UNIVERSITY OF CALIFORNIA

LICK OBSERVATORY TECHNICAL REPORTS

No. 3

PDP 8 LICK FOCAL SYSTEM
Machine Language Listings

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INTRODUCTION

This booklet contains listings for the special system programs used to modify Digital Equipment's FOCAL-69, for use at Lick Observatory as LICK FOCAL.

The report is divided into several segments:

1. Tables of memory allocations and special codes. P. 1
2. Overlays to convert FOCAL-69, 8K, 4 Word into LICK FOCAL. P. 5
3. A brief outline of the procedure used to load and store the overlays, using DEC's DISK MONITOR System. P.36B
4. The coding used to bootstrap and load LICK FOCAL from Dectape, and to copy one tape to another. P.37
5. The bookkeeping program which builds up the machine language program overlays that reside on the disc when LICK FOCAL is running. P.53
6. The bookkeeping program which stores additional overlays on Dectape so that they can be copied onto the disc by an X NAME ( ) command when LICK FOCAL is running. P.60
7. Listings for the X NAME ( ) command and for the program calling - X CALL ( ) command. P.68

NOTE: Some notes on operation and use of these programs are given in L.O.T.R.No. 1.

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8	ENTR - Get overlay from disc
9	EXEC - Enables "X ---" Commands
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15	GODO - Initializes FOCAL when loading
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22	INTEX - Interrupt handler
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STORE OVERLAY ON DECTAPE (for X NAME( ))

60 PREP - Preset dispatch tables

61 TOVR - Store overlay on tape

TWO VITAL SYSTEM PROGRAMS

68 CHAIN - For X CALL( ); X FILE ( ); X END( )

72 NAME - For replacing overlay 6 from Dectape.

L7

(1)

Core Usage - Lick FOCAL - 1973

Field 1

0 - 5 LFOC

6 - 7 CONØ
10-17 ARGH, Temp

20-44 CONØ
76-77 CONØ

112-130 CONØ
132-137 CONØ

240-376 LFOC
400-461 LFOC

462-537 Tely Buffer

540-554 LFOC-LINEØ
555-556 LFOC-CHAIN
560-- TEXT
*600-744 FOC4(FNKBN)

*746-767 FOC4 (FNTABF)

*1000-1173 GODO
*1200-1577 COPE
*1600-1753 COPG
*2000-2362 FAST
*2400-2540 COPG
6000-6041 ENTR

7000-7145 GWRD
7150-7177 Chain Nest Buffer
7200-7271 DISK 1OUT
7274-7320-MESG
7322-7377 FLAG 1OUT
7400-7422 DSET
7425-7434 CRT entry
7435-7440 INTEX
7447-7576 DECT 1OUT

Field Ø

2414-- 2424. Apparently empty
7515-7557 Empty

31 LFOC
132 LFOC
134 LFOC
173 LFOC

375-407 EXEC

1012 EXEC

1142-1157 LFOC
1201 EXEC
1335-1336 FOC4
1343-1353 LFOC
1553-1561 GOTØ

2600-2655 INTEX
2662-2743

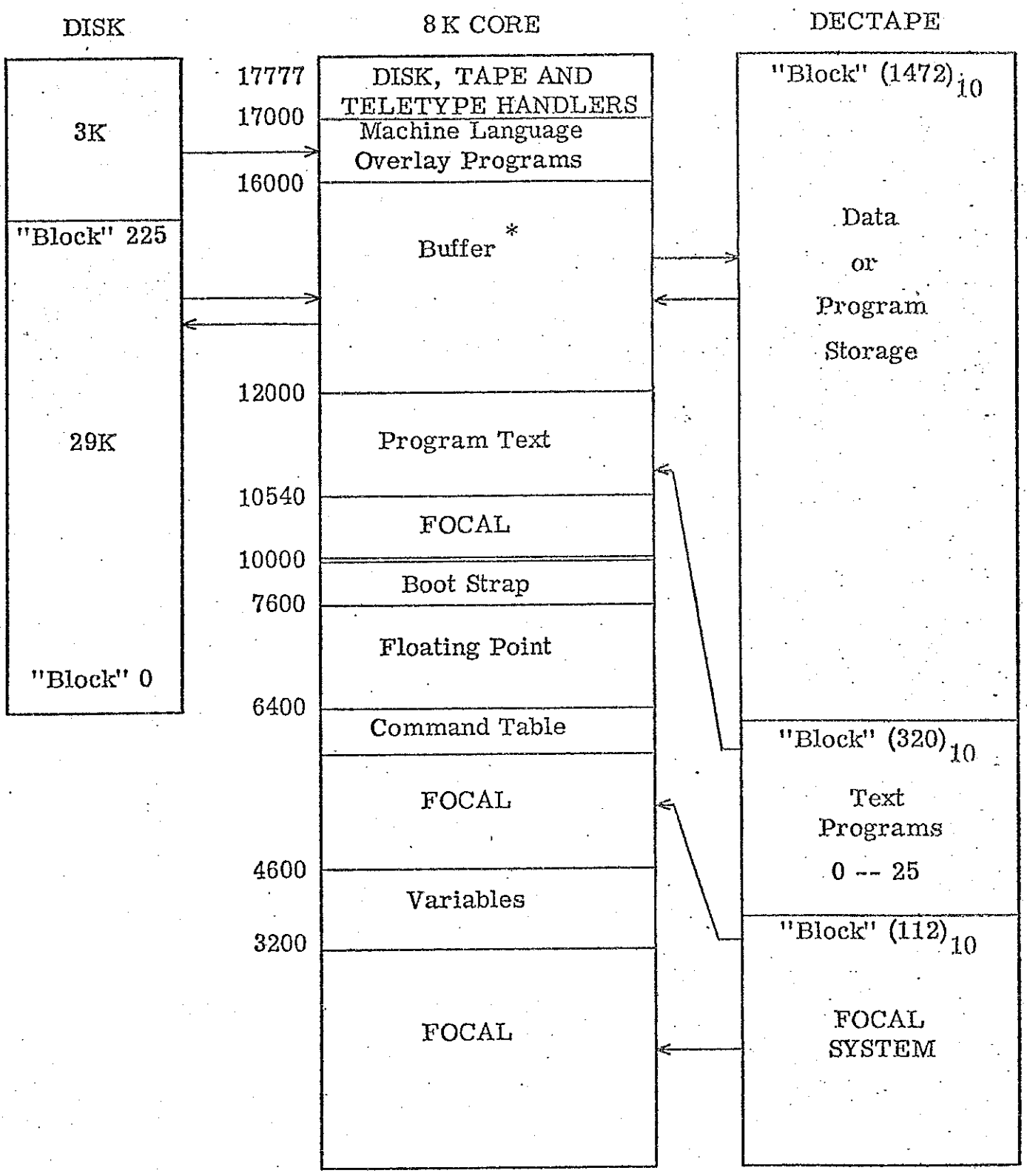
3120-3136----- CHAIN
3140-3177 TTY Output Buffer
*4600-4616 LFOC
4726-4727 LFOC
4732-4765 FOC5
5000-5032 FOC5

5333 LFOC
5354-5376 LFOC
6002 LFOC
6200-6233 FOC5
6234-6367 FOC4 (loads from 10600--)
7503-7514 LFOC

7560-7564 - 8K overlay
7572-7577 - 8K overlay

*Initializing only

PDP 8 Memory Utilization for Lick-FOCAL



*The buffer is used as a data buffer for the disk, DECtape and IBM tape. For the Microphotometer and Automatic Measuring Engine, part of the buffer (12000 - 12565) is used for FOCAL program text, and part (15000 - 15777 is used for core resident programs.

DISPATCH TABLE ALLOCATIONS

LICK FOCAL 1974

KB1 +	Scanner	Microphoto	AME
0	PUT	PUT	PUT
1	(F)TAK	(F)TAK	(F)TAK
2	CALL	CALL	CALL
3	FILE	FILE	FILE
4	END	END	END
5			JOY
6	STOR	STOR	STOR
7	(F)ASK	(F)ASK	(F)ASK
10	CRT		SAVX
11			SAVY
12	SWIT	SWIT	SWIT
13			STEP
14	MSAV	UP	COR
15	MGET	DN	GMIC
16	CLER	LFT	MICR
17		RIT	MICS
20	SAV	SHFT	LOC
21	PUL	SET	SCNR
22	CHAN	(F)UNC	GSCN
23	IN	IFIX	SCNS
24	OUT		
25	SHFT		SHFT
26	EDIT		PHOR
27	ERAS	[illegible]	GPHO
30	DIVD	DIVM	PHOS
31		ICRT	SWTA
32	MOVE	COMP	
33	PUTN	PUTN	PUTN

KB1 +	SCN	MIC	AME
34		PEN	SURV
35		PLOT	PLOT
36	DIS	DIS	DIS
37	STAT	STAT	STAT
40	NAME	NAME	NAME
41	WHAT	WHAT	WHAT
42		SHOW	IN
43		ADD	OUT
44		SUB	IOR
45			TEST
46	FORM		CLER
47	LOOK		AND
50		MINM	AME
51	TOTL	TOTL	TOTL
52	COMP	ZCOM	DISP
53	CPEN	CPEN	SWTS
54			ALOC
55	PAUS		MOV
56	GO	GO	GO
57	DO	DO	DO
60	ZCOM	PUTL	PUTL
61		TAKL	TAKL
62	PEAK	CONV	BUZ
63	VAR	MULT	VAR.
64	MPUT	MPUT	MPUT
65	MTAK	MTAK	MPUT

X NAME( ) overlays locations from KB1+66 to KB1+77.

IOT LIST PDP 8-I

0 - ION, IOF

1 - Paper Tape

2 - Paper Punch

3 - Keyboard

4 - Teletype

5 - CRT

6 - CRT

7 - CRT

10 - Parity

11 - Multiple Line Interface

12 - Multiple Line Interface

13 - Clock

14

15 -

16

17

20 - Field Ø

21 - Field 1

22 - Read Field

23

24 - Field

25 - Select

26 -

27

30 - "COUDE" (EL 170)

31 - Microphotometer (EL 155)

32 - "Coude" (EL 170)

33 - Pulsers (EL 172)

34 - Pulsers (EL 172)

35 - Multiplexer
Serial Interface EL 331)

36 - Switch Panel CRT
+ Joystick (EL 245)

37 -

40 - Data Comm.

41 - Data Comm.

42 - Data Comm.

43 - Data Comm.

44 - Data Comm.

45 - Cass. Scanner

46 - Cass ~~(Data Com)~~

47 - Dec Data Com

50 - Calcomp

51 - Calcomp

52 - Calcomp

53 - ADC (Dec)

54 - ADC (Dec)

55 - D→A (Dec)

56

57 - Sample & Hold

60 - DISC DF32

61 - DISC

62 - DISC

63 - Card Reader

64 - RF08 DISC

65 - Line Printer

66 - Line Printer

67 - Coude (EL 170-2C)
(Card Reader) also)

70 - IBM Tape

71

72 - Gaertner AME

73 - AME EL-424

74

75

76 - Dectape

77 - Dectape

Tape 14C (Type) + File 3
TAPE 12 M: File 3, File 2.

```
/CON0
/A LIST OF CONSTANTS AND ADDRESSES
FIELD 1
KB1=140
FNTABL=6234        /NEW FUNCTION LIST
FNTABF=6346
FNKB1=-6200+600+FNTABL+10
FLETER=FNTABL+10
LISTSM=600                    /FUNCTION LIST
ARG1=50
ARG2=ARG1+1
ARG3=ARG2+1
ARG4=ARG3+1
ARG5=ARG4+1
ARG6=ARG5+1
ARG7=ARG6+1
ARG8=ARG7+1
ARG9=ARG8+1
ARG10=ARG9+1       /(=61)
ARG3H=10
ARG4H=ARG3H+1
ARG5H=ARG4H+1
ARG6H=ARG5H+1
ARG7H=ARG6H+1
ARG8H=ARG7H+1
ARG9H=ARG8H+1
ARG10H=ARG9H+1
/
GETWRX=KB1+1
/
DXS=6057
DXL=6053
DIX=6054
DYS=6067
DYL=6063
MUY=7405
DVI=7407
SHL=7413
ASR=7415
LSR=7417
MQL=7421
MQA=7501
CCEC=6136
CSCF=6133
CCFF=6132
/
MVSTOP=6316
XPOWER=6313        /STOP MICROPHOTOMETER CODES
/
/FOCAL CONSTANTS
```

```
                XRT2=12
                TELSW=16
                LASTV=31
                T1=32
                BOTTOM=35
                T2=71
                CFRS=133
                END=134
                ENDT=135
                EFUN3I=136
                CHAR=66
                COMBUF=132
                DAXIN=173
                ERROR2=4566
                GETC=4545
                PUSHJ=4540
                POPJ=5541
                EFUN=1743
                EVAL=1613
                INTEGER=53
                THISLN=23
                FINDLN=4555
                PC=22
                NAGSW=65
                PROC=611
                BUFR=60
                LINENO=67
                XRT=11
                AXOUT=17
                /
                F1=5354 /NEW DISPATCHER
                /
                LINE0=540
                LINE1=560
                LVARIB=3200
                SPRINT=2600
                BUFERB=7577
                /
                DISCX=20
                DTAPX=21
                MESAGX=22
                *0      /LOADER MISSES FIRST WORD
0000  0000      0
                *6
0006  5770      CLENGT,-2010
0007  0132      CLOKGO,KILALL
                *23
0023  0400      DDCORE,400      /INITIAL TEST VALUES
0024  7570      DDWCNT,7570
0025  0000      DISADD,0
0026  0010      DSFELD,0010
0027  0004      DTBLOK,4
0030  0000      DTUNIT,0
0031  0000      TEMPS0,0
0032  7577      M201,-201
0033  0000      BWTEST,0        /PARTIAL DISC BUFFER PROTECT
0034  3200      LASVAR,LVARIB   /HOLDS CURRENT LAST VARIABLE
0035  0044      FLACR,44        /FLAC
0036  5216      BUFEMD,-2562    /-BFTEMP-2010+3:TEXT END
0037  0020      P20,20
                /
```

```
0040   7067   DISEND,-711      /700777 SHOULD BE LAST DISC ADDRESS
0041   0000   DTEST,0
0042   0000   PGLAST,0         /FOR CHAINING
0043   0500   FSDATA,500
0044   3000   FSPROG,3000      /LABL MUST SET THIS TO 160 OR FOCAL FAILS!
               /
               *76
0076   0100   P100,100
0077   7700   M100,-100
               DCSETX=112
               CCLOCK=113
               DISPAX=114       /ENTRY TO LFOC DISPATCH
               GETPRX=115
               BLOKIN=116
               INTESX=117
               PUTWRX=120
               LINPNT=121
               LØTPNT=122       /POINTS TO TEMP STORE FOR LINEØ
               FLAGX=123
               MVBUFX=124
               WAITX=125
               *126
0126   0000   INTRUP,0
               TYPEX=127
               CRLFX=130
               KILALL=132
               FLSETX=133
               NOWNAM=134
               PGRETN=135       /ALSO FOR CHAINING
               OCTPNX=136       /USED TO PRINT CHAIN ADDRESS.
               BWRITX=137
```

(7)

File: Tape 140
Oct 12/72

```
.PALP
*OUT-S:DSET
*
*IN-S:CON0,S:DSET
*
*
*OPT-T

ARG1    0050
ARG10   0061

                /CON0
                XLIST
                PAUSE/
                /
                /DSET
                /PRESETS DISC ADDRESS FOR BLOCK NO. IN AC
                /
                *DCSETX
0112    7400    DCSET
                *7400
7400    0000    DCSET,0
7401    7425      MQL!MUY
7402    0201      201
7403    7407      DVI
7404    0200      200
7405    3025      DCA DISADD     /LOW 7 BITS
7406    7413      SHL
7407    0006      6
7410    3026      DCA DSFELD     /HIGH 35 BITS
7411    7501      MQA    /MIDDLE 5 BITS
7412    1025      TAD DISADD
7413    3025      DCA DISADD
7414    7421      MQL
7415    1026      TAD DSFELD
7416    7413      SHL    /HIGH 5 BITS TO UPPER HALF OF WORD
7417    0005      5
7420    6214      RDF    /SET FIELD
7421    3026      DCA DSFELD
7422    5600      JMP I DCSET

.
```

File 3 Tape 14 A

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10/12/22

```
.PALP
*OUT-S:ENTR
*
*IN-S:CON0,S:ENTR
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /ENTR
                /LOADS A NEW MACHINE LANGUAGE FUNCTION
                /IF A NUMBER BELOW 177 IS FOUND IN DISPATCH TABLE
                *GETPRX
0115    6000    GETPRG
                /
                *6000
6000    0000    GETPRG,0
6001    1431        TAD I TEMPS0
6002    7450        SNA
6003    5532        JMP I KILALL
6004    7425        MQL!MUY
6005    0104        104
6006    7701        CLA!MQA
6007    1241        TAD P440        /FIRST DISC ADDRESS IS 1500
6010    3025        DCA DISADD
6011    1235        TAD P710        /LAST 4K OF DISC AND FIELD 1
6012    3026        DCA DSFELD
6013    3041        DCA DTEST       /OVER RIDE PROTECTION
6014    1237        TAD PKB1
6015    3023        DCA DDCORE
6016    1077    RETRY,TAD M100
6017    3024        DCA DDWCNT
6020    4420        JMS I DISCX     /LOAD NEW DISPATCH TABLE
6021    5216        JMP RETRY       /DISC ERROR
6022    1076        TAD P100
6023    1025        TAD DISADD
6024    3025        DCA DISADD
6025    1236        TAD M736
6026    3024        DCA DDWCNT
6027    1240        TAD P6042
6030    3023        DCA DDCORE
6031    4420        JMS I DISCX
6032    5216        JMP RETRY       /ERROR
6033    2041        ISZ DTEST       /RESET DISC PROTECT
6034    5600        JMP I GETPRG
6035    0710    P710,710
6036    7042    M736,-736
6037    0140    PKB1,KB1
6040    6042    P6042,6042
6041    0440    P440,440

.
```

N.V 8/73
File 3 Tape 14B

(9)

```
.PALP
*OUT-S:EXEC
*
*IN-S:CON0,S:EXEC
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /EXEC
                /MODS TO ALLOW USE OF "X ECUTE". E.G.: X RIT(A,B,C)
                /INSTEAD OF SET D=FRIT(A,B,C)
                /
                FIELD 0
                COMLST=774
                *COMLST+16
1012    0330    330       /X(ECUTE)
                /
                COMGO=1163
                *COMGO+16
1201    0404    XECUTE
                /
                *404
0404    3055    XECUTE,DCA 55    /CLEAR LASTOP OR TROUBLE AFTER MODIFY
0405    4540      PUSHJ
0406    1743    EFUN     /USE EFUN TO DECODE XECUTE COMMAND
0407    5610       JMP I .+1
0410    0611       PROC /PROCESS+1 (AVOID GETC)
                /
                /MODS TO CHANGE FUNCTION HASH-CODE. REDUCES CHANCE OF
                /TWO NAMES HAVING THE SAME CODE
                /
                *EFUN+7
1752    5753       JMP I .+1
1753    0375    375
                /
                *375     /USE SPACE VACATED BY OLD FNTABF
0375    7104       CLL RAL
0376    7104       CLL RAL
0377    1066       TAD CHAR
0400    0203       AND P3777     /WE CAN HAVE 4 LETTER FUNCTIONS NOW
0401    5602       JMP I .+1
0402    1743       EFUN
0403    3777    P3777,3777

.
```

File 3 Tape 140
of 13/32.

