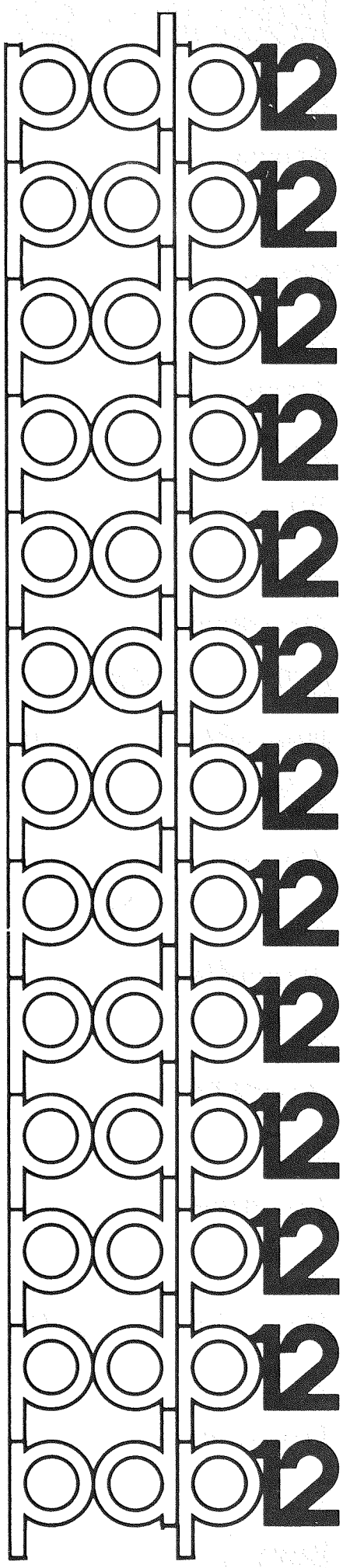
digital

ADTAPE
AND
ADCON



DEC-12-UW2A-D
June, 1970

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FOREWORD

Using the programs ADTAPE and ADCON, data sampled at rates up to 1ØØØ points/second on up to 16 analog channels can be stored by individual channels. ADTAPE is used first to collect the data and store it as sampled in four block units on tape. ADCON then takes all the stored data and places it on tape by individual channel. The two programs function separately and may be used independently.

ADTAPE is described in section 1 through 3 of this manual and ADCON is described in sections 4 and 5.

1.0 USING ADTAPE

1.1 Introduction

ADTAPE permits up to sixteen AD12 A/D channels to be sampled consecutively. One or two channels can be displayed on the scope at any time during sampling simply by typing the number(s) of the channel(s) on the Teletype(R). Sampling rates up to 1 KC (1ØØØ points/second) and a maximum time per point of up to 4Ø seconds/point are acceptable. The signal to begin or end sampling can be by means of a Sense Switch, external level, or clock channel. It is also possible to begin sampling after a predetermined delay from the sync signal and to terminate the sampling after a requested number of points have been collected (up to a maximum of 10,000). A save or non-save mode provides the option of storing the data on LINCtape.

ADTAPE functions in two parts; the first part, initialization, displays a series of scope messages requesting user input of the required parameters for the given experiment. The main section of the program, part 2, controls the actual experiment until its conclusion.

1.2 Hardware Requirements

PDP-12A with KW12A clock and 4K of core memory

1.3 Initial Starting Procedure

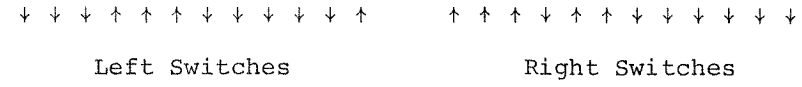
1. Mount a LAP6-DIAL[1] tape containing ADTAPE on tape unit Ø. (Unit Ø is indicated by setting the tape channel indicator to 8 on TU55 transports).
2. Mount another tape on unit 1. ADTAPE uses tape 1 to store data and will replace any previous information on the tape with incoming data if that space is needed. (This tape need not be mounted until parameter initialization is completed.)
3. Set the switches of both tape units to REMOTE and set unit Ø to WRITE ENABLE.

(R) Teletype is a registered trademark of Teletype Corporation.

[1] LAP6-DIAL is hereafter referred to as DIAL.

4. Set the mode switch to LINC mode and press I/O PRESET.

5. Set the Left Switches to Ø7Ø1 and the Right Switches to 73ØØ by pushing down the back portion of the switches indicated by ↓ and pushing down the front portion of those indicated by ↑ in the following diagram.



Left Switches Right Switches

6. Press the DO console switch.

7. When the tape has stopped moving, press the START 2Ø key.

8. Press the LINE FEED key, type LO ADTAPE,Ø and press the RETURN key.

1.4 Responding to ADTAPE

When responding to display messages that expect a numerical reply, the number of digits acceptable is indicated by the number of dashes on the display. As each digit is typed in, it replaces the leftmost dash. Any remaining blanks are ignored; supplying no digits assumes a value of Ø.

Each display includes a vertical cursor located to the left of the dash that will be replaced next. The cursor moves to the next dash as each is filled in on a line.

Each response line in a display is terminated by pressing the RETURN key. The cursor is moved to the beginning of the next line in the display. If the cursor is currently located at the last line of the display, press LINE FEED to advance to the next message. If a change is required in the value typed in for the current display, pressing RETURN when the cursor is located at the last dash in the display will move the cursor to the first dash of the current message. Press RETURN until the cursor is located at the correct line, then type in the corrected value. Press RETURN until the cursor is at the last line then press LINE FEED to proceed to the next display. Note that skipping lines that already contain values by pressing RETURN saves those values.

At any time while typing in values, Sense Switch Ø may be depressed to return to the first message and to erase all values typed in up to that point. New values can be typed in by the above procedures.

2.0 INITIALIZATION

The first part of ADTAPE is a series of displays requiring answers by the user. This sequence of messages and acceptable responses follows. Refer to section 2.13 for a chart illustrating the sequence of messages. Any errors detected in a user's response cause the message to be redisplayed when LINE FEED is pressed. All the parameters requested in the message must then be retyped.

2.1 Message 1

```
PROGRAM
A-DTAPE
TYPE C TO CONTINUE '_
```

This message requires only that C and then LINE FEED be typed to advance to the next message.

2.2 Message 2

```
STANDARD EXPERIMENT?
IF NO, TYPE N
IF YES, TYPE Y
REPLY '_
```

Any previously defined, stored set of parameters may be used for this experiment if their location on tape is known. If a new set of parameters is to be used for this experiment, type N followed by LINE FEED. Continue at message 6 which is displayed next. If a stored set of parameters is to be used, type Y followed by LINE FEED. Continue at message 3.

2.3 Message 3

```
PARAMETER LOCATION
TBLK NO '_ _ _
UNIT _
```

The location on LINCtape of the previously stored parameters to be used in this experiment are defined in this message. Type the octal tape block location (TBLK), Ø-777, and press RETURN. Then type the number of the tape unit holding the tape. Only unit Ø or 1 may be specified. Terminate the response by pressing LINE FEED.

2.4 Message 4

```
NEW START TBLK?
IF NO, TYPE N
IF YES, TYPE Y
REPLY !_
```

When a previously stored parameter set is being used, it may be desirable to store the incoming data at a new tape block so that the previously stored data is not overwritten. Type Y, press LINE FEED and continue at message 5 if a new storage location is to be used. Type N, press LINE FEED and continue at message 12 if the stored data is to be overwritten.

2.5 Message 5

```
TBLK NO. !_ _ _
```

If a new starting tape block was requested in message 4, the desired starting block must be specified. Type the octal block number (Ø-776) and press LINE FEED. Continue at message 10.

2.6 Message 6

```
STARTING CHANNEL !_
NUMBER OF CHANNELS _ _ _
```

The first channel and the number of consecutive channels starting with the specified first channel to be sampled are requested by this message. The starting channel must be in the range Ø to 37_8 and the total number of channels to be sampled can only be 1, 2, 4, 8 or 16_{10}. If some other number of channels is typed, the next largest acceptable value is assumed. A request for 12 channels, for example, will cause sixteen channels to be sampled. Be sure that the number of channels to be sampled does not exceed the last available channel, i.e., STARTING CHANNEL+NO. OF CHANNELS$\leq 40_8$.

2.7 Message 7

```
STARTING TBLK !_ _ _
RATE
U OR M OR S?
DELAY _ _ _ X RATE
```

The tape block at which data storage is to start is requested in the first line of the display. Acceptable values are Ø-776$_8$. The second line asks for the time lapse between samples and must be a multiple of 100 microseconds. Remember, that a maximum rate of 1ØØØ points/second and maximum time of 4Ø seconds/point can be sampled[1]. The units of the rate are designated by the response to line 3 where typing U indicates microseconds, M, milliseconds and S, seconds.

Because of the manner in which the clock operates, if a rate is entered in milliseconds that is greater than 4Ø95 and the unit's rightmost digit is not Ø, the tens digit is increased by 1 and the unit's digit is set to Ø.

For example:

rate requested	calculated rate	% error
4Ø96 M	4,100 M	.097
9999 M	10,000 M	.010

A delay after the SYNC pulse may be specified in line 4 of message 7. Decimal values between Ø and 999 that are a multiple of the rate are acceptable.

2.8 Message 8

```
SYNC ON:
1.  SENSE SWITCH N
2.  EXTERNAL LEVEL N
3.  CLOCK CHANNEL N
CODE ?_
N _
```

CODE is requesting a choice of sync device, specified as 1, 2, or 3 in the display. N refers to the choice of one of the following parameters for the specified device.

Device code	Parameters
1	Ø-5
2	Ø-5
3	1-3

Type the code number, press RETURN, type the parameter and press LINE FEED.

---

[1] ADTAPE will try to perform the specified operation, but may produce unacceptable results when more than 1ØØØ pts./sec. are requested. If ADTAPE detects that the sampling rate is too fast, FAST is printed on the Teletype and the experiment is terminated.

2.9 Message 9

```
      END SAMPLING ON:
1.  SENSE SWITCH N
2.  EXTERNAL LEVEL N
3.  CLOCK CHANNEL N
4.  TOTAL PTS PER CH N
      CODE !_
      N _ _ _ _
```

The signal to terminate the sampling is defined in the same manner as the sync pulse in message 8. Type the device code number (1 to 4), press RETURN, type the parameter for that device and press LINE FEED. The parameters used in message 8 apply here also; the range for choice 4 is Ø-9999. Note that the response to messages 8 and 9 can not be identical; the same device may be used, but a unique parameter is required.

2.10 Message 10

```
SAVE PARAMETERS?
IF NO, TYPE N
IF YES, TYPE Y
REPLY !_
```

The parameters specified by messages 4 through 9 can be saved for future use by typing Y. If N is typed, all parameters must be respecified for the next experiment.

2.11 Message 11

```
TBLK LOCATION?
TBLK NO !_ _ _
UNIT _
```

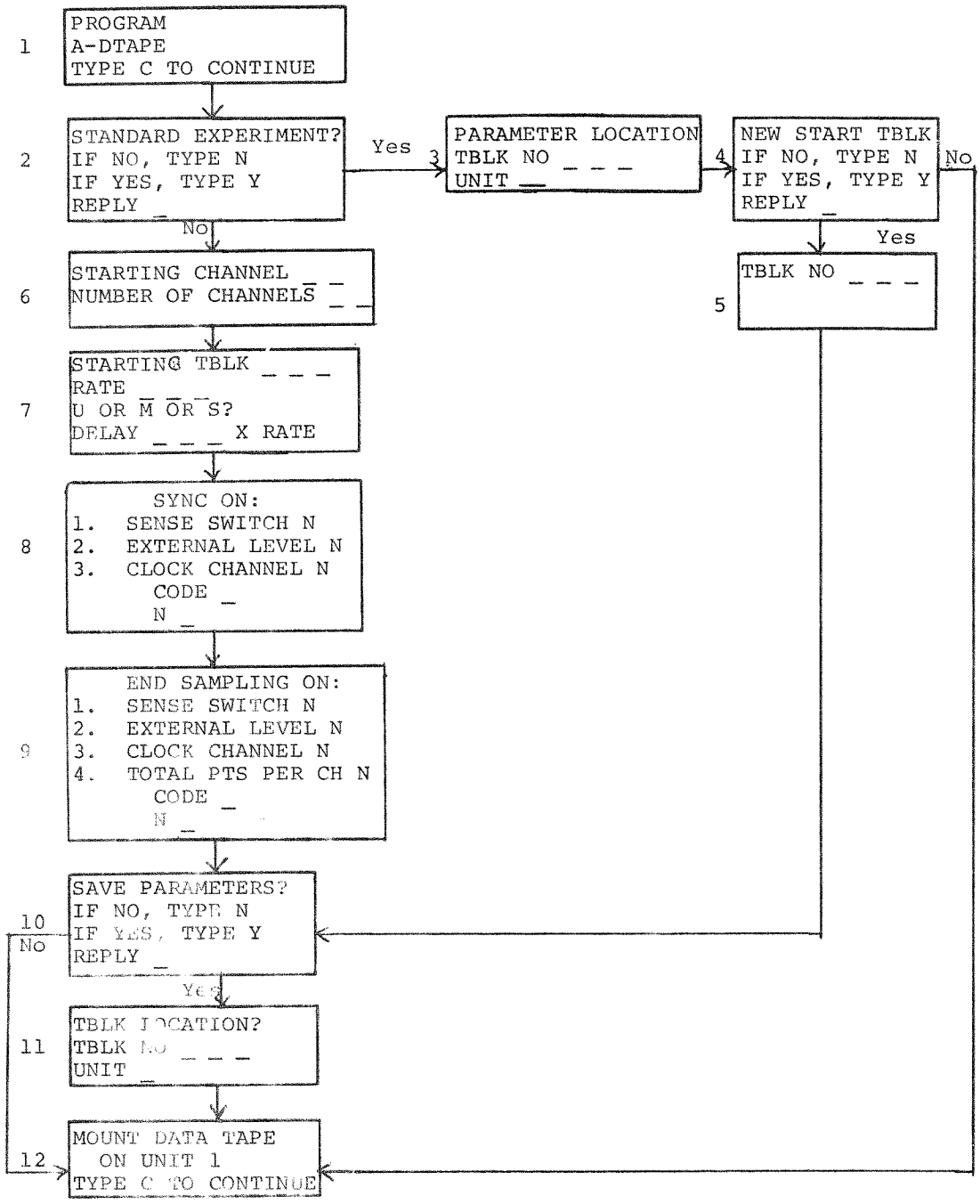
The tape block in which the parameters are to be stored is supplied by this message specified as the tape block, which must be an octal number from Ø to 777, and its unit number, Ø or 1.

2.12 Message 12

```
MOUNT DATA TAPE
  ON UNIT 1
TYPE C TO CONTINUE !_
```

Mount the data tape on unit 1 and then type C to start the experiment.

2.13 MESSAGE SEQUENCE



3.0 DATA COMMANDS

Once the experiment has been started, ADTAPE is in visual mode. The data being received on the active channels can be displayed on the scope at this time. Incoming data can also be stored by requesting store mode. Any of the following actions are implemented by typing the appropriate character. If the end of tape is reached before sampling is finished, the Teletype bell rings and TAPE is printed to alert the user to this condition.

Note that when data is being written onto tape, no check is made because the sampling rate is too fast for a write and check operation.

3.1 Channel Display

Any of the channels requested in message 6 can be displayed when the program is in visual mode. The active channels are called relative to the starting channel, as follows:

to display channel	type
n (starting channel)	1
n+1	2
n+2	3
.	.
.	.
.	.
n+8	9
n+9	A
n+10	B
.	.
.	.
.	.
n+14	F
n+15	G

Thus, if message 6 was answered as

STARTING CHANNEL 3
NUMBER OF CHANNELS 7

Then

to display channel	type
3	1
4	2
5	3
6	4
7	5
8	6
9	7
1Ø	8

Remember that eight channels will be sampled if 5, 6, or 7 channels are requested.

The data's spectrum is traced across the scope by a single dot. If two channels are requested, two dots are displayed on the scope; they are always seen at the same X axis location. The most recently requested A/D channel is displayed on scope channel 1; the second most recently requested A/D channel is displayed on scope channel 2. The channel indicator knob must be set to the desired scope channel. The indicator knob may also be set to display both scope channels; that is the recommended setting. Before choosing a channel, a moving dot is displayed on the scope, but does not represent incoming data. The dot only represents the current value of the display buffers and is of no interest to the user.

3.2 Store Mode - S

The program starts in visual mode. S must be typed to collect and store data. Data is then displayed and collected in 1K buffers in core. When a buffer is filled, it is written out on tape and another 1K buffer continues to collect the data.

3.3 Visual (non-store) Mode - V

If the initial visual mode has been exited at any time during the experiment, it can be reentered by typing V. This mode allows the data from up to two A/D channels to be displayed on the scope. No data will be stored in core or on tape in visual mode. Storing will be resumed after store mode is entered. (Refer to section 3.2.)

3.4 Pause Mode - P

Typing P temporarily stops sampling and/or writing onto tape.

3.5 Continue - C

After entering pause mode, only typing C will continue the experiment.

3.6 Rerun - R

The experiment can be restarted using the last set of parameters supplied. All data previously collected with these parameters is lost.

3.7 Return - X

Typing X causes the program to return to DIAL.[1]

3.8 End of Experiment

When the terminating signal defined in message 9 is received, the remaining locations of the buffer currently accepting data are filled with 4ØØØ and the buffer is then written onto tape. The header block is modified to accommodate the new data (refer to Appendix A). When all tape writing is completed, the bell on the Teletype rings and END is printed. Return to DIAL (X) or rerun (R) the experiment.

If the end of the assigned LINCtape is reached before the terminating signal has been received, TAPE is printed on the Teletype and the data collected up to that point is saved. END is then printed; return to DIAL (X) or rerun the experiment (R).

---

[1]The DIAL tape containing the ADTAPE program must be on unit Ø and unit Ø must be set to WRITE ENABLE and REMOTE before the RETURN command can be used.

4.0 USING ADCON

4.1 Introduction

The ADCON program takes the segmented data collected by ADTAPE and stores it in contiguous blocks on a formatted LINCtape by channel number. ADCON can be used for any or all of the sampled A/D channels.

Like ADTAPE, ADCON functions in two parts; the first part is a series of scope messages requesting user information required for part two. The second part transfers the segmented data and stores it in contiguous blocks on the formatted LINCtape.

In this discussion, only those parts of ADCON that differ from ADTAPE are detailed. If not specified, an operation is performed in the same manner as in ADTAPE.

4.2 HARDWARE REQUIREMENTS

PDP-12A with 4K of core

4.3 INITIAL STARTING PROCEDURE

The starting procedure is the same as that for ADTAPE except step 8 where ADCON is substituted for ADTAPE; the command is →LO ADCON,U .

Responses to ADCON are made in the same manner as for ADTAPE.

5.0 INITIALIZATION

5.1 Message 1

```
                    ADCON
DATA FROM THE DATA TAPE IS TRANSFERRED
TO A NEW TAPE IN CONTIGUOUS BLOCKS
TYPE C TO CONTINUE !_
```

This message requires only that C and then LINE FEED be typed to advance to the next message.

5.2 Message 2

```
LOCATION OF DATA
TO BE TRANSFERRED?
STARTING TBLK !_ _ _
UNIT _
```

The location on the data tape where the standard parameters used in the experiment reside is restated here (see message 2 of ADTAPE.) When LINE FEED is pressed, a delay of a few seconds occurs until message 3 appears.

5.3 Message 3

```
TRANSFER LOCATION?
STARTING TBLK !_ _ _
UNIT _
```

The starting location on a formatted LINCtape for output where the converted data in contiguous blocks is to be transferred is requested in message 3.

Both messages 2 and 3 require typing the 3 digit octal tape block location (TBLK), Ø-777, pressing RETURN, typing the number of the tape unit Ø-7, and terminating the response by pressing LINE FEED.

Note that the tape containing the segmented data (e.g., from ADTAPE) can be used to collect the contiguous data by ADCON. This method, however, has the following restrictions:

1. Much more time must be allotted for travelling up and down the tape to gather and store the data.
2. The starting tape block in message 3 must be less than the starting tape block in message 2 or it must be greater than the last block which contains the segmented data. If either of these conditions is not met, message 3 is redisplayed, waiting for acceptable values.

3. If insufficient space is provided on tape so that the contiguous data for a channel will overwrite segmented data, the message OVERRUN DATA is printed and the bell rings on the Teletype and ADCON message 1 is displayed. Contiguous data is put on tape up to the block where the segmented data starts, but the segmented data will not be overwritten.

5.4 Message 4

```
CREATE FILES FOR

CHANNEL NUMBER !_
TYPE A FOR ALL CHANNELS SAMPLED
TYPE C WHEN FINISHED SELECTIONS
```

Of the A/D channels sampled, the data for any or all of them can be converted into contiguous blocks of data. Type in the specific channel numbers to be converted (octal only) one at a time, followed by a LINE FEED each time. If all the sampled channels are desired, it is not necessary to type in each channel number; type the letter A followed by LINE FEED. As each channel number is typed, it appears in the spaces at the end of the channel number display. When LINE FEED is pressed after the value, that number moves from the space at the end of that line to the space between lines 1 and 2 of the display. A list of the channel numbers typed is collected in this space; each value entered moves from the end of line 2 to the list when LINE FEED is pressed. When A is typed, it appears in line 2; when LINE FEED is pressed after it, all the channel numbers sampled appear in the space between lines 1 and 2 on the display.

Non-octal numbers or more than sixteen entries are ignored.

No check is made on duplicate channel number entries. Thus, if a legal channel number is entered more than once, a file for that channel is made as many times as it is requested.

The letter C followed by pressing LINE FEED must be typed to proceed to the next message.

5.5 Message 5

```
   CAUTION!
IF UNIT Ø IS USED TO COLLECT
CONTIGUOUS DATA, REMOVE DIAL TAPE
TYPE T  TO BEGIN TRANSFER!_
```

If the PDP-12 system used has only two tape transports and unit Ø is being used to accept the data, it is advisable to remove the DIAL tape from unit Ø, as DIAL could be destroyed, and replace it with an output LINCtape to be used to accept the contiguous data. However, if other tape transports are available, they can accommodate the storage tape; the DIAL tape need not be removed, and message 5 is not displayed. The program will automatically proceed to the heading below in that case.

Typing T followed by LINE FEED initiates part 2 of the program which performs the transfer of data.

