```
.REM %(

                        IDENTIFICATION

PRODUCT CODE:     AC U109C MC

PRODUCT NAME:     CZRQCCO  RQDX3 FORMATTER

PRODUCT DATE:     JUNE 6,  1986

MAINTAINER:       DIAGNOSTIC ENGINEERING

AUTHOR:           Richard Dietz
```

TABLE OF CONTENTS

1.0 ABSTRACT

This formatter was written to format Winchester drives attached to the RQDX3 disk controller. All new drives being attached to the RQDX3 controller must be formatted so that the drive can be brought online for use by a MSCP server or in simpler terms to be used by an operating system. This disk formatter is similar to the RQDX1/2 disk formatter in that the same standard DUP dialog is used and similar standard formatter questions are passed by the controller to the host user. The formatter is different from the RQDX1/2 disk formatter because a table of disk formatting parameters is passed to the controller. The RQDX1/2 disk controller already has these tables in its firmware.

The format program actual has 2 controller run programs in it. If the controller is an RQDX3, the program will down line load a program into the controller which will identify the drive according to its cylinder size. Since each of the DEC drives have a differnt cylinder size it will know which drive it is and therefore which parameter or UIT table to pass to the controller. The second program is already contained in the microcode. This program called "FORMAT" does the actual formatting of the drive. The host program just passes information back and forth to the controller local program.

The UIT, Unit Information Table is picked by the down line loaded auto sizer program (AUTOSZ). After the drive is known the format program will be run on the controller. This format program (FORMAT) is very similiar to the RQDX1/2 format program. The only difference as stated before is that the UIT will be down line loaded into the drive if the down line load question is asked. Every time the drive is brought on line the UIT table which was placed on the drive by this formatter program will be transfered into the controller with all the drive parameters. As long as the UIT still exists on the drive it does not have to be passed in by the host user. Only if the user requests to "Down line load" information to the controller will the UIT table be passed to the drive. Note the RX33 floppy drive does not use the UIT tables. The RX33 drive parameters are stored in the firmware so a table wasn't necessary.

The UIT table contains information about the drive such as size, number of tracks per surface, etc. This information is already know for certain DEC acquired Winchester drives. These tables are usually different for the different drives manufactured. CAUTION do not use non DEC drives you are liable to destroy Format and Data storeed on them.

All though not a goal of the diagnostic this program can be used to run standard DUP dialog local programs such as 'DIRECT". These local programs are stored in the firmware.

2.0 HOW TO RUN IT?

2.1 HARDWARE REQUIREMENTS

An RQDX3 disk controller and one or more Winchester or RX33 drives configured into a Q bus PDP 11 system.

2.2 SOFTWARE REQUIREMENTS

This diagnostic was written using DRS the Diagnostic Supervisor. The diagnostic is expected to be run under XXDP diagnostic operating system. It is also possible to run the formatter under APT.

2.3 QUESTIONS ASKED AND THEIR ANSWERS
2.3.1 HARDWARE QUESTIONS FROM DIAGNOSTIC SOFTWARE

The diagnostic is a standard DRS program with the standard DRS commands. Below I have a script of the questions asked an the answers to the initial DRS questions. The Default value for the IP address 's 172150. This is standard configurat'on address for the first MSCP controller on a system. Any other MSCP controllers on the system will have to be in the float'ng address space of the IO page. The default vector address is 154 any other value between 0 774 could be used but is not suggested. If you want the default answers then just hit the "return' key on the keyboard. The Formatter will run an auto sizer to determine the proper drive character'stic table to give to the controller. This auto sizer will figure out how many cylinders on the drive and through a small look up table we decide which table to down line load to the RQDX3 controller. The user will have to enter a drive number and a serial number. After this a warning message will appear asking if the user wants to proceed. The default is no so the/ user must type "Y" in order to format h's drives.

Typical Diagnostic Script:

```
boot up XXDP
.RUN ZRQC??
ZRQCC0.BIN

DRSXM-A0
ZRQC-C-0
RQDX3 Disk Park\Format Utility
Unit is RD51,RD52,RD53,RD54,RX33,RD31        Please type yes to "Change HW?"
Restart Address is 141656
DR>START

Change HW ?  Y
# Un'ts ?  1

IP Address 172150 ? <rtn>
Vector Address 154 ? <rtn>
Just Park heads  N ? <rtn>
Logical Drive (0-255) 0 ? <rtn>
Dr've Serial Number(1 32000) 12345 ? <rtn>

***** WARNING all the data on this drive will be DESTROYED ****

Proceed to format the drive N ? <Y><rtn>
```

2.3.2 UIT TABLES

The UIT tables are stored in this program. There are 10 large data tables formed in this diagnostic that contain the drive parameters for certain DEC drives. There are only 6 RQDX3 Winchester drive manufactures. So only 6 of the tables contain any information. The others are there for future drives. The AUTOSZ program ran previous to the FORMAT program will determine what type of drive is to be formatted and which table to pass to the disk controller. Once in the disk controller the table will be written to the disk drive. This table should never be erased unless the drive is broken or format is run again.

NOTE this is only for the RQDX3 disk controller and NOT for the RQDX1/2.

Unit Information Tables listed:

Enter UIT:

UIT	Drive Name
0:	RD51
1:	RD52 part # 30 21721 02 (1 light on front panel)
2:	RD52 part # 30 23227 02 (2 lights on front panel)
3:	RD53
4:	RD31
5:	RD54
6:	
7:	
10:	

2.4 PROGRAM MESSAGES AND FORMAT COMPLETION

When the format finally starts a "Format Begun' message will appear and in the end a "Format Complete" message will appear. There may be 60+ minutes between the messages. If the extented messages are allowed 3 "Verification Pass XXXXXX Begun" messages may appear. Theses messages tell when the controller checks the blocks for bad spots in the disk surface. These passes take several minutes each and touch all the cylinders on the drive. At the end of the format if extended messages are on a table will be printed out reporting the results of the format. Ussually there are several bad spots on a disk. This is very common and is NOT a mistake. These bad blocks are revectored to new areas on the disk. If the manufactures bad block information is used which is ussually the case. There will only be 1 verification pass. After the drive formats the autosizer program will be run again. This will park the heads on the inner most cylinder. Some manufactures have a parking area where the heads are placed before the drive is physically moved or shipped to the customer. If you plan on moving your system you should backup your system and run the formatter to put the heads on the parking area. This will help prevent damage to the heads and formatted data surfaces.

Completion Report:

xxx	Revectored LBNs
xxx	Primary revectored LBNs

```
xxx     Secondary/tertiary revectored LBNs
xxx     Bad Blocks in the RCT area due to data errors
xxx     Bad Blocks in the DBN area due to data errors
xxx     Bad Blocks in the XBN area due to data errors
xxx     Blocks retired on check pass
FCT was not used
Format Completed

RQDX Drive xxxx finished
PLEASE wait .... Parking drive heads

pass aborted for this unit
ZRQC EOP 1
    0 Cumulative errors
```

Note that every time the disk formats successfully the program drops the UNIT. This is purposesly done so one doesn't reformat it twice.

RX33 diskette formatting is a little varied in that several extra questions will be asked. These questions where installed mainly to protect the person trying to format a diskette on the same drive as their boot media. If the drive doing the formatting is not the boot drive then please ignore the warnings.

```
WARNING   Remove boot diskette if in drive.
Insert a diskette to be formatted & press <RETURN>.

Format Complete
FCT was not used
Format completed

Do you want to format another diskette?

If boot drive, reinsert boot diskette & press <RETURN>.

RQDX Drive xxxx finished
pass aborted for this unit
ZRQC EOP 1
    0 Cumulative errors
```

2.5 EXECUTION TIME

The execution time for this diagnostic varies greatly according to the size of the drive being formatted. If an error in the drive configuration or state such as a write protect switch being on, an error will occur right after all the questions have been answered. If there are no errors the formatter will take between 5 minutes to 60 minutes depending on the drive being formatted. A RD51 takes between 10 minutes to format depending on the way questions are answered. A RD52 take between 10 & 25 minutes to format and a RD53 a very long time to format. The program checks continuously to make sure the controller is still working. If no progress is indicated by the progress indicator a timeout error will occur. If the disk controller goes off line for some unapparent reason the formatter will know. Either way if one checks the light on the

```
289                             Winchester to see if it is lite or check  the READY light of the dr've
290                             for a flickering light, this will tell the user that the formatter 's
291                             working.  When the formatter completes a "Format complete" message
292                             will appear on the terminal.
293
294                              3.     ERRORS
295
296                             There are many types of errors poss'ble while formatt'ng a dr've.
297                             First the system has to be configured r'ght. The dr'ves have to be
298                             jumpered right along with the disk controller. If you get an error
299                             read the entire error message carefully. See if there is something
300                             simple wrong such as loss and misconf'gured drives before calling FS.
301                             This is ussually the case very seldom do the drive or controller
302                             break. So check the cables, check the jumpers, try several times and
303                             if you st'll can't format then call Field Service.
304
305
306
307                     error #         Comment                 Problem
308                     0,SF0   ;unkown response
309                             Not a DUP standard local program or Data Error in local program
310                             execution.
311
312                     1,HRD0  ;Fatal DUP type returned
313                             Error with Format program check detailed error message more then
314                             likely this will be a drive error or drive conf'guration error.
315                             If the detailed message has a GET STATUS error. This means that the
316                             drive you asked to format had the wrong status. Example offline,write
317                             protected, RX50 instead of an RDxx, power plug us loose, jumpers are
318                             wrong.
319
320                     2,DF3   ;Can't do remote programs"
321                             Wrong controller or bad microcode controller error.
322
323                     3,SFT0  ;"already active  will do an ABORT cmd"
324                             Wrong controller or bad microcode controller error. The controller
325                             was expected to be in an idle state but was found in an active state.
326                             Try again and if still there check for ECOs and new Microcode.
327
328                     4,DF2   ;wrong step bit set after interrupt
329                             Controller initialazation error. Controller is broken or at
330                             wrong address and something is in its place.
331
332                     5,DF1   ;controller timeout during hard init
333                             Controller error, controller is slow or it can't 'nterrupt the
334                             Q bus. Controller is dead.
335
336                     6,SFT1  ;wrong model #,wrong controller
337                             This is not really an error. You are using the wrong formatter
338                             program to for the wrong disk controller. It still might work
339                             but no guarantees.
340
341                     7,DF4   ;NXM trap at controller IP address
342                             Wrong configuration address of the controller check for
343                             wrong jumper settings.
344
345                     8,SF100 ;Unexpected interrupt
```

Something in system interrupting or late interrupt. This could be the system clock or an interrupt from an IO port. If the interrupt is at address 4,10 probable a software error Try again.

9,DF12 ;Fatal SA error
Controller crashed check detailed error message either dead controller or configuration error.

10,DF11 ;Bad response packet
Inapropriate command or soft controller error check detail message for more info.

11,DF13 ;no progress shown after cmd timeout
The controller didn't indicate progress which means that it is working very slow or is stuck. Leave the program running for a couple minutes. If this message repeats then the drive is likely broken. If you just get 1 message it is possible the controller took to long to revector a block. This is probable a drive error or a drive with many revector blocks.

12,DF14 ;no iterrupt after get dust status command controller dead
The controller got lost. The program running in the controller got out of synch with the host program. This could mean several things. Check for a loose controller board loose cables. Try running again after rebooting the system. If you still get the error check the controller.

4. PROGRAM DESIGN AND FLOW

The program is kind of simple. There is only 1 command ring and 1 response ring. For every command send there is expected 1 response. If the command sent times out a "Get DUST Status" command is sent to check on the controllers progress. This usually happens when the actual format is being done. The rest of the commands pass information back and forth from the user to the controller and back with out ever timing out. This program is written according to UQSSP and DUP specs. This specs can be acquired from NEWTON::ARCH$FILES:. At the start of the program the INIT sequence brings the controller into the higher protocol state of running DUP commands. Once initialized the controller executed a GET DUST STATUS command to make sure the controller is in an Idle state.

If idle which it should be the program asks for a program name to run. The EXECUTE LOCAL PROGRAM command is executed which should start the program into the DUP dialog loop. This dialog is described in the DUP spec. Here several SEND DATA and RECEIVE DATA commands are executed to ask questions and supply information on the success and completion of the local FORMAT program running in the RQDX3.

A pass will occur when the formatter has completed formatting all the logical units.

5.0 GLOSSARY

```
403
404                         ZRQCc0 follows  the  module  name  format  described  in  the
405                                 XXDP Programmer's Guide.
406
407                          RQ       Identifies the hardware and thus the module.
408
409                            C     Distiguishes between two or more different
410                                  d'agnost'cs for the same generic device.  The
411                                  sequence A, B, C, ETC. must be used for
412                                  each additional diagnostic.
413
414                             c    Spec'fies the module revision.
415
416                              0   Specifies the number of patches.
417
418                         7.0  BIBLIOGRAPHY
419
420                        UQSSP (NEWTON::ARCH$FILES:)
421                        MSCP (NEWTON::ARCH$FILES:)
422                        DUP (NEWTON::ARCH$FILES:)
423                        DRS programmers manual (JON::disk$user1:[diaglib.drs])
424                        XXDP programmer guide (JON::disk$user1:[diaglib.xxdp])
425
426                         8.0  REVISION HISTORY
427
428                        Revision B contains an autosizing routine which w'll
429                        size the drive instead of having the user pick the drive table.
430                        This will keep people out of the systems and lower the changes
431                        of loose cables etc. Also added a AUTO mode which allows no manual
432                        interventions. Set up the default p-table to format drive 0 3.
433                        Since floppies are always the last drive in the system this is
434                        gauranteed to format all the drive in the system and error when 't
435                        gets to the floppy.
436
437                        Revision C contains several changes. First RX33,RD31,RD54 support was
438                        added. The RX33 boot device questions where added. The autosizer was
439                        fixed to also size for floppies. The Autosizer errors are now reported
440                        to the host along with what drives are located on what units and there
441                        drive size or floppy type. The default question in manual mode was
442                        changed so that if an FCT (factory control table) is not present
443                        "Bad Block Information" it will not continue on. This was changed for
444                        all drives except the RD51 which doesn't have a FCT table. Also there
445                        was a small change to the autosizer which affects version C1 hardware
446                        etched RQDX3 boards specially the ones without the LUN ECO. The autosizer
447                        now run in the beg'nning and the end. A head parking feature was added
448                        so that RD31 and RD32 heads would be parked in the inner most cylinder
449                        upon completion of the program. The autosizer utility was updated to
450                        displays a little more information.
451
452                    )%
```

```
                                .MCALL SVC
000000                          SVC
000000                          .ENABLE ABS,AMA
                000052          .=52
000052  010000                    .word       bit12                   ;extended mon'tor in XXDP
                002000          .=2000
002000                          BGNMOD MOD1
002000                          POINTER BGNDU,BGNCLN,BGNPROT,BGNSETUP
002000                          HEADER ZRQC,C,0,600,0
002122                          DISPATCH 1
002126                          DESCRIPT <RQDX3 Format\Park Disk Utility>
002166                          DEVTYPE <RD51,RD52,RD53,RD31,RD54,RX33 *** Answer "Y" to "Change HW (L) ?" ***>
```

```
  469 002274                        BGNHW DFPTBL
  470 002276  172150                      .WORD   172150          ;IP address
  471 002300  000154                      .WORD   154             ;Vector address
  472 002302  000000                      .WORD   000000          ;unit zero as defualt drive
  473 002304  030071                      .WORD   012345.         ;ser'al number
  474 002306  100000                      .word   100000          ;auto sizer-"yes", warn'ng="no' or don't continue
  475 002310                        ENDHW
  476
```

```
478 002310                          EQUALS
                                    ;
                                    ; BIT DIFINITIONS
                                    ;
            100000                  BIT15=- 100000
            040000                  BIT14== 40000
            020000                  BIT13=- 20000
            010000                  BIT12== 10000
            004000                  BIT11=- 4000
            002000                  BIT10== 2000
            001000                  BIT09== 1000
            000400                  BIT08== 400
            000200                  BIT07== 200
            000100                  BIT06== 100
            000040                  BIT05== 40
            000020                  BIT04== 20
            000010                  BIT03== 10
            000004                  BIT02== 4
            000002                  BIT01== 2
            000001                  BIT00== 1
                                    ;
            001000                  BIT9==  BIT09
            000400                  BIT8==  BIT08
            000200                  BIT7==  BIT07
            000100                  BIT6==  BIT06
            000040                  BIT5==  BIT05
            000020                  BIT4==  BIT04
            000010                  BIT3==  BIT03
            000004                  BIT2==  BIT02
            000002                  BIT1==  BIT01
            000001                  BIT0==  BIT00
                                    ;
                                    ; EVENT FLAG DEFINITIONS
                                    ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                    ;
                                    ;                                   ;  BIT POSITION IN SECOND STATUS WORD
            000040                  EF.START==      32.                 ; (100000) START COMMAND WAS ISSUED
            000037                  EF.RESTART==    31.                 ; (040000) RESTART COMMAND WAS ISSUED
            000036                  EF.CONTINUE==   30.                 ; (020000) CONTINUE COMMAND WAS ISSUED
            000035                  EF.NEW==        29.                 ; (010000) A NEW PASS HAS BEEN STARTED
            000034                  EF.PWR==        28.                 ; (004000) A POWER-FAIL/POWER UP OCCURRED
                                    ;
                                    ;
                                    ; PRIORITY LEVEL DEFINITIONS
                                    ;
            000340                  PRI07== 340
            000300                  PRI06== 300
            000240                  PRI05== 240
            000200                  PRI04== 200
            000140                  PRI03== 140
            000100                  PRI02== 100
            000040                  PRI01== 40
            000000                  PRI00== 0
                                    ;
                                    ;OPERATOR FLAG BITS
                                    ;
            000004                  EVL==       4
```

```
                000010          LOT-=       10
                000020          ADR=-       20
                000040          IDU-=       40
                000100          ISR=-      100
                000200          UAM==      200
                000400          BOE==      400
                001000          PNT--     1000
                002000          PRI=-     2000
                004000          IXE==     4000
                010000          IBE==    10000
                020000          IER==    20000
                040000          LOE==    40000
                100000          HOE==   100000
479                             .sbttl Literals
480
481                             ;+
482                             ; Mask values to mask out specified flags
483                             ;-
484             000010                  UITothr = 10            ;UIT other
485                                                             ;if UIT doesn't exist
486
487                             ;+
488                             ; M'sc.
489                             ;-
490             000004                  MaxDrv  = 4             ;Maximum Number of drives
491             000002                  DUP.id  = bit1          ;DUP connection ID
492             000007                  Mrqdx1  = 7.            ;model number for RQDX1
493             000023                  Mrqdx3  = 19.           ;model number for RQDX3
494             000001                  stdaln  = bit0          ;stand alone modifier
495             000367                  retry   = 367           ;Number of retries UDC
496                             ;+
497                             ; Opcodes for DUP commands
498                             ;-
499             000001                  op.gds  = 1
500             000006                  op.abrt = 6
501             000004                  op.sen  = 4
502             000005                  op.rec  = 5
503             000003                  op.elp  = 3
504             000002                  op.esp  = 2
505             000200                  op.end  = 200
506                             ;+
507                             ; Message type masks
508                             ;
509             000001                  Question = 1
510             000002                  DefQuest = 2
511             000003                  inform   = 3
512             000004                  terminat = 4
513             000005                  ftlerr   = 5
514             000006                  specl    = 6
515
516             177760                  type    = 177760
517             170000                  msgnbr  = 170000
518                             ;+
519                             ;Auto sizer literals
520                             ;
521
522                             ; Interrupt Service Routines and Priority Levels
```

```
523
524     100002                  $udc    -       100002          ; Pointer to UDC interrupt handler
525     100006                  $clk    =       100006          ; Pointer to Clock interrupt handler
526     100016                  $sec            100016          ; Pointer to Sector Done Interrupt hand. r
527     000000                  ps0     -       0               ; Allow Any Interrupts
528     000340                  ps7             340             ; Inhibit Interrupts
529
530                             ; CSRs
531
532     140002                  rw$pll          140002
533     140004                  w$fpl   -       140004
534     140006                  r$fps   =       140006
535     140010                  r$dat   =       140010
536     140012                  r$cmd   -       140012
537     140020                  w$dat   -       140020
538     140022                  w$cmd   -       140022
539
540                             ; RECEIVE DATA ASCII reply message types:
541
542     000020                  .a.typ  =       20                      ; ASCII Message Type Multiplier
543     000020                  .a.que  -       1*.a.typ                ; Question
544     000040                  .a.def  =       2*.a.typ                ; Default question
545     000060                  .a.inf  =       3*.a.typ                ; Information
546     000100                  .a.ter  =       4*.a.typ                ; Termination
547     000120                  .a.fat  =       5*.a.typ                ; Fatal error
548
549                             ; RECEIVE DATA binary message types.
550
551     000140                  .b.spl  =       6*.a.typ                ; Special
552
553                             ; Status Codes returned by SIZER (Success is zero)
554
555     000001                  erudon          =       1               ; UDC Never Done
556     000002                  eruint          =       2               ; UDC Never Interrupted
557     000003                  ersek0          =       3               ; Couldn't Restore to Cyl 0
558
559                             ; UDC Commands
560
561     000000                  op.res          =       0               ; Reset 9224
562     000001                  op.dd           =       1               ; Deselect Drive
563     000003                  op.rd           =       3               ; Restore Drive
564     000005                  op.si1          =       5               ; Step In One Cylinder
565     000007                  op.so1          =       7               ; Step Out One Cylinder
566     000044                  op.srd          =       44              ; Select Winchester Drive
567     000054                  op.srx          =       54              ; Select Floppy Drive
568     000100                  op.srp          =       100             ; Set Register Pointer
569     000300                  rd.mode         =       300             ; RD Mode
570
571
```

Macro Definitions

```
                                .sbttl  Macro Definitions


                                ;+
                                ;       Execute a GET DUST STATUS command and the check the response.
                                ;

000000                          A=0
000001                          B=1
                                .MACRO  GETDUST                         ;Execute a GET DUST STATUS command
                                B=B+1                                   ;Increment the CRN number
                                gdstmp  \B                              ;call variable B as if it where a number (\)
                                .ENDM

                                .MACRO  GDSTMP  B
                                        .list
                                GDS'B:  bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
                                        bne     GDS'B                   ;if we don't own it wait until we do
                                        mov     #14.,cmdlen             ;load lenght of packet to be send
                                        movb    #0,cmdlen+2             ;load msg type and credit
                                        movb    #dup.id,cmdlen+3        ;load DUP connection ID
                                        inc     cmdpak                  ;load new CRN
                                        clr     cmdpak+2
                                        clr     cmdpak+4
                                        clr     cmdpak+6
                                        mov     #op.gds,cmdpak+10       ;load up opcode
                                        clr     cmdpak+12               ;no modifiers

                                        mov     #RFD'B,@vector          ;New vector place
                                        mov     #rsppak,rsprng          ;load response packet area into ring
                                        mov     #cmdpak,cmdrng          ;load command packet area into ring
                                        mov     #140000,RSPRNG+2        ;Port ownership bit.
                                        mov     #bit15,CMDRNG+2
                                        jsr     pc,POLLWT               ;Go to poll and wait routine.

                                ;*************************************************************************

                                    RFD'B:                              ;Intr to here.
                                        add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
                                        mov     #intsrv,@vector         ;Change vector
                                        jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                        ;the response recvd from the mut.
                                                                        ;it will check the cmd ref
                                                                        ;num, the endcode and status.
                                        .nlist
                                .ENDM
```

Macro Definitions

```
                                ;+
                                ;       Execute an ABORT command and then checks the response.
                                ;-


                                .MACRO  ABRT                            ;Execute an ABORT command
                                B-B+1                                   ;increment the CRN number
                                abrttmp \B                              ;call variable B as if it where a number ( )
                                .ENDM

                                .MACRO  ABRTTMP B
                                        .list
                                ABRT'B: bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
                                        bne     ABRT'B                  ;if we don t own it wait until we do
                                        mov     #14.,cmdlen             ;load lenght of packet to be send
                                        movb    #0,cmdlen+2             ;load msg type and credit
                                        movb    #dup.id,cmdlen+3        ;load DUP connection ID
                                        inc     cmdpak                  ;load new CRN
                                        clr     cmdpak+2
                                        clr     cmdpak+4
                                        clr     cmdpak+6
                                        mov     #op.abrt,cmdpak+10      ;load up opcode
                                        clr     cmdpak+12               ;no modifiers

                                        mov     #RFD'B,@vector          ;New vector place
                                        mov     #rsppak,rsprng          ;load response packet area into ring
                                        mov     #cmdpak,cmdrng          ;load command packet area into ring
                                        mov     #140000,RSPRNG+2        ;Port ownership bit.
                                        mov     #bit15,CMDRNG+2
                                        jsr     pc,POLLWT               ;Go to poll and wait routine.

                                ;*************************************************************************

                                    RFD'B:                              ;entr to here.
                                        add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
                                        mov     #intsrv,@vector         ;Change vector
                                        jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                        ;the response recvd from the mut.
                                                                        ;it will check the cmd ref
                                                                        ;num, the endcode and status.
                                        .nlist
                                .ENDM
```

Macro Definitions

```
                        ;*
                        ;       Execute a Send data cmd in dup and then check the response for the proper info
                        ;

                        .MACRO  SENDDAT SPLACE,SBYTCN           ;Execute a Send Data command
                        B-B+1                                   ;increment the CRN number
                        sendtmp \B,SPlace,Sbytcn                ;call variable A,B as if it where a number (\)
                        .ENDM

                        .MACRO  SENDTMP B,Splace,Sbytcnt
                                .list
                        SDT'B:  bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
                                bne     SDT'B                   ;if we don't own it wait until we do
                                mov     #34,cmdlen              ;load lenght of packet to be send
                                movb    #0,cmdlen+2             ;load msg type and credit
                                movb    #dup.id,cmdlen+3        ;load DUP connection ID
                                inc     cmdpak                  ;load new CRN
                                clr     cmdpak+2
                                clr     cmdpak+4
                                clr     cmdpak+6
                                mov     #op.sen,cmdpak+10       ;load up opcode
                                clr     cmdpak+12               ;no modifiers
                                mov     Sbytcnt,cmdpak+14
                                clr     cmdpak+16
                                mov     Splace,cmdpak+20        ;load address of buffer describtor
                                clr     cmdpak+22
                                clr     cmdpak+24
                                clr     cmdpak+26
                                clr     cmdpak+30
                                clr     cmdpak+32

                                mov     #RFD'B,@vector          ;New vector place
                                mov     #rsppak,rsprng          ;load response packet area into ring
                                mov     #cmdpak,cmdrng          ;load command packet area into ring
                                mov     #140000,RSPRNG+2        ;Port ownership bit.
                                mov     #bit15,CMDRNG+2
                                jsr     pc,POLLWT               ;Go to poll and wait routine.

                        ;*****************************************************************

                            RFD'B:                              ;Intr to here.
                                add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
                                mov     #intsrv,@vector         ;Change vector
                                jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                ;the response recvd from the mut.
                                                                ;it will check the cmd ref
                                                                ;num, the endcode and status.
                                .nlist
                        .ENDM
```

