UNIVERSITY OF CALIFORNIA

LICK OBSERVATORY TECHNICAL REPORTS

No. 17

SCANNER DATA TAKING PROGRAM
Programmer's Guide and Listings

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INTRODUCTION

This manual is meant to accompany Lick Observatory Technical Report No. 14, "The Scanner Data Taking System User's Manual." It includes a programmer's guide to the SDTS programs and a listing of the programs as of 10 June 1976. We anticipate continued evolution of the programs, but hopefully these listings can serve as a benchmark. We wish to thank Joe Wampler, Tom Ewing, Dave Burstein and Alan Koski for their many programming contributions.

Programmer's Guide to the Scanner Data Taking System

I. Basic tape organization:

Program	Overlay	Scan	Contents
(0-2)	6-11	--	X NAME overlays.
3-25	↑	--	Focal programs
26-49	DO NOT USE	(0-2)	Focal programs
↑			
DO NOT USE		3	Store sweeps, spectro setups, λ calibrations
↓		4-14	Scratch data storage (quartz calibrations, etc.)
146-169	298-345	15-17	Focal programs, X NAME overlays

II. Basic Focal program organziation:

1. Program 10 is a calling program which reads switch 1, 1 and then starts the appropriate program. Every other focal program should start with 1.01 X CALL(10, 1) so that typing CTRL-C, GO will call program 10.

2. Programs 146-169 are intended for preliminary setup programs, because of their position at the far end of the tape and the long time required for tape spinning to get at them. The necessary X NAME overlays are also mixed into this part of tape so an accurate map of the tape contents must be kept. The wavelength calibration and focus programs currently live back here.

3. The programs which are used often during the night are stored as programs 3-49.

III. Disk organization:

1. The 32 K disk is used for storage of intermediate results and as an I/O buffer between the scanner and Dectape.

Disk Record	Contents
0-7	Last Run Buffer
8-15	Sum Buffer
16-23	Calibration Buffer
24-37	Scratch area

2. Because of the 129 word block size used in formatting the disk, each record (= 1024 words placed in 8 blocks) has eight extra words at the end. A number of these words are used for storage of vital variables, flags, etc. because they do not get wiped out during the bootstrap procedure.

Record	Word(s)	Contents
0-7	1024-1031	Scan I.D. (see §IV)
15	1024-1027	Δ Right Ascension } for star-sky chopping.
15	1028-1031	Δ Declination } see prog. 3.
16	1024	Quartz calibration flag (normally = 3000)
16	1025	CT (Time into scan)
16	1026	QL
16	1027	RU (current scan number)
16	1028	RU+333 (test when re-entering data taking programs).
16	1029	LOG I.D. Flag
16	1030	CENTER
22	1025	R/L Response
23	1024	Used by polarimetry, scrunch
23	1025	Used by polarimetry, scrunch
23	1028	Used by polarimetry, scrunch

IV. Log I.D. Information stored on tape (and on disk records 0-7):

1. This data fills the last eight words (1024-1031) of each record.

2. Format is either integer in single or double precision, or packed ASCII (two six bit characters per word) for the NAME and COMMENTS.

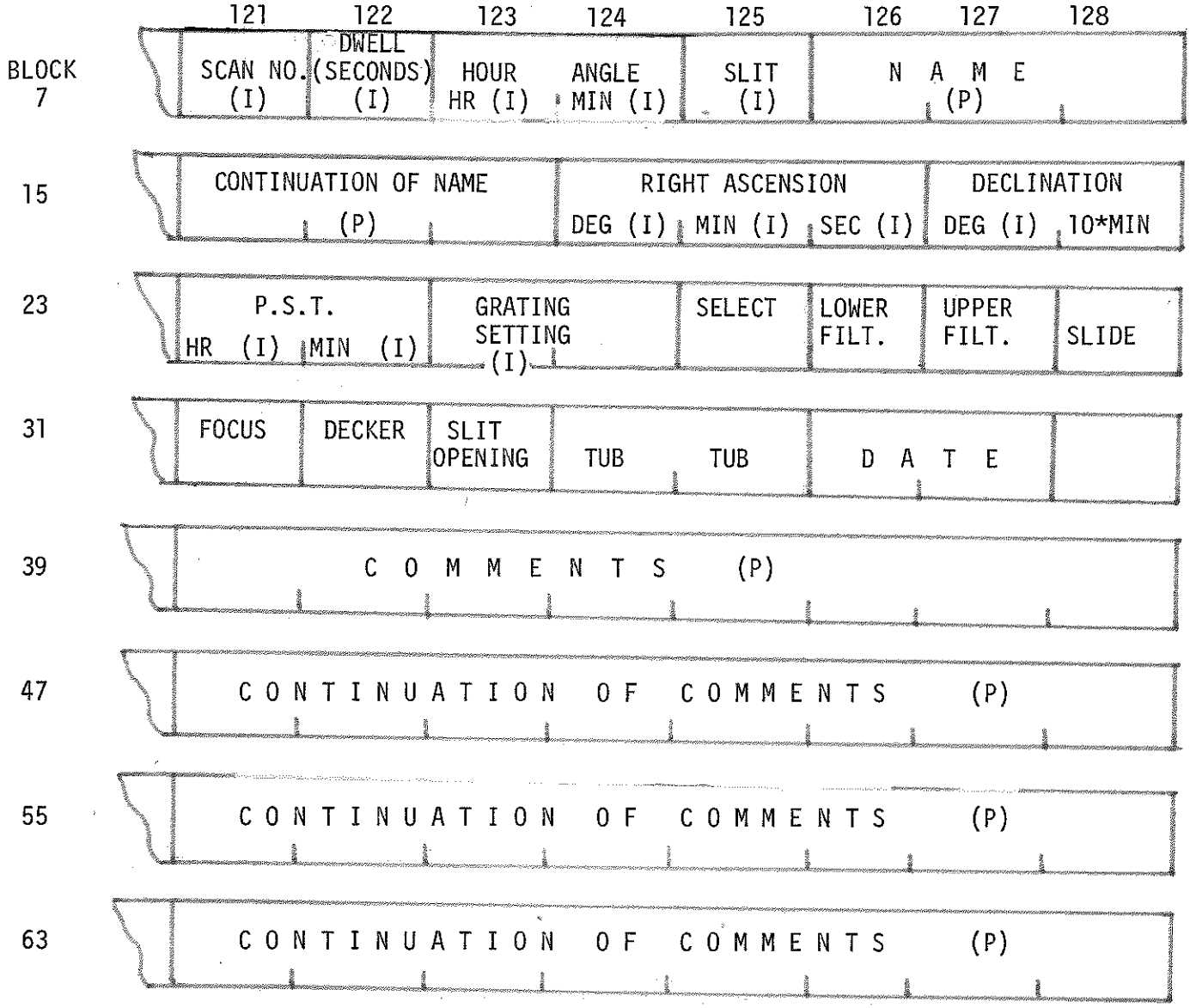
3. The P.S.T. date is encoded as 3600 * MONTH +60* DAY + (LAST TWO DIGITS OF YEAR).

4. Hour angle, R.A. Dec, and P.S.T. have hours, degrees, minutes, and seconds stored as separate integers.

Raw Data Tape (4096 channel, or 8 record, format)

I = integer format (loaded onto disk with X PUT)

P = packed ASCII character format (loaded onto disk with X CODI)



Note that the 129 words in a DECTAPE block are numbered 0-128, and that the 64 blocks in a scan are numbered 0-63.

SCANNER DATA TAKING SYSTEM

7 June 1976

Program	Contents
0	↑
1	X NAME overlays (total of 11)
2	↓
3	Fast Precision Offset
4	Comments, Rocker
5	Log I.D.
6	Log Edit.
7	Toggle Dispatch
8	Save scans, Special Functions Dispatch.
9	Data Taking - main program
10	Main calling program - X CALL(10, 1) to read switch 1, 1.
11	Add left, Add Right, Subtract, Change Counting Time
12	Display
13	Tape I/O, Programmed Sequence, Recall a Scan.
14	Polarimetry
15	Polarimetry
16	Polarimetry
17	Precession
18	Precession
19	Plot
20	Average points for display, Advance Calcomp page, Scrunch.
21	Scrunch
22	Programmed Sequence, Mem Test
23	Programmed Sequence
24	Programmed Sequence

