

1. ABSTRACT

The TC59 utility program is designed to be an aid to the hardware debugging of the tape drive associated with the TC59 program.

2. REQUIREMENTS

2.1 Equipment

PDP-9
TC59 Magnetic Tape Control
1 to 8 TU20 7-track magnetic tape transports.

2.2 Storage

Minimum configuration PDP-9 requires 8K of storage.

The utility program occupies most of memory from address 200 to address 2777. Addresses 3000 to 6777 may be used for typing in programs via DDT.

The program write buffer is from address 7000 to address 11524.

The program read buffer is from address 11525 to address 14251.

2.3 Preliminary Programs

The TC59 control test should run in its entirety before attempting to exercise this program.

3. LOADING PROCEDURE

The TC59 Utility Program was initially assembled in MACRO-9 format. PDP-7 DDT was then utilized to compile the utility program definitions and TC59 IOT definitions. The program was then repunched by DDT and must be reloaded by same. (DEC-9B-CDDA-PU)

Load DDT using PDP-7 load procedure.
Load the TC59 utility program using DDT LOAD\$/

4. STARTING PROCEDURE

4.1 Control Switch Settings

None.

4.2 Starting Address

DDT starts at 16340 and may be used to type in any program or data desired.

The utility program when started at address 200 allows the operator to enter 3 control words via the AC switches to specify any of the magnetic tape operations. After one pass starting from address 200 the program may be started at address 201 to repeat the last selected operation.

Programs typed in via DDT may be started at whatever address they are typed in at.

4.3 Program and/or Operator Action

A person using this program may want to:

1. Do a single operation or a sequence of operations in a step mode
2. Repeat the same operation in a step mode.
3. Type in his own program to do some operation or a specific sequence of operations.

To perform a single operation in a step mode:

1. Set the address switches to 0200
2. Press I/O RESET
3. Press START; the program will type:
SET WORD 1 IN SR
4. Set the switch register as desired for control word 1 per paragraph 9.1.1
5. Press CONTINUE; the program will type:
SET WORD 2 IN SR
6. Set the switch register as desired for control word 2 per paragraph 9.1.2
7. Press CONTINUE; the program will type:
SET WORD 3 IN SR

8. Set the switch register as desired for control word 3 per paragraph 2.1.3
9. Press CONTINUE; the program will perform the operation specified and start over at step 3.
10. At this point if you wish to repeat the same operation, set the address switches to 201 and press START. Each time that START is pressed the same operation will be re-executed.
11. Or, a sequence of operations may be stepped through by changing the switch register contents for steps 4, 6 and 8.

To type in your own program via DDT:

1. Determine the sequence of operations you wish to perform.
2. "CODE" the command string necessary to perform the sequence desired utilizing pencil and paper and per the commands available in subroutine definitions paragraph 5.2, and the normal computer instructions via DDT.
3. Set the address switches to 16340.
4. Press I/O RESET.
5. Press START.
6. DDT will output a carriage return line feed and allow you to type in your coded program.
7. After typing in your program via DDT, press STOP.
8. Set the address switches to the start of your program.
9. Press I/O RESET.
10. Press START.

5. OPERATING PROCEDURE

5.1 Operational Switch Settings

SW0 = 1 is delete all typeouts
SW1 = 1 is delete read error recovery
SW2 = 1 is delete write error recovery

5.2 Subroutine Aspects

The TC59 Utility Program is a series of subroutines that can be put together via DDT to form small exercises.

The individual subroutines have been defined to DDT and when the utility is loaded by DDT the symbol tables are repeated.

The subroutines defined to DDT are as follows:

The tape motion commands available for standard call in the TC59 Utility are as follows:

| COMMAND | DESCRIPTION |
|---------|---|
| WR | Write one 4095 character record from the write buffer |
| RD | Read one 4095 character or less record into the read buffer |
| RDC | Read compare one record against the write buffer |
| BK | Backspace 1 record |
| SP | Space forward 1 record |
| EOF | Write end of file |
| RWD | Rewind to load point |

The pattern generation commands available for standard call in the TC59 Utility are as follows:

| COMMAND | DESCRIPTION |
|---------|---|
| ST0 | Store zeros in the write buffer |
| ST1 | Store ones in the write buffer |
| ST25 | Store 252525 in the write buffer |
| ST52 | Store 525252 in the write buffer |
| STC | Store a count pattern in the write buffer (Count is 010101, 020202, 030303, etc.) |
| STX | Store a random data pattern in the write buffer |
| SL1 | Store a sliding one bit character pattern in the write buffer |
| SL0 | Store a sliding zero bit character pattern in the write buffer |
| STW | Store the contents of WORDX in the write buffer. WORDX is at address and may be changed to any pattern word desired. |
| ST7 | Store the contents of the next seven memory words after ST7 in the write buffer |

The utility program accumulates the total of the number of read errors, non-recoverable read errors, non-permanent write parity errors and permanent write parity errors. Two commands are available to manipulate these counters:

ZK Zero the error counters
DK Dump (print) the contents of the error counters on the teletype.

The utility program contains index commands to aid in setting operations on index of 64 decimal times:

SIN Set index
IN Index return IN11 if overflow IN12 if counter did not overflow

The utility program contains one command to sense end of tape:

EOT If end of tape is 0 return EOT? if end of tape = 1 return EOT H

The utility program contains a command to compare the read buffer against the write buffer and type out discrepancies:

COMP Compare the contents of the read buffer against the write buffer

The utility program contains commands that may be used to select density and parity selections for the standard tape motion calls:

PE Select Even Parity
PO Select Odd Parity
D2 Select 200 BPI
D5 Select 556 BPI
D8 Select 800 BPI

6. ERRORS

6.1 Write Errors

Write errors encountered by the utility program are handled as follows:

Backspace 2 records
Space forward 1 record
Rewrite operation

If the error again occurs, the operation is repeated up to 3 times. If the error is recovered from within three attempts it is counted as 1 recovered or non-permanent write error.

If the error is not recovered from after three retries, it is counted as 1 permanent write error, a bad spot and the program proceeds to backspace and reread until the error does not occur.

If AC switch 2 is a 1 the write recovery procedure is not used. The improperly written record is left written on tape as is, and the error is counted as 1 non-permanent write error.

Write errors are counted only once. Either as a non-permanent or a permanent. A typeout of 4 non-permanent and 2 permanent write errors would indicate a total of 6 write errors occurred.

6.1.2 Read Errors

Read errors encountered by the TC59 Utility Program are handled as follows:

All read error statuses cause an error typeout to be generated:

COMMAND = XXXXXX STATUS = XXXXXX

At completion of the typeout the program attempts to backspace and reread. If the error occurs again, another error typeout is generated. This sequence is repeated a maximum of 3 times. If the read error is recovered from before the third reread it is counted as 1 read error. If the read error is not recovered from within 3 read errors it is counted as 1 read error and 1 non-recoverable read error.

Recoverable read errors are counted only once. Non-recoverable read errors are counted twice. If the typeout of errors indicates 3 read errors and 1 non-recoverable, this indicates that a total of 3 read errors occurred and 1 of these was non-recoverable.

9. PROGRAM DESCRIPTION

The TC59 Utility Program can be used to generate either simple or more complex exercisers. It is recommended that this program be used mainly to generate simple programs that may be used for scope loops.

The utility program allows the user to either use subroutines that have been predefined to DDT, or allows the user to generate his own operations with different record lengths, etc., via a program entrance to the command decoding portion of the utility program.

9.1 Command Decoding

The main portion of the utility program deciphers commands given to it by decoding three words.

The main portion of the program may be entered by:

1. A JMS to address 202

The JMS should be followed by the three command words

- X JMS 202
- X+1 WORD 1 (Paragraph 9.1.1)
- X+2 WORD 2 (Paragraph 9.1.2)
- X+3 WORD 3 (Paragraph 9.1.3)
- X+4 Return after executing command.

2. A JMS to address 204 will cause the last operation specified to be repeated.

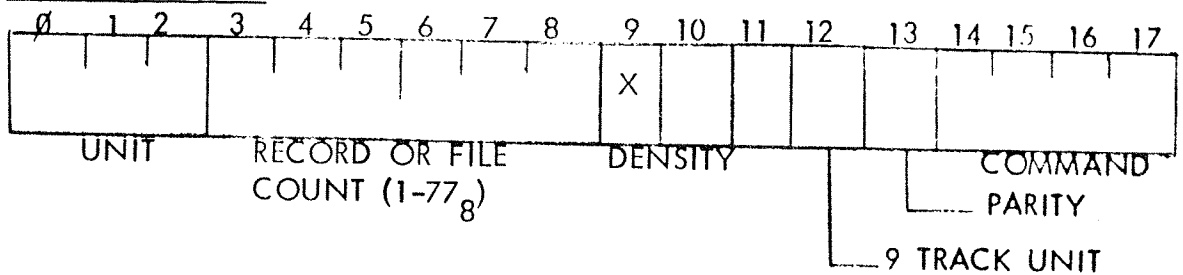
- Y JMS 204
- Y+1 Return after executing last command.

3. By starting at address 200 and entering the three control words via the Switch Register.

4. By starting at address 201 the last operation specified to the utility will be executed again without having to enter the 3 control words.

9.1.1

WORD 1 FORMAT



Density (10-11)

- 00 > 200 BPI
- 01 > 556 BPI
- 10 > 800 BPI
- 11 > 800 BPI 9 TRACK

9 TRACK (12)

- 0 > 7 TRACK
- 1 > 9 TRACK

Parity (13)

- 0 > Even
- 1 > Odd

Command (14-17)

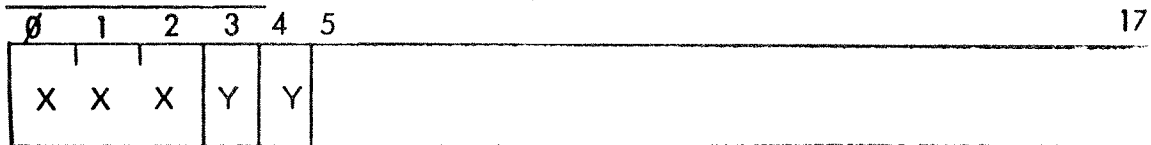
- 00 NOP
- 01 REWIND
- 02 READ
- 03 READ/COMPARE

- 04 WRITE
- 05 WRITE END OF FILE
- 06 SPACE FORWARD
- 07 SPACE REVERSE
- 10 WRITE CORE DUMP
- 11 READ CORE DUMP
- 12 SEARCH AND READ
- 13 REWIND AND READ
- 14 WRITE EXTENDED INTERRECORD GAP (3 1/2")
- 15 BACKSPACE AND READ
- 16 SPACE FILES FORWARD
- 17 SPACE FILES REVERSE

To write one record on drive 0 at 800 BPI ODD Parity WORD 1 would equal 000224, or to backspace 3 records written at 556 BPI on drive 5 WORD 1 would equal 503107.

9.1.2

WORD 2 FORMAT



STARTING ADDRESS

XXX Not used

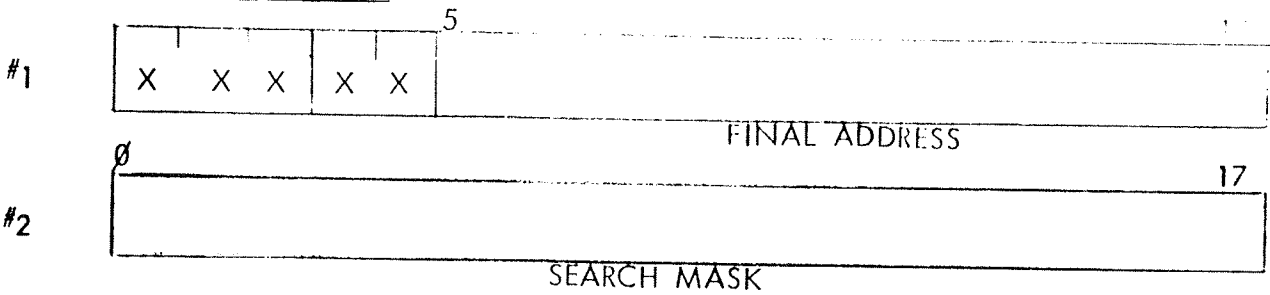
YY May be used to specify an extended memory

Starting Address (5-17)

The first address of any read or write operation, i.e., commands (requiring WORD 2)

- 02 READ
- 03 READ COMPARE
- 04 WRITE
- 10 WRITE CORE DUMP
- 11 READ CORE DUMP
- 12 SEARCH AND READ
- 13 REWIND AND READ
- 14 WRITE XIRG
- 15 BACKSPACE AND READ

9.1.3 WORD 3 FORMATS



#1 FINAL ADDRESS (5-17)

The last address written i.e., Commands (Requiring WORD 3)

- 03 READ/COMPARE
- 04 WRITE
- 10 WRITE CORE DUMP
- 14 WRITE XIRG

#2 SEARCH MASK (0-17) [COMMAND 12]

Search Mask (1st word of Block to be read)

9.2 GENERAL INFORMATION

1. Reads may be performed in infinite length blocks. The only requirements are that the starting address is outside of the program area of TC59U. Should the current address ever equal Base address (200) of TC59U a "NO READ" is typed out, and the read-in is terminated by a CAF instruction.
2. If errors occur on a record being written or read, 3 attempts to reread or rewrite the block.
3. On "Space Records Forward", the command is terminated by the count = \emptyset , or EOF, or EOT.
4. On "Space Records Reverse", the command is terminated by the count = \emptyset , or EOF or BOT.
5. On "Space Files Forward", the command is terminated by count = \emptyset or EOT.
6. On "Space Files Reverse", the command is terminated by count = \emptyset or BOT.
7. Searches are accomplished on the first word in the block. If a "find" is made the record is read into memory.

