PDP-15 92
DECTAPE

IDENTIFICATION

DECTAPE

PRODUCT CODE:	MAINDEC-15-DATCA-A-D
PRODUCT NAME:	TCØ2/15 BASIC EXERCISER, PART 2
DATE CREATED:	MARCH 17, 1972
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	E. STEINBERGER, R. CHRISTOPHER
REPLACES:	MAINDEC-15-D3CB-D

(12)

ABSTRACT

TC02/15 BASIC EXERCISER PART 2 IS A SERIES OF TEST PROGRAMS THAT MAY BE USED TO GAIN A HIGH DEGREE OF CONFIDENCE IN THE DATA HANDLING ABILITY OF A TC02/15 DECTAPE CONTROL AND ANY CONFIGURATION OF 1 TO 8 TU55/56 DECTAPE TRANSPORTS.

THE BASIC EXERCISER CONSISTS OF SEVERAL BASIC ROUTINES THAT MAY BE INDIVIDUALLY SELECTED. THE INSTRUCTION TEST OPERATES DRIVE 8/0 ONLY, AND REQUIRES THAT DRIVE 8/0 BE ON LINE AND WRITE ENABLED.

THE ROUTINES ARE:

ROUTINE 1. TC02/15 INSTRUCTION TEST

ROUTINE 2. TC02/15 API TEST

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-15
TC02/15 DECTAPE CONTROL
1 TO 8 TU55/56 DECTAPE TRANSPORTS
API (OPTIONAL)

2.2 STORAGE

THE PROGRAM OCCUPIES CORE MEMORY UP TO ADDRESS 2500.

2.3 PRELIMINARY PROGRAMS

ALL PDP-15 CENTRAL PROCESSOR MAINDEC DIAGNOSTICS SHOULD RUN SUCCESSFULLY BEFORE ATTEMPTING TO RUN THIS PROGRAM.

3. LOADING PROCEDURE

PLACE THE BINARY TAPE IN THE READER
SET THE ADDRESS SWITCHES TO 17700
SET THE BANK MODE SWITCH TO A 1
PRESS I/O RESET
PRESS READ IN

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

THE PARTICULAR ROUTINE TO BE RUN IS SELECTED BY PLACING THE NUMBER OF THE ROUTINE IN AC SWITCH REGISTER BITS 16 AND 17.

AC 16-17	ROUTINE	READ SECTION
00	NO TEST	
01	TC02/15 INSTRUCTION TEST	7.1
10	TC02/15 API TEST	7.2
11	NO TEST	

4.2 STARTING ADDRESS

200

4.3 PROGRAM AND/OR OPERATOR ACTION

A. SET THE ADDRESS SWITCHES TO 200
B. SELECT THE ROUTINE TO BE RUN VIA AC SWITCHES 16-17
C. PRESS I/O RESET
D. PRESS START

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

AC SWITCH	FUNCTION
0=0	ENABLE TTY MESSAGES
0=1	DELETE TTY MESSAGES

READ EACH OF THE INDIVIDUAL TEST DESCRIPTIONS TO DETERMINE IF ANY OTHER SWITCH SETTINGS APPLY TO THAT PARTICULAR ROUTINE.

5.1.1 TEST ROUTINES AND APPLICABLE RUN SWITCHES

TEST ROUTINE	AC SW	FUNCTION
TC02/15 INSTRUCTION TEST	8=1	HALT AT END OF NON-MOTION TESTS (IF TAPE MOTION HAS NOT BEEN TESTED, ROUTINE 0 (PART 1) SHOULD BE UTILIZED BEFORE ATTEMPTING TAPE MOTION PORTION OF THE INSTRUCTION TEST.)
TC02/15 API TEST	9=1	HALT AT END OF TEST.

5.2 SUBROUTINE ABSTRACTS

N/A

5.3 PROGRAM AND/OR OPERATOR PROCEDURE

THIS SERIES OF ROUTINES IS DESIGNED FOR INITIAL CHECKOUT OF A TC02/15 DECTAPE CONTROL AND ITS ASSOCIATED DRIVES, OR MAINTENANCE AND REPAIR OF THE CONTROL AND DRIVES AFTER INSTALLATION.

THE FOLLOWING PROCEDURE COULD BE USED FOR INITIAL CHECKOUT OF THE CONTROL AND DRIVES, AND TO AID IN THE REPAIR OF MALFUNCTIONS ONCE THE CONTROL AND DRIVES HAVE BEEN OPERATING.

5.3.1 OPERATION CHECK

THE FIRST ROUTINE UTILIZED IS THE TC02/15 INSTRUCTION TEST, IT IS USED TO VERIFY CONTROL OPERATIONS.

5.3.1.1 INITIAL CONTROL STATE

WHEN POWER IS INITIALLY APPLIED TO THE TC02/15 CONTROL, STATUS A, THE ERROR AND DECTAPE FLAGS, AND THE DATA FLAG CAN COME UP IN ANY STATE. A SHORT MANUAL PROCEDURE WILL PREVENT ERASING DECTAPES AND HAVING TO RELOAD PROGRAMS.

PRESS I/O RESET

NOW EXAMINE THE TC02/15 INDICATOR PANEL. THE FOLLOWING INDICATORS SHOULD ALL BE OFF, INDICATING A 0 STATE.

DTF (DECTAPE FLAG)
DF (DATA FLAG)
ALL ERROR FLAGS
W (WREN WRITE ENABLE)
STATUS A BIT 4 (MOTION)
US (UP TO SPEED)
C0 TO C2 CAN BE IN ANY STABLE STATE (NOT COUNTING)
ALL STATE REGISTER BITS EXCEPT 1 SHOULD BE 0, AND
BIT 1 SHOULD BE A 1 (STATE IDLE)

5.3.1.2 TC02/15 CONTROL TEST

THE FIRST HALF OF THE TC02/15 INSTRUCTION TEST VERIFIES THE EXISTENCE OF ALL DECTAPE IOTS EXCEPT DTOF (SKIP IF DTF=1), AND ALSO VERIFIES THAT THE STATUS A REGISTER BITS FUNCTION PROPERLY AND WILL HOLD ALL COMBINATIONS OF DATA.

SET THE ADDRESS SWITCHES TO 200
SET THE AC SWITCHES TO 1001
PRESS I/O RESET
SET DRIVE 0/0 ON LINE AND WRITE ENABLED
PRESS START

THE PROGRAM TESTS AND VERIFIES ALL CONTROLS FUNCTIONS THAT DO NOT REQUIRE TAPE MOTION, AND HALTS AT ADDRESS 522.

A HALT AT ANY OTHER ADDRESS INDICATES A CONTROL ERROR. CONSULT THE PROGRAM LISTING FOR THE ERROR DEFINITION.

(5.3.1.2 TC02/15 CONTROL TEST CONTINUED)

AT THIS POINT, IF TAPE MOTION HAS ALREADY BEEN DEFINED, AND IT IS NOT A "RAW" CONTROL THAT IS BEING TESTED:

SET DRIVE 0/0 ON LINE AND WRITE ENABLED
PRESS CONTINUE

THE PROGRAM WILL VERIFY THE FUNCTIONAL OPERATIONS OF THE TC02/15 CONTROL FOR ALL DECTAPE OPERATIONS EXCEPT WRTM, TYPEOUT "END" ON THE TTY AND HALT AT ADDRESS 1561.

A HALT AT ANY OTHER ADDRESS INDICATES A CONTROL ERROR. CONSULT THE PROGRAM LISTING FOR THE ERROR DEFINITION.

5.3.2 CHECK API OPTION

RUN TEST ROUTINE 2 TO VERIFY THAT THE API WORKS IN A STATIC CONDITION. ONCE TEST 2 RUNS IN ITS ENTIRETY, ROUTINES 4, 5, 6, AND 7 (PART 1), SHOULD BE RUN WITH THE API OPTION SELECTED (AC SWITCH 12=1 AT START FROM 200).

AFTER ONE PASS THROUGH THE API TEST ROUTINE 2, THE PROGRAM WILL TYPE "API END". IF AC SWITCH 8=1 THE PROGRAM WILL REPEAT, IF AC SWITCH 8=0 THE PROGRAM WILL HALT.

6. ERRORS

NEITHER THE TC02/15 INSTRUCTION TEST OR THE TC02/15 API TEST HAVE ERROR TYPEOUTS AND ALL HARDWARE MALFUNCTIONS DETECTED RESULT IN A PROCESSOR HALT AT A SPECIFIC ADDRESS.

7. PROGRAM DESCRIPTION

7.1 TC02/15 INSTRUCTION TEST (ROUTINE 1)

THE TC02/15 INSTRUCTION TEST IS SEGMENTED INTO TWO MAJOR DIVISIONS:

A. THOSE FUNCTIONAL OPERATIONS THAT CAN BE TESTED WITHOUT TAPE MOTION.

B. THOSE FUNCTIONS THAT CAN ONLY BE TESTED UTILIZING TAPE MOTION.

IF AC SWITCH 8=1, THE PROCESSOR WILL HALT AFTER COMPLETION OF THE NON-MOTION TESTS AND BEFORE PROCEEDING TO THE TESTS THAT REQUIRE TAPE MOTION.

BOTH SERIES OF TESTS REQUIRE DRIVE 0/0 TO BE ON LINE AND WRITE ENABLED, AND DO NOT USE ANY OTHER DRIVES.

THE CONTROL AND NO TAPE MOTION PORTION OF THE TESTS TEST THE PERFORMANCE OF THE FOLLOWING:

I/O RESET CLEARS ALL TC02/15 FLAGS
EXISTENCE OF ALL DECTAPE IOTS EXCEPT DTSF
BIT AND DATA TEST ON DECTAPE STATUS A
IORS BIT 10=0 WITH ALL DECTAPE FLAGS=0
FR 1-3=7 TO GENERATE A SELECT ERROR
XSA DLY TO BE NOT GREATER THAN 5US
SELECT ERROR TO GENERATE ERROR FLAG
IORS BIT 10=1 IF EF=1
DTEF TO SKIP IF EF IS A 1
DTDF TO NOT SKIP IF EF IS A 1
NO PROGRAM INTERRUPT WITH EF=1 AND ENI=0
DTXA WITH AC BIT 10=1 INHIBITS CLEARING EF
DTXA WITH AC BIT 10=0 DOES CLEAR EF
SE GOING TO 1 GENERATES ERR STP AND STATUS A BIT 4 IS CLEARED BY ERR STP
EF AND STATUS A BIT 9 (ENI) ON A 1 ALLOW PROGRAM INTERRUPT
DOES CAF GENERATE I/O POWER CLEAR AND CLR EF

THE TAPE MOTION TESTS VERIFY THE PERFORMANCE OF THE FOLLOWING OPERATIONS:

FIRST TEST	MOVE FUNCTION
	MOVE TAPE BACKWARDS
	DOES DATA BREAK NOT OCCUR IN MOVE
	WILL EZ BE DETECTED
	DOES EZ GENERATE EF
	DOES EZ GENERATE ERR STP AND CLEAR TAPE MOTION (STATUS A BIT 4)
	DTXA WITH BIT 10=0 SHOULD CLEAR EZ
	CAF SHOULD CLEAR EZ

SECOND TEST — WRITE ALL (BACKWARDS)