Macro Definitions

```
719
720
721                             ;*
722                             ;       Execute a Receive Data command and the check the response.
723                             ;
724
725
726                             .MACRO  RECVDAT Rplace,Rbytcnt          ;Execute a Send Data command
727                             B-B+1                                   ;increment the CRN number
728                             recvtmp \B,Rplace,Rbytcnt               ;call variable A,B as if it where a number (\)
729                             .ENDM
730
731                             .MACRO  RECVTMP B,RPlace,Rbytcnt
732                                     .list
733                             RCD'B:  bit     #b't15,cmdrng+2         ;test ownership of ring make sure we own it
734                                     bne     RCD'B                   ;if we don't own it wa't until we do
735                                     mov     #34,cmdlen              ;load lenght of packet to be send
736                                     movb    #0,cmdlen+2             ;load msg type and credit
737                                     movb    #dup.id,cmdlen+3        ;load DUP connection ID
738                                     inc     cmdpak                  ;load new CRN
739                                     clr     cmdpak+2
740                                     clr     cmdpak+4
741                                     clr     cmdpak+6
742                                     mov     #op.rec,cmdpak+10       ;load up opcode
743                                     clr     cmdpak+12               ;no modifiers
744                                     mov     Rbytcnt,cmdpak+14
745                                     clr     cmdpak+16
746                                     mov     Rplace,cmdpak+20        ;load address of buffer descr'btor
747                                     clr     cmdpak+22
748                                     clr     cmdpak+24
749                                     clr     cmdpak+26
750                                     clr     cmdpak+30
751                                     clr     cmdpak+32
752
753                                     mov     #RFD'B,@vector          ;New vector place
754                                     mov     #rsppak,rsprng          ;load response packet area into r'ng
755                                     mov     #cmdpak,cmdrng          ;load command packet area into ring
756                                     mov     #140000,RSPRNG+2        ;Port ownership b't.
757                                     mov     #bit15,CMDRNG+2
758                                     jsr     pc,POLLWT               ;Go to poll and wait routine.
759
760                             ;*************************************************************************
761
762                                 RFD'B:                              ;Intr to here.
763                                     add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
764                                     mov     #intsrv,@vector         ;Change vector
765                                     jsr     pc,RSPCHK               ;Go to routine that will check on
766                                                                     ;the response recvd from the mut.
767                                                                     ;it w'll check the cmd ref
768                                                                     ;num, the endcode and status.
769                                     .nlist
770                             .ENDM
```

Macro Definitions

```
772
773
774                             ;+
775                             ;       Execute a Execute Local Program command and the check the response.
776                             ;
777
778
779                             .MACRO  EXLCPRG Enamadr                 ;Execute a Send Data command
780                             B-B+1                                   ;increment the CRN number
781                             elptmp  \B,Enamadr                      ;call variable A,B as if it where a number (\)
782                             .ENDM
783
784                             .MACRO  ELPTMP  B,Enamadr
785                                     .list
786                             ELP'B:  bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
787                                     bne     ELP'B                   ;if we don't own it wait until we do
788                                     mov     #22,cmdlen              ;load lenght of packet to be send
789                                     movb    #0,cmdlen+2             ;load msg type and credit
790                                     movb    #dup.id,cmdlen+3        ;load DUP connection ID
791                                     inc     cmdpak                  ;load new CRN
792                                     clr     cmdpak+2
793                                     clr     cmdpak+4
794                                     clr     cmdpak+6
795                                     mov     #op.elp,cmdpak+10       ;load up opcode
796                                     mov     #stdaln,cmdpak+12       ;stand alone modifier
797                                     mov     #6,r0                   ;6 letters transfer
798                                     mov     #cmdpak+14,r1           ;starting address to place program name
799                                     mov     #Enamadr,r2             ;start of Program Name
800                             rfdj'B: movb    (r2)+,(r1)+             ;add 2 to bycnt then store
801                                     sob     r0,rfdj'B
802
803                                     mov     #RFD'B,@vector          ;New vector place
804                                     mov     #rsppak,rsprng          ;load response packet area into ring
805                                     mov     #cmdpak,cmdrng          ;load command packet area into ring
806                                     mov     #140000,RSPRNG+2        ;Port ownership bit.
807                                     mov     #bit15,CMDRNG+2
808                                     jsr     pc,POLLWT               ;Go to poll and wait routine.
809
810                             ;*****************************************************************************
811
812                                 RFD'B:                              ;Intr to here.
813                                     add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
814                                     mov     #intsrv,@vector         ;Change vector
815                                     jsr     pc,RSPCHK               ;Go to routine that will check on
816                                                                     ;the response recvd from the mut.
817                                                                     ;it will check the cmd ref
818                                                                     ;num, the endcode and status.
819                                     .nlist
820                             .ENDM
821
```

Macro Definitions

```
                                ;+
                                ;       Execute a Eexcute Supplied Program command and the check the response.
                                ;


                                .MACRO  EXCSUPPRG                       ;Execute a Supplied program command
                                B-B+1                                   ;increment the CRN number
                                esptmp  \B                              ;call variable A,B as if it where a number (\)
                                .ENDM

                                .MACRO  ESPTMP  B
                                        .list
                                ESP'B:  bit     #b't15,cmdrng+2         ;test ownership of ring make sure we own 't
                                        bne     ESP'B                   ;'f we don't own it wait until we do
                                        mov     #50,cmdlen              ;load lenght of packet to be send
                                        movb    #0,cmdlen+2             ;load msg type and credit value
                                        movb    #dup.'d,cmdlen+3        ;load DUP connection ID
                                        clr     CMDpak+2
                                        clr     CMDpak+4
                                        clr     CMDpak+6
                                        mov     #op.esp,CMDpak+10       ;load up opcode
                                        mov     #0,CMDpak+12            ;no stand alone modifier
                                        mov     #<autoend autosz>,cmdpak+14 ;load length of prg into buffer
                                        clr     cmdpak+16
                                        mov     #autosz,cmdpak+20       ;starting address of downline load prg
                                        clr     CMDpak+22
                                        clr     CMDpak+24
                                        clr     CMDpak+26
                                        clr     CMDpak+30
                                        clr     CMDpak+32
                                        clr     CMDpak+34               ;overlay buffer descriptor
                                        clr     CMDpak+36
                                        clr     CMDpak+40
                                        clr     CMDpak+42
                                        clr     CMDpak+44
                                        clr     CMDpak+46
                                        mov     #RFD'B,@vector          ;New vector place
                                        mov     #rsppak,rsprng          ;load response packet area into ring
                                        mov     #cmdpak,cmdrng          ;load command packet area into ring
                                        mov     #140000,RSPRNG+2        ;Port ownership bit.
                                        mov     #bit15,CMDRNG+2
                                        jsr     pc,POLLWT               ;Go to poll and wa't routine.
                                ;*************************************************************************
                                    RFD'B:                              ;Intr to here.
                                        add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
                                        mov     #intsrv,@vector         ;Chanre vector
                                        jsr     pc,RSPCHK               ;Go t routine that will check on
                                                                        ;the response recvd from the mut.
                                        .nlist                          ;it will check the cmd ref
                                .ENDM                                   ;num, the endcode and status.
```

Word & Buffer defintions

```
                                .sbttl  Word & Buffer defintions

002310  000000          LOGUNIT: .WORD                  ;logunit number
002312  000000          LOCAL:   .WORD                  ;
002314  000000          PLOC:    .WORD                  ;p table address
002316  000000          ptbl:    .WORD                  ;p table address
002320  000000          UITadr:  .word
002322  000000          BOOT:    .word                  ;bootable media
                        ;*
                        ; These next locations may be altered to supply the correct IP & SA address
                        ; If only 1 jumper is to be placed on the MUT the locations should be filled
                        ;  with addresses 177770 and 177772 respectively.
                        ;
002324  000000          IPreg:   .WORD   0              ;Address of the SA and IP registers
002326  000000          Vector:  .word   0
002330  000000          Unit:    .word   0              ;unit number
002332  000123                   .word   123
002334  177777          sernbr:  .word   177777         ;serial number
002336  000000          UNTflgs: .word   0              ;flags, bit15 =auto mode
                                                        ;bit13 =unknown model number,bit12 =park heads only
002340  000000          mdlnbr:  .word   0              ;model number of the controller as returned in step 4
002342  000000          mcdnbr:  .word   0              ;microcode number of the controller as returned in step 4
002344  000000          UIN:     .word   0              ;this is a pointer to the correct UIT table

002346                  RSP1:    .BLKW   2              ;Response packet length
002352                  RSPPAK:  .BLKW   30.            ;Response packet
002446                  CMDLEN:  .BLKW   2              ;Command packet length
002452                  CMDPAK:  .BLKW   20.            ;Command packet

002522  000000          CINTR:   .WORD   0              ;Command interrupt indicator
002524  000000          RINTR:   .WORD   0              ;Response interrupt indicator
002526  002352          RSPRNG:  .word   rsppak         ;Message ring
002530  140000                   .word   140000
002532  002452          CMDRNG:  .word   cmdpak         ;Command ring
002534  100000                   .word   100000
002536  177777                   .WORD    1

002540  000000          LSTCRN:  .word   0              ;storage for unreturned command CRN
002542  000000          LSTCMD:  .word   0              ;storage for unreturned command opcode
002544  000000          LSTVCT:  .word   0              ;storage for unreturned command intterupt vector address
002546  000000          LOPRGI:  .word   0              ;Low word of the progress indicator
002550  000000          HIPRGI:  .word   0              ;High word of progress indicator

                        .nlist bin                      ;data area
002552  DATARE: .asciz  /%A12345678901234567890123456789012345678901234567890123456789012345678901234567890/
                .even
002676  PRGnam: .ascii  /FORMAT/        ;address of local format program name
002704          .byte   0               ;null for asciz
002705  XBN:    .ASCIZ  /0123456789/
002720  DBN:    .ASCIZ  /0123456789/
002733  LBN:    .ASCIZ  /0123456789/
002746  RBN:    .ASCIZ  /0123456789/
                .even
                                .list bin
```

```
                                .sbttl  DISK UNIT INFORMATION TABLES
                                ;+
                                ; The following tables are made up of disk drive parameters which will be
                                ; feed to the FORMAT controller local program which will then use the
                                ; information to format the drives.
                                ;
        002776                  .-2776
002776  177777                      .word       1               ;back door for custom table build
        003000                  .-3000

                                ;+
                                ;       Unit Information table RD51 Seagate
                                ;


003000                          UIT0:
                                                                ;/*Top of Unit Information table (UIT)
003000  000071                          .word   57.             ;/XBN size (lo wrd) XBN size = 3*(1+sectors_per track)/
003002  000000                          .word   0               ;/XBN size (hi wrd)/
003004  000127                          .word   87.             ;/DBN size (lo wrd)/
003006  000000                          .word   0               ;/DBN size (hi wrd)/
003010  052360                          .word   21744.          ;/LBN size (lo wrd)/
003012  000000                          .word   0               ;/LBN size (hi wrd)/
003014  000220                          .word   144.            ;/RBN size (lo wrd)/
003016  000000                          .word   0               ;/RBN size (hi wrd)/
003020  000022                          .word   18.             ;/Sectors per track/
003022  000004                          .word   4.              ;/Surfaces per unit/
003024  000462                          .word   306.            ;/Cylinders per unit/
003026  000156                          .word   110.            ;/Write precomp cylinder/
003030  000462                          .word   306.            ;/Reduce write current cylinder /
003032  000000                          .word   0               ;/Seek Rate/
003034  000001                          .word   1               ;/Use CRC or ECC/
003036  000044                          .word   36.             ;/RCT Size/
003040  000004                          .word   4.              ;/Number of RCT copies/
003042  040063                          .word   ^B0100000000110011 ;^H4033;/Media (lo wrd)/
003044  022544                          .word   ^B0010010101100100 ;^H2564;/Media (hi wrd)/
003046  000002                          .word   2               ;/Sector Interleave (n-to 1)/
003050  000002                          .word   2               ;/Surface to Surface Skew/
003052  000001                          .word   1               ;/Cylinder to Cylinder Skew/
003054  000020                          .word   16.             ;/Gap size 0/
003056  000020                          .word   16.             ;/Gap size 1/
003060  000005                          .word   5.              ;/Gap size 2/
003062  000020                          .word   16.             ;/Gap size 3/
003064  000015                          .word   13.             ;/Sync size/
003066  000001                          .word   1               ;/MSCP cylinders per Unit/
003070  000001                          .word   1               ;/MSCP Groups per Cylinder/
003072  000001                          .word   1               ;/MSCP Tracks per Group/
003074  000002                          .word   2               ;/Max allowed bad spots per surface/
003076  000151                          .word   105.            ;/Bad spot tolerance (bytes)/
003100  000463                          .word   307.            ;/auto recal cylinder
003102  000463                          .word   307.            ;/auto recal cylinder
        000104                  UITsiz = .-UIT0
        003104                  .=3000+ UITsiz


                                ;+
```

DISK UNIT INFORMATION TABLES

```
                                ;       Unit Information table    RD52 Quantum drive
                                ;
                                
003104                          UIT1:
                                                                ;/*Top of Unit Information table (UIT)
003104  000066                          .word   54.             ;/XBN size (lo wrd) XBN size = 3*(1+sectors_per_track)/
003106  000000                          .word   0               ;/XBN size (hi wrd)/
003110  000122                          .word   82.             ;/DBN size (lo wrd)/
003112  000000                          .word   0               ;/DBN size (hi wrd)/
003114  166140                          .word   60512.          ;/LBN size (lo wrd)/
003116  000000                          .word   0               ;/LBN size (hi wrd)/
003120  000250                          .word   168.            ;/RBN size (lo wrd)/
003122  000000                          .word   0               ;/RBN size (hi wrd)/
003124  000021                          .word   17.             ;/Sectors per track/
003126  000010                          .word   8.              ;/Surfaces per unit/
003130  001000                          .word   512.            ;/Cylinders per unit/
003132  000400                          .word   256.            ;/Write precomp cylinder/
003134  001000                          .word   512.            ;/Reduce write current cyl'nder /
003136  000000                          .word   0               ;/Seek Rate/
003140  000001                          .word   1               ;/Use CRC or ECC/
003142  000004                          .word   4               ;/RCT Size/
003144  000010                          .word   8.              ;/Number of RCT copies/
003146  040064                          .word   ^B0100000000110100 ;^H4034;/Media (lo wrd)/
003150  022544                          .word   ^B0010010101100100 ;^H2564;/Media (h' wrd)/
003152  000001                          .word   1               ;/Sector Interleave (n-to 1)/
003154  000002                          .word   2               ;/Surface to Surface Skew/
003156  000015                          .word   13.             ;/Cylinder to Cylinder Skew/
003160  000020                          .word   16.             ;/Gap size 0/
003162  000020                          .word   16.             ;/Gap size 1/
003164  000005                          .word   5.              ;/Gap size 2/
003166  000050                          .word   40.             ;/Gap size 3/
003170  000015                          .word   13.             ;/Sync size/
003172  000001                          .word   1               ;/MSCP cylinders per Unit/
003174  000001                          .word   1               ;/MSCP Groups per Cylinder/
003176  000001                          .word   1               ;/MSCP Tracks per Group/
003200  000012                          .word   10.             ;/Max allowed bad spots per surface/
003202  000151                          .word   105.            ;/Bad spot tolerance (bytes)/
003204  001000                          .word   512.            ;/auto recal cylinder
003206  001000                          .word   512.            ;/auto recal cylinder

003210                          .=3000+UITsiz+UITsiz


                                ;+
                                ;       Unit Information table  RD52 Atasi
                                ;-

003210                          UIT2:
                                                                ;/*Top of Unit Information table (UIT)
003210  000066                          .word   54.             ;/XBN size (lo wrd) XBN size = 3*(1+sectors_per_track)/
003212  000000                          .word   0               ;/XBN size (hi wrd)/
003214  000101                          .word   65.             ;/DBN size (lo wrd)/
003216  000000                          .word   0               ;/DBN size (hi wrd)/
003220  166140                          .word   60512.          ;/LBN size (lo wrd)/
003222  000000                          .word   0               ;/LBN size (hi wrd)/
```

DISK UNIT INFORMATION TABLES

```
1048 003224  000250                        .word   168.             ;/RBN size (lo wrd)/
1049 003226  000000                        .word   0                ;/RBN size (hi wrd)/
1050 003230  000021                        .word   17.              ;/Sectors per track/
1051 003232  000007                        .word   7.               ;/Surfaces per unit/
1052 003234  001205                        .word   645.             ;/Cylinders per unit/
1053 003236  000500                        .word   320.             ;/Write precomp cylinder/
1054 003240  001205                        .word   645.             ;/Reduce write current cylinder /
1055 003242  000000                        .word   0                ;/Seek Rate/
1056 003244  000001                        .word   1                ;/Use CRC or ECC/
1057 003246  000004                        .word   4                ;/RCT Size/
1058 003250  000010                        .word   8.               ;/Number of RCT copies/
1059 003252  040064                        .word   ^B0100000000110100 ;^H4034;/Media (lo wrd)/
1060 003254  022544                        .word   ^B0010010101100100 ;^H2564;/Media (hi wrd)/
1061 003256  000001                        .word   1                ;/Sector Interleave (n to-1)/
1062 003260  000002                        .word   2                ;/Surface to Surface Skew/
1063 003262  000007                        .word   7.               ;/Cylinder to Cylinder Skew/
1064 003264  000020                        .word   16.              ;/Gap size 0/
1065 003266  000020                        .word   16.              ;/Gap size 1/
1066 003270  000005                        .word   5.               ;/Gap size 2/
1067 003272  000050                        .word   40.              ;/Gap size 3/
1068 003274  000015                        .word   13.              ;/Sync size/
1069 003276  000001                        .word   1                ;/MSCP cylinders per Unit/
1070 003300  000001                        .word   1                ;/MSCP Groups per Cylinder/
1071 003302  000001                        .word   1                ;/MSCP Tracks per Group/
1072 003304  000024                        .word   20.              ;/Max allowed bad spots per surface/
1073 003306  000151                        .word   105.             ;/Bad spot tolerance (bytes)/
1074 003310  001206                        .word   646.             ;/auto recal cylinder
1075 003312  001206                        .word   646.             ;/auto recal cylinder
1076
1077         003314                .-3000+UITsiz+UITsiz+UITsiz
1078
1079                               ;+
1080                               ;       Unit Information table  RD53 Micropolis
1081                               ;-
1082
1083
1084 003314                        UIT3:
1085                                                                ;/*Top of Unit Information table (UIT)
1086 003314  000066                        .word   54.              ;/XBN size (lo wrd) XBN size = 3*(1+sectors_per track)/
1087 003316  000000                        .word   0                ;/XBN size (hi wrd)/
1088 003320  000122                        .word   82.              ;/DBN size (lo wrd)/
1089 003322  000000                        .word   0                ;/DBN size (hi wrd)/
1090 003324  016730                        .word   7640.            ;/LBN size (lo wrd)/
1091 003326  000002                        .word   2.               ;/LBN size (hi wrd)/
1092 003330  000430                        .word   280.             ;/RBN size (lo wrd)/
1093 003332  000000                        .word   0                ;/RBN size (hi wrd)/
1094 003334  000021                        .word   17.              ;/Sectors per track/
1095 003336  000010                        .word   8.               ;/Surfaces per unit/
1096 003340  002000                        .word   1024.            ;/Cylinders per unit/
1097 003342  002000                        .word   1024.            ;/Write precomp cylinder/
1098 003344  002000                        .word   1024.            ;/Reduce write current cylinder /
1099 003346  000000                        .word   0                ;/Seek Rate/
1100 003350  000001                        .word   1                ;/Use CRC or ECC/
1101 003352  000005                        .word   5                ;/RCT Size/
1102 003354  000010                        .word   8.               ;/Number of RCT copies/
1103 003356  040065                        .word   ^B0100000000110101 ;^H4035;/Media (lo wrd)/
1104 003360  022544                        .word   ^B0010010101100100 ;^H2564;/Media (hi wrd)/
```

DISK UNIT INFORMATION TABLES

```
1105 003362  000001                    .word   1               ;/Sector Interleave (n-to-1)/
1106 003364  000002                    .word   2               ;/Surface to Surface Skew/
1107 003366  000010                    .word   8.              ;/Cylinder to Cylinder Skew/
1108 003370  000020                    .word   16.             ;/Gap size 0/
1109 003372  000020                    .word   16.             ;/Gap size 1/
1110 003374  000005                    .word   5.              ;/Gap size 2/
1111 003376  000050                    .word   40.             ;/Gap size 3/
1112 003400  000015                    .word   13.             ;/Sync size/
1113 003402  000001                    .word   1               ;/MSCP cylinders per Unit/
1114 003404  000001                    .word   1               ;/MSCP Groups per Cylinder/
1115 003406  000001                    .word   1               ;/MSCP Tracks per Group/
1116 003410  000040                    .word   32.             ;/Max allowed bad spots per surface/
1117 003412  000156                    .word   110.            ;/Bad spot tolerance (bytes)/
1118 003414  002000                    .word   1024.           ;/auto recal cylinder
1119 003416  002000                    .word   1024.           ;/auto recal cylinder
1120
1121         003420            .-3000+UITsiz+UITsiz+UITsiz+UITsiz
1122
1123
1124                           ;+
1125                           ;       Unit Information table  RD31 Seagate
1126                           ;
1127
1128
1129 003420                    UIT4:
1130                                                    ;/*Top of Unit Information table (UIT)
1131 003420  000066                    .word   54.             ;/XBN size (lo wrd) XBN size = 3*(1+sectors_per_track)/
1132 003422  000000                    .word   0               ;/XBN size (hi wrd)/
1133 003424  000016                    .word   14.             ;/DBN size (lo wrd)/
1134 003426  000000                    .word   0               ;/DBN size (hi wrd)/
1135 003430  121160                    .word   41584.          ;/LBN size (lo wrd)/
1136 003432  000000                    .word   0               ;/LBN size (hi wrd)/
1137 003434  000144                    .word   100.            ;/RBN size (lo wrd)/
1138 003436  000000                    .word   0               ;/RBN size (hi wrd)/
1139 003440  000021                    .word   17.             ;/Sectors per track/
1140 003442  000004                    .word   4.              ;/Surfaces per unit/
1141 003444  001147                    .word   615.            ;/Cylinders per unit/
1142 003446  000400                    .word   256.            ;/Write precomp cylinder/
1143 003450  001147                    .word   615.            ;/Reduce write current cylinder /
1144 003452  000000                    .word   0               ;/Seek Rate/
1145 003454  000001                    .word   1               ;/Use CRC or ECC/
1146 003456  000003                    .word   3               ;/RCT Size/
1147 003460  000010                    .word   8.              ;/Number of RCT copies/
1148 003462  040037                    .word   ^B0100000000011111 ;^H401F;/Media (lo wrd)/
1149 003464  022544                    .word   ^B0010010101100100 ;^H2564;/Media (hi wrd)/
1150 003466  000001                    .word   1               ;/Sector Interleave (n-to 1)/
1151 003470  000002                    .word   2               ;/Surface to Surface Skew/
1152 003472  000004                    .word   4.              ;/Cylinder to Cylinder Skew/
1153 003474  000020                    .word   16.             ;/Gap size 0/
1154 003476  000020                    .word   16.             ;/Gap size 1/
1155 003500  000005                    .word   5.              ;/Gap size 2/
1156 003502  000050                    .word   40.             ;/Gap size 3/
1157 003504  000015                    .word   13.             ;/Sync size/
1158 003506  000001                    .word   1               ;/MSCP cylinders per Unit/
1159 003510  000001                    .word   1               ;/MSCP Groups per Cylinder/
1160 003512  000001                    .word   1               ;/MSCP Tracks per Group/
1161 003514  000010                    .word   8.              ;/Max allowed bad spots per surface/
```

DISK UNIT INFORMATION TABLES

```
1162 003516  000151                        .word   105.            ;/Bad spot tolerance (bytes)/
1163 003520  001147                        .word   615.            ;/auto recal cylinder
1164 003522  001150                        .word   616.            ;/auto recal cylinder
1165
1166         003524                .=3000+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz
1167
1168
1169                               ;+
1170                               ;       Unit Information table  RD54 Maxtor Drive
1171                               ;
1172
1173
1174 003524                       UIT5:
1175                                                               ;/*Top of Unit Information table (UIT)
1176 003524  000066                        .word   54.             ;/XBN size (lo wrd) XBN size = 3*(1+sectors_per_track)/
1177 003526  000000                        .word   0               ;/XBN size (hi wrd)/
1178 003530  000[illegible]                .word   201.            ;/DBN size (lo wrd)/
1179 003532  000000                        .word   0               ;/DBN size (hi wrd)/
1180 003534  137730                        .word   137730          ;/LBN size (lo wrd)/
1181 003536  000004                        .word   4               ;/LBN size (hi wrd)/
1182 003540  001141                        .word   609.            ;/RBN size (lo wrd)/
1183 003542  000000                        .word   0               ;/RBN size (hi wrd)/
1184 003544  000021                        .word   17.             ;/Sectors per track/
1185 003546  000017                        .word   15.             ;/Surfaces per unit/
1186 003550  002311                        .word   1225.           ;/Cylinders per unit/
1187 003552  002311                        .word   1225.           ;/Write precomp cylinder/
1188 003554  002311                        .word   1225.           ;/Reduce write current cylinder /
1189 003556  000000                        .word   0               ;/Seek Rate/
1190 003560  000001                        .word   1               ;/Use CRC or ECC/
1191 003562  000007                        .word   7               ;/RCT Size/
1192 003564  000010                        .word   8.              ;/Number of RCT copies/
1193 003566  040066                        .word   ^B0100000000110110 ;^H4036;/Media (lo wrd)/
1194 003570  022544                        .word   ^B0010010101100100 ;^H2564;/Media (hi wrd)/
1195 003572  000001                        .word   1               ;/Sector Interleave (n-to 1)/
1196 003574  000002                        .word   2               ;/Surface to Surface Skew/
1197 003576  000010                        .word   8.              ;/Cylinder to Cylinder Skew/
1198 003600  000020                        .word   16.             ;/Gap size 0/
1199 003602  000020                        .word   16.             ;/Gap size 1/
1200 003604  000005                        .word   5.              ;/Gap size 2/
1201 003606  000050                        .word   40.             ;/Gap size 3/
1202 003610  000015                        .word   13.             ;/Sync size/
1203 003612  000001                        .word   1               ;/MSCP cylinders per Unit/
1204 003614  000001                        .word   1               ;/MSCP Groups per Cylinder/
1205 003616  000001                        .word   1               ;/MSCP Tracks per Group/
1206 003620  000040                        .word   32.             ;/Max allowed bad spots per surface/
1207 003622  000151                        .word   105.            ;/Bad spot tolerance (bytes)/
1208 003624  002311                        .word   1225.           ;/auto recal cylinder
1209 003626  002312                        .word   1226.           ;/auto recal cylinder possible on this vendor's
1210                                                               ;/drive mmm
1211
1212         003630                .=3000+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz
1213
1214
1215                               ;+
1216                               ;       Unit Information table
1217                               ;-
1218
```

DISK UNIT INFORMATION TABLES

```
1219
1220 003630                            UIT6:
1221                                                                ;/*Top of Unit Information table (UIT)
1222 003630  000066                            .word   54.          ;/XBN size (lo wrd) XBN size = 3*(1+sectors per trac
1223 003632  000000                            .word   0            ;/XBN size (hi wrd)/
1224 003634  000057                            .word   47.          ;/DBN size (lo wrd)/
1225 003636  000000                            .word   0            ;/DBN size (hi wrd)/
1226 003640  016677                            .word   016677       ;/LBN size (lo wrd)/
1227 003642  000002                            .word   2            ;/LBN size (hi wrd)/
1228 003644  000524                            .word   340.         ;/RBN size (lo wrd)/
1229 003646  000000                            .word   0            ;/RBN size (hi wrd)/
1230 003650  000021                            .word   17.          ;/Sectors per track/
1231 003652  000010                            .word   8.           ;/Surfaces per unit/
1232 003654  002000                            .word   1024.        ;/Cylinders per unit/
1233 003656  002000                            .word   1024.        ;/Write precomp cylinder/
1234 003660  002000                            .word   1024.        ;/Reduce write current cylinder /
1235 003662  000000                            .word   0            ;/Seek Rate/
1236 003664  000001                            .word   1            ;/Use CRC or ECC/
1237 003666  000005                            .word   5            ;/RCT Size/
1238 003670  000003                            .word   3            ;/Number of RCT copies/
1239 003672  040065                            .word   ^B0100000000110101 ;^H4035;/Media (lo wrd)/
1240 003674  022544                            .word   ^B0010010101100100 ;^H2564;/Media (hi wrd)/
1241 003676  000001                            .word   1            ;/Sector Interleave (n-to-1)/
1242 003700  000002                            .word   2            ;/Surface to Surface Skew/
1243 003702  000010                            .word   8.           ;/Cylinder to Cylinder Skew/
1244 003704  000020                            .word   16.          ;/Gap size 0/
1245 003706  000020                            .word   16.          ;/Gap size 1/
1246 003710  000005                            .word   5.           ;/Gap size 2/
1247 003712  000050                            .word   40.          ;/Gap size 3/
1248 003714  000015                            .word   13.          ;/Sync size/
1249 003716  000001                            .word   1            ;/MSCP cylinders per Unit/
1250 003720  000001                            .word   1            ;/MSCP Groups per Cylinder/
1251 003722  000001                            .word   1            ;/MSCP Tracks per Group/
1252 003724  000040                            .word   32.          ;/Max allowed bad spots per surface/
1253 003726  000156                            .word   110.         ;/Bad spot tolerance (bytes)/
1254 003730  002000                            .word   1024.        ;/auto recal cylinder
1255 003732  002000                            .word   1024.        ;/auto recal cylinder
1256
1257         003734                .=3000+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz
1258
1259
1260                                ;+
1261                                ;       Unit Information table
1262                                ;-
1263
1264
1265 003734                            UIT7:
1266                                                                ;/*Top of Unit Information table (UIT)
1267 003734  000066                            .word   54.          ;/XBN size (lo wrd) XBN size = 3*(1+sectors_per_track)/
1268 003736  000000                            .word   0            ;/XBN size (hi wrd)/
1269 003740  000057                            .word   47.          ;/DBN size (lo wrd)/
1270 003742  000000                            .word   0            ;/DBN size (hi wrd)/
1271 003744  016677                            .word   016677       ;/LBN size (lo wrd)/
1272 003746  000002                            .word   2            ;/LBN size (hi wrd)/
1273 003750  000524                            .word   340.         ;/RBN size (lo wrd)/
1274 003752  000000                            .word   0            ;/RBN size (hi wrd)/
1275 003754  000021                            .word   17.          ;/Sectors per track/
```