The Teletype prints out a heading for the data list as:

```
CHAN    STBLK    NB
```

As each specified channel is converted, the Teletype prints the sampled channel number (CHAN) followed by the block number on the formatted LINCtape where the contiguous data begins (STBLK) and the number of blocks used by the data (NB).

When all requested channels have been converted and the list on the Teletype is completed, a final message appears on the scope.

5.6 Message 6

```
REQUESTED DATA
HAS BEEN TRANSFERRED

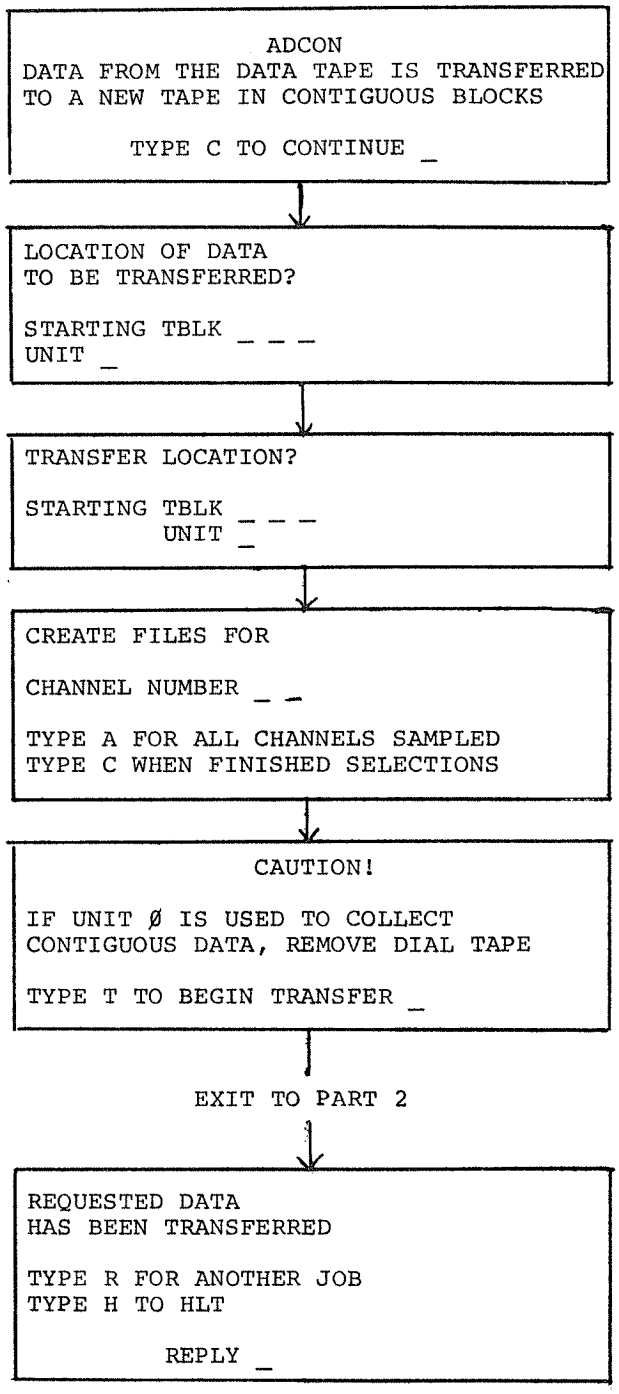
TYPE R FOR ANOTHER JOB
TYPE H TO HLT
REPLY !_
```

Typing R followed by LINE FEED causes the program to return to the message 1. Another experiment with segmented data can now be converted. If no other transfers are needed at this time, typing H followed by LINE FEED causes the processor to HALT.

Note that Sense Switch Ø can not be set to one once message 6 of ADCON is displayed.

If the last block of tape is used up before the transfer is completed, the message E.O.TAPE is printed and the bell rings on the Teletype and message 1 is redisplayed. (None of the ADTAPE command actions can be used with ADCON.)

5.7 MESSAGE SEQUENCE



APPENDIX A

ADTAPE TAPE FORMAT

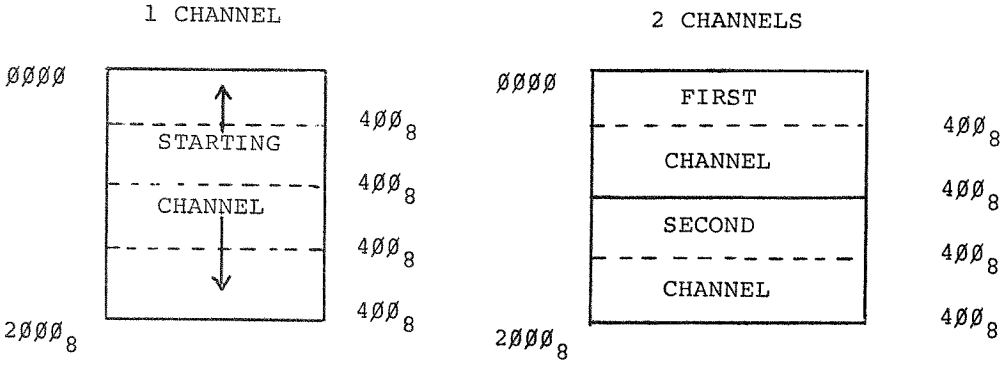
The tape block (TBLK) used to start storing data by ADTAPE is specified in message 4 or 7. The first block is used to store the set of parameters used to control the experiment in the first locations of the block as follows:

Location	Contents
1	Starting A/D channel
2	Number of consecutive A/D channels to be sampled
3	Starting tape block
4	Value used to initialize the clock control register
5	Value used to initialize the clock buffer preset register
6	Delay after sync
7	Sync code
8	Sync parameter
9	Stop code
10	Stop parameter
11	Last tape block used to store the data

The actual experimental data storage starts at block TBLK+1 and continues in succeeding blocks until the experiment is terminated.

The data is stored on tape in four block chunks (2000_8 words). Each 2000 word buffer is divided into a number of equal sections such that the number of sections equals the number of channels being sampled.

Remember that the number of channels sampled must be 1, 2, 4, 8, or 16. A buffer will therefore be sectioned in one of the five following configurations, depending on the number of channels sampled.



```
0000                    *20
0001                    /ADTAPE .20
0002                    /3/31/70
0003                    /
0004                    /PAGE 0
0005                    /
0006                            PMODE
0007                    *0
0010    0000    0000            0
0011    0001    5402            JMP I    .+1
0012    0002    1200            PDP8IN
0013    0003    0000    BETA3,  0
0014    0004    0000    BETA4,  0
0015    0005    0000    BETA5,  0
0016                    *10
0017    0010    0000    XR0,    0
0020    0011    0000    XR1,    0
0021    0012    0000    XR2,    0
0022    0013    0000    XR3,    0
0023                            *20
0024    0020    5421            JMP I  .+1
0025    0021    0200            XTART
0026    0022    0000    ENXM,   0
0027    0023    1600    OKSAMA, OKSAM
0030    0024    0660    ECA,    ECHO
0031    0025    1226    DPY,    DISPLY
0032    0026    1221    SAMXTA, TAPEX
0033    0027    7464    M314,   -314
0034                    *40
0035    0040    0000            0
0036                            LMODE
0037    0041    0060            SET I    0
0040    0042    1761            LRTN
0041    0043    0002            PDP
0042                            PMODE
0043    0044    5402            JMP I    2
0044    0045    1170    SMXT,   SAMXIT
0045    0046    1777    C1777,  1777
0046    0047    7764    M14,    -14
0047                    *50
0050    0050    0001    STCHAN, 1
0051    0051    0001    NCHAN,  1
0052    0052    0001    STTBLK, 1
0053    0053    3100    CLOCK1, 3100
0054    0054    0020    CLOCK2, 20
0055    0055    0005    SYNDLY, 5
0056    0056    0001    SYNCON, 1
0057    0057    0001    SYNNUM, 1
0060    0060    0001    STOPON, 1
0061    0061    0000    STOPNM, 0
0062    0062    0000            0
0063    0063    0002            2
0064    0064    0047    PLIST,  STCHAN-1
0065    0065    0400    C400,   400
0066    0066    7774    X4,     -4
0067    0067    0003    C3,     3
0070    0070    1243    TAPEA,  TAPE
0071    0071    0000    CCXSAV, 0
0072    0072    0303    C303,   303
0073    0073    0000    BEFORE, 0
0074    0074    0000    ENREG,  0
0075    0075    0000    IXMASK, 0
```

```
0076                    *100
0077        0100  0153  STACKT, QSTACK-1
0100        0101  0167  STAC,   QSTACK+13
0101        0102  0000  STACKE, 0
0102        0103  0000  DIS1,   0
0103        0104  0000  DIS2,   0
0104        0105  0000  TBLK,   0
0105        0106  0000  QCTR,   0
0106        0107  0000  DELTA,  0
0107        0110  0000  BUFTOP, 0
0110        0111  0000  BUFFUL, 0
0111        0112  0000  TOTPTS, 0
0112        0113  0000        0
0113        0114  0000        0
0114        0115  0000  SAMFLG, 0
0115        0116  0000  STORFG, 0
0116        0117  0000  SAMINS, 0
0117        0120  1000  C1000,  1000
0120        0121  2000  C2000,  2000
0121        0122  0000  DISP1,  0
0122        0123  0000  DISP2,  0
0123        0124  0000  PUTPTR, 0
0124        0125  0000  DISCTR, 0
0125        0126  1613  SAMSTT, SSTRING-1
0126        0127  1605  FSAM,   FSTSAM
0127        0130  0000  BINIT,  0
0130        0131  0000  CLKDL,  0
0131        0132  5533  SJMP,   JMP I   .+1
0132        0133  1000        SAMEND
0133        0134  4535  SJMS,   JMS I   .+1
0134        0135  1040        THING
0135        0136  0000  AC,     0
0136        0137  0000  LI,     0
0137        0140  0000  BUFLIM, 0
0140        0141  0000  RET,    0
0141        0142  0000  CCMASK, 0
0142        0143  0000  INMASK, 0
0143        0144  0000  OUMASK, 0
0144        0145  0000  MONSW,  0
0145        0146  1040  THINGA, THING
0146        0147  1064  QSETA,  QSET
0147        0150  1113  TIDLEA, TIDLE
0150        0151  0472  MONA,   MONITOR
0151        0152  7000  X1000,  -1000
0152        0153  0100  C100,   100
0153        0154  4001  QSTACK, 4001
0154        0155  5001        5001
0155        0156  6001        6001
0156        0157  7001        7001
0157        0160  4002        4002
0160        0161  5002        5002
0161        0162  6002        6002
0162        0163  7002        7002
0163        0164  4003        4003
0164        0165  5003        5003
0165        0166  6003        6003
0166        0167  7003        7003
0167                    /
0170                    /INITIALIZE MODE FOR ADTAPE
0171                    /
0172                          PMODE
0173                    *200
0174                    /
```

```
0175    0200  7300  XTART,  CLA CLL
0176    0201  6002          IOF
0177    0202  6141          LINC
0200                        LMODE
0201    0203  7345          JMP GOGO
0202    0204  0002          PDP
0203                        PMODE
0204    0205  7001          IAC
0205    0206  1052          TAD     STTBLK
0206    0207  3105          DCA     TBLK
0207    0210  1105          TAD     TBLK
0210    0211  1152          TAD     X1000
0211    0212  7700          SMA CLA
0212    0213  7402          HLT
0213    0214  1365          TAD     SAMAN
0214    0215  3141          DCA     RET
0215    0216  1100          TAD     STACKT
0216    0217  3011          DCA     XR1
0217    0220  3003          DCA     BETA3
0220    0221  7130          STL RAR
0221    0222  3004          DCA     BETA4
0222    0223  3103          DCA     DIS1
0223    0224  1101          TAD STAC
0224    0225  7041          CIA
0225    0226  3102          DCA STACKE
0226    0227  1375          TAD ISZDL
0227    0230  3423          DCA I OKSAMA
0230    0231  3104          DCA     DIS2
0231    0232  7040          CMA
0232    0233  3073          DCA BEFORE
0233    0234  7040          CMA
0234    0235  1051          TAD     NCHAN
0235    0236  7440          SZA
0236    0237  5242          JMP     .+3
0237    0240  1121          TAD     C2000
0240    0241  5263          JMP     EX
0241    0242  1366          TAD     X1
0242    0243  7440          SZA
0243    0244  5247          JMP     .+3
0244    0245  1120          TAD     C1000
0245    0246  5263          JMP     EX
0246    0247  1367          TAD     X2
0247    0250  7540          SMA SZA
0250    0251  5255          JMP     .+4
0251    0252  7200          CLA
0252    0253  1065          TAD     C400
0253    0254  5263          JMP     EX
0254    0255  1066          TAD     X4
0255    0256  7740          SMA SZA CLA
0256    0257  5262          JMP .+3
0257    0260  1371          TAD     C200
0260    0261  5263          JMP     EX
0261    0262  1153          TAD     C100
0262    0263  3140  EX,     DCA     BUFLIM
0263    0264  1121          TAD     C2000
0264    0265  3110          DCA     BUFTOP
0265    0266  1140          TAD     BUFLIM
0266    0267  7041          CIA
0267    0270  3111          DCA     BUFFUL
0270    0271  3112          DCA     TOTPTS
0271    0272  3113          DCA     TOTPTS+1
0272    0273  3114          DCA     TOTPTS+2
0273    0274  1140          TAD     BUFLIM
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0274    0275  3107          DCA     DELTA
0275    0276  3115          DCA     SAMFLG
0276    0277  3122          DCA     DISP1
0277    0300  3123          DCA     DISP2
0300    0301  6046          TLS
0301    0302  4424          JMS I ECA
0302    0303  1121          TAD     C2000
0303    0304  3130          DCA     BINIT
0304    0305  1050          TAD     STCHAN
0305    0306  0370          AND     C37
0306    0307  1153          TAD     C100
0307    0310  3117          DCA     SAMINS
0310    0311  1117          TAD     SAMINS
0311    0312  3773          DCA I   FSTA
0312    0313  1126          TAD     SAMSTT
0313    0314  3010          DCA     XR0
0314    0315  1051          TAD     NCHAN
0315    0316  7041          CIA
0316    0317  3116          DCA     STORFG
0317    0320  1364  IN1,    TAD     LINCI
0320    0321  3410          DCA I   XR0
0321    0322  2117          ISZ     SAMINS
0322    0323  1117          TAD     SAMINS
0323    0324  3410          DCA I   XR0
0324    0325  1363          TAD     C2
0325    0326  3410          DCA I   XR0
0326    0327  1134          TAD     SJMS
0327    0330  3410          DCA I   XR0
0330    0331  2116          ISZ     STORFG
0331    0332  5320          JMP     IN1
0332    0333  1132          TAD     SJMP
0333    0334  3410          DCA I   XR0
0334    0335  6132          CLLR
0335    0336  6133          CLAB
0336    0337  1153          TAD     C100
0337    0340  6132          CLLR
0340    0341  7200          CLA
0341    0342  1054          TAD     CLOCK2
0342    0343  7041          CIA
0343    0344  6133          CLAB
0344    0345  7200          CLA
0345    0346  1374          TAD     C300
0346    0347  6134          CLEN
0347    0350  3074          DCA ENREG
0350    0351  3071          DCA CCXSAV
0351    0352  1056          TAD     SYNCON
0352    0353  1357          TAD     INJUMP
0353    0354  3356          DCA     .+2
0354    0355  1057          TAD     SYNNUM
0355    0356  0000          0
0356    0357  5757  INJUMP, JMP I   .+0
0357    0360  0400          INSSW
0360    0361  0403          INEXF
0361    0362  0406          INCCX
0362    0363  0002  C2,     2
0363    0364  6141  LINCI,  6141
0364    0365  1020  SAMAN,  SAMEN
0365    0366  7777  X1,     -1
0366    0367  7776  X2,     -2
0367    0370  0037  C37,    37
0370    0371  0200  C200,   200
0371    0372  0004  C4,     4
0372    0373  1605  FSTA,   FSTSAM
```

