPER       NO DATA        FRM CN1     NO DATA
  FIU B      NO DATA      REPLY       NO DATA        TLM FMT     NO DATA
**************************************************************************

U9:U9:28<CRT11> SNAP MVSI2E
```

```
MVSI2E          000/00/00/00

******************* SCIENCE INSTRUMENT 2 ********************************

 FORMAT 1                     FORMAT 2                    STATUS

  SCRC ID     NO DATA          SCRC ID     NO DATA        INTRFACE    NO DATA
  PK LGTH     PC DATA          PK LGTH     NO DATA        SD CEST     NO DATA
  PK CCLE     NO DATA          PK CCLE     NO DATA        NSSC CON    NO DATA
  IC PAR      NO DATA          IC PAR      NO DATA        FORMAT      NO DATA
  DESER NO    NO DATA          C-SER NO    NO DATA        SD INPUT    NO DATA
  LINE/FRM    NO DATA          LINE/FRM    NO DATA
  WDS/LINE    NO DATA          WCS/LINE    NO DATA        SD THAKP    NO DATA

                                                         FRM CNT     NO DATA
                                                         TLM FMT     NO DATA
**************************************************************************
```

FIGURE 6.2.4-4 (Cont'd)

APPENDIX A

Glossary of Abbreviations, Acronyms & Mnemonics
(Emphasis on FOS- or Flight- Related Terms)

ACCUM	Accumulator
AI	Accumulation Interval
AMP	Ampere, Amplifier
APP	Appendix
ASCII	American Standard Code for Information Interchange
BER	Bit Error Rate
BNR	Burst Noise Reject
C&DH	Command & Data Handling
CARD	Constraints and Restrictions Document
CEA	Central Electronics Assembly
CEI	Contract End Items
CLPS	Calibration Lamp Power Supply
CMD SEQ	Command Sequence
CMOS	Complementary Monolithic Oxide on Silica
CPC	Computer Program Component
CPCI	Computer Program Configuration Item
CPS	Central Power Supply
CPT	Comprehensive Performance Test
CPU	Central Processing Unit
CRT	Cathode Ray Tube
DAC	Digital-to-Analog Converter
DC	Direct Current
DCF	Data Capture Facility
DDCMP	(DEC) Digital Data Communication Message Protocol
DDTBL	Discriminator DAC/Disabled Diode Table
DEC	Digital Equipment Corporation
DEF	Deflection
DF224	ST Spacecraft Control Computer
DISC	Discriminator
DT	Dead Time
DVU	Design Verification Unit
EAA	Entrance Aperture Assembly
ED	Engineering Data
EDB	Executive Data Buffer
EF	Event Flag
ESTR	Engineering & science Tape recorder (1 of 3 telemetry streams)
EPA	Entrance Port Assembly
ET	Engineering Telemetry
FDB	FOS Data Base
FGS	Fine Guidance Sensors
FGWA	Filter Grating Wheel Assembly
FLT	Flight
FOC	Faint Object Camera
FOS	Faint Object Spectrograph
FOT	First On Test
FOV	Field of View
F/W	Firmware
GDMA	Ground Data Management Analysis

7. CONTINGENCIES.

7.1 Safing Procedures. As long as the FOS is operational a safe mode can be achieved by executing the following commands:

YHVDAC/000
YENTRNC/200

7.2 Quick-Reaction Time Constraints.

7.3 Contingency Procedure. In normal modes of operation, the FOS microprocessors are only reset on initialization. The Housekeeping processor is coded to reflect the fact that a spontaneous microprocessor reset is an anomalous condition.

The microprocessor reset command should carry with it the operational constraint that, if the Housekeeping processor is enabled, the processor should be disabled for two minutes, fifteen seconds after the reset command, as illustrated by the following sample sequence:

```
/T0
/MPROCNTL/30/12 * INHIBIT HOUSEKEEPING COMMANDING AND
                   EXECUTION
/T25
/YRESET-A or YRESET-B * RESET THE APPROPRIATE MICROPROCESSOR
/T713000 * WAIT TWO MINUTES, 15 SECONDS
/MPROCNTL/30/64 * RE-ENABLE HOUSEKEEPING COMMANDING
                   AND EXECUTION (WITH RE-INITIALIZATION)
```

PDL	Program Design Language
PDR	Preliminary Design Review
P-E	Perkin-Elmer Corp.
pF	pico(10^{-9}) Farad
PIT	Processor Interface Table
POCC	Payload Operations Control Center
PODPS	Post Observation Data Processing System
PORTS	Preliminary Operations Requirements & Test Support
PROC REQ	Processor Request
PROM	Programmable Read Only Memory
PSF	Point Spread Function
PSS	Payload Safing Sequence
PWR	Power
QSO	Quasi-Stellar Object
R	Resolution ($\Delta\lambda/\lambda$)
RAM	Random Access Memory (read/write)
RDONUM	Readout Number
REF	Reference
REG	Regulator, regulated
RF	Radio Frequency
RIU	Remote Interface Unit
RLY	Relay
ROM	Read Only Memory, also Rough Order of Magnitude
RPI	Relay Position Indicator
RSDP	Routine Science Data Processor
RTCS	Relative Time Command Sequence
RTN	Return
SA	Single Access (TDRSS), Solar Array
SAA	South Atlantic (Magnetic) Anomaly
SC	Spacecraft
SD	Science Data
SDAS	Science Data Analysis Software
SDD	Software Design Document
SDF	Science Data Formatter
SDP	Science Data Processing
SDR(C)	Sci. Data Readout (Conversion)
SDS	Science Data Storage
SEQ	Sequence
SHP	Standard Header Packet
SI	Science Instrument
SICC	Science Instrument Control Center
SLIB	SOGS (TRW) Library Document Identifier
SMC	Serial Magnitude Command
SMS	Science Mission Specification
SOGS	Science Operations Ground System (TRW)
SPC	Stored Program Command (SATS)
SPSS	Science Planning and Scheduling System
SRD	Software Requirements Document
SSA	S-Band Single Access (TDRSS)
SSC	Science Support Center (See also NSSC)
SSM	Support Systems Module
ST	Space Telescope
STDN	Spacecraft Tracking and Data Network
STOCC	ST Operations Control Center

GFE	Government Furnished Equipment
GND	Ground (electrical)
GO	General Observer
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
GSS	Guide Star Selection
GT	Ground Test
GTO	Guaranteed Time Observer
HGA	High Gaint Antenna
HL	High Level (Discrete Command)
HRS	High Resolution Spectrograph
HSP	High Speed Photometer
HV	High Voltage
HVPS	High Voltage Power Supply
H/W	Hardware
IBM	International Business Machines, Inc.
ICD	Interface Control Document
IDT	Investigator Definition Team
IEB	Instruction Engineering Bit
I/F	Interface
IRD	Interface Requirements Document
IST	Instrument Science Team
K	For memory, 2^{10} (1024) bits; otherwise, 10^3
KSA	Ku-Band Single Access (TDRSS)
LED	Light Emitting Diode
LMSC	Lockheed Missiles & Space Company, Inc.
ma	Milli-ampere
MA	Multiple Access (TDRSS)
MAF	Major Frame (FOS: 1 min)
MHz	10^6 Hz
MIF	Minor Frame (FOS: 1/2 sec)
MMC	Martin Marietta Corporation
MOGS	Mission Operations Ground System
ms(ec)	Millisecond
MUX	Multiplexor
NASCOM	NASA Communication Network
NCC	Network Control Center
nm	Nanometer (10^{-9} meters or 10 anstroms)
NSSC-1	NASA Standard Spacecraft Computer-Model 1
OLD	Operations & Limitations Document
OP	Operational
OPT	Orbital Performance Test
OSCF	Operations Support Computing Facility
OSS	Observation Support System
OTA	Optical Telescope Assembly
OTM	Optical Thermal Measurements
PA	Polarizer Assembly
PACA	Polarizer Assembly Clock Angle
PASS	POCC Application Software Support
PAWA	Polarizer Assembly Waveplate Angle
PC	Photocathode, also Planetary Camera
PCS	Pointing Control System
PDB	Project Data Base
PDL	Program Design Language

APPENDIX B

ALL FOS Telemetry by Mnemonic

MNEMONIC	ID	HD	SF	UDL	SHP	SIGNIFICANCE
ASCIIHD	Y.403			838		ASCII Header (64 words).
DDTBL	Y.401			322		Disc. DAC/Disabled Diode Table (512 words)
MAF	Y.405			962.5		Major frame number (8 bits).
MIF	Y.404			962		Minor frame number (8 bits)
NMEMCLR	Y.407			964		Memory clear number (16 bits)
NREAD	Y.406			963		Readout number (16 bits).
RAMMAP	Y.402			834		RAM map (4 words)
YACACC HI	Y.031				884-5	Number of counts in this dwell HI.
YACACC LO	Y.031				884-5	Number of counts in this dwell LO
YAQMD		8	67	935.5		Data Acq. mode. Has 7.205-Y.212
YACSAV HI	Y.029				880-5	Historic counts HI.
YACSAV LO	Y.029				881-5	Historic counts LO.
YACTMERR	Y564	8	118:1	961		Accumulator timer set error. A 0 is OK and a 1 is error
YAMCIP	Y583	8	119:7	961.5		Auto memory clear in progress. A 1 means clear to be done (interface with data monitoring background task)
YAPERPOS HI	Y505	8	9	906.5		Aperture position HI.
YAPERPOS HI	Y505	8	39	921.5		Aperture position HI.
YAPERPOS HI	Y505	8	69	936.5		Aperture position HI.
YAPERPOS HI	Y505	8	99	951.5		Aperture position HI.
YAPERPOS LO	Y505	8	10	907		Aperture position LO.
YAPERPOS LO	Y505	8	40	922		Aperture position LO.
YAPERPOS LO	Y505	8	70	937		Aperture position LO.
YAPERPOS LO	Y505	8	100	952		Aperture position LO.
YAPERTMP	Y313	7	12		157.5	Aperture Mechanism Temperature.
YAFRFRPI	Y123	1	1:5		139.5	Aperture Failsafe Arm/Safe Status. A 0 is Arm and 1 is Safe.
YARITHCK HI	Y516	8	28	916		Arithmetic self-check (speed) results HI.
YARITHCK LO	Y516	8	29	916.5		Arithmetic self-check (speed) results LO.
YARIUTMP	Y326				161.5	RIU-A Temperature
YBASKP	Y.019				887-3 887-4	Y base for current data
Y3RIUTMP	Y327	7	17		162.5	RIU-B Temperature
YBSM	Y.022				890-3	Channel number of peak
YCALRPI	Y102	4	1:6		142.5	Calibration Lamp Supply RPI. A 0 is on and 1 is off.