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```
.PALP
*OUT-S:FOC4
*
*IN-S:CONØ,S:FOC4
*
*
*OPT-T

ARG1    ØØ5Ø

                /CONØ
                XLIST
                PAUSE/
                /
                /FOC4
                /GETS MOVED TO 6200 FF,FIELD Ø.
                /FIRST PART IS A COPY OF FOC5
                /
                FIELD 1
                DECON=5627
                DECONV=56ØØ
                EXP=44
                CHAR=66
                INPUT=756
                M24Ø=114
                MPER=115
                DNUMBER=5714
                T3=33
                *6ØØ
Ø6ØØ    ØØØØ    LIST1,Ø /GOES TO FLINTP
                FLINTP=LIST1
Ø6Ø1    7640        SZA CLA
Ø6Ø2    4631        JMS I XIN
Ø6Ø3    1Ø66        TAD CHAR
Ø6Ø4    1114        TAD M24Ø
Ø6Ø5    7650        SNA CLA
Ø6Ø6    52Ø2        JMP .-4
Ø6Ø7    463Ø        JMS I DPCVPT
Ø61Ø    1Ø66        TAD CHAR
Ø611    1115        TAD MPER
Ø612    7640        SZA CLA
Ø613    5221        JMP FIGO1
Ø614    4631        JMS I XIN
Ø615    3632        DCA I DPN
Ø616    4627        JMS I DCONP
Ø617    1632        TAD I DPN
Ø62Ø    7041        CMA IAC
Ø621    3Ø33    FIGO1,DCA T3
Ø622    1226        TAD P43
Ø623    3Ø44        DCA EXP
Ø624    4633        JMS I NEWPUT
Ø625    56ØØ        JMP I FLINTP
                /
Ø626    ØØ43    P43,43
Ø627    5627    DCONP,DECON
Ø63Ø    56ØØ    DPCVPT,DECONV
Ø631    Ø756    XIN,INPUT
Ø632    5714    DPN,DNUMBER
Ø633    5ØØØ    NEWPUT,MOVFN
                /
```

```
                MOVFN=5000
                /
                *FNTABL-6200+600
0634    3443    3443    /ABS
0635    1706    1706    /SGN
0636    0662    0662    /ITR
0637    0320    0320    /EXP
0640    1077    1077    /LOG
0641    1726    1726    /SIN
0642    0013    0013    /COS
0643    2034    2034    /SQT
                /
                *FNKB1
0644    0000    0       /INITIALIZE TABLE TO ZERO
                XLIST
0743    0000    0
0744    7777    LTSTOT,7777     /END OF TABLE
                /
                /CRTGO USES SOME OF THIS PAGE,AND SEE BELOW
                /
                *FNTABF-6200+600        /ALSO MOVED TO PAGE 0
0746    2014    2014    /ABS
0747    2010    2010    /SGN
0750    1160    1160    /ITR
0751    4620    4620    /EXP
0752    5040    5040    /LOG
0753    5205    5205    /SIN
0754    5200    5200    /COS
0755    7400    7400    /SQT
0756    7300    TTEST, CLA CLL
0757    1071        TAD T2
0760    1367        TAD PLIMIT   /TESTING FOR NEW FUNCTION TABLE
0761    7630        SZL CLA
0762    5766        JMP I NEWFUN /POINTER PAST SQT
0763    1471        TAD I T2     /AN OLD TABLE
0764    3071        DCA T2
0765    5471        JMP I T2 .   /SAME AS IN OLD SORTB
                /
0766    5354    NEWFUN, F1
0767    1422    PLIMIT,-10-FNTABF
                /
                FIELD 0 /MUST BE INITIALLY LOADED IN FIELD 0
                /
                *1335
1335    5736        JMP I .+1    /MAKE SORTB COME HERE
1336    6356        TTEST+6200-600      /ACTUAL OPERATING LOCATION
```

File 3: Tape 14A
Oct. 12/72.

(12)

```
.PALP
*OUT-S:FOC5
*
*IN-S:CON0,S:FOC5
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /FOC5
                /RELOCATION OF FOCAL'S FLINTP AT 6200
                /
                FIELD 0
                DECON=5627
                DECONV=5600
                OVER2=47
                EXP=44
                CHAR=66
                INPUT=756
                M240=114
                MPER=115
                DNUMBER=5714
                T3=33
                PT1=30
                RESOLV=7173
                DNORM=7335
                /
                FINT=4407
                FEXT=0
                FPUT=6000
                FGET=0
                FMUL=4000
                /
                *6152    /TENPT
6152    4756    TEN
                *6144    /PPTEN
6144    4762    PTEN
                *2404    /INFIX+3
2404    6225    FEXIT    /USED FOR ALT MODE RESPONSE TO ASK
                /
                *6200                    /This gets overlaid
6200    0000    FLINTP,0                 by FOC4, during GODO
6201    7640        SZA CLA              at start.
6202    4631        JMS I XIN
6203    1066        TAD CHAR
6204    1114        TAD M240
6205    7650        SNA CLA
6206    5202        JMP .-4
6207    4630        JMS I DPCVPT
6210    1066        TAD CHAR
6211    1115        TAD MPER
6212    7640        SZA CLA
6213    5221        JMP FIG01
6214    4631        JMS I XIN
6215    3632        DCA I DPN
```

```
6216  4627      JMS I DCONP
6217  1632      TAD I DPN
6220  7041      CMA IAC
6221  3033  FIG01,DCA T3
6222  1226      TAD P43
6223  3044      DCA EXP
6224  4633      JMS I NEWPUT
6225  5600  FEXIT,JMP I FLINTP
            /
6226  0043  P43,43
6227  5627  DCONP,DECON
6230  5600  DPCVPT,DECONV
6231  0756  XIN,INPUT
6232  5714  DPN,DNUMBER
6233  5000  NEWPUT,MOVFN
            /
            *5000
5000  0000  MOVFN,0
5001  4630      JMS I RESOL5
5002  4626      JMS I INORM
5003  4407      FINT
5004  6430      FPUT I PT1
5005  0000      FEXT
5006  1066      TAD CHAR
5007  1231      TAD MINUSE
5010  7640      SZA CLA
5011  5223      JMP ENDF1+3
5012  4627      JMS I XIN2
5013  4625      JMS I DPCVPX
5014  4630      JMS I RESOL5
5015  1047      TAD OVER2
5016  1033      TAD T3
5017  3033      DCA T3
5020  4407  ENDF1,FINT
5021  0430      FGET I PT1
5022  0000      FEXT
5023  4632      JMS I RESTX
5024  5600      JMP I MOVFN
            /
5025  5600  DPCVPX,DECONV
5026  7335  INORM,DNORM
5027  0756  XIN2,INPUT
5030  7173  RESOL5,RESOLV
5031  7473  MINUSE,-305
5032  4732  RESTX,REST
            /
            *4732
4732  0000  REST,0
4733  1033      END3,TAD T3
4734  7450      SNA
4735  5732      JMP I REST
4736  7700      SMA CLA
4737  5346      JMP FIG04
4740  4407      FINT
4741  4362      FMUL PTEN
4742  6430      FPUT I PT1
4743  0000      FEXT
4744  7001      IAC
4745  5353      JMP .+6
4746  4407  FIG04,FINT
```

```
4747  4356      FMUL TEN
4750  6430      FPUT I PT1
4751  0000      FEXT
4752  7040      CMA
4753  1033      TAD T3
4754  3033      DCA T3
4755  5333      JMP END3
                /
4756  0004    TEN,4
4757  2400    2400
4760  0000    0
4761  0000    0
                /
4762  7775    PTEN,7775
4763  3146    3146
4764  3147    3147      /3146 FOR 4 WORD
4765  3150    3150
                /
```

(See LFOC 4600 - "FOC 3")

Tape 14B
oct 25/72

(15)

```
.PALP
*OUT-S:GODO
*
*IN-S:CON0,S:GODO
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /GODO
                /TESTS IF SET1 IS IN CORE.
                /CHECKS MONITOR.IF TAPE,STORES SET1 ON DISC
                /MOVES FUNCTION CODES TO FIELD 0
                /REWRITES ANY SEGMENT OF DISC HAVING PARITY ERRORS.
                /PROTECTS OVERLAY AREA OF DISC
                /
                *1000
1000    7300    GODO,CLA CLL
1001    6201        CDF
1002    1742        TAD I MONTES
1003    6211        CDF 10
1004    1347        TAD M6766       /TESTING FOR DECTAPE MONITOR
1005    7640        SZA CLA
1006    5300        JMP EXIT
1007    6601      DCMA  /CLEAR DISK FLAG
1010    6766      DTXA!DTCA         /CLEAR TAPE FLAGS
1011    3126      DCA INTRUP        /LOCK INTERRUPT OFF
1012    1334        TAD P500
1013    3341        DCA POINT
1014    1337        TAD M6
1015    3340        DCA COUNT
1016    6201    TESET1,CDF
1017    1741        TAD I POINT
1020    6211        CDF 10
1021    7041        CIA
1022    1140        TAD KB1
1023    7640        SZA CLA
1024    5353        JMP ERROR       /SET1 NOT IN CORE
1025    1333        TAD P1040
1026    1341        TAD POINT
1027    3341        DCA POINT       /ADVANCE TO NEXT TABLE
1030    2340        ISZ COUNT
1031    5216        JMP TESET1
1032    1132        TAD KILALL
1033    3373        DCA KILTEM
1034    1372        TAD ERTYPE      /DISC ERRORS RETURN VIA KILALL
1035    3132        DCA KILALL      /RETURN FOR DISC ERROR
                /
1036    1334    STORIM,TAD P500 /PUT FIELD 0 ON DISC
1037    3023        DCA DDCORE
1040    1343        TAD M6277       /AVOID LAST WORD OF DISC
1041    3024        DCA DDWCNT
1042    1350        TAD P1500
1043    3025        DCA DISADD
1044    1344        TAD P700
```

```
1045  3026      DCA DSFELD
1046  3041     DCA DTEST      /DISABLE DISC PROTECT
1047  1345      TAD P2
1050  4420      JMS I DISCX
1051  7000      OPR
1052  7201      CLA IAC
1053  3041      DCA DTEST     /ENABLE DISC TEST
                /
                /
                /TEST AND REWRITE ERROR BLOCKS ON DISC
1054  3026  DISTES,DCA DSFELD
1055  3025      DCA DISADD
1056  1332      TAD M20
1057  3340      DCA COUNT
1060  1336      TAD M3777     /6622 FLAG HANGS FOR LAST DISC WORD
1061  3024      DCA DDWCNT
1062  4420  TEST,JMS I DISCX          /READ ONE TRACK SEGMENTS
1063  7000      OPR
1064  7100      CLL
1065  1025      TAD DISADD
1066  1335      TAD P3777
1067  3025      DCA DISADD
1070  7430      SZL
1071  1076      TAD P100
1072  1026      TAD DSFELD
1073  3026      DCA DSFELD
1074  2340      ISZ COUNT
1075  5262      JMP TEST
1076  1373      TAD KILTEM
1077  3132      DCA KILALL    /RESTORE NORMAL ERROR EXIT
1100  1346  EXIT,TAD P577    /MOVE FUNCTION CODES TO FIELD 0
1101  3010      DCA 10
1102  1351      TAD P6177
1103  3011      DCA 11
1104  1352      TAD M200
1105  3012      DCA 12
1106  1410  MOVE,TAD I 10
1107  6201      CDF
1110  3411      DCA I 11
1111  6211       CDF 10
1112  2012      ISZ 12
1113  5306      JMP MOVE
1114  6203      CDF!CIF
1115  5716      JMP I P7600
1116  7600  P7600,7600
                /
1117  1345  ERRORD,TAD P2
1120  4420      JMS I DISCX   /REWRITE IT
1121  7000      OPR
1122  4530      JMS I CRLFX
1123  1026     TAD DSFELD
1124  4536      JMS I OCTPNX
1125  4422      JMS I MESAGX
1126  4002  TEXT / B
1127  0104  AD
1130  0000  /
1131  5254     JMP DISTES     /TRY AGAIN
                /
1132  7760  M20,-20
1133  1040  P1040,1040
```

```
1134  0500  P500,500
1135  3777  P3777,3777
1136  4001  M3777,-3777
1137  7772  M6,-6
1140  0000  COUNT,0
1141  0000  POINT,0
1142  7676  MONTES,7676      /TAPE MONITOR LOC.HOLDS 6766
1143  1501  M6277,-6277
1144  0700  P700,700
1145  0002  P2,2
1146  0577  P577,577
1147  1012  M6766,-6766
1150  1500  P1500,1500
1151  6177  P6177,6177
1152  7600  M200,-200
1153  4422  ERROR,JMS I MESAGX
1154  4040  TEXT /
1155  2014  PL
1156  0501  EA
1157  2305  SE
1160  4040
1161  0301  CA
1162  1414  LL
1163  4023   S
1164  0524  ET
1165  6140  1
1166  0611  FI
1167  2223  RS
1170  2400  T/
1171  5300     JMP EXIT
1172  1117  ERTYPE,ERRORD
1173  0000  KILTEM,0
```

.

(18)

File 3 Tape 14A
Oct 4/72
12

```
.PALP
*OUT-S:GOTØ
*
*IN-S:CONØ,S:GOTØ
*
*
*OPT-T

ARG1    ØØ5Ø

                /CONØ
                XLIST
                PAUSE/
                /
                /GOTØ
                /FIELD Ø ENTRY TO ALLOW COMPUTED GO,DO IN GOTO
                /
                FIELD Ø
                *1553
1553   3357     GOPUSH,DCA GODO
1554   6ØØ1       ION
1555   4545       GETC   /BYPASS ')'
1556   454Ø       PUSHJ
1557   ØØØØ     GODO,Ø   /421 OR 6Ø4
156Ø   5761     EXIT,JMP I .+1
1561   Ø273       273

.
```

(19)

File 3 Tape 14 A
Oct 12 '72

```
.PALP
*OUT-S:GWRD
*
*IN-S:CON0,S:GWRD
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /GWRD
                /READ OR WRITE A WORD IN DISC FILE TO OR FROM ARG2
                /NUMBER OF 129 WORD BLOCK IN ARG3.WORD ADDRESS
                /IN ARG4
                /CALL:X PUT(NB,NW,A) TO SAVE A AS DISC WORD NW,BLOCK NB
                /SET D=FTAK(NB,NW) TO PLACE DISC WORD IN D
                /
                *KB1
0140    7000    PUT
                *GETWRX /SET TO KB1+1
0141    7005    GETWRD  /FTAK
                /
                *FNKB1
0644    1574    1574    /PUT
0645    1723    1723    /TAK
                /
                *PUTWRX
0120    7012    PUTWRD
                *BWRITX
0137    7110    BWRITE
                *MVBUFX
0124    7125    MVBUFR
                *BLOKIN
0116    3777    3777    /FORCED INITIALIZE
                /
                *7000
7000    0000    PUT,0
7001    1054        TAD ARG5
7002    3051        DCA ARG2
7003    4212        JMS PUTWRD
7004    5600        JMP I PUT
                /
7005    0000    GETWRD,0
7006    3051        DCA ARG2        /SET TO ZERO
7007    1205        TAD GETWRD
7010    3212        DCA PUTWRD
7011    5214        JMP GCODE       /ZERO TO READ
7012    0000    PUTWRD,0
7013    7240        CLA CMA
7014    3322    GCODE,DCA GTEST
7015    1053        TAD ARG4
7016    7450        SNA
7017    1052        TAD ARG3
7020    7650        SNA CLA
7021    5263        JMP NEXWRD      /NO ADDRESS GIVEN,TAKE NEXT WORD
7022    1053        TAD ARG4        /WORD ADDRESS
```