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0373    0374  0300  C300,   300
0374    0375  2131  ISZDL,  ISZ CLKDL
0375                /
0376                *400
0377                /
0400    0400  4313  INSSW,  JMS     SSSET
0401    0401  3702          DCA I   SSA
0402    0402  5213          JMP     IN4
0403    0403  4321  INEXF,  JMS     EXLSET
0404    0404  3703          DCA I   EXA
0405    0405  5213          JMP IN4
0406    0406  4326  INCCX,  JMS     CCXSET
0407    0407  1075          TAD IXMASK
0410    0410  3022          DCA ENXM
0411    0411  1142          TAD     CCMASK
0412    0412  3143          DCA     INMASK
0413    0413  1060  IN4,    TAD     STOPON
0414    0414  0317          AND     C7
0415    0415  1221          TAD     JMPSTI
0416    0416  3220          DCA     .+2
0417    0417  1063          TAD STOPNM+2
0420    0420  0000          0
0421    0421  5621  JMPSTI, JMP I   .+0
0422    0422  0426          OUSSW
0423    0423  0431          OUEXL
0424    0424  0434          OUCCX
0425    0425  0437          IN5
0426    0426  4313  OUSSW,  JMS     SSSET           /SSW
0427    0427  3704          DCA I   SSO
0430    0430  5237          JMP     IN5
0431    0431  4321  OUEXL,  JMS     EXLSET          /EXL
0432    0432  3705          DCA I   EXO
0433    0433  5237          JMP     IN5
0434    0434  4326  OUCCX,  JMS     CCXSET          /CCX
0435    0435  1142          TAD     CCMASK
0436    0436  3144          DCA     OUMASK
0437    0437  7200  IN5,    CLA
0440    0440  1306          TAD C140
0441    0441  6141          LINC
0442                        LMODE
0443    0442  0004          ESF
0444    0443  0011          CLR
0445    0444  2105          ADD TBLK
0446    0445  4447          STC SBLX
0447    0446  0717          CHK 10
0450    0447  0000  SBLX,   0
0451    0450  0011          CLR
0452    0451  2507          ADD C110
0453    0452  0001          AXO
0454    0453  0002          PDP
0455                        PMODE
0456    0454  7201          CLA IAC
0457    0455  3145          DCA     MONSW
0460    0456  3106          DCA QCTR
0461    0457  6001          ION
0462    0460  7000          NOP
0463    0461  4710  MON1,   JMS I   SYNA
0464    0462  4711          JMS I   CHTTYA
0465    0463  5261          JMP     MON1
0466    0464  4712  MON2,   JMS I   STOA
0467    0465  4711          JMS I   CHTTYA
0470    0466  4425          JMS I DPY
0471    0467  5264          JMP     MON2
```

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0670                    /
0671    0660    0000    ECHO,   0
0672    0661    6041            TSF
0673    0662    5261            JMP .-1
0674    0663    6046            TLS
0675    0664    3257            DCA     KHAR
0676    0665    1344            TAD     C212
0677    0666    6041            TSF
0700    0667    5266            JMP     .-1
0701    0670    6046            TLS
0702    0671    1067            TAD     C3
0703    0672    6041            TSF
0704    0673    5272            JMP     .-1
0705    0674    6046            TLS
0706    0675    7200            CLA
0707    0676    5660            JMP I   ECHO
0710                    /
0711                    /PAUS AFTER P UNTIL C IS TYPED
0712                    /
0713    0677    6002    PAUS,   IOF
0714    0700    6031            KSF
0715    0701    5300            JMP     .-1
0716    0702    6036            KRB
0717    0703    1345            TAD     M303
0720    0704    7640            SZA CLA
0721    0705    5277            JMP     PAUS
0722    0706    1072            TAD     C303
0723    0707    4260            JMS     ECHO
0724    0710    6001            ION
0725    0711    5600            JMP I   CHKTTY
0726                    /
0727                    /SET UP DISPLAY REGISTERS DIS1 AND DIS2
0730                    /
0731    0712    1257    DISSET, TAD     KHAR
0732    0713    1346            TAD     M260
0733    0714    3257            DCA     KHAR
0734    0715    1257            TAD     KHAR
0735    0716    1347            TAD     M12
0736    0717    7710            SPA CLA
0737    0720    5324            JMP     DISS1
0740    0721    1257            TAD     KHAR
0741    0722    1350            TAD     M7
0742    0723    3257            DCA     KHAR
0743    0724    1103    DISS1,  TAD     DIS1
0744    0725    3104            DCA     DIS2
0745    0726    1257            TAD     KHAR
0746    0727    7041            CIA
0747    0730    3103            DCA     DIS1
0750    0731    5600            JMP I   CHKTTY
0751    0732    7467    M311,   -311
0752    0733    7456    M322,   -322
0753    0734    7460    M320,   -320
0754    0735    7450    M330,   -330
0755    0736    7455    M323,   -323
0756    0737    7452    M326,   -326
0757    0740    7517    M261,   -261
0760    0741    7506    M272,   -272
0761    0742    0301    M301,   301
0762    0743    7470    M310,   -310
0763    0744    0212    C212,   212
0764    0745    7475    M303,   -303
0765    0746    7520    M260,   -260
0766    0747    7766    M12,    -12
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0767    0750  7771  M7,     -7
0770    0751  1716  DIALA,  DIAL
0771    0752  1071  CCX,    TAD CCXSAV
0772    0753  0143          AND INMASK
0773    0754  7650          SNA CLA
0774    0755  5365          JMP CCX1
0775    0756  6134          CLEN
0776    0757  1074          TAD ENREG
0777    0760  0022          AND ENXM
1000    0761  6134          CLEN
1001    0762  3074          DCA ENREG
1002    0763  5764          JMP I .+1
1003    0764  1744          CLOCKG
1004    0765  1771  CCX1,   TAD I SYN15
1005    0766  3370          DCA .+2
1006    0767  5770          JMP I .+1
1007    0770  0000          0
1010    0771  1400  SYN15,  SYNGO
1011                        *1000
1012    1000  1116  SAMEND, TAD     STORFG
1013    1001  7650          SNA CLA
1014    1002  5445          JMP I   SMXT
1015    1003  2114          ISZ     TOTPTS+2
1016    1004  5210          JMP     SAM3
1017    1005  2113          ISZ     TOTPTS+1
1020    1006  7000          NOP
1021    1007  7000          NOP
1022    1010  2111  SAM3,   ISZ     BUFFUL
1023    1011  5236          JMP     SAM5
1024    1012  4264          JMS     QSET
1025    1013  4313  SAM7,   JMS     TIDLE
1026    1014  7450          SNA
1027    1015  5220          JMP     SAMEN
1030    1016  3115          DCA     SAMFLG
1031    1017  5470          JMP I   TAPEA
1032    1020  3115  SAMEN,  DCA  SAMFLG
1033    1021  7100  SAM11,  CLL
1034    1022  1130          TAD     BINIT
1035    1023  1121          TAD     C2000
1036    1024  7420          SNL
1037    1025  7410          SKP
1040    1026  1121          TAD     C2000
1041    1027  3130          DCA BINIT
1042    1030  1130          TAD     BINIT
1043    1031  3110          DCA     BUFTOP
1044    1032  1140          TAD     BUFLIM
1045    1033  7041          CIA
1046    1034  3111          DCA     BUFFUL
1047    1035  5445          JMP I SMXT
1050    1036  2110  SAM5,   ISZ     BUFTOP
1051    1037  5445          JMP I SMXT
1052                        /ROUTINE TO BE USED IN SAM LOOP
1053                        /
1054    1040  0000  THING,  0
1055    1041  3524          DCA I   PUTPTR
1056    1042  1125          TAD     DISCTR
1057    1043  1103          TAD     DIS1
1060    1044  7640          SZA CLA
1061    1045  5251          JMP     THING2
1062    1046  1524          TAD I   PUTPTR
1063    1047  3122          DCA     DISP1
1064    1050  5257          JMP     THING1
1065    1051  1125  THING2, TAD     DISCTR
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1066    1052  1104          TAD     DIS2
1067    1053  7640          SZA CLA
1070    1054  5257          JMP     THING1
1071    1055  1524          TAD I   PUTPTR
1072    1056  3123          DCA     DISP2
1073    1057  2125  THING1, ISZ     DISCTR
1074    1060  1124          TAD     PUTPTR
1075    1061  1107          TAD     DELTA
1076    1062  3124          DCA     PUTPTR
1077    1063  5640          JMP I   THING
1100                /
1101                /TIME (LONGEST 49.5 USECS
1102                /
1103    1064  0000  QSET,   0
1104    1065  1312          TAD C4X
1105    1066  1106          TAD QCTR
1106    1067  1275          TAD MLIM
1107    1070  7500          SMA
1110    1071  5277          JMP TYPAX
1111    1072  1276          TAD LIMX
1112    1073  3106          DCA QCTR
1113    1074  5664          JMP I QSET
1114    1075  7763  MLIM,   -15
1115    1076  0015  LIMX,   15
1116    1077  7200  TYPAX,  CLA
1117    1100  1304          TAD LT
1120    1101  3010          DCA XR0
1121    1102  5703          JMP I ,+1
1122    1103  1313          TYPGO
1123    1104  1104  LT,     .
1124    1105  0306          306
1125    1106  0301          301
1126    1107  0323          323
1127    1110  0324          324
1130    1111  0000          0
1131                /
1132    1112  0004  C4X,     4
1133                /CHECKS STATUS OF TAPE-EXIT WITH AC NOT= 0 IF IDLE
1134                /
1135    1113  0000  TIDLE,   0
1136    1114  7001          IAC
1137    1115  6141          LINC
1140    1116  0416          416
1141    1117  0011          11
1142    1120  0002          2
1143    1121  5713          JMP I   TIDLE
1144                /CHECK TOTAL PTS TO STOP
1145    1122  7200  TOTP,   CLA
1146    1123  1062          TAD STOPNM+1
1147    1124  7161          CLL CML CIA
1150    1125  1113          TAD TOTPTS+1
1151    1126  7530          SZL SPA
1152    1127  5337          JMP TOTP1
1153    1130  7440          SZA
1154    1131  5745          JMP I ALDA
1155    1132  1063          TAD STOPNM+2
1156    1133  7141          CIA CLL
1157    1134  1114          TAD TOTPTS+2
1160    1135  7630          SZL CLA
1161    1136  5745          JMP I ALDA
1162    1137  7200  TOTP1,  CLA
1163    1140  1744          TAD I STOPPP
1164    1141  3343          DCA ,+2
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1165      1142  5743          JMP I .+1
1166      1143  0000          0
1167      1144  1431  STOPPP, STOPP
1170      1145  1465  ALDA,   ALDONE
1171                  /
1172      1146  1357  ENSEN,  TAD EN1
1173      1147  3013          DCA XR3
1174      1150  1413          TAD I XR3
1175      1151  6041          TSF
1176      1152  5351          JMP .-1
1177      1153  6046          TLS
1200      1154  7640          SZA CLA
1201      1155  5350          JMP .-5
1202      1156  5551          JMP I MONA
1203      1157  1157  EN1,    .
1204      1160  0207          207
1205      1161  0207          207
1206      1162  0215          215
1207      1163  0212          212
1210      1164  0305          305
1211      1165  0316          316
1212      1166  0304          304
1213      1167  0000          0
1214      1170  6141  SAMXIT, LINC
1215                          LMODE
1216      1171  0223          XSK I BETA3
1217      1172  0016          NOP
1220      1173  0224          XSK I BETA4
1221      1174  0016          NOP
1222      1175  0002          PDP
1223                          PMODE
1224      1176  5426          JMP I SAMXTA
1225                  /INTERRUPT HANDLER
1226                  *1200
1227      1200  3136  PDP8IN, DCA     AC
1230      1201  7010          RAR
1231      1202  3137          DCA     LI
1232      1203  1153          TAD     C100
1233      1204  6151  6151
1234      1205  5210          JMP     CLOCK
1235      1206  7200          CLA
1236      1207  5243          JMP     TAPE
1237      1210  7200  CLOCK,  CLA
1240      1211  6131          6131
1241      1212  7402          HLT
1242      1213  6135          CLSA
1243      1214  7500          SMA
1244      1215  5220          JMP DISAB
1245      1216  7200          CLA
1246      1217  5423          JMP I   OKSAMA
1247      1220  3071  DISAB,  DCA CCXSAV
1250      1221  1137  TAPEX,  TAD     LI
1251      1222  7104          CLL RAL
1252      1223  1136          TAD     AC
1253      1224  6001  GOCAT,  ION
1254      1225  5400          JMP I   0               /BYE BYE
1255      1226  0000  DISPLY, 0
1256      1227  6141          LINC
1257                          LMODE
1260      1230  2122          ADD DISP1
1261      1231  0341          SCR 1
1262      1232  0143          DIS  BETA3
1263      1233  0011          CLR
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```
1264    1234  2123          ADD DISP2
1265    1235  0341          SCR 1
1266    1236  0144          DIS  BETA4
1267    1237  0011          CLR
1270    1240  0002          PDP
1271                        PMODE
1272    1241  5626          JMP I DISPLY
1273    1242  7777  M1X,     -1
1274                        /TAPE INTERRUPT HANDLER
1275                        /
1276    1243  1340  TAPE,   TAD     C200X
1277    1244  6151          6151
1300
1301    1245  7200          CLA
1302    1246  1106          TAD QCTR
1303    1247  7450          SNA
1304    1250  5221          JMP TAPEX
1305    1251  1242          TAD M1X
1306    1252  3106          DCA QCTR
1307    1253  1411          TAD I   XR1
1310    1254  3337          DCA     TEMP
1311    1255  1337          TAD     TEMP
1312    1256  0341          AND     C7000
1313    1257  1105          TAD     TBLK
1314    1260  3270          DCA     WRITE
1315    1261  1337          TAD     TEMP
1316    1262  0342          AND     C7X
1317    1263  1343          TAD     C640X
1320    1264  3266          DCA     .+2
1321    1265  6141          LINC
1322    1266  0000          0
1323    1267  0716          716
1324    1270  0000  WRITE,  0
1325    1271  0002          2
1326    1272  2105          ISZ     TBLK
1327    1273  1105          TAD     TBLK
1330    1274  1152          TAD     X1000
1331    1275  7700          SMA CLA
1332    1276  5311          JMP     TAPE1
1333    1277  1011          TAD     XR1
1334    1300  1102          TAD     STACKE
1335    1301  7640          SZA CLA
1336    1302  5305          JMP     TAPE3
1337    1303  1100          TAD     STACKT
1340    1304  3011          DCA     XR1
1341    1305  1115  TAPE3,  TAD     SAMFLG
1342    1306  7650          SNA CLA
1343    1307  5221          JMP      APEX
1344    1310  5541          JMP I   ET
1345    1311  1322  TAPE1,  TAD      ISTP
1346    1312  3010          DCA      R0
1347    1313  6041  TYPGO,  TSF
1350    1314  5313          JMP     .-1
1351    1315  1410          TAD I    R0
1352    1316  6046          TLS
1353    1317  7640          SZA CLA
1354    1320  5313          JMP      APE1+2
1355    1321  5744          JMP I A  AKE
1356    1322  1322  LISTP,  .
1357    1323  0215          215
1360    1324  0212          212
1361    1325  0324          324
1362    1326  0301          301
=
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1363    1327  0320          320
1364    1330  0305          305
1365    1331  0215          215
1366    1332  0212          212
1367    1333  0212          212
1370    1334  0207          207
1371    1335  0207          207
1372    1336  0000          0
1373    1337  0000  TEMP,    0
1374    1340  0200  C200X,   200
1375    1341  7000  C7000,   7000
1376    1342  0007  C7X,     7
1377    1343  0640  C640X,   640
1400    1344  1532  ALFAKE,  AL14
1401                /
1402                        LMODE
1403    1345  0011  GOGO,    CLR
1404    1346  3354          ADD C2X0
1405    1347  0004          ESF
1406    1350  0011          CLR
1407    1351  0001          AXO
1410    1352  0004          ESF
1411    1353  6000          JMP 0
1412    1354  0200  C2X0,    200
1413                        PMODE
1414                /
1415                *1400
1416                /
1417    1400  0000  SYNGO,   0
1420    1401  7200          CLA
1421    1402  1206          TAD     JMPSYN
1422    1403  1056          TAD     SYNCON
1423    1404  3205          DCA     .+1
1424    1405  0000          0
1425    1406  5606  JMPSYN,  JMP I   .+0
1426    1407  1412          SSW
1427    1410  1423          EXL
1430    1411  0752          CCX
1431    1412  7001  SSW,     IAC
1432    1413  6141          LINC
1433    1414  0000  SSWSYN,  0
1434    1415  0011          11
1435    1416  0002          2
1436    1417  7650  SYNC1,   SNA CLA
1437    1420  5600          JMP I   SYNGO
1440    1421  5622          JMP I CLAD
1441    1422  1744  CLAD,    CLOCKG
1442    1423  7001  EXL,     IAC
1443    1424  6141          LINC
1444    1425  0000  EXLSYN,  0
1445    1426  0011          11
1446    1427  0002          2
1447    1430  5217          JMP     SYNC1                    /PDP
1450                /
1451                /CHECK FOR STOP SIGNAL
1452    1431  0000  STOPP,   0
1453    1432  7200          CLA
1454    1433  1237          TAD     JMPSTO
1455    1434  1060          TAD     STOPON
1456    1435  3236          DCA     .+1
1457    1436  0000          0
1460    1437  5637  JMPSTO,  JMP I   .+0
1461    1440  1444          SSSW
```

```
1462    1441  1454          SEXL
1463    1442  1462          SCCX
1464    1443  1122          TOTP
1465    1444  7001  SSSW,   IAC
1466    1445  6141          LINC
1467    1446  0000  SSWSTO,  0
1470    1447  0011          11
1471    1450  0002          2
1472    1451  7650  STOP1,   SNA CLA
1473    1452  5631          JMP I   STOPP
1474    1453  5265          JMP     ALDONE
1475    1454  7001  SEXL,    IAC
1476    1455  6141          LINC
1477    1456  0000  EXLSTO,  0
1500    1457  0011          11
1501    1460  0002          2
1502    1461  5251          JMP     STOP1
1503    1462  1071  SCCX,    TAD CCXSAV                    /CLSA
1504    1463  0144          AND     OUMASK
1505    1464  5251          JMP     STOP1
1506    1465  7200  ALDONE,  CLA
1507    1466  6132          CLLR
1510    1467  1140          TAD     BUFLIM
1511    1470  1111          TAD     BUFFUL
1512    1471  7650          SNA CLA
1513    1472  5324          JMP     AL3
1514    1473  1110  AL1,     TAD     BUFTOP
1515    1474  3124          DCA     PUTPTR
1516    1475  1051          TAD     NCHAN
1517    1476  7041          CIA
1520    1477  3140          DCA     BUFLIM
1521    1500  7130  AL2,     STL RAR
1522    1501  4546          JMS I   THINGA
1523    1502  2140          ISZ     BUFLIM
1524    1503  5300          JMP     AL2
1525    1504  2111          ISZ     BUFFUL
1526    1505  7410          SKP
1527    1506  5311          JMP     .+3
1530    1507  2110          ISZ     BUFTOP
1531    1510  5273          JMP     AL1
1532    1511  6002          IOF
1533    1512  4547          JMS I   QSETA
1534    1513  4550          JMS I   TIDLEA
1535    1514  7450          SNA
1536    1515  5322          JMP     AL5
1537    1516  3115          DCA     SAMFLG
1540    1517  1370          TAD     AL5A
1541    1520  3141          DCA     RET
1542    1521  5470          JMP I   TAPEA
1543    1522  6001  AL5,     ION
1544    1523  3115          DCA     SAMFLG
1545    1524  1106  AL3,     TAD     QCTR
1546    1525  7640          SZA CLA
1547    1526  5324          JMP     AL3
1550    1527  4550  AL6,     JMS I   TIDLEA
1551    1530  7650          SNA CLA
1552    1531  5327          JMP     AL6
1553    1532  6002  AL14,    IOF
1554    1533  7200          CLA
1555    1534  6141          LINC
1556    1535  0001          1
1557    1536  0002          2
1560    1537  1064          TAD     PLIST
```

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1561      1540  3010          DCA      XRØ
1562      1541  1047          TAD      M14
1563      1542  3107          DCA      DELTA
1564      1543  1046          TAD      C1777
1565      1544  3011          DCA      XR1
1566      1545  1410  AL1Ø,   TAD I XRØ
1567      1546  3411          DCA I XR1
1570      1547  2107          ISZ      DELTA
1571      1550  5345          JMP      AL1Ø
1572      1551  7040          CMA
1573      1552  1105          TAD      TBLK
1574      1553  3411          DCA I XR1
1575      1554  7130          STL RAR
1576      1555  1052          TAD STTBLK
1577      1556  3362          DCA AL15
1600      1557  6141          LINC
1601      1560  0641          641
1602      1561  0716          716
1603      1562  0000  AL15,    Ø
1604      1563  0002          2
1605      1564  1067          TAD C3
1606      1565  3145          DCA      MONSW
1607      1566  5767          JMP I .+1
1610      1567  1146          ENSEN
1611      1570  1522  AL5A,   AL5
1612      1571  0104  ADPTR,  0104
1613      1572  2401          2401
1614      1573  2005          2005
1615      1574  7777          7777
1616      1575  0000          Ø
1617                *1600
1620      1600  2131  OKSAM,  ISZ      CLKDL
1621      1601  5426          JMP I SAMXTA
1622      1602  1315          TAD      JMPBY
1623      1603  3200          DCA      OKSAM
1624      1604  6141          LINC
1625      1605  0000  FSTSAM, Ø
1626      1606  0002          2
1627      1607  7200          CLA
1630      1610  1110          TAD      BUFTOP
1631      1611  3124          DCA      PUTPTR
1632      1612  7001          IAC
1633      1613  3125          DCA      DISCTR
1634      1614  0000  SSTRING,Ø
1635                /
1636                *.+100
1637      1715  5204  JMPBY,  JMP FSTSAM-1
1640                /
1641                /CALL DIAL "X" FROM TTY
1642                /
1643      1716  6002  DIAL,   IOF
1644      1717  6141          LINC
1645                          LMODE
1646      1720  7740          JMP      FIXUP
1647      1721  0642          LDF      2
1650      1722  0063          SET I    BETA3
1651      1723  2014          2014
1652      1724  0064          SET I    BETA4
1653      1725  1733          DITAB-1
1654      1726  1024          LDA I    BETA4
1655      1727  1063          STA I    BETA3
1656      1730  0450          AZE
1657      1731  7726          JMP      .-3
=
```

```
1660    1732  0602          LIF     2
1661    1733  6015          JMP     15
1662    1734  0643  DITAB,  LDF     3
1663    1735  0721          RCG I
1664    1736  7300          7\300
1665    1737  0000          0
1666    1740  0011  FIXUP,  CLR
1667    1741  0001          AXO
1670    1742  0004          ESF
1671    1743  6000          JMP 0
1672                        PMODE
1673                  /START CLOCK
1674    1744  1055  CLOCKG, TAD SYNDLY
1675    1745  7041          CIA
1676    1746  7440          SZA
1677    1747  5353          JMP .+4
1700    1750  1315          TAD JMPBY
1701    1751  3200          DCA OKSAM
1702    1752  7410          SKP
1703    1753  3131          DCA CLKDL
1704    1754  1053          TAD CLOCK1
1705    1755  6132          CLLR
1706    1756  7200          CLA
1707    1757  2145          ISZ MONSW
1710    1760  5551          JMP I MONA
1711    1761  6002  LRTN,   IOF
1712    1762  6141          LINC
1713                        LMODE
1714    1763  5774          STC ZZ
1715    1764  2040          ADD 40
1716    1765  1620          BSE I
1717    1766  6000          6000
1720    1767  5773          STC QIT
1721    1770  3774          ADD ZZ
1722    1771  0500          IOB
1723    1772  6001          6001
1724    1773  0000  QIT,    0
1725    1774  0000  ZZ,     0
1726                        SEGMNT 2
1727                        *20
1730    0020  1020          LDA I
1731    0021  0020          20
1732    0022  0004          ESF
1733    0023  1020          LDA I
1734    0024  0702          QAINIT-1
1735    0025  1040          STA
1736    0026  0011          11
1737    0027  1120          ADA I
1740    0030  2000          2000
1741    0031  4012          STC 12
1742    0032  0641          LDF 1
1743    0033  1020          LDA I
1744    0034  0702          QAINIT-1
1745    0035  1120          ADA I
1746    0036  6206          -AAAEND
1747    0037  4013          STC 13
1750    0040  1031          LDA I 11
1751    0041  1072          STA I 12
1752    0042  0233          XSK I 13
1753    0043  6040          JMP .-3
1754    0044  6057  START,  JMP M1
1755    0045  6064          JMP MA
1756    0046  6071          JMP M2
```

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1757      0047  6105          JMP M3
1760      0050  6121          JMP M4
1761      0051  6135          JMP M5
1762      0052  6151  JMPME,  JMP ME
1763      0053  6203  JMPM6,  JMP M6
1764      0054  0002          PDP
1765                          PMODE
1766      4055  5656          JMP I LOCX
1767      4056  0200  LOCX,   200
1770                          LMODE
1771      0057  0057  M1,     SET 17
1772      0060  0000          0
1773      0061  0601          LIF 1
1774      0062  6020          JMP M1A
1775      0063  6017          JMP 17
1776      0064  0057  MA,     SET 17
1777      0065  0000          0
2000      0066  0601          LIF 1
2001      0067  6041          JMP MAA
2002      0070  6017          JMP 17
2003      0071  0057  M2,     SET 17
2004      0072  0000          0
2005      0073  6703  M2A,    JMP QAINIT
2006      0074  0232          MESS2
2007      0075  0671          ANSWER
2010      0076  6227          JMP CHKSNS
2011      0077  0070          SET I 10
2012      0100  0671          ANSWER
2013      0101  0603          LIF 3
2014      0102  6020          JMP M2B
2015      0103  6017          JMP 17
2016      0104  6073          JMP M2A
2017      0105  0057  M3,     SET 17
2020      0106  0000          0
2021      0107  6703  M3A,    JMP QAINIT
2022      0110  0262          MESS3
2023      0111  0671          ANSWER
2024      0112  6227          JMP CHKSNS
2025      0113  0070          SET I 10
2026      0114  0671          ANSWER
2027      0115  0603          LIF 3
2030      0116  6141          JMP M3B
2031      0117  6017          JMP 17
2032      0120  6107          JMP M3A
2033      0121  0057  M4,     SET 17
2034      0122  0000          0
2035      0123  6703  M4A,    JMP QAINIT
2036      0124  0331          MESS4
2037      0125  0671          ANSWER
2040      0126  6227          JMP CHKSNS
2041      0127  0070          SET I 10
2042      0130  0671          ANSWER
2043      0131  0603          LIF 3
2044      0132  6231          JMP M4B
2045      0133  6017          JMP 17
2046      0134  6123          JMP M4A
2047      0135  0057  M5,     SET 17
2050      0136  0000          0
2051      0137  6703  M5A,    JMP QAINIT
2052      0140  0421          MESS5
2053      0141  0671          ANSWER
2054      0142  6227          JMP CHKSNS
2055      0143  0070          SET I 10
```

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2056      0144  0671          ANSWER
2057      0145  0603          LIF 3
2060      0146  6320          JMP M5B
2061      0147  6017          JMP 17
2062      0150  6137          JMP M5A
2063      0151  0057  ME,     SET 17
2064      0152  0000          0
2065      0153  6703  MEA,    JMP QAINIT
2066      0154  0566          MESSE
2067      0155  0671          ANSWER
2070      0156  6227          JMP CHKSNS
2071      0157  0070          SET I 10
2072      0160  0671          ANSWER
2073      0161  1330          LDH I 10
2074      0162  1420          SHD I
2075      0163  1600          1600
2076      0164  6017          JMP 17
2077      0165  1420          SHD I
2100      0166  3100          3100
2101      0167  6171          JMP MFA
2102      0170  6153          JMP MEA
2103      0171  6703  MFA,    JMP QAINIT
2104      0172  0636          MESSF
2105      0173  0671          ANSWER
2106      0174  6227          JMP CHKSNS
2107      0175  0070          SET I 10
2110      0176  0671          ANSWER
2111      0177  0603          LIF 3
2112      0200  6531          JMP MFB
2113      0201  6017          JMP 17
2114      0202  6171          JMP MFA
2115      0203  0057  M6,     SET 17
2116      0204  0000          0
2117      0205  6703  M6A,    JMP QAINIT
2120      0206  0527          MESS6
2121      0207  0671          ANSWER
2122      0210  6227          JMP CHKSNS
2123      0211  0070          SET I 10
2124      0212  0671          ANSWER
2125      0213  1330          LDH I 10
2126      0214  1420          SHD I
2127      0215  0300          0300
2130      0216  6017          JMP 17
2131      0217  6205          JMP M6A
2132      0220  0045  ANSBUF, SET 5
2133      0221  0000          0
2134      0222  1330          LDH I 10
2135      0223  0603          LIF 3
2136      0224  0040          SET 0
2137      0225  0005          5
2140      0226  6000          JMP 0
2141      0227  0440  CHKSNS, SNS 0
2142      0230  6756          JMP QARFSH
2143      0231  6044          JMP START
2144      0232  0623
2144      0233  2401
2144      0234  2224
2144      0235  1116
2144      0236  0740
2144      0237  0310
2144      0240  0116
2144      0241  1605
2144      0242  1440
```