147	Lambda Calibration
148	Lambda Calibration
149	Lambda Calibration
150	Lambda Calibration
151	Lambda Calibration
153	X NAME overlays
154	X NAME overlays
155	wavelength table
156	Focus program
157	X NAME overlays
158	Focus program

```
 *******    THIS PROGRAM IS CALLED BY BOOTSTRAPPING THE TAPE AND TYPING "GO":




*W
C:LICK FOCAL SCN75-C  GZ@@

01.10 X CALL(10,1)

10.10 A !"'ALT MODE' TO COPY"D;X MTAK(8,-320,200);X MPUT(8,-320,200,7)
10.20 X MTAK(8,-120,120);X MPUT(8,-120,120,7);X MTAK(8,0,192)
10.30 X MPUT(8,0,192,7);X MTAK(8,960,194);X MPUT(8,960,194,7)
*


*********  X NAME OVERLAYS  *********


*X WHAT(1,11)

001
PAIR,SCRN,TMUL,NEW ETAP
002
DTIM, TINC, FILT, DMUL  P
003
10/31/74 SPEC
004
POLY, FLIP    P
005
TTTT 15 DEC 1974
006
5/14/76 POSN (MUX MODS)
007
10 OCT '74 FIND,SIG,SEEK
008
5 DEC '74 IBM,ISOR (+4096=NO E
009
5/14/76 TUB,CHOP (MUX MODS)
010
5/14/76 RTCL,STAG (MUX MODS)
011
5/14/76 TIME*


*X WHAT(298,25)

312
LOGB,NUDG 17 APR '75
313
4/73 POLY, FLIP
314
10 OCT '74 FIND,SIG,SEEK
320
10/31/74 SPEC
321
4/1/76 MAMF*
```

```
)/206265;I (D-1.56)10.25
LE"!!!!;X END(0)
7*FTUB(0)+4.67)/57.2958
A=375*FSIN(PA)/FCOS(D)
25)10.4;S J=FITR(J/10)-1
0.9,10.5;I (J-OL)10.9,10.6;I (J-OR)10.9,10.65
.9

,1024);S DD=FASK(0,0)

10))10.7,10.7;X NAME(10)
9)
I (J)10.8
I (-J)10.9,10.9
OT COMPLETE MOVE."
 AND LIMITS."!!!!!!!!


ISION OFFSET"!!!!

      ";D 11.9;S DD=14.09*(60*M+S)
ARC);  ";D 11.9;S DA=10.71*(60*M+S)
IME);  ";D 11.9;S DA=DA+160.7*(60*M+S)

 SIGN)"S

(N,CD);I (J-FABS(N))12.3,12.4



KY-STAR);"!!;D 11.2;D 11.3;D 11.4
X STOR(0,0;DD);X END(0)
```

```
PROG.NO.  3     6/ 13/   76

C:LICK FOCAL SCN75-C  0&JL

01.01 X CALL(10,1)$C-F 3

10.15 X NAME(6)$S D=FPOSN(1)/206265$I (D-1.56)10.25
10.20 T !!!"TOO CLOSE TO POLE"!!!!$X END(0)
10.25 X NAME(9)$S PA=(.01087*FTUB(0)+4.67)/57.2958
10.30 S DD=510*FCOS(PA)$S DA=375*FSIN(PA)/FCOS(D)
10.35 S J=FTAK(7,125)$I (J-25)10.4$S J=FITR(J/10)-1
10.40 S K=1$S L=0$I (J-08)10.9,10.5$I (J-0L)10.9,10.6$I (J-0R)10.9,10.65
10.45 I (J-08)10.9,10.55,10.9
10.50 D 10.55$G 10.65
10.55 S L=-1$S DA=FASK(8*15,1024)$S DD=FASK(0,0)
10.60 S K=-1
10.65 I (L)10.7$I (FSWIT(4,10))10.7,10.7$X NAME(10)
10.66 X STAG(562*K)$X NAME(9)
10.70 S CD=0$S N=K*DA$D 12$I (J)10.8
10.75 S CD=1$S N=K*DD$D 12$I (-J)10.9,10.9
10.80 T !!!"TELESCOPE DID NOT COMPLETE MOVE."
10.82 T " CHECK COMP ENABLE AND LIMITS."!!!!!!!!
10.90 X NAME(0)$X END(0)

11.10 X STAT(-1)$T !!!"PRECISION OFFSET"!!!!
11.15 X NAME(9)
11.20 T "CHANGE DEC BY:          "$D 11.9$S DD=14.09*(60*M+S)
11.30 T !"CHANGE R.A. BY  (ARC): "$D 11.9$S DA=10.71*(60*M+S)
11.40 T !"CHANGE R.A. BY (TIME): "$D 11.9$S DA=DA+160.7*(60*M+S)
11.50 S K=1$G 10.7
11.90 A "MIN"M,"  SEC (WITH SIGN)"S

12.20 S N=FITR(N)$S J=FCHOP(N,CD)$I (J-FABS(N))12.3,12.4
12.30 S J=-1
12.40 R

13.10 T !!!"ENTER OFFSET (SKY-STAR):"!!$D 11.2$D 11.3$D 11.4
13.15 X STOR(8*15,1024+DA)$X STOR(0.0$DD)$X END(0)

31.98 W
31.99 X END(0)
```

```
PROG.NO.  4     6/ 13/   76

C:LICK FOCAL SCN75-C  J1E)

01.01 C-PROG 4
01.02 X CALL(10,1)

05.10 S J=FTAK(128,1027)!T !!"THIS IS SCAN"%2,J
05.15 X NAME(5)!A ", COMMENT SCAN NO"K!I (K)31.99!I (J-K)5.2,6.1
05.20 X CALL(6,10,1)
05.25 X END(0)

06.10 T !"COMMENT..."!S J=FTYCO(70,2000)
06.20 X PACC(64,2000)!X CODI(39,121,32,2000,8,121)!X NAME(0)!X END(0)

07.10 A !!"GRATING ROCKER"!"MIN TILT"L1!I (L1)31.99!A "  MAX TILT"L2
07.20 X NAME(3)!X SPEC(0,1,L1)!I (-FSWIT(3,0,0,0,4095))7.9!D 8
07.30 X NAME(3)!X SPEC(0,1,L2)!I (-FSWIT(3,0,0,0,4095))7.9!D 8!G 7.2
07.90 X NAME(0)!X LED(0,1,8,1)!X END(0)

08.10 X NAME(0)!X PAUS(0)!X MEMR(0,1024)!X PAUS(1)!X FORM(1)
08.20 S J=FCHAN(511)!X LED(J,1,6)

31.98 W
31.99 X END(0)
```

```
PROG.NO.  5    6/ 13/   76

CLICK FOCAL SCN75-C  D=L.

01.01 X CALL(10,1);C-P 5
01.10 S J=FTAK(8*16,1029);I (J-0) 8.1,8.1,1.2
01.20 F J=5,8;D 6.1
01.27 S J=FTAK(128,1027);X PUT(7,121,J)
01.30 S J=FTAK(128,1025);X PUT(7,122,J)
01.37 X NAME(3);S J=FSPEC(0);X PUT(23,123,J/4096);F J=0,3;D 2.9
01.38 S K=FSPEC(9);X PUT(0,0,K);X TAK(31,120);F J=5,7;D 2.9
01.39 I (-FSPEC(8))1.4;T !!!"DARK SLIDE CLOSED!"!!!!!!!
01.40 X NAME(6);S K=FPOSN(-1)+TM/2;D 3;X PUT(7,123,K1);X PUT(0,0,K2)
01.41 T !"HA ="%2,K1,";"K2
01.42 S K=FPOSN(0)/10;D 3;X PUT(15,124,K1);X PUT(0,0,K2);X PUT(0,0,K3)
01.44 S K=FPOSN(1);D 3;X PUT(0,0,K1);X PUT(0,0,K2*10+K3/6)
01.46 X NAME(9);S K=FTUB(0);X PUT(31,124,K/4096);X PUT(0,0,K)
01.47 X NAME(11);S K=FTIME(2);S J=FITR(K/3600);X PUT(23,121,J)
01.48 X PUT(0,0,<K-3600*J>/60);S K=FTIME(5);X PUT(31,126,K/4096);X PUT(0,0,K)
01.50 A !"SLIT"J;T !;X PUT(7,125,J);I (J-27)8.1
01.70 X NAME(5);T "NAME.."
01.73 S J=FTYCO(20,2000)
01.80 I (J-0) 1.7,1.9,1.7
01.90 X PACC(12,2000);X CDDI(7,126,6,2000,8,121)

02.60 T "   DONE."!6 8.1
02.90 S K=FSPEC(J);X PUT(0,0,K)

03.10 S K1=FITR(K/3600);S K2=FITR(<K-3600*K1>/60);S K3=K-3600*K1-60*K2

06.10 X STOR(8*J-1,121,0);X STOR(8*J-1,125,0)

08.10 X NAME(0);X END(0)

10.10 X STAT(300,500,4);T "DISASTER!";X STAT(-1)
10.20 T !!!"SWEEP DISASTER...RELOAD SWEEPS."!!!%8,J,K,L,!;X CALL(8,416)

31.98 W
31.99 X'END(0)
```

```
PROG.NO.  6     6/ 13/   76

C;LICK FOCAL SCN75-C  00L-

01.03 X CALL(10,1)$C-P 6
01.10 X STAT(-1)$T !!"RAW DATA LOG EDIT"!"ALT MODE = NO CHNG"$S K=100
01.15 S B=200$S R1=208
01.20 A !"SCAN"K$I (K)1.03$I (K-100)1.3$T "  THIS SCAN"
01.25 S J=FTAK(7,125)$X CALL(5,178,1)
01.27 G 3.4
01.30 X NAME(5)$F M=0,7$X MTAK(B+M,64*K+8*M+7,1,7)

02.03 F M=0,7$X DICO(B+M,121,8,1024+8*M)
02.05 X CODI(B1,0,64,1024)
02.10 X PUT(B1,0,K)$T !"DWELL"$D 8$T !"HA HR"$D 8$T "MIN"$D 8
02.15 T !"SLIT"$D 8$T !"NAME..."
02.20 S J=FTYCO(70,2000)
02.25 I (J-2)2.3$I (J-4)2.15,2.35,2.15
02.30 X PACC(12,2000)$X CODI(B1,5,6,2000)
02.35 X TAK(B1,10)$T !"RA HR"$D 8$T "MIN"$D 8$T "SEC"$D 8$T !"DEC DEG"
02.40 D 8$S J=1.E16$A "MIN"J$I (1.E15-J)2.45$X PUT(0,0,10*J)
02.45 X TAK(B1,15)$T !"PST HR"$D 8$T "MIN"$D 8$S J=1.E16
02.50 A !"TILT"J$I (1.E15-J)2.55$X PUT(0,0,J/4096)$X PUT(0,0,J)
02.55 X TAK(B1,19)$T !"SELECT"$D 8$T !"LOW FILT"$D 8$T !"UPP FILT"$D 8
02.60 T !"CORR"$D 8$T !"COLL"$D 8$T !"DECKER"$D 8$T !"SLIT OPENING"$D 8
02.65 T !"COMMENT..."
02.70 D 2.2$I (J-2)2.75$I (J-4)2.7,2.8,2.7
02.75 X PACC(64,2000)$X CODI(B1,32,32,2000)
02.80 X DICO(B1,0,64,1024)$F M=0,7$X CODI(B+M,121,8,1024+8*M)

03.30 F M=0,7$X MPUT(B+M,64*K+8*M+7,1,7)
03.40 X END(0)

08.10 S J=1.E16$A J$I (J-1.E16)8.2$X TAK(0,0)$R
08.20 X PUT(0,0,J)

10.10 D 1.15$D 1.3$D 2.03$D 2.05$G 2.65

31.98 W
31.99 X END(0)
```

```
C:LICK FOCAL SCN75-C  0705
PROGRAM 7
01.01 X CALL(10,1)!C-PR. 7, TOGGLE DISPATCH

02.01 X GO(2,SW*2)!C-SERIES 3 TOGGLES.
02.04 X CALL(8,20,1)!C-SPEC. FUNC.
02.05 T ""!X CALL(9,2*128+17)
02.06 X CALL(4,650,1)!COMMENTS
02.07 G 2.05
02.10 X CALL(19,11,1)!C-PLOT
02.11 G 2.05
02.12 X CALL(13,8,1)!C-RECALL A RUN
02.13 G 2.05
02.14 S B=0!X CALL(12,12,1)!C-DISPLAY
02.15 G 2.05

03.01 X GO(3,SW*2)!C-SERIES 4 TOGGLES.
03.14 S SW=FSWIT(4,1)!X GO(4,2*SW+1)
03.16 S SW=FSWIT(4,4)!X GO(5,2*SW+1)
03.18 X CALL(11,2)!C-CHNG DWELL
03.20 G 3.26
03.22 G 3.26
03.24 X CALL(17,138)!C-PRECESSION
03.25 G 2.05
03.26 T "  NOT IN USE."!G 2.05

04.01 X CALL(29,2,1)!C-SKYLINE MONITOR
04.02 G 2.05
04.03 X CALL(40,2,1)!C-LAM ID
04.04 G 2.05
04.05 X CALL(4,7,1)!C-ROCKER
04.06 G 2.05
04.07 X CALL(13,9,1)!C-TAPE I/O
04.08 G 2.05
04.09 X CALL(14,138)!C-POLARIMETRY
04.10 G 2.05
04.11 X CALL(49,3)!C-FAST SWEEP LOAD
04.12 G 2.05
04.13 X CALL(44,3,1)!CHNG SPEC SETUP
04.14 G 2.05
04.15 X CALL(45,2,1)!C-STORE SPEC SETUP
04.16 G 2.05

05.01 X CALL(29,10,1)!C-SKY LINE MON. LOAD
05.02 G 2.05
05.03 X CALL(38,2,1)!C-LAMBDA CAL
05.04 G 2.05
05.05 X CALL(6,138,1)!C-LOG EDIT
05.06 G 2.05
05.07 X CALL(43,2,1)!C-LOG LIST
05.08 G 2.05
05.09 X CALL(3,11,1)!C-OFFSET
05.10 G 2.05
05.11 X CALL(3,13,1)!C-SETUP OFFSET
05.12 G 2.05
05.13 X CALL(33,2)
05.14 G 2.05
05.15 G 3.26
05.16 G 2.05

31.98 W
31.99 X END(0)
```

```
PROG.NO.  8     6/ 13/    76

CLICK FOCAL SCN75-C  O;N<

01.02 X CALL(10,1);C-P 8

02.04 X STAT(-1)
02.10 T !!"TAPE IS FULL;MOUNT NEW TAPE ON UNIT 7"
02.14 X STAT(100,800,2);DO 2.1;X STAT(-1)
02.30 X END(0)

03.10 D 4.1;X CLER(1);X MEMY(0,CN,1);S K=FCHAN(254,1)-FCHAN(255,1)
03.20 S J=FCHAN(511,1)-FCHAN(510,1);X MEMX(1,CN,1);S L=FCHAN(100,1)
03.30 I (FABS(J)+FABS(K)-1E4*FABS(L-X0)-40)3.4
03.32 I (FSWIT(4,11)-1)3.34;X CALL(3,10)
03.34 X CALL(9,326)
03.40 X CALL(5,10)

04.10 S X0=4070;S CN=-50
04.20 X END(0)

08.02 S TL=0;S TR=0
08.05 T "                "
08.10 F K=0,1;DO 13;S TR=TR+FTOTL(0)+FTOTL(0,1)
08.12 T ""
08.14 F K=2,3;DO 13;S TL=TL+FTOTL(0)+FTOTL(0,1)
08.16 T "          ";X PUT(64,1025);S J=FTAK(128,1025);X PUT(7,122,J)
08.20 X MPUT(0,64*RU,64,7)
08.25 T !"SCAN "%2 RU," ON TAPE;TIME ",%5,TM,,CT
08.30 T %7 "; TL="TL,". TR="TR
08.35 G 3.1

13.10 X MEMR(K*1024);X FORM(1)
13.20 X SAV(K*2,1);X SAV(K*2+1)

20.10 S D=FSWIT(1,4)
20.20 X GO(20,D*2+30)
20.30 T !" ERASING. ";X CLER(0);F J=0,7;X SAV(J+8)
20.31 G 20.9
20.32 A !"L OR R"J;S L=FITR(J/OR);S B=8;X CALL(11,27,1)
20.33 T " SUBTRACTED";G 20.9
20.34 X CALL(11,13,1)
20.35 T " ADDED LEFT.";G 20.9
20.36 X CALL(11,14,1)
20.37 T "ADDED RIGHT.";G 20.9
20.38 C-FUTURE AUTO-ADD
20.39 G 20.9
20.40 X CALL(20,8,1)
20.41 G 20.9
20.42 X CALL(35,2,1)
20.43 G 20.9
20.44 X CALL(23,4,1)
20.90 X END(0)

31.98 W
31.99 X END(0)
```

```
PROG.NO.  9     6/ 13/   76

CLICK FOCAL SCN75-C  DILO

01.01 X CALL(10,1);C-P9

02.11 S TM=0;D 12.05;X TAK(1,1)
02.14 T !"SCAN ",Z2 RU
02.15 T " READY";F J=0,300;S A=A
02.17 X SWIT(0);S SW=FSWIT(4,1,0,0,2496);I (-SW)2.22;S SW=FSWIT(3,1,0,0,119)
02.20 I (-SW)4.1;S SW=FSWIT(3,1,0,0,904);I (SW)2.3,2.3,8.01
02.22 S SW=FLOG(SW*2)/.69;X SWIT(0,63)
02.24 X CALL(7,3)
02.30 X NAME(0);IF (TM) 2.36,2.36;IF (PS)2.31,2.31;X PAUS(1);S PS=0