DISK UNIT INFORMATION TABLES

```
1276 003756  000010                        .word   8.              ;/Surfaces per unit/
1277 003760  002000                        .word   1024.            ;/Cylinders per unit/
1278 003762  002000                        .word   1024.            ;/Write precomp cylinder/
1279 003764  002000                        .word   1024.            ;/Reduce write current cylinder /
1280 003766  000000                        .word   0                ;/Seek Rate/
1281 003770  000001                        .word   1                ;/Use CRC or ECC/
1282 003772  000005                        .word   5                ;/RCT Size/
1283 003774  000003                        .word   3                ;/Number of RCT copies/
1284 003776  040065                        .word   tB0100000000110101 ;tH4035;/Media (lo wrd)/
1285 004000  022544                        .word   tB0010010101100100 ;tH2564;/Media (hi wrd)/
1286 004002  000001                        .word   1                ;/Sector Interleave (n-to-1)/
1287 004004  000002                        .word   2                ;/Surface to Surface Skew/
1288 004006  000010                        .word   8.               ;/Cylinder to Cylinder Skew/
1289 004010  000020                        .word   16.              ;/Gap size 0/
1290 004012  000020                        .word   16.              ;/Gap size 1/
1291 004014  000005                        .word   5.               ;/Gap size 2/
1292 004016  000050                        .word   40.              ;/Gap size 3/
1293 004020  000015                        .word   13.              ;/Sync size/
1294 004022  000001                        .word   1                ;/MSCP cylinders per Unit/
1295 004024  000001                        .word   1                ;/MSCP Groups per Cylinder/
1296 004026  000001                        .word   1                ;/MSCP Tracks per Group/
1297 004030  000040                        .word   32.              ;/Max allowed bad spots per surface/
1298 004032  000156                        .word   110.             ;/Bad spot tolerance (bytes)/
1299 004034  002000                        .word   1024.            ;/auto recal cylinder
1300 004036  002000                        .word   1024.            ;/auto recal cylinder
1301
1302         004040                .-3000+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz+UITsiz
1303
1304
1305                               ;+
1306                               ;       DEFAULT Unit Information table
1307                               ;
1308
1309
1310 004040                       UITdf:
1311                                                        ;/*Top of Unit Information table (UIT)
1312 004040  000066                        .word   54.              ;/XBN size (lo wrd) XBN size - 3*(1+sectors per_track)/
1313 004042  000000                        .word   0                ;/XBN size (hi wrd)/
1314 004044  000311                        .word   201.             ;/DBN size (lo wrd)/
1315 004046  000000                        .word   0                ;/DBN size (hi wrd)/
1316 004050  137710                        .word   137710           ;/LBN size (lo wrd)/
1317 004052  000004                        .word   4                ;/LBN size (hi wrd)/
1318 004054  001161                        .word   625.             ;/RBN size (lo wrd)/
1319 004056  000000                        .word   0                ;/RBN size (hi wrd)/
1320 004060  000021                        .word   17.              ;/Sectors per track/
1321 004062  000017                        .word   15.              ;/Surfaces per unit/
1322 004064  002311                        .word   1225.            ;/Cylinders per unit/
1323 004066  002311                        .word   1225.            ;/Write precomp cylinder/
1324 004070  002311                        .word   1225.            ;/Reduce write current cylinder /
1325 004072  000000                        .word   0                ;/Seek Rate/
1326 004074  000001                        .word   1                ;/Use CRC or ECC/
1327 004076  000007                        .word   7                ;/RCT Size/
1328 004100  000010                        .word   8.               ;/Number of RCT copies/
1329 004102  040066                        .word   tB0100000000110110 ;tH4034;/Media (lo wrd)/
1330 004104  022544                        .word   tB0010010101100100 ;tH2564;/Media (hi wrd)/
1331 004106  000001                        .word   1                ;/Sector Interleave (n-to-1)/
1332 004110  000002                        .word   2                ;/Surface to Surface Skew/
```

DISK UNIT INFORMATION TABLES

```
1333 004112  000015                    .word   13.          ;/Cylinder to Cylinder Skew/
1334 004114  000020                    .word   16.          ;/Gap size 0/
1335 004116  000020                    .word   16.          ;/Gap size 1/
1336 004120  000005                    .word   5.           ;/Gap size 2/
1337 004122  000050                    .word   40.          ;/Gap size 3/
1338 004124  000015                    .word   13.          ;/Sync size/
1339 004126  000001                    .word   1            ;/MSCP cylinders per Unit/
1340 004130  000001                    .word   1            ;/MSCP Groups per Cylinder/
1341 004132  000001                    .word   1            ;/MSCP Tracks per Group/
1342 004134  000012                    .word   10.          ;/Max allowed bad spots per surface/
1343 004136  000151                    .word   105.         ;/Bad spot tolerance (bytes)/
1344 004140  002000                    .word   1024.        ;/auto recal cylinder
1345 004142  002000                    .word   1024.        ;/auto recal cylinder
1346
```

```
                                .sbttl DISK PARAMETER QUESTIONS
        .nlist  bin

        ;*
        ; P table Questions
        ;-

004144  IP.adr:  .ASCIZ  /IP Address/
004157  vec.adr: .ASCIZ  /Vector Address/
004176  prk.hds: .ASCIZ  /Just park the heads/
004222  drv.nbr: .ASCIZ  /Logical Drive (0 255)/
004250  ser.nbr: .ASCIZ  /Drive Serial Number(1 32000)/
004305  auto.md: .ASCIZ  /Auto Format Mode/
004326  warning: .ASCIZ /***** WARNING all the data on this drive w'll be DESTROYED ***/
004425           .byte  0

004426  do.cont: .ASCIZ  /Proceed to format the drive/

004462  DrvTxa: .asciz /%N%AUIT#  Drive Name%N/
004511  DrvTxb: .asciz /%A_ __  _____  ___  ____  __   ___   __   __  ___ ______%N/
004605  DrvTx0: .asciz /%A  0   RD51                                              %N/
004701  DrvTx1: .asciz /%A  1   RD52 part # 30 21721 02 (1 light on front panel) %N/
004775  DrvTx2: .asciz /%A  2   RD52 part # 30-23227-02 (2 lights on front panel)%N/
005071  DrvTx3: .asciz /%A  3   RD53                                              %N/
005165  DrvTx4: .asciz /%A  4   RD31                                              %N/
005261  DrvTx5: .asciz /%A  5   RD54                                              %N/
005355  DrvTx6: .asciz /%A  6                                                     %N/
005450  DrvTx7: .asciz /%A  7                                                     %N/
005543  DrvTxc: .asciz /%A 10                                                     %N/
005637  ASMSGr: .ASCIZ /%A      Unrecognized Drive                                %N/

005733  ASMSG1: .ASCII  /%N%AAUTOSIZER FOUND:/
005757          .ASCIZ  /%N%AUnt  Cyls  UIT#  Drive Name%N/
006021  ASMSG7: .ASCIZ  /%A  %D1%A              Nonexistent%N/
006066  ASMSG8: .ASCIZ  /%A  %D1%A              RX50 Floppy (UNFORMATABLE)%N/
006152  ASMSG9: .ASCIZ  /%A  %D1%A              RX33 Floppy (FORMATABLE)%N/
006234  ASMSG2: .ASCIZ  /%A  %D1%A  %D4%A  /
006257  ASMSG3: .ASCIZ  /%N%AAUTOSIZER RETURNED FAILURE STATUS CODE %D1%A:/
006341  ASMSG4: .ASCIZ  /%N%A    CONTROLLER CHIP NEVER WENT DONE/
006411  ASMSG5: .ASCIZ  /%N%A    CONTROLLER CHIP NEVER INTERRUPTED/
006463  ASMSG6: .ASCIZ  /%N%A    SEEK FAILED/
006507  ASMSGT: .ASCIZ  /%N/
006512  parkdrv: .ASCIZ  /%N%APLEASE wa't .... parking d'sk heads./

006563  Unt.nbr: .ASCIZ  /Enter Unit Identifier Table (UIT)/
006625  ask.prg: .ASCIZ  /What local program do you want to run/
006673  ask.xbn: .ASCIZ  /Enter XBN size in decimal (upto 10 digits)/
006746  ask.dbn: .ASCIZ  /Enter DBN size in decimal (upto 10 digits)/
007021  ask.lbn: .ASCIZ  /Enter LBN size in decimal (upto 10 digits)/
007074  ask.rbn: .ASCIZ  /Enter RBN size in decimal (upto 10 digits)/

007147  bot.dev: .ASCII <15><12>/WARNING - If FLOPPY remove boot diskette if in drive to be formatted and/
007261           .ASCII <15><12>/                        insert a diskette to be formatted./
007351           .ASCII <15><12>/          If WINCHESTER check if wrt protect switch (off) & ready switch (on)./
007471           .ASCIZ <15><12>/WARNING - All data on drive will be DESTROYED, do you want to continue?/
007603  bot.rep: .ASCIZ /If boot drive, reinsert boot diskette &  ress <RETURN>./
```

DISK PARAMETER QUESTIONS

```
1405 007673  bot.con: .ASCIZ <15><12>/Do you want to format another diskette?/
1406
1407         ; Top of Unit Information table (UIT)
1408
1409 007745  TBQ0:    .ASCIZ  /XBN size (lo wrd) XBN size   3*(1+sectors per_track)/
1410 010032  TBQ1:    .ASCIZ  /XBN size (hi wrd)/
1411 010054  TBQ2:    .ASCIZ  /DBN size (lo wrd)/
1412 010076  TBQ3:    .ASCIZ  /DBN size (hi wrd)/
1413 010120  TBQ4:    .ASCIZ  /LBN size (lo wrd)/
1414 010142  TBQ5:    .ASCIZ  /LBN size (hi wrd)/
1415 010164  TBQ6:    .ASCIZ  /RBN size (lo wrd)/
1416 010206  TBQ7:    .ASCIZ  /RBN size (hi wrd)/
1417 010230  TBQ8:    .ASCIZ  /Sectors per track/
1418 010252  TBQ9:    .ASCIZ  /Surfaces per unit/
1419 010274  TBQ10:   .ASCIZ  /Cylinders per unit/
1420 010317  TBQ11:   .ASCIZ  /Write precomp cylinder/
1421 010346  TBQ12:   .ASCIZ  /Reduce write current cylinder /
1422 010405  TBQ13:   .ASCIZ  /Seek Rate/
1423 010417  TBQ14:   .ASCIZ  /Use CRC or ECC/
1424 010436  TBQ15:   .ASCIZ  /RCT Size/
1425 010447  TBQ16:   .ASCIZ  /Number of RCT copies/
1426 010474  TBQ17:   .ASCIZ  /Media (lo wrd)/
1427 010513  TBQ18:   .ASCIZ  /Med'a (hi wrd)/
1428 010532  TBQ19:   .ASCIZ  /Sector Interleave (n-to 1)/
1429 010565  TBQ20:   .ASCIZ  /Surface to Surface Skew/
1430 010615  TBQ21:   .ASCIZ  /Cylinder to Cylinder Skew/
1431 010647  TBQ22:   .ASCIZ  /Gap size 0/
1432 010662  TBQ23:   .ASCIZ  /Gap size 1/
1433 010675  TBQ24:   .ASCIZ  /Gap size 2/
1434 010710  TBQ25:   .ASCIZ  /Gap size 3/
1435 010723  TBQ26:   .ASCIZ  /Sync size/
1436 010735  TBQ28:   .ASCIZ  /MSCP cylinders per Unit/
1437 010765  TBQ29:   .ASCIZ  /MSCP Groups per Cylinder/
1438 011016  TBQ30:   .ASCIZ  /MSCP Tracks per Group/
1439 011044  TBQ31:   .ASCIZ  /Max allowed bad spots per surface/
1440 011106  TBQ32:   .ASCIZ  /Bad spot tolerance (bytes)/
1441
1442 011141  DF1:     .ASCIZ  /Controller Initialization Timeout/
1443 011203  DF2:     .ASCIZ  /Controller never advanced to next step/
1444 011252  DF3:     .ASCIZ  /Controller can not execute local programs or non STD DUP dialog program/
1445 011362  DF4:     .ASCIZ  /NXM Trap at controllers IP address/
1446         ;DF10:   .ASCIZ  /No Interrupt occurred after SA polled/
1447 011425  DF11:    .ASCIZ  /Bad Response Packet returned/
1448 011462  DF12:    .ASCIZ  /Fatal SA error ctlr offline/
1449 011516  DF13:    .ASCIZ  /No progress shown after a cmd had timed out/
1450 011572  DF14:    .ASCIZ  /GET DUST CMD time_out after another CMD time_out/
1451 011653  DF15:    .ASCIZ  /%N%AFatal error was reported when running local program/
1452 011743  DF16:    .ASCIZ  /%N%AA Special was reported when running local program don't know how to handle it/
1453 012065  SF0:     .ASCIZ  /DUP protocol Error, unexpected message/
1454 012134  SF1:     .ASCIZ  /%N%ASYSTEM is NOT in manual mode/
1455 012175  SF100:   .ASCIZ  /Unexpected or delayed Controller Interrupt/
1456 012250  HRD0:    .ASCIZ  /Fatal Format error/
1457 012273  SFT0:    .ASCIZ  /Controller in an unexpected ACTIVE state/
1458 012344  SFT1:    .ASCIZ  /Wrong Model Number on controller/
1459 012405  PB0:     .ASCIZ  /%N%AModel # listed %O6/
1460 012434  PB1:     .ASCIZ  /%N%AExpected SA step bit %O6%A,Received in SA %O6/
1461 012516  PB3:     .ASCIZ  /%N%AAsking for Format Parameter table/
```

DISK PARAMETER QUESTIONS

```
1462 012564  PB4:     .ASCIZ  /%N%AReceived valid Format Parameter table/
1463 012636  PB5:     .ASCIZ  /%N%AOn UNIT %O6%A, %O6 Bad Blks were found during Format/
1464 012727  PB6:     .ASCIZ  /%N%AOn UNIT %O6%A, %O6 Bad Blks were found during Verify pass %O6/
1465 013031  PB7:     .ASCIZ  /%N%ADUP Message Type: %O6/
1466 013063  PB8:     .ASCIZ  /%N%ADUP message number: %O6/
1467 013117  PB9:     .ASCIZ  /%N%AMSCP Controller model # : %D3/
1468 013161  PB10:    .ASCIZ  /%N%A    Microcode version # : %D3/
1469 013223  PB11:    .ASCIZ  /%N%AController is IDLE when it should be ACTIVE running format program/
1470 013332  PB13:    .ASCIZ  /%N/
1471 013335  PF2:     .ASCIZ  /%N%N%AFinished local program without procedure error/
1472 013422  PBF0:    .ASCIZ  /%N%AFormat Parameter table entry at byte %O6%N%Ais out of range/
1473 013522  PBF1:    .ASCIZ  /%N%AFormat Parameter table entry at byte %O6%N%Ais incompatible with entry at byte %O6/
1474 013651  PBF2:    .ASCIZ  /%N%AUNIT %O6%A does not exist on controller/
1475 013725  PBF3:    .ASCIZ  /%N%AUNIT %O6%A does exist but doesn't respond on controller/
1476 014021  PBF4:    .ASCIZ  /%N%AUNIT %O6%A is write protected /
1477 014064  PBF5:    .ASCIZ  /%N%AWrite Fault detected on UNIT %O6/
1478 014131  PBF6:    .ASCIZ  /%N%AAttempt to step hd %O3%A at cyl %O3%A failed on UNIT %O6/
1479 014226  PBF7:    .ASCIZ  /%N%AAttempt to format hd %O3%A at cyl %O3%A failed on UNIT %O6/
1480 014325  PBF8:    .ASCIZ  /%N%ATo many Bad Blocks              total Bad Blocks %O6/
1481 014415  PBF9:    .ASCIZ  /%N%ADisk Controller model : %D3/
1482 014455  PBF10:   .ASCIZ  /%N%A    Microcode version : %D3/
1483 014515  PB11crn: .ASCIZ  /%N%AExpected CRN %O6%A,Received CRN %O6/
1484 014565  PB11op:  .ASCIZ  /%N%ACMDpkt Opcode %O6%A,RSPpkt Opcode %O6/
1485 014637  PB11sts: .ASCIZ  /%N%AResponse pkt status %O6/
1486 014673  PB11end: .ASCIZ  /%N%ANo end bit(200) in response packet endcode/
1487 014752  PB11GDS: .ASCIZ  /%N%AGet Dust Status cmd/
1488 015002  PB11ESP: .ASCIZ  /%N%AExecute Supplied Prg cmd/
1489 015037  PB11ELP: .ASCIZ  /%N%AExecute Local Prg cmd/
1490 015071  PB11SD:  .ASCIZ  /%N%ASend Data cmd/
1491 015113  PB11RD:  .ASCIZ  /%N%AReceive Data cmd/
1492 015140  PB11AP:  .ASCIZ  /%N%AAbort Prg cmd/
1493 015162  pb11s0:  .ASCIZ  /%N%Asts:  successful/
1494 015207  pb11s1:  .ASCIZ  /%N%Asts:  Invalid Command/
1495 015241  pb11s2:  .ASCIZ  /%N%Asts:  No Region Available/
1496 015277  pb11s3:  .ASCIZ  /%N%Asts:  No Region Suitable/
1497 015334  pb11s4:  .ASCIZ  /%N%Asts:  Program Not Known/
1498 015370  pb11s5:  .ASCIZ  /%N%Asts:  Load Failure/
1499 015417  pb11s6:  .ASCIZ  /%N%Asts:  Standalone/
1500 015444  pb11s9:  .ASCIZ  /%N%Asts:  Host Buffer Access error/
1501 015507  pb11w0:  .ASCIZ  /%N%AUnknown command OPCODE received in timeout loop/
1502 015573  pb11w1:  .ASCIZ  /%N%AUnknown command CRN received in command timeout loop/
1503 015664  pb1201:  .ASCIZ  /%N%ASA er: Envelope\packet Read (parity or timeout)/
1504 015750  pb1202:  .ASCIZ  /%N%ASA er: Envelope\packet Write (parity or timeout)/
1505 016035  pb1203:  .ASCIZ  /%N%ASA er: Controller ROM and RAM parity/
1506 016106  pb1204:  .ASCIZ  /%N%ASA er: Controller RAM parity/
1507 016147  pb1205:  .ASCIZ  /%N%ASA er: Controller ROM parity/
1508 016210  pb1206:  .ASCIZ  /%N%ASA er: Queue Read (parity or timeout)/
1509 016262  pb1207:  .ASCIZ  /%N%ASA er: Queue Write (parity or timeout)/
1510 016335  pb1208:  .ASCIZ  /%N%ASA er: Interrupt Master/
1511 016371  pb1209:  .ASCIZ  /%N%ASA er: Host Access Timeout (higher level protocol dependent)/
1512 016472  pb1210:  .ASCIZ  /%N%ASA er: Credit Limit Exceeded /
1513 016534  pb1211:  .ASCIZ  /%N%ASA er: Bus Master Error/
1514 016570  pb1212:  .ASCIZ  /%N%ASA er: Diagnostic Controller Fatal error/
1515 016645  pb1213:  .ASCIZ  /%N%ASA er: Instruction Loop Timeout/
1516 016711  pb1214:  .ASCIZ  /%N%ASA er: Invalid Connection Identifier/
1517 016762  pb1215:  .ASCIZ  /%N%ASA er: Interrupt Write Error/
1518 017023  pb1216:  .ASCIZ  /%N%ASA er: MAINTENANCE READ\WRITE Invalid Region Identifier/
```

DISK PARAMETER QUESTIONS

```
1519 017117  pb1217: .ASCIZ  /%N%ASA er: MAINTENANCE WRITE Load to non loadable controller/
1520 017214  pb1218: .ASCIZ  /%N%ASA er: Controller RA;1 error (non par'ty)/
1521 017271  pb1219: .ASCIZ  /%N%ASA er: INIT sequence error/
1522 017330  pb1220: .ASCIZ  /%N%ASA er: High level protocol incompatibil'ty error/
1523 017415  pb1221: .ASCIZ  /%N%ASA er: Purge\poll hardware failure/
1524 017464  pb1222: .ASCIZ  /%N%ASA er: Mapping Register read error (parity or timeout)/
1525 017557  pb1223: .ASCIZ  /%N%ASA er: Attempt to set port data transfer mapp'ng when option not present/
1526 017674  PB12:   .ASCIZ  /%N%ASA Value (oct) %06/
1527
1528 017723  PBsf0:  .ASCIZ  /%N%ADUP type %06%A message number %06/
1529 017771  DRPunt: .ASCIZ  /%N%N%ARQDX DRIVE %06%A finished./
1530 020032  TYPASC: .ASCIZ  /%N%APLEASE TYPE ANSWER to controller question or just <return>/
1531
1532          ;mmm
1533          ;
```

```
                        .sbttl  FORMAT Messages

                ; quer'es

020131  qfuit:  ;.byte  2,,,b.spl                ; Unit Info Table? (spl #2)
020131          .asciz  '%N%AEntering UIT%O2%A: on drive number %D3%N'
020206  qfdat:  ;.byte  0,,,a.que                ; Date? (que #0)
020206          .asciz  'Enter date <MM DD-YYYY>:'
020237  dfunt:  ;.byte  1,,,a.def                ; Unit? (def #1)
020237          .asciz  'Enter unit number to format <0>:'
020300  dfbad:  ;.byte  4,,,a.def                ; Use Bad? (def #4)
020300          .asciz  'Use existing bad block information <N>:'
020350  dfdwn:  ;.byte  5,,,a.def                ; Downline? (def #5)
020350          .asciz  'Use down line load <Y>:'
020400  dfcon:  ;.byte  6,,,a.def                ; Continue? (def #6)
020400          .asciz  'Continue if bad block information is inaccessible <N>:'
020467  qfser:  ;.byte  7,,,a.que                ; Ser'al #? (que #7)
020467          .asciz  'Enter non zero serial number <8 10 d'gits>:'
020543  ASK.ANSWER:
020543          .asciz  'ans>'

                ; Informational Messages

020550  sfbegt: ;.byte  0,,,a.inf                ; Begin (inf #0)
020550          .asciz  '%N%AFormat Begun'
020571  sfdont: ;.byte  1,,,a.inf                ; Complete (inf #1)
020571          .asc'z  '%N%AFormat complete'
020615  sfrevt: ;.byte  2,,,a.inf                ; # of Revectored LBNs (inf #2)
020615          .asciz  '% Revectored LBNS'
020637  sfr1t:  ;.byte  3,,,a.inf                ; # of primary ... (inf #3)
020637          .asciz  '% Primary revectored LBNS'
020671  sfr2t:  ;.byte  4,,,a.inf                ; # of secondary ... (inf #4)
020671          .asciz  '% Secondary/tertiary revectored LBNS'
020736  sfrcbt: ;.byte  5,,,a.inf                ; # of Bad RCT blocks ... (inf #5)
020736          .asciz  '% Bad blocks in the RCT area  e to data errors'
021016  sfdbbt: ;.byte  7,,,a.inf                ; # of Bad DBNs ... (inf #7)
021016          .asciz  '% Bad blocks in the DBN area due to data errors'
021076  sfxbbt: ;.byte  9,,,a.inf                ; # of Bad XBNs ... (inf #9)
021076          .asciz  '% Bad blocks in the XBN area due to data errors'
021156  sftryt: ;.byte  11,,,a.inf               ; # of Retries (inf #11)
021156          .asciz  '% Blocks retried on the check pass'
021221  sfrbbt: ;.byte  14,,,a.inf               ; # of Bad RBNs ... (inf #14)
021221          .asciz  '% Bad RBNS'
021234  sfcylt: ;.byte  15,,,a.'nf               ; Formatting Cyl (inf #15)
021234          .asciz  'Formatting Cyl %'
```

