

ZRQB1

RDRX DISK FORMATTER

6 Mar 1984 14:16:44  
6 Mar 1984 14:16:36

VAX 11 B1'ss 16 V4.0 579  
DISK\$USER2:([YOUNG.FMT]ZRQB1.B16;4

: 0001 0  
: 0002 0  
: 0003 0  
: 0004 0  
: 0005 0  
: 0006 0  
: 0007 1  
: 0008 1  
: C 0009 1  
: C 0010 1  
: C 0011 1  
: C 0012 1  
: C 0013 1  
: C 0014 1  
: C 0015 1  
: C 0016 1  
: C 0017 1  
: C 0018 1  
: C 0019 1  
: C 0020 1  
: C 0021 1  
: C 0022 1  
: C 0023 1  
: C 0024 1  
: C 0025 1  
: C 0026 1  
: C 0027 1  
: C 0028 1  
: C 0029 1  
: C 0030 1  
: C 0031 1  
: C 0032 1  
: C 0033 1  
: C 0034 1  
: C 0035 1  
: C 0036 1  
: C 0037 1

MODULE ZRQB1 (\*TITLE 'RDRX DISK FORMATTER'  
IDENT = 'REV C PATCH 0',  
ADDRESSING MODE (ABSOLUTE) ,  
ENVIRONMENT (NOEIS)  
) .

BEGIN

\*(

IDENTIFICATION

PRODUCT CODE: AC T566C MC  
PRODUCT NAME: CZRQB0 RQDX1 DISK FORMATTER  
PRODUCT DATE: 9 APRIL 1984  
MAINTAINER: DIAGNOSTIC ENGINEERING  
AUTHOR: Doug Neale

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ZRQB1  
REV C PATCH 0

RDRX DISK FORMATTER

6 Mar 1984 14:16:44  
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VAX 11 Bliss 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB1.B16;4

SEQ 0002  
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REVISION HISTORY

```

: C 0038 1
: C 0039 1
: C 0040 1
: C 0041 1   February 1983   Jay Nevin
: C 0042 1       Adapted existing AZTEC formatter for use with RQDX RD51
: C 0043 1
: C 0044 1   March 1983     Russell Young
: C 0045 1       -Corrected minor incompatibilities in expectations between controller and host
: C 0046 1
: C 0047 1   February 1984   Russell Young
: C 0048 1       Updated the main routine to work on either version 8 or 9 of the RQDX microcode.
: C 0049 1       In version 8 the ASCII strings are stored in the host code because of space
: C 0050 1       limitations in the controller. Version 9, for increased generality, has the
: C 0051 1       strings held in the controller and transmitted to the host. This still contains
: C 0052 1       the original code section to maintain compatibility with version 8.
: C 0053 1
: C 0054 1   March 1984     Russell Young
: C 0055 1       -Removed checks on incoming error and informational messages to allow controller
: C 0056 1       modification without reissuing th's every time. Also, the routine SETCPU was
: C 0057 1       added to allow this to run on an ORION system.

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6 Mar 1984 14:16:44  
6 Mar 1984 14:16:36VAX-11 Bios 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB1.B16;4SEQ 0003  
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: C 0058	1	
: C 0059	1	TABLE OF CONTENTS
: C 0060	1	
: C 0061	1	
: C 0062	1	
: C 0063	1	1.0 GENERAL INFORMATION
: C 0064	1	
: C 0065	1	1.1 PROGRAM ABSTRACT
: C 0066	1	1.1.1 HOST RESIDENT PROGRAM
: C 0067	1	1.1.2 CONTROLLER RESIDENT PROGRAM
: C 0068	1	
: C 0069	1	1.2 SYSTEM REQUIREMENTS
: C 0070	1	1.2.1 HARDWARE REQUIREMENTS
: C 0071	1	1.2.2 SOFTWARE REQUIREMENTS
: C 0072	1	
: C 0073	1	1.3 RELATED DOCUMENTS AND STANDARDS
: C 0074	1	
: C 0075	1	2.0 OPERATING INSTRUCTIONS
: C 0076	1	2.1 HARDWARE QUESTIONS
: C 0077	1	2.2 SOFTWARE QUESTIONS
: C 0078	1	2.3 FORMATTER QUESTIONS
: C 0079	1	
: C 0080	1	3.0 RUNNING THE FORMATTER
: C 0081	1	3.1 ERRORS
: C 0082	1	3.2 SUCCESS

```

: C 0083 1
: C 0084 1
: C 0085 1
: C 0086 1
: C 0087 1
: C 0088 1
: C 0089 1
: C 0090 1
: C 0091 1
: C 0092 1
: C 0093 1
: C 0094 1
: C 0095 1
: C 0096 1
: C 0097 1
: C 0098 1
: C 0099 1
: C 0100 1
: C 0101 1
: C 0102 1
: C 0103 1
: C 0104 1
: C 0105 1
: C 0106 1
: C 0107 1
: C 0108 1
: C 0109 1
: C 0110 1
: C 0111 1
: C 0112 1
: C 0113 1
: C 0114 1
: C 0115 1
: C 0116 1
: C 0117 1
: C 0118 1
: C 0119 1
: C 0120 1
: C 0121 1
: C 0122 1
: C 0123 1
: C 0124 1
: C 0125 1
: C 0126 1
: C 0127 1
: C 0128 1
: C 0129 1
: C 0130 1
: C 0131 1
: C 0132 1
: C 0133 1
: C 0134 1
: C 0135 1

```

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

1.1.1 HOST RESIDENT PROGRAM

This program is the front end which invokes the formatter for the RD51/52 disk connected to the RQDX1 controller. It interfaces with the actual formatter which is in the controller. This involves initialization of the port, invoking the actual formatter via the DUP protocol, getting needed data from the user and sending it to the controller, and finally informing the user of the final outcome. The last two steps depend on the version of the controller present. The host resident program is designed to run both version 8 and version 9 of the RQDX controller.

1.1.2 CONTROLLER RESIDENT PROGRAM

When invoked by the host resident portion, this will prompt for any information it needs, and then begin running. A run consists of marking the disk as unformatted, formatting it, running three passes of a surface analysis, saving the FCT and RCT, and marking the disk as formatted.

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

LSI - 11/23 processor with 28K or more of memory, console device (EX. VT100) and RQDX1 CONTROLLER board and attached RD51/52 WINCHESTER drive(s).

As of rev C of this program, it will also run on an Orion J-11 processor.

1.2.2 SOFTWARE REQUIREMENTS

THIS DIAGNOSTIC IS DESIGNED TO RUN WITH THE DIAGNOSTIC SUPERVISOR AS DESCRIBE. IN PARAGRAPH 2.0.

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SEG 0005  
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: C 0136 1  
: C 0137 1  
: C 0138 1  
: C 0139 1  
: C 0140 1  
: C 0141 1  
: C 0142 1

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP, SUPERVISOR/USERS MANUAL CHQUS  
DSDFV12 DEC DISK FORMATTING STANDARDS

```

; C 0143 1
; C 0144 1
; C 0145 1
; C 0146 1
; C 0147 1
; C 0148 1
; C 0149 1
; C 0150 1
; C 0151 1
; C 0152 1
; C 0153 1
; C 0154 1
; C 0155 1
; C 0156 1
; C 0157 1
; C 0158 1
; C 0159 1
; C 0160 1
; C 0161 1
; C 0162 1
; C 0163 1
; C 0164 1
; C 0165 1
; C 0166 1
; C 0167 1
; C 0168 1
; C 0169 1
; C 0170 1
; C 0171 1
; C 0172 1
; C 0173 1
; C 0174 1
; C 0175 1
; C 0176 1
; C 0177 1
; C 0178 1
; C 0179 1
; C 0180 1
; C 0181 1
; C 0182 1
; C 0183 1
; C 0184 1
; C 0185 1
; C 0186 1
; C 0187 1
; C 0188 1
; C 0189 1
; C 0190 1
; C 0191 1
; C 0192 1
; C 0193 1
; C 0194 1
; C 0195 1

```

## 2.0 OPERATING INSTRUCTIONS

This is a rev C supervisor diagnostic: for operating instructions, please see chapter 5 of xxdp+ operator's manual. they are no longer included in the diagnostic listing because it is desired that a change in those instructions not require a re-assembly of all supervisor diagnostics.

## 2.1 HARDWARE QUESTIONS

The following series of questions comprise the parameters necessary to initialize the controller.

### Hardware Configuration Questions

The program will ask the following questions in response to a START command (non-script). No default will be accepted for the CHANGE HARDWARE and SOFTWARE questions.

### 1. CHANGE HW (L) ?

Answer NO to use the pre-built answers for all hardware questions. This program will be released pre-built to format unit 0 with default answers shown below. The pre-built answers may be changed at any time with the setup utility. Answer YES to be asked all the hardware questions.

### 2. IP ADDRESS (0) 172150 ?

Enter the address of the IP register of one RDQX1 as addressed by the processor with memory management turned off. The program expects an even 16-bit address in the range of 160000 to 177774. 172150 is the default.

### 3. VECTOR ADDRESS (0) 154 ?

Answer with the interrupt vector of same RDQX1 in the above question. A vector address in the range of 4 to 774 may be specified. 154 is the default.

|||

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SEQ 0007  
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: C 0196 1  
: C 0197 1  
: C 0198 1  
: C 0199 1  
: C 0200 1

4. BR LEVEL (D) 4 ?

Answer with the bus request interrupt level used by the  
above RQDX1 Levels 4 through 7 are acceptable. 4 is the  
default.

: C 0201 1  
: C 0202 1  
: C 0203 1  
: C 0204 1  
: C 0205 1  
: C 0206 1  
: C 0207 1  
: C 0208 1  
: C 0209 1  
: C 0210 1  
: C 0211 1  
: C 0212 1  
: C 0213 1  
: C 0214 1  
: C 0215 1  
: C 0216 1  
: C 0217 1  
: C 0218 1  
: C 0219 1  
: C 0220 1  
: C 0221 1  
: C 0222 1  
: C 0223 1  
: C 0224 1  
: C 0225 1  
: C 0226 1  
: C 0227 1  
: C 0228 1  
: C 0229 1  
: C 0230 1  
: C 0231 1  
: C 0232 1  
: C 0233 1  
: C 0234 1  
: C 0235 1  
: C 0236 1  
: C 0237 1  
: C 0238 1  
: C 0239 1  
: C 0240 1  
: C 0241 1  
: C 0242 1  
: C 0243 1  
: C 0244 1  
: C 0245 1  
: C 0246 1  
: C 0247 1  
: C 0248 1  
: C 0249 1  
: C 0250 1  
: C 0251 1  
: C 0252 1  
: C 0253 1

2.2 SOFTWARE QUESTIONS

---

Software Parameter Questions

The program will ask the following questions in response to a START or RESTART command (non-script). No default will be accepted.

1. CHANGE SW (L) ?

Answer either Y or N to this question. A Yes answer will allow the formatter to be set up for the APT environment by asking only questions 2. and 3. below. A No answer will cause the formatter to proceed to ask questions as explained in section 2.3 below.

2. SOFTWARE QUESTIONS ONLY APPLY UNDER APT. ENTER UNIT NUMBER (0) ?

This will accept any answer in the range of 0 to 3. It will default to 0 if a <CR> is struck.

3. ENTER MODE [1 = REFORMAT, 2 = RESTORE, 3 = RECONSTRUCT] (0) ?

Answering this question with one of the above numbers will cause the formatter to try one of the three formatting modes as explained in 2a, 2b or 2c below.

2.3 FORMATTER QUESTIONS

-----

The questions asked depend on the version of the controller microcode in the RQDX. When the controller is first initialized, the host program determines which version is running. If it is version 8, the host program, driven by prompts from the controller, displays questions stored as ASCII text on the host. If version 9 is running, the prompts are transmitted from the controller. The actual questions asked and the order in which they are asked differs in the two versions.

2.3.1 VERSION 8 QUESTIONS

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After these DRS set up questions, the version 8 formatter will ask the following manual intervention questions needed to proceed. These questions will not be asked under APT. The default answers contained in the formatter will be used. These answers interact directly with the RQDX1 Controller.



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; C 0254 1  
; C 0255 1  
; C 0256 1  
; C 0257 1

1. ENTER UNIT NUMBER TO FORMAT (0)

The answer should be in the range of 0 to 3. The default answer  
is 0.

: C 0258 1  
: C 0259 1  
: C 0260 1  
: C 0261 1  
: C 0262 1  
: C 0263 1  
: C 0264 1  
: C 0265 1  
: C 0266 1  
: C 0267 1  
: C 0268 1  
: C 0269 1  
: C 0270 1  
: C 0271 1  
: C 0272 1  
: C 0273 1  
: C 0274 1  
: C 0275 1  
: C 0276 1  
: C 0277 1  
: C 0278 1  
: C 0279 1  
: C 0280 1  
: C 0281 1  
: C 0282 1  
: C 0283 1  
: C 0284 1  
: C 0285 1  
: C 0286 1  
: C 0287 1  
: C 0288 1  
: C 0289 1  
: C 0290 1  
: C 0291 1  
: C 0292 1  
: C 0293 1  
: C 0294 1  
: C 0295 1  
: C 0296 1  
: C 0297 1  
: C 0298 1  
: C 0299 1  
: C 0300 1  
: C 0301 1  
: C 0302 1  
: C 0303 1  
: C 0304 1  
: C 0305 1  
: C 0306 1  
: C 0307 1  
: C 0308 1  
: C 0309 1

2. The next three questions select the type of format which will be done. The three modes are explained in Unibus Disk Adapter Functional Specification REV: 2.8. Since they are mutually exclusive, answering Y to any one of them will cause the formatter to skip the remaining ones and go on to the next question. Answering N to all three will cause it to default to REFORMAT mode, the same as answering Y to question 2a. In this case, the following message will be printed.

EXISTING BAD BLOCK INFORMATION USED

2a. USE EXISTING BAD BLOCK INFORMATION (N)

Answering Y to this will cause the formatter to try a REFORMAT mode format. This means it will try to read its own FCT to get its serial number, and try reading the manufacturer's bad spot record on the inner cylinder to initialize the RCT. If it fails in either attempt, it will give up and return an error.

2b. USE DOWN LINE LOAD (N)

This mode is known as RESTORE, it is not currently supported, but is included for possible future improvement. Answering Y to it will have the same result as answering Y to question 2c.

2c. CONTINUE IF BAD BLOCK INFORMATION IS INACCURATE (N)

Answering Y to this will cause a RECONSTRUCT mode format to be done. Nothing will be assumed about the disk, and the manufacturer's bad spot data, even if present, will be ignored.

3. ENTER 8 CHARACTER SERIAL NUMBER

If REFORMAT mode is selected, this question will not be asked. Otherwise, it needs 8 characters to be entered. The number is not important, and must only be unique on the controller. Thus, on a one RD51/52 system, any eight characters will suffice, and on a two RD51/52 system each one must be different - this is not difficult to achieve, since each character may be any printable ASCII symbol.

4. ENTER DATE IN MM-DD-YY FORMAT

Type in the date of formatting. It needs exactly eight characters, so January 1, 1984 must be entered as 01 01-84. This question will be asked in all modes of formatting.

1 1

2.3.2 VERSION 9 QUESTIONS

1. Enter date <MM-DD-YYYY>  
Date should be entered in the form requested. For example,  
1 29 1958 , or  
4-25-1980
2. Enter unit number to format <0>:  
Unit number is entered in decimal, U <= x < 16. Default is 0
3. Use existing bad block information <N>:  
If yes, Execute a REFORMAT mode formatting. That is, try to  
use the RCT which already exists on the disk.
4. Use down-line load <N>:  
A Y here will cause question 5 to be skipped, and  
the controller to prompt for the head, cylinder, and  
byte offset of the bad blocks, as reported by the  
manufacturer.
5. Continue if bad block information is inaccessible <N>:  
If the formatter tries to read the Factory Control Table and  
fails, it will abort the format if this is not answered yes.
6. Enter non-zero serial number:  
Enter one to ten digits. The controller requires an even number,  
so if an odd number are typed a "." is appended to the end.

3.0 RUNNING

-----  
After asking the date, the actual formatting will begin.  
If all goes well, in just under 11 minutes it will return  
a successful completion message. Otherwise, it will print  
an error message, probably much sooner.

3.1.1 Version 8 Errors

The following are the error messages generated by the formatter.  
If any other message appears it has been printed by DRS or XXDP\*,  
so refer to the pertinent documentation for explanation. Errors  
1, 2, and 3 will occur almost immediately, 4 can appear up to  
about a minute after starting, 5 from about 1 minute to 10 minutes,  
and 6 and 7 after 10 minutes.

1. UNIT IS NOT WINCHESTER OR CAN NOT BE SELECTED  
The unit selected is either unavailable or is not  
an RD51/52. Check to assure it is not write protected.

: C 0310 1  
: C 0311 1  
: C 0312 1  
: C 0313 1  
: C 0314 1  
: C 0315 1  
: C 0316 1  
: C 0317 1  
: C 0318 1  
: C 0319 1  
: C 0320 1  
: C 0321 1  
: C 0322 1  
: C 0323 1  
: C 0324 1  
: C 0325 1  
: C 0326 1  
: C 0327 1  
: C 0328 1  
: C 0329 1  
: C 0330 1  
: C 0331 1  
: C 0332 1  
: C 0333 1  
: C 0334 1  
: C 0335 1  
: C 0336 1  
: C 0337 1  
: C 0338 1  
: C 0339 1  
: C 0340 1  
: C 0341 1  
: C 0342 1  
: C 0343 1  
: C 0344 1  
: C 0345 1  
: C 0346 1  
: C 0347 1  
: C 0348 1  
: C 0349 1  
: C 0350 1  
: C 0351 1  
: C 0352 1  
: C 0353 1  
: C 0354 1  
: C 0355 1  
: C 0356 1  
: C 0357 1  
: C 0358 1  
: C 0359 1  
: C 0360 1  
: C 0361 1  
: C 0362 1

ZRQB1  
REV C PATCH 0

RDRX DISK FORMATTER

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DISK\$USER2:[YOUNG.FMT]ZRQB1.B16;4

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: C 0363 1      2.    INITIAL FAILURE ACCESSING FCT
: C 0364 1          The Format Control Table cannot be read. If you are trying
: C 0365 1          REFORMAT mode, try RECONSTRUCT. If that fails also, the disk
: C 0366 1          may be bad.
: C 0367 1
: C 0368 1      3.    FACTORY BAD BLOCK INFORMATION IS INACCESSABLE
: C 0369 1          This will only occur if a REFORMAT is attempted and the factory
: C 0370 1          bad spot data is not accessible. Run in RECONSTRUCT mode.
: C 0371 1
: C 0372 1      4.    SEEK FAILURE DURING ACTUAL FORMATTING
: C 0373 1          There has been a hardware error during the actual formatting.
: C 0374 1          If this error persists, check for hardware problems.
: C 0375 1
: C 0376 1      5.    REVECTOR LIMIT EXCEEDED
: C 0377 1          The disk can only handle 144 bad blocks, and more than
: C 0378 1          that have been found. If this persists the disk is bad.
: C 0379 1
: C 0380 1      6.    RCT WRITE FAILURE
: C 0381 1          The formatting and surface analysis were completed successfully,
: C 0382 1          but a write to the disk afterwards failed.
: C 0383 1
: C 0384 1      7.    FAILURE CLOSING FCTS
: C 0385 1          Everything has been completed, but the disk is still
: C 0386 1          marked as being unformatted.
: C 0387 1
: C 0388 1      3.1.2  Version 9 error messages
: C 0389 1          1.    GET STATUS failure
: C 0390 1          2.    Q-PORT send error
: C 0391 1          3.    Unsuccessful command
: C 0392 1          4.    Q-PORT receive error
: C 0393 1          5.    Q-Bus I/O error
: C 0394 1          6.    Formatter initialization error
: C 0395 1          7.    Nonexistent unit number
: C 0396 1          8.    DBN/XBN format error (drive FORMAT command failed)
: C 0397 1          9.    FCT does not have enough good copies of each block
: C 0398 1          10.   SEEK error
: C 0399 1          11.   RCT does not have enough good copies of each block
: C 0400 1          12.   LBN format error (drive FORMAT command failed)"
: C 0401 1          13.   FCT write error
: C 0402 1          14.   RCT read error
: C 0403 1          15.   RCT write error
: C 0404 1          16.   RCT full
: C 0405 1          17.   FCT read error
: C 0406 1          18.   FCT nonexistent
: C 0407 1          19.   FCT Down line-load error
: C 0408 1          20.   Drive init timeout
: C 0409 1          21.   Illegal response to start-up question
: C 0410 1          22.   WARNING - possible head addressing problem - run diagnostics
: C 0411 1          23.   INPUT Error
: C 0412 1          24.   Media degraded
: C 0413 1
: C 0414 1      3.2    SUCCESS
: C 0415 1

```

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REV C PATCH 0

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DISK\$USER2:[YOUNG.FMT]ZRQB1.B16;4

: C 0416 1  
: C 0417 1  
: C 0418 1  
: C 0419 1  
: C 0420 1  
: C 0421 1  
: C 0422 1  
: C 0423 1  
: C 0424 1  
: C 0425 1  
: C 0426 1  
: C 0427 1  
: C 0428 1  
: C 0429 1  
: C 0430 1  
: C 0431 1  
: C 0432 1  
: C 0433 1  
: C 0434 1  
: C 0435 1  
: C 0436 1  
: C 0437 1  
: C 0438 1  
: C 0439 1  
: C 0440 1  
: C 0441 1  
: C 0442 1  
: C 0443 1  
: C 0444 1  
: C 0445 1  
: C 0446 1  
: C 0447 1  
: C 0448 1  
: C 0449 1  
: C 0450 1  
: C 0451 1  
: C 0452 1  
: C 0453 1  
: C 0454 1  
: C 0455 1  
: C 0456 1  
: C 0457 1  
: C 0458 1  
: 0459 1

---  
If all goes well, in about 11 minutes the format will be complete.

3.2.1 VERSION 8 SUCCESS

Successful completion is signaled by a message

FORMAT COMPLETED, xxx REVECTORED LBNS

where xxx is a decimal number. This should be a small number performance will deteriorate if it is too large.

3.2.2 VERSION 9 SUCCESS

The rev 9 controller will provide additional information and statistics at the end of each run.

1. Format complete  
Signals the end of the formatting process
2. FCT used successfully  
or  
FCT was not used  
Reports if the Factory Control Table was accessible
3. xxx Revectoring LBN's  
The total number of bad blocks found
4. xxx Primary revectoring LBN's  
The number of primary revectoring LBNs. Currently the controller does not support primary revectoring.
5. xxx Secondary/tertiary revectoring LBN's  
This number should be equal to the total LBNs reported in message 3.
6. xxx Bad blocks in the RCT area due to data errors  
bad blocks found in the Replacement and Caching Table area
7. xxx Bad blocks in the DBN area due to data errors  
Bad blocks found in the Diagnostic Block Number area
8. xxx Bad blocks in the XBN area due to data errors  
Bad blocks in the extended Block Number area
9. xxx Bad RBN's  
Bad blocks found in the Replacement Block Number area
10. xxx Blocks retried on the check pass  
The number of revectorings

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REV C PATCH 0RDRX DISK FORMATTER  
PROGRAM HEADER6 Mar 1984 14:16:44  
6 Mar 1984 14:16:36VAX-11 Bliss 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZROB1.B16;4SEQ 0014  
Page 4

```

: 0460 1  @sbttl 'PROGRAM HEADER'
: 0461 1
: 0462 1  library 'ZROB80.L16';           !Define RDRX Formatter Library
: 0463 1
: 0464 1  require 'BLSMAC.REQ';         !Define Bliss Macro Require file
: 2000 1
: 2001 1  ;;
: 2002 1  ! The psect named 'code' or 'code!' is redefined here
: 2003 1  ! to be called "asfcode". This is done to force the IKB
: 2004 1  ! linker to place the program header information starting
: 2005 1  ! at absolute address 2000.
: 2006 1  !
: 2007 1  !psect
: 2008 1  !   code = asfcode;
: 2009 1
: 2010 1  !literal
: 2011 1  !   DS#NBR_OF_TESTS = 1;           !Indicates number of test in Diag
: 2012 1
: 2013 1  !
: 2014 1  ! The structure of a diagnostic program may contain any or all of the
: 2015 1  ! ten optional sections. But five of the optional sections require a
: 2016 1  ! pointer that is derived by and for the supervisor, and is located in
: 2017 1  ! the header block. Therefore, in relation to the effective use of
: 2018 1  ! these five pointers, the optional sections call must be coded to re
: 2019 1  ! flect usage (i.e., any,all,or none).
: 2020 1
: 2021 1  ! The following coding possibilities exist:
: 2022 1
: 2023 1  !   POINTER (BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU,ERRTBL,BGNSETUP)
: 2024 1
: 2025 1  !   (or any subset of the args)
: 2026 1
: 2027 1  !   POINTER (ALL)                   ; All provides pointers for all five
: 2028 1  !                                     ; sections
: 2029 1  !   POINTER (NONE)                   ; None indicates to supervisor that no
: 2030 1  !                                     ; pointers are required.
: 2031 1  !                                     ; this is the default
: 2032 1
: 2033 1  !   No pointers are optional using bliss. Make sure the following
: 2034 1  !   sections of code are in place (in the correct skels),even if
: 2035 1  !   the sections are blank.
: 2036 1
: 2037 1  !   ARGUMENT          FUNCTION
: 2038 1  !   -----
: 2039 1  !   RPT                REPORT CODE
: 2040 1  !   SW                 SOFTWARE TABLE
: 2041 1  !   SFT                SOFTWARE TABLE QUESTIONS
: 2042 1  !   AU                 ADD CODE
: 2043 1  !   DU                 DROP CODE
: 2044 1  !   TBL                ERROR TABLE
: 2045 1  !   SETUP              ASSEMBLED P TABLES
: 2046 1  !
: 2047 1  !   POINTER (ALL);

```



D:

ZRQB1  
REV C PATCH 0

RDRX DISK FORMATTER  
DISPATCH TABLE

6 Mar-1984 14:16:44  
6 Mar 1984 14:16:36

VAX-11 B11e-16 V4.0-579  
DISK:USER2:[R0UNG.FMT]ZRQB1.B16;4

SEQ 0016  
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```
: 2060 1  *sbttl 'DISPATCH TABLE'  
: 2061 1  :  
: 2062 1  ! The dispatch table section contains address pointers to the various  
: 2063 1  ! tests contained within the diagnostic program. This section requires  
: 2064 1  ! the coding of only the dispatch macro.  
: 2065 1  :  
: 2066 1  DISPATCH (DS#NBR OF TESTS);  
: 2067 1  ERR_TBL;                !Define Supervisor Error table storage
```



ZRQB1  
REV C PATCH 0

RDRX DISK FORMATTER  
DEFAULT HARDWARE P TABLE

6 Mar-1984 14:16:44  
6-Mar-1984 14:16:36

VAX-11 Bliss 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB1.B16;4

SEQ 0017  
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```

: 2068 1  *sbttl 'DEFAULT HARDWARE P TABLE'
: 2069 1  !'
: 2070 1  ! The default hardware P Table contains default values of
: 2071 1  ! the test-device parameters. The structure of this table
: 2072 1  ! is identical to the structure of the hardware P-Tables,
: 2073 1  ! and is used as a "template" for building the P-Tables.
: 2074 1  !'
: 2075 1  BGNHW (DFPTBL);
: 2076 1
: 2077 1  global
: 2078 1      HW_IP_ADRS : word initial (%o'172150'),      !Define RDRX Controller IP reg
: 2079 1      HW_VECTOR : word initial (%o'154'),        !Define RDRX interrupt vector address
: 2080 1      HW_BR_LEVEL : word initial (4),            !Define RDRX bus request level
: 2081 1      HW_UNIT_NO : word initial (0);             !Define RDRX unit no. to format
: 2082 1
: 2083 1  ENDDHW;

```

F 2

ZRQB1  
REV C PATCH 0

RDRX DISK FORMATTER  
SOFTWARE P-TABLE

6 Mar 1984 14:16:44  
6 Mar 1984 14:16:36

VAX-11 B1199 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB1.B16;4

SEQ 0018  
Page 18  
(13)

```

; 2084 1  %sbttl SOFTWARE P-TABLE
; 2085 1  !*
; 2086 1  ! The software table contains various data used by the
; 2087 1  ! program as operational parameters. These parameters are
; 2088 1  ! set up at assembly time and may be varied by the operator
; 2089 1  ! at run time.
; 2090 1  !-
; 2091 1  BGNSW (SFPTBL);
; 2092 1  !*
; 2093 1  ! All software parameter coding is done within the RDRX
; 2094 1  ! DM code. This is per DUP functional spec compliance.
; 2095 1  !-
; 2096 1  global
; 2097 1  SW_UNIT_NO :          word initial (0),          !default unit to 0
; 2098 1  SW_MODE :           word initial (3);          !default mode to reconstruct
; 2099 1  ENDSW;

```

ZRQB1  
REV C PATCH 0

RDRX DISK FORMATTER  
PROTECTION TABLE

6 Mar-1984 14:16:44  
6-Mar-1984 14:16:36

VAX-11 Blues-16 V4.0-579  
DISK#USER2:(YOUNG.FMT)ZRQB1.B16;4

SEQ 0019  
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```
: 2100 1 #sbttl 'PROTECTION TABLE
: 2101 1 !'
: 2102 1 ! This table is used by the runtime
: 2103 1 ! services to protect the load media.
: 2104 1 !
: 2105 1 ! 1st arg = Offset into P_Table for csr address
: 2106 1 ! 2nd arg = Offset into P_Table for massbus address
: 2107 1 ! 3rd arg = Offset into P_Table for drive number
: 2108 1 !
: 2109 1 BGNPROT ( 1, -1, 1);
: 2110 1 ENDPROT;
```

ZRQB1  
REV C PATCH 0

RDRX DISK FORMATTER  
MODULE DECLARATIONS

6 Mar 1984 14:16:44  
6 Mar 1984 14:16:36

VAX-11 Bliss-16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB1.B16;4

SEQ 0020  
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(15)

```

: 2111 1 #sbttl 'MODULE DECLARATIONS'
: 2112 1 !*
: 2113 1 ! Within BLSMAC.REQ the psect names, plit global and own,
: 2114 1 ! are redefined to be aa$code. This is done to force the
: 2115 1 ! tkb linker to link the header information starting at
: 2116 1 ! at absolute address 2000. Redefine these psect names
: 2117 1 ! back to their original names for house keeping purposes.
: 2118 1 !
: 2119 1 ! Also change the attributes for the psect "global" so that
: 2120 1 ! global data will not be linked starting at absolute address
: 2121 1 ! 2000.
: 2122 1 !-
: 2123 1 psect
: 2124 1     plit = $plit$( global),
: 2125 1     global = $glob$(nowrite, noexecute, global, concatenate),
: 2126 1     own = $own$;
: 2127 1
: 2128 1 !*
: 2129 1 ! Structure declarations used within this
: 2130 1 ! module.
: 2131 1 !-
: 2132 1
: 2133 1 structure
: 2134 1
: 2135 1     !*
: 2136 1     ! RDRX register accessing structure. This
: 2137 1     ! structure allows RDRX register accessing
: 2138 1     ! to be transportable between the PDP-11 and
: 2139 1     ! VAX Diagnostic Supervisors.
: 2140 1     !
: 2141 1     ! This also defines an access algorithm for
: 2142 1     ! VAX to allow field reference to MBA address
: 2143 1     ! space without generating machine checks.
: 2144 1     !-
: 2145 1
: 2146 1 RDRX [0, P, S, E] =
: 2147 2     begin
: 2148 2
: 2149 2     local
: 2150 2         RC$S_REG;
: 2151 2
: 2152 2     RC$S_REG = .(RDRX * #upval*0)<0, #bpval, 0>;
: 2153 2     RC$S_REG
: 2154 2     end
: 2155 1     <P, S, E>;
: 2156 1

```

ZRQB1  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL DATA SECTION

6-Mar-1984 14:16:44  
6-Mar-1984 14:16:36

VAX-11 Bliss 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB1.B16;4

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(16)

```

: 2157 1  *sbttl 'GLOBAL DATA SECTION'
: 2158 1  !*
: 2159 1  ! The global data section contains data that are used
: 2160 1  ! in more than one test or module.
: 2161 1  !
: 2162 1  !
: 2163 1  global
: 2164 1  !
: 2165 1  ! Communication area Declarations
: 2166 1  !
: 2167 1  COM_AREA : blockvector [REC_ALLOCATE + SND_ALLOCATE + HDR_SIZ, 2, word],
: 2168 1  HEAD_AREA : ref block [4, word] field (HDR_FIELD),
: 2169 1  RECEIVE_RING : ref blockvector [REC_ALLOCATE, 2, word] field (DSC_FIELD),
: 2170 1  SEND_RING : ref blockvector [SND_ALLOCATE, 2, word] field (DSC_FIELD),
: 2171 1  REC_ENVELOPE : blockvector [REC_ALLOCATE, RB_SIZE + 2, word] field (ENV_FIELD),
: 2172 1  SND_ENVELOPE : blockvector [SND_ALLOCATE, SB_SIZE + 2, word] field (ENV_FIELD),
: 2173 1  REC_BUF : block [RECB_SIZE, word] field (RECB_FIELD),
: 2174 1  SND_BUF : vector [SNDB_SIZE, word],
: 2175 1  OUT$STD_BUF : BLOCKVECTOR [REC_ALLOCATE, 2, WORD] FIELD (OUT$FIELD),
: 2176 1  RET_EN$AD : ref block [RB_SIZE + 2, word] field (ENV_FIELD);
: 2177 1  !
: 2178 1  global bind
: 2179 1  !
: 2180 1  ! Diagnostic supervisor printing ascii format strings.
: 2181 1  !
: 2182 1  FMT1 = uplit (#asciz'#T'), !Print one ascii string pointer
: 2183 1  FMT2 = uplit (#asciz'#NAFORMATTING PHYSICAL UNIT #D3'),
: 2184 1  FMT3 = uplit (#asciz'#NANALOGICAL UNIT #D2$S#APHYSICAL UNIT #D2$S#AFORMAT ABORTED'),
: 2185 1  FMT4 = uplit (#asciz'#NAFORMAT COMPLETED, #D2$S#A REVECTORED LBNS'),
: 2186 1  ! FMT5 = uplit (#asciz'#NAFORMAT ABORTED, ERROR NUMBER #D2'),
: 2187 1  CRLF = uplit (#asciz'#N'),
: 2188 1  !
: 2189 1  ! Formatter messages (so formatter can conserve space).
: 2190 1  !
: 2191 1  UNIT$MSG = uplit (#asciz'ENTER UNIT TO BE FORMATTED'),
: 2192 1  EXIST$MSG = uplit (#asciz'USE EXISTING BAD BLOCK INFORMATION'),
: 2193 1  DOWN$MSG = uplit (#asciz'USE DOWN LINE LOAD'),
: 2194 1  INACC$MSG = uplit (#asciz'CONTINUE IF BAD BLOCK INFORMATION IS INACCURATE'),
: 2195 1  DFLT$MSG = uplit (#asciz'#NAEXISTING BAD BLOCK INFORMATION USED'),
: 2196 1  SERIAL$MSG = uplit (#asciz'ENTER 8 CHARACTER SERIAL NUMBER'),
: 2197 1  DATE$MSG = uplit (#asciz'ENTER DATE IN MM-DD-YY FORMAT'),
: 2198 1  DATMSG = uplit (#asciz'ENTER DATE <MM DD-YYYY>'), !rev 9 date string
: 2199 1  !
: 2200 1  ! default strings
: 2201 1  DEF_DATE = uplit (#asciz'01-29-58'),
: 2202 1  DEF_SERIAL = uplit (#asciz'40502179'),
: 2203 1  ! Ring base address declaration
: 2204 1  !
: 2205 1  RINGBASE = COM_AREA [REC BASE],
: 2206 1  !
: 2207 1  !
: 2208 1  !
: 2209 1  MSGADR = REC_BUF [MSG_TXT];

```

```

: 2210 1
: 2211 1
: 2212 1
: 2213 1
: 2214 1
: 2215 1
: 2216 1
: 2217 1
: 2218 1
: 2219 1
: 2220 1
: 2221 1
: 2222 1
: 2223 1
: 2224 1
: 2225 1
: 2226 1
: 2227 1
: 2228 1
: 2229 1
: 2230 1
: 2231 1
: 2232 1
: 2233 1
: 2234 1
: 2235 1
: 2236 1
: 2237 1
: 2238 1
: 2239 1
: 2240 1
: 2241 1
: 2242 1
: 2243 1
: 2244 1
: 2245 1
: 2246 1
: 2247 1
: 2248 1
: 2249 1
: 2250 1
: 2251 1
: 2252 1
: 2253 1
: 2254 1
: 2255 1
: 2256 1
: 2257 1
: 2258 1
: 2259 1
: 2260 1
: 2261 1
: 2262 1

global
:
:   ! Miscellaneous data declarations
:
:   ! OVSA : WORD,                !Overlay section starting adrs
:   ! NXT_CRN : BYTE,            !Stores next cmd ref number
:   ! RET_STATUS : word initial (%o'000000'), !Saves various return status codes
:   ! LUN : word,                !Stores logical unit number being formatted
:   ! PID_SAVE : word,           !Saves proces indicator word
:   ! UC_VER : byte,             !Stores ucode version number
:   ! NSD_SLOT : word,           !Next send Descriptor slot
:   ! NRD_SLOT : word,           !Next receive Descriptor slot
:
:   ! Hardware P_Table storage declarations
:
:   ! RDRX_ADDR : ref RDRX field (ISD_FIELD), !Controller register access structure
:   ! VEC_ADDR : word,           !Interrupt vector address storage
:   ! BR_LEVEL : word,           !Bus request level storage
:   ! UNIT_NO : word,            !Unit number to format storage
:   ! PTBL_PTR : ref vector [4, word],       !Stores P_Table base address
:
:   ! Dup Protocol data structures
:
:   ! Reserved field mask structure declaration
:
:   ! RSVD_STRUCT : vector [4, word] preset ( !Reserved SA reg fields definitions
:   ! [0] = %x'00FF',             !Step one rsvd field
:   ! [1] = %x'0000',             !Step two rsvd field
:   ! [2] = %x'0700',             !Step three rsvd field
:   ! [3] = %x'07FF'),           !Step four rsvd & ucode field
:
:   ! Init Sequence Data_Structure declaration
:
:   ! ISD_STRUCT : blockvector [4, 2, word] field (ISD_FIELD) preset (
:   !   ! Step one read SA register field declaration
:   !   ! [BLKO, WRDO, ERR_BIT] = 0,           !Error bit
:   !   ! [BLKO, WRDO, STP_FIELD] = %b'0001', !All step bit fields
:   !   ! [BLKO, WRDO, S1R_NV] = 0,           !No host inter vec settable adrs
:   !   ! [BLKO, WRDO, S1R_QB] = 1,           !22-bit addressing support
:   !   ! [BLKO, WRDO, S1R_DI] = 1,           !Enhanced diag implementation
:   !   ! [BLKO, WRDO, S1R_RSVD] = %o'377',   !Reserved field
:   !   ! Step one write SA register field declaration
:   !   ! [BLKO, WRD1, ERR_BIT] = 1,           !Error bit
:   !   ! [BLKO, WRD1, S1W_WR] = 0,           !Diag wrap around
:   !   ! [BLKO, WRD1, S1W_CRING] = SND_SIZ, !Number of Send ring slots pwns of 2
:   !   ! [BLKO, WRD1, S1W_RRING] = REC_SIZ, !Number of Receive ring slots pwns of 2

```