```
2144        0243  4074
2144                    MESS2,  TEXT ZFSTARTING CHANNEL  <2
2145        0244  6243
2145
2146        0245  4743
2146        0246  0616
2146        0247  2515
2146        0250  0205
2146        0251  2240
2146        0252  1706
2146        0253  4003
2146        0254  1001
2146        0255  1616
2146        0256  0514
2146        0257  2340
2146        0260  7462
2146        0261  3400
2146                    FNUMBER OF CHANNELS <2\Z
2147        0262  0623
2147        0263  2401
2147        0264  2224
2147        0265  1116
2147        0266  0740
2147        0267  2402
2147        0270  1413
2147        0271  4074
2147                    MESS3,  TEXT ZFSTARTING TBLK <3
2150        0272  6343
2150
2151        0273  4743
2151        0274  0640
2151        0275  4040
2151        0276  4040
2151        0277  4040
2151        0300  4040
2151        0301  2201
2151        0302  2405
2151        0303  4074
2151                    F          RATE <4
2152        0304  6443
2152
2153        0305  4743
2153        0306  0640
2153        0307  2540
2153        0310  1722
2153        0311  4015
2153        0312  4017
2153        0313  2240
2153        0314  2377
2153        0315  4074
2153                    F U OR M OR S? <1
2154        0316  6143
2154
2155        0317  4743
2155        0320  0604
2155        0321  0514
2155        0322  0131
2155        0323  7540
2155        0324  7463
2155        0325  4030
2155        0326  4022
2155        0327  0124
2155        0330  0534
```

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2155                        FDELAY= <3 X RATE\Ž
2156        0331    0640
2156        0332    4040
2156        0333    4040
2156        0334    4023
2156        0335    3116
2156        0336    0340
2156        0337    1716
2156                        MESS4,  TEXT ŽF       SYNC ON:
2157        0340    7243
2157
2160        0341    4743
2160        0342    0661
2160        0343    5640
2160        0344    2305
2160        0345    1623
2160        0346    0540
2160        0347    2327
2160        0350    1124
2160        0351    0310
2160                        F1, SENSE SWITCH N
2161        0352    4016
2161        0353    4306
2161        0354    6256
2161        0355    4005
2161        0356    3024
2161        0357    0522
2161        0360    1601
2161        0361    1440
2161        0362    1405
2161        0363    2605
2161        0364    1440
2161                        F2, EXTERNAL LEVEL N
2162        0365    1643
2162        0366    0663
2162        0367    5640
2162        0370    0314
2162        0371    1703
2162        0372    1340
2162        0373    0310
2162        0374    0116
2162        0375    1605
2162        0376    1440
2162                        F3, CLOCK CHANNEL N
2163        0377    1643
2163
2164        0400    4743
2164        0401    0640
2164        0402    4040
2164        0403    4040
2164        0404    4040
2164        0405    4003
2164        0406    1704
2164        0407    0540
2164                        F         CODE <1
2165        0410    7461
2165        0411    4306
2165        0412    4040
2165        0413    4040
2165        0414    4040
2165        0415    4040
2165        0416    1640
2165        0417    7461
```

```
2165       0420  3400
2165                   F         N <1\Z
2166
2167       0421  0640
2167       0422  4040
2167       0423  0516
2167       0424  0440
2167       0425  2301
2167       0426  1520
2167       0427  1411
2167       0430  1607
2167       0431  4017
2167                   MESS5,  TEXT ZF   END SAMPLING ON:
2170       0432  1672
2170
2171       0433  4347
2171       0434  4306
2171       0435  6156
2171       0436  4023
2171       0437  0516
2171       0440  2305
2171       0441  4023
2171       0442  2711
2171       0443  2403
2171       0444  1040
2171                   F1, SENSE SWITCH N
2172       0445  1643
2172       0446  0662
2172       0447  5640
2172       0450  0530
2172       0451  2405
2172       0452  2216
2172       0453  0114
2172       0454  4014
2172       0455  0526
2172       0456  0514
2172                   F2, EXTERNAL LEVEL N
2173       0457  4016
2173       0460  4306
2173       0461  6356
2173       0462  4003
2173       0463  1417
2173       0464  0313
2173       0465  4003
2173       0466  1001
2173       0467  1616
2173       0470  0514
2173                   F3, CLOCK CHANNEL N
2174       0471  4016
2174       0472  4306
2174       0473  6456
2174       0474  4024
2174       0475  1724
2174       0476  0114
2174       0477  4020
2174       0500  2423
2174       0501  4020
2174       0502  0522
2174       0503  4003
2174       0504  1056
2174                   F4, TOTAL PTS PER CH, N
2175       0505  4016
2175
```

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2176       0506   4347
2176       0507   4306
2176       0510   4040
2176       0511   4040
2176       0512   4040
2176       0513   4040
2176       0514   0317
2176       0515   0405
2176       0516   4074
2176                     F         CODE <1
2177       0517   6143
2177       0520   0640
2177       0521   4040
2177       0522   4040
2177       0523   4040
2177       0524   4016
2177       0525   4074
2177       0526   6434
2177                     F         N <4\Z
2200
2201       0527   0640
2201       0530   4015
2201       0531   1725
2201       0532   1624
2201       0533   4004
2201       0534   0124
2201       0535   0140
2201       0536   2401
2201                     MESS6,  TEXT ZF  MOUNT DATA TAPE
2202       0537   2005
2202
2203       0540   4347
2203       0541   4306
2203       0542   4040
2203       0543   4040
2203       0544   4017
2203       0545   1640
2203       0546   2516
2203       0547   1124
2203                     F      ON UNIT 1
2204       0550   4061
2204
2205       0551   4347
2205       0552   4306
2205       0553   2431
2205       0554   2005
2205       0555   4003
2205       0556   4024
2205       0557   1740
2205       0560   0317
2205       0561   1624
2205       0562   1116
2205       0563   2505
2205       0564   7461
2205       0565   3400
2205                     FTYPE C TO CONTINUE<1\Z
2206       0566   0640
2206       0567   4023
2206       0570   0126
2206       0571   0540
2206       0572   2001
2206       0573   2201
2206       0574   1505
```

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2206      0575  2405
2206      0576  2223
2206                    MESSE,  TEXT ZF  SAVE PARAMETERS?
2207      0577  7743
2207
2210      0600  4743
2210
2211      0601  4743
2211      0602  0640
2211      0603  4040
2211      0604  1106
2211      0605  4016
2211      0606  1754
2211      0607  2431
2211      0610  2005
2211      0611  4040
2211                    F   IF NO,TYPE  N
2212      0612  1643
2212      0613  0640
2212      0614  4040
2212      0615  1106
2212      0616  4031
2212      0617  0523
2212      0620  5424
2212      0621  3120
2212      0622  0540
2212                    F   IF YES,TYPE  Y
2213      0623  4031
2213
2214      0624  4347
2214      0625  4306
2214      0626  4040
2214      0627  4040
2214      0630  4040
2214      0631  2205
2214      0632  2014
2214      0633  3140
2214      0634  7461
2214      0635  3400
2214                    F       REPLY <1\Z
2215      0636  0640
2215      0637  4040
2215      0640  2402
2215      0641  1413
2215      0642  4014
2215      0643  1703
2215      0644  0124
2215      0645  1117
2215                    MESSF,  TEXT ZF   TBLK LOCATION?
2216      0646  1677
2216
2217      0647  4347
2217
2220      0650  4347
2220      0651  4306
2220      0652  4040
2220      0653  4040
2220      0654  2402
2220      0655  1413
2220      0656  4016
2220      0657  1756
2220      0660  4074
2220                    F    TBLK NO, <3
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2221        0661   6343
2221        0662   0640
2221        0663   4040
2221        0664   4025
2221        0665   1611
2221        0666   2440
2221        0667   4074
2221        0670   6134
2221                      F    UNIT  <1\Z
2222        0671   0000   ANSWER, Ø
2223                             *,+11
2224                             NOLIST
3201                             SEGMNT 3
3202                             *20
3203        0020   0055   M2B,     SET 15
3204        0021   0000            Ø
3205        0022   0054            SET 14
3206        0023   0655            INPTR
3207        0024   0640            LDF Ø
3210        0025   1020            LDA I
3211        0026   0010            10
3212        0027   1040            STA
3213        0030   0647            MULWD
3214        0031   0017            COM
3215        0032   4641            STC UPLIM
3216        0033   6611            JMP CHAR
3217        0034   0467            SKP
3220        0035   7016            JMP ERRORX
3221        0036   1000            LDA
3222        0037   0656            OCTAC
3223        0040   1120            ADA I
3224        0041   7740            -37
3225        0042   0471            APO I
3226        0043   7016            JMP ERRORX
3227        0044   1000            LDA
3230        0045   0656            OCTAC
3231        0046   1460            SAE I
3232        0047   7777            7777
3233        0050   0467            SKP
3234        0051   0011            CLR
3235        0052   4657            STC STCHTP
3236        0053   1020            LDA I
3237        0054   0012            12
3240        0055   1040            STA
3241        0056   0647            MULWD
3242        0057   0017            COM
3243        0060   4641            STC UPLIM
3244        0061   6611            JMP CHAR
3245        0062   0467            SKP
3246        0063   7016            JMP ERRORX
3247        0064   1000            LDA
3250        0065   0656            OCTAC
3251        0066   0470            AZE I
3252
3253        0067   7016            JMP ERRORX
3254        0070   1120            ADA I
3255        0071   7757            -20
3256        0072   0471            APO I
3257        0073   7016            JMP ERRORX
3260        0074   1120            ADA I
3261        0075   0010            10
3262        0076   0471            APO I
3263        0077   6130            JMP NCH20
-
```

```
3264      0100  1120            ADA I
3265      0101  0004            4
3266      0102  0471            APO I
3267      0103  6133            JMP  NCH10
3270      0104  1120            ADA I
3271      0105  0002            2
3272      0106  0471            APO I
3273      0107  6136            JMP NCH4
3274      0110  1000            LDA
3275      0111  0656            OCTAC
3276      0112  1040  SUMCHN,    STA
3277      0113  0660            NCHTP
3300      0114  2657            ADD STCHTP
3301      0115  1120            ADA I
3302      0116  7737            -40
3303      0117  0471            APO I
3304      0120  7016            JMP ERRORX
3305      0121  1000            LDA
3306      0122  0657            STCHTP
3307      0123  1074            STA I 14
3310      0124  1000            LDA
3311      0125  0660            NCHTP
3312      0126  1074            STA I 14
3313      0127  7017            JMP NORMX
3314      0130  1020  NCH20,     LDA I
3315      0131  0020            20
3316      0132  6112            JMP SUMCHN
3317      0133  1020  NCH10,     LDA I
3320      0134  0010            10
3321      0135  6112            JMP SUMCHN
3322      0136  1020  NCH4,      LDA I
3323      0137  0004            4
3324      0140  6112            JMP SUMCHN
3325      0141  0055  M3B,       SET 15
3326      0142  0000            0
3327      0143  1020            LDA I
3330      0144  7767            -10
3331      0145  4724            STC UPLIM1
3332      0146  1020            LDA I
3333      0147  7223            JMP M8TAC
3334      0150  4750            STC MULWD1
3335      0151  6662            JMP CHRTPL
3336      0152  0467            SKP
3337      0153  7016            JMP ERRORX
3340      0154  1000            LDA
3341      0155  1203            LOTAC
3342      0156  1040            STA             /STR STBLK TEMP
3343      0157  1370            STBLK
3344      0160  1120            ADA I           /STBLK < 777?
3345      0161  7001            -776
3346      0162  0471            APO I
3347      0163  7016            JMP ERRORX      /NO
3350      0164  1020            LDA I           /CONVERT RATE &
3351      0165  7765            -12             /DELAY FROM DEC,
3352      0166  4724            STC UPLIM1      /INP TO OCT SUM
3353      0167  1020            LDA I
3354      0170  7235            JMP M10TAC
3355      0171  4750            STC MULWD1
3356      0172  6662            JMP CHRTPL
3357      0173  0467            SKP
3360      0174  7016            JMP ERRORX
3361      0175  0602            LIF 2
3362      0176  6220            JMP ANSBUF
=
```

```
3363    0177  1420          SHD I           /IS CHAR A U?
3364    0200  2500          2500
3365    0201  7023          JMP UCHK        /YES
3366    0202  1420          SHD I           /IS CHAR AN M?
3367    0203  1500          1500
3370    0204  7040          JMP MCHK        /YES
3371    0205  1420          SHD I           /IS CHAR AN S?
3372    0206  2300          2300
3373    0207  7050          JMP SCHK        /YES
3374    0210  7016          JMP ERRORX
3375    0211  0602  RTN,     LIF 2
3376    0212  6220          JMP ANSBUF
3377    0213  1420          SHD I           /NEXT CHAR
3400    0214  7400          7400            /IS A 74?
3401    0215  0467          SKP             /YES
3402    0216  7016          JMP ERRORX      /HAS TO BE
3403    0217  7267          JMP CNTREG
3404    0220  0467          SKP
3405    0221  7016          JMP ERRORX
3406    0222  6662          JMP CHRTPL
3407    0223  0467          SKP
3410    0224  7016          JMP ERRORX
3411    0225  1000          LDA             /GET DELAY
3412    0226  1203          LOTAC           /NUM
3413    0227  1074          STA I 14        /STORE SYNDLY
3414    0230  7017          JMP NORMX
3415    0231  0055  M4B,     SET 15
3416    0232  0000          0
3417    0233  1020          LDA I           /CONVERT SYNCON
3420    0234  0010          10              /NUM FROM
3421    0235  1040          STA             /OCTAL INPUT
3422    0236  0647          MULWD           /TO
3423    0237  0017          COM             /OCTAL
3424    0240  4641          STC UPLIM       /SUM
3425    0241  6611          JMP CHAR
3426    0242  0467          SKP
3427    0243  7016          JMP ERRORX
3430    0244  1000          LDA
3431    0245  0656          OCTAC
3432    0246  4657          STC STCHTP      /TEMP STORE
3433    0247  6611          JMP CHAR
3434    0250  0467          SKP
3435    0251  7016          JMP ERRORX
3436    0252  1000          LDA
3437    0253  0657          STCHTP          /GET SYNCON NUM
3440    0254  1460          SAE I           /IS IT CL,CH,?
3441    0255  0003          3
3442    0256  6270          JMP BYCLK       /NO
3443    0257  1000          LDA             /YES
3444    0260  0656          OCTAC
3445    0261  0451          APO
3446    0262  7016          JMP ERRORX
3447    0263  1120          ADA I           /CCH IS NONNEG
3450    0264  7774  MINUS3, -3              /CCH LESS THAN 4
3451    0265  0471          APO I
3452    0266  7016          JMP ERRORX      /SHOULD BE
3453    0267  6305          JMP DONE        /YES
3454    0270  1460  BYCLK,  SAE I           /IS IT EXTL?
3455    0271  0002          2
3456    0272  0467          SKP
3457    0273  6277          JMP BYCLK1
3460    0274  1460          SAE I           /IS IT SSW?
3461    0275  0001          1
=
```

```
3462    0276  7016          JMP ERRORX      /NO
3463    0277  1000  BYCLK1, LDA
3464    0300  0656          OCTAC
3465    0301  1120          ADA I           /IS SSW OR EXTL
3466    0302  7772  MINUS5, -5              /NUM LESS THAN 6
3467    0303  0471          APO I
3470    0304  7016          JMP ERRORX      /NO
3471    0305  1000  DONE,   LDA             /YES
3472    0306  0657          STCHTP
3473    0307  1074          STA I 14        /STORE SYNCON
3474    0310  1000          LDA
3475    0311  0656          OCTAC
3476    0312  1460          SAE I
3477    0313  7777          7777
3500    0314  0467          SKP
3501    0315  0011          CLR
3502    0316  1074          STA I 14        /STORE SYNNUM
3503    0317  7017          JMP NORMX
3504    0320  0055  M5B,     SET 15
3505    0321  0000          0
3506    0322  6662          JMP CHRTPL
3507    0323  0467          SKP
3510    0324  7016          JMP ERRORX
3511    0325  7204          JMP TACMOV
3512    0326  1103          HOTAC1          /SAVE STOPON
3513    0327  6662          JMP CHRTPL
3514    0330  0467          SKP
3515    0331  7016          JMP ERRORX
3516    0332  7204          JMP TACMOV
3517    0333  1106          NTAC1           /SAVE STOPNO
3520    0334  0062          SET I 2         /ADDR-1 OF
3521    0335  2055          2055            /SYNCON NUM
3522    0336  1022          LDA I 2         /GET SYNCON
3523    0337  0017          COM
3524    0340  3105          ADD LOTAC1      /ADD STOPON
3525    0341  0450          AZE             /SYNCON=STOPON?
3526    0342  6347          JMP .+5         /NO
3527    0343  1022          LDA I 2         /GET SYNNUM
3530    0344  0017          COM
3531    0345  3110          ADD NTAC3       /ADD STOPNO
3532    0346  0450          AZE             /SYNNUM=STOPNO?
3533    0347  0467          SKP             /NO
3534    0350  7016          JMP ERRORX      /THEY MUST DIFF.
3535    0351  1000          LDA
3536    0352  1105          LOTAC1          /GET STOPON
3537    0353  1460          SAE I           /TOTAL PTS
3540    0354  0004          4               /PER CHAN?
3541    0355  0467          SKP
3542    0356  6412          JMP DONE1       /YES
3543    0357  1460          SAE I           /CL,CH,?
3544    0360  0003          3
3545    0361  6375          JMP BYCLK2      /NO
3546    0362  1000          LDA             /YES
3547    0363  1106          NTAC1
3550    0364  0451          APO             /CL,CH,>0?
3551    0365  7016          JMP ERRORX      /SHOULD BE
3552    0366  7111          JMP TPLADD      /CL, CH,<4?
3553    0367  0427          SUBT3
3554    0370  1000          LDA
3555    0371  1201          HOTAC
3556    0372  0471          APO I
3557    0373  7016          JMP ERRORX      /NO,SHOULD BE
3560    0374  6412          JMP DONE1       /YES
```