02.31 IF (FMEMC<1>)2.32,2.40
02.32 S CT=(TM*226.5+1-FMEMC(1))/226.5
02.36 S J=FITR(CT/60);X LED(J,3,2);X LED(CT-60*J,1,2);G 2.17
02.38 X MEMC(0);I (TM) 2.11,2.11;X PUT(8*16,1025,CT);T " STOPPING!"
02.40 X SWIT(0,63);X CALL(8,8);C-SAVE IT
02.80 S B=0;S RU=RU+1
02.84 IF (18-RU) 2.9,2.9
02.86 G 2.11
02.90 X CALL(8,2)
02.91 S RU=0;GO 2.11

03.10 D 12.05;G 2.17

04.10 D 2.22;X SWIT(0,63);X CALL(7,2)

08.01 D 2.22;I (SW-S)8.08;X GO(8,SW*2)
08.08 X PAUS(0);S PS=1;G 2.17
08.16 G 12.06;C-START
08.18 G 2.11;C-RESET
08.20 D 2.32;G 2.38;C-STOP

12.05 X PUT(8*16,1025,TM);X PUT(0,0,QL);X PUT(0,0,RU);X PUT(0,0,RU+333)
12.06 E
12.10 S D=FSWIT(1,7)
12.20 S TM=(2^D)*15;S CT=0;X MEMC(0)
12.22 X MEME(0);X MEMC(TM*226.5+1)
12.30 X PUT(8*16,1025,TM);S QL=FTAK(0,0);S RU=FTAK(0,0)
12.35 D 2.14;T " STARTED"
12.40 X CALL(5,138,1)
12.90 G 2.17

31.98 W
31.99 X END(0)
```

```
PROG.NO. 10     6/ 13/   76

C:LICK FOCAL SCN75-C  0<08

01.02 X NAME(0)#C-P10
01.04 X STAT(-1)
01.20 S D=FSWIT(1,1)
01.30 X GO(D+10,10)

02.10 C-LIST ALL
02.20 X CALL(34,2)

03.20 X CALL(34,3)

10.10 X CALL(17,138)
10.20 G 1.2

11.10 X CALL(22,25)
11.20 GO

12.10 X STAT(-1)#T !!"INITIALIZE DATA TAKING"
12.15 A !"TYPE FIRST SCAN NO."RU#X LED(0,1,8,1)
12.17 X STOR(8*15,1024#0)#X STOR(0,0#0)
12.20 A !"WANT LOG I.D. ON DATA TAPES? <Y/N>"K#D 20#I (K)12.2,12.28
12.24 T !"NO LABELS"#X PUT(8*16,1029)#G 12.3
12.26 F K=1,8#X STOR(8*K-1,121)#X STOR(8*K,125)
12.28 X PUT(8*16,1029,1)#X NAME(6)#I (FPOSN(0))12.29,12.9
12.29 I (324000-FPOSN(1))12.9
12.30 A !"L/R RESPONSE RATIO (USUALLY=1)"K#X PUT(8*22,1025,2000*K)
12.35 X NAME(0)#A !"COUNT IN PROGRESS? <Y/N>"K#D 20#I (K)12.35,12.4
12.37 S TM=0#G 12.5
12.40 S TM=1
12.50 I (-TM)12.6#X CALL(9,2)
12.60 T !"SCAN "%2 RU," IN PROGRESS."#X CALL(9,3)
12.70 X CALL(9,2)
12.90 T !!"TEL. POS. DISPLAY NOT WORKING!!!"!!!

13.10 I (-(FTAK<8*16,1027>-FTAK<0,0>+333)^2)12.15
13.20 S TM=FTAK(8*16,1025)#S OL=FTAK(0)#S RU=FTAK(0)#G 12.5

14.10 X CALL(48,137)#C-SET SWEEPS
14.20 GO

15.10 X CALL(36,2)#C-LAMBDA CAL
15.20 G

16.10 X CALL(156,130)

17.10 X CALL(31,132)#C-PEAKS
17.20 GO

20.10 I (K-ON)20.5,20.3#I (K-0Y)20.5,20.4
20.20 I (K-ONO)20.5,20.3#I (K-OYES)20.5,20.4,20.5
20.30 S K=1#R
20.40 S K=0#R
20.50 T "  ???"#S K=-1

31.98 W
31.99 X END(0)
```

```
PROG.NO.  3     6/ 13/   76

CLICK FOCAL SCN75-C  O&JL

01.01 X CALL(10,1)!C-P 3

10.15 X NAME(6)!S D=FPOSN(1)/206265!I (D-1.56)10.25
10.20 T !!!"TOO CLOSE TO POLE"!!!!!X END(O)
10.25 X NAME(9)!S PA=(.01087*FTUB(O)+4.67)/57.2958
10.30 S DD=510*FCOS(PA)!S DA=375*FSIN(PA)/FCOS(D)
10.35 S J=FTAK(7,125)!I (J-25)10.4!S J=FITR(J/10)-1
10.40 S K=1!S L=0!I (J-OB)10.9,10.5!I (J-OL)10.9,10.6!I (J-OR)10.9,10.65
10.45 I (J-OS)10.9,10.55,10.9
10.50 D 10.55!G 10.65
10.55 S L=-1!S DA=FASK(8*15,1024)!S DD=FASK(0,0)
10.60 S K=-1
10.65 I (L)10.7!I (FSWIT(4,10))10.7,10.7!X NAME(10)
10.66 X STAB(562*K)!X NAME(9)
10.70 S CD=0!S N=K*DA!D 12!I (J)10.8
10.75 S CD=1!S N=K*DD!D 12!I (-J)10.9,10.9
10.80 T !!!"TELESCOPE DID NOT COMPLETE MOVE."
10.82 T " CHECK COMP ENABLE AND LIMITS."!!!!!!!!
10.90 X NAME(O)!X END(O)

11.10 X STAT(-1)!T !!!"PRECISION OFFSET"!!!!
11.15 X NAME(9)
11.20 T "CHANGE DEC BY:          "!D 11.9!S DD=14.09*(60*M+S)
11.30 T !"CHANGE R.A. BY  (ARC): "!D 11.9!S DA=10.71*(60*M+S)
11.40 T !"CHANGE R.A. BY (TIME): "!D 11.9!S DA=DA+160.7*(60*M+S)
11.50 S K=1!G 10.7
11.90 A "MIN"M,"  SEC (WITH SIGN)"S

12.20 S N=FITR(N)!S J=FCMOP(N,CD)!I (J-FABS(N))12.3,12.4
12.30 S J=-1
12.40 R

13.10 T !!!"ENTER OFFSET (SKY-STAR):"!!!D 11.2!D 11.3!D 11.4
13.15 X STOR(8*15,1024!DA)!X STOR(0,0!DD)!X END(O)

31.98 W
31.99 X END(O)
```

```
PROG.NO. 11     6/ 13/    76

CLICK FOCAL SCN75-C  0.0K

01.01 X CALL(10,1);C-P11

02.10 A !"ENTER NEW COUNTING TIME (MINUTES)"J;I (J)2.8
02.20 S CT=(TM*226.5+1-FMEMC(1))/226.5;X PAUS(0);S TM=60*J
02.25 S J=TM-CT;I (J)2.9,2.9;X MEMC(J*226.5+1);X PUT(8*16,1025,TM)
02.80 T "  DONE.";X CALL(9,2*128+30)
02.90 X CALL(9,6*128+20)

12.01 C-"L"
12.08 C
12.20 S B=16;S R=4;DO 29
12.30 S R=0;DO 28
12.40 X END(0)

13.01 C-ADD DATA
13.10 S L=1
13.20 F K=0,3;X PULL(K,1);X PULL(K+4);DO 25;DO 13.99
13.40 X END(0)
13.99 X IN(8+K,L);X IN(12+K,1-L);X SAV(8+K,L);X SAV(12+K,1-L)

14.01 C ADD DATA REVERSED.
14.20 S L=0;G 13.2
14.40 X END(0)

18.01 C-"R"
18.20 S B=16;S R=0;DO 29
18.30 S R=4;DO 28
18.40 X END(0)

25.10 I (FTAK(8*16,1024)-3000)25.4,25.15,25.4;C-SEE 16.15.25
25.15 S P=FTAK(8*22,1025);I (-P)25.2;S P=2000
25.20 X DIVD(16+K,1,P);X DIVD(20+K,0,2000)
25.30 R
25.40 X STAT(100,800,1);T !"NO CALIBRATION!";X STAT(-1)

27.01 C-NORMALIZE,SUBTRACT ALL,L=1 TO REVERSE.
27.10 F K=0,3;X PULL(K,1);X PULL(K+4);DO 25;DO 27.8;DO 27.9
27.40 X END(0)
27.80 X SAV(24,1);X SAV(25)
27.90 X PULL(B+K,1);X PULL(B+K+4);X OUT(24,1-L);X OUT(25,L);DO 27.91
27.91 X SAV(B+K,1);X SAV(B+K+4)

28.10 F K=0,3;X PULL(B+K+R);X OUT(K+R);X SAV(B+K+R)
28.20 R

29.10 F K=0,3;X PULL(B+K+R);X IN(K+R);X SAV(B+K+R)
29.20 R

30.10 S R=0;DO 29;S R=4;DO 29;C-ADD A RUN
30.11 X END(0)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 12     6/ 13/    76

CLICK FOCAL SCN75-C  DTF/

01.01 C-PROG.12-DISPLAY
01.02 X CALL(10,1)

03.10 S DF=750-100*FSWIT(1,10)
03.15 S P=FSWIT(2,7)
03.20 S SC=<2^FSWIT(2,3)>*<10^FSWIT(2,5)>*2
03.30 S B=FSWIT(2,9)
03.42 R
03.50 S B=0
03.51 S B=8
03.52 S B=16
03.53 DO 7;S B=0

07.01 C-SNAPSHOT
07.10 S D=FMEMC(1);X PAUS(0)
07.20 F K=0,3;X MEMR(K*1024);X FORM(1);DO 7.9
07.22 I (D)7.25,7.25;X PAUS(1)
07.25 R
07.90 X SAV(K*2,1);X SAV(K*2+1)

11.10 DO 3;S B=0;G 12.03

12.01 C-DISPLAY
12.02 DO 3;X DO(3,50+B)
12.03 S N=1024;S SX=SC
12.04 S DF=FSWIT(2,1);X GD(12,DF+10)
12.10 D 13;D 14;G 15.1;C-STAR-SKY
12.11 D 14;D 23.2;G 15.4;C-STAR
12.12 D 14;D 23.2;DO 29;S DF=DF-50;D 13;D 23.1;G 15.4;C-SKY,STAR
12.13 D 13;D 23.1;G 15.4;C-SKY

13.04 S K=2+B
13.10 X PULL(K,1);X PULL(K+1);D 13.99
13.20 X SAV(25,1);S K=B;DO 13.1;X SAV(24,1)
13.90 R
13.99 X FORM(1);X FORM(2)

14.60 S K=6+B;DO 13.1;X SAV(27,1)
14.70 S K=4+B;DO 13.1;X SAV(26,1)
14.90 R

15.01 C-DIFR.
15.10 X PULL(26,1);X PULL(27)
15.20 X OUT(24,1);X OUT(25)
15.30 DO 30
15.40 DO 29
15.80 S P=0
15.90 X END(0)

16.01 C-SUM
16.10 DO 15.1
16.20 X IN(24,1);X IN(25)
16.30 G 15.3

23.10 X PULL(25);DO 30
23.20 X PULL(27);DO 30

29.10 X CLER(0);X CRT(1,0,0,0,0,DF+25)

30.10 I (P-2)30.4,30.5
30.40 X CRT(SX,N,0,1,9,DF+25);R
30.50 S N=512;D 13.99;S SX=SC*2;G 30.4

31.98 W
31.99 X END(0)
```

```
PROG.NO. 13     6/ 13/   76

C:LICK FOCAL SCN75-C  01FZ

01.01 C-PROG. 13
01.02 X CALL(10,1)

05.04 IF (Q)5.99,5.1,5.12
05.10 X STAT(650,900)
05.12 T !"USE SWITCHES TO REPLOT,OR DISPLAY AGAIN."
05.20 T !!"BLOCK ALLOCATIONS",!!
05.22 T "B="
05.30 T "0--DATA/CALIBRATION,OR LAST INPUT."
05.40 T !  "   8-DATA TOTALLED"
05.50 T !"   16-CALIBRATION"
05.91 T !! "      PF="
05.92 T "0--DIFFERENCE OF STAR-SKY."
05.93 T !"          1--'SKY'"
05.94 T !"          2--'STAR'"
05.95 T !"          3--SUM OF BOTH SLITS."
05.98 X CALL(24,2,1)
05.99 X END(0)

08.01 C-RECALL A SCAN
08.10 A !"DISPLAY SCAN NO."RN;S B=0;S K1=7;D 11.2;X CALL(12,11,1)
08.20 X END(0)

09.05 T !"SET SW. 2,9, THEN ENTER"
09.10 A !"SAVE OR GETT"M;I (M-0GET)9.2,11.1
09.20 I (M-0SAVE)11.4,10.1,11.4

10.10 D 28;I (K1-7)10.12,10.15
10.12 I (RN-4)10.13;I (14-RN)10.13,10.15,10.15
10.13 T !"USE ONLY SCANS 4-14 ON UNIT 8."!G 11.3
10.15 X DO(28,50+B)
10.20 F J=0,7;X FULL(J+B);X MSAV(RN*8+J,0,K1)
10.25 G 11.25

11.10 DO 28;X DO(28,50+B)
11.20 F J=0,7;X MGET(RN*8+J,0,K1);X SAV(J+B)
11.22 I (-FABS(B-16))11.25;X PUT(16*8,1024,3000)
11.25 T " DONE."
11.30 X END(0)
11.40 T "???"!G 11.25

28.04 ASK !"SCAN NO."RN," TAPE UNIT"K1
28.10 S B=FSWIT(2,9)
28.20 R
28.50 S B=0
28.51 S B=8
28.52 S B=16
28.53 X PAUS(0);DO 28.6;X PAUS(1);S B=0
28.60 F K=0,3;X MEMR(K*1024);X FORM(1);X SAV(K*2,1);X SAV(K*2+1)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 19     6/ 13/   76

CLICK FOCAL SCN75-C  O$JD

01.01 C-P 19-PLOT
01.02 X CALL(10,1)

03.10 S OF=750-100*FSWIT(1,10)
03.15 S P=FSWIT(2,7);S PC=1
03.16 S DT=FSWIT(2,11)
03.20 S SC=<2^FSWIT(2,3)>*<10^FSWIT(2,5)>
03.30 S B=FSWIT(2,9)
03.42 R
03.50 S B=0
03.51 S B=8
03.52 S B=16
03.53 DO 7;S B=0

07.01 C-SNAPSHOT
07.10 X PAUS(0)
07.20 F K=0,3;X MEMR(K*1024);X FORM(1);DO 7.9
07.22 I (FTAK(8*16,1025))7.25,7.25;X PAUS(1)
07.25 R
07.90 X SAV(K*2,1);X SAV(K*2+1)

11.01 C-PLOT
11.02 DO 3;X DO(3,50+B);S PO=0
11.03 IF (DT-1)11.04,29.1,13.1
11.04 IF (-QL)11.05,11.1,11.1
11.05 F J=0,1;X COMP(-1350);S QL=1
11.10 S PF=FSWIT(2,1)
11.12 S N=512;S PX=1;S PL=3;S H=4
11.13 IF (P)11.14,11.14;X CALL(20,P+10,1)
11.14 S MX=1000
11.16 X GO(11,PF+20)
11.20 DO 11.3;G 11.26;C-STAR-SKY
11.21 S M=H;G 11.3;C-STAR
11.22 S M=0;G 11.3;C-STAR,SKY
11.23 S M=0;G 11.3
11.25 G 11.5
11.26 F J=0,PL;X PULL(J+B+H);X OUT(J+B);D 11.6
11.27 G 11.5
11.30 X OPEN(1,10)
11.40 F J=M,M+PL;X PULL(B+J);DO 11.6
11.50 S D=FZCOM(OF);X COMP(0,OF-D);F J=0,1;X COMP(-1024*PC)
11.51 S QL=0;IF (PF-2)11.58,12.1
11.58 X END(0)
11.60 X CRT(SC,N,0,0,0,OF,PX,PO)

12.10 S PF=1;S OF=OF+100;G 11.21;C-STAR AFTER SKY

13.10 IF (DT-3)13.4;S PO=1;C-DOTS
13.20 G 11.04
13.40 X OPEN(0,10);F J=0,1;X COMP(1350);S QL=1
13.50 X END(0)

29.10 X CALL(20,29,1)
29.20 X END(0)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 14     6/ 13/    76

C:LICK FOCAL SCN75-C  0.M3

01.02 X CALL(10,1)!C-P14
01.10 X NAME(1)!T !!"POLARIMETRY REDUCTION"
01.20 A !"NEW FRINGE CALIB? <Y/N>"LC!G 3.05
01.60 X STAT(1,975,1)!T "MARK RIGHT-MOST, THEN 2 LEFT-MOST "
01.65 T "FRINGES FROM TBL:"!
01.70 S S0=32.5!F L=0,11,11!T %4.0 !!F J=L,L+10!D 17.1
01.80 X CALL(16,2,1)
01.90 G 1.2

03.05 A !!"SET SW(2,1), HIT 'ALT MODE'"!D
03.06 S G=FSWIT(2,1)+1!S J=7
03.10 S J=J+1!X PULL(J+4)!X DO(9,G)!X SAV(J-4)!I (J-11)3.1