```
: 2263 1 [BLK0, WRD1, S1W IE]= 0, !Init Sequence interrupt request
: 2264 1 [BLK0, WRD1, S1W VADR]= %o 33', !Interrupt vector address
: 2265 1
: 2266 1 ! Step two read SA register field declaration
: 2267 1
: 2268 1 [BLK1, WRD0, ERR_BIT] = 0, !Error bit
: 2269 1 [BLK1, WRD0, STP_FIELD] = %b'0010 , !All step bit fields
: 2270 1 [BLK1, WRD0, S2R_PTYP]= 0, !Port type number
: 2271 1 [BLK1, WRD0, S2R_BIT7]= 1, !Echoed IE bit from step one write
: 2272 1 [BLK1, WRD0, S2R_WR]= 0, !Echoed b't 14 from step one write
: 2273 1 [BLK1, WRD0, S2R_CRING]= SND_SIZ, !Echoed b'ts 3-5 from step one write
: 2274 1 [BLK1, WRD0, S2R_RRING]= REC_SIZ, !Echoed bits 0-2 from step one write
: 2275 1
: 2276 1 ! Step two write SA register field declaration
: 2277 1
: 2278 1 [BLK1, WRD1, S2W_LRBASE]= RINGBASE, !Ring base lower address
: 2279 1
: 2280 1 ! NOTE:
: 2281 1 ! The adapter purge interrupt is loaded within
: 2282 1 ! the bninit code due to the inability to field
: 2283 1 ! select bits <1, 15, 0> from the ringbase adrs.
: 2284 1 [BLK1, WRD1, S2W_PI]= 0, !Adapter purge interrupt request
: 2285 1
: 2286 1 ! Step three read SA register field declaration
: 2287 1
: 2288 1 [BLK2, WRD0, ERR_BIT] = 0, !Error bit
: 2289 1 [BLK2, WRD0, STP_FIELD] = %b'0100', !All step bit fields
: 2290 1 [BLK2, WRD0, S3R_RSVD]= %o'7', !Reserved
: 2291 1 [BLK2, WRD0, S3R_IE]= 0, !Echoed IE bit from step one write
: 2292 1 [BLK2, WRD0, S3R_VADR]= %o'33', !Echoed VADR from step one write
: 2293 1
: 2294 1 ! Step three write SA register field declaration
: 2295 1
: 2296 1 [BLK2, WRD1, S3W_PP]= 0, !Purge & Poll test request
: 2297 1 [BLK2, WRD1, S3W_HRBASE]= 0, !Ring base high address
: 2298 1
: 2299 1 ! Step four read SA register field declaration
: 2300 1
: 2301 1 [BLK3, WRD0, ERR_BIT] = 0, !Error bit
: 2302 1 [BLK3, WRD0, STP_FIELD] = %b'1000', !All step bit fields
: 2303 1 [BLK3, WRD0, S4R_RSVD]= %o'7', !Reserved
: 2304 1 [BLK3, WRD0, S4R_MOD]= %o'17', !Controller u-CODE version
: 2305 1 [BLK3, WRD0, S4R_VER]= %o'17', !Controller u-CODE version
: 2306 1
: 2307 1 ! Step four write SA register field declaration
: 2308 1
: 2309 1 [BLK3, WRD1, S4W_RSVD]= %o'377', !Reserved
: 2310 1 [BLK3, WRD1, S4W_BURST]= 0, !Max number longwords per NPR \fer
: 2311 1 [BLK3, WRD1, S4W_LF]= 0, !Last fail request
: 2312 1 [BLK3, WRD1, S4W_GO]= 0; !Go bit
: 2313 1
```

```

: 2314 1  *sbttl GLOBAL TEXT SECTION
: 2315 1  !!
: 2316 1  ! The global text section contains format statements,
: 2317 1  ! messages, and ASCII information that are used in
: 2318 1  ! all modules.
: 2319 1  !
: 2320 1
: 2321 1  global bind
: 2322 1  !
: 2323 1  ! Self-detected fatal port/controller errors
: 2324 1  !
: 2325 1  PFE_STRUCT = uplit (
: 2326 1  uplit (%asciz'%N%A$FTLERR- UNRECOGNIZABLE ERROR CODE'),
: 2327 1  uplit (%asciz'%N%A$FTLERR- ENVELOPE/PACKET READ (PARITY OR TIMEOUT)'),
: 2328 1  uplit (%asciz'%N%A$FTLERR- ENVELOPE/PACKET WRITE (PARITY OR TIMEOUT)'),
: 2329 1  uplit (%asciz'%N%A$FTLERR- CONTROLLER ROM AND RAM PARITY'),
: 2330 1  uplit (%asciz'%N%A$FTLERR- CONTROLLER RAM PARITY'),
: 2331 1  uplit (%asciz'%N%A$FTLERR- CONTROLLER ROM PARITY'),
: 2332 1  uplit (%asciz'%N%A$FTLERR- RING READ (PARITY OR TIMEOUT)'),
: 2333 1  uplit (%asciz'%N%A$FTLERR- RING WRITE (PARITY OR TIMEOUT)'),
: 2334 1  uplit (%asciz'%N%A$FTLERR- INTERRUPT MASTER'),
: 2335 1  uplit (%asciz'%N%A$FTLERR- HOST ACCESS TIMEOUT'),
: 2336 1  uplit (%asciz'%N%A$FTLERR- CREDIT LIMIT EXCEEDED'),
: 2337 1  uplit (%asciz'%N%A$FTLERR- UNIBUS MASTER ERROR'),
: 2338 1  uplit (%asciz'%N%A$FTLERR- DIAGNOSTIC CONTROLLER FATAL ERROR'),
: 2339 1  uplit (%asciz'%N%A$FTLERR- INSTRUCTION LOOP TIMEOUT'),
: 2340 1  uplit (%asciz'%N%A$FTLERR- INVALID CONNECTION IDENTIFIER'),
: 2341 1  uplit (%asciz'%N%A$FTLERR- INTERRUPT WRITE'),
: 2342 1  uplit (%asciz'%N%A$FTLERR- MAINTENANCE READ/WRITE INVALID REGION IDENTIFIER'),
: 2343 1  uplit (%asciz'%N%A$FTLERR- MAINTENANCE WRITE LOAD TO NON-LOADABLE CONTROLLER'),
: 2344 1  uplit (%asciz'%N%A$FTLERR- CONTROLLER RAM ERROR (NON-PARITY)'),
: 2345 1  uplit (%asciz'%N%A$FTLERR- INIT SEQUENCE ERROR'),
: 2346 1  uplit (%asciz'%N%A$FTLERR- HIGH-LEVEL PROTOCOL INCOMPATIBILITY ERROR'),
: 2347 1  uplit (%asciz'%N%A$FTLERR- PURGE/POLL HARDWARE FAILURE')) : vector [22].
: 2348 1  !
: 2349 1  ! Init code error and informational
: 2350 1  ! messages
: 2351 1  !
: 2352 1  PWR_MSG = uplit (%asciz'%N%A$FTLERR- INIT CODE RE-ENTERED DUE TO PWR FAIL'),
: 2353 1  ABO_MSG = uplit (%asciz'%N%A$FTLERR- ABORTING HOST AND REMOTE PROGRAMS'),
: 2354 1  TO_MANY_UNITS = uplit (%asciz'%N%A$FTLERR- ILLEGAL NUMBER OF UNITS SELECTED'),
: 2355 1  GOOD_NUM_UNITS = uplit (%asciz'%N%A$FTLERR- LIMIT OF SIXTEEN UNITS PER FORMATING SESSION ),
: 2356 1  BOOT_FAILURE = uplit (%asciz'%N%A$FTLERR- RDRX CONTROLLER INITIALIZATION ERROR'),
: 2357 1  PROTO_VIOLATION = uplit (%asciz'%N%A$FTLERR- PROTOCOL VIOLATION ERROR'),
: 2358 1  PORT_INIT_ERR = uplit (%asciz'%N%A$FTLERR- COMMUNICATION AREA INIT ERROR ),
: 2359 1  !
: 2360 1  ! Local load media DM module file name.ext
: 2361 1  !
: 2362 1  ! DM_FN$EXT = UPLIT (%ASCIZ'AZFMTR.SAV'),
: 2363 1  !
: 2364 1  ! Hardware parameter coding questions
: 2365 1  !
: 2366 1  HW_Q1 IP = uplit (%asciz'IP REGISTER ADDRESS').

```



ZRQB1  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL TEXT SECTION6-Mar 1984 14:16:44  
6 Mar-1984 14:16:36VAX-11 B1116-16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB1.B16;4

```

: 2367 1      HW_Q2_VECTOR = uplit (%asciz'INTERRUPT VECTOR ADDRESS'),
: 2368 1      HW_Q3_BR = uplit (%asciz'BUS REQUEST LEVEL'),
: 2369 1
: 2370 1      SW_Q1_UNIT = uplit (%asciz'SOFTWARE QUESTIONS ONLY APPLY UNDER APT, ENTER UNIT NUMBER'),
: 2371 1      SW_Q2_MODE = uplit (%asciz'ENTER MODE (1 = REFORMAT, 2 = RESTORE, 3 = RECONSTRUCT)'),
: 2372 1      !
: 2373 1      ! Program flow ascii string messages
: 2374 1      !
: 2375 1      !RP_MSG = uplit (%asciz'%N%AREPORT CODE SECTION'),
: 2376 1      !IN_MSG = uplit (%asciz'%N%AINIT CODE SECTION'),
: 2377 1      !AUTO_MSG = uplit (%asciz'%N%AAUTODROP SECTION'),
: 2378 1      !CLN_MSG = uplit (%asciz'%N%ACLEAN-UP CODE SECTION'),
: 2379 1      !DU_MSG = uplit (%asciz'%N%ADROP-UNIT CODE SECTION'),
: 2380 1      !AU_MSG = uplit (%asciz'%N%AAADD UNIT CODE SECTION'),
: 2381 1      !T1_MSG = uplit (%asciz'%N%AATEST CODE SECTION 1'),
: 2382 1      !T2_MSG = uplit (%asciz'%N%AATEST CODE SECTION 2'),
: 2383 1      !T3_MSG = uplit (%asciz'%N%AATEST CODE SECTION 3'),
: 2384 1      !DINT_MSG = uplit (%asciz'%N%ADUP$I_SERVICE ROUTINE'),
: 2385 1      !IINT_MSG = uplit (%asciz'%N%AINT$I_SERVICE ROUTINE'),
: 2386 1      !
: 2387 1
: 2388 1      !
: 2389 1      ! Formatter error returns
: 2390 1      FMT_ERR = uplit (
: 2391 1          uplit (%asciz'%N%FAILURE CLOSING FCTS'),
: 2392 1          uplit (%asciz'%N%ARCT WRITE FAILURE'),
: 2393 1          uplit (%asciz'%N%AREVECTOR LIMIT EXCEEDED'),
: 2394 1          uplit (%asciz'%N%ASEEK FAILURE DURING ACTUAL FORMATTING'),
: 2395 1          uplit (%asciz'%N%AFACTORY BAD BLOCK INFORMATION IS INACCESSABLE'),
: 2396 1          uplit (%asciz'%N%AINITIAL FAILURE ACCESSING FCT'),
: 2397 1          uplit (%asciz'%N%AUNIT IS NOT WINCHESTER OR CAN NOT BE SELECTED')) : vector [7],
: 2398 1      !
: 2399 1      ! Error message structure
: 2400 1      !
: 2401 1      EMSG_STRUCT = uplit (
: 2402 1      uplit (%asciz'%N%A$FTLERR- RESPONCE STATUS ERROR'),
: 2403 1      uplit (%asciz'%N%A$FTLERR- HOST/CONTROLLER OUT OF SEQ'),
: 2404 1      uplit (%asciz'%N%A$FTLERR- REMOTE PROG NOT RUNNING'),
: 2405 1      uplit (%asciz'%N%A$FTLERR- UNKNOWN RETURN STATUS CODE'),
: 2406 1      uplit (%asciz'%N%A$FTLERR- COM AREA INIT ERROR'),
: 2407 1      uplit (%asciz'%N%A$FTLERR- PORT/HOST SYNC ERROR'),
: 2408 1      uplit (%asciz'%N%A$FTLERR- MESSAGE LENGTH ERROR'),
: 2409 1      uplit (%asciz'%N%A$FTLERR- UNKNOWN ENCODE RECEIVED'),
: 2410 1      uplit (%asciz'%N%A$FTLERR- ADAPTOR PURGE ERROR'),
: 2411 1      uplit (%asciz'%N%A$FTLERR- UNKNOWN INTERRUPT'),
: 2412 1      uplit (%asciz'%N%A$FTLERR- INIT SEQ STEP TIMED OUT'),
: 2413 1      uplit (%asciz'%N%A$FTLERR- INIT SEQ COMPARE ERROR'),
: 2414 1      uplit (%asciz'%N%A$FTLERR- UNEXPECTED ATTENTION END MESSAGE RECEIVED'),
: 2415 1      uplit (%asciz'%N%A$FTLERR- UNEXPECTED COMMAND OPCODE IN END MESSAGE RECEIVED'),
: 2416 1      uplit (%asciz'%N%A$FTLERR- UNEXPECTED SERIOUS EXCEPTION END MESSAGE RECEIVED'),
: 2417 1      uplit (%asciz'%N%A$FTLERR- INVALID COMMAND END MESSAGE RECEIVED'),
: 2418 1      uplit (%asciz'%N%A$FTLERR- UNKNOWN MESSAGE TYPE RECEIVED'),
: 2419 1      uplit (%asciz'%N%A$FTLERR- OUTSTANDING COMMAND BUFFER FULL'),

```

ZRQB1  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL TEXT SECTION

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DISK\$USER2:[YOUNG.FMT]ZRQB1.B16;4

```

: 2420 1  uplit (%asciz' #N#A$FTLERR- OUT STANDING COMMAND BUFFER OUT OF SYNC ERROR'),
: 2421 1  uplit (%asciz' #N#A$FTLERR- UNKNOWN MESSAGE NUMBER RECEIVED'),
: 2422 1  uplit (%asciz' #N#A$FTLERR- FILE READ ERROR'),
: 2423 1  uplit (%asciz' #N#A$FTLERR- PORT/CONTROLLER TIMEOUT ERROR')) : vector [22];
: 2424 1
: 2425 1  end
: 2426 1
: 2427 0  eludom

```