DOES WRITE ALL NOT CAUSE SE
WILL WRITE ALL CAUSE A DATA BREAK (SHOULD GET AT
    LEAST 9 TPD'S BEFORE EZ. AT LEAST ONE OF
    THEM SHOULD CAUSE 0 TO DB.)
IS WC LOCATION +1 AT DATA BREAK
IS CA LOCATION +1 AT DATA BREAK IN WRITE ALL
WILL DECTAPE FLAG (DTF) SET AT WRITE ALL DATA
    BREAK
IS WRITE ALL TRANSFER DIRECTION OUT AND NOT IN
WILL DTXA WITH AC BIT 11=1 NOT CLEAR DTF
DOES DTF=1 MAKE IORS BIT 10 A 1
WILL DTF=1 AND ENI=1 (STATUS A BIT 9) ALLOW
    PROGRAM INTERRUPT
WILL DTF=1 AND ENI=0 NOT ALLOW PROGRAM
    PROGRAM INTERRUPT
WILL DTDF SKIP WITH DTF=1
WILL DTEF NOT SKIP WITH DTF=1 AND EF=0
CAF SHOULD CLEAR THE DTF

THIRD TEST — READ ALL (FORWARD)

WILL DATA BREAK OCCUR IN READ ALL
DOES CA LOCATION INCREMENT IN READ ALL
WILL 1 TO DTF SET TIM WITH DTF ALREADY EQUAL TO 1
DOES TIM SET EF LEVEL
DOES TIM GENERATE ERR STP AND CLEAR MOTION
DTXA WITH BIT 10=1 SHOULD CLEAR DTF BUT NOT
    TIM
CAF SHOULD CLEAR TIM

FOURTH TEST — READ ALL C MODE

DOES READ ALL C MODE ALLOW DATA BREAK
DTF DOES NOT SET AT WCO IN C MODE
DTF DOES SET AT WCO (WORD COUNT OVERFLOW)
WC=0 SHOULD NOT ALLOW ANY MORE DATA BREAKS
CAF SHOULD CLEAR TAPE MOTION

FIFTH TEST — SEARCH NORMAL MODE

DOES SEARCH ALLOW DATA BREAK
DOES DTF=1 AFTER A SEARCH DATA BREAK
CA LOCATION SHOULD NOT INCREMENT IN SEARCH
TRANSFER DIRECTION OF DATA SHOULD BE INPUT

SIXTH TEST — SEARCH C MODE

DOES SEARCH C MODE ALLOW DATA BREAK
DOES DTF NOT SET TO 1 WITHOUT WCO IN C MODE
DOES DTF SET TO 1 AT SEARCH C MODE AND WCO

SEVENTH TEST — READ DATA NORMAL MODE

DOES READ DATA NOT ALLOW DATA BREAKS UNTIL
STATE DATA
WHILE IN STATE DATA DO DATA BREAKS OCCUR EVERY
200MS (APPROXIMATELY)
DOES STATE CHECK GOING TO 0 SET 1 TO DTF

EIGHTH TEST — READ DATA C MODE

DOES READ DATA ALLOW 256 DATA BREAKS PER BLOCK
STATE CHECK GOING TO 0 SHOULD NOT SET 1 TO DTF
IF WC=1
WCO (WORD COUNT OVERFLOW) BY ITSELF SHOULD NOT
SET 1 TO DTF
STATE CHECK GOING TO 0, WC=0 AND READ DATA
C MODE SHOULD SET 1 TO DTF

NINTH TEST — WRITE DATA NORMAL MODE

WRITE DATA SHOULD NOT ALLOW DATA BREAKS UNTIL
STATE REVERSE CHECK
ONE DATA BREAK SHOULD OCCUR DURING STATE REVERSE
CHECK
DATA BREAKS SHOULD OCCUR APPROXIMATELY EVERY
200MS IN STATE DATA
DOES WREN GO TO A 1 AT STATE DATA (NO DATA
BREAKS IF IT DOESN'T)
WRITE DATA SHOULD NOT ALLOW DATA BREAKS DURING
STATE FINAL
WRITE DATA SHOULD NOT ALLOW DATA BREAKS DURING
STATE CHECK
WRITE DATA NORMAL MODE AND STATE CHECK GOING TO
0 SHOULD SET 1 TO DTF
WREN SHOULD GO TO 0 DURING STATE IDLE AND NOT
ALLOW ANY MORE DATA BREAKS
AGAIN TEST WRITE DATA TO ALLOW 1 DATA BREAK
AT STATE REVERSE CHECK
WREN SHOULD NOT GO TO A 1 AT STATE DATA IF DTF
IS ALREADY A 1
DTXA, WRITE DATA AND NOT STATE IDLE OR STATE
BLOCK MARK SHOULD CAUSE A TIMING ERROR
TIMING ERROR SHOULD CLEAR US VIA ERR STOP WHICH
IN TURN CLEARS REGISTER TO IDLE, ANOTHER
DTXA AND WRITE DATA SHOULD NOT CAUSE A
SECOND TIMING ERROR

TENTH TEST — WRITE DATA C MODE

TEST ONLY 256 DATA BREAKS PER BLOCK WRITE DATA
STATE CHECK GOING TO 0 SHOULD NOT SET 1 TO DTF
IF WC=1 (NO WCO)
STATE CHECK GOING TO 0 SHOULD SET 1 TO DTF IF
WC=0 (AFTER WCO)

7.2 TC02/15 API TEST (ROUTINE 2)

THE TC02/15 API TEST IS A STATIC TEST OF THE TC02/15 INTERRUPTS VIA THE API AND SHOULD RUN IN ITS ENTIRETY BEFORE ATTEMPTING TO EXERCISE THE OTHER TEST ROUTINE UTILIZING THE API (AC SWITCH 12=1 AT START FROM 200).

INITIALLY, THE API TEST LOADS ADDRESSES 30 TO 77 WITH A SERIES OF LAW'S (30=LAW 30 TO 77=LAW 77). AFTER EACH DECTAPE API BREAK THE AC SHOULD EQUAL LAW 44. AC SWITCH 8=0 IS HALT AT END OF TEST, AC SWITCH 8=1 IS REPEAT API TEST.

THE SEQUENCE OF TESTS MADE ARE AS FOLLOWS:

WITH ALL DECTAPE FLAGS EQUAL TO 0 API SHOULD NOT BREAK
WITH EF=1 AND API OFF SHOULD NOT BREAK
API ON AND EF=1 SHOULD BREAK TO ADDRESS 44
DBK AND NEW EF=1 SHOULD BREAK TO ADDRESS 44
API OFF AND DBK WITH NEW EF=1 SHOULD NOT ALLOW BREAK
DECTAPE SHOULD NOT BREAK WITH PRIORITY 0 ACTIVE
DBK FROM PRIORITY 0 ACTIVE SHOULD ALLOW BREAK TO ADDRESS 44
API REQUEST ON PRIORITY 7 SHOULD NOT INTERFERE WITH DECTAPE API REQUEST
API ON-API OFF SHOULD NOT ALLOW A BREAK
API ON-API OFF SHOULD NOT CAUSE DECTAPE API REQUEST TO BE LAST
DBK-API OFF SHOULD NOT ALLOW API BREAK
DBK-API OFF SHOULD NOT CAUSE DECTAPE REQUEST TO BE LAST
API SHOULD HAVE PRIORITY OVER PROGRAM INTERRUPT
DBK SHOULD ALLOW SECOND BREAK FROM SAME EF AND PIE SHOULD NOT OCCUR
IF ENI=0 (DECTAPE STATUS A BIT 9) AND EF=1 NO API BREAK SHOULD OCCUR
DECTAPE FLAG=1 AND ENI=1 AND API ON SHOULD BREAK TO ADDRESS 44
DECTAPE FLAG=1 AND API ON SHOULD OVERRIDE PROGRAM INTERRUPT TO ADDRESS 0

8. PROGRAM LISTING

```
                        .TITLE * MAINDEC-15-DATCA-A * MARCH 17, 1972 *
                        .ABS
                    /TC02 BASIC EXERCISER PDP-15 - PART2
                    /COPYRIGHT 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                    /EQUATE DECTAPE IOT'S
    707541          DTCA=707541
    707542          DTRA=707542
    707544          DTXA=707544
    707545          DTLA=DTCA!DTXA
    707561          DTEF=707561
    707562          DTRB=707562
    707601          DTDF=707601
                    /EQUATE DECTAPE FUNCTIONS (STAT A)
    021000          SRCHFW=21000
    061000          SRCHBW=61000
    060000          MOVBKW=60000
    022000          RDATAF=22000
    005000          WRALL=5000
    003000          RDALL=3000
                    /BIT CONSTANTS EQUATED
    020000          GOBIT=20000
    040000          DIRBIT=40000
    100000          EZBIT=100000
    010000          MODEBT=10000
    020000          PARBIT=20000
    000100          DTFBIT=100
    000400          ENABLI=400
    775000          BLKTIM=LAW -3000        /ABOUT 36 MSEC
    777400          BLENTH=LAW -400 /-256 FOR BLOCK WC -400 OCTAL
    000030          WCLOC=30                        /WORD COUNT
    000031          CALOC=31                        /CURRENT ADDRESS
    006400          BUFFER=6400
    007000          BUFFR2=BUFFER+400
    000300          INHCLR=300
    006377          BLKFND=BUFFER-1
    007400          BUFFR3=BUFFR2+400
    700004          CLOF=700004
    700044          CLON=700044
    700301          KSF=700301
    700402          TCF=700402
    700406          TLS=700406
    700401          TSF=700401
                    /
                    /IN CASE OF CAL
00020                       .LOC 20
00020   000020              20
00021   700304              IORS-10
00022   700301              KSF
00023   741000              SKP
00024   740040              HLT
00025   700042              ION
00026   703344              DBR
00027   620020              JMP* 20
```