```
7023  7421      MQL
7024  7407      DVI
7025  0201      201
7026  3053      DCA ARG4        /WORD ADDRESS FOR SINGLE BLOCK
7027  7501      MQA             /GET MQ
7030  1052      TAD ARG3        /BLOCK ADDRESS
7031  3052      DCA ARG3
7032  1052      TAD ARG3
7033  7041      CIA
7034  1116      TAD BLOKIN      /IS BLOCK IN CORE
7035  7640      SZA CLA
7036  5301      JMP NEWBLK      /NO
7037  1053      TAD ARG4
7040  1316      TAD DBUFR
7041  3323      DCA DBUFRP      /WORD ADDRESS IN CORE BUFFER
                /
7042  1322  GETSET,TAD GTEST
7043  7004      RAL
7044  7200      CLA
7045  1051      TAD ARG2        /DATA TO DISC
7046  7430      SZL
7047  3723      DCA I DBUFRP /WRITING
7050  1723      TAD I DBUFRP
7051  2323      ISZ DBUFRP      /EXIT POINTING TO NEXT WORD
7052  7000      OPR             /PROTECT AGAINST ISZ SKIP
7053  3051      DCA ARG2        /DATA FROM DISC
7054  3050      DCA ARG1        /SINGLE PRECISION ONLY
7055  1033      TAD BWTEST
7056  7450      SNA
7057  1322      TAD GTEST       /IF WRITING,PROTCT CORE BUFFER
7060  3033      DCA BWTEST      /USED BY BWRITE!
7061  3322      DCA GTEST       /ALLOW EXTERNAL USE OF BWRITE
7062  5612      JMP I PUTWRD
                /
                /
7063  1323  NEXWRD,TAD DBUFRP
7064  7041      CIA
7065  1316      TAD DBUFR
7066  1324      TAD P200        /AVOID LITERALS
7067  7700      SMA CLA
7070  5242      JMP GETSET
7071  1316  BUFEND,TAD DBUFR          /END OF 129 WORD BUFFER
7072  3323      DCA DBUFRP
7073  4310      JMS BWRITE      /SAVE IT
7074  2116      ISZ BLOKIN
7075  7100  BUFGET,CLL
7076  4325      JMS MVBUFR      /READ BLOCK TO CORE
7077  7577      BUFERR
7100  5242      JMP GETSET
                /
7101  4310  NEWBLK,JMS BWRITE         /SAVE CURRENT BLOCK
7102  1316      TAD DBUFR
7103  1053      TAD ARG4
7104  3323      DCA DBUFRP
7105  1052      TAD ARG3
7106  3116      DCA BLOKIN
7107  5275      JMP BUFGET
                /
7110  0000  BWRITE,0           /SAVE CORE BUFFER
7111  1033      TAD BWTEST
```

```
7112  7700      SMA CLA
7113  5710      JMP I BWRITE /READING ONLY
7114  7120      STL
7115  4325      JMS MVBUFR    /WRITE IT
7116  7577  DBUFR,BUFERB     /POINTS TO BUFFER
7117  1322      TAD GTEST
7120  3033      DCA BWTEST    /PARTIAL WRITE BUFFER PROTECTED
7121  5710      JMP I BWRITE
              /
7122  0000  GTEST,0
7123  7577  DBUFRP,BUFERB-1 / next word pointer.
7124  0200  P200,200
              /
              /
              /READ OR WRITE A 129 WORD DISC BLOCK
              /
              /CALL:STL(WRITE) CLL(READ)
              /         JMS MVBUFR
              /         POINTER TO BUFFER FIRST WORD
              /         RETURN
              /
7125  0000  MVBUFR,0
7126  7206      CLA RTL
7127  3031      DCA TEMPS0    /READ OR WRITE
7130  1116      TAD BLOKIN
7131  4512      JMS I DCSETX  /PRESETS DISC ADDRESS
7132  1032      TAD M201
7133  3024      DCA DDWCNT
7134  1725      TAD I MVBUFR
7135  2325      ISZ MVBUFR
7136  3023      DCA DDCORE
7137  1031      TAD TEMPS0
7140  4420      JMS I DISCX
7141  7410      SKP           /DISC ERROR
7142  5725      JMP I MVBUFR
7143  3322      DCA GTEST
7144  3033      DCA BWTEST    /DON'T REWRITE POSSIBLY BAD DATA
7145  5725      JMP I MVBUFR
              /
```

Tape 14K
Oct 27/72

```
.PALP
*OUT-S:INTEX
*
*IN-S:CONØ,S:INTEX
*
*
*OPT-T

ARG1    0050

                /CONØ
                XLIST
                PAUSE/
                /
                /INTEX
                /INTERRUPT HANDLER
                /
                RECOVR=2740
                INBUF=34
                P200=123
                IOBUFF=3140
                P177=106
                /
                FIELD Ø
                *2600
2600  0000      SAVAC,Ø
2601  0000      SAVLK,Ø
2602  0000      SAVMQ,Ø
2603  3200      INTRPT,DCA SAVAC
2604  7501        MQA
2605  3202        DCA SAVMQ
2606  7010        RAR
2607  3201        DCA SAVLK
2610  6213        CDF!CIF 10
2611  4662        JMS I FLAGO
2612  6041        TSF
2613  5231        JMP KINT
2614  6042        TCF             /FIRST DO TTY OUTPUT
2615  3016        DCA TELSW
2616  1665        TAD I OPTRI
2617  7450        SNA
2620  5231        JMP KINT
2621  6044        TPC
2622  3016        DCA TELSW
2623  3665        DCA I OPTRI     /clearing the TTY buffer
2624  1265        TAD OPTRI
2625  7001        IAC
2626  0255        AND P37         /TEXT 3140-3177
2627  1263        TAD OPTRØ
2630  3265        DCA OPTRI
2631  6031      KINT,KSF
2632  5243        JMP EXIT
2633  6036        KRB
2634  0106        AND P177
2635  7450        SNA
2636  5243        JMP EXIT
2637  1123        TAD P200
2640  3254        DCA SIN
2641  1254        TAD SIN
2642  3034        DCA INBUF       /REMOVED ERROR2 FOR INBUF OVERFLOW!
```

```
                /
2643   1202     EXIT,TAD SAVMQ
2644   7421       MQL
2645   1201       TAD SAVLK
2646   7104       CLL RAL
2647   1200       TAD SAVAC
2650   6244       RMF
2651   6001       ION
2652   5400     EXITJ,JMP I Ø
                /
2653   7740     M40,-40
2654   0000     SIN,Ø
2655   0037     P37,37
                /
                *2662
2662   7435     FLAGO,FLCALL
2663   3140     OPTRØ,IOBUFF
2664   3140     OPTRO,IOBUFF      /VARS
2665   3140     OPTRI,IOBUFF
                /
2666   0000     X133,Ø
2667   1034       TAD INBUF
2670   7550       SPA SNA
2671   5267       JMP .-2
2672   3276       DCA XOUTL
2673   3034       DCA INBUF
2674   1276       TAD XOUTL
2675   5666       JMP I X133
                /                    = 2675 ?  from OUT.
2676   0000     XOUTL,Ø
2677   3266       DCA X133
2700   6001       ION
2701   1664       TAD I OPTRO
2702   7640       SZA CLA           /ALL THIS IS TAKEN FROM FOCAL
2703   5301       JMP .-2
2704   6002       IOF
2705   1016       TAD TELSW
2706   7640       SZA CLA
2707   5314       JMP .+5
2710   1266       TAD X133
2711   6046       TLS
2712   3016       DCA TELSW
2713   5323       JMP INTON
2714   1266       TAD X133
2715   3664       DCA I OPTRO       /loading the TTY buffer.
2716   1264       TAD OPTRO
2717   7001       IAC
2720   0255       AND P37
2721   1263       TAD OPTRØ
2722   3264       DCA OPTRO
2723   6001     INTON,ION
2724   5676       JMP I XOUTL
                /
                *RECOVR+3
2743   1253     TAD M40
                /                    7437   6203     CDF!CIF
                FIELD 1              7440   5635     JMP I FLCALL   /RETURN TO FOCAL.
                *7435
7435   0000     FLCALL,Ø
7436   4523       JMS I FLAGX       /CHECK CLOCK,DISC,DECTAPE.
```

Tape 14.0 (3)
Apr. 24/73

(24)

```
.PALP
*OUT-S:LOUT
*
*IN-S:CON0,S:FLAG,S:DFCT,S:DISK
*
*
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /FLAG
                /FLAG TEST ROUTINE FOR SIMULTANEOUS OPERATIONS
                /CALL*JMS I FLAGX
                /       NORMAL RETURN  (RESTART FOCAL FOR CTRL-C)
                /
                *FLAGX
0123    7327    FLAGS
                *WAITX
0125    7323    WAITF
                *KILALL
0132    7360    FLQUIT
                /
                *7322
7322    3351    DTWAIT,DCA DECTST //SELECT ERROR UNRESETABLE IF NO TAPE.
7323    6002    WAITF,IOF         /DISK OR TAPE SHOULD ONLY INTERRUPT HERE.
7324    4523      JMS I FLAGX
7325    4517      JMS I INTESX    /SETS ION UNLESS INTRUP=0
7326    5323      JMP WAITF
                /
7327    0000    FLAGS,0
7330    6031       KSF
7331    5340       JMP TCLOCK
7332    6034       KRS
7333    1357       TAD CTRLC
7334    7640      SZA CLA
7335    5340      JMP TCLOCK
7336    6032      KCC             /CTRL-C..FIRST CLEAR KEYBOARD
7337    5532      JMP I KILALL
7340    6133   TCLOCK,CSCF        /SKIP AND CLEAR CLOCK FLAG  IF SKIP
7341    5345      JMP DESTST
7342    2113      ISZ CLKCNT
7343    5345      JMP DESTST
7344    4407      JMS I CLOKGO
7345    6622   DESTST,DFSC
7346    5351       JMP .+3
7347    5750       JMP I DISEXT /DISC FLAG SEEN
7350    7243   DISEXT,GODISK
7351    6771   DECTST,DTSF      /SET TO DTSF BY DECT,TO CLA BY KILALL
7352    5727       JMP I FLAGS   /NO DECTAPE FLAG
7353    1360      TAD FLQUIT
7354    3351      DCA DECTST     /BECAUSE SEL.ERR. FLAG CAN'T BE CLEARED
7355    5756       JMP I DECEXT
7356    7533   DECEXT,GODECT
7357    7575   CTRLC,-203        /CTRL C  CODE IS 203
                /
7360    7300   FLQUIT,CLA CLL    /KILL EVERYTHING!
```

```
7361  3351      DCA DECTST      /SINCE SELECT ERROR CAN'T BE CLEARED.
7362  6132       CCFF           /CLOCK OFF
7363  6601       DCMA /DISC FLAG OFF
7364  1376      TAD TEMWIT
7365  3125      DCA WAITX       /WAITX CAN BE CHANGED BY IMPATIENT USER'S!
7366  1030       TAD DTUNIT
7367  6766       DTCA!DTXA      /STOP DECTAPE
7370  6702      6702            /STOP IBM TAPE MOTION IF ANY
7371  6313       XPOWER  }  /used by AME LABL
7372  6316       MVSTOP  }
7373  6203       CDF CIF
7374  5775       JMP I P200     /RESTART FOCAL
                /
7375  0200    P200,200
7376  7323    TEMWIT,WAITF
                PAUSE/
                /
                /DECT
                /DECTAPE SUBROUTINES FOR FIELD 1
                /CALL:0 IN AC TO READ,20 TO WRITE
                /       JMS I DTAPX
                /       ERROR RETURN
                /       NORMAL RETURN
                *DTAPX
0021  7447    DECTAP
                /
                *7447
7447  0000    DECTAP,0
7450  1364      TAD P130      /PREPARE CONTINUOUS MODE
7451  3327            DCA DTFUNC
7452  1030      TAD DTUNIT
7453  0374      AND P7000
7454  3030      DCA DTUNIT    /AVOIDS HANGUP ON RIDICULOUS INPUT.
7455  6214    DTBEGN,RDF      /IN FIELD 1 ETC
7456  6774            DTLB            /SET FIELD FOR SEARCH
7457  1373            TAD PDTTEM
7460  6201       CDF
7461  3765            DCA I P7755     /CORE ADDRESS
7462  6211       CDF 10
7463  1366    DTSRCH,TAD P610 /SEARCH BACK
7464  1030            TAD DTUNIT
7465  6766            DTCA!DTXA
7466  4330    DTBACK,JMS DTFLAG
7467  7001            IAC
7470  7700            SMA CLA
7471  5266            JMP DTBACK
7472  1030    DTFRNT,TAD DTUNIT
7473  1367            TAD P210        /214 WOULD ENABLE DT INTERRUPT.
7474  6766            DTCA!DTXA
7475  4330    DTFORW,JMS DTFLAG
7476  7450            SNA
7477  5303            JMP DTGO
7500  7700            SMA CLA
7501  5255            JMP DTBEGN      /MISSED IT
7502  5275            JMP DTFORW
7503  1026    DTGO, TAD DSFELD
7504  6774      DTLB  /SETS BITS 6,7,8 TO FIELD.
7505  7240            CLA CMA
7506  1023            TAD DDCORE
7507  6201            CDF
```

```
7507  6201          CDF
7510  3765          DCA I P7755      /SETTING DATA ADDRESS
7511  1024          TAD DDWCNT
7512  3770          DCA I P7754      /WORD COUNT
7513  6211     CDF 10
7514  1327          TAD DTFUNC
7515  6764          DTXA     /CHANGE SEARCH TO READ OR WRITE
7516  6771  TAPTST, DTSF
7517  5316    JMP .-1        /NO INTERRUPT ALLOWED WHILE READING OR WRITE
7520  1375    TAD DTRETN
7521  3330    DCA DTFLAG
7522  5333    JMP GODECT     /BE SURE NO CTRL-C WILL INTERVENE!
7523  2247  DTDONE, ISZ DECTAP                  /NO ERRORS
7524  1030  DTEXIT, TAD DTUNIT
7525  6766          DTCA!DTXA        /CLEAR FLAGS
7526  5647    JMP I DECTAP  /EXITS WITH INTERRUPT OFF!
              /
7527  0000  DTFUNC, 0
              /
7530  0000  DTFLAG, 0
7531  1316    TAD TAPTST     /ENABLE FLAGS FOR DECTAPE
7532  5776    JMP I DWAITX   /ALLOW CTRL-C CLOCK, ETC.
7533  6772  GODECT, DTRB      /RETURNS HERE FROM FLAGS
7534  7700          SMA CLA
7535  5355          JMP DTTEST
7536  6761          DTRA
7537  0371  DUMMY, AND P400   /FILLS THE HOLE HARMLESSLY.
7540  7650          SNA CLA
7541  5346          JMP DTERRO       /ERROR MOVING FORWARD
7542  6772          DTRB
7543  0372          AND P1000
7544  7640          SZA CLA
7545  5272          JMP DTFRNT       /END OF TAPE
7546  1030  DTERRO, TAD DTUNIT
7547  6766     DTCA!DTXA     /ERROR, STOP TAPE
7550  4422          JMS I MESAGX
7551  2401  TEXT /TA
7552  2005  PE
7553  7700  ?/
7554  5324          JMP DTEXIT
7555  6764  DTTEST, DTXA      /ACKNOWLEDGE FLAG
7556  1031          TAD TEMPS0
7557  7421          MQL      /DISPLAY BLOCK NO.
7560  1027          TAD DTBLOK
7561  7041          CIA
7562  1031          TAD TEMPS0
7563  5730          JMP I DTFLAGS
7564  0130  P130, 130
7565  7755  P7755, 7755
7566  0610  P610, 610
7567  0210  P210, 210
7570  7754  P7754, 7754
7571  0400  P400, 400
7572  1000  P1000, 1000
7573  0031  PDTTEM, TEMPS0
7574  7000  P7000, 7000
7575  7523  DTRETN, DTDONE
7576  7322  DWAITX, DTWAIT    /IN FLAGS
              PAUSE/
              /
```

```
                /DISK
                /DISC ROUTINES.ACC=0 TO READ,=2 TO WRITE
                /CALL:JMS I DISCX
                /       ERROR RETURN
                /       NORMAL RETURN
                /
                *DISCX
0020  7200      DISC
                /
                *7200
7200  0000      DISC,   0
7201  1271              TAD DMART
7202  3235              DCA DISFUN
7203  1024        TAD DDWCNT
7204  7140        CLL CMA
7205  1025        TAD DISADD
7206  7010        RAR  /GET LINK
7207  7417        LSR                 /shift right.
7210  0007        7
7211  1026        TAD DSFELD
7212  1040        TAD DISEND    /-VE LIMIT=7060
7213  7420       SNL
7214  5222       JMP DCTRY
7215  7710         SPA CLA      /MAX VALUE IS 717=707+10
7216  5257       JMP LOST
7217  1041        TAD DTEST
7220  7640        SZA CLA       /NO TEST IF DTEST=0
7221  5257        JMP LOST      /NOT DISC 0
7222  7240      DCTRY,CLA CMA
7223  6201        CDF
7224  1023              TAD DDCORE
7225  3670              DCA I DISCA
7226  1024              TAD DDWCNT
7227  3667              DCA I DISWC
7230  6211        CDF 10
7231  1026              TAD DSFELD
7232  6615              DEAL
7233  7300              CLA CLL
7234  1025              TAD DISADD
7235  7000      DISFUN, OPR       /DMAW OR DMAR CLEAR AC.
7236  1126       TAD INTRUP
7237  7640       SZA CLA          /INTERRUPT ALLOWED?
7240  5525       JMP I WAITX      /WAIT FOR A FLAG
7241  6622       DFSC  /NO!
7242  5241       JMP .-1
7243  6621      GODISK, DFSE      /RETURN FROM FLAGS
7244  5252              JMP LOSE
7245  2200         ISZ DISC       /GOOD RETURN
7246  7200      DSEXIT, CLA
7247  6601        DCMA /ALLOW SIMPLE DISC BUSY TEST
7250  4517       JMS I INTESX  /RESET INTERRUPT STATUS
7251  5600              JMP I DISC
7252  4422      LOSE, JMS I MESAGX        /FAILURE
7253  0411      TEXT /DI
7254  2303      SC
7255  7700      ?/
7256  5532        JMP I KILALL
                /
7257  4422      LOST, JMS I MESAGX
7260  0411      TEXT /DI
```

- Block
- 619 · 7164 - 205
7160 · 222
7167 · 194
7166 198
7165 202
7163 210
7067 226

Not needed! I think.