```

.TITLE ZRQB1 RDRX DISK FORMATTER
.IDENT /REV C /
.ENABL AMA

```

```

000000          .PSECT $CODE$, RO
000000      132      122      121      L$NAME:: .ASCII /ZRQ/
000003      102          .ASCII /B/
000004      000          .BYTE 0
000005      000          .BYTE 0
000006      000          .BYTE 0
000007      000          .BYTE 0
000010          L$REV::
000010      103          .ASCII /C/
000011      060          .ASCII /O/
000012      000000G      L$UNIT:: .WORD T$PTHV
000014      002260      L$TIML:: .WORD 2260
000016      000000G      L$HPCP:: .WORD L$HARD
000020      000000G      L$SPCP:: .WORD L$SOFT
000022      000142'      L$HPTP:: .WORD L$HW
000024      000156'      L$SPTP:: .WORD L$SW
000026      000000G      L$LADP:: .WORD L$LAST
000030      000000      L$STA:: .WORD 0
000032      000000      L$CO:: .WORD 0
000034      000000      L$DTYP:: .WORD 0
000036      000000      L$APT:: .WORD 0
000040      000126'      L$DTP:: .WORD L$DISPATCH
000042      000000      L$PRIO:: .WORD 0
000044      000000      L$ENVI:: .WORD 0
000046      000000      L$EXP1:: .WORD 0
000050          L$MREV::
000050      003          .BYTE 3
000051      003          .BYTE 3
000052      000000      L$EF:: .WORD 0
000054      000000          .WORD 0
000056      000000      L$SPC:: .WORD 0
000060      000000G      L$DEVP:: .WORD L$DVTYP
000062      000000G      L$REPP:: .WORD L$RPT
000064      000000      L$EXP4:: .WORD 0
000066      000000      L$EXP5:: .WORD 0
000070      000000G      L$AUT:: .WORD L$AU
000072      000000G      L$DUT:: .WORD L$DU
000074      000000      L$LUN:: .WORD 0

```

ZRQB1 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL TEXT SECTION

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DISK\$USER2:[YOUNG.FMT]ZRQB1.B16;4

000076 000000G  
000100 104035  
000102 000130  
000104 000000G  
000106 000000G  
000110 000000G  
000112 000164  
000114 000000  
000116 000000  
000120 000000  
000122 000001  
000124 000001  
000126 000000G

000130  
000132  
000134  
000136  
000140 000000C

000142 172150

000144 000154

000146 000004

000150 000000

000152  
000154 000000C

000156 000000

000160 000003

000162

000164 177777

000166 177777

000170 177777

000000  
000000 045 124 000  
000003 000  
000004 045 116 045  
000007 101 106 117  
000012 122 115 101  
000015 124 124 111  
000020 116 107 040  
000023 120 110 131  
000026 123 111 103  
000031 101 114 040

L\$DESP::WORD L\$DESC  
L\$LOAD::WORD -73743  
L\$ETP::WORD L\$ERRTABL  
L\$ICP::WORD L\$INIT  
L\$CCP::WORD L\$CLEAN  
L\$ACP::WORD L\$AUTO  
L\$PRT::WORD L\$PROT  
L\$TEST::WORD 0  
L\$DLY::WORD 0  
L\$HIME::WORD 0  
L\$CPU::WORD 1  
D\$PCNT::WORD 1  
L\$DISPATCH::  
.WORD T1  
ERRTYP::BLKW 1  
ERRNBR::BLKW 1  
ERRMSG::BLKW 1  
ERRBLK::BLKW 1  
L\$HLEN::  
.WORD <<L\$NDHW L\$HLEN>/2>  
HW.IP.ADRS::  
.WORD -5630  
HW.VECTOR::  
.WORD 154  
HW.BR.LEVEL::  
.WORD 4  
HW.UNIT.NO::  
.WORD 0  
L\$NDHW::BLKW 1  
L\$SWLEN::  
.WORD <<L\$NDSW-L\$SWLEN>/2>  
SW.UNIT.NO::  
.WORD 0  
SW.MODE::  
.WORD 3  
L\$NDSW::BLKW 1  
L\$PROT::WORD -1  
.WORD -1  
.WORD -1

.PSECT \$PLIT\$, RO, D, GBL  
P.AAA: .ASCII /#T/<00>  
.ASCII <00>  
P.AAB: .ASCII /#M/  
.ASCII /AFO/  
.ASCII /RMA/  
.ASCII /TTI/  
.ASCII /NG /  
.ASCII /PHY/  
.ASCII /SIC/  
.ASCII /AL /

000034	125	116	111	.ASCII	/UNI/
000037	124	040	045	.ASCII	/T #/
000042	104	063	000	.ASCII	/D3/<00>
000045	000			.ASCII	<00>
000046	045	116	045	P.AAC:	.ASCII /#N#/
000051	101	114	117	.ASCII	/ALO/
000054	107	111	103	.ASCII	/GIC/
000057	101	114	040	.ASCII	/AL /
000062	125	116	111	.ASCII	/UNI/
000065	124	040	045	.ASCII	/T #/
000070	104	062	045	.ASCII	/D2#/
000073	123	045	101	.ASCII	/S#A/
000076	120	110	131	.ASCII	/PHY/
000101	123	111	103	.ASCII	/SIC/
000104	101	114	040	.ASCII	/AL /
000107	125	116	111	.ASCII	/UNI/
000112	124	040	045	.ASCII	/T #/
000115	104	062	045	.ASCII	/D2#/
000120	123	045	101	.ASCII	/S#A/
000123	106	117	122	.ASCII	/FOR/
000126	115	101	124	.ASCII	/MAT/
000131	040	101	102	.ASCII	/ AB/
000134	117	122	124	.ASCII	/ORT/
000137	105	104	000	.ASCII	/ED/<00>
000142	045	116	045	P.AAD:	.ASCII /#N#/
000145	101	106	117	.ASCII	/AFO/
000150	122	115	101	.ASCII	/RMA/
000153	124	040	103	.ASCII	/T C/
000156	117	115	120	.ASCII	/OMP/
000161	114	105	124	.ASCII	/LET/
000164	105	104	054	.ASCII	/ED./
000167	040	045	104	.ASCII	/ #D/
000172	062	045	123	.ASCII	/2#S/
000175	045	101	040	.ASCII	/#A /
000200	122	105	126	.ASCII	/REV/
000203	105	103	124	.ASCII	/ECT/
000206	117	122	105	.ASCII	/ORE/
000211	104	040	114	.ASCII	/D L/
000214	102	116	123	.ASCII	/BNS/
000217	000			.ASCII	<00>
000220	045	116	000	P.AAE:	.ASCII /#N/<00>
000223	000			.ASCII	<00>
000224	105	116	124	P.AAF:	.ASCII /ENT/
000227	105	122	040	.ASCII	/ER /
000232	125	116	111	.ASCII	/UNI/
000235	124	040	124	.ASCII	/T I/
000240	117	040	102	.ASCII	/O B/
000243	105	040	106	.ASCII	/E F/
000246	117	122	115	.ASCII	/ORM/
000251	101	124	124	.ASCII	/ATT/
000254	105	104	000	.ASCII	/ED/<00>
000257	000			.ASCII	<00>
000260	125	123	105	P.AAG:	.ASCII /USE/

000263	040	105	130	.ASCII	/ EX/
000266	111	123	124	.ASCII	/IST/
000271	111	116	107	.ASCII	/ING/
000274	040	102	101	.ASCII	/ BA/
000277	104	040	102	.ASCII	/D B/
000302	114	117	103	.ASCII	/LOC/
000305	113	040	111	.ASCII	/K I/
000310	116	106	117	.ASCII	/NFO/
000313	122	115	101	.ASCII	/RMA/
000316	124	111	117	.ASCII	/TIO/
000321	116	000	000	.ASCII	/N/<00><00>
000324	125	123	105	P.AAH:	.ASCII /USE/
000327	040	104	117	.ASCII	/ DO/
000332	127	116	040	.ASCII	/WN /
000335	114	111	116	.ASCII	/LIN/
000340	105	040	114	.ASCII	/E L/
000343	117	101	104	.ASCII	/OAD/
000346	000	000		.ASCII	<00><00>
000350	103	117	116	P.AAI:	.ASCII /CON/
000353	124	111	116	.ASCII	/TIN/
000356	125	105	040	.ASCII	/UE /
000361	111	106	040	.ASCII	/IF /
000364	102	101	104	.ASCII	/BAD/
000367	040	102	114	.ASCII	/ BL/
000372	117	103	113	.ASCII	/OCK/
000375	040	111	116	.ASCII	/ IN/
000400	106	117	122	.ASCII	/FOR/
000403	115	101	124	.ASCII	/MAT/
000406	111	117	116	.ASCII	/ION/
000411	040	111	123	.ASCII	/ IS/
000414	040	111	116	.ASCII	/ IN/
000417	101	103	103	.ASCII	/ACC/
000422	125	122	101	.ASCII	/URA/
000425	124	105	000	.ASCII	/TE/<00>
000430	045	116	045	P.AAJ:	.ASCII / <del>W</del> /
000433	101	105	130	.ASCII	/AEX/
000436	111	123	124	.ASCII	/IST/
000441	111	116	107	.ASCII	/ING/
000444	040	102	101	.ASCII	/ BA/
000447	104	040	102	.ASCII	/D B/
000452	114	117	103	.ASCII	/LOC/
000455	113	040	111	.ASCII	/K I/
000460	115	106	117	.ASCII	/NFO/
000463	122	115	101	.ASCII	/RMA/
000466	124	111	117	.ASCII	/TIO/
000471	116	040	125	.ASCII	/N U/
000474	123	105	104	.ASCII	/SED/
000477	000			.ASCII	<00>
000500	105	116	124	P.AAK:	.ASCII /ENT/
000503	105	122	040	.ASCII	/ER /
000506	070	040	103	.ASCII	/B C/
000511	110	101	122	.ASCII	/HAR/
000514	101	103	124	.ASCII	/ACT/

ZRQB1 RDRX DISK FORMATTER  
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SEQ 0030  
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DISK#USER2:[YOUNG,FMT]ZRQB1.B16;4 (17)

000517	105	122	040	.ASCII	/ER /
000522	123	105	122	.ASCII	/SER/
000525	111	101	114	.ASCII	/IAL/
000530	040	116	125	.ASCII	/ NU/
000533	115	102	105	.ASCII	/MBE/
000536	122	000		.ASCII	/R/<00>
000540	105	116	124	P. AAL:	.ASCII /ENT/
000543	105	122	040	.ASCII	/ER /
000546	104	101	124	.ASCII	/DAT/
000551	105	040	111	.ASCII	/E I/
000554	116	040	115	.ASCII	/N M/
000557	115	055	104	.ASCII	/M-D/
000562	104	055	131	.ASCII	/D-Y/
000565	131	040	106	.ASCII	/Y F/
000570	117	122	115	.ASCII	/ORM/
000573	101	124	000	.ASCII	/AT/<00>
000576	105	116	124	P. AAM:	.ASCII /ENT/
000601	105	122	040	.ASCII	/ER /
000604	104	101	124	.ASCII	/DAT/
000607	105	040	040	.ASCII	/E /
000612	074	115	115	.ASCII	/<MM/
000615	055	104	104	.ASCII	/-DD/
000620	055	131	131	.ASCII	/-YY/
000623	131	131	076	.ASCII	/YY>/
000626	000	000		.ASCII	<00><00>
000630	060	061	055	P. AAN:	.ASCII /01-/
000633	062	071	055	.ASCII	/29-/
000636	065	070	000	.ASCII	/58/<00>
000641	000			.ASCII	<00>
000642	064	060	065	P. AAO:	.ASCII /405/
000645	060	062	061	.ASCII	/021/
000650	067	071	000	.ASCII	/79/<00>
000653	000			.ASCII	<00>
000654	045	116	045	P. AAQ:	.ASCII /MM/
000657	101	044	106	.ASCII	/A#F/
000662	115	124	105	.ASCII	/MTE/
000665	122	122	055	.ASCII	/RR-/
000670	040	125	116	.ASCII	/ UN/
000673	122	105	103	.ASCII	/REC/
000676	117	107	116	.ASCII	/OGN/
000701	111	132	101	.ASCII	/IZA/
000704	102	114	105	.ASCII	/BLE/
000707	040	105	122	.ASCII	/ ER/
000712	122	117	122	.ASCII	/ROR/
000715	040	103	117	.ASCII	/ CO/
000720	104	105	000	.ASCII	/DE/<00>
000723	000			.ASCII	<00>
000724	045	116	045	P. AAR:	.ASCII /MM/
000727	101	044	106	.ASCII	/A#F/
000732	124	114	105	.ASCII	/TLE/
000735	122	122	055	.ASCII	/RR-/
000740	040	105	116	.ASCII	/ EN/
000743	126	105	114	.ASCII	/VEL/

000746	117	120	105	.ASCII	/OPE/	
000751	057	120	101	.ASCII	<57>/PA/	
000754	103	113	105	.ASCII	/CKE/	
000757	124	040	122	.ASCII	/T R/	
000762	105	101	104	.ASCII	/EAD/	
000765	040	050	120	.ASCII	/ (P/	
000770	101	122	111	.ASCII	/ARI/	
000773	124	131	040	.ASCII	/TY /	
000776	117	122	040	.ASCII	/OR /	
001001	124	111	115	.ASCII	/TIM/	
001004	105	117	125	.ASCII	/EQU/	
001007	124	051	000	.ASCII	/T)/<00>	
001012	045	116	045	P.AAS:	.ASCII	/N#/
001015	101	044	106	.ASCII	/A#F/	
001020	124	114	105	.ASCII	/TLE/	
001023	122	122	055	.ASCII	/RR-/	
001026	040	105	116	.ASCII	/ EN/	
001031	126	105	114	.ASCII	/VEL/	
001034	117	120	105	.ASCII	/OPE/	
001037	057	120	101	.ASCII	<57>/PA/	
001042	103	113	105	.ASCII	/CKE/	
001045	124	040	127	.ASCII	/T W/	
001050	122	111	124	.ASCII	/RIT/	
001053	105	040	050	.ASCII	/E (/	
001056	120	101	122	.ASCII	/PAR/	
001061	111	124	131	.ASCII	/ITY/	
001064	040	117	122	.ASCII	/ OR/	
001067	040	124	111	.ASCII	/ TI/	
001072	115	105	117	.ASCII	/MEO/	
001075	125	124	051	.ASCII	/UT)/	
001100	000	000		.ASCII	<00><00>	
001102	045	116	045	P.AAT:	.ASCII	/N#/
001105	101	044	106	.ASCII	/A#F/	
001110	124	114	105	.ASCII	/TLE/	
001113	122	122	055	.ASCII	/RR-/	
001116	040	103	117	.ASCII	/ CO/	
001121	116	124	122	.ASCII	/NTR/	
001124	117	114	114	.ASCII	/OLL/	
001127	105	122	040	.ASCII	/ER /	
001132	122	117	115	.ASCII	/ROM/	
001135	040	101	116	.ASCII	/ AN/	
001140	104	040	122	.ASCII	/D R/	
001143	101	115	040	.ASCII	/AM /	
001146	120	101	122	.ASCII	/PAR/	
001151	111	124	131	.ASCII	/ITY/	
001154	000	000		.ASCII	<00><00>	
001156	045	116	045	P.AAU:	.ASCII	/N#/
001161	101	044	106	.ASCII	/A#F/	
001164	124	114	105	.ASCII	/TLE/	
001167	122	122	055	.ASCII	/RR-/	
001172	040	103	117	.ASCII	/ CO/	
001175	116	124	122	.ASCII	/NTR/	
001200	117	114	114	.ASCII	/OLL/	

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SEQ 0032  
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VAX-11 B1: 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB1.B16;4 (17)

001203	105	122	040	.ASCII	/ER /
001206	122	101	115	.ASCII	/RAM/
001211	040	120	101	.ASCII	/ PA/
001214	122	111	124	.ASCII	/RIT/
001217	131	000	000	.ASCII	/Y/<00><00>
001222	045	116	045	P.AAV:	.ASCII /#Nm/
001225	101	044	106	.ASCII	/A\$F/
001230	124	114	105	.ASCII	/TLE/
001233	122	122	055	.ASCII	/RR-/
001236	040	103	117	.ASCII	/ CO/
001241	116	124	122	.ASCII	/NTR/
001244	117	114	114	.ASCII	/OLL/
001247	105	122	040	.ASCII	/ER /
001252	122	117	115	.ASCII	/ROM/
001255	040	120	101	.ASCII	/ PA/
001260	122	111	124	.ASCII	/RIT/
001263	131	000	000	.ASCII	/Y/<00><00>
001266	045	116	045	P.AAW:	.ASCII /#Nm/
001271	101	044	106	.ASCII	/A\$F/
001274	124	114	105	.ASCII	/TLE/
001277	122	122	055	.ASCII	/RR-/
001302	040	122	111	.ASCII	/ RI/
001305	116	107	040	.ASCII	/NG /
001310	122	105	101	.ASCII	/REA/
001313	104	040	050	.ASCII	/D (/
001316	120	101	122	.ASCII	/PAR/
001321	111	124	131	.ASCII	/ITY/
001324	040	117	122	.ASCII	/ OR/
001327	040	124	111	.ASCII	/ TI/
001332	115	105	117	.ASCII	/MEO/
001335	125	124	051	.ASCII	/UT/
001340	000	000		.ASCII	<00><00>
001342	045	116	045	P.AAX:	.ASCII /#Nm/
001345	101	044	106	.ASCII	/A\$F/
001350	124	114	105	.ASCII	/TLE/
001353	122	122	055	.ASCII	/RR-/
001356	040	122	111	.ASCII	/ RI/
001361	116	107	040	.ASCII	/NG /
001364	127	122	111	.ASCII	/WRI/
001367	124	105	040	.ASCII	/TE /
001372	050	120	101	.ASCII	/(PA/
001375	122	111	124	.ASCII	/RIT/
001400	131	040	117	.ASCII	/Y O/
001403	122	040	124	.ASCII	/R T/
001406	117	115	105	.ASCII	/IME/
001411	117	125	124	.ASCII	/OUT/
001414	051	000		.ASCII	/)/<00>
001416	045	116	045	P.AAY:	.ASCII /#Nm/
001421	101	044	106	.ASCII	/A\$F/
001424	124	114	105	.ASCII	/TLE/
001427	122	122	055	.ASCII	/RR-/
001432	040	111	116	.ASCII	/ IN/
001435	124	105	122	.ASCII	/TER/



001440	122	125	120	.ASCII	/RUP/
001443	124	040	115	.ASCII	/T M/
001446	101	123	124	.ASCII	/AST/
001451	105	122	000	.ASCII	/ER/<00>
001454	045	116	045	P.AAZ:	.ASCII /#N#/
001457	101	044	106	.ASCII	/A#F/
001462	124	114	105	.ASCII	/TLE/
001465	122	122	055	.ASCII	/RR-/
001470	040	110	117	.ASCII	/HO/
001473	123	124	040	.ASCII	/ST /
001476	101	103	103	.ASCII	/ACC/
001501	105	123	123	.ASCII	/ESS/
001504	040	124	111	.ASCII	/TI/
001507	115	105	117	.ASCII	/MEO/
001512	125	124	000	.ASCII	/UT/<00>
001515	000			.ASCII	<00>
001516	045	116	045	P.ABA:	.ASCII /#N#/
001521	101	044	106	.ASCII	/A#F/
001524	124	114	105	.ASCII	/TLE/
001527	122	122	055	.ASCII	/RR-/
001532	040	103	122	.ASCII	/ CR/
001535	105	104	111	.ASCII	/EDI/
001540	124	040	114	.ASCII	/T L/
001543	111	115	111	.ASCII	/IMI/
001546	124	040	105	.ASCII	/T E/
001551	130	103	105	.ASCII	/XCE/
001554	105	104	105	.ASCII	/EDE/
001557	104	000	000	.ASCII	/D/<00><00>
001562	045	116	045	P.ABB:	.ASCII /#N#/
001565	101	044	106	.ASCII	/A#F/
001570	124	114	105	.ASCII	/TLE/
001573	122	122	055	.ASCII	/RR-/
001576	040	125	116	.ASCII	/ UN/
001601	111	102	125	.ASCII	/IBU/
001604	123	040	115	.ASCII	/S M/
001607	101	123	124	.ASCII	/AST/
001612	105	122	040	.ASCII	/ER /
001615	105	122	122	.ASCII	/ERR/
001620	117	122	000	.ASCII	/OR/<00>
001623	000			.ASCII	<00>
001624	045	116	045	P.ABC:	.ASCII /#N#/
001627	101	044	106	.ASCII	/A#F/
001632	124	114	105	.ASCII	/TLE/
001635	122	122	055	.ASCII	/RR-/
001640	040	104	111	.ASCII	/ DI/
001643	101	107	116	.ASCII	/AGN/
001646	117	123	124	.ASCII	/OST/
001651	111	103	040	.ASCII	/IC /
001654	103	117	116	.ASCII	/CON/
001657	124	122	117	.ASCII	/TRO/
001662	114	114	105	.ASCII	/LLE/
001665	122	040	106	.ASCII	/R F/
001670	101	124	101	.ASCII	/ATA/

ZRQ81 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL TEXT SECTION

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DISK\$USER2:(YOUNG.FMT)ZRQ81.B16;4

001673	114	040	105		.ASCII	/L E/
001676	122	122	117		.ASCII	/RRO/
001701	122	000	000		.ASCII	/R/<00><00>
001704	045	116	045	P.ABD:	.ASCII	/N#/
001707	101	044	106		.ASCII	/A#F/
001712	124	114	105		.ASCII	/TLE/
001715	122	122	055		.ASCII	/RR-/
001720	040	111	116		.ASCII	/ IN/
001723	123	124	122		.ASCII	/STR/
001726	125	103	124		.ASCII	/UCT/
001731	111	117	116		.ASCII	/ION/
001734	040	114	117		.ASCII	/ LO/
001737	117	120	040		.ASCII	/OP /
001742	124	111	115		.ASCII	/TIM/
001745	105	117	125		.ASCII	/EQU/
001750	124	000			.ASCII	/T/<00>
001752	045	116	045	P.ABE:	.ASCII	/N#/
001755	101	044	106		.ASCII	/A#F/
001760	124	114	105		.ASCII	/TLE/
001763	122	122	055		.ASCII	/RR-/
001766	040	111	116		.ASCII	/ IN/
001771	126	101	114		.ASCII	/VAL/
001774	111	104	040		.ASCII	/ID /
001777	103	117	116		.ASCII	/CON/
002002	116	105	103		.ASCII	/NEC/
002005	124	111	117		.ASCII	/TIO/
002010	116	040	111		.ASCII	/N I/
002013	104	105	116		.ASCII	/DEN/
002016	124	111	106		.ASCII	/TIF/
002021	111	105	122		.ASCII	/IER/
002024	000	000			.ASCII	<00><00>
002026	045	116	045	P.ABF:	.ASCII	/N#/
002031	101	044	106		.ASCII	/A#F/
002034	124	114	105		.ASCII	/TLE/
002037	122	122	055		.ASCII	/RR-/
002042	040	111	116		.ASCII	/ IN/
002045	124	105	122		.ASCII	/TER/
002050	122	125	120		.ASCII	/RUP/
002053	124	040	127		.ASCII	/T W/
002056	122	111	124		.ASCII	/RIT/
002061	105	000	000		.ASCII	/E/<00><00>
002064	045	116	045	P.ABG:	.ASCII	/N#/
002067	101	044	106		.ASCII	/A#F/
002072	124	114	105		.ASCII	/TLE/
002075	122	122	055		.ASCII	/RR-/
002100	040	115	101		.ASCII	/ MA/
002103	111	116	124		.ASCII	/INT/
002106	105	116	101		.ASCII	/ENA/
002111	116	103	105		.ASCII	/NCE/
002114	040	122	105		.ASCII	/ RE/
002117	101	104	057		.ASCII	/AD/<57>
002122	127	122	111		.ASCII	/WRI/
002125	124	105	040		.ASCII	/TE /

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DISK\$USER2:(YOUNG.FMT)ZRQB1.B16;4

ZRQB1 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL TEXT SECTION

002130	111	116	126	.ASCII	/INV/
002133	101	114	111	.ASCII	/ALI/
002136	104	040	122	.ASCII	/D R/
002141	105	107	111	.ASCII	/EGI/
002144	117	116	040	.ASCII	/ON /
002147	111	104	105	.ASCII	/IDE/
002152	116	124	111	.ASCII	/NTI/
002155	106	111	105	.ASCII	/FIE/
002160	122	000		.ASCII	/R/<00>
002162	045	116	045	P.ABM:	.ASCII /#N#/
002165	101	044	106	.ASCII	/A#F/
002170	124	114	105	.ASCII	/TLE/
002173	122	122	055	.ASCII	/RR-/
002176	040	115	101	.ASCII	/ MA/
002201	111	116	124	.ASCII	/INT/
002204	105	116	101	.ASCII	/ENA/
002207	116	103	105	.ASCII	/NCE/
002212	040	127	122	.ASCII	/ WR/
002215	111	124	105	.ASCII	/ITE/
002220	040	114	117	.ASCII	/ LO/
002223	101	104	040	.ASCII	/AD /
002226	124	117	040	.ASCII	/TO /
002231	116	117	116	.ASCII	/NON/
002234	055	114	117	.ASCII	/-LO/
002237	101	104	101	.ASCII	/ADA/
002242	102	114	105	.ASCII	/BLE/
002245	040	103	117	.ASCII	/ CO/
002250	116	124	122	.ASCII	/NTR/
002253	117	114	114	.ASCII	/OLL/
002256	105	122	000	.ASCII	/ER/<00>
002261	000			.ASCII	<00>
002262	045	116	045	P.ABI:	.ASCII /#N#/
002265	101	044	106	.ASCII	/A#F/
002270	124	114	105	.ASCII	/TLE/
002273	122	122	055	.ASCII	/RR-/
002276	040	103	117	.ASCII	/ CO/
002301	116	124	122	.ASCII	/NTR/
002304	117	114	114	.ASCII	/OLL/
002307	105	122	040	.ASCII	/ER /
002312	122	101	115	.ASCII	/RAM/
002315	040	105	122	.ASCII	/ ER/
002320	122	117	122	.ASCII	/ROR/
002323	040	050	116	.ASCII	/ (N/
002326	117	116	055	.ASCII	/ON-/
002331	120	101	122	.ASCII	/PAR/
002334	111	124	131	.ASCII	/ITY/
002337	051	000	000	.ASCII	/)/<00><00>
002342	045	116	045	P.ABJ:	.ASCII /#N#/
002345	101	044	106	.ASCII	/A#F/
002350	124	114	105	.ASCII	/TLE/
002353	122	122	055	.ASCII	/RR-/
002356	040	111	116	.ASCII	/ IN/
002361	111	124	040	.ASCII	/IT /

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ZRQB1 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL TEXT SECTION

002364	123	105	121	.ASCII	/SEQ/
002367	125	105	116	.ASCII	/UEN/
002372	103	105	040	.ASCII	/CE /
002375	105	122	122	.ASCII	/ERR/
002400	117	122	000	.ASCII	/OR/<00>
002403	000			.ASCII	<00>
002404	045	116	045	P.ABK:	.ASCII /#N#/
002407	101	044	106		.ASCII /A#F/
002412	124	114	105		.ASCII /TLE/
002415	122	122	055		.ASCII /RR-/
002420	040	110	111		.ASCII / HI/
002423	107	110	055		.ASCII /GH-/
002426	114	105	126		.ASCII /LEV/
002431	105	114	040		.ASCII /EL /
002434	120	122	117		.ASCII /PRO/
002437	124	117	103		.ASCII /TOC/
002442	117	114	040		.ASCII /OL /
002445	111	116	103		.ASCII /INC/
002450	117	115	120		.ASCII /OMP/
002453	101	124	111		.ASCII /ATI/
002456	102	111	114		.ASCII /BIL/
002461	111	124	131		.ASCII /ITY/
002464	040	105	122		.ASCII / ER/
002467	122	117	122		.ASCII /ROR/
002472	000	000		P.ABL:	.ASCII <00><00>
002474	045	116	045		.ASCII /#N#/
002477	101	044	106		.ASCII /A#F/
002502	124	114	105		.ASCII /TLE/
002505	122	122	055		.ASCII /RR-/
002510	040	120	125		.ASCII / PU/
002513	122	107	105		.ASCII /RGE/
002516	057	120	117		.ASCII <57>/PO/
002521	114	114	040		.ASCII /LL /
002524	110	101	122		.ASCII /HAR/
002527	104	127	101		.ASCII /DWA/
002532	122	105	040		.ASCII /RE /
002535	106	101	111		.ASCII /FAI/
002540	114	125	122		.ASCII /LUR/
002543	105	000	000	P.AAP:	.ASCII /E/<00><00>
002546	000654'				.WORD P.AAQ
002550	000724'				.WORD P.AAR
002552	001012'				.WORD P.AAS
002554	001102'				.WORD P.AAT
002556	001156'				.WORD P.AAU
002560	001222'				.WORD P.AAV
002562	001266'				.WORD P.AAW
002564	001342'				.WORD P.AAX
002566	001416'				.WORD P.AAY
002570	001454'				.WORD P.AAZ
002572	001516'				.WORD P.ABA
002574	001562'				.WORD P.ABB
002576	001624'				.WORD P.ABC
002600	001704'				.WORD P.ABD

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ZRQB1 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL TEXT SECTION

002602	001752'			.WORD	P.ABE
002604	002026'			.WORD	P.ABF
002606	002064'			.WORD	P.ABG
002610	002162'			.WORD	P.ABH
002612	002262'			.WORD	P.ABI
002614	002342'			.WORD	P.ABJ
002616	002404			.WORD	P.ABK
002620	002474			.WORD	P.ABL
002622	045	116	045	P.ABM:	.ASCII /#N#/ /A#F/ /TLE/ /RR-/ / IN/ /IT / /COD/ /E R/ /E-E/ /NTE/ /RED/ / DU/ /E T/ /O P/ /WR / /FAI/ /L/<00>
002625	101	044	106		
002630	124	114	105	P.ABN:	.ASCII /#N#/ /A#F/ /TLE/ /RR-/ / AB/ /ORT/ /ING/ / HO/ /ST / /AND/ / RE/ /MOT/ /E P/ /ROG/ /RAM/ /S/<00><00>
002633	122	122	055		
002636	040	111	116		
002641	111	124	040		
002644	103	117	104		
002647	105	040	122		
002652	105	055	105		
002655	116	124	105		
002660	122	105	104		
002663	040	104	125		
002666	105	040	124		
002671	117	040	120		
002674	127	122	040		
002677	106	101	111		
002702	114	000			
002704	045	116	045		
002707	101	044	106		
002712	124	114	105		
002715	122	122	055		
002720	040	101	102		
002723	117	122	124		
002726	111	116	107		
002731	040	110	117		
002734	123	124	040		
002737	101	116	104		
002742	040	122	105		
002745	115	117	124		
002750	105	040	120		
002753	122	117	107		
002756	122	101	115		
002761	123	000	000		
002764	045	116	045	P.ABO:	.ASCII /#N#/ /A#F/ /TLE/ /RR-/ / IL/ /LEG/ /AL / /NUM/ /BER/ / OF/ / UN/ /ITS/
002767	101	044	106		
002772	124	114	105		
002775	122	122	055		
003000	040	111	114		
003003	114	105	107		
003006	101	114	040		
003011	116	125	115		
003014	102	105	122		
003017	040	117	106		
003022	040	125	116		
003025	111	124	123		

ZRQB1  
REV C PATCH 0 RDRX DISK FORMATTER  
GLOBAL TEXT SECTION6-Mar-1984 14:16:44  
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DISK#USER2:(YOUNG.FMT)ZRQB1.B16;4

003030	040	123	105	.ASCII	/ SE/
003033	114	105	103	.ASCII	/LEC/
003036	124	105	104	.ASCII	/TED/
003041	000			.ASCII	<00>
003042	045	116	045	P.ABP:	.ASCII /N#/
003045	101	044	106	.ASCII	/A#F/
003050	124	114	105	.ASCII	/TLE/
003053	122	122	055	.ASCII	/RR-/
003056	040	114	111	.ASCII	/ LI/
003061	115	111	124	.ASCII	/MIT/
003064	040	117	106	.ASCII	/ OF/
003067	040	123	111	.ASCII	/ SI/
003072	130	124	105	.ASCII	/XTE/
003075	105	116	040	.ASCII	/EN /
003100	125	116	111	.ASCII	/UNI/
003103	124	123	040	.ASCII	/TS /
003106	120	105	122	.ASCII	/PER/
003111	040	106	117	.ASCII	/ FO/
003114	122	115	101	.ASCII	/RMA/
003117	124	111	116	.ASCII	/TIN/
003122	107	040	123	.ASCII	/G S/
003125	105	123	123	.ASCII	/ESS/
003130	111	117	116	.ASCII	/ION/
003133	000			.ASCII	<00>
003134	045	116	045	P.ABQ:	.ASCII /N#/
003137	101	044	106	.ASCII	/A#F/
003142	124	114	105	.ASCII	/TLE/
003145	122	122	055	.ASCII	/RR-/
003150	040	122	104	.ASCII	/ RD/
003153	122	130	040	.ASCII	/RX /
003156	103	117	116	.ASCII	/CON/
003161	124	122	117	.ASCII	/TRO/
003164	114	114	105	.ASCII	/LLE/
003167	122	040	111	.ASCII	/R I/
003172	116	111	124	.ASCII	/NIT/
003175	111	101	114	.ASCII	/IAL/
003200	111	132	101	.ASCII	/IZA/
003203	124	111	117	.ASCII	/TIO/
003206	116	040	105	.ASCII	/N E/
003211	122	122	117	.ASCII	/RRO/
003214	122	000		.ASCII	/R/<00>
003216	045	116	045	P.ABR:	.ASCII /N#/
003221	101	044	106	.ASCII	/A#F/
003224	124	114	105	.ASCII	/TLE/
003227	122	122	055	.ASCII	/RR-/
003232	040	120	122	.ASCII	/ PR/
003235	117	124	117	.ASCII	/OTO/
003240	103	117	114	.ASCII	/COL/
003243	040	126	111	.ASCII	/ VI/
003246	117	114	101	.ASCII	/OLA/
003251	124	111	117	.ASCII	/TIO/
003254	116	040	105	.ASCII	/N E/
003257	122	122	117	.ASCII	/RRO/

ZRQB1 RDPX DISK FORMATTER  
REV C PATCH 0 GLOBAL TEXT SECTION

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DISK#USER2:[YOUNG.FMT]ZRQB1.B16;4

003262	122	000			.ASCII	/R/<00>
003264	045	116	045	P.ABS:	.ASCII	/MNS/
003267	101	044	106		.ASCII	/A#F/
003272	124	114	105		.ASCII	/TLE/
003275	122	122	055		.ASCII	/RR-/
003300	040	103	117		.ASCII	/ CO/
003303	115	115	125		.ASCII	/MMU/
003306	116	111	103		.ASCII	/NIC/
003311	101	124	111		.ASCII	/ATI/
003314	117	116	040		.ASCII	/ON /
003317	101	122	105		.ASCII	/ARE/
003322	101	040	111		.ASCII	/A I/
003325	116	111	124		.ASCII	/NIT/
003330	040	105	122		.ASCII	/ ER/
003333	122	117	122		.ASCII	/ROR/
003336	000	000			.ASCII	<00><00>
003340	111	120	040	P.ABT:	.ASCII	/IP /
003343	122	105	107		.ASCII	/REG/
003346	111	123	124		.ASCII	/IST/
003351	105	122	040		.ASCII	/ER /
003354	101	104	104		.ASCII	/ADD/
003357	122	105	123		.ASCII	/RES/
003362	123	000			.ASCII	/S/<00>
003364	111	116	124	P.ABU:	.ASCII	/INT/
003367	105	122	122		.ASCII	/ERR/
003372	125	120	124		.ASCII	/UPT/
003375	040	126	105		.ASCII	/ VE/
003400	103	124	117		.ASCII	/CTO/
003403	122	040	101		.ASCII	/R A/
003406	104	104	122		.ASCII	/DDR/
003411	105	123	123		.ASCII	/ESS/
003414	000	000			.ASCII	<00><00>
003416	102	125	123	P.ABV:	.ASCII	/BUS/
003421	040	122	105		.ASCII	/ RE/
003424	121	125	105		.ASCII	/QUE/
003427	123	124	040		.ASCII	/ST /
003432	114	105	126		.ASCII	/LEV/
003435	105	114	000		.ASCII	/EL/<00>
003440	123	117	106	P.ABW:	.ASCII	/SOF/
003443	124	127	101		.ASCII	/TWA/
003446	122	105	040		.ASCII	/RE /
003451	121	125	105		.ASCII	/QUE/
003454	123	124	111		.ASCII	/STI/
003457	117	116	123		.ASCII	/ONS/
003462	040	117	116		.ASCII	/ ON/
003465	114	131	040		.ASCII	/LY /
003470	101	120	120		.ASCII	/APP/
003473	114	131	040		.ASCII	/LY /
003476	125	116	104		.ASCII	/UND/
003501	105	122	040		.ASCII	/ER /
003504	101	120	124		.ASCII	/APT/
003507	056	040	105		.ASCII	/ E/
003512	116	124	105		.ASCII	/NTE/

003515	122	040	125	.ASCII	/R U/
003520	116	111	124	.ASCII	/NIT/
003523	040	116	125	.ASCII	/ NU/
003526	115	102	105	.ASCII	/MBE/
003531	122	000	000	.ASCII	/R/<00><00>
003534	105	116	124	P.ABX: .ASCII	/ENT/
003537	105	122	040	.ASCII	/ER /
003542	115	117	104	.ASCII	/MOD/
003545	105	040	133	.ASCII	/E [ /
003550	061	040	075	.ASCII	/1 - /
003553	040	122	105	.ASCII	/ RE/
003556	106	117	122	.ASCII	/FOR/
003561	115	101	124	.ASCII	/MAT/
003564	054	040	062	.ASCII	/ . 2/
003567	040	075	040	.ASCII	/ - /
003572	122	105	123	.ASCII	/RES/
003575	124	117	122	.ASCII	/TOR/
003600	105	054	040	.ASCII	/E. /
003603	063	040	075	.ASCII	/3 - /
003606	040	122	105	.ASCII	/ RE/
003611	103	117	116	.ASCII	/CON/
003614	123	124	122	.ASCII	/STR/
003617	125	103	124	.ASCII	/UCT/
003622	135	000		.ASCII	/]/<00>
003624	045	116	045	P.ABZ: .ASCII	/NNS/
003627	101	106	101	.ASCII	/AFA/
003632	111	114	125	.ASCII	/ILU/
003635	122	105	040	.ASCII	/RE /
003640	103	114	117	.ASCII	/CLO/
003643	123	111	116	.ASCII	/SIN/
003646	107	040	106	.ASCII	/G F/
003651	103	124	123	.ASCII	/CTS/
003654	000	000		.ASCII	<00><00>
003656	045	116	045	P.ACA: .ASCII	/NNS/
003661	101	122	103	.ASCII	/ARC/
003664	124	040	127	.ASCII	/T W/
003667	122	111	124	.ASCII	/RIT/
003672	105	040	106	.ASCII	/E F/
003675	101	111	114	.ASCII	/AIL/
003700	125	122	105	.ASCII	/URE/
003703	000			.ASCII	<00>
003704	045	116	045	P.ACB: .ASCII	/NNS/
003707	101	122	105	.ASCII	/ARE/
003712	126	105	103	.ASCII	/VEC/
003715	124	117	122	.ASCII	/TOR/
003720	040	114	111	.ASCII	/ LI/
003723	115	111	124	.ASCII	/MIT/
003726	040	105	130	.ASCII	/ EX/
003731	103	105	105	.ASCII	/CEE/
003734	104	105	104	.ASCII	/DED/
003737	000			.ASCII	<00>
003740	045	116	045	P.ACC: .ASCII	/NNS/
003743	101	123	105	.ASCII	/ASE/



003746	105	113	040	.ASCII	/EK /
003751	106	101	111	.ASCII	/FAI/
003754	114	125	122	.ASCII	/LUR/
003757	105	040	104	.ASCII	/E D/
003762	125	122	111	.ASCII	/URI/
003765	116	107	040	.ASCII	/NG /
003770	101	103	124	.ASCII	/ACT/
003773	125	101	114	.ASCII	/UAL/
003776	040	106	117	.ASCII	/ FO/
004001	122	115	101	.ASCII	/RMA/
004004	124	124	111	.ASCII	/TTI/
004007	116	107	000	.ASCII	/NG/<00>
004012	045	116	045	P.ACD: .ASCII	/N/
004015	101	106	101	.ASCII	/AFA/
004020	103	124	117	.ASCII	/CTO/
004023	122	131	040	.ASCII	/RY /
004026	102	101	104	.ASCII	/BAD/
004031	040	102	114	.ASCII	/ BL/
004034	117	103	113	.ASCII	/OCK/
004037	040	111	116	.ASCII	/ IN/
004042	106	117	122	.ASCII	/FOR/
004045	115	101	124	.ASCII	/MAT/
004050	111	117	116	.ASCII	/ION/
004053	040	111	123	.ASCII	/ IS/
004056	040	111	116	.ASCII	/ IN/
004061	101	103	103	.ASCII	/ACC/
004064	105	123	123	.ASCII	/ESS/
004067	101	102	114	.ASCII	/ABL/
004072	105	000		.ASCII	/E/<00>
004074	045	116	045	P.ACE: .ASCII	/N/
004077	101	111	116	.ASCII	/AIN/
004102	111	124	111	.ASCII	/ITI/
004105	101	114	040	.ASCII	/AL /
004110	106	101	111	.ASCII	/FAI/
004113	114	125	122	.ASCII	/LUR/
004116	105	040	101	.ASCII	/E A/
004121	103	103	105	.ASCII	/CCE/
004124	123	123	111	.ASCII	/SSI/
004127	116	107	040	.ASCII	/NG /
004132	106	103	124	.ASCII	/FCT/
004135	000			.ASCII	<00>
004136	045	116	045	P.ACF: .ASCII	/N/
004141	101	125	116	.ASCII	/AUN/
004144	111	124	040	.ASCII	/IT /
004147	111	123	040	.ASCII	/IS /
004152	116	117	124	.ASCII	/NOT/
004155	040	127	111	.ASCII	/ WI/
004160	116	103	110	.ASCII	/NCH/
004163	105	123	124	.ASCII	/EST/
004166	105	122	040	.ASCII	/ER /
004171	117	122	040	.ASCII	/OR /
004174	103	101	116	.ASCII	/CAN/
004177	040	116	117	.ASCII	/ NO/

004202	124	040	102	.ASCII	/T B/
004205	105	040	123	.ASCII	/E S/
004210	105	114	105	.ASCII	/ELE/
004213	103	124	105	.ASCII	/CTE/
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004222	003656				.WORD P.ACA
004224	003704				.WORD P.ACB
004226	003740				.WORD P.ACC
004230	004012				.WORD P.ACD
004232	004074				.WORD P.ACE
004234	004136				.WORD P.ACF
004236	045	116	045	P.ACH:	.ASCII /N#
004241	101	044	106		.ASCII /A#F/
004244	124	114	105		.ASCII /TLE/
004247	122	122	055		.ASCII /RR-/
004252	040	122	105		.ASCII /RE/
004255	123	120	117		.ASCII /SPO/
004260	116	103	105		.ASCII /NCE/
004263	040	123	124		.ASCII /ST/
004266	101	124	125		.ASCII /ATU/
004271	123	040	105		.ASCII /S E/
004274	122	122	117		.ASCII /RRO/
004277	122	000	000	P.ACI:	.ASCII /R/<00><00>
004302	045	116	045		.ASCII /N#
004305	101	044	106		.ASCII /A#F/
004310	124	114	105		.ASCII /TLE/
004313	122	122	055		.ASCII /RR-/
004316	040	110	117		.ASCII /MO/
004321	123	124	057		.ASCII /ST/<57>
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004327	124	122	117		.ASCII /TRO/
004332	114	114	105		.ASCII /LLE/
004335	122	040	117		.ASCII /R O/
004340	125	124	040		.ASCII /UT /
004343	117	106	040		.ASCII /OF /
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004355	101	044	106		.ASCII /A#F/
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004363	122	122	055		.ASCII /RR-/
004366	040	122	105		.ASCII /RE/
004371	115	117	124		.ASCII /MOT/
004374	105	040	120		.ASCII /E P/
004377	122	117	107		.ASCII /ROG/
004402	040	116	117		.ASCII /NO/
004405	124	040	122		.ASCII /T R/
004410	125	116	116		.ASCII /UNN/
004413	111	116	107		.ASCII /ING/
004416	000	000			.ASCII <00><00>
004420	045	116	045	P.ACK:	.ASCII /N#
004423	101	044	106		.ASCII /A#F/

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004426	124	114	105	.ASCII	/TLE/
004431	122	122	055	.ASCII	/RR /
004434	040	125	116	.ASCII	/ UN/
004437	113	116	117	.ASCII	/KNO/
004442	127	116	040	.ASCII	/WN /
004445	122	105	124	.ASCII	/RET/
004450	125	122	116	.ASCII	/URN/
004453	040	123	124	.ASCII	/ ST/
004456	101	124	125	.ASCII	/ATU/
004461	123	040	103	.ASCII	/S C/
004464	117	104	105	.ASCII	/ODE/
004467	000			.ASCII	<00>
004470	045	116	045	P.ACL:	.ASCII /N#/
004473	101	044	106	.ASCII	/A#F/
004476	124	114	105	.ASCII	/TLE/
004501	122	122	055	.ASCII	/RR-/
004504	040	103	117	.ASCII	/ CO/
004507	115	040	101	.ASCII	/M A/
004512	122	105	101	.ASCII	/REA/
004515	040	111	116	.ASCII	/ IN/
004520	111	124	040	.ASCII	/IT /
004523	105	122	122	.ASCII	/ERR/
004526	117	122	000	.ASCII	/OR/<00>
004531	000			.ASCII	<00>
004532	045	116	045	P.ACM:	.ASCII /N#/
004535	101	044	106	.ASCII	/A#F/
004540	124	114	105	.ASCII	/TLE/
004543	122	122	055	.ASCII	/RR-/
004546	040	120	117	.ASCII	/ PO/
004551	122	124	057	.ASCII	/RT/<57>
004554	110	117	123	.ASCII	/HOS/
004557	124	040	123	.ASCII	/T S/
004562	131	116	103	.ASCII	/YNC/
004565	040	105	122	.ASCII	/ ER/
004570	122	117	122	.ASCII	/ROR/
004573	000			.ASCII	<00>
004574	045	116	045	P.ACN:	.ASCII /N#/
004577	101	044	106	.ASCII	/A#F/
004602	124	114	105	.ASCII	/TLE/
004605	122	122	055	.ASCII	/RR-/
004610	040	115	105	.ASCII	/ ME/
004613	123	123	101	.ASCII	/SSA/
004616	107	105	040	.ASCII	/GE /
004621	114	105	116	.ASCII	/LEN/
004624	107	124	110	.ASCII	/GTH/
004627	040	105	122	.ASCII	/ ER/
004632	122	117	122	.ASCII	/ROR/
004635	000			.ASCII	<00>
004636	045	116	045	P.ACO:	.ASCII /N#/
004641	101	044	106	.ASCII	/A#F/
004644	124	114	105	.ASCII	/TLE/
004647	122	122	055	.ASCII	/RR-/
004652	040	125	116	.ASCII	/ UN/

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004655	113	116	117	.ASCII	/KNO/	
004660	127	116	040	.ASCII	/WN /	
004663	105	116	104	.ASCII	/END/	
004666	103	117	104	.ASCII	/COD/	
004671	105	040	122	.ASCII	/E R/	
004674	105	103	105	.ASCII	/ECE/	
004677	111	126	105	.ASCII	/IVE/	
004702	104	000		.ASCII	/D/<00>	
004704	045	116	045	P.ACP:	.ASCII	/N/
004707	101	044	106	.ASCII	/A#F/	
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004715	122	122	055	.ASCII	/RR-/	
004720	040	101	104	.ASCII	/ AD/	
004723	101	120	124	.ASCII	/APT/	
004726	117	122	040	.ASCII	/OR /	
004731	120	125	122	.ASCII	/PUR/	
004734	107	105	040	.ASCII	/GE /	
004737	105	122	122	.ASCII	/ERR/	
004742	117	122	000	.ASCII	/OR/<00>	
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004754	124	114	105	.ASCII	/TLE/	
004757	122	122	055	.ASCII	/RR-/	
004762	040	125	116	.ASCII	/ UN/	
004765	113	116	117	.ASCII	/KNO/	
004770	127	116	040	.ASCII	/WN /	
004773	111	116	124	.ASCII	/INT/	
004776	105	122	122	.ASCII	/ERR/	
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005014	124	114	105	.ASCII	/TLE/	
005017	122	122	055	.ASCII	/RR-/	
005022	040	111	116	.ASCII	/ IN/	
005025	111	124	040	.ASCII	/IT /	
005030	123	105	121	.ASCII	/SEQ/	
005033	040	123	124	.ASCII	/ ST/	
005036	105	120	040	.ASCII	/EP /	
005041	124	111	115	.ASCII	/TIM/	
005044	105	104	040	.ASCII	/ED /	
005047	117	125	124	.ASCII	/OUT/	
005052	000	000		.ASCII	<00><00>	
005054	045	116	045	P.ACS:	.ASCII	/N/
005057	101	044	106	.ASCII	/A#F/	
005062	124	114	105	.ASCII	/TLE/	
005065	122	122	055	.ASCII	/RR /	
005070	040	111	116	.ASCII	/ IN/	
005073	111	124	040	.ASCII	/IT /	
005076	123	105	121	.ASCII	/SEQ/	
005101	040	103	117	.ASCII	/ CO/	
005104	115	120	101	.ASCII	/MPA/	

005107	122	105	040		.ASCII	/RE /
005112	105	122	122		.ASCII	/ERR/
005115	117	122	000		.ASCII	/OR/<00>
005120	045	116	045	P.ACT:	.ASCII	/NNS/
005123	101	044	106		.ASCII	/A\$F/
005126	124	114	105		.ASCII	/TLE/
005131	122	122	055		.ASCII	/RR-/
005134	040	125	116		.ASCII	/ UN/
005137	105	130	120		.ASCII	/EXP/
005142	105	103	124		.ASCII	/ECT/
005145	105	104	040		.ASCII	/ED /
005150	101	124	124		.ASCII	/ATT/
005153	105	116	124		.ASCII	/ENT/
005156	111	117	116		.ASCII	/ION/
005161	040	105	116		.ASCII	/ EN/
005164	104	040	115		.ASCII	/D M/
005167	105	123	123		.ASCII	/ESS/
005172	101	107	105		.ASCII	/AGE/
005175	040	122	105		.ASCII	/ RE/
005200	103	105	111		.ASCII	/CEI/
005203	126	105	104		.ASCII	/VED/
005206	000	000			.ASCII	<00><00>
005210	045	116	045	P.ACU:	.ASCII	/NNS/
005213	101	044	106		.ASCII	/A\$F/
005216	124	114	105		.ASCII	/TLE/
005221	122	122	055		.ASCII	/RR-/
005224	040	125	116		.ASCII	/ UN/
005227	105	130	120		.ASCII	/EXP/
005232	105	103	124		.ASCII	/ECT/
005235	105	104	040		.ASCII	/ED /
005240	103	117	115		.ASCII	/COM/
005243	115	101	116		.ASCII	/MAN/
005246	104	040	117		.ASCII	/D O/
005251	120	103	117		.ASCII	/PCO/
005254	104	105	040		.ASCII	/DE /
005257	111	116	040		.ASCII	/IN /
005262	105	116	104		.ASCII	/END/
005265	040	115	105		.ASCII	/ ME/
005270	123	123	101		.ASCII	/SSA/
005273	107	105	040		.ASCII	/GE /
005276	122	105	103		.ASCII	/REC/
005301	105	111	126		.ASCII	/EIV/
005304	105	104	000		.ASCII	/ED/<00>
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005313	101	044	106		.ASCII	/A\$F/
005316	124	114	105		.ASCII	/TLE/
005321	122	122	055		.ASCII	/RR-/
005324	040	125	116		.ASCII	/ UN/
005327	105	130	120		.ASCII	/EXP/
005332	105	103	124		.ASCII	/ECT/
005335	105	104	040		.ASCII	/ED /
005340	123	105	122		.ASCII	/SER/

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005343	111	117	125	.ASCII	/IOU/	
005346	123	040	105	.ASCII	/S E/	
005351	130	103	105	.ASCII	/XCE/	
005354	120	124	111	.ASCII	/PTI/	
005357	117	116	040	.ASCII	/ON /	
005362	105	116	104	.ASCII	/END/	
005365	040	115	105	.ASCII	/ ME/	
005370	123	123	101	.ASCII	/SSA/	
005373	107	105	040	.ASCII	/GE /	
005376	122	105	103	.ASCII	/REC/	
005401	105	111	126	.ASCII	/EIV/	
005404	105	104	000	.ASCII	/ED/<00>	
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005413	101	044	106	.ASCII	/A#F/	
005416	124	114	105	.ASCII	/TLE/	
005421	122	122	055	.ASCII	/RR-/	
005424	040	111	116	.ASCII	/ IN/	
005427	126	101	114	.ASCII	/VAL/	
005432	111	104	040	.ASCII	/ID /	
005435	103	117	115	.ASCII	/COM/	
005440	115	101	116	.ASCII	/MAN/	
005443	104	040	105	.ASCII	/D E/	
005446	116	104	040	.ASCII	/ND /	
005451	115	105	123	.ASCII	/MES/	
005454	123	101	107	.ASCII	/SAG/	
005457	105	040	122	.ASCII	/E R/	
005462	105	103	105	.ASCII	/ECE/	
005465	111	126	105	.ASCII	/IVE/	
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005475	101	044	106	.ASCII	/A#F/	
005500	124	114	105	.ASCII	/TLE/	
005503	122	122	055	.ASCII	/RR-/	
005506	040	125	116	.ASCII	/ UN/	
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005514	127	116	040	.ASCII	/MN /	
005517	115	105	123	.ASCII	/MES/	
005522	123	101	107	.ASCII	/SAG/	
005525	105	040	124	.ASCII	/E T/	
005530	131	120	105	.ASCII	/YPE/	
005533	040	122	105	.ASCII	/ RE/	
005536	103	105	111	.ASCII	/CEI/	
005541	126	105	104	.ASCII	/VED/	
005544	000	000		.ASCII	<00><00>	
005546	045	116	045	P.ACY:	.ASCII	/M#/
005551	101	044	106	.ASCII	/A#F/	
005554	124	114	105	.ASCII	/TLE/	
005557	122	122	055	.ASCII	/RR-/	
005562	040	117	125	.ASCII	/ OU/	
005565	124	123	124	.ASCII	/TST/	
005570	101	116	104	.ASCII	/AND/	
005573	111	116	107	.ASCII	/ING/	

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005576	040	103	117	.ASCII	/ CO/
005601	115	115	101	.ASCII	/MMA/
005604	116	104	040	.ASCII	/ND /
005607	102	125	106	.ASCII	/BUF/
005612	106	105	122	.ASCII	/FER/
005615	040	106	125	.ASCII	/ FU/
005620	114	114	000	.ASCII	/LL/<00>
005623	000			.ASCII	<00>
005624	045	116	045	P.ACZ:	.ASCII / <del>NS</del> /
005627	101	044	106	.ASCII	/A#F/
005632	124	114	105	.ASCII	/TLE/
005635	122	122	055	.ASCII	/RR-/
005640	040	117	125	.ASCII	/ OU/
005643	124	040	123	.ASCII	/T S/
005646	124	101	116	.ASCII	/TAN/
005651	104	111	116	.ASCII	/DIN/
005654	107	040	103	.ASCII	/G C/
005657	117	115	115	.ASCII	/OM/
005662	101	116	104	.ASCII	/AND/
005665	040	102	125	.ASCII	/ BU/
005670	106	106	105	.ASCII	/FFE/
005673	122	040	117	.ASCII	/R O/
005676	125	124	040	.ASCII	/UT /
005701	117	106	040	.ASCII	/OF /
005704	123	131	116	.ASCII	/SYN/
005707	103	040	105	.ASCII	/C E/
005712	122	122	117	.ASCII	/RRO/
005715	122	000	000	.ASCII	/R/<00><00>
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005723	101	044	106	.ASCII	/A#F/
005726	124	114	105	.ASCII	/TLE/
005731	122	122	055	.ASCII	/RR-/
005734	040	125	116	.ASCII	/ UN/
005737	113	116	117	.ASCII	/KNO/
005742	127	116	040	.ASCII	/LN /
005745	115	105	123	.ASCII	/MES/
005750	123	101	107	.ASCII	/SAG/
005753	105	040	116	.ASCII	/E N/
005756	125	115	102	.ASCII	/UMB/
005761	105	122	040	.ASCII	/ER /
005764	122	105	103	.ASCII	/REC/
005767	105	111	126	.ASCII	/EIV/
005772	105	104	000	.ASCII	/ED/<00>
005775	000			.ASCII	<00>
005776	045	116	045	P.ADB:	.ASCII / <del>NS</del> /
006001	101	044	106	.ASCII	/A#F/
006004	124	114	105	.ASCII	/TLE/
006007	122	122	055	.ASCII	/RR-/
006012	040	106	111	.ASCII	/ FI/
006015	114	105	040	.ASCII	/LE /
006020	122	105	101	.ASCII	/REA/
006023	104	040	105	.ASCII	/D E/
006026	122	122	117	.ASCII	/RRO/

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006031	122	000	000
006034	045	116	045
006037	101	044	106
006042	124	114	105
006045	122	122	055
006050	040	120	117
006053	122	124	057
006056	103	117	116
006061	124	122	117
006064	114	114	105
006067	122	040	124
006072	111	115	105
006075	117	125	124
006100	040	105	122
006103	122	117	122
006106	000	000	
006110	004236		
006112	004302		
006114	004352		
006116	004420		
006120	004470		
006122	004532		
006124	004574		
006126	004636		
006130	004704		
006132	004746		
006134	005006		
006136	005054		
006140	005120		
006142	005210		
006144	005310		
006146	005410		
006150	005472		
006152	005546		
006154	005624		
006156	005720		
006160	005776		
006162	006034		

P.ADC:	.ASCII	/R/<00><00>
	.ASCII	/N#
	.ASCII	/A#F/
	.ASCII	/TLE/
	.ASCII	/RR-/
	.ASCII	/ PO/
	.ASCII	/RT/<57>
	.ASCII	/CON/
	.ASCII	/TRO/
	.ASCII	/LLE/
	.ASCII	/R T/
	.ASCII	/IME/
	.ASCII	/OUT/
	.ASCII	/ ER/
	.ASCII	/ROR/
	.ASCII	<00><00>
P.ACG:	.WORD	P.ACH
	.WORD	P.ACI
	.WORD	P.ACJ
	.WORD	P.ACK
	.WORD	P.ACL
	.WORD	P.ACM
	.WORD	P.ACN
	.WORD	P.ACO
	.WORD	P.ACP
	.WORD	P.ACQ
	.WORD	P.ACR
	.WORD	P.ACS
	.WORD	P.ACT
	.WORD	P.ACU
	.WORD	P.ACW
	.WORD	P.ACX
	.WORD	P.ACY
	.WORD	P.ACZ
	.WORD	P.ADA
	.WORD	P.ADB
	.WORD	P.ADC

000000	.PSECT	\$GLOB\$, RO , D , GBL
000000	COM.AREA:	
	.BLKW	24
000050	HEAD.AREA::	
	.BLKW	1
000052	RECEIVE.RING::	
	.BLKW	1
000054	SEND.RING::	
	.BLKW	1
000056	REC.ENVELOPE::	
	.BLKW	200
000456	SND.ENVELOPE::	



ZRQB1 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL TEXT SECTION

6 Mar-1984 14:16:44  
6-Mar 1984 14:16:36

VAX-11 Bliss 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB1.B16;4

000736		REC.BUF::	.BLKW	130
001316		SND.BUF::	.BLKW	170
001430		OUT\$STD.BUF::	.BLKW	45
001450		RET.EN\$AD::	.BLKW	10
001452		NXT.CRN::	.BLKW	1
			.BLKB	1
			.EVEN	
001454	000000	RET.STATUS::	.WORD	0
001456		LUN::	.BLKW	1
001460		PID.SAVE::	.BLKW	1
001462		UC.VER::	.BLKB	1
			.EVEN	
001464		NSD.SLOT::	.BLKW	1
001466		NRD.SLOT::	.BLKW	1
001470		RDRX.ADDR::	.BLKW	1
001472		VEC.ADDR::	.BLKW	1
001474		BR.LEVEL::	.BLKW	1
001476		UNIT.NO::	.BLKW	1
001500		PTBL.PTR::	.BLKW	1
001502	000377	RSVD.STRUCT::	.WORD	377
			.WORD	0
001504	000000		.WORD	3400
001506	003400		.WORD	3777
001510	003777		.WORD	
001512	377	ISD.STRUCT::	.BYTE	377
001513	013		.BYTE	13
001514	033		.BYTE	33
001515	222		.BYTE	222
001516	222		.BYTE	222
001517	020		.BYTE	20
001520	000010		.WORD	RINGBASE
001522	033		.BYTE	33
001523	047		.BYTE	47
001524	000000		.WORD	0
001526	377		.BYTE	377
001527	107		.BYTE	107
001530	000		.BYTE	0
001531	377		.BYTE	377

.GLOBL L\$SOFT, T\$PTHV, L\$RPT, L\$INIT  
.GLOBL L\$CLEAN, L\$LAST, L\$HARD, L\$DVTYP  
.GLOBL L\$DESC, L\$DU, L\$AU, L\$AUTO, T1

000130'	L\$ERRTBL==	ERRTYP
000156'	L\$SW==	L\$SWLEN+2
000142'	L\$HW==	L\$HWLEN+2
000011'	L\$DEPO==	L\$REV+1
000142'	DFPTBL==	L\$HWLEN+2
000156'	SFPTBL==	L\$SWLEN+2
000000'	FMT1==	P.AAA
000004'	FMT2==	P.AAB
000046'	FMT3==	P.AAC
000142'	FMT4==	P.AAD
000220'	CPLF==	P.AAE
000224'	UNIT\$.MSG==	P.AAF
000260'	EXIST\$.MSG==	P.AAG
000324'	DOWN\$.MSG==	P.AAH
000350'	INACC\$.MSG==	P.AAI
000430'	DFLT\$.MSG==	P.AAJ
000500'	SERIAL\$.MSG==	P.AAK
000540'	DATE\$.MSG==	P.AAL
000576'	DATMSG==	P.AAM
000630'	DEF.DATE==	P.AAN
000642'	DEF.SERIAL==	P.AAO
000010'	RINGBASE==	COM.AREA+10
000740'	MSGADR==	REC.BUF+2
002546'	PFE.STRUCT==	P.AAP
002622'	PWR.MSG==	P.ABM
002704'	ABO.MSG==	P.ABN
002764'	TO.MANY.UNITS==	P.ABO
003042'	GOOD.NUM.UNITS==	P.ABP
003134'	BOOT.FAILURE==	P.ABQ
003216'	PROTO.VIOLATION==	P.ABR
003264'	PORT.INIT.ERR==	P.ABS
003340'	HW.Q1.IP==	P.ABT
003364'	HW.Q2.VECTOR==	P.ABU
003416'	HW.Q3.BR==	P.ABV
003440'	SW.Q1.UNIT==	P.ABW
003534'	SW.Q2.MODE==	P.ABX
004220'	FMT.ERR==	P.ABY
006110'	EMSG.STRUCT==	P.ACG

PSECT SUMMARY

Psect Name	Words	Attributes
\$CODE\$	61	RO , I , LCL , REL , CON
\$GLOB\$	429	RO , D , GBL , REL , CON

ZRQB1 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL TEXT SECTION

6-Mar-1984 14:16:44  
6 Mar 1984 14:16:36

VAX-11 Bliss-16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB1.B16;4

: \$PLIT\$ 1594 RU , D , GBL, REL, CON

Library Statistics

File	Total	Symbols Loaded	Percent	Pages Mapped	Processing Time
DISK#USER2:[YOUNG.FMT]ZRQBBO.L16;4	358	223	62	18	00:00.1

COMMAND QUALIFIERS

: BLISS/PDP11/LIST ZRQB1.B16/EN:NOEIS/SOURCE=PAGE:53

: Size: 0 code + 2084 data words  
 : Run Time: 00:20.9  
 : Elapsed Time: 00:49.1  
 : Lines/CPU Min: 6954  
 : Lexemes/CPU-Min: 38982  
 : Memory Used: 207 pages  
 : Compilation Complete

ZRQB2

RDRX DISK FORMATTER

5 Mar-1984 14:46:32  
5-Mar 1984 14:39:06VAX 11 Bliss 16 V4.0-579  
DISK:USER2:[YOUNG.FMT]ZRQB2.B16;2