9.3 PRINTOUTS

I. "SET WORD1 IN SR"

Enter word 1 (one) in switch register. Depress CONTINUE.

II. "SET WORD2 IN SR"

Enter word 2 (two) in switch register. Depress CONTINUE.

III. "SET WORD3 IN SR"

Enter word 3 (three) in switch register. Depress CONTINUE.

IV. "COMMAND = XXXXXX STATUS = XXXXXX"

Indicates an error has occurred. COMMAND is the command issued and STATUS is the error status received.

V. "NO READ"

The starting address of the read buffer is within the program limits of TC59U; or the block is long enough to begin to read over into TC59U.

9.4 SAMPLE PROGRAMS

9.4.1 Sample Program Number 1

1. Write the length of tape
2. Random data changed every block
3. At end of tape type out the number of errors
4. 800 BPI
5. Odd Parity (Always use odd parity with STX)

| | | |
|-------|----------|------------------------------------|
| 4000/ | RWD | (Rewind) |
| 4001/ | PO | (Select ODD Parity) |
| 4002/ | ZK | (Zero error counters) |
| 4003/ | D8 | (Select 800 BPI) |
| 4005/ | WR | (Write one block) |
| 4006/ | EOT | (is end of tape set) |
| 4007/ | SKP | (Yes EOT = 1) |
| 4010/ | JMP 4004 | (Generate new pattern and write) |
| 4011/ | DK | (Print contents of error counters) |
| 4012/ | JMP 4000 | (Repeat the program) |

The program can then be started at address 4000.

9.4.2 Sample Program Number 2

1. Generate the sliding \emptyset character pattern
2. Write 64 blocks at 556 bits per inch even parity
3. Backspace 64 blocks
4. Read each block and compare data against that written
5. At EOT type out the total number of write and read errors encountered

| | | |
|-------|----------------|-------------------------------------|
| 4100/ | PE | (Select Even Parity) |
| 4101/ | ZK | (Zero Error Counters) |
| 4102/ | D5 | (556 BPI) |
| 4103/ | RWD | (Rewind to load point) |
| 4104/ | SL \emptyset | (Store sliding \emptyset pattern) |
| 4105/ | SIN | (Set index) |
| 4106/ | WR | (Write one block) |
| 4107/ | EOT | (at end of tape yet) |
| 4110/ | JMP 4127 | (Yes type accumulated errors) |
| 4111/ | IN | (written 64 blocks) |
| 4112/ | SKP | (Yes) |
| 4113/ | JMP .-5 | (Go back and write again) |
| 4114/ | SIN | (Set up index again) |
| 4115/ | BK | (Backspace 1 record) |
| 4116/ | IN | (Backspaced 64) |
| 4117/ | SKP | (Yes) |
| 4120/ | JMP .-3 | (Back up 1 more record) |
| 4121/ | SIN | (Reset counter again) |

| | | |
|-------|----------|--------------------------------|
| 4122/ | RD | (Read 1 block) |
| 4123/ | COMP | (Compare read against written) |
| 4124/ | IN | (Done 64 blocks) |
| 4125/ | JMP 4105 | (Yes start from write again) |
| 4126/ | JMP .-4 | (Read and compare next block) |
| 4127/ | DK | (Dump error counters) |
| 4130/ | JMP 4100 | (Restart) |

ADVANCE COPY

THIS DESCRIPTION IS PRELIMINARY /
SUBJECT TO CHANGE WITHOUT NOTICE.

```

        .TITLE TC-590
/TC-59 UTILITY PROGRAM
/MANUAL ENTRANCE: BASE
/MANUAL REPEAT: BASE+1
/PROGRAM ENTRANCE: BASE+2
/PROGRAM CALLING SEQUENCE:
/      JMS BASE+2
/      WORD1=COMMAND
/      WORD2=START @
/      WORD3=STOP @ OR MASK (SEARCH)
/      NEXT INSTRUCTION
/IN ADDITION A JMS BASE+4 WILL REPEAT THE
/LAST COMMAND.
/WORD 1:  BITS  0-2, UNIT
/          BITS  3-8, RECORD OR FILE COUNT (SPACE)
/          BIT   9, NOT USED
/          BITS 10-11, DENSITY (0=200, 1=556, 2=800)
/          BIT  12, 9 TRACK UNIT (0=7 TRACK)
/          BIT  13, PARITY (0=EVEN)
/          BITS 14-17, COMMAND
/          COMMANDS:
/          00=NOP,                10=WRITE CORE DUMP, 9 TRACK
/          01=REWIND,            11=READ COR DUMP, 9 TRACK
/          02=READ,              12=SEARCH AND READ
/          03=READ/COMPARE,      13=REWIND AND READ
/          04=WRITE,             14=WRITE XIRG
/          05=WRITE EOF,         15=BACKSPACE AND READ
/          06=SPACE RECORD FWD,  16=SPACE FILE FWD
/          07=SPACE RECORD REV,  17=SPACE FILE REV
/
/WORD2:  BITS 0-4 NOT USED MUST BE 0
/        BITS 5-17, STARTING ADDRESS (READ OR WRITE)
/
/WORD3:  CONFIGURATION #1
/        BITS 0-4, NOT USED MUST BE 0
/        BITS 5-17, FINAL ADDRESS (WRITE)
/        CONFIGURATION #2
/        BITS 0-17 SEARCH MASK (FIRST WORD IN BLOCK) BITS 0 TO 4 ARE USED
/
/
/BIT 0 = 1 IN LOCATION BASE+7, WILL RESULT IN NO ERROR RECOVERY
/
/SW0=1 DELETE ALL TYPEOUTS
/SW1=1 DELETE READ ERROR RECOVERY
/SW2=1 DELETE WRITE ERROR RECOVERY
        .EJECT
    
```

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| | |
|--------|-------------|
| 707352 | MTRS=707352 |
| 707312 | MTRC=707312 |
| 707341 | MTSF=707341 |
| 707321 | MTCR=707321 |
| 707301 | MTTR=707301 |
| 707326 | MTLC=707326 |
| 707304 | MTGO=707304 |
| 707322 | MTAF=707322 |
| 707324 | LCM=707324 |
| 707402 | RDR=707402 |
| 707404 | LDR=707404 |
| 707401 | SDF=707401 |

/ .AFS

| | |
|-------|--------|
| 00200 | |
| 00200 | 600210 |
| 00201 | 600336 |
| 00202 | 000000 |
| 00203 | 600235 |
| 00204 | 000000 |
| 00205 | 600253 |
| 00206 | 000000 |
| 00207 | 000000 |

```

/
.LOC 200
RASE JMP UTMAN
      JMP COMASS
      ?
      JMP UTPGM
      0
      JMP UTRPT
      0
NONER 0

```

```

/MANUAL ENTRANCE
/MANUAL ENTRANCE, REPEAT
/PROGRAM ENTRANCE
/PROGRAM REPEAT ENTRANCE

```

/BIT 0 = 1 IMPLIES NO ERROR RECOVERY

```

002525 /DEFINE STANDARD BUFFER AREAS
007000 BLENGTH=2525
011524 BUFFER=7000
014251 ENDBUF=BUFFER+BLENGTH-1
      ENDRBF=ENDRUF+BLENGTH
      .EJECT

```

+++

| | | | | |
|-------|--------|--------|-------------|-------------------------------|
| 01210 | 140252 | UTMAN | DZM PGMFLG | |
| 01211 | 140257 | | DZM RPTFLG | |
| 01212 | 762477 | | LAC TEXT1 | /"SET WORD 1 IN SR, CONTINUE" |
| 01213 | 101663 | | JMS TYPET | |
| 01214 | 740240 | | HLT | |
| 01215 | 750204 | | CLA:OAS | /ENTER WORD 1 |
| 01216 | 440232 | | DAC WORD1 | |
| 01217 | 762511 | | LAC TEXT2 | /"SET WORD 2 IN SR, CONTINUE" |
| 01220 | 101663 | | JMS TYPET | |
| 01221 | 740240 | | HLT | |
| 01222 | 750204 | | CLA:OAS | /ENTER WORD2 |
| 01223 | 440233 | | DAC WORD2 | |
| 01224 | 762523 | | LAC TEXT3 | /"SET WORD 3 IN SR, CONTINUE" |
| 01225 | 101663 | | JMS TYPET | |
| 01226 | 740240 | | HLT | |
| 01227 | 750204 | | CLA:OAS | /ENTER WORD3 |
| 01230 | 440234 | | DAC WORD3 | |
| 01231 | 600336 | | JMP COMASS | /TO COMMAND ASSEMBLY |
| 01232 | 400000 | WORD1 | M | |
| 01233 | 400000 | WORD2 | M | |
| 01234 | 400000 | WORD3 | M | |
| 01235 | 140257 | UTPGM | DZM RPTFLG | /PROGRAM ENTRY TO UTILITY |
| 01236 | 220202 | | LAC* BASE+2 | /ENTER WORD ONE |
| 01237 | 440232 | | DAC WORD1 | |
| 01240 | 440202 | | ISZ BASE+2 | |
| 01241 | 220202 | | LAC* BASE+2 | /ENTER WORD TWO |
| 01242 | 440233 | | DAC WORD2 | |
| 01243 | 440202 | | ISZ BASE+2 | |
| 01244 | 220202 | | LAC* BASE+2 | /ENTER WORD3 |
| 01245 | 440234 | | DAC WORD3 | |
| 01246 | 440202 | | ISZ BASE+2 | |
| 01247 | 202615 | | LAC ONE | |
| 01250 | 440252 | | DAC PGMFLG | /SET PROGRAM FLAG=1 |
| 01251 | 600336 | | JMP COMASS | /TO COMMAND ASSEMBLY |
| 01252 | 400000 | PGMFLG | M | /1=PROGRAM ENTRY |
| 01253 | 140252 | UTRPT | DZM PGMFLG | |
| 01254 | 202615 | | LAC ONE | /PROGRAM REPEAT ENTRY |
| 01255 | 440257 | | DAC RPTFLG | /SET REPEAT FLAG=1 |
| 01256 | 600336 | | JMP COMASS | /TO COMMAND ASSEMBLY |
| | | | .EJECT | |

| | | | | |
|-------|--------|-------------|---|-------------------------|
| 01257 | 040400 | RPTFLG | 0 | /1=PROGRAM REPEAT |
| 01260 | 040400 | COMSTP | 0 | /COMMAND STRIPPER |
| 01261 | 200232 | LAC WORD1 | | |
| 01262 | 502607 | AND UMASK | | /UNIT MASK=700000 |
| 01263 | 040325 | DAC UNIT | | /STORE UNIT |
| 01264 | 200232 | LAC WORD1 | | |
| 01265 | 502610 | AND DMASK | | /DENSITY MASK=000300 |
| 01266 | 040326 | DAC DENSIT | | /STORE DENSITY |
| 01267 | 200232 | LAC WORD1 | | |
| 01270 | 502611 | AND PARM | | /PARITY MASK=000020 |
| 01271 | 744200 | CLL | | |
| 01272 | 742010 | RTL | | /SHIFT INTO POSITION |
| 01273 | 742010 | RTL | | |
| 01274 | 742010 | RTL | | |
| 01275 | 742010 | RTL | | |
| 01276 | 742010 | RTL | | |
| 01277 | 040327 | DAC PARITY | | /STORE PARITY |
| 01300 | 777777 | LAC -1 | | |
| 01301 | 340233 | TAD WORD2 | | /STARTING CA |
| 01302 | 040330 | DAC CASTRT | | /IS WORD2-1 |
| 01303 | 740001 | CMA | | |
| 01304 | 342615 | TAD ONE | | /WORD COUNT FOR |
| 01305 | 340234 | TAD WORD3 | | /RECORD IS CASTRT |
| 01306 | 740001 | CMA | | /SUBTRACTED FROM END |
| 01307 | 342615 | TAD ONE | | /ADDS MADE - |
| 01310 | 040331 | DAC WCSTRT | | |
| 01311 | 200232 | LAC WORD1 | | |
| 01312 | 502612 | AND NINER | | /9 TRACK MASK=000040 |
| 01313 | 741200 | SNA | | /IS UNIT NINE TRACK? |
| 01314 | 600317 | JMP .+3 | | /NO |
| 01315 | 202610 | LAC DMASK | | /YES |
| 01316 | 040326 | DAC DENSIT | | /SET DENSITY TO 800 RPI |
| 01317 | 142644 | DZY CNTRPT | | |
| 01320 | 140650 | DZY WRREC | | |
| 01321 | 620260 | JMP* COMSTP | | /EXIT STRIPPER |
| 01322 | 000000 | 0 | | |
| 01323 | 000000 | 0 | | |
| 01324 | 000000 | 0 | | |
| 01325 | 000000 | UNIT | 0 | |
| 01326 | 000000 | DENSIT | 0 | |
| 01327 | 000000 | PARITY | 0 | |
| 01330 | 000000 | CASTRT | 0 | |
| 01331 | 000000 | WCSTRT | 0 | |
| 01332 | 000000 | RECBSP | 0 | |
| 01333 | 000000 | PERMRS | 0 | |
| 01334 | 000000 | RRDRR | 0 | |
| 01335 | 000000 | RDFRRO | 0 | |