```
7261   2303   SC
7262   4005    E
7263   1604   ND
7264   0000   /
7265   3033       DCA BWTEST    /DON'T TRY TO REWRITE THIS BLOCK
7266   5532       JMP I KILALL
               /
7267   7750   DISWC,7750
7270   7751   DISCA,7751
7271   6603   DMART,DMAR
```

TAPE 14C
NOV. 2/72

(29)

See Focal Build Procedure

```
.PALP
*OUT-S:LFOC
*
*IN-S:CON0,S:LFOC,S:FOC2,S:FOC3
*
*
*
*
*OPT-T

ARG1    0050

              /CON0
              XLIST
              PAUSE/
              /
              /LFOC
              /LICK-FOCAL
              /(WORDS 0-5 ARE USED IN FIELD 1)
              /LOAD FOC0,FOVL(DEC'S 8K OVERLAY),WRD4,LFOC ;200
              /START AT 200;SAVE FOCH!6400-7577;200
              /LOAD INTEX,FOC4,FOC5,EXEC,CHAIN,GOT0,GODO,COPE,COPG,ENTR
              /GWRD,DSET,IOUT;SAVE AFOC!10000-1177,6000,7000-7577;1000
              /.AFOC..FOCH
              /SAVE START!0-3177,4600-6177,6400-7577;4600
              /SAVE FOC!10000-1177,6000,7000-7577;1000
              /
              FIELD 0
              *LASTV
0031   3200   LVARIB
              *END
0134   3200   LVARIB  /ALLOW RESTART WITH *4600
              /ALLOWS CALL NEW PROGRAM WITH COMMON VARIABLES.
              /
              /
              *6002
6002   7600   7600     /REMOVES = SIGN IN PRINTOUT
              /
              *COMBUF
0132   0462   COMMON
              *5333
5333   2501   2501     /SINE CONSTANT CORRECTION PER SOFTWARE SUMMARY
              /
              *7503    /REPLACE LIBRARY COMMAND
7503   6002      IOF
7504   6211      CDF 10
7505   1031      TAD LASTV
7506   3713      DCA I LASVRX
7507   1060      TAD BUFR
7510   3714      DCA I BFPINT
7511   6201      CDF
7512   5504      JMP I PP7600
              /
              PP7600=104
7513   0034   LASVRX,LASVAR
7514   0555   BFPINT,BFTEMP
              /
              /
              *DAXIN  /CODE TO PROTECT TEXT BUFFERS
0173   1142   AXINEW
              /
              *1142
```

LOAD chain, LFOC

```
1142  0000  AXINEW,0
1143  7421     MQL
1144  1010     TAD 10
1145  1354     TAD COMEND
1146  7650     SNA CLA
1147  4566     ERROR2
1150  1010     TAD 10
1151  6211     CDF 10
1152  1755     TAD I BUFEMX
1153  5756     JMP I ONGOX
1154  7241  COMEND,-LINE0+1  /END OF INPUT BUFFER
1155  0036  BUFEMX,BUFEMD    /END OF TEXT BUFFER
1156  1343  ONGOX,ONGO
            /
1157  5742     JMP I AXINEW
            /
            *1343
1343  6201  ONGO,CDF
1344  7700     SMA CLA
1345  4566     ERROR2         /TEXT OVERFLOW
1346  7501     MQA
1347  6211     CDF 10
1350  3410     DCA I 10
1351  6201     CDF
1352  5753     JMP I AXBACK
1353  1157  AXBACK,ONGOX+1   /FILLING IN AVAILABLE SPACE
            /
            /
            FIELD 1
            *0
0000  0000  0
0001  0000  0
0002  0000  0          /TDUMP DATA
0003  0000  0
0004  0000  0
0005  5051  5051
            /
            *TYPEX
0127  0436  TYPE
            *CRLFX
0130  0240  CRLF
            *INTESX
0117  0371  INTEST
            *OCTPNX
0136  0400  OCTPNT
            /
            /
            *240
0240  0000  CRLF,0
0241  1246     TAD P215
0242  4527     JMS I TYPEX
0243  1247     TAD P212
0244  4527     JMS I TYPEX
0245  5640     JMP I CRLF
            /
0246  0215  P215,215
0247  0212  P212,212
            HERE=.
            PAUSE/
            /
```

```
                /
                /
                /
                /
                /
                /
                /FOC2
                /FOCAL FUNCTION CALLER
                /STORES ARGUMENTS OF FUNCTION "SET A=F---(ARG3,ARG4--ARG8)"
                /ENTERS FIELD 1 WITH N=FNTABL LOC-FLETER+1
                /STARTS ROUTINE N IN FIELD 1 WHICH
                /LOADS FLOATING ACC. WHICH IS FINALLY
                /STORED IN VARIABLE "A" BY FOCAL
                /
                FIELD Ø
                *1761
1761   6233     FNTABL-1
1762   Ø112     FNTABF-FNTABL
                *F1
                /
5354   4453        JMS I INTEGER
5355   7421       MQL
5356   1Ø45       TAD 45          /UPPER 12 BITS
5357   6213        CDF CIF 1Ø
5360   5761             JMP I .+1
5361   Ø25Ø             SETUP
5362   4540     FXGET,PUSHJ
5363   1612        EVAL-1
5364   4453        JMS I INTEGER
5365   7421       MQL
5366   1Ø45       TAD 45          /HIGH 12 BITS OF FLAC1
5367   6213     FXGO,CDF CIF 1Ø /GO TO FIELD 1
5370   5771        JMP I .+1
5371   Ø3Ø7        SAVE2
                /
5372   4540     FLOAT1,PUSHJ
5373   1612        EVAL-1
5374   5367        JMP FXGO
                /
5375   6ØØ1     BACK,ION
5376   5536        JMP I EFUN3I
                /
                FIELD 1
                /
                *DISPAX
Ø114   Ø327     GOSTAR  /ENTRY FROM SPECIAL ROUTINES LIKE "CRT"
                /
                *HERE
Ø25Ø   3Ø1Ø     SETUP,DCA 1Ø
Ø251   75Ø1       MQA
Ø252   3Ø52       DCA ARG3        /FIRST INPUT ARGUMENT
Ø253   1367       TAD PARG4
Ø254   3Ø51       DCA ARG2        /POINTERS FOR MORE VARIABLES
Ø255   137Ø       TAD P1Ø
Ø256   3Ø17       DCA 17          /11-17
Ø257   1366       TAD M7
Ø26Ø   3Ø31       DCA TEMPSØ
Ø261   1364        TAD FNTABP
Ø262   62Ø1        CDF
Ø263   1765        TAD I FNPINT /POSITION IN FNTABL
```

```
0264  3050      DCA ARG1      /POINTS TO SUBROUTINE POINTER
0265  6201  SETOUT,CDF
0266  1761      TAD I CHARAC /CHAR IN FIELD 0
0267  6211      CDF 10
0270  1357      TAD MCOMMA
0271  7640      SZA CLA
0272  5276      JMP ENTERQ
0273  6203      CDF CIF
0274  5675      JMP I .+1     /MORE ARGUMENTS
0275  5362      FXGET
              /
0276  6201  ENTERQ,CDF
0277  1761      TAD I CHARAC
0300  6211      CDF 10
0301  1360      TAD MSEMIC
0302  7640      SZA CLA
0303  5316      JMP FCLEAR
0304  6203      CDF CIF       / ; INDICATES FLOATING VARIABLE
0305  5706      JMP I .+1
0306  5372      FLOAT1
              /
0307  3417  SAVE2,DCA I 17
0310  7501      MQA
0311  3451      DCA I ARG2
0312  2051      ISZ ARG2
0313  2031       ISZ TEMPS0
0314  5265       JMP SETOUT
0315  5323      JMP ENTERY
0316  3417  FCLEAR,DCA I 17
0317  3451      DCA I ARG2     /CLEAR REST OF ARG. BUFFER
0320  2051      ISZ ARG2
0321  2031      ISZ TEMPS0     /COUNTER
0322  5316      JMP FCLEAR
0323  1050  ENTERY,TAD ARG1
0324  1363           TAD MLIST
0325  7700           SMA CLA
0326  5351           JMP EXIT          /ILLEGAL CALL
0327  1050  GOSTAR,TAD ARG1 /ENTERS HERE FROM CRT LETTERING
0330  1362           TAD PKB1
0331  3031           DCA TEMPS0
0332  6002      IOF
0333  3126      DCA INTRUP     /DISABLE INTERRUPT DURING GETPRG
0334  1431           TAD I TEMPS0
0335  0356       AND P7600
0336  7640       SZA CLA
0337  5342       JMP PROGIN
0340  4515       JMS I GETPRX /LOAD NEW MACHINE LANGUAGE
0341  5327       JMP GOSTAR
0342  1431  PROGIN,TAD I TEMPS0
0343  3031           DCA TEMPS0
0344  3050      DCA ARG1       /IN CASE RESULT TO ARG2 ONLY.
0345  2126      ISZ INTRUP     /ALLOW INTERRUPT DURING PROGRAM
0346  6001      ION
0347  4431           JMS I TEMPS0
0350  4755       JMS I FXSAVP
0351  6774  EXIT,DTLB                 /SET FIELD 0 FOR MONITOR
0352  6203           CDF CIF
0353  5754           JMP I .+1
0354  5375           BACK
              /
```

```
0355  0415  FXSAVP,FXSAVE
0356  7600  P7600,7600
0357  7524  MCOMMA,-254
0360  7505  MSEMIC,-273      /SEMICOLON SHOWS FLOATING POINT
0361  0066  CHARAC,CHAR
0362  0137  PKB1,KB1-1
0363  7677  MLIST,KB1-KBN-2
0364  1535  FNTABP,1-FLETER
0365  0012  FNPINT,XRT2
            /
            /
0366  7771  M7,-7
0367  0053  PARG4,ARG4
0370  0010  P10,10
            /
0371  0000  INTEST,0         /RESETS INTERRUPT
0372  6002    IOF
0373  1126    TAD INTRUP
0374  7640    SZA CLA
0375  6001    ION
0376  5771    JMP I INTEST
            /
            /
            PAGE
0400  0000  OCTPNT,0
0401  7421     MQL
0402  1213     TAD M4
0403  3215     DCA FXSAVE    /TEMP STORE
0404  7413  CHARSH,SHL
0405  0002     2
0406  1214     TAD P260
0407  4236     JMS TYPE
0410  2215     ISZ FXSAVE
0411  5204     JMP CHARSH
0412  5600     JMP I OCTPNT
            /
0413  7774  M4,-4
0414  0260  P260,260
            /
0415  0000  FXSAVE,0         /SAFELY TRANSFERS ARG1,ARG2 TO FLAC
0416  6201          CDF
0417  1235     TAD P27
0420  3435          DCA I FLACR
0421  1050          TAD ARG1
0422  7104          CLL RAL
0423  7450          SNA
0424  7100          CLL              /AVOID -0
0425  7010          RAR
0426  3633          DCA I FLAC1
0427  1051     TAD ARG2      /LOW ORDER HALF
0430  3634          DCA I FLAC2
0431  6211          CDF+10
0432  5615          JMP I FXSAVE
            /
0433  0045  FLAC1,45
0434  0046  FLAC2,46
0435  0027  P27,27
            /
0436  0000  TYPE,0
0437  3031     DCA TEMPS0
```

```
0440  1126    TAD INTRUP
0441  7650    SNA CLA
0442  5251    JMP NOWAIT     /NEVER ALLOW INTERRUPT IF INTRUP=0
0443  6001  TYWAIT,ION
0444  6201    CDF
0445  1661    TAD I TELSWX
0446  6211    CDF 10
0447  7640    SZA CLA
0450  5243    JMP TYWAIT     /WAIT TILL FOCAL TYPING DONE
0451  6002  NOWAIT,IOF
0452  1031    TAD TEMPS0
0453  6046    TLS
0454  6041    TSF
0455  5254    JMP .-1
0456  7300    CLA CLL
0457  4517    JMS I INTESX   /RESET INTERRUPT
0460  5636    JMP I TYPE
              /
0461  0016  TELSWX,TELSW
              /
0462  0000  COMMON,0
              /TELETYPE BUFFER HERE
              /
              /
              *KB1
0140  0000  0        /IN EACH WORD OF DISPATCH TABLE
              XLIST
0237  0000  KBN,0
              PAUSE/
              /
              /FOC3
              /FOCAL INITIAL START,ODDS AND ENDS
              /
              FIELD 0
              *4600
4600  7300    CLA CLL
4601  6211    CDF 10
4602  1616    TAD I LINPN0
4603  3060    DCA 60         /SET TEXT ADDRESS IN "BUFR"
4604  1615    TAD I LSVAR0
4605  3031    DCA 31         /SET CURRENT VARIABLE POINTER
4606  6201    CDF
4607  1076    TAD PT212
4610  4551    JMS I 151      /PRINTC
4611  1117    TAD 117        /7774 FOR STEN,7775 FOR START
4612  1326    TAD DELTA
4613  3727    DCA I P6277    /WAS LOADED BY X OR M FOC
4614  5177    JMP 177
              PT212=76       /CLF IS LINEFEED.
4615  0034  LSVAR0,LASVAR
4616  0555  LINPN0,BFTEMP
              /
              *4726   /TEMP IN FEXP
4726  3152  DELTA,3146-7774
4727  4764  P6277,4764       /SEE FOC5
              /
              *BUFR
0060  0560    LINE1
              *CFRS
0133  0540  LINE0
```

```
                *ENDT
0135    0560    LINE1
                *226        /COMBOT
0226    0540     LINE0
                /
                FIELD 1
                *LINPNT
0121    0555    BFTEMP
                *LØTPNT
0122    0556    LØTEMP
                /
                *LINEØ
0540    0000    Ø
0541    0000    Ø
0542    0372    0372
0543    1411    1411
0544    0313    0313
0545    4006    4006
0546    1703    1703
0547    0114    0114        /C:LICK FOCAL
0550    5567    5567
0551    6340    6340        /-73
0552    4040    4040
0553    4040    4040
0554    4040    4040        /SPACES
0555    0560    BFTEMP,LINE1        /LOADED FROM "BUFR" BEFORE TAPE SAVE
0556    0000    LØTEMP,Ø            /TEMP STORE FOR LINEØ WHEN CHAINING
                *LINE1-1
0557    7715    7715
0560    0000    Ø           /FIRST WORD OF TEXT
                /
```

TAPE 14B
a.k. 3/1/72.

```
.PALP
*OUT-S:MESG
*
*IN-S:CONØ,S:MESG
*
*
*OPT-T

ARG1    ØØ5Ø

                /CONØ
                XLIST
                PAUSE/
                /
                /MESG
                /PRINTS FIELD I FOCAL MESAGES
                /
                *MESAGX
ØØ22    7274    MESAGE
                /
                *7274
 7274   ØØØØ    MESAGE,Ø
 7275   4530        JMS I CRLFX
 7276   1674    PRINT,TAD I MESAGE
 7277   2274        ISZ MESAGE
 73ØØ   7421        MQL
 73Ø1   43Ø4        JMS CHARP
 73Ø2   43Ø4        JMS CHARP
 73Ø3   5276        JMP PRINT
                /
 7304   ØØØØ    CHARP,Ø
 7305   7413        SHL
 7306   ØØØ5        5
 7307   745Ø        SNA
 7310   5674        JMP I MESAGE
 7311   1317        TAD M4Ø
 7312   75ØØ        SMA
 7313   1Ø76        TAD P1ØØ        /4Ø IS SPACE=24Ø
 7314   132Ø        TAD P14Ø
 7315   4527        JMS I TYPEX
 7316   57Ø4        JMP I CHARP
                /
 7317   7740    M4Ø,-4Ø
 732Ø   Ø14Ø    P14Ø,14Ø

.
```

PROCEDURE TO BUILD FOCAL

```
.LOAD
*IN-S:FOC0,S:FOVL,S:WRD4,S:LFOC
*
*     FOCAL 69          4 WORD OVERLAY
*
*                 8K OVERLAY
ST=200
↑↑↑↑↑*L
.SAVE FOCH!6400-7577;200
.LOAD
*IN-S:CHAIN,S:LFOC,S:EXEC,S:FOC4,S:FOC5
*
*
*
*
*
ST=
↑↑↑↑↑↑
.LOAD
*IN-S:INTEX,S:GOT0,S:GODO,S:GWRD,S:ENTR
*
*
*
*
*
ST=
↑↑↑↑↑↑
.LOAD
*IN-S:DSET,S:MESG,S:IOUT
*
*
*
ST=
↑↑↑↑
.SAVE AFOC!10000-1177,6000,7000-7577;1000
.AFOC
.
 FOCH
?00.00
*
.SAVE STEN!0-3177,4600-6177,6400-7577;4600
.PUTT
SET TAPE 8 TO WRITE ENABLED.
FILE NO.(0-4):3
 FILE 3 FULL.TYPE Y TO REUSE IT :Y
DONE!
.PIP
*OPT-S

*OUT-D0:STEN
*
*IN-S:STEN
*↑
```

(36C)

PROCEDURE TO REVISE .STEN
(example)

```
.GETT
SET TAPE 8 TO WRITE LOCK.          TAPE 14C
FILE NO.(0-4):3
.AFOC
.STEN
*
.SAVE TEMP!6400-7577;200
.LOAD
*IN-S:EXEC      ~ New version of EXEC
*
ST=
↑↑
?00.00
*
.TEMP
?00.00
*
.SAVE STEN!0-3177,4600-6177,6400-7577;4600
.PUTT
SET TAPE 8 TO WRITE ENABLED.
FILE NO.(0-4):3
 FILE 3 FULL.TYPE Y TO REUSE IT :Y
DONE!
.PIP
*OPT-S