```
: 0001 0  MODULE ZRQB2 (TITLE 'RDRX DISK FORMATTER'  
: 0002 0  IDENT = 'REV C PATCH 0',  
: 0003 0  ADDRESSING_MODE (ABSOLUTE) ,  
: 0004 0  ENVIRONMENT (NOEIS)  
: 0005 0  ) =  
: 0006 1  BEGIN  
: 0007 1  
: 0008 1  !      CONTROLLER FUNCTIONS  
: 0009 1  
: 0010 1  library 'ZRQBBO.L16';  
: 0011 1  
: 0012 1  require 'BLSMAC.REQ';  
: 1548 1  
: 1549 1  #sbttl 'MODULE DECLARATIONS'
```

!Define RDRX Library module

!Define Bliss Macro Library

ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
MODULE DECLARATIONS

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX-11 B1100-16 V4.0-579  
DISK:USER2:[YOUNG.FMT]ZRQB2.B16:2

SEQ 0053  
Page (2)

```

: 1550 1      ;
: 1551 1      ;
: 1552 1      ;
: 1553 1      ;
: 1554 1      ;
: 1555 1      ;
: 1556 1      ;
: 1557 1      ;
: 1558 1      ;
: 1559 1      ;
: 1560 1      ;
: 1561 1      ;
: 1562 1      ;
: 1563 1      ;
: 1564 1      ;
: 1565 1      ;
: 1566 1      ;
: 1567 1      ;
: 1568 2      ;
: 1569 2      ;
: 1570 2      ;
: 1571 2      ;
: 1572 2      ;
: 1573 2      ;
: 1574 2      ;
: 1575 2      ;
: 1576 1      ;
: 1577 1      ;

:
: Structure declarations used within this module.
:
structure
:
: RDRX register accessing structure. This
: structure allows RDRX register accessing
: to be transportable between the PDP-11 and
: VAX Diagnostic Supervisors.
:
: This also defines an access algorithm for
: VAX to allow field reference to MBA address
: space without generating machine checks.
:
RDRX (O, P, S, E) =
  begin
    local
      RC%S_REG;
    RC%S_REG = .(RDRX * #upval*0)<0, #bpval, 0>;
    RC%S_REG
  end
  <P, S, E>;

```

ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
MODULE DECLARATIONS

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX-11 Bliss 16 V4.0-579  
DISK1USER2:[YOUNG.FMT]ZRQB2.B16;2

SEQ 0054  
Page 3  
(3)

```

: 1578 1  ;
: 1579 1  ; The psect named "code or fcode" is redefined here
: 1580 1  ; to be called "aefcode". This is done to force the tkb
: 1581 1  ; linker to place the program header information starting
: 1582 1  ; at absolute address 2000. Then for consistency "aefcode"
: 1583 1  ; is used in place of "code or fcode" across all modules.
: 1584 1  ;
: 1585 1  ;psect
: 1586 1  ;   code = aefcode;
: 1587 1  ;
: 1588 1  ;
: 1589 1  ; External Routine declared outside this module.
: 1590 1  ;
: 1591 1  ;external routine
: 1592 1  ;   DECODE : NOVALUE.
: 1593 1  ;   LOAD_FILE;

```

ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
MODULE DECLARATIONS

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX-11 Bliss 16 V4.0 579  
DISK:USER2:[YOUNG.FMT]ZRQB2.B16:2

SEQ 0055  
Page 4  
(4)

```

: 1594 1  !.
: 1595 1  ! External Declaration of datums
: 1596 1  ! declared outside of this module.
: 1597 1  !
: 1598 1  !
: 1599 1  external
: 1600 1  !
: 1601 1  ! Hardware question ascii string messages
: 1602 1  !
: 1603 1  HW_Q1_IP, !H/W question 1 for IP reg address
: 1604 1  HW_Q2_VECTOR, !H/W question 2 for interrupt vector address
: 1605 1  HW_Q3_BR, !H/W question 3 for bus req level
: 1606 1  !
: 1607 1  SW_Q1_UNIT, !software question 1 for unit
: 1608 1  SW_Q2_MODE, !software question 2 for unit
: 1609 1  !
: 1610 1  ! Formatting print string
: 1611 1  !
: 1612 1  FMT2, !Notifies unit being formatted
: 1613 1  FMT3, !Notifies format abort
: 1614 1  !
: 1615 1  ! Init code error and informational messages
: 1616 1  !
: 1617 1  PWR_MSG,
: 1618 1  ABO_MSG,
: 1619 1  TC_MANY_UNITS,
: 1620 1  GOOD_NUM_UNITS,
: 1621 1  !
: 1622 1  ! Miscellaneous external data declarations
: 1623 1  !
: 1624 1  LUN : byte,
: 1625 1  PTBL_PTR : ref vector [4, word],
: 1626 1  !
: 1627 1  ! Supervisor defined data declarations
: 1628 1  !
: 1629 1  L$UNIT,
: 1630 1  !
: 1631 1  ! Hardware P_Table storage declarations
: 1632 1  !
: 1633 1  RDRX_ADDR : ref RDRX field (ISD_FIELD),
: 1634 1  VEC_ADDR : word,
: 1635 1  BR_LEVEL : word,
: 1636 1  UNIT_NO : word,
: 1637 1  !
: 1638 1  ! Formatter data structures
: 1639 1  !
: 1640 1  ISD_STRUCT : blockvector [4, 2, word] field (ISD_FIELD);
: 1641 1  !

```

ZRQ82  
REV C PATCH 0

RDRX DISK FORMATTER  
TYPE AND DESCRIPTION

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX-11 Bliss-16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQ82.B16;2

SEQ 0056  
Page 5  
(5)

```

: 1642 1  *abttl 'TYPE AND DESCRIPTION
: 1643 1  !
: 1644 1  ! Two lines of text will be printed to the operator (in addition to the
: 1645 1  ! program name). The first will come from the "DESCRIPT" macro at start
: 1646 1  ! up time and will identify the diagnostics. The second will come from
: 1647 1  ! the "DEVTYPE" macro at hardware dialogue time and will identify the
: 1648 1  ! device under test. The arguments of both macros are 72 character
: 1649 1  ! ascii strings enclosed in parentheses:
: 1650 1  !
: 1651 1  DESCRIPT (*asciz'RD51/52 DISK FORMATTER');
: 1652 1  DEVTYP (*asc'z'RQDX1 DISK DRIVE SUBSYSTEM');

```



ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
HARDWARE PARAMETER CODING

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX 11 Bliss 16 V4.0 579  
DISK&USER2:[YOUNG.FMT]ZRQB2.B16;2

```

; 1653 1 #sbt1 'HARDWARE PARAMETER CODING'
; 1654 1 !.
; 1655 1 ! The hardware parameter coding section contains macros
; 1656 1 ! that are used by the supervisor to build P Tables. The
; 1657 1 ! macros are not executed as machine instructions but are
; 1658 1 ! interpreted by the supervisor as data structures. The
; 1659 1 ! macros allow the supervisor to establish communications
; 1660 1 ! with the operator.
; 1661 1 !.
; 1662 1 BGNHRD;
; 1663 1 GPRMA (HW_Q1_IP, #0'0', 0, #0'16000', #0'17777', YES, 1);      !Get RDRX Controller IP register
; 1664 1 GPRMA (HW_Q2_VECTOR, #0'2', 0, 4, #0'774', YES, 1);      !Get RDRX Interrupt Vector address
; 1665 1 GPRMD (HW_Q3_BR, #0'4', 0, #0'17777', 0, 7, YES, 1);      !Get RDRX Bus Request Priority
; 1666 1 ENDRD;

```

ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
SOFTWARE PARAMETER CODING SECTION

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX-11 Bliss-16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB2.B16;2

SEQ 0058  
Page 7  
(7)

```

: 1667 1  *sbttl 'SOFTWARE PARAMETER CODING SECTION'
: 1668 1  !
: 1669 1  ! The software parameter coding section contains macros
: 1670 1  ! that are used by the supervisor to build P-Tables. The
: 1671 1  ! macros are not executed as machine instructions but are
: 1672 1  ! interpreted by the supervisor as data structures. The
: 1673 1  ! macros allow the supervisor to establish communications
: 1674 1  ! with the operator.
: 1675 1  !
: 1676 1  BGNSFT;
: 1677 1  !
: 1678 1  ! Software parameter coding is accomplished v'a DM
: 1679 1  ! micro code. This is to conform to DUP protocol
: 1680 1  ! standards.
: 1681 1  !
: 1682 1  GPRMD (SW_Q1_UNIT, %o'0', 0, %o'177777', 0, 3, YES, 0);      !get unit number
: 1683 1  GPRMD (SW_Q2_MODE, %o'2', 0, %o'177777', 1, 3, YES, 0);    !Get mode
: 1684 1  ENDSFT;

```

ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
REPORT CODING SECTION

5 Mar-1984 14:46:32  
5 Mar 1984 14:39:06

VAX-11 Bliss-16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB2.B16;2

SEQ 0059  
Page 3  
(8)

```

: 1685 1  *$bttl 'REPORT CODING SECTION'
: 1686 1  !*
: 1687 1  ! The statistical report coding section contains the PRINTS macros that
: 1688 1  ! will be used to generate statistical reports. The 'BGNRPT' and 'ENDRPT'
: 1689 1  ! macros are used as begining and ending directives for the coding con-
: 1690 1  ! tained in the section. However, an externally located DORPT call, or
: 1691 1  ! a print command from the operator, may be used to request the execu-
: 1692 1  ! tion of the report coding.
: 1693 1  !-
: 1694 2  BGNRPT;
: 1695 2  return;
: 1696 2  !:*****
: 1697 2  !: THIS SECTION CONTAINS THE CODE FOR PRINTING
: 1698 2  !: STATISTICAL INFORMATION GATHERED BY THE DIAGNOSTIC. IT IS
: 1699 2  !: EXECUTED BY THE OPERATOR COMMAND "PRINT" OR BY THE MACRO CALL
: 1700 2  !: "DORPT". USE THE PRINTS MACRO TO PRINT THE INFORMATION.
: 1701 2  !: USE FORMAT STATEMENTS AS IN THE PRINTB/PRINTX MACROS. IT IS
: 1702 2  !: THE PROGRAMMER'S RESPONSIBILTY TO DEVISE AND IMPLEMENT THE
: 1703 2  !: FORM AND CONTENT OF THE STATISTICS.
: 1704 2  !:*****
: 1705 1  ENDRPT;

```

```

.TITLE ZRQB2 RDRX DISK FORMATTER
.IDENT /REV C /
.ENABL AMA

```

```

000000      .PSECT  $CODE$, RO
000000      L$DESC:: .ASCII /RD5/
000003      122      104      065      .ASCII /1/<57>/5/
000006      061      057      065      .ASCII /2 D/
000011      062      040      104      .ASCII /ISK/
000014      111      123      113      .ASCII / FO/
000017      040      106      117      .ASCII /RMA/
000022      122      115      101      .ASCII /TTE/
000025      124      124      105      .ASCII /R/<00><00>
000030      122      000      000      L$DVTYP::
000033      122      121      104      .ASCII /RQD/
000033      130      061      040      .ASCII /X1 /
000036      104      111      123      .ASCII /DIS/
000041      113      040      104      .ASCII /K D/
000044      122      111      126      .ASCII /RIV/
000047      105      040      123      .ASCII /E S/
000052      125      102      123      .ASCII /UBS/
000055      131      123      124      .ASCII /YST/
000060      105      115      000      .ASCII /EM/<00>
000063      000      .ASCII <00>
000064      000000C      L$HRDLN::
000066      000031      .WORD <<<L$NDHRD-L$HRDLN>/2> 1>
000070      000000G      GP$1:: .WORD 31
000072      016000      .WORD HW.Q1.IP
                                .WORD 16000

```

ZRQB2 RDRX DISK FORMATTER  
REV C PATCH 0 REPORT CODING SECTION

5 Mar-1984 14:46:32  
5 Mar-1984 14:39:06

VAX-11 Bliss 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB2.B16;2  
SEQ 0060 Page 9 (8)

000074 177777  
000076 001031  
000100 000000G  
000102 000004  
000104 000774  
000106 002032  
000110 000000G  
000112 177777  
000114 000000  
000116 000007  
000120  
  
000122 000000C  
  
000124 000032  
000126 000000G  
000130 177777  
000132 000000  
000134 000003  
000136 001032  
000140 000000G  
000142 177777  
000144 000001  
000146 000003  
000150

GP#2: .WORD 1  
.WORD 1031  
.WORD HW.Q2.VECTOR  
.WORD 4  
.WORD 774  
GP#3: .WORD 2032  
.WORD HW.Q3.BR  
.WORD 1  
.WORD 0  
.WORD 7  
L\$NDHRD: .BLKW 1  
L\$SFTLN: .WORD <<<L\$NDSFT-L\$SFTLN>/2> 1>  
GP#4: .WORD 32  
.WORD SW.Q1.UNIT  
.WORD -1  
.WORD 0  
.WORD 3  
GP#5: .WORD 1032  
.WORD SW.Q2.MODE  
.WORD -1  
.WORD 1  
.WORD 3  
L\$NDSFT: .BLKW 1  
  
.GLOBL HW.Q1.IP, HW.Q2.VECTOR, HW.Q3.BR  
.GLOBL SW.Q1.UNIT, SW.Q2.MODE, FMT2, FMT3  
.GLOBL PWR.MSG, ABO.MSG, TO.MANY.UNITS  
.GLOBL GOOD.NUM.UNITS, LUN, PTBL.PTR  
.GLOBL L\$UNIT, RDRX.ADDR, VEC.ADDR, BR.LEVEL  
.GLOBL UNIT.NO, ISD.STRUCT

000066'  
000124'

L\$HARD== L\$HRDLN+2  
L\$SOFT== L\$SFTLN+2

000000 000207 LRPT: .SBTTL LRPT REPORT CODING SECTION ; 1684  
RTS PC

; Routine Size: 1 word, Routine Base: \$CODE\$ + 0152  
; Maximum stack depth per invocation: 0 words

000000 004737 000152' L\$RPT: .SBTTL L\$RPT REPORT CODING SECTION ; 1695  
000004 104425 JSR PC,LRPT  
000006 000207 TRAP 25  
RTS PC

25

ZRQB2 RDRX DISK FORMATTER  
REV C PATCH 0 REPORT CODING SECTION

5-Mar-1984 14:46:32  
5-Mar 1984 14:39:06

VAX-11 Bliss 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB2.B16;2

SEQ 0061  
Page 10  
(8)

; Routine Size: 4 words. Routine Base: \$CODE\$ + 0154  
; Maximum stack depth per invocation: 2 words

```

: 1706 1 #sbttl 'INITIALIZE SECTION
: 1707 2 BGNINIT;
: 1708 2
: 1709 2
: 1710 2 !**
: 1711 2 ! The initialization code is executed at the beginning of every
: 1712 2 ! sub-pass and is primarily used for requesting P_Tables. Any
: 1713 2 ! other set-up type functions may also be performed in the init
: 1714 2 ! code.
: 1715 2 !
: 1716 2 ! The initialize code is executed under five conditions. There
: 1717 2 ! are supervisor event flags that are used to let the diagnostic
: 1718 2 ! know under which condition the execution is taking place. The
: 1719 2 ! event flags are read using the "READEF" macro.
: 1720 2 !
: 1721 2 ! The conditions under which the init code is executed and the
: 1722 2 ! corresponding event flags are:
: 1723 2
: 1724 2 START COMMAND EF.START
: 1725 2 RESTART COMMAND EF.RESTART
: 1726 2 CONTINUE COMMAND EF.CONTINUE
: 1727 2 POWERDOWN/POWERUP EF.PWR
: 1728 2 NEW PASS EF.NEW
: 1729 2
: 1730 2 Example of event flag use:
: 1731 2
: 1732 2 if READEF(EF.START) then
: 1733 2 START_FLAG = 1;
: 1734 2
: 1735 2 !**
: 1736 2 ! First read the event flag EF_PWR to see
: 1737 2 ! if this init code is being performed due
: 1738 2 ! to a system power fail. If it is then
: 1739 2 ! report the incident to the operator and
: 1740 2 ! abort the DM machine and further execution
: 1741 2 ! of this program.
: 1742 2 !-
: 1743 2
: 1744 2 if READEF (EF_PWR) !Is the PWR event flag set
: 1745 2 then
: 1746 3 begin !Report the incident and abort
: 1747 3 PRINTF (PWR_MSG); !Power fail print message
: 1748 3 PRINTF (ABO_MSG); !Aborting program message
: 1749 3 WRT_RDRX (RCIP, RC_ALL, ZEROS); !Abort DM code execution
: 1750 3 DOCLN; !Abort further program execution
: 1751 3 end;
: 1752 2
: 1753 2
: 1754 2 ! See if the DRS commands START or RESTART were used to start
: 1755 2 ! this formatting session. If either of them were used then
: 1756 2 ! start the formatting session at logical unit zero.
: 1757 2
: 1758 2

```

ZRQB2  
REV C PATCH 0RDRX DISK FORMATTER  
INITIALIZE SECTION5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06VAX-11 Bliss-16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB2.B16;2

```

: 1759 3  if (READEF (EF_START)) or (READEF (EF_RESTART)) !Did start of restart get us here
: 1760 3  then
: 1761 3      begin
: 1762 3      !
: 1763 3      ! Check the operator for trying to format
: 1764 3      ! more than the defined limit.  If they
: 1765 3      ! are then report the error and die.
: 1766 3      !
: 1767 3      !
: 1768 3      if .L$UNIT gtru L$LIMIT                                !Is the formatting limit exceeded
: 1769 3      then
: 1770 4          begin
: 1771 4          PRINTF (TO_MANY_UNITS);                          !Report the error
: 1772 4          PRINTF (GOOD_NUM_UNITS);                        !Tell him/her the limit
: 1773 4          DOCLN;                                          !Go to cleanup and die
: 1774 3          end;
: 1775 3      !
: 1776 3      !
: 1777 3      ! Everything looks good so far so lets
: 1778 3      ! move on and get the hardware question
: 1779 3      ! responses and save them.
: 1780 3      !
: 1781 3      !
: 1782 3      LUN = -1;                                           !Start formatting at logical unit 0
: 1783 3      !
: 1784 3      do
: 1785 4          begin
: 1786 4          LUN = .LUN + 1;
: 1787 4          !
: 1788 4          if .LUN gequ .L$UNIT then DOCLN;
: 1789 4          !
: 1790 4          end
: 1791 3      until (GPHARD (.LUN, PTBL_PTR)) nequ ZERO;
: 1792 3      !
: 1793 3      RDRX_ADDR = .PTBL_PTR [wrđ0];                          !Load up the controllers base address
: 1794 3      VEC_ADDR = .PTBL_PTR [wrđ1];                          !Load up the controllers vector address
: 1795 3      BR_LEVEL = .PTBL_PTR [wrđ2];                          !Load up the controllers bus request
: 1796 3      UNIT_NO = .PTBL_PTR [wrđ3];                          !Load up the unit number to format
: 1797 3      !
: 1798 3      ! Before leaving the init code section we must
: 1799 3      ! first do some house keeping left behind from
: 1800 3      ! the ISD_STRUCT preset declaration. The adapter
: 1801 3      ! purge interrupt bit must be defined for the
: 1802 3      ! type machine this formatter is running under.
: 1803 3      !
: 1804 3      !
: 1805 3      if $bliss (bliss16)                                       !Define compiler
: 1806 3      then
: 1807 3          ISD_STRUCT [BLK1, WRD1, S2W PI] = ZERO !No purging for PDP 11
: 1808 3      else
: 1809 3          ISD_STRUCT [BLK1, WRD1, S2W PI] = ONE; !Purging for VAX 11
: 1810 3      !
: 1811 3      !

```

```
: 1812 3      ! Now load in the RDRX formatter DM code from
: 1813 3      ! the local boot device into the
: 1814 3      ! blank buffer allocated in azkel6. Report
: 1815 3      ! load error if an error code is returned.
: 1816 3      !
: 1817 3      ! The DM code will only be read in during start
: 1818 3      ! or restarts of the host code. Block zero of the
: 1819 3      ! the DM .sav file will thrown out.
: 1820 3      !-
: 1821 3
: 1822 3      ! if LOAD_FILE (AZFMTR, DM_FN$EXT, DM SIZE) then DECODE ();
: 1823 3
: 1824 3      !
: 1825 3      ! Now calculate the overlay sections starting address
: 1826 3      ! and store the result in global location 'ovsa' for
: 1827 3      ! future ref.
: 1828 3      !
: 1829 3      ! This takes the DM buffer starting adrs and adds to it
: 1830 3      ! the number of bytes in the (initial load + remote prog
: 1831 3      ! header size) resulting in the first adrs of the overlay
: 1832 3      ! section.
: 1833 3      !
: 1834 3
: 1835 3      ! OVSA = AZFMTR + (.AZFMTR [WRD0]);          !Calculate overlay start adrs
: 1836 3
: 1837 3      end
: 1838 2      else
: 1839 3      begin
: 1840 3
: 1841 3      if READEF (EF_CONTINUE)
: 1842 3      then
: 1843 4          begin
: 1844 4              !
: 1845 4              ! End this Host code if this .lun is the
: 1846 4              ! the last logical unit to format.
: 1847 4              !
: 1848 4
: 1849 4              if (.LUN + 1) gequ .L$UNIT then DOCLN;
: 1850 4
: 1851 4              PRINTF (FMT3, .LUN, .UNIT_NO);          !Report this luns format was aborted
: 1852 4
: 1853 3          end;
: 1854 3
: 1855 3      if READEF (EF_NEW) then GPHARD (0, 0);          !New pass means all units formatted
: 1856 3
: 1857 3      do
: 1858 4          begin
: 1859 4              LUN = .LUN + 1;
: 1860 4
: 1861 4              if .LUN gequ .L$UNIT then DOCLN;
: 1862 4
: 1863 4          end
: 1864 3      until (GPHARD (.LUN, PTBL PTR)) nequ ZERO;
```



ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
INITIALIZE SECTION

5-Mar 1984 14:46:32  
5-Mar 1984 14:39:06

VAX-11 Bliss 16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB2.B16;2

```

: 1865 3
: 1866 3
: 1867 3
: 1868 3
: 1869 3
: 1870 2
: 1871 2
: 1872 1

```

RDRX\_ADDR = .PTBL\_PTR [wr0];  
VEC\_ADDR = .PTBL\_PTR [wr1];  
BR\_LEVEL = .PTBL\_PTR [wr2];  
UNIT\_NO = .PTBL\_PTR [wr3];  
end;  
!  
ENDINIT;

```

!Load up the controllers base address
!Load up the controllers vector address
!Load up the controllers bus request
!Load up the unit number to format

```

```

000000 005746          LINIT: .SBTTL LINIT INITIALIZE SECTION
000002 012700 000034   TST      (SP)
000006 104447          MOV      #34,R0
000010 103025          TRAP    47
000012 012746 000000G   BHIS    1$
000016 012746 000001   MOV      #PWR.MSG, -(SP)
000022 010600          MOV      #1, -(SP)
000024 104417          MOV      SP,R0
000026 012716 000000G   TRAP    17
000032 012746 000001   MOV      #ABO.MSG, (SP)
000036 010600          MOV      #1, -(SP)
000040 104417          MOV      SP,R0
000042 017766 000000G 000006   TRAP    17
000050 005000          MOV      @RDRX.ADDR, 6(SP)
000052 005077 000000G   CLR     R0
000056 104444          CLR     @RDRX.ADDR
000060 062706 000006   TRAP    44
000064 012700 000040   1$:    ADD     #6, SP
000070 104447          MOV      #40,R0
000072 103404          TRAP    47
000074 012700 000037   BCS     2$
000100 104447          MOV      #37,R0
000102 103065          TRAP    47
000104 023727 000000G 000020   2$:    BHIS    6$
000112 101417          CMP     L$UNIT, #20
000114 012746 000000G   BLOS   3$
000120 012746 000001   MOV      #TO.MANY.UNITS, (SP)
000124 010600          MOV      #1, -(SP)
000126 104417          MOV      SP,R0
000130 012716 000000G   TRAP    17
000134 012746 000001   MOV      #GOOD.NUM.UNITS, (SP)
000140 010600          MOV      #1, -(SP)
000142 104417          MOV      SP,R0
000144 104444          TRAP    17
000146 062706 000006   TRAP    44
000152 112737 000377 000000G   3$:    ADD     #6, SP
000160 105237 000000G   4$:    MOVB   #377, LUN
000164 005000          INCB   LUN
000166 153700 000000G   CLR     R0
000172 020037 000000G   BISB   LUN, R0
000176 103401          CMP     R0, L$UNIT
000200 104444          BLO    5$
          TRAP    44

```

```

1705
1744
1747
1748
1749
1746
1759
1768
1771
1772
1770
1782
1786
1788

```

000202	005000		58:	CLR	RO	:	1791
000204	153700	000000G		BISB	LUN,RO		
000210	104442			TRAP	42		
000212	010037	000000G		MOV	RO,PTBL.PTR		
000216	001760			BEQ	48		
000220	011037	000000G		MOV	(RO),RDRX.ADDR	:	1793
000224	016037	000002 000000G		MOV	2(RO),VEC.ADDR	:	1794
000232	016037	000004 000000G		MOV	4(RO),BR.LEVEL	:	1795
000240	016037	000004 000000G		MOV	6(RO),UNIT.NO	:	1796
000246	142737	000011 000006G		BICB	#1,ISD.STRUCT.6	:	1805
000254	000474			BR	118	:	1759
000256	012700	000036	68:	MOV	#36,RO	:	1941
000262	104447			TRAP	47		
000264	103025			BHIS	88		
000266	005000			CLR	RO	:	1949
000270	153700	000000G		BISB	LUN,RO		
000274	005200			INC	RO		
000276	020037	000000G		CMP	RO,L#UNIT		
000302	103401			BLO	78		
000304	104444			TRAP	44		
000306	013746	000000G	78:	MOV	UNIT.NO,-(SP)	:	1851
000312	005046			CLR	-(SP)		
000314	113716	000000G		MOVB	LUN,(SP)		
000320	012746	000000G		MOV	#FMT3,-(SP)		
000324	012746	000003		MOV	#3,-(SP)		
000330	010600			MOV	SP,RO	:	SP.0
000332	104417			TRAP	17		
000334	062706	000010		ADD	#10,SP	:	1843
000340	012700	000035	88:	MOV	#35,RO	:	1855
000344	104447			TRAP	47		
000346	103004			BHIS	98		
000350	005000			CLR	RO		
000352	104442			TRAP	42		
000354	010037	000000		MOV	RO,#00		
000360	105237	000000G	98:	INCB	LUN	:	1859
000364	005000			CLR	RO	:	1861
000366	153700	000000G		BISB	LUN,RO		
000372	020037	000000G		CMP	RO,L#UNIT		
000376	103401			BLO	108		
000400	104444			TRAP	44		
000402	005000		108:	CLR	RO	:	1864
000404	153700	000000G		BISB	LUN,RO		
000410	104442			TRAP	42		
000412	010037	000000G		MOV	RO,PTBL.PTR		
000416	001760			BEQ	98		
000420	011037	000000G		MOV	(RO),RDRX.ADDR	:	1866
000424	016037	000002 000000G		MOV	2(RO),VEC.ADDR	:	1867
000432	016037	000004 000000G		MOV	4(RO),BR.LEVEL	:	1868
000440	016037	000006 000000G		MOV	6(RO),UNIT.NO	:	1869
000446	005726		118:	TST	(SP).	:	1705
000450	000207			RTS	PC		

: Routine Size: 149 words, Routine Base: \$CODE\$ - 0164

C6

ZRQB2 RDR: DISK FORMATTER  
REV C PATCH 0 INITIALIZE SECTION

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX-11 Bliss 16 V4.0 579  
DISK:USER2:[YOUNG.FMT]ZRQB2.B16;2

SEG 0067  
Page 16  
(9)

; Maximum stack depth per invocation: 7 words

000000	004737	000164		.SBTTL	L\$INIT INITIALIZE SECTION	
000004	104411		L\$INIT::	JSR	PC.LINIT	:
000006	000207			TRAP	11	
				RTS	PC	

1870

; Routine Size: 4 words, Routine Base: \$CODE\$ + 0636  
; Maximum stack depth per invocation: 2 words

ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
AUTODROP SECTION

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX 11 Bits 16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB2.B16;2

SEQ 0058  
Page 17  
(10)

```

; 1873 1  .sbtll 'AUTODROP SECTION
; 1874 1  '
; 1875 1  ! This code is executed immediately after the initialize code if
; 1876 1  ! the "ADR" flag was set. The unit(s) under test are checked to
; 1877 1  ! see if they will respond. Those that don't are immediately
; 1878 1  ! dropped from testing.
; 1879 1  !
; 1880 2  BGNAUTO;
; 1881 2  !
; 1882 2  ! Testing devices for existence
; 1883 2  ! is done via test 1 of this program.
; 1884 2  !
; 1885 2  return;
; 1886 1  ENDAUTO;
    
```

```

000000 000207          LAUTO:  .SBTTL  LAUTO AUTODROP SECTION          ;          1872
                                RTS      PC
    
```

```

; Routine Size: 1 word,      Routine Base: $CODE$ + 0646
; Maximum stack depth per invocation: 0 words
    
```

```

000000 004737 000646'  L$AUTO:  .SBTTL  L$AUTO AUTODROP SECTION          ;          1885
000004 104461          JSR      PC,LAUTO
000006 000207          RTS      PC
    
```

```

; Routine Size: 4 words,      Routine Base: $CODE$ + 0650
; Maximum stack depth per invocation: 2 words
    
```

En

ZRQ82  
REV C PATCH 0

RDRX DISK FORMATTER  
CLEANUP CODING SECTION

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX-11 Bliss 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQ82.B16;2

```

; 1887 1  *sbttl 'CLEANUP CODING SECTION'
; 1888 1  *
; 1889 1  * Cleanup coding is assembled with the diagnostic program, utilizing in
; 1890 1  * initiating (BGNCLN) and ending (ENDCLN) directives. The coding can be
; 1891 1  * used by either the diagnostic program or the supervisor to affect the
; 1892 1  * return of a test device to a static state.
; 1893 1  *
; 1894 1  * The clean-up code is invoked in three different ways:
; 1895 1  *
; 1896 1  *     A. At end of every sub pass
; 1897 1  *     B. Issuance of DOCLN macro
; 1898 1  *     C. Operator ^C
; 1899 1  *
; 1900 2  BGNCLN;
; 1901 2  BRESET;
; 1902 2  return;
; 1903 1  ENDCLN;

```

```

000000 104433          .SBTTL  LCLEAN CLEANUP CODING SECTION          1900
000002 000207          LCLEAN: TRAP    33                          ;
                                RTS      PC                          ;
                                ;
; Routine Size: 2 words,      Routine Base: $CODE$ + 0660
; Maximum stack depth per invocation: 2 words

```

```

000000 004737 000660'          .SBTTL  L$CLEAN CLEANUP CODING SECTION          1902
                                L$CLEAN:
                                JSR     PC,LCLEAN
                                TRAP    12
                                RTS     PC
; Routine Size: 4 words,      Routine Base: $CODE$ + 0664
; Maximum stack depth per invocation: 2 words

```

ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
DROP UNIT SECTION

5 Mar 1984 14:46:32  
5 Mar-1984 14:39:06

VAX-11 Bliss 16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB2.B16:2

```

; 1904 1  ;sbttl DROP UNIT SECTION'
; 1905 1  ;'
; 1906 1  ; The drop code is invoked by a DODU macro or a drop command, and con-
; 1907 1  ; tains any code that needs to be executed in conjunction with the drop
; 1908 1  ; ping of a unit from the test cycle. No coding is required in this
; 1909 1  ; section.
; 1910 1  ;
; 1911 1  ; The effect of a DODU is the same whether executed in the init code or
; 1912 1  ; in a hardware test. It invokes the drop unit coding and causes subse-
; 1913 1  ; quent GPHARD'S for that logical unit to be returned 'NOT COMPLETE'.
; 1914 1  ; This effect lasts only for the duration of the current command.
; 1915 1  ;
; 1916 2  BGNDU;
; 1917 2  return;
; 1918 1  ENDDU;
    
```

```

000000 000207          LDU:      .SBTTL  LDU DROP UNIT SECTION          ;          1903
                                RTS      PC
    
```

```

; Routine Size: 1 word,      Routine Base: $CODE$ + 0674
; Maximum stack depth per invocation: 0 words
    
```

```

000000 004737 000674'  L$DU::  .SBTTL  L$DU DROP UNIT SECTION          ;          1917
000004 104453          JSR      PC,LDU
000006 000207          TRAP    53
                                RTS      PC
    
```

```

; Routine Size: 4 words,      Routine Base: $CODE$ + 0676
; Maximum stack depth per invocation: 2 words
    
```

ZRQB2  
REV C PATCH 0

RDRX DISK FORMATTER  
ADD UNIT SECTION

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX-11 Bliss-16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB2.B16;2

```

; 1919 1  .sbtbl 'ADD UNIT SECTION
; 1920 1  '
; 1921 1  ; The add code is invoked by the ADD command, and contains any code that
; 1922 1  ; needs to be executed in conjunction with adding a unit back to the
; 1923 1  ; test cycle. No coding is required in this section.
; 1924 1  ;
; 1925 1  ; Units may be added to the test sequence only through the use of opera
; 1926 1  ; tor ADD command. Each unit must have a P-TABLE in memory due to an
; 1927 1  ; earlier hardware dialogue (i.e. the unit was previously dropped).
; 1928 1  ; The ADD code must be delimited by BGNAU, ENDAU. There is no particu
; 1929 1  ; lar coding required in the add code to cause the add to be effective:
; 1930 1  ;
; 1931 1  ; The section is just for programmer housekeeping.
; 1932 1  ;
; 1933 2  BGNAU;
; 1934 2  return;
; 1935 1  ENDAU;

```

```

000000 000207          LAU:  .SBTTL  LAU ADD UNIT SECTION          ;          1918
                          RTS    PC
; Routine Size: 1 word,      Routine Base: $CODE$ + 0706
; Maximum stack depth per invocation: 0 words

```

```

000000 004737 000706    L$AU:: .SBTTL  L$AU ADD UNIT SECTION    ;          1934
000004 104452          JSR    PC,LAU
000006 000207          TRAP  52
                          RTS    PC
; Routine Size: 4 words,      Routine Base: $CODE$ + 0710
; Maximum stack depth per invocation: 2 words

```

```

; 1936 1  end
; 1937 1
; 1938 0  eludom

```

```

;
; PSECT SUMMARY
;
; Psect Name      Words      Attributes
; $CODE$          232        RO , I , LCL , REL , CON

```

```

;
; Library Statistics
;

```

ZRQB2 RDRX DISK FORMATTER  
REV C PATCH 0 ADD UNIT SECTION

5 Mar 1984 14:46:32  
5 Mar 1984 14:39:06

VAX 11 Bliss 16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB2.B16;2

File	Total	Symbols Loaded	Percent	Pages Mapped	Processing Time
DISK\$USER2:[YOUNG.FMT]ZRQB80.L16;4	358	104	29	18	00:00.1

COMMAND QUALIFIERS

BLISS/PDP11/LIST ZRQB2.B16/EN:NOEIS/SOURCE=PAGE:53

Size: 179 code + 53 data words  
 Run Time: 00:15.4  
 Elapsed Time: 02:12.3  
 Lines/CPU Min: 7535  
 Lexemes/CPU-Min: 47202  
 Memory Used: 194 pages  
 Compilation Complete



ZRQ83

RDRX DISK FORMATTER

5-Mar-1984 14:48:56  
5 Mar 1984 14:39:51VAX-11 Bliss-16 V4.0 579  
DISK#USER2:{YOUNG.FMT}ZRQ83.B16:15Page 1  
(1)

```

: 0001 0  MODULE ZRQ83 (#TITLE 'RDRX DISK FORMATTER'
: 0002 0          IDENT = 'REV C PATCH 0',
: 0003 0          ADDRESSING MODE (ABSOLUTE) ,
: 0004 0          ENVIRONMENT (NOEIS)
: 0005 0          ) -
: 0006 1  BEGIN
: 0007 1
: 0008 1  !           MAIN CODE FOR FORMATTER
: 0009 1
: 0010 1  library 'ZRQ8B0.L16';
: 0011 1
: 0012 1  require 'BLSMAC.REQ';
: 1548 1
: 1549 1  #abttl 'MODULE DECLARATIONS'

```

```

!Define RDRX formatter library
!Define Bliss Macro require file

```

ZRQB3  
REV C PATCH 0

RDRX DISK FORMATTER  
MODULE DECLARATIONS

5 Mar 1984 14:48:56  
5 Mar 1984 14:39:51

VAX 11 B11:16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB3.B16;15

```

: 1550 1 forward routine
: 1551 1     btod ,
: 1552 1     REV8 : novalue ,
: 1553 1     REV9 : novalue;
: 1554 1  !*
: 1555 1  ! The psect named "code or $code$" is redefined here
: 1556 1  ! to be called "abfcode". This is done to organize the
: 1557 1  ! formatters test sections into a seperate psect.
: 1558 1  !
: 1559 1  !psect
: 1560 1  !     code = abfcode;
: 1561 1  !
: 1562 1  !*
: 1563 1  ! Structure declarations used within this module.
: 1564 1  !
: 1565 1  !
: 1566 1  structure
: 1567 1  !
: 1568 1  !*
: 1569 1  ! RDRX register accessing structure. This
: 1570 1  ! structure allows RDRX register accessing
: 1571 1  ! to be transportable between the PDP 11 and
: 1572 1  ! VAX Diagnostic Supervisors.
: 1573 1  !
: 1574 1  ! This also defines an access algorithm for
: 1575 1  ! VAX to allow field reference to MBA address
: 1576 1  ! space without generating machine checks.
: 1577 1  !
: 1578 1  !
: 1579 1  RDRX [O, P, S, E] =
: 1580 2     begin
: 1581 2         local
: 1582 2             RC$S_REG;
: 1583 2             RC$S_REG = .(RDRX + #upval*0)<0, #bpval, 0>;
: 1584 2             RC$S_REG
: 1585 2         end
: 1586 2         <P, S, E>;
: 1587 2     end
: 1588 1
: 1589 1

```

ZRQB3  
REV C PATCH 0

RDRX DISK FORMATTER  
MODULE DECLARATIONS

5 Mar-1984 14:48:56  
5-Mar-1984 14:39:51

VAX-11 B1100 16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB3.B16;15

```

: 1590 1      ::
: 1591 1      :: External Routines declared outside this module.
: 1592 1      ::
: 1593 1      ::
: 1594 1      external routine
: 1595 1          setcpu,
: 1596 1          copy,
: 1597 1          ABORT,
: 1598 1          GET_DUST_STATUS,
: 1599 1          EX_LOC_PROG,
: 1600 1          REC_DATA,
: 1601 1          SEND_DATA,
: 1602 1          SET_CNTRL_CHAR,
: 1603 1          DUP$I_SERVICE : INT_LNK$TYP novalue,
: 1604 1          INT$I_SERVICE : INT_LNK$TYP novalue,
: 1605 1          INIT_COM_AREA,
: 1606 1          BOOT_RDRX,
: 1607 1          DECODE : novalue;
: 1608 1

```