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3561    0375  1460  BYCLK2, SAE I
3562    0376  0002          2               /EXT LEVEL?
3563    0377  0467          SKP
3564    0400  6404          JMP BYCLK3
3565    0401  1460          SAE I
3566    0402  0001          1               /SSW?
3567    0403  7016          JMP ERRORX
3570    0404  7111  BYCLK3, JMP TPLADD      /IS EXTL
3571    0405  0432          SUBT6           /OR SSW<6?
3572    0406  1000          LDA
3573    0407  1201          HOTAC
3574    0410  0471          APO I
3575    0411  7016          JMP ERRORX      /NO
3576    0412  1000  DONE1,  LDA             /YES
3577    0413  1105          LOTAC1
3600    0414  1074          STA I 14        /STORE STOPON
3601    0415  1000          LDA
3602    0416  1106          NTAC1           /STORE
3603    0417  1074          STA I 14        /STOPNO
3604    0420  1000          LDA             /IT
3605    0421  1107          NTAC2           /IS
3606    0422  1074          STA I 14        /A
3607    0423  1000          LDA             /TRIPPLE
3610    0424  1110          NTAC3           /PREC
3611    0425  1074          STA I 14        /NUM
3612    0426  7017          JMP NORMX
3613    0427  7777  SUBT3,  7777
3614    0430  7777          7777
3615    0431  7774          7774            /-3
3616    0432  7777  SUBT6,  7777
3617    0433  7777          7777
3620    0434  7772          7772            /-5
3621    0435  0055  MBB,    SET 15
3622    0436  0000          0
3623    0437  0640          LDF 0
3624    0440  1020          LDA I
3625    0441  0010          10
3626    0442  1040          STA
3627    0443  1012          MULWD3
3630    0444  0017          COM
3631    0445  5004          STC UPLIM3
3632    0446  6754          JMP CHRTER
3633    0447  0467          SKP
3634    0450  6604          JMP ERORX
3635    0451  1000          LDA             /SAVE
3636    0452  0656          OCTAC           /PARAMETER
3637    0453  4602          STC PTBNSV      /TBLK NO.
3640    0454  6754          JMP CHRTER
3641    0455  0467          SKP
3642    0456  6604          JMP ERORX
3643    0457  1000          LDA
3644    0460  0656          OCTAC
3645    0461  1040          STA             /SAVE
3646    0462  0603          UNITSV          /UNIT NO.
3647    0463  1120          ADA I
3650    0464  7776          -1
3651    0465  0471          APO I
3652    0466  6604          JMP ERORX
3653    0467  1000          LDA
3654    0470  0603          UNITSV
3655    0471  0470          AZE I
3656    0472  6475          JMP .+3
3657    0473  1020          LDA I
```

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3660    0474  0010          10
3661    0475  1120          ADA I
3662    0476  0700          RDC
3663    0477  4504          STC TPWRD1
3664    0500  1020          LDA I             /MBLK = Ø OF
3665    0501  4000          4000              /CURRENT DF
3666    0502  2602          ADD PTBNSV
3667    0503  4505          STC TPWRD2
3670    0504  0000  TPWRD1, Ø
3671    0505  0000  TPWRD2, Ø
3672    0506  6605          JMP NOMX
3673    0507  0055  MDB,     SET 15
3674    0510  0000          Ø
3675    0511  6754          JMP CHRTER
3676    0512  0467          SKP
3677    0513  6604          JMP ERORX
3700    0514  1000          LDA
3701    0515  0656          OCTAC
3702    0516  1460          SAE I
3703    0517  7777          7777
3704    0520  0467          SKP
3705    0521  0011          CLR
3706    0522  1040          STA
3707    0523  2052          2000+52
3710    0524  1120          ADA I
3711    0525  7001          -776
3712    0526  0471          APO I             /STTBLK < 777?
3713    0527  6604          JMP ERORX         /NO
3714    0530  6605          JMP NOMX
3715    0531  0055  MFB,     SET 15
3716    0532  0000          Ø
3717    0533  1020          LDA I
3720    0534  0010          10
3721    0535  1040          STA
3722    0536  0647          MULWD
3723    0537  0017          COM
3724    0540  4641          STC UPLIM
3725    0541  6611          JMP CHAR
3726    0542  0467          SKP
3727    0543  7016          JMP ERRORX
3730    0544  1000          LDA               /SAVE
3731    0545  0656          OCTAC             /PARAMETER
3732    0546  4602          STC PTBNSV        /TBLK NO.
3733    0547  6611          JMP CHAR
3734    0550  0467          SKP
3735    0551  7016          JMP ERRORX
3736    0552  1000          LDA
3737    0553  0656          OCTAC
3740    0554  1040          STA               /SAVE
3741    0555  0603          UNITSV            /UNIT NO.
3742    0556  1120          ADA I
3743    0557  7776          -1
3744    0560  0471          APO I
3745    0561  7016          JMP ERRORX
3746    0562  1000          LDA
3747    0563  0603          UNITSV
3750    0564  0470          AZE I
3751    0565  6570          JMP .+3
3752    0566  1020          LDA I
3753    0567  0010          10
3754    0570  1120          ADA I
3755    0571  0704          WRC
3756    0572  4577          STC TAPEW1
=
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3757    0573  1020          LDA I           /MBLK=0 OF
3760    0574  4000          4000            /CURRENT DF
3761    0575  2602          ADD PTBNSV
3762    0576  4600          STC TAPEW2
3763    0577  0000  TAPEW1,  0
3764    0600  0000  TAPEW2,  0
3765    0601  7017          JMP NORMX
3766    0602  0000  PTBNSV,  0
3767    0603  0000  UNITSV,  0
3770    0604  0235  ERORX,   XSK I 15
3771    0605  0601  NOMX,    LIF 1
3772    0606  0040          SET 0
3773    0607  0015          15
3774    0610  6000          JMP 0
3775    0611  0056  CHAR,    SET 16
3776    0612  0000          0
3777    0613  0011          CLR
4000    0614  4656          STC OCTAC       /CLR LOC OCTAC
4001    0615  0602  LOOP1,   LIF 2
4002    0616  6220          JMP ANSBUF
4003    0617  1420          SHD I
4004    0620  7400          7400            /END OF ANS F.?
4005    0621  6016          JMP 16          /YES
4006    0622  1420          SHD I           /NO
4007    0623  3400          3400            /EOM?
4010    0624  6016          JMP 16          /YES
4011    0625  1420          SHD I           /NO
4012    0626  0000          0               /A BLANK?
4013    0627  6615          JMP LOOP1       /YES
4014    0630  1120          ADA I           /NO
4015    0631  7717          -60             /A DIGIT?
4016    0632  1040          STA
4017    0633  0661          NUM
4020    0634  1120          ADA I
4021    0635  0001          1
4022    0636  0451          APO             /NUM IS NONNEG?
4023    0637  6653          JMP XIT         /SHOULD BE
4024    0640  1120          ADA I           /YES
4025    0641  0000  UPLIM,   0              /IS NUM LESS
4026    0642  0471          APO I           /THAN 10 OR 12?
4027    0643  6653          JMP XIT         /IT SHOULD BE
4030    0644  1000          LDA             /YES
4031    0645  0656          OCTAC           /MUL BY 10 OR 12
4032    0646  1260          MUL I           /FOR OCT OR DEC
4033    0647  0000  MULWD,   0              /CONVERSION
4034    0650  2661          ADD NUM
4035    0651  4656          STC OCTAC
4036    0652  6615          JMP LOOP1
4037    0653  0236  XIT,     XSK I 16        /BEGIN MESS AGN,
4040    0654  6016          JMP 16
4041    0655  2047  INPTR,   2047
4042    0656  0000  OCTAC,   0
4043    0657  0000  STCHTP,  0
4044    0660  0000  NCHTP,   0
4045    0661  0000  NUM,     0
4046    0662  0056  CHRTPL,  SET 16          /RTN JMP TO
4047    0663  0000          0               /CURRENT MESS
4050    0664  0011          CLR
4051    0665  5074          STC NUMSAV
4052    0666  7253          JMP TPLCLR      /CLR TAC
4053    0667  1201          HOTAC
4054    0670  7253          JMP TPLCLR      /CLR A T.P. REG
4055    0671  1106          NTAC1
```

```
4056    0672  0064          SET I 4
4057    0673  0000          Ø
4060    0674  0602  LOOP2,  LIF 2
4061    0675  6220          JMP ANSBUF
4062    0676  1420          SHD I
4063    0677  7400          7400              /E,O,ANS,F,?
4064    0700  6016          JMP 16
4065    0701  1420          SHD I
4066    0702  3400          3400              /EOM?
4067    0703  6016          JMP 16
4070    0704  1420          SHD I
4071    0705  0000          Ø                 /A BLANK?
4072    0706  6674          JMP LOOP2
4073    0707  1120          ADA I
4074    0710  7717          -6Ø               /A DIGIT?
4075    0711  0450          AŻE
4076    0712  6715          JMP ,+3
4077    0713  1020          LDA I             /MAKE +Ø
4100    0714  0000          Ø
4101    0715  1040          STA
4102    0716  0661          NUM
4103    0717  1120          ADA I
4104    0720  0001          1
4105    0721  0451          APO               /NON NEG?
4106    0722  6653          JMP XIT           /SHOULD BE
4107    0723  1120          ADA I             /YES
4110    0724  0000  UPLIM1, Ø                 /IS NO<1Ø OR 12?
4111    0725  0471          APO I
4112    0726  6653          JMP XIT           /SHOULD BE
4113    0727  0224          XSK I 4           /INCR B4
4114    0730  1000          LDA
4115    0731  0004          4
4116    0732  1460          SAE I             /C(B3)=3?
4117    0733  0003          3
4120    0734  0467          SKP               /NO
4121    0735  6741          JMP ,+4           /YES
4122    0736  1460          SAE I             /C(B3)=4?
4123    0737  0004          4
4124    0740  6745          JMP .+5           /NO
4125    0741  1000          LDA               /YES
4126    0742  1074          NUMSAV            /SAVE SUM
4127    0743  2661          ADD NUM           /OF 3RD AND
4130    0744  5074          STC NUMSAV        /4TH DIGITS
4131    0745  1000          LDA
4132    0746  0661          NUM               /GET DIGIT BACK
4133    0747  5110          STC NTAC3
4134    0750  0000  MULWD1, Ø
4135    0751  7111          JMP TPLADD        /ADD NUM
4136    0752  1106          NTAC1             /TO TAC
4137    0753  6674          JMP LOOP2         /GET NEXT CHAR
4140    0754  0056  CHRTER, SET 16
4141    0755  0000          Ø
4142    0756  0011          CLR
4143    0757  4656          STC OCTAC
4144    0760  0601  LOOP3,  LIF 1
4145    0761  6133          JMP ANSBF
4146    0762  1420          SHD I
4147    0763  7400          7400
4150    0764  6016          JMP 16
4151    0765  1420          SHD I
4152    0766  3400          3400
4153    0767  6016          JMP 16
4154    0770  1420          SHD I
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4155    0771  0000          0
4156    0772  6760          JMP LOOP3
4157    0773  1120          ADA I
4160    0774  7717          -60
4161    0775  1040          STA
4162    0776  0661          NUM
4163    0777  1120          ADA I
4164    1000  0001          1
4165    1001  0451          APO
4166    1002  6653          JMP XIT
4167    1003  1120          ADA I
4170    1004  0000  UPLIM3,  0
4171    1005  0471          APO I
4172    1006  6653          JMP XIT
4173    1007  1000          LDA
4174    1010  0656          OCTAC
4175    1011  1260          MUL I
4176    1012  0000  MULWD3,  0
4177    1013  2661          ADD NUM
4200    1014  4656          STC OCTAC
4201    1015  6760          JMP LOOP3
4202    1016  0235  ERRORX,  XSK I 15
4203    1017  0602  NORMX,   LIF 2
4204    1020  0040          SET 0
4205    1021  0015          15
4206    1022  6000          JMP 0
4207    1023  7204  UCHK,    JMP TACMOV
4210    1024  1103          HOTAC1          /LOC OF T,P, NUM
4211    1025  1000          LDA
4212    1026  1074          NUMSAV
4213    1027  0450          AZE             /MULT OF 100USEC
4214    1030  7016          JMP ERRORX      /NO
4215    1031  7111          JMP TPLADD      /YES
4216    1032  1075          M1000           /IS NO>=1000?
4217    1033  1000          LDA
4220    1034  1201          HOTAC
4221    1035  0451          APO
4222    1036  7016          JMP ERRORX      /IT MUST BE
4223    1037  6211          JMP RTN         /YES
4224    1040  0063  MCHK,    SET I 3
4225    1041  7774          -3
4226    1042  7235          JMP M10TAC      /MUL BY 1000
4227    1043  0223          XSK I 3         /CHG TO USEC
4230    1044  7042          JMP .-2
4231    1045  7204          JMP TACMOV
4232    1046  1103          HOTAC1          /LOC OF T,P, NUM
4233    1047  6211          JMP RTN
4234    1050  0063  SCHK,    SET I 3
4235    1051  7771          -6
4236    1052  7204          JMP TACMOV
4237    1053  1103          HOTAC1          /SAVE T,P, NUM
4240    1054  7111          JMP TPLADD
4241    1055  1100          M50             /NUM<=40?
4242    1056  1000          LDA
4243    1057  1201          HOTAC
4244    1060  0471          APO I
4245    1061  7016          JMP ERRORX      /NO
4246    1062  7253          JMP TPLCLR
4247    1063  1201          HOTAC           /CLR TAC
4250    1064  7111          JMP TPLADD
4251    1065  1103          HOTAC1
4252    1066  7235          JMP M10TAC      /MUL BY 1000000
4253    1067  0223          XSK I 3         /CHG TO U-SEC
-
```

```
4254    1070  7066          JMP ,-2
4255    1071  7204          JMP TACMOV
4256    1072  1103          HOTAC1              /LOC OF T.P. NUM
4257    1073  6211          JMP RTN
4260    1074  0000  NUMSAV,  0
4261    1075  7777  M1000,   7777
4262    1076  7777          7777
4263    1077  6030          6030                /-1747 OCTAL
4264    1100  7777  M50,     7777
4265    1101  7777          7777
4266    1102  7727          7727                /-50 OCTAL
4267    1103  0000  HOTAC1,  0
4270    1104  0000  MOTAC1,  0
4271    1105  0000  LOTAC1,  0
4272    1106  0000  NTAC1,   0
4273    1107  0000  NTAC2,   0
4274    1110  0000  NTAC3,   0
4275    1111  0053  TPLADD,  SET 13
4276    1112  0000          0
4277    1113  7172          JMP TPLGET
4300    1114  0002  P3,      PDP
4301                        PMODE
4302    7115  7100          CLL
4303    7116  7510          SPA                 /ADD OR SUBT?
4304    7117  7060          CML CMA             /SUBT, SET L &
4305    7120  6141          LINC                /MAKE ADDR +
4306                        LMODE
4307    1121  4011          STC 11              /ADDR OF TPUW
4310    1122  1011          LDA 11              /HI ORDER 3RD
4311    1123  0452          LZE                 /ADD OR SUBT?
4312    1124  0017          COM                 /SUBT, MAKE
4313    1125  5153          STC ADDHI           /ARG -
4314    1126  1031          LDA I 11            /MID ORDER 3RD
4315    1127  0452          LZE
4316    1130  0017          COM
4317    1131  5150          STC ADDMED
4320    1132  1031          LDA I 11            /LO ORDER 3RD
4321    1133  0452          LZE
4322    1134  0017          COM
4323    1135  5167          STC ADDLO
4324    1136  0071          SET I 11            /PTR TO TAC
4325    1137  1201          HOTAC               /HI ORD 3RD
4326    1140  0067          SET I 7             /PTR TO TAC
4327    1141  1202          MOTAC               /MID ORD 3RD
4330    1142  0066          SET I 6             /PTR TO TAC
4331    1143  1203          LOTAC               /LO ORD 3RD
4332    1144  0011          CLR                 /CLR LINK BIT
4333    1145  3167          ADD ADDLO           /ARG1+LOTAC
4334    1146  1206          LAM 6               /TO LOTAC
4335    1147  1020          LDA I
4336    1150  0000  ADDMED,  0                  /ARG2+MOTAC
4337    1151  1207          LAM 7               /TO MOTAC
4340    1152  1020          LDA I
4341    1153  0000  ADDHI,   0                  /ARG3+HOTAC
4342    1154  1211          LAM 11              /TO HOTAC
4343    1155  5153          STC ADDHI           /CLR AC&NOT L.
4344    1156  0474          FLO I               /OVRFLO ON HI
4345                                            /ORDER LAM?
4346    1157  0017          COM                 /YES,7777 TO
4347                /ADDLO(ERROR FLAG)
4350    1160  5167          STC ADDLO           /NO,0 TO ER,FLG.
4351    1161  1206          LAM 6               /L &LOTAC TO LOT
4352    1162  5150          STC ADDMED          /CLR AC&NOT L.
```

```
4353    1163  1207          LAM 7           /L&MOTAC TO MOT
4354    1164  5153          STC ADDHI       /CLR AC&NOT L.
4355    1165  1211          LAM 11          /L&HOTAC TO HOT
4356    1166  1020          LDA I           /ERROR FLG TO
4357    1167  0000  ADDLO,   Ø               /AC
4360    1170  0233          XSK I 13        /RETURN
4361    1171  6013          JMP 13          /TO P+2
4362    1172  1000  TPLGET,  LDA             /GET ADDR OF
4363    1173  0013          13              /T,P,WD PTR
4364    1174  1560          BCL I           /MASK OUT JMP
4365    1175  6000          6000
4366    1176  4012          STC 12          /PUT ADDR OF
4367    1177  1012          LDA 12          /T,P, WD IN AC
4370    1200  6000          JMP Ø
4371    1201  0000  HOTAC,   Ø
4372    1202  0000  MOTAC,   Ø
4373    1203  0000  LOTAC,   Ø
4374    1204  0053  TACMOV,  SET 13          /MOVE TAC TO
4375    1205  0000          Ø               /A TPL WD
4376    1206  7172          JMP TPLGET      /GET ADDR
4377    1207  4012          STC 12          /FROM AC
4400    1210  3201          ADD HOTAC
4401    1211  1052          STA 12          /SAVE HOTAC
4402    1212  1000          LDA
4403    1213  1202          MOTAC           /SAVE MOTAC
4404    1214  1072          STA I 12
4405    1215  1000          LDA
4406    1216  1203          LOTAC           /AVE LOTAC
4407    1217  1072          STA I 12
4410    1220  0011          CLR
4411    1221  0233          XSK I 13        /RTN TO
4412    1222  6013          JMP 13
4413    1223  1000  M8TAC,   LDA
4414    1224  0000          Ø
4415    1225  5234          STC M8RTN
4416    1226  7111          JMP TPLADD
4417    1227  1201          HOTAC           /2 X TAC
4420    1230  7111          JMP TPLADD
4421    1231  1201          HOTAC           /4 X TAC
4422    1232  7111          JMP TPLADD
4423    1233  1201          HOTAC           /8 X TAC
4424    1234  0000  M8RTN,   Ø
4425    1235  1000  M10TAC,  LDA             /SAVE
4426    1236  0000          Ø               /RETURN
4427    1237  5252          STC MULRTN      /JMP
4430    1240  7111          JMP TPLADD
4431    1241  1201          HOTAC           /2 X TAC
4432    1242  7204          JMP TACMOV
4433    1243  1264          TEMPSV          /SAVE 2 X TAC
4434    1244  7111          JMP TPLADD
4435    1245  1201          HOTAC           /4 X TAC
4436    1246  7111          JMP TPLADD
4437    1247  1201          HOTAC           /8 X TAC
4440    1250  7111          JMP TPLADD
4441    1251  1264          TEMPSV          /10 X TAC
4442    1252  0000  MULRTN,  Ø               /RTN
4443    1253  0053  TPLCLR,  SET 13
4444    1254  0000          Ø
4445    1255  7172          JMP TPLGET
4446    1256  4012          STC 12
4447    1257  1052          STA 12
4450    1260  1072          STA I 12
4451    1261  1072          STA I 12
```

```
4452    1262  0233          XSK I 13
4453    1263  6013          JMP 13
4454    1264  0000  TEMPSV, Ø
4455    1265  0000          Ø
4456    1266  0000          Ø
4457    1267  0056  CNTREG,  SET 16
4460    1270  0000          Ø
4461    1271  0065          SET I 5
4462    1272  7773          -4
4463    1273  1020          LDA I
4464    1274  1366          ADDR-3
4465    1275  5325          STC ADRESS      /PTR TO CL.RATE
4466    1276  1020          LDA I
4467    1277  2100          2100
4470    1300  5367          STC CR
4471    1301  0011  TPHERE,  CLR
4472    1302  5366          STC CC
4473    1303  1020          LDA I
4474    1304  1000          1000
4475    1305  3367          ADD CR
4476    1306  5367          STC CR          /UPDATE CR 10 X
4477    1307  3325          ADD ADRESS
4500    1310  3365          ADD A3
4501    1311  5325          STC ADRESS
4502    1312  0225          XSK I 5
4503    1313  0467          SKP
4504    1314  6653          JMP XIT
4505    1315  1000          LDA
4506    1316  1103          HOTAC1
4507    1317  5201          STC HOTAC       /HI OR RATE
4510    1320  3104          ADD MOTAC1
4511    1321  5202          STC MOTAC       /MED OR RATE
4512    1322  3105          ADD LOTAC1
4513    1323  5203          STC LOTAC       /LO OR RATE
4514    1324  7111          JMP TPLADD      /CALL T,P, RTN
4515    1325  0000  ADRESS,  Ø
4516    1326  0002          PDP
4517                        PMODE
4520    7327  2366          ISZ CC          /CC>4096?
4521    7330  7410          SKP
4522    7331  5363          JMP TPH
4523    7332  6141          LINC
4524                        LMODE
4525    1333  1000          LDA
4526    1334  1201          HOTAC           /SAMRATE
4527    1335  0451          APO             /HAS GONE
4530    1336  7351          JMP DATA        /TO ZERO
4531    1337  0450          AZE             /OR IS
4532    1340  7324          JMP ADRESS-1    /NEG.?
4533    1341  1000          LDA
4534    1342  1202          MOTAC
4535    1343  0450          AZE
4536    1344  7324          JMP ADRESS-1
4537    1345  1000          LDA
4540    1346  1203          LOTAC
4541    1347  0450          AZE
4542    1350  7324          JMP ADRESS-1
4543    1351  1000  DATA,   LDA
4544    1352  1370          STBLK
4545    1353  1074          STA I 14
4546    1354  1000          LDA             /YES
4547    1355  1367          CR
4550    1356  1074          STA I 14        /CL CONT RATE
=
```

```
4551    1357  1000          LDA
4552    1360  1366          CC
4553    1361  1074          STA I 14          /BUF-PRES REG
4554    1362  6016          JMP 16
4555                        PMODE
4556    7363  6141  TPH,    LINC
4557                        LMODE
4560    1364  7301          JMP TPHERE        /GET SLOWER CL R
4561    1365  0003  A3,      3
4562    1366  0000  CC,      0
4563    1367  0000  CR,      0
4564    1370  0000  STBLK,   0
4565    1371  7777  ADDR,    7777
4566    1372  7777          7777
4567    1373  7633          -144              /-100 U-SEC
4570    1374  7777          7777
4571    1375  7777          7777
4572    1376  6027          -1750             /-1000 U-SEC
4573    1377  7777          7777
4574    1400  7775          7775
4575    1401  4357          4357              /-10000 U-SEC
4576                        SEGMNT 1
4577                        *20
4600    0020  0047  M1A,     SET 7
4601    0021  0000          0
4602    0022  6703  M1AA,    JMP QAINIT
4603    0023  0142          MESS1
4604    0024  0671          ANSWER
4605    0025  6127          JMP CHKSN
4606    0026  0070          SET I 10
4607    0027  0671          ANSWER
4610    0030  1330          LDH I 10
4611    0031  1420          SHD I
4612    0032  0300          0300              /IT IS A C?
4613    0033  0467          SKP               /YES
4614    0034  6022          JMP M1AA          /NO
4615    0035  0602  NORMXX,  LIF 2
4616    0036  0040          SET 0
4617    0037  0007          7
4620    0040  6000          JMP 0
4621    0041  0047  MAA,     SET 7
4622    0042  0000          0
4623    0043  6703  MAAA,    JMP QAINIT
4624    0044  0201          MESSA
4625    0045  0671          ANSWER
4626    0046  6127          JMP CHKSN
4627    0047  0070          SET I 10
4630    0050  0671          ANSWER
4631    0051  1330          LDH I 10
4632    0052  1420          SHD I
4633    0053  1600          1600              /AN  N?
4634    0054  6035          JMP NORMXX        /YES
4635    0055  1420          SHD I
4636    0056  3100          3100              /A  Y?
4637    0057  6061          JMP MBA           /YES
4640    0060  6043          JMP MAAA          /NO
4641    0061  6703  MBA,     JMP QAINIT
4642    0062  0252          MESSB
4643    0063  0671          ANSWER
4644    0064  6127          JMP CHKSN
4645    0065  0070          SET I 10
4646    0066  0671          ANSWER
4647    0067  0603          LIF 3
*
```

```
4650    0070  6435          JMP MBB
4651    0071  6073          JMP MCA
4652    0072  6061          JMP MBA          /ERROR
4653    0073  6703  MCA,     JMP QAINIT
4654    0074  0306          MESSC
4655    0075  0671          ANSWER
4656    0076  6127          JMP CHKSN
4657    0077  0070          SET I 10
4660    0100  0671          ANSWER
4661    0101  1330          LDH I 10
4662    0102  1420          SHD I
4663    0103  1600          1600             /AN  N?
4664    0104  6111          JMP .+5          /YES
4665    0105  1420          SHD I
4666    0106  3100          3100             /A  Y?
4667    0107  6113          JMP MDA          /YES
4670    0110  6073          JMP MCA          /N OR Y PLEASE
4671    0111  0602          LIF 2
4672    0112  6053          JMP JMPM6
4673    0113  6703  MDA,     JMP QAINIT
4674    0114  0356          MESSD
4675    0115  0671          ANSWER
4676    0116  6127          JMP CHKSN
4677    0117  0070          SET I 10
4700    0120  0671          ANSWER
4701    0121  0603          LIF 3
4702    0122  6507          JMP MDB
4703    0123  0467          SKP
4704    0124  6113          JMP MDA
4705    0125  0602          LIF 2
4706    0126  6052          JMP JMPME
4707    0127  0440  CHKSN,   SNS 0
4710    0130  6756          JMP QARFSH
4711    0131  0602          LIF 2
4712    0132  6044          JMP START
4713    0133  0045  ANSBF,   SET 5
4714    0134  0000          0
4715    0135  1330          LDH I 10
4716    0136  0603          LIF 3
4717    0137  0040          SET 0
4720    0140  0005          5
4721    0141  6000          JMP 0
4722    0142  0640
4722    0143  4040
4722    0144  4040
4722    0145  4040
4722    0146  2022
4722    0147  1707
4722    0150  2201
4722                MESS1,  TEXT 2F          PROGRAM
4723    0151  1543
4723
4724    0152  4743
4724    0153  0640
4724    0154  4040
4724    0155  4040
4724    0156  0155
4724    0157  0440
4724    0160  2417
4724    0161  4024
4724    0162  0120
4724                F       A-D TO TAPE
4725    0163  0543
-
```

```
4725
4726        0164   4743
4726        0165   0640
4726        0166   2431
4726        0167   2005
4726        0170   4003
4726        0171   4024
4726        0172   1740
4726        0173   0317
4726        0174   1624
4726        0175   1116
4726        0176   2505
4726        0177   7461
4726        0200   3400
4726                       F TYPE C TO CONTINUE<1\Z
4727
4730        0201   0623
4730        0202   2401
4730        0203   1604
4730        0204   0122
4730        0205   0440
4730        0206   0530
4730        0207   2005
4730        0210   2211
4730        0211   1505
4730        0212   1624
4730                       MESSA,  TEXT ZFSTANDARD EXPERIMENT?
4731        0213   7743
4731
4732        0214   4743
4732
4733        0215   4743
4733        0216   0640
4733        0217   4040
4733        0220   1106
4733        0221   4016
4733        0222   1754
4733        0223   4024
4733        0224   3120
4733        0225   0540
4733                       F   IF NO, TYPE  N
4734        0226   4016
4734        0227   4306
4734        0230   4040
4734        0231   4011
4734        0232   0640
4734        0233   3105
4734        0234   2354
4734        0235   2431
4734        0236   2005
4734        0237   4040
4734                       F   IF YES,TYPE  Y
4735        0240   3143
4735
4736        0241   4743
4736        0242   0640
4736        0243   4040
4736        0244   4040
4736        0245   4022
4736        0246   0520
4736        0247   1431
4736        0250   4074
4736        0251   6134
=
```

```
4736                        F       REPLY <1\Z
4737        0252    0620
4737        0253    0122
4737        0254    0115
4737        0255    0524
4737        0256    0522
4737        0257    4014
4737        0260    1703
4737        0261    0124
4737        0262    1117
4737                        MESSB,  TEXT ZFPARAMETER LOCATION?
4740        0263    1677
4740
4741        0264    4347
4741
4742        0265    4347
4742        0266    4306
4742        0267    4040
4742        0270    4040
4742        0271    2402
4742        0272    1413
4742        0273    4016
4742        0274    1756
4742        0275    4074
4742                        F     TBLK NO, <3
4743        0276    6343
4743        0277    0640
4743        0300    4040
4743        0301    4025
4743        0302    1611
4743        0303    2440
4743        0304    4074
4743        0305    6134
4743                        F     UNIT  <1\Z
4744        0306    0640
4744        0307    4016
4744        0310    0527
4744        0311    4023
4744        0312    2401
4744        0313    2224
4744        0314    4024
4744        0315    0214
4744                        MESSC,  TEXT ZF  NEW START TBLK?
4745        0316    1377
4745
4746        0317    4347
4746
4747        0320    4347
4747        0321    4306
4747        0322    4040
4747        0323    4011
4747        0324    0640
4747        0325    1617
4747        0326    5440
4747        0327    2431
4747        0330    2005
4747        0331    4040
4747                        F    IF NO, TYPE  N
4750        0332    1643
4750        0333    0640
4750        0334    4040
4750        0335    1106
4750        0336    4031
=
```

```
4750        0337   0523
4750        0340   5440
4750        0341   2431
4750        0342   2005
4750        0343   4040
4750                      F    IF YES, TYPE  Y
4751        0344   3143
4751
4752        0345   4743
4752        0346   0640
4752        0347   4040
4752        0350   4040
4752        0351   4022
4752        0352   0520
4752        0353   1431
4752        0354   4074
4752        0355   6134
4752                      F       REPLY <1\Ż
4753        0356   0640
4753        0357   4040
4753        0360   4024
4753        0361   0214
4753        0362   1340
4753        0363   1617
4753        0364   5674
4753        0365   6334
4753                      MESSD,  TEXT ŻF     TBLK NO,<3\Ż
```