*OUT-D0:STEN
*
*IN-S:STEN.
*↑                                 TAPE 10
*OPT-
.PIP
*OPT-S

*OUT-D0:STEN                       TAPE 12
*
*IN-S:STEN
*↑
*OPT-
```

(37)

Tape 14C
Nov. 3/62

```
.PALP
*OUT-S:COPE
*
*IN-S:CON0,S:COPE
*
*
*OPT-T
```

FIELD 1

```
ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /COPE
                /PART OF FAST--COPIES FOCAL TAPES.
                /MUST RUN WITH INTERRUPT OFF!!!
                /
                *1200
1200    7300    COPIER,CLA CLL
1201    3126      DCA INTRUP
1202    4422      JMS I MESAGX
1203    2401    TEXT /TA
1204    2005    PE
1205    4003     C
1206    1720    OP
1207    1105    IE
1210    2200    R/
1211    1127      TAD TYPEX       /USE SPECIAL TYPER
1212    3362      DCA TYPTEM
1213    1363      TAD TYPNEW
1214    3127      DCA TYPEX
1215    1132      TAD KILALL
1216    3361      DCA KILTEM
1217    1346      TAD KILRET
1220    3132      DCA KILALL
1221    4523      JMS I FLAGX
1222    4422      JMS I MESAGX
1223    2022    TEXT /PR
1224    0523    ES
1225    2340    S
1226    0324    CT
1227    2214    RL
1230    5520    -P
1231    4024     T
1232    1740    O
1233    0231    BY
1234    2001    PA
1235    2323    SS
1236    4020     P
1237    2211    RI
1240    1624    NT
1241    1725    OU
1242    2456    T.
1243    0000    /
1244    4523      JMS I FLAGX
1245    4422      JMS I MESAGX
1246    6072    TEXT /0:
1247    0530    EX
1250    1124    IT
```

```
1251  5600  •/
1252  4523    JMS I FLAGX
1253  4422    JMS I MESAGX
1254  6172  TEXT /1:
1255  2324  ST
1256  1722  OR
1257  0540  E
1260  2410  TH
1261  1123  IS
1262  4006   F
1263  1703  OC
1264  0114  AL
1265  4017   O
1266  1640  N
1267  2401  TA
1270  2005  PE
1271  4070   8
1272  5600  •/
1273  4523    JMS I FLAGX
1274  4530    JMS I CRLFX
1275  4422    JMS I MESAGX
1276  0317  TEXT /CO
1277  2031  PY
1300  4006   F
1301  2217  RO
1302  1540  M
1303  2401  TA
1304  2005  PE
1305  4070   8
1306  4024   T
1307  1740  O
1310  2401  TA
1311  2005  PE
1312  4067   7
1313  7200  :/
1314  4523    JMS I FLAGX
1315  4422    JMS I MESAGX
1316  6272  TEXT /2:
1317  2022  PR
1320  1707  OG
1321  2201  RA
1322  1523  MS
1323  4060   Ø
1324  5555  --
1325  6265  25
1326  5600  •/
1327  4523    JMS I FLAGX
1330  4422    JMS I MESAGX
1331  6372  TEXT /3:
1332  2022  PR
1333  1707  OG
1334  2201  RA
1335  1523  MS
1336  4060   Ø
1337  5564  -4
1340  7156  9•
1341  0000  /
1342  4523    JMS I FLAGX
1343  5744    JMP I ONGOX
            /
```

```
                /
1344    1412    ONGOX,ONGO
1345    1535    PASSEX,PASS
                /
1346    1347    KILRET,.+1
1347    5371      JMP READF0
                /
                *KILRET+2           /MUST BE 2
1350    4353      JMS FIXUP         /USED BY FSEND IN COPG
1351    5752      JMP I .+1
1352    2000      2000              /FAST FOCAL SAVER
                /
1353    0000    FIXUP,0
1354    1361      TAD KILTEM
1355    3132      DCA KILALL
1356    1362      TAD TYPTEM
1357    3127      DCA TYPEX
1360    5753      JMP I FIXUP
                /
1361    0000    KILTEM,0
1362    0000    TYPTEM,0
1363    1554    TYPNEW,TYPE
1364    0200    M7600,-7600         /READ ALL BUT LAST PAGE
                /
1365    4422    EXITAL,JMS I MESAGX
1366    0417    TEXT /DO
1367    1605    NE
1370    4000     /
1371    1364    READF0,TAD M7600            /RESTORE FIELD 0
1372    3024      DCA DDWCNT
1373    5374      JMP NEXPAG
1374    3023    NEXPAG,DCA DDCORE
1375    3026      DCA DSFELD
1376    1030      TAD DTUNIT
1377    6766      DTCA!DTXA         /BE SURE TAPE IS STOPPED
1400    3030     DCA DTUNIT         /DSFELD ALWAYS 0 ALREADY
1401    1211      TAD BKSTAR        /FIRST BLOCK OF FIELD 0
1402    3027      DCA DTBLOK
1403    4421      JMS I DTAPX
1404    5203      JMP .-1           /TAPE ERROR
1405    4777      JMS FIXUP
1406    6203      CDF!CIF
1407    5610      JMP I .+1
1410    0177      177
                /
1411    0072    BKSTAR,72           /ALSO DEFINED IN 'FAST'
                /
                /
1412    4422    ONGO,JMS I MESAGX
1413    6472    TEXT /4:
1414    1601    NA
1415    1505    ME
1416    2340    S
1417    6155    1-
1420    5565    -5
1421    5600    ./
1422    4523      JMS I FLAGX
1423    4422      JMS I MESAGX
1424    6572    TEXT /5:
1425    0114    AL
```

PAGE END

```
1426  1440  L
1427  0617  FO
1430  0301  CA
1431  1454  L,
1432  1601  NA
1433  1505  ME
1434  2340  S
1435  0116  AN
1436  0440  D
1437  2022  PR
1440  1707  OG
1441  5660  .0
1442  5555  --
1443  6471  49
1444  5600  ./
1445  4523    JMS I FLAGX
1446  4422    JMS I MESAGX
1447  6672  TEXT /6:
1450  2305  SE
1451  1405  LE
1452  0324  CT
1453  0504  ED
1454  4016   N
1455  0115  AM
1456  0556  E.
1457  0000  /
1460  4523    JMS I FLAGX
1461  4422  PART2,JMS I MESAGX
1462  6772  TEXT /7:
1463  2305  SE
1464  1405  LE
1465  0324  CT
1466  0504  ED
1467  4020   P
1470  2217  RO
1471  0722  GR
1472  0115  AM
1473  2356  S.
1474  0000  /
1475  4523    JMS I FLAGX
1476  4422    JMS I MESAGX
1477  7072  TEXT /8:
1500  0317  CO
1501  2031  PY
1502  4024   T
1503  1005  HE
1504  4027   W
1505  1017  HO
1506  1405  LE
1507  4024   T
1510  0120  AP
1511  0556  E.
1512  0000  /
1513  4523    JMS I FLAGX
1514  4422    JMS I MESAGX
1515  7172  TEXT /9:
1516  0317  CO
1517  2031  PY
1520  4006   F
1521  1703  OC
```

```
1522  0114  AL
1523  5416  ,N
1524  0115  AM
1525  0523  ES
1526  4001   A
1527  1604  ND
1530  4011   I
1531  1623  NS
1532  0522  ER
1533  2423  TS
1534  5600  */
1535  6036  PASS,KRB          /CLEAR POSSIBLE KEYBOARD FLAG
1536  6002    IOF
1537  7300    CLA CLL
1540  3126    DCA INTRUP      /BE SURE TAPE WON'T TURN ION.
1541  4422    JMS I MESAGX
1542  1720  TEXT /OP
1543  2411  TI
1544  1716  ON
1545  4003   C
1546  1704  OD
1547  0572  E:
1550  0000  /
1551  5752    JMP I .+1
1552  2400   2400
             /
1553  7560  MCTRLP,-220
1554  0000  TYPE,0
1555  6046  PRINT,TLS
1556  6041    TSF
1557  5356    JMP .-1
1560  7300    CLA CLL
1561  6031    KSF
1562  5754    JMP I TYPE
1563  6034    KRS
1564  1353    TAD MCTRLP
1565  7650    SNA CLA
1566  5335    JMP PASS
1567  4523    JMS I FLAGX     /TEST FOR CTRL-C
1570  6036    KRB
1571  5355    JMP PRINT
1577  1353
```

.

Tape 14C
Nov 13/72

(42)

```
.PALP
*OUT-S:COPG
*
*IN-S:CON0,S:COPG
*
*
*OPT-T

ARG1    0050                                   FIELD 1

                /CON0
                XLIST
                PAUSE/
                /
                /COPG
                /CONTINUE COPE
                /
                *2400
2400   7300     COPBEG, CLA CLL
2401   4220       JMS KEREAD
2402   1031       TAD TEMPS0
2403   7450       SNA
2404   5532       JMP I KILALL   /'EXIT'
2405   7510       SPA
2406   5532       JMP I KILALL   /BELOW 260 (=0)
2407   1242       TAD M12
2410   7700       SMA CLA
2411   5532       JMP I KILALL   /ABOVE 271 (=9)
2412   1031       TAD TEMPS0
2413   1241       TAD OPLIST
2414   3031       DCA TEMPS0
2415   1431       TAD I TEMPS0
2416   3031       DCA TEMPS0
2417   5431       JMP I TEMPS0
                /
2420   0000     KEREAD, 0
2421   6031       KSF
2422   5221       JMP .-1
2423   6034       KRS
2424   1237       TAD M215
2425   7650       SNA CLA
2426   4530       JMS I CRLFX
2427   4523       JMS I FLAGX    /TEST CTRL-C
2430   6036       KRB
2431   6046       TLS
2432   6041       TSF
2433   5232       JMP .-1
2434   1240       TAD M260
2435   3031       DCA TEMPS0     /EXPECT A NUMBER.
2436   5620       JMP I KEREAD
                /
2437   7563     M215, -215       /C.R.
2440   7520     M260, -260
                /
2441   2442     OPLIST, .+1
2442   7766     M12, -12
2443   2456      FSEND  /FAST FOCAL SAVER.
2444   1600       COPY25
2445   1606       COPY49
2446   1611       NAME5
```

```
2447  1616      COPBIG
2450  2461      NAME1
2451  1702      PROG1
2452  1622      COPYAL
2453  1624      COPYFC
2454  0132      KILALL
2455  0132      KILALL
                /
2456  2132    FSEND, ISZ KILALL
2457  7000        OPR  /SEE COPE FOR KILRET+2
2460  5532        JMP I KILALL
                /
2461  4422    NAME1, JMS I MESAGX       /SINGLE NAME TRANSFER
2462  1116    TEXT /IN
2463  5070    (8
2464  5172    ):
2465  0000    /
2466  4740        JMS I GETDCX
2467  7450        SNA
2470  5324        JMP BAD           /NO NAMENO. 0.
2471  7110        CLL RAR           /4  NOT 8 BLOCKS.
2472  1335        TAD P130
2473  3027        DCA DTBLOK
2474  1337        TAD M1004
2475  3024        DCA DDWCNT
2476  3030        DCA DTUNIT
2477  3026        DCA DSFELD
2500  3023        DCA DDCORE
2501  4421        JMS I DTAPX       /READ A NAME
2502  5301        JMP .-1           /TAPE ERROR
2503  4422        JMS I MESAGX
2504  1725    TEXT /OU
2505  2450    T(
2506  6751    7)
2507  7200    :/
2510  4740        JMS I GETDCX
2511  7450        SNA
2512  5324        JMP BAD           /4 BLOCKS PER NAME
2513  7110        CLL RAR
2514  1335        TAD P130
2515  3027        DCA DTBLOK
2516  1336        TAD PP7000
2517  3030        DCA DTUNIT
2520  1037        TAD P20
2521  4421        JMS I DTAPX       /WRITING ERROR
2522  5320        JMP .-2
2523  5532        JMP I KILALL
                /
2524  4422    BAD, JMS I MESAGX
2525  6040    TEXT "0
2526  1123    IS
2527  4011     I
2530  1414    LL
2531  0507    EG
2532  0114    AL
2533  4100    !"
2534  5532        JMP I KILALL
                /
2535  0130    P130, 130
2536  7000    PP7000, 7000
```

```
2537  6774  M1004,-1004      /4 BLOCKS LONG
2540  1730  GETDCX,GETDEC
            /
            *1600
1600  1230  COPY25,TAD P320
1601  3113    DCA CCLOCK     /BLOCK COUNTER
1602  1044  PRMOVE,TAD FSPROG
1603  3027    DCA DTBLOK
1604  3023  GODOIT,DCA DDCORE
1605  5234    JMP COPY       /TAPE ROUTINE.
            /
1606  1231  COPY49,TAD P620
1607  3113    DCA CCLOCK
1610  5202    JMP PRMOVE
            /
1611  1227  NAME5,TAD LNAME1
1612  3027    DCA DTBLOK
1613  1226    TAD P24
1614  3113    DCA CCLOCK
1615  5204    JMP GODOIT
            /
1616  1232  COPBIG,TAD P1000
1617  3113  COPYGO,DCA CCLOCK
1620  3027    DCA DTBLOK
1621  5204    JMP GODOIT
            /
1622  1233  COPYAL,TAD P2700
1623  5217    JMP COPYGO
            /
1624  1301  COPYFC,TAD PROG0
1625  5217    JMP COPYGO
            /
1626  0024  P24,24
1627  0134  LNAME1,134
1630  0320  P320,320
1631  0620  P620,620
1632  1000  P1000,1000
1633  2700  P2700,2700
            /
1634  1113  COPY,TAD CCLOCK /BLOCK COUNT
1635  7550    SNA SPA
1636  5270    JMP QUIT
1637  1276    TAD M36
1640  3113    DCA CCLOCK
1641  1113    TAD CCLOCK
1642  7500    SMA
1643  7200    CLA
1644  1277    TAD P36
1645  7425    MQL!MUY
1646  0201    201
1647  7701    CLA!MQA
1650  7041    CIA
1651  3024    DCA DDWCNT
1652  3030  READ,DCA DTUNIT
1653  3026    DCA DSFELD     /USE FIELD 0
1654  3023    DCA DDCORE
1655  4421    JMS I DTAPX
1656  5252    JMP READ       /TAPE ERROR
1657  1300    TAD P7000
1660  3030    DCA DTUNIT     /UNIT 7
```

```
1661  1037     TAD P20
1662  4421     JMS I DTAPX
1663  5252     JMP READ
1664  1027     TAD DTBLOK
1665  1277     TAD P36
1666  3027     DCA DTBLOK
1667  5234     JMP COPY
               /
1670  7300  QUIT, CLA CLL
1671  4422     JMS I MESAGX
1672  0417  TEXT /DO
1673  1605  NE
1674  4100  !/
1675  5532     JMP I KILALL
               /
1676  7742  M36, -36
1677  0036  P36, 36
1700  7000  P7000, 7000
               /
1701  0160  PROG0, 160        /1ST PROG. BLOCK NO.
               /
1702  4530  PROG1, JMS I CRLFX
1703  4422     JMS I MESAGX
1704  0611  TEXT /FI
1705  2223  RS
1706  2472  T:
1707  0000  /
1710  4330     JMS GETDEC
1711  1301     TAD PROG0      /FIRST PROG.
1712  3027     DCA DTBLOK
1713  4422     JMS I MESAGX
1714  4014  TEXT / L
1715  0123  AS
1716  2472  T:
1717  0000  /
1720  4330     JMS GETDEC
1721  1301     TAD PROG0
1722  7041     CIA
1723  1027     TAD DTBLOK
1724  7041     CIA
1725  1353     TAD P10
1726  3113     DCA CCLOCK     /BLOCK COUNT
1727  5204     JMP GODOIT
               /
1730  0000  GETDEC, 0
1731  3351     DCA TEMP
1732  4752  GETNUM, JMS I KREADX
1733  1031     TAD TEMPS0     /THE NUMBER
1734  7710     SPA CLA
1735  5345     JMP GETOUT     /FOR CR, SPACE ETC.
1736  1351     TAD TEMP
1737  7425     MQL!MUY
1740  0012     12
1741  7701     CLA!MQA
1742  1031     TAD TEMPS0
1743  3351     DCA TEMP
1744  5332     JMP GETNUM
               /
1745  1351  GETOUT, TAD TEMP
1746  7104     CLL RAL
```

```
1747   7106     CLL RTL                    /X8..8 BLOCKS PER 'NAME'
1750   5730     JMP I GETDEC
                /
1751   0000   TEMP,0
1752   2420   KREADX,KEREAD
1753   0010   P10,10

.
```

Tape 14C.
Nov 2/72

(47)

```
.PALP
*OUT-S:FAST
*
*IN-S:CONØ,S:FAST,S:FAS2
*
*
*
*OPT-T
```

FIELD 1

```
ARG1    0050

            /CONØ
            XLIST
            PAUSE/
            /
            /FAST
            /SYSTEM TO BOOTSTRAP FOCAL BETWEEN TAPE AND CORE
            /BLOCKS: Ø-BOOTSTRAP,1-FIELD 1,40-DISC
            /72 TO 131-FIELD Ø
            /
            /NOTE THAT BOOT AT 2227(7627) IS USED BY COPG!
            /
            FIELD 1
            *2000
2000  7300  BUILD,CLA CLL    /STORE DISC AND CORE SYSTEM ON TAPE
2001  4252      JMS SETDIS
2002  1362       TAD BOOTS
2003  3023       DCA DDCORE
2004  1275       TAD M200
2005  3024       DCA DDWCNT
2006  1274       TAD P1Ø
2007  3026       DCA DSFELD
2010  3027       DCA DTBLOK    /LOAD BOOTSTRAP IN BLOCK Ø-
2011  3030       DCA DTUNIT
2012  1037       TAD P20
2013  4421       JMS I DTAPX   /WRITE TAPE
2014  5200       JMP BUILD     /TAPE ERROR
2015  3024       DCA DDWCNT    /NOW SAVE ALL OF FIELD 1
2016  3023       DCA DDCORE
2017  7001       IAC
2020  3027       DCA DTBLOK
2021  1037       TAD P20
2022  4421       JMS I DTAPX
2023  5200       JMP BUILD     /TAPE ERROR
2024  1132      TAD KILALL
2025  3352      DCA KILTEM
2026  1374      TAD RECOVR
2027  3132      DCA KILALL     /READ FIELD Ø WHEN DONE!
2030  1273       TAD BKSTAR
2031  3027       DCA DTBLOK
2032  3026       DCA DSFELD
2033  1037       TAD P20
2034  4421       JMS I DTAPX   /SAVE FIELD Ø
2035  5233       JMP .-2       /TAPE ERROR
2036  4252  DISCR,JMS SETDIS
2037  4420       JMS I DISCX
2040  5236       JMP DISCR     /DISC ERROR
2041  4757      JMS I NAMSVX
2042  1037       TAD P20
2043  4421       JMS I DTAPX   /STORE DISC OVERLAY ON TAPE
2044  5236       JMP DISCR     /TAPE ERROR
```