.EJECT

| | | | | |
|-------|---------|--------|---------------|---------------------------------------|
| 00336 | 100260 | COMASS | JMS COMSTP | /COMMAND ASSEMBLY |
| 00337 | 200232 | | LAC WORD1 | |
| 00340 | 5002633 | | AND SEVT | /COMMAND MASK=000017 |
| 00341 | 340345 | | TAD COMTRL | |
| 00342 | 440344 | | DAC COMTRL-1 | |
| 00343 | 420344 | | XCT* COMTBL-1 | |
| 00344 | 000000 | | A | |
| 00345 | 400346 | COMTRL | .+1 | |
| 00346 | 600400 | | JMP NONEOP | /NO OPERATION |
| 00347 | 600415 | | JMP REWIND | /REWIND |
| 00350 | 600434 | | JMP READ | /READ |
| 00351 | 600523 | | JMP RDCOMP | /READ COMPARE |
| 00352 | 600566 | | JMP WRITE | /WRITE |
| 00353 | 600654 | | JMP WRFOF | /WRITE END OF FILE |
| 00354 | 600702 | | JMP SPPF | /SPACE RECORDS FORWARD |
| 00355 | 600726 | | JMP SPRR | /SPACE RECORDS REVERSE |
| 00356 | 600767 | | JMP WRCORE | /WRITE CORE DUMP MODE |
| 00357 | 601041 | | JMP RDCORE | /READ CORE DUMP MODE |
| 00360 | 601113 | | JMP SRRD | /SEARCH AND READ |
| 00361 | 601315 | | JMP RWORD | /REWIND AND READ |
| 00362 | 601405 | | JMP WRXIRG | /WRITE WITH EXTENDED INTER-RECORD GAP |
| 00363 | 601226 | | JMP BACKRD | /BACKSPACE RECORD AND READ |
| 00364 | 601467 | | JMP SPPF | /SPACE FILES FORWARD |
| 00365 | 601532 | | JMP SPFR | /SPACE FILES REVERSE |
| 00366 | 750000 | EXIT | CLA | |
| 00367 | 540257 | | SAB RPTFLG | /IS ENTERANCE FROM REPEAT |
| 00370 | 741000 | | SKP | /NO, SKIP |
| 00371 | 620204 | | JMP* BASE+4 | /YES |
| 00372 | 540252 | | SAB PGMFLG | /IS ENTERANCE FROM PROGRAM |
| 00373 | 741000 | | SKP | /NO, SKIP |
| 00374 | 620202 | | JMP* BASE+2 | /YES |
| 00375 | 600000 | | JMP BASE | |
| 00376 | 000000 | | A | |
| 00377 | 000000 | | A | |
| | | | .EJECT | |

| | | | | |
|-------|--------|--------|------------|--------------------------|
| 00400 | 707321 | NONEOP | MTR | /IS CONTROL READY |
| 00401 | 600400 | | JMP .-1 | /POWER CLEAR |
| | | | | /CLEAR ALL |
| 00402 | 200325 | | LAC UNIT | |
| 00403 | 300327 | | ADD PARITY | |
| 00404 | 300326 | | ADD DENSIT | |
| 00405 | 707326 | | MTRC | /LOAD NOP COMMAND |
| 00406 | 707304 | | MTRG | |
| 00407 | 707341 | | MTRF | /WAIT FOR ILLEGAL |
| 00410 | 600407 | | JMP .-1 | |
| 00411 | 601601 | | JMP ERROR | |
| 00412 | 000000 | | 0 | |
| 00413 | 000000 | | 0 | |
| 00414 | 000000 | | 0 | |
| 00415 | 707321 | REWIND | MTR | /IS CONTROL READY |
| 00416 | 600415 | | JMP .-1 | /POWER CLEAR - CLEAR ALL |
| 00417 | 200325 | | LAC UNIT | |
| 00420 | 707326 | | MTRC | /LOAD REWIND COMMAND |
| 00421 | 707301 | | MTRR | |
| 00422 | 600421 | | JMP .-1 | /TRANSPORT NOT READY |
| 00423 | 302634 | | ADD ONEK | |
| 00424 | 707326 | | MTRC | /LOAD REWIND |
| 00425 | 707304 | | MTRG | /REWIND |
| 00426 | 707341 | | MTRF | /WAIT FOR FLAG |
| 00427 | 600426 | | JMP .-1 | |
| 00430 | 707352 | | MTRS | |
| 00431 | 740200 | | SZA | /IS STATUS BOT |
| 00432 | 600366 | | JMP EXIT | |
| 00433 | 601601 | | JMP ERROR | /ERROR |
| | | | .EJECT | |

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434 777775
 435 742644
 436 170642
 437 209325
 440 304327
 441 302635
 442 300326
 443 707321
 444 600443
 445 707326
 446 707301
 447 600446
 450 202646
 451 740001
 452 300433
 453 741102
 454 600462
 455 202647
 456 740001
 457 300433
 460 741100
 461 600512
 462 707304
 463 200433
 464 542646
 465 600512
 466 707341
 467 600463
 470 707352
 471 502654
 472 741200
 473 600466
 474 101601
 475 442644
 476 600501
 477 440334
 500 600466
 501 777776
 502 542644
 503 440335
 504 700204
 505 602673
 506 740200
 507 600366
 510 101165
 511 600436

READ LAC -3
 REREAD LAC CNTRPT
 LAC GETCAW
 LAC UNIT
 LAC PARITY
 ADD TR0K
 ADD DE SIT
 MISC
 JMP -1
 MISC
 MISC
 JMP -1
 LAC L0WLIM
 END
 AND 33
 SNA
 JMP +5
 LAC L0PLIM
 CAA
 AND 33
 SNA
 JMP NOREAD
 MISC
 LAC 33
 SNA L0WLIM
 JMP NOREAD
 MISC
 JMP -4
 MISC
 AND STST
 SNA
 JMP EXIT
 JMP ERROR
 ISZ CNTRPT
 JMP +3
 ISZ ER0DER
 JMP EXIT
 LAC -2
 SNA CNTRPT
 ISZ PDERR0
 LAC
 AND R20K
 SNA
 JMP EXIT
 JMP BACK1
 JMP REREAD
 EJECT

/READ .IF ERROR

 /TRANSPORT NOT READY
 /TEST STARTING ADDRESS

 /<START

 />END
 /READ ONE BLOCK

 /TEST FOR ERROR
 /NO ERROR
 /TYPE ERROR STATUS
 /REREAD 3 TIMES
 /NO
 /COUNT NON RECOVERABLE
 /3 REREADS STILL ERROR

```

****
00512 703302 NOREAD DAF
00513 702552 LAR TEXT6 /ERROR: NO READ
00514 101063 JMS TYPE1
00515 600366 JMS EXIT
00516 400000 WS2
00517 400000
00520 400000
00521 142644 RDEXIT DEM CNTRPT
00522 601601 JMP ERROR
00523 777775 RDCOMP LAR -3
00524 442644 DAC CNTRPT
00525 100642 JMS GETCAW
                                /READ COMPARE
                                /CURRENT ADDRESS WORD COUNT
                                /IS CONTROL READY
                                /POWER CLEAR - CLEAR ALL

00526 707321 MTR
00527 600526 JMP -1
00530 200325 LAC UNIT
00531 300325 ADD PARITY
00532 302636 ADD THREK
00533 300326 ADD DENSIT
00534 707326 MTRC /READ COMPARE
00535 707301 MTR
00536 600535 JMP -1
00537 707304 MTRC,
00540 707341 MISC /IS JOB DONE?
00541 600540 JMP -1 /NO
00542 707352 MTRC /READ STATUS
00543 741100 SNA /ERROR?
00544 600366 JMP EXIT /NO
00545 502671 AND K3736K
00546 741200 SNA /ONLY EDT=1
00547 600366 JMP EXIT /YES NOT AN ERROR
00550 101063 JMS ERROR /TYPE STATUS
00551 442644 ISZ CNTRPT /DONE 3 REREADS
00552 600555 JMP +3 /NO
00553 400334 ISZ ORDER /YES REREAD 3+1
00554 600366 JMP EXIT /TO NON REC READ ERROR
00555 777776 LAR -2
00556 542644 SNA CNTRPT
00557 440335 ISZ RDRRO /+1 READ ERRORS
00560 700000 LAR
00561 502673 AND K200K /DELETE READ
00562 740200 SNA /RECOVERY
00563 600366 JMP EXIT /YES GET OUT
00564 101165 JMS BACK1 /BACKSPACE/
00565 600525 JMP RDCOMP+2 /READ COMPARE AGAIN
                                /EJECT

```

TC-500 HARD

/ 566 777774
 / 567 420650
 / 570 100642
 / 571 707321
 / 572 600571
 / 573 200325
 / 574 300327
 / 575 3002637
 / 576 300326
 / 577 707326
 / 600 707301
 / 601 600600
 / 602 707304
 / 603 707341
 / 604 600603
 / 605 707352
 / 606 740100
 / 607 600632
 / 610 5002671
 / 611 741200
 / 612 600632
 / 613 440650
 / 614 741000
 / 615 600637
 / 616 707322
 / 617 750004
 / 620 5002672
 / 621 740200
 / 622 600632
 / 623 1001165
 / 624 1001165
 / 625 707352
 / 626 5002643
 / 627 741200
 / 630 1001205
 / 631 600570

 / 632 777774
 / 633 540650
 / 634 600366
 / 635 440332
 / 636 600366

 / 637 440333
 / 640 1001165
 / 641 601407

 / 642 600642
 / 643 200330
 / 644 440333
 / 645 200331
 / 646 600332
 / 647 600642

WRITE LAR -4
 DAC WRREC
 JMS GETCAW
 MTR /IS CONTROL READY
 JMP .-1 /POWER CLEAR - CLEAR ALL
 LAC UNIT
 ADD PARITY
 ADD FOURK
 ADD DENSIT
 MTRC
 MTR /ASSEMBLE WRITE COMMAND
 JMP .-1
 MTRC
 MTRF /WAIT ON FLAG
 JMP .-1
 MTR /IS STATUS ERROR
 SNA /NO
 JMP WR1XIT /MASK
 AND K3736K
 SNA /AND TEST EOT
 JMP WR1XIT /MUST BE EOT
 ISZ WRREC
 SKP
 JMP RECEX
 MTRF
 LAS
 AND K100K
 SZA /DELETE WRITE REC
 JMP WR1XIT /YES GET OUT
 JMS RACK1
 JMS RACK1
 MTRF
 AND BOT
 SNA
 JMS SPACE1
 JMP WRITE+2

 / WR1XIT LAR -4
 SNA WRREC
 JMP EXIT
 ISZ RECBSP
 JMP EXIT

 / RECEX ISZ PERMRS
 JMS RACK1
 JMP WRXIRG+2

 / /SETUP CA AND WC
 GETCAW JMP .
 LAC CASTRT
 DAC 33
 LAC WCSTRT
 DAC 32
 JMP* GETCAW

/IS CONTROL READY
 /POWER CLEAR - CLEAR ALL

 /ASSEMBLE WRITE COMMAND

 /WAIT ON FLAG

 /IS STATUS ERROR
 /NO
 /MASK
 /AND TEST EOT
 /MUST BE EOT

 /DELETE WRITE REC
 /YES GET OUT

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/
EJECT

TC-591 240

01650 707300
 01651 400000
 01652 100000
 01653 400000
 01654 707321
 01655 500654
 01656 200325
 01657 300640
 01658 300326
 01659 707326
 01660 707301
 01661 500660
 01662 707304
 01663 707341
 01664 500665
 01665 707352
 01666 740100
 01667 600675
 01668 500652
 01669 740200
 01670 600366
 01671 101601
 01672 500366
 01673 400000
 01674 400000
 01675 400000
 01676 100753
 01677 200325
 01678 300327
 01679 300641
 01680 300326
 01681 707321