YCALSELR	Y133	3	1:7		141.5	Calibration Lamp Select RPI. A 0 is B and a 1 is A
YCALVLT	Y320	6	0		137.5	Calibration Lamp Supply Voltage
YCDACERR	Y578	8	117:5	960.5		Calibration DAC readback error flag. A 0 is OK and a 1 is
YCEATMP	Y311	7	10		115.5	Central Electronics Temperatures
YCLKMON	Y134	3	1:2		141.5	Microprocessor Clock Monitor. A 0 is 3 MHz and 1 is 1.5
YCLSCUR	Y328	0	1		138.5	Calibration Lamp Supply Current
YCMTRST	Y101	3	1:8		141.5	Carousel Motor Status. A 0 is B and a 1 is A.
YCPIP	Y574	8	119:4	961.5		CEA plot is progress. A 1 means plot in progress
YCPSTMP	Y318	7	18		163.5	Central Power Supply Temperature
YDATACTL	Y567	8	118:5-8	961		Data control commands. Has Y.227-Y.230
YDATALIM	Y549	8	114	959		High byte of acquisition limit. See Section 3.1.2.3
YDDACERR	Y563	8	117:3	960.5		Discriminator DAC readback error flag. A 0 is OK and a 1 is error
YDEADHI	Y587	8	65	934.5		Accumulator close time high byte.
YDEADLO	Y588	8	66	935		Accumulator close time low byte

STOL	Systems Test and Operations Language
STOMS	ST Observatory Management System
ST ScI	Space Telescope Science Institute
STSOP	Space Telescope Science and Operations Project
SV	Science Verification ($\sim$ months 2-4)
S/W	Software
TA	Target Acquisition
TAC	Telemetry and Command (Processor)
TBD	To be Determined
TBR	To be Resolved
TBS	To be Specified
TD	Technical Directive
TDI	Time Delayed Integration
TDRS(S)	Tracking & Data Relay Satellite (System)
TI	Texas Instruments, Inc.
T(L)M	Telemetry
TOT	Turn on Test
TRI	Time-Resolved Integration
UCLA	University of California, Los Angeles
UCSD	University of California, San Diego
UDL	Unique Data Log (for each SI)
usec	Microsecond
UTC	Universal Time Classification or Coordinated
UV	Ultra-Violet
VAP	Verification and Acceptance Program
WFPC	Wide Field Planetary Camera
X´ab´	Hexadecimal (base 16) value for "ab"
Y	Conventional first letter for FOS parameters
YDAQM	Acquisition Mode
YDCH1	First Channel
YDFWV	Firmware Version
YDINT	Integrations
YDLPF	Lines Per Frame
YDNCH	Number of Channels
YDOVR	Overscans
YDPTR	Patterns Per Readout
YDSL	Slices
YDWPL	Words Per Line
YDXS	X Steps
YDYS	Y Steps
Yxxx	Abbreviated LMSC ET Measurement ID
Yxxx$_c$	Abbreviated LMSC Command ID
Y.xxx	Coined Measurement ID (lacks LMSC identifier)
Y.xxx$_c$	Coined Command ID
???	Material needing determination/confirmation
μ	May be used for arc-second ($''$) superscript
	Micron, 10^{-6} m, 10Å
λ	Wavelength

Symbol	Address					Description
YFM2CF	Y.006				883-2	Count rate window change for next data set.
YFM2FL	Y620	9	20		889-4	Action indicator for YFM2PR module.
YFM2ST	Y625	9	25			Mode 2 target acquisition processor status. Is 1 if YFMOD2 executing, 2 if terminated abnormally, 4 if termination normal.
YFOCUSRB	Y519	8	33	918.5		Focus trim coil DAC readback.
YFPKST	Y628	9	28			Peak-up target acquisition processor status.
YFPRST	Y605	9	4			Science data processing status. Is 1 if YFSDPR executing, 2 if terminated on error, 4 if termination normal.
YFPUCT	Y629	9	29			Counter of frames/dwell during FPKUP.
YFRCTR	Y621	9	21		879-3	Count frames for part 1 of YFSDPR processor.
YFSCTR	Y639	9	38			Number of tests by FHKPG where fail-safe armed. Counter indicating number of tests since YFHKPG was initialized where fail-safe RPI was armed.
YFSDST	Y603	9	3			Science data storage status. Is 1 if YFSDST executing, 2 if terminated on error, 4 if termination normal.
YFTOST	Y609	9	9			Turn off status. Is 1 if YFOFF executing, 2 if terminated abnormally, 4 if termination normal.
YFUTT HI	Y.030				882-5	Saved dwell time HI.
YFUTT LO	Y.030				883-5	Saved dwell time LO.
YFWCTR	Y640	9	40			Firmware version error, consecutive major frames.
YFWSTAT1 HI	Y536	8	82	943		Firmware status group 1 HI. Typically ASCII (interpretation depends on use)
YFWSTAT1 LO	Y536	8	83	943.5		Firmware status group 1 LO. As above.
YFWSTAT2 HI	Y537	8	84	944		Firmware status group 2 HI. As above.
YFWSTAT2 LO	Y537	8	85	944.5		Firmware status group 2 LO. As above.
YFWSTAT3 HI	Y538	8	86	945		Firmware status group 3 HI. As above.
YFWSTAT3 LO	Y538	8	87	945.5		Firmware status group 3 LO. As above.
YFWSTAT4 HI	Y539	8	88	946		Firmware status group 4 HI. As above.
YFWSTAT4 LO	Y539	8	89	946.5		Firmware status group 4 LO. As above.
YFWSTAT5 HI	Y540	8	90	947		Firmware status group 5 HI. As above.
YFWSTAT5 LO	Y540	8	91	947.5		Firmware status group 5 LO. As above.
YFWSTAT6 HI	Y541	8	92	948		Firmware status group 6 HI. As above.
YFWSTAT6 LO	Y541	8	93	948.5		Firmware status group 6 LO. As above.
YFXCTR	Y.008				895-2 895-4	X-offset to center.
YFYCTR	Y.009				896-2 896-4	Y-offset to center.
YGIVUP	Y622	9	22		882-2	Mode 2 target acquisition error indicator.
YGPCTR	Y.026				879-4	Previous value of binary search step counter.
YGPCTR	Y623	9	23			Count frames for part 2 of YFSDPR processor.
YHTRRPI	Y118	1	1:8		139.5	Heater Control Relay Position. A 0 is HTON (on) and 1 is HTOF (off)
YHVCUR	Y325	1	0		152.5	High Voltage Supply Current.
YHVDACER	Y561	8	117:7	960.5		HV DAC readback error flag. A 0 is OK and a 1 is error.
YHVDACRB HI	Y520	9	34:7-8	919		High voltage DAC readback HI.
YHVDACRB LO	Y520	8	35	919.5		High voltage DAC readback LO.
YHVRPI	Y117	4	1:5		142.5	High Voltage Relay Position. A 0 is HVON (on) and 1 is HVOF (off)
YHVSPAR	Y581	8	34:3	919		Spare bit.
YHVTMP	Y316	7	15		160.5	High Voltage Supply Temperature.
YHVVLT	Y319	0	0		131.5	High Voltage Supply Voltage.
YINSENG	Y104	3	1:4		141.5	Instruction Engineering Bit Status. A 0 is OK and 1 is
YINTEG	Y546	8	110	957		Number of integrations/X-step.
YINIMODE	Y547	8	112	958		Initialization mode. Has Y.213-Y.218
YINTPRES	Y338				140.5	FDS internal pressure gauge.

YDOOR	Y503	8	8:7-8	906	Entrance door position.
YDOOR	Y503	8	38:7-8	921	Entrance door position.
YDOOR	Y503	8	68:7-8	936	Entrance door position.
YDOOR	Y503	8	98:7-8	951	Entrance door position.
YDOORTMP	Y312	7	11	156.5	Entrance door mechanism temp.
YDPRMPWR	Y579	8	34:1-2	915	Descramble PROM power status. A 00 is off, 01 is even, 10 is odd, and 11 is both.
YDRDACER	Y562	8	117:8	960.5	Discriminator reference DAC readback error flag. A 0 is OK and a 1 is error.
YDREFDAC	Y518	8	32	918	Discriminator reference DAC.
YDSCRVLT	Y324	5	0	136.5	Discriminator Reference Voltage.
YEDGE	Y.027			889-4	Result of edge test.
YEDSCRAM	Y107	3	1:6	141.5	Descramble PROM Power Status Even. A 0 is off and 1 is on.
YENGSYNC	Y500	8	0	902	Microprocessor serial engr data packet sync. Value is X'A5'
YENTFRPI	Y124	1	1:6	139.5	Entrance Door Failsafe Arm/Safe Status. A 0 is Arm and 1 is Safe.
YERCTR	Y639	9	39		Consecutive major frames with error check error. Counter indicating consecutive major frames in which an error check error is indicated.
YERRCHK HI	Y502	8	2	903	Firmware check character HI.
YERRCHK LO	Y502	8	3	903.5	Firmware check character LO.
YFASST	608	9	8		Autonomous safe status. Is 1 if YFASAF executing, 2 if terminated abnormally, 4 if termination normal
YFDACERR	Y560	8	117:2	960.5	Focus DAC readback error flag. A 0 is OK and a 1 is error.
YFDWCT	Y630	9	30	879-5	Dwell counter for FPKUP.
YFFCPWR	Y580	8	34:4	915	Flat field cal lamp power. A zero is off and a 1 is on
YFGWATMP	Y315	7	14	159.5	Filter/Grating Wheel Motor A Temp.
YFGWBTMP	Y329	7	19	164.5	Filter/Grating Wheel Motor B Temp.
YFGWAPOS	Y506	8	8:1-4	906	Filter/Grating Wheel Assembly position.
YFGWAPOS	Y506	8	38:1-4	921	Filter/Grating Wheel Assembly position
YFGWAPOS	Y506	8	68:1-4	936	Filter/Grating Wheel Assembly position.
YFGWAPOS	Y506	8	98:1-4	951	Filter/Grating Wheel Assembly position.
YFGWASP	Y508	8	8:6	906	FGWA spare.
YFGWASP	Y508	8	38:6	921	FGWA spare.
YFGWASP	Y508	8	68:6	936	FGWA spare.
YFGWASP	Y508	8	98:6	951	FGWA spare.
YFGWASTR	Y504	8	8:5	906	FGWA encoder strobe bit.