```
2045  4422      JMS I MESAGX
2046  0417  TEXT /DO
2047  1605  NE
2050  4100  !/
2051  5342      JMP FELD0     /RECOVER FIELD 0 FOR RESTART
              /
2052  0000  SETDIS,0
2053  6201      CDF
2054  3772      DCA I TELSWX /ALLOW USE OF 'TYPE'
2055  6211      CDF 10
2056  1360      TAD P500
2057  3023      DCA DDCORE
2060  1301      TAD M6277
2061  3024      DCA DDWCNT
2062  1276      TAD P1500
2063  3025      DCA DISADD
2064  1300      TAD P700
2065  3026      DCA DSFELD
2066  1272      TAD BKDISC
2067  3027      DCA DTBLOK    /SET ADDRESSES FOR DISC OVERLAY XFER
2070  3126     DCA INTRUP     /NO INTERRUPT DURIN 'FAST'
2071  5652     JMP I SETDIS
              /
2072  0040  BKDISC,40
2073  0072  BKSTAR,72
2074  0010  P10,10
2075  7600  M200,-200
2076  1500  P1500,1500
2077  0000  COUNT,0
2100  0700  P700,700
2101  1501  M6277,-6277
              /
              /
              /
              /
              /
              /FIELD 1 PART OF BOOTSTRAP USES FOCAL DISC,TAPE ROUTINES.
              /
2102  7300  READIS,CLA CLL  /CODING TO XFER DISC OVERLAY
2103  4252      JMS SETDIS   /FROM TAPE BACK TO DISC
2104  1132      TAD KILALL
2105  3352      DCA KILTEM
2106  1353      TAD ERTYPE
2107  3132      DCA KILALL
2110  4421     JMS I DTAPX   /OVERLAY FROM TAPE
2111  7110      JMP.-1       /TAPE ERROR
2112  3041  STORIM,DCA DTEST        /DISABLE DISC PROTECT
2113  1363      TAD P2
2114  4420      JMS I DISCX
2115  5312      JMP STORIM   /DISC ERROR
2116  7001      IAC
2117  3041      DCA DTEST    /ENABLE DISC PROTECT
2120  3026  DISTES,DCA DSFELD       /TEST AND REWRITE BAD DISC SEGMENTS
2121  3025      DCA DISADD   /(STOLEN FROM GODO)
2122  1361      TAD M20
2123  3277      DCA COUNT
2124  1355      TAD M3777
2125  3024      DCA DDWCNT
2126  4420  TEST,JMS I DISCX
2127  7000      OPR
```

```
2130  7100      CLL
2131  1025      TAD DISADD
2132  1354      TAD P3777
2133  3025      DCA DISADD
2134  7430      SZL
2135  1076      TAD P100
2136  1026      TAD DSFELD
2137  3026      DCA DSFELD
2140  2277      ISZ COUNT
2141  5326      JMP TEST
2142  1352  FELD0,TAD KILTEM
2143  3132      DCA KILALL
2144  3023     DCA DDCORE     /NOW READ FIELD 0
2145  3026      DCA DSFELD
2146  1356      TAD M7600
2147  3024      DCA DDWCNT
2150  1273      TAD BKSTAR
2151  5773     JMP I READ0X
              /
2152  0000  KILTEM,0
2153  2164  ERTYPE,ERROR0
2154  3777  P3777,3777
2155  4001  M3777,-3777
2156  0200  M7600,-7600
2157  2337  NAMSVX,NAMSAV
2160  0500  P500,500
2161  7760  M20,-20
2162  2200  BOOTS,BEG1
2163  0002  P2,2
              /
2164  1363  ERROR0,TAD P2    /COMES HERE FOR DISC ERROR
2165  4420      JMS I DISCX   /REWRITE IT
2166  7000      OPR
2167  1026      TAD DSFELD
2170  4536      JMS I OCTPNX
2171  5320      JMP DISTES
              /
2172  0016  TELSWX,TELSW
2173  2327  READ0X,READ0
              /
2174  2142  RECOVR,FELD0
              PAUSE/
              /
              /FAS2
              /BLOCK 0 BOOTSTRAP GETS READ BACK TO FIELD 0
              /ASSEMBLED IN FIELD 1,USED IN FIELD 0
              /
              *2200
2200  5227  BEG1,JMP BOOT
2201  6211      CDF 10
2202  1624      TAD I TEST1
2203  7041      CIA
2204  1226      TAD TEST0     /BE SURE SYSTEM IS STILL THERE
2205  7640      SZA CLA
2206  5334      JMP FSTART
2207  1625      TAD I TEST2
2210  7041      CIA
2211  1226      TAD TEST0
2212  7640      SZA CLA
2213  5334     JMP FSTART
```

```
2214  1623     TAD I P1200
2215  7041     CIA
2216  1226     TAD TEST0
2217  7640     SZA CLA
2220  5334     JMP FSTART
2221  6213     CDF!CIF 10
2222  5623     JMP I P1200
               /
2223  1200   P1200,1200
2224  2000   TEST1,2000
2225  1200   TEST2,1200
2226  7300   TEST0,CLA CLL
               /
2227  7300   BOOT,CLA CLL     /USED BY BOOTSTRAP AND BY COPG
2230  4236      JMS DECTAP
2231  5200      JMP BEG1      /TAPE ERROR
2232  3200      DCA BEG1      /MONITOR ENTRIES  NOW RESTART FOCAL
               /
2233  6213      CDF!CIF 10
2234  5635      JMP I .+1
2235  2102    READIS /GET REST OF FOCAL
               /
2236  0000   DECTAP,0
2237  6774    DTBEGN,DTLB     /SET FIELD 0
2240  3355      DCA BEG1+155 /SEARCH BLK TO WORD 0
2241  1323   DTSRCH,TAD P614
2242  6766      DTCA!DTXA     /SEARCH BACK
2243  4273   DTBACK,JMS DTFLAG
2244  7001      IAC
2245  7700      SMA CLA
2246  5243      JMP DTBACK
2247  1322   DTFRNT,TAD P214
2250  6766      DTCA!DTXA
2251  4273   DTFORW,JMS DTFLAG
2252  7450      SNA
2253  5257      JMP DTGO
2254  7700      SMA CLA
2255  5237      JMP DTBEGN    /MISSED IT
2256  5251      JMP DTFORW
2257  1326   DTGO,TAD PP10
2260  6774      DTLB          /READ TO FIELD 1
2261  7240      CLA CMA
2262  3355      DCA BEG1+155 /DATA ADDRESS=0
2263  3354      DCA BEG1+154 /WORD COUNT=7777
2264  1321      TAD PP130
2265  6764      DTXA          /CHANGE SEARCH TO READ OR WRITE
2266  4273      JMS DTFLAG
2267  2236      ISZ DECTAP    /NO ERRORS
2270  7200   DTEXIT,CLA
2271  6766      DTCA!DTXA     /CLEAR FLAGS
2272  5636      JMP I DECTAP
               /
2273  0000   DTFLAG,0
2274  6771      DTSF
2275  5274      JMP .-1
2276  6772      DTRB
2277  7700      SMA CLA
2300  5313      JMP DTTEST
2301  6761      DTRA
2302  0324      AND P400
```

```
2303  7650      SNA CLA
2304  5311      JMP DTERRO    /ERROR MOVING FORWARD
2305  6772      DTRB
2306  0325      AND PP1000
2307  7640      SZA CLA
2310  5247      JMP DTFRNT    /END OF TAPE
2311  6766  DTERRO,DTCA!DTXA        /ERROR,STOP TAPE
2312  5270      JMP DTEXIT
2313  6764  DTTEST,DTXA       /ACKNOWLEDGE FLAG
2314  1000      TAD 0
2315  7421      MQL             /DISPLAY BLOCK NO.
2316  7240      CLA CMA         /LOOK FOR BLOCK 1
2317  1000      TAD 0
2320  5673      JMP I DTFLAG
                /
2321  0130  PP130,130
2322  0214  P214,214
2323  0614  P614,614
2324  0400  P400,400
2325  1000  PP1000,1000
2326  0010  PP10,10
                /
                /
                /
2327  3027  READ0,DCA DTBLOK          /CONTINUATION OF CALL FIELD 0
2330  3030      DCA DTUNIT
2331  4421      JMS I DTAPX
2332  5327      JMP READ0     /TAPE ERROR
2333  4530      JMS I CRLFX
                /
2334  6203  FSTART,CDF!CIF
2335  5736      JMP I .+1
2336  0177      177           /START FOCAL!!!!!!!
                /SO-7740 FF. IS FREE IN FIELD 0
                /
2337  0000  NAMSAV,0
2340  1357    TAD NAM65       /SAVE NAMES FOR X NAME(0)
2341  3010    DCA 10
2342  1360    TAD P6777
2343  3011    DCA 11
2344  1362    TAD M12
2345  3012    DCA 12
2346  1410  MOVNAM,TAD I 10
2347  6201    CDF
2350  3411    DCA I 11
2351  6211    CDF 10
2352  2012    ISZ 12
2353  5346    JMP MOVNAM
2354  1361    TAD M6432
2355  3024    DCA DDWCNT      /SAVE FULL 32 BLOCKS
2356  5737    JMP I NAMSAV
                /
2357  0731  NAM65,FNKB1+65
2360  6777  P6777,6777
2361  1346  M6432,-6432
2362  7766  M12,-12
```

File 2 Tape 10A
Mar 21/72

(5-2)

```
.PALP
*OUT-S:INIT
*
*IN-S:CON0,S:INIT
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /INIT
                /INITIALIZE IMAGE-ONCE ONLY
                /LOAD XFOC;CALL INIT;SAVE SET1!500-6777;
                /
                *1534
1534    1374        TAD M6
1535    3373        DCA COUNT6
1536    1376        TAD SETFIR
1537    3367        DCA OUTP
1540    1377    SYS,TAD M100
1541    3371        DCA COUN40
1542    1375        TAD PKB1
1543    3370        DCA TABLE
1544    1367        TAD OUTP
1545    1372        TAD P1040
1546    3367        DCA OUTP
1547    1367        TAD OUTP
1550    3366        DCA OUT
1551    1770    NEXT,TAD I TABLE
1552    6201        CDF
1553    3766        DCA I OUT
1554    6211        CDF 10
1555    2366        ISZ OUT
1556    2370        ISZ TABLE
1557    2371        ISZ COUN40
1560    5351        JMP NEXT
1561    2373        ISZ COUNT6
1562    5340        JMP SYS
1563    6203        CDF CIF
1564    5765        JMP I .+1
1565    7600        7600
1566    0000    OUT,0
1567    0000    OUTP,0
1570    0000    TABLE,0
1571    0000    COUN40,0
1572    1040    P1040,1040
1573    0000    COUNT6,0
1574    7772    M6,-6
1575    0140    PKB1,KB1
1576    7440    SETFIR,500-1040
1577    7700    M100,-100

.
```

(53A)

STOR - Description

The STOR routine does the bookkeeping needed to put new programs into and overlay on the disk:

An image of the disc overlay called "SET1" holds 6 overlays of programs that will run in Field 1, Loc. 6042 -- 6777. With each overlay, is a 64 word table, with pointers to each program, actual entry addresses for the programs in that overlay, and overlay numbers for programs located in one of the other 5 overlays. (The FOCAL system can thus recognize if a program is in core because the pointer will be a number greater than 2000.) If a number 10, 20, 30, 40, 50 or 6 0 is found, the overlay 1, 2, 3, 4, 5, or 6 is first read into core from the disc along with its pointer table. The system then finds that the requested program is in core and starts it.

The sequence of operations for the STOR program are listed below:

(GFOC has been loaded, then the new programs, then SET1)

1 - Initialize

2 - Ask for program (overlay) No.: "Prog. no."

3 - If SET1 is not already in Field Ø, type "PLEASE LOAD SET1 FIRST", quit.

4 - "WORD" - Remove Prog. no. from all tables in SET1

5 - "TBTEST" If an entry in KB1 table (>100) has changed, type a query.

6 - "TOTEST" (a) If a word in KB1 table is 2000-5777, copy it to all SET1 tables. It points to core resident code.

(b) If a word in KB1 table is 7000 or above, ignore it.

(c) If a word is between 6000 and 7000, put Prog. No. in all SET1 tables.

7 - "CODE" Delete all occurrences of Prog. No. from KB1 Table.

8 - "CODON" In the table of SET1 that corresponds to the new Prog. No., replace all occurrences of Prog. No. (see 6-C): Copy word (pointer) from KB1 table to SET1 table.
Replace pointer in KB1 table by Prog. no.

9 - "P MOVE" Copy the new programs (Loc. 6042 -- 6777, Field 1) from Field 1 to the proper table in SET1

10 - "ENDMES" Type instructions for saving GFOC, SET1

11 - "FIX6" Put 60 (for Prog. 6) in locations of each SET1 table corresponding to KB1 + 66 through KB1 + 77.

The operator now saves SET1 and GFOC on the disc, uses PUTT to save the disc file, uses PIP to transfer GFOC to the tape monitor and types.

.FAST .SET1 .TAPE .GFOC .STEN to build the new version of FOCAL.

(53c)

```
 PALP
*OUT-S:STOR
*
*IN-S:CON0,S:STOR,S:ST02
*
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /STOR
                /LOAD STOR,ST02;SAVE STOR!11200-2177;1200
                /ADDS NEW PROGRAM TO DISC OVERLAY SYSTEM
                /CALL XFOC;LOAD NEW PROGRAM;CALL SET1
                /CALL STOR
                /
                OUTP=14
                COUNT6=15
                PRONUM=ARG6
                COUN40=ARG7
                FNTABX=ARG8
                OUT=ARG9
                TABLE=ARG10
                *1200
 1200   7300    STARTS,CLA CLL
 1201   3126      DCA INTRUP      /SO 'TYPE' DOESN'T TEST TELSW.
 1202   4422       JMS I MESAGX
 1203   2022    TEXT /PR
 1204   1707    OG
 1205   4016     N
 1206   1756    0.
 1207   5061    (1
 1210   5555    --
 1211   6651    6)
 1212   7200    :/
 1213   4777        JMS KREAD
 1214   0356        AND P7
 1215   7450        SNA
 1216   5200        JMP STARTS
 1217   1360        TAD P260
 1220   6046        TLS
 1221   6041        TSF
 1222   5221        JMP .-1
 1223   1362        TAD M267
 1224   7500        SMA
 1225   5200        JMP STARTS
 1226   1356        TAD P7
 1227   7106        CLL RTL
 1230   7004        RAL
 1231   3055        DCA PRONUM      /PROGRAM CODE NO.
 1232   4776        JMS TESTNO
 1233   7410        SKP
 1234   1775    SYST,TAD P1040
 1235   1014        TAD OUTP
 1236   3014        DCA OUTP        /SET UP NEXT TABLE
 1237   1014        TAD OUTP
```

```
1240  3060        DCA OUT
1241  4774        JMS SETUP
1242  6201   WORD,CDF
1243  1460        TAD I OUT
1244  7041        CIA
1245  1055        TAD PRONUM
1246  7650        SNA CLA
1247  3460        DCA I OUT      /REMOVE OLD REFERENCES TO (PRONUM)
1250  6201   TBTEST,CDF
1251  1460        TAD I OUT
1252  7450        SNA
1253  5271        JMP TOTEST     /SET1 ENTRY=0
1254  7041        CIA
1255  6211        CDF 10
1256  1461        TAD I TABLE
1257  7650        SNA CLA
1260  5271        JMP TOTEST     /SET1=TABLE
1261  1461        TAD I TABLE
1262  0363        AND P7700
1263  7650        SNA CLA
1264  5311        JMP NEXTW      /C(KB1 TABLE) <100 IS O.K.
1265  4773        JMS ERROR
1266  1461        TAD I TABLE    /Y (OK)
1267  6201        CDF
1270  3460        DCA I OUT
1271  6211   TOTEST,CDF 10
1272  1461        TAD I TABLE
1273  1365        TAD P1000
1274  7500        SMA
1275  5311        JMP NEXTW      />6777
1276  1365        TAD P1000
1277  7000        OPR
1300  7700        SMA CLA
1301  5305        JMP OVRPUT     /6000-6777
1302  1461        TAD I TABLE
1303  5306        JMP CORPUT     /2000-5777..CORE RESIDENT.
1304  5311        JMP NEXTW      /<6000
1305  1055   OVRPUT,TAD PRONUM
1306  6201   CORPUT,CDF
1307  3460        DCA I OUT
1310  6211        CDF 10
1311  7300   NEXTW,CLA CLL
1312  2060        ISZ OUT
1313  2061        ISZ TABLE
1314  2056        ISZ COUN40
1315  5242        JMP WORD
1316  2015        ISZ COUNT6
1317  5234        JMP SYST       /NEXT TABLE OF 6
1320  4774        JMS SETUP
1321  1055        TAD PRONUM
1322  7425        MQL!MUY
1323  0104        104            /PROG.*10*104=1040*PROG.
1324  7701        CLA!MQA
1325  1357        TAD MOUT       /500-1040
1326  3060        DCA OUT        /ADDRESS IN TAPE FILE
1327  1461   CODE,TAD I TABLE
1330  7041        CIA
1331  1055        TAD PRONUM
1332  7640        SZA CLA
1333  5340        JMP CODON
```