/FOR WRITE EOP COMMAND

WRHEC

WREOF

SPRF

0
 0
 0
 MTR
 JMP .-1
 LAC UNIT
 ADD FIVEK
 ADD DENSIT
 MTR
 MTR
 JMP .-1
 MTR
 MTR
 JMP .-1
 MTR
 SMA
 JMP .+4
 AND XIRG
 SFF
 JMP EXIT
 JMP ERROR
 JMP EXIT
 0
 0
 0
 JMP GETRC
 LAC UNIT
 ADD PARITY
 ADD SIXK
 ADD DENSIT
 MTR
 .EJECT

/WRITE END OF FILE
 /POWER CLEAR - CLEAR ALL
 /FORM WRITE EOP COMMAND

/WAIT FOR DONE

/READ STATUS
 /ERROR?
 /NO
 /YES

/SPACE RECORDS FORWARD

/IS CONTROL READY

1111

| | | | |
|-------|--------|-------------------|--------------------------|
| 4 711 | 507727 | JMP .-1 | /POWER CLEAR - CLEAR ALL |
| 4 711 | 707326 | MTLC | |
| 4 712 | 707301 | NTR | |
| 4 713 | 500712 | JMP .-1 | |
| 4 714 | 707304 | MTCO | |
| 4 715 | 707341 | MISF | |
| 4 716 | 600715 | JMP .-1 | |
| 4 717 | 707352 | MTR | /READ STATUS |
| 4 720 | 740100 | SMA | /ERROR? |
| 4 721 | 500366 | JMP EXIT | /NO |
| 4 722 | 101001 | JMS ERROR | /YES |
| 4 723 | 600366 | JMP EXIT | |
| 4 724 | 400000 | R | |
| 4 725 | 100000 | R | |
| 4 726 | 100753 | JMS GETRC | /SPACE RECORDS REVERSE |
| 4 727 | 200325 | LAC UNIT | |
| 4 730 | 300327 | ADD PARITY | |
| 4 731 | 302042 | ADD SEVENK | |
| 4 732 | 300326 | ADD DENSIT | |
| 4 733 | 707321 | MTR | /IS CONTROL READY |
| 4 734 | 500733 | JMP .-1 | /POWER CLEAR - CLEAR ALL |
| 4 735 | 707326 | MTLC | |
| 4 736 | 707301 | NTR | |
| 4 737 | 600736 | JMP .-1 | |
| 4 740 | 707304 | MTCO | |
| 4 741 | 707341 | MISF | |
| 4 742 | 600741 | JMP .-1 | |
| 4 743 | 707352 | MTR | /READ STATUS |
| 4 744 | 740100 | SMA | /ERROR? |
| 4 745 | 600366 | JMP EXIT | /NO |
| 4 746 | 101001 | JMS ERROR | /YES |
| 4 747 | 600366 | JMP EXIT | |
| 4 750 | 100000 | R | |
| 4 751 | 500000 | R | |
| 4 752 | 200000 | R | |
| / | | | |
| 4 753 | 500753 | /GET RECORD COUNT | |
| 4 754 | 200332 | GETRC | |
| 4 755 | 500013 | JMP . | /GET CONTROL 1 |
| 4 756 | 744020 | LAC WORD1 | /MASK RECORD COUNT |
| 4 757 | 742020 | AND BCMASK | |
| 4 758 | 742020 | RCR | /MOVE COUNT |
| 4 759 | 742020 | RTR | /OVER TO 12 TO 17 |
| 4 761 | 742020 | RTR | |
| 4 762 | 742020 | RTI | |
| 4 763 | 742021 | CR | /MAKE 2 COMP |
| 4 764 | 300015 | INC ONE | |
| 4 765 | 100032 | PAR 32 | |
| 4 766 | 600753 | JMS GETRC | /EXIT |
| / | | | |
| | | LEECI | |

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01007 31732
 01008 51212
 01009 71200
 01010 91241
 01011 11642
 01012 31732
 01013 51774
 01014 71325
 01015 91327
 01016 112637
 01017 31326
 01018 512650
 01019 717326
 01020 917341
 01021 111204
 01022 317304
 01023 517341
 01024 711007
 01025 917352
 01026 110100
 01027 310366
 01028 511720
 01029 710650
 01030 912621
 01031 111033
 01032 310650
 01033 510650
 01034 710650
 01035 910650
 01036 110650
 01037 310650
 01038 510650
 01039 710650
 01040 910650
 01041 110650
 01042 310650
 01043 510650
 01044 710650
 01045 910650
 01046 110650
 01047 310650
 01048 510650
 01049 710650
 01050 910650
 01051 110650
 01052 310650
 01053 510650
 01054 710650
 01055 910650
 01056 110650
 01057 310650
 01058 510650
 01059 710650
 01060 910650
 01061 110650
 01062 310650
 01063 510650
 01064 710650
 01065 910650
 01066 110650
 01067 310650
 01068 510650
 01069 710650
 01070 910650
 01071 110650
 01072 310650
 01073 510650
 01074 710650
 01075 910650
 01076 110650
 01077 310650
 01078 510650
 01079 710650
 01080 910650
 01081 110650
 01082 310650
 01083 510650
 01084 710650
 01085 910650
 01086 110650
 01087 310650
 01088 510650
 01089 710650
 01090 910650
 01091 110650
 01092 310650
 01093 510650
 01094 710650
 01095 910650
 01096 110650
 01097 310650
 01098 510650
 01099 710650
 01100 910650

WRCORE

LAC WRD01
 AND FINER
 SNA
 JMP ERRORP
 JMS NETCAW
 MTR
 JMP .-1
 LAC UNIT
 ADD PARITY
 ADD FOURK
 ADD DENSIT
 ADD TRFNTK
 MTRC
 MTR
 JMP .-1
 MTRC
 MTRF
 MTRF
 JMP .-1
 MTRC
 SNA
 JMP EXIT
 JMS NUREC
 LAC WRREC
 SNA FIVE
 JMP COREX
 ISR WRREC
 NOP
 CLC
 DAC 32
 LAC SEVENK
 LCM
 MTRF
 MTRC
 MTRC
 JMP .-1
 JMP WRCORE
 .EJECT

/WRITE CORE DUMP

 /IS UNIT 9 TRACK
 /NO
 /WORD COUNT
 /IS CONTROL READY
 /POWER CLEAR - CLEAR ALL

 /WRITE CORE DUMP

 /WAIT ON FLAG

 /READ STATUS
 /ERROR?
 /NO
 /YES
 /HAVE FIVE RECOVERYS PAST
 /YES
 /NO

 /LOAD BACKSPACE

 /RECOVERY

| | | | | |
|-------|--------|--------|------------|--------------------------|
| 01033 | 140650 | COREX | DZM WRREC | /CLEAR COUNTER |
| 01034 | 601601 | | JMP ERROR | /FIVE REWRITES STILL BAD |
| 01035 | 000000 | | Ø | |
| 01036 | 000000 | | Ø | |
| 01037 | 000000 | | Ø | |
| 01040 | 000000 | | Ø | |
| 01041 | 777775 | ROCORE | LAW -3 | /READ CORE |
| 01042 | 042644 | | DAC CNTRPT | /RPT CNTR = 3 |
| 01043 | 200232 | | LAC WORD1 | /IS UNIT 9 TRACK |
| 01044 | 502612 | | AND NINER | |
| 01045 | 741200 | | SNA | |
| 01046 | 601601 | | JMP ERROR | |
| 01047 | 100642 | RERDCO | JMS GETCAW | /SETUP CA AND WC |
| 01050 | 200325 | | LAC UNIT | |
| 01051 | 300327 | | ADD PARITY | |
| 01052 | 302635 | | ADD TWOK | |
| 01053 | 300326 | | ADD DENSIT | |
| 01054 | 302650 | | ADD TWENTK | |
| 01055 | 707321 | | MTCR | |
| 01056 | 601055 | | JMP .-1 | |
| 01057 | 707326 | | MTLC | |
| 01060 | 707301 | | MTRR | /IS UNIT READY? |
| 01061 | 601060 | | JMP .-1 | |
| 01062 | 202646 | | LAC LOWLIM | /IS START ADD IN UTIL? |
| 01063 | 740001 | | CMA | |
| 01064 | 300033 | | ADD 33 | |
| 01065 | 741100 | | SPA | |
| 01066 | 601074 | | JMP .+6 | |
| 01067 | 202647 | | LAC UPLIM | |
| 01070 | 740001 | | CMA | |
| 01071 | 300033 | | ADD 33 | |
| 01072 | 741100 | | SPA | |
| 01073 | 600512 | | JMP NOREAD | |
| 01074 | 707304 | | HTGO | /READ |
| 01075 | 200033 | | LAC 33 | /IS CA IN UTIL? |
| 01076 | 542646 | | SAD LOWLIM | |
| 01077 | 600512 | | JMP NOREAD | |
| 01100 | 707341 | | MTSF | |
| 01101 | 601075 | | JMP .-4 | |
| 01102 | 707352 | | MTRS | |
| 01103 | 502654 | | AND STTST | |
| 01104 | 741200 | | SNA | |
| 01105 | 600366 | | JMP EXIT | |
| 01106 | 101720 | | JMS NOREC | |
| 01107 | 101601 | | JMS ERROR | |
| | | | .EJECT | |

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| | | | | |
|-------|---------|------|-------------|--------------------------|
| 01117 | 740000 | | | |
| 01111 | 740000 | | | |
| 01112 | 740000 | | | |
| 01113 | 740001 | SRRD | CLA:CM4 | /SEARCH AND READ |
| 01114 | 740032 | | DAC 32 | /ONE WORD TO WC |
| 01115 | 740051 | | LAC ADDW3 | /MASK ADD TO CA |
| 01116 | 740033 | | DAC 33 | |
| 01117 | 740021 | | MTR | /CONTROL READY? |
| 01120 | 601117 | | JMP .-1 | /POWER CLEAR - CLEAR ALL |
| 01121 | 200325 | | LAC UNIT | |
| 01122 | 300327 | | ADD PARITY | |
| 01123 | 300336 | | ADD THREEK | |
| 01124 | 300326 | | ADD DENSITY | |
| 01125 | 700326 | | MTC | /LOAD COMMAND |
| 01126 | 700301 | | MTR | |
| 01127 | 601126 | | JMP .-1 | |
| 01130 | 700304 | | MTC | |
| 01131 | 700341 | | MIF | |
| 01132 | 601131 | | JMP .-1 | |
| 01133 | 700352 | | MIF | /READ STATUS |
| 01134 | 5002635 | | AND TWOK | /READ-COMPARE ERROR |
| 01135 | 740200 | | SNA | |
| 01136 | 601226 | | JMP BACKRD | /FIND IS MADE |
| 01137 | 700352 | | MIF | |
| 01140 | 5002652 | | AND XIRG | /END OF FILE |
| 01141 | 740200 | | SZA | |
| 01142 | 601146 | | JMP .+4 | |
| 01143 | 700352 | | MIF | |
| 01144 | 5002637 | | AND FOURK | /END OF TAPE |
| 01145 | 740200 | | SZA | |
| 01146 | 601150 | | JMP .+2 | |
| 01147 | 601113 | | JMP SRRD | |
| 01150 | 1001601 | | JMS ERROR | |
| 01151 | 6003366 | | JMP EXIT | |
| 01152 | 000000 | | 0 | |
| 01153 | 000000 | | 0 | |
| | | | .EJECT | |

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| | | | |
|-------------------------|--------|--------------|--------------------------|
| 01164 | 442644 | ISZ CNTRPT | /INC RPT CNT? |
| 01165 | 621165 | JMP .+3 | |
| 01166 | 440334 | ISZ NRDRFR | /NON REC+1 |
| 01167 | 600366 | JMP EXIT | |
| 01168 | 777776 | LAR -2 | |
| 01169 | 542644 | SAD CNTRPT | /1ST |
| 01170 | 440335 | ISZ RDRFRD | /YES+1 |
| 01171 | 181165 | JMS BACK1 | /BACKWD |
| 01172 | 621147 | JMP RERDCO | |
| / | | | |
| /BACK TAPE UP 1 RECORD | | | |
| 01175 | 621165 | BACK1 JMP . | |
| 01176 | 707321 | MICR | /WAIT FOR CU READY |
| 01177 | 621166 | JMP .-1 | |
| 01178 | 200325 | LAC UNIT | |
| 01179 | 707326 | MILC | |
| 01180 | 707301 | MTRR | /WAIT TAPE READY |
| 01181 | 621172 | JMP .-1 | |
| 01182 | 342642 | TAD SEVENK | |
| 01183 | 340326 | TAD DENSIT | |
| 01184 | 707326 | MILC | |
| 01185 | 777777 | LAR -1 | |
| 01200 | 440332 | BAC 32 | /COUNT RECORD |
| 01201 | 707304 | MTCO | |
| 01202 | 707341 | MISF | /WAIT FOR BACKSPACE DONE |
| 01203 | 621202 | JMP .-1 | |
| 01204 | 621165 | JMP* BACK1 | |
| /MOVE TAPE FWD 1 RECORD | | | |
| 01205 | 621205 | SPACF1 JMP . | |
| 01206 | 707321 | MICR | /WAIT FOR CU READY |
| 01207 | 621206 | JMP .-1 | |
| 01208 | 200325 | LAC UNIT | |
| 01209 | 707326 | MILC | |
| 01210 | 707301 | MTRR | /WAIT FOR DRIVE READY |
| 01211 | 621212 | JMP .-1 | |
| 01212 | 342641 | TAD SIXK | /FORM SPACE FWD |
| 01213 | 340327 | TAD PARITY | /AT CORRECT DENSITY |
| 01214 | 340326 | TAD DENSIT | /AND PARITY |
| 01215 | 707326 | MILC | |
| 01216 | 777777 | LAR -1 | /1 RECORD |
| 01217 | 440332 | BAC 32 | |
| 01218 | 707304 | MTCO | /GO |
| 01219 | 707341 | MISF | /WAIT FOR DONE |
| 01220 | 621223 | JMP .-1 | |
| 01221 | 621205 | JMP* SPACF1 | |
| 01222 | | .EJECT | |