YFGWASTR	Y504	8	38:5	921	FGWA encoder strobe bit.
YFGWASTR	Y504	8	68:5	936	FGWA encoder strobe bit.
YFGWASTR	Y504	8	98:5	951	FGWA encoder strobe bit.
YFHKST	Y607	9	7		Housekeeping status. Is 1 if YFHPKG executing, 2 if terminated on error, 4 if disabled by another processor.
YFINST	Y602	9	2		Status of INIT processor. Is 1 if YFINIT executing, 2 if terminated on error, 4 if termination normal
YFIRMVER	Y501	8	1	902.5	Firmware version number. Has Y.201 (YYPATM)
YFLGCT	Y617	9	17		Counts main frame limit check failures. Counter for consecutive major frames in which same FOS limit check failed.
YFL169	Y611	9	11		Data items 9-16. FOS limit check flags B2
YFL241	Y612	9	12		Data items 17-24. FOS limit check flags B3
YFL322	Y613	9	13		Data items 25-32. FOS limit check flags B4
YFLB1	Y610	9	10		Data items 1-8. FOS limit check flags B1

Name	Y-code					Description
YPLRZPOS LO	Y507	8	12	908		Polarizer position LO.
YPLRZPOS LO	Y507	8	42	923		Polarizer position LO.
YPLRZPOS LO	Y507	8	72	938		Polarizer position LO.
YPLRZPOS LO	Y507	8	102	953		Polarizer position LO.
YPMFATMP	Y307	7	6		151.5	Permanent Magnet Focus Assembly A Temperature.
YPMFBTMP	Y333	7	22		167.5	Permanent Magnet Focus Assembly B Temperature.
YPOLFRPI	Y130	1	1:7		179.5	Polarizer Failsafe Arm/Safe Status. A 0 is Arm and 1 is Saf
YPOLRTMP	Y314	7	13		158.5	Polarizer Mechanism Temperature.
YPPINV	Y.017			885-3 885-4		Preplanned branch status.
YPTRNS	Y577	8	111	957.5		Patterns per readout.
YQSRPI	Y119	4	1:3		142.5	Quiet Supply Relay Position. A 0 is +QPS (on) and is -QPS (off)
YRAMADDR HI	Y545	8	108	956		RAM address pointer HI.
YRAMADDR LO	Y545	8	109	956.5		RAM address pointer LO.
YRANGE	Y555	8	52	928		Y range.
YREADCYC	Y549	8	113	958.5		Readouts/memory clear.
YREJECTS HI	Y652	8	51	927.5		Number of adder rejects HI.
YREJECTS LO	Y652	8	58	931		Number of adder rejects LO.
YRESETST	Y105	3	1:1		141.5	Microprocessor Reset Status. A 0 is reset and a 1 is not re
YRIP	Y572	8	119:2	961.5		Resting in peace = observation complete.
YRIUS2	Y131	4	1:1-2		142.5	RIU Standby Status. Bit 1 is for FIU A and bit 2 for for RIU B. A 0 means STBY1 and a 1 means STBY2
YRSINV	Y.018			886-3 886-4		Raster scan request status.
YSAFCR	Y643	9	43			Consecutive major frames gone safe autonomously. Number of consecutive major frames in which FOS indicated it has gone safe autonomously.
YSAFING	Y514	8	26	915		Auto safe mode transition. Has Y202-Y204 (bits 1-5 unused) Bits 6-7 zeroed when sampled.
YSCCTR	Y656	9	45			Counter of failed self-check tests. Number of consecutive major farmes in which the FOS has failed the self-check test
YSDIP	Y584	8	119:8	961.5		Science dump in progress. A 1 means dump in progress.
YSELFCHK HI	Y517	8	30	917		Processor self-check results HI.
YSELFCHK LO	Y517	8	31	917.5		Processor self-check results LO.
YSFFLG	Y618	9	18			Autonomous safe flag. Is 1 if YFASAF has been invoked by application processor, 2 if not invoked
YSIGPTMP	Y310	7	9		154.5	Signal Processor Temperature.
YSMCERRS	Y649	8	95	949.5		Serial magnitude command error report flags. Has Y.219-Y.226. Word zeroed when sampled.
YSMECT	Y615	9	15			Counts main frame magnitude command errors. Counter for consecutive major frames in which a serial magnitude command error reported.
YSPARE	Y589	8	34:5-6	919		Spare.
YSPCTR	Y646	9	46			Counter of speed check errors. Counter indicating consecutive major frames in which a speed check error is indicated.
YSPEED	Y516	8	28			Hi bits: Speed check - Timesince last MJF
	Y516	8	29			Low bits: Speed check
YSPR	Y.400			1		Spare (225 words).
YSPR	Y.408			965		Spare word.
YSPRBIT1	Y556	9	117:1	960.5		Spare bit. All bits in word zeroed when sampled.
YSPR0	Y605	9	5			Spare 0.
YSPR1	Y626	9	26			Spare 1.
YSPR2	Y627	9	27			Spare 2.
YSPR3	Y635	9	35			Spare 3.
YSPR4	Y636	9	36			

Name	Code					Description
YKEEP	Y616	9	16			Counts main frame keep alive failure. Counter of consecutive major frames in which FOS serial ED fails keep-alive test
YLASTCMD HI	Y543	8	96	950		Last command at SMC error HI>
YLASTCMD LO	Y543	8	97	950.5		Last command at SMC error LO.
YLINCT	Y606	9	6			Line number within a frame.
YLINSFRM HI	Y552	8	6	905		Lines per frame HI.
YLINSFRM LO	Y552	8	7	905.5		Lines per frame LO.
YLIVEHI	Y585	8	63	933.5		Accumulator open time high byte.
YLIVELO	Y586	8	64	934		Accumulator open time low byte.
YLSRPI	Y120	4	1:4		142.5	Logic Supply Relay Status. A 0 is +LPS (on) and 1 is -LPS (o
YMAP	Y.004				879-2	Map number.
YMCLEARS	Y542	8	94	949		Memory clears/data acquisition.
YMDMPADR HI	Y550	8	115	959.5		Memory dump address HI.
YMDMPADR LO	Y550	8	116	960		Memory dump address LO.
YMECHTOC	Y566	8	118:2-4	961		Mechanism time-out code.
YMFCCT	Y641	9	41			Counter of major frame fail-safe RPI test. Major frame counter used for fail-safe RPI test
YMFECT	Y642	9	42			Counter of major frame output for data log. Major frame counter tested for output of SHPs
YMMIP	Y582	8	119:6	961.5		Mechanism motion in progress. A 1 means motion in progress.
YMSLICES	Y576	8	59	931.5		Number of memory slices.
YM2MAP	Y.005				880-2	Maximum maps.
YMBCTR	Y.020				889-3	Brightness rank.
YNDAIP	Y571	8	119:1	961.5		Data acquisition not in progress. A 1 means not in progress.
YNMAX	Y.023				891-3	Number of counts in peak.
YNMEAN	Y.024			892-3	891-4	Counts in mean sky.
YNOISELM HI	Y544	8	106	955		Burst noise rejection limit HI.
YNOISELM LO	Y544	8	107	955.5		Burst noise rejection limit LO.
YNTARG	Y.028				870-4	Counts in target channels.
YNUMCHNL	Y532	8	62	933		Number of channels to be processed.
YOBSJ	Y.021				889-3	Peak matrix number.
YODSCRAM	Y106	3	1:5		141.5	Descramble PROM Power Status Odd. A 0 is off and 1 is on.
YONOFF	Y601	9	1			FOS on/off indicator. Is 1 if FOS successfully turned off via YFOFF; otherwise 2
YOVCTR	Y644	9	44			Counter of failed YOVRLITE sum tests. Number of consecutive major frames in which FOS overlight sum test has
YOVRLITE B1	Y513	8	22	913		Overlight sum MS byte. Total of 32 bits.
YOVRLITE B2	Y513	8	23	913.5		Overlight sum NMS byte. Total of 32 bits.
YOVRLITE B3	Y513	8	24	914		Overlight sum NLS byte. Total of 32 bits.
YOVRLITE B4	Y513	8	25	914.5		Overlight sum LS byte. Total of 32 bits.
YOVRSCAN	Y530	8	60	932		X deflection overscan.
YOV169	Y632	9	32			Next 8 LSBs accumulated YOVRLITE.
YOV241	Y633	9	33			Next 8 LSBs accumulated YOVRLITE.
YOV322	Y634	9	34			8 MSBs accumulated YOVRLITE.
YOV81	Y631	9	31			8 LSBs accumulated LOVRLITE.
YPAMATMP	Y306	7	5		150.5	Pre-Amp Assembly A Temperature.
YPAMBTMP	Y331	7	21		166.5	Pre-Amp Assembly B Temperature.
YPCATMP	Y305	7	4		149.5	Photocathode A Temperature.
YPCBTMP	Y330	7	20		165.5	Photocathode B Temperature.
YPIP	Y573	8	119:3	961.5		Pause in progress. A 1 means pause in progress.
YPKCT1	Y.012				880-3 880-4	Objects found in field.
YPLRZPOS HI	Y507	8	11	907.5		Polarizer position HI.
YPLRZPOS HI	Y507	8	41	922.5		Polarizer position HI.
YPLRZPOS HI	Y507	8	71	937.5		Polarizer position HI.
YPLRZPOS HI	Y507	8	101	952.5		Polarizer position HI.

Name	Code					Description
YXDAC LO	Y553	8	44	524		X DAC readback LO.
YXDAC LO	Y553	8	104	954		X DAC readback LO.
YXDEFCUR	Y321	2	0		133.5	X-Deflection Coil Driver Current.
YXFILW		8	15			X Filter width in F/W TA
YXPITCH HI	Y522	8	46	925		X deflection pitch between diodes HI.
YXPITCH LO	Y522	8	47	925.5		X deflection pitch between diodes LO.
YXSTEPS	Y524	8	50	927		X deflection sub-steps.
YXYDFTMP	Y334	7	27		168.5	X Y Deflection Focus DAC Temperature.
YYABRTDA	Y.229	8	118:7	961		Abort data acquisition command flag. A 1 means abort.
YYAPMC	Y.410				234	Aperture Mechanism Control Block (18 words).
YYAUTPO	Y.210	8	67:6	935.5		Automatic polarizer sequence instrument mode.
YYBASE HI	Y527	8	55	929.5		Y deflection base HI.
YYBASE LO	Y527	8	56	930		Y deflection base LO.
YYBEGNDA	Y.227	8	118:5	961		Begin data acquisition command flag. A 1 means begin.