```
1334  3461  DELETE,DCA I TABLE       /REMOVE OLD REF.TO PRONUM
1335  3457     DCA I FNTABX          /CORRESPONDING FUNCTION CODE
1336  6201     CDF
1337  3460     DCA I OUT             /IMAGE IN SET1
1340  6201  CODON,CDF
1341  1460     TAD I OUT
1342  6211     CDF 10
1343  7041     CIA
1344  1055     TAD PRONUM
1345  7640     SZA CLA          /REPLACE KB1 ENTRIES FOR THIS PROG.
1346  5772     JMP FILNEX       /NOT DUE TO THIS PROG. NO.
1347  1461     TAD I TABLE
1350  6201     CDF
1351  3460     DCA I OUT        /SAVE NEW ENTRY IN IMAGE
1352  6211     CDF 10
1353  1055     TAD PRONUM
1354  3461     DCA I TABLE      /REPLACE NEW ENTRY IN XFOC BY CODE NO.
1355  5772    JMP FILNEX
              /
1356  0007  P7,7
1357  7440  MOUT,500-1040
1360  0260  P260,260
1361  7772  M6,-6
1362  7511  M267,-267
1363  7700  P7700,7700
1364  0016  TELSWX,TELSW
1365  1000  P1000,1000
              /
1372  1400
1373  1423
1374  1501
1375  1630
1376  1600
1377  1652
           PAGE
1400  2061  FILNEX,ISZ TABLE
1401  2060     ISZ OUT
1402  2057     ISZ FNTABX
1403  2056     ISZ COUN40
1404  5777     JMP CODE
1405  1356    TAD P6042
1406  3061     DCA TABLE
1407  1357     TAD M736
1410  3056     DCA COUN40
1411  1461  PMOVE,TAD I TABLE        /X FER PROGRAM TO SET1
1412  6201     CDF
1413  3460     DCA I OUT
1414  6211     CDF 10
1415  2061     ISZ TABLE
1416  2060     ISZ OUT
1417  2056     ISZ COUN40
1420  5211     JMP PMOVE
1421  4530     JMS I CRLFX
1422  5315     JMP ENDMES
              /
1423  0000  ERROR,0
1424  1314     TAD TEST
1425  7640     SZA CLA
1426  5251     JMP CR          /ONLY PRINT THIS ONCE
1427  4422  JMS I MESAGX
```

```
1430  1417  TEXT /LO
1431  0356  C.
1432  4023   S
1433  0524  ET
1434  6140  1
1435  1302  KB
1436  1140  I
1437  5656  ..
1440  5020  (P
1441  2205  RE
1442  2323  SS
1443  4031   Y
1444  4011   I
1445  0640  F
1446  1713  OK
1447  5100  )/
1450  2314     ISZ TEST
1451  4530  CR,JMS I CRLFX
1452  1060     TAD OUT
1453  4536     JMS I OCTPNX
1454  1313     TAD P240
1455  4527     JMS I TYPEX
1456  6201     CDF
1457  1460     TAD I OUT
1460  6211     CDF 10
1461  4536     JMS I OCTPNX
1462  1313     TAD P240
1463  4527     JMS I TYPEX
1464  1461     TAD I TABLE
1465  4536     JMS I OCTPNX
1466  4776  NEXRED,JMS KREAD
1467  6046     TLS
1470  6041     TSF
1471  5270     JMP .-1
1472  1300     TAD YMINUS
1473  7650     SNA CLA
1474  5623     JMP I ERROR
1475  6203  EXIT,CDF CIF
1476  5677     JMP I .+1
1477  7600  7600
            /
1500  7447  YMINUS,-331
            /
1501  0000  SETUP,0
1502  1077     TAD M100
1503  3056     DCA COUN40
1504  1311     TAD PKB1
1505  3061     DCA TABLE
1506  1312     TAD FNTABP
1507  3057     DCA FNTABX
1510  5701     JMP I SETUP
            /
1511  0140  PKB1,KB1
1512  0644  FNTABP,FNKB1
1513  0240  P240,240
1514  0000  TEST,0
            /
1515  4422  ENDMES,JMS I MESAGX
1516  2301  TEXT /SA
1517  2605  VE
```

```
1520  4023   S
1521  0524  ET
1522  6141  1!
1523  6560  50
1524  6055  0-
1525  6667  67
1526  6767  77
1527  7300  ;/
1530  4422     JMS I MESAGX
1531  5656  TEXT /..
1532  5647  .'
1533  0617  FO
1534  0341  C!
1535  6160  10
1536  6060  00
1537  6055  0-
1540  6161  11
1541  6767  77
1542  5466  ,6
1543  6060  00
1544  6054  0,
1545  6760  70
1546  6060  00
1547  5567  -7
1550  6567  57
1551  6773  7;
1552  6160  10
1553  6060  00
1554  0000  /
1555  5775     JMP FIX6
              /
              /
1556  6042  P6042,6042
1557  7042  M736,-736
              PAUSE/
              /
              /STO2
              /
1575  2000
1576  1652
1577  1327
              PAGE
1600  0000  TESTNO,0
1601  1227      TAD PP500
1602  3014      DCA OUTP
1603  1272      TAD MM6
1604  3015      DCA COUNT6
1605  1272      TAD MM6
1606  3232      DCA COUNTR
1607  1227      TAD PP500
1610  3231      DCA SETLOC
1611  7410      SKP
1612  1230  NEXTES,TAD P1040
1613  1231      TAD SETLOC
1614  3231      DCA SETLOC
1615  1140      TAD KB1
1616  7041      CIA
1617  6201      CDF
1620  1631      TAD I SETLOC
1621  6211      CDF 10
```

```
1622  7640      SZA CLA
1623  5233      JMP GETIT
1624  2232      ISZ COUNTR
1625  5212      JMP NEXTES
1626  5600      JMP I TESTNO
                /
1627  0500    PP500,500
1630  1040    P1040,1040
1631  0000    SETLOC,0
1632  0000    COUNTR,0
                /
1633  4422    GETIT,JMS I MESAGX      /PLEASE LOAD SET1,THEN RECALL STOR
1634  2014    TEXT /PL
1635  0501    EA
1636  2305    SE
1637  4014     L
1640  1701    OA
1641  0440    D
1642  2305    SE
1643  2461    T1
1644  4006     F
1645  1122    IR
1646  2324    ST
1647  0000    /
1650  5673       JMP I EXITX
                /
1651  0137    P0KB1,KB1-1
                /
1652  0000    KREAD,0
1653  6036       KRB
1654  6031       KSF
1655  5254       JMP .-1
1656  6036      KRB
1657  7421      MQL
1660  7501       MQA
1661  1266      TAD M203       /CTRL-C
1662  7650       SNA CLA
1663  5673      JMP I EXITX
1664  7501       MQA
1665  5652       JMP I KREAD
1666  7575    M203,-203
1667  7730    M50,-50
                /
                /
1670  7600    M200,-200
1671  6077    P6077,6077
1672  7772    MM6,-6
1673  1475    EXITX,EXIT
                /
                PAGE
2000  1234    FIX6,TAD MF5
2001  3010       DCA 10
2002  1236       TAD P565       /KB1+66-1,IN SET1
2003  3011       DCA 11
2004  1235    NEXPRG,TAD MF12
2005  3012       DCA 12
2006  6201       CDF
2007  1237    WORDS,TAD PF60
2010  3411       DCA I 11
2011  2012       ISZ 12
```

```
2012  5207     JMP WORDS
2013  1011     TAD 11
2014  1240     TAD P1026      /SETTING KB1+66--77 TO PROG. 6
2015  3011     DCA 11
2016  2010     ISZ 10
2017  5204     JMP NEXPRG
2020  6211     CDF 10
2021  1241     TAD KBN65
2022  3010     DCA 10
2023  1235     TAD MF12
2024  3011     DCA 11
2025  1237   TABFIX,TAD PF60
2026  3410     DCA I 10
2027  2011     ISZ 11
2030  5225     JMP TABFIX     /LAST 10 ENTRIES ARE 60 FOR 'NAME'
2031  6203   CDF!CIF
2032  5633     JMP I .+1
2033  7600     7600           /RESTART MONITOR
              /
2034  7773   MF5,-5
2035  7766   MF12,-12
2036  0565   P565,565
2037  0060   PF60,60
2040  1026   P1026,1026
2041  0225   KBN65,KB1+65     /LOADS KB1+66--KB1+77.
              /
```

File 2 Tape 13A
May 1 '72

(60)

```
.PALP
*OUT-S:PREP
*
*IN-S:CON0,S:PREP
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /PREP
                /INITIALIZES CORE BEFORE 'TOVR' CAN BE USED.
                /
                *600
0600    7543    7543
0601    1234    1234        /TELLS TOVER I'M HERE.
                /
                *KB1+66
0226    0000    0
0227    0000    0
0230    0000    0
0231    0000    0
0232    0000    0
0233    0000    0
0234    0000    0
0235    0000    0
0236    0000    0
0237    0000    0
                /
                *FNKB1+66
0732    0000    0 ;
0733    0000    0 ;
0734    0000    0;
0735    0000    0;
0736    0000    0;
0737    0000    0;
0740    0000    0;
0741    0000    0;
0742    0000    0;
0743    0000    0;
0744    0000    0;
                        /INITIALIZE TO ZERO

.
```

File 4 Tape 12 N
June 20/73

(61)

used: on Tape 12B - 3,4
15A - 4

```
.PALP
*OUT-S:TOVR
*
*IN-S:CON0,S:TOV1,S:TOV2
*
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /TOV1
                /STORES AN OVERLAY ON USER TAPE(#7)
                /5 OVERLAYS FROM BLOCK 134-157.GET MOVED TO DISC
                /OVERLAYS  6,7 FF. RUB OUT PROGRAMS!
                /LOAD OVER XFOC.START AT 'SAVER'-1400;THEN:
                /SAVE TOVR!11000-1777,7200-7577;1000
                /
                POUT=ARG1
                COUNT=ARG2
                SAVE=ARG3
                *INTESX
0117    1160    FIXIT
                *KILALL
0132    1302    EXIT
                *CRLFX
0130    1150    CRLF
                *TYPEX
0127    1142    TYPE
                /
                *1000
1000    7300    CLA CLL
1001    1777    SETUP,TAD P17
1002    3011      DCA 11
1003    1776      TAD P1617
1004    3010      DCA 10
1005    1775      TAD M120        /PLACE PAGE ZERO ENTRIES
1006    4774      JMS MOVEPB
1007    4530      JMS I CRLFX
1010    1647      TAD I P600
1011    1245      TAD M7543
1012    7640      SZA CLA
1013    5220      JMP GOOF
1014    1650      TAD I P601
1015    1246      TAD M1234
1016    7650      SNA CLA
1017    5251      JMP TESTKB
1020    4422    GOOF,JMS I MESAGX
1021    3117    TEXT /YO
1022    2540    U
1023    2310    SH
1024    1725    OU
1025    1404    LD
1026    4024     T
1027    3120    YP
1030    0540    E
1031    4720    'P
```

```
1032  2205  RE
1033  2047  P'
1034  4006   F
1035  1122  IR
1036  2324  ST
1037  4017   O
1040  0640  F
1041  0114  AL
1042  1441  L!
1043  0000  /
1044  5773  JMP EXIT
            /
1045  0235  M7543,-7543
1046  6544  M1234,-1234
1047  0600  P600,600
1050  0601  P601,601
1051  1310  TESTKB,TAD PKBP66
1052  3010  DCA 10
1053  1772    TAD M12
1054  3011    DCA 11
1055  1410  TESON,TAD I 10
1056  7640    SZA CLA
1057  5326    JMP RUBIT
1060  2011    ISZ 11
1061  5255    JMP TESON
1062  4422  JMS I MESAGX
1063  2410  TEXT /TH
1064  0522  ER
1065  0540  E
1066  0122  AR
1067  0540  E
1070  1617  NO
1071  4005   E
1072  1624  NT
1073  2211  RI
1074  0523  ES
1075  4024   T
1076  1740  O
1077  3117  YO
1100  2522  UR
1101  4020   P
1102  2217  RO
1103  0722  GR
1104  0115  AM
1105  4100  !/
1106  5771   JMP SET2
            /
1107  0016  TELSWX,TELSW
1110  0225  PKBP66,KB1+65
            /
1111  0000  PRINDC,0
1112  1770    TAD OVRNUM
1113  1767    TAD M6
1114  7110    CLL RAR         /2 OVERLAYS PER PROGRAM
1115  7427    MQL!DVI
1116  0144    144
1117  4331    JMS TYPEDC
1120  7427    MQL!DVI
1121  0012    12
1122  4331    JMS TYPEDC
```

```
1123  1766    TAD P260
1124  4527    JMS I TYPEX
1125  5711    JMP I PRINDC
              /
1126  3647  RUBIT,DCA I P600
1127  3650    DCA I P601     /AVOID DOUBLED ENTRIES.
1130  5771    JMP SET2
              /
1131  0000  TYPEDC,0
1132  3052    DCA SAVE
1133  7501    MQA
1134  7450    SNA
1135  5340    JMP GETOUT
1136  1766    TAD P260
1137  4527    JMS I TYPEX
1140  1052  GETOUT,TAD SAVE
1141  5731    JMP I TYPEDC
              /
1142  0000  TYPE,0
1143  6046    TLS
1144  6041    TSF
1145  5344    JMP .-1
1146  7300    CLA CLL
1147  5742    JMP I TYPE
              /
1150  0000  CRLF,0
1151  1357    TAD P215
1152  4342    JMS TYPE
1153  1356    TAD P212
1154  4342    JMS TYPE
1155  5750    JMP I CRLF
              /
1156  0212  P212,212
1157  0215  P215,215
              /
1160  0000  FIXIT,0
1161  5760    JMP I FIXIT    /INTES IS USED BY DECTAPE
              PAUSE/
              /
              /TOV2
              /
1166  1557
1167  1311
1170  1307
1171  1200
1172  1351
1173  1302
1174  1334
1175  1343
1176  1350
1177  1347
              PAGE
1200  7300  SET2,CLA CLL
1201  4530    JMS I CRLFX
1202  4422    JMS I MESAGX
1203  2301  TEXT /SA
1204  2605  VE
1205  5017  (0
1206  1640  N
1207  2401  TA
```


```
              PAGE
1200  7300  SET2,CLA CLL
1201  4530    JMS I CRLFX
1202  4422    JMS I MESAGX
1203  2301  TEXT /SA
1204  2605  VE
1205  5017  (0
1206  1640  N
1207  2401  TA
1210  2005  PE
1211  4067   7
1212  5101  )A
1213  2340  S
1214  1726  OV
```

```
1215  0522  ER
1216  1401  LA
1217  3140  Y
1220  1617  NO
1221  5672  .:
1222  0000  /
1223  4777     JMS GETDEC
1224  3307     DCA OVRNUM
1225  1307     TAD OVRNUM
1226  7450     SNA
1227  5200     JMP SET2
1230  1311     TAD M6
1231  7700     SMA CLA
1232  4776     JMS WARN
1233  1307     TAD OVRNUM
1234  7106     CLL RTL          /4 BLOCKS EACH
1235  1306     TAD OVBLOK
1236  3027     DCA DTBLOK
1237  7300     CLA CLL
1240  1310     TAD P6015        /NEED 2*12+1 SPACES
1241  3023     DCA DDCORE
1242  1321     TAD M1004
1243  3024     DCA DDWCNT
1244  1312     TAD P7000
1245  3030     DCA DTUNIT
1246  1310     TAD P6015
1247  3050     DCA POUT
1250  1316     TAD FKB66        /MOVE NAMES
1251  3317     DCA PIN
1252  1314     TAD P1234        /IDENTITY CODE
1253  3450     DCA I POUT
1254  2050     ISZ POUT
1255  4322     JMS MOVIT
1256  1315  NAMEM, TAD PKB66 /MOVE POINTERS
1257  3317     DCA PIN
1260  4322     JMS MOVIT
1261  1312     TAD P7000
1262  3050     DCA POUT
1263  4775     JMS LABEL
1264  1313     TAD P710
1265  3026     DCA DSFELD
1266  1037     TAD P20
1267  4421     JMS I DTAPX
1270  5266     JMP .-2          /TAPE ERROR
1271  4422     JMS I MESAGX
1272  1726  TEXT /OV
1273  0522  ER
1274  1401  LA
1275  3140  Y
1276  2324  ST
1277  1722  OR
1300  0504  ED
1301  4100  !/
            /
1302  6774  EXIT, DTLB
1303  6203     CDF!CIF
1304  5705     JMP I .+1
1305  7600     7600
            /
1306  0130  OVBLOK, 134-4
```

```
1307  0000  OVRNUM,0
1310  6015  P6015,6015
1311  7772  M6,-6
1312  7000  P7000,7000
1313  0710  P710,710
1314  1234  P1234,1234
1315  0226  PKB66,KB1+66
1316  0732  FKB66,FNKB1+66
1317  0000  PIN,0
1320  7760  M20,-20
1321  6774  M1004,-1004
            /
1322  0000  MOVIT,0
1323  1351    TAD M12
1324  3051    DCA COUNT
1325  1717  MOVER,TAD I PIN
1326  3450    DCA I POUT
1327  2317    ISZ PIN
1330  2050    ISZ POUT
1331  2051    ISZ COUNT
1332  5325    JMP MOVER
1333  5722    JMP I MOVIT
            /
1334  0000  MOVEPB,0
1335  3012   DCA 12
1336  1410    TAD I 10
1337  3411    DCA I 11
1340  2012    ISZ 12
1341  5336    JMP .-3
1342  5734    JMP I MOVEPB
            /
1343  7660  M120,-120
1344  7540  M240,-240
1345  0237  P237,237
1346  2037  P2037,2037
1347  0017  P17,17
1350  1617  P1617,1617
            /
1351  7766  M12,-12
            /
1375  1453
1376  1536
1377  1411
            PAGE
1400  0000  SAVER,0
1401  1777   TAD P17
1402  3010    DCA 10
1403  1776    TAD P1617
1404  3011    DCA 11
1405  1210    TAD M460
1406  4775    JMS MOVEPB
1407  5774    JMP EXIT
            /
1410  7320  M460,-460
            /
1411  0000  GETDEC,0
1412  3232    DCA NUMBER     /READY FOR A DECIMAL INPUT
1413  4233  NEXOCT,JMS KREAD
1414  1356    TAD M260
1415  7510    SPA
```