0000 ERRORS

```
AAAEND 5571
AC     0136
ADDHI  7153
ADDLO  7167
ADDMED 7150
ADDR   7371
ADPTR  1571
ADRESS 7325
ALDA   1145
ALDONE 1465
ALFAKE 1344
AL1    1473
AL10   1545
AL14   1532
AL15   1562
AL2    1500
AL3    1524
AL5    1522
AL5A   1570
AL6    1527
ANSBF  2133
ANSBUF 4220
ANSWER 4671
A3     7365
BEFORE 0073
BETA3  0003
BETA4  0004
BETA5  0005
BINIT  0130
BUFFUL 0111
BUFLIM 0140
BUFTOP 0110
BYCLK  6270
```

```
BYCLK1  6277
BYCLK2  6375
BYCLK3  6404
CC      7366
CCMASK  0142
CCX     0752
CCXSAV  0071
CCXSET  0526
CCX1    0765
CHAN1   0537
CHAN2   0545
CHAN3   0553
CHAR    6611
CHKSN   2127
CHKSNS  4227
CHKTTY  0600
CHRTER  6754
CHRTPL  6662
CHTTYA  0511
CLAD    1422
CLKDL   0131
CLOCK   1210
CLOCKG  1744
CLOCK1  0053
CLOCK2  0054
CNTREG  7267
CR      7367
C100    0153
C1000   0120
C110    0507
C14     0574
C140    0506
C17     0525
C1777   0046
C2      0363
C2X0    1354
C200    0371
C200X   1340
C2000   0121
C212    0744
C3      0067
C300    0374
C303    0072
C37     0370
C4      0372
C4X     1112
C400    0065
C440    0520
C60     0571
C640X   1343
C7      0517
C7X     1342
C7000   1341
C7717   0570
C7737   0567
C7763   0573
C7767   0572
C7774   0576
C7775   0575
DATA    7351
DELTA   0107
DIAL    1716
DIALA   0751
=
```

```
DISAB   1220
DISCTR  0125
DISPLY  1226
DISP1   0122
DISP2   0123
DISSET  0712
DISS1   0724
DIS1    0103
DIS2    0104
DITAB   1734
DONE    6305
DONE1   6412
DPY     0025
ECA     0024
ECHO    0660
ENREG   0074
ENSEN   1146
ENXM    0022
EN1     1157
ERORX   6604
ERRORX  7016
EX      0263
EXA     0503
EXL     1423
EXLSET  0521
EXLSTO  1456
EXLSYN  1425
EXO     0505
FIXUP   1740
FSAM    0127
FSTA    0373
FSTSAM  1605
GETKBD  5424
GOCAT   1224
GOGO    1345
HOTAC   7201
HOTAC1  7103
INCCX   0406
INEXF   0403
INJUMP  0357
INMASK  0143
INPTR   6655
INSSW   0400
IN1     0320
IN10    0560
IN4     0413
IN5     0437
ISZDL   0375
IXMASK  0075
JMPBY   1715
JMPME   4052
JMPM6   4053
JMPSTI  0421
JMPSTO  1437
JMPSYN  1406
JUMPST  0533
KHAR    0657
LI      0137
LIMX    1076
LINCI   0364
LISTP   1322
LOCX    4056
LOOP1   6615
```

```
LOOP2   6674
LOOP3   6760
LOTAC   7203
LOTAC1  7105
LRTN    1761
LT      1104
MA      4064
MAA     2041
MAAA    2043
MBA     2061
MBB     6435
MCA     2073
MCHK    7040
MDA     2113
MDB     6507
ME      4151
MEA     4153
MESSA   2201
MESSB   2252
MESSC   2306
MESSD   2356
MESSE   4566
MESSF   4636
MESS1   2142
MESS2   4232
MESS3   4262
MESS4   4331
MESS5   4421
MESS6   4527
MFA     4171
MFB     6531
MINUS3  6264
MINUS5  6302
MLIM    1075
MONA    0151
MONITO  0472
MONJMP  0476
MONSW   0145
MON1    0461
MON2    0464
MON3    0470
MOTAC   7202
MOTAC1  7104
MULRTN  7252
MULWD   6647
MULWD1  6750
MULWD3  7012
M1      4057
M1A     2020
M1AA    2022
M1X     1242
M10TAC  7235
M1000   7075
M12     0747
M14     0047
M2      4071
M2A     4073
M2B     6020
M260    0746
M261    0740
M272    0741
M3      4105
M3A     4107
-
```

```
M3B     6141
M301    0742
M303    0745
M310    0743
M311    0732
M314    0027
M320    0734
M322    0733
M323    0736
M326    0737
M330    0735
M4      4121
M4A     4123
M4B     6231
M5      4135
M5A     4137
M5B     6320
M50     7100
M6      4203
M6A     4205
M7      0750
M8RTN   7234
M8TAC   7223
NCHAN   0051
NCHTP   6660
NCH10   6133
NCH20   6130
NCH4    6136
NOMX    6605
NORMX   7017
NORMXX  2035
NTAC1   7106
NTAC2   7107
NTAC3   7110
NUM     6661
NUMSAV  7074
OCTAC   6656
OKSAM   1600
OKSAMA  0023
OUCCX   0434
OUEXL   0431
OUMASK  0144
OUSSW   0426
PAUS    0677
PDP8IN  1200
PLIST   0064
PTBNSV  6602
PUTPTR  0124
P3      7114
QAB     4707
QACA    4720
QACHAR  5560
QACKLF  5524
QACNTR  5507
QAD     4731
QAE     4753
QAEXIT  5540
QAF     5421
QAG     4765
QAH     5017
QAI     5034
QAINIT  4703
QAJ     5041
```

```
QAK     5210
QAKRB   6036
QAL     5100
QALEGL  5500
QAM     5004
QAN     5126
QAO     5134
QAP     5145
QAQ     5166
QARFSH  4756
QAT     5173
QATLS   6046
QATPE   5547
QATSF   6041
QATY    5441
QAU     5411
QAV     5221
QAW     5415
QAX     5327
QAY     5315
QAZ     5204
QCTR    0106
QIT     1773
QSET    1064
QSETA   0147
QSTACK  0154
RET     0141
RTN     6211
SAMAN   0365
SAMEN   1020
SAMEND  1000
SAMFLG  0115
SAMINS  0117
SAMSTT  0126
SAMXIT  1170
SAMXTA  0026
SAM11   1021
SAM3    1010
SAM5    1036
SAM7    1013
SBLX    0447
SCCX    1462
SCHK    7050
SEXL    1454
SJMP    0132
SJMS    0134
SMXT    0045
SSA     0502
SSO     0504
SSSET   0513
SSSW    1444
SSTRIN  1614
SSW     1412
SSWSTO  1446
SSWSYN  1414
STAC    0101
STACKE  0102
STACKT  0100
START   4044
STBLK   7370
STCHAN  0050
STCHTP  6657
STOA    0512
-
```

```
STOPNM 0061
STOPON 0060
STOPP  1431
STOPPP 1144
STOP1  1451
STORFG 0116
STTBLK 0052
SUBT3  6427
SUBT6  6432
SUMCHN 6112
SYNA   0510
SYNCON 0056
SYNC1  1417
SYNDLY 0055
SYNGO  1400
SYNNUM 0057
SYN15  0771
TACMOV 7204
TAPE   1243
TAPEA  0070
TAPEW1 6577
TAPEW2 6600
TAPEX  1221
TAPE1  1311
TAPE3  1305
TBLK   0105
TEMP   1337
TEMPSV 7264
THING  1040
THINGA 0146
THING1 1057
THING2 1051
TIOLE  1113
TIOLEA 0150
TOTP   1122
TOTPTS 0112
TOTP1  1137
TPH    7363
TPHERE 7301
TPLADD 7111
TPLCLR 7253
TPLGET 7172
TPWRD1 6504
TPWRD2 6505
TYPAX  1077
TYPGO  1313
UCHK   7023
UNITSV 6603
UPLIM  6641
UPLIM1 6724
UPLIM3 7004
WRITE  1270
XIT    6653
XR0    0010
XR1    0011
XR2    0012
XR3    0013
XTART  0200
X1     0366
X1000  0152
X2     0367
X4     0066
ZZ     1774
```