03.15 I (0X-LC)1.6
03.20 F J=4,7!X PULL(J)!X PAIR(0)!X SAV(J,1)
03.30 S S0=FTAK(191,121)!S NS=S0-FTAK(191,122)
03.40 X CLER(0)!X MGET(15,1)!X FORM(0)
03.50 S T(1)=FASK(191,125)!S T(0)=FTOTL(0,1)+T(1)
03.60 F B=0,1!X SAV(3,B)!X SCRN(4,T(B),B)!X DIVD(3,B,100)!X SAV(2-B,B)
03.70 X CALL(15,4,1)

07.40 T !" LAMBDA        Q        U        V  ERROR   PLIN   P.A."
07.50 S J=NS!S S=S0-NS/2!T %5.02 !!"WTD AVG"!D 18
07.60 T !!F J=0,NS-1!T !!D 17!D 18
07.70 X END(0)

09.01 X OUT(J)
09.02 R
09.03 X IN(J)
09.04 X PULL(J)

17.10 S S=S0-J-.5!T 1E4*(8.89+.0016*S^2-2.7E-7*S^4)/S

18.10 F I=1,6!S D(I)=FCHAN(16*I+208*FITR(I/4)+J,1)/(30.72*SC)+1E-9
18.20 S Q=D(2)!S V=D(4)+D(6)!S U=D(1)-D(3)+.0032*S*V!S D=-Q/U
18.30 T " "Q," "U," "V+.0032*S*U,D(5),FSQT(Q*Q+U*U)
18.35 S Z=2-FSGN(U)!I (FABS(D)-1)18.4!S D=-1/D!S Z=Z-FSGN(U)*FSGN(Q)
18.40 T 28.6*D/(1+.28*D^2)+45*Z

31.98 W
31.99 X END(0)
```

```
PROG.NO. 15     6/ 13/   76

C:LICK FOCAL SCN75-C  030'

01.01 X CALL(10,1)!C-F15

04.10 X FORM(0)!X FORM(24)!S SC=FPEAK(0,1,2*NS-1)/3072
04.20 F J=0,2,2*NS-2!S D1=FCHAN(J+1,1)/SC!S D0=FCHAN(J,1)/SC!D 10
04.30 F J=6,7!X PULL(J-5)!X DIVD(J,0,3072)!X SAV(J-6)!X PAIR(0)!X SAV(J,1)

05.10 X ERAS(256,100,1280)!S W=768!S R=1!F I=1,4!S N=128*(5-I)!D 12
05.20 F K=0,9!S C(K)=FCOS((2*K+1)*.3927)*2047
05.30 F R=0,1!D 13
05.45 X PULL(7,1)!X FORM(0)!X FORM(2)
05.50 S E=0!F J=0,NS-1!S D=0!D 14
05.60 X EDIT(288+NS,1,FSQT(1/E))!F R=0,1!F I=1,R+1,3!D 16
05.70 X END(0)

10.10 S D=(D1-D0)/24!S D=FITR(D+FSGN(D)/2)
10.20 F R=0,1!X PUTN(48,24*J+520*R,(D1+D0)/2-24*D,48,D)

12.10 S D=600/(5-I)!S Z=0
12.30 X CLER(0)!X CWRT(W-512*(R-2),N,D)!X SCRN(6,Z)!X IN(R)!X SAV(R)
12.40 S R=FITR((W+N-1)/512)!S Z=(512*R-W)*D!I (Z)12.5!D 12.3
12.50 S W=W+N

13.10 F J=0,3!X CLER(1)!D 20
13.50 X CLER(0)!F I=0,4!X CWRT(1024+32*I,32,(5-I+FITR(1/(I+1)))*400)
13.60 X SCRN(4-R)!X SAV(7-R)

14.10 F R=0,1!F I=0,2-R,2!S D=D+FCHAN(32*I+256*R+J,1)^2/5
14.50 X EDIT(288+J,1,FSQT(D))!I (-D)14.6!R
14.60 S E=E+1/D

16.10 S AV=0!S W=16*I+256*R
16.20 F J=0,NS-1!S AV=AV+FCHAN(W+J,1)/FCHAN(288+J,1)^2
16.30 X EDIT(W+NS,1,AV/E)

20.10 X CWRT((1-R)*256,512,-1)!F K=0,7!X CWRT(K*128,64,C(K+2*R))
20.20 F K=-1,1!X PAIR(0,K)
20.30 X PULL(3-J,1)!X DMUL(0,1,512,2047)!X PAIR(0,1)!X SAV(7-J-R)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 16     6/ 13/   76

C;LICK FOCAL SCN75-C  O%N5

01.02 X CALL(10,1);C-P16

02.05 X STAT(-1);T ""
02.10 S DC=20;S C1=1750
02.11 S C0=2%FITR(FSWIT(3,11,C1/2,50)/1024);D 10.1
02.15 S CC=C1;D 2.11;S C(0)=C1;D 2.11;S J=1;D 10.4
02.20 A !"CENTRAL WAVELENGTH "LA;S SS=(89E3+143E9/LA^2)/LA;D 10.6
02.25 S J=J+1;D 10;I (C0-CC)2.25
02.30 S NJ=J;X PUT(191,121,S);X PUT(0,0,S-NJ)
02.50 F J=0,NJ;D 12
02.70 X STOR(191,125;C(0)%100+50)
02.80 F J=0,NJ-1;S C(J)=(C(J+1)-C(J))/48
02.85 S C(-1)=3%C(0)-3%C(1)+C(2);S C(NJ)=3%C(NJ-1)-3%C(NJ-2)+C(NJ-3)
02.90 X CLER(0);F J=0,NJ-1;D 13
02.94 A !"SET TAPE 8 TO 'WRITE ENABLE', PRESS 'RETURN'"J
02.95 X MSAV(15);X END(0)

10.10 S C1=FPEAK(C0-DC/6,401,C0+DC/6,1)
10.20 S C0=C0+DC/3;S C2=C1;D 10.1;S DC=C2-2%C(J-1)+C1
10.30 S C0=C(J-1)+DC;D 10.1
10.40 S C(J)=C1;S DC=C(J)-C(J-1);S C0=C1+DC/3
10.50 I (C1-1024)10.6;R
10.60 S S=FITR(SS+(1024-C1)/DC+.5)+J

12.02 S D0=C(J+1)-C(J);I (J-NJ)12.05;S D0=C(J)-C(J-1)
12.05 S CJ=0;S CB=0;S DC=FITR(D0/10);I (DC-20)12.1;S DC=20
12.10 S A=FCHAN(C(J)-DC,401);S A1=FCHAN(C(J)+DC,401)
12.15 I (A1-A)12.2;S A=A1
12.20 F K=-DC,DC;S D=FCHAN(C(J)+K,401)-A;I (D)12.5;S CB=CB+D;S CJ=CJ+K%D
12.30 S C(J)=C(J)+CJ/CB
12.40 X STAT(C(J)/2,1,.5);T "^";X STAT(-1)
12.50 C

13.10 S D=(C(J+1)-C(J-1))/.96
13.20 F K=0,47;X CWRT(1024+48%J+K,0,C(J)%100+D%(K-23.5)+.5)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 17     6/ 13/   76

CLICK FOCAL SCN75-C  M.K.

01.01 C- PROGRAM 17, PRECESSION
01.02 X CALL(10,1)
01.10 T !!"PRECESSION"
01.20 T !!" EQUINOX      RA: HR MIN SEC    DEC: DEG MIN"!
01.30 A !"OLD"T1,I (T1)2.8,2.8,A "       "H1," "M1," "S1,"        "D1
01.40 I (D1)1.6,1.5,1.6
01.50 T "ENTER MIN. OF DEC WITH SIGN"
01.60 A " "MD,!"NEW"T2,I (T2)2.8,2.8

02.01 S RAD=57.29578
02.30 S AM=(15.*H1+.25*M1+.004167*S1)/RAD
02.40 S AA=MD;S MX=MD;I (FSGN(MD)-FSGN(D1))2.44,2.44;S MX=-MD
02.44 S DW=(D1+.016667*MX)/RAD
02.50 X CALL(16,5,1)
02.60 G 6.32
02.80 T !,"ERROR";X END(0)

06.32 I (FABS(M2)-60.)6.5,6.5
06.34 I (M2)6.38,6.84,6.42
06.38 D 6.6;G 6.32
06.42 D 6.62;G 6.32
06.50 I (M2)6.56,6.7,6.52
06.52 I (DG)6.54,6.7,6.7
06.54 D 6.62;G 6.7
06.56 I (DG)6.7,6.7;D 6.6;G 6.7
06.60 S M2=M2+60;S DG=DG-1
06.62 S M2=M2-60;S DG=DG+1
06.70 T #"                "%2,H2," "MI,%3.01,S2,"       "%2,DG
06.80 T %3.01,FSGN(DG)*M2;G 6.89
06.84 T !"ERROR IN M2"
06.89 I (FSWIT(4,12))31.99,31.99;I (TM)6.92,6.92;I (FMEMC(1))6.92,31.99
06.92 I (FSWIT(3,1,0,0,904))1.3,1.3,31.99
06.98 T "+"

31.98 W
31.99 X END(0)
```

```
PROG.NO. 18     6/ 13/    76

C:LICK FOCAL SCN75-C  NFL/

01.01 C- PROG.18: PRECESSION
01.02 X CALL(10,1)

03.02 S T3=0.5*(T1+T2);S DV=T3-1950.;S DT=T2-T1
03.06 S MS=3.07327+.0000186*DV
03.08 S NS=1.33617-.0000058*DV
03.10 S NA=20.0426-.000086*DV
03.20 S PK=MS+NS*FSIN(AM)*FSIN(DW)/FCOS(DW)
03.22 S PL=NA*FCOS(AM)
03.50 R

05.01 D 3
05.02 S PA=PK*(T3-T1);S PD=PL*(T3-T1)
05.04 S P3=.0041667*PA/RAD
05.06 S P4=.016667*PD/(60.*RAD)
05.08 S AM=AM+P3;S DW=DW+P4
05.10 DO 3.20;DO 3.22
05.12 S DA=DT*PK;S DD=DT*PL/60.
05.14 IF (S1) 5.20,5.15,5.20
05.15 S M3=FITR(M1);S S1=(M1-M3)*60.
05.16 S S2=S1+DA;S MI=M3;GO 5.22
05.20 S S2=S1+DA;S MI=M1;S M3=FITR(M1)
05.22 IF (S2) 5.26; IF (S2-60.) 5.30
05.24 S S2=S2-60.;S MI=MI+1.;GO 5.22
05.26 S S2=S2+60.;S MI=MI-1.;GO 5.22
05.30 IF (MI) 5.32,5.34,5.35
05.32 S MI=MI+60.;S H2=H1-1.;GO 5.50
05.34 S H2=H1;GO 5.50
05.35 IF (MI-60.) 5.34,5.36,5.38
05.36 S MI=0.;S H2=H1+1.;GO 5.50
05.38 S MI=MI-60.;S H2=H1+1.
05.50 S M2=MX+DD;S D0=D1
05.90 X END(0)
05.95 X END(0)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 20     6/ 13/    76

CLICK FOCAL SCN75-C  M=

01.01 C-PROG. 20
01.02 X CALL(10,1)

08.10 T !!"SCRUNCH"!
08.30 A "  ANG/CH"Z2;S Z2=Z2*100;S D=2
08.50 X CALL(21,D,1)
08.70 F I=0,4,4;D 9
08.80 T !"DONE";X END(0)

09.10 F J=0,3;X PULL(J+I+8);X PAIR(0);X SAV(J+24,1)
09.20 F J=4,7;X PULL(J);X SCRN(24,T(J-4));X DIVD(J,0,100);X SAV(J-4+I)

11.10 DO 21
11.15 S B=24
11.20 X END(0)

12.10 DO 22
12.15 S B=24
12.20 X END(0)

13.10 D 21;S B=24;S PX=1;S PC=.5;X END(0)

21.01 C-AV.2 CHANNELS
21.05 S K=B+2;S H=2
21.10 S N=512;S PX=2;S PL=1
21.20 X PULL(K,1);X PULL(K+1);X FORM(1);X FORM(2)
21.30 X SAV(25,1);S K=B;DO 21.2;X SAV(24,1)
21.40 S K=B+6;DO 21.2;X SAV(27,1)
21.50 S K=B+4;DO 21.2;X SAV(26,1)
21.60 S SC=SC*2
21.90 R

22.01 C-AV 4
22.10 DO 21;S K=24;DO 21.2;X SAV(24,1)
22.20 S K=26;DO 21.2;X SAV(26,1)
22.30 S PX=4;S PL=0
22.40 S SC=SC*2
22.90 R

29.10 IF (-QL)29.3
29.15 X OPEN(0,10);S PC=1;I (FSWIT(2,7)-3)29.2;S PC=.5
29.20 F J=0,1;X COMP(1100*PC)
29.30 S X=FZCOM(0);X COMP(400,-X,1)
29.40 T !"CHECK TO SEE THAT THE CALCOMP PLOTTER PEN IS ON THE BASE LINE."!!!
29.50 S QL=0
29.60 X END(0)
29.90 X END(0)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 21     6/ 13/   76

C:LICK FOCAL SCN75-C  N;MS

01.01 X CALL(10,1);C-P21

02.30 F J=0,5;S C(J)=100*FASK(8*<17+J>,1028)/10^(2*J)
02.50 X STOR(191,121;C(0)-50*C(1));X STOR(191,125;Z2*2)
02.60 S S=C(5);F J=1,4;S S=S*204800+C(5-J)
02.70 X STOR(42,0;-C(0)/S);X STOR(42,4;1/S)
02.80 X NAME(4);F J=0,5;X STOR(40,4*J;-C(J));X STOR(41,4*J;1024*J*C(J))

03.10 X CLER(0);F J=1,2;X SAV(J);X PUTN(8*J+0,512*(J-1),512,1)
03.20 F J=1,2;X PULL(J);X POLY(191,121,1);X SAV(J)
03.30 S NC=204790*S/Z2;I (NC-2037)4.4;S NC=2036

04.40 F J=1,2;X PULL(J);X POLY(42,0,1);X SAV(J+2);D 6;D 6;D 6;X SAV(J)
04.50 S D=FCHAN(0,200);F J=24,39;X SHFT(J,-1)
04.70 X EDIT(511,300,D);F J=0,1;X PULL(4-J,J);X OUT(2-J,J)
04.80 X EDIT(511,0,NC);X FORM(0)

05.10 X NAME(1);X SAV(27,1);X PULL(27);S NC=FCRED(2047)
05.20 T %7.03 !"LAM(0) ="FASK(191,121)/100
05.30 X PUTN(32,0,1,1024);X OUT(4);X FORM(0)
05.40 X SAV(5,1);X SAV(7);F J=5,2,7;D 7
05.50 X ERAS(NC,400,2048-NC);X IN(0);F J=1,3;S T(J)=FTOTL(0,400,512*J)
05.60 X END(0)

06.30 X POLY(41,4,4);X SAV(7);X PULL(J+2);X POLY(40,0,5)
06.40 X IN(J);X DIVD(7,0,1024);X IN(J+2);X SAV(J+2)

07.10 X PULL(J);X PAIR(0);X CLER(0);X FORM(0)
07.20 F B=0,1;X DIVD(0,B,1,2);X SAV(J-B,B)

10.10 D 2;G 5.6

11.10 D 4;G 5.6

31.98 W
31.99 X END(0)
```

```
PROG.NO. 22     6/ 13/    76

CLICK FOCAL SCN75-C  N+IY

01.01 C-PROG. 22
01.02 X CALL(10,1)

15.10 S R=FTOTL(774,1600,500)/FTOTL(774,2000,500)
15.20 F  J=20,23;X PULL(J);X DIVD(0,0,1000*R,1000);X SAV(J)
15.30 S D=FPEAK(0,1600,4095);S Q=1;I (D-4000)15.4;S Q=4000/D
15.40 F  J=16,23;X PULL(J);X DIVD(0,0,Q*4000,D*Q);X SAV(J)
15.90 X PUT(16*8,1024,3000);X END(0)

25.01 A !"READY TO TEST MEMORY,0.K? <Y/N>",K;IF (K-0Y)31.99,25.02,31.99
25.02 X PUTN(8,0,3800,512);X PULL(1,1);X MEMX(1)
25.03 X PUTN(8,0,2000,512);X PULL(1,1);X MEMY(0);X MEMC(0)
25.10 T !" WILL LOAD SCANNER MEM. WITH RAMPS,"
25.20 T !"THEN TESTS EACH CHANNEL CONTENT"
25.30 T !"CHANNEL 15 WILL BE PRINTED EVEN IF ALL OK,"
25.40 T !!"CHAN    SENT    RECEIVED   DIFF"

26.04 F J=0,511;X EDIT(J,1,J*193)
26.05 X SAV(19,1)
26.10 X PULL(19,1)
26.20 F J=0,512,4000;X MEMW(J,512);X MEMW(J,512,1)

27.20 X MEMR(0)
27.30 X FORM(1)
27.36 X EDIT(15,1,712)
27.40 F J=0,511;S D=FCHAN(J,1);D 27.9
27.50 T !"TEST COMPLETE"!"YOU MUST RELOAD SWEEPS"
27.60 G 26.1
27.90 IF (D-J*193) 27.91,27.92,27.91
27.91 T !%3,J,%8,193*J,D,193*J-D
27.92 R

28.05 GOTO 30.1
28.10 F J=0,511;S D=FCHAN(J,1);T !%3 J,%6 D

30.10 F K=0,7;X MGET(RN*8+K,0,7);X SAV(K)
30.20 R

31.98 W
31.99 X END(0)
```

```
PROG.NO. 23     6/ 13/    76

C:LICK FOCAL SCN75-C  03M4

01.01 C-PROG. 1
01.02 X CALL(10,1)

04.06 IF (-FSWIT(3,2))4.08,4.1