FORMAT Messages

```
1581
1582                    ; Successful Termination Messages
1583
1584                        ;.byte      12.,.a.te                   ; Reformat Worked (ter #12)
1585 021255  sffcut: .asciz  '%N%AFCT used successfully'
1586                        ;.byte      13.,.a.ter                  ; Reconstruct Worked (ter #13)
1587 021307  sffcnt: .ascii  '%N%AFCT was not used'
1588 021333          .asciz  '%N%AFormat completed'
1589                    ; Error messages
1590
1591 021360  efstat: ;.byte  1.,.a.fat                   ; Status Error (fat #1)
1592 021360          .asciz  '%N%AGET STATUS failure'
1593
1594 021407  efsndt: ;.byte  2.,.a.fat                   ; Send Error (fat #2)
1595 021407          .asciz  '%N%AQ PORT send error'
1596
1597 021435  efcmdt: ;.byte  3.,.a.fat                   ; Command Error (fat #3)
1598 021435          .asciz  '%N%AUnsuccessful command'
1599
1600 021466  efrcvt: ;.byte  4.,.a.fat                   ; Receive Error (fat #4)
1601 021466          .asciz  '%N%AQ PORT receive error'
1602
1603 021517  efbust: ;.byte  5.,.a.fat                   ; Bus Error (fat #5)
1604 021517          .asciz  '%N%AQ-Bus I/O error'
1605
1606 021543  efinit: ;.byte  6.,.a.fat                   ; Format Init Error (fat #6)
1607 021543          .asciz  '%N%AFormatter initialization error'
1608
1609 021606  efnut:  ;.byte  7.,.a.fat                   ; Unit nonexistent error (fat #7)
1610 021606          .asciz  '%N%ANonexistent unit number'
1611
1612 021642  efdxft: ;.byte  8.,.a.fat                   ; DBN/XBN Format error (fat #8)
1613 021642          .asciz  '%N%ADBN/XBN format error (drive FORMAT command failed)'
1614
1615 021731  effcct: ;.byte  9.,.a.fat                   ; FCT copies error (fat #9)
1616 021731          .asciz  '%N%AFCT does not have enough good copies of each block'
1617
1618 022020  efsekt: ;.byte  10.,.a.fat                  ; Seek error (fat #10)
1619 022020          .asciz  '%N%ASEEK error'
1620
1621 022037  efrcct: ;.byte  11.,.a.fat                  ; RCT copies error (fat #11)
1622 022037          .asciz  '%N%ARCT does not have enough good copies of each block'
1623
1624 022126  eflbft: ;.byte  12.,.a.fat                  ; LBN format error (fat #12)
1625 022126          .asciz  '%N%ALBN format error (drive FORMAT command failed)'
1626
1627 022211  effcwt: ;.byte  13.,.a.fat                  ; FCT write error (fat #13)
1628 022211          .asciz  '%N%AFCT write error (check write protect switch)'
1629
1630 022272  efrcrt: ;.byte  14.,.a.fat                  ; RCT read error (fat #14)
1631 022272          .asciz  '%N%ARCT read error'
1632
1633 022315  efrcwt: ;.byte  15.,.a.fat                  ; RCT write error (fat #15)
1634 022315          .asciz  '%N%ARCT write error'
1635
1636 022341  efrcft: ;.byte  16.,.a.fat                  ; RCT full error (fat #16)
1637 022341          .asciz  '%N%ARCT full'
```

```
1638
1639 022356  effcrt: ;.byte  17.,.a.fat              ; FCT read error (fat #17)
1640 022356          .asciz  '%N%AFCT read error'
1641
1642 022401  effcnt: ;.byte  18.,.a.fat              ; FCT nonexistent error (fat #18)
1643 022401          .asciz  '%N%AFCT nonexistent'
1644
1645 022425  effcdt: ;.byte  19.,.a.fat              ; FCT downline load error (fat #19)
1646 022425          .asciz  '%N%AFCT Down line load error'
1647
1648 022462  eftmot. ;.byte  20.,.a.fat              ; Drive timeout error (fat #20)
1649 022462          .asciz  '%N%ADrive in't timeout'
1650
1651 022511  efillt: ;.byte  21.,.a.fat              ; Illegal response error (fat #21)
1652 022511          .asciz  '%N%AIllegal response to start up quest'on'
1653
1654 022563  efwart: ;.byte  22.,.a.fat              ; Head error (fat #22)
1655 022563          .asciz  '%N%AWARNING   possible head addressing problem   run diagnostics
1656
1657 022664  efinpt: ;.byte  23.,.a.fat              ; Input error (fat #23)
1658 022664          .asciz  '%N%AINPUT Error '
1659
1660 022705  efmedt: ;.byte  24.,.a.fat              ; Media error (fat #24)
1661 022705          .asciz  '%N%AMedia degraded'
1662
1663 022730  efunrg: ;.byte  1.,.a.fat               ; Status Error (fat #1)
1664 022730          .asciz  '%N%AUnrecogonized drive'
1665
1666                          .list   bin
1667                          .even
```

```
                                .sbttl global subroutines

                                ;****************************************************************
                                ;
                                ;       THIS ROUTINE WILL ALTER THE CPU INTERRUPT LEVEL TO THREE,
                                ;       INITIATE THE MUT POLLING AND WAIT A REASONABLE AMOUNT OF
                                ;       TIME HOPING THAT THE MUT WILL INTERRUPT.
                                ;There is really 2 sections to this routine. One sect'on awa'ts the
                                ;normal course of a command by waiting for an iterrupt and then going
                                ;The other course of the rout'ne is to handled timeout commands. Th's  s
                                ;
                                ;a l'ttle more difficult. If there 's a command that is time-out the
                                ;program will do a GETDUST status command to find out the status. IF
                                ;we get an interrupt there are 2 possib'lties.
                                ; 1. a response to the Get Dust status command. Handled l'ke any other
                                ;command.
                                ; 2. a response to the timeout command in which case we handle 't instead
                                ;of the normal handler located in the program right after it was issued.
                                ;This means that there is a GET DUST response pending which we must handle
                                ;shortly after. As soon as we handle the GET DUST response we check to
                                ; make sure we handled the timed out command by checking the LSTCRN register
                                ; and return to the DUP dialog mode by checking the DUP message type and
                                ;responding to the intial timed out command
                                ;
                                ;  }>>> waiting for initial or timed out command
                                ;  }    }interrupt received
                                ;  }    }just jump to vector address location
                                ;  }    }or on site response handler located right after cmd loader 'n the program
                                ;  }    }
                                ;  }    if no interrupt then save cmd 'nfo & submit GETDUST command
                                ;}>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>waiting for GETDUST status & t'med out command responses, if no 'nterrupt then fatal err
                                ;} }                             }interrupt received
                                ;} }                             }test for response to GET DUST or TIMED_OUT cmd
                                ;} }                             }handle response here
                                ;} }                             }if response was GET DUST check if we handle the TIMED_OUT cmd already
                                ;} }    }<<<<<<<<<<<<<<<<<<<<<<<<}(yes, LSTCRN = 0) go back to DUP d'alog mode by checking DUP type and responding
                                ;} }<<<<<<<<<<<<<<<<<<<<<<<<<<<<<}(no,  LSTCRN = #) load TIMED_OUT cmd Vector,Opcode,CRN goto top of routine
                                ;}<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<}if response was TIMED_OUT cmd clear LSTCRN and wait for GET DUST response
                                ;       }
                                ;       } go to DUP dialog routine
                                ;****************************************************************


     022760                     POLLWT:

     022760  106427  000140     pollw:  mtps    #140            ;Drop cpu level to three.
     022764  005777  157334             tst     @IPreg          ;Tell mut to start polling.

     022770  012700  000074             mov     #60.,r0         ;outer wait loop
     022774  012701  004000     1$:     mov     #4000,r1        ;       ;
     023000  106427  000340     2$:     mtps    #340            ;don't want interrupts while in other routines
     023004  004737  031606             jsr     pc,BIT15T       ;       ;inner wait loop
     023010                             BREAK                   ;check for control C
     023012  106427  000140             mtps    #140            ;turn on interrupts again after check
     023016  077110                     sob     r1,2$           ;       ;
     023020  077013                     sob     r0,1$           ;
                                                                ;No response has been received
```

Global subroutines

```
   1726 023022  106427  000340                mtps    #340                    ;don't want interrupts while setting up for cmd
   1727 023026  004737  031606                jsr     pc,BIT15T               ;test SA make sure not a fatal error
   1728 023032  013700  002462                mov     cmdpak+10,r0            ;get opcode
   1729 023036  022700  000001                cmp     #op.gds,r0              ;if the command issued was a GETDUST STATUS and time
out big trouble
   1730 023042  001006                        bne     GDS0                    ;if not go do a GET DUST to find out what the situat
ion is
   1731 023044                                ERRDF   12,df14                 ;type no iterrupt after get dust status command cont
roller dead
   1732 023054  000137  037420                jmp     dropunt                 ;drop unit and go on
   1733
   1734                             ;GETDUST                                  ;save timed out command information
   1735
   1736 023060  017737  157242  002544  GDS0: mov     @vector,LSTVCT          ;store the vector address of timeout command
   1737 023066  013737  002452  002540        mov     cmdpak,LSTCRN           ;store the CRN of the timed out command
   1738 023074  013737  002462  002542        mov     cmdpak+10,LSTCMD        ;store the opcode of timed out command
   1739
   1740 023102  032737  100000  002534        bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
   1741 023110  001363                        bne     GDS0                    ;if we don't own it wait until we do
   1742 023112  012737  000016  002446        mov     #14.,cmdlen             ;load lenght of packet to be send
   1743 023120  112737  000000  002450        movb    #0,cmdlen+2             ;load msg type and credit
   1744 023126  112737  000002  002451        movb    #dup.id,cmdlen+3        ;load DUP connection ID
   1745 023134  005237  002452                inc     cmdpak                  ;load new CRN
   1746 023140  005037  002454                clr     cmdpak+2
   1747 023144  005037  002456                clr     cmdpak+4
   1748 023150  005037  002460                clr     cmdpak+6
   1749 023154  012737  000001  002462        mov     #op.gds,cmdpak+10       ;load up opcode
   1750 023162  005037  002464                clr     cmdpak+12               ;no modifiers
   1751
   1752 023166  012777  023226  157132        mov     #RFDO,@vector           ;NEW VECTOR PLACE
   1753 023174  012737  002352  002526        mov     #rsppak,rsprng          ;load response packet area into ring
   1754 023202  012737  002452  002532        mov     #cmdpak,cmdrng          ;load command packet area into ring
   1755 023210  012737  140000  002530        mov     #140000,RSPRNG+2        ;PORT OWNERSHIP BIT.
   1756 023216  012737  100000  002534        mov     #bit15,CMDRNG+2
   1757 023224  000655                        br      POLLWT                  ;GO and wait for interrupt
   1758
   1759
   1760                                       ;+
   1761                                       ; There is only 3 ways out code.
   1762                                       ;If GETDUST resposne and TIMED_OUT cmd response was handled
   1763                                       ; if LSTCRN = 0 and RSPPAK+10 = OP.GDS+OP.END then
   1764                                       ; back to DUP dialog mode.
   1765                                       ;or
   1766                                       ; (TIMED_OUT cmd still hasn't returned but GETDUST has returned)
   1767                                       ; if LSTCRN = # and RSPPAK+10 = OP.GDS+OP.END then
   1768                                       ; check if idle or active. if idle then error
   1769                                       ; check for progress in progress indicator if no progress then error
   1770                                       ; load LSTVCT into @vector,LSTCRN into cmdpak, LSTCMD into cmdpak+10
   1771                                       ; set response ring ownership to Port Owned
   1772                                       ; jmp to pollwt.
   1773                                       ;or
   1774                                       ; (TIMED_OUT cmd response recieved before GETDUST response returned)
   1775                                       ; if LSTCRN = # and RSPPAK+10 not= OP.GDS+OP.END then
   1776                                       ; clear LSTCRN and
   1777                                       ; jmp to pollwt.
   1778                                       ;+
   1779
   1780 023226                                RFDO:                           ;INTR TO HERE if GETDUST or TIMED_OUT cmd
   1781 023226  106427  000340                mtps    #340                    ;No interrupts please
   1782 023232  062706  000004                add     #4,sp                   ;fix stack 4 for intrpt
```

Global subroutines

```
   1783 023236  013701  002452                 mov     cmdpak,r1               ;check command packet CRN
   1784 023242  013700  002352                 mov     rsppak,r0               ;check response packet CRN
   1785 023246  020001                         cmp     r0,r1                   ;Are they the SAME must be GETDUST cmd
   1786 023250  001103                         bne     3$                      ;if not it must be the TIMED_OUT cmd
   1787
   1788 023252  023727  002362  000201         cmp     rsppak+10,#op.gds+op.end        ;'t should be a GETDUST lets make sure
   1789 023260  001412                         beq     1$
   1790 023262                                 printf  #pb11w0                 ;unexpected cmd response 'n time out loop
   1791 023302  000137  037404                 jmp     unkwn                   ;error handler
   1792
   1793 023306  004737  030654         1$:     jsr     pc,RSPCHK               ;check the response
   1794 023312  005737  002540                 tst     LSTCRN                  ;see 'f timed out command was already rec'eved (lstc
rn = 0)
   1795 023316  001004                         bne     2$
   1796 023320  062706  000002                 add     #2,sp                   ;adjust stack for Timed Out cmd's 'nitial call to PO
LLWT
   1797 023324  000137  034100                 jmp     DUPDLG                  ;if T'med out cmd was already rece'ved then goto DUP
 dialog mode
   1798
   1799 023330                         2$:                                     ;'f Timed out command was not rece'ved already (LSTC
RN not= 0)
   1800 023330  132737  000010  002371         bitb    #bit3,rsppak+17         ;if server idle then error
   1801 023336  001010                         bne     1002$                   ;if not check for progress
   1802 023340                                 printf  #pb11                   ;controller idle when it should be active
   1803
   1804 023360  013700  002372         1002$:  mov     rsppak+20,r0            ;check for progress in progress indicator
   1805 023364  013701  002374                 mov     rsppak+22,r1
   1806 023370  020037  002546                 cmp     r0,loprgi               ;see 'f low word of progress indicator is the same a
s older value
   1807 023374  001007                         bne     1001$                   ;if 't is then continue
   1808 023376  020137  002550                 cmp     r1,hiprgi               ;see if high vaule is the same
   1809 023402  001004                         bne     1001$
   1810 023404                                 ERRDF   11,DF13                 ;no progress shown after cmd timeout
   1811
   1812 023414  010037  002546         1001$:  mov     r0,loprgi               ;update progress indicator
   1813 023420  010137  002550                 mov     r1,hiprgi
   1814 023424  013737  002540  002452         mov     LSTCRN,cmdpak           ;move TIMED_OUT cmd CRN into cmd
   1815 023432  013737  002542  002462         mov     LSTCMD,cmdpak+10        ;move TIMED_OUT cmd Opcode into cmd
   1816 023440  013777  002544  156660         mov     LSTVCT,@vector          ;load TIMED_OUT cmd interrupt handler address 'nto v
ector
   1817 023446  012737  140000  002530         mov     #140000,RSPRNG+2        ;Port owned
   1818 023454  000137  022760                 jmp     pollw                   ;wait for TIMED OUT cmd response
   1819
   1820
   1821
   1822 023460  020037  002540         3$:     cmp     r0,LSTCRN               ;check the crn with the last CRN from the timeout co
mmand
   1823 023464  001412                         beq     4$                      ;
   1824 023466                                 printf  #pb11w1                 ;Unexpected cmd response in time out loop
   1825 023506  000137  037404                 jmp     unkwn                   ;error handler
   1826
   1827                                                                        ;Timed out command recieved but Get Dust Status is s
till in Queue
   1828 023512  013737  002540  002452  4$:     mov     LSTCRN,cmdpak           ;load timed out command values for RSPCHK routine
   1829 023520  013737  002542  002462         mov     LSTCMD,cmdpak+10        ;load timed out command values for RSPCHK routine
   1830 023526  005037  002540                 clr     LSTCRN                  ;if it is the timeout command clear LAST CRN registe
r
   1831 023532  004737  030654                 jsr     pc,RSPCHK               ;go check the command
   1832 023536  012737  140000  002530         mov     #140000,RSPRNG+2        ;PORT OWNERSHIP BIT.
   1833 023544  000137  022760                 jmp     POLLW                   ;go wait for GETDUST intterupt
```

Global subroutines

```
   1835
   1836
   1837                                 ;*****************************************************************************
   1838                                 ;       HARD INITIALIZE
   1839                                 ; This routine hard initialize the disk controller so that DUP commands
   1840                                 ; can be issued. This routine is governed by the UQSSP spec.
   1841                                 ; This format starts by initializating
   1842                                 ;       r1 = ptable address
   1843                                 ;       r3 = step bit mask
   1844                                 ;       r4 - SA address
   1845
   1846 023550                         HRDINT:
   1847 023550  106427  000140                 mtps    #140
   1848 023554  013704  002324                 mov     'preg,r4
   1849 023560  012703  004000                 mov     #b't11,r3               ;'nit'alization step reg
   1850 023564  005024                 1$:     clr     (r4)+                   ; start in't'alaztion IP and put SA adrs 'nto r4
   1851 023566                                 Break
   1852
   1853 023570  012700  177777                 mov     #-1,r0                  ;look'ng for step 1 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>
   1854 023574  004737  031606         4$:     jsr     pc,bit15T               ;Look for fatal SAreg error
   1855 023600  030314                         bit     r3,(r4)                 ;check sa reg for step 1        bit11 =0 >1
   1856 023602  001002                         bne     6$
   1857 023604  077005                         sob     r0,4$
   1858 023606  000560                         br      t'mout
   1859
   1860 023610  013700  002326         6$:     MOV     vector,r0               ;responding 'n step 1 <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
<<<<<<<<<<<<<<<<<<<<<<<<<
   1861 023614  000241                         clc
   1862 023616  006200                         asr     r0
   1863 023620  006200                         asr     r0
   1864 023622  052700  100200                 bis     #<bit15+bit7>,r0        ;- VECTOR/4
   1865 023626  013701  002326                 mov     vector,r1
   1866 023632  012721  023672                 mov     #sp2int,(r1)+           ;load up interrupt loacation 'nto vector
   1867 023636  012711  000140                 mov     #140,(r1)               ;lower the priority
   1868 023642  010014                         mov     r0,(r4)                 ; Enable INTERRUPTS,set 1 cmd rng & 1 rsp rng
   1869
   1870 023644  006303                         asl     r3                      ;next step
   1871 023646  012700  177777                 mov     #-1,r0                  ;looking for step 2 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>
   1872 023652  106427  000340         8$:     mtps    #340
   1873 023656                                 break                           ;waste some time
   1874 023660                                 break                           ;waste some time
   1875 023662  106427  000140                 mtps    #140
   1876 023666  077007                         sob     r0,8$                   ;wa't ten seconds
   1877 023670  000527                         br      timout                  ;timed out if here
   1878
   1879 023672  062706  000004         sp2int: add     #4,sp
   1880 023676  004737  031606                 jsr     pc,bit15T               ;look for sa e'-or
   1881 023702  030314                         bit     r3,(r4)                 ;check step
   1882 023704  001541                         beq     wrngstep
   1883
   1884 023706  012700  002526         12$:    mov     #RSPRNG,R0              ;responding in step 2 <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
<<<<<<<<<<<<<<<<<<<<<<<<<
   1885 023712  042700  000001                 bic     #bit0,r0                ;no adapter purge interrupts
   1886 023716  013701  002326                 mov     vector,r1
   1887 023722  012721  023762                 mov     #sp3int,(r1)+           ;load up interrupt loacation 'nto vector
   1888 023726  012711  000140                 mov     #140,(r1)               ;lower the pr'or'ty
   1889 023732  010014                         mov     r0,(r4)                 ;load low ringbase address of the communications are
a
   1890
   1891 023734  006303                         asl     r3                      ;next step
```

Global subroutines

```
023736  012700  177777                  mov     # 1,r0          ;looking for step 3 >>>>>>>>>>>> >>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>
023742  106427  000340          13$:    mtps    #340
023746                                  break                   ;waste some t me
023750                                  break                   ;waste some t me
023752  106427  000140                  mtps    #140
023756  077007                          sob     r0,13$          ;wa t ten seconds
023760  000473                          br      timout
023762                          sp3int:
023762  062706  000004                  add     #4,sp
023766  004737  031606                  jsr     pc,b t15T
023772  030314                          bit     r3,(r4)
023774  001505                          beq     wrngstep

023776  013701  002326                  mov     vector,r1       ;respond ng in step 3 <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
<<<<<<<<<<<<<<<<<<<<<<<<<<
024002  012721  024042                  mov     #sp4int,(r1)+   ;load up  nterrupt loacat on into vector
024006  012711  000340                  mov     #340,(r1)       ;after step four we want no  nterrupts unt l expecte
d.
024012  005014                          clr     (r4)            ;load low ringbase address of the communications are
a

024014  006303                          asl     r3
024016  012701  177777                  mov     # 1,r1          ;look ng for step 4 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>
024022  106427  000340          18$:    mtps    #340
024026                                  break                   ;waste some time
024030                                  break                   ;waste some time
024032  106427  000140                  mtps    #140
024036  077107                          sob     r1,18$          ;wa t ten seconds
024040  000443                          br      t mout
024042                          sp4int:
024042  062706  000004                  add     #4,sp
024046  004737  031606                  jsr     pc,bit15T       ;check for SA error
024052  030314                          bit     r3,(r4)         ;check for step 4
024054  001455                          beq     wrngstep

024056  011401                          mov     (r4),r1         ; dentify the controller number and microcode vers o
n number
024060  010102                          mov     r1,r2
024062  006201                          asr     r1              ;shift version # out
024064  006201                          asr     r1
024066  006201                          asr     r1
024070  006201                          asr     r1
024072  042701  177400                  bic     #177400,r1      ;clear top bits off
024076  010137  002340                  mov     r1,mdlnbr       ;model number storage
024102  042702  177760                  bic     #177760,r2      ;clear model number out
024106  010237  002342                  mov     r2,mcdnbr
024112  122701  000007                  cmpb    #Mrqdx1,r1      ;check for Mode  #
024116  001454                          beq     gobit
024120  122701  000023                  cmpb    #Mrqdx3,r1      ;check for Model #
024124  001451                          beq     gobit

024126                                  ERRSOFT 6,SFT1          ; DEVICE FATAL wrong model #,wrong controller
024136  052737  020000  002336          bis     #bit13,UNTflgs  ;set unknown model number in unit flags
024144  000137  024250                  jmp     gobit           ;drop unit and go on

024150                          timout:
024150                                  ERRDF   5,DF1           ; DEVICE FATAL controller timeout dur ng hard init
024160                                  Printf  #pbl,r3,(r4)    ; Expected SA step bit xxxxx set, rece ved yyyyyy
024204  000137  037420                  jmp     dropunt         ;drop unit and go on

024210                          wrngstep:
```

Global subroutines

```
1949 024210                                        ERRDF   4,DF2                   ; DEVICE FATAL wrong step bit set after interrupt
1950 024220                                        Printf  #pb1,r3,(r4)            ; Expected SA step bit xxxxx, received in SA yyyyyy
1951 024244  000137  037420                        jmp     dropunt                 ;drop unit and go on
1952
1953 024250                              GOBIT:
1954 024250  012714  000001                        mov     #1,(r4)                 ;Controller is NOW INITIALIZED
1955 024254  012700  177777                        mov     # 1,r0
1956 024260  000240                      1$:       nop                             ;waste just a little time so program can terminate
1957 024262  077002                                sob     r0,1$
1958 024264                              GDScmd:
1959 024264                              GETDUST                                   ;Do a Get Dust Status command start things off
     024264  032737  100000  002534      GDS2:     bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
     024272  001374                                bne     GDS2                    ;if we don t own it wa t unt l we do
     024274  012737  000016  002446                mov     #14.,cmdlen             ;load lenght of packet to be send
     024302  112737  000000  002450                movb    #0,cmdlen+2             ;load msg type and credit
     024310  112737  000002  002451                movb    #dup.id,cmdlen+3        ;load DUP connect on ID
     024316  005237  002452                        inc     cmdpak                  ;load new CRN
     024322  005037  002454                        clr     cmdpak+2
     024326  005037  002456                        clr     cmdpak+4
     024332  005037  002460                        clr     cmdpak+6
     024336  012737  000001  002462                mov     #op.gds,cmdpak+10       ;load up opcode
     024344  005037  002464                        clr     cmdpak+12               ;no mod fiers

     024350  012777  024412  155750                mov     #RFD2,@vector           ;New vecto- place
     024356  012737  002352  002526                mov     #rsppak,rsprng          ;load response packet area nto r ng
     024364  012737  002452  002532                mov     #cmdpak,cmdrng          ;load command packet area into r ng
     024372  012737  140000  002530                mov     #140000,RSPRNG+2        ;Port ownership bit.
     024400  012737  100000  002534                mov     #bit15,CMDRNG+2
     024406  004737  022760                        jsr     pc,POLLWT               ;Go to poll and wait routine.

                                         ;*************************************************************************

     024412                                  RFD2:                                 ;Intr to here.
     024412  062706  000006                        add     #6,sp                   ;fix stack for nterrupt (4), pollwt subrtn (2)
     024416  012777  032650  155702                mov     #intsrv,@vector         ;Change vector
     024424  00473?  030654                        jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                                   ;the response recvd from the mut.
                                                                                   ;it will check the cmd ref
                                                                                   ;num, the endcode and status.
1960 024430  132737  000010  002371                bitb    #bit3,rsppak+17         ;is this server active already
1961 024436  001467                                beq     dnint                   ;branch to Execute Local Program
1962 024440                                        ERRSOFT 3,SFTO                  ;Soft Error "already active  will do an ABORT cmd
1963 024450                              ABRT                                      ;Do ng an ABRT do get into dle state
     024450  032737  100000  002534      ABRT3: bit      #bit15,cmdrng+2         ;test ownership of ring make sure we own t
     024456  001374                                bne     ABRT3                   ;if we don't own it wait until we do
     024460  012737  000016  002446                mov     #14.,cmdlen             ;load lenght of packet to be send
     024466  112737  000000  002450                movb    #0,cmdlen+2             ;load msg type and credit
     024474  112737  000002  002451                movb    #dup.id,cmdlen+3        ;load DUP connection ID
     024502  005237  002452                        inc     cmdpak                  ;load new CRN
     024506  005037  002454                        clr     cmdpak+2
     024512  005037  002456                        clr     cmdpak+4
     024516  005037  002460                        clr     cmdpak+6
     024522  012737  000006  002462                mov     #op.abrt,cmdpak+10      ;load up opcode
     024530  005037  002464                        clr     cmdpak+12               ;no modifiers

     024534  012777  024576  155564                mov     #RFD3,@vector           ;New vector place
     024542  012737  002352  002526                mov     #rsppak,rsprng          ;load response packet area  nto ring
```

Global subroutines

```
        024550  012737  002452  002532          mov     #cmdpak,cmdrng          ;load command packet area into ring
        024556  012737  140000  002530          mov     #140000,RSPRNG+2        ;Port ownership bit.
        024564  012737  100000  002534          mov     #bit15,CMDRNG+2
        024572  004737  022760                  jsr     pc,POLLWT               ;Go to poll and wait routine.

                                ;*****************************************************************

        024576                          RFD3:                                   ;Intr to here.
        024576  062706  000006                  add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
        024602  012777  032650  155516          mov     #intsrv,@vector         ;Change vector
        024610  004737  030654                  jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                                ;the response recvd from the mut.
                                                                                ;it will check the cmd ref
                                                                                ;num, the endcode and status.
   1964 024614  000623                          br      GDScmd                  ;branch back to make sure not busy
   1965 024616                          DNINT:
   1966 024616  000207                          rts     pc
   1967
```

Global subroutines

```
1969
1970                                    ;*****************************************************************
1971                                    ;                       AUTOsizer
1972                                    ;       This routine runs the Execute Supplied program called AUTOSZ
1973                                    ; This program is downline loaded into the controller to determine
1974                                    ; which drive is out in the controller. First you must tell which drive
1975                                    ; you want to format. After listing the dr've number the program will load
1976                                    ; the program and figure which DEC drive 't is and which UIT to load 'nto
1977                                    ; the disk controller fo rthe format program.
1978                                    ;
1979                                    ;*****************************************************************
1980
1981 024620                            AUTOSizer:
1982 024620                                excSUPprg                               ;downline load the program autosz
     024620  032737  100000  002534     ESP4:   bit     #bit15,cmdrng+2         ;test ownersh'p of r'ng make sure we own 't
     024626  001374                             bne     ESP4                    ;if we don't own it wait until we do
     024630  012737  000050  002446             mov     #50,cmdlen              ;load lenght of packet to be send
     024636  112737  000000  002450             movb    #0,cmdlen+2             ;load msg type and credit value
     024644  112737  000002  002451             movb    #dup.id,cmdlen+3        ;load DUP connect'on ID
     024652  005037  002454                     clr     CMDpak+2
     024656  005037  002456                     clr     CMDpak+4
     024662  005037  002460                     clr     CMDpak+6
     024666  012737  000002  002462             mov     #op.esp,CMDpak+10       ;load up opcode
     024674  012737  000000  002464             mov     #0,CMDpak+12            ;no stand alone modif'er
     024702  012737  001204  002466             mov     #<autoend-autosz>,cmdpak+14 ;load length of prg into buffer
     024710  005037  002470                     clr     cmdpak+16
     024714  012737  025270  002472             mov     #autosz,cmdpak+20       ;starting address of downline load prg
     024722  005037  002474                     clr     CMDpak+22
     024726  005037  002476                     clr     CMDpak+24
     024732  005037  002500                     clr     CMDpak+26
     024736  005037  002502                     clr     CMDpak+30
     024742  005037  002504                     clr     CMDpak+32
     024746  005037  002506                     clr     CMDpak+34               ;overlay buffer descriptor
     024752  005037  002510                     clr     CMDpak+36
     024756  005037  002512                     clr     CMDpak+40
     024762  005037  002514                     clr     CMDpak+42
     024766  005037  002516                     clr     CMDpak+44
     024772  005037  002520                     clr     CMDpak+46
     024776  012777  025040  155322             mov     #RFD4,@vector           ;New vector place
     025004  012737  002352  002526             mov     #rsppak,rsprng          ;load response packet area 'nto ring
     025012  012737  002452  002532             mov     #cmdpak,cmdrng          ;load command packet area into ring
     025020  012737  140000  002530             mov     #140000,RSPRNG+2        ;Port ownership b't.
     025026  012737  100000  002534             mov     #bit15,CMDRNG+2
     025034  004737  022760                     jsr     pc,POLLWT               ;Go to poll and wait routine.
                                        ;*****************************************************************
     025040                                 RFD4:                                ;Intr to here.
     025040  062706  000006                     add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
     025044  012777  032650  155254             mov     #intsrv,@vector         ;Change vector
     025052  004737  030654                     jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                                ;the response recvd from the mut.
1983 025056                                 Recvdata    #msg,#msglen            ;get results of auto size
     025056  032737  100000  002534     RCD5:   bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
     025064  001374                             bne     RCD5                    ;if we don't own it wait until we do
     025066  012737  000034  002446             mov     #34,cmdlen              ;load lenght of packet to be send
     025074  112737  000000  002450             movb    #0,cmdlen+2             ;load msg type and credit
     025102  112737  000002  002451             movb    #dup.id,cmdlen+3        ;load DUP connection ID
     025110  005237  002452                     inc     cmdpak                  ;load new CRN
```