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| | | | | |
|-------|---------|--------|--------------|-----------------------|
| 01226 | 777776 | BACKRD | LAW -3 | /BACKSPACE |
| 01227 | 542644 | | SAD CNTRPT | /AND READ |
| 01230 | 707321 | | MTR | |
| 01231 | 601230 | | JMP .-1 | /WAIT CU READY |
| 01232 | 750001 | | CLC | |
| 01233 | 440032 | | DAC 32 | |
| 01234 | 200025 | | LAC UNIT | |
| 01235 | 300327 | | ADD PARITY | |
| 01236 | 302642 | | ADD SEVENK | |
| 01237 | 300326 | | ADD DENSIT | |
| 01240 | 707326 | | MILC | |
| 01241 | 707301 | | MTR | |
| 01242 | 601241 | | JMP .-1 | |
| 01243 | 707304 | | MTR | |
| 01244 | 707341 | | MISF | |
| 01245 | 601244 | | JMP .-1 | |
| 01246 | 100642 | | JMS GETCAW | |
| 01247 | 2002635 | | LAC TWOK | |
| 01250 | 707324 | | LCM | |
| 01251 | 2002646 | | LAC LOWLIM | /TEST SA IN UTIL |
| 01252 | 740001 | | CMA | |
| 01253 | 300233 | | ADD 33 | |
| 01254 | 741100 | | SPA | |
| 01255 | 601263 | | JMP .+6 | |
| 01256 | 2002647 | | LAC UPLIM | |
| 01257 | 740001 | | CMA | |
| 01260 | 300233 | | ADD 33 | |
| 01261 | 741100 | | SPA | |
| 01262 | 600512 | | JMP NOREAD | |
| 01263 | 707304 | | MTR | /SA NOT IN UTIL |
| 01264 | 707322 | | MTR | |
| 01265 | 200233 | | LAC 33 | /TEST CA IN UTIL |
| 01266 | 542646 | | SAD LOWLIM | |
| 01267 | 600512 | | JMP NOREAD | |
| 01270 | 707341 | | MISF | |
| 01271 | 601265 | | JMP .-4 | |
| 01272 | 707352 | | MTR | /READ STATUS |
| 01273 | 542654 | | AND STTST | |
| 01274 | 741200 | | SVA | |
| 01275 | 600366 | | JMP EXIT | |
| 01276 | 101720 | | JMS NOREC | |
| 01277 | 101601 | | JMS ERROR | /TYPE READ ERROR |
| 01300 | 442644 | | ISZ CNTRPT | /5 TIMES |
| 01301 | 601304 | | JMP .+3 | /NOT NON REC YET |
| 01302 | 440334 | | ISZ NRRDR | /+1 NON REC RD ERRORS |
| 01303 | 600366 | | JMP EXIT | |
| 01304 | 777776 | | LAW -2 | |
| 01305 | 542644 | | SAD CNTRPT | /1ST REREAD PASS |
| 01306 | 440335 | | ISZ RDRRO | /YES +1 READ ERRORS |
| 01307 | 601230 | | JMP BACKRD+2 | /RETRY |
| 01310 | 200000 | | Ø | |
| 01311 | 200000 | | Ø | |
| 01312 | 200000 | | Ø | |
| 01313 | 200000 | | Ø | |

TC-590 MADE IN

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TC-59U

| | | TC-59U - TAPE 2 | |
|-------|--------|-----------------|----------------|
| 01315 | 202653 | RWDRD | /REWIND & READ |
| 01316 | 042644 | LAC MFIVE | |
| 01317 | 200325 | DAC CNTRPT | |
| 01320 | 707321 | LAC UNIT | |
| 01321 | 601320 | MTCR | |
| 01322 | 707326 | JMP .-1 | |
| 01323 | 707301 | MTLC | |
| 01324 | 601323 | MTTR | |
| 01325 | 342717 | JMP .-1 | |
| 01326 | 707326 | TAP CONEK | |
| 01327 | 707304 | MTCO | |
| 01330 | 707301 | MTCO | |
| 01331 | 601330 | MTTR | |
| 01332 | 707352 | JMP .-1 | |
| 01333 | 602643 | MTR5 | |
| 01334 | 701200 | AND ROT | /IS ROT? |
| 01335 | 011601 | SNA | /NO |
| 01336 | 200233 | JMP ERROR | /YES |
| 01337 | 302645 | LAC WORD2 | /SA TO CA |
| 01340 | 040033 | ADD MORE | |
| 01341 | 140032 | DAC 33 | |
| 01342 | 750000 | DZM 32 | /0 TO WC |
| 01343 | 300325 | CLA | |
| 01344 | 300327 | ADD UNIT | |
| 01345 | 302635 | ADD PARITY | |
| 01346 | 300326 | ADD TWOK | |
| 01347 | 707326 | ADD DENSIT | |
| 01350 | 202646 | MTLC | |
| 01351 | 740301 | LAC LOWLIM | |
| 01352 | 300033 | CMA | |
| 01353 | 741100 | ADD 33 | |
| 01354 | 601362 | SPA | |
| 01355 | 202647 | JMP .+6 | |
| 01356 | 740001 | LAC UPLIM | |
| 01357 | 300033 | CMA | |
| 01360 | 741100 | ADD 33 | |
| 01361 | 600512 | SPA | |
| 01362 | 707304 | JMP NOREAD | |
| 01363 | 200033 | MTCO | /NO |
| 01364 | 542646 | LAC 33 | /IS CA IN UTIL |
| 01365 | 600512 | SAD LOWLIM | |
| | | JMP NOREAD | |
| | | .EJECT | |

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|---------|--------|--------|--------------|-------------------------|
| 01405 | 777774 | WRXIRG | LAW -4 | |
| 01406 | 040650 | | DAC WRREC | |
| 01407 | 100642 | | JMS GETCAW | /WRITE WITH EXTENDED |
| | | | | /INTER-RECORD GAP |
| 01410 | 707321 | | MTCR | /WAIT FOR CONTROL READY |
| 01411 | 601410 | | JMP .-1 | |
| 01412 | 200325 | | LAC UNIT | /FORM COMMAND |
| 01413 | 300327 | | ADD PARITY | |
| 01414 | 302652 | | ADD XIRG | |
| 01415 | 302637 | | ADD FOURK | |
| 01416 | 300326 | | ADD DENSIT | |
| 01417 | 707326 | | MTLC | /LOAD IT |
| 01420 | 707301 | | MTRR | /WAIT FOR DRIVE READY |
| 01421 | 601420 | | JMP .-1 | |
| 01422 | 707304 | | MTGO | |
| 01423 | 707341 | | MISF | /WAIT FOR WRITE DONE |
| 01424 | 601423 | | JMP .-1 | |
| 01425 | 707352 | | MTRR | /READ STATUS |
| 01426 | 740100 | | SMA | /ANY ERRORS |
| 01427 | 601454 | | JMP WRXXIT-3 | /NO GET OUT |
| 01430 | 502671 | | AND K3736K | |
| U 01431 | 741200 | | SNA | |
| 01432 | 602713 | | JMP WRXXI5-3 | |
| 01433 | 707322 | | MTAF | |
| 01434 | 750004 | | LAS | |
| 01435 | 502672 | | AND K100K | |
| 01436 | 740200 | | SZA | |
| 01437 | 601454 | | JMP WRXXIT-3 | |
| 01440 | 200650 | | LAC WRREC | |
| 01441 | 740100 | | SMA | |
| 01442 | 601446 | | JMP .+4 | |
| 01443 | 440650 | | ISZ WRREC | |
| 01444 | 601450 | | JMP .+4 | |
| 01445 | 440333 | | ISZ PERMBS | |
| 01446 | 101165 | | JMS BACK1 | |
| 01447 | 601407 | | JMP WRXIRG+2 | |
| 01450 | 101165 | | JMS BACK1 | |
| 01451 | 101165 | | JMS BACK1 | |
| 01452 | 101205 | | JMS SPACF1 | |
| 01453 | 601407 | | JMP WRXIRG+2 | /REPEAT |
| 01454 | 200650 | | LAC WRREC | |
| 01455 | 740100 | | SMA | |
| 01456 | 600366 | | JMP EXIT | |
| 01457 | 777774 | WRXXIT | LAW -4 | |
| 01460 | 540650 | | SAD WRREC | |
| 01461 | 600366 | | JMP EXIT | |
| 01462 | 440332 | | ISZ RECBSP | |
| 01463 | 600366 | | JMP EXIT | |
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|-------|--------|-------|--------------|--------------------------------|
| 01464 | 000000 | | Ø | |
| 01465 | 000000 | | Ø | |
| 01466 | 000000 | | Ø | |
| 01467 | 100753 | SPFF | JMS GETRC | /SPACE FILES FORWARD |
| 01470 | 200032 | | LAC 32 | /FILE COUNT INSTEAD OF RECORDS |
| 01471 | 041524 | | DAC SPF1 | /SAVE |
| 01472 | 140032 | | DZM 32 | /CLEAR |
| 01473 | 200325 | | LAC UNIT | |
| 01474 | 300327 | | ADD PARITY | |
| 01475 | 302641 | | ADD SIXK | |
| 01476 | 300326 | | ADD DENSIT | |
| 01477 | 707321 | | MTCR | |
| 01500 | 601477 | | JMP .-1 | |
| 01501 | 707326 | | MTLG | |
| 01502 | 707301 | | MTR | |
| 01503 | 601502 | | JMP .-1 | |
| 01504 | 707304 | SPFFR | MTGO | /SPACE FOR FILE MARK |
| 01505 | 707321 | | MTCR | |
| 01506 | 601505 | | JMP .-1 | |
| 01507 | 707352 | | MTRS | /READ STATUS |
| 01510 | 502652 | | AND XIRG | /FILE MARK |
| 01511 | 741200 | | SNA | |
| 01512 | 601516 | | JMP .+4 | /NO |
| 01513 | 441524 | | ISZ SPF1 | /YES INC COUNTER |
| 01514 | 741000 | | SKP | /NOT DONE |
| 01515 | 600366 | | JMP EXIT | /YES |
| 01516 | 707352 | | MTRS | /EOT? |
| 01517 | 502637 | | AND FOURK | |
| 01520 | 741200 | | SNA | |
| 01521 | 601472 | | JMP SPFFR-12 | |
| 01522 | 101601 | | JMS ERROR | |
| 01523 | 600366 | | JMP EXIT | |
| 01524 | 000000 | SPF1 | Ø | |
| 01525 | 000000 | SPF2 | Ø | |
| 01526 | 000000 | | Ø | |
| 01527 | 000000 | | Ø | |
| 01530 | 000000 | | Ø | |
| 01531 | 000000 | | Ø | |

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|-------|--------|-------|--------------|----------------------|
| 01532 | 100753 | SPFR | JMS GETRC | /SPACE FILES RESERVE |
| 01533 | 200032 | | LAC 32 | /FILF COUNT |
| 01534 | 041524 | | DAC SPF1 | /SAVF |
| 01535 | 140032 | | DZM 32 | /CLEAR |
| 01536 | 200325 | | LAC UNIT | /CLEAR |
| 01537 | 300327 | | ADD PARITY | |
| 01540 | 302642 | | ADD SEVENK | |
| 01541 | 300326 | | ADD DENSIT | |
| 01542 | 707321 | | MTCR | |
| 01543 | 601542 | | JMP .-1 | |
| 01544 | 707326 | | MTLC | |
| 01545 | 707301 | | MTTR | |
| 01546 | 601545 | | JMP .-1 | |
| 01547 | 707304 | SPFRR | MTGO | /SPACE REVERSE |
| 01550 | 707321 | | MTCR | |
| 01551 | 601550 | | JMP .-1 | |
| 01552 | 707352 | | MTRS | /READ STATUS |
| 01553 | 502652 | | AND XIRG | /FILE MARK |
| 01554 | 741200 | | SNA | |
| 01555 | 601561 | | JMP .+4 | /NO |
| 01556 | 441524 | | ISZ SPF1 | /YES |
| 01557 | 741000 | | SKP | |
| 01560 | 600366 | | JMP EXIT | /YES |
| 01561 | 707352 | | MTRS | /IS BOT? |
| 01562 | 502643 | | AND ROT | |
| 01563 | 741200 | | SNA | |
| 01564 | 601535 | | JMP SPFRR-12 | /YES |
| 01565 | 101601 | | JMS ERROR | |
| 01566 | 600366 | | JMP EXIT | |
| 01567 | 000000 | | 0 | |
| 01570 | 000000 | | 0 | |
| 01571 | 000000 | | 0 | |
| 01572 | 000000 | | 0 | |
| 01573 | 000000 | | 0 | |
| 01574 | 000000 | | 0 | |
| 01575 | 000000 | | 0 | |
| 01576 | 000000 | | 0 | |
| 01577 | 000000 | | 0 | |
| 01600 | 000000 | | 0 | |