/

.EJECT

```
                        /STARTING ADDRESS IS 200
                        /SET SW REG SW16 TO SW17 SELECT TEST
                        /=1 IS TC02 INSTRUCTION TEST USES DRIVE 0 ONLY
                        /= 2 IS API TEST
                        /SWITCH 0 IS DELETE ALL TYPEOUTS
                        /SELECT TESTS SETUP FOR
                        /FIRST DRIVE 0 TO DRIVE TABLES
00200                           .LOC 200
00200   750004          TC02TS  LAS
00201   502300                  AND (3
00202   342301                  TAD (JMP* TSTTBL
00203   040206                  DAC GOTST
00204   202302                  LAC (JMP* 2
00205   040001                  DAC 1
00206   620211          GOTST   JMP* TSTTBL     /LOC CHANGE TO + TEST NUMBER
00207   740040                  HLT
00210   600200                  JMP TC02TS
00211   000207          TSTTBL  GOTST+1
00212   000232                  INSTST
00213   001563                  APITST
00214   000207                  GOTST+1
        000215          NDTTBL=.
00230                           .LOC TSTTBL+17
00230   000000          MSBITS  0
00231   000000          UNFUNC  0
                                .EJECT
```

```
                        /PART 1 VERIFIES STAT B
                        /IS CLEARED BY I/O RESET AT START
                        /PART 2 REQUIRED DRIVE 0 ON-LINE WRITE EN
00232   707572          INSIST  DTRB+10          /ALL FLAGS
00233   740200                  SZA              /SHOULD BE CLEAR
00234   740040          INERR1  HLT              /BUT ARE NOT
                        /ALSO - IORS - BIT 10 SHOULD = 0
00235   706314                  IORS             /READ STATUS
00236   502203                  AND I200                 /MASK BIT 10
00237   740200                  SZA              /SHOULD = 0
00240   740040          INERR2  HLT              /IORS FAILED
                        /
                        /
                        /SKIP ON DECTAPE FLAG SHOULD NOT SKIP
00241   750000                  CLA
00242   707601                  DTDF             /SHOULD NOT SKIP
00243   740001                  CMA              /DTF = 0
00244   741200                  SNA              /SHOULD HAVE EXC CMA
00245   740040          INER03  HLT              /AC = 0 IS SKIP ERROR
                        /
                        /
                        /SKIP ON ERROR FLAG SHOULD NOT SKIP
00246   750000                  CLA
00247   707561                  DTEF             /SHOULD NOT SKIP EF = 0
00250   740001                  CMA              /SHOULD EXECUTE CMA
00251   741200                  SNA              /DID IT
00252   740040          INER04  HLT              /NO AC = 0 IS SKIP ERROR
                        /
                        /PROGRAM INTERRUPT SHOULD NOT
                        /OCCUR ALL DECTAPE FLAGS = 0
00253   202304                  LAC (JMP INER05-1        /INT JMP
00254   040001                  DAC 1
00255   750000                  CLA              /MAKE 0 FOR TEST
00256   700042                  ION              /ENABLE
00257   740000                  NOP              /SHOULD NOT BREAK
00260   700002                  IOF              /SHOULD EXECUTE
00261   740001                  CMA              /SHOULD EXECUTE
00262   741200                  SNA              /AC = 0 IS INT
00263   740040          INER05  HLT              /INTERRUPTED IN ERROR
                        /
                        /STATUS A CLEAR AND READ 0'S
00264   750000                  CLA
00265   707541                  DTCA             /SHOULD CLEAR STAT A
00266   707552                  DTRA+10          /SHOULD READ 0'S
00267   740200                  SZA              /AC NOT = 0 IS ERROR
00270   740040          INER06  HLT              /CLEAR STAT A OR READ ERROR
                                .EJECT
```

```
                        /SEE IF ANY STATUS A BITS SET TO 1
                        /AND READ BACK TO AC (ANY AT ALL)
00271   750000                  CLA
00272   707541                  DTCA            /CLEAR STAT A
00273   777777                  LAW -1
00274   707544                  DTXA            /SHOULD READ A FEW 1'S
00275   750000                  CLA
00276   707542                  DTRA            /SHOULD READ A FEW 1'S
00277   741200                  SNA             /ANYTHING BUT ALL 0 OK
00300   740040          INER07  HLT             /EITHER DID NOT SET OR READ
                        /
                        /
                        /STATUS A BIT TESTS
                        /FIRST BIT TEST DOES IT CLEAR
                        /DO ALL TESTS FOR 1 BIT THEN RPT
                        /START WITH BIT 9 AND GO TO BIT 0
00301   202305          SABTST  LAC (400
00302   040010                  DAC 10
                        /
                        /BIT CLEAR TEST
00303   777777                  LAW -1
00304   040017                  DAC 17          /2ND PASS SWITCH
00305   750000                  CLA
00306   707541                  DTCA            /CLEEAR STAT A
00307   707552                  DTRA+10         /READ A
00310   500010                  AND 10          /MASK BIT
00311   740200                  SZA             /IS IT 0
00312   740040          SAER00  HLT             /NO DISPLAY FAILED BIT
                        /
                        /NOW TEST THAT THE BIT WILL SET
                        /TO A 1 THEN LOOP BACK AND TEST CLEAR AGAIN
                        /BIT SET TEST WILL IT GO TO A 1
                        /AND READ BACK AS A 1
                        /
00313   200010                  LAC 10
00314   707544                  DTXA            /BIT SHOULD SET TO 1
00315   707552                  DTRA+10         /AND READ TO AC
00316   500010                  AND 10          /BIT SHOULD = 1
00317   240010                  XOR 10          /NOW SHOULD = 0
00320   740200                  SZA
00321   740040          SAER01  HLT             /DISPLAY FAILED BIT
00322   440017                  ISZ 17          /2ND PASS CLEAR AND SET
00323   741000                  SKP             /YES
00324   600305                  JMP SABTST+4
                                .EJECT
```

```
                        /NOW TEST WILL THE BIT GO 1 TO 0
                        /FIRST CLEAR SET TO 1 COMP TO 0
                        /
00325   750000          SAER02  CLA
00326   707541                  DTCA            /CLEAR A
00327   200010                  LAC 10
00330   707544                  DTXA            /SET BIT TO 1
00331   707544                  DTXA            /SHOULD MAKE IT 0
00332   707552                  DTRA+10         /AND READ 0
00333   500010                  AND 10
00334   740200                  SZA             /BIT GO TO 0
00335   740040                  HLT             /DISPLAY FAILED BIT
                        /
                        /
                        /NOW TEST WILL THE BIT NOT GO
                        /TO A 1 WITH THE AC BIT = 0
                        /
00336   750000          SAER03  CLA
00337   707541                  DTCA            /CLEAR ALL
00340   200010                  LAC 10
00341   740001                  CMA             /MAKE AC BIT = 0
00342   707544                  DTXA            /STATA BIT SHOULD STAY 0
00343   707552                  DTRA+10         /READ IT
00344   500010                  AND 10          /MASK IT
00345   740200                  SZA             /BIT SHOULD BE 0
00346   740040                  HLT             /DISPLAY FAILED BIT
                        /
                        /
                        /NOW TEST WILL THE BIT
                        /REMAIN A 1 WITH THE AC BIT = 0
                        /
00347   750000          SAER04  CLA
00350   707541                  DTCA            /CLEAR STAT A
00351   200010                  LAC 10
00352   542306                  SAD (020000
00353   600364                  JMP SAER04+1    /CAN NOT DO BIT 4
00354   707544                  DTXA            /MAKE BIT = 1
00355   740001                  CMA
00356   707544                  DTXA            /SHOULD NOT CHANGE IT TO 0
00357   707552                  DTRA+10         /READ STAT A
00360   500010                  AND 10          /MASK BIT SHOULD = 1
00361   240010                  XOR 10          /XOR SHOULD GO TO 0
00362   740200                  SZA
00363   740040                  HLT             /DISPLAY BIT THAT DID NOT STAY 1
                        /
00364   200010                  LAC 10          /FOR NEXT BIT
00365   744010                  CLL!RAL         /POSITION
00366   740200                  SZA             /DONE ALL BITS
00367   600302                  JMP SABTST+1    /NO
                                .EJECT
```

```
                        /STATUS A DATA TEST
                        /WILL STAT A HOLD ALL
                        /COMBINATIONS EXCEPT BIT 4 = 0
                        /
00370   140010          SADATA  DZM 10
00371   200010                  LAC 10          /GET DATA
00372   502307                  AND (757400     /MASK BIT 4
00373   040011                  DAC 11          /SAVE FOR COMPARE
00374   707545                  DTLA            /LOAD A
00375   707552                  DTRA+10         /READ A
00376   540011                  SAD 11          /CORRECT RESULT
00377   600403                  JMP .+4         /YES
00400   740040          SAER00  HLT             /DISPLAY FAILED SA
00401   200011                  LAC 11          /DISPLAY CORRECT SA
00402   740040                  HLT
00403   200010                  LAC 10
00404   342305                  TAD (400                /DATA INCREMENT
00405   040010                  DAC 10
00406   740200                  SZA             /DONE ALL COMBINATIONS
00407   600371                  JMP SADATA+1    /NO
                        /
                        /
                        /NOW TEST STAT B OPERATION
                        /A LITTLE FARTHER
                        /
                        /FIRST TEST DOES CAF
                        /CLEAR ALL STAT B FLAGS
                        /
00410   703302          SBTEST  CAF             /CLEAR ALL
00411   707572                  DTRB+10         /READ STAT B
00412   740200                  SZA             /ANY 1 BITS ARE ERROR
00413   740040          SBER00  HLT             /DISPLAY FAILED SB
                        /
                        /
                        /NOW TEST WILL SELECT ERROR
                        /SET AND READ BACK TO AC
                        /AS 440000 BIT 0 AND BIT 3 ONLY
                        /XSA DLY MIGHT BE MORE THAN 5 MICROSEC
00414   202310                  LAC (7000
00415   707545                  DTLA
00416   600417                  JMP .+1         /1
00417   600420                  JMP .+1         /2
00420   600421                  JMP .+1         /3
00421   600422                  JMP .+1         /4 MICROSEC
00422   707572                  DTRB+10         /5+ MICROSEC
00423   242311                  XOR (440000     /AC SHOULD = 440000
00424   740200                  SZA             /NOW SHOULD = 0
00425   740040          SBER01  HLT             /DISPLAY FAILED BITS
                                .EJECT
```

```
                    /ERROR FLAG IS AC BIT 10 ON IORS
                    /
00426   700314              IORS
00427   502303              AND (200
00430   242303              XOR (200
00431   740200              SZA
00432   740040      SBER1A  HLT             /IORS FAILED ON EF = 1
                    /
                    /SE = 1 DTEF SHOULD SKIP EF=1
                    /
00433   750000              CLA
00434   707561              DTEF            /SHOULD SKIP EF = 1
00435   740001              CMA             /SHOULD NOT BE EXECUTED
00436   740200              SZA             /AC NOT 0 THEN NO SKIP
00437   740040      SBER02  HLT             /SKIP FAILED TO SKIP
                    /
                    /PROGRAM INTERRUPT SHOULD NOT OCCUR
                    /STAT A BIT 9 = 0
                    /
00440   202312              LAC (JMP SBER03-1
00441   040001              DAC 1           /IN CASE INT
00442   750000              CLA
00443   700042              ION             /ENABLE PIE
00444   740000              NOP             /SHOULD NOT BREAK
00445   700002              IOF             /DISABLE PIE
00446   740001              CMA             /SHOULD BE EXECUTED
00447   741200              SNA             /IF AC = 0
00450   740040      SBER03  HLT             /THEN INTERRUPT IN ERROR
                    /
                    /DTSF SHOULD NOT SKIP DTF = 0
                    /
00451   750000              CLA
00452   707601              DTDF            /SHOULD NOT SKIP
00453   740001              CMA             /DTF = 0 SHOULD EXECUTE CMA
00454   741200              SNA             /AC = 0 IS SKIP ERROR
00455   740040      SBER04  HLT
                    /
                    /DTXA WITH BIT 10 = 1 SHOULD
                    /NOT CLEAR STAT B ERRORS