```

: 1609 1      ;;
: 1610 1      ;; External Declaration of datums
: 1611 1      ;; declared outside of this module.
: 1612 1      ;;
: 1613 1
: 1614 1      external
: 1615 1      !
: 1616 1      ! Micellaneous external data declarations
: 1617 1
: 1618 1      REC_ENVELOPE : blockvector [REC_ALLOCATE, RB_SIZE + 2, word] field (ENV_FIELD),
: 1619 1      NXT_CRN : byte, !Next seq command ref number
: 1620 1      RET_EN$AD : ref block [RB_SIZE + 2, word] field (ENV_FIELD),
: 1621 1      SND_BUF : vector [SNDB_SIZE, word], !DUP send cmd text buffer
: 1622 1      REC_BUF : block [RECB_SIZE, word] field (RECB_FIELD), !DUP receive cmd text buffer
: 1623 1      MSGADR, !Pointer to DM sent ascii text
: 1624 1      NSD_SLOT : word, !Stores next send ring slot to load cmd into
: 1625 1      NRD_SLOT : word, !Stores next receive slot to expect response in
: 1626 1      VEC_ADDR : word, !Stores controllers vector address
: 1627 1      RET_STATUS : word, !Stores return status of called routines
: 1628 1      PID_SAVE : word, !Saves process indicator word
: 1629 1      RDRX_ADDR : ref RDRX field (ISD_FIELD), !RDRX reference structure
: 1630 1      PTBL_PTR : ref vector [4, word], !table pointer for fetching unit number
: 1631 1      SW_UNIT_NO : word, !software table unit number
: 1632 1      SW_MODE : word, !software table mode
: 1633 1      UC_VER : byte, !controller version number
: 1634 1      UNIT_NO : word, !unit number to format
: 1635 1      !
: 1636 1      ! Init sequence code error and informational messages
: 1637 1      !
: 1638 1      BOOT_FAILURE,
: 1639 1      PROT0_VIOLATION,
: 1640 1      PORT_INIT_ERR,
: 1641 1      !
: 1642 1      ! Default values
: 1643 1      !
: 1644 1      DEF_SERIAL,
: 1645 1      DEF_DATE,
: 1646 1      !
: 1647 1      ! Printing format strings
: 1648 1      !
: 1649 1      FMT1,
: 1650 1      FMT2,
: 1651 1      FMT4,
: 1652 1      FMT_ERR : vector [7],
: 1653 1      DATMSG,
: 1654 1      CRLF,
: 1655 1      !
: 1656 1      !
: 1657 1      !Special questions so the formatter can save code.
: 1658 1      !
: 1659 1      UNIT$ MSG,
: 1660 1      EXIST$ MSG,
: 1661 1      DOWN$ MSG,

```

5 Mar-1984 14:48:56  
5 Mar-1984 14:39:51

VAX 11 Bliss 16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQ83.B16:15

ZRQ83  
REV C PATCH 0

RDRX DISK FORMATTER  
MODULE DECLARATIONS

:	1662	1	INACC\$ _MSG.
:	1663	1	DFLT\$ _MSG.
:	1664	1	SERIAL\$ _MSG.
:	1665	1	DATE\$ _MSG.
:	1666	1	

ZRQB3  
REV C PATCH 0

RDRX DISK FORMATTER  
FORMATTER SECTION 1

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5 Mar-1984 14:39:51

VAX-11 Blues-16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB3.B16;15

```

: 1667 1  #abttl 'FORMATTER SECTION 1'
: 1668 3  BGNTST;
: 1669 3
: 1670 3  !..
: 1671 3  ! Functional Description :
: 1672 3  ! Implicit Inputs :
: 1673 3  ! Implicit Outputs :
: 1674 3  ! Completion Codes :
: 1675 3  ! Side Effects :
: 1676 3  !
: 1677 3  LABEL TLOOP;
: 1678 3  own
: 1679 3  RETRIES,                !Store number of retries to perform
: 1680 3  loopc;
: 1681 3  !..
: 1682 3  ! The next thing to be done is to boot the
: 1683 3  ! RDRX controller. We will allow a few
: 1684 3  ! retries if not successful after the first
: 1685 3  ! boot before we considered the Controller
: 1686 3  ! dead.
: 1687 3
: 1688 3  ! But before we do the boot sequence the processors
: 1689 3  ! priority and interrupt vector address must first
: 1690 3  ! be loaded. During the init sequence the Init
: 1691 3  ! sequence interrupt service routine will just flag
: 1692 3  ! any interrupts and ignore them since interrupts are
: 1693 3  ! disabled during init sequence. Later the DUP interrupt
: 1694 3  ! service routine will be load and do the DUP communications
: 1695 3  ! protocol.
: 1696 3
: 1697 3  ! The following priorities will be assigned:
: 1698 3  ! 1. Processor will run at priority zero.
: 1699 3  ! 2. The RDRX runs at priority 5 by default.
: 1700 3  ! 3. The DUP interrupt routine will run at priority 7.
: 1701 3
: 1702 3  SETPRI (PRIO0);           !Set the processors priority
: 1703 3  CLRVEC (.VEC_ADDR);        !Clear out the vector before setting
: 1704 3  SETVEC (.VEC_ADDR, INT$I_SERVICE, PRIO7); !Set the interrupt service priority
: 1705 3
: 1706 3  !..
: 1707 3  ! Retry the RDRX booting until the
: 1708 3  ! return is true or the retry limit
: 1709 3  ! is reached.
: 1710 3  !-
: 1711 3  setcpu ();              !set up delay constant for timing loops
: 1712 3
: 1713 3  RETRIES = -1;            !Reset the retry counter
: 1714 3
: 1715 3  do
: 1716 4  begin
: 1717 4  RET_STATUS = BOOT_RDRX (); !Boot the RDRX controller
: 1718 4  RETRIES = .RETRIES + 1;    !Up the retry count
: 1719 4  end

```

ZRQ83  
REV C PATCH 0

RDRX DISK FORMATTER  
FORMATTER SECTION 1

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VAX-11 Blues 16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQ83.B16;15

SEQ 0079  
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```
1720 3      until (.RET_STATUS) or (.RETRIES eqv ONE);      !Repeat the Boot until done
1721 3
1722 3      !
1723 3      ! Report booting error if the return
1724 3      ! status never came back as true.
1725 3      !
1726 3      ! if not .RET_STATUS
1727 3      ! then
1728 4          begin
1729 4              PRINTB (BOOT_FAILURE);
1730 4              DORPT;
1731 4              DOCLN;
1732 3          end;
1733 3
1734 3      !
1735 3      ! Now that the RDRX controller is
1736 3      ! booted, check to make sure that the
1737 3      ! controller has done its part of the
1738 3      ! DUP protocol by clearing out the
1739 3      ! port communications area.
1740 3      !
1741 3      ! While we're there set up the communication
1742 3      ! area for the up and coming communications
1743 3      ! between the remote and host program.
1744 3      !
1745 3      !
1746 3      ! if INIT_COM_AREA ( )
1747 3      ! then
1748 4          begin
1749 4              PRINTB (PROTO_VIOLATION);
1750 4              PRINTB (PORT_INIT_ERR);
1751 4              DOCLN;
1752 3          end;
1753 3
1754 3      !
1755 3      ! Before writing the go to the IP register
1756 3      ! load the DUP interrupt service adrs into
1757 3      ! the RDRX vector address for the up and
1758 3      ! coming communications between the host
1759 3      ! and controller.
1760 3      !
1761 3      CLRVEC (.VEC_ADDR);
1762 3      SETVEC (.VEC_ADDR, DUP$I_SERVICE, P4I07);
1763 3      !
1764 3      ! All systems are go. Start the controllers
1765 3      ! functional micro code off and running. Write
1766 3      ! to the SA Register with the go bit set and start
1767 3      ! things rolling.
1768 3      !
1769 3      WRT_RDRX (RCSA, RC ALL, ONE);
1770 3
```

```
!Repeat the Boot until done
!
!Did the Controller boot
!Report a boot error
!Report some statistical data
!Abort the program
!
!Was the com area cleared out as expected
!Com area not inited so error and abort
!
!Clear out the vector before starting
!Set the interrupt service priority
!
!Let the controller go
```

C7

ZRQB3  
REV C PATCH 0

RDRX DISK FORMATTER  
FORMATTER SECTION 1

5 Mar 1984 14:48:56  
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VAX-11 B1100 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB3.B16;15

SEQ 0080  
Page 8  
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```

: 1771 3  !#abttl 'FORMATTER SECTION 2
: 1772 3  !
: 1773 3  !
: 1774 3  !..
: 1775 3  ! Functional Description :
: 1776 3  ! Implicit Inputs :
: 1777 3  ! Implicit Outputs :
: 1778 3  ! Completion Codes :
: 1779 3  ! Side Effects :
: 1780 3  !
: 1781 3  !
: 1782 3  !..
: 1783 3  ! Set the controller characteristics. Default
: 1784 3  ! values will be taken in all cases except for
: 1785 3  ! the host time out value which will be changed
: 1786 3  ! to 'wait for ever'.
: 1787 3  !-
: 1788 3  !
: 1789 3  !if SET_CNTRLR_CHAR () then DECODE ();           !Call decode 'f not successful
: 1790 3  !
: 1791 3  !..
: 1792 3  ! Do a unit on line cmd which will spin up the
: 1793 3  ! device and load the heads. The unit to be
: 1794 3  ! placed on line will be the last unit number
: 1795 3  ! received from the 'gphard' macro in the init
: 1796 3  ! code.
: 1797 3  !
: 1798 3  !

```



```

: 1799 3      !#abttl 'FORMATTER SECTION 3
: 1800 3
: 1801 3      ! See if the Dup server in the RDRX Controller is in an
: 1802 3      ! idle state. To do this first get the dust status and
: 1803 3      ! then look at the flag field bit 3 for a :
: 1804 3      !
: 1805 3      !     0 = idle
: 1806 3      !     1 = active
: 1807 3
: 1808 3      if GET_DUST_STATUS () then DECODE ();          !Call Decode if connection error
: 1809 3
: 1810 3      !
: 1811 3      ! Look in the flag field bit 3 to see if the server is active.
: 1812 3      !
: 1813 3
: 1814 3      if .RET_EN$AD [FLG_B3]                          !If the server is active exit and reboot
: 1815 3      then
: 1816 4          begin
: 1817 4              !*****
: 1818 4              ! Do some stat recording
: 1819 4              !*****
: 1820 4              DOCLN;                                  !Exit this passes execution
: 1821 3              end;
: 1822 3
: 1823 3      !
: 1824 3      ! The server is not active so down line load the formatter
: 1825 3      ! and start its execution by issuing a "Execute local program".
: 1826 3      ! Call the decode routine if a connection error is detected.
: 1827 3      !
: 1828 3
: 1829 3      if EX_LOC_PROG () then DECODE ();              !Call decode if connection error
: 1830 3
: 1831 3      !
: 1832 3      ! Get the dust status to see if the server is in an active
: 1833 3      ! state. An active state is what we want so error if the
: 1834 3      ! server is in an idle state.
: 1835 3      !
: 1836 3      ! If in the active state then save the progress indicator
: 1837 3      ! in "Pid_save" for future reference.
: 1838 3      !
: 1839 3
: 1840 3      if GET_DUST_STATUS () then DECODE ();          !Call decode if connection error
: 1841 3
: 1842 3      !
: 1843 3      ! Look at the flag field bit 3 to see if the server is active.
: 1844 3      !
: 1845 3
: 1846 4      if not (.RET_EN$AD [FLG_B3])                    !Reboot if server is idle
: 1847 3      then
: 1848 4          begin
: 1849 4              !*****
: 1850 4              ! Do some stat recording
: 1851 4              !*****

```

```

: 1852 4      DOCLN;                !Exit this passes execution
: 1853 4      end
: 1854 3      else
: 1855 3      PID_SAVE = .RET EN$AD [PLO_IND];    !Save the progress indicator
: 1856 3
: 1857 3      !.
: 1858 3      ! The Dup server is in the active state running the formatter
: 1859 3      ! program. This DO LOOP will loop on the DUP sub protocol
: 1860 3      ! doing the "send and receive" data commands. These commands
: 1861 3      ! establish the communications between this host program and
: 1862 3      ! the remote formatter program running in the RDRX controller.
: 1863 3      !
: 1864 3      loopc = 0;
: 1865 3
: 1866 3      while .loopc eglu 0 do
: 1867 4          begin
: 1868 4
: 1869 4          !.
: 1870 4          ! Do a 'Receive_data' command which poll's the remote program
: 1871 4          ! for a message. The returned message can either be a:
: 1872 4          !
: 1873 4          ! 1. Question
: 1874 4          !     Where the ascii text is a prompt for information.
: 1875 4          !
: 1876 4          ! 2. Default question
: 1877 4          !     Where the default question message is identical
: 1878 4          !     to the question message except that a null (zero
: 1879 4          !     length) send data is taken to be a default answer
: 1880 4          !     to the question.
: 1881 4          !
: 1882 4          ! 3. Information
: 1883 4          !     Where the ascii text is an informative message.
: 1884 4          !
: 1885 4          ! 4. Termination
: 1886 4          !     Where the ascii text is an normal termination message.
: 1887 4          !
: 1888 4          ! 5. Fatal Error
: 1889 4          !     Where the ascii text is a fatal error message.
: 1890 4          !
: 1891 4          ! 6. Special
: 1892 4          !     This type is used when only a host program could
: 1893 4          !     respond.
: 1894 4          !.
: 1895 4
: 1896 4          CLR_RBUF;                !Clear out the receive buffer area
: 1897 4          if REC_DATA ( ) then DECODE ( );    !Call decode if connection error
: 1898 4
: 1899 4          !
: 1900 4          ! From the first word in the send/receive data buffer, look
: 1901 4          ! to see what type message the remote program has sent to
: 1902 4          ! the Host program. Use this message type number to index
: 1903 4          ! into the select expression to perform the requested action
: 1904 4          ! by the remote program.
```

ZRQB3  
REV C PATCH 0

RDRX DISK FORMATTER  
FORMATTER SECTION 1

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DISK\$USER2:{YOUNG.FMT}ZRQB3.B16;15

SEQ 0083  
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```

; 1905 4      !
; 1906 4      CLR_SBUF;          !Clear out the send buffer area
; 1907 4      CH$PTR (MSGADR, .REC_ENVELOPE [.NSD_SLOT, BLO_CNT] - 2)<0, 8> = 0;
; 1908 4
; 1909 4      if .UC_VER lequ 8 then REV8 (loopc)    !be compatible with version 8 and 9
; 1910 4      else REV9 (RETRIES, loopc);
; 1911 4
; 1912 3      end;
; 1913 3      WRT_RDRX (RCIP, RC_ALL, ONES);    ! shut down the controller
; 1914 3      if .loopc equl 1 then
; 1915 4          begin
; 1916 4              EXIT_TST;          ! normal termination
; 1917 4          end
; 1918 4      else begin
; 1919 4          DOCLN;          ! error abort
; 1920 3      end;
; 1921 1      ENDTST;

```

```

.TITLE ZRQB3 RDRX DISK FORMATTER
.IDENT /REV C /
.ENABL AMA

```

000000  
000000  
000002

```

.PSECT $OWN$, D
RETRIES: .BLKW 1
LOOPC: .BLKW 1

```

```

.GLOBL SETCPU, COPY, ABORT, GET.DUST.STATUS
.GLOBL EX.LOC.PROG, REC.DATA, SEND.DATA
.GLOBL SET.CNTRL.CHAR, DUP$I.SERVICE
.GLOBL INT$I.SERVICE, INIT.COM.AREA, BOOT.RDRX
.GLOBL DECODE, REC.ENVELOPE, NXT.CRN
.GLOBL RET.EN$AD, SND.BUF, REC.BUF, MSGADR
.GLOBL NSD.SLOT, NRD.SLOT, VEC.ADDR, RET.STATUS
.GLOBL PID.SAVE, RDRX.ADDR, PTBL.PTR
.GLOBL SW.UNIT.NO, SW.MODE, UC.VER, UNIT.NO
.GLOBL BOOT.FAILURE, PROTO.VIOLATION
.GLOBL PORT.INIT.ERR, DEF.SERIAL, DEF.DATE
.GLOBL FMT1, FMT2, FMT4, FMT.ERR, DATMSG
.GLOBL CRLF, UNIT$.MSG, EXIST$.MSG, DOWN$.MSG
.GLOBL INACC$.MSG, DFLT$.MSG, SERIAL$.MSG
.GLOBL DATE$.MSG

```

000000

```

.SBTTL $T1 FORMATTER SECTION 1
.PSECT $CODE$, RO

```

000000 010146  
000002 162706 000006  
000006 005000  
000010 104441

```

$T1:  MOV    R1, -(SP)          ;          1605
      SUB    #6, SP
      CLR   RO                 ;          1702
      TRAP  41

```

000012	013700	000000G		MOV	VEC.ADDR,RO	:	1703
000016	104436			TRAP	36		
000020	012746	000340		MOV	#340,(SP)	:	1704
000024	012746	000000G		MOV	#INT\$I.SERVICE,(SP)		
000030	013746	000000G		MOV	VEC.ADDR,-(SP)		
000034	012746	000003		MOV	#3,(SP)		
000040	104437			TRAP	37		
000042	004737	000000G		JSR	PC,SETCPU	:	1711
000046	012737	177777	000000'	MOV	#-1,RETRIES	:	1713
000054	004737	000000G	1\$:	JSR	PC,BOOT.RDRX	:	1717
000060	010037	000000G		MOV	RO,RET.STATUS		
000064	005237	000000'		INC	RETRIES	:	1718
000070	032700	000001		BIT	#1,RO	: #,RET.STATUS	1720
000074	001004			BNE	2\$		
000076	023727	000000'	000001	CMP	RLTRIES,#1		
000104	001363			BNE	1\$		
000106	032737	000001	000000G	2\$:	BIT	#1,RET.STATUS	1726
000114	001011			BNE	3\$		
000116	012716	000000G		MOV	#BOOT.FAILURE,(SP)	:	1729
000122	012746	000001		MOV	#1,-(SP)		
000126	010600			MOV	SP,RO	: SP,*	
000130	104414			TRAP	14		
000132	104424			TRAP	24		
000134	104444			TRAP	44	:	1730
000136	005726			TST	(SP),	:	1728
000140	004737	000000G	3\$:	JSR	PC,INIT.COM.AREA	:	1746
000144	006000			ROR	RO		
000146	103016			BCC	4\$		
000150	012716	000000G		MOV	#PROTO.VIOLATION,(SP)	:	1749
000154	012746	000001		MOV	#1,(SP)		
000160	010600			MOV	SP,RO	: SP,*	
000162	104414			TRAP	14		
000164	012716	000000G		MOV	#PORT.INIT.ERR,(SP)	:	1750
000170	012746	000001		MOV	#1,-(SP)		
000174	010600			MOV	SP,RO	: SP,*	
000176	104414			TRAP	14		
000200	104444			TRAP	44		
000202	022626			CMP	(SP),,(SP),	:	1748
000204	013700	000000G	4\$:	MOV	VEC.ADDR,RO	:	1761
000210	104436			TRAP	36		
000212	012716	000340		MOV	#340,(SP)	:	1762
000216	012746	000000G		MOV	#DUP\$I.SERVICE,-(SP)		
000222	013746	000000G		MOV	VEC.ADDR,-(SP)		
000226	012746	000003		MOV	#3,-(SP)		
000232	104437			TRAP	37		
000234	013700	000000G		MOV	RDRX.ADDR,RO	:	1769
000240	016066	000002	000016	MOV	2(RO),16(SP)	: #,RC\$S.REG	
000246	012701	000001		MOV	#1,R1	: #,RC\$M.REG	
000252	010160	000002		MOV	R1,2(RO)	: RC\$M.REG,*	
000256	004737	000000G		JSR	PC,SET.CNTRLR.CHAR	:	1789
000262	006000			ROR	RO		
000264	103002			BCC	5\$		
000266	004737	000000G		JSR	PC,DECODE		

ZRQ83  
REV C PATCH 0 RDRX DISK FORMATTER  
FORMATTER SECTION 1

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VAX-11 Blues 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQ83.B16;15

000272	004737	000000G		5:	JSR	PC.GET.DUST.STATUS	:	1808
000276	006000				ROR	RO		
000300	103002				BCC	6:		
000302	004737	000000G			JSR	PC.DECODE		
000306	013700	000000G		6:	MOV	RET.EN\$AD,RO	:	1814
000312	032760	004000	000022		BIT	#4000,22(RO)		
000320	001401				BEQ	7:		
000322	104444				TRAP	44	:	1816
000324	004737	000000G		7:	JSR	PC.EX.LOC.PROG	:	1829
000330	006000				ROR	RO		
000332	103002				BCC	8:		
000334	004737	000000G			JSR	PC.DECODE		
000340	004737	000000G		8:	JSR	PC.GET.DUST.STATUS	:	1840
000344	006000				ROR	RO		
000346	103002				BCC	9:		
000350	004737	000000G			JSR	PC.DECODE		
000354	013700	000000G		9:	MOV	RET.EN\$AD,RO	:	1846
000360	032760	004000	000022		BIT	#4000,22(RO)		
000366	001002				BNE	10:		
000370	104444				TRAP	44	:	1848
000372	000405				BR	11:	:	1846
000374	013700	000000G		10:	MOV	RET.EN\$AD,RO	:	1855
000400	016037	000024	000000G		MOV	24(RO),PID.SAVE		
000406	005037	000002		11:	CLR	LOOPC	:	1364
000412	012701	000020			MOV	#20,R1	:	1867
000416	060601				ADD	SP,R1	:	I,*
000420	005737	000002		12:	TST	LOOPC	:	1866
000424	001065				BNE	13:		
000426	005066	000020			CLR	20(SP)	:	I
000432	005061	000000G			CLR	MSGADR(R1)		
000436	005266	000020			INC	20(SP)	:	I
000442	026627	000020	000057		CMP	20(SP),#57	:	I,*
000450	101770				BLOS	13:		
000452	004737	000000G			JSR	PC.REC.DATA	:	1897
000456	006000				ROR	RO		
000460	103002				BCC	14:		
000462	004737	000000G			JSR	PC.DECODE		
000466	005000			14:	CLR	RO	:	I
000470	005060	000000G		15:	CLR	SND.BUF(RO)	:	*(I)
000474	062700	000002			ADD	#2,RO	:	*,I
000500	020027	000110			CMP	RO,#110	:	I,*
000504	101771				BLOS	15:		
000506	013700	000000G			MOV	NSD.SLOT,RO	:	1907
000512	000300				SWAB	RO		
000514	106000				RORB	RO		
000516	006000				ROR	RO		
000520	006000				ROR	RO		
000522	142700	000077			BICB	#77,RO		
000526	016000	000020G			MOV	REC.ENVELOPE+20(RO),RO		
000532	105060	177776G			CLRB	MSGADR 2(RO)		
000536	123727	000000G	000010		CMPB	UC.VER,#10	:	1909
000544	101005				BHI	16:		
000546	012716	000002			MOV	#LOOPC,(SP)		

ZRQ83  
REV C PATCH 0

RDRX DISK FORMATTER  
FORMATTER SECTION 1

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VAX-11 B116 16 V4.0-579  
DISK#USER2:([YOUNG.FMT])ZRQ83.B16;15

```

000552 004737 000000V      JSR    PC,REV8
000554 000720              BR     12$
000560 012716 000000      16$:  MOV    @RETRIEFS,(SP)      ;
000564 012746 000002'      MOV    @LOOPC,-(SP)      ;
000570 004737 000000V      JSR    PC,REV9
000574 005726              TST    (SP)+
000576 000710              BR     12$
000600 017766 000000G 000022 17$:  MOV    @RDRX.ADDR,22(SP)  ;
000606 012700 177777      MOV    #-1,R0           ;
000612 010077 000000G      MOV    R0,@RDRX.ADDR   ;
000616 023727 000002' 000001  CMP    LOOPC,#1        ;
000624 001002              BNE    18$
000626 104463              TRAP   63
000630 000401              BR     19$
000632 104444              18$:  TRAP   44
000634 062706 000024      19$:  ADD    @24,SP
000640 012601              MOV    (SP)+,R1
000642 000207              RTS    PC
  
```

: Routine Size: 210 words, Routine Base: \$CODE\$ + 0000  
: Maximum stack depth per invocation: 13 words

```

000000 004737 000000'      .SBTTL T1 FORMATTER SECTION 1
000000V      T1::
000004 104466              1$:  JSR    PC,$T1
000006 006000              TRAP   66
000010 103773              ROR    R0
000012 000207              BLO    1$
                          RTS    PC
  
```

: Routine Size: 6 words, Routine Base: \$CODE\$ + 0644  
: Maximum stack depth per invocation: 2 words

```

: 1922 1
: 1923 1 routine REV8 (endflg) : novalue =
: 1924 2 begin
: 1925 2   selectoneu .REC_BUF [MSG_TYP] of      !Select the appropriate action
: 1926 2     set
: 1927 2
: 1928 2     [1] :      !Question message type
: 1929 3       begin
: 1930 3       !
: 1931 3       ! Look into the send/receive data buffer at the message
: 1932 3       ! number field and see what question the remote program
: 1933 3       ! is asking. Use the fields value to index into the
: 1934 3       ! select expression to perform the appropriate action.
: 1935 3       !
: 1936 3
: 1937 3   selectoneu .REC_BUF [MSG_NUM] of      !Select the requested question
  
```

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DISK:USER2:[YOUNG.FMT]ZRQB3.B16;15

ZRQB3  
REV C PATCH 0RDRX DISK FORMATTER  
FORMATTER SECTION 1

```

: 1938 3      set
: 1939 3
: 1940 3      [0] :                               !Enter unit number to format
: 1941 4      begin
: 1942 5      if (MANUAL) then          GMANID (UNIT$ _MSG, SND_BUF, D, %'3', 0, 3, NO)
: 1943 4      else SND_BUF = .SW UNIT NO;
: 1944 4      if SEND_DATA (SNDB_COUNT) then DECODE ();
: 1945 3      end;
: 1946 3
: 1947 3      [1] :                               !Choose one of the responses
: 1948 4      begin
: 1949 4      if (MANUAL) then
: 1950 5          begin
: 1951 5          SND_BUF = 0;
: 1952 5          GMANIL (EXIST$ _MSG, SND_BUF, %'1', YES, 1);
: 1953 6          if ( .SND_BUF<0, 1, 0> NEQU 1)
: 1954 6              then begin
: 1955 6                  GMANIL (DOWN$ _MSG, SND_BUF, %'2', YES, 1);
: 1956 7                  if ( .SND_BUF<1, 1, 0> NEQU 1)
: 1957 7                      then begin
: 1958 7                          GMANIL (INACC$ _MSG, SND_BUF, %'4', YES, 1);
: 1959 8                          if ( .SND_BUF<2, 1, 0> NEQU 1)
: 1960 8                              then begin
: 1961 8                                  SND_BUF<0, 1, 0> = 1;
: 1962 8                                  PRINTB(DFLT$ _MSG);
: 1963 7                                  end;
: 1964 6                              end;
: 1965 5                          end;
: 1966 5                      end
: 1967 4                  else SND_BUF = .SW_MODE;
: 1968 4
: 1969 4          if SEND_DATA (SNDB_COUNT) then DECODE ();
: 1970 3          end;
: 1971 3
: 1972 3      [2] :                               !Enter an eight character non-zero ascii serial number
: 1973 4      begin                               !(Any eight characters will do)
: 1974 5      if (MANUAL) then GMANID (SERIAL$ _MSG, SND_BUF, A, %'177777'. 8, 8, NO)
: 1975 4      else copy (DEF_SERIAL, SND_BUF, 8);
: 1976 4      if SEND_DATA (SNDB_COUNT) then DECODE ();
: 1977 3      end;
: 1978 3
: 1979 3      [3] :                               !Enter current date MM-DD YY < exact format required
: 1980 4      begin                               !(Actually, any six characters will do)
: 1981 5      if (MANUAL) then GMANID (DATE$ _MSG, SND_BUF, A, %'177777'. 8, 8, NO)
: 1982 4      else copy (DEF_DATE, SND_BUF, 8);
: 1983 4      if SEND_DATA (SNDB_COUNT) then DECODE ();
: 1984 3      end;
: 1985 3
: 1986 3      [otherwise] :                       !This message number is unknown
: 1987 4      begin
: 1988 4      RET STATUS = UMN CODE;             !Unknown message number error code
: 1989 4      DECODE ();                         !Report error and die
: 1990 3      end;

```

```

: 1991 3      tes;
: 1992 3
: 1993 2      end;
: 1994 2
: 1995 2      [2] :      !Default Question
: 1996 3      begin
: 1997 3
: 1998 3      selectoneu .REC_BUF [MSG_NUM] of
: 1999 3      set
: 2000 3      [otherwise] :      !This message number is unknown
: 2001 4      begin
: 2002 4      RET_STATUS = UMN_CODE;      !Unknown message number error code
: 2003 4      DECODE ();      !Report error and die
: 2004 3      end;
: 2005 3      tes;
: 2006 3
: 2007 2      end;
: 2008 2
: 2009 2      [3] :      !Informational message
: 2010 3      begin
: 2011 3
: 2012 3      selectoneu .REC_BUF [MSG_NUM] of
: 2013 3      set
: 2014 3
: 2015 3      [0, 9] :      !Format begun plus my debug msg
: 2016 4      begin
: 2017 4      PRINTB (FMT1, MSGADR);
: 2018 3      end;
: 2019 3
: 2020 3      [otherwise] :      !This message number is unknown
: 2021 4      begin
: 2022 4      RET_STATUS = UMN_CODE;      !Unknown message number error code
: 2023 4      DECODE ();      !Report error and die
: 2024 3      end;
: 2025 3      tes;
: 2026 3
: 2027 2      end;
: 2028 2
: 2029 2      [4] :      !Termination message
: 2030 3      begin
: 2031 3      .endflg = 1;
: 2032 3      PRINTB (FMT4, .REC_BUF[MSG_NUM]);
: 2033 2      end;
: 2034 2
: 2035 2      [5] :      !Fatal error message
: 2036 3      begin
: 2037 3
: 2038 3      PRINTB (.FMT_ERR [.REC_BUF[MSG_NUM] 1]);
: 2039 3      .endflg = 2;
: 2040 2      end;
: 2041 2
: 2042 2      [6] :      !Special message type
: 2043 3      begin

```



ZRQ83  
REV C PATCH 0

RDRX DISK FORMATTER  
FORMATTER SECTION 1

5-Mar-1984 14:48:56  
5-Mar-1984 14:39:51

VAX-11 Bliss 16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQ83.B16:15

```

; 2044 3
; 2045 3      selectu .REC BUF [MSG NUM] of
; 2046 3      set
; 2047 3      [always] :
; 2048 4          begin
; 2049 4          RET_STATUS = UMN CODE;
; 2050 4          DECODE ();
; 2051 3          end;
; 2052 3      tes;
; 2053 3
; 2054 2      end;
; 2055 2
; 2056 2      [otherwise] :
; 2057 3          begin
; 2058 3          RET_STATUS = UMT CODE;
; 2059 3          DECODE ();
; 2060 2          end;
; 2061 2      tes;
; 2062 1      end;

```

```

!This message number is unknown
!Unknown message number error code
!Report error and die

```

000000	004137	000000G	REV8:	.SBTTL	REV8 FORMATTER SECTION 1		
000004	013701	000000G		JSR	R1,\$SAVE2	:	1923
000010	006201			MOV	REC.BUF,R1	:	1925
000012	006201			ASR	R1		
000014	006201			ASR	R1		
000016	006201			ASR	R1		
000020	000301			SWAB	R1		
000022	042701	177760		BIC	#177760,R1		
000026	020127	000001		CMP	R1,#1	:	1928
000032	001171			BNE	10\$		
000034	013702	000000G		MOV	REC.BUF,R2	:	1937
000040	042702	170000		BIC	#170000,R2		
000044	001017			BNE	2\$	:	1940
000046	104450			TRAP	50	:	1942
000050	103011			BHIS	1\$		
000052	104443			TRAP	43		
000054	000406			.WORD	406		
000056	000000G			.WORD	SND.BUF		
000060	000042			.WORD	42		
000062	000000G			.WORD	UNIT\$.MSG		
000064	000003			.WORD	3		
000066	000000			.WORD	0		
000070	000003			.WORD	3		
000072	000467			BR	4\$		
000074	013737	000000G 000000G	1\$:	MOV	SW.UNIT.NO,SND.BUF	:	1943
000102	000463			BR	4\$	:	1944
000104	020227	000001	2\$:	CMP	R2,#1	:	1947
000110	001070			BNE	5\$		
000112	104450			TRAP	50	:	1949
000114	103053			BHIS	3\$		
000116	005037	000000G		CLR	SND.BUF	:	1951

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VAX-11 Bliss 16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB3.016;15

ZRQB3 RDRX DISK FORMATTER  
REV C PATCH 0 FORMATTER SECTION 1

000122	104443				TRAP	43	:	1952
000124	000404				.WORD	404		
000126	000000G				.WORD	SND.BUF		
000130	000130				.WORD	130		
000132	000000G				.WORD	EXIST\$.MSG		
000134	000001				.WORD	1		
000136	032737	000001	000000G		BIT	#1,SND.BUF	:	1953
000144	001042				BNE	4\$		
000146	104443				TRAP	43	:	1955
000150	000404				.WORD	404		
000152	000000G				.WORD	SND.BUF		
000154	000130				.WORD	130		
000156	000000G				.WORD	DOWN\$.MSG		
000160	000002				.WORD	2		
000162	032737	000002	000000G		BIT	#2,SND.BUF	:	1956
000170	001030				BNE	4\$		
000172	104443				TRAP	43	:	1958
000174	000404				.WORD	404		
000176	000000G				.WORD	SND.BUF		
000200	000130				.WORD	130		
000202	000000G				.WORD	INACC\$.MSG		
000204	000004				.WORD	4		
000206	032737	000004	000000G		BIT	#4,SND.BUF	:	1959
000214	001016				BNE	4\$		
000216	152737	000001	000000G		3ISB	#1,SND.BUF	:	1961
000224	012746	000000G			MOV	#DFLT\$.MSG,-(SP)	:	1962
000230	012746	000001			MOV	#1,-(SP)	:	
000234	010600				MOV	SP,R0	:	SP,4
000236	104414				TRAP	14		
000240	022626				CMP	(SP)+,(SP)+	:	1960
000242	000403				BR	4\$	:	1949
000244	013737	000000G	000000G	3\$:	MOV	SW.MODE,SND.BUF	:	1967
000252	012746	000020		4\$:	MOV	#20,-(SP)	:	1969
000256	004737	000000G			JSR	PC,SEND.DATA		
000262	005726				TST	(SP)+		
000264	006000				ROR	R0		
000266	103164				BCC	19\$		
000270	000561				BR	18\$		
000272	020227	000002		5\$:	CMP	R2,#2	:	1972
000276	001016				BNE	7\$		
000300	104450				TRAP	50	:	1974
000302	103011				BHIS	6\$		
000304	104443				TRAP	43		
000306	000406				.WORD	406		
000310	000000G				.WORD	SND.BUF		
000312	000142				.WORD	142		
000314	000000G				.WORD	SERIAL\$.MSG		
000316	177777				.WORD	-1		
000320	000010				.WORD	10		
000322	000010				.WORD	10		
000324	000752				BR	4\$		
000326	012746	000000G		6\$:	MOV	#DEF.SERIAL,(SP)	:	1975
000332	000420				BR	9\$		

ZRQB3 RDRX DISK FORMATTER  
REV C PATCH 0 FORMATTER SECTION 1

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VAX-11 Blues-16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB3.B16;15

000334	020227	000003	7\$:	CMP	R2,#3	:	1979
000340	001126			BNE	16\$		
000342	104450			TRAP	50	:	1981
000344	103011			BHIS	8\$		
000346	104443			TRAP	43		
000350	000406			.WORD	406		
000352	000000G			.WORD	SND.BUF		
000354	000142			.WORD	142		
000356	000000G			.WORD	DATE\$.MSG		
000360	177777			.WORD	-1		
000362	000010			.WORD	10		
000364	000010			.WORD	10		
000366	000731			BR	4\$		
000370	012746	000000G	8\$:	MOV	#DEF.DATE,-(SP)	:	1982
000374	012746	000000G	9\$:	MOV	#SND.BUF,-(SP)		
000400	012746	000010		MOV	#10,-(SP)		
000404	004737	000000G		JSR	PC.COPY		
000410	062706	000006		ADD	#6,SP		
000414	000716			BR	4\$	:	1983
000416	020127	000002	10\$:	CMP	R1,#2	:	1995
000422	001475			BEQ	16\$	:	2002
000424	020127	000003		CMP	R1,#3	:	2009
000430	001021			BNE	12\$		
000432	013700	000000G		MOV	REC.BUF,R0	:	2012
000436	042700	170000		BIC	#170000,R0		
000442	001403			BEQ	11\$	:	2015
000444	020027	000011		CMP	R0,#11		
000450	001062			BNE	16\$		
000452	012746	000000G	11\$:	MOV	#MSGADR,-(SP)	:	2017
000456	012746	000000G		MOV	#FMT1,-(SP)		
000462	012746	000002		MOV	#2,-(SP)		
000466	010600			MOV	SP,R0	:	SP,*
000470	104414			TRAP	14		
000472	000420			BR	13\$	:	2016
000474	020127	000004	12\$:	CMP	R1,#4	:	2029
000500	001020			BNE	14\$		
000502	012776	000001 000010		MOV	#1,#10(SP)	:	*,ENDFLG
000510	013746	000000G		MOV	REC.BUF,-(SP)	:	2031
000514	042716	170000		BIC	#170000,(SP)		2032
000520	012746	000000G		MOV	#FMT4,-(SP)		
000524	012746	000002		MOV	#2,-(SP)		
000530	010600			MOV	SP,R0	:	SP,*
000532	104414			TRAP	14		
000534	062706	000006	13\$:	ADD	#6,SP	:	2030
000540	000207			RTS	PC	:	1925
000542	020127	000005	14\$:	CMP	R1,#5	:	2035
000546	001020			BNE	15\$		
000550	013700	000000G		MOV	REC.BUF,R0	:	2038
000554	042700	170000		BIC	#170000,R0		
000560	006300			RO	R0		
000562	016046	177776G		MOV	FMT.ERR-2(R0),-(SP)		
000566	012746	000001		MOV	#1,-(SP)		
000572	010600			MOV	SP,R0	:	SP,*

ZRQ83 RDRX DISK FORMATTER  
REV C PATCH 0 FORMATTER SECTION 1

5-Mar-1984 14:48:56  
5-Mar-1984 14:39:51

VAX-11 Blis 16 V4.0 579  
DISK1USER2:[YOUNG.FMT]ZRQ83.B16;15

000574	104414			TRAP	14			
000576	012776	000002	000014	MOV	#2,B14(SP)		; *,ENDFLG	2039
000604	022626			CMP	(SP), (SP)		;	2036
000606	000207			RTS	PC		;	1925
000610	020127	000006	15:	CMP	R1, #6		;	2042
000614	001004			BNE	17:		;	
000616	012737	004001	000000G	MOV	#4001,RET.STATUS		;	2049
000624	000403			BR	18:		;	2050
000626	012737	001001	000000G	MOV	#1001,RET.STATUS		;	2058
000634	004737	000000G	18:	JSR	PC,DECODE		;	2059
000640	000207		19:	RTS	PC		;	1923

; Routine Size: 209 words, Routine Base: \$CODE\$ + 0660  
; Maximum stack depth per invocation: 8 words

```

: 2063 1
: 2064 1 routine REV9 (retrys, endflg) : novalue =
: 2065 2 begin
: 2066 2 local
: 2067 2   cptr.
: 2068 2   cnum;
: 2069 2   selectoneu .REC_BUF [MSG_TYP] of           !Select the appropriate action
: 2070 2     set
: 2071 2
: 2072 2     [1] :                                     !Question message type
: 2073 3       begin
: 2074 3         :
: 2075 3         : Look into the send/receive data buffer at the message
: 2076 3         : number field and see what question the remote program
: 2077 3         : is asking. Use the fields value to index into the
: 2078 3         : select expression to perform the appropriate action.
: 2079 3         :
: 2080 3
: 2081 3       selectoneu .REC_BUF [MSG_NUM] of       !Select the requested question
: 2082 3         set
: 2083 3
: 2084 3         [0] :                                   !Enter current date <MM DD YYYY>
: 2085 4           begin
: 2086 4             :
: 2087 4             : If in un-attended reformat mode then give to the DM the
: 2088 4             : date received from the init code else let the DM prompt
: 2089 4             : the operator for the date.
: 2090 4             :
: 2091 4
: 2092 4           if (MANUAL)                         !Is the host running in unattended mode
: 2093 4             then
: 2094 5               begin
: 2095 5                 GMANID (MSGADR, SND_BUF, A, #0'177777', 8, 10, NO);
: 2096 5               end
: 2097 4             else
: 2098 5               begin
: 2099 5