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|-------|--------|--------|------------|------------------|
| 01601 | 601601 | ERROR | JMP . | /ERROR ROUTINE |
| 01602 | 707312 | | MTRC | /READ COMMAND |
| 01603 | 041620 | | DAC COMAND | |
| 01604 | 750000 | | CLA | |
| 01605 | 707352 | | MTRS | /READ STATUS |
| 01606 | 041621 | | DAC STATUS | |
| 01607 | 762535 | | LAW TEXT4 | |
| 01610 | 101663 | | JMS TYPET | |
| 01611 | 761620 | | LAW COMAND | |
| 01612 | 101624 | | JMS TYPEC | /TYPE COMMAND |
| 01613 | 762544 | | LAW TEXT5 | |
| 01614 | 101663 | | JMS TYPET | |
| 01615 | 761621 | | LAW STATUS | /TYPE STATUS |
| 01616 | 101624 | | JMS TYPEC | |
| 01617 | 621601 | | JMP* ERROR | |
| 01620 | 000000 | COMAND | 0 | |
| 01621 | 000000 | STATUS | 0 | |
| 01622 | 000000 | | 0 | |
| 01623 | 000000 | | 0 | |
| 01624 | 000000 | TYPEC | 0 | /TYPE CONTENTS |
| 01625 | 041650 | | DAC TYCT | |
| 01626 | 750004 | | LAS | |
| 01627 | 741100 | | SPA | /DELETE TYPEOUTS |
| 01630 | 621624 | | JMP* TYPEC | /YES |
| 01631 | 777772 | | LAW 17772 | |
| 01632 | 041651 | | DAC TYPECT | |
| 01633 | 221650 | | LAC* TYCT | |
| 01634 | 740010 | | RAL | |
| 01635 | 041650 | | DAC TYCT | |
| 01636 | 201650 | | LAC TYCT | |
| 01637 | 742010 | | RTL | |
| 01640 | 740010 | | RAL | |
| 01641 | 041650 | | DAC TYCT | |
| 01642 | 501652 | | AND TYMSK | |
| 01643 | 301653 | | ADD ASC | |
| 01644 | 101655 | | JMS TYPER | |
| 01645 | 441651 | | ISZ TYPECK | |
| 01646 | 601636 | | JMP .-10 | |
| 01647 | 621624 | | JMP* TYPEC | |
| 01650 | 000000 | TYCT | 0 | |
| 01651 | 000000 | TYPECK | 0 | |
| 01652 | 000007 | TYMSK | 7 | |
| 01653 | 000260 | ASC | 260 | |
| 01654 | 000000 | | 0 | |
| 01655 | 000000 | TYPER | 0 | |
| 01656 | 700406 | | TLS | |
| 01657 | 700401 | | TSF | |
| 01660 | 601657 | | JMP .-1 | |
| 01661 | 621655 | | JMP* TYPER | |
| | | | .EJECT | |

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|-------|--------|--------|-------------|---------------------------|
| 01662 | 000000 | | 0 | |
| 01663 | 000000 | TYPET | 0 | /TYPE TEXT |
| 01664 | 041707 | | DAC TYTT | |
| 01665 | 750004 | | LAS | |
| 01666 | 741100 | | SPA | /DELETE TYPEOUTS |
| 01667 | 621663 | | JMP* TYPET | /YES |
| 01670 | 221707 | | LAC* TYTT | |
| 01671 | 742020 | | RTR | |
| 01672 | 742020 | | RTR | |
| 01673 | 742020 | | RTR | |
| 01674 | 742020 | | RTR | |
| 01675 | 740020 | | RAR | |
| 01676 | 101712 | | JMS TYPERT | |
| 01677 | 541710 | | SAD RO | |
| 01700 | 621663 | | JMP* TYPET | |
| 01701 | 221707 | | LAC* TYTT | |
| 01702 | 101712 | | JMS TYPERT | |
| 01703 | 541710 | | SAD RO | |
| 01704 | 621663 | | JMP* TYPET | |
| 01705 | 441707 | | ISZ TYTT | |
| 01706 | 601665 | | JMP TYPET+2 | |
| 01707 | 000000 | TYTT | 0 | |
| 01710 | 000377 | RO | 377 | |
| 01711 | 000000 | | 0 | |
| 01712 | 000000 | TYPERT | 0 | |
| 01713 | 501710 | | AND RO | |
| 01714 | 700406 | | TLS | |
| 01715 | 700401 | | TSF | |
| 01716 | 601715 | | JMP ,-1 | |
| 01717 | 621712 | | JMP* TYPERT | |
| | | / | | |
| 01720 | 000000 | NOREC | 0 | /NO ERROR RECOVERY ON SR0 |
| 01721 | 750700 | | CLA | |
| 01722 | 300007 | | ADD NONER | |
| 01723 | 741100 | | SMA | |
| 01724 | 621720 | | JMP* NOREC | |
| 01725 | 600366 | | JMP EXIT | |
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|-------|--------|--------|---------------------------------------|---------------|
| 01726 | 000000 | WR | 0 | /WRITE |
| 01727 | 100022 | | JMS BASE+2 | |
| 01730 | 000024 | | 24 | |
| 01731 | 000000 | | RUFFER | |
| 01732 | 011524 | | FNDBUF | |
| 01733 | 621726 | | JMP* WR | |
| 01734 | 000000 | RD | 0 | /READ |
| 01735 | 100022 | | JMS BASE+2 | |
| 01736 | 000022 | | 22 | |
| 01737 | 011525 | | FNDBUF+1 | |
| 01740 | 014251 | | FNDRBF | |
| 01741 | 621734 | | JMP* RD | |
| 01742 | 000000 | RDC | 0 | /READ COMPARE |
| 01743 | 100022 | | JMS BASE+2 | |
| 01744 | 000023 | | 23 | |
| 01745 | 000000 | | RUFFER | |
| 01746 | 011524 | | FNDBUF | |
| 01747 | 621742 | | JMP* RDC | |
| 01750 | 000000 | RKSP | 0 | /BACKSPACE |
| 01751 | 100022 | | JMS BASE+2 | |
| 01752 | 001027 | | 1027 | |
| 01753 | 000000 | | 0 | |
| 01754 | 000000 | | 0 | |
| 01755 | 621750 | | JMP* BKSP | |
| 01756 | 000000 | SP | 0 | /SPACE FWD |
| 01757 | 100022 | | JMS BASE+2 | |
| 01760 | 001026 | | 1026 | |
| 01761 | 000000 | | 0 | |
| 01762 | 000000 | | 0 | |
| 01763 | 621756 | | JMP* SP | |
| 01764 | 000000 | RWD | 0 | /REWIND |
| 01765 | 100022 | | JMS BASE+2 | |
| 01766 | 000021 | | 1 | |
| 01767 | 000000 | | 0 | |
| 01770 | 000000 | | 0 | |
| 01771 | 621764 | | JMP* RWD | |
| | | | /STORE A SINGLE WORD | |
| | | | /PATTERN IN MEMORY WORD IS IN WORDX | |
| | | | /CHANGE CONTENTS OF WORDX TO CHNG PAT | |
| | | STSNGL | JMP . | |
| 01772 | 601772 | | LAR -BLENGTH | |
| 01773 | 775253 | | DAD PATS | |
| 01774 | 242662 | | LAC WRRUF | |
| 01775 | 202656 | | DAC 17 | |
| 01776 | 040017 | | LAC WORDX | |
| 01777 | 202675 | | DAC* 17 | |
| 00000 | 000017 | | ISZ PATS | |
| 00001 | 442662 | | JMP .-2 | |
| 00002 | 601770 | | JMP* STSNGL | |
| 00003 | 601772 | | .EJECT | |

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|-------|--------|-----------------------------------|-------------|---------------------------|
| 02004 | 142055 | COMP | DEB COUNT | /COMPARE READ AND WRITE |
| 02005 | 142056 | | LAC WRRUF | /BUFFERS |
| 02006 | 202056 | | DAC 17 | |
| 02007 | 440017 | | LAC RDRUF | |
| 02010 | 202057 | | DAC 16 | |
| 02011 | 440016 | | LAC* 16 | |
| 02012 | 220016 | | SAD* 17 | |
| 02013 | 260017 | | SKP | |
| 02014 | 741000 | | JMP .+5 | |
| 02015 | 602022 | | LAC 16 | /REACHED END OF DATA READ |
| 02016 | 200016 | | SAD 33 | |
| 02017 | 640033 | | JMP* COMP | |
| 02020 | 602034 | | JMP .-7 | |
| 02021 | 602012 | | LAW TEXT7 | |
| 02022 | 762057 | | JMS TYPET | |
| 02023 | 101063 | | LAC WRCOM | |
| 02024 | 242060 | | JMS TYPEC | |
| 02025 | 101024 | | LAW TEXT8 | |
| 02026 | 762061 | | JMS TYPET | |
| 02027 | 101063 | | LAC* WRCOM | |
| 02030 | 222060 | | JMS TYPEC | |
| 02031 | 101024 | | LAW TEXT8 | |
| 02032 | 762061 | | JMS TYPET | |
| 02033 | 101063 | | LAC RDCOM | |
| 02034 | 202061 | | JMS TYPEC | |
| 02035 | 101024 | | LAW TEXT8 | |
| 02036 | 762061 | | JMS TYPET | |
| 02037 | 101063 | | LAC* RDCOM | |
| 02040 | 222061 | | JMS TYPEC | |
| 02041 | 101024 | | JMP COMP+12 | |
| 02042 | 602016 | /STORE ONE OF THE 7 WORD PATTERNS | JMP . | |
| 02043 | 602043 | ST7WRD | LAW -305 | |
| 02044 | 777473 | | DAC PATS | |
| 02045 | 042060 | | LAC WRRUF | |
| 02046 | 202056 | | DAC 17 | |
| 02047 | 440017 | | LAC ST7WRD | |
| 02050 | 202043 | | DAC 16 | |
| 02051 | 040016 | | LAC* ST7WRD | |
| 02052 | 222043 | | DAC* 17 | |
| 02053 | 060017 | | LAC* 16 | |
| 02054 | 220016 | | DAC* 17 | |
| 02055 | 060017 | | LAC* 16 | |
| 02056 | 220016 | | DAC* 17 | |
| 02057 | 060017 | | LAC* 16 | |
| 02060 | 220016 | | DAC* 17 | |
| 02061 | 060017 | | LAC* 16 | |
| 02062 | 220016 | | DAC* 17 | |
| 02063 | 060017 | | LAC* 16 | |
| 02064 | 220016 | | DAC* 17 | |
| 02065 | 060017 | | LAC* 16 | |
| 02066 | 220016 | | DAC* 17 | |
| 02067 | 060017 | | LAC* 16 | |
| 02070 | 442060 | | ISA PATS | |

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W071 627159
W072 62716

JMP ST7WPD+5
JMP 1A
.EJECT

FC-500

| | | | | |
|-------|--------|------------------------------------|--------------|--------------------------|
| 00073 | 200000 | EOF | 0 | |
| 00074 | 100000 | | JMS BASE+2 | |
| 00075 | 200000 | | 0 | |
| 00076 | 200000 | | 0 | |
| 00077 | 000000 | | 0 | |
| 00100 | 600000 | | JMP* EOF | |
| 00101 | 000000 | REPT | 0 | /REPEAT |
| 00102 | 100000 | | JMS BASE+4 | |
| 00103 | 600000 | | JMP* REPT | |
| 00104 | 000000 | SETIN | 0 | /SET INDEX TO -100 |
| 00105 | 777700 | | LAC 17700 | |
| 00106 | 000000 | | DAC +2 | |
| 00107 | 600000 | | JMP* SETIN | |
| 00110 | 000000 | | 0 | |
| 00111 | 000000 | INDEX | 0 | /CHECK INDEX=0 |
| 00112 | 440000 | | ISZ -2 | /CALLING:JMS INDEX |
| 00113 | 700000 | | SKP | / :YES |
| 00114 | 600000 | | JMP* INDEX | / :NO |
| 00115 | 440000 | | ISZ INDEX | |
| 00116 | 600000 | | JMP* INDEX | |
| 00117 | 000000 | ST0 | 0 | /STORE 0 IN WRITE BUFFER |
| 00120 | 775253 | | LAC -BLENGTH | |
| 00121 | 000000 | | DAC PATS | |
| 00122 | 200000 | | LAC WRBUF | |
| 00123 | 000000 | | DAC 17 | |
| 00124 | 700000 | | CLA | |
| 00125 | 000000 | | DAC* 17 | |
| 00126 | 440000 | | ISZ PATS | |
| 00127 | 600000 | | JMP -2 | |
| 00130 | 600000 | | JMP* ST0 | |
| 00131 | 600000 | /STORE A SLIDING 0 IN WRITE BUFFER | | |
| 00132 | 100000 | SLIDE0 | JMP . | |
| 00133 | 777676 | | JMS ST7WRD | |
| 00134 | 700000 | | 777676 | |
| 00135 | 577776 | | 700000 | |
| 00136 | 700000 | | 377776 | |
| 00137 | 577776 | | 700000 | |
| 00140 | 700000 | | 577776 | |
| 00141 | 577776 | | 700000 | |
| 00142 | 600000 | | 675737 | |
| | | | JMP* SLIDE0 | |
| | | | .EJECT | |