                    /
00456   202303              LAC (200
00457   707544              DTXA            /XOR INH CLEAR EF
00460   707572              DTRB+10         /READ STATUS B
00461   741200              SNA             /SHOULD NOT BE 0
00462   740040      SBER05  HLT             /STAT B CLEARED
                            .EJECT
```

```
                        /DTXA WITH BIT 10 = 0 SHOULD CLEAR
00463   750000          SBER05  CLA
00464   707545                  DTLA            /SHOULD CLEAR BIT 10 = 0
00465   707572                  DTRB+10         /READ STAT B
00466   740200                  SZA             /AC SHOULD = 0
00467   740040                  HLT             /DISPLAY FAILED SE
                        /
                        /SE GOING TO 1 SHOULD CLEAR SA BIT4
                        /IS ERROR STOP GENERATED
                        /
00470   202313                  LAC (27400      /ALSO ENI BIT
00471   707545                  DTLA            /SHOULD CAUSE SE
00472   600473                  JMP .+1         /WAIT 5
00473   600474                  JMP .+1         /MICROSEC
00474   600475                  JMP .+1
00475   600476                  JMP .+1
00476   707552                  DTRA+10
00477   502306                  AND (20000
00500   740200                  SZA             /GO SHOULD BE 0
00501   740040          SBER07  HLT             /ERROR STOP NOT GEN
                        /
                        /EF=1 SE=1 AND SA BIT 9 = 1
                        /PIE SHOULD CAUSE PROGRAM INTERRUPT
                        /
00502   202314                  LAC (JMP SBER08-1
00503   040001                  DAC 1
00504   750000                  CLA
00505   700042                  ION             /PIE ON
00506   740000                  NOP             /WAIT SHOULD BREAK
00507   700002                  IOF             /PIE OFF (NOT EXC)
00510   740001                  CMA             /SHOULD NOT BE EXC
00511   740200                  SZA             /INT OCCUR IF AC = 0
00512   740040          SBER08  HLT             /INT FAIL AC NOT 0
                        /
                        /CAF SHOULD CLEAR SE IN STAT B
                        /
00513   703302                  CAF             /SHOULD CLEAR SE
00514   707572                  DTRB+10         /SHOULD READ 0'S
00515   740200                  SZA
00516   740040          SBER09  HLT             /CAF DID NOT CLEAR
                        /
                        /END OF TESTS THAT CAN BE MADE
                        /WITHOUT TAPE MOTION
                        /HALT IF SWS = 1000
                        /
00517   750004                  LAS
00520   502315                  AND (1000
00521   740200                  SZA
00522   740040                  HLT
                                .EJECT
```

```
                        /START TAPE MOTION TESTS
                        /DO A MOVE BACKWARD INTO EZ
                        /MONITOR WC LOCATION IN CASE DB
                        /OCCURS EZ SHOULD OCCUR WITHIN
                        /45 SECONDS EZ IS ONLY LEGAL STATUS
                        /
00523   202316          TMOTST  LAC (600000
00524   707545                  DTLA
00525   777777                  LAW -1                  /SET UP
00526   040030                  DAC WCLOC                       /CA AND
00527   202317                  LAC (BUFFER             /WC TO
00530   040031                  DAC CALOC                       /PREVENT CLOBBER
00531   202320                  LAC (-32
00532   040010                  DAC 10
00533   140011                  DZM 11
00534   200030                  LAC WCLOC                       /WATCH OUT
00535   740100                  SMA                     /FOR DATA BREAK
00536   740040          TMER00  HLT                     /WC SHOULD NOT INCREMENT
00537   707572                  DTRB+10
00540   740200                  SZA                     /STAT 6 ANY YET
00541   600545                  JMP .+4                 /YES
00542   707552                  DTRA+10
00543   502306                  AND (20000
00544   741200                  SNA                     /HAS GO CLEARED
00545   600553                  JMP .+6                 /YES
00546   440011                  ISZ 11
00547   600534                  JMP TMER00-2
00550   440010                  ISZ 10                  /WAITED 45 SECONDS
00551   600534                  JMP TMER00-2            /NO
00552   740040          TMER01  HLT                     /NOTHING HAPPENED
00553   707572                  DTRB+10                 /READ STATUS
00554   242321                  XOR (500000             /SHOULD MAKE EZ AND EF = 0
00555   740200                  SZA                     /ANY OTHER = 1 IS ALSO ERROR
00556   740040          TMER02  HLT                     /DISPLAY BITS IN ERROR
00557   707552                  DTRA+10
00560   502306                  AND (20000              /ERROR STOP SHOULD
00561   740200                  SZA                     /CLEAR GO BIT
00562   740040          TMER03  HLT                     /EZ DID NOT CLEAR NOT
00563   200030                  LAC WCLOC
00564   740100                  SMA                     /WAS DATA BREAK MADE
00565   740040          TMER04  HLT                     /YES DATA BREAK IN ERROR
                        /
                        /CAF SHOULD CLEAR EZ AND EF
                        /
00566   703302                  CAF                     /SHOULD CLEAR EZ
00567   707572                  DTRB+10                 /READ STATUS
00570   740200                  SZA                     /AC SHOULD = 0
00571   740040          TMER05  HLT
                                .EJECT
```

```
                        /NOW SET EZ AGAIN
                        /
    00572   202306              LAC (20000
    00573   707544              DTXA
    00574   707572              DTRB+10         /WAIT FOR EZ
    00575   741200              SNA
    00576   600574              JMP .-2
                        /
                        /DTXA WITH AC BIT 10 = 0 SHOULD CLEAR EZ
                        /
    00577   750000              CLA
    00600   707544              DTXA            /SHOULD CLEAR STAT B
    00601   707572              DTRB+10         /READ STATUS
    00602   740200              SZA             /BITS SHOULD GO TO 0
    00603   740040      TMER06  HLT
                        /
                        /WRITE ALL SHOULD NOT CAUSE
                        /A SELECT ERROR
                        /USE WRITE ALL NORMAL MODE
    00604   202322              LAC (45400      /ALSO ENI
    00605   707545              DTLA            /LOAD WRITE ALL
    00606   600607              JMP .+1         /WAIT FOR
    00607   600610              JMP .+1         /XSA DELAY
    00610   600611              JMP .+1         /TO GO AWAY
    00611   600612              JMP .+1
    00612   707572              DTRB+10         /READ STATUS
    00613   740200              SZA             /NO FLAGS SHOULD BE SET
    00614   740040      TMER07  HLT
                        /
                        /NOW MAKE TAPE GO BKWD
                        /DATA BREAK SHOULD BE MADE WITHIN
                        /250 MILLISECONDS AND DTF SHOULD BE SET
                        /
    00615   777777              LAW -1
    00616   046400              DAC BUFFER
    00617   040030              DAC WCLOC
    00620   202323              LAC (BUFFER-1
    00621   040031              DAC CALOC
    00622   202306              LAC (20000
    00623   707544              DTXA
    00624   202324              LAC (-55000
    00625   040010              DAC 10
    00626   200030              LAC WCLOC
    00627   740100              SMA             /WC GO TO 0
    00630   600637              JMP .+7         /YES
    00631   707572              DTRB+10
    00632   740200              SZA             /ANY STATUS YET
    00633   600637              JMP .+4         /YES
    00634   440010              ISZ 10          /WAITED 250 MSEC
    00635   600626              JMP .-7         /NO
    00636   740040      TMER08  HLT             /NOTHING HAPPENED 250 MSEC
                        .EJECT
```

```
                        /WC = 777777 IS NO BREAK
                        /= 0 IS 1 BREAK
                        /POSITIVE AND NOT = 0 IS MORE THAN 1 BREAK
                        /TEST WC TO HAVE INCR
                        /FROM WRITE ALL
                        /
00637   200030                  LAC .CLOC               /WC SHOULD COUNT
00640   740200                  SZA                     /ONCE AND ONLY ONCE
00641   740040          TMER9   HLT                     /NO = 1'S IS MORE THAN 1 BREAK
                        /
                        /
                        /CA SHOULD BE INCREMENTED
                        /ONCE AND ONLY ONCE
                        /
00642   200031                  LAC CALOC
00643   542323                  SAD (BUFFER-1           /DID CA CHANGE
00644   740040                  HLT                     /NO DID NOT +1
00645   542317                  SAD (BUFFER             /CA ONLY +1
00646   741000                  SKP                     /YES
00647   740040          TMER10  HLT                     /CA INCREMENTED INCORRECT
                        /
                        /
                        /WAIT FOR EZ INTERRUPT
                        /
00650   707572                  DTRB+10
00651   740100                  SMA
00652   600650                  JMP .-2
                        /
                        /
                        /NOW TEST FLAGS EF EZ AND DTF SHOULD = 1
                        /DTF SHOULD SET DURING WA DATA BREAK
                        /ALL OTHER FLAGS SHOULD = 0
                        /
00653   242325                  XOR (500100
00654   740200                  SZA
00655   740040          TMER11  HLT                     /DISPLAY FLAGS IN ERROR
                        /
                        /
                        /WRITE ALL SHOULD NOT HAVE INPUT
                        /BUFFER SHOULD STILL BE 777777
                        /
00656   206400                  LAC BUFFER              /GET WORD WRITTEN
00657   740001                  CMA
00660   740200                  SZA                     /WAS IT ALTERED
00661   740040          TMER12  HLT                     /WRITE ALL INPUT
                                .EJECT
```

```
                        /THE DECTAPE FLAG SHOULD NOT CLEAR
                        /WITH AC BIT 11 = 1 AND DTXA
                        /EZ SHOULD CLEAR AC BIT 10 = 0
                        /
00662   202326                  LAC (100
00663   707544                  DTXA            /DTF SHOULD NOT CLEAR
00664   707572                  DTRB+10         /READ STATUS
00665   242326                  XOR (100                /SHOULD CLEAR DTF POS
00666   740200                  SZA             /ALL BITS SHOULD = 0
00667   740040          TMER13  HLT             /DISPLAY BITS IN ERROR
                        /
                        /
                        /DTF = 1 SHOULD READ BACK IORS BIT 10
                        /
00670   700314                  IORS            /READ I/O STATUS
00671   502303                  AND (200                /MASK BIT 10
00672   242303                  XOR (200                /SHOULD MAKE IT 0
00673   740200                  SZA
00674   740040          TMER14  HLT             /IORS FAILED
                        /
                        /
                        /STATUS A BIT 9=1 SHOULD INT WITH PIE = 1
                        /
00675   202327                  LAC (JMP TMER15-1
00676   040001                  DAC 1
00677   750000                  CLA
00700   700042                  ION             /PIE = 1
00701   740000                  NOP             /SHOULD EXECUTE 7 THE BREAK
00702   700002                  IOF             /SHOULD NOT BE EXECUTED
00703   740001                  CMA             /SHOULD NOT BE EXECUTED
00704   740200                  SZA             /AC NOT 0 DID NOT BREAK
00705   740040          TMER15  HLT
                        /
                        /
                        /STATUS A BIT 9 = 0 AND DTF = 1
                        /INT SHOULD NOT OCCUR
                        /
00706   202330                  LAC (500                /CLEAR SA 9
00707   707544                  DTXA            /AND NOT CLEAR DTF
00710   202331                  LAC (JMP TMER16-1
00711   040001                  DAC 1
00712   750000                  CLA
00713   700042                  ION             /ENABLE PIE
00714   740000                  NOP             /SHOULD NOT BREAK
00715   700002                  IOF             /SHOULD BE EXECUTED
00716   740001                  CMA             /SHOULD BE EXECUTED
00717   740100                  SMA             /AC SHOULD BE NEGATIVE
00720   740040          TMER16  HLT             /AC = 0 IS ILLEGAL INT
                                .EJECT
```

```