```

ZRQBS  
REV C PATCH 0

RDRX DISK FORMATTER  
FORMATTER SECTION 1

5 Mar 1984 14:48:56

VAX-11 B1100 16 V4.0-579

5 Mar 1984 14:39:51

DISK#USER2:(YOUNG.FMT)ZRQBS.B16;15

```

: 2100 5          if ..retrys          !Did DM not verify the date the last time
: 2101 5          then
: 2102 6              begin
: 2103 6                  !
: 2104 6                  ! Clear out the date text buffer before loading in
: 2105 6                  ! date and ask the operator for the date again.
: 2106 6                  !
: 2107 6              end
: 2108 6              incr i from 0 to 11 do
: 2109 6                  SND_BUF [i] = ZEROS;
: 2110 6
: 2111 6              GMANID (DATMSG, SND_BUF, A, #0'177777', 8, 10, NO); !Get date from operator
: 2112 5              end;
: 2113 5
: 2114 5          .retrys = ONE;          !Set the retry flag
: 2115 4          end;
: 2116 4
: 2117 4          !
: 2118 4          PRINTB (CRLF);
: 2119 4
: 2120 4          if SEND_DATA (SNDB_COUNT) then DECODE ();
: 2121 4
: 2122 3          end;
: 2123 3          [2] :          ! get cylinder number
: 2124 4          begin
: 2125 4              GMANID (MSGADR, SND_BUF, D, #0'177777', 0, 999, NO);
: 2126 4              btod (.SND_BUF, SND_BUF);
: 2127 4              if SEND_DATA (SNDB_COUNT) then DECODE ();
: 2128 3          end;
: 2129 3
: 2130 3          [3] :
: 2131 4          begin
: 2132 4              GMANID (MSGADR, SND_BUF, D, #0'177777', 0, 11700, NO);
: 2133 4              btod (.SND_BUF, SND_BUF);
: 2134 4              if SEND_DATA (SNDB_COUNT) then DECODE ();
: 2135 3          end;
: 2136 3
: 2137 3          [7] :          !Enter a non-zero serial number
: 2138 4          begin
: 2139 4              cnum = SNDB_COUNT;
: 2140 5              if (MANUAL)
: 2141 5                  then begin
: 2142 5                      GMANID (MSGADR, SND_BUF, A, #0'177777', 1, 64, NO);
: 2143 5                      PRINTB (CRLF);
: 2144 5                      cptr = CH$PTR (SND_BUF);
: 2145 5                      cnum = 0;          !start at 2 to include message type and number
: 2146 5                      while .CH$PTR (.cptr) < 0, 8 > nequ 0
: 2147 6                          do begin
: 2148 6                              cnum = .cnum + 1;
: 2149 6                              cptr = CH$PLUS (.cptr, 1);
: 2150 5                      end;
: 2151 5                      if .cnum AND 1 neq 0
: 2152 6                          then begin

```

ZRQ83  
REV C PATCH 0

RDRX DISK FORMATTER  
FORMATTER SECTION 1

5 Mar 1984 14:48:56  
5-Mar-1984 14:39:51

VAX-11 B16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQ83.B16;15

```

: 2153 6          CHPTR (.cptr)<0, 8> = 'C';
: 2154 6          cnum = .cnum + 1;
: 2155 5          end;
: 2156 5          end;
: 2157 4          else copy (DEF_SERIAL, SND_BUF, 8);
: 2158 4          if SEND DATA (.cnum) then DECODE ();
: 2159 4
: 2160 3          end;
: 2161 3
: 2162 3          [otherwise] :          !This message number is unknown
: 2163 4          begin
: 2164 4          RET_STATUS = UMN_CODE;          !Unknown message number error code
: 2165 4          DECODE ();          !Report error and die
: 2166 3          end;
: 2167 3          tes;
: 2168 3
: 2169 2          end;
: 2170 2
: 2171 2          [2] :          !Default Question
: 2172 3          begin
: 2173 3
: 2174 3          selectoneu .REC_BUF [MSG_NUM] of
: 2175 3          set
: 2176 3
: 2177 3          [1] :          !Enter unit number to format <0>
: 2178 4          begin
: 2179 4          :
: 2180 4          : If in un-attended reformat mode then give to the DM the
: 2181 4          : unit number obtained from the hardware P_Table else let
: 2182 4          : the DM prompt the operator for the unit to format.
: 2183 4          :
: 2184 4
: 2185 5          if (MANUAL)          !Is the host running in unattended mode
: 2186 4          then
: 2187 5          begin
: 2188 5          GMANID (MSGADR, SND_BUF, D, '17777', 0, 15, YES);
: 2189 5          end
: 2190 4          else
: 2191 5          begin
: 2192 5          SND_BUF = .UNIT_NO;
: 2193 5          PRINTB (FMT2, .UNIT_NO);          !Report which unit is being formatted
: 2194 4          end;
: 2195 4
: 2196 4          PRINTB (CRLF);
: 2197 4          if .SND_BUF gequ 10 then          SND_BUF = .SND_BUF - 10 * 'ascii'10
: 2198 4          else SND_BUF = .SND_BUF * 'c'0';
: 2199 4
: 2200 4          if SEND DATA (SNOB_COUNT) then DECODE ();
: 2201 4
: 2202 3          end;
: 2203 3
: 2204 3          [2] :          !get head number (CR to signal end)
: 2205 4          begin

```

ZRQ83  
REV C PATCH 0RDRX DISK FORMATTER  
FORMATTER SECTION 15-Mar 1984 14:48:56  
5 Mar-1984 14:39:51VAX-11 B1:ss-16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQ83.B16;15

```

: 2206 4          SND_BUF = 10;          ! default says finished
: 2207 4          cnum = 0;             ! set for default answer
: 2208 4          GMANID (MSGADR, SND_BUF, D, %o'177777', 0, 10, YES);
: 2209 5          if .SND_BUF lequ 9 then begin !oops not default
: 2210 5              btod(.SND_BUF, SNF_BUF);
: 2211 5              cnum = 2;
: 2212 4          end;
: 2213 4          if SEND_DATA (.cnum) then DECODE ();
: 2214 3          end;
: 2215 3
: 2216 3          [4] :                  !Use existing bad block information <N>
: 2217 4          begin
: 2218 4          !
: 2219 4          ! If in un-attended reformat mode then tell the DM to
: 2220 4          ! do a reformat mode else let the DM prompt the operator
: 2221 4          ! for the formatting mode to use for this unit.
: 2222 4          !
: 2223 4          !
: 2224 5          if (MANUAL)           !Is the host running in unattended mode
: 2225 4          then
: 2226 5              begin
: 2227 5                  GMANIL (MSGADR, SND_BUF, %o'1', YES, 1);
: 2228 5                  SND_BUF = .SND_BUF + %c'Y' - 1; !host version only cares Y or non-Y, so send N as X
: 2229 5              end
: 2230 4          else
: 2231 5              begin
: 2232 5                  SND_BUF = %c'Y';           !Default to do reformat mode
: 2233 4              end;
: 2234 4          !
: 2235 4          PRINTB (CRLF);
: 2236 4          !
: 2237 4          if SEND_DATA (SNDB_COUNT) then DECODE ();
: 2238 4          !
: 2239 3          end;
: 2240 3
: 2241 3          [5] :                  !Use down-line load <N>
: 2242 4          begin
: 2243 4          !
: 2244 5          if (MANUAL)           !Is the host running in unattended mode
: 2245 4          then
: 2246 5              begin
: 2247 5                  GMANIL (MSGADR, SND_BUF, %o'1', YES, 1);
: 2248 5                  SND_BUF = .SND_BUF + %c'Y' - 1;
: 2249 5              end
: 2250 4          else
: 2251 5              begin
: 2252 5                  SND_BUF = %c'N';           !Default not to continue
: 2253 4              end;
: 2254 4          !
: 2255 4          if SEND DATA (SNDB COUNT) then DECODE ();
: 2256 4          !
: 2257 3          end;
: 2258 3

```

5 Mar-1984 14:48:56

VAX-11 Bliss-15 V4.0 579

5 Mar-1984 14:39:51

DISK\$USER2:[YOUNG.FMT]ZRQB3.B16;15

ZRQB3  
REV C PATCH 0RDRX DISK FORMATTER  
FORMATTER SECTION 1

```

: 2259 3          [6] :          !Continue if bad block information is inaccessible <N>
: 2260 4          begin
: 2261 4
: 2262 5          if (MANUAL)          !Is the host running in unattended mode
: 2263 4          then
: 2264 5          begin
: 2265 5              GMANIL (MSGADR, SND_BUF, %0'1', YES, 1);
: 2266 5              SND_BUF = .SND_BUF + %c'Y' - 1;
: 2267 5          end
: 2268 4          else
: 2269 5          begin
: 2270 5              SND_BUF = %c'N';          !Default not to continue
: 2271 4          end;
: 2272 4
: 2273 4          PRINTB (CRLF);
: 2274 4          !
: 2275 4          if SEND_DATA (SNDB_COUNT) then DECODE ();
: 2276 4
: 2277 3          end;
: 2278 3
: 2279 3          [otherwise] :          !This message number is unknown
: 2280 4          begin
: 2281 4              GMANID (MSGADR, SND_BUF, A, %0'177777', 1, 64, NO);
: 2282 4          if SEND_DATA (SNDB_COUNT) then DECODE ();
: 2283 3          end;
: 2284 3          tes;
: 2285 3
: 2286 2          end;
: 2287 2
: 2288 2          [3] :          !Informational message
: 2289 3          begin
: 2290 3
: 2291 3          PRINTB (CRLF);
: 2292 3          PRINTB (FMT1, MSGADR);
: 2293 3
: 2294 2          end;
: 2295 2
: 2296 2          [4] :          !Termination message
: 2297 3          begin
: 2298 3
: 2299 3          PRINTB (CRLF);
: 2300 3          PRINTB (FMT1, MSGADR);
: 2301 3          .endflg = 1;          !mark as normal termination
: 2302 3
: 2303 2          end;
: 2304 2
: 2305 2          [5] :          !Fatal error message
: 2306 3          begin
: 2307 3
: 2308 3          PRINTB (CRLF);
: 2309 3          PRINTB (FMT1, MSGADR);
: 2310 3          .endflg = 2;          ! mark as error
: 2311 3

```



5 Mar 1984 14:48:56  
5 Mar-1984 14:39:51

VAX-11 Blues-16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB3.816:15

ZRQB3 RDRX DISK FORMATTER  
REV C PATCH 0 FORMATTER SECTION 1

```

: 2312 2      end;
: 2313 2
: 2314 2      [6] :      !Special message type
: 2315 3      begin
: 2316 3      RET_STATUS = UMN_CODE;
: 2317 3      DECODE ();
: 2318 3
: 2319 2      end;
: 2320 2
: 2321 2      [otherwise] :      !This message number is unknown
: 2322 3      begin
: 2323 3      RET_STATUS = UMT_CODE;      !Unknown message number error code
: 2324 3      DECODE ();      !Report error and die
: 2325 2      end;
: 2326 2      tes;
: 2327 1      end;

```

```

000000 004137 000000G      REV9:  .SBTTL  REV9 FORMATTER SECTION 1
000004 013701 000000G      JSR    R1,$SAVE2      ;      2064
000010 006201      MOV    REC.BUF,R1      ;      2069
000012 006201      ASR    R1
000014 006201      ASR    R1
000016 006201      ASR    R1
000020 000301      ASR    R1
000022 042701 177760      SWAB   R1
000026 020127 000001      BIC    #177760,R1
000032 001402      CMP    R1,#1      ;      2072
000034 000137 002204'      BEQ    1$
000040 013702 000000G      JMP    16$
000044 042702 170000      1$:   MOV    REC.BUF,R2      ;      2081
000050 001044      BIC    #170000,R2
000052 104450      BNE    6$      ;      2084
000054 103011      TRAP   50      ;      2092
000056 104443      BHIS   2$      ;
000060 000406      TRAP   43      ;      2095
000062 000000G      .WORD  406
000064 000142      .WORD  SND.BUF
000066 000000G      .WORD  142
000070 177777      .WORD  MSGADR
000072 000010      .WORD  -1
000074 000012      .WORD  10
000076 000427      .WORD  12
000100 032776 000001 000012      BR     5$      ;      2092
000106 001420      BIT    #1,#12(SP)      ; *,RETRY5      2100
000110 005000      BEQ    4$
000112 005060 000000G      CLR    R0      ; I      2108
000116 062700 000002      CLR    SND.BUF(R0)      ; *(I)      2109
000122 020027 000026      ADD    #2,R0      ; *.I      2108
000126 003771      CMP    R0,#26      ; I,*
000130 104443      BLE    3$
000132 000406      TRAP   43      ;
      .WORD  406

```

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VAX-11 Blues 16 V4.0 579

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DISK#USER2:(YOUNG.FMT)ZRQB3.B16;15

ZRQB3 RDRX DISK FORMATTER  
REV C PATCH 0 FORMATTER SECTION 1

000134	000000G				.WORD	SND.BUF			
000136	000142				.WORD	142			
000140	000000G				.WORD	DATMSG			
000142	177777				.WORD	-1			
000144	000010				.WORD	10			
000146	000012				.WORD	12			
000150	012776	000001	000012	4\$:	MOV	#1,B12(SP)	:	*,RETRY5	2114
000156	000137	002614		5\$:	JMP	29\$	:		2119
000162	020227	000002		6\$:	CMP	R2,#2	:		2123
000166	001025				BNE	7\$			
000170	104443				TRAP	43	:		2125
000172	000406				.WORD	406			
000174	000000G				.WORD	SND.BUF			
000176	000042				.WORD	42			
000200	000000G				.WORD	MSGADR			
000202	177777				.WORD	-1			
000204	000000				.WORD	0			
000206	001747				.WORD	1747			
000210	013746	000000G			MOV	SND.BUF,-(SP)	:		2126
000214	012746	000000G			MOV	#SND.BUF,-(SP)			
000220	004737	000000V			JSR	PC,BTOD			
000224	012716	000020			MOV	#20,(SP)	:		2127
000230	004737	000000G			JSR	PC,SEND.DATA			
000234	006000				ROR	R0			
000236	103430				BLO	8\$			
000240	000431				BR	9\$	:		2124
000242	020227	000003		7\$:	CMP	R2,#3	:		2130
000246	001030				BNE	10\$			
000250	104443				TRAP	43	:		2132
000252	000406				.WORD	406			
000254	000000G				.WORD	SND.BUF			
000256	000042				.WORD	42			
000260	000000G				.WORD	MSGADR			
000262	177777				.WORD	-1			
000264	000000				.WORD	0			
000266	026664				.WORD	26664			
000270	013746	000000G			MOV	SND.BUF,-(SP)	:		2133
000274	012746	000000G			MOV	#SND.BUF,-(SP)			
000300	004737	000000V			JSR	PC,BTOD			
000304	012716	000020			MOV	#20,(SP)	:		2134
000310	004737	000000G			JSR	PC,SEND.DATA			
000314	006000				ROR	R0			
000316	103002				BCC	9\$			
000320	004737	000000G		8\$:	JSR	PC,DECODE			
000324	022626			9\$:	CMP	(SP)*,(SP)*	:		2131
000326	000207				RTS	PC	:		2081
000330	020227	000007		10\$:	CMP	R2,#7	:		2137
000334	001402				BEQ	11\$			
000336	000137	003036			JMP	36\$			
000342	012701	000020		11\$:	MOV	#20,R1	:	*,CNUM	2139
000346	104450				TRAP	50	:		2140
000350	103027				BHIS	14\$			
000352	104443				TRAP	43	:		2142

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VAX-11 Blues 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB3.B16;15

ZRQB3 RDRX DISK FORMATTER  
REV C PATCH 0 FORMATTER SECTION 1

000354	000406			.WORD	406			
000356	000000G			.WORD	SND.BUF			
000360	000142			.WORD	142			
000362	000000G			.WORD	MSGADR			
000364	177777			.WORD	1			
000366	000001			.WORD	1			
000370	000100			.WORD	100			
000372	012700	000000G		MOV	#SND.BUF,R0	:	*,CPTR	2144
000376	005001			CLR	R1	:	CNUM	2145
000400	105710		12:	TSTB	(R0)	:	CPTR	2146
000402	001403			BEQ	13:			
000404	005201			INC	R1	:	CNUM	2148
000406	005200			INC	R0	:	CPTR	2149
000410	000773			BR	12:			2146
000412	032701	000001		BIT	#1,R1	:	*,CNUM	2151
000416	001416			BEQ	15:			
000420	112710	000056		MOVB	#56,(R0)	:	*,CPTR	2153
000424	005201			INC	R1	:	CNUM	2154
000426	000412			BR	15:			2140
000430	012746	000000G		MOV	#DEF.SERIAL,(SP)	:		2157
000434	012746	000000G		MOV	#SND.BUF,-(SP)			
000440	012746	000010		MOV	#10,-(SP)			
000444	004737	000000G		JSR	PC,COPY			
000450	062706	000006		ADD	#6,SP			
000454	010146		15:	MOV	R1,-(SP)	:	CNUM,*	2158
000456	000137	002620		JMP	30:			
000462	020127	000002		CMP	R1,#2	:		2171
000466	001402			BEQ	17:			
000470	000137	002634		JMP	31:			
000474	013702	000000G		MOV	REC.BUF,R2	:		2174
000500	042702	170000		BIC	#170000,R2			
000504	020227	000001		CMP	R2,#1	:		2177
000510	001044			BNE	21:			
000512	104450			TRAP	50	:		2185
000514	103011			BHIS	18:			
000516	104443			TRAP	43	:		2188
000520	000406			.WORD	406			
000522	000000G			.WORD	SND.BUF			
000524	000052			.WORD	52			
000526	000000G			.WORD	MSGADR			
000530	177777			.WORD	-1			
000532	000000			.WORD	0			
000534	000017			.WORD	17			
000536	000415			BR	19:	:		2185
000540	013737	000000G 000000G		MOV	UNIT.NO,SND.BUF	:		2192
000546	013746	000000G		MOV	UNIT.NO,-(SP)	:		2193
000552	012746	000000G		MOV	#FMT2,-(SP)			
000556	012746	000002		MOV	#2,(SP)			
000562	010600			MOV	SP,R0	:	SP,*	
000564	104414			TRAP	14			
000566	062706	000006		ADD	#6,SP	:		2191
000572	023727	000000G 000012		CMP	SND.BUF,#12	:		2197
000600	103404			BLO	20:			



001020	000404				.WORD	404			
001022	000000G				.WORD	SND.BUF			
001024	000130				.WORD	130			
001026	000000G				.WORD	MSGADR			
001030	000001				.WORD	1			
001032	062737	000130	000000G	26\$:	ADD	#130,SND.BUF	:		2266
001040	000414				BR	29\$	:		2262
001042	012737	000116	000000G	27\$:	MOV	#116,SND.BUF	:		2270
001050	000410				BR	29\$	:		2275
001052	104443			28\$:	TRAP	43	:		2281
001054	000406				.WORD	406			
001056	000000G				.WORD	SND.BUF			
001060	000142				.WORD	142			
001062	000000G				.WORD	MSGADR			
001064	177777				.WORD	1			
001066	000001				.WORD	1			
001070	000100				.WORD	100			
001072	012746	000020		29\$:	MOV	#20,(SP)	:		2282
001076	004737	000000G		30\$:	JSR	PC,SEND.DATA			
001102	005726				TST	(SP)+			
001104	006000				ROR	RO			
001106	103113				BCC	39\$			
001110	000510				BR	38\$			
001112	020127	000003		31\$:	CMP	R1,#3	:		2288
001116	001017				BNE	32\$	:		
001120	012746	000000G			MOV	#CRLF,-(SP)	:		2291
001124	012746	000001			MOV	#1,-(SP)	:		
001130	010600				MOV	SP,RO	:	SP,*	
001132	104414				TRAP	14			
001134	012716	000000G			MOV	#MSGADR,(SP)	:		2292
001140	012746	000000G			MOV	#FMT1,-(SP)			
001144	012746	000002			MOV	#2,-(SP)			
001150	010600				MOV	SP,RO	:	SP,*	
001152	104414				TRAP	14			
001154	000451				BR	34\$	:		2289
001156	020127	000004		32\$:	CMP	R1,#4	:		2296
001162	001022				BNE	33\$	:		
001164	012746	000000G			MOV	#CRLF,-(SP)	:		2299
001170	012746	000001			MOV	#1,-(SP)	:		
001174	010600				MOV	SP,RO	:	SP,*	
001176	104414				TRAP	14			
001200	012716	000000G			MOV	#MSGADR,(SP)	:		2300
001204	012746	000000G			MOV	#FMT1,-(SP)			
001210	012746	000002			MOV	#2,(SP)			
001214	010600				MOV	SP,RO	:	SP,*	
001216	104414				TRAP	14			
001220	012776	000001	000020		MOV	#1,#20(SP)	:	*,ENDFLG	2301
001226	000424				BR	34\$	:		2297
001230	020127	000005		33\$:	CMP	R1,#5	:		2305
001234	001024				BNE	35\$	:		
001236	012746	000000G			MOV	#CRLF,-(SP)	:		2308
001242	012746	000001			MOV	#1,(SP)			
001246	010600				MOV	SP,RO	:	SP,*	

ZRQB3  
REV C PATCH 0  
RDRX DISK FORMATTER  
FORMATTER SECTION 1

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VAX-11 Bliss 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB3.B16;15

001250	104414			TRAP	14		
001252	012716	000000G		MOV	#MSGADR,(SP)	:	2309
001256	012746	000000G		MOV	#FMT1,(SP)	:	
001262	012746	000002		MOV	#2,-(SP)	:	
001266	010600			MOV	SP,R0	: SP,*	
001270	104414			TRAP	14		
001272	012776	000002	000020	MOV	#2,#20(SP)	: *,ENDFLG	2310
001300	062706	000010	34#:	ADD	#10,SP	:	2306
001304	000207			RTS	PC	:	2069
001306	020127	000006	35#:	CMP	R1,#6	:	2314
001312	001004			BNE	37#	:	
001314	012737	004001	000000G	MOV	#4001,RET.STATUS	:	2316
001322	000403			BR	38#	:	2317
001324	012737	001001	000000G	MOV	#1001,RET.STATUS	:	2323
001332	004737	000000G	38#:	JSR	PC,DECODE	:	2324
001336	000207		39#:	RTS	PC	:	2064

: Routine Size: 368 words, Routine Base: \$CODE\$ + 1522  
: Maximum stack depth per invocation: 9 words

```

: 2328 1
: 2329 1 routine btod(num, ptr) =
: 2330 2 begin
: 2331 2 local i, j;
: 2332 2 i = 1;
: 2333 2 j = 0;
: 2334 2 while .num/.i gequ 10 do i = .i * 10;
: 2335 2
: 2336 2 while .i gequ 1 do
: 2337 3 begin
: 2338 3 j = .j + 1;
: 2339 3 ch$ptr(.ptr)<0,8> = #c'0' + .num/.i;
: 2340 3 ptr = ch$plus(.ptr, 1);
: 2341 3 num = .num / (.num/.i)*.i;
: 2342 3 i = .i/10;
: 2343 2 end;
: 2344 2 return .j;
: 2345 1 end;

```

000000	004137	000000G		.SBTTL	BTOD FORMATTER SECTION 1			
000004	012701	000001		BTOD:	JSR	R1,\$SAVE3	:	2329
000010	005002				MOV	#1,R1	: *,I	2332
000012	016646	000014			CLR	R2	: J	2333
000016	010146		1#:		MOV	14(SP),-(SP)	: NUM,*	2334
000020	004737	000000G			MOV	R1,-(SP)	: I,*	
000024	022626				JSR	PC,BL\$DIV		
000026	020027	000012			CMP	(SP)*,(SP)*		
000032	103410				CMP	R0,#12		
000034	010146				BLO	2#		
000036	012746	000012			MOV	R1,-(SP)	: I,*	
					MOV	#12,-(SP)		

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5 Mar-1984 14:39:51

VAX-11 Bliss 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB3.B16;15

ZRQB3 RDRX DISK FORMATTER  
REV C PATCH 0 FORMATTER SECTION 1

000042	004737	000000G	JSR	PC,BL\$MUL		
000046	010001		MOV	R0,R1	; *,I	
000050	022626		CMP	(SP)+,(SP)+		
000052	000757		BR	1\$		
000054	005701	2\$:	TST	R1	; I	2336
000056	001434		BEQ	3\$		
000060	005202		INC	R2	; J	2338
000062	016646	000014	MOV	14(SP),-(SP)	; NUM,*	2339
000066	010146		MOV	R1,-(SP)	; I,*	
000070	004737	000000G	JSR	PC,BL\$DIV		
000074	010003		MOV	R0,R3		
000076	062703	000060	ADD	#60,R3		
000102	110376	000016	MOVB	R3,#16(SP)	; *,PTR	
000106	005266	000016	INC	16(SP)	; PTR	2340
000112	010016		MOV	R0,(SP)		2341
000114	010146		MOV	R1,-(SP)	; I,*	
000116	004737	000000G	JSR	PC,BL\$MUL		
000122	160066	000022	SUB	R0,22(SP)	; *,NUM	
000126	010116		MOV	R1,(SP)	; I,*	2342
000130	012746	000012	MOV	#12,-(SP)		
000134	004737	000000G	JSR	PC,BL\$DIV		
000140	010001		MOV	R0,R1	; *,I	
000142	062706	000010	ADD	#10,SP		2337
000146	000742		BR	2\$		2336
000150	010200	3\$:	MOV	R2,R0	; J,*	2330
000152	000207		RTS	PC		2329

; Routine Size: 54 words, Routine Base: \$CODE\$ + 3062  
; Maximum stack depth per invocation: 9 words

; 2346 1  
; 2347 1 end  
; 2348 0 eludom

OTS external references  
.GLOBL \$SAVE3, \$SAVE2, BL\$DIV, BL\$MUL

PSECT SUMMARY

Psect Name	Words	Attributes
\$OWN\$	2	RW, D, LCL, REL, CON
\$CODE\$	847	RO, I, LCL, REL, CON

Library Statistics

Symbols ----- Pages Processing

ZRQB3 RDRX DISK FORMATTER  
 REV C PATCH 0 FORMATTER SECTION 1

5-Mar-1984 14:48:56  
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VAX-11 Bliss-16 V4.0-579  
 DISK#USER2:[YOUNG.FMT]ZRQB3.B16;15

File	Total	Loaded	Percent	Mapped	Time
DISK#USER2:[YOUNG.FMT]ZRQB80.L16;4	358	208	58	18	00:00.1

COMMAND QUALIFIERS

BLISS/PDP11/LIST ZRQB3.B16/EN:NOEIS/SOURCE=PAGE:53

: Size: 847 code + 2 data words  
 : Run Time: 00:28.2  
 : Elapsed Time: 02:26.6  
 : Lines/CPU Min: 4993  
 : Lexemes/CPU-Min: 32641  
 : Memory Used: 306 pages  
 : Compilation Complete



ZRQB4

RDRX DISK FORMATTER

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58VAX-11 Bliss 16 v4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQB4.B16:5Page 1  
(1)

```

: 0001 0  MODULE ZRQB4 (#TITLE 'RDRX DISK FORMATTER'
: 0002 0          IDENT = 'REV C PATCH 0',
: 0003 0          ADDRESSING_MODE (ABSOLUTE) ,
: 0004 0          ENVIRONMENT (NOEIS)
: 0005 0          ) =
: 0006 1  BEGIN
: 0007 1
: 0008 1  !          SUBROUTINES
: 0009 1
: 0010 1  library ZRQBBO.L16;
: 0011 1
: 0012 1  require 'BLSMAC.REQ';
: 1548 1
: 1549 1  #sbttl MODULE DECLARATIONS

```

```

!Define RDRX Formatter library
!Define Bliss Macro require file

```

```

: 1550 1
: 1551 1 forward routine
: 1552 1 GET_NSD, !Get next send descriptor slot index
: 1553 1 GET_NRD, !Get next receive descriptor slot index
: 1554 1 LOAD_OUT$STD_BUF, !Load out standing command buffer
: 1555 1 GET_CMD$REF, !Get unique command reference number
: 1556 1 DECODE : novalue, !Decode return status error code
: 1557 1 DUP$I_SERVICE : INT_LNK$TYP novalue, !Dup/UQ port interrupt service routine
: 1558 1 CTO_WAIT, !Command time out wait
: 1559 1 ABORT, !Abort Dup command
: 1560 1 GET_DUST_STATUS, !Get Dust Status command
: 1561 1 EX_LOC_PROG, !Execute Local Program command
: 1562 1 SEND_DATA, !Send Data command
: 1563 1 REC_DATA, !Receive Data command
: 1564 1 SET_CNTRLR_CHAR, !Set Controller Characteristics command
: 1565 1 INT$I_SERVICE : INT_LNK$TYP novalue, !Initialization sequence interrupt service
: 1566 1 IS_TIMER, !Initialization sequence time-out wait
: 1567 1 BOOT_RDRX, !Initialize sequence for RDRX controller
: 1568 1 INIT_COM_AREA; !Initialize UQ Port communication area
: 1569 1

```

ZRQ84  
REV C PATCH 0

RDRX DISK FORMATTER  
MODULE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Blues 16 V4.0 579  
DISK#USER2: [YOUNG.FMT]ZRQ84.B16;3

```

: 1570 1  ;;
: 1571 1  ;; The psect named "code or $code$" is redefined here
: 1572 1  ;; to be called "acicode". This is done to organize
: 1573 1  ;; formatter routine code into a separate psect.
: 1574 1  ;;
: 1575 1  ;; psect
: 1576 1  ;;   code = acicode;
: 1577 1  ;;
: 1578 1  ;;
: 1579 1  ;; Structure declarations used within this module.
: 1580 1  ;;
: 1581 1  ;;
: 1582 1  structure
: 1583 1  ;;
: 1584 1  ;;
: 1585 1  ;; RDRX register accessing structure. This
: 1586 1  ;; structure allows RDRX register accessing
: 1587 1  ;; to be transportable between the PDP-11 and
: 1588 1  ;; VAX Diagnostic Supervisors.
: 1589 1  ;;
: 1590 1  ;; This also defines an access algorithm for
: 1591 1  ;; VAX to allow field reference to MBA address
: 1592 1  ;; space without generating machine checks.
: 1593 1  ;;
: 1594 1  ;;
: 1595 1  RDRX [0, P, S, E] =
: 1596 2  begin
: 1597 2  local
: 1598 2  RC$S_REG;
: 1599 2  RC$S_REG = .(RDRX + $upval*0)<0, $bpval, 0>;
: 1600 2  RC$S_REG
: 1601 2  end
: 1602 2  <P, S, E>;
: 1603 2  end
: 1604 1  ;;
: 1605 1  ;;

```

ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
MODULE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar-1984 14:40:58

VAX-11 Bliss 16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 1606 1  !*
: 1607 1  ! External Declaration of datums declared outside of this module.
: 1608 1  !
: 1609 1  !
: 1610 1  external
: 1611 1  !
: 1612 1  ! Communications area declarations
: 1613 1  !
: 1614 1  COM_AREA : blockvector [REC_ALLOCATE + SND_ALLOCATE + HDR_SIZ, 2, word],
: 1615 1  HEAD_AREA : ref block [4, word] field (HDR_FIELD),
: 1616 1  RECEIVE_RING : ref blockvector [REC_ALLOCATE, 2, word] field (DSC_FIELD),
: 1617 1  SEND_RING : ref blockvector [SND_ALLOCATE, 2, word] field (DSC_FIELD),
: 1618 1  REC_ENVELOPE : blockvector [REC_ALLOCATE, RB_SIZE + 2, word] field (ENV_FIELD),
: 1619 1  SND_ENVELOPE : blockvector [SND_ALLOCATE, SB_SIZE + 2, word] field (ENV_FIELD),
: 1620 1  RET_EN$AD : ref block [RB_SIZE + 2, word] field (ENV_FIELD),
: 1621 1  REC_BUF : block [RECB_SIZE, word] field (RECB_FIELD),
: 1622 1  SND_BUF : vector [SNDB_SIZE, word],
: 1623 1  OUT$STD_BUF : blockvector [REC_ALLOCATE, 2, word] field (OUT$FIELD),
: 1624 1  !
: 1625 1  ! Miscellaneous external data declarations
: 1626 1  !
: 1627 1  NRD_SLOT : word, !Next receive descriptor slot
: 1628 1  NSD_SLOT : word, !Next send descriptor slot
: 1629 1  RDRX_ADDR : ref RDRX field (ISD_FIELD), !Controller reg access struct
: 1630 1  RET_STATUS : word, !Global return status location
: 1631 1  PID_SAVE : word, !Saves program indicator field
: 1632 1  VEC_ADDR : word, !RDRX interrupt vector address
: 1633 1  UC_VER : byte, !Micro code version storage
: 1634 1  RSVD_STRUCT : vector [4, word], !Stores init seq reserved fields
: 1635 1  ISD_STRUCT : blockvector [4, 2, word] field (ISD_FIELD), !Init seq data
: 1636 1  UNIT_NO : word, !P_table unit number to format
: 1637 1  NXT_CRN : byte, !Stores next cmd ref number
: 1638 1  !
: 1639 1  ! Error Messages Structures
: 1640 1  !
: 1641 1  PFE_STRUCT : vector [22], !Port fatal error msg struct
: 1642 1  EMSG_STRUCT : vector [22]; !Error message structure
: 1643 1  !
: 1644 1  !

```

1645 1  
ZRQB4  
REV C PATCH 0

\*\$bttl 'GLOBAL ROUTINE DECLARATIONS'  
RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5-Mar-1984 14:51:26  
5-Mar 1984 14:40:58

VAX-11 Bliss 16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

Page 6  
(6)

```

1646 1 global routine GET NSD -      !Chooses the next send slot
1647 1
1648 1
1649 1 !..
1650 1 ! Functional Description :
1651 1 ! This routine will determine which send ring descriptor the
1652 1 ! port/controller is polling and returns that desc slot number
1653 1 ! to the calling routine. This host program will call this
1654 1 ! routine each time it wishes to deposit another command into the
1655 1 ! command (send) ring.
1656 1 ! Formal Parameters :
1657 1 ! none
1658 1
1659 1 ! Implicit Inputs :
1660 1 ! NSD_SLOT :      Global storage for the next send descriptor slot.
1661 1 ! Stores where the host should place this command for
1662 1 ! processing by the port/controller.
1663 1
1664 1 ! Implicit Outputs :
1665 1 ! The global storage "Nsd_slot" is updated to the
1666 1 ! present send slot where the port/controller is polling.
1667 1
1668 1 ! Completion Codes :
1669 1 ! Returns the contents of "Nsd_slot" to the calling routine.
1670 1
1671 1 ! Side Effects :
1672 1 ! none
1673 1 !..
1674 1
1675 2 begin
1676 2 |
1677 2 | Increment the next send descriptor_slot by one
1678 2 |
1679 2 | NSD_SLOT = .NSD_SLOT + 1;
1680 2 |
1681 2 | Set the slot pointer back to zero if it wraps around
1682 2 | to the top of the ring.
1683 2 |
1684 2 |
1685 2 | if .NSD_SLOT gtru SND_ALLOCATE 1 then NSD_SLOT = ZERO;
1686 2 |
1687 2 |
1688 2 | Return the next send descriptor_slot to the caller
1689 2 |
1690 2 | return .NSD_SLOT;
1691 1 end;

```

```

.TITLE ZRQB4 RDRX DISK FORMATTER
.IDENT /REV C /
.ENABL AMA

.GLOBL COM.AREA, HEAD.AREA, RECEIVE.RING

```

ZRQB4 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5-Mar-1984 14:40:58

VAX-11 Bliss 16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB4.B16;3

.GLOBL SEND.RING, REC.ENVELOPE, SND.ENVELOPE  
.GLOBL RET.EN\$AD, REC.BUF, SND.BUF, OUT\$STD.BUF  
.GLOBL NRD.SLOT, NSD.SLOT, RDRX.ADDR  
.GLOBL RET.STATUS, PID.SAVE, VEC.ADDR  
.GLOBL UC.VER, RSVD.STRUCT, ISD.STRUCT  
.GLOBL UNIT.NO, NXT.CRN, PFE.STRUCT, EMSG.STRUCT

.SBTTL GET.NSD GLOBAL ROUTINE DECLARATIONS  
.PSECT \$CODE\$, RO

000000

000000 005237 000000G

GET.NSD::

000004 023727 000000G 000003

INC NSD.SLOT ; 1679  
CMP NSD.SLOT,#3 ; 1685

000012 101402

BLOS 1\$

000014 005037 000000G

CLR NSD.SLOT

000020 013700 000000G

1\$: MOV NSD.SLOT,RO ; 1675

000024 000207

RTS PC ; 1646

: Routine Size: 11 words, Routine Base: \$CODE\$ + 0000  
: Maximum stack depth per invocation: 0 words

: 1692 1

ZRQ84  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Bliss 16 V4.0 579  
DISKUSER2:[YOUNG.FMT]ZRQ84.B16:3

```

: 1693 1 global routine GET NRD = !Chooses the next receive slot
: 1694 1
: 1695 1
: 1696 1 : Functional Description :
: 1697 1 : This routine will determine which receive ring descriptor the
: 1698 1 : port/controller is polling and returns that desc slot number to
: 1699 1 : the calling routine. This host program will call this routine
: 1700 1 : each time it wishes to process another receive ring descriptor.
: 1701 1
: 1702 1 : Formal Parameters :
: 1703 1 : none
: 1704 1
: 1705 1 : Implicit Inputs :
: 1706 1 : NRD_SLOT : Global storage for the next receive descriptor slot.
: 1707 1 : Stores where the port should return this commands
: 1708 1 : response indicator.
: 1709 1
: 1710 1 : Implicit Outputs :
: 1711 1 : The global storage "Nrd_slot" is updated to the
: 1712 1 : present receive slot where the port/controller
: 1713 1 : is polling.
: 1714 1
: 1715 1 : Completion Codes :
: 1716 1 : Returns the contents of "Nrd_slot" to the calling routine.
: 1717 1
: 1718 1 : Side Effects :
: 1719 1 : none
: 1720 1
: 1721 1
: 1722 2 begin
: 1723 2 :
: 1724 2 : Increment the next receive descriptor_slot by one
: 1725 2
: 1726 2 NRD_SLOT = .NRD_SLOT + 1;
: 1727 2
: 1728 2 : Set the slot pointer back to zero if it wraps around
: 1729 2 : to the top of the ring.
: 1730 2
: 1731 2
: 1732 2 if .NRD_SLOT gtru REC_ALLOCATE 1 then NRD_SLOT = ZERO;
: 1733 2
: 1734 2
: 1735 2 : Return the next receive descriptor slot to the caller
: 1736 2
: 1737 2 return .NRD_SLOT;
: 1738 1 end;

```

```

000000 005237 000000G .SBTTL GET.NRD GLOBAL ROUTINE DECLARATIONS
000004 023727 000000G 000003 GET.NRD:
000012 101402 INC NRD.SLOT ;
CMP NRD.SLOT, #3 ;
BLOS 1$

```

1726  
1730

| 3

ZRQ84 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Bliss-16 V4.0 579  
DISK:USER2:[YOUNG.FMT]ZRQ84.816;3

000014	005037	000000G		CLR	NRD.SLOT	
000020	013700	000000G	11:	MOV	NRD.SLOT,RO	
000024	000207			RTS	PC	

1722  
1693

: Routine Size. 11 words. Routine Base: \$CODE\$ + 0026  
: Maximum stack depth per invocation: 0 words

: 139 1





```

: 1793 1  :
: 1794 1  :
: 1795 1  :
: 1796 2  begin
: 1797 2
: 1798 2  :
: 1799 2  : Search through the out standing command buffer
: 1800 2  : and look for the first open slot. Return this
: 1801 2  : first slot index to the caller if one is found.
: 1802 2  : If no open slots are found then return an error code.
: 1803 2  :
: 1804 2
: 1805 2  incru i from 0 to REC ALLOCATE - 1 do      !Find the first open slot
: 1806 2  :
: 1807 2  : An open slot is by definition the value
: 1808 2  : $o'100000' in the slots first word.
: 1809 2  :
: 1810 2
: 1811 2  if .OUT$STD_BUF [.i, CMD_WRD] eqlu $o'100000' !Is this slot open
: 1812 2  then
: 1813 3  begin
: 1814 3  OUT$STD_BUF [.i, REC_FLG] = FALSE; !Clear the received flag
: 1815 3  OUT$STD_BUF [.i, CMD_REF] = .REF_NUM; !Load this cmd's ref num
: 1816 3  OUT$STD_BUF [.i, ENV_ADR] = ZERO; !Clear the previous env adr
: 1817 3  return .i; !Return buffer index to caller
: 1818 2  end;
: 1819 2
: 1820 2  :
: 1821 2  : The buffer is full if the code reaches
: 1822 2  : here. This should never happen so
: 1823 2  : report an error for debug purposes.
: 1824 2  :
: 1825 2  return RET STATUS = OBF_CODE; !Report an 'out$std buffer full' error
: 1826 1  end;

```

		.SBTTL	LOAD.OUT\$STD.BUF	GLOBAL ROUTINE DECLARATIONS	
000000	004137	000000G	LOAD.OUT\$STD.BUF::		
			JSR	R1,\$SAVE2	1740
000004	005002		CLR	R2	1805
000006	010200		1\$: MOV	R2,R0	1811
000010	006300		ASL	R0	
000012	006300		ASL	R0	
000014	012701	000000G	MOV	#OUT\$STD.BUF,R1	
000020	060001		ADD	R0,R1	
000022	021127	100000	CMP	(R1),#-100000	
000026	001010		BNE	2\$	
000030	042711	100000	BIC	#100000,(R1)	1814
000034	116611	000010	MOVB	10(SP),(R1)	1815
000040	005060	000002G	CLR	OUT\$STD.BUF+2(R0)	1816
000044	010200		MOV	R2,R0	1813
000046	000207		RTS	PC	
000050	005202		2\$: INC	R2	1805



ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar-1984 14:51:26  
5 Mar-1984 14:40:58VAX-11 Bliss 16 V4.0-579  
DISK:USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 1828 1 global routine GET_CMD$REF = !Gets next unique cmd ref number
: 1829 1
: 1830 1
: 1831 1
: 1832 1
: 1833 1
: 1834 1
: 1835 1
: 1836 1
: 1837 1
: 1838 1
: 1839 1
: 1840 1
: 1841 1
: 1842 1
: 1843 1
: 1844 1
: 1845 1
: 1846 1
: 1847 1
: 1848 1
: 1849 1
: 1850 1
: 1851 1
: 1852 1
: 1853 1
: 1854 1
: 1855 1
: 1856 1
: 1857 1
: 1858 1
: 1859 1
: 1860 1
: 1861 1
: 1862 1
: 1863 1
: 1864 1
: 1865 1
: 1866 1
: 1867 1
: 1868 1
: 1869 1
: 1870 1
: 1871 1
: 1872 1
: 1873 1
: 1874 1
: 1875 2
: 1876 2
: 1877 2
: 1878 2
: 1879 2
: 1880 2

```

global routine GET\_CMD\$REF = !Gets next unique cmd ref number

```

: 1831 1
: 1832 1
: 1833 1
: 1834 1
: 1835 1
: 1836 1
: 1837 1
: 1838 1
: 1839 1
: 1840 1
: 1841 1
: 1842 1
: 1843 1
: 1844 1
: 1845 1
: 1846 1
: 1847 1
: 1848 1
: 1849 1
: 1850 1
: 1851 1
: 1852 1
: 1853 1
: 1854 1
: 1855 1
: 1856 1
: 1857 1
: 1858 1
: 1859 1
: 1860 1
: 1861 1
: 1862 1
: 1863 1
: 1864 1
: 1865 1
: 1866 1
: 1867 1
: 1868 1
: 1869 1
: 1870 1
: 1871 1
: 1872 1
: 1873 1
: 1874 1
: 1875 2
: 1876 2
: 1877 2
: 1878 2
: 1879 2
: 1880 2

```

Functional Description :

A 32 bit unique non-zero number used to identify host commands. Class drivers should supply a unique reference number in each command that the send to a DUP server. A class driver may supply a zero reference number if it does not need to associate a command with its end message.