```
1416  5227     JMP GOTIT
1417  3031     DCA TEMPSØ
1420  1232     TAD NUMBER
1421  7425     MQL!MUY
1422  0012     12
1423  7701     CLA!MQA
1424  1031     TAD TEMPSØ
1425  3232     DCA NUMBER
1426  5213     JMP NEXOCT
1427  7300   GOTIT,CLA CLL
1430  1232       TAD NUMBER
1431  5611       JMP I GETDEC
              /
1432  0000   NUMBER,Ø
              /
1433  0000   KREAD,Ø
1434  6036     KRB
1435  6031     KSF
1436  5235     JMP .-1
1437  6036     KRB
1440  6046     TLS
1441  6041     TSF
1442  5241     JMP .-1
1443  7421     MQL
1444  7501     MQA
1445  1252     TAD M203        /CTRL-C
1446  7650     SNA CLA
1447  5774     JMP EXIT
1450  7501     MQA
1451  5633     JMP I KREAD
              /
1452  7575   M203,-203
              /
1453  0000   LABEL,Ø
1454  1334     TAD M17
1455  3051     DCA COUNT
1456  4422     JMS I MESAGX
1457  2431   TEXT /TY
1460  2005   PE
1461  4011    I
1462  5604   .D
1463  7320   ;P
1464  2205   RE
1465  2323   SS
1466  4022    R
1467  0524   ET
1470  2522   UR
1471  1672   N:
1472  0000   /
1473  3450   CHAR1,DCA I POUT          /CLEAR IT
1474  4233     JMS KREAD
1475  4321     JMS TEST
1476  7106     CLL RTL
1477  7006     RTL
1500  7006     RTL
1501  3450     DCA I POUT
1502  4233     JMS KREAD
1503  4321     JMS TEST
1504  1450     TAD I POUT
1505  3450     DCA I POUT
```

```
1506  2050     ISZ POUT
1507  2051     ISZ COUNT
1510  5273     JMP CHAR1
1511  3450     DCA I POUT
1512  5317     JMP LEAVE
1513  2050  MESDON, ISZ POUT
1514  3450     DCA I POUT
1515  2051     ISZ COUNT
1516  5313     JMP MESDON     /ZERO REST OF MESSAGE AREA
1517  4530  LEAVE, JMS I CRLFX
1520  5653     JMP I LABEL
            /
1521  0000  TEST, 0
1522  3332     DCA TEMP
1523  1332     TAD TEMP
1524  1333     TAD M215
1525  7650     SNA CLA
1526  5313     JMP MESDON
1527  1332     TAD TEMP
1530  0335     AND P77
1531  5721     JMP I TEST
            /
1532  0000  TEMP, 0
1533  7563  M215, -215
1534  7761  M17, -17
1535  0077  P77, 77
            /
1536  0000  WARN, 0
1537  4422     JMS I MESAGX
1540  2711  TEXT /WI
1541  1414  LL
1542  4022   R
1543  2502  UB
1544  4017   O
1545  2524  UT
1546  4020   P
1547  2217  RO
1550  0756  G.
1551  4016   N
1552  1756  O.
1553  4000   /
1554  4773     JMS PRINDC     /PRINT PROG.NO.
1555  5736     JMP I WARN
            /
1556  7520  M260, -260
1557  0260  P260, 260
1573  1111
1574  1302
1575  1334
1576  1350
1577  1347
```

(68)

Tape 14C
Nov. 3/72

```
.PALP
*OUT-S:CHAIN
*
*IN-S:CONØ,S:CHAIN
*
*
*OPT-T

ALSET  6660

                /CONØ
                XLIST
                PAUSE/
                /
                /CHAIN-CHAINING PROGRAM
                /X FILE(N) TO STORE PROGRAM N
                /X CALL(N,SB,Q) TO CALL PROGRAM N,SUBROUTINE SB
                /X END(Ø) WILL THEN CONTINUE ORIGINAL PROGRAM.
                /IF Q IS >Ø CALLS CAN BE NESTED.
                /
                /PROGRAMS START AUTOMATICALLY IF SB IS NON-ZERO.
                /LINE AB.XY CAN BE CALLED BY SB=128*AB+XY
                /
                CHBUFR=7150
                ERR2=2726
                /
                *PGRETN
0135   7150     CHBUFR
                *KB1+2
0142   6616     CHACAL
0143   6671     CHAPUT
0144   6750     XEND
                /
                *FNKB1+2
0646   2554     2554     /CALL
0647   2545     2545     /FILE
0650   0164     164      /END
                /
                FIELD Ø
                *3120    /ENTERED FROM ALSET
3120   3060     LINFIN,DCA BUFR /NEW END OF TEXT
3121   7501       MQA
3122   7450      SNA
3123   5177      JMP 177        /NO LINENO,DON'T START.
3124   3067       DCA LINENO    /NEW FIRST LINE NO.
3125   4555      FINDLN
3126   7000       OPR  /LINE NOT FOUND
3127   6774       DTLB /SET FIELD Ø FOR MONITOR IN CASE ARG4 IS Ø
3130   7001      IAC
3131   3065      DCA NAGSW      /ALL TEXT
3132   6001      ION
3133   4540      PUSHJ
3134   0606      606            /GO, AFTER FINDLN
3135   5736      JMP I .+1
3136   0273      273
               /
               FIELD 1
               *6600
6600   0000    CHAIN,Ø
6601   1052       TAD ARG3
```

```
6602  7106      CLL RTL
6603  7004      RAL             /8 BLOCKS PER PROGRAM
6604  1044      TAD FSPROG      /FIRST BLOCK USED
6605  3027      DCA DTBLOK
6606  1006      TAD CLENGT      /CHAIN LENGTH
6607  3024      DCA DDWCNT
6610  3030      DCA DTUNIT      /TAPE 8
6611  1121      TAD LINPNT      /START OF TEXT (BFTEMP)
6612  3023      DCA DDCORE
6613  1346      TAD P10
6614  3026      DCA DSFELD
6615  5600      JMP I CHAIN
                /
6616  0000  CHACAL,0
6617  1054    TAD ARG5
6620  7640    SZA CLA
6621  5224    JMP NEST
6622  1372  FIXT,TAD PZERO
6623  3135    DCA PGRETN
6624  6203  NEST,CIF!CDF
6625  1135    TAD PGRETN
6626  1374    TAD MINMAX
6627  7700    SMA CLA
6630  4771    JMS I ERRORP    /TOO MANY NESTED CALLS
6631  1773    TAD I PCX       /SAVE PC
6632  6213    CDF!CIF 10
6633  3016    DCA 16
6634  1416    TAD I 16        /PC POINTS TO CURRENT LINENO
6635  7001    IAC             /X END(0) WILL RETURN TO NEXT LINE
6636  2135    ISZ PGRETN
6637  3535    DCA I PGRETN
6640  1042    TAD PGLAST
6641  2135    ISZ PGRETN
6642  3535    DCA I PGRETN
6643  4200  CDO,JMS CHAIN
6644  4421      JMS I DTAPX
6645  5243      JMP .-2       /TAPE ERROR
6646  1052    TAD ARG3        /RETURNS HERE WITH INTERRUPT OFF.
6647  3042    DCA PGLAST      /NEW PROGRAM NO.
6650  1053      TAD ARG4
6651  7421      MQL
6652  7501      MQA
6653  0266      AND P7600
6654  7640      SZA CLA
6655  5260      JMP ALSET     /GROUP NUMBER FOUND
6656  7413      SHL
6657  0006      6             /LESS THAN 200,CHANGE TO A GROUP NO.
6660  7200  ALSET,CLA
6661  1522      TAD I L0TPNT  /L0TEMP
6662  3747      DCA I L0PNT   /LINE0
6663  1521      TAD I LINPNT  /BFTEMP
6664  6203      CDF CIF
6665  5667      JMP I LINFIX
                /
                /BFTEMP STORES "BUFR". L0TEMP STORES C(LINE0)
                /
6666  7600  P7600,7600
6667  3120  LINFIX,LINFIN
6670  0060  BUFPNT,BUFR
                /
```

See "LFOC"

C(LINPNT) = 555

```
6671  0000  CHAPUT,Ø          /STORE FROM C(LINPNT) FOR 2Ø1Ø WORDS
6672  4422     JMS I MESAGX
6673  0275  TEXT /B=
6674  6100  1/
6675  6201     CDF
6676  1670     TAD I BUFPNT
6677  6211     CDF 1Ø
6700  3521     DCA I LINPNT /BFTEMP
6701  1521     TAD I LINPNT
6702  4536     JMS I OCTPNX /PRINT LAST TEXT ADDRESS
6703  4200     JMS CHAIN
6704  2053     ISZ ARG4     /FORCE GETWRX (NEEDS NON-ZERO)
6705  4541    JMS I GETWRX
6706  2116    ISZ BLOKIN    /IN CASE BLOKIN=ARG3
6707  4541    JMS I GETWRX  /SAVES DISK BUFFER AND SETS POINTERS.
6710  7240     CLA CMA
6711  3116     DCA BLOKIN   /DISC BUFFER TO BE ERASED
6712  4421     JMS I DTAPX  /READ FIRST BLOCK BEFORE CHANGING IT
6713  5312     JMP .-1      /TAPE ERROR
6714  1666     TAD I P76ØØ  /SECOND BUFFER WORD IS LØTEMP
6715  7650     SNA CLA
6716  5336     JMP OK       /TAPE UNUSED
6717  1042     TAD PGLAST
6720  7041     CIA
6721  1052     TAD ARG3
6722  7650     SNA CLA
6723  5336     JMP OK       /SAME PROGRAM JUST CALLED FROM TAPE
6724  4422     JMS I MESAGX
6725  1713  TEXT /OK
6726  7700  ?/
6727  6002    IOF
6730  6031     KSF
6731  5330     JMP .-1
6732  6036     KRB
6733  1345     TAD M331     /TYPE Y TO STORE ANYWAY
6734  7640     SZA CLA
6735  5532     JMP I KILALL
6736  4200  OK,JMS CHAIN
6737  1747     TAD I LØPNT
6740  3522     DCA I LØTPNT /SETS LINEØ EXIT
6741  1037  CHWRIT,TAD P20  /WRITE IT
6742  4421     JMS I DTAPX
6743  5341     JMP .-2      /TAPE ERROR
6744  5671     JMP I CHAPUT
              /
6745  7447  M331,-331
6746  0010  P1Ø,1Ø
6747  0540  LØPNT,LINEØ
              /
6750  0000  XEND,Ø
6751  1535    TAD I PGRETN
6752  3052    DCA ARG3
6753  7040    CMA
6754  1135    TAD PGRETN
6755  3135    DCA PGRETN
6756  1535    TAD I PGRETN
6757  3053    DCA ARG4
6760  7040    CMA
6761  1135    TAD PGRETN
6762  3135    DCA PGRETN
```

```
                /
6763   1135     TAD PGRETN
6764   7041     CIA
6765   1372     TAD PZERO
6766   7700     SMA CLA
6767   5222     JMP FIXT        /PGRETN =PZERO; INCREASE IT
6770   5243     JMP CDO
                /
6771   2726   ERRORP, ERR2
6772   7147   PZERO, CHBUFR-1
6773   0022   PCX, PC
6774   0603   MINMAX, -7175

.
```

File 4, Tape 12M
Jan. 15/73

```
.PALP
*OUT-S:NAME
*
*IN-S:CON0,S:NAME
*
*
*OPT-T

ARG1    0050

                /CON0
                XLIST
                PAUSE/
                /
                /NAME
                /X NAME(N) REPLACES DISC OVERLAY#6 FROM TAPE 8.
                /N=0 GIVES ORIGINAL SYSTEM OVERLAY.
                /X WHAT(G,N) TYPES I.D. FOR N OVERLAYS,STARTING AT G
                /USE NEGATIVE N TO DISABLE X NAME!
                /
                POUT=10
                PIN=11
                COUNT=ARG5
                /
                /
                *FNKB1+40
0704    1555    1555    /NAME
0705    3334    3334    /WHAT
                *KB1+40
0200    6230    NAME    /THIS LOC IS USED BY PCAL (CALCOMP LETTERS.)
0201    6340    WHAT
                /
                *6200
6200    0000    GTAPE,0 /READ FROM TAPE
6201    1325      TAD P710
6202    3026      DCA DSFELD
6203    3030      DCA DTUNIT
6204    1334      TAD M1065
6205    3024      DCA DDWCNT
6206    1052      TAD ARG3
6207    7450      SNA
6210    5221      JMP RESTOR      /GET ORIGINAL
6211    7106      CLL RTL         /X 4 BLOCKS
6212    1337      TAD OVBLOK
6213    3027      DCA DTBLOK
6214    1336      TAD P4066
6215    3023      DCA DDCORE
6216    4421      JMS I DTAPX     /GET NEW OVERLAY
6217    5216      JMP .-1
6220    5600      JMP I GTAPE
6221    1324    RESTOR,TAD P4000
6222    3023      DCA DDCORE      /PART OF THIS BLOCK IS UNNEEDED.
6223    1335      TAD P65
6224    3027      DCA DTBLOK      /PART OF INITIAL OVERLAY.
6225    4421      JMS I DTAPX
6226    5225      JMP .-1         /ERROR
6227    5600      JMP I GTAPE
                /
6230    0000    NAME,0
6231    1052      TAD ARG3
```

```
6232  7041     CIA
6233  1134     TAD NOWNAM
6234  7650     SNA CLA          /IS IT ALREADY ON DISK?
6235  5630     JMP I NAME       /YES
6236  4209     JMS GTAPE
6237  1052     TAD ARG3
6240  7650     SNA CLA
6241  5250     JMP OK           /DON'T TEST ORIGINAL.
6242  1736     TAD I P4066
6243  1323     TAD M1234
6244  7650     SNA CLA
6245  5250     JMP OK
6246  4530     JMS I CRLFX      /SO ERROR PRINT IS SEEN
6247  5532     JMP I KILALL     /MAGIC WORD WRONG
6250  1321  OK, TAD KB65
6251  3010     DCA POUT
6252  1330     TAD M12
6253  3054     DCA COUNT
6254  1326     TAD P60
6255  3410     DCA I POUT       /RESETTING DISPATCH TABLE.
6256  2054     ISZ COUNT
6257  5254     JMP .-3
6260  1322     TAD P4101        /KB1+66
6261  3023     DCA DDCORE
6262  1327     TAD M752
6263  3024     DCA DDWCNT
6264  1331     TAD P7026        /OVERLAY 6 ADDRESS ON DISC
6265  3025     DCA DISADD
6266  6002     IOF
6267  3126     DCA INTRUP       /MUST GO TO COMPLETION
6270  3041     DCA DTEST        /ALLOW SYSTEM REWRITE
6271  1332     TAD P2
6272  4420     JMS I DISCX      /REWRITE DISC
6273  7000     OPR              /DISC ERROR-NEVER GETS HERE!
6274  2041     ISZ DTEST        /RESTORE PROTECTION.
6275  1052     SETNAM, TAD ARG3
6276  7650     SNA CLA
6277  1317     TAD DIFREN       /NAMES #0 AT END OF OVERLAY
6300  1336     TAD P4066
6301  3011     DCA PIN
6302  1320     TAD FTAB65
6303  3010     DCA POUT
6304  1330     TAD M12
6305  3054     DCA COUNT
6306  1411  NEXNAM, TAD I PIN
6307  6201     CDF
6310  3410     DCA I POUT       /CHANGING NAME TABLE
6311  6211     CDF 10
6312  2054     ISZ COUNT
6313  5306     JMP NEXNAM
6314  1052     TAD ARG3
6315  3134     DCA NOWNAM       /RECORD CURRENT OVERLAY.
6316  5630     JMP I NAME
               /
6317  0764  DIFREN, 5052-4066
6320  6331  FTAB65, FLETER+65
6321  0225  KB65, KB1+65
6322  4101  P4101, 4101
6323  6544  M1234, -1234
```

```
6325  0710  P710,710
6326  0060  P60,60
6327  7026  M752,-752
6330  7766  M12,-12
6331  7026  P7026,7026
6332  0002  P2,2
6333  7772  M6,-6
6334  6713  M1065,-1065
6335  0065  P65,65
6336  4066  P4066,4066
6337  0130  OVBLOK,134-4
            /
6340  0000  WHAT,0
6341  1053    TAD ARG4
6342  7040    CMA
6343  3054    DCA COUNT       /NAME COUNT
6344  4200  LOADIT,JMS GTAPE
6345  4530    JMS I CRLFX
6346  1052    TAD ARG3
6347  1375    TAD P260
6350  4527    JMS I TYPEX
6351  1376    TAD P272
6352  4527    JMS I TYPEX     /PRINT N:
6353  1736    TAD I P4066
6354  1323    TAD M1234
6355  7640    SZA CLA
6356  5364    JMP NEXT        /NOT AN OVERLAY
6357  1370    TAD MESDO
6360  3773    DCA I P5050
6361  1371    TAD RETRN1
6362  3774    DCA I P5071
6363  4772    JMS I P5047
6364  2052  NEXT,ISZ ARG3
6365  2054    ISZ COUNT
6366  5344    JMP LOADIT
6367  5740    JMP I WHAT
            /
6370  4422  MESDO,JMS I MESAGX
6371  5647  RETRN1,5647       /JMP I 5047(SUBROUTINE EXIT)
6372  5047  P5047,5047
6373  5050  P5050,5050
6374  5071  P5071,5071
6375  0260  P260,260
6376  0272  P272,272
```