                        /DTSF SHOULD SKIP DTF = 1
00721   750000                  CLA             /CLEAR FOR INDICATOR
00722   707601                  DTDF            /SHOULD SKP CMA
00723   740001                  CMA             /SHOULD NOT BE EXECUTED
00724   740200                  SZA             /AC NOT 0 IS NOT SKIP
00725   740040          TMER17  HLT             /DTSF FAILED TO SKIP
                        /
                        /
                        /DTEF SHOULD NOT SKIP EF = 0
00726   750000                  CLA             /CLEAR FOR INDICATOR
00727   707561                  DTEF            /SHOULD NOT SKIP EF = 0
00730   740001                  CMA             /SHOULD NOT BE EXECUTED
00731   740100                  SMA             /AC = 0 IS SKPD
00732   740040          TMER18  HLT             /DTEF SKIPPED IN ERROR
                        /
                        /
                        /
                        /CAF SHOULD CLEAR DECTAPE FLAG
                        /
00733   703302                  CAF             /CLEAR ALL
00734   707572                  DTRB+10         /READ STATUS
00735   740200                  SZA             /AC SHOULD = 0
00736   740040          TMER19  HLT             /CAF DID NOT CLEAR
                        /
                        /
                        /DO A READ ALL FORWARD NORMAL MODE
                        /SHOULD DATA BREAK WITHIN 250 MILLISECONDS
                        /
00737   202332                  LAC (023000     /READ ALL FORWARD
00740   707545                  DTLA            /LOAD AND GO
00741   777776                  LAW -2
00742   040030                  DAC WCLOC               /2 WORDS
00743   202323                  LAC (BUFFER-1
00744   040031                  DAC CALOC               /INTO BUFFER
00745   202333                  LAC (-122000
00746   040010                  DAC 10
00747   200030                  LAC WCLOC
00750   740001                  CMA
00751   741200                  SNA             /WC +1 YET
00752   600756                  JMP .+4         /YES
00753   440010                  ISZ 10          /WAITED 250 MILLISECONDS
00754   600747                  JMP .-5         /NO
00755   740040          TMER20  HLT             /NOTHING IN 250 MSEC
00756   707572                  DTRB+10
00757   242326                  XOR (100                /DTF SHOULD = 1
00760   740200                  SZA             /ALL OTHERS 0
00761   740040          TMER21  HLT             /DTF DID NOT SET
                                .EJECT
```

```
                        /THE CA SHOULD BE INCR +1
00762   200031                  LAC CALOC
00763   542323                  SAD (BUFFER-1
00764   740040          TMER22  HLT
                        /AND ONLY +1
00765   542317                  SAD (BUFFER
00766   741000                  SKP
00767   740040          TMER23  HLT
                        /
                        /
                        /NOW A TIMING ERROR SHOULD OCCUR
                        /WITHIN 250 MICROSECONDS
                        /
00770   777700                  LAW -100
00771   040010                  DAC 10
00772   707572                  DTRB+10         /READ STATUS
00773   741100                  SPA             /EF YET
00774   600777                  JMP .+3         /YES
00775   440010                  ISZ 10          /WAITED 250 USEC
00776   600772                  JMP .-4         /NO
                        /
                        /
                        /TIMING EF AND DTF SHOULD = 1
00777   242334                  XOR (410100     /SHOULD MAKE AC = 0
01000   740200                  SZA             /WIGHT FLAGS
01001   740040          TMER24  HLT             /1 BITS ARE ERROR MIGHT ACT = 0
                        /
                        /TIMING ERROR SHOULD CLEAR MOTION
01002   707552                  DTRA+10         /READ STAT A
01003   502306                  AND (GOBIT      /MASK MOT BIT
01004   740200                  SZA             /TIM CLEAR IT
01005   740040          TMER25  HLT             /TIM DID NOT GENERATE ERROR STOP
                        /
                        /
                        /A DATA BREAK SHOULD NOT HAVE
                        /BEEN MADE WCO AT LAST DBRK
                        /
01006   200030                  LAC WCLOC               /SHOULD NOT HAVE CHANGED
01007   740200                  SZA             /DID IT +1
01010   740040          TMER26  HLT             /DBRKD THRU WC = 0
                        /
                        /
                        /DTXA WITH AC BIT 10 = 1 AND 11 = 0
                        /SHOULD CLEAR DTF AND NOT CLEAR TIMING
                        /
01011   202303                  LAC (200
01012   707544                  DTXA            /SHOULD CLEAR DTF 11=0
01013   707572                  DTRB+10         /READ STAT B
01014   242335                  XOR (410000     /MAKE EF AND TIM = 0
01015   740200                  SZA             /DTF CLEAR AND NOT TIM
01016   740040          TMER27  HLT             /DISPLAY FLD BITS
                                .EJECT
```

```
                        /CAF SHOULD CLEAR TIMING ERROR
                        /
01017   703302                  CAF             /CLEAR ALL
01020   707572                  DTRB+10         /READ TIM ERROR
01021   740200                  SZA             /STAT B SHOULD = 0
01022   740040          TMER28  HLT             /DISPLAY FLD STAT B
                        /
                        /
                        /NOW DO A READ ALL FORWARD C MODE
                        /SET CA FOR 2 WORDS
                        /1ST DATA BREAK WITHIN 250 MILLISEC
                        /2ND DATA BREAK WITHIN 250 MICROSEC
                        /2ND BRK SETS DTF
                        /A THIRD BREAK SHOULD NOT BE MADE
                        /
01023   202336                  LAC (3300       /READ ALL C MODE
01024   707545                  DTLA            /LOAD AND START
01025   777776                  LAW -2          /2 WORD
01026   040030                  DAC WCLOC
01027   202323                  LAC (BUFFER-1   /INTO BUFFER
01030   040031                  DAC CALOC
01031   202333                  LAC (-122000    /COUNT 250 MILLISEC
01032   040010                  DAC 10
01033   200030                  LAC WCLOC
01034   740001                  CMA             /WC +1 YET
01035   741200                  SNA
01036   601042                  JMP .+4         /YES 1 BREAK MADE
01037   440010                  ISZ 10          /WAITED 250 MILLISEC
01040   601033                  JMP .-5         /NO
01041   740040          TMER29  HLT             /NO DATA BREAK 250 MILLISEC
                        /
                        /
                        /THE DTF SHOULD NOT HAVE SET
                        /
01042   707572                  DTRB+10         /READ STAT B
01043   740200                  SZA             /DTF SHOULD = 0 NOT WCO
01044   740040          TMER30  HLT             /DISPLAY ERROR STAT B
                        /
                        /
                        /A SECOND BREAK SHOULD BE MADE
                        /WITHIN 250 MICROSEC OF LAST
                        /SINCE WCO DTF SHOULD = 1
01045   777700                  LAW -100
01046   040010                  DAC 10
01047   200030                  LAC WCLOC
01050   741200                  SNA
01051   601055                  JMP .+4
01052   440010                  ISZ 10
01053   601047                  JMP .-4
01054   740040          TMER31  HLT
                                .EJECT
```

```
                        /2ND BREAK SHOULD SET DTF
                        /
01055   707572                  DTRB+10         /READ STAT B
01056   242326                  XOR (100                /ONLY DTF SHOULD = 1
01057   740200                  SZA             /WAS STAT COR
01060   740040          TMER32  HLT             /DISPLAY FAILED BITS
                        /
                        /
                        /A THIRD BREAK SHOULD NOT BE MADE
                        /WC = 0
                        /
01061   777700                  LAW -100
01062   040010                  DAC 10
01063   200030                  LAC WCLOC               /GET WC
01064   740200                  SZA             /DID IT +1
01065   740040          TMER33  HLT             /DATA BREAK THRU WC = 0
01066   440010                  ISZ 10          /WAITED 250 MIC SEC
01067   601063                  JMP .-4         /NO
                        /
                        /
                        /I/O POWER CLEAR (CAF) SHOULD CLEAR TAPE MOTION
                        /
01070   703302                  CAF             /CLEAR ALL
01071   707552                  DTRA+10         /READ STAT A
01072   502306                  AND (GOBIT      /MASK MOT BIT
01073   740200                  SZA             /DID IT CLEAR
01074   740040          TMER34  HLT             /NO POWER CLEAR FAILED
                        /
                        /
                        /NOW DO SEARCH FORWARD NORMAL MODE
                        /DATA BREAK SHOULD BE MADE WITHIN 1 SECOND
                        /
01075   202337                  LAC (21000      /SEARCH N MODE
01076   707545                  DTLA            /LOAD AND GO
01077   140030                  DZM WCLOC
01100   202323                  LAC (BUFFER-1
01101   040031                  DAC CALOC
01102   777777                  LAW -1
01103   046377                  DAC BUFFER-1
01104   202340                  LAC (172360
01105   040010                  DAC 10
                        .EJECT
```

```
                        /MONITOR WC FOR 1 SECOND
01106   200036                  LAC WCLOC
01107   740200                  SZA                     /BREAK MADE YET
01110   601114                  JMP .+4                 /YES
01111   440010                  ISZ 10                  /WAITED 1 SEC
01112   601106                  JMP .-4                 /NO
01113   740040          TMER35  HLT                     /NO DATA BREAK FOR 1 SEC
                        /
01114   707572                  DTRB+10                 /READ STAT B
01115   242326                  XOR (100                        /ONLY DTF SHOULD BE SET
01116   740200                  SZA
01117   740040          TMER36  HLT                     /DISPLAY BITS IN ERROR
                        /
                        /
                        /CA SHOULD NOT INCR IN SEARCH
01120   200031                  LAC CALOC
01121   542323                  SAD (BUFFER-1           /DID CA +1
01122   741000                  SKP                     /NO
01123   740040          TMER37  HLT                     /+1 TO CA INH FAILED
                        /
                        /WAS TRANSFER DIRECTION INPUT
01124   206377                  LAC BUFFER-1            /GET INPUT WORD
01125   740001                  CMA                     /SHOULD NOT = 0
01126   741200                  SNA                     /INPUT MADE
01127   740040          TMER38  HLT                     /APPARENTLY OUTPUT
                                .EJECT
```

```
                        /TAPE SHOULD STILL BE MOVING
                        /CHANGE TO SEARCH C MODE
01130   202341                  LAC (10000
01131   707544                  DTXA            /SET C MODE BIT
01132   777776                  LAW -2          /SET UP 2 WORDS
01133   040030                  DAC WCLOC
                        /
                        /FIRST DATA BREAK IS APPROX 56 MILLISEC
01134   202342                  LAC (-23420
01135   040010                  DAC 10
01136   200030                  LAC WCLOC               /GET WC
01137   740001                  CMA             /MAKE +
01140   741200                  SNA             /BREAK YET
01141   601145                  JMP .+4         /YES
01142   440010                  ISZ 10          /WAITED 70 MILLISEC
01143   601136                  JMP .-5         /NO
01144   740040          TMER39  HLT             /NO DATA BREAK 70 MILLISEC
                        /
                        /NO WCO SHOULD NOT SET DTF AT BREAK1
01145   707572                  DTRB+10         /READ STAT B
01146   740200                  SZA             /NO FLAGS SHOULD = 1
01147   740040          TMER40  HLT             /DISPLAY ERROR STAT B
                        /
                        /2ND DATA BREAK APPROX, 56 MILLISEC
01150   202342                  LAC (-23420
01151   040010                  DAC 10
01152   200030                  LAC WCLOC               /SECOND BREAK
01153   741200                  SNA             /MADE YET
01154   601160                  JMP .+4         /YES
01155   440010                  ISZ 10          /WAITED 70 MILLISEC
01156   601152                  JMP .-4         /NO
01157   740040          TMER41  HLT             /NO DATA BREAK 70 MILLISEC
                        /
                        /WCO SHOULD SET DTF IN CMODE
01160   707572                  DTRB+10         /READ STAT B