YYCHPK1	Y.013				881.3 881.4	First channel where peak found.
YYCHPK2	Y.014				882.3 882.4	Second channel where peak found.
YYCHPK3	Y.015				883.3 883.4	Third channel where peak found.
YYCHPK4	Y.016				884.3 884.4	Fourth channel where peak found.
YYDACERR	Y559	8	117:6	960.5		Y DAC readback error flag. A 0 is Ok and a 1 is error.
YYDAC HI	Y521	8	36	930		Y DAC readback HI.
YYDAC LO	Y521	8	37	930.5		Y DAC readback LO.
YYDBLSN	Y.209	8	67:5	935.5		Double/-Single precision adder instrument mode.
YYDCMIP	Y.223	8	95:5	949.5		Data command illegal path.
YYDCMOF	Y.222	8	95:4	949.5		Data command overflow.
YYDEFCUR	Y322	2	0		134.5	Y-Deflection Coil Driver Current.
YYENDDA	Y.228	8	118:6	961		End data acquisition command flag. A 1 means end.
YYEPMC	Y.409				226	Entrance Port Mechanism Control Block (8 words).
YYFGMC	Y.412				306	FGWA Mechanism Control Block (16 words).
YYFILW		8	45			Y Filter width in F/W TA
YYFVCTR2	Y.010				893.4	V2 component of ST slew request.
YYFVCTR2 HI	Y.010				887.2	V2 component of ST slew request HI.
YYFVCTR2 LO	Y.010				888.2	V2 component of ST slew request LO.
YYFVTCR3 HI	Y.011				894.4	V3 component of ST slew request.
YYFVTCR3 HI	Y.011				889.2	V3 component of ST slew request HI.
YYFVTCR3 LO	Y.011				890.2	V3 component of ST slew request LO.
YYILT3CC	Y.219	8	95:1	949.5		Illegal Type-3 command code.
YYILT4CC	Y.220	8	95:2	949.5		Illegal Type-4 command code.
YYILT4MO	Y.221	8	95:3	949.5		Illegal Type-4 command modifier.
YYINDFHY	Y.217	8	112:5	958		Do deflection hysteresis pattern at beginning of data acquisition.
YYINHSLT	Y.214	8	112:2	959		Inhibit slice table fill.
YYINHXDF	Y.216	8	112:4	958		Inhibit X-deflection table fill.
YYINHYDF	Y.215	8	112:3	958		Inhibit Y-deflection table fill.
YYNMINOR	Y.007				884.2	Minor frame number.
YYNXTSB	Y.002				880.1	Next available message position in status buffer.
YYPATH	Y.201	8	1:8	902.5		Path identification. A 0 is "A" (amber or red) and a 1 is "B" (blue).
YYPITCH HI	Y526	8	53	928.5		Y deflection pitch between diodes HI.
YYPITCH LO	Y526	8	54	929		Y deflection pitch between diodes LO.
YYPLMC	Y.411				252	Polarizer Mechanism Control Block (54 words).
YYREJRE	Y.207	8	67:3	935.5		Reject/-Retry instrument mode.
YYRSETMP	Y.230	8	118:8	961		Reset microprocessor command flag. A 1 means reset.
YYRSMNI	Y.213	8	112:1	958		Resume (no initialization).
YYSAFED	Y.204	8	26:8	915		Auto safing enabled/disabled.
YYSAFLKA	Y.202	8	26:6	915		Auto safe due to loss of keep-alive SMC.
YYSGYSL	Y.203	8	26:7	915		Auto safe due to loss of telemetry sync.
YYSBST	Y.003				881.1	FOS single-bit status items.

					Spare 4.
					Spare 5.
YSPR5	Y637	9	37		Spare 6.
YSPR6	Y647	9	47		Spare 7.
YSPR7	Y648	9	48		Spare.
YSPR8 B1	Y.648	9	49		Spare.
YSPR8 B2	Y.648	9	50		Spare.
YSPR8 B3	Y.648	9	51		Spare.
YSPR8 B4	Y.648	9	52		Spare.
YSPR8 B5	Y.648	9	53		Spare.
YSPR8 B6	Y.648	9	54		Spare.
YSPR8 B7	Y.648	9	55		Spare.
YSPR8 B8	Y.648	9	56		Spare.
YSPR8 B9	Y.648	9	57		Spare.
YSPR8 B10	Y.648	9	58		Spare.
YSPR8 B11	Y.648	9	59		Spare.
YSTBUF	Y600	9	0	879.1	Number of FOS status buffer entries. Measured since last time the counter reset.
YTACMP	Y624	9	24	981.2	Mode 2 Target acquisition completion indicator. A 1 means complete.
YTAMAX HI	Y650	8	20	912	Upper Target/Acq Window HI.
YTAMAX LO	Y650	8	21	912.5	Upper Target/Acq Window LO.
YTAMIN HI	Y651	8	80	942	Lower Target/Acq Window HI.
YTAMIN LO	Y651	8	81	942.5	Lower Target/Acq Window LO.
YTAMODE	Y515	8	27	915.5	Target acquisition mode.
YTAQIP	Y575	8	119:5	961.5	Target acquisition in progress. A 1 means acquisition in progress.
YTARXCTR HI	Y510	8	16	910	Target Acq X-center HI. Has 4 others.
YTARXCTR HI	Y510	8	76	940	Target Acq X center HI.
YTARXCTR LO	Y510	8	17	910.5	Target Acq X-center LO.
YTARXCTR LO	Y510	8	77	940.5	Target Acq X center LO.
YTARXTBD		8	16:0		F/W TA Result - Found target successfully
YTARXTBD		8	16:1		F/W TA result - Field crowded
YTARXTBD		8	16:2		F/W TA Result - Too bright
YTARXTBD		8	16:3		F/W TA result - Too faint
YTARXTBD		8	19:		Bits 0-3 = No rel. maxima near target (0-15)
YTARYCTR HI	Y511	8	18	911	Target Acq Y-center HI. Has 1 other.
YTARYCTR HI	Y511	8	78	941	Target Acq Y center HI.
YTARYCTR LO	Y511	8	19	911.5	Target Acq Y-center LO.
YTERYCTR LO	Y511	8	79	941.5	Target Acq Y center LO.
YTOFLG	Y619	9	19		Turn off flag. Is 1 if YFOFF has been invoked by application processor, 2 if not invoked.
YTRMFCUR	Y323	4	0	135.5	Trim Focus Coil Driver Current.
YVARI1	Y.025			893.3 892.4	Sky variance.
YWRDSLIN HI	Y551	8	4	904	Words per line HI.
YWRDSLIN LO	Y551	8	5	904.5	Words per line LO.
YWTCHDOG	Y103	3	1:3	141.5	Watchdog Timer Status. A 0 is OK and 1 is error.
YXBASE HI	Y523	8	48	926	X deflection base HI.
YXBASE LO	Y523	8	49	926.5	X deflection base LO.
YXDACERR	Y558	8	117:4	960.5	X DAC readback error flag. A 0 is OK and a 1 is error.
YXDAC HI	Y553	8	13	908.5	DAC readback HI.
YXDAC HI	Y553	8	43	923.5	X DAC readback HI.
YXDAC HI	Y553	8	73	938.5	X DAC readback HI.
YXDAC HI	Y553	8	103	953.5	X DAC readback HI.
YXDAC LO	Y553	8	14	909	X DAC readback LO.

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APPENDIX C
SHP FOS-UNIQUE AREA CONTENTS
See Section 3.7.5.3

From YFHKPG – Housekeeping (Processor 30)

Set 1/1

Word	Value	Meaning
1	1	Identification number for YFHKPG.
2	YSTBUF	The number of FOS Status Buffer entries since the last time YSTBUF was reset from the ground.
3	SBUFPTRH	The next available message position in the Status Buffer. Equivalent to M10J013D.
4	-----	The FOS single bit items in the SI C&DH Normal Telemetry. Equivalent to M12J004B through M12J011B.

From YFMOD2 – Mode 2 Target Acquisition (Processor 28)

Set 1/1

Word	Value	Meaning
1	2	Identification number for YFMOD2.
2	YTACMP	Target Acquisition completion indicator. 0 = No on-board Target Acquisition has occurred since NSSC-I initialization. 1 = Target Acquisition is complete. 2 = Set by initialization of YFMOD2, Processor 28, or by YFSDPR, Processor 32.
3	YGIVUP	Target Acquisition error indicator. 0 = Set by initialization of YFMOD2, Processor 28, or by YFSDPR, Processor 32. 1 = Field is too crowded. 2 = YFM2CF had an invalid value in YFM2PR. 3 = Processor 32 only. 4 = Processor 32 only. 5 = Not used. 6 = Processor 32 only. 7 = Processor 32 only. 8 = Processor 32 only. 9 = The 4" Raster Scan was exhausted. 10 = The target was not identified, and neither the pre-planned branch nor the 4" Raster Scan were available.

YYSDCIP	Y.226	8	95:9	949.5		Science dump command illegal path.
YYSHUID	Y.001				878	Identifier for FOS-Unique SHP data.
YYSPR	Y.211	8	67:7	935.5		Spare bit.
YYSPR	Y.212	8	67:8	935.5		Spare bit.
YYSPR	Y.218	8	112:6-9	958		Spare bits.
YYSSCIF	Y.224	8	95:6	949.5		Synchronous start command illegal path.
YYSTEPS	Y528	8	57	930.5		Y deflection sub steps.
YYSYNCS	Y.205	8	67:1	935.5		Synchronous start instrument mode.
YYTARGA	Y.208	8	67:4	935.5		Target acquisition instrument mode.
YYTAWCIP	Y.225	8	95:7	949.5		Target acquisition window command illegal path.
YYTIMTG	Y.206	8	67:2	935.5		Time-Tag instrument mode.
Y1BUSRPI	Y121	4	1:7		142.5	Common Bus Relay #1 Status. A 0 is B On/A Off1 a a 1 is A On/B Off1
Y1OATMP	Y308	7	7		152.5	Optics Area Temperature Location 1.
Y1OBTMP	Y301	7	0		145.5	Optical Bench Temperature Location 1.
Y1SDFPRT	Y125	1	1:1		139.5	SD CEA A K1-K6 Status. A 0 is AB and 1 is AA.
Y1STC4NL	Y531	8	61	932.5		First channel to be processed.
Y2BUSRPI	Y122	4	1:9		142.5	Common Bus Relay #2 Status. A 0 is B On/A Off2 a a 1 is A On/B Off2.
Y2OATMP	Y309	7	8		153.5	Optics Area Temperature Location 2.