Command reference numbers must be unique across all commands that are outstanding on the same connection i.e., they must be unique across all outstanding commands issued by a single class driver (Host) to a single DUP server. The class driver may re-use a commands reference number when the command is no longer outstanding -- i.e., after receiving the commands end message or after re-synchronizing with the DUP server. Command reference numbers need not be unique for commands issued by different class drivers --- i.e. commands issued by different host or commands for diffeent DUP servers from the same host. Therefore controllers must internally use the combination of a command reference number and the connection on which the command was received as the unique identifier of an outstanding command.

This routine will generate a unique command reference number and will search the outstanding command buffer to see if already used. The first unused unique command reference found will be returned to the calling routine.

Formal Parameters :

none

Implicit Inputs :

NXT\_CRN This global location stores the next unique cmd reference number to be used.

Implicit Outputs :

NXT\_CRN This global location is loaded with the next unique command reference number.

Completion Codes :

The contents of .NXT\_CRN is returned to the calling routine.

Side Effects :

none

```

: 1875 2 begin
: 1876 2 local
: 1877 2 DONE;
: 1878 2
: 1879 2
: 1880 2

```

ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar-1984 14:51:26  
5 Mar-1984 14:40:58VAX-11 Bliss-16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 1881 2      ! Increment the global unique command
: 1882 2      ! reference number before anything is done.
: 1883 2      !
: 1884 2      NXT_CRN = .NXT_CRN + 1;
: 1885 2      !
: 1886 2      !
: 1887 2      ! Repeat generating and searching the outstanding
: 1888 2      ! command buffer until a unique command reference
: 1889 2      ! number is found.
: 1890 2      !
: 1891 2      !
: 1892 2      do
: 1893 3      begin
: 1894 3      !
: 1895 3      ! Wrap this next command reference number around
: 1896 3      ! back to one if it is greater then 255 (decimal).
: 1897 3      !
: 1898 3      !
: 1899 3      if .NXT_CRN gequ 255 then NXT_CRN = 1;
: 1900 3      !
: 1901 3      DONE = TRUE;                !Clear the all done indicator flag
: 1902 3      !
: 1903 3      !
: 1904 3      ! Now search the out$std_buffer for this command
: 1905 3      ! reference number. If not there then done stays
: 1906 3      ! true and the loop will end else increment to the
: 1907 3      ! next unique command ref number and make done false
: 1908 3      ! to continue the loop.
: 1909 3      !
: 1910 3      !
: 1911 3      incru i from 0 to REC_ALLOCATE - 1 do !Search buffer for this cmd ref num
: 1912 3      !
: 1913 3      if .OUT$STD_BUF [.i, CMD_REF] eglu .NXT_CRN !Does it already exist
: 1914 3      then
: 1915 4      begin
: 1916 4      !It already exists
: 1917 4      !Try the next sequential cmd ref num
: 1918 4      !Make code loop again
: 1919 4      !Exit this incr loop
: 1920 4      !
: 1921 4      !
: 1921 3      end
: 1922 2      until .DONE;                !Repeat loop until done
: 1923 2      !
: 1924 2      !
: 1925 2      ! Return the unique command reference number to the caller.
: 1926 2      !
: 1927 2      return .NXT_CRN;
: 1928 1      end;

```

000000 010146

```

      .SBTTL GET.CMD$REF GLOBAL ROUTINE DECLARATIONS
GET.CMD$REF::
      MOV R1,-(SP)
      ;

```

1828

R10

ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5-Mar-1984 14:51:26  
5-Mar-1984 14:40:58

VAX-11 B11es 16 V4.0-579  
DISK:USER2:[YOUNG.FMT]ZRQB4.016.3

000002	105237	000000G		INCB	NXT.CR0	:	1884
000006	123727	000000G	000377	CHPB	NXT.CR0,#377	:	1899
000014	103403			BLO	28		
000016	112737	000001	000000G	MOVB	#1,NXT.CR0		
000024	012701	000001		MOV	#1,R1	: *,DONE	1901
000030	005000			CLR	RO	: I	1911
000032	126037	000000G	000000G	CHPB	OUT\$STD.BUF(RO),NXT.CR0	: *(I),*	1913
000040	001004			BNE	48		
000042	105237	000000G		INCB	NXT.CR0	:	1916
000046	005001			CLR	R1	: DONE	1917
000050	000405			BR	58	:	1915
000052	062700	000004		ADD	#4,RO	: *.I	1911
000056	020027	000014		CHP	RO,#14	: I,*	
000062	101763			BLOS	38		
000064	006001			ROR	R1	: DONE	1922
000066	103347			BCC	18		
000070	005000			CLR	RO	:	1927
000072	153700	000000G		BISB	NXT.CR0,RO		
000076	012601			MOV	(SP),R1	:	1828
000100	000207			RTS	PC		

: Routine Size: 33 words, Routine Base: \$CODE\$ + 0146  
: Maximum stack depth per invocation: 2 words

: 1929 1

ZROB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58VAX 11 B1ies 16 V4.0-579  
DISK:USER2:[YOUNG.FMT]ZROB4.016.3

global routine DECODE : novalue - !Decodes failing SA reg data

!..

## Functional Description :

Due to the implimentation of the DUP and UQ Port protocol there are two levels at which an issued command to a port/controller can fail and they are:

1. The issued command can time out.
2. An error can be posted in SA register bit 15 by the port to report an error.
3. The issued command to the port/controller can be executed correctly without any errors but the response packet status field could have an error or status other than success posted.

These errors or status's returned are all returned to the host routine which queued the DUP command via the global storage "RET\_STATUS". The host to port/controller communications connection having the highest priority (ie. if the SA Reg error bit is set the DUP interrupt routine returns a PFE\_CODE and this code is passed up to the calling host routine with out being intercepted by any routine on the way up).

This routine will then be called when the return from a queued command comes back with an error code or non successfull status code. This is by definition when bit 0 in the returned status is equal to 1.

An appropriate recovery action will be done for each individual error.

Formal Parameters :  
none

Implicit Inputs :  
RET\_STATUS: Stored in this global storage is the returned error code or non-successful status code from a queued command.

Implicit Outputs :  
none

Completion Codes :  
none

Side Effects :  
All formatter errors are fatal, therefor after execution of this routine the RDRX controller is initialized aborting any DM code running in the controller.

!..

```

: 1930 1
: 1931 1
: 1932 1
: 1933 1
: 1934 1
: 1935 1
: 1936 1
: 1937 1
: 1938 1
: 1939 1
: 1940 1
: 1941 1
: 1942 1
: 1943 1
: 1944 1
: 1945 1
: 1946 1
: 1947 1
: 1948 1
: 1949 1
: 1950 1
: 1951 1
: 1952 1
: 1953 1
: 1954 1
: 1955 1
: 1956 1
: 1957 1
: 1958 1
: 1959 1
: 1960 1
: 1961 1
: 1962 1
: 1963 1
: 1964 1
: 1965 1
: 1966 1
: 1967 1
: 1968 1
: 1969 1
: 1970 1
: 1971 1
: 1972 1
: 1973 1
: 1974 1
: 1975 1
: 1976 1
: 1977 1
: 1978 1
: 1979 1
: 1980 1
: 1981 1
: 1982 1

```

ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
5 Mar-1984 14:40:58VAX-11 Bliss-16 V4.0-579  
DISK1USER2:(YOUNG.FMT)ZRQB4.B16,3

```

: 1983 2
: 1984 2
: 1985 2
: 1986 2
: 1987 2
: 1988 2
: 1989 2
: 1990 2
: 1991 2
: 1992 2
: 1993 2
: 1994 2
: 1995 2
: 1996 2
: 1997 2
: 1998 2
: 1999 2
: 2000 2
: 2001 2
: 2002 2
: 2003 2
: 2004 2
: 2005 2
: 2006 2
: 2007 2
: 2008 2
: 2009 2
: 2010 2
: 2011 2
: 2012 2
: 2013 2
: 2014 2
: 2015 2
: 2016 2
: 2017 2
: 2018 2
: 2019 2
: 2020 2
: 2021 2
: 2022 2
: 2023 2
: 2024 2
: 2025 2
: 2026 2
: 2027 2
: 2028 2
: 2029 2
: 2030 2
: 2031 2
: 2032 2
: 2033 2
: 2034 2
: 2035 2

```

```

begin
:
: Use the contents of 'RET_STATUS' to select what
: type error or non successful status code is to
: be processed.
:
selectoneu .RET STATUS of
set
:
: "Communication area initialize error code
: This error code indicates that the port did
: not init the com area in the host memory after
: step 2 of the initialization sequence.
:
[CIE_CODE] : !Code equals #0'01'
begin
PRINTF (.EMSG_STRUCT [MSG4]);
end;
:
: "Port/Controller time out" error code
: Port/Controller timed out after the specified
: time out interval.
:
[CTO_CODE] : !Code equals #0'11'
begin
PRINTF (.EMSG_STRUCT [MSG21]);
end;
:
: "Port fatal error" code
: The error bit in the SA Register was set when
: examined in the DUP#I_SERVICE routine. This
: error indicates a Port fatal error code.
:
[PFE_CODE] : !Code equals #0'21'
begin
PRINTF (.PFE_STRUCT [.RDRX ADDR [RCSA, ERR CODE]]);
end;
:
: "Return status error" code
: This indicates that a non successful return status
: code was returned from an issued command.
:
[RSE_CODE] : !Code equals #0'31

```



ZRQ84  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58VAX-11 Blues 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZRQ84.B16;3

```

: 2036 3      begin
: 2037 3      PRINTF (.EMSG_STRUCT [MSG0]);
: 2038 2      end;
: 2039 2      :
: 2040 2      : "Port Portocol violation" error code
: 2041 2      :
: 2042 2      : A protocol violation error was detected during
: 2043 2      : host processing of an issued command.
: 2044 2      :
: 2045 2      :
: 2046 2      [PVE_CODE] :                !Code equals %o'41'
: 2047 2      begin
: 2048 3      PRINTF (.EMSG_STRUCT [MSG1]);
: 2049 2      end;
: 2050 2      :
: 2051 2      : "Remote program died" error code
: 2052 2      :
: 2053 2      : This indicates that the remote program running
: 2054 2      : in the DM machine did not responded within the
: 2055 2      : designated time out interval and that the progress
: 2056 2      : indicator was not increase after subsiquent time out
: 2057 2      : delays. It is assumed that the remote program is dead
: 2058 2      : and is treated as a fatal error.
: 2059 2      :
: 2060 2      :
: 2061 2      [RPD_CODE] :                !Code equals %o'51'
: 2062 2      begin
: 2063 3      PRINTF (.EMSG_STRUCT [MSG2]);
: 2064 2      end;
: 2065 2      :
: 2066 2      : "Port to host synchronious error" code
: 2067 2      :
: 2068 2      :
: 2069 2      [PSE_CODE] :                !Code equals %o'61'
: 2070 2      begin
: 2071 3      PRINTF (.EMSG_STRUCT [MSG5]);
: 2072 2      end;
: 2073 2      :
: 2074 2      : "Message length error" code
: 2075 2      :
: 2076 2      :
: 2077 2      [MLE_CODE] :                !Code equals %o'71'
: 2078 2      begin
: 2079 3      PRINTF (.EMSG_STRUCT [MSG6]);
: 2080 2      end;
: 2081 2      :
: 2082 2      : "Unknown end code" error code
: 2083 2      :
: 2084 2      :
: 2085 2      [UEC_CODE] :                !Code equals %o'101
: 2086 2      begin
: 2087 3      PRINTF (.EMSG_STRUCT [MSG7]);
: 2088 2      end;

```

ZRQ84  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
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DISK:USER2:[YOUNG.FMT]ZRQ84.B16;3

```

: 2089 2      :
: 2090 2      :      : 'Adeptor purge request' error code
: 2091 2      :      :
: 2092 2      :
: 2093 2      :      [APR_CODE] :      !Code equals %o'201'
: 2094 3      :      begin
: 2095 3      :      PRINTF (.EMSG_STRUCT [MSG8]);
: 2096 2      :      end;
: 2097 2      :      :
: 2098 2      :      : "Unknown interrupt" error code
: 2099 2      :      :
: 2100 2      :
: 2101 2      :      [UIN_CODE] :      !Code equals %o'301'
: 2102 3      :      begin
: 2103 3      :      PRINTF (.EMSG_STRUCT [MSG9]);
: 2104 2      :      end;
: 2105 2      :      :
: 2106 2      :      : "ATTENTION MSG ENDCODE" error code
: 2107 2      :      :
: 2108 2      :
: 2109 2      :      [ATN_CODE] :      !Code equals %o'401'
: 2110 3      :      begin
: 2111 3      :      PRINTF (.EMSG_STRUCT [MSG12]);
: 2112 2      :      end;
: 2113 2      :      :
: 2114 2      :      : "COMMAND MSG ENDCODE" error code
: 2115 2      :      :
: 2116 2      :
: 2117 2      :      [CMD_CODE] :      !Code equals %o'501'
: 2118 3      :      begin
: 2119 3      :      PRINTF (.EMSG_STRUCT [MSG13]);
: 2120 2      :      end;
: 2121 2      :      :
: 2122 2      :      : "SERIOUS EXCEPTION" error code
: 2123 2      :      :
: 2124 2      :
: 2125 2      :      [SEX_CODE] :      !Code equals %o'601'
: 2126 3      :      begin
: 2127 3      :      PRINTF (.EMSG_STRUCT [MSG14]);
: 2128 2      :      end;
: 2129 2      :      :
: 2130 2      :      : "INVALID COMMAND" error code
: 2131 2      :      :
: 2132 2      :
: 2133 2      :      [IVC_CODE] :      !Code equals %o'701'
: 2134 3      :      begin
: 2135 3      :      PRINTF (.EMSG_STRUCT [MSG15]);
: 2136 2      :      end;
: 2137 2      :      :
: 2138 2      :      : "UNKNOWN MESSAGE TYPE" error code
: 2139 2      :      :
: 2140 2      :
: 2141 2      :      [UMT_CODE] :      !Code equals %o'1001'

```



ZRQ84 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

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DISK\$USER2:[YOUNG.FMT]ZRQ84.B16;3

: 2195 2  
: 2196 1           end;

Address	Offset	Label	Instruction	Comment	Line
000000	010146		MOV R1, (SP)		1930
000002	024646		-(SP), -(SP)		
000004	013701	000000G	MOV RET.STATUS, R1		1991
000010	020127	000001	CMP R1, #1		2001
000014	001007		BNE 1\$		
000016	013746	000010G	MOV MSG.STRUCT+10, (SP)		2003
000022	012746	000001	MOV #1, (SP)		
000026	010600		MOV SP, R0	: SP, *	
000030	104417		TRAP 17		
000032	000577		BR 13\$		2002
000034	020127	000011	1\$: CMP R1, #11		2012
000040	001007		BNE 2\$		
000042	013746	000052G	MOV MSG.STRUCT+52, (SP)		2014
000046	012746	000001	MOV #1, -(SP)		
000052	010600		MOV SP, R0	: SP, *	
000054	104417		TRAP 17		
000056	000577		BR 15\$		2013
000060	020127	000021	2\$: CMP R1, #21		2024
000064	001017		BNE 3\$		
000066	013700	000000G	MOV RDRX.ADDR, R0		2016
000072	016016	000002	MOV 2(R0), (SP)	: *, RC\$S.REG	
000076	011600		MOV (SP), R0	: RC\$S.REG, *	
000100	042700	174000	BIC #174000, R0		
000104	006300		ASL R0		
000106	016046	000000G	MOV PFE.STRUCT(R0), -(SP)		
000112	012746	000001	MOV #1, (SP)		
000116	010600		MOV SP, R0	: SP, *	
000120	104417		TRAP 17		
000122	000567		BR 17\$		2025
000124	020127	000031	3\$: CMP R1, #31		2035
000130	001007		BNE 4\$		
000132	013746	000000G	MOV MSG.STRUCT, -(SP)		2037
000136	012746	000001	MOV #1, -(SP)		
000142	010600		MOV SP, R0	: SP, *	
000144	104417		TRAP 17		
000146	000567		BR 19\$		2036
000150	020127	000041	4\$: CMP R1, #41		2046
000154	001007		BNE 5\$		
000156	013746	000002G	MOV MSG.STRUCT+2, (SP)		2048
000162	012746	000001	MOV #1, -(SP)		
000166	010600		MOV SP, R0	: SP, *	
000170	104417		TRAP 17		
000172	000567		BR 21\$		2047
000174	020127	000051	5\$: CMP R1, #51		2061
000200	001007		BNE 6\$		
000202	013746	000004G	MOV MSG.STRUCT+4, -(SP)		2063
000206	012746	000001	MOV #1, (SP)		
000212	010600		MOV SP, R0	: SP, *	

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ZRQ84  
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RDRx DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

000214	104417			TRAP	17		
000216	000567			BR	23\$		2062
000220	020127	000061	6\$:	CMP	R1,#61		2069
000224	001007			BNE	7\$		
000226	013746	000012G		MOV	EMSG.STRUCT+12, -(SP)		2071
000232	012746	000001		MOV	#1, (SP)		
000236	010600			MOV	SP,R0		
000240	104417			TRAP	17		
000242	000567			BR	25\$		2070
000244	020127	000071	7\$:	CMP	R1,#71		2077
000250	001007			BNE	8\$		
000252	013746	000014G		MOV	EMSG.STRUCT+14, (SP)		2079
000256	012746	000001		MOV	#1, (SP)		
000262	010600			MOV	SP,R0		
000264	104417			TRAP	17		
000266	000576			BR	28\$		2078
000270	020127	000101	8\$:	CMP	R1,#101		2085
000274	001007			BNE	9\$		
000276	013746	000016G		MOV	EMSG.STRUCT+16, (SP)		2087
000302	012746	000001		MOV	#1, (SP)		
000306	010600			MOV	SP,R0		
000310	104417			TRAP	17		
000312	000564			BR	28\$		2086
000314	020127	000201	9\$:	CMP	R1,#201		2093
000320	001007			BNE	10\$		
000322	013746	000020G		MOV	EMSG.STRUCT+20, (SP)		2095
000326	012746	000001		MOV	#1, (SP)		
000332	010600			MOV	SP,R0		
000334	104417			TRAP	17		
000336	000552			BR	28\$		2094
000340	020127	000301	10\$:	CMP	R1,#301		2101
000344	001007			BNE	11\$		
000346	013746	000022G		MOV	EMSG.STRUCT+22, (SP)		2103
000352	012746	000001		MOV	#1, -(SP)		
000356	010600			MOV	SP,R0		
000360	104417			TRAP	17		
000362	000540			BR	28\$		2102
000364	020127	000401	11\$:	CMP	R1,#401		2109
000370	001007			BNE	12\$		
000372	013746	000030G		MOV	EMSG.STRUCT+30, (SP)		2111
000376	012746	000001		MOV	#1, (SP)		
000402	010600			MOV	SP,R0		
000404	104417			TRAP	17		
000406	000526			BR	28\$		2110
000410	020127	000501	12\$:	CMP	R1,#501		2117
000414	001007			BNE	14\$		
000416	013746	000032G		MOV	EMSG.STRUCT+32, -(SP)		2119
000422	012746	000001		MOV	#1, (SP)		
000426	010600			MOV	SP,R0		
000430	104417			TRAP	17		
000432	000514			BR	28\$		2118
000434	020127	000601	13\$: 14\$:	CMP	R1,#601		2125
000440	001007			BNE	16\$		

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GLOBAL ROUTINE DECLARATIONS

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000442	013746	000034G		MOV	EMSG.STRUCT+34, (SP)	:	2127
000446	012746	000001		MOV	#1, (SP)	:	
000452	010600			MOV	SP,R0	: SP,*	
000454	104417			TRAP	17	:	
000456	000502		15\$:	BR	28\$	:	2126
000460	020127	000701	16\$:	CMP	R1,#701	:	2133
000464	001007			BNE	18\$	:	
000466	013746	000036G		MOV	EMSG.STRUCT+36, (SP)	:	2135
000472	012746	000001		MOV	#1, -(SP)	:	
000476	010600			MOV	SP,R0	: SP,*	
000500	104417			TRAP	17	:	
000502	000470		17\$:	BR	28\$	:	2134
000504	020127	001001	18\$:	CMP	R1,#1001	:	2141
000510	001007			BNE	20\$	:	
000512	013746	000040G		MOV	EMSG.STRUCT+40, (SP)	:	2143
000516	012746	000071		MOV	#1, (SP)	:	
000522	010600			MOV	SP,R0	: SP,*	
000524	104417			TRAP	17	:	
000526	000456		19\$:	BR	28\$	:	2142
000530	020127	004001	20\$:	CMP	R1,#4001	:	2149
000534	001007			BNE	22\$	:	
000536	013746	000046G		MOV	EMSG.STRUCT+46, (SP)	:	2151
000542	012746	000001		MOV	#1, (SP)	:	
000546	010600			MOV	SP,R0	: SP,*	
000550	104417			TRAP	17	:	
000552	000444		21\$:	BR	28\$	:	2150
000554	020127	002001	22\$:	CMP	R1,#2001	:	2157
000560	001007			BNE	24\$	:	
000562	013746	000042G		MOV	EMSG.STRUCT+42, -(SP)	:	2159
000566	012746	000001		MOV	#1, -(SP)	:	
000572	010600			MOV	SP,R0	: SP,*	
000574	104417			TRAP	17	:	
000576	000432		23\$:	BR	28\$	:	2158
000600	020127	003001	24\$:	CMP	R1,#3001	:	2165
000604	001007			BNE	26\$	:	
000606	013746	000044G		MOV	EMSG.STRUCT+44, (SP)	:	2167
000612	012746	000001		MOV	#1, -(SP)	:	
000616	010600			MOV	SP,R0	: SP,*	
000620	104417			TRAP	17	:	
000622	000420		25\$:	BR	28\$	:	2166
000624	020127	005001	26\$:	CMP	R1,#5001	:	2173
000630	001007			BNE	27\$	:	
000632	013746	000050G		MOV	EMSG.STRUCT+50, -(SP)	:	2175
000636	012746	000001		MOV	#1, -(SP)	:	
000642	010600			MOV	SP,R0	: SP,*	
000644	104417			TRAP	17	:	
000646	000406			BR	28\$	:	2174
000650	013746	000006G	27\$:	MOV	EMSG.STRUCT+6, -(SP)	:	2184
000654	012746	000001		MOV	#1, -(SP)	:	
000660	010600			MOV	SP,R0	: SP,*	
000662	104417			TRAP	17	:	
000664	022626		28\$:	CMP	(SP), (SP)	:	2183
000666	017766	000000G 000002		MOV	@RDRX.ADDR,2(SP)	: *,RC\$S.REG	2193

ZRQB4 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

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DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3  
SEQ 0127  
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(10)

000674 012700 177777  
000700 010077 000000G  
000704 104444  
000706 022626  
000710 012601  
000712 000207

MOV # 1,R0  
MOV R0,RDRX.ADDR  
TRAP 44  
CMP (SP),.(SP).  
MOV (SP),R1  
RTS PC

; \*.RC#M.REG  
; RC#M.REG,.\*

1930

; Routine Size: 230 words, Routine Base: \$CODE\$ + 0250  
; Maximum stack depth per invocation: 7 words

; 2197 1

ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar-1984 14:51:26  
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DISK#USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 2198 1 global routine DUP$I SERVICE : INT_LNK$TYP novalue = !Signals receive queue entry
: 2199 1
: 2200 1
: 2201 1 !..
: 2202 1 ! Functional Description :
: 2203 1 ! The transmission of a message will result in a host interrupt if and
: 2204 1 ! only if interrupts were armed suitably during initialization and one
: 2205 1 ! of the following conditions has been met:
: 2206 1 !
: 2207 1 ! 1. The message was a command with F=1 and the port's fetching it
: 2208 1 ! caused the command ring to transition from full to not-full.
: 2209 1 ! (This interrupt means that the host may place another command
: 2210 1 ! in the ring.)
: 2211 1 !
: 2212 1 ! 2. The message was a response with F=1 and the port's depositing
: 2213 1 ! it caused the response ring to transition from empty to not-
: 2214 1 ! empty. (This interrupt means that there is a response for
: 2215 1 ! the host to process.)
: 2216 1 !
: 2217 1 ! 3. The port is interfaced to the host via a bus abapter and a
: 2218 1 ! command requires the port/controller to re-access a given
: 2219 1 ! location during data transfer. (This interrupt means that
: 2220 1 ! the port/controller is requesting the host to purge the
: 2221 1 ! indicated chanel of the bus adapter.)
: 2222 1 !
: 2223 1 ! This interrupt service routine is entered when any of the above
: 2224 1 ! conditions occure. When entered it will be determined what type
: 2225 1 ! interrupt was executed and take the necessary action.
: 2226 1 ! Formal Parameters :
: 2227 1 ! none
: 2228 1 !
: 2229 1 ! Implicit Inputs :
: 2230 1 ! Nrd_slot: A global flag which points to the next receive descriptor
: 2231 1 ! slot where the port/controller should be polling on and
: 2232 1 ! where to expect the first response packet to process.
: 2233 1 !
: 2234 1 ! Implicit Outputs :
: 2235 1 ! Ret_status: This global flag is the mechinism by which these DUP
: 2236 1 ! and UQ Port protocol routines pass status code back to
: 2237 1 ! to the host routine's requesting communications over
: 2238 1 ! the established connections. The status returned is
: 2239 1 ! decoded by the caller to determine if an error or bad
: 2240 1 ! response packet status was discovered.
: 2241 1 !
: 2242 1 ! Out$std_buf: This buffer is used to save all commands issued to the
: 2243 1 ! port and are considered outstanding when in this buffer.
: 2244 1 ! This interrupt service routine will indicate this command
: 2245 1 ! is no longer outstanding by setting the rec_flg in the
: 2246 1 ! slot matching this response envelope command ref number.
: 2247 1 !
: 2248 1 ! Completion Codes :
: 2249 1 ! none
: 2250 1

```



```

: 2251 1 ! Side Effects :
: 2252 1 ! none
: 2253 1 !
: 2254 1 !
: 2255 2 begin
: 2256 2
: 2257 2 local
: 2258 2 TEMP. !Holds nrd_slot + 1 reference
: 2259 2 FOUND_CMD. !Found command flag
: 2260 2 REF_NUM; !Stores response packets cmd ref number
: 2261 2
: 2262 2 !
: 2263 2 ! Before this interrupt service routine does anything
: 2264 2 ! look at the SA register for any port fatal errors
: 2265 2 ! posted. If there are errors posted then report the
: 2266 2 ! error and kick the bucket.
: 2267 2 !
: 2268 2 !
: 2269 2 if .RDRX_ADDR [RCSA, ERR_BIT] !Are there any errors posted
: 2270 2 then
: 2271 3 begin
: 2272 3 RET_STATUS = PFE_CODE; !Indicate the error type
: 2273 3 DECODE (); !Decode and print the error
: 2274 3 return; !Just for show. Decode will kill it
: 2275 2 end;
: 2276 2
: 2277 2 !
: 2278 2 ! See what kind of interrupt got us here.
: 2279 2 !
: 2280 2 ! We could have a:
: 2281 2 !
: 2282 2 ! 1. Response ring transition interrupt.
: 2283 2 ! 2. Send ring transition interrupt.
: 2284 2 ! 3. A adaptor purge request interrupt (which is
: 2285 2 ! illegal running under the PDP-11 Diagnostic
: 2286 2 ! supervisor and is flagged as a fatal controller
: 2287 2 ! error.)
: 2288 2 ! 4. Or an unknown interrupt not known by this program
: 2289 2 ! which also results in a fatal controller error.
: 2290 2 !
: 2291 2 !
: 2292 2 !
: 2293 2 !
: 2294 2 !
: 2295 2 ! Check to see if we get here because of a response ring
: 2296 2 ! transition interrupt. This is more likely to be the
: 2297 2 ! most frequent interrupt so check it first.
: 2298 2 !
: 2299 2 !
: 2300 2 if .HEAD_AREA [RSP_INT]
: 2301 2 then
: 2302 3 begin
: 2303 3 HEAD_AREA [RSP_INT] = ZEROS; !Clear the interrupt indicator location

```

ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

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```

: 2304 3      GET_NRD ();                !Get the resp slot location to process
: 2305 3      !
: 2306 3      ! Check the host protocol for being out of sequence
: 2307 3      ! with the controller by making sure that this slot
: 2308 3      ! is owned by the host (meaning that there is a resp
: 2309 3      ! envelope at this ring slot to process.
: 2310 3      !
: 2311 3      !
: 2312 3      if .RECEIVE_RING [.NRD_SLOT, OWN_BIT] nequ HOST_OWNED  !Is this owned by host
: 2313 3      then
: 2314 4      begin                    !Host/port is out of sequence
: 2315 4      RET_STATUS = PSE_CODE;    !Load a "Port sync error" code
: 2316 4      DECODE ();              !Report the error and kick the bucket
: 2317 4      return;                !Just for show Decode kills it
: 2318 3      end;
: 2319 3      !
: 2320 3      !
: 2321 3      ! Per DUP protocol once interrupted due to a response ring
: 2322 3      ! interrupt, the host code should process all response packets
: 2323 3      ! found in the response ring. This while loop will continue
: 2324 3      ! to process the response packets in the response ring until
: 2325 3      ! none remain.
: 2326 3      !-
: 2327 3      !
: 2328 3      while TRUE do           !Process all response packets in ring
: 2329 4      begin
: 2330 4      BREAK;                  !Look for control c's
: 2331 4      !
: 2332 4      ! Load the Reference structure "Ret_en$ad" with the address
: 2333 4      ! of this response envelope to process (The minus %o'4' is
: 2334 4      ! done to address the first word in the envelope packet
: 2335 4      ! and is equal to location "text-4").
: 2336 4      !
: 2337 4      RET_EN$AD = (.RECEIVE_RING [.NRD_SLOT, LO_EN$AD]) - %o'4';
: 2338 4      !
: 2339 4      !
: 2340 4      ! Test the end packet for its possible three end types.
: 2341 4      !
: 2342 4      ! End message opcodes (also called endcodes) are formed by adding the end
: 2343 4      ! message flag to the command opcode. For example, a READ commands end
: 2344 4      ! message contains the value OP.RED + OP.END in its opcode field. The Invalid
: 2345 4      ! command end message contains just the end message flag (i.e., OP.END) in
: 2346 4      ! its opcode field. The serious exception opcode shown above (i.e. OP.SEX +
: 2347 4      ! OP.END) in its opcode field.
: 2348 4      !
: 2349 4      ! Commands opcode bits 6 and 7 indicate the type of message (command, end or
: 2350 4      ! attention message. Command opcodes bits 3 through 5 indicate the command
: 2351 4      ! category (immediate, sequential or no-sequential) and whether or not the
: 2352 4      ! command includes a buffer descriptor.
: 2353 4      !
: 2354 4      ! See MSCP document appendix "A-1 NOTE:" for more information on this topic.
: 2355 4      !-
: 2356 4      !

```

ZRQBA  
REV C PATCH 0

RORX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

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DISK:USER2:[YOUNG.FMT]ZRQBA.016:3

```

2357 4      selectnew .RET_ENHAD [TIPMSG] of !Select the endpacket size
2358 4      set
2359 4
2360 4      [ENDMSG] : !Is this an end code packet
2361 5      begin
2362 5
2363 5      ..
2364 5      ! Select off of the encode to make sure the communications
2365 5      ! mechanism transferred the correct number of byte for this
2366 5      ! end packet. If this number of bytes transferred is not
2367 5      ! correct for the commands end packet then load the error
2368 5      ! code into return status, call decode to report the
2369 5      ! error and kick the bucket and die. This encode is formed
2370 5      ! by adding the end message flag to '200' to the commands
2371 5      ! opcode.
2372 5
2373 5
2374 5      selectnew .RET_ENHAD [ENDCODE] of
2375 5      set
2376 5      !
2377 5      ! "RECEIVE DATA" command end packet
2378 5      !
2379 5
2380 5      [EOP_RED] :
2381 6      begin
2382 6
2383 6      if .RET_ENHAD [MSG_LENGTH] gtru ESZ RED !Is the byte count correct
2384 6      then
2385 7      begin
2386 7      RET_STATUS = MLE_CODE; !Return a 'message length error code'
2387 7      DECODE (); !Report the error and kick the bucket
2388 7      return; !Just for show. Decode kills it
2389 6      end;
2390 6
2391 5      end;
2392 5
2393 5      ! "SEND DATA" command end packet
2394 5      ! "SET CONTROLLER CHAR" command end packet (same opcode)
2395 5
2396 5
2397 5      [EOP_SED] :
2398 5      ! [EOP_SCC] :
2399 6      begin
2400 6
2401 6      if (not ((.RET_ENHAD [MSG_LENGTH] lequ ESZ_SED) or !Is the byte count correct
2402 7      (.RET_ENHAD [MSG_LENGTH] equ ESZ_SCC)) )
2403 6      then
2404 7      begin
2405 7      RET_STATUS = MLE_CODE; !Return a "message length error code"
2406 7      DECODE (); !Report the error and kick the bucket
2407 7      return; !Just for show. Decode kills it
2408 6      end;
2409 6

```

ZROB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58VAX-11 B11es 16 V4.0.579  
DISKUSER2:[YOUNG.FMT]ZROB4.B16;3