01161   242326                  XOR (100                /WCO SHOULD SET DTF
01162   740200                  SZA             /DTF = 1 ALL OTHERS = 0
01163   740040          TMER42  HLT             /DISPLAY BITS IN ERROR
                        /
                        /NOW CHANGE TO READ DATA
                        /NORMAL MODE SET WC TO -257
                        /
01164   202343                  LAC (13000
01165   707544                  DTXA            /CHANGE TO RDATA NORMAL MODE
01166   777377                  BLENTH-1                /-257
01167   040030                  DAC WCLOC               /FOR WC
                        .EJECT
```

```
                        /FIRST DATA BREAK SHOULD NOT OCCUR
                        /FOR AT LEAST 420 MICROSEC
                        /
01170   777575                  LAW -203
01171   040010                  DAC 10
01172   440010                  ISZ 10          /TIME OUT 420
01173   601172                  JMP .-1         /MICRO SEC
                        /
01174   200030                  LAC WCLOC               /BREAK MADE YET
01175   542344                  SAD (BLENTH-1
01176   741000                  SKP             /NO BREAK YET OK
01177   740040          TMER43  HLT             /DATA BREAK IN STAT BLOCK OR REVCK
                        /
                        /
                        /FIRST DATA BREAK SHOULD OCCUR
                        /WITHIN NEXT 300 MICROSEC
                        /
01200   777700                  LAW -100
01201   040010                  DAC 10
01202   200030                  LAC WCLOC               /GET WC
01203   542345                  SAD (BLENTH     /BREAK YET
01204   601210                  JMP .+4         /YES
01205   440010                  ISZ 10          /TIMED OUT 300 MICROSEC
01206   601202                  JMP .-4         /NO
01207   740040          TMER44  HLT             /NO DATA BREAK
                        /
                        /1 TO DF SHOULD NOT SET DTF
01210   707572                  DTRB+10         /READ STAT B
01211   740200                  SZA             /NO FLAGS SHOULD = 1
01212   740040          TMER45  HLT
                        /
                        /
                        /EACH SUCCEEDING DATA BREAK
                        /SHOULD OCCUR WITHIN 300 MICROSEC
                        /OF LAST DATA BREAK
01213   202346          SVWCP1  LAC (1
01214   340030                  TAD WCLOC               /CURRENT WC +1
01215   040011                  DAC 11          /SAVE FOR COMPARE
01216   777720                  LAW -60
01217   040010                  DAC 10
01220   200030                  LAC WCLOC               /BREAK MADE YET
01221   540011                  SAD 11
01222   601226                  JMP .+4         /YES DATA BREAK
01223   440010                  ISZ 10          /WAITED 300 MICROSEC
01224   601220                  JMP .-4         /NO
01225   740040          TMER46  HLT             /NO DBRK 300 MICROSEC
                        /
01226   740001                  CMA
01227   740200                  SZA             /256 WORDS YET
01230   601213                  JMP SVWCP1      /NO
                        .EJECT
```

```
                        /THE DTF SHOULD SET WITHIN 300 MICROSEC
                        /STAT CHECK GOING TO 0 AND RDATA NORMAL
01231   777634                  LAW -144
01232   040010                  DAC 10
01233   440010                  ISZ 10          /TIME OUT 300 MICROSEC
01234   601233                  JMP .-1
01235   707572                  DTRB+10
01236   502347                  AND (357777     /MASK PAR
01237   242326                  XOR (100                /ONLY DTF SHOULD = 1
01240   740200                  SZA
01241   740040          TMER47  HLT             /DISPLAY FAILED BITS
                        /
                        /WAIT ANOTHER 300 MICROSEC
                        /WCLOC SHOULD NOT CHANGE
01242   777634                  LAW -144
01243   040010                  DAC 10
01244   440010                  ISZ 10          /TIME OUT 300
01245   601244                  JMP .-1         /MICRO SEC
01246   200030                  LAC WCLOC               /WC GET +1
01247   740001                  CMA
01250   740200                  SZA
01251   740040          TMER48  HLT             /DATA BREAK DURING IDLE
                        /
                        /
                        /NOW CHANGE TO READ DATA
                        /C MODE SET WC FOR 2 BLOCKS
                        /DTF SHOULD NOT SET AT END OF
                        /FIRST BLOCK NO WCO, DTF SHOULD SET
                        /AT END OF SECOND BLOCK WC WILL = 0
                        /
01252   202341                  LAC (10000
01253   707544                  DTXA            /SET CMODE
01254   777000                  LAW -1000               /-512
01255   040030                  DAC WCLOC               /FOR 2 BLOCKS
01256   202323                  LAC (BUFFER-1
01257   040031                  DAC CALOC
                        /
                        /SHOULD MAKE 256 DATA BREAKS
                        /WITHIN NEXT 56 MILLISEC
                        /
01260   202350                  LAC (756700
01261   040010                  DAC 10
01262   200031                  LAC CALOC               /GET CA
01263   542351                  SAD (BUFFR2-1   /END OF BUFFER
01264   601270                  JMP .+4         /YES MADE 256 BRKS
01265   440010                  ISZ 10          /WAITED 1 BLOCK TIME
01266   601262                  JMP .-4         /NO
01267   740040          TMER49  HLT             /DISPLAY CA
                                .EJECT
```

```
                        /TIME OUT 600 MICROSEC
                        /NO MORE DATA BRKS SHOULD BE MADE
                        /
01270   777470                  LAW -310
01271   040010                  DAC 10
01272   440010                  ISZ 10          /TIME OUT
01273   601272                  JMP .-1         /600 MICROSEC
01274   200030                  LAC WCLOC
01275   542345                  SAD (BLENTH     /MAKE ANY MORE BREAKS
01276   741000                  SKP             /NO
01277   740040          TMER50  HLT             /EXTRA DATA BREAKS
                        /
                        /THE DTF SHOULD NOT BE SET
                        /RDATA CMODE AND WC = 1
                        /
01300   707572                  DTRB+10         /READ STAT B
01301   502347                  AND (357777     /MASK OFF PARITY
01302   740200                  SZA             /ANY OTHERS SET
01303   740040          TMER51  HLT             /DISPLAY FLAGS IN ERROR
                        /
                        /NOW SHOULD MAKE ANOTHER 256
                        /DATA BREAKS WITHIN NEXT 56 MILLISEC
                        /
01304   202352                  LAC (-34000
01305   040010                  DAC 10
01306   200030                  LAC WCLOC
01307   741200                  SNA             /WC GO TO 0 YET
01310   601314                  JMP .+4         /YES
01311   440010                  ISZ 10          /5 BLOCK TIME ELAPSED
01312   601306                  JMP .-4         /NO
01313   740040          TMER52  HLT
                        /
                        /WCO SHOULD NOT SET DTF BY ITSELF
                        /
01314   707572                  DTRB+10         /READ STAT B
01315   502347                  AND (357777     /MASK PARITY
01316   740200                  SZA             /SHOULD HAVE NO OTHER FLAGS
01317   740040          TMER53  HLT
                        /
                        /TIME OUT 300 MICROSEC THEN
                        /THE DTF SHOULD BE SET ST CHECK TO 0
                        /RDATA C MODE AND WC = 0
01320   777634                  LAW -144
01321   040010                  DAC 10
01322   440010                  ISZ 10          /TIME OUT 300
01323   601322                  JMP .-1         /MICRO SEC
01324   707572                  DTRB+10         /READ STAT B
01325   502347                  AND (357777     /MASK PARITY
01326   242326                  XOR (100                /ONLY DTF SHOULD = 1
01327   740200                  SZA             /DISPLAY FAILED BITS
01330   740040          TMER54  HLT
                                .EJECT
```

```
                        /NOW CHANGE BACK TO SEARCH NORMAL MODE
                        /AND TEST WRITE DATA OVER NEXT BLOCK
                        /
01331   202343                  LAC (13000
01332   707544                  DTXA            /CHANGE TO SEARCH N MODE
01333   140030                  DZM WCLOC
01334   202323                  LAC (BLKEND
01335   040031                  DAC CALOC
01336   707572                  DTRB+10         /FIND BLOCK YET
01337   741200                  SNA
01340   601336                  JMP .-2         /WAIT FOR ST BLK
01341   202353                  LAC (5000
01342   707544                  DTXA            /CHANGE TO WRITE DATA
01343   777377                  BLENTH=1
01344   040030                  DAC WCLOC               /-257
                        /
                        /SHOULD NOT MAKE ANY BREAKS FOR AT LEAST 280 USEC
01345   777702                  LAW -76
01346   040010                  DAC 10
01347   440010                  ISZ 10          /TIME OUT
01350   601347                  JMP .-1         /280 MICROSEC
01351   200030                  LAC WCLOC
01352   542344                  SAD (BLENTH-1   /MAKE ANY BREAKS
01353   741000                  SKP             /NO
01354   740040          TMER55  HLT             /PREMATUR WDATA BREAK
                        /
                        /THE FIRST DATA BREAK SHOULD
                        /OCCUR DURING STATE REVERSE CHECK
                        /WITHIN NEXT 300 MICROSEC
01355   777634                  LAW -144
01356   040010                  DAC 10
01357   200031                  LAC CALOC
01360   542317                  SAD (BUFFER     /MAKE 1ST BREAK
01361   601365                  JMP .+4         /YES
01362   440010                  ISZ 10          /WAITED 300 MICSEC
01363   601357                  JMP .-4         /NO
01364   740040          TMER56  HLT             /NO BREAK STATE REVERSE CHECK
                        /
                        /NEXT 255 DATA BREAKS
                        /SHOULD OCCUR WITHIN 300
                        /MICROSEC OF EACH OTHER
01365   202346          WDWCP1  LAC (1
01366   340030                  TAD WCLOC               /CURRENT WC +1
01367   040011                  DAC 11          /SAVE IT
01370   777720                  LAW -60
01371   040010                  DAC 10
01372   200030                  LAC WCLOC
01373   540011                  SAD 11          /MAKE NEXT BREAK
01374   601400                  JMP .+4         /YES
01375   440010                  ISZ 10          /WAITED 300 MICSEC
01376   601372                  JMP .-4         /NO
01377   740040          TMER57  HLT             /NO DBRK 300 MICSEC
                                .EJECT
```

```
                    /SEE IF 256 DATA BREAKS YET
01400   740001              CMA
01401   740200              SZA             /MADE 256 BREAKS
01402   601365              JMP WDWCP1      /NO
                    /
                    /
                    /TIME OUT 200 MICRO SEC
                    /WRITE DATA SHOULD NOT DATA BREAK DURING STATE FINAL
                    /
01403   777700              LAW -100
01404   040010              DAC 10
01405   440010              ISZ 10          /TIME OUT
01406   601405              JMP .-1         /200 MIC SEC
01407   200030              LAC WCLOC               /GET WC
01410   740001              CMA
01411   740200              SZA             /EXTRA BREAK
01412   740040      TMER58  HLT             /WDATA BREAK STATE FINAL
                    /
                    /
                    /TIME OUT ANOTHER 200 USEC
                    /DTF SHOULD GO TO 1 AND NO DATA BREAK
                    /DURING STATE CHECK
                    /
01413   777600              LAW -200                /+ A LITTLE XTRA
01414   040010              DAC 10
01415   440010              ISZ 10          /TIME OUT ABOUT
01416   601415              JMP .-1         /200 MICROSEC
01417   707572              DTRB+10         /READ STAT B
01420   242326              XOR (100                /DTF SHOULD = 1
01421   740200              SZA
01422   740040      TMER59  HLT             /DISPLAY ERROR BITS
                    /
                    /WRITE DATA DATA BREAK SHOULD
                    /BE INHIBITED DURING STATE CHECK
01423   200030              LAC WCLOC       /GET WC
01424   740001              CMA
01425   740200              SZA             /EXTRA BREAK
01426   740040      TMER60  HLT             /WDATA BREAK STATE CHECK
                    /
                    /TIME OUT 600 MICROSEC
                    /WREN SHOULD GO TO 0 DURING STATE IDLE
                    /AND NO MORE DATA BREAKS
                    /