04.08 S Q=-1;G 4.72
04.10 X SWIT(-1);S Q=0
04.12 T !"SEE CRT!"
04.13 X STAT(50,990,1)
04.14 T "PLEASE TYPE DESIRED FUNCTION CODES"
04.16 T " FOR A SEQUENCE;"
04.18 T !"(FOLLOW BY RUN NO. IF APPROPRIATE.)"
04.22 T !!"CALIBRATION:",!"CX-ERASE."
04.24 T "        CD-DISPLAY"
04.28 T !"C";DO 16.1
04.30 T !"C";DO 16.2
04.34 T !"CQ-ADD;LIGHT IN BOTH SLITS."
04.36 T !"CF-FINALLY,NORMALIZE CALIBRATION CURVES."
04.40 T !!"DATA:",!"DX-ERASE.       DD-DISPLAY."
04.44 T !"D";DO 16.1;T "--DIVIDED!"
04.46 T !"D";DO 16.2;T "--DIVIDED!"
04.48 T !"DS-SUBTRACT (SKY IN BOTH SLITS)."
04.58 T !"K-KILL  THIS."
04.59 T !"N-PAUSE WHILE NEW TAPE IS MOUNTED."
04.62 T !"AP-ADVANCE PLOTTER"
04.64 T !"P-PLOT..BLOCK B,OFFSET OF,SCALE SC,FUNCTION PF.(SEE ABOVE)."
04.65 T !"DP-PLOT FROM SWITCH PARAMETERS."
04.66 T !"C-CORRECT A TYPING ERROR"
04.67 T !"S-SAVE ON TAPE S   G-GET FROM TAPE S:BLOCK B,RUN RN."
04.70 T !!"L-LIST..X-DELETE..I-INSERT..C-CHANGE..PROGRAM CODES."
04.71 T !"A-ADD TO PROGRAM...B-BEGIN PROGRAM..Q-QUIT."
04.72 X CALL(13,5,1)
04.80 T !"FINISHED!"
04.85 IF (-TM)4.99
04.90 X CALL(9,2*128+17)
04.99 X END(0)

16.10 T "L-ADD(STAR IN LEFT SLIT)"
16.20 T "R-ADD(STAR IN RIGHT SLIT)"

31.98 W
31.99 X END(0)
```

```
PROG.NO. 24     6/ 13/   76

C:LICK FOCAL SCN75-C  NTL/

01.01 C-PROG. 24
01.02 X CALL(10,1)

02.10 X STAT(-1)$ WC=1$ BC=224
02.20 T !"STEP,OPTION CODE,SCAN NO.:",%3
02.29 T !%3 WC$A CD$IF (CD)3.1,3.1,2.32
02.30 DO 4.1$D 2.29
02.32 IF (64-CD)10.99
02.34 X GO(10,CD)
02.35 A RN$X PUT(BC,WC,RN)$ WC=WC+1
02.40 G 2.29

03.10 X CALL(25,3*128+20,1)
03.12 X END(0)

04.10 X PUT(BC,WC,CD)$ WC=WC+1
04.20 G 2.35

10.01 DO 30$ WC=CN$T !!$G 2.29$C-A
10.02 D 30$ WC=CN-1$G 3.1$C-B
10.03 DO 30$S P=26$S S=6$G 20.1$C
10.07 G 10.19$C-G
10.09 DO 30$S P=26$S S=3$G 20.1$C-I
10.11 X CALL(9,2*128+17)$C-K
10.12 X SWIT(-1)$S P=26$S S=5$G 20.1$C-L
10.14 G 2.3$C-N
10.16 D 4.1$T " B"$DO 2.35$T " OF"$DO 2.35$T " SC"$G 16.16$C-P
10.17 G 2.3$C-Q
10.19 D 4.1$T " B"$D 2.35$T " RN"$D 2.35$G 2.29$C-S
10.24 S P=26$S S=4$G 20.1$C-X
10.26 G 2.3$C-AP
10.34 CD
10.36 G 2.3$CF
10.42 G 4.1$CL
10.44 C-DD
10.46 G 2.3$CP
10.47 CQ
10.48 CR
10.52 G 4.1$C-DL
10.54 G 2.3$CX
10.56 G 2.3$C-DP
10.58 G 4.1$C-DR
10.59 D 4.1$A " L OR R",J$S CD=FITR(J/OR)$G 4.1
10.64 G 2.3$C-DX
10.99 T " ILLEGAL"$G 2.29

16.16 D 2.35$T " PF"$D 2.35$G 2.29

20.10 X CALL(P,S,1)
20.20 G 2.29

30.10 A " AT STEP NO.",CN

31.98 W
31.99 X END(0)
```

```
PROG.NO. 25    6/ 13/   76

C:LICK FOCAL SCN75-C  OZ

01.01 C-PROG. 25
01.02 X CALL(10,1)

03.10 S WC=0;S BC=224
03.20 S WC=WC+1;S CD=FTAK(BC,WC)
03.22 IF (CD-99)3.3,3.97,3.97
03.30 S P=11;X GO(4,CD)
03.97 X END(0)

04.01 X OPEN(0,10);X COMP(1100);X COMP(1100);G 3.2;C-A
04.07 G 6.04;C-G
04.14 T !"MOUNT NEXT TAPE,THEN PRESS ALT MODE.";A J;G 3.2
04.16 D 3.2;S B=CD;D 3.2;S OF=CD;D 3.2;S SC=CD;G 16.16;C-P
04.17 X END(0)
04.19 D 6.04;G 7.1
04.26 X OPEN(0,10);X COMP(1100);X COMP(1100);G 3.2;C-AP
04.34 S B=16;S P=12;S S=12;G 12.1;CD
04.36 S P=22;S S=15;G 12.1;CF
04.42 S B=16;S S=12;G 12.04;CL
04.44 S B=8;S P=12;S S=12;G 12.1;C-DD
04.47 S S=30;S B=16;G 12.04;CQ
04.48 S B=16;S S=18;G 12.04;CR
04.50 S S=3;G 12.1;CP
04.52 S S=13;G 12.04;C-DL
04.54 X PUT(8*16,1024,0);X CLER(0);F J=0,7;X SAV(16+J);CX
04.55 G 3.2
04.56 S P=19;S S=11;S B=8;G 12.1;C-DP
04.58 S S=14;G 12.04;C-DR
04.59 S B=8;S S=27;D 3.2;S L=CD;G 12.04;C-DS
04.64 X CLER(0);F J=0,7;X SAV(6+J);C-DX
04.65 G 3.2

06.04 D 3.2;S B=CD;D 3.2;S RN=CD
06.10 F J=0,7;X MGET(RN*8+J);X SAV(J+8)
06.11 G 3.2

07.10 I (RN-4)7.2;I (14-RN)7.2;F J=0,7;X PULL(8+J);X MSAV(RN*8+J)
07.11 G 3.2
07.20 T !"USE ONLY SCANS 4-14 ON UNIT 8,";G 3.97

12.04 S WC=WC+1;S RN=FTAK(BC,WC);IF (RN-18)12.08;G 3.2
12.08 F J=0,7;X MGET(J+RN*8,0,7);X SAV(J)
12.10 X CALL(P,S,1)
12.20 G 3.2

16.16 S S=11*128+14;DO 3.2;S PF=CD;S P=19;G 12.1

31.98 W
31.99 X END(0)
```

```
PROG.NO. 26     6/ 13/    76

C:LICK FOCAL SCN75-C  NEM<

01.01 C-PROG 26.CONTINUES PROGRAM SEQUENCE.
01.10 X CALL(10,1)

02.20 DO 5.2;T D,". "

03.01 C-INSERT
03.10 DO 30
03.20 S D1=FTAK(BC,CN)
03.30 X PUT(BC,CN,D)
03.40 S D=D1;S CN=CN+1;D 3.2
03.50 D 3.3;IF (CN-127)3.4
03.55 S WC=WC+1
03.60 X END(0)

04.01 C-DELETE
04.10 S D=FTAK(BC,CN);S CN=CN+
04.20 X PUT(BC,CN,D)
04.30 IF (D-65)4.1
04.40 X END(0)

05.01 C-LIST
05.02 IF (-FSWIT<3,2>)5.06
05.04 X STAT(20,900,1)
05.06 T !"PROGRAM",!"STEP NO.,CODE."
05.10 S J=1
05.20 S D=FTAK(BC,J);S J=J+1
05.24 IF (D)5.99,5.99
05.26 IF (65-D)5.99
05.28 IF (D-00)5.3,5.98
05.30 T !%3 J-1,". ";X DO(10,D)
05.32 G 5.2
05.98 DO 5.3
05.99 X STAT(-1);X END(0)

06.01 CHANGE
06.10 D 30;X PUT(BC,CN,D)
06.90 X END(0)

10.01 T "A"
10.07 T "G   B=";D 2;T "RN=";D 2
10.14 T "N"
10.16 T "P  B=";D 2;T "OF=";D 2;T "SC=";D 2;T "PF=";D 2
10.17 T "Q"
10.19 T "S  B=";D 2;T "RN=";D 2
10.26 T "AF"
10.34 T "CD"
10.36 T "CF"
10.42 T "CL.  RN=";D 2
10.44 T "DD"
10.46 T "CF"
10.47 T "CQ.  RN=";D 2
10.48 T "CR.  RN=";D 2
10.52 T "DL.  RN=";D 2
10.54 T "CX"
10.56 T "DF"
10.58 T "DR.  RN=";D 2
10.59 T "DS.  L=";D 2;T "RN=";D 2
10.64 T "DX"

30.10 A "  NEW CODE?",D

31.98 W
31.99 X END(0)
```

```
PROG.NO. 27     6/ 13/    76

CLICK FOCAL SCN75-C  NQL;

01.01 C-PROG.27-STABILITY TESTER-PART 1
01.02 X CALL(10,1)

02.10 T !"TYPE EXPECTED PEAK CENTERS"
02.15 E
02.20 S B=224;DO 20
02.50 A !!"PEAKS FROM TUBE OR TAPE",J
02.60 IF (J-OTUBE)2.7,4.01,2.7
02.70 IF (J-OTAPE)2.5,3.1,2.5

03.01 C-CONTROL FOR TAPE
03.10 T !"TYPE SCAN NO.'S"
03.20 S B=225;DO 20
03.25 S SN=0;C-NOW USE THEM
03.30 S SN=SN+1
03.40 S J=FTAK(225,SN);IF (30-J)3.99
03.50 F K=0,3;DO 3.9;DO 3.92
03.55 T !!"SCAN",%2 J
03.60 S RB=800;X CALL(28,6)
03.70 G 3.3
03.90 X MGET(J*8+K*2,0,7);X SAV(K*2+8)
03.92 X MGET(J*8+K*2+1,0,7);X SAV(K*2+9)
03.99 S J=J-100;A !"CHANGE TAPES, HIT RETURN"DY;G 3.5

04.01 CONTROL FOR TUBE
04.02 T !"SET LAMP,COUNTING TIME"
04.04 DO 12
04.06 S SJ=0;S RB=800
04.10 IF (FMEMC(1))4.1,4.2,4.1
04.20 F K=0,3;X MEMR(K*1024);X FORM(1);DO 4.9
04.30 DO 12
04.35 T !!"SCAN",%2 SJ;S SJ=SJ+1
04.40 X CALL(28,6);C-PRINT PEAKS
04.50 G 4.1
04.90 X SAV(K*2+8,1);X SAV(K*2+9)

12.01 C-START COUNT
12.10 X MEME(0)
12.20 S D=FSWIT(1,7)
12.22 S D=(2^D)*15;X MEMC(D*233+1)

20.01 S N=1;T " END WITH -1"
20.20 A ! J;X PUT(B,N,J)
20.30 IF (J)20.5
20.40 S N=N+1;G 20.2
20.50 R

31.98 W
31.99 X END(0)
```

```
PROG.NO. 28     6/ 13/    76

C:LICK FOCAL SCN75-C  LHJB

01.01 C-PROG.28-STABILITY TESTER-PART 2
01.10 X CALL(10,1)

06.01 C-PEAK CENTROIDS
06.04 S PK=0
06.10 S PK=PK+1
06.20 S X=FTAK(224,PK);IF (2048-X)6.99
06.30 S XP=FPEAK(X-5,RB,X+5,1)
06.34 S SM=0.1;S S1=0.1
06.38 S YB=FCHAN(XP-5)/2+FCHAN(XP+5)/2
06.40 F J=XP-5,XP+5;DO 7
06.50 S XR=SM/S1;T !%6.02 XR
06.60 S X=X+2048;DO 6.3;D 6.34;D 6.38;D 6.4
06.70 S XL=SM/S1-2048;T XL;S XC=(XL+XR)/2
06.80 IF (XC<PK>)6.85,6.85;T "   " %4.02 XC-XC(PK)
06.85 I (PK)8.2;S XC(PK)=XC
06.90 IF (XF<PK>)6.92,6.92;T "    " XC-XF(PK);G 6.98
06.92 S XF<PK>=XC
06.98 G 6.1
06.99 T !;X END(0)

07.10 S A=FCHAN(J,RB)-YB;I (A)7.3,7.3;S SM=SM+J*A
07.20 S S1=S1+A;R
07.30 C

08.10 S B=8*24;S W=1025;T !!"     R        L"
08.20 I (8*25-B)6.99;S X=FTAK(B,W);I (2048-X)6.99;D 11;S PK=-1;G 6.3

11.10 S W=W+1;I (1032-W)11.2;R
11.20 S B=B+8;S W=1025

31.98 W
31.99 X END(0)
```

```
PROG.NO. 29     6/ 13/   76

CLICK FOCAL SCN75-C  J.JG

01.01 C-PR.29
01.10 X CALL(10,1)

02.20 X PULL(8);X SAV(24)
02.30 F J=0,7;X PULL(7-J);X SAV(8-J)
02.35 T !
02.40 S RB=100;X CALL(28,8,1)
02.60 F J=0,7;X PULL(J+1);X SAV(J)
02.70 X PULL(24);X SAV(8)
02.80 X END(0)

10.10 T !"SKY LINE MONITOR---LOAD-UP"!
10.30 S B=8*24;S W=1025;S X=500;S Y=500
10.32 X STAT(100,950,1);T "MARK LINES"
10.35 S K=FSWIT(3,11,X,Y);I (K-1024*X-Y)10.4,10.5
10.40 S X=FITR(K/1024);S Y=K-1024*X;X PUT(B,W,2*X)
10.45 D 11;I (B-8*25)10.35,10.35
10.47 T !"NO MORE ROOM";G 10.6
10.50 X PUT(B,W,-1)
10.60 X STAT(-1);X CALL(10,13)

11.10 S W=W+1;I (1032-W)11.2;R
11.20 S B=B+8;S W=1025

31.98 W
31.99 X END(0)
```

```
PROG.NO. 30     6/ 13/   76

C:LICK FOCAL SCN75-C  N<N/

01.01 X CALL(10,1);C-PR.30

06.16 S WL=10;S BD=210;S WD=0;S XP(2)=0
06.18 IF (2000-WL) 6.98
06.20 IF (FCHAN<WL,RB>-CT) 6.30,6.36,6.36
06.30 S WL=WL+2;G 6.18
06.36 S Y=FCHAN(WL,RB);S WL=WL+1;S Y1=FCHAN(WL,RB)
06.40 C-A BUMP!
06.42 IF (Y-Y1) 6.36;S YT=2*(CN+Y)/3;S XP=WL-1;S XP(1)=XP
06.43 S WL=WL-3
06.44 S Y1=FCHAN(WL,RB);S Y=FCHAN(WL-1,RB)
06.45 IF (Y1-Y) 6.48
06.46 IF (Y1-YT) 6.48;S WL=WL-1;G 6.44
06.48 S XF=WL;S WL=XP+1
06.49 C FRONT EDGE
06.54 S YF=<FCHAN(XF-1,RB)+FCHAN(XF,RB)+FCHAN(XF+1,RB)>/3
06.60 DO 6.36
06.62 IF (Y1-Y) 6.64,6.60;S XP=0
06.64 IF (YF-Y1)6.6;C-TR.EDGE??
06.70 S XL=WL-(Y1-YF)/(Y1-Y)
06.72 S XC=(XF+XL)/2;S PK=<FCHAN(XC,RB)+FCHAN(XC+1,RB)>/2
06.73 IF (XP<1>-XP<2>-2)6.96
06.74 TYPE ! %7.02 XC,%5 XP(1),%6.01 PK
06.75 S XP(2)=XP(1);DO 10
06.76 IF (FABS<XC-XP(1)>-1) 6.78
06.77 T "  ?"
06.78 C
06.90 S WL=FITR(XL)
06.93 IF (FCHAN<WL,RB>-FCHAN<WL+1,RB>) 6.30
06.96 S WL=WL+1;G 6.93
06.98 IF (SQ)6.99;X END(0)
06.99 T !"AV. ERROR=",%4.02 TL/TN;X END(0)

10.04 IF (SQ)10.10
10.08 X STOR(1,M;XC);S M=M+4;G 10.99
10.10 S DF=XC-FASK(1,M)
10.30 IF (DF+3)10.99
10.40 S M=M+4
10.50 IF (3-DF)10.1
10.60 S TL=TL+PK*DF;S TN=TN+PK
10.70 T "   ", %3.02 DF
10.99 R

31.98 W
31.99 X END(0)
```

```
PROG.NO. 31     6/ 13/    76

CLICK FOCAL SCN75-C  N7NP

01.01 C-"PEAK"-PROG. 31
01.02 X CALL(10,1)
01.04 G 2.1
01.05 A !"PEAKS FROM TAPE OR TUBE?"J
01.06 IF (J-OTAPE) 1.08,10.02,1.08
01.08 IF (J-OTUBE) 1.04,1.12,1.04
01.12 X MEME(O)
01.20 S D=60*FSWIT(1,7);X MEMC(O);X MEMC(D*2&3)
01.40 IF (FMEMC<1>)1.4,1.5,1.4
01.50 X MEMR(O);X FORM(1);X SAV(1,1);X SAV(2)
01.55 X MEMR(1024);X FORM(1);X SAV(3,1);X SAV(4)
01.58 DO 10.26;D 10.27;D 10.28;D 10.29
01.60 X CALL(30,6)
01.68 F J=0,100000;S A=A
01.69 T !,!