```

: 2410 5      end;
: 2411 5      :
: 2412 5      :- GET DUST STATUS" command end packet
: 2413 5      :
: 2414 5      :
: 2415 5      [EOP_GDS] :
: 2416 6      begin
: 2417 6
: 2418 6      if .RET_EN$AD [MSG_LENGTH] nequ ESZ_GDS      !Is the byte count correct
: 2419 6      then
: 2420 7      begin
: 2421 7      RET_STATUS = MLE_CODE; !Return a "message length error code
: 2422 7      DECODE ();      !Report the error and kick the bucket
: 2423 7      return;      !Just for show. Decode kills it
: 2424 6      end;
: 2425 6
: 2426 6      end;
: 2427 5      :
: 2428 5      :- "EXECUTE SUPPLIED PROGRAM" command end packet
: 2429 5      :
: 2430 5      :
: 2431 5      [EOP_ESP] :
: 2432 5      begin
: 2433 5
: 2434 5      if .RET_EN$AD [MSG_LENGTH] nequ ESZ_ESP      !Is the byte count correct
: 2435 5      then
: 2436 5      begin
: 2437 5      RET_STATUS = MLE_CODE; !Return a "message length error code'
: 2438 5      DECODE ();      !Report the error and kick the bucket
: 2439 5      return;      !Just for show. Decode kills it
: 2440 5      end;
: 2441 5
: 2442 5      end;
: 2443 5      :
: 2444 5      :- "EXECUTE LOCAL PROGRAM" command end packet
: 2445 5      :
: 2446 5      :
: 2447 5      [EOP_ELP] :
: 2448 6      begin
: 2449 6
: 2450 6      if .RET_EN$AD [MSG_LENGTH] nequ ESZ_ELP      !Is the byte count correct
: 2451 6      then
: 2452 7      begin
: 2453 7      RET_STATUS = MLE_CODE; !Return a "message length error code
: 2454 7      DECODE ();      !Report the error and kick the bucket
: 2455 7      return;      !Just for show. Decode kills it
: 2456 6      end;
: 2457 6
: 2458 5      end;
: 2459 5      :
: 2460 5      :- "ABORT PROGRAM" command end packet
: 2461 5      :
: 2462 5

```

ZROB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58VAX 11 B1: 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZROB4.B16;3SEQ\_0133  
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```

: 2463 5      [FOP_ABT] :
: 2464 6      begin
: 2465 6
: 2466 6      if .RET EN$AD [MSG_LENGTH] nequ ESZ_ABT      !Is the byte count correct
: 2467 6      then
: 2468 7      begin
: 2469 7      RET_STATUS = MLE_CODE; !Return a 'message length error code'
: 2470 7      DECODE ();      !Report the error and kick the bucket
: 2471 7      return;      !Just for show. Decode kills it
: 2472 6      end;
: 2473 6
: 2474 5      end;
C 2475 5      *
C 2476 5      : "ON LINE" command end packet
C 2477 5      :
C 2478 5
C 2479 5      [EOP_ONL] :
C 2480 5      begin
C 2481 5
C 2482 5      if .RET EN$AD [MSG_LENGTH] nequ ESZ_ONL      !Is the byte count correct
C 2483 5      then
C 2484 5      begin
C 2485 5      RET_STATUS = MLE_CODE; !Return a "message length error code"
C 2486 5      DECODE ();      !Report the error and kick the bucket
C 2487 5      return;      !Just for show. Decode kills it
C 2488 5      end;
C 2489 5      end;
C 2490 5      )
: 2491 5      :
: 2492 5      : The "OP_END" end message flag all by its self tells
: 2493 5      : us that the controller is flagging us of an illegal
: 2494 5      : command sent over the connection. Error and kick the
: 2495 5      : bucket.
: 2496 5      :
: 2497 5
: 2498 5      [OP_END] :
: 2499 6      begin
: 2500 6      RET_STATUS = IVC_CODE;
: 2501 6      DECODE ();
: 2502 6      return;
: 2503 6      end;
: 2504 5      :
: 2505 5      : The controller is telling us that a serious exception
: 2506 5      : has occured. Error and kick the bucket.
: 2507 5      :
: 2508 5
: 2509 5      [EOP_SEX] :
: 2510 6      begin
: 2511 6      RET_STATUS = SEX_CODE;
: 2512 6      DECODE ();
: 2513 6      return;
: 2514 5      end;
: 2515 5

```

ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
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VAX-11 Blis 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 2516 5      ; Unknown end packet endcode type
: 2517 5      ;
: 2518 5      ;
: 2519 5      ; [otherwise] :
: 2520 6      ;     begin
: 2521 6      ;     RET_STATUS = UEC CODE;      !Return an "unknown end code
: 2522 6      ;     DECODE ();                !Report the error and kick the bucket
: 2523 6      ;     return;                   !Just for show. Decode kills 't
: 2524 5      ;     end;
: 2525 5      ; tes;
: 2526 5      ;
: 2527 5      ;
: 2528 5      ; ! The port/controller sent the endpacket over the connection
: 2529 5      ; ! with out any problems. Now find this commands owner in the
: 2530 5      ; ! outstanding buffer and indicate to them that the command
: 2531 5      ; ! has been received.
: 2532 5      ;
: 2533 5      ; REF_NUM = .RET_EN$AD [CMD_LREF]; !Get this rec packets cmd ref number
: 2534 5      ;
: 2535 5      ; ! Search the outstanding command buffer for this commands
: 2536 5      ; ! reference number.
: 2537 5      ;
: 2538 5      ; ! If found, load the buffer location with the ret en$ad
: 2539 5      ; ! and set the received flag to signify that this command
: 2540 5      ; ! has been received by this interrupt service routine.
: 2541 5      ;
: 2542 5      ; FOUND_CMD = FALSE;           !Clear the found cmd flag
: 2543 5      ;
: 2544 5      ; incru i from 0 to REC_ALLOCATE - 1 do      !Search the buffer
: 2545 5      ;
: 2546 5      ;     if .OUT$STD_BUF [.i, CMD_REF] eqv .REF_NUM !Is this the cmd ref
: 2547 5      ;     then
: 2548 6      ;     begin
: 2549 6      ;     OUT$STD_BUF [.i, REC_FLG] = TRUE; !Indicate command is received
: 2550 6      ;     OUT$STD_BUF [.i, ENV_ADR] = .RET_EN$AD; !Return envelope adrs
: 2551 6      ;     FOUND_CMD = TRUE; !Indicate it was found
: 2552 6      ;     exitloop; !Exit the loop
: 2553 5      ;     end;
: 2554 5      ;
: 2555 5      ;
: 2556 5      ; ! If the search through the command ref
: 2557 5      ; ! buffer failed to find this commands cmd
: 2558 5      ; ! reference number then die.
: 2559 5      ;
: 2560 5      ;
: 2561 5      ; if not .FOUND_CMD
: 2562 5      ; then
: 2563 6      ;     begin
: 2564 6      ;     RET STATUS = PSE CODE;
: 2565 6      ;     DECODE ();
: 2566 6      ;     return;
: 2567 5      ;     end;
: 2568 5

```

ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58VAX 11 Bliss 16 V4.0 579  
DISK\$USER2:(YOUNG.FMT)ZRQB4.B16;3

```

: 2569 4          end;          !End of END$MSG processing
: 2570 4          :
: 2571 4          : The set controller characteristics command
: 2572 4          : disabled the reporting of attentions messages
: 2573 4          : so treat this as a fatal error and die.
: 2574 4          :
: 2575 4          :
: 2576 4          [ATT$MSG] :          !Attention end message type
: 2577 5          begin
: 2578 5          RET_STATUS = ATN_CODE;
: 2579 5          DECODE ();
: 2580 5          return;
: 2581 4          end;
: 2582 4          :
: 2583 4          : It doesn't make any since for this end message
: 2584 4          : packet not to have the end message flag added
: 2585 4          : to this command opcode as treat it as a fatal
: 2586 4          : error and die.
: 2587 4          :
: 2588 4          :
: 2589 4          [CMD$MSG] :
: 2590 5          begin
: 2591 5          RET_STATUS = CMD_CODE;
: 2592 5          DECODE ();
: 2593 5          return;
: 2594 4          end;
: 2595 4          :
: 2596 4          : This end code type is of unknown origin so
: 2597 4          : treat is as a fatal error and die.
: 2598 4          :
: 2599 4          :
: 2600 4          [otherwise] :
: 2601 5          begin
: 2602 5          RET_STATUS = UEC CODE;          !Unknown message type code received
: 2603 5          DECODE ();
: 2604 5          return;
: 2605 4          end;
: 2606 4          tes;
: 2607 4          :
: 2608 4          :
: 2609 4          : Before we leave put this receive envelope message length
: 2610 4          : field back to the envelope size, in bytes (Per UQ Spec).
: 2611 4          : This size does not include the 2 UQ's words preceding the
: 2612 4          : command text area.
: 2613 4          :
: 2614 4          RET_EN$AD [MSG_LENGTH] = RB SIZE*2;
: 2615 4          :
: 2616 4          : Return this receive slot descriptor back to
: 2617 4          : the port to fulfill my part of the protocol.
: 2618 4          :
: 2619 4          RECEIVE_RING [.NRD SLOT, OWN BIT] = PORT OWNED;
: 2620 4          :
: 2621 4          : Look at the next response ring descriptor. If its

```

ZROB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
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DISKUSER2:[YOUNG.FMT]ZROB4.B16;3

```

: 2622 4      : host owned then continue this process else exit the
: 2623 4      : loop. First see if the ring reference has wrapped
: 2624 4      : around to the top of the ring.
: 2625 4      :
: 2626 4      :
: 2627 4      : if .NRD_SLOT + 1 gtru REC ALLOCATE 1      !Has the ring ref wrapped around
: 2628 4      : then
: 2629 4      :     TEMP = ZERO                          !Wrap it back to zero dsc slot
: 2630 4      : else
: 2631 4      :     TEMP = .NRD_SLOT + 1;                !Look at the next seq dsc slot
: 2632 4      :
: 2633 4      :
: 2634 4      : Now see if the next receive descriptor slot is
: 2635 4      : host owned.
: 2636 4      :
: 2637 4      :
: 2638 4      : if .RECEIVE_RING [.TEMP, OWN_BIT] ealu MOST_OWNED !Are we done yet
: 2639 4      : then
: 2640 4      :     GET_NRD ( )                          !Get the next resp desc to process
: 2641 4      : else
: 2642 4      :     exitloop;                            !No more to do so exit
: 2643 4      :
: 2644 3      : end;                                     !End of WHILE LOOP
: 2645 3      :
: 2646 3      :
: 2647 3      : All response ring descriptors have been with out any
: 2648 3      : detected errors so return to the main host code with
: 2649 3      : an pass return code.
: 2650 3      :
: 2651 3      : return RET_STATUS = PAS CODE;            !Return a 'pass code
: 2652 2      : end;
: 2653 2      :
: 2654 2      : *****END OF RESPONSE RING INTERRUPT PROCESSING*****
: 2655 2      :
: 2656 2      :
: 2657 2      : A send ring transition interrupt could happen if at
: 2658 2      : some date only one descriptor slot is allocated for
: 2659 2      : commands.
: 2660 2      :
: 2661 2      : Clear the interrupt indicator if this is true and do
: 2662 2      : a return with no errors.
: 2663 2      :
: 2664 2      :
: 2665 2      : if .HEAD_AREA [CMD_INT]                  !Is this a com ring transition interrupt
: 2666 2      : then
: 2667 3      :     begin
: 2668 3      :     HEAD_AREA [CMD INT] = ZERO;          !Clear out the indicator
: 2669 3      :     return;                             !Continue on with the host code
: 2670 2      :     end;
: 2671 2      :
: 2672 2      : *****END OF COMMAND RING INTERRUPT PROCESSING*****
: 2673 2      :
: 2674 2      :

```



ZRQ84  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

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VAX 11 B1116 V4.0 579  
DISK\$USER2:([YOUNG.FMT])ZRQ84.B16;3

```

: 2675 2      ! Check to see if an adaptor purge is being requested
: 2676 2      ! by the port/controller in order to complete execution
: 2677 2      ! of a issued command. Remember that this is illegal
: 2678 2      ! during PDP-11 formatting and is considered to be a
: 2679 2      ! fatal error.
: 2680 2      !
: 2681 2
: 2682 2      if .HEAD_AREA [ADP_CH] nequ ZERO          !Is the an adaptor purge request?
: 2683 2      then
: 2684 3          begin
: 2685 3              RET_STATUS = APR CODE;          !Indicate the error code
: 2686 3              DECODE ();                    !Report the error and kick the bucket
: 2687 3              return;                      !Just for show. Decode kills it
: 2688 3          end;
: 2689 2
: 2690 2      !*****END OF ADAPTOR PURGE INTERRUPT PROCESSING*****
: 2691 2
: 2692 2      !
: 2693 2      ! The host program has been interrupted by an unknown interrupt
: 2694 2      ! source if the routine program flow reaches here.
: 2695 2
: 2696 2      ! Load the error code into return status and call decode to take
: 2697 2      ! appropriate action.
: 2698 2      !
: 2699 2
: 2700 2      RET_STATUS = UIN_CODE;
: 2701 2      DECODE ();
: 2702 2      return;
: 2703 1      end;

```

		.SBTTL	DUP\$I.SERVICE	GLOBAL ROUTINE DECLARATIONS	
000000	010046		DUP\$I.SERVICE::		
			MOV	R0, -(SP)	2198
			MOV	R1, (SP)	
			MOV	R2, (SP)	
			MOV	R3, (SP)	
			MOV	R4, (SP)	
			MOV	R5, (SP)	
			MOV	RDRX.ADDR,R0	2269
			MOV	2(R0), (SP)	; *.RC\$S.REG
			BPL	1\$	
			MOV	#21,RET.STATUS	2272
			BR	14\$	2273
			MOV	HEAD.AREA,R0	2300
			BIT	#1,6(R0)	
			BNE	2\$	
			JMP	26\$	
			CLR	6(R0)	2303
			JSR	PC,GET.NRD	2304
			MOV	NRD.SLOT,R0	2312
			ASL	R0	
			ASL	R0	

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VAX 11 B16 16 V4.0 579  
 DISK#USER2:[YOUNG.FMT]ZROB4.B16;3

ZROB4  
 REV C PATCH 0  
 RDRX DISK FORMATTER  
 GLOBAL ROUTINE DECLARATIONS

000076	063700	000000G			ADD	RECEIVE.RING,RO		
000102	032760	100000	000002		BIT	#100000,2(RO)		
000110	001404				BEQ	4#		
000112	012737	000061	000000G	3#:	MOV	#61,RET.STATUS	:	2315
000120	000577				BR	21#	:	2316
000122	104422			4#:	TRAP	22	:	2329
000124	013700	000000G			MOV	NRD.SLOT,RO	:	2337
000130	006300				ASL	RO		
000132	006300				ASL	RO		
000134	063700	000000G			ADD	RECEIVE.RING,RO		
000140	011037	000000G			MOV	(RO),RET.EN#AD		
000144	162737	000004	000000G		SUB	#4,RET.EN#AD		
000152	013701	000000G			MOV	RET.EN#AD,R1	:	2357
000156	116100	000014			MOVB	14(R1),RO		
000162	006200				ASR	RO		
000164	006200				ASR	RO		
000166	006200				ASR	RO		
000170	006200				ASR	RO		
000172	006200				ASR	RO		
000174	006200				ASR	RO		
000176	042700	177774			BIC	#177774,RO		
000202	020027	000002			CMP	RO,#2	:	2360
000206	001130				BNE	19#		
000210	005002				CLR	R2	:	2374
000212	156102	000014			BISB	14(R1),R2		
000216	020227	000205			CMP	R2,#205	:	2380
000222	001007				BNE	6#		
000224	021127	000060			CMP	(R1),#60	:	2383
000230	101462				BLOS	15#		
000232	012737	000071	000000G	5#:	MOV	#71,RET.STATUS	:	2386
000240	000527				BR	21#	:	2387
000242	020227	000204		6#:	CMP	R2,#204	:	2397
000246	001007				BNE	8#		
000250	021127	000060			CMP	(R1),#60	:	2401
000254	101450				BLOS	15#		
000256	021127	000034			CMP	(R1),#34	:	2402
000262	001445			7#:	BEQ	15#		
000264	000762				BR	5#	:	2405
000266	020227	000201		8#:	CMP	R2,#201	:	2415
000272	001003				BNE	9#		
000274	021127	000026			CMP	(R1),#26	:	2418
000300	000770				BR	7#		
000302	020227	000203		9#:	CMP	R2,#203	:	2447
000306	001003				BNE	10#		
000310	021127	000020			CMP	(R1),#20	:	2450
000314	000762				BR	7#		
000316	020227	000206		10#:	CMP	R2,#206	:	2463
000322	001003				BNE	11#		
000324	021127	000014			CMP	(R1),#14	:	2466
000330	000754				BR	7#		
000332	020227	000200		11#:	CMP	R2,#200	:	2498
000336	001004				BNE	12#		
000340	012737	000701	000000G		MOV	#701,RET.STATUS	:	2500

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VAX-11 Bliss 16 V4.0-579  
DISK\$USER2:(YOUNG.FMT)ZRQB4.B16;3

ZRQB4  
REV C PATCH 0  
RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

000346	000557			BR	29\$				2501
000350	020227	000207	12\$:	CMP	R2,#207				2509
000354	001004			BNE	13\$				
000356	012737	000601	000000G	MOV	#601,RET.STATUS				2511
000364	000550			BR	29\$				2512
000366	012737	000101	000000G	MOV	#101,RET.STATUS				2521
000374	000544			BR	29\$				2522
000376	013700	000000G		MOV	RET.EN\$AD,R0				2533
000402	016005	000004		MOV	4(R0),R5				
000406	005004			CLR	R4				2542
000410	005000			CLR	R0				2544
000412	005001			CLR	R1				2546
000414	156001	000000G		BISB	OUT\$STD.BUF(R0),R1				
000420	020105			CMP	R1,R5				
000422	001011			BNE	17\$				
000424	052760	100000	000000G	BIS	#100000,OUT\$STD.BUF(R0)				2549
000432	013760	000000G	000002G	MOV	RET.EN\$AD,OUT\$STD.BUF+2(R0)				2550
000440	012704	000001		MOV	#1,R4				2551
000444	000405			BR	18\$				2548
000446	062700	000004		ADD	#4,R0				2544
000452	020027	000014		CMP	R0,#14				
000456	101755			BLOS	16\$				
000460	032704	000001		BIT	#1,R4				2501
000464	001016			BNE	22\$				
000466	000611			BR	3\$				2564
000470	020027	000001		CMP	R0,#1				2576
000474	001004			BNE	20\$				
000476	012737	000401	000000G	MOV	#401,RET.STATUS				2578
000504	000500			BR	29\$				2579
000506	005700			TST	R0				2589
000510	001326			BNE	13\$				
000512	012737	000501	000000G	MOV	#501,RET.STATUS				2591
000520	000472			BR	29\$				2592
000522	012777	000074	000000G	MOV	#74,RET.EN\$AD				2614
000530	013700	000000G		MOV	NRD.SLOT,R0				2619
000534	006300			ASL	R0				
000536	006300			ASL	R0				
000540	063700	000000G		ADD	RECEIVE.RING,R0				
000544	052760	100000	000002	BIS	#100000,2(R0)				
000552	013700	000000G		MOV	NRD.SLOT,R0				2627
000556	005200			INC	R0				
000560	020027	000003		CMP	R0,#3				
000564	101402			BLOS	23\$				
000566	005003			CLR	R3				2629
000570	000401			BR	24\$				2627
000572	010003			MOV	R0,R3				2631
000574	010300			MOV	R3,R0				2638
000576	006300			ASL	R0				
000600	006300			ASL	R0				
000602	063700	000000G		ADD	RECEIVE.RING,R0				
000606	032760	100000	000002	BIT	#100000,2(R0)				
000614	001004			BNE	25\$				
000616	004737	000026		JSR	PC,GET.NRD				2640

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VAX 11 B1'ss 16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQBA.B16;3

ZRQBA  
REV C PATCH 0  
RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

000622	000137	001306'		JMP	4\$	:	2638
000626	005037	000000G	25\$:	CLR	RET.STATUS	:	2651
000632	000427			BR	30\$	:	2302
000634	013700	000000G	26\$:	MOV	HEAD.AREA,R0	:	2665
000640	032760	000001 000004		BIT	01,4(R0)		
000646	001403			BEQ	27\$		
000650	005060	000004		CLR	4(R0)	:	2668
000654	000416			BR	30\$	:	2667
000656	013700	000000G	27\$:	MOV	HEAD.AREA,R0	:	2682
000662	105760	000003		TSTB	3(R0)		
000666	001404			BEQ	28\$		
000670	012737	000201 000000G		MOV	0201,RET.STATUS	:	2685
000676	000403			BR	29\$	:	2686
000700	012737	000301 000000G	28\$:	MOV	0301,RET.STATUS	:	2700
000706	004737	000250'	29\$:	JSR	PC,DECODE	:	2701
000712	005726		30\$:	TST	(SP)+	:	2198
000714	012605			MOV	(SP)+,R5		
000716	012604			MOV	(SP)+,R4		
000720	012603			MOV	(SP)+,R3		
000722	012602			MOV	(SP)+,R2		
000724	012601			MOV	(SP)+,R1		
000726	012600			MOV	(SP)+,R0		
000730	000002			RTI			

: Routine Size: 237 words, Routine Base: \$CODE\$ + 1164  
: Maximum stack depth per invocation: 13 words

: 2704 1

```

: 2705 1 global routine CTO_WAIT (TO_VALUE, REF_NUM, BUF$LOC) = !Controller time out wait
: 2706 1
: 2707 1
: 2708 1 !**
: 2709 1 ! Functional Description :
: 2710 1 ! This routine is called to wait for the port/controller to either
: 2711 1 ! complete the queued command or time out the command.
: 2712 1 !
: 2713 1 ! Formal Parameters :
: 2714 1 ! TO_VALUE Indicate the time-out interval for this command.
: 2715 1 !
: 2716 1 ! REF_NUM This argument contains the unique reference number
: 2717 1 ! assigned to this command being timed out by this
: 2718 1 ! routine.
: 2719 1 !
: 2720 1 ! BUF$LOC This argument points to the out$std_buf location
: 2721 1 ! where this command is saved. At this location the
: 2722 1 ! received flag "rec_flg" bit is examined within the
: 2723 1 ! the timeout loop and when it equals true will
: 2724 1 ! signal that this command has been received by the
: 2725 1 ! interrupt service routine.
: 2726 1 !
: 2727 1 ! Impl'cit Inputs :
: 2728 1 ! none
: 2729 1 !
: 2730 1 ! Implicit Outputs :
: 2731 1 ! The command word in the out$std_buffer 'word zero of a command
: 2732 1 ! slot' is cleared out with the value #0'100000' to indicate this
: 2733 1 ! is an unused out$std_buffer slot and that it can be reused.
: 2734 1 !
: 2735 1 ! Completion Codes :
: 2736 1 ! There are two levels of return status returned by this routine.
: 2737 1 ! 1. The DUP interrupt service returns to this routine a status code
: 2738 1 ! to indicate the success of the connection/communications mechanism
: 2739 1 ! to complete the queued command. If the port/controller does not
: 2740 1 ! time out then this return status is returned as this routines
: 2741 1 ! return status code.
: 2742 1 !
: 2743 1 ! 2. If the port/controller times out then the SA Register error bit
: 2744 1 ! is examined for the error bit set. If set then an port fatal
: 2745 1 ! error code is returned to the calling routine else a controller
: 2746 1 ! time out error code is returned.
: 2747 1 !
: 2748 1 ! In all cases, if an error code is returned (bit 0 = 1) then the
: 2749 1 ! routine decode is called to decode the error code and does the
: 2750 1 ! necessary recovery actions.
: 2751 1 !
: 2752 1 ! At the next higher level of return from this routine is another level
: 2753 1 ! of return status returned. This level test the success of the
: 2754 1 ! connection and also test the status field in the returned response
: 2755 1 ! envelope for the success of the controller to successfully complete
: 2756 1 ! the requested command.
: 2757 1 !
: 2757 1 ! Side Effects :

```

ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5-Mar-1984 14:51:26  
5 Mar-1984 14:40:58VAX-11 Bliss 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 2758 1      :      none
: 2759 1      :
: 2760 1      :
: 2761 2      :      begin
: 2762 2
: 2763 2      :      !+
: 2764 2      :      ! Before doing the timeout wait make sure that this buffer location
: 2765 2      :      ! that we're suppose to time out actually contains the command ref
: 2766 2      :      ! number that was sent to us via the formal argument. Error and
: 2767 2      :      ! kick the bucket if not the same.
: 2768 2      :
: 2769 2
: 2770 2      :      if .OUT$STD_BUF [.BUF$LOC, CMD_REF] nequ .REF_NUM      !Is this the same ref_num
: 2771 2      :      then
: 2772 3          :      begin
: 2773 3              :      RET_STATUS = USE_CODE;                !Indicate the error code
: 2774 3              :      DECODE ();                          !Call decode to report the error
: 2775 2              :      end;
: 2776 2
: 2777 2      :      !+
: 2778 2      :      ! Loop on a one micro second delay for the number of times
: 2779 2      :      ! requested by the caller. After each delay see if the flag
: 2780 2      :      ! "rec_flg" has been set yet. Return "Ret_status" and clear the
: 2781 2      :      ! command word to %o'100000' to indicate this command has been
: 2782 2      :      ! received if this flag gets set before the timer expires.
: 2783 2      :      ! Return a error code if the timer expires before the flag gets set.
: 2784 2      :      !-
: 2785 2
: 2786 2      :      incru i from 0 to .TO_VALUE do          !Loop for time-out_value
: 2787 3          :      begin
: 2788 3              :      DELAY (C_US);                        !Do the one micro second delay
: 2789 3              :
: 2790 3              :      ! Exit routine with the DUP interrupt service
: 2791 3              :      ! routines "ret_status" if "rec_flg" got set before
: 2792 3              :      ! the timer expires.
: 2793 3              :
: 2794 3
: 2795 3              :      if .OUT$STD_BUF [.BUF$LOC, REC_FLG] eqlu TRUE      !Is this command received yet
: 2796 3              :      then
: 2797 4                  :      begin
: 2798 4                      :      OUT$STD_BUF [.BUF$LOC, CMD_WRD] = %o'100000';      !Return the slot to the unused state
: 2799 4                      :      return .RET_STATUS;                                !Return the interrupt service status
: 2800 3                  :      end;
: 2801 3
: 2802 3              :      BREAK;                                           !Service any control C's
: 2803 2              :      end;
: 2804 2
: 2805 2      :
: 2806 2      :      ! The port/controller timed out if the code
: 2807 2      :      ! reached here. Return an error code to
: 2808 2      :      ! the caller and exit the routine.
: 2809 2
: 2810 2

```

ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5-Mar-1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Bliss-16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

```

; 2811 2      if .RDRX_ADDR [RCSA, ERR_BIT]      !Is the SA error bit set
; 2812 2      then
; 2813 2          return RET_STATUS = PFE CODE    !Port timed out with fatal error
; 2814 2      else
; 2815 2          return RET_STATUS = CTO_CODE;    !Port just timed out
; 2816 2
; 2817 1      end;
    
```

.GLOBL L\$CPU, L\$DLY

```

000000 004137 000000G      .SBTTL CTO.WAIT GLOBAL ROUTINE DECLARATIONS
                                CTO.WAIT::
000004 024646              JSR      R1,$SAVE3                ;                2705
000006 016600 000016      CMP      -(SP),-(SP)
000012 006300              MOV      16(SP),R0                ; BUF$LOC,*      2770
000014 006300              ASL      R0
000016 012703 000000G      MOV      @OUT$STD.BUF,R3
000022 060003              ADD      R0,R3
000024 005000              CLR      R0
000026 151300              BISB    (R3),R0
000030 020066 000020      CMP      R0,20(SP)                ; *,REF.NUM
000034 001405              BZQ     1$
000036 012737 003001 000000G      MOV      @3001,RET.STATUS        ;                2773
000044 004737 000250'      JSR      PC,DECODE                ;                2774
000050 005002              1$:   CLR      R2                    ; I                2786
000052 000425              BR      8$
000054 013701 000000G      2$:   MOV      L$CPU,R1                ; *,$$TMP2        2788
000060 001411              3$:   BEQ     6$
000062 013700 000000G      MOV      L$DLY,R0                ; *,$$TMP1
000066 001404              BEQ     5$
000070 005066 000002      4$:   CLR      2(SP)                ; $,TMP
000074 005300              DEC      R0                        ; $$TMP1
000076 001374              BNE     4$
000100 005301              5$:   DEC      R1                    ; $$TMP2
000102 000766              BR      3$
000104 005713              6$:   TST     (R3)                    ;                2795
000106 100005              BPL     7$
000110 012713 100000      MOV      @-100000,(R3)            ;                2798
000114 013700 000000G      MOV      RET.STATUS,R0            ;                2797
000120 000421              BR      11$
000122 104422              7$:   TRAP   22                    ;                2800
000124 005202              INC      R2                        ; I                2786
000126 020266 000022      8$:   CMP      R2,22(SP)                ; I,TU.VALUE
000132 101750              BLOS   2$
000134 013700 000000G      MOV      RDRX.ADDR,R0            ;                2811
000140 016016 000002      MOV      2(R0),(SP)                ; *,RC$S.REG
000144 100003              BPL     9$
000146 012700 000021      MOV      @21,R0                    ;                2813
000152 000402              BR      10$
000154 012700 000011      9$:   MOV      @11,R0                ;                2815
    
```

ZRQB4 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX 11 Blines 16 v4.0 579  
DISK:USER2:[YOUNG.FMT]ZRQB4.016;3

000160	010037	000000G	108:	MOV	RO,RET,STATUS
000164	022626		118:	CMF	(SP)-,(SP)-
000166	000207			RTS	PC

;

2705

; Routine Size. 60 words, Routine Base: %CODES - 2116  
; Maximum stack depth per invocation: 8 words

; 2818 1



ZRQ84  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Bliss 16 V4.0 579  
DISKUSER2:([YOUNG.FMT]ZRQ84.B16:3

1 2819 1  
1 2820 1  
1 2821 1  
1 2822 1  
1 2823 1  
1 2824 1  
1 2825 1  
1 2826 1  
1 2827 1  
1 2828 1  
1 2829 1  
1 2830 1  
1 2831 1  
1 2832 1  
1 2833 1  
1 2834 1  
1 2835 1  
1 2836 1  
1 2837 1  
1 2838 1  
1 2839 1  
1 2840 1  
1 2841 1  
1 2842 1  
1 2843 1  
1 2844 1  
1 2845 1  
1 2846 1  
1 2847 1  
1 2848 1  
1 2849 1  
1 2850 1  
1 2851 1  
1 2852 1  
1 2853 1  
1 2854 1  
1 2855 1  
1 2856 1  
1 2857 2  
1 2858 2  
1 2859 2  
1 2860 2  
1 2861 2  
1 2862 2  
1 2863 2  
1 2864 2  
1 2865 2  
1 2866 2  
1 2867 2  
1 2868 2  
1 2869 2  
1 2870 2  
1 2871 2

```

global routine ABORT -           !Aborts remote program

..
Functional Description :
  The abort program command is used to terminate the execution of a
  remote program in an orderly fashion. When a successful response
  is received to this command the remote program has stopped
  executing and the server is in idle state. Note that the sending
  of this command does not preclude further send data or receive data
  exchanges; On the contrary, the remote program may be designed to
  send out termination status and possibly even ask questions during
  its forced-exit sequence. The time out for this command is a fixed
  10 seconds and if a response is not received by then the
  connection to the dust should be terminated. This command is only
  legal if the dust is in active state.

Formal Parameters :
  none

Implicit Inputs :
  NSD_SLOT           This global storage gets loaded by the routine
                    'Get_nsd' and in it is stored the next send ring
                    descriptor slot where the port/controller should
                    be polling on and the place to put this commands
                    command packet.

Implicit Outputs :
  none

Completion Codes :
  RET_STATUS:       Return status passes back to the calling routine
                    the status of the just issued command.

Side Effects :
  Any remote program running in the controllers DM machine will
  be aborted.

begin
  local
    REF_NUM,          !Stores unique cmd ref number
    ABO_BUF$LOC,     !Stores outstanding cmd buffer location
    TEMP;            !A place to put the read IP register data

  ! Before we load up the command packet up
  ! with all this good information get the
  ! next send descriptor slot and a unique
  ! command reference number.

  GET_NSD ();        !Get the next send desc slot
  REF_NUM = GET_CMD$REF (); !Get a unique command ref num

```

```
2872 2
2873 2
2874 2
2875 2 SND_ENVELOPE [.NSD_SLOT, MSG_LENGTH] = SZ ABT;      !Load the length of envelope
2876 2 SND_ENVELOPE [.NSD_SLOT, CREDITS] = ONE;        !Load credits
2877 2 SND_ENVELOPE [.NSD_SLOT, MSG_TYPE] = 0;         !Load message type
2878 2 SND_ENVELOPE [.NSD_SLOT, CONN_ID] = 2;          !Load connection ID
2879 2
2880 2
2881 2
2882 2 SND_ENVELOPE [.NSD_SLOT, CMD_LREF] = .REF_NUM;    !Define reference number
2883 2 SND_ENVELOPE [.NSD_SLOT, CMD_HREF] = ZERO;       !Hi order ref number
2884 2 SND_ENVELOPE [.NSD_SLOT, UN_LUSED] = ZERO;      !Unused low order
2885 2 SND_ENVELOPE [.NSD_SLOT, UN_HUSED] = ZERO;      !Unused hi order
2886 2 SND_ENVELOPE [.NSD_SLOT, OPCODE] = OP_ABT;     !Load opcode
2887 2 SND_ENVELOPE [.NSD_SLOT, RSVD] = ZERO;        !Reserved field
2888 2 SND_ENVELOPE [.NSD_SLOT, MODIFIER] = ZERO;
2889 2
2890 2 ! Call the load outstanding command buffer routine
2891 2 ! and load this command into the buffer. The return
2892 2 ! from this routine will point us to the buffer location
2893 2 ! where this command is stored. Later we can look at
2894 2 ! this location to see if the interrupt service routine
2895 2 ! has received and process it.
2896 2
2897 2 ABO_BUF%LOC = LOAD_OUT%STD BUF (.REF_NUM); !Load the command
2898 2
2899 2 if .ABO_BUF%LOC eqv OBF_CODE then DECODE ();      !Error if buffer is full
2900 2
2901 2
2902 2 ! Set the ownership bit to 1 giving this slot
2903 2 ! to the port/controller
2904 2
2905 2 SEND_RING [.NSD_SLOT, OWN_BIT] = PORT_OWNED;
2906 2
2907 2 ! Read the IP register to stimulate port polling
2908 2
2909 2 TEMP = .RDRX_ADDR [RCIP, RC_ALL];
2910 2
2911 2 ! Time out the port/controller processing the command.
2912 2
2913 2 ! The first test tests the connections ability to
2914 2 ! respond to this command without any errors in the SA
2915 2 ! register and for the command not timing out.
2916 2
2917 2 ! The second tests the DUP server for good status. If
2918 2 ! bad status is sent back then an error code is returned
2919 2 ! to the calling routine where the routine "decode" will
2920 2 ! decode and take the appropriate recovery. The time
2921 2 ! out routine will loop on delaying and checking the hi
2922 2 ! bit of the first word in the out%std_buf for a true.
2923 2 ! When true signals us that the interrupt service routine
2924 2 ! has received the endpacket and no connection errors
```

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Blues 16 V4.0 579  
DISK#USER2:[10UNG.FMT]ZROb4.016;3

ZROB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

```

: 2925 2      ; were detected.
: 2926 2      ;
: 2927 2      ;
: 2928 2      ; if CTO_WAIT (3000, .REF_NUM, .ABO_BUF$LOC) then DECODE (); !Is return an error
: 2929 2      ;
: 2930 2      ;
: 2931 2      ; Get the return envelope address from the out$std_buf
: 2932 2      ; at this commands buffer location and check the packet
: 2933 2      ; for good status error and die if bad status was returned
: 2934 2      ;
: 2935 2      ; RET_EN$AD = .OUT$STD_BUF (.ABO_BUF$LOC, ENV ADR); !Get the ret env adr
: 2936 2      ;
: 2937 2      ; Now test for good status
: 2938 2      ;
: 2939 2      ;
: 2940 2      ; if .RET_EN$AD [STATUS] nequ ZERO          !Test the status
: 2941 2      ; then
: 2942 2      ;     return RET_STATUS = RSE_CODE          !Return a "Response status err" code
: 2943 2      ; else
: 2944 2      ;     return .RET_STATUS;                !This ret_status is good or bad
: 2945 2      ;
: 2946 1      ; end;

```

```

000000 004137 000000G      .SBTTL  ABORT GLOBAL ROUTINE DECLARATIONS
000004 005746      ABORT:: JSR   R1,$SAVE2          ; 2819
000006 004737 000000'     TST   (SP)
000012 004737 000146'     JSR   PC,GET.NSD          ; 2870
000016 010002      JSR   PC,GET.CMD$REF     ; 2871
000020 013746 000000G     MOV   RO,R2              ; *.REF.NUM
000024 012746 000054      MOV   NSD.SLOT,-(SP)     ; 2875
000030 004737 000000G     MOV   #54,-(SP)
000034 012760 000014 000000G JSR   PC,BL$MUL
000042 012701 00002G     MOV   #14,SND.ENVELOPE(RO)
000046 060001      MOV   #SND.ENVELOPE+2,R1 ; 2876
000050 112711 000001      ADD   RO,R1
000054 112761 000002 000001  MOVB  #1,(R1)            ; 2877
000062 010260 000004G     MOVB  #2,1(R1)          ; 2878
000066 005060 000006G     MOV   R2,SND.ENVELOPE+4(RO) ; REF.NUM,*
000072 005060 000010G     CLR   SND.ENVELOPE+6(RO) ; 2882
000076 005060 000012G     CLR   SND.ENVELOPE+10(RO) ; 2883
000102 112760 000006 000014G MOVB  #6,SND.ENVELOPE+14(RO) ; 2884
000110 105060 000015G     CLR   SND.ENVELOPE+12(RO) ; 2885
000114 005060 000016G     CLR   SND.ENVELOPE+15(RO) ; 2886
000120 010216      CLR   SND.ENVELOPE+16(RO) ; 2887
000122 004737 000054'     MOV   R2,(SP)          ; REF.NUM,*
000126 010001      JSR   PC,LOAD.OUT$STD.BUF ; 2897
000130 020127 002001      MOV   RO,R1            ; *.ABO_BUF$LOC
000134 001002      CMP   R1,#2001        ; ABO_BUF$LOC,*
000136 004737 000250'     BNE   1$              ; 2899
000142 013700 000000G     JSR   PC,DECODE
000146 006300 1$:      MOV   NSD.SLOT,RO     ; 2905
                                ASL   RO

```

5 Mar 1984 14:51:26

5 Mar 1984 14:40:58

VAX-11 B11s 16 V4.0 579  
DISK\$USER2:([YOUNG.FMT]ZQ84.B16;3

ZRQ84 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

000150	006300		ASL	R0		
000152	063700	000000G	ADD	SEND.RING,R0		
000156	052760	100000 000002	BIS	#100000,2(R0)		
000164	017766	000000G 000004	MOV	@RDRX.ADDR,4(SP)	: *,RC\$S.REG	2909
000172	016600	000004	MOV	4(SP),R0	: RC\$S.REG,TEMP	
000176	012716	005670	MOV	#5670,(SP)	: REF.NUM,*	2928
000202	010246		MOV	R2,(SP)	: ABO.BUF\$LOC,*	
000204	010146		MOV	R1,(SP)		
000206	004737	002116'	JSR	PC.CTO.WAIT		
000212	022626		CHP	(SP)*,(SP)*		
000214	006000		ROR	R0		
000216	103002		BCC	2\$		
000220	004737	000250'	JSR	PC.DECODE	: ABO.BUF\$LOC,*	2935
000224	010100		MOV	R1,R0		
000226	006300		ASL	R0		
000230	006300		ASL	R0		
000232	016037	000002G 000000G	MOV	OUT\$STD.BUF+2(R0),RET.EN\$AD		
000240	016000	000002G	MOV	OUT\$STD.BUF+2(R0),R0	:	2940
000244	005760	000016	TST	16(R0)		
000250	001405		BEQ	3\$		
000252	012700	000031	MOV	#31,R0	:	2942
000256	010037	000000G	MOV	R0,RET.STATUS	:	2944
000262	000402		BR	4\$		
000264	013700	000000G	MOV	RET.STATUS,R0	:	2819
000270	062706	000006	ADD	#6,SP		
000274	000207		RTS	PC		

; Routine Size: 95 words. Routine Base: \$CODE\$ + 2306  
; Maximum stack depth per invocation: 9 words

; 2947 1

ZRQB4  
 REV C PATCH 0

RDRX DISK FORMATTER  
 GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
 5 Mar 1984 14:40:58

VAX-11 Bliss-16 V4.0 579  
 DISK&USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 2948 1 global routine GET DUST STATUS - !Gets DUP server status
: 2949 1
: 2950 1
: 2951 1 : Functional Description :
: 2952 1 : This command allows the host program to interrogate the DUP server
: 2953 1 : to determine its characteristics, its state and the state of the
: 2954 1 : program currently running (if any). It is legal in either idle or
: 2955 1 : active state and does not affect the state of server. It has a
: 2956 1 : fixed timeout interval of 3 seconds. If the response times out, the
: 2957 1 : host should break the connection.
: 2958 1
: 2959 1 : Formal Parameters :
: 2960 1 : none
: 2961 1
: 2962 1 : Implicit Inputs :
: 2963 1 : NSD_SLOT This global storage gets loaded by the routine
: 2964 1 : 'Get_nsd' and