01427   777470              LAW -310
01430   040010              DAC 10
01431   440010              ISZ 10          /TIME OUT 600 MICSEC
01432   601431              JMP .-1
01433   200030              LAC WCLOC               /GET WC
01434   740001              CMA
01435   740200              SZA             /DID IT +1
01436   740040      TMER61  HLT             /WREN PROB DID NOT GO TO 0
                    .EJECT
```

```
                        /WRITE DATA WILL MAKE 1 DATA BREAK AT STATE REVERSE CHECK
01437   777776                  LAW -2
01440   040030                  DAC WCLOC
01441   200030                  LAC WCLOC
01442   740001                  CMA             /WAIT FOR DBRK
01443   740200                  SZA             /AT NEXT REVERSE CHECK
01444   601441                  JMP .-3
01445   777470                  LAW -310
01446   040010                  DAC 10
01447   440010                  ISZ 10
01450   601447                  JMP .-1
                        /
                        /
                        /A DTXA AT THIS POINT WITH
                        /WRITE DATA WILL CAUSE TIMING ERROR
                        /STBLKMRK AND ST IDLE =0
01451   707554                  DTXA+10         /XOR 0'S
01452   442160                  ISZ DLY         /WDATA ALREADY = 1
01453   601452                  JMP .-1         /WAIT
01454   707572                  DTRB+10         /TIMING SHOULD BE = 1
01455   242335                  XOR (410000     /SHOULD CLEAR TIM AND EF
01456   740200                  SZA
01457   740040          TMER63  HLT             /DISPLAY FAILED BIT
                        /
                        /NEXT DTXA SHOULD CLEAR TIMING
                        /LAST ERROR MAKES US = 0 WHICH SHOULD
                        /CLEAR STATE REG TO STATE IDLE
01460   707554                  DTXA+10         /CLEAR AGAIN
01461   601462                  JMP .+1         /WAIT 5
01462   601463                  JMP .+1
01463   601464                  JMP .+1
01464   601465                  JMP .+1
01465   707572                  DTRB+10         /READ SHOULD ALL = 0
01466   740200                  SZA
01467   740040          TMER64  HLT             /DISPLAY ERROR STATUS
                                .EJECT
```

```
                        /NOW START UP IN SEARCH AGAIN
                        /AND TEST WRITE DATA CMODE
                        /
01470   202337                  LAC (21000      /SEARCH N MODE
01471   707545                  DTLA            /LOAD AND GO
01472   140030                  DZM WCLOC
01473   202323                  LAC (BLKFND
01474   040031                  DAC CALOC
01475   200030                  LAC WCLOC               /WAIT FOR BLOCK
01476   741200                  SNA
01477   601475                  JMP .-2
01500   202354                  LAC (15000
01501   707544                  DTXA            /MAKE W DATA C MODE
01502   777001                  LAW -777                /-511
01503   040030                  DAC WCLOC
01504   202323                  LAC (BUFFER-1   /1 WORD SHORT 2 BLOCKS
01505   040031                  DAC CALOC
01506   202352                  LAC (-34000
01507   040010                  DAC 10
01510   200031                  LAC CALOC
01511   542351                  SAD (BUFFR2-1   /WAIT FIRST
01512   601516                  JMP .+4         /256 DATA BRAKS
01513   440010                  ISZ 10
01514   601510                  JMP .-4
01515   740040      TMER65      HLT             /
                        /
                        /NOW TIME OUT 600 MICROSEC DTF SHOULD = 0
01516   777470                  LAW -310
01517   040010                  DAC 10
01520   440010                  ISZ 10          /WAIT 600 MICSEC
01521   601520                  JMP .-1
01522   707572                  DTRB+10         /READ STAT B
01523   740200                  SZA             /DTF SHOULD = 0
01524   740040      TMER66      HLT             /CMODE AND WC = 1 INH DTF
                        /
                        /ANY BREAKS MADE ST FINAL AND STATE CHECK
01525   200031                  LAC CALOC               /GET CA
01526   542351                  SAD (BUFFR2-1   /SHOULD NOT HAVE INCREMENTED
01527   741000                  SKP             /OK
01530   740040      TMER67      HLT             /EXTRA DB WRITE DATA CMODE
                        /
                        /SHOULD MADE NEXT 255 BREAKS 56 MILLISEC
01531   202352                  LAC (-34000
01532   040010                  DAC 10
01533   200030                  LAC WCLOC               /WAIT FOR WC
01534   741200                  SNA             /TO GO TO 0
01535   601541                  JMP .+4         /WC = 0
01536   440010                  ISZ 10          /WAITED 56 MILLSEC
01537   601533                  JMP .-4         /NO
01540   740040      TMER68      HLT             /DID NOT MAKE ENOUGH BREAKS
                        .EJECT
```

```
                        /NOW WAIT 900 MICROSEC AND DTF SHOULD = 1
01541   777320                  LAW -460
01542   040010                  DAC 10
01543   440010                  ISZ 10          /WAIT 900 MICSEC
01544   601543                  JMP .-1
01545   707572                  DTRB+10         /READ STAT B
01546   242326                  XOR (100
01547   740200                  SZA             /DTF SHOULD = 1
01550   740040          TMER69  HLT             /CMODE WC=0 AND STCHK TO 0 FAILED
                        /WITH WC = 0 SHOULD NOT MADE ANY MORE BREAKS
01551   200030                  LAC WCLOC
01552   740200                  SZA
01553   740040          TMER70  HLT             /WC = 0 DID NOT INH DF
01554   703302                  CAF
01555   102077                  JMS TYPIEX
01556   777777                  777777
01557   455644                  455644
01560   770000                  770000
01561   740040          TMER71  HLT
01562   600523                  JMP TMOTST
                        /LOAD ADDRESSES 30 TO 77 WITH LAW .'S
                        /TEST FOR NO API BREAK AT START
01563   202355          APITST  LAC (27         /FOR START STORE IN 30
01564   040010                  DAC 10
01565   760030                  LAW 30          /FIRST LAW
01566   060010                  DAC* 10
01567   542356                  SAD (LAW 77     /DONE TO LAST CHANNEL
01570   601573                  JMP .+3         /YES
01571   342346                  TAD (1          /LAW +1
01572   601566                  JMP .-4         /STORE NEXT
                        /NOW CLEAR ALL FLAGS AND TURN API ON
                        /NONE OF THE CHANNELS SHOULD BREAK
01573   703302                  CAF             /CLEAR ALL FLAGS
01574   202357                  LAC (400000
01575   705504                  ISA             /TURN ON API ENABLE
01576   402074                  XCT LACI0               /STALL 4 CYCLES
01577   740200                  SZA             /AC SHOULD STILL = 0
01600   740040                  HLT             /DISPLAY FAILED CHAN IN AC
                        /NOW SET SELECT ERROR IN THE TC02 API IS OFF CAF
                        /TC02 SHOULD NOT API BREAK TO ADDRESS 44
01601   703302                  CAF             /SHOULD TURN API OFF
01602   202360                  LAC (7400               /ALSO ENABLE I
01603   707545                  DTLA            /WILL SET SELECT ERROR
01604   750000                  CLA
01605   601606                  JMP .+1
01606   601607                  JMP .+1         /API SHOULD NOT
01607   601610                  JMP .+1         /BREAK IT IS TURNED
01610   601611                  JMP .+1         /OFF
01611   601612                  JMP .+1
01612   740200                  SZA             /API BREAK IN ERROR
01613   740040                  HLT             /DISPLAY FAILED CHANNEL
                                .EJECT
```

```
                        /NOW TC02 SHOULD BREAK TO ADDRESS 44
                        /WHEN API IS TURNED ON
01614   202357                  LAC (400000     /TC02 SE = 1
01615   705504                  ISA             /SET API ENABLE
01616   402074                  XCT LACI0               /STALL 4 CYCLES API BREAK
01617   542361                  SAD (LAW 44     /TO ADDRESS 44
01620   741000                  SKP             /YES OK IF AC = 0 NO BREAK
01621   740040                  HLT             /API NOT = 0  WRONG ADDRESS
                        /DBK INSTRUCTION SHOULD ALLOW 2ND BREAK
                        /SE STILL = 1  AND API STILL ENABLED
01622   707554                  DTXA+10
01623   703304                  DBK             /CLEAR PRIORITY ACTIVE
01624   401616                  XCT .-6         /SHOULD ALLOW 2ND BREAK AFTER 5 CYCLES
01625   542361                  SAD (LAW 44     /RIGHT ADDRESS
01626   741000                  SKP             /YES, BROKE TO 44
01627   740040                  HLT             /AC = 0 NO BREAK OTHER WRONG
                        /NOW TURN API OFF
                        /THEN DBK SHOULD NOT ALLOW A BREAK
01630   707554                  DTXA+10
01631   705514                  ISA+10          /CLEAR API ENABLE
01632   703304                  DBK             /CLEAR DECTAPE PR ACT
01633   402074                  XCT LACI0
01634   740200                  SZA             /AC SHOULD STILL = 0 NO BREAK
01635   740040                  HLT             /API DID NOT TURN OFF
                        /SET A HIGHER PRIORITY ACTIVE
                        /AND ENABLE API SHOULD NOT BREAK
01636   707554                  DTXA+10
01637   202362                  LAC (400200     /SET PR0 ACTIVE API ON
01640   705504                  ISA             /DO IT
01641   402074                  XCT LACI0
01642   740200                  SZA             /SHOULD NOT ALLOW BREAK
01643   740040                  HLT             /0 ACTIVE YET API BROKE
                        /NOW DBK SHOULD ALLOW TC02 BREAK
                        /CLEAR PR0 ACTIVE THEN BREAKS
01644   703304                  DBK             /CLEAR PR0 ACTIVE
01645   401641                  XCT .-4         /STALL 5 CYCLES SHOULD TEN API
01646   542361                  SAD (LAW 44     /IF AC = 0 NO BREAK
01647   741000                  SKP             /AC = LAW 44 IS OK
01650   740040                  HLT             /AC NOT 0 AND NOT LAW 44 OTHER CHAN
                        /PROGRAM LEVEL REQUESTS SHOULD NOT INTERFERE WITH DECTAPE
01651   703302                  CAF
01652   707554                  DTXA+10         /WILL CAUSE SELECT ERROR
01653   202363                  LAC (400400     /TO TURN API AND 4 PROG REQ ON
01654   705504                  ISA             /ENABLE
01655   402074                  XCT LACI0               /STALL 4 CYCLES AND API BREAK
01656   542361                  SAD (LAW 44     /GET TO 44 ONLY
01657   741000                  SKP             /YES
01660   740040                  HLT
                                .EJECT
```

```
                        /TURN API ON THEN OFF
                        /SHOULD NOT ALLOW TC02 TO BREAK
                        /
01661   703302                  CAF             /CLEAR API ENABLE
01662   707554                  DTXA+10         /AND DECTAPE ACTIVE
01663   402074                  XCT LACI0               /WAIT FOR SE
01664   202357                  LAC (400000
01665   705504                  ISA             /TURN API ON
01666   705514                  ISA+10          /TURN IT OFF
01667   402074                  XCT LACI0
01670   740200                  SZA             /SHOULD NOT HAVE BROKEN
01671   740040                  HLT             /BREAK AFTER API OFF
                        /
                        /ALSO DBK FOLLOWED BY API OFF
                        /SHOULD NOT ALLOW A BREAK BUT LAST API OFF
                        /SHOULD NOT LOOSE SE INTERRUPT
                        /
01672   202357                  LAC (400000
01673   705504                  ISA             /ENABLE  API
01674   402074                  XCT LACI0               /SHOULD NOP THEN BREAK
01675   542361                  SAD (LAW 44
01676   741000                  SKP             /API DID NOT LOOSE SE
01677   740040                  HLT             /API ON API OFF CLRD SE
01700   707554                  DTXA+10
01701   402074                  XCT LACI0
01702   703304                  DBK             /CLEAR DECTAPE ACTIVE
01703   705514                  ISA+10          /TURN API OFF
01704   402074                  XCT LACI0               /SHOULD NOT ALLOW BREAK
01705   740200                  SZA
01706   740040                  HLT             /BREAK AFTER API OFF
                        /
                        /DBK FOLLOWED BY API OFF SHOULD
                        /NOT HAVE LOST THE SELECT ERROR INTERRUPT
                        /
01707   202357                  LAC (400000
01710   705504                  ISA
01711   402074                  XCT LACI0
01712   542361                  SAD (LAW 44
01713   741000                  SKP             /LAST ISA 10 LOST AN ACTIVE INTERRUPT