Y2OBTMP	Y302	7	1		146.5	Optical Bench Temperature Location 2.
Y2SDFPRT	Y126	1	1:2		139.5	SD CEA A K7-K11 Status. A 0 is AB and 1 is AA.
Y3OBTMP	Y303	7	2		147.5	Optical Bench Temperature Location 3.
Y3SDFPRT	Y127	1	1:3		139.5	SD CEA B K1-K6 Status. A 0 is BB and 1 is BA.
Y4OBTMP	Y304	7	3		148.5	Optical Bench Temperature Location 4.
Y4SDFPRT	Y128	1	1:4		139.5	SD CEA B K7-K11 Status. A 0 is BB and 1 is BA.
Y5VLPSV	Y337	6	1		144.5	Plus 5 Volt Logic Power Supply Voltage.
Y8VQPSV	Y332	5	1		145.5	Plus 8 Volt Quiet Power Supply Voltage.

= Pre-planned branch is not available.

13	YPPINV	A flag indicating whether the pre-planned branch has been requested. 1 = Pre-planned branch is requested. (Ground action is required.) 2 = Pre-planned branch has not been requested.
14	YRSINV	A flag indicating the status of the 4" Raster Scan. 1 = The 4" Raster Scan has been started. 2 = The 4" Raster Scan has not been started. 3 = The 4" Raster Scan is not permitted.
15	YRSMVS	The maximum number of moves permitted during a 4" Raster Scan.
16	YSCNUM	The move counter for the 4" Raster Scan.
17	YTALIM	The number of window limit changes + one allowed by Processor 28.
18	YTACNT	The number of window limit changes actually performed by Processor 28.
19	NEDM4	The most recent high order word of the FOS engineering array YTARXCTR. The most significant 4 bits of this 8-bit number are the TA Status bits used by Processor 28.
20	NEDM2	The most recent high order word of the FOS engineering array YTARYCTR. The most significant 4 bits of this 8-bit number indicates the presence or absence of something within the counts window.
21	YFM2ST	The status indicator for Processor 28. 1 = Executing normally. 2 = Terminated on an error. 4 = Successful completion.
22	YTAMOD	The FOS engineering word YTAMODE. Contains various TA processing parameters for the firmware. Used by Processor 28 to determine which of certain branches to take.

From YFSDPR - Science Data Processing (Processor 32)

Set 1/3

Word	Value	Meaning
1	3	Identification number for YFSDPR Binary Search

| 4 | YFM2CF | The action indicator for Module YFM2PR. Used by Processors 28 and 32.
1 = Processor 32 only.
2 = Processor 32 only.
3 = Processor 32 only.
4 = Used when the field was too faint the last time the Target Acquisition firmware processed the data. Process the existing Target Acquisition data for a window with a lower minimum count (Processor 28).
5 = Used when the only objects in the field were too bright the last time the Target Acquisition firmware processed the data. Process the existing Target Acquisition data for a window with a higher maximum count (Processor 28).
6 = Used to obtain the initial value of YTAMIN from the FOS engineering data and stuff it into FOS RTCS 2 (Processor 28).
7 = Used to obtain the initial value of YTAMAX from the FOS engineering data and stuff it into FOS RTCS 2 (Processor 28). |
5	NMINOR	Minor frame number obtained from the system software.
6	YFXCTR	The result of combining the two Serial ED words containing YTARXCTR, scaling by 32, and adding the offset term. The result is in 32nd's of a micron at the photocathode.
7	YFYCTR	The result of combining the two Serial ED words containing YTARYCTR, scaling by 32, and adding the offset term. The result is in 32nd's of a micron at the photocathode.
8	YFVCTR(1)	The 2 high-order bits of the first element of the two-element vector used for coordinate transformation by the system software. (18 bits total)
9	YFVCTR(1)	The 16 low-order bits of the first element of the two-element vector used for coordinate transformation by the system software.
10	YFVCTR(2)	The 2 high-order bits of the second element of the two-element vector used for coordinate transformation by the system software.
11	YFVCTR(2)	The 16 low-order bits of the second element of the two-element vector used for coordinate transformation by the system software.
12	YPPB	A flag indicating whether a pre-planned branch is available. 1 = Pre-planned branch is available. 2

14   YBASKP   The calculated value of Y-base for the latest
                   frame of Science Data.

15   YNBCTR   The peak chosen for the binary search is the
                   YNBCTRth brightest peak in the field.

16   YOBSJ   The index (in the singly dimensioned equivalent
                   of the M array) of the peak selected for the
                   binary search.   Range 1-12.

17   YBSM   The channel number of the peak selected for the
                   binary search.

18   YNMAX   The total counts above the mean sky background in
                   the peak selected for the binary search.

19   YNMEAN   The computed mean sky background.

20   YVARI1   The computed sky variance (standard deviation of
                   the mean sky background).

21   YFM2FL   A record of the action to be taken by Module
                   YFM2PR to acquire the next frame of Science Data
                   to be analyzed.
                   1 = Used during Aperture Scan. Increment the
                   Y-BASE data field by a pre-defined value
                   (Processor 32).
                   2 = Used to increment Y-BASE in geometrically
                   decreasing steps (Processor 32).
                   3 = Used to decrement Y-BASE in geometrically
                   decreasing steps (Processor 32).
                   4 = Processor 28 only.
                   5 = Processor 28 only.
                   6 = Processor 28 only.
                   7 = Processor 28 only.

From YFSDPR - Science Data Processing (Processor 32)

Set 2/3

Word   Value   Meaning

1   4   Identification number for YFSDPR Binary Search
                    Case 2 Processing, Binary Search. This is the
                    last part of NSSC-1 controlled, Mode II Target
                    Acquisition.

2   YTACMP   Target Acquisition completion indicator. 0 = No
                    on-board Target Acquisition has occurred since
                    NSSC-I initialization.
                    1 = Target Acquisition is complete.
                    2 = Set by initialization of YFMOD2, Processor
                    28, or by YFSDPR, Processor 32.

Case 1 Processing, Aperture Mapping. This is the
first part of NSSC-1 controlled, Mode II Target
Acquisition.

2	YGIVUP	Target Acquisition error indicator. 0 = Set by initialization of YFMOD2, Processor 28, or by YFSDPR, Processor 32. 1 = Processor 28 only. 2 = YFM2CF had an invalid value in YFM2PR. 3 = YSDPRC had an invalid value in YFSDPR. 4 = YFSDFL had an invalid value in YFBSPR. 5 = Not used. 6 = Science Data failed data validity test in YFDVCK. 7 = Only valid for word 1 = 4. 8 = Only valid for word 1 = 4. 9 = The 4" Raster Scan was exhausted. 10 = The target was not identified, and neither the pre-planned branch nor the 4" Raster Scan were available.
3	YFRCTR	The frame counter for Science Data acquired during Aperture Mapping. The value corresponds to the Science Data frame which was just analyzed. Range 0-3.
4	YFOUND	The total number of peaks found in the Aperture Map.
5-8	M(1,YFRCTR)- M(4,YFRCTR)	The channel numbers of the peaks found for a given value of YFRCTR.
9	YPPB	A flag indicating whether a pre-planned branch is available. 1 = Pre-planned branch is available. 2 = Pre-planned branch is not available.
10	YPPINV	A flag indicating whether the pre-planned branch has been requested. 1 = Pre-planned branch is requested. (Ground action is required.) 2 = Pre-planned branch has not been requested.
11	YRSINV	A flag indicating the status of the 4" Raster Scan. 1 = The 4" Raster Scan has been started. 2 = The 4" Raster Scan has not been started. 3 = The 4" Raster Scan is not permitted.
12	YRSMVS	The maximum number of moves permitted during a 4" Raster Scan.
13	YSCNUM	The move counter for the 4" Raster Scan.

target peak in the current frame of Science Data.

14	YNMEAN	The computed mean sky background.
15	YVARI1	The computed sky variance (standard deviation of the mean sky background).
16	YFVCTR(1)	The 2 high-order bits of the first element of the two-element vector used for coordinate transformation by the system software.
17	YFVCTR(1)	The 16 low-order bits of the first element of the two-element vector used for coordinate transformation by the system software.
18	YFVCTR(2)	The 2 high-order bits of the second element of the two-element vector used for coordinate transformation by the system software.
19	YFVCTR(2)	The 16 low-order bits of the second element of the two-element vector used for coordinate transformation by the system software.
20	YFXCTR	The calculated FOS X-offset to center the object in the aperture, scaled to 32nd's of a micron at the photo-cathode, with the offset term added.
21	YFYCTR	The calculated FOS Y-offset to center the object in the aperture, scaled to 32nd's of a micron at the photo-cathode, with the offset term added.

From YFSDPR - Science Data Processing (Processor 32)

Set 3/3

Word	Value	Meaning
1	5	Identification number for YFSDPR Peakup Mode Target Acqusition Processing, Peakup Mode.
2	YTACMP	Target Acquisition completion indicator. 0 = No on-board Target Acquisition has occurred since NSSC-I initialization. 1 = Target Acquisition is complete. 2 = Set by initialization of YFMOD2, Processor 28, or by YFSDPR, Processor 32.
3	YFDWCT	The dwell counter. Range 1-YDWELS.
4	YDWELS	The total number of dwells in this ST dwell-scan.
5	YACSI2(1)	The 2 high-order bits of the first element of the two-element array equivalenced to the double-word

3 YGIVUP   Target Acquisition error indicator.
0 = Set by initialization of YFMOD2, Processor 28, or by YFSDPR, Processor 32.
1 = Processor 28 only.
2 = YFM2CF had an invalid value in YFM2PR.
3 = YSDPRC had an invalid value in YFSDPR.
4 = YFSDFL had an invalid value in YFBSPR.
5 = Not used.
6 = Science Data failed data validity test in YFDVCK.
7 = YEDGE had an invalid value in YFBSC2.
8 = Binary Search exhausted without success.
9 = Only valid for word 1 = 2-3. 10 = Only valid for word 1 = 2-3.

4 YGPCTR   The frame counter for Science Data acquired during Binary Search. The value corresponds to the Science Data frame which has just been analyzed. Range 0-5.

5 YPKCT1   The number of peaks found in the latest frame of Science Data.

6-9 M1(1)-   M1(1) is equivalenced to M(1,1). The channel
    M1(4)   numbers of the peaks found in the latest frame of Science Data.

10 YBASKP   The calculated value of Y-BASE for the latest frame of Science Data.

11 YFM2FL   A record of the action taken by Module YFM2PR to acquire the frame of Science Data just analyzed.
1 = Used during Aperture Scan. Increment the Y-BASE data field by a pre-defined value (Processor 32).