Global subroutines

```
        025114  005037  002454                  clr     cmdpak+2
        025120  005037  002456                  clr     cmdpak+4
        025124  005037  002460                  clr     cmdpak+6
        025130  012737  000005  002462          mov     #op.rec,cmdpak+10       ;load up opcode
        025136  005037  002464                  clr     cmdpak+12               ;no modifiers
        025142  012737  000014  002466          mov     #msglen,cmdpak+14
        025150  005037  002470                  clr     cmdpak+16
        025154  012737  026460  002472          mov     #msg,cmdpak+20  ;load address of buffer describtor
        025162  005037  002474                  clr     cmdpak+22
        025166  005037  002476                  clr     cmdpak+24
        025172  005037  002500                  clr     cmdpak+26
        025176  005037  002502                  clr     cmdpak+30
        025202  005037  002504                  clr     cmdpak+32

        025206  012777  025250  155112          mov     #RFD5,@vector           ;New vector place
        025214  012737  002352  002526          mov     #rsppak,rsprng          ;load response packet area into ring
        025222  012737  002452  002532          mov     #cmdpak,cmdrng          ;load command packet area into ring
        025230  012737  140000  002530          mov     #140000,RSPRNG+2        ;Port ownership bit.
        025236  012737  100000  002534          mov     #bit15.CMDRNG+2
        025244  004737  022760                  jsr     pc,PULLWT               ;Go to poll and wait routine.

                                        ;*****************************************************************

        025250                          RFD5:                                   ;Intr to here.
        025250  062706  000006                  add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
        025254  012777  032650  155044          mov     #intsrv,@vector         ;Change vector
        025262  004737  030654                  jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                                ;the response recvd from the mut.
                                                                                ;it will check the cmd ref
                                                                                ;num, the endcode and status.
   1984 025266  000207                  rts     pc                              ;return
```

```
                                .sbttl AUTOSZ

                                ;*****************************************************************
                                ;                       AUTOsz
                                ;       This is the actual down line loaded code which is placed  n
                                ; the RAM inside the RQDX3 controller. This code firgures out the
                                ; cylinder size of the drive. From the cylinder size we can determ'ne
                                ; which drive it is. If the drive is a winchester we will step the dr've
                                ; into the inner most cylinder. The inner most cyl'nder for most dr'ves
                                ; is the parking cylinder.
                                ;
                                ;+
                                ; AUTOsz   Determine Drive Type and Size
                                ;
                                ; Input:         None.
                                ;
                                ; Output:
                                ;               A Special Type Message:
                                ;
                                ;               +  - -    - -   - -+  -     ---   +
                                ;               }   Special Msg #10 (decimal)   } +00
                                ;               + - -   ---    --- -+--  ---  --+
                                ;               }           Status              } +02
                                ;               +----   --   -- - ---  ----- ---+
                                ;               } Innermost Cyl'nder for Unit 0 } +04
                                ;               +   -     --- ----  - ------- --+
                                ;               } Innermost Cylinder for Unit 1 } +06
                                ;               +-- - ---  --- -  -- - ---- ----+
                                ;               } Innermost Cylinder for Unit 2 } +10
                                ;               + --    ---  ---- -- --- --  ---+
                                ;               } Innermost Cylinder for Unit 3 } +12
                                ;               +---- ---  ----- ---  ----------+
                                ;
                                ;               where,  status      =   0 for success,
                                ;                                       1 for UDC never went done,
                                ;                                       2 for UDC never interrupted,
                                ;                                       3 for Seek Failed
                                ;
                                ;                       cylinder    =   3 for RX33 Floppy
                                ;                                       2 for RX50 Floppy
                                ;                                       0 to 2048 for Winn'e,
                                ;                                       -1 for Non existent unit
                                ;
                                ; Note: The Unit Numbers will correspond to the numbers that the Host
                                ;       would use (i.e., not necessarily the DRVSEL numbers).  Thus,
                                ;       Winnies will always precede Floppies and "null devices".
                                ;-
                                ;*****************************************************************

2036 025270                     AUTOsz:
2037                            .dsable AMA
2038 025270  001204                     .word   <AUTOend-AUTOsz>        ;Byte count low         TEST HEADER
2039 025272  000000                     .word   0                       ;byte count high
2040 025274  000000                     .word   0                       ;overlay low
2041 025276  000000                     .word   0                       ;overlay high
2042 025300     101     125     124     .ascii  /AUTOSZ/                ;6 character asciz name
```

```
      025303     117     123     132
 2043                                        .even
 2044 025306  000001                         .word   1                       ;version number
 2045 025310     000                         .byte   0                       ;flags
 2046 025311     177                         .byte   177                     ;timeout
 2047 025312  000240                         nop                             ;start down line loaded test
 2048
 2049 025314                         AUTO::
 2050 025314  000240                         nop                             ;start down line loaded test
 2051
 2052                                ; Executable Code Starts Here
 2053
 2054 025316  106427  000340                    mtps    #ps7                 ; Set up our own interrupts handlers
 2055 025322  005037  140004                    clr     @#w$fpl              ; clear the leds
 2056 025326  013746  100002                    mov     @#i$udc, (sp)        ; Save the MSCP handlers - UDC
 2057 025332  013746  100006                    mov     @#i$clk, (sp)        ; ... Clock
 2058 025336  013746  100016                    mov     @#i$sec, (sp)        ; ... Sector
 2059
 2060                                ; Taken from RQDX3.MAC m$init code:
 2061
 2062 025342  112737  000000  140022            movb    #op.res,@#w$cmd      ; reset the smc9224 chip
 2063 025350  112737  000111  140022            movb    #op.srp+11,@#w$cmd   ; enable interrupts
 2064 025356  112737  000040  140020            movb    #40,@#w$dat          ;
 2065 025364  005067  001064                    clr     s$$bug               ; assume the bug is not present
 2066 025370  032737  020000  140006            bit     #20000,@#r$fps       ; is the ECO wire there?
 2067 025376  001415                            beq     sizset               ; definitely not
 2068 025400  112737  000001  140022            movb    #op.dd,@#w$cmd       ; deselect all drives
 2069 025406  012700  001000                    mov     #1000,r0             ; wait for a bit
 2070 025412                         sizwt:                                 ; ...
 2071 025412  005300                            dec     r0                   ; ...
 2072 025414  001376                            bne     sizwt                ; ...
 2073
 2074 025416  032737  020000  140006            bit     #20000,@#r$fps       ; is the ECO wire there?
 2075 025424  001002                            bne     sizset               ; nope
 2076 025426  005267  001022                    inc     s$$bug               ; say it is
 2077
 2078 025432                         sizset:                                ; Set up handlers
 2079 025432  010700                            mov     pc,r0                ; ...
 2080 025434  062700  000670                    add     #<s$$udc-.>,r0       ; Use our own udc handler
 2081 025440  010037  100002                    mov     r0,@#i$udc           ; ...
 2082 025444  010700                            mov     pc,r0                ; ...
 2083 025446  062700  000716                    add     #<s$$rti .>,r0       ;
 2084 025452  010037  100006                    mov     r0,@#i$clk           ; Make clock interrupt rti
 2085 025456  010037  100016                    mov     r0,@#i$sec           ; Make sector interrupt rti
 2086 025462  106427  000000                    mtps    #ps0                 ; Make it good
 2087
 2088                                ; Go Size the Drives
 2089
 2090 025466  010146                            mov     r1, (sp)             ; Save Registers
 2091 025470  010246                            mov     r2,-(sp)             ; Save Registers
 2092 025472  010346                            mov     r3, (sp)             ; ...
 2093 025474  010702                            mov     pc,r2                ; Point to Unit Descriptor Table
 2094 025476  062702  000766                    add     #<msgdat+2> .,r2     ; ...
 2095 025502  010200                            mov     r2,r0                ; ...
 2096 025504  012703  000004                    mov     #4.,r3               ; Initialize all Unit Descriptors
 2097 025510                         siznon:                                ; ...
 2098 025510  012720  177777                    mov     #-1.,(r0)+           ; ... to "Non-Existant Unit"
```

```
2099 025514  077303                        sob     r3,siznon               ; ...
2100
2101 025516  012703  000002                mov     #2.,r3                  ; Set Drive Count to logical unit 0
2102
2103 025522                        sizlop::                                ; ** Loop Until We Get All of Them **
2104                                                                       ; **Check if it is a Winnie**
2105 025522  012737  000010  140002        mov     #bit3,@#rw$pll          ; Set up Pllctl Csr
2106 025530  012737  000104  140022        mov     #op.srp+4,@#w$cmd       ; Set up UDC registers
2107 025536  005037  140020                clr     @#w$dat                 ; ... Head 0
2108 025542  005037  140020                clr     @#w$dat                 ; ... Cylinder 0
2109 025546  012737  000110  140022        mov     #op.srp+8.,@#w$cmd      ; ...
2110 025554  012737  000300  140020        mov     #rd.mode,@#w$dat        ; ... Set mode for winnie
2111 025562  010300                        mov     r3,r0                   ; Select the Drive
2112 025564  062700  000044                add     #op.srd,r0              ; ... op.sd.rd=44
2113 025570  004767  000572                jsr     pc,doudc                ; Do UDC command
2114 025574  005700                        tst     r0                      ; Okay?
2115 025576  001402                        beq     sizfps                  ; Nope, someth'ng 's screwed up
2116 025600  000167  000416                jmp     sizend
2117 025604                        sizfps:
2118 025604  032737  140000  140006        bit     #bit14+b't15,@#r$fps    ; W'nnie?
2119 025612  001121                        bne     s'zwin                  ; Yes, go set cylinder count
2120
2121 025614                        sizflp:                                 ; ** Check 'f it is a Floppy **
2122 025614  012737  000011  140002        mov     #bit0+bit3,@#rw$pll     ; Set Pllctl CSR
2123 025622  112737  000107  140022        movb    #op.srp+7,@#w$cmd       ; Set up UDC reg'sters
2124 025630  112737  000367  140020        movb    #retry,@#w$dat          ; ... retry = 367
2125 025636  010300                        mov     r3,r0                   ; Select the Drive
2126 025640  062700  000054                add     #op.srx,r0              ; ... op.sd.rx-54
2127 025644  004767  000516                jsr     pc,doudc                ; Do UDC command
2128 025650  005?00                        tst     r0                      ; Okay?
2129 025652  0011?3                        bne     sizend                  ; Nope, something is screwed up
2130 025654  005004                        clr     r4                      ; Step counter
2131
2132 025656                        steprx:                                 ; ** Step In & Out Until Track 0 Found **
2133 025656  020427  000240                cmp     r4,#160.                ; How many t'mes have we step?
2134 025662  002034                        bge     sizrx                   ; Enough?
2135 025664  112737  000111  140022        movb    #op.srp+9.,@#w$cmd      ; Set up UDC registers
2136 025672  132737  000020  140010        bitb    #bit4,@#r$dat           ; At track 0?
2137 025700  001025                        bne     sizrx                   ; Yes, then go check Floppy type
2138 025702  020427  000120                cmp     r4,#80.                 ; Is step counter >= 80 ?
2139 025706  002412                        blt     stepout                 ;
2140 025710  020427  000202                cmp     r4,#130.                ; Is step counter <= 130 ?
2141 025714  003007                        bgt     stepout                 ;
2142 025716  012700  000005                mov     #op.si1,r0              ; Step 'n one track
2143 025722  004767  000440                jsr     pc,doudc                ; Do UDC command
2144 025726  005700                        tst     r0                      ; Okay?
2145 025730  001134                        bne     sizend                  ; Nope, someth'ng is screwed up
2146 025732  000406                        br      stepmore                ;
2147 025734                        stepout:
2148 025734  012700  000007                mov     #op.so1,r0              ; Step out one track
2149 025740  004767  000422                jsr     pc,doudc                ; Do UDC command
2150 025744  005700                        tst     r0                      ; Okay?
2151 025746  001125                        bne     sizend                  ; Nope, something is screwed up
2152 025750                        stepmore:
2153 025750  005204                        inc     r4                      ; Increment step counter
2154 025752  000741                        br      steprx                  ; ** Bottom of find track 0 loop **
2155
```

```
2156 025754                            sizrx:                          ; ** Check Floppy type RX50/RX33 **
2157 025754  112737  000111  140022            movb    #op.srp+9.,@#w$cmd      ; Set up UDC registers
2158 025762  132737  000020  140010            bitb    #bit4,@#r$dat           ; At track 0?
2159 025770  001506                            beq     sizdrv                  ;
2160 025772  112737  000104  140022            movb    #op.srp+4,@#w$cmd       ; Set up UDC registers
2161 026000  112737  000001  140020            movb    #1,@#w$dat              ; .. Head =1
2162 026006  010300                            mov     r3,r0                   ; Select the Drive
2163 026010  062700  000054                    add     #op.srx,r0              ; ... op.sd.rx=54
2164 026014  004767  000346                    jsr     pc,doudc                ; Do UDC command
2165 026020  005700                            tst     r0                      ; Okay?
2166 026022  001077                            bne     sizend                  ; Nope, something is screwed up
2167 026024  112737  000111  140022            movb    #op.srp+9.,@#w$cmd      ; Set up UDC registers
2168 026032  132737  000020  140010            bitb    #bit4,@#r$dat           ; At track 0?
2169 026040  001003                            bne     sizrx3                  ; No, it's an RX50
2170 026042  012712  000002                    mov     #2,(r2)                 ; Mark it as an RX50
2171 026046  000455                            br      sizrd                   ;
2172 026050                            sizrx3:
2173 026050  012712  000003                    mov     #3,(r2)                 ; Yes, mark it as an RX33
2174 026054  000452                            br      sizrd                   ; Go do next drive
2175 026056                            sizwin:
2176 026056  005012                            clr     (r2)                    ; It's a Winnie   Set Count to 0
2177
2178 026060  012700  000007                    mov     #op.so1,r0              ; Step out one track
2179 026064  004767  000276                    jsr     pc,doudc                ; Do UDC command
2180 026070  005700                            tst     r0                      ; Okay?
2181 026072  001053                            bne     sizend                  ; Nope, something is screwed up
2182
2183 026074  012700  000003                    mov     #ersek0,r0              ; Assume that seek to 0 failed
2184 026100  112737  000111  140022            movb    #op.srp+9.,@#w$cmd      ; At Cylinder 0?
2185 026106  132737  000020  140010            bitb    #bit4,@#r$dat           ; ...
2186 026114  001442                            beq     sizend                  ; Nope, something's wrong
2187
2188 026116                            sizin:                          ; ** Step In Until Track 0 Found **
2189 026116  005212                            inc     (r2)                    ; Up Cylinder Count
2190 026120  012700  000005                    mov     #op.si1,r0              ; Step In One Cylinder
2191 026124  004767  000236                    jsr     pc,doudc                ; Do UDC Command
2192 026130  005700                            tst     r0                      ; Okay?
2193 026132  001033                            bne     sizend                  ; Nope, something is screwed up
2194
2195 026134  112737  000111  140022            movb    #op.srp+9.,@#w$cmd      ; At Cylinder 0?
2196 026142  132737  000020  140010            bitb    #bit4,@#r$dat           ; If so, skip to bump up
2197 026150  001003                            bne     parkit                  ; ... descriptors
2198
2199 026152  021227  004000                    cmp     (r2),#2048.             ; SMC Cylinder Limit Reached?
2200 026156  002757                            blt     sizin                   ; ** Bottom of Step In Loop **
2201
2202 026160                            parkit:                         ; step in, to inner most cylinder
2203 026160  011201                            mov     (r2),r1                 ; get total number of cylinders
2204 026162  005301                            dec     r1                      ; we want one less then recalibrate cylinder
2205 026164  012700  000005            1$:     mov     #op.si1,r0              ; Step In One Cylinder
2206 026170  004767  000172                    jsr     pc,doudc                ; Do UDC Command
2207 026174  005700                            tst     r0                      ; Okay?
2208 026176  001011                            bne     sizend                  ; Nope, something is screwed up
2209 026200  077107                            sob     r1,1$
2210 026202                            sizrd:                          ; ** This was a Winnie **
2211
2212 026202  062702  000002                    add     #untdsz,r2              ; Bump Pointer to Next Unit Descriptor
```

```
2213
2214 026206                            sizdrv:                         ; ** Check Next Drive **
2215 026206  005203                            inc     r3              ; Up Drive Count
2216 026210  020327  000005                    cmp     r3,#5.          ; All 4 Drives Checked?
2217 026214  003002                            bgt     sizend          ; ...
2218 026216  000167  177300                    jmp     sizlop          ; ** Bottom of Loop **
2219
2220 026222                            sizend:                         ; ** Send Status and Table **
2221 026222  010067  000234                    mov     r0,msgdat       ; Save status
2222 026226  012700  000001                    mov     #op.dd,r0       ; Deselect Drive
2223 026232  004767  000130                    jsr     pc,doudc        ; ...
2224 026236  012603                            mov     (sp)+,r3        ; Pop
2225 026240  012602                            mov     (sp)+,r2        ; ...
2226 026242  012601                            mov     (sp)+,r1        ; ...
2227 026244  106427  000340                    mtps    #ps7            ; Put the MSCP Handlers Back
2228 026250  012637  100016                    mov     (sp)+,@#i$sec   ; ...
2229 026254  012637  100006                    mov     (sp)+,@#i$clk   ; ...
2230 026260  012637  100002                    mov     (sp)+,@#i$udc   ; ...
2231 026264  106427  000000                    mtps    #ps0            ; ...
2232
2233 026270                            sizexi::                        ; ** Okay, talk to the Host **
2234
2235                                   ;PutData,msg,msglen   Send Response to Host
2236
2237 026270  010700                            mov     pc,r0           ;f'gure the relative address
2238 026272  062700  000166                    add     #msg-.,r0       ;... of the buffer
2239 026276  012746  000014                    mov     #msglen, (sp)   ;load lenght in bytes of the buffer
2240 026302  010046                            mov     r0,-(sp)        ;load relative address of the buffer
2241 026304  013746  000146                    mov     @#146, (sp)     ;load location of routine in microcode
2242 026310  004736                            jsr     pc,@(sp)+       ;call Put Data routine in Ucode
2243 026312  022626                            cmp     (sp)+,(sp)+     ;fix stack
2244
2245                                   ; Term'nate Supplied Program
2246
2247 026314  013700  000142                    mov     @#142,r0        ;load location of routine in microcode
2248 026320  004710                            jsr     pc,(r0)         ;call Terminate routine in Ucode
2249 026322  000207                            rts     pc              ; ...
```

```
                                ;+
                                ; UDC Interrupt Handler
                                ;
                                ; Taken from RQDX3.MAC m$udc code:
                                ;-

026324                          s$$udc::                        ; UDC Handler
026324  005767  000124                  tst     s$$bug          ; 's the ECO w're there?
026330  001404                          beq     s$$udi          ; nope
026332  032737  020000  140006          bit     #20000,@#r$fps  ; 's the 9224 'nterrupt line set?
026340  001011                          bne     s$$rti          ; if not, must be a bogus 'nterrupt

026342                          s$$udi:                         ; ...
026342  113746  140012                  movb    @#r$cmd, (sp)   ; get interrupt status
026346  142716  000035                  bicb    #35,(sp)        ; clear bits of no interest
026352  122726  000240                  cmpb    #240,(sp)+      ; val'd status?
026356  001002                          bne     s$$rti          ; no, it's a bogus interrupt
026360  005267  000072                  inc     s$$flag         ; set the flag

                                ;+
                                ; Return from Interrupt
                                ;

026364                          s$$rti::                        ;;; ...
026364  000002                          rti                     ;;; just quit

                                ;+
                                ; DOUDC - Do a UDC Command
                                ;
                                ; This routine sends a commands and waits an interrupt or
                                ; until timer expires.
                                ;
                                ; Input:        r0      - command
                                ; Output:       r0      - 0 for success, non zero for failure
                                ;-

        007570                  mseca = 30.*132.                ; Max Step Rate * some *
                                                                ;  loop for 7.5 MHz T11 clock

026366                          doudc::                         ; ** Do a UDC command **
026366  010146                          mov     r1,-(sp)        ; save r1
026370  005067  000062                  clr     s$$flag         ; Clear udc flag (interrupt pend'ng)
026374  010037  140022                  mov     r0,@#w$cmd      ; Send the command
026400  012700  004000                  mov     #2048.,r0       ; Set the rom timer (max cylinders)

026404                          mswait:                         ; ** Wait **
026404  012701  007570                  mov     #mseca,r1       ; set one millisecond counter
026410                          ms'n:                           ; ** Top of Inner Loop **
026410  005767  000042                  tst     s$$flag         ; 3.60 udc interrupted
026414  001005                          bne     msend           ; 1.60 out if udc interrupted
026416  077104                          sob     r1,msin         ; 2.40  Total: 7.60 @7.5MHz=>
                                                                ;                8.5457 @6.67MHz
026420  077007                          sob     r0,mswait       ; ** Bottom of Outer Loop **
026422  012700  000002                  mov     #eruint,r0      ; Never Interrupted
026426  000410                          br      douret          ; ...

026430                          msend:                          ; ** Interrupt Happened **
```

```
2308 026430  012700  000001                mov     #erudon,r0              ; Assume Never Done
2309 026434  013701  140012                mov     @#r$cmd,r1              ; Get the return status
2310 026440  032701  000040                bit     #bit5,r1                ; All done yet?
2311 026444  001401                        beq     douret                  ; If so, pop out of this
2312
2313 026446  005000                        clr     r0                      ; Assume everything's ok
2314
2315 026450                        douret:                                 ; ** Return **
2316 026450  012601                        mov     (sp)+,r1
2317 026452  000207                        rts     pc                      ; Back to caller
```

```
                                .sbttl  SIZER Supplied Program Data

                                ;       .psect  c$data

                                ; Special Stuff

026454                          s$$bug: .blkw   1                       ; ECO Wire
026456                          s$$flag:.blkw   1                       ; UDC flag

                                ; Packet Area

026460      012     140         msg::   .byte   10.,,b.spl              ; Final Message
026462                          msgdat: .blkw   5.                      ; Status and Unit Descriptor Table
            000014              msglen  = . msg                         ; Message Length (Byte Count)
            000002              untdsz  = 2.                            ; Unit Descriptor Length

                                .enable AMA
026474                          AUTOend:
```

```
2338
2339                                    ;*****************************************************************
2340                                    ;                       AUTOdisplay
2341                                    ;       This routine will display the results of the autosizers
2342                                    ;  findings. It will say weather the autosizer errored or not and
2343                                    ;  what drives it found.
2344                                    ;
2345                                    ;*****************************************************************
2346
2347 026474                            AUTOdis:
2348 026474  123727  026461  000140              cmpb    msg+1,#.b.spl           ;check if Special Message
2349 026502  001401                              beq     1$                      ;if not then no info to print
2350 026504  000207                              rts     pc                      ;so just return
2351
2352 026506  123727  026460  000012  1$:         cmpb    msg,#10.                ;
2353 026514  001401                              beq     2$                      ;check message number
2354 026516  000207                              rts     pc                      ;return if msg number doesn t match
2355 026520                            2$:
2356 026520  005737  026462                      tst     msg+2                   ;test completion status of Autosizer
2357 026524  001457                              beq     24$                     ;if zero no error report the findings
2358                                                                            ;if not zero then there is an error
2359
2360                                    ; Autosizer Failure Code
2361 026526                                  printb  #ASMSG3,msg+2              ; Print Autosizer Failure Code
2362 026552  023727  026462  000001              cmp     msg+2,#1                ; Is it a UDC never done error ?
2363 026560  001010                              bne     11$                     ; No, check for next code
2364 026562                                  printb  #ASMSG4                    ; Yes, Tell error type
2365 026602  023727  026462  000002  11$:         cmp     msg+2,#2                ; Is it a UDC never interrupted error ?
2366 026610  001010                              bne     12$                     ; No, check for next code
2367 026612                                  printb  #ASMSG5                    ; Yes, Tell error type
2368 026632  023727  026462  000003  12$:         cmp     msg+2,#3                ; Is it a seek error ?
2369 026640  001010                              bne     13$                     ; No, go reinitialize ctrl
2370 026642                                  printb  #ASMSG6                    ; Yes, Tell error type
2371 026662                            13$:
2372 026662  000207                              rts     pc                      ;return
2373
2374                                    ; Autosizer Findings
2375 026664                            24$:
2376 026664                                  printb  #ASMSG1                    ; print Autosizer findings
2377 026704  012701  026464                      mov     #msg+4,r1               ; first cylinder entry
2378 026710  005002                              clr     r2                      ; Start with unit number zero
2379 026712  022711  177777            26$:      cmp     #-1.,(r1)               ; Is unit Non-existant ?
2380 026716  001013                              bne     61$                     ; No, check for RX50
2381 026720                                  printb  #ASMSG7,R2                 ; Yes, tell it is non-existant
2382 026742  000137  027522                      jmp     20$                     ; ...
2383 026746  022711  000002            61$:      cmp     #2.,(r1)                ; Is unit an RX50 ?
2384 026752  001013                              bne     62$                     ; No, check for RX33
2385 026754                                  printb  #ASMSG8,R2                 ; Yes, tell it is an RX50
2386 026776  000137  027522                      jmp     20$                     ; ...
2387 027002  022711  000003            62$:      cmp     #3.,(r1)                ; Is unit an RX33 ?
2388 027006  001013                              bne     63$                     ; No, then it is a Winchester
2389 027010                                  printb  #ASMSG9,R2                 ; Yes, tell it is RX33
2390 027032  000137  027522                      jmp     20$                     ; ...
2391 027036                            63$:                                    ; It is a  WINCHESTER
2392 027036                                  printb  #ASMSG2,r2,(r1)            ; Tell it is a Winchester with so many cylinder
2393
2394 027062                            71$:
```