01.70 G 1.12

02.10 X STAT(-1);T !!"FIND PEAKS"!"OPTIONS:"!"1-LIST ALL PEAKS"
02.20 T !"2-STABILITY CHECK"!"3-SKY LINE MONITOR---LOAD-UP"
02.30 A !!"ENTER OPTION #"J;I (J-2)1.05,2.5;X CALL(29,10)
02.50 X CALL(27,2)

10.02 S N=O;S SO=O
10.03 T !"TYPE SCAN NO.S,END WITH -1"
10.04 T !!"SCAN  LEFT(L) OR RIGHT(R)"
10.09 S N=N+1
10.10 ASK !,JJ(N)
10.15 IF (JJ<N>) 10.18,10.16,10.16
10.16 A SD(N);G 10.09
10.18 S N=O
10.19 S N=N+1;S J=JJ<N>;IF (J) 10.99;S AD=O;IF (1+OL-SD<N>)10.2;S AD=4
10.20 F K=O,3;X MGET(J*8+K+AD,1,7);X SAV(K+1,1)
10.25 T !! "RUN "%2 J,!
10.26 S TL=O;S TN=1;S M=O
10.27 X PULL(1,1);S RB=101
10.28 S CN=FTOTL(O,101,2048)/2048
10.29 S CT=CN*3
10.30 X CALL(30,6)
10.35 S SO=-1
10.40 G 10.19
10.99 QUIT

31.98 W
31.99 X END(O)
```

```
PROG.NO. 32     6/ 13/    76

C:LICK FOCAL SCN75-C  0304

01.01 C-PR.32, OFFSET ARITHMETIC
01.02 X CALL(10,1)

02.01 E
02.30 X STAT(50,950,1);X SWIT(-1);F  J=0,50;S LN=6
02.32 T "ALWAYS ENTER ZERO TO PROCEED TO NEXT STEP"!!
02.33 T "FIRST SET RETICLE ON PROGRAM STAR, THEN ON FIELD STAR"!
02.35 T "     PROGRAM STAR    FIELD STAR         DX         DY"!
02.40 T "         X       Y       X       Y"!       "
02.45 S N=1

03.10 D 6;T %2.0,!N)A "  "XP(N);I (XP(N))3.4,3.4;A YP(N);I (YP(N))3.4,3.4
03.15 A XF(N);I (XF(N))3.4,3.4;A YF(N);I (YF(N))3.4,3.4
03.20 S DX(N)=XP(N)-XF(N);S DY(N)=YP(N)-YF(N);T %5.0,"   "DX(N)
03.25 T "   "DY(N);S N=N+1;G 3.10
03.40 D 6
03.42 D 6;A !"DELETE LINE NO."ST;I (ST)4.1,4.1
03.45 S DX(ST)=0;S DY(ST)=0;G 3.42

04.10 S T=0;S XD=0;S YD=0;F J=1,N-1;D 10
04.15 I (T)5.1,5.1;S XD=XD/T;S YD=YD/T
04.19 D 6
04.20 D 6;T %5.0, !"DIFFERENCES ARE:  DX: "XD,"  DY: "YD
04.23 D 6;D 6;D 6;T !"PUT FIELD STAR IN SLIT, "
04.25 T "THEN ENTER GUIDE STAR POSITION";A !"X"XG,"  Y"YG
04.27 D 6;T !"TO PUT PROGRAM STAR IN SLIT, PUT GUIDE STAR AT:"
04.30 D 6;T %7.01,!"X="XG-XD,"     Y="YG-YD
04.35 X STAT(-1);D 4.3
04.40 E
04.45 X STAT(-1);X CALL(10,13)

05.10 D 6;T !"ERROR----ALL ENTRIES DELETED!";G 4.45

06.10 S LN=LN+1;I (24-LN)6.2;R
06.20 X STAT(-1)

10.10 I (DX(J))10.2,10.15,10.2
10.15 I (DY(J))10.2,10.4
10.20 S XD=XD+DX(J);S YD=YD+DY(J);S T=T+1
10.40 R

31.98 W
31.99 X END(0)
```

```
PROG.NO. 33     6/ 13/   76

CLICK FOCAL SCN75-C  OCEO

01.01 X CALL(10,1);C-P 33

02.10 S X=90
02.20 T !!!"SPIRAL SEARCH"!"TURN OFF COMP. ENABLE TO PAUSE, "
02.25 T "THEN HIT 3,11 TO STOP."!!!!!!!
02.30 S A=220;S C=-2
02.35 S D=1;S LR=0;S LD=0;X NAME(6);S DEC=FPOSN(1)/206265
02.40 X NAME(9);S XD=X/.071;S XR=X/(.093*FCOS(DEC))
02.45 S B=11%(2^FSWIT(1,7))
02.50 S B(0)=10000/(B*C)-A/C;I (-B(0))2.6;S B(0)=1
02.60 I (B(0)-90)2.7;S B(0)=90
02.70 S B(1)=FITR(1.31*B(0));I (B(1)-100)3.1;S B(1)=100

03.10 S D=-D;S LD=LD+XD;S LR=LR+XR;I (1.E5-LD)6.1
03.20 S S(1)=FITR(D*LD);S S(0)=FITR(D*LR)
03.30 S J=0;D 5
03.40 S J=1;D 5
03.50 G 2.45

05.10 S N=FCHOP(S(J),J,A,B,C)
05.20 I (N-S(J))5.3;R
05.30 S S(J)=S(J)-D*N;I (-FSWIT(3,11))5.4;G 5.1
05.40 T !!"SEARCH COMPLETE"!!!!;G 6.2

06.10 T !!"SEARCH RADIUS > 1 DEGREE."
06.20 A !"RETURN TO STARTING POINT? <Y/N>"K;I (K-0Y)6.9,6.3,6.9
06.30 S DD=FITR(.5*FITR(LD/XD));I (D)6.45;I (-J)6.4
06.35 S S(1)=XD*DD;S S(0)=XR*DD-LR+S(0);G 6.6
06.40 S S(1)=XD*DD-LD+S(1);S S(0)=-XR*DD;G 6.6
06.45 I (-J)6.5;S S(1)=-XD*DD;S S(0)=-XR*DD+LR-S(0);G 6.6
06.50 S S(1)=-XD*DD+LD-S(1);S S(0)=XR*DD+1
06.60 S N=FCHOP(S(0));I (-N)6.7;T !!"ENABLE COMPUTER!!"!!!;G 6.6
06.70 X CHOP(S(1),1)
06.90 X NAME(0);X END(0)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 34     6/ 13/    76

CLICK FOCAL SCN75-C  JWJL

01.01 C-PROG.34  MISC.

02.10 C-LISTING ROUTINE
02.20 ASK !!"FIRST AND LAST PROG.NO.S",PA,PZ
02.25 DO 5
02.30 S J=PA
02.35 T !!!!!!!!!!!!"PROG.NO.",%2 J;DO 6;T !!
02.40 X CALL(J,128*31+97)
02.50 S J=J+1
02.60 IF (J-PZ) 2.35,2.35,2.99
02.99 Q

03.01 C-LIST
03.20 T !"TYPE PROG.'S TO BE LISTED,END WITH -VE"
03.30 E
03.35 S N=-1
03.40 S N=N+1;ASK ! PA(N)
03.50 IF (PA<N>) 3.7;G 3.4
03.70 S N=-1;DO 5
03.80 S N=N+1;IF (PA<N>)2.99;S J=PA<N>;DO 2.35
03.90 X CALL(PA<N>,128*31+97)
03.92 GO 3.8

05.10 ASK !"TYPE TO-DAY'S DATE",DZ,MZ,YZ
05.20 R

06.10 T "  ",%2 DZ,"/",MZ,"/",%4 YZ
06.20 R

31.98 W
31.99 X END(0)
```

```
PROG.NO. 35     6/ 13/    76

CLICK FOCAL SCN75-C  MXMQ

01.01 C-PR. 35
01.02 X CALL(10,1)

02.04 T !!"NOISE FILTER"
02.05 A !"G(AUSS) OR F(OURIER)?"GF#I (GF-OF)2.07,4.1
02.07 I (GF-OG)2.05,2.1,2.05
02.10 A "  WIDTH"W1#I (-W1)3.1#S W1=1#G 3.1
02.15 F J=8,11#X PULL(J+4)#X OUT(J)#X SAV(J-4)
02.17 S M=FPEAK(0,400,2047)#S R1=2048/M
02.20 F J=4,7#X PULL(J)#X DIVD(0,0,R1,1/R1+1)#X SAV(J)
02.25 X NAME(2)#F J=4,7#D 5
02.26 S M1=FPEAK(0,400,2047)
02.27 X NAME(4)#X ERAS(512-W,1,W)#X SAV(7,1)
02.30 X CLER(0)#F J=0,3#X SAV(J)
02.35 S R1=M/M1#D 2.2
02.40 T !"DONE."#X NAME(0)#X END(0)

03.10 S W=5*W1#I (W-170)3.2#S W=170
03.20 S XN=5.72/W1#X CLER(0)#F S=1,W-1#D 3.8
03.30 X EDIT(512-W,0,2934579*XN)#X CLER(1)#X FORM(0)#X SAV(3)#G 2.15
03.80 S A=XN*2934579.2*FEXP(-2.772*<S/W1>^2)#D 3.9
03.90 X EDIT(512-W-S,0,A)#X EDIT(512-W+S,0,A)

04.10 S W=100#X NAME(1)#X CLER(1)#X TACO(90,201,8,823)#X SAV(3,1)#G 2.15

05.10 X PULL(J+1)#X PULL(J,1)#X FORM(0)#X PULL(3)#X FILT(W)
05.15 X SAV(3)#X CLER(1)#X FORM(0)#X DIVD(0,1,1,400)
05.20 X SAV(J,1)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 36     6/ 13/    76

CLICK FOCAL SCN75-C  J9E0

01.01 X CALL(10,1)$C-P 36

02.10 A !!!!"LAMBDA CAL? <Y/N>"J$I (J-0Y)2.2$X CALL(147,138)
02.20 T !"XFER CALIBRATIONS TO SDRS TAPE (UNIT 7)"
02.25 X MGET(24)
02.30 A !"CAL. NO. FROM DATA TAKING TAPE"J$I (J)1.01$I (9-J)3.1
02.40 S CN=12*J+391$F J=1,12$S B(J)=FCHAN(CN+J)
02.50 X MGET(0,0,7)$X MGET(1,1,7)$S CN=FCHAN(0)+1$I (CN-85)2.7
02.60 A !"FULL! START OVER AT CAL 1? <Y/N>"J$I (J-0Y)1.01$S CN=1
02.70 X EDIT(0,0,CN)$X EDIT(0,1,CN)$S CN=6*CN-6
02.75 F J=1,6$X EDIT(CN+J,0,B(J))$X EDIT(CN+J,1,B(J+6))
02.76 T !"SAVED AS CAL"%3,FCHAN(0),". LAM(0)="%6.02,(B(1)+B(7))/2000
02.80 X MSAV(0,0,7)$X MSAV(1,1,7)$G 2.25

03.10 T !"ONLY 0-9 ALLOWED!"$G 2.3

31.98 W
31.99 X END(0)



PROG.NO. 37     6/ 13/    76

CLICK FOCAL SCN75-C  L LH

01.01 X CALL(10,1)$C-P 37

02.05 X STAT(99,900,0)$S U=512$S V=U$S U1=0$S NN=0
02.07 T "PICK LINES(>5)$ MARK CENTER"
02.08 T !"BOTH <R> AND <L> SLITS DONE TOGETHER"
02.10 S D=FSWIT(3,11,U,V)$S U=FITR(D/1024)$I (U-U1)2.2,2.8,2.2
02.20 S W=U*2$F J=0,1$D 6
02.30 S NN=NN+2$T !$S U1=U$G 2.1
02.80 F J=0,1$X PULL(J+10)$D 8$X SAV(J+10)
02.90 X CALL(38,2)

06.10 X PULL(1+4*J)$S P=FPEAK(W-4,B<J+1>,W+4,1)
06.20 S XP=FTOTL(P-1,B<J+1>,3)/3$S CT=XP/3
06.30 X NAME(7)$X PULL(1+4*J)$S S=FIND(P-10,B<J+1>,P+10,P,CT,CT,4)
06.40 I (S)6.7$S PK=P-10+S/FSIG(0)$I (3-FABS<PK-P>)6.8
06.45 X STAT(PK/2-2,D-U*1024,0)$T "*"
06.50 X STAT(-1)$T %7.02,"PK="PK$I (1-J)6.55,6.55$A "  LA="LA
06.55 I (LA)6.8$X PULL(10+J)$X EDIT(GG*50+NN,0,PK*100)
06.60 X EDIT(GG*50+NN+1,0,LA*100)$X SAV(10+J)
06.70 R
06.80 S J=3$S NN=NN-2$R

08.10 X EDIT(0,0,GG)$X EDIT(GG,0,GS)$X EDIT(GG*50+49,0,NN)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 38    6/ 13/   76

CLICK FOCAL SCN75-C  NSEO

01.01 X CALL(10,1)$C-P 41

02.10 S SF(1)=1000$S SF(2)=2.E6$S SF(3)=8.E9$S SF(4)=1.E13
02.15 S SF(5)=1.E16$S SF(6)=1.E19$F J=1,6$S SF(J+6)=SF(J)
02.20 X STAT(-1)$T !!!!!"LAMBDA CAL SETUP"!!
02.25 A "LOAD FROM TAPE 8 (ENTER CAL NO. OR -1)"J$I (J)2.5
02.30 X MGET(24)$S CN=391+12*J$F J=1,12$S C(J)=FCHAN(J+CN)/SF(J)
02.35 D 6.3$X END(0)
02.50 A !"LOAD FROM SDRS TAPE ON UNIT 7 (ENTER SDRS CAL NO. OR -1)"J
02.55 I (J)2.9$X MGET(0,0,7)$X MGET(1,1,7)$S CN=6*J-6
02.60 F J=1,6$S C(J)=FCHAN(CN+J)/SF(J)$S C(J+6)=FCHAN(CN+J,1)/SF(J)
02.65 G 6.3
02.90 X CALL(40,3,1)

06.10 X STAT(500,900)$T "  CHAN  LAMBDA  CALC  RESID",%6.02$S C(5)=0
06.15 S C(6)=0$F J=1,N$T !XC(J),L(J)$D 6.95$T Y,L(J)-Y
06.20 F J=1,6$S C(J+6)=C(J)
06.30 D 6.97$F J=1,6$X STOR(8*<16+J>,1028),.5*(C(J)+C(J+6)))
06.35 X STAT(-1)
06.40 A !"SAVE ON TAPE 8 AS CAL NO. (0-9, OR -1 TO SKIP)"J$I (J)6.6
06.45 I (9-J)6.9$S CN=391+12*J$X MGET(24)
06.50 F J=1,12$X EDIT(CN+J,0,C(J)*SF(J))
06.55 X MSAV(24)
06.60 X END(0)
06.90 T "  ??? TOO BIG"$G 6.4
06.95 S Y=C(1)$F K=2,4$S Y=Y+C(K)*XC(J)^(K-1)
06.97 T "   LAM(0)="%6.02,(C(1)+C(7))/2

31.98 W
31.99 X END(0)


PROG.NO. 39    6/ 13/   76

CLICK FOCAL SCN75-C  LUKC

01.01 X CALL(10,1)$C-P 42

07.01 S X1=0$S X2=0$S X3=0$S X4=0$S X5=0$S X6=0$S Y0=0$S Y1=0$S Y2=0
07.02 S Y3=0$S N=0
07.03 F J=1,M$S X=XC(J)$S Y=L(J)$D 8
07.05 D 9$F J=1,4$S C(J)=2*B(J)
07.90 X END(0)

08.01 S Y=Y/2$I (-X)8.2$S J=M+1$R
08.20 S XS=X*X$S XC=XS*X$S XF=XC*X$S XV=XF*X$S X1=X1+X$S X2=X2+XS
08.30 S X3=X3+XC$S X4=X4+XF$S X5=X5+XV$S X6=X6+XV*X$S Y0=Y0+Y
08.40 S Y1=Y1+Y*X$S Y2=Y2+Y*XS$S Y3=Y3+Y*XC$S N=N+1

09.01 S A1=X2-X1*X1/N$S A2=(X3-X2*X1/N)/A1$S A3=(X4-X3*X1/N)/A1
09.02 S A4=(A2*X1-X2)/N$S C1=(Y1-X1*Y0/N)/A1$S A5=(A3*X1-X3)/N
09.03 S C2=(-C1*X1+Y0)/N$S A6=A4*X2-A2*X3+X4
09.04 S A7=-(A5*X2-A3*X3+X5)/A6$S A8=(Y2-C2*X2-C1*X3)/A6
09.05 S A9=-A7*A2-A3$S D1=-A8*A2+C1$S D2=A7*A4+A5$S D3=A8*A4+C2
09.06 S B(4)=(Y3-D3*X3-D1*X4-A8*X5)/(D2*X3+A9*X4+A7*X5+X6)
09.07 S B3=B(4)$S B(3)=B3*A7+A8$S B(2)=B3*A9+D1$S B(1)=B3*D2+D3

31.98 W
31.99 X END(0)
```

```
PROG.NO. 40     6/ 13/    76

C:LICK FOCAL SCN75-C  LFEO

01.01 X CALL(10,1)#C-P 40

02.10 T !"WAVELENGTH ID"!
02.20 S D=FSWIT(3,11,500,500)/512#S D=FITR(D)
02.30 S J=FASK(8*17,1028)#F K=1,5#S J=J+FASK(8*<17+K>,1028)*<D^K>
02.35 X STAT(-1)#T %5,"PK="D,"  LAMBDA="J
02.40 X END(0)

03.10 T !!!!"QUICKIE LAMBDA CALIBRATION"!!!
03.15 T "DISPLAY SPECTRUM, THEN PRESS 3,11"
03.20 I (-FSWIT(3,7))3.3#I (FSWIT(3,11))3.2,3.2,4.1
03.30 X CALL(12,12,1)
03.40 G 3.2

04.10 X STAT(50,900,1)#T "MARK AND IDENTIFY LINES"#S X=500#S Y=500#S J=0
04.15 S DL=512500
04.20 S D=FSWIT(3,11,X,Y)#I (D-DL)4.3,5.1