2 = Used to increment Y-BASE in geometrically decreasing steps (Processor 32).
3 = Used to decrement Y-BASE in geometrically decreasing steps (Processor 32).
4 = Processor 28 only.
5 = Processor 28 only.
6 = Processor 28 only.
7 = Processor 28 only.

12 YEDGE   The result of the edge test. Used to determine which case of YFBSC2 to execute.
1 = Star is on the edge of the diode array. The Binary Search is finished.
2 = Star is still on, or back on, the diode array.
3 = Star is not on the diode array.

13 YNTARG   The number of counts above the mean sky for the

TYPE 4 COMMANDS
Data Commands

Command Code 4 bit	Modi- fier 4 bit	Data Field 8 bit	Description

(Mnemonic) (F/W internal name)
YRAMADDR   RAD

1 0001	0 0000	00000001
RAM STORAGE ADDRESS		

LOAD RAM STORAGE ADDRESS WITH THE ENTIRE
16 BITS OF THE NEXT SERIAL MAGNITUDE
COMMAND.

YSCIDMP   SCIDMP

0001	0001	000000NN
DUMP START ADDRESS		
WORDS/LINE		
LINES/FRAME		

START ADDRESS WITH THE NEXT COMMAND, THE
FOLLOWING TWO COMMANDS SPECIFY THE NUMBER
OF WORDS PER LINE AND THE NUMBER OF LINES
PER FRAME RESPECTIVELY TO BE USED DURING
SCIENCE TRANSFERS TO THE SDF. WHEN NN =
10, WORDS/LINE AND LINES/FRAME ARE SET
UP ACCORDING TO THE TWO WORDS FOLLOWING.
WHEN NN = 01, LINES/FRAME IS SET UP
ACCORDING TO THE WORD FOLLOWING.

YTARACQ TAW

1	2	
0001	0010	000000NN
UPPER (OR LOWER)		
LOWER (OR NONE)		

WHEN NN = 10, LOAD THE UPPER AND LOWER
TARGET ACQUISITION WINDOW VALUES RESPECTIVE-
LY WITH THE TWO COMMANDS FOLLOWING.
WHEN NN = 01, LOAD THE LOWER WINDOW VALUE
WITH THE COMMAND FOLLOWING.

YDISCADR   DAD

1 0001	3 0011	00000001
		DISCRIM ADDR/DATA

↖ ALL/ONE

LOAD THE DISCRIMINATOR ADDRESS POINTER WITH
THE LOW 9 BITS OF THE COMMAND FOLLOWING IF
THE ALL/ONE BIT IS 0. IF ALL/ONE = 1,
SET ALL DISCRIMINATOR THRESHOLD TABLE VALUES
EQUAL TO LOW 8 BITS OF THE DATA COMMAND.

YLIVETYM   LTYM

1 0001	4 0100	00000001
LIVE TIME		

LOAD NEXT COMMAND INTO ACCUMULATOR
OPEN (LIVE) TIME VARIABLE
LSB OF DATA COMMAND CORRESPONDS
TO $7.8125\,\mu s$.

quantity YACSAV. YACSAV contains the accumulated
Science Data for the dwell that satisfies the
criteria of the Peakup Mode TA. YFPUTT is the
time tag corresponding to YACSAV.

6	YACSI2(1)	The 16 low-order bits of the first element of the two-element array equivalenced to the double-word quantity YACSAV. YACSAV contains the accumulated Science Data for the dwell that satisfies the criteria of the Peakup Mode TA. YFPUTT is the time tag corresponding to YACSAV.
7	YACSI2(2)	The 2 high-order bits of the second element of the two-element array equivalenced to the double-word quantity YACSAV. YACSAV contains the accumulated Science Data for the dwell that satisfies the criteria of the Peakup Mode TA. YFPUTT is the time tag corresponding to YACSAV.
8	YACSI2(2)	The 16 low-order bits of the second element of the two-element array equivalenced to the double-word quantity YACSAV. YACSAV contains the accumulated Science Data for the dwell that satisfies the criteria of the Peakup Mode TA. YFPUTT is the time tag corresponding to YACSAV.
9	YACAI2(1)	The 2 high-order bits of the first element of the two-element array equivalenced to the double-word quantity YACACC. YACACC contains the accumulated Science Data for the current dwell.
10	YACAI2(1)	The 16 low-order bits of the first element of the two-element array equivalenced to the double-word quantity YACACC. YACACC contains the accumulated Science Data for the current dwell.
11	YACAI2(2)	The 2 high-order bits of the second element of the two-element array equivalenced to the double-word quantity YACACC. YACACC contains the accumulated Science Data for the current dwell.
12	YACAI2(2)	The 16 low-order bits of the second element of the two-element array equivalenced to the double-word quantity YACACC. YACACC contains the accumulated Science Data for the current dwell.
13-14	YFPUTT	The time tag for the dwell which satisfies the criteria of the Peakup Mode TA. The last YFPUTT is written to the SI C&DH PIT for transmission to the SSM at the conclusion of the dwell scan. YACSAV is the accumulated data corresponding to YFPUTT.

Command Code 4 bit	Modi- fier 4 bit	Data Field 8 bit	Description

YSPAREIA   SPARE

1	A
0001	1010

YMECHCAL   MCAL

1	B	
0001	1011	N
XXXX	XSSS	I
MECH. CONTROL INFO.		
⋮		

LOAD THE SECOND COMMAND AS THE STARTING
LOCATION FOR MECH CAL, WITH SSS SELECTING
A MECHANISM AS IN YMECHREG AND I AN INDEX
INTO THE SELECTED MECHANISM CONTROL BLOCK.
LOAD THE FOLLOWING COMMANDS AS MECHANISM
CONTROL INFORMATION IN SUCCESSIVE LOCATIONS
IN THE MECHANISM CONTROL BLOCK(S).

YSYNC   SYNST

1	C	
0001	1100	00000010
FINE DELAY		
START MINOR FRAME		

LOAD THE SECOND COMMAND AS THE FINE
DELAY TO BE USED WHEN A SYNCHRONOUS
DATA ACQUISITION IS TO START ($\geq$10 MS).
ALSO LOAD THE START MINOR FRAME WITH
THE THIRD COMMAND. FINE DELAY IS
SPECIFIED AS THE NEGATIVE (TWO'S
COMPLEMENT) OF THE TIME REQUIRED,
SPECIFIED IN TICKS OF THE CLOCK, WHERE
THE CLOCK TICKS IN UNITS OF 7.8125 S.

YSCIADDR   AQAD

1	D	
0001	1101	00000001
SCIENCE DATA		
START ADDR.		

LOAD THE SECOND COMMAND AS THE FIRST
RAM ADDRESS FOR SCIENCE DATA
PROCESSING.

Command Code 4 bit	Modifier 4 bit	Data Field 8 bit	Description

¿DEADTYM   DTYM

1	5	
0001	0101	00000001
DEAD TIME		

LOAD NEXT COMMAND INTO ACCUMULATOR
CLOSED (DEAD) TIME VARIABLE.
LSB OF DATA COMMAND CORRESPONDS
TO $7.8125\mu s$.

YCHNLEN   CHIN

	1	6	
	0001	0110	00000001
INH/ENA	SPARE		CHNL #

ALL/ONE ↑

USING THE NEXT COMMAND LOW ORDER 9
BITS AS THE CHANNEL ADDRESS; INH/ENA
BIT=0 ENABLE THAT CHANNEL, IF
SIGN=1, INHIBIT THAT CHANNEL, IF
(ALL/ONE) = 1, INHIBIT/ENABLE
ALL CHANNELS.

YREJLIM   REJ

1	7	
0001	0111	00000001
REJECTION LIMIT		

LOAD THE NEXT COMMAND AS THE NOISE
REJECTION LIMIT. IF THIS NEXT COMMAND = -1,
DISABLE BURST NOISE REJECTION. IF
THE COMMAND = 0, DISABLE THE ADDER
ENTIRELY (THIS ALSO INHIBITS OVER-
LIGHT SUM UPDATING).

YACQLIM   AQLM

1	8	
0001	1000	00000001
ACQ. LIMIT		

LOAD THE NEXT COMMAND AS THE DATA
ACQUISITION LIMIT. IF ANY DATUM
IN MEMORY EXCEEDS THIS PEAK LIMIT,
ACQUISITION IS ENDED AT THE NEXT
READOUT OPPORTUNITY.

YSTRWRD   SWF

1	9	
0001	1001	N

STORE THE NEXT N COMMANDS AS DATA
STARTING AT THE RAM ADDRESS SET BY YRAMADDR.
INCREMENT THE RAM ADDRESS BY TWO
AFTER EACH WORD IS STORED.

Command Code 4 bit	Modifier 4 bit	Data Field 8 bit	Description

YENTRNC   !EN

3 0011	0 0000	D I R	ENTRANCE PORT POSITION	SET THE ENTRANCE PORT TO THE POSITION SPECIFIED IN THE DATA FIELD (1=OPEN (DIR=1); 2=CLOSED (DIR=0).

YAPER   !AP

3 0011	1 0001	D I R	APERTURE POSITION	SET THE ENTRANCE APERTURE TO THE POSITION (1-12) SPECIFIED IN DATA FIELD. MOVE FORWARD IF DIR=0, BACKWARD IF DIR=1.

YPLZR   !PZ

3 0011	2 0010	D I R	POLARIZER POSITION	SET THE POLARIZER MECHANISM TO THE POSITION SPECIFIED IN THE DATA FIELD (1-48). FORWARD IF DIR=0, BACKWARD IF DIR=1.

YFILTER   !FG

3 0011	3 0011	D I R	FILTER GRATING WHEEL POSITION	SET THE FILTER/GRATING WHEEL TO DATA FIELD SPECIFIED POSITION (1-10). MOVE FORWARD IF DIR=0, BACKWARD IF DIR=1.

YMCHREG   (MECH)   !DAC

3 0011	4 0100	X	SSS	P_4 P_3 P_2 P_1	LOAD THE MECHANISM REGISTER WITH THE DATA FIELD. P_1 THRU P_4 SPECIFY THE MOTOR PHASE DRIVE SIGNALS (1 => ON, 0 => OFF). SSS SELECTS A MECHANISM: SSS=1=> ENTRANCE DOOR, SSS=2=> APERTURE, SSS=3=> POLARIZER, SSS=5=>, FILTER/GRATING WHEEL.