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|---|-------|--------|--------------------------------------|--------------|---------------------------|
| | 00143 | 775253 | ST1 | R | /STORE 1 IN WRITE BUFFER |
| | 00144 | 775253 | | LAR -BLENGTH | |
| | 00145 | 042662 | | DAC PATS | |
| | 00146 | 202656 | | LAC WRRUF | |
| | 00147 | 042662 | | DAC 17 | |
| | 00150 | 775253 | | CLC | |
| | 00151 | 042662 | | DAC* 17 | |
| | 00152 | 442662 | | IS7 PATS | |
| | 00153 | 602151 | | JMP .-2 | |
| | 00154 | 602143 | | JMP* ST1 | |
| | 00155 | 000000 | ST25 | R | /STORE 25 IN WRITE BUFFER |
| | 00156 | 775253 | | LAR -BLENGTH | |
| S | 00157 | 042662 | H | DAC PATS | |
| | 00160 | 202656 | | LAC WRRUF | |
| | 00161 | 042662 | | DAC 17 | |
| | 00162 | 042664 | | LAC P25 | |
| | 00163 | 042662 | | DAC* 17 | |
| | 00164 | 442662 | | IS7 PATS | |
| | 00165 | 602163 | | JMP .-2 | |
| | 00166 | 602155 | | JMP* ST25 | |
| | 00167 | 000000 | ST52 | R | /STORE 52 IN WRITE BUFFER |
| | 00170 | 775253 | | LAR -BLENGTH | |
| | 00171 | 042662 | | DAC PATS | |
| | 00172 | 202656 | | LAC WRRUF | |
| | 00173 | 042662 | | DAC 17 | |
| | 00174 | 042664 | | LAC P25 | |
| | 00175 | 740001 | | CMA | |
| | 00176 | 042662 | | DAC* 17 | |
| | 00177 | 442662 | | IS7 PATS | |
| | 00200 | 602176 | | JMP .-2 | |
| | 00201 | 602167 | | JMP* ST52 | |
| | 00202 | 602002 | /STORE A SLIDING BIT IN WRITE BUFFER | | |
| | 00203 | 102043 | SLIDE1 | JMP . | |
| | 00204 | 041002 | | JMS ST7WPD | |
| | 00205 | 041020 | | R40102 | |
| | 00206 | 400001 | | 041002 | |
| | 00207 | 020410 | | 020410 | |
| | 00210 | 040000 | | 274000 | |
| | 00211 | 010004 | | 010004 | |
| | 00212 | 102040 | | 102040 | |
| | 00213 | 602002 | | JMP* SLIDE1 | |
| | | | | .EJECT | |

IC-500

| | | | | |
|-------|--------|--------|--------------|---|
| 02214 | 775253 | STCNT | 0 | /STORE COUNT IN WRITE BUFFER |
| 02215 | 775253 | | LAR -BLENTH | |
| 02216 | 842262 | | DAC PATS | |
| 02217 | 212256 | | LAC WRRUF | |
| 02220 | 442217 | | DAC 17 | |
| 02221 | 212265 | | LAC RW1 | |
| 02222 | 462217 | | DAC* 17 | |
| 02223 | 442263 | | DAC PTWS | |
| 02224 | 442262 | | IS2 PATS | |
| 02225 | 741200 | | SKP | |
| 02226 | 622214 | | JMP* STCNT | |
| 02227 | 212263 | | LAC PTWS | |
| 02230 | 812265 | | ADD R41 | |
| 02231 | 622222 | | JMP *-7 | |
| 02232 | 812200 | STX | 0 | /STORE RANDOM PATTERN IN /WRITE BUFFER |
| 02233 | 775253 | | LAR -BLENTH | |
| 02234 | 842262 | | DAC PATS | |
| 02235 | 212256 | | LAC WRRUF | |
| 02236 | 442217 | | DAC 17 | |
| 02237 | 212277 | | LAC RANDEX | |
| 02240 | 542211 | | SAC RANDEX | |
| 02241 | 741200 | | SKP | |
| 02242 | 602252 | | JMP RANTAD-1 | |
| 02243 | 212212 | | LAC RANDEX | |
| 02244 | 442277 | | DAC RANDEX | |
| 02245 | 212276 | | LAC RANCON | |
| 02246 | 744210 | | CLL!RAL | |
| 02247 | 741200 | | SZL | |
| 02250 | 342215 | | TAR ONE | |
| 02251 | 442276 | | DAC RANCON | |
| 02252 | 222277 | | LAC* RANDEX | |
| 02253 | 342276 | RANTAD | TAR RANCON | |
| 02254 | 442277 | | DAC* RANDEX | |
| 02255 | 442277 | | IS2 RANDEX | |
| 02256 | 212217 | DEP | DAC* 17 | |
| 02257 | 442262 | | IS2 PATS | |
| 02260 | 612241 | | JMP STX+7 | |
| 02261 | 622232 | | JMP* STX | |
| | | | .EJECT | |

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00262 041730
 00263 041731
 00264 042666
 00265 041730
 00266 041736
 00267 042666
 00270 041736
 00271 041744
 00272 042666
 00273 041744
 00274 041752
 00275 042666
 00276 041752
 00277 041760
 00301 042666
 00301 041760
 00302 042675
 00303 042666
 00304 042675
 00305 042662
 00306 042666
 00307 041730
 00310 042666
 00311 042667
 00312 041730
 00313 041736
 00314 042666
 00315 042667
 00316 041736
 00317 041744
 00320 042666
 00321 042667
 00322 041744
 00323 041752
 00324 042666
 00325 042667
 00326 041752
 00327 041760
 00330 042666
 00331 042667
 00332 041760
 00333 042675
 00334 042666
 00335 042667
 00336 042675
 00337 042666

D200

/
 LAC RR+2
 AND PMASK
 DAC RR+2
 LAC RD+2
 AND PMASK
 DAC RD+2
 LAC RDC+2
 AND PMASK
 DAC RDC+2
 LAC RKSP+2
 AND PMASK
 DAC RKSP+2
 LAC SP+2
 AND PMASK
 DAC SP+2
 LAC EOF+2
 AND PMASK
 DAC EOF+2

/SET DENSITY TO 200 BPI

D556

/
 LAC RR+2
 AND PMASK
 ADD D5
 DAC RR+2
 LAC RD+2
 AND PMASK
 DAC RD+2
 LAC RDC+2
 AND PMASK
 DAC RDC+2
 LAC RKSP+2
 AND PMASK
 DAC RKSP+2
 LAC SP+2
 AND PMASK
 DAC SP+2
 LAC EOF+2
 AND PMASK
 DAC EOF+2
 JMP# D556
 /EJECT

/SET DENSITY TO 556 BPI

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```

/SELECT EVEN PARITY
EVNPAR      JMP .
            LAC WR+2          /GET WRITE WORD
            AND PARMASK      /MAKE PARITY=0
            DAC WR+2          /FOR EVEN
            LAC RD+2
            AND PARMASK      /DO SAME TO READ
            DAC RD+2
            LAC RDC+2
            AND PARMASK      /AND READ COMPARE
            DAC RDC+2
            LAC RKSP+2        /AND BACKSPACE
            AND PARMASK
            DAC RKSP+2
            LAC SP+2
            AND PARMASK      /AND SPACE FWD
            DAC SP+2
            JMP* EVNPAR

/SELECT ODD PARITY
ODDPAR      JMP .
            LAC WR+2          /GET WRITE WORD
            AND PARMASK      /MAKE PARITY=0
            TAO PARM         /THEN MAKE IT=1
            DAC WR+2          /FOR ODD PARITY
            LAC RD+2
            AND PARMASK      /DO SAME
            TAO PARM         /FOR READ=ODD
            DAC RD+2
            LAC RDC+2
            AND PARMASK      /AND READ COMPARE
            TAO PARM         /=ODD
            DAC RDC+2
            LAC RKSP+2        /AND BACKSPACE
            AND PARMASK
            TAO PARM
            DAC RKSP+2
            LAC SP+2          /AND SPACE FWD
            AND PARMASK
            TAO PARM
            DAC SP+2
            JMP* ODDPAR