01714   740040                  HLT
                        .EJECT
```

```
                        /API SHOULD OVERRIDE PROGRAM INTERRUPT
                        /
01715   140000          DZM 0
01716   202364          LAC (.+10
01717   040002          DAC 2
01720   703302          CAF
01721   700042          ION             /ENABLE PI
01722   202357          LAC (400000
01723   705504          ISA             /ENABLE API
01724   202360          LAC (7400
01725   707545          DTLA            /CAUSE A SELECT ERROR
01726   402074          XCT LACI0
01727   601730          JMP .+1         /WAIT
01730   601731          JMP .+1         /FOR PI OR API
01731   601732          JMP .+1         /SHOULD ONLY GET
01732   601733          JMP .+1         /THE API BREAK
01733   601734          JMP .+1         /AND NOT THE PI
01734   601735          JMP .+1
01735   542361          SAD (LAW 44     /API OK
01736   741000          SKP             /YES
01737   740040          HLT             /API DID NOT BREAK
01740   200000          LAC 0           /SHOULD STILL BE 0
01741   740200          SZA             /DID PI OCCUR
01742   740040          HLT             /YES API DID NOT INH PI
                        /
                        /DBK SHOULD NOT ALLOW 2ND BREAK FROM SAME FLAG
                        /AND PIE SHOULD NOT OCCUR ADRS 0 STILL = 0
                        /
01743   202365          LAC (.+6
01744   040002          DAC 2
01745   703304          DBK             /DBK
01746   402016          XCT SRCHL0              /STALL 5 CYCLES
01747   601750          JMP .+1         /SHOULD NOT PIE SHOULD APE
01750   601751          JMP .+1         /SELECT ERROR HAS ALREADY
01751   542361          SAD (LAW 44     /BEEN SERVICED SHD BE
01752   741000          SKP             /SERVICED TWICE
01753   740040          HLT
01754   200000          LAC 0           /API BROKE
01755   740200          SZA
01756   740040          HLT             /PROGRAM INTERRUPT WENT TO 0
01757   700002          IOF
01760   760044          LAW 44
01761   040044          DAC 44          /RESTORE 44 TO LAW .
01762   202302          LAC (JMP* 2)    /RESTORE 1 FOR NEXT
01763   040001          DAC 1           /INTERRUPT
                        /
                        .EJECT
```

```
                    /STATUS A BIT 9 = 0  SE = 1
                    /SHOULD NOT ALLOW API BREAK
                    /
01764   703302              CAF
01765   202357              LAC (400000
01766   705504              ISA
01767   202310              LAC (7000               /SE AGAIN ONLY NO-ENI
01770   707545              DTLA            /CAUSE SE
01771   402074              XCT LACI0
01772   601773              JMP .+1         /WAIT SHOULD NOT API
01773   601774              JMP .+1
01774   601775              JMP .+1
01775   601776              JMP .+1
01776   740200              SZA             /DID API BREAK
01777   740040              HLT             /API BROKE NOT DT ENI
02000   703302              CAF
02001   102260              JMS REWDRV              /PUT DRIVE IN EZ
02002   202366              LAC (SRCHFW+ENABLI
02003   340231              TAD UNFUNC
02004   707545              DTLA            /SEARCH FORWARD GO
02005   202323              LAC (BLKFND
02006   040031              DAC CALOC               /SET UP CA
02007   707572              DTRB+10
02010   741200              SNA             /WAIT FOR DTF
02011   602007              JMP .-2
02012   741100              SPA             /ERROR STATUS
02013   602002              JMP .-11                /DO IT AGAIN
02014   202357              LAC (400000
02015   705504              ISA             /ENABLE API
02016   402074      SRCHL0  XCT LACI0
02017   542361              SAD (LAW 44     /DID BREAK OCCUR TO 44
02020   741000              SKP             /YES API ON DTF
02021   740040              HLT
                    .EJECT
```

```
                        /NOW START SEARCH FORWARD WITH API ON
                        /WHEN SEARCH DATA BREAKS SHOULD API
                        /ALSO USE CLOCK INTERRUPT FOR TIMER
                        /
02022   703302          CAF
02023   200231          LAC UNFUNC
02024   342360          TAD (SRCHFW+ENABLI
02025   707545          DTLA
02026   777324          LAW -454                /5 SECOND CLOCK
02027   440007          DAC 7           /JUST IN CASE HANGS
02030   140000          DZM 0
02031   700044          CLON
02032   202367          LAC (.+12
02033   440002          DAC 2
02034   202357          LAC (400000
02035   705504          ISA
02036   700042          ION
02037   750000          CLA
02040   741200          SNA
02041   602040          JMP .-1
02042   700004          CLOF
02043   700002          IOF
02044   542361          SAD (LAW 44     /DID API FOR DECTAPE
02045   741000          SKP             /YES DT BREAK OK
02046   740040          HLT
02047   200000          LAC 0
02050   740200          SZA             /DID PI OCCUR
02051   740040          HLT             /PI IN ERROR
02052   206377          LAC BLKFND              /WAS SEARCH
02053   741200          SNA             /DATA BREAK MADE
02054   740040          HLT             /SEARCH DID NOT DO
02055   703302          CAF
02056   102077          JMS TYPTEX
02057   777777          LAW -1
02060   416051          416051          /API
02061   004556          4556            / EN
02062   447700          447700          /D EOM
02063   750004          LAS
02064   502315          AND (1000
02065   741200          SNA
02066   740040          HLT
02067   601563          JMP APITST
02070   402071  XCTXCT  XCT .+1         /SO THAT
02071   402072          XCT .+1         /PROGRAM WILL STALL
02072   402016          XCT SRCHL0              /FOR 7 CYCLES
02073   777777  EX1FLG  LAW -1          /MADE 0 BY DZM IN 1
                        .EJECT
```

```
02074  222075      LACI0   LAC* .+1                /LAC I NEXT ADDRESS
02075  002076              .+1             /WHICH POINTS AT NEXT
02076  000000              0               /WHICH CONTAINS ZEROS
                   /TYPE TEXT ROUTINE
                   /MASSAGE PACKED 6 BIT CODES
                   /ASCII -240 STORED AFTER JMS
                   /777777 IS CAR RET LINE FEED
                   /77 CHAR IS EOM
02077  602077      TYPTEX  JMP .
02100  222077              LAC* TYPTEX
02101  442077              ISZ TYPTEX
02102  042162              DAC TYPSAV
02103  740001              CMA
02104  740200              SZA
02105  602110              JMP .+3
02106  102252              JMS TYCRLF
02107  602100              JMP TYPTEX+1
02110  740001              CMA
02111  742020              RTR
02112  742020              RTR
02113  742020              RTR
02114  042163              DAC TYPSAV+1
02115  742020              RTR
02116  742020              RTR
02117  742020              RTR
02120  102136              JMS TYPCHR
02121  202163              LAC TYPSAV+1
02122  102136              JMS TYPCHR
02123  202162              LAC TYPSAV
02124  102136              JMS TYPCHR
02125  602100              JMP TYPTEX+1
                   /STOP ON ERROR IF DELETE SWS NOT SET
02126  602126      ERRHLT  JMP .
02127  750004              LAS
02130  502370              AND (600000
02131  740200              SZA
02132  622126              JMP* ERRHLT
02133  202126              LAC ERRHLT
02134  740040              HLT
02135  622126              JMP* ERRHLT
02136  602136      TYPCHR  JMP .
02137  502371              AND (77
02140  542371              SAD (77
02141  622077              JMP* TYPTEX
02142  342372              TAD (240
02143  102145              JMS TYPCHA
02144  622136              JMP* TYPCHR
                           .EJECT
```

```
02145   602145      TYPCHA  JMP .
02146   042161              DAC SAVCHA
02147   750004              LAS
02150   741000              SPA
02151   622145              JMP* TYPCHA
02152   202161              LAC SAVCHA
02153   700406              TLS
02154   700401              TSF
02155   602154              JMP .-1
02156   700402              TCF
02157   622145              JMP* TYPCHA
02160   000000      DLY     0
02161   000000      SAVCHA  0
02162   000000      TYPSAV  0
02163   000000              0
02164   000000              0
02165   000000              0
02166   000000              0
                    /TYPE CONTENTS OF THE
                    /AC IN OCTAL
02167   602167      TYPCON  JMP .
02170   102220              JMS DECONT
02171   102241              JMS TYPOCT
02172   202166              LAC TYPSAV+4
02173   102241              JMS TYPOCT
02174   202165              LAC TYPSAV+3
02175   102241              JMS TYPOCT
02176   202164              LAC TYPSAV+2
02177   102241              JMS TYPOCT
02200   202163              LAC TYPSAV+1
02201   102241              JMS TYPOCT
02202   202162              LAC TYPSAV
02203   102241              JMS TYPOCT
02204   102246              JMS SPACE2
02205   622167              JMP* TYPCON
                    /TYPE OUT LOWEST 3 CHAR
                    /IN OCTAL
02206   602206      TYPC03  JMP .
02207   102220              JMS DECONT
02210   202164              LAC TYPSAV+2
02211   102241              JMS TYPOCT
02212   202163              LAC TYPSAV+1
02213   102241              JMS TYPOCT
02214   202162              LAC TYPSAV
02215   102241              JMS TYPOCT
02216   102246              JMS SPACE2
02217   622206              JMP* TYPC03
                            .EJECT
```

```
02220   602220          DECONT  JMP .
02221   342162                  DAC TYPSAV
02222   742020                  RTR
02223   740020                  RAR
02224   042163                  DAC TYPSAV+1
02225   742020                  RTR
02226   740020                  RAR
02227   042164                  DAC TYPSAV+2
02230   742020                  RTR
02231   740020                  RAR
02232   042165                  DAC TYPSAV+3
02233   742020                  RTR
02234   740020                  RAR
02235   042166                  DAC TYPSAV+4
02236   742020                  RTR
02237   740020                  RAR
02240   622220                  JMP* DECONT
02241   602241          TYPOCT  JMP .
02242   502373                  AND (7
02243   342374                  TAD (260
02244   102145                  JMS TYPCHA
02245   622241                  JMP* TYPOCT
02246   602246          SPACE2  JMP .
02247   102077                  JMS TYPTEX
02250   000077                  77
02251   622246                  JMP* SPACE2
02252   602252          TYCRLF  JMP .
02253   202375                  LAC (215
02254   102145                  JMS TYPCHA
02255   202376                  LAC (212
02256   102145                  JMS TYPCHA
02257   622252                  JMP* TYCRLF
                        /REWIND DRIVE TO REVERSE ENDZONE
02260   000000          REWDRV  0
02261   202316                  LAC (GOBIT+DIRBIT
02262   340231                  TAD UNFUNC
02263   707545                  DTLA            /MOVE TAPE BKWD
02264   707572                  DTRB+10         /WAIT FOR FLAGS
02265   741200                  SNA
02266   602264                  JMP .-2
02267   707562                  DTRB
02270   542321                  SAD (500000     /CAN ONLY BE ENDZONE
02271   741000                  SKP             /OK
02272   740040                  XX              /ERROR
02273   700314                  IORS
02274   502303                  AND (200
02275   740200                  SZA             /ERROR FLAG?
02276   622260                  JMP* REWDRV     /YES
02277   602272                  JMP .-5         /NO
        000000                  .END
02300   000003  *L
02301   620211  *L
02302   620002  *L
```

```
02303   000200   *L
02304   600262   *L
02305   000400   *L
02306   020000   *L
02307   757400   *L
02310   007000   *L
02311   440000   *L
02312   600447   *L
02313   027400   *L
02314   600511   *L
02315   001000   *L
02316   060000   *L
02317   006400   *L
02320   777746   *L
02321   500000   *L
02322   045400   *L
02323   006377   *L
02324   723000   *L
02325   500100   *L
02326   000100   *L
02327   600704   *L
02330   000500   *L
02331   600717   *L
02332   023000   *L
02333   656000   *L
02334   410100   *L
02335   410000   *L
02336   033000   *L
02337   021000   *L
02340   172366   *L
02341   010000   *L
02342   754360   *L
02343   013000   *L
02344   777377   *L
02345   777400   *L
02346   000001   *L
02347   357777   *L
02350   756700   *L
02351   006777   *L
02352   744000   *L
02353   005000   *L
02354   015000   *L
02355   000027   *L
02356   760077   *L
02357   400000   *L
02360   007400   *L
02361   760044   *L
02362   400200   *L
02363   400400   *L
02364   001726   *L
02365   001751   *L
02366   021400   *L
02367   002044   *L
```

```
02370    000000    *L
02371    000077    *L
02372    000240    *L
02373    000007    *L
02374    000260    *L
02375    000215    *L
02376    000212    *L
          SIZE=02377     NO ERROR LINES
```