04.30 S J=J+1#S DL=D#S X=FITR(D/1024)#S Y=D-1024*X#X STAT(X-2,Y-5)#T "*"
04.40 S XC(J)=2*X#X STAT(-1)#T !"CH="%5,2*X#A "  ENTER WAVELENGTH"L(J)
04.45 I (-L(J))4.2#S J=J-1#G 4.2

05.10 I (3-J)5.3#T !"NEED AT LEAST 4 POINTS"#G 4.2
05.30 S M=J#X CALL(39,7,1)
05.40 X END(0)

31.98 W
31.99 X END(0)

PROG.NO. 41     6/ 13/    76

C:LICK FOCAL SCN75-C  NUEO

01.01 X CALL(10,1)#C-P 41

02.10 S SF(1)=1000#S SF(2)=2.E6#S SF(3)=0.E9#S SF(4)=1.E13
02.15 S SF(5)=1.E16#S SF(6)=1.E19
02.20 X STAT(-1)#T !!!!!"LAMBDA CAL SETUP"!!
02.25 A "LOAD FROM TAPE 8 (ENTER CAL NO. OR -1)"J#I (J)2.5
02.30 X MGET(24)#S CN=420+6*J#F J=1,6#S C(J)=FCHAN(J+CN)/SF(J)
02.35 D 6.3#X END(0)
02.50 A !"LOAD FROM SDRS TAPE ON UNIT 7 (ENTER SDRS CAL NO. OR -1)"J
02.55 I (J)2.9#X MGET(0,0,7)#X MGET(1,1,7)#S CN=6*J-6
02.60 F J=1,6#S C(J)=.5*(FCHAN(CN+J)+FCHAN(CN+J,1))/SF(J)
02.65 G 6.3
02.90 X CALL(40,3,1)

06.10 X STAT(500,900)#T "  CHAN  LAMBDA  CALC  RESID",%6.02#S C(5)=0
06.15 S C(6)=0#F J=1,N#T !XC(J),L(J)#D 6.95#T Y,L(J)-Y
06.30 F J=1,6#X STOR(8*<16+J>,1028#C(J))
06.35 X STAT(-1)
06.40 A !"SAVE ON TAPE 8 AS CAL NO. (0-14, OR -1 TO SKIP)"J#I (J)6.6
06.45 I (14-J)6.9#S CN=420+6*J#X MGET(24)
06.50 F J=1,6#X EDIT(CN+J,0,C(J)*SF(J))
06.55 X MSAV(24)
06.60 X END(0)
06.90 T "  ??? TOO BIG"#G 6.4
06.95 S Y=C(1)#F K=2,4#S Y=Y+C(K)*XC(J)^(K-1)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 42     6/ 13/    76

CLICK FOCAL SCN75-C  0 M=

01.01 X CALL(10,1)

02.10 T !!!!!"SCAN DWELL H.A. SLIT SETUP COM     NAME          R.A."
02.12 T "       DEC      PST"!
02.20 F J=J1,J2;D 3
02.30 T !!"SETUP TILT SELECT L.FILT U.FILT CORR COLL DECKER SLIT"!
02.35 S SL=0;F J=J1,J2;D 4
02.40 T !!"COMMENTS"!;F J=J1,J2;D 5
02.90 X END(0)

03.10 S B=J+193
03.20 S X=FTAK(B,1);I (X)3.9,3.9
03.30 T !%2,J,%5,X;D 9;T %2" ",X;D 9;T X
03.32 T "   "$ M=FTAK(B,4);S X=M;I (X-27)3.34;S X=FITR(X/10)-1
03.34 I (X-0B)3.37,3.38;I (X-0L)3.37,3.38;I (X-0N)3.37,3.38
03.35 I (X-0Q)3.37,3.38;I (X-0R)3.37,3.38
03.37 S X=-1
03.38 X EDIT(0,1,192+X);X COTY(1,1024)
03.40 S S0=FTAK(B,18);F K=1,8;S S0=S0+FTAK(0,0)
03.42 S S0=FITR(S0/10)
03.45 T %5,S0;I (FTAK(B,32))3.47,3.47;T "   X  "$0 3.5
03.47 T "      "
03.50 I (J-J1)3.55,3.55;I (M-28)3.9
03.55 X DICO(B,5,6,1024);X UNPK(6,1024)
03.60 S X=FCOTY(12,1024)
03.65 F K=1,X;T " "
03.70 S X=FTAK(B,11);D 9.2;T %2,X;D 9;T X;D 9;T X;D 9;T "  "X
03.75 D 9;T %3.01,X/10;D 9;T %2" ",X;D 9;T X
03.90 R

04.10 D 3.1;D 3.4;D 3.42;I (S0-SL)4.2,3.9,4.2
04.20 S SL=S0;T !%5,S0,4096*FTAK(B,18)+FTAK(0,0);F K=1,7;T FTAK(0,0)

05.10 D 3.1;I (FTAK(B,32))5.2,3.9
05.20 X DICO(B,32,32,1024,1);X UNPK(32,1024);T !%2,J,"-"
05.30 X COTY(64,1024)

09.10 S X=FTAK(0,0)
09.20 S X=X-4096*FITR(X/2048)

31.98 W
31.99 X END(0)
```

```
PROG.NO. 43     6/ 13/   76

CLICK FOCAL SCN75-C  M\F%

01.10 X CALL(10,1);C-P 43

02.05 X STAT(-1)
02.10 A !!!"LOG LIST, RAW DATA SCANS---1ST"J1;I (J1)1.1;A " LAST"J2
02.15 X NAME(5);A !!"TAPE NO"X,"  DATE:"
02.17 X TYCO(128,1024)
02.20 F J=J1,J2;D 3;X CODI(J+193,0,64,1024)
02.30 X CALL(42,2,1)
02.40 X END(0)

03.10 F M=1,8;X MTAK(192,64*J+8*M-1,1,7);X DICO(192,121,8,1024+8*(M-1))

31.98 W
31.99 X END(0)
```

```
PROG.NO. 44     6/ 13/   76

CLICK FOCAL SCN75-C  MNE0

01.01 X CALL(10,1);C-P 44

03.10 T !!!"***CHANGE SPEC SETUP***"!!
03.20 A !"ENTER NEW SPEC SETUP NO."K;I (K)31.99
03.25 X MGET(24,1);X NAME(3);S K=12*(K-1)
03.40 S L=0;F J=2,3;D 8
03.42 S L=1;F J=4,6;D 8
03.44 F J=7,8;D 4
03.47 S XC=FCHAN(K+8,1);S X=FCHAN(K,1)-20;I (X)3.55;X SPEC(0,1,X,1)
03.55 S L=FCHAN(K+10,1);I (L)3.65;X PUT(16*8,1024,3000)
03.60 F J=0,7;X MGET(8*L+J);X SAV(16+J)
03.65 I (X)3.7;X SPEC(0,1,X);X SPEC(0,1,X+20)
03.70 S X=FCHAN(K+1,1);I (X)3.75;X SPEC(1,1,X,1)
03.75 S L=FCHAN(K+1,11);I (L)3.9;
03.80 C-LOAD LAMBDA COEFFS.
03.90 S SW=FCHAN(K+9,1);I (SW)3.95;X NAME(0);X CALL(49,2,1)
03.95 X NAME(3);I (X)3.96;X SPEC(1,1,X)
03.96 I (XC-FSPEC(9))3.97,3.99
03.97 I (XC)3.99;T !!"YOU MUST MANUALLY CHANGE TO THE";D 9;T " CORRECTOR."
03.99 T !!"DONE"!;X END(0)

04.10 D 8;I (-X)4.2,4.2;R
04.20 F K1=1,1250;S K1=K1

08.10 S X=FCHAN(K+J,1);I (-X)8.2,8.2;R
08.20 X SPEC(J+L,1,X)

09.10 I (-XC)9.2;T " BLUE";R
09.20 T " RED"
```

```
PROG.NO. 45     6/ 13/    76

C:LICK FOCAL SCN75-C  D@HC

01.10 X CALL(10,1)$C-PR 45

02.10 X STAT(-1)$T !!!25,"SPECTROGRAPH SETUP$"!$X MDET(24,1)
02.20 A !!"LIST SETUP NO (-1 TO END, 0=CURRENT READINGS)"S$I (S)2.6,2.4
02.22 S J=1$I (S-33)2.24$D 11.1$G 2.2
02.24 X DO(10,J)$T FCHAN(12*(S-1)+J-1,1)$S J=J+1$I (12-J)2.2,2.2,2.24
02.40 S J=1$T !!"CURRENT SPECTROGRAPH READINGS:"$X NAME(3)
02.42 X DO(10,J)$T FSPEC(J-1)$S J=J+1$I (J-5)2.42
02.44 X DO(10,J)$T FSPEC(J)$S J=J+1$I (J-10)2.44,2.2,2.2
02.60 A !!"EDIT SETUP NO (-1 TO END)"S$I (S)2.9,2.8$I (S-33)2.62,2.8,2.8
02.62 S J=1
02.64 X DO(10,J)$S X=FCHAN(12*(S-1)+J-1,1)$A X$X EDIT(12*(S-1)+J-1,1,X)
02.66 S J=J+1$I (12-J)2.6,2.6,2.64
02.80 D 11.1$G 2.6
02.90 X NAME(0)$A !!"SAVE SETUPS ON TAPE? <Y/N>"K$D 20$I (K)2.9,2.92,2.94
02.92 X MSAV(24,1)
02.94 X END(0)

10.01 T !"TILT     ="
10.02 T !"SELECT   ="
10.03 T !"LOW FILT="
10.04 T !"UPP FILT="
10.05 T !"COLL     ="
10.06 T !"DECKER   ="
10.07 T !"SLIT     ="
10.08 T !"DK SLD   ="
10.09 T !"CORR     ="
10.10 T !"SWEEP    ="
10.11 T !"QUARTZ   ="
10.12 T !"LAM CAL ="

11.10 T "  ONLY SETUPS 1-32 ALLOWED"

20.10 I (K-ON)20.5,20.3$I (K-OY)20.5,20.4
20.20 I (K-ONO)20.5,20.3$I (K-OYES)20.5,20.4,20.5
20.30 S K=1$R
20.40 S K=0$R
20.50 T "  ???"$S K=-1

31.98 W
31.99 X END(0)
```

```
PROG.NO. 46    6/ 13/   76

C:LICK FOCAL SCN75-C  03M9

01.01 X CALL(10,1)$C-P 46

02.10 X MEMC(0)$S YO=YZ
02.30 X CLER(0)$X SAV(7)$X PUTN(56,0,YO,512,64)$X PULL(7,1)$X MEMY(0)
02.50 F J=0,5$D 6
02.60 A !!"REPEAT STEP NO"J$I (J)2.7$D 6$G 2.6
02.70 F J=0,1$X PUTN(56,256*J,0,256,1)
02.80 X NAME(4)$X PULL(7,1)$F J=0,4$D 7
02.90 X NAME(0)$X CALL(47,5*128+52)

06.10 S ST=FABS(-3695+1478*J)$S XB=FITR(J/3)
06.15 X CLER(0)$X SAV(7)$X PUTN(56,256*XB,ST,256)$X PULL(7,1)
06.20 X EDIT(511,1,(1-XB)*ST)$X MEMX(0)$X MEME(0)$X MEMC(2000)
06.25 I (-FMEMC(1))6.25$X MEMR(0)$X FORM(1)$X SAV(1,1)
06.30 X MEMR(2048)$X FORM(1)$X IN(1,1)
06.35 D 12$S YA(J)=(UH+HP)/2$X ERAS(HP,1,UH-HP)
06.40 D 12$S YB(J)=(UH+HP)/2$I (YB(J)-YA(J))6.5
06.45 S D=YA(J)$S YA(J)=YB(J)$S YB(J)=D
06.50 S X(J)=21.75+42.5*J$S YA(J)=YO+8*YA(J)-155$S YB(J)=YO+8*YB(J)-155
06.60 T !%4,J,8*X(J),YA(J),YB(J)

07.10 S Y1=YA(J)$S Y2=YA(J+1)$S D=0$D 8
07.20 S Y1=YB(J)$S Y2=YB(J+1)$S D=256$D 8

08.10 S SL=(Y2-Y1)/(X(J+1)-X(J))$X STOR(48,0$Y1-SL*X(J))$X STOR(0,0$SL)
08.20 S A=X(J)$S B=X(J+1)-1$I (-J)8.3$S A=0
08.30 I (J-4)8.4$S B=255
08.40 X POLY(48,0,1,1,A+D,B+D)

12.10 S P1=FPEAK(0,1,255)$S Y1=FPEAK(0,1,255,1)$F L=0,200$D 12.8
12.20 S UH=HP$F K=0,200$S L=-K$D 12.8
12.30 R
12.80 I (FCHAN(Y1+L,1)-P1/2)12.9,12.9$I (255-Y1-L)12.9$I (Y1+L)12.9,12.9
12.90 S HP=Y1+L$S L=201$S K=201

31.98 W
31.99 X END(0)
```

```
PROG.NO. 47    4/ 13/   76

C:LICK FOCAL SCN75-C  NWLP

01.01 C-PROG. 47-SET SWEEPS
01.02 X CALL(10,1)

05.02 S ST=50
05.04 IF (MN-4) 5.10,5.10,5.06
05.06 C
05.10 IF (MN) 5.14,5.14,5.2
05.14 S MN=1;S YO=0
05.20 T !!"TRACE TOP SCAN",!
05.22 F J=0,300;S A=A
05.30 S K=0;DO 7
05.32 X STAT(-1)
05.40 X STAT(1,980,1);T !"NOW TRACE SECOND SCAN"
05.50 S K=256;DO 7
05.52 S D=FCHAN(0,1);X EDIT(511,1,D)
05.53 S D=FCHAN(256,1);X EDIT(255,1,D)
05.60 X STAT(-1);X SAV(27,1)

06.05 X CLER(0);X SAV(26);X PULL(27,1);X MEMY(0,CN);X MEMY(0,CN)
06.10 X PUTN(208,0,YO,512);X OUT(26,1);F J=0,1;X CRT(4/MN,256,256*J,1,100)
06.20 A !"LEFT SLIT CHANNEL OFFSET"OF;X PUTN(200,255,XO-OF,256);X PULL(25,1)
06.30 X MEMX(1,CN);T "    OFFSET="%4,OF;X CALL(48,3)

07.01 C-JOYSTICK
07.04 S X=10;S Y=500
07.10 S D=FSWIT(3,11,X,Y)
07.20 S X=FITR(D/1024);S Y=D-1024*X
07.22 X STAT(X-2,Y-6);T "*"
07.24 S X1=X2;S X2=X
07.30 S Y1=Y2;S Y2=YO+Y*4/MN
07.40 IF (X2-25) 7.42,7.44,7.44
07.42 S X2=0;S X=X+ST;G 7.1
07.44 S SL=4*(Y2-Y1)/(X2-X1)
07.46 S L1=K+X1/4;S L2=K+X2/4
07.50 IF (X2-1000) 7.54,7.54,7.6
07.54 F J=L1,L2;X EDIT(J,1,Y1+SL*<J-L1>)
07.56 S X=X+ST;DO 7.1
07.60 S L2=255+K;DO 7.54
07.90 R

31.98 W
31.99 X END(0)
```

```
PROG.NO. 48     6/ 13/   76

C:LICK FOCAL SCN75-C  N5MX

01.01 X CALL(10,1);C-P48
01.11 E
01.12 X STAT(-1);T !!!"SET SWEEPS"
01.13 S YA=2000;S M=0;S YI=32;S YZ=850
01.15 S X0=4070;S CN=-50
01.25 S MN=2;X PUTN(208,0,YA,512);X PUTN(200,0,X0,512)
01.30 A !"MAP TUBE? <Y/N>"K;D 15;I (K)1.3,1.35;X CALL(49,10)
01.35 A !"SWEEP # (-1=NO CHNG, 0=JOYSTICK, 1-8=FROM TAPE)"SW
01.37 I (SW)2.2,1.9
01.40 X MGET(SW+24);X SAV(27);S D=FTAK(216,516)
01.45 I (-D)1.5;T "  NOTHING THERE!";G 1.35
01.50 S Y=FTAK(0,0);X TAK(0,0);S OF=FTAK(0,0);S OF=OF-4096*FITR(OF/2048)
01.55 X PUT(216,516);X PUT(0,0);X PUT(0,0);X PUT(0,0);I (-Y0)2.1;S Y0=Y*10;G 2.1
01.90 X CALL(47,5)

02.10 X CALL(47,6)
02.20 I (SW+1)2.3;X CALL(47,6*128+20)
02.30 T !!"START LAMP; USE 1 SEC DECKER"!!" STEP   X   Y1   Y2";X CALL(46,2)

03.10 A !"CURVES OK? <Y/N>"K;D 15;I (K)3.1,1.35
03.20 A !"SAVE AS SWEEP NO"SW;I (SW)3.6,3.6;X PUT(216,516,MN)
03.30 X PUT(0,0,Y0/10);X PUT(0,0,X0/10);X PUT(0,0,OF);X PULL(27);X MSAV(SW+24)
03.60 T !"ALL SET"!!!
03.70 I (FSWIT<3,1,0,0,4095>)1.01,3.7,1.01

10.10 D 1.13;D 1.15;D 1.25;X END(0)

15.10 I (K-ON)15.3,15.5;I (K-OY)15.3,15.4
15.20 I (K-ONO)15.3,15.5;I (K-OYES)15.3,15.4
15.30 T "  ???";S K=-1;R
15.40 S K=1;R
15.50 S K=0

31.98 W
31.99 X END(0)
```

```
PROG.NO. 49     6/ 13/    76

CLICK FOCAL SCN75-C  OGH=

01.01 X CALL(10,1)!C-PROG 49, SET SWEEPS

02.05 X CALL(48,10,1)
02.10 I (SW)4.1,4.1!X MGET(SW+24)!X SAV(27)
02.20 I (FTAK(216,516))4.2,4.2!S OF=FTAK(216,519)
02.30 S OF=OF-FITR(OF/2048)*4096!X PUT(216,516)!X PUT(0,0)!X PUT(0,0)
02.40 X PUT(0,0)!X PULL(27,1)!X MEMY(0,CN)!X MEMY(0,CN)!X CLER(0)!X SAV(27)