SIZER Supplied Program Data

```
   2395 027062  023711  003102                cmp     UIT0+UITsiz-2,(r1)      ;if cylinder # equals UIT table # this is the correc
t UIT table
   2396 027066  001403                        beq     710$
   2397 027070  023711  003100                cmp     UIT0+UITsiz 4,(r1)      ;if cylinder # equals UIT table # th's is the correc
t JIT table
   2398 027074  001012                        bne     72$
   2399 027076                        710$:   printb  #DrvTx0                 ;1      rd51
   2400 027116  000137  027522                jmp     20$
   2401
   2402 027122  023711  003206        72$:    cmp     UIT1+UITsiz-2,(r1)      ;if cylinder # equals UIT table # this is the correc
t UIT table
   2403 027126  001403                        beq     720$
   2404 027130  023711  003204                cmp     UIT1+UITsiz-4,(r1)      ;if cylinder # equals UIT table # this 's the correc
t UIT table
   2405 027134  001011                        bne     73$
   2406 027136                        720$:   printb  #DrvTx1                 ;1      rd52
   2407 027156  000561                        br      20$
   2408
   2409 027160  023711  003312        73$:    cmp     UIT2+UITsiz-2,(r1)      ;if cyl'nder # equals UIT table # th's is the correc
t UIT table
   2410 027164  001403                        beq     730$
   2411 027166  023711  003310                cmp     UIT2+UITsiz 4,(r1)      ;'f cylinder # equals UIT table # this is the correc
t UIT table
   2412 027172  001011                        bne     74$
   2413 027174                        730$:   printb  #DrvTx2                 ;1      rd52
   2414 027214  000542                        br      20$
   2415
   2416 027216  023711  003416        74$:    cmp     UIT3+UiTsiz 2,(r1)      ;if cylinder # equals UIT table # this is the correc
t UIT table
   2417 027222  001403                        beq     740$
   2418 027224  023711  003414                cmp     UIT3+UITsiz 4,(r1)      ;if cylinder # equals UIT table # this is the correc
t UIT table
   2419 027230  001011                        bne     75$
   2420 027232                        740$:   printb  #DrvTx3                 ;1      rd53
   2421 027252  000523                        br      20$
   2422
   2423 027254  023711  003522        75$:    cmp     UIT4+UITsiz-2,(r1)      ;if cylinder # equals UIT table # this is the correc
t UIT table
   2424 027260  001403                        beq     750$
   2425 027262  023711  003520                cmp     UIT4+UITsiz 4,(r1)      ;if cylinder # equals UIT table # th's is the correc
t UIT table
   2426 027266  001011                        bne     76$
   2427 027270                        750$:   printb  #DrvTx4                 ;1      rd54
   2428 027310  000504                        br      20$
   2429
   2430 027312  023711  003626        76$:    cmp     UIT5+UITsiz-2,(r1)      ;if cylinder # equals UIT table # this 's the correc
t UIT table
   2431 027316  001403                        beq     760$
   2432 027320  023711  003624                cmp     UIT5+UITsiz-4,(r1)      ;if cylinder # equals UIT table # this 's the correc
t UIT table
   2433 027324  001011                        bne     77$
   2434 027326                        760$:   printb  #DrvTx5                 ;1      rd31
   2435 027346  000465                        br      20$
   2436
   2437 027350  023711  003732        77$:    cmp     UIT6+UITsiz 2,(r1)      ;if cylinder # equals UIT table # th's is the correc
t UIT table
   2438 027354  001403                        beq     770$
   2439 027356  023711  003730                cmp     UIT6+UITsiz-4,(r1)      ;if cylinder # equals UIT table # this is the correc
t UIT table
   2440 027362  001011                        bne     78$
   2441 027364                        770$:   printb  #DrvTx6                 ;1      rd
   2442 027404  000446                        br      20$
   2443
   2444 027406  023711  004036        78$:    cmp     UIT7+UITsiz-2,(r1)      ;if cylinder # equals UIT table # this is the correc
t UIT table
   2445 027412  001403                        beq     780$
```

```
 2447 027420  001011                        bne     79$
 2448 027422                        780$:    printb  #DrvTx7                ;1      rd
 2449 027426  000427                        br      20$
 2450
 2451 027444  023711  004142          79$:  cmp     UITdf+UITsiz-2,(r1)      ;if cylinder # equals UIT table # this is the correc
t UIT table
.MAIN.  MACRO V05.03  Tuesday 10 Jun-86 13:21  Page 25-2                                                    SEQ 0056
SIZER Supplied Program Data

 2452 027450  001403                        beq     790$
 2453 027452  023711  004140                cmp     UITdf+UITsiz-4,(r1)      ;if cylinder # equals UIT table # this is the correc
t UIT table
 2454 027456  001011                        bne     80$
 2455 027460                        790$:    printb  #DrvTxc                  ;1      custom rd
 2456 027500  000410                        br      20$
 2457
 2458 027502                        80$:     printb  #ASMSGr                  ;"Unrecogonized Drive"
 2459
 2460 027522  005721                20$:     tst     (r1)+                    ; Point to next unit descriptor
 2461 027524  005202                         inc     r2                       ; Set for next unit
 2462 027526  020227  000004                cmp     r2,#MaxDrv               ; Last unit?
 2463 027532  001402                        beq     27$                      ; Yes, exit routine
 2464 027534  000137  026712                jmp     26$                      ; No, do next unit
 2465 027540  000207                27$:     rts     pc                       ;
 2466
 2467                               ;*****************************************************************
 2468                               ;
 2469                               ;       This routine builds the UIT table or get the UIT table
 2470                               ; depending who the questions are answered to the manual questions.
 2471                               ; If the unit is a listed or regconizable drive we will use a prebuilt
 2472                               ; UIT table. If not we will have to ask all the questions to build
 2473                               ; a table.
 2474                               ;
 2475                               ;*****************************************************************
 2476 027542                        BLDUIT:
 2477 027542  032737  100000  002336          bit     #bit15,untflgs
 2478 027550  001402                        beq     manbld
 2479 027552  000137  030060                jmp     autobld
 2480
 2481 027556                        manbld: printf  #DrvTxa                  ;print out UIT tables and their related drives
 2482 027576                                printf  #DrvTxb                  ;UIN    Drive
 2483 027616                                printf  #DrvTx0                  ;0      rd51
 2484 027636                                printf  #DrvTx1                  ;1      rd52
 2485 027656                                printf  #DrvTx2                  ;2      etc
 2486 027676                                printf  #DrvTx3                  ;3      etc
 2487 027716                                printf  #DrvTx4                  ;4
 2488 027736                                printf  #DrvTx5
 2489 027756                                printf  #DrvTx6
 2490 027776                                printf  #DrvTx7
 2491 030016                                printf  #DrvTxc
 2492
 2493 030036                        GMANID unt.nbr,UIN,0,17,0,10,no          ;GET Unit identifier number (0 7)
 2494                                                                        ;PLACE IN bits 0-3.
 2495                                                                        ;no defaults person must know what Unit Identificati
on number.
 2496 030056  000515                        br      uitloc                   ;get correct table address into UITadrs
 2497
 2498 030060                        autobld:
 2499 030060  013700  002330                mov     unit,r0                  ;get unit number
 2500 030064  006300                        asl     r0                       ;get the byte offset of tbl
 2501 030066  012737  000000  002344  1$:   mov     #0,uin                   ;pick UIT number 0
 2502 030074  023760  003102  026464        cmp     UIT0+UITsiz 2,msg+4(r0) ;if cylinder # equals UIT table # this is the correc
t UIT table
 2503 030102  001503                        beq     2$
 2504 030104  012737  000001  002344        mov     #1,uin                   ;pick UIT number 1
 2505 030112  023760  003206  026464        cmp     UIT1+UITsiz-2,msg+4(r0) ;if cylinder # equals UIT table # this is the correc
t UIT table
 2506 030120  001474                        beq     2$
 2507 030122  012737  000002  002344        mov     #2,uin                   ;pick UIT number 2
 2508 030130  023760  003312  026464        cmp     UIT2+UITsiz-2,msg+4(r0) ;if cylinder # equals UIT table # this is the correc
t UIT table
```

```
   2509 030136  001465                          beq     2$
   2510 030140  012737  000003  002344          mov     #3,uin                  ;pick UIT number 3
   2511 030146  023760  003416  026464          cmp     UIT3+UITsiz 2,msg+4(r0) ;if cylinder # equals UIT table # th s 's the correc
t UIT table
   2512 030154  001456                          beq     2$
   2513 030156  012737  000004  002344          mov     #4,uin                  ;pick UIT number 4
   2514 030164  023760  003522  026464          cmp     UIT4+UITsiz-2,msg+4(r0) ;if cylinder # equals UIT table # th s 's the correc
t UIT table
   2515 030172  001447                          beq     2$
   2516 030174  023760  003520  026464          cmp     UIT4+UITsiz-4,msg+4(r0) ;if cylinder # equals UIT table # this is the correc
t UIT table
   2517 030202  001443                          beq     2$                      ;automatic recal feature of this drive
   2518 030204  012737  000005  002344          mov     #5,uin                  ;pick UIT number 5
   2519 030212  023760  003626  026464          cmp     UIT5+UITsiz 2,msg+4(r0) ;if cylinder # equals UIT table # this is the correc
t UIT table
   2520 030220  001434                          beq     2$
   2521 030222  023760  003624  026464          cmp     UIT5+UITsiz 4,msg+4(r0) ;if cylinder # equals UIT table # this is the correc
t UIT table
   2522 030230  001430                          beq     2$                      ;automat'c recal feature of th's drive
   2523 030232  012737  000006  002344          mov     #6,uin                  ;pick UIT number 6
   2524 030240  023760  003732  026464          cmp     UIT6+UITsiz 2,msg+4(r0) ;'f cylinder # equals UIT table # th's 's the correc
t UIT table
   2525 030246  001421                          beq     2$
   2526 030250  012737  000007  002344          mov     #7,uin                  ;p'ck UIT number 7
   2527 030256  023760  004036  026464          cmp     UIT7+UITsiz 2,msg+4(r0) ;if cyl'nder # equals UIT table # this is the correc
t UI' table
   2528 030264  001412                          beq     2$
   2529 030266                                  printb  #efunrg                 ;"No UIT table suitable for this dr've'
   2530 030306  000137  037420                  jmp     dropunt                 ;drop unit and end pass
   2531 030312                          2$:
   2532 030312                          uitloc:
   2533 030312  012703  003000                  mov     #UIT0,r3                ;r3 contains base address of UIT tables
   2534 030316  013702  002344                  mov     UIN,r2                  ;get the correct UIT table address 'nto UITadr regis
ter
   2535 030322  001403                          beq     11$                     ;if UIN=0 then set table to UIT0
   2536 030324  062703  000104          10$:    add     #UITsiz,r3              ;else multiply UIT size by the UIN number and add to
 base address
   2537 030330  077203                          sob     r2,10$
   2538 030332  010337  002320          11$:    mov     r3,UITadr               ;store the proper address of the UIT table
   2539 030336  000137  030344                  jmp     cont                    ;all done
   2540
   2541 030342                          tblbld:                                 ;We must build a UNIT INFORMATION TABLE
   2542 030342  000240                          nop                             ;try IRQCBI for custom built tables available thru S
DC.
   2543 030344  000207                  cont:   rts     pc                  ;go back
   2544                                 ;*****************************************************************
   2545                                 ;
   2546                                 ;       Octal number to ASCII Decimal number
   2547                                 ;       r1 = address of ascii decimal data
   2548                                 ;       r0 - octal data word
   2549                                 ;*****************************************************************
   2550 030346                          OCTASC:
   2551 030346  010246                          mov     r2,-(sp)
   2552 030350  010346                          mov     r3, (sp)
   2553 030352  005002                          clr     r2                      ;clear the dec'mal table pointer
   2554 030354  005003                  1$:     clr     r3                      ;clear decimal 'digit
   2555 030356  005203                  2$:     'nc     r3                      ;increment decimal digit
   2556 030360  166200  030420                  sub     dectbl(r2),r0           ;subtract a power of ten from accumulator
   2557 030364  002374                          bge     2$                      ;if not negative subtract another
   2558 030366  066200  030420                  add     dectbl(r2),r0           ;adjust accumulator so positive
   2559 030372  005303                          dec     r3                      ;adjust decimal digit
   2560 030374  062703  000060                  add     #60,r3                  ;convert decimal to ascii
   2561 030400  110321                          movb    r3,(r1)+                ;mov ascii digit text into buffer
   2562 030402  005722                          tst     (r2)+                   ;increment table pointer
   2563 030404  005762  030420                  tst     dectbl(r2)              ;check if thats all
   2564 030410  001361                          bne     1$
```

```
2566 030414  012602                    mov     (sp)+,r2
2567 030416  000207                    rts     pc
2568 030420                    dectbl:
2569 030420  023420                    .word   10000.
2570 030422  001750                    .word   1000.
2571 030424  000144                    .word   100.
2572 030426  000012                    .word   10.
2573 030430  000001                    .word   1.
2574 030432  000000                    .word   0
2575                           ;*****************************************************************
2576                           ;
2577                           ;       ASCII DECIMAL numbers to  Octal numbers
2578                           ;       r1 - address of ascii decimal data
2579                           ;       r0 = address to store octal data low word, high word
2580                           ;*****************************************************************
2581 030434                    ASCDEC:
2582 030434  010546                    mov     r5, (sp)
2583 030436  010446                    mov     r4, (sp)
2584 030440  010346                    mov     r3, (sp)
2585 030442  010246                    mov     r2,-(sp)
2586 030444  005004                    clr     r4
2587 030446  005003                    clr     r3
2588 030450  005002                    clr     r2
2589 030452  112104            3$:     movb    (r1)+,r4
2590 030454  001423                    beq     1$                      ;if digit equals null than all done
2591                           ;       cmp     r4,#60                  ;check for a real number value
2592                           ;       blt     asklbn                  ;wasn't a real number
2593                           ;       cmp     r4,#71
2594                           ;       bgt     asklbn                  ;wasn't a real number
2595
2596 030456  162704  000060            sub     #60,r4
2597 030462  010346                    mov     r3, (sp)
2598 030464  010246                    mov     r2, (sp)                ;save accum
2599
2600 030466  012705  000003            mov     #3,r5                   ;accum * 8
2601 030472  006302            4$:     asl     r2
2602 030474  006103                    rol     r3
2603 030476  077503                    sob     r5,4$
2604
2605 030500  006316                    asl     (sp)                    ;accum*2
2606 030502  006166  000002            rol     2(sp)
2607
2608 030506  000241                    clc                             ; accum*8 + accum*2
2609 030510  062602                    add     (sp)+,r2
2610 030512  005503                    adc     r3
2611 030514  062603                    add     (sp)+,r3
2612
2613 030516  060402                    add     r4,r2                   ;add present digit to accum*10
2614 030520  005503                    adc     r3
2615 030522  000753                    br      3$
2616
2617 030524  010220            1$:     mov     r2,(r0)+                ;load lo number
2618 030526  010310                    mov     r3,(r0)                 ;load hi number
2619
2620 030530  012602                    mov     (sp)+,r2                ;restore stack to its orginal
2621 030532  012603                    mov     (sp)+,r3
2622 030534  012604                    mov     (sp)+,r4
```

```
 2623 030536  012605                        mov     (sp)+,r5
 2624 030540  000207                        rts     pc
 2625
 2626                                ;*****************************************************************
 2627                                ;
 2628                                ; This routine types out the ASCII information passed
 2629                                ; by the disk controller. This ASCII information is
 2630                                ; contained in the buffer called DATARE and is offset
 2631                                ; by 1 word. To fake the DRS macro routine a "%A" is
 2632                                ; placed in front of the text.
 2633                                ;*****************************************************************
 2634
 2635 030542                        typDUPbuf:
 2636 030542  012701  002552                mov     #datare,r1      ;get data area address of ascii info
 2637 030546  063701  002366                add     rsppak+14,r1    ;add the number of byte transfered
 2638 030552  105021                1$:     clrb    (r1)+           ;put null characters into data buffer after end of ASCII inf
o
 2639 030554  020127  002676                cmp     r1,#prgnam      ;
 2640 030560  001374                        bne     1$              ;we do this to fake out the DRS macro
 2641
 2642 030562  112737  000045  002552        movb    #45,datare      ;put the "%" delimiter for the DRS macro
 2643 030570  112737  000101  002553        movb    #101,datare+1   ;put the "A" for ascii info for the DRS macro
 2644 030576                                printx  #PB13           ;New Line <cr><lf>
 2645 030616                                printx  #datare         ;print the message returned from the controller
 2646
 2647 030636                        clrDUPbuf:
 2648 030636  012701  002552                mov     #datare,r1      ;clear out entire data area
 2649 030642  105021                2$:     clrb    (r1)+           ;
 2650 030644  020127  002676                cmp     r1,#prgnam      ;
 2651 030650  001374                        bne     2$              ;
 2652 030652  000207                        rts     pc
 2653                                ;*****************************************************************
 2654                                ;
 2655                                ;       THIS ROUTINE IS TO CHECK ON THE RESPONSE PACKET
 2656                                ;       GOODNESS. THE COMMAND REFERENCE NUMBER, THE END CODE
 2657                                ;       AND THE STATUS ARE TESTED.
 2658                                ;*****************************************************************
 2659
 2660 030654                        RSPCHK:
 2661
 2662 030654  013701  002452            mov         cmdpak,r1
 2663 030660  013700  002352            mov         rsppak,r0
 2664 030664  020001                    cmp         r0,r1                   ;compare CRN numbers
 2665 030666  001014                    bne         1$
 2666 030670  013701  002462            mov         cmdpak+10,r1
 2667 030674  062701  000200            add         #200,r1
 2668 030700  013700  002362            mov         rsppak+10,r0
 2669 030704  020001                    cmp         r0,r1                   ;compare Opcodes
 2670 030706  001004                    bne         1$
 2671 030710  013701  002364            mov         rsppak+12,r1            ;check the status
 2672 030714  001001                    bne         1$
 2673 030716  000207                    rts         pc                      ;if all checks then return
 2674
 2675                                                                       ;if all doesn't check then a bad packet
 2676 030720                        1$:     ERRDF   10,df11                 ;Bad response packet
 2677 030730                        PRNTpkt:
 2678 030730                                Printb  #PB11crn,cmdpak,rsppak  ;Expected CRN XXXX ,Received CRN YYYY
 2679 030760  013701  002362                mov     rsppak+10,r1            ;check response opcode reply
```

```
2680 030764  032701  000200              bit     #200,r1                 ;see if a end command response was send
2681 030770  001010                      bne     2$
2682 030772                              printx  #PB11end                ;No end bit in response packet endcode
2683 031012  022701  000201      2$:     cmp     #201,r1
2684 031016  001010                      bne     3$                      ;check if Get Dust Status command
2685 031020                              printx  #PB11GDS
2686 031040  022701  000202      3$:     cmp     #202,r1
2687 031044  001010                      bne     4$                      ;check if Execute Supplied Program
2688 031046                              printx  #PB11ESP
2689 031066  022701  000203      4$:     cmp     #203,r1
2690 031072  001010                      bne     5$                      ;check if Execute Local Program
2691 031074                              printx  #PB11ELP
2692 031114  022701  000204      5$:     cmp     #204,r1
2693 031120  001010                      bne     6$                      ;check if Send Data
2694 031122                              printx  #PB11SD
2695 031142  022701  000205      6$:     cmp     #205,r1
2696 031146  001022                      bne     7$                      ;check if Receive Data
2697 031150                              printx  #PB11RD
2698 031170                              Printb  #PBSF0,r3,r5    ;"type xxx, message number xxxxx is unknow to this program"
2699 031214  022701  000206      7$:     cmp     #206,r1
2700 031220  001010                      bne     8$                      ;check if Abort Program
2701 031222                              printx  #PB11AP
2702 031242                      8$:     Printb  #PB11op,cmdpak+10,rsppak+10
2703                                                                     ;CMDpkt opcode XXXX,RSPpkt opcode YYYYY
2704
2705 031272  013701  002364              mov     rsppak+12,r1            ;find out what kind of status we have
2706 031276  022701  000000              cmp     #0.,r1
2707 031302  001010                      bne     10$
2708 031304                              printx  #pb11s0                 ;status:  successful
2709 031324  022701  000001      10$:    cmp     #1.,r1
2710 031330  001010                      bne     11$
2711 031332                              printx  #pb11s1                 ;status:  Invalid Command
2712 031352  022701  000002      11$:    cmp     #2.,r1
2713 031356  001010                      bne     12$
2714 031360                              printx  #pb11s2                 ;status:  No Region Available
2715 031400  022701  000003      12$:    cmp     #3.,r1
2716 031404  001010                      bne     13$
2717 031406                              printx  #pb11s3                 ;status:  No Region Su'table
2718 031426  022701  000004      13$:    cmp     #4.,r1
2719 031432  001010                      bne     14$
2720 031434                              printx  #pb11s4                 ;status:  Program Not Known
2721 031454  022701  000005      14$:    cmp     #5.,r1
2722 031460  001010                      bne     15$
2723 031462                              printx  #pb11s5                 ;status:  Load Fa'lure
2724 031502  022701  000006      15$:    cmp     #6.,r1
2725 031506  001010                      bne     16$
2726 031510                              printx  #pb11s6                 ;status:  Standalone
2727 031530  022701  000011      16$:    cmp     #9.,r1
2728 031534  001010                      bne     19$
2729 031536                              printx  #pb11s9                 ;status:  Host Buffer Access error
2730 031556                      19$:
2731 031556                              Printb  #PB11sts,rsppak+12      ;Response packet status XXXX
2732 031602  000137  037420              jmp     dropunt                 ;drop unit and go on
2733
2734
2735                             ;*****************************************************************************
2736                             ;
```

```
2737                                    ;                       BIT FIFTEEN TEST
2738                                    ;*************************************************************************
2739 031606                            BIT15T:
2740 031606  032714  100000                       bit     #bit15,(r4)
2741 031612  001001                               bne     100$
2742 031614  000207                               rts     pc
2743 031616                            100$:      ERRDF   9,df12                  ;Fatal SA error
2744 031626  011401                               mov     (r4),r1
2745 031630  022701  001000                       cmp     #1000,r1
2746 031634  001010                               bne     1$
2747 031636                                       printx  #pb1201                 ;
2748 031656  022701  100001           1$:         cmp     #100001,r1
2749 031662  001010                               bne     2$
2750 031664                                       printx  #pb1202                 ;
2751 031704  022701  100002           2$:         cmp     #100002,r1
2752 031710  001010                               bne     3$
2753 031712                                       printx  #pb1203                 ;
2754 031732  022701  100003           3$:         cmp     #100003,r1
2755 031736  001010                               bne     4$
2756 031740                                       printx  #pb1204                 ;
2757 031760  022701  100004           4$:         cmp     #100004,r1
2758 031764  001010                               bne     5$
2759 031766                                       printx  #pb1205                 ;
2760 032006  022701  100005           5$:         cmp     #100005,r1
2761 032012  001010                               bne     6$
2762 032014                                       printx  #pb1206                 ;
2763 032034  022701  100006           6$:         cmp     #100006,r1
2764 032040  001010                               bne     7$
2765 032042                                       printx  #pb1207                 ;
2766 032062  022701  100007           7$:         cmp     #100007,r1
2767 032066  001010                               bne     8$
2768 032070                                       printx  #pb1208                 ;
2769 032110  022701  100010           8$:         cmp     #100010,r1
2770 032114  001010                               bne     9$
2771 032116                                       printx  #pb1209                 ;
2772 032136  022701  100011           9$:         cmp     #100011,r1
2773 032142  001010                               bne     10$
2774 032144                                       printx  #pb1210                 ;
2775 032164  022701  100012           10$:        cmp     #100012,r1
2776 032170  001010                               bne     11$
2777 032172                                       printx  #pb1211                 ;
2778 032212  022701  100013           11$:        cmp     #100013,r1
2779 032216  001010                               bne     12$
2780 032220                                       printx  #pb1212                 ;
2781 032240  022701  100014           12$:        cmp     #100014,r1
2782 032244  001010                               bne     13$
2783 032246                                       printx  #pb1213                 ;
2784 032266  022701  100015           13$:        cmp     #100015,r1
2785 032272  001010                               bne     14$
2786 032274                                       printx  #pb1214                 ;
2787 032314  022701  100016           14$:        cmp     #100016,r1
2788 032320  001010                               bne     15$
2789 032322                                       printx  #pb1215                 ;
2790 032342  022701  100017           15$:        cmp     #100017,r1
2791 032346  001010                               bne     16$
2792 032350                                       printx  #pb1216                 ;
2793 032370  022701  100020           16$:        cmp     #100020,r1
```

SIZER Supplied Program Data

```
 2794 032374  001010                          bne     17$
 2795 032376                                  printx  #pb1217                 ;
 2796 032416  022701  100021          17$:    cmp     #100021,r1
 2797 032422  001010                          bne     18$
 2798 032424                                  printx  #pb1218                 ;
 2799 032444  022701  100022          18$:    cmp     #100022,r1
 2800 032450  001010                          bne     19$
 2801 032452                                  printx  #pb1219                 ;
 2802 032472  022701  100023          19$:    cmp     #100023,r1
 2803 032476  001010                          bne     20$
 2804 032500                                  printx  #pb1220                 ;
 2805 032520  022701  100024          20$:    cmp     #100024,r1
 2806 032524  001010                          bne     21$
 2807 032526                                  printx  #pb1221                 ;
 2808 032546  022701  100025          21$:    cmp     #100025,r1
 2809 032552  001010                          bne     22$
 2810 032554                                  printx  #pb1222                 ;
 2811 032574  022701  100026          22$:    cmp     #100026,r1
 2812 032600  001010                          bne     23$
 2813 032602                                  printx  #pb1223                 ;
 2814 032622                          23$:
 2815 032622                                  printb  #pb12,r1                ;SA value: xxxxx
 2816 032644  000137  037420                  jmp     dropunt                 ;drop unit and go on
 2817
 2818                                 ;*****************************************************************
 2819                                 ;       Unexpected Interrupt Server
 2820                                 ;
 2821                                 ;*****************************************************************
 2822 032650                          intsrv:
 2823
 2824 032650                                  ERRSF   8,sf100 ;Fatal SA error
 2825 032660                                  docln                   ;do clean up and quit
 2826 032662  000137  037420                  jmp     dropunt         ;drop test unit and set pass
 2827
 2828
```

```
 2830 032666                            BGNPROT
 2831 032666  177777                    .WORD -1
 2832 032670  177777                    .WORD  1
 2833 032672  177777                    .WORD  1
 2834 032674                            ENDPROT
 2835
 2836 032674                            BGNINIT                 ;Sequential example
 2837 032674                            READEF      #EF.CONTINUE ;Cont'nue command?
 2838 032702                            BCOMPLETE   conton      ;Yes, get no P table but still init'al'ze
 2839 032704                            READEF      #EF.NEW     ;New pass
 2840 032712                            BNCOMPLETE  next        ;if not new then go to next unit number
 2841 032714                        SETUP:
 2842 032714  012737  177777  002310          mov     #-1,LOGUNIT         ;Initial'ze logical unit nbr
 2843 032722                        NEXT:
 2844 032722  005237  002310              'nc     LOGUNIT             ;Point to next logical unit
 2845 032726  023737  002310  002012      cmp     LOGUNIT,L$UNIT      ;Have we passed max'mum?
 2846 032734  001002                      bne     1$                  ;No
 2847 032736  000137  033114              jmp     ABORT               ;Yes, abort the pass
 2848 032742                        1$:
 2849 032742                              GPHARD LOGUNIT,PLOC         ;Get the P table
 2850 032754                              BNCOMPLETE NEXT             ;if not ava'lable get next unit
 2851
 2852 032756  013700  002314              mov     ploc,r0
 2853 032762  010037  002316              mov     r0,ptbl             ;store the Ptable address for unit
 2854 032766  012037  002324              mov     (r0)+,ipreg         ;store IPreg address into register
 2855 032772  012037  002326              mov     (r0)+,vector        ;store vector
 2856 032776  012037  002330              mov     (r0)+,unit          ;store logical drive number
 2857 033002  012037  002334              mov     (r0)+,sernbr        ;store the serial number
 2858 033006  012037  002336              mov     (r0)+,untflgs
 2859
 2860 033012  005037  002540      conton: clr     LSTCRN              ;bas'c initialization stuff
 2861 033016  005037  002544              clr     LSTVCT
 2862 033022  005037  002546              clr     LOPRGI
 2863 033026  005037  002550              clr     HIPRGI
 2864
 2865 033032  013746  000004      1$:     mov     @#4, (sp)           ;test to see 'f controller is there
 2866 033036  012737  033052  000004      mov     #$2,@#4
 2867 033044  005077  147254              clr     @IPreg              ;get controller into know state
 2868 033050  000410                      br      $3
 2869
 2870 033052                      $2:     ERRDF   7,DF4               ;NXM trap at controller IP address
 2871 033062                              dodu    LOGUNIT             ;drop unit
 2872 033070  000714                      br      next                ;get new unit
 2873
 2874 033072  012637  000004      $3:     mov     (sp)+,@#4           ;move value back into location 4
 2875
 2876 033076  012700  000076              mov     #76,r0              ;clean out all packets and 'nterrupt flags
 2877 033102  012701  002346              mov     #rsp1,r1            ;and the command area
 2878 033106  005021              $4:     clr     (r1)+
 2879 033110  077002                      sob     r0,$4
 2880
 2881 033112  000401                      br      end
 2882
 2883 033114                      ABORT:
 2884 033114                              DOCLN                       ;Do clean up and abort the pass
 2885 033116                       END:
 2886 033116                              ENDINIT                     ;Finished
```