Command Code 7 bit	Modi-fier 4 bit	Data Field 8 bit

Description

YDISC   !DDT

2 0010	0 0000	DISCRIMINATOR DAC VALUE

FOR THE CHANNEL
SPECIFIED BY THE DISCRIMINATOR
ADDRESS POINTER BY COMMAND YDISCADR, LOAD
THE DISCRIMINATOR DAC TABLE WITH THE DATA
FIELD. INCREMENTS THE DISC ADDR BY ONE
AFTER THE DAC TABLE LOAD.

YREFDAC   !RD

2 0010	1 0001	COMMON REFERENCE DAC VALUE

LOAD THE COMMON DISCRIMINATOR
REFERENCE DAC WITH DATA FIELD.
READBACK DAC AND SET ERROR BITS
1 AND 6 IF READBACK DOES NOT
EQUAL DATA FIELD, OTHERWISE
RESET ERROR BIT 6.

YFOCUS   !FD

2 0010	2 0010	FOCUS TRIM VALUE

LOAD THE FOCUS TRIM DAC WITH
DATA FIELD. READBACK DAC AND
SET ERROR BITS 1 AND 4 IF READBACK
DOES NOT EQUAL DATA FIELD,
OTHERWISE RESET ERROR BIT 4.

YFFCAL   !CL

2 0010	3 0011	D

SET THE LED (FLAT FIELD CAL LAMP)
ON IF D = 1, OFF IF D = 0.

Command Code 4 bit	Modifier 4 bit	Data Field 8 bit	Description

YX-STEP !XS

4 0100	0 0000	# OF X STEPS

SELECT NUMBER OF X DEFLECTION
STEPS TO BE TAKEN DURING DATA
ACQUISITION. 32 IS THE MAXIMUM
ALLOWED VALUE.

YXFILWID !XF

4 0100	1 0001	X-FILTER WIDTH

SELECT WIDTH OF FILTERING FUNCTION IN THE
X-DIRECTION FOR USE IN TARGET ACQUISITION
PROCESSING.

YINIT !IM

4 0100	2 0010	12345678

SELECT AN INITIALIZATION MODE TO
BE PERFORMED BY "BEGIN DATA ACQ"
COMMAND.

DATA FIELD BIT
#1 1 = RESUME
#2 1 = INHIBIT SLICE TABLE FILL
#3 1 = INHIBIT Y DEFLECTION TABLE FILL
#4 1 = INHIBIT X DEFLECTION TABLE FILL
#5 1 = DO DEFLECTION DEPERM, HYSTERESIS I

YISTCHNL (2/)!IC

4 0100	3 0011	FIRST CHANNEL IN ARRAY/2

SELECT THE FIRST CHANNEL IN THE
DETECTOR ARRAY TO BE PROCESSED.
ACTUAL CHANNEL USED IS 2*DATA FIELD.
THE FIRST PHYSICAL CHANNEL IS
NUMBERED ZERO.

YINTS !#I

4 0100	4 0100	# OF INTS PER X-STEP

SELECT NUMBER OF SUB-INTEGRATIONS (INTS)
PER X-STEP (0=>256). NOISE REJEC-
TION IS PERFORMED ON EACH INT.

Command Code 4 bit	Modi-fier 4 bit	Data Field 8 bit	Description

YMCHSTEP   *MCHSTP

3 0011	5 0101	D I R	SSS	NNNN

MSB   LSB

STEP THE MECHANISM SPECIFIED BY
SSS (AS IN YMCHREG) $2^{**}N$ STEPS
IN THE DIRECTION INDICATED BY
DIR, DIR=0, STEP CLOCKWISE, DIR=1,
STEP COUNTER-CLOCKWISE, IF N=15,
STOP MECHANISM MOTION.

Command Code 4 bit	Modi-fier 4 bit	Data Field 8 bit

Description

YACCMODE   ! AM

5 0101	2 0010	1234567

SELECT A DATA ACQUISITION MODE:
DATA FIELD BIT

#1 1 = SYNC START
#2 1 = TIME-TAGGED:
#3 1 = REJECT/RETRY
#4 1 = TARGET ACQ
#5 1 = DOUBLE PRECISION ADDER
#6 1 = AUTOMATIC POLARIZATION

YCHNLS   (2/) ! #C

5 0101	3 0011	# OF DATA CHANNEL/2

SELECT THE NUMBER OF CHANNELS
TO BE PROCESSED IN THE DETECTOR
ARRAY.   ACTUAL NUMBER OF CHANNELS
USED IS 2*DATA FIELD, DATA FIELD
= 0 => 512 CHANNELS.

YOVRSCAN   ! OS

5 0101	4 0100	X-DEFLECTION OVERSCAN

SELECT THE NUMBER OF DIODES OVER-
SCAN OF THE X-DEFLECTION TO
BE USED DURING DATA ACQUISITION.
128 IS THE MAXIMUM ALLOWED VALUE.

YSLICES   ! SL

5 0101	5 0101	# OF MEMORY SLICES

SELECT THE NUMBER OF MEMORY
SLICES TO BE USED DURING DATA
ACQUISITION (0=>256).

YCLEARS   ! CA

5	6	# MEMORY CLEARS/ ACQUISITION

SET THE NUMBER OF MEMORY
CLEAR CYCLES PER DATA
ACQUISITION (0=> ∞).

Command Code 4 bit	Modi- fier 4 bit	Data Field 8 bit	Description

YY-RNGE   !YR

4	5	Y-DEFLECTION RANGE

SELECT THE RANGE OVER WHICH Y-
DEFLECTION IS TO OCCUR. Y-DEFLECTION
WITH N Y-STEPS COVERS THE BOTTOM
(N-1)/N OF THE RANGE SPECIFIED,
SCALED SO THAT A Y-RANGE PARAMETER
OF 128 CORRESPONDS TO THE FULL
DEFLECTION CAPABILITY.

YOUT-CLR   !RC

4 0100	6 0110	#SCIENCE DATA READOUTS PER MEMORY CLEAR

NUMBER OF SCIENCE DATA READOUTS PER
DATA MEMORY CLEAR (0=>). CLEAR OCCURS
AFTER LAST READOUT IN THE SEQUENCE.

YTAMODE   !TM

4 0100	7 0111

SELECT A TARGET ACQUISITION MODE:
DATA FIELD BIT
#1   (?FILTER), 1=FILTER DATA B4 TA PROCESS
#2   (?FIX), 1=FIX DATA BEFORE TA PROCESSIN
#3   (-YFFILL), 1=SUPPRESS YFILTER TABLE FI
#4   (-XFFILL), 1=SUPPRESS XFILTER TABLE FI
#5   (DBBUF), 1=FILTER INTO 2ND BUFFER
#6   NOT USED
#7   (+YE), USE UPPER/LOWER DIODE EDGE (1/0
#8   (YE), USE DIODE EDGE/PEAK (1/0)

YY-STEP   !YS

5 0101	0 0000	# OF Y-STEPS

SELECT NUMBER OF Y DEFLECTION STEPS
TO BE TAKEN DURING DATA ACQUISITION.
(0=>256). FOR N Y-STEPS THE FIRST
Y-STEP OCCURS AT Y-DEFLECTION = Y-BASE,
WITH SUCCEEDING Y-STEPS AT DISPLACEMENTS
OF Y-RANGE/N.

YYFILWID   !YF

5 0101	1 0001	d

SELECT WIDTH OF FILTERING FUNCTION IN T
DIRECTION FOR USE IN TARGET ACQUISITON
PROCESSING.

Command Code 4 bit	Modi-fier 4 bit	Data Field 8 bit		Description

YRAM-MAP   RMMP

| 6 0110 | 0 0000 | PHYS. PAGE | LOGICAL PAGE | MAP THE PHYSICAL RAM PAGE TO THE ADDRESS RANGE SPECIFIED BY THE LOGICAL PAGE. EACH PAGE HAS 2048 WORD CAPACITY. |

YSTOPDMP   -DMP

| 6 0110 | 1 0001 | XXXXXXXX | STOP SCIENCE DUMP IMMEDIATELY AND DISABLE FURTHER AUTOMATIC SCIENCE DUMPS. |

YMEMCHK   MCHK

| 6 0110 | 2 0010 | MEMORY CHECK PATTERN | SELECT A TEST PATTERN TO BE LOADED INTO MEMORY. FILL MEMORY FROM A000(HEX) THROUGH FFFE(HEX) WITH THE SPECIFIED TEST PATTERN. |

YKPALVED   KPAL

| 6 0110 | 3 0011 | D | ENABLE KEEP ALIVE LOSS OR TELEMETRY SYNC LOSS TO CAUSE INTERNAL SAFE MODE TRANSITION IF D $\neq$ 0. DISABLE IF D=0. |

YSDERASE   SDE

| 6 | 4 | XXXXXXXX | SET ALL MEMORY LOCATIONS CURRENTLY BEING USED FOR SCIENCE DATA ACQUISITION (INCLUDING REJECT ARRAY, IF APPLICABLE) TO 0. |

YSCIACT   SDA

| 6 | 5 | D | ACTIVATE AN IMMEDIATE SCIENCE DATA DUMP IF D $\neq$ 0. IF D=0, ENABLE AUTOMATIC SCIENCE DATA DUMPS. |

Command Code 4 bit	Modi-fier 4 bit	Data Field 8 bit	Description

YPTRNOUT   !PR

5 0101	7 0111	# PATTERNS/ READOUT

SET THE NUMBER OF COMPLETE
DATA ACQUISITION PATTERNS
PER SCIENCE DATA READOUT
(0=>256).

Command Code 4 bit	Modi- fier 4 bit	Data Field 8 bit	Description

YTA	+TA	
6	B	D

CAUSES TARGET ACQUISITION CALCULATION TO
PERFORMED ON DATA ALREADY EXISTING IN SC
DATA MEMORY. RESULTS ARE REPORTED IN SE
ENGINEERING DATA ON COMPLETION OF CALCUL
THE VALUE OF D IS IMMATERIAL.