/IF END OF TAPE=1 EXIT IF=0 SKIP NEXT INSTR
TSTEQ      JMP .
            AND FERR         /GET DRIVE STATUS
            AND EOT BIT     /MASK EOT BIT
            STA             /EOT=1
            ISZ TSTEQ        /NO STOP EXIT+1
            JMP* TSTEQ
            JEJECT          /EXIT

```

TEXT

| | | | | |
|-------|--------|-------|--------|----------------|
| 01547 | 215212 | TEXT1 | 215212 | /CR LF |
| 01548 | 323305 | | 323305 | /S E |
| 01549 | 324240 | | 324240 | /T SP |
| 01550 | 327317 | | 327317 | /W O |
| 01551 | 322304 | | 322304 | /R D |
| 01552 | 244261 | | 244261 | /SP 1 |
| 01553 | 244311 | | 244311 | /SP I |
| 01554 | 316240 | | 316240 | /N SP |
| 01555 | 323322 | | 323322 | /S R |
| 01556 | 377000 | | 377000 | /R O |
| 01557 | 215212 | TEXT2 | 215212 | /CR LF |
| 01558 | 323305 | | 323305 | /S E |
| 01559 | 324240 | | 324240 | /T SP |
| 01560 | 327317 | | 327317 | /W O |
| 01561 | 322304 | | 322304 | /R D |
| 01562 | 244262 | | 244262 | /SP 2 |
| 01563 | 244311 | | 244311 | /SP I |
| 01564 | 316240 | | 316240 | /N SP |
| 01565 | 323322 | | 323322 | /S R |
| 01566 | 377000 | | 377000 | /R O |
| 01567 | 215212 | TEXT3 | 215212 | /CR LF |
| 01568 | 323305 | | 323305 | /S E |
| 01569 | 324240 | | 324240 | /T SP |
| 01570 | 327317 | | 327317 | /W O |
| 01571 | 322304 | | 322304 | /R D |
| 01572 | 244263 | | 244263 | /SP 3 |
| 01573 | 244311 | | 244311 | /SP I |
| 01574 | 316240 | | 316240 | /N SP |
| 01575 | 323322 | | 323322 | /S R |
| 01576 | 377000 | | 377000 | /R O |
| 01577 | 215212 | TEXT4 | 215212 | /CR LF |
| 01578 | 303317 | | 303317 | /C O |
| 01579 | 315315 | | 315315 | /M M |
| 01580 | 301316 | | 301316 | /A N |
| 01581 | 304240 | | 304240 | /D SP |
| 01582 | 275240 | | 275240 | /= SP |
| 01583 | 377000 | | 377000 | /R O |
| 01584 | 244240 | TEXT5 | 244240 | /SP SP |
| 01585 | 323324 | | 323324 | /S T |
| 01586 | 301324 | | 301324 | /A T |
| 01587 | 325323 | | 325323 | /U S |
| 01588 | 244275 | | 244275 | /SP = |
| 01589 | 244377 | | 244377 | /SP RO |
| 01590 | 215212 | TEXT6 | 215212 | /CR LF |
| 01591 | 316317 | | 316317 | /N O |
| 01592 | 244322 | | 244322 | /SP R |
| 01593 | 305301 | | 305301 | /E A |
| 01594 | 344377 | | 344377 | /D RO |
| 01595 | 215212 | TEXT7 | 215212 | /CR,LF |
| 01596 | 377000 | | 377000 | /RUBOUT |
| 01597 | 244240 | TEXT8 | 244240 | /SPACE, SPACE |
| 01598 | 244377 | | 244377 | /SPACE, RUBOUT |
| | | | OBJECT | |

TC-59

| | | | |
|-------|--------|--------|--------------|
| 00650 | 222714 | UPLIM | .05A FINIS+1 |
| 00651 | 220148 | TWENTK | 200000 |
| 00652 | 404233 | ADDW3 | .05A WORD2 |
| 00653 | 414100 | XIRG | 100000 |
| 00654 | 777773 | MFIVE | 777773 |
| 00655 | 376600 | STTST | 376600 |
| 00656 | 000000 | COUNT | 0 |
| 00657 | 006777 | WRBUF | BUFFER-1 |
| 00658 | 011524 | RDRUF | FRDRUF |
| 00659 | 000117 | WRCOM | 17 |
| 00661 | 000116 | RDCOM | 16 |
| 00662 | 000000 | PATS | 0 |
| 00663 | 252525 | PTWS | 0 |
| 00664 | 010101 | P25 | 252525 |
| 00665 | 777477 | P01 | 010101 |
| 00666 | 000000 | PMASK | 777477 |
| 00667 | 000000 | D5 | 100 |
| 00670 | 000000 | D8 | 200 |
| 00671 | 373600 | K3736K | 373600 |
| 00672 | 100000 | K100K | 100000 |
| 00673 | 200000 | K200K | 200000 |
| 00674 | 777757 | PARMSK | 777757 |
| 00675 | 000000 | WORDX | 0 |
| | | | .EJECT |

| | | | |
|-------|--------|--------|-----------|
| 00676 | 123456 | RANCON | 123456 |
| 00677 | 002710 | RANDEX | RANTRL+10 |
| 00700 | 654321 | RANTRL | 654321 |
| 00701 | 361416 | | 361416 |
| 00702 | 055363 | | 055363 |
| 00703 | 546060 | | 546060 |
| 00704 | 243035 | | 243035 |
| 00705 | 762572 | | 762572 |
| 00706 | 453237 | | 453237 |
| 00707 | 150214 | | 150214 |
| 00710 | 000000 | | 0 |
| | | / | |
| 00711 | 002710 | RANXX | RANTRL+10 |
| 00712 | 002700 | RANDTX | RANTRL |
| 00713 | 000000 | | 0 |
| 00714 | 000000 | | 0 |
| 00715 | 000000 | FINIS | 0 |
| 00717 | 002634 | *LIT | .END |

TC-500

| | |
|---------|--------|
| ADRES | 02651 |
| ASC | 01653 |
| BACKRD | 01226 |
| BACK1 | 01165 |
| BASE | 00270 |
| BKSP | 01750 |
| BLENTH | 002525 |
| BOT | 02643 |
| BUFFEK | 007000 |
| CASRT | 00330 |
| CNTRPT | 02644 |
| COMMAND | 01620 |
| COMPASS | 00336 |
| COMP | 02004 |
| COMPSTP | 00240 |
| CONTRL | 00345 |
| CONEX | 01033 |
| COUNT | 02655 |
| DEVSIT | 00326 |
| DEP | 02256 |
| DMASK | 02610 |
| DMPCTR | 02400 |
| D200 | 02262 |
| D5 | 02667 |
| D506 | 02326 |
| D8 | 02670 |
| D800 | 02340 |
| ELEV | 02625 |
| ENDBUF | 011524 |
| ENJRRF | 014281 |
| EOF | 02073 |
| ERROR | 01601 |
| EVAPAK | 02422 |
| EXIT | 00366 |
| FIFT | 02631 |
| FIFTE | 02715 |
| FILE | 02621 |
| FILEK | 02640 |
| FOUR | 02620 |
| FOURK | 02637 |
| FOURT | 02632 |
| GETCAK | 00642 |
| GETRC | 00753 |
| INDEX | 02111 |
| K100K | 02672 |
| K200K | 02673 |
| K373AK | 02671 |
| LC1 | 707324 |
| LDR | 707424 |
| LO-LTR | 02646 |
| MIFVF | 02653 |
| MIF | 02645 |
| MTF | 707322 |
| MTFR | 707321 |
| MTG | 707324 |

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MTLC 707326
MTRC 707312
MTRS 707352
MTSF 707341
MTTR 707301
VIVER 02612
VOVFOP 00400
VOVEP 00207
VORFAD 00512
VOREC 01720
VRRDFR 00334
VDRPAR 02443
VNF 02615
VNFK 02634
VNFITY 00327
VARM 02611
VARMK 02674
VATS 02662
VEMRS 00333
VGMFIG 00252
VMASK 02666
VTAS 02663
V01 02665
V25 02664
VANC0V 02676
VANDFX 02677
VANDTX 02712
VANDXX 02711
VANTAD 02253
VANTRL 02700
VCMASK 02613
VD 01734
VDH 707402
VDHUF 02607
VDG 01702
VDG0N 02601
VDG0MP 00503
VDG0RE 01441
VDERR0 00335
VDEXIT 00501
VEDD 00434
VECRSP 00332
VEDEX 00607
VEPT 02101
VERD00 01047
VEREAD 00436
VERIND 00415
VD 01710
VPTFIG 00257
VW0 01764
VWR00 01315
VDF 707401
VETIM 02103
VED 02603
VEDK 02642

TG-801

| | |
|--------|-------|
| SEAT | 01000 |
| SIX | 02602 |
| SIXK | 02601 |
| SIXT | 02600 |
| SLIDF | 02101 |
| SLIDF1 | 02202 |
| SP | 01705 |
| SPACE1 | 01208 |
| SPEF | 01407 |
| SPEFP | 01504 |
| SPFR | 01502 |
| SPFRF | 01547 |
| SPF1 | 01504 |
| SPF2 | 01505 |
| SPFF | 02702 |
| SPFR | 02700 |
| SR-D | 01113 |
| STATUS | 01601 |
| STCNT | 02214 |
| STSNCL | 01722 |
| STTST | 02604 |
| STX | 02202 |
| ST1 | 02117 |
| ST1 | 02143 |
| ST25 | 02155 |
| ST52 | 02167 |
| ST7WRH | 02043 |
| TEXT | 02604 |
| TEXT1 | 02477 |
| TEXT10 | 02571 |
| TEXT11 | 02576 |
| TEXT12 | 02602 |
| TEXT2 | 02011 |
| TEXT3 | 02003 |
| TEXT4 | 02005 |
| TEXT5 | 02044 |
| TEXT6 | 02002 |
| TEXT7 | 02007 |
| TEXT8 | 02001 |
| TEXT9 | 02003 |
| THRE | 02607 |
| THREK | 02606 |
| THRETT | 02607 |
| TSTFOT | 02471 |
| TWFL | 02606 |
| TWENTK | 02600 |
| TW1 | 02606 |
| TWJK | 02605 |
| TYIT | 01600 |
| TYKSK | 01602 |
| TYHFC | 01604 |
| TYHFCX | 01601 |
| TYHFF | 01600 |
| TYHFF1 | 01710 |
| TYHFF2 | 01603 |

| | |
|--------|-------|
| IC-507 | 4175 |
| LYTT | 417 |
| UMASK | 42677 |
| UNIT | 40345 |
| UPLIM | 42647 |
| UT-AM | 40211 |
| UT-PM | 40248 |
| UT-PT | 40255 |
| XCSTFF | 40331 |
| XO-0X | 42678 |
| XO-01 | 40232 |
| XO-02 | 40233 |
| XO-03 | 40234 |
| XR | 41745 |
| XR-UF | 40518 |
| XR-0X | 42677 |
| XR-ORE | 40747 |
| XR-OF | 40648 |
| XR-IF | 40548 |
| XR-FC | 40647 |
| XR-IFB | 41445 |
| XR-XTT | 41447 |
| XR-XTB | 42716 |
| XR-XTT | 40542 |
| XSP | 40518 |
| XING | 42642 |
| ZE-CTH | 42377 |
| ZE-0 | 42514 |

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| | |
|---------|-------|
| BASE | 02201 |
| BO-FE | 02202 |
| BT-AN | 02211 |
| BO-F1 | 02252 |
| BO-F2 | 02253 |
| BO-F3 | 02254 |
| UTPGM | 02275 |
| HGMFIS | 02282 |
| UTRPT | 02283 |
| RPTFIS | 02287 |
| CO-STP | 02288 |
| UNIT | 02305 |
| DENSITY | 02325 |
| PARITY | 02327 |
| CASPAR | 02330 |
| ACSTRI | 02331 |
| RECBSP | 02332 |
| PERMR5 | 02333 |
| WRDFR | 02334 |
| HDERRH | 02335 |
| CO-ASS | 02335 |
| CONTRL | 02345 |
| EXIT | 02355 |
| NONOP | 02400 |
| HE-ING | 02415 |
| HEAD | 02434 |
| HE-ED | 02435 |
| NO-FAH | 02512 |
| AS2 | 02515 |
| RDFXIT | 02511 |
| RDCOMP | 02513 |
| WRITE | 02525 |
| ARIXIT | 02532 |
| REEX | 02537 |
| GETCAR | 02542 |
| ARREC | 02552 |
| ARFOP | 02554 |
| SPKE | 02702 |
| SPKR | 02703 |
| GETRC | 02753 |
| ARIGRE | 02707 |
| CO-EX | 01033 |
| ROFOP | 01041 |
| HERDOP | 01047 |
| SR-D | 01113 |
| HACK1 | 01115 |
| SPACE1 | 01205 |
| HACK2 | 01205 |
| SW-RR | 01305 |
| ARTR | 01405 |
| ARIXIT | 01407 |
| SP-F | 01407 |
| SP-FW | 01504 |
| SP-F1 | 01504 |
| SP-F2 | 01505 |

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SPER 01600
SPERR 01601
ERROR 01601
CO-AMM 01602
STATUS 01601
TYPER 01604
TYCT 01604
TYPECA 01601
TYASA 01602
ASD 01603
TYPER 01605
TYPET 01603
TYTT 01707
TO 01710
TYPERT 01712
VOREC 01726
VR 01726
RO 01734
ROD 01742
RKSP 01751
SP 01755
RWJ 01764
STSNCL 01772
CO-P 02004
ST/WRD 02043
EOF 02073
REPT 02101
SETIM 02104
INDEX 02111
STR 02117
SLIDF 02131
ST1 02143
ST25 02155
ST52 02177
SLIDF 02202
STCNT 02214
STK 02252
KA-TA 02253
JEP 02254
J2-W 02262
J556 02306
J810 02342
JERCT 02372
JAPCT 02407
EV-PAR 02422
JDPAR 02443
ESTER 02471
TEXT1 02477
TEXT2 02511
TEXT3 02523
TEXT4 02530
TEXT5 02564
TEXT6 02582
TEXT7 02587

IN-500 CASE

| | |
|---------|-------|
| TEXT | 02571 |
| TEXT | 02572 |
| TEXT1 | 02573 |
| TEXT11 | 02575 |
| TEXT12 | 02602 |
| JMASK | 02607 |
| JMASK | 02610 |
| PANM | 02611 |
| MINFR | 02612 |
| RCMASK | 02613 |
| ZERO | 02614 |
| JN- | 02615 |
| TW- | 02616 |
| TH-F | 02617 |
| FOUR | 02620 |
| FIVE | 02621 |
| SIX | 02622 |
| SEV | 02623 |
| TEX | 02624 |
| ELEV | 02625 |
| TWEL | 02626 |
| TH-ET | 02627 |
| FOURT | 02634 |
| FIFT | 02631 |
| SIXT | 02632 |
| SEVT | 02633 |
| ONEK | 02634 |
| TWOK | 02635 |
| THREK | 02636 |
| FOURK | 02637 |
| FIVEK | 02640 |
| SIXK | 02641 |
| SEVENK | 02642 |
| FOI | 02643 |
| INTR-ET | 02644 |
| IO-F | 02645 |
| LO-LTY | 02646 |
| JPLIM | 02647 |
| TWENT- | 02648 |
| AD-EX | 02651 |
| AL-G | 02652 |
| AFIVE | 02653 |
| STTST | 02654 |
| CO-INT | 02655 |
| AR-UF | 02656 |
| AD-UF | 02657 |
| AR-OF | 02658 |
| CO-OF | 02659 |
| PAIS | 02662 |
| PT-S | 02663 |
| P25 | 02664 |
| P01 | 02665 |
| PM-SP | 02666 |
| -5 | 02667 |
| 10 | 02668 |

| IC-500 | Page |
|--------|--------|
| K373A | 42671 |
| K1 WK | 42672 |
| K2 WK | 42673 |
| PA MCK | 42674 |
| K0 DDX | 42675 |
| KA DCO | 42676 |
| KA DEX | 42677 |
| KA TRL | 42711 |
| KA DXX | 42711 |
| KA DTX | 42712 |
| FI LIS | 42715 |
| WRXX15 | 42716 |
| JUFFFX | 711524 |
| ENDREF | 711524 |
| ENDREF | 714241 |
| MTTR | 747311 |
| MTRO | 747314 |
| MTRO | 747312 |
| MTOR | 747321 |
| MTAF | 747322 |
| LCY | 747324 |
| MTLC | 747325 |
| MTSF | 747341 |
| MTKS | 747352 |
| SDF | 747411 |
| NDH | 747412 |
| LDF | 747414 |