SIZER Supplied Program Data

```
 2887
 2888
 2889 033120                            BGNAUTO
 2890 033120                            DODU LOGUNIT
 2891 033126                            ENDAUTO
 2892
 2893 033130                            BGNCLN
 2894 033130  005077  147170                   clr     @IPreg                  ;get controller into know state
 2895 033134                                   Break                           ;waste some time
 2896 033136                            ENDCLN
 2897
 2898 033140                            BGNDU
 2899 033140                                   printf #DRPunt,unit
 2900 033164                            ENDDU
 2901
```

SIZER Supplied Program Data

```
    2903 033166                                BGNTST 1
    2904 033166  004737  023550                       jsr     pc,hrdint               ;init the controller
    2905 033172  032737  010000  002336               bit     #bit12,untflgs          ;check if just want to park the heads
    2906 033200  001402                               beq     3$
    2907 033202  000137  037420                       jmp     dropunt                 ;jump to end of test where heads are automatically p
arked
    2908 033206  122737  000023  002340  3$:          cmpb    #Mrqdx3,mdlnbr          ;check if RQDX3 controller
    2909 033214  001403                               beq     2$
    2910 033216  042737  100000  002336               bic     #bit15,untflgs          ;if other then RQDX3 than impossible to run auto siz
er or in auto mo
    2911 033224  032737  100000  002336  2$:          bit     #bit15,untflgs          ;test if auto mode is enabled
    2912 033232  001404                               beq     1$                      ;if not skip the auto sizer routine
    2913 033234  004737  024620                       jsr     pc,AUTOsizer            ;if it is then run AUTO SIZER on the controller
    2914 033240  004737  026474                       jsr     pc,AUTOdis              ;display information from autosizer routine
    2915
    2916 033244                                1$:                                     ; ...
    2917 033244  005077  147054                       clr     @IPreg                  ;can any spurious interrupts
    2918 033250                                    printb  #ASMSGT                     ; ...
    2919 033270                                ELPcmd:
    2920 033270  000401                               br      4$                      ; set this to a NOP for APT compatability
    2921 033272  000415                               br      3$                      ; skip manual question
    2922 033274  005037  002322               4$:     clr     boot                    ; WARNING - remove boot diskette first
    2923 033300                                GMANIL  bot.dev,BOOT, 1,YES             ; Insert new diskette
    2924                                                                               ; DO you want to continue
    2925 033314  005737  002322                       tst     BOOT                    ;
    2926 033320  001002                               bne     3$                      ; Yes, run format
    2927 033322  000137  037420                       jmp     dropunt                 ; No, drop unit
    2928 033326                                3$:
    2929
    2930 033326  004737  023550                       jsr     pc,hrdint               ; Reinit ctrl in case of unknown state
    2931 033332                                    printb  #pb9,mdlnbr             ; Print the disk controller model number
    2932 033356                                    printb  #pb10,mcdnbr            ; Print microcode version number in dec.
    2933
    2934 033402  032737  100000  002336               bit     #bit15,untflgs          ;test if auto mode is enabled
    2935 033410  001011                               bne     1$                      ;branch if in auto mode else
    2936 033412                                GMANID ASK.prg,PRGnam,A,-1,6.,6.,yes   ;ask for the User what local program he wants to run
    2937 033432  000411                               br      2$
    2938 033434                                1$:
    2939 033434  012737  047506  002676               mov     #"FO,PRGnam             ;place "FORMAT" into ascii buffer if in auto mode
    2940 033442  012737  046522  002700               mov     #"RM,PRGnam+2
    2941 033450  012737  052101  002702               mov     #"AT,PRGnam+4
    2942 033456                                2$:
    2943 033456                                EXLCPRG PRGnam                          ;Execute Local program "FORMAT" or what ever they wr
ote
         033456  032737  100000  002534  ELP6:    bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
         033464  001374                           bne     ELP6                    ;if we don't own it wait until we do
         033466  012737  000022  002446           mov     #22,cmdlen              ;load lenght of packet to be send
         033474  112737  000000  002450           movb    #0,cmdlen+2             ;load msg type and credit
         033502  112737  000002  002451           movb    #dup.id,cmdlen+3        ;load DUP connection ID
         033510  005237  002452                   inc     cmdpak                  ;load new CRN
         033514  005037  002454                   clr     cmdpak+2
         033520  005037  002456                   clr     cmdpak+4
         033524  005037  002460                   clr     cmdpak+6
         033530  012737  000003  002462           mov     #op.elp,cmdpak+10       ;load up opcode
         033536  012737  000001  002464           mov     #stdaln,cmdpak+12       ;stand alone modifier
         033544  012700  000006                   mov     #6,r0                   ;6 letters transfer
         033550  012701  002466                   mov     #cmdpak+14,r1           ;starting address to place program name
         033554  012702  002676                   mov     #PRGnam,r2              ;start of Program Name
         033560  112221                   rfdj6:  movb    (r2)+,(r1)+             ;add 2 to bycnt then store
         033562  077002                           sob     r0,rfdj6
```

```
        033564  012777  033626  146534          mov     #RFD6,@vector           ;New vector place
        033572  012737  002352  002526          mov     #rsppak,rsprng          ;load response packet area into ring
        033600  012737  002452  002532          mov     #cmdpak,cmdrng          ;load command packet area into ring
        033606  012737  140000  002530          mov     #140000,RSPRNG+2        ;Port ownership bit.
        033614  012737  100000  002534          mov     #bit15,CMDRNG+2
        033622  004737  022760                  jsr     pc,POLLWT               ;Go to poll and wait routine.

                                        ;*************************************************************************

        033626                              RFD6:                               ;Intr to here.
        033626  062706  000006                  add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
        033632  012777  032650  146466          mov     #intsrv,@vector         ;Change vector
        033640  004737  030654                  jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                                ;the response recvd from the mut.
                                                                                ;it will check the cmd ref
                                                                                ;num, the endcode and status.
  2944
  2945 033644   122737  000011  002371          cmpb    #bit3+bit0,rsppak+17    ;is this program a standalone,DUP dialog type
  2946 033652   001406                          beq     1$                      ;
  2947 033654                                   ERRDF   2,DF3                   ;"Device Fatal can't do remote programs
  2948 033664   000137  037420                  jmp     dropunt                 ;drop unit and go on
  2949 033670                           1$:
  2950 033670                           RCDcmd:
  2951 033670                           RECVDAT #datare,#80.
        033670  032737  100000  002534  RCD7:   bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
        033676  001374                          bne     RCD7                    ;if we don't own it wait until we do
        033700  012737  000034  002446          mov     #34,cmdlen              ;load lenght of packet to be send
        033706  112737  000000  002450          movb    #0,cmdlen+2             ;load msg type and credit
        033714  112737  000002  002451          movb    #dup.id,cmdlen+3        ;load DUP connection ID
        033722  005237  002452                  inc     cmdpak                  ;load new CRN
        033726  005037  002454                  clr     cmdpak+2
        033732  005037  002456                  clr     cmdpak+4
        033736  005037  002460                  clr     cmdpak+6
        033742  012737  000005  002462          mov     #op.rec,cmdpak+10       ;load up opcode
        033750  005037  002464                  clr     cmdpak+12               ;no modifiers
        033754  012737  000120  002466          mov     #80.,cmdpak+14
        033762  005037  002470                  clr     cmdpak+16
        033766  012737  002552  002472          mov     #datare,cmdpak+20       ;load address of buffer describtor
        033774  005037  002474                  clr     cmdpak+22
        034000  005037  002476                  clr     cmdpak+24
        034004  005037  002500                  clr     cmdpak+26
        034010  005037  002502                  clr     cmdpak+30
        034014  005037  002504                  clr     cmdpak+32

        034020  012777  034062  146300          mov     #RFD7,@vector           ;New vector place
        034026  012737  002352  002526          mov     #rsppak,rsprng          ;load response packet area into ring
        034034  012737  002452  002532          mov     #cmdpak,cmdrng          ;load command packet area into ring
        034042  012737  140000  002530          mov     #140000,RSPRNG+2        ;Port ownership bit.
        034050  012737  100000  002534          mov     #bit15,CMDRNG+2
        034056  004737  022760                  jsr     pc,POLLWT               ;Go to poll and wait routine.

                                        ;*************************************************************************

        034062                              RFD7:                               ;Intr to here.
        034062  062706  000006                  add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
        034066  012777  032650  146232          mov     #intsrv,@vector         ;Change vector
```

SIZER Supplied Program Data

```
        034074  004737  030654                  jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                                  ;the response recvd from the mut.
                                                                                  ;it will check the cmd ref
                                                                                  ;num, the endcode and status.
    2952                                    ;+
    2953                                    ;       get
    2954                                    ;       r3 = type
    2955                                    ;       r4 - SA adrs
    2956                                    ;       r5 - sub number
    2957                                    ;
    2958 034100  113703  002553            DUPDLG: movb    datare+1,r3             ;get dup type info
    2959 034104  006203                            asr     r3
    2960 034106  006203                            asr     r3
    2961 034110  006203                            asr     r3
    2962 034112  006203                            asr     r3
    2963 034114  042703  177760                    bic     #type,r3                ;mask off all but DUP type
    2964 034120  013705  002552                    mov     datare,r5               ;get dup message number info
    2965 034124  042705  170000                    bic     #msgnbr,r5              ;clear out top 4 bits
    2966
    2967
    2968                                    ;+
    2969                                    ; Check for the type.
    2970                                    ; if QUESTION type, it will be answered by sending
    2971                                    ; an answer through a Send command which will be followed
    2972                                    ; by a Receive command to await further instructions.
    2973                                    ;
    2974                                    ; If a DEFAULT QUESTION type is given an answer will
    2975                                    ; either be given or a blank send command returned.
    2976                                    ; Either way we will do a Send command followed by a
    2977                                    ; Receive command.
    2978                                    ;
    2979                                    ; if INFORMATIONAL type, check message number and type
    2980                                    ; inforrmation according to message number given.
    2981                                    ;
    2982                                    ; if FATAL ERROR type, check message number and print
    2983                                    ; error message accordingly. No other commands will
    2984                                    ; be given following this type of command.
    2985                                    ;
    2986                                    ; If TERMINATION type check the message number and print the
    2987                                    ; correct message. Ussually this implies a succesful
    2988                                    ; end to the formatter. After this command we exit the program
    2989                                    ;
    2990                                    ; If SPECIAL type we are asking for the FCT table to be passed
    2991                                    ; to the RQDX3 controller. We will send the table with a Send
    2992                                    ; command and then to a Receive command to proceed.
    2993                                    ;
    2994 034130  022703  000001            qstn:   cmp     #Question,r3            ;test for "question" subtype
    2995 034134  001117                            bne     dfqstn                  ;if not branch
    2996 034136  032737  020000  002336            bit     #bit13,untflgs          ;see if we are working on a known controller
    2997 034144  001077                            bne     qnbra                   ;if not type out ascii
    2998 034146  122737  000106  002676            cmpb    #'F,prgnam              ;if running the format program then print info
    2999 034154  001073                            bne     qnbra                   ;else just go for an answer
    3000
    3001 034156  004737  030636            qnbr0:  jsr     pc,clrDUPbuf            ;clear out data buffer so DRS macros don't show defa
ult
    3002 034162  022705  000000                    cmp     #0,r5                   ;check for message number
    3003 034166  001036                            bne     qnbr7                   ;check for next message number
    3004 034170  032737  100000  002336            bit     #bit15,untflgs
```

```
                                        bne     1$
                                GMANID  qfdat,DATARE,A,177777,10.,10.,no               ;DATE MM DD YYYY ?
                                        br      2$
                        1$:     mov     #"06,datare             ;The date is not used anyway so any date will do
                                mov     #" 1,datare+2           ;I'll be celebrating this day
                                mov     #"7-,datare+4
                                mov     #"19,datare+6
                                mov     #"86,datare+10
                        2$:     jmp     SDTcmd                  ;branch to Send Data command

                        qnbr7:  cmp     #7,r5                   ;check for message number
                                bne     qnbra                   ;check for next message number
                                bit     #bit15,untflgs
                                bne     1$
                                GMANID  qfser,DATARE,A,177777,8.,10.,NO         ;SERIAL NUMBER 9 digits ?
                                br      2$
                        1$:     mov     sernbr,r0
                                mov     #datare,r1              ;place to stick asc''
                                jsr     pc,OCTASC               ;convert octal to decimal asc''
                        2$:     jmp     SDTcmd

                        qnbra:  jsr     pc,typDUPbuf            ;type out ASCII sent by disk controller
                                GMANID  ASK.ANSWER,DATARE,A,177777,0.,10.,YES   ;give it an answer
                                jmp     SDTcmd                  ;branch to Send Data command


                        dfqstn: cmp     #DefQuest,r3            ;test for "Default Question' subtype
                                beq     1$
                                jmp     infrm                   ;if not branch
                        1$:     bit     #bit13,untflgs          ;see if we are working on a known controller
                                beq     2$
                                jmp     dqnbra                  ;if not type out ascii
                        2$:     cmpb    #'F,prgnam              ;if running the format program then print info
                                bne     dqnbra                  ;else just go for an answer

                        dqnbr1: jsr     pc,clrDUPbuf            ;clear out data buffer so DRS macros don t show defa
ult
                                cmp     #1,r5                   ;check for message number
                                bne     dqnbr4                  ;check for next message number
                                                                ;put in message number
                                bit     #bit15,untflgs
                                bne     3$
                                GMANID  dfunt,DATARE,A,177777,0,3,YES   ;Ask for UNIT NUMBER 0-255 ?
                                br      4$
                        3$:     mov     unit,r0                 ;get unit number if in auto mode from Hardware P tab
le
                                mov     #datare,r1              ;store decimal ascii conversion in data area
                                jsr     pc,OCTASC               ;convert octal to ascii decimal in data area

                        4$:     mov     #datare,r1              ;address of ascii decimal data
                                mov     #unit,r0                ;address to store octal conversion
                                jsr     pc,ASCDEC               ;convert ascii decimal to octal
                        2$:     cmp     #3,unit                 ;make sure unit number is less than 4 or between 0-3
                                bge     1$
                                sub     #4,unit                 ;subtract 4 until unit is less than four
                                br      2$
                        1$:

                                jmp     SDTcmd                  ;branch to Send Data command
```

SIZER Supplied Program Data

```
   3062
   3063 034552  022705  000004          dqnbr4: cmp     #4,r5                   ;check for message number
   3064 034556  001021                          bne     dqnbr5                  ;check for next message number
   3065 034560  012737  000116  00255^          mov     #'N,datare              ;set the default for NO
   3066 034566  032737  100000  002336          bit     #bit15,untflgs
   3067 034574  001010                          bne     1$
   3068 034576                          GMANID  dfbad,DATARE,A,177777,0,1,YES   ;Use existing bad block information (Y or N)?
   3069 034616  000137  035016          1$:     jmp     SDTcmd                  ;branch to Send Data command
   3070
   3071 034622  022705  000005          dqnbr5: cmp     #5,r5                   ;check for message number
   3072 034626  001021                          bne     dqnbr6                  ;check for next message number
   3073 034630  012737  000131  002552          mov     #'Y,datare              ;Set the default for YES
   3074 034636  032737  100000  002336          bit     #bit15,untflgs
   3075 034644  001010                          bne     1$
   3076 034646                          GMANID  dfdwn,DATARE,A,177777,0,1,YES   ;Use Down Line Load (Y or N)?
   3077 034666  000137  035016          1$:     jmp     SDTcmd                  ;branch to Send Data command
   3078
   3079 034672  022705  000006          dqnbr6: cmp     #6,r5                   ;check for message number
   3080 034676  001035                          bne     dqnbra                  ;check for next message number
   3081 034700  012737  000116  002552          mov     #'N,datare              ;set the default for NO
   3082 034706  032737  100000  002336          bit     #bit15,untflgs          ;is this auto mode
   3083 034714  001414                          beq     1$                      ;NO, ask question
   3084                                                                         ;Yes see if RD51
   3085 034716  013701  002330                  mov     unit,r1                 ; first cylinder entry
   3086 034722  006301                          asl     r1                      ;
   3087 034724  062701  026464                  add     #msg+4,r1               ; point to current unit entry
   3088 034730  023711  003102                  cmp     UIT0+UITsiz 2,(r1)      ; Is it an RD51?
   3089 034734  001014                          bne     2$                      ; NO, all done
   3090                                                                         ; YES, make question answer yes because
   3091                                                                         ; NO FCT tables on RD51
   3092 034736  012737  000131  002552          mov     #'Y,datare              ; set the default for NO
   3093 034744  000410                          br      2$                      ; and skip question
   3094 034746                          1$:
   3095 034746                          GMANID  dfcon,DATARE,A,177777,0,1,YES   ;Continue if bad block information is inaccessable (
Y or N)?
   3096 034766  000137  035016          2$:     jmp     SDTcmd
   3097
   3098                                                                         ;if unknown use default and continue
   3099                                                                         ;who knows maybe it will be useful some day
   3100 034772                          dqnbra:
   3101 034772  004737  030542                  jsr     pc,typDUPbuf            ;type out ASCII sent by disk controller
   3102
   3103 034776                          GMANID  ASK.ANSWER,DATARE,A,177777,0.,10.,YES           ;give it an answer
   3104
   3105 035016                          SDTcmd:
   3106 035016                                  SENDDAT #datare,#10.            ;sent the answer
        035016  032737  100000  002534  SDT10:  bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own it
        035024  001374                          bne     SDT10                   ;if we don't own it wait until we do
        035026  012737  000034  002446          mov     #34,cmdlen              ;load lenght of packet to be send
        035034  112737  000000  002450          movb    #0,cmdlen+2             ;load msg type and credit
        035042  112737  000002  002451          movb    #dup.id,cmdlen+3        ;load DUP connection ID
        035050  005237  002452                  inc     cmdpak                  ;load new CRN
        035054  005037  002454                  clr     cmdpak+2
        035060  005037  002456                  clr     cmdpak+4
        035064  005037  002460                  clr     cmdpak+6
        035070  012737  000004  002462          mov     #op.sen,cmdpak+10       ;load up opcode
        035076  005037  002464                  clr     cmdpak+12               ;no modifiers
        035102  012737  000012  002466          mov     #10.,cmdpak+14
```

SIZER Supplied Program Data

```
        035110  005037  002470                  clr     cmdpak+16
        035114  012737  002552  002472          mov     #datare,cmdpak+20       ;load address of buffer describtor
        035122  005037  002474                  clr     cmdpak+22
        035126  005037  002476                  clr     cmdpak+24
        035132  005037  002500                  clr     cmdpak+26
        035136  005037  002502                  clr     cmdpak+30
        035142  005037  002504                  clr     cmdpak+32

        035146  012777  035210  145152          mov     #RFD10,@vector          ;New vector place
        035154  012737  002352  002526          mov     #rsppak,rsprng          ;load response packet area into ring
        035162  012737  002452  002532          mov     #cmdpak,cmdrng          ;load command packet area into ring
        035170  012737  140000  002530          mov     #140000,RSPRNG+2        ;Port ownership bit.
        035176  012737  100000  002534          mov     #bit15,CMDRNG+2
        035204  004737  022760                  jsr     pc,POLLWT               ;Go to poll and wait routine.

                                        ;*************************************************************************

        035210                          RFD10:                                  ;Intr to here.
        035210  062706  000006                  add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
        035214  012777  032650  145104          mov     #intsrv,@vector         ;Change vector
        035222  004737  030654                  jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                                ;the response recvd from the mut.
                                                                                ;it will check the cmd ref
                                                                                ;num, the endcode and status.
   3107 035226  000137  033670                  jmp     RCDcmd                  ;do another receive cmd
   3108
   3109
   3110
   3111 035232  022703  000003          infrm:  cmp     #Inform,r3              ;test for "Informational" subtype
   3112 035236  001046                          bne     term                    ;if not branch
   3113 035240  032737  020000  002336          bit     #bit13,untflgs          ;see if we are working on a known controller
   3114 035246  001036                          bne     inbra                   ;if not type out ascii
   3115 035250  122737  000106  002676          cmpb    #'F,prgnam              ;if running the format program then print info
   3116 035256  001032                          bne     inbra
   3117
   3118 035260  022705  000000          inbr0:  cmp     #0,r5                   ;check for message number
   3119 035264  001012                          bne     inbr1                   ;check for next message number
   3120 035266  004737  030636                  jsr     pc,clrDUPbuf            ;clear out DUP buffer so there is no echo on last AS
CII
   3121 035272                                  printf  #sfbegt                 ;format begun
   3122 035312  022705  000001          inbr1:  cmp     #1,r5                   ;check for message number
   3123 035316  001012                          bne     inbra                   ;check for next message number
   3124 035320  004737  030636                  jsr     pc,clrDUPbuf            ;clear out DUP buffer so there is no echo on last AS
CII
   3125 035324                                  printf  #sfdont                 ;format complete
   3126
   3127 035344  004737  030542          inbra:  jsr     pc,typDUPbuf            ;type out ASCII sent by disk controller
   3128 035350  000137  033670                  jmp     RCDcmd                  ;do another receive command
   3129
   3130
   3131
   3132 035354  022703  000004          term:   cmp     #terminat,r3            ;test for termination type
   3133 035360  001116                          bne     ftler                   ;if not branch
   3134 035362  032737  020000  002336          bit     #bit13,untflgs          ;see if we are working on a known controller
   3135 035370  001076                          bne     tnbra                   ;if not type out ascii
   3136 035372  122737  000106  002676          cmpb    #'F,prgnam              ;if running the format program then branch to error
routine
   3137 035400  001072                          bne     tnbra
   3138
   3139 035402  022705  000014          tnbr12: cmp     #12.,r5                 ;test for sub number 01
```

```
   3140 035406  001012                          bne     tnbr13                  ;branch if not sub number #1
   3141 035410                                  printf  #sffcut
   3142 035430  000137  037420                  jmp     dropunt                 ;drop test unit and end pass
   3143
   3144 035434  022705  000015          tnbr13: cmp     #13.,r5                 ;test for msg number
   3145 035440  001052                          bne     tnbra                   ;branch if not right number
   3146 035442                                  printf  #sffcnt                 ;
   3147 035462  032737  100000  002336          bit     #bit15,untflgs          ;are we in auto mode
   3148 035470  001434                          beq     2$                      ;  NO , then we are all done
   3149                                                                         ;  YES, is this an RX33
   3150 035472  013701  002330                  mov     unit,r1                 ; first cylinder entry
   3151 035476  006301                          asl     r1                      ;
   3152 035500  062701  026464                  add     #msg+4,r1               ; point to current unit entry
   3153 035504  022711  000003                  cmp     #3,(r1)                 ; Is it an RX33?
   3154 035510  001024                          bne     2$                      ; NO, all done
   3155                                                                         ; YES, ask if it wants to continue or not
   3156
   3157 035512  005077  144606                  clr     @IPreg                  ; reinit the controller stop spurious interrupts
   3158 035516                          GMANIL  bot.con,BOOT, 1,YES             ; Do you want to format another?
   3159
   3160 035532  005737  002322                  tst     BOOT                    ; Yes, execute local program
   3161 035536  001007                          bne     1$                      ; No, tell him to insert bootable media
   3162
   3163 035540                          GMANIL  bot.rep,BOOT, 1,YES             ; Please insert boot media and hit return
   3164 035554  000402                          br      2$                      ;
   3165 035556  000137  033270          1$:     jmp     ELPcmd                  ;
   3166 035562  000137  037420          2$:     jmp     dropunt                 ;
   3167
   3168 035566  004737  030542          tnbra:  jsr     pc,typDUPbuf            ;type out ASCII sent by disk controller
   3169 035572                                  printf  #PF2                    ;print finished local program without procedure erro
r
   3170 035612  000137  037426                  jmp     etst                    ;end DUP diaglog but stay in test loop
   3171
   3172
   3173 035616  022703  000005          ftler:  cmp     #Ftlerr,r3              ;test for "Fatal Error" subtype
   3174 035622  001402                          beq     1$
   3175 035624  000137  037100                  jmp     spcl                    ;if not branch
   3176 035630  032737  020000  002336  1$:     bit     #bit13,untflgs          ;see if we are working on a known controller
   3177 035636  001004                          bne     3$                      ;if not type out asci
   3178 035640  122737  000106  002676          cmpb    #'F,prgnam              ;if running the format program then branch to error
routine
   3179 035646  001414                          beq     2$
   3180 035650  004737  030542          3$:     jsr     pc,typDUPbuf            ;type out ASCII sent by disk controller
   3181 035654                                  printf  #DF15                   ;Fatal error reported when running local program
   3182 035674  000137  037420                  jmp     dropunt                 ;drop unit and end pass
   3183
   3184 035700                          2$:     ERRHRD  1,HRD0                  ;Hard device  error
   3185
   3186 035710  022705  000001          fnbr1:  cmp     #1,r5                   ;test for sub number #1
   3187 035714  001012                          bne     fnbr2                   ;branch if not sub number #1
   3188 035716                          gstsf:
   3189 035716                                  printb  #efstat                 ;"GET STATUS failure'
   3190 035736  000137  037420                  jmp     dropunt                 ;drop unit and end pass
   3191
   3192 035742  022705  000002          fnbr2:  cmp     #2.,r5                  ;test for msg number
   3193 035746  001012                          bne     fnbr3                   ;branch if not right number
   3194 035750                                  printf  #efsndt                 ;
   3195 035770  000137  037420                  jmp     dropunt                 ;drop unit and end pass
   3196
```

```
3197 035774  022705  000003          fnbr3:  cmp     #3.,r5          ;test for msg number
3198 036000  001012                         bne     fnbr4           ;branch if not right number
3199 036002                                 printf  #efcmdt         ;
3200 036022  000137  037420                 jmp     dropunt         ;drop unit and end pass
3201
3202 036026  022705  000004          fnbr4:  cmp     #4.,r5          ;test for msg number
3203 036032  001012                         bne     fnbr5           ;branch if not right number
3204 036034                                 printf  #efrcvt         ;
3205 036054  000137  037420                 jmp     dropunt         ;drop unit and end pass
3206
3207 036060  022705  000005          fnbr5:  cmp     #5.,r5          ;test for msg number
3208 036064  001012                         bne     fnbr6           ;branch if not right number
3209 036066                                 printf  #efbust         ;
3210 036106  000137  037420                 jmp     dropunt         ;drop unit and end pass
3211
3212 036112  022705  000006          fnbr6:  cmp     #6.,r5          ;test for msg number
3213 036116  001012                         bne     fnbr7           ;branch if not right number
3214 036120                                 printf  #efinit         ;
3215 036140  000137  037420                 jmp     dropunt         ;drop unit and end pass
3216
3217 036144  022705  000007          fnbr7:  cmp     #7.,r5          ;test for msg number
3218 036150  001012                         bne     fnbr8           ;branch if not right number
3219 036152                                 printf  #efnut          ;
3220 036172  000137  037420                 jmp     dropunt         ;drop unit and end pass
3221
3222 036176  022705  000010          fnbr8:  cmp     #8.,r5          ;test for msg number
3223 036202  001012                         bne     fnbr9           ;branch if not right number
3224 036204                                 printf  #efdxft
3225 036224  000137  037420                 jmp     dropunt         ;drop unit and end pass
3226
3227 036230  022705  000011          fnbr9:  cmp     #9.,r5          ;test for msg number
3228 036234  001012                         bne     fnbr10          ;branch if not right number
3229 036236                                 printf  #effcct         ;
3230 036256  000137  037420                 jmp     dropunt         ;drop unit and end pass
3231
3232 036262  022705  000012          fnbr10: cmp     #10.,r5         ;test for msg number
3233 036266  001012                         bne     fnbr11          ;branch if not right number
3234 036270                                 printf  #efsekt         ;
3235 036310  000137  037420                 jmp     dropunt         ;drop unit and end pass
3236
3237 036314  022705  000013          fnbr11: cmp     #11.,r5         ;test for msg number
3238 036320  001012                         bne     fnbr12          ;branch if not right number
3239 036322                                 printf  #efrcct         ;
3240 036342  000137  037420                 jmp     dropunt         ;drop unit and end pass
3241
3242 036346  022705  000014          fnbr12: cmp     #12.,r5         ;test for msg number
3243 036352  001012                         bne     fnbr13          ;branch if not right number
3244 036354                                 printf  #eflbft         ;
3245 036374  000137  037420                 jmp     dropunt         ;drop unit and end pass
3246
3247 036400  022705  000015          fnbr13: cmp     #13.,r5         ;test for msg number
3248 036404  001012                         bne     fnbr14          ;branch if not right number
3249 036406                                 printf  #effcwt         ;
3250 036426  000137  037420                 jmp     dropunt         ;drop unit and end pass
3251
3252 036432  022705  000016          fnbr14: cmp     #14.,r5         ;test for msg number
3253 036436  001012                         bne     fnbr15          ;branch if not right number
```

```
3254 036440                                    printf  #efrcrt                ;
3255 036460  000137  037420                    jmp     dropunt                ;drop un't and end pass
3256
3257 036464  022705  000017          fnbr15:   cmp     #15.,r5                ;test for msg number
3258 036470  001012                            bne     fnbr16                 ;branch 'f not r'ght number
3259 036472                                    printf  #efrcwt                ;
3260 036512  000137  037420                    jmp     dropunt                ;drop unit and end pass
3261
3262 036516  022705  000020          fnbr16:   cmp     #16.,r5                ;test for msg number
3263 036522  001012                            bne     fnbr17                 ;branch if not right number
3264 036524                                    printf  #efrcft                ;
3265 036544  000137  037420                    jmp     dropunt                ;drop unit and end pass
3266
3267 036550  022705  000021          fnbr17:   cmp     #17.,r5                ;test for msg number
3268 036554  001012                            bne     fnbr18                 ;branch if not r'ght number
3269 036556                                    printf  #effcrt                ;
3270 036576  000137  037420                    jmp     dropunt                ;drop unit and end pass
3271
3272 036602  022705  000022          fnbr18:   cmp     #18.,r5                ;test for msg number
3273 036606  001012                            bne     fnbr19                 ;branch if not r'ght number
3274 036610                                    printf  #effcnt                ;
3275 036630  000137  037420                    jmp     dropunt                ;drop unit and end pass
3276
3277 036634  022705  000023          fnbr19:   cmp     #19.,r5                ;test for msg number
3278 036640  001012                            bne     fnbr20                 ;branch 'f not right number
3279 036642                                    printf  #effcdt                ;
3280 036662  000137  037420                    jmp     dropunt                ;drop unit and end pass
3281
3282 036666  022705  000024          fnbr20:   cmp     #20.,r5                ;test for msg number
3283 036672  001012                            bne     fnbr21                 ;branch 'f not right number
3284 036674                                    printf  #eftmot                ;
3285 036714  000137  037420                    jmp     dropunt                ;drop unit and end pass
3286
3287 036720  022705  000025          fnbr21:   cmp     #21.,r5                ;test for msg number
3288 036724  001012                            bne     fnbr22                 ;branch if not right number
3289 036726                                    printf  #efillt                ;
3290 036746  000137  037420                    jmp     dropunt                ;drop unit and end pass
3291
3292 036752  022705  000026          fnbr22:   cmp     #22.,r5                ;test for msg number
3293 036756  001012                            bne     fnbr23                 ;branch if not right number
3294 036760                                    printf  #efwart                ;
3295 037000  000137  037420                    jmp     dropunt                ;drop unit and end pass
3296
3297 037004  022705  000027          fnbr23:   cmp     #23.,r5                ;test for msg number
3298 037010  000412                            br      fnbr24                 ;branch if not right number
3299 037012                                    printf  #efinpt                ;
3300 037032  000137  037420                    jmp     dropunt                ;drop unit and end pass
3301
3302
3303 037036  022705  000030          fnbr24:   cmp     #24.,r5                ;test for msg number
3304 037042  001012                            bne     1$
3305 037044                                    printf  #efmedt
3306 037064  000137  037420                    jmp     dropunt                ;drop unit and end pass
3307
3308 037070  004737  030542          1$:       jsr     pc,typDUPbuf           ;type out ASCII sent by disk controller
3309 037074  000137  037420                    jmp     dropunt                ;drop unit and end pass
3310
```

```
 037100  022703  000006          spcl:   cmp     #specl,r3               ;test for special type
 037104  001137                          bne     unkwn                   ;branch if not known
 037106  032737  020000  002336          bit     #bit13,untflgs          ;see if we are working on a known controller
 037114  001004                          bne     2$                      ;if not type out ascii
 037116  122737  000106  002676          cmpb    #'F,prgnam              ;if running the format program then print 'nfo
 037124  001414                          beq     1$
 037126  004737  030542          2$:     jsr     pc,typDUPbuf            ;type out ASCII sent by d'sk controller
 037132                                  pr'ntf  #DF16                   ;spec'al command 'ssued by local program did not kno
w how to handle
 037152  000137  037404                  jmp     unkwn                   ;report error

 037156  022705  000002          1$:     cmp     #2,r5                   ;test for message number 1
 037162  001110                          bne     unkwn                   ;branch 'f not known
 037164  004737  027542                  jsr     pc,blduit               ;go get or build UIT table
 037170                                  SENDDAT UITadr,#UITsiz          ;sent Unit Information table
 037170  032737  100000  002534  SDT11:  bit     #bit15,cmdrng+2         ;test ownership of ring make sure we own 't
 037176  001374                          bne     SDT11                   ;if we don't own 't wa't until we do
 037200  012737  000034  002446          mov     #34,cmdlen              ;load lenght of packet to be send
 037206  112737  000000  002450          movb    #0,cmdlen+2             ;load msg type and cred't
 037214  112737  000002  002451          movb    #dup.id,cmdlen+3        ;load DUP connection ID
 037222  005237  002452                  inc     cmdpak                  ;load new CRN
 037226  005037  002454                  clr     cmdpak+2
 037232  005037  002456                  clr     cmdpak+4
 037236  005037  002460                  clr     cmdpak+6
 037242  012737  000004  002462          mov     #op.sen,cmdpak+10       ;load up opcode
 037250  005037  002464                  clr     cmdpak+12               ;no modifiers
 037254  012737  000104  002466          mov     #UITs'z,cmdpak+14
 037262  005037  002470                  clr     cmdpak+16
 037266  013737  002320  002472          mov     UITadr,cmdpak+20        ;load address of buffer describtor
 037274  005037  002474                  clr     cmdpak+22
 037300  005037  002476                  clr     cmdpak+24
 037304  005037  002500                  clr     cmdpak+26
 037310  005037  002502                  clr     cmdpak+30
 037314  005037  002504                  clr     cmdpak+32

 037320  012777  037362  143000          mov     #RFD11,@vector          ;New vector place
 037326  012737  002352  002526          mov     #rsppak,rsprng          ;load response packet area into ring
 037334  012737  002452  002532          mov     #cmdpak,cmdrng          ;load command packet area 'nto ring
 037342  012737  140000  002530          mov     #140000,RSPRNG+2        ;Port ownersh'p bit.
 037350  012737  100000  002534          mov     #bit15 CMDRNG+2
 037356  004737  022760                  jsr     pc,POl   T              ;Go to poll and wait rout'ne.

                                 ;*******************************************************************

 037362                                  RFD11:                          ;Intr to here.
 037362  062706  000006                  add     #6,sp                   ;fix stack for interrupt (4), pollwt subrtn (2)
 037366  012777  032650  142732          mov     #intsrv,@vector         ;Change vector
 037374  004737  030654                  jsr     pc,RSPCHK               ;Go to routine that will check on
                                                                         ;the response recvd from the mut.
                                                                         ;it will check the cmd ref
                                                                         ;num, the endcode and status.
 037400  000137  033670                  jmp     RCDcmd                  ;do another receive cmd


 037404                          unkwn:  ERRSF   0,SF0                   ; system error unkown response
```

SIZER Supplied Program Data

```
3332 037414  004737  030730                jsr     pc,PRNTpkt              ;type out packet information
3333
3334 037420                        dropunt:
3335 037420                                DODU    LOGUNIT                 ;drop the unit
3336
3337 037426                        etst:
3338 037426  023727  002340  000023          cmp     mdlnbr,#mrqdx3
3339 037434  001014                          bne     1$                      ;if rqdx3 do park else don't
3340 037436  004737  023550                jsr     pc,hrdint               ;reboot system controller
3341 037442                            printb  #Parkdrv                ;tell user to wait while parking heads
3342 037462  004737  024620                jsr     pc,autosizer            ;go park heads
3343 037466                        1$:
3344 037466                                docln                           ;take controller offline
3345 037470                        ENDTST
```

SIZER Supplied Program Data

```
3347 037472                          BGNHRD
3348
3349 037474                               GPRMA ip.adr,0,0,160000,177776,YES   ;Get IP reg addr (170000-177776)
3350                                                                           ;place in word 2 of the table
3351                                                                           ;default value is from default
3352                                                                           ;table.
3353
3354 037504                               GPRMA vec.adr,2,0,0,776,YES          ;Get the vector addr (octal 0-776)
3355                                                                           ;place in word
3356                                                                           ;default value is from default
3357                                                                           ;table.
3358
3359 037514                               GPRML prk.hds,10,bit12,YES           ;ask if they want to just park the heads
3360
3361 037522                               XFERT label0                         ;If last gprml input is true (y) transfer
3362
3363 037524                               GPRML auto.md,10,bit15,YES           ;ask if they want to go in to auto mode
3364                                                                           ;This will format the drive using the autosizer
3365
3366 037532                               XFERF label0                         ;If last gprml input is false (n) transfer
3367                                                                           ;control to label.
3368
3369 037534                               GPRMD drv.nbr,4,D,-1,0,255.,YES      ;Get the logical drive (dECIMAL 0-255)
3370                                                                           ;place in word
3371                                                                           ;default value is from default
3372                                                                           ;table.
3373
3374
3375 037546                               GPRMD ser.nbr,6,D, 1,1,012345.,YES   ;Get the drive serial number
3376                                                                           ;place in word
3377                                                                           ;default value is from default
3378                                                                           ;table.
3379
3380
3381 037560                          label0:
3382
3383 037560                          exit hrd
3384 037562                           ENDHRD
3385
3386
3387 037562                           LASTAD
     037566                          L$LAST::
3388 037566                          ENDMOD
3389          000001                  .END
```

Symbol table

```
A       = 000000          BIT9    = 001000 G        C$PNTR- 000014          DRVTX4  005165          FNBR18  036602
ABORT     033114          BLDUIT    027542          C$PNTF- 000017          DRVTX5  005261          FNBR19  036634
ABRT3     024450          BOE     - 000400 G        C$PNTS= 000016          DRVTX6  005355          FNBR2   035742
ADR     = 000020 G        BOOT      002322          C$PNTX  000015          DRVTX7  005450          FNBR20  036666
ASCDEC    030434          BOT.CO    007673          C$PUTB- 000072          DRV.NB  004222          FNBR21  036720
ASK.AN    020543          BOT.DE    007147          C$PUTW= 000073          DUPDLG  034100          FNBR22  036752
A K.DB    006746          BOT.RE    007603          C$QIO - 000377          DUP.ID- 000002          FNBR23  037004
ASK.LB    007021          CINTR     002522          C$RDBU- 000007          EFBUST  021517          FNBR24  037036
ASK.PR    006625          CLRDUP    030636          C$REFG= 000047          EFCMDT  021435          FNBR3   035774
ASK.RB    007074          CMDLEN    002446          C$REL - 000077          EFDXFT  021642          FNBR4   036026
ASK.XB    006673          CMDPAK    002452          C$RESE  000033          EFFCCT  021731          FNBR5   036060
ASMSGR    005637          CMDRNG    002532          C$REVI= 000003          EFFCDT  022425          FNBR6   036112
ASMSGT    006507          CONT      030344          C$RFLA= 000021          EFFCNT  022401          FNBR7   036144
ASMSG1    005733          CONTON    033012          C$RPT = 000025          EFFCRT  022356          FNBR8   036176
ASMSG2    006234          C$AU    = 000052          C$SEFG- 000046          EFFCWT  022211          FNBR9   036230
ASMSG3    006257          C$AUTO= 000061            C$SPRI- 000041          EFILLT  022511          FTLER   035616
ASMSG4    006341          C$BRK   = 000022          C$SVEC= 000037          EFINIT  021543          FTLERR= 000005
ASMSG5    006411          C$BSEG= 000004            C$TOME- 000076          EFINPT  022664          F$AU    = 000015
ASMSG6    006463          C$BSUB= 000002            DATARE  002552          EFLBFT  022126          F$AUTO= 000020
ASMSG7    006021          C$CLCK= 000062            DBN     002720          EFMEDT  022705          F$BGN - 000040
ASMSG8    006066          C$CLEA= 000012            DECTBL  030420          EFNUT   021606          F$CLEA= 000007
ASMSG9    006152          C$CLOS= 000035            DEFQUE= 000002          EFRCCT  022037          F$DU    = 000016
ASSEMB= 000010            C$CLP1= 000006            DFBAD   020300          EFRCFT  022341          F$END - 000041
AUTO      025314 G        C$CPBF= 000074            DFCON   020400          EFRCRT  022272          F$HARD= 000004
AUTOBL    030060          C$CPME= 000075            DFDWN   020350          EFRCVT  021466          F$HW    = 000013
AUTODI    026474          C$CVEC= 000036            DFPTBL  002276 G        EFRCWT  022315          F$INIT= 000006
AUTOEN    026474          C$DCLN= 000044            DFQSTN  034374          EFSEKT  022020          F$JMP   = 000050
AUTOSI    024620          C$DODU= 000051            DFUNT   020237          EFSNDT  021407          F$MOD   = 000000
AUTOSZ    025270          C$DRPT= 000024            DF1     011141          EFSTAT  021360          F$MSG   = 000011
AUTO.M    004305          C$DU    = 000053          DF11    011425          EFTMOT  022462          F$PROT= 000021
B       = 000011          C$EDIT= 000003            DF12    011462          EFUNRG  022730          F$PWR   = 000017
BIT0    = 000001 G        C$ERDF= 000055            DF13    011516          EFWART  022563          F$RPT   = 000012
BIT00   = 000001 G        C$ERHR= 000056            DF14    011572          EF.CON= 000036 G        F$SEG   = 000003
BIT01   = 000002 G        C$ERRO= 000060            DF15    011653          EF.NEW= 000035 G        F$SOFT= 000005
BIT02   = 000004 G        C$ERSF= 000054            DF16    011743          EF.PWR= 000034 G        F$SRV - 000010
BIT03   = 000010 G        C$ERSO= 000057            DF2     011203          EF.RES= 000037 G        F$SUB   = 000002
BIT04   = 000020 G        C$ESCA= 000010            DF3     011252          EF.STA= 000040 G        F$SW    = 000014
BIT05   = 000040 G        C$ESEG= 000005            DF4     011362          ELPCMD  033270          F$TEST= 000001
BIT06   = 000100 G        C$ESUB= 000003            DIAGMC= 000000          ELP6    033456          GDSCMD  024264
BIT07   = 000200 G        C$ETST= 000001            DNINT   024616          END     033116          GDS0    023060
BIT08   = 000400 G        C$EXIT= 000032            DOUDC   026366 G        ERSEK0= 000003          GDS2    024264
BIT09   = 001000 G        C$FREQ= 000101            DOURET  026450          ERUDON= 000001          GOBIT   024250
BIT1    = 000002 G        C$FRME= 000100            DO.CON  004426          ERUINT= 000002          GSTSF   035716
BIT10   = 002000 G        C$GETB= 000026            DQNBRA  034772          ESP4    024620          G$CNTO= 000200
BIT11   = 004000 G        C$GETW= 000027            DQNBR1  034432          ETST    037426          G$DELM= 000372
BIT12   = 010000 G        C$GMAN= 000043            DQNCR4  034552          EVL     = 000004 G      G$DISP= 000003
BIT13   = 020000 G        C$GPHR= 000042            DQNBR5  034622          E$END   = 002100        G$EXCP= 000400
BIT14   = 040000 G        C$GPRI= 000040            DQNBR6  034672          E$LOAD= 000035          G$HILI= 000002
BIT15   = 100000 G        C$INIT= 000011            DROPUN  037420          FNBR1   035710          G$LOLI= 000001
BIT15T    031606          C$INLP= 000020            DRPUNT  017771          FNBR10  036262          G$NO    = 000000
BIT2    = 000004 G        C$MANI= 000050            DRVTXA  004462          FNBR11  036314          G$OFFS= 000400
BIT3    = 000010 G        C$MAP   = 000102          DRVTXB  004511          FNBR12  036346          G$OFSI= 000376
BIT4    = 000020 G        C$MEM   = 000031          DRVTXC  005543          FNBR13  036400          G$PRMA= 000001
BIT5    = 000040 G        C$MMU   = 000103          DRVTX0  004605          FNBR14  036432          G$PRMD= 000002
BIT6    = 000100 G        C$MSG   = 000023          DRVTX1  004701          FNBR15  036464          G$PRML= 000000
BIT7    = 000200 G        C$OPNR= 000034            DRVTX2  004775          FNBR16  036516          G$RADA= 000140
BIT8    = 000400 G        C$OPNW= 000104            DRVTX3  005071          FNBR17  036550          G$RADB= 000000
```

SEQ 0078

Symbol table

```
G$RADD= 000040          L$CCP   002106 G        MRQDX1= 000007          PB11EN  014673          PRI01 = 000040 G
G$RADL= 000120          L$CLEA  033130 G        MRQDX3- 000023          PB11ES  015002          PRI02 = 000100 G
G$RADO= 000020          L$CO    002032 G        MSECA = 007570          PB11GD  014752          PRI03 - 000140 G
G$XFER= 000004          L$DEPO  002011 G        MSEND   026430          PB11OP  014565          PRI04 = 000200 G
G$YES = 000010          L$DESC  002126 G        MSG     026[illegible]0 G       PB11RD  015113          PRI05 = 000240 G
HIPRGI  002550          L$DESP  002076 G        MSGDAT  026462          PB11SD  015071          PRI06 = 000300 G
HOE   = 100000 G        L$DEVP  002060 G        MSGLEN= 000014          PB11ST  014637          PRI07 = 000340 G
HRDINT  023550          L$DISP  002124 G        MSGNBR= 170000          PB11S0  015162          PRK.HD  004176
HRDO    012250          L$DLY   002116 G        MSIN    026410          PB11S1  015207          PRNTPK  030730
IBE   = 010000 G        L$DTP   002040 G        MSWAIT  026404          PB11S2  015241          PS0   = 000000
IDU   = 000040 G        L$DTYP  002034 G        NEXT    032722          PB11S3  015277          PS7   = 000340
IER   = 020000 G        L$DU    033140 G        OCTASC  030346          PB11S4  015334          PTBL    002316
INBRA   035344          L$DUT   002072 G        OP.ABR- 000006          PB11S5  015370          QFDAT   020206
INBRO   035260          L$DVTY  002166 G        OP.DD - 000001          PB11S6  015417          QFSER   020467
INBR1   035312          L$EF    002052 G        OP.ELP= 000003          PB11S9  015444          QFUIT   020131
INFORM= 000003          L$ENVI  002044 G        OP.END= 000200          PB11W0  015507          QNBRA   034344
INFRM   035232          L$ETP   002102 G        OP.ESP= 000002          PB11W1  015573          QNBR0   034156
INTSRV  032650          L$EXP1  002046 G        OP.GDS= 000001          PB12    017674          QNBR7   034264
IPREG   002324          L$EXP4  002064 G        OP.RD = 000003          PB1201  015664          QSTN    034130
IP ADR  004144          L$EXP5  002066 G        OP.REC= 000005          PB1202  015750          QUESTI= 000001
ISR   = 000100 G        L$HARD  037474 G        OP.RES= 000000          PB1203  016035          RBN     002746
IXE   = 004000 G        L$HIME  002120 G        OP.SEN= 000004          PB1204  016106          RCDCMD  033670
I$AU  = 000041          L$HPCP  002016 G        OP.SI1= 000005          PB1205  016147          RCD5    025056
I$AUTO= 000041          L$HPTP  002022 G        OP.SO1= 000007          PB1206  016210          RCD7    033670
I$CLK = 100006          L$HW    002276 G        OP.SRD= 000044          PB1207  016262          RD.MOD= 000300
I$CLN = 000041          L$ICP   002104 G        OP.SRP= 000100          PB1208  016335          RETRY = 000367
I$DU  = 000041          L$INIT  032674 G        OP.SRX= 000054          PB1209  016371          RFDJ6   033560
I$HRD = 000041          L$LADP  002026 G        O$APTS= 000000          PB1210  016472          RFDO    023226
I$INIT= 000041          L$LAST  037566 G        O$AU  = 000000          PB1211  016534          RFD10   035210
I$MOD = 000041          L$LOAD  002100 G        O$BGNR= 000000          PB1212  016570          RFD11   037362
I$MSG = 000041          L$LUN   002074 G        O$BGNS= 000000          PB1213  016645          RFD2    024412
I$PROT= 000040          L$MREV  002050 G        O$DU  = 000001          PB1214  016711          RFD3    024576
I$PTAB= 000041          L$NAME  002000 G        O$ERRT= 000000          PB1215  016762          RFD4    025040
I$PWR = 000041          L$PRIO  002042 G        O$GNSW= 000000          PB1216  017023          RFD5    025250
I$RPT = 000041          L$PROT  032666 G        O$POIN= 000001          PB1217  017117          RFD6    033626
I$SEC = 100016          L$PRT   002112 G        O$SETU= 000001          PB1218  017214          RFD7    034062
I$SEG = 000041          L$REPP  002062 G        PARKDR  006512          PB1219  017271          RINTR   002524
I$SETU= 000041          L$REV   002010 G        PARKIT  026160          PB1220  017330          RSPCHK  030654
I$SRV = 000041          L$SPC   002056 G        PBF0    013422          PB1221  017415          RSPPAK  002352
I.SUB = 000041          L$SPCP  002020 G        PBF1    013522          PB1222  017464          RSPRNG  002526
I$TST = 000041          L$SPTP  002024 G        PBF10   014455          PB1223  017557          RSP1    002346
I$UDC = 100002          L$STA   002030 G        PBF2    013651          PB13    013332          RW$PLL= 140002
J$JMP = 000167          L$TEST  002114 G        PBF3    013725          PB3     012516          R$CMD = 140012
LABELO  037560          L$TIML  002014 G        PBF4    014021          PB4     012564          R$DAT = 140010
LBN     002733          L$UNIT  002012 G        PBF5    014064          PB5     012636          R$FPS = 140006
LOCAL   002312          L10000  002310          PBF6    014131          PB6     012727          SDTCMD  035016
LOE   = 040000 G        L10002  033116          PBF7    014226          PB7     013031          SDT10   035016
LOGUNI  002310          L10003  033126          PBF8    014325          PB8     013063          SDT11   037170
LOPRGI  002546          L10004  033136          PBF9    014415          PB9     013117          SERNBR  002334
LOT   = 000010 G        L10005  033164          PBSF0   017723          PF2     013335          SER.NB  004250
LSTCMD  002542          L10006  037470          PB0     012405          PLOC    002314          SETUP   032714
LSTCRN  002540          L10007  037562          PB1     012434          PNT   = 001000 G        SFBEGT  020550
LSTVCT  002544          MANBLD  027556          PB10    013161          POLLW   022760          SFCYLT  021234
L$ACP   002110 G        MAXDRV= 000004          PB11    013223          POLLWT  022760          SFDBBT  021016
L$APT   002036 G        MCDNBR  002342          PB11AP  015140          PRGNAM  002676          SFDONT  020571
L$AUT   002070 G        MDLNBR  002340          PB11CR  014515          PRI   = 002000 G        SFFCNT  021307
L$AUTO  033120 G        MOD1    002000 G        PB11EL  015037          PRIOO = 000000 G        SFFCUT  021255
```

Symbol table

```
SFRBBT  021221          STEPRX  025656          TBQ28   010735          T$NEST- 177777          UIT2    003210
SFRCBT  020736          SVCGBL= 000000          TBQ29   010765          T$NS0 = 000000          UIT3    003314
SFREVT  020615          SVCINS= 177777          TBQ3    010076          T$NS1 = 000004          UIT4    003420
SFR1T   020637          SVCSUB= 177777          TBQ30   011016          T$PTHV= ****** GX       UIT5    003524
SFR2T   020671          SVCTAG= 177777          TBQ31   011044          T$PTNU= 000000          UIT6    003630
SFTRYT  021156          SVCTST= 177777          TBQ32   011106          T$SAVL= 177777          UIT7    003734
SFT0    012273          S$LSYM= 010000          TBQ4    010120          T$SEGL= 177777          UNIT    002330
SFT1    012344          S$$BUG  026454          TBQ5    010142          T$SIZE= ****** GX       UNKWN   037404
SFXBBT  021076          S$$FLA  026456          TBQ6    010164          T$SUBN= 000000          UNTDSZ= 000002
SF0     012065          S$$RTI  026364 G        TBQ7    010206          T$TAGL= 177777          UNTFLG  002336
SF1     012134          S$$UDC  026324 G        TBQ8    010230          T$TAGN= 010010          UNT.NB  006563
SF100   012175          S$$UDI  026342          TBQ9    010252          T$TEMP= 000000          VECTOR  002326
SIZDRV  026206          TBLBLD  030342          TERM    035354          T$TEST= 000001          VEC.AD  004157
SIZEND  026222          TBQ0    007745          TERMIN= 000004          T$TSTM= 177777          WARNIN  004326
SIZEXI  026270 G        TBQ1    010032          TIMOUT  024150          T$TSTS= 000001          WRNGST  024210
SIZFLP  025614          TBQ10   010274          TNBRA   035566          T$$AUT= 010003          W$CMD = 140022
SIZFPS  025604          TBQ11   010317          TNBR12  035402          T$$CLE= 010004          W$DAT = 140020
SIZIN   026116          TBQ12   010346          TNBR13  035434          T$$DU = 010005          W$FPL = 140004
SIZLOP  025522 G        TBQ13   010405          TYPASC  020032          T$$HAR= 010007          XBN     002705
SIZNON  025510          TBQ14   010417          TYPDUP  030542          T$$HW = 010000          X$ALWA= 000000
SIZRD   026202          TBQ15   010436          TYPE  = 177760          T$$INI= 010002          X$FALS= 000040
SIZRX   025754          TBQ16   010447          T$ARGC= 000001          T$$PRO= 010001          X$OFFS= 0004(0
SIZRX3  026050          TBQ17   010474          T$CODE= 001004          T$$TES= 010006          X$TRUE= 000020
SIZSET  025432          TBQ18   010513          T$ERRN= 000000          T1      033166 G        $2      033052
SIZWIN  026056          TBQ19   010532          T$EXCP= 000000          UAM   - 000200 G        $3      033072
SIZWT   025412          TBQ2    010054          T$FLAG= 000041          UIN     002344          $4      033106
SPCL    037100          TBQ20   010565          T$FREE= ****** GX       UITADR  002320          .A.DEF= 000040
SPECL = 000006          TBQ21   010615          T$GMAN= 000000          UITDF   004040          .A.FAT= 000120
SP2INT  023672          TBQ22   010647          T$HILI= 030071          UITLOC  030312          .A.INF= 000060
SP3INT  023762          TBQ23   010662          T$LAST= 000001          UITOTH= 000010          .A.QUE= 000020
SP4INT  024042          TBQ24   010675          T$LOLI= 000001          UITSIZ= 000104          .A.TER= 000100
STDALN= 000001          TBQ25   010710          T$LSYM= 010000          UIT0    003000          .A.TYP= 000020
STEPMO  025750          TBQ26   010723          T$LTNO= 000001          UIT1    003104          .B.SPL= 000140
STEPOU  025734

. ABS.  037566    000   (RW,I,GBL,ABS,OVR)
        000000    001   (RW,I,LCL,REL,CON)
Errors detected:  0

*** Assembler statistics


Work  file  reads: 332
Work  file writes: 338
Size of work file: 39752 Words  ( 156 Pages)
Size of core pool: 19684 Words  ( 75 Pages)
Operating  system: RSX 11M/PLUS (Under VAX/VMS)

Elapsed time: 00:04:22.27
ZRQCCO,ZRQCCO.LST/-SP=SVC35R/ML,ZRQCCO.MAC
```