Command Code 4 bit	Modifier 4 bit	Data Field 8 bit	Description

---

YKEY   YKEY

6	6	D

IF THE DATA FIELD IS 06, KEEP ALIVE
SAFE MODE TRANSITION IS TEMPORARILY
INHIBITED. (2-3 MIN)

YDDCHK   DDCHK

6	7	XXXXXXX

READ, REWRITE, AND CHECK ALL DISCRIMINATOR
DAC'S. THE RESULTS OF THE READ AND CHECK
ARE STORED IN THE DISCRIMINATOR DAC AND
CHANNEL ENABLE TABLE (DDTBL) LOCATED AT
MEMORY ADDRESS 9AF8 HEX.

YEFILL   EFILL

6	8	XXXXXXX

SAMPLE ALL SERIAL ENGINEERING QUANTITIES
(PARAMETERS, DACSC MECHANISMS...)
AND PLACE THEIR VALUES IN THE
ENGINEERING SUBCOM TABLE, STARTING AT MEMOR
LOCATION ^9F80^.

YPAUSE   PAQ

6	9	D

SET THE PAUSE ACQUISITION BIT (MNF 119)
IF D IS NON-ZERO; OTHERWISE RESET THE
PAUSE ACQUISITION BIT. THIS COMMAND
MAY BE USED TO PAUSE DATA ACQUISITION
IMMEDIATELY AND THEN CONTINUE ACQUISITION
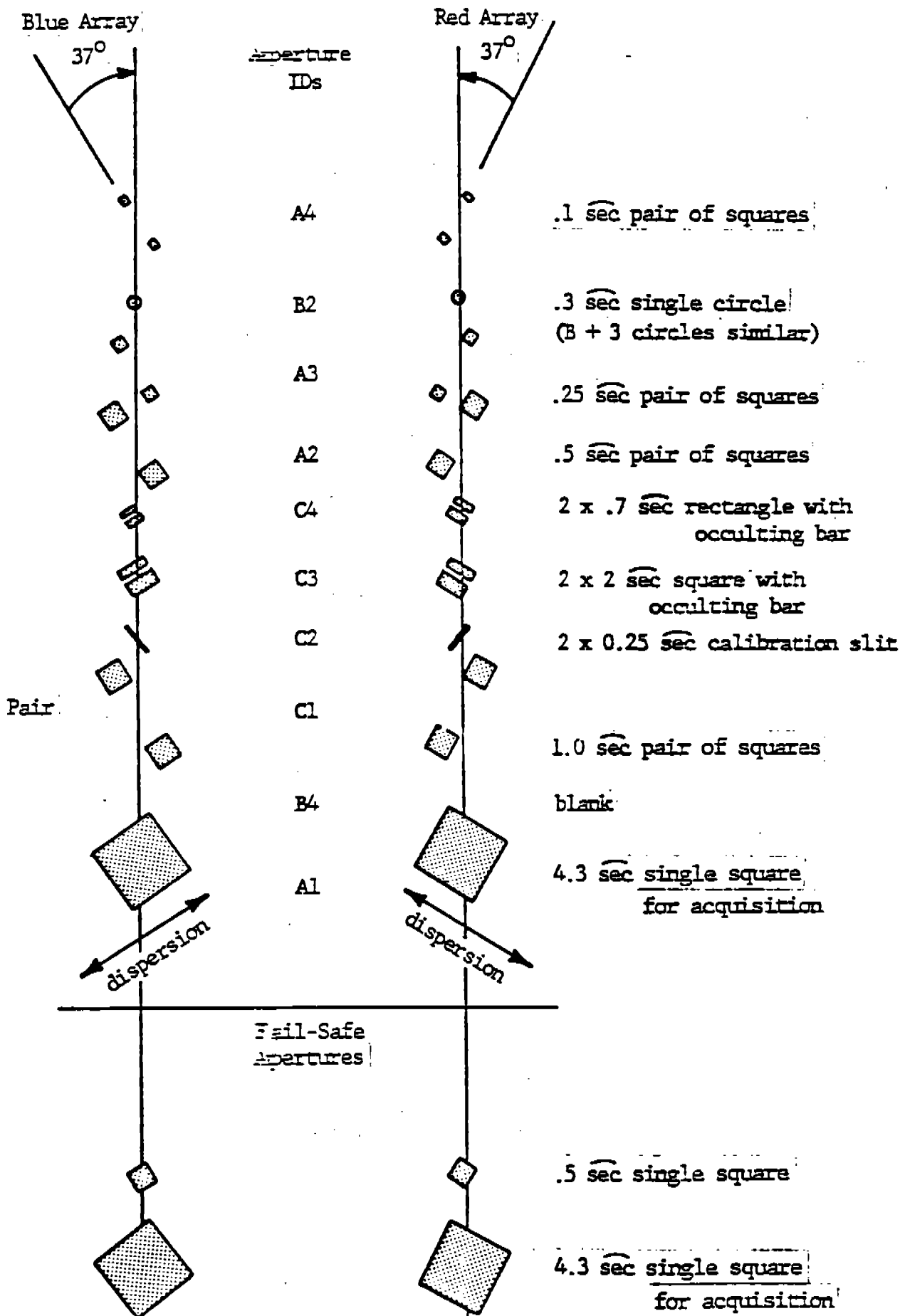WITHOUT DISTURBING THE DATA ACQUISITION
COUNTERS.

YRANDOM   RFILL

6	A	D

FILL SCIENCE DATA MEMORY AREA STARTING
AT A000 (HEX) WITH THE PSEUDO-RANDOM
SEQUENCE COMPUTED BY $X(N+1) = X(N) *
517 + 13849$, $(X(0)=0)$. THE DATA FIELD
"D" SPECIFIES A DISPLACEMENT INTO THE
PSEUDO RANDOM SEQUENCE BY THE AMOUNT OF THE
VALUE AT LOCATION ^A000^ (HEX).

ENTRANCE APERTURES AND ORIENTATIONS

	Aperture IDs	
Blue Array 37°		Red Array 37°
	A4	.1 sec pair of squares
	B2	.3 sec single circle (B + 3 circles similar)
	A3	.25 sec pair of squares
	A2	.5 sec pair of squares
	C4	2 x .7 sec rectangle with occulting bar
	C3	2 x 2 sec square with occulting bar
	C2	2 x 0.25 sec calibration slit
Pair	C1	
		1.0 sec pair of squares
	B4	blank
	A1	4.3 sec single square for acquisition

dispersion

Fail-Safe Apertures

.5 sec single square

4.3 sec single square for acquisition

3.2.2.3 <u>Polarizer.</u> The polarizer mechanism, shown in figures 3.2.2.3-1 and 3.2.2.3-2, places two waveplate/Wollaston prism pairs in the two light paths or places openings in the light paths and rotates each waveplate in 22.5° increments with respect to its Wollaston prism. The Wollaston prisms are mounted in a rotating cylinder drive through a two stage 105:1 antibacklash gear reduction by a 90° size 11 stepper motor. The waveplates are mounted to a gear within the cylinder in such a way that one revolution of the cylinder results in 1 1/16 revolution of the waveplates with respect to the Wollaston prisms. The command to set the polarizer is YPLZR. Position indication is provided by two 8 bit pin contact encoders which provide a unique output (YPLRZPOS) for each position of the polarizer. Table 3.2.2.3-1 gives the mapped-encoder values for each of the 48 positions of the polarizer that the command YPLZR controls. Encoder values are stored in the polarizer mechanism control block (see section 3.6.3.2). Different values are stored for the two independent optical path/electronic groups side A and side B. This was done so that the command values sent up to the FOS have the same meaning for both sides in the sense that each value positions a specified optical element and angle into the currently active beam independent of which beam is active. Also this means that there are a minimum number of command values each corresponding to a non-blocked position of the polarizer. The down-linked encoder values must be converted to mapped values by taking the one's complement and then converting each byte separately from Gray to binary. The encoder values are not exact, normal operation is anticipated with a non-zero deadband for the polarizer mechanism. Fail safe mode is by means of critical commands YARMPL and YBLPOL, which cause a burn-wire pinpuller to allow torsion springs to rotate the polarizer permanently out of the light paths.

Polarizer lifetime is expected to be 100,000 motor increments of 22.5° (ref. section 4.7).

Expected mechanism lifetime is 30,000 rotations ~~averaging~~
~~90o. This is for each~~ aperture wheel motor (ref. section 4.7).

3.2.2.2-1
Table 3.2.2-1

ID	Fwd Cmd	Hex T/M	Hex Map	Description
B-1 0.50 SNG	1	4C E2	DD16	Single, round, 0.5 arc second. Used in polarimetry and spectroscopy.
B-2 0.30 SNG	2	6D 63	E3E8	Single, round, 0.3 arc second. Used in polarimetry and spectroscopy.
B-3 1.00 SNG	3	62 18	E9BA	Single, round, 1.0 arc second. Used in polarimetry and spectroscopy.
B-4 BLANK	4	67 35	EF8C	Blank. Used as light shield and for dark count measurement.
A-1 4.3 SNG	5	F6 0A	0EA6	Single, square, 4.3 arc second. Used in target acquisition.
A-2 0.50 PAIR	6	E1 B3	1477	Pair. square. 0.5 arc second, 3.0 arc seco separation (distance between pair centers) Used in target acquisition.
A-3 0.25 PAIR	7	E8 90	1A4A	Pair, square, 0.25 arc second, 3.0 arc second separation. Used with object and sky.
A-4 0.10 PAIR	8	CF E9	201B	Pair, square, 0.1 arc second, 3.0 arc sec separation. Used with object and sky.
C-1 1.00 PAIR	9	CF D0	3F35	Pair, square, 1.0 arc second, 3.0 arc second separation. Used with object and sky.
C-2 0.25 x 2.0	10	98 FB	4507	Single, rectangular, 0.25 x 2.0 arc second (in dispersion and cross-dispersion respectively). Used with extended objects.
C-3 2.0 BAR	11	91 4A	4BD9	Single, square, 2.0 arc second, with 0.3 second wide occulter bar in cross-dispers direction.) Used with faint sources surrounding bright objects.

C-4 12   86 01 51AB   Single, rectangular, 0.7 x 2.0 arc second
  0.70 x 2.0 BAR   (in-dispersion and cross-dispersion
                             respectively), with 0.3 arc second wide
                             occulter bar in cross-dispersion direction.
                             Used with faint sources surrounding bright
                             objects.

FS-1 and -2 --   ----   Single (Fail-safe aperture), square, 0.5   a
                             second, 4.4 arc second separation from FS-2
                             Used with target acquisition and spectroscop

FS-2 --   ----   ----   Single (Fail-safe aperture), square, 4.3 ar
   FAILSAFE   second, 4.4 arc second separation from FS-1
                             Used with target acquisition and spectroscop