02.50 X PUTN(216,0,X0,512)!X PUTN(216,255,X0-OF,256)!X PULL(27,1)
02.60 X PULL(27,1)!X MEMX(1,CN)!T "   SWEEP"%4,SW," ALL SET"
02.70 X END(0)

03.10 A !"ENTER SWEEP NO. (1-7, FROM TAPE)"SW!G 2.05

04.10 T !"MUST BE >0. BAILING OUT."!G 2.7
04.20 T !"NO SWEEPS THERE. BAILING OUT."!G 2.7

10.01 C-MAP TUBE
10.02 X PULL(26,1)!X MEMY(0,CN)!A !"COUNTS PER DOT"SC!X PULL(25,1)
10.03 X MEMX(1,CN)
10.05 S Y=YZ!S X=0!S Y0=10*FITR(Y/10)!X CLER(1)!X SAV(27,1)
10.10 X PUTN(216,0,Y,256)!S Y2=Y+YI!X PUTN(216,256,Y2,256)
10.15 X PULL(27,1)!X MEMY(0,CN)!X MEMC(0)!X MEME(0)!X MEMC(500)
10.20 S D=FMEMC(1)!I (-FSWIT<3,11>)10.5!I (-FSWIT<3,12>)10.05
10.30 I (-FABS(D))10.2!F K=0,1!D 10.98
10.35 S Y=Y+YI!F K=2,3!D 10.98
10.45 I (2000+Y0-Y)10.05!S Y=Y+YI
10.50 I (FSWIT(3,11))10.6,10.6!X END(0)
10.60 I (Y-4000)10.1!S M=M+25!G 10.05
10.98 S J=1024*K!X MEMR(J)!X FORM(2)!X LOOK(J/2,<Y-Y0>*MN/4,1,512,SC)

31.98 W
31.99 X END(0)
*
```

```
*X CALL(147)
*W
C:LICK FOCAL SCN75-C  03N3

01.01 X CALL(10,1)
01.10 E
01.15 X STAT(-1)!T !!!"LAMBDA CAL."!
01.20 S P(1)=0!S P(5)=0!F J=9,12!X PUTN(8*J,0,0,1032)

02.10 X SWIT(-1)!X STAT(-1)!A !!"SCAN",S,!!I (S)25.1
02.15 X CLER(0)!X MTAK(8,64*S,64,7)
02.17 F J=1,4,5!S P(J)=P(J)+1!S P(J+1)=P(J)!X STOR(68+4*J,8*P(J)!-1)
02.20 S SL=1!D 20!S SL=5!D 20
02.50 X CALL(148,2,1)
02.55 G 2.1

20.05 X PULL(1)!X NAME(312)
20.10 X PULL(SL)!S SC=FPEAK(0,100*SL,2047)/225+1!S OF=125*SL-75!S K=0
20.15 D 20.9!S K=2!D 20.9!X PULL(26,1)!X PULL(27)
20.20 X CRT(SC,1024,0,1,15,OF)!X CLER(0)!X CRT(1,0,0,0,0,OF)!X PULL(26,1)
20.25 X PULL(27)!X FORM(1)!X FORM(2)!X SAV(13,1)!X SAV(25,1)
20.30 X NUDG(25,512,-4096,24)!X PULL(13)!X OUT(25)!X SAV(13)!X SAV(25)
20.35 X NUDG(25,512,4096,24)!X NAME(314)!!X PULL(13)!X OUT(24)!D 21
20.40 S R=68+4*SL!X PULL(SL)!F J=1,D!D 22
20.45 R
20.90 X PULL(K+SL,1)!X PULL(K+SL+1)!X FORM(1)!X FORM(2)!X SAV(26+K/2,1)

21.10 F J=-150,5,-20!S D=FSEEK(-J,0,0,3,509)!I (50-D)21.2
21.20 S J=0

22.10 S PK=4*FCHAN(J,1)!S PK=FPEAK(PK-5,100*SL,PK+5,1)
22.15 S CT=.1*(FTOTL(PK-15,100*SL,5)+FTOTL(PK+10,100*SL,5))
22.20 S K=FIND(PK-5,100*SL,10,PK,CT,1.5*CT,5)!I (K)22.9
22.25 S PK=PK-5+K/FSIG(0)!I (256-P(SL))22.9!S P(SL)=P(SL)+1
22.30 X STOR(R,8*P(SL)!PK)!X STAT(PK/2-2,125*SL-85)!T "^"
22.90 R

25.10 X CALL(149,2)

31.98 W
31.99 X END(0)
*
```

```
*X CALL(148)
*W
C:LICK FOCAL SCN75-C  M*JO

01.01 X CALL(10,1)

02.20 X STAT(20,970,1)$S D1=524800$S X=512$S Y=512
02.30 T "MARK PEAKS (AT LEAST 4 IN RIGHT SLIT),"!!"LEFT SLIT:"
02.40 X STAT(20,460,1)$T "RIGHT SLIT:"
02.50 S D=FSWIT(3,11,X,Y)$I (D-D1)2.52,2.9
02.52 S D1=D$S X=FITR(D/1024)
02.55 S Y=D-1024*X$S SL=FITR(Y/512)*4+1$S R=68+4*SL
02.60 F J=P(SL+1)+1,P(SL)$D 2.99$I (FABS(K-2*X)-3)2.65,2.65$D 2.63
02.62 G 2.72
02.63 I (2*X-K)2.7
02.65 S PK=J$S J=P(SL)+1
02.70 S PK=-1$S J=P(SL)+1
02.72 I (PK)2.5$X STAT(X-3,Y-7)$T "*"
02.75 X STAT(-1)$T !%7.02,"CH="K$A "  LAM="J$I (J)2.5
02.80 X STOR(R,8*PK-4$J)$G 2.5
02.90 X END(0)
02.99 S K=FASK(R,8*J)

05.10 S B(5)=0$S B(6)=0$F J=1,6$S BB(J+6*FITR(SL/5))=B(J)
05.20 I (3-SL)6.1$X END(0)

06.10 A !"SAVE AS CAL NO"S$I (S)6.4$I (9-S)6.9$X MGET(24)
06.12 S SF(1)=1.E3$S SF(2)=2.E6$S SF(3)=8.E9$S SF(4)=1.E13
06.14 F J=1,4$S SF(J+6)=SF(J)
06.20 S S=12*S+391$F J=1,12$X EDIT(S+J,0,BB(J)*SF(J))$T %7,!BB(J)*SF(J)
06.30 X MSAV(24)
06.35 E
06.40 X CALL(10,13)
06.90 T !"ONLY 0-9 ALLOWED!"$G 6.1

31.98 W
31.99 X END(0)
*
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```
*X CALL(149)
*W
CLICK FOCAL SCN75-C  0-0U

01.01 X CALL(10,1)!C-P 149

02.05 S AI=0
02.10 D 10!D 11!S SL=1!X CALL(150,6,1)
02.15 D 5!I (Q)2.1!I (AI)2.2!A !"AUTO ID? <Y/N>"AI!S AI=FITR(AI/OY)
02.17 I (AI)2.2,2.2!D 7!G 2.1
02.20 X STAT(-1)!D 11!X CALL(148,5,1)
02.35 S SL=5!I (-AI)2.4,2.4!D 7
02.40 D 10!D 12!X CALL(150,6,1)
02.45 D 5!I (Q)2.4
02.50 X STAT(-1)!D 12!X CALL(148,5,1)

05.05 X STAT(50,950,1)
05.10 T !"ERASE BAD POINTS"!S D1=524800!S X=512!S Y=512!S Q=0
05.20 S D=FSWIT(3,11,X,Y)!I (D-D1)5.25,5.9
05.25 S X=FITR(D/1024)!S Y=D-1024*X!S D1=D!S K=2*X!S R=68+4*SL
05.30 F J=1,P(SL)!D 6
05.40 G 5.2
05.90 X STAT(-1)!R

06.10 S K1=FASK(R,8*J)!I (FABS(K1-K)-4)6.15,6.15!R
06.15 I (-FASK(R,8*J-4))6.2!R
06.20 X STOR(R,8*J-4!0)!X STAT(X-5,Y-14,1)!T "X"!S J=P(SL)+1!S Q=-1

07.20 X MGET(129,1)!S NL=FCHAN(510,1)!S K=B(1)*100!S P1=0!D 8!S P1=K
07.30 S K=100*(-FCHAN(511)/400+A1+2048*A2)!D 8!S P2=K!S R=68+4*SL
07.40 S AI=-1!F J=1,P(SL)!D 9

08.10 F J=P1,NL!I (FCHAN(J,1)-K)8.2!S K=J!S J=512
08.20 R

09.10 I (FASK(R,8*J-4))9.2,9.2!R
09.20 S L=FASK(0,0)!I (L)9.6!S L=100*(B(1)+B(2)*L+B(3)*L^2+B(4)*L^3)
09.30 F K=PP,P2!S M=FCHAN(K,1)!I (FABS(M-L)-1000)9.5
09.40 R
09.50 X STOR(R,8*J-4!M/100)!S PP=K!S K=P2+1
09.60 S PP=P1

10.10 X SWIT(-1)!X STAT(50,1000,1)!F J=1,100!S J=J

11.10 T !"RIGHT SLIT"

12.10 T !"LEFT SLIT"

31.98 W
31.99 X END(0)
*
```

```
*X CALL(150)
*W
C:LICK FOCAL SCN75-C  0-0U

01.01 X CALL(10,1)!C-P 150

05.10 D 7!S SL=1!D 6.2!S SL=5!D 6.2!D 9!X END(0)

06.10 D 7
06.20 S R=68+4*SL!F J=1,P(SL)!D 8
06.30 D 9!X CALL(151,10,1)
06.40 D 11!X END(0)

07.10 S X1=0!S X2=0!S X3=0!S X4=0!S X5=0!S X6=0!S Y0=0!S Y1=0
07.15 S Y2=0!S Y3=0!S N=0!S RE=0

08.10 S Y=FASK(R,8*J-4)!I (-Y)8.15!R
08.15 S X=FASK(0,0)
08.20 S XS=X*X!S XC=XS*X!S XF=XC*X!S XV=XF*X!S X1=X1+X!S X2=X2+XS
08.30 S X3=X3+XC!S X4=X4+XF!S X5=X5+XV!S X6=X6+XV*X!S Y0=Y0+Y
08.40 S Y1=Y1+Y*X!S Y2=Y2+Y*XS!S Y3=Y3+Y*XC!S N=N+1

09.01 S A1=X2-X1*X1/N!S A2=(X3-X2*X1/N)/A1!S A3=(X4-X3*X1/N)/A1
09.02 S A4=(A2*X1-X2)/N!S C1=(Y1-X1*Y0/N)/A1!S A5=(A3*X1-X3)/N
09.03 S C2=(-C1*X1+Y0)/N!S A6=A4*X2-A2*X3+X4
09.04 S A7=-(A5*X2-A3*X3+X5)/A6!S A8=(Y2-C2*X2-C1*X3)/A6
09.05 S A9=-A7*A2-A3!S D1=-A8*A2+C1!S D2=A7*A4+A5!S D3=A8*A4+C2
09.06 S B(4)=(Y3-D3*X3-D1*X4-A8*X5)/(D2*X3+A9*X4+A7*X5+X6)
09.07 S B3=B(4)!S B(3)=B3*A7+A8!S B(2)=B3*A9+D1!S B(1)=B3*D2+D3
09.20 S A1=B(1)-1.E6*B(3)-2.E9*B(4)!S A2=B(2)+2.E3*B(3)+3.E6*B(4)
09.22 X STOR(104,0!-400*(B(1)-A1))!X STOR(0,0!-400*(B(2)-A2))
09.23 X STOR(0,0!-400*B(3))!X STOR(0,0!-400*B(4))
09.25 X CLER(0)!X SAV(14)!X PUTN(112,0,0,512,4)
09.30 X NAME(313)!X PULL(14)!X POLY(104,0,3)!X CRT(100,0,0,0,15,500)

11.10 X STAT(-1)!T %7.02,!"RMS ERROR=".5*FSQT(RE)/N

31.98 W
31.99 X END(0)
*
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```
*X CALL(151)
*W
C:LICK FOCAL SCN75-C  DCM;

01.01 X CALL(10,1);C-P151

02.05 X STAT(-1);T !!!"LAMBDA TABLE MAKER";X MGET(129);X SAV(2)
02.07 S ST=FCHAN(510)
02.10 T !!"PRESENT TABLE";F J=0,ST;T !%3,J,%7.02,FCHAN(J)/100
02.15 T !!"ADD LINES;E 0 4358.30(-1=END)",!!;S SF=ST;F J=ST+1,400;D 5
02.30 T !!"DELETE LINES-GIVE#(-1=END)";F J=0,ST;D 6
02.40 S C=200;X CLER(1);X SAV(4,1);F J=0,SF;D 3
02.45 X SAV(5,1);X PUTN(32,512,1000,512)
02.50 X PULL(4);X OUT(5);X PULL(5,1);S CC=-1;F L=200,C-1;D 4
02.55 X ERAS(200,1,200);X SAV(3,1);X PULL(3)
02.60 X EDIT(510,0,CC);S ST=CC;D 2.1;A !"OK?<Y/N>"OK;I (OK-OY)2.05
02.70 T !!"SAVE ON TAPE 8";X MSAV(129);T !"DONE!";G 1.01

03.10 S LA=FCHAN(J);I (-LA)3.2;R
03.20 X EDIT(C,1,LA);S C=C+1

04.10 S CH=FPEAK(200,0,C-1,1);S LA=FCHAN(CH,1);X EDIT(CC+1,1,LA)
04.20 X EDIT(CH,0,0);S CC=CC+1

05.10 A !"ADD LA"LA;I (LA)5.2;X EDIT(J,0,LA*100);T "*";S SF=SF+1;R
05.20 S J=500

06.10 A !"LINE #"L;I (L)6.2;X EDIT(L,0,0);T "*";R
06.20 S J=500

10.10 S R=68+4*SL
10.20 F J=1,P(SL);D 19

11.10 X END(0)

19.10 S Y=FASK(R,8*J-4);I (-Y)19.15;R
19.15 S X=FASK(0,0);S Y=-4*(Y-A1-X*A2)
19.20 S RE=RE+(Y-.01*FCHAN((X+2)/4))^2;I (492-FABS(Y))19.3;D 20;T "*";R
19.30 S Y=490*FSGN(Y);D 20;T "?"

20.10 X STAT(X/2-3,Y+493)

31.98 W
31.99 X END(0)
*
```

```
*X CALL(156)
*W
C:LICK FOCAL SCN75-C  O/M>X,IWB(E

01.01 X CALL(10,1)!C 156
01.40 E
01.50 X LED(0,1,3,1)

02.10 D 9!T !!"FOCUS <C>OLLIMATOR FOCUS OR <D>ISSECTOR VOLTAGE"
02.15 A !"DWELL TIME (SECONDS)"T!I (T)1.01!S T=T/4.1E-3
02.20 A !"TURN ON NE LAMP      HIT RETURN"Q!D 8
02.30 X SWIT(-1)!F J=0,3!X MAMR(J*1024)!X FORM(2)!X SAV(J+1,1)
02.40 X PULL(1)!S SC=FPEAK(0,100,2047)/300+1
02.50 F J=1,2,3!X PULL(J,1)!X PULL(J+1)!X CRT(SC,1024,0,1,5,(250*J-150))
02.60 X STAT(1,950,1)!T "MARK CHANNEL OF PEAK, THEN VALLEY"!S D=512!D 6!S P=D*2
02.70 D 6!S V=D*2!S DI=V-P!X PULL(1)!S SC=FITR(12*FCHAN(V/2,100)/FCHAN(P/2,100))+
02.75 D 9!T !%4.02"MAX GRAPH VALUE ="SC
02.80 D 9!T !!%4"VALLEY AT CHANNEL"V
02.90 A !!"VARY <C/D>T"Q!I (Q-OC)2.1,4.1

03.10 T "   SET VOLTAGE, TYPE VALUE"
03.20 D 13!A !"V"Q!I (Q)2.8!D 8!X CALL(158,2)
03.30 G 3.2

04.10 A "   FROM"Q1,"STEP,>0"Q2,"TO"Q3!S Q=Q1!D 7
04.20 D 13!T !%3"C="C!X NAME(320)!S D=FSPEC(5,1,C)!D 8
04.30 S Q=Q+Q2!I (Q3-Q)4.4!D 7!X NAME(320)!S D=FSPEC(5,1,C,1)
04.40 X CALL(158,2)
04.50 I (Q3-Q)2.8!G 4.2

06.30 S D=FSWIT(3,11,0,512)!S D=FITR(D/1024)

07.10 S C=Q!I (-C)7.2!S C=1!R
07.20 I (C-999)7.3!S C=999
07.30 R

08.20 X NAME(321)!X MAMC(0)!X MAME(0)!X MAMC(T)
08.50 S D=FMAMC(1)!I (D)8.7,8.7!X LED(D*4.1E-3,1,3)!G 8.5
08.70 R

09.50 X STAT(-1)

13.10 T !!F J=1,20!T " "
13.50 T "+"

31.98 W
31.99 X END(0)
*
```

```
*X CALL(158)
*W
C:LICK FOCAL SCN75-C  KKGC3SFFPTS K=H+DI-3;D 9.7;F K=H+DI-2,H+DI+3;D 9

01.01 X CALL(10,1);C PROG 158

02.10 X NAME(321)
02.20 F J=1,4;X MAMR((J-1)*1024);X FORM(1);X SAV(J*2-1,1);X SAV(J*2)
02.30 F J=1,4,5;X PULL(J);S H=FPEAK(P-15,J*100,P+15,1);D 8
02.40 T #%4.02"      "V(1),V(5),"  ";S S(3)=FABS(S(1)-S(5))-1
02.50 I (S(1)-S(5))2.8,2.7
02.60 S J=5;D 7;T "L";S J=3;D 7.2;T "R";G 2.9
02.70 S J=1;D 7;T "*";G 2.9
02.80 S J=1;D 7;T "R";S J=3;D 7.2;T "L"
02.90 X END(0)

07.10 I (S(J))7.3;T "+"
07.20 I (S(J)-1)7.3;F K=1,S(J);T " "
07.30 R

08.20 S K=H+DI-3;D 9.7;F K=H+DI-2,H+DI+3;D 9
08.40 S V(J)=M*8/FTOTL(H-1,J*100,3)
08.60 S S(J)=FITR(V(J)/(SC/56)+.5)-1;I (56-S(J))8.8;R
08.80 S S(J)=56

09.20 I (FTOTL(K-1,J*100,3)-M)9.7;R
09.70 S M=FTOTL(K-1,J*100,3)

31.98 W
31.99 X END(0)
*
```