ADCON

```
0000                    *20
0001                            SEGMNT 2
0002                            *20
0003    0020  1020  BEGIN,  LDA I
0004    0021  0020          20
0005    0022  0004          ESF
0006    0023  1020  BEGIN1, LDA I              /CORE
0007    0024  1001          QAINIT-1           /MOVE
0010    0025  1040          STA                /OF
0011    0026  0011          11                 /QANDA
0012    0027  1120          ADA I              /TO
0013    0030  2000          2000               /SEGMNT 0
0014    0031  4012          STC 12
0015    0032  0640          LDF 0
0016    0033  1020          LDA I
0017    0034  1001          QAINIT-1
0020    0035  1120          ADA I
0021    0036  6107          -AAAEND
0022    0037  4013          STC 13
0023    0040  1031          LDA I 11
0024    0041  1072          STA I 12
0025    0042  0233          XSK I 13           /CORE MOVE DONE?
0026    0043  6040          JMP .-3            /NO
0027    0044  0643          LDF 3
0030    0045  6072  START,   JMP F1             /YES
0031    0046  6107          JMP F3
0032    0047  6123          JMP F4
0033    0050  6137          JMP F5
0034    0051  6171          JMP F6
0035    0052  0600          LIF 0
0036    0053  6463          JMP RESET2
0037    0054  0002          PDP
0040                        PMODE
0041    4055  7200          CLA
0042    4056  6046          TLS
0043    4057  7200  HEADNG,  CLA
0044    4060  6041          TSF                /FLAG SET?
0045    4061  5260          JMP HEADNG+1               /NO
0046    4062  1412          TAD I XR2          /GET CHAR.
0047    4063  6046          TLS                /PRINT CHAR.
0050    4064  7450          SNA                /EOM?
0051    4065  7410          SKP                /YES
0052    4066  5257          JMP HEADNG         /NO
0053    4067  6141          LINC
0054                        LMODE
0055    0070  0601          LIF 1
0056    0071  6375          JMP NXTCHN
0057    0072  0057  F1,      SET 17
0060    0073  0000          0
0061    0074  7002  F1A,     JMP QAINIT
0062    0075  0434          FRAME1
0063    0076  0774          ANSWER
0064    0077  6377          JMP CHKSNS
0065    0100  0070          SET I 10
0066    0101  0774          ANSWER
0067    0102  1330          LDH I 10
0070    0103  1420          SHD I
0071    0104  0300          0300               /A C?
0072    0105  6017          JMP 17             /YES
0073    0106  6074          JMP F1A            /NO
0074    0107  0057  F3,      SET 17
0075    0110  0000          0
=
```

```
0076    0111  7002  F3A,    JMP QAINIT
0077    0112  0530          FRAME3
0100    0113  0774          ANSWER
0101    0114  6377          JMP CHKSNS
0102    0115  0070          SET I 10
0103    0116  0774          ANSWER
0104    0117  0601          LIF 1
0105    0120  6020          JMP F3B
0106    0121  6017          JMP 17
0107    0122  6111          JMP F3A
0110    0123  0057  F4,      SET 17
0111    0124  0000          0
0112    0125  7002  F4A,     JMP QAINIT
0113    0126  0603          FRAME4
0114    0127  0774          ANSWER
0115    0130  6377          JMP CHKSNS
0116    0131  0070          SET I 10
0117    0132  0774          ANSWER
0120    0133  0601          LIF 1
0121    0134  6050          JMP F4B
0122    0135  6017          JMP 17
0123    0136  6125          JMP F4A
0124    0137  0057  F5,      SET 17
0125    0140  0000          0
0126    0141  6402          JMP RESTR
0127    0142  0074          SET I 14        /PTR TO ADDR
0130    0143  0657          FRAME5+13       /OF Q,F, SPACES
0131    0144  0073          SET I 13        /CTR FOR 24
0132    0145  0000          0               /LOC OF Q,F,
0133    0146  0072          SET I 12        /PTR TO ADDR-1
0134    0147  0335          QUE-1           /OF Q,BUFF,
0135    0150  0071          SET I 11        /CTR FOR
0136    0151  7775          -2              /TWO Q,F,
0137    0152  0067          SET I 7
0140    0153  0000          0
0141    0154  7002  F5A,     JMP QAINIT
0142    0155  0644          FRAME5
0143    0156  0774          ANSWER
0144    0157  6377          JMP CHKSNS
0145    0160  0070          SET I 10
0146    0161  0774          ANSWER
0147    0162  0601          LIF 1
0150    0163  6116          JMP F5B
0151    0164  0467          SKP
0152    0165  6154          JMP F5A
0153    0166  4430          STC TEMP1       /SAVE CH,N,
0154    0167  6176          JMP DPOSIT
0155    0170  6154          JMP F5A
0156    0171  0057  F6,      SET 17
0157    0172  0000          0
0160    0173  0600          LIF 0
0161    0174  6470          JMP F6A
0162    0175  6017          JMP 17
0163    0176  1000  DPOSIT, LDA
0164    0177  0000          0
0165    0200  4272          STC RTN2
0166    0201  1000          LDA
0167    0202  0007          7               /CHK TO SEE
0170    0203  1460          SAE I           /THAT NO, OF
0171    0204  0020          20              /CH IS 16,
0172    0205  0467          SKP
0173    0206  6154          JMP F5A
0174    0207  0227          XSK I 7
-
```

```
0175    0210  1000          LDA
0176    0211  0430          TEMP1
0177    0212  1072          STA I 12        /STA CH,N, IN Q
0200    0213  0303          ROR 3
0201    0214  1560          BCL I
0202    0215  7770          7770
0203    0216  0470          AZE I           /TENS DIGIT=0?
0204    0217  6245          JMP UNDIGT      /YES
0205    0220  1120          ADA I           /NO, CHANGE
0206    0221  0060          60              /TO 6 BIT CHAR
0207    0222  4357          STC SVTENS
0210    0223  1000          LDA             /CHK TO
0211    0224  0013          13
0212    0225  1460          SAE I           /SEE
0213    0226  0030          30              /IF
0214    0227  0467          SKP             /STORAGE
0215    0230  6234          JMP .+4         /ROOM
0216    0231  1460          SAE I           /IN
0217    0232  0027          27              /PRESENT
0220    0233  0467          SKP             /Q,F,
0221    0234  6240          JMP .+4
0222    0235  1460          SAE I
0223    0236  0026          26
0224    0237  0467          SKP
0225    0240  6360          JMP RESET       /NO ROOM
0226    0241  0233          XSK I 13
0227    0242  1000          LDA
0230    0243  0357          SVTENS
0231    0244  1374          STH I 14        /STA TENS DIGIT
0232    0245  1000  UNDIGT, LDA
0233    0246  0013          13
0234    0247  1460          SAE I           /CHK
0235    0250  0030          30              /HERE
0236    0251  0467          SKP             /TOO
0237    0252  6256          JMP .+4
0240    0253  1460          SAE I
0241    0254  0027          27
0242    0255  0467          SKP
0243    0256  6360          JMP RESET       /NO ROOM
0244    0257  1012          LDA 12
0245    0260  1560          BCL I
0246    0261  7770          7770            /GET UNIT DIGIT
0247    0262  1120          ADA I           /CHANGE TO
0250    0263  0060          60              /6 BIT CHAR
0251    0264  0233          XSK I 13
0252    0265  1374          STH I 14        /STA UNIT DIGIT
0253    0266  1020          LDA I
0254    0267  0054          54
0255    0270  0233          XSK I 13
0256    0271  1374          STH I 14        /STA A COMMA
0257    0272  0000  RTN2,    0
0260    0273  1020  EXIT,    LDA I
0261    0274  1777          1777
0262    0275  1072          STA I 12
0263    0276  0072          SET I 12
0264    0277  0335          QUE=1
0265    0300  0601          LIF 1
0266    0301  6256          JMP UNITCK      /DISPLAY FRAME6?
0267    0302  0467          SKP             /YES
0270    0303  0237          XSK I 17        /NO
0271    0304  6017          JMP 17
0272    0305  4432  ALL,    STC STCH1
0273    0306  0601          LIF 1
=
```

```
0274    0307  6000          JMP Ø
0275    0310  1040          STA
0276    0311  0433          NCH1
0277    0312  2432          ADD STCH1
0300    0313  1120          ADA I
0301    0314  7776          -1
0302    0315  4431          STC SUM1
0303    0316  1000  ALLRPT, LDA
0304    0317  0432          STCH1
0305    0320  4430          STC TEMP1
0306    0321  6176          JMP DPOSIT
0307    0322  1000          LDA
0310    0323  0432          STCH1
0311    0324  0017          COM
0312    0325  2431          ADD SUM1
0313    0326  0451          APO
0314    0327  6154          JMP F5A
0315    0330  1000          LDA
0316    0331  0432          STCH1
0317    0332  1120          ADA I
0320    0333  0001          1
0321    0334  4432          STC STCH1
0322    0335  6316          JMP ALLRPT
0323    0336  0000  QUE,     Ø
0324                        *,+20
0325    0357  0000  SVTENS,  Ø
0326    0360  0231  RESET,   XSK I 11
0327    0361  0467          SKP
0330    0362  6141          JMP F5+2
0331    0363  0074          SET I 14
0332    0364  0674          FRAME5+30
0333    0365  0073          SET I 13
0334    0366  0000          Ø
0335    0367  6000          JMP Ø
0336    0370  0045  ANSBUF,  SET 5
0337    0371  0000          Ø
0340    0372  1330          LDH I 10
0341    0373  0601          LIF 1
0342    0374  0040          SET Ø
0343    0375  0005          5
0344    0376  6000          JMP Ø
0345    0377  0440  CHKSNS,  SNS Ø
0346    0400  7055          JMP QARFSH
0347    0401  6045          JMP START
0350    0402  1000  RESTR,   LDA              /SAVE RTN JMP
0351    0403  0000          Ø
0352    0404  4422          STC RTN1
0353    0405  0072          SET I 12         /CTR FOR
0354    0406  7775          -2               /TWO Q,F,
0355    0407  0074          SET I 14         /PTR TO ADDR
0356    0410  0657          FRAME5+13        /OF Q,F,SPACES
0357    0411  0073          SET I 13         /CTR FOR 24
0360    0412  7747          -30              /SPACES OF Q,F,
0361    0413  1020  LP,      LDA I            /RESTORE Q,F,
0362    0414  0040          40               /WITH 40S
0363    0415  1374          STH I 14
0364    0416  0233          XSK I 13         /Q,F, RESTORED?
0365    0417  6413          JMP LP           /NO
0366    0420  0232          XSK I 12         /BOTH Q,F, REST?
0367    0421  0467          SKP              /NO
0370    0422  0000  RTN1,    Ø                /YES
0371    0423  0234          XSK I 14         /STRT OF NXT QF
0372    0424  6411          JMP LP-2
```

```
0373      0425  1032  QUEUE,  LDA I 12
0374      0426  0601          LIF 1
0375      0427  6000          JMP Ø
0376      0430  0000  TEMP1,   Ø
0377      0431  0000  SUM1,    Ø
0400      0432  0000  STCH1,   Ø
0401      0433  0000  NCH1,    Ø
0402      0434  0640
0402      0435  4040
0402      0436  4040
0402      0437  4040
0402      0440  0104
0402      0441  0317
0402                  FRAME1, TEXT ŻF        ADCON
0403      0442  1643
0403
0404      0443  4743
0404      0444  1040
0404      0445  0401
0404      0446  2401
0404      0447  4006
0404      0450  2217
0404      0451  1540
0404      0452  2410
0404      0453  0540
0404      0454  0401
0404      0455  2401
0404      0456  4024
0404      0457  0120
0404      0460  0540
0404      0461  1123
0404      0462  4024
0404      0463  2201
0404      0464  1623
0404      0465  0605
0404      0466  2222
0404                  H DATA FROM THE DATA TAPE IS TRANSFERRED
0405      0467  0504
0405      0470  4310
0405      0471  4024
0405      0472  1740
0405      0473  0140
0405      0474  1605
0405      0475  2740
0405      0476  2401
0405      0477  2005
0405      0500  4011
0405      0501  1640
0405      0502  0317
0405      0503  1624
0405      0504  1107
0405      0505  2517
0405      0506  2523
0405      0507  4002
0405      0510  1417
0405      0511  0313
0405                  H TO A NEW TAPE IN CONTIGUOUS BLOCKS
0406      0512  2343
0406
0407      0513  4743
0407      0514  0624
0407      0515  3120
0407      0516  0540
-
```

```
0407      0517  0340
0407      0520  2417
0407      0521  4003
0407      0522  1716
0407      0523  2411
0407      0524  1625
0407      0525  0540
0407      0526  7461
0407      0527  3400
0407                  FTYPE C TO CONTINUE <1\Ƶ
0410      0530  0640
0410      0531  4014
0410      0532  1703
0410      0533  0124
0410      0534  1117
0410      0535  1640
0410      0536  1706
0410      0537  4004
0410      0540  0124
0410                  FRAME3, TEXT ƵF  LOCATION OF DATA
0411      0541  0143
0411      0542  0640
0411      0543  2417
0411      0544  4002
0411      0545  0540
0411      0546  2422
0411      0547  0116
0411      0550  2306
0411      0551  0522
0411      0552  2205
0411                  F TO BE TRANSFERRED?
0412      0553  0477
0412
0413      0554  4347
0413
0414      0555  4347
0414      0556  4306
0414      0557  4040
0414      0560  2324
0414      0561  0122
0414      0562  2411
0414      0563  1607
0414      0564  4024
0414      0565  0214
0414      0566  1340
0414                  F  STARTING TBLK <3
0415      0567  7463
0415      0570  4306
0415      0571  4040
0415      0572  4040
0415      0573  4040
0415      0574  4040
0415      0575  4040
0415      0576  4025
0415      0577  1611
0415      0600  2440
0415      0601  7461
0415      0602  3400
0415                  F           UNIT <1\Ƶ
0416      0603  0640
0416      0604  2422
0416      0605  0116
0416      0606  2306
```

```
0416       0607  0522
0416       0610  4014
0416       0611  1703
0416       0612  0124
0416       0613  1117
0416                     FRAME4, TEXT ŻF TRANSFER LOCATION?
0417       0614  1677
0417
0420       0615  4347
0420
0421       0616  4347
0421       0617  4306
0421       0620  4040
0421       0621  2324
0421       0622  0122
0421       0623  2411
0421       0624  1607
0421       0625  4024
0421       0626  0214
0421       0627  1340
0421                     F  STARTING TBLK <3
0422       0630  7463
0422       0631  4306
0422       0632  4040
0422       0633  4040
0422       0634  4040
0422       0635  4040
0422       0636  4040
0422       0637  4025
0422       0640  1611
0422       0641  2440
0422       0642  7461
0422       0643  3400
0422                     F            UNIT <1\Ż
0423       0644  0640
0423       0645  4003
0423       0646  2205
0423       0647  0124
0423       0650  0540
0423       0651  0611
0423       0652  1405
0423       0653  2340
0423       0654  0617
0423                     FRAME5, TEXT ŻF  CREATE FILES FOR
0424       0655  2243
0424
0425       0656  4743
0425       0657  1040
0425       0660  4040
0425       0661  4040
0425       0662  4040
0425       0663  4040
0425       0664  4040
0425       0665  4040
0425       0666  4040
0425       0667  4040
0425       0670  4040
0425       0671  4040
0425       0672  4040
0425                     H
0426       0673  4043
0426       0674  1040
0426       0675  4040
```

```
0426        0676   4040
0426        0677   4040
0426        0700   4040
0426        0701   4040
0426        0702   4040
0426        0703   4040
0426        0704   4040
0426        0705   4040
0426        0706   4040
0426        0707   4040
0426                     H
0427        0710   4043
0427
0430        0711   4743
0430        0712   0640
0430        0713   4040
0430        0714   0310
0430        0715   0116
0430        0716   1605
0430        0717   1440
0430        0720   1625
0430        0721   1502
0430        0722   0522
0430        0723   4074
0430                     F    CHANNEL NUMBER <2
0431        0724   6243
0431
0432        0725   4743
0432        0726   1040
0432        0727   4040
0432        0730   4024
0432        0731   3120
0432        0732   0540
0432        0733   0140
0432        0734   0617
0432        0735   2240
0432        0736   0114
0432        0737   1440
0432        0740   0310
0432        0741   0116
0432        0742   1605
0432        0743   1423
0432        0744   4023
0432        0745   0115
0432        0746   2014
0432                     H    TYPE A FOR ALL CHANNELS SAMPLED
0433        0747   0504
0433
0434        0750   4347
0434        0751   4310
0434        0752   4040
0434        0753   4040
0434        0754   2431
0434        0755   2005
0434        0756   4003
0434        0757   4027
0434        0760   1005
0434        0761   1640
0434        0762   0611
0434        0763   1611
0434        0764   2310
0434        0765   0504
0434        0766   4023
```

```
0434    0767  0514
0434    0770  0503
0434    0771  2411
0434    0772  1716
0434    0773  2334
0434                H    TYPE C WHEN FINISHED SELECTIONS\Z
0435    0774  0000  ANSWER, 0
0436                      *,+5
0437                      NOLIST
1414                      SEGMNT 1
1415                      *20
1416    0020  0055  F3B,    SET 15
1417    0021  0000          0
1420    0022  1020          LDA I
1421    0023  0010          10
1422    0024  1040          STA
1423    0025  0227          MULWD
1424    0026  0017          COM
1425    0027  4221          STC UPLIM
1426    0030  6163          JMP CHAR
1427    0031  0467          SKP
1430    0032  6305          JMP ERRORX
1431    0033  1000          LDA
1432    0034  0133          OCTAC
1433    0035  6156          JMP ŻERO
1434    0036  4134          STC STBLKD      /DATA TBLK NO.
1435    0037  6163          JMP CHAR
1436    0040  0467          SKP
1437    0041  6305          JMP ERRORX
1440    0042  1000          LDA
1441    0043  0133          OCTAC
1442    0044  6156          JMP ŻERO
1443    0045  4135          STC UNITD       /DATA UNIT NO.
1444    0046  6312          JMP RDHD
1445    0047  6306          JMP NORMX
1446    0050  0055  F4B,    SET 15
1447    0051  0000          0
1450    0052  6163          JMP CHAR
1451    0053  0467          SKP
1452    0054  6305          JMP ERRORX
1453    0055  1000          LDA
1454    0056  0133          OCTAC
1455    0057  6156          JMP ŻERO
1456    0060  4136          STC STBLKN      /NEW TBLK NO.
1457    0061  6163          JMP CHAR
1460    0062  0467          SKP
1461    0063  6305          JMP ERRORX
1462    0064  1000          LDA
1463    0065  0133          OCTAC
1464    0066  6156          JMP ŻERO
1465    0067  4137          STC UNITN       /NEW UNIT NO.
1466    0070  4155          STC FLAG        /SET C(FLAG)=0
1467    0071  1000          LDA
1470    0072  0137          UNITN           /NEW UNIT NO
1471    0073  1440          SAE
1472    0074  0135          UNITD           /UNITN=UNITD?
1473    0075  6306          JMP NORMX       /NO
1474    0076  1000          LDA             /YES
1475    0077  0146          LASTBN          /IF UNITN=UNITD
1476    0100  0017          COM             /    THEN
1477    0101  2136          ADD STBLKN      /STBLKN>LASTBN
1500    0102  0451          APO             /    OR
1501    0103  0467          SKP             /STBLKN<STBLKD.
```

```
1502    0104  6306          JMP NORMX       /  OTHERWISE
1503    0105  2146          ADD LASTBN      /ERROR
1504    0106  0017          COM
1505    0107  2134          ADD STBLKD
1506    0110  0451          APO
1507    0111  6305          JMP ERRORX
1510    0112  1020          LDA I
1511    0113  7767          -10             /SET A FLAG
1512    0114  4155          STC FLAG        /FOR LATER ON.
1513    0115  6306          JMP NORMX
1514    0116  0055  F5B,     SET 15
1515    0117  0000          0
1516    0120  6163          JMP CHAR
1517    0121  0467          SKP
1520    0122  6305          JMP ERRORX
1521    0123  1000          LDA
1522    0124  0133          OCTAC
1523    0125  6156          JMP ZERO
1524    0126  6235          JMP CHKCH
1525    0127  1000          LDA
1526    0130  0133          OCTAC
1527    0131  6156          JMP ZERO
1530    0132  6306          JMP NORMX
1531    0133  0000  OCTAC,  0
1532    0134  0000  STBLKD, 0
1533    0135  0000  UNITD,  0
1534    0136  0000  STBLKN, 0
1535    0137  0000  UNITN,  0
1536    0140  0000  NUM,    0
1537    0141  0003  MBLK,   3
1540    0142  0000  STCHAN, 0
1541    0143  0000  NCHAN,  0
1542    0144  0000  QSAVE,  0
1543    0145  0000  QSAVE2, 0
1544    0146  0000  LASTBN, 0
1545    0147  0000  NUMGRP, 0
1546    0150  0000  TEMP2,  0
1547    0151  0000  TEMP5,  0
1550    0152  0000  DELTA,  0
1551    0153  0000  POWER2, 0
1552    0154  0000  GETCHN, 0
1553    0155  0000  FLAG,   0
1554    0156  1460  ZERO,   SAE I
1555    0157  7777          7777
1556    0160  0467          SKP
1557    0161  0011          CLR
1560    0162  6000          JMP 0
1561
1562    0163  0056  CHAR,   SET 16
1563    0164  0000          0
1564    0165  0011          CLR
1565    0166  4133          STC OCTAC
1566    0167  0602  LOOP1,  LIF 2
1567    0170  6370          JMP ANSBUF
1570    0171  1420          SHD I
1571    0172  7400          7400            /E,O,ANS,F,?
1572    0173  6016          JMP 16
1573    0174  1420          SHD I
1574    0175  3400          3400            /EOM?
1575    0176  6016          JMP 16
1576    0177  1420          SHD I
1577    0200  0000          0               /A BLANK?
1600    0201  6167          JMP LOOP1
=
```

```
1601    0202  1420          SHD I
1602    0203  0100          0100          /AN A?
1603    0204  6275          JMP RALL
1604    0205  1420          SHD I
1605    0206  0300          0300          /A C?
1606    0207  6273          JMP REXIT
1607    0210  1120          ADA I
1610    0211  7717          -60           /S DIGIT?
1611    0212  1040          STA
1612    0213  0140          NUM
1613    0214  1120          ADA I
1614    0215  0001          1
1615    0216  0451          APO           /NUM IS NONNEG?
1616    0217  6233          JMP XIT       /SHOULD BE
1617    0220  1120          ADA I
1620    0221  0000  UPLIM,  0             /IS NUM LESS
1621    0222  0471          APO I         /THAN 10 OR 12?
1622    0223  6233          JMP XIT       /SHOULD BE
1623    0224  1000          LDA
1624    0225  0133          OCTAC
1625    0226  1260          MUL I         /MUL BY 10 OR 12
1626    0227  0000  MULWD,  0             /FOR OCT OR DEC
1627    0230  2140          ADD NUM       /CONVERSION
1630    0231  4133          STC OCTAC
1631    0232  6167          JMP LOOP1
1632    0233  0236  XIT,    XSK I 16
1633    0234  6016          JMP 16
1634    0235  0046  CHKCH,  SET 6
1635    0236  0000          0
1636    0237  4144          STC QSAVE     /SAVE CH.N.
1637    0240  2142          ADD STCHAN
1640    0241  0017          COM
1641    0242  1120          ADA I
1642    0243  0001          1
1643    0244  2144          ADD QSAVE     /CH NO IS
1644    0245  0451          APO           />=STCHAN?
1645    0246  6305          JMP ERRORX          /NO
1646    0247  4145          STC QSAVE2    /YES
1647    0250  2143          ADD NCHAN
1650    0251  0017          COM
1651    0252  2145          ADD QSAVE2    /CH NO IS
1652    0253  0471          APO I         /<STCH+NCHAN?
1653    0254  6305          JMP ERRORX          /NO
1654    0255  6006          JMP 6         /YES
1655    0256  0046  UNITCK,  SET 6
1656    0257  0000          0
1657    0260  1000          LDA
1660    0261  0137          UNITN
1661    0262  1460          SAE I
1662    0263  0000          0             /UNITN = 0?
1663    0264  0467          SKP           /NO
1664    0265  6267          JMP JMPF6     /YES
1665    0266  0226          XSK I 6
1666    0267  0602  JMPF6,  LIF 2
1667    0270  0040          SET 0
1670    0271  0006          6
1671    0272  6000          JMP 0
1672    0273  0602  REXIT,  LIF 2
1673    0274  6273          JMP EXIT
1674    0275  1000  RALL,   LDA
1675    0276  0142          STCHAN
1676    0277  0602          LIF 2
1677    0300  6305          JMP ALL
=
```

```
1700    0301  1000          LDA
1701    0302  0143          NCHAN
1702    0303  0602          LIF 2
1703    0304  6310          JMP ALL+3
1704    0305  0235  ERRORX,  XSK I 15
1705    0306  0602  NORMX,   LIF 2
1706    0307  0040          SET 0
1707    0310  0015          15
1710    0311  6000          JMP 0
1711                  /FROM DATA TAPE READ STCHAN AND NCHAN
1712                  /
1713    0312  0053  RDHD,    SET 13
1714    0313  0000          0
1715    0314  6320          JMP RDHEAD
1716    0315  0040          SET 0
1717    0316  0013          13
1720    0317  6000          JMP 0
1721    0320  1000  RDHEAD,  LDA
1722    0321  0000          0
1723    0322  4374          STC RTN3
1724    0323  1000          LDA
1725    0324  0135          UNITD
1726    0325  0341          SCR 1
1727    0326  0001          AXO               /SET XOB
1730    0327  1000          LDA
1731    0330  0135          UNITD
1732    0331  4150          STC TEMP2
1733    0332  1500          SRO
1734    0333  0150          TEMP2             /BIT 11=0?
1735    0334  6340          JMP BIT1          /NO
1736    0335  1020  BIT0,    LDA I            /YES
1737    0336  0700          RDC
1740    0337  6344          JMP STR
1741    0340  1020  BIT1,    LDA I
1742    0341  0700          RDC
1743    0342  1120          ADA I
1744    0343  0010          10                /SET BIT 8
1745    0344  4353  STR,     STC TPWRD1
1746    0345  1000          LDA
1747    0346  0141          MBLK
1750    0347  0303          ROR 3
1751    0350  1100          ADA
1752    0351  0134          STBLKD
1753    0352  4354          STC TPWRD2
1754    0353  0000  TPWRD1,  0
1755    0354  0000  TPWRD2,  0
1756    0355  1000          LDA
1757    0356  1400          1400
1760    0357  4142          STC STCHAN
1761    0360  3401          ADD 1401
1762    0361  4143          STC NCHAN
1763    0362  3414          ADD 1414
1764    0363  4146          STC LASTBN
1765    0364  2134          ADD STBLKD
1766    0365  0017          COM               /DETERMINE
1767    0366  2146          ADD LASTBN        /NUM OF
1770    0367  0342          SCR 2             /GROUPS OF
1771    0370  1120          ADA I             /4 BLKS ORIG
1772    0371  0001          1                 /TRANSFERED
1773    0372  0017          COM
1774    0373  4147          STC NUMGRP
1775    0374  0000  RTN3,    0
1776                  /
=
```

```
1777                    /PART 2 OF PROGRAM
2000                    /GET CHANNEL TO BE TRANS.FROM THE Q.
2001                    /
2002    0375  0042  NXTCHN, SET 2
2003    0376  0147          NUMGRP
2004    0377  0002          PDP
2005                        PMODE
2006    2400  4420          JMS I BUFTRR      /SETUP 1 BLK BUF
2007    2401  6141          LINC
2010                        LMODE
2011    0402  0077          SET I 17          /CTR FOR NO.
2012    0403  0000          0                 /OF WRTAPES
2013    0404  0602          LIF 2
2014    0405  6425          JMP QUEUE         /GET A
2015    0406  1460          SAE I             /CHAN NO.
2016    0407  1777          1777              /ANOTHER CHAN?
2017    0410  0467          SKP               /YES
2020    0411  7273          JMP TRANDN        /FINISHED
2021    0412  1040          STA
2022    0413  0154          GETCHN
2023    0414  6525          JMP BUFSUB        /SAVE CHAN
2024    0415  2552          ADD TB            /NO. AND
2025    0416  4555          STC C1            /STBLK OF
2026    0417  2553          ADD TC            /TRANSFER
2027    0420  4556          STC C2            /TAPE
2030    0421  1000          LDA               /WHICH WILL
2031    0422  0136          STBLKN            /BE
2032    0423  6525          JMP BUFSUB        /TYPED
2033    0424  2551          ADD TA            /OUT
2034    0425  4563          STC TB1           /LATER
2035    0426  2552          ADD TB            /ON
2036    0427  4564          STC TB2
2037    0430  2553          ADD TC
2040    0431  4565          STC TB3
2041    0432  1000          LDA               /YES
2042    0433  0134          STBLKD            /FIRST BLK
2043    0434  1120          ADA I             /ON DATA TAPE
2044    0435  0001          1                 /TO BE
2045    0436  4472          STC TBLK          /TRANSFERED
2046    0437  0467          SKP
2047    0440  6141  RD4BLK, 6141              /LINC
2050    0441  0222          XSK I 2           /THIS CH DONE?
2051    0442  0467          SKP               /NO
2052    0443  6601          JMP TYPOUT+1      /YES
2053    0444  0643          LDF 3
2054    0445  1000          LDA               /DATA TAPE
2055    0446  0135          UNITD             /UNIT NO
2056    0447  0341          SCR 1
2057    0450  0001          AXO               /SET XOB
2060    0451  1000          LDA
2061    0452  0135          UNITD
2062    0453  4150          STC TEMP2
2063    0454  1500          SRO
2064    0455  0150          TEMP2             /BIT 11=0?
2065    0456  6517          JMP BITN          /NO
2066    0457  6514          JMP BITY          /YES
2067    0460  4474  STORE,  STC TAPEW1
2070    0461  0066          SET I 6           /CTR FOR MBLKS
2071    0462  7773          -4                /4,5,6,7
2072    0463  1000          LDA
2073    0464  0524          MBLK4
2074    0465  4467          STC MBLCK
2075    0466  1020          LDA I
=
```

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2076    0467  0000  MBLCK,  0
2077    0470  0303          ROR 3
2100    0471  1120          ADA I
2101    0472  0000  TBLK,    0
2102    0473  4475          STC TAPEW2
2103    0474  0000  TAPEW1,  0
2104    0475  0000  TAPEW2,  0
2105    0476  1000          LDA             /INCREMENT
2106    0477  0472          TBLK            /TBLK
2107    0500  1120          ADA I           /NUM
2110    0501  0001          1
2111    0502  4472          STC TBLK
2112    0503  0226          XSK I 6         /4 BLKS READ/
2113    0504  0467          SKP             /NO
2114    0505  6633          JMP TRANSF      /YES
2115    0506  1000          LDA
2116    0507  0467          MBLCK
2117    0510  1120          ADA I
2120    0511  0001          1
2121    0512  4467          STC MBLCK
2122    0513  6466          JMP MBLCK-1
2123    0514  1020  BITY,   LDA I
2124    0515  0700          RDC
2125    0516  6460          JMP STORE
2126    0517  1020  BITN,   LDA I
2127    0520  0700          RDC
2130    0521  1120          ADA I
2131    0522  0010          10
2132    0523  6460          JMP STORE
2133    0524  0004  MBLK4,  4
2134    0525  1040  BUFSUB, STA             /SAVE NUM TO
2135    0526  0151          TEMP5           /BE TYPED
2136    0527  0346          SCR 6           /GET HUNDREDS
2137    0530  1120          ADA I           /DIGIT
2140    0531  0260          260
2141    0532  4551          STC TA
2142    0533  2151          ADD TEMP5
2143    0534  0343          SCR 3           /GET TENS DIGIT
2144    0535  1560          BCL I
2145    0536  7770          7770
2146    0537  1120          ADA I
2147    0540  0260          260
2150    0541  4552          STC TB
2151    0542  2151          ADD TEMP5       /GET UNITS DIGT
2152    0543  1560          BCL I
2153    0544  7770          7770
2154    0545  1120          ADA I
2155    0546  0260          260
2156    0547  4553          STC TC
2157    0550  6000          JMP 0
2160    0551  0000  TA,      0
2161    0552  0000  TB,      0
2162    0553  0000  TC,      0
2163    0554  0240  BUFTTY, 240             /SPACE
2164    0555  0000  C1,      0
2165    0556  0000  C2,      0
2166    0557  0240          240             /SPACE
2167    0560  0240          240             /  "
2170    0561  0240          240             /  "
2171    0562  0240          240             /  "
2172    0563  0000  TB1,     0
2173    0564  0000  TB2,     0
2174    0565  0000  TB3,     0
-
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```
2175    0566  0240          240
2176    0567  0240          240
2177    0570  0240          240
2200    0571  0000  NB1,    0
2201    0572  0000  NB2,    0
2202    0573  0000  NB3,    0
2203    0574  0215          215             /CR
2204    0575  0212          212             /LF
2205    0576  0000          0               /EOL
2206    0577  0467          SKP
2207    0600  6141  TYPOUT, 6141            /LINC
2210    0601  1000          LDA             /GET NO, OF
2211    0602  0017          17              /BLKS TRANSFD
2212    0603  6525          JMP BUFSUB
2213    0604  2551          ADD TA
2214    0605  4571          STC NB1
2215    0606  2552          ADD TB
2216    0607  4572          STC NB2
2217    0610  2553          ADD TC
2220    0611  4573          STC NB3
2221    0612  0002          PDP
2222                        PMODE
2223    2613  1230          TAD X5
2224    2614  3013          DCA XR3
2225    2615  7200          CLA
2226    2616  6046          TLS
2227    2617  7200  AGAIN,  CLA
2230    2620  6041          TSF             /TYPE
2231    2621  5220          JMP .-1         /OUT
2232    2622  1413          TAD I XR3       /CHAN &
2233    2623  6046          TLS             /STBLK &
2234    2624  7450          SNA             /NB
2235    2625  7410          SKP
2236    2626  5217          JMP AGAIN
2237    2627  7410          SKP
2240    2630  2553  X5,     BUFTTY-1
2241    2631  6141          LINC
2242                        LMODE
2243    0632  6375          JMP NXTCHN
2244                /
2245                /TRANSFER DATA FROM 1K BUFFER(SEG 3)
2246                /TO MBLK 3(SEG 1)AND WRITE ON TAPE,
2247                /
2250    0633  0064  TRANSF, SET I 4          /CTR FOR
2251    0634  0000          0               /POWER OF 2
2252    0635  1000          LDA             /OF NCHAN
2253    0636  0143          NCHAN
2254    0637  4150          STC TEMP2
2255    0640  1500          SRO
2256    0641  0150          TEMP2           /BIT 11=0?
2257    0642  6645          JMP POWER       /NO
2260    0643  0224          XSK I 4         /YES
2261    0644  6640          JMP .-4
2262    0645  1000  POWER,  LDA
2263    0646  0004          4               /GET POWER OF 2
2264    0647  1040          STA
2265    0650  0153          POWER2
2266    0651  1120          ADA I           /ADD SCR
2267    0652  0340          340
2270    0653  4656          STC NSCR
2271    0654  1020          LDA I           /NUM WHICH AFTER
2272    0655  2000          2000            /ROT GIVES DELTA
2273    0656  0000  NSCR,   0
=
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```
2274    0657  4152          STC DELTA
2275    0660  0002          PDP
2276                        PMODE
2277    2661  5662          JMP I ,+1
2300    2662  3000          3000
2301                        *3000
2302    3000  1716          TAD I POWR2
2303    3001  1204          TAD JMPC
2304    3002  3203          DCA ,+1
2305    3003  0000          0
2306    3004  5605  JMPC,   JMP I ,+1
2307    3005  3012          CHAN1
2310    3006  3017          CHAN2
2311    3007  3022          CHAN4
2312    3010  3025          CHAN10
2313    3011  3030          CHAN20
2314    3012  1300  CHAN1,  TAD M2000       /2000 LOC CTR
2315    3013  3312          DCA CTR
2316    3014  1307          TAD A6000       /1ST LOC+1 OF1K
2317    3015  3011          DCA XR1
2320    3016  5246          JMP NXT1
2321    3017  1301  CHAN2,  TAD M1000       /1000 LOC CTR
2322    3020  3312          DCA CTR
2323    3021  5232          JMP CONT
2324    3022  1303  CHAN4,  TAD M400        /400 LOC CTR
2325    3023  3312          DCA CTR
2326    3024  5232          JMP CONT
2327    3025  1304  CHAN10, TAD M200        /200 LOC CTR
2330    3026  3312          DCA CTR
2331    3027  5232          JMP CONT
2332    3030  1305  CHAN20, TAD M100        /100 LOC CTR
2333    3031  3312          DCA CTR
2334    3032  1722  CONT,   TAD I GETCH     /CH NO,
2335    3033  7041          CIA             /SET UP
2336    3034  1720          TAD I STCH      /CTR TO
2337    3035  1306          TAD M1          /LOCATE PTR
2340    3036  3313          DCA DELCTR      /AT START
2341    3037  1307          TAD A6000       /OF TRANSFER
2342    3040  2313          ISZ DELCTR      /LOCATION
2343    3041  7410          SKP
2344    3042  5245          JMP NXT1+1
2345    3043  1715          TAD I DELTAA
2346    3044  5240          JMP .+4
2347    3045  3011          DCA XR1
2350    3046  1411  NXT1,   TAD I XR1       /END OF DATA
2351    3047  1277          TAD M4000       /FOR THIS CH?
2352    3050  7450          SNA
2353    3051  5271          JMP DONE        /YES
2354    3052  1311          TAD A4000       /NO
2355    3053  3410          DCA I XR
2356    3054  2314          ISZ CTR400      /BLK FULL?
2357    3055  7410          SKP             /NO
2360    3056  4421          JMS I WRTPE     /YES
2361    3057  2312          ISZ CTR         /FIN BUFF?
2362    3060  5246          JMP NXT1        /NO
2363    3061  5662          JMP I RD4BK     /RDC 4 MORE BLKS
2364    3062  2440  RD4BK,  RD4BLK
2365    3063  0000  BUFTR,  0
2366    3064  1310          TAD A3400       /1ST LOC+1 TR BU
2367    3065  3010          DCA XR
2370    3066  1303          TAD M400        /CTR FRO 400 LOC
2371    3067  3314          DCA CTR400      /OF TRANS BUF
2372    3070  5663          JMP I BUFTR
```

```
2373    3071  7130  DONE,   STL RAR
2374    3072  3410          DCA I XR
2375    3073  2314          ISZ CTR400
2376    3074  5271          JMP DONE
2377    3075  4421          JMS I WRTPE
2400    3076  5723          JMP I TYP
2401    3077  4000  M4000,  =4000
2402    3100  6000  M2000,  =2000
2403    3101  7000  M1000,  =1000
2404    3102  7001  M777,   =777
2405    3103  7400  M400,   =400
2406    3104  7600  M200,   =200
2407    3105  7700  M100,   =100
2410    3106  7777  M1,     =1
2411    3107  5777  A6000,  5777
2412    3110  3377  A3400,  3377
2413    3111  4000  A4000,  4000
2414    3112  0000  CTR,    0
2415    3113  0000  DELCTR, 0
2416    3114  0000  CTR400, 0
2417    3115  2152  DELTAA, DELTA
2420    3116  2153  POWR2,  POWER2
2421    3117  2375  NXTCH,  NXTCHN
2422    3120  2142  STCH,   STCHAN
2423    3121  2144  QSAV,   QSAVE
2424    3122  2154  GETCH,  GETCHN
2425    3123  2600  TYP,    TYPOUT
2426                *3200
2427    3200  0000  WRTAPE, 0
2430    3201  6141          LINC
2431                        LMODE
2432    1202  1000          LDA
2433    1203  0136          STBLKN          /BLK TO BE
2434    1204  3102          ADD M777        /WRITTEN ON
2435    1205  0471          APO I           /<= 777?
2436    1206  7275          JMP ENDTP       /NO
2437    1207  1000          LDA             /YES
2440    1210  0137          UNITN           /OF UNITD=UNITN
2441    1211  1440          SAE             /THEN
2442    1212  0135          UNITD           /BLK TO BE
2443    1213  7226          JMP BYPASS      /WRITTEN ON
2444    1214  1000          LDA             /< STBLKD
2445    1215  0155          FLAG
2446    1216  0471          APO I           /STBLKN < STBLKD
2447    1217  7226          JMP BYPASS      /NO
2450    1220  1000          LDA             /YES
2451    1221  0136          STBLKN
2452    1222  0017          COM
2453    1223  2134          ADD STBLKD
2454    1224  0451          APO
2455    1225  7317          JMP OVERTP      /BLK IS OK?
2456    1226  0237  BYPASS, XSK I 17        /NO
2457    1227  1000          LDA             /YES
2460    1230  0137          UNITN
2461    1231  0341          SCR 1
2462    1232  0001          AXO             /SET XOB
2463    1233  1000          LDA
2464    1234  0137          UNITN
2465    1235  4150          STC TEMP2
2466    1236  1500          SRO
2467    1237  0150          TEMP2           /BIT 11=0?
2470    1240  7266          JMP BITNO       /NO
2471    1241  7263          JMP BITYES      /YES
```

```
2472    1242  5251  SAVE,   STC TPWD1
2473    1243  1000          LDA
2474    1244  0141          MBLK
2475    1245  0303          ROR 3
2476    1246  1100          ADA
2477    1247  0136          STBLKN
2500    1250  5252          STC TPWD2
2501    1251  0000  TPWD1,   0
2502    1252  0001  TPWD2,   0
2503    1253  1020          LDA I
2504    1254  0001          1
2505    1255  2136          ADD STBLKN      /INCR STBLKN FOR
2506    1256  4136          STC STBLKN      /NEXT ROUND
2507    1257  0002          PDP
2510                        PMODE
2511    3260  4420          JMS I BUFTRR
2512    3261  5600          JMP I WRTAPE
2513    3262  6141          LINC
2514                        LMODE
2515    1263  1020  BITYES, LDA I
2516    1264  0704          WRC
2517    1265  7242          JMP SAVE
2520    1266  1020  BITNO,  LDA I
2521    1267  0704          WRC
2522    1270  1120          ADA I
2523    1271  0010          10              /SET BIT8
2524    1272  7242          JMP SAVE
2525    1273  0600  TRANDN, LIF 0
2526    1274  6505          JMP F7A
2527    1275  0002  ENDTP,   PDP
2530                        PMODE
2531    3276  7200          CLA
2532    3277  1313          TAD X6
2533    3300  3014          DCA XR4
2534    3301  6046          TLS
2535    3302  7200  HEAD1,  CLA
2536    3303  6041          TSF
2537    3304  5303          JMP .-1
2540    3305  1414          TAD I XR4
2541    3306  6046          TLS
2542    3307  7450          SNA
2543    3310  7410          SKP
2544    3311  5302          JMP HEAD1
2545    3312  7410          SKP
2546    3313  0424  X6,     TAPE-1
2547    3314  6141          LINC
2550                        LMODE
2551    1315  0602          LIF 2
2552    1316  6020          JMP BEGIN
2553    1317  0002  OVERTP,  PDP
2554                        PMODE
2555    3320  7200          CLA
2556    3321  1335          TAD X7
2557    3322  3015          DCA XR5
2560    3323  6046          TLS
2561    3324  7200  HEAD2,  CLA
2562    3325  6041          TSF
2563    3326  5325          JMP .-1
2564    3327  1415          TAD I XR5
2565    3330  6046          TLS
2566    3331  7450          SNA
2567    3332  7410          SKP
2570    3333  5324          JMP HEAD2
```

```
2571    3334  7410          SKP
2572    3335  0441  X7,     SMASH=1
2573    3336  6141          LINC
2574                        LMODE
2575    1337  0602          LIF 2
2576    1340  6020          JMP BEGIN
2577                        SEGMNT 0
2600                        *10
2601    0010  0000  XR,     0
2602    0011  0000  XR1,    0
2603    0012  0000  XR2,    0
2604    0013  0000  XR3,    0
2605    0014  0000  XR4,    0
2606    0015  0000  XR5,    0
2607                        *20
2610    0020  3063  BUFTRR, BUFTR
2611    0021  3200  WRTPE,  WRTAPE
2612                        *400
2613    0400  0212  XR22,   212          /LF
2614    0401  0212          212          /LF
2615    0402  0212          212          /LF
2616    0403  0303          303          /C
2617    0404  0310          310          /H
2620    0405  0301          301          /A
2621    0406  0316          316          /N
2622    0407  0240          240          /SPACE
2623    0410  0240          240          /  "
2624    0411  0323          323          /S
2625    0412  0324          324          /T
2626    0413  0302          302          /B
2627    0414  0314          314          /L
2630    0415  0313          313          /K
2631    0416  0240          240          /SPACE
2632    0417  0240          240          /  "
2633    0420  0316          316          /N
2634    0421  0302          302          /B
2635    0422  0215          215          /CR
2636    0423  0212          212          /LF
2637    0424  0000          0            /EOM
2640    0425  0212  TAPE,   212          /LF
2641    0426  0305          305          /E
2642    0427  0256          256          /.
2643    0430  0317          317          /O
2644    0431  0256          256          /.
2645    0432  0324          324          /T
2646    0433  0301          301          /A
2647    0434  0320          320          /P
2650    0435  0305          305          /E
2651    0436  0215          215          /CR
2652    0437  0212          212          /LF
2653    0440  0207          207          /BELL
2654    0441  0000          0            /EOM
2655    0442  0212  SMASH,  212          /LF
2656    0443  0317          317          /O
2657    0444  0326          326          /V
2660    0445  0305          305          /E
2661    0446  0322          322          /R
2662    0447  0322          322          /R
2663    0450  0325          325          /U
2664    0451  0316          316          /N
2665    0452  0240          240          /SPACE
2666    0453  0304          304          /D
2667    0454  0301          301          /A
=
```

```
2670    0455  0324          324             /T
2671    0456  0301          301             /A
2672    0457  0215          215             /CR
2673    0460  0212          212             /LF
2674    0461  0207          207             /BELL
2675    0462  0000          0               /EOM
2676    0463  1020  RESET2, LDA I            /RESET PTR TO
2677    0464  0377          XR22-1          /TOP OF
2700    0465  4012          STC XR2         /TTY HEADING
2701    0466  0602          LIF 2
2702    0467  6000          JMP 0
2703    0470  0047  F6A,     SET 7
2704    0471  0000          0
2705    0472  7002  F6AA,    JMP QAINIT
2706    0473  0535          FRAME6
2707    0474  0774          ANSWER
2710    0475  6523          JMP CHKSN
2711    0476  0070          SET I 10
2712    0477  0774          ANSWER
2713    0500  1330          LDH I 10
2714    0501  1420          SHD I
2715    0502  2400          2400            /A  T?
2716    0503  6527          JMP NORMXX      /YES
2717    0504  6472          JMP F6AA        /NO
2720    0505  7002  F7A,     JMP QAINIT
2721    0506  0640          FRAME7
2722    0507  0774          ANSWER
2723    0510  7055          JMP QARFSH
2724    0511  0070          SET I 10
2725    0512  0774          ANSWER
2726    0513  1330          LDH I 10
2727    0514  1420          SHD I
2730    0515  2200          2200            /AN R?
2731    0516  6533          JMP START1
2732    0517  1420          SHD I
2733    0520  1000          1000            /AN H?
2734    0521  0000          HLT             /STOP
2735    0522  6505          JMP F7A         /NO
2736    0523  0440  CHKSN,  SNS 0
2737    0524  7055          JMP QARFSH
2740    0525  0602          LIF 2
2741    0526  6023          JMP BEGIN1
2742    0527  0602  NORMXX, LIF 2
2743    0530  0040          SET 0
2744    0531  0007          7
2745    0532  6000          JMP 0
2746    0533  0602  START1, LIF 2
2747    0534  6020          JMP BEGIN
2750    0535  0640
2750    0536  4040
2750    0537  4040
2750    0540  4003
2750    0541  0125
2750    0542  2411
2750    0543  1716
2750                FRAME6, TEXT ¢F     CAUTION!
2751    0544  4143
2751
2752    0545  4743
2752
2753    0546  4743
2753    0547  1040
2753    0550  4040
```

```
2753    0551  4040
2753    0552  4011
2753    0553  0640
2753    0554  2516
2753    0555  1124
2753    0556  4060
2753    0557  4011
2753    0560  2340
2753    0561  2523
2753    0562  0504
2753    0563  4024
2753    0564  1740
2753    0565  0317
2753    0566  1414
2753    0567  0503
2753                H       IF UNIT 0 IS USED TO COLLECT
2754    0570  2443
2754    0571  1040
2754    0572  4040
2754    0573  0317
2754    0574  1624
2754    0575  1107
2754    0576  2517
2754    0577  2523
2754    0600  4004
2754    0601  0124
2754    0602  0154
2754    0603  4022
2754    0604  0515
2754    0605  1726
2754    0606  0540
2754    0607  0411
2754    0610  0114
2754    0611  4024
2754    0612  0120
2754                H   CONTIGUOUS DATA, REMOVE DIAL TAPE
2755    0613  0543
2755
2756    0614  4743
2756    0615  1040
2756    0616  4040
2756    0617  4040
2756    0620  4040
2756    0621  4024
2756    0622  3120
2756    0623  0540
2756    0624  2440
2756    0625  2417
2756    0626  4002
2756    0627  0507
2756    0630  1116
2756    0631  4024
2756    0632  2201
2756    0633  1623
2756    0634  0605
2756    0635  2240
2756    0636  7461
2756    0637  3400
2756                H       TYPE T TO BEGIN TRANSFER <1\Z
2757    0640  0640
2757    0641  4040
2757    0642  2205
2757    0643  2125
=
```

```
2757       0644  0523
2757       0645  2405
2757       0646  0440
2757       0647  0401
2757                   FRAME7, TEXT ŻF   REQUESTED DATA
2760       0650  2401
2760       0651  4306
2760       0652  1001
2760       0653  2340
2760       0654  0205
2760       0655  0516
2760       0656  4024
2760       0657  2201
2760       0660  1623
2760       0661  0605
2760       0662  2222
2760                   FHAS BEEN TRANSFERRED
2761       0663  0504
2761
2762       0664  4347
2762
2763       0665  4347
2763       0666  4310
2763       0667  4040
2763       0670  4040
2763       0671  4040
2763       0672  4040
2763       0673  2431
2763       0674  2005
2763       0675  4022
2763       0676  4006
2763       0677  1722
2763       0700  4001
2763       0701  1617
2763       0702  2410
2763       0703  0522
2763       0704  4012
2763                   H         TYPE R FOR ANOTHER JOB
2764       0705  1702
2764       0706  4310
2764       0707  4040
2764       0710  4040
2764       0711  4040
2764       0712  4040
2764       0713  2431
2764       0714  2005
2764       0715  4010
2764       0716  4024
2764       0717  1740
2764       0720  1014
2764                   H         TYPE H TO HLT
2765       0721  2443
2765
2766       0722  4743
2766       0723  0640
2766       0724  4040
2766       0725  4040
2766       0726  4022
2766       0727  0520
2766       0730  1431
2766       0731  4074
2766       0732  6134
2766                   F       REPLY <1\Ż
```

0000 ERRORS

```
AAAEND 5670
AGAIN  2617
ALL    4305
ALLRPT 4316
ANSBUF 4370
ANSWER 4774
A3400  3110
A4000  3111
A6000  3107
BEGIN  4020
BEGIN1 4023
BITN   2517
BITNO  3266
BITY   2514
BITYES 3263
BIT0   2335
BIT1   2340
BUFSUB 2525
BUFTR  3063
BUFTRR 0020
BUFTTY 2554
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CHAN10 3025
CHAN2  3017
CHAN20 3030
CHAN4  3022
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CHKSN  0523
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C2     2556
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DPOSIT 4176
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FLAG   2155
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FRAME3 4530
FRAME4 4603
FRAME5 4644
FRAME6 0535
FRAME7 0640
F1     4072
F1A    4074
F3     4107
F3A    4111
F3B    2020
F4     4123
F4A    4125
F4B    2050
F5     4137
-
```

```
F5A     4154
F5B     2116
F6      4171
F6A     0470
F6AA    0472
F7A     0505
GETCH   3122
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NUM     2140
NUMGRP  2147
NXTCH   3117
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NXT1    3046
OCTAC   2133
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QACA    5017
QACHAR  5657
QACKLF  5623
QACNTR  5606
QAD     5030
QAE     5052
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QAF     5520
QAG     5064
QAH     5116
QAI     5133
QAINIT  5002
QAJ     5140
QAK     5307
QAKRB   6036
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```
QAL      5177
QALEGL   5577
QAM      5103
QAN      5225
QAO      5233
QAP      5244
QAQ      5265
QARFSH   5055
QAT      5272
QATLS    6046
QATPE    5646
QATSF    6041
QATY     5540
QAU      5510
QAV      5320
QAW      5514
QAX      5426
QAY      5414
QAZ      5303
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QUE      4336
QUEUE    4425
RALL     2275
RDHD     2312
RDHEAD   2320
RD4BK    3062
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RTN2     4272
RTN3     2374
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STBLKD   2134
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TB2      2564
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TEMP2    2150
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_
```

```
TPWD2   3252
TPWRD1  2353
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TRANDN  3273
TRANSF  2633
TYP     3123
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UNDIGT  4245
UNITCK  2256
UNITD   2135
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UPLIM   2221
WRTAPE  3200
WRTPE   0021
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XR      0010
XR1     0011
XR2     0012
XR22    0400
XR3     0013
XR4     0014
XR5     0015
X5      2630
X6      3313
X7      3335
ZERO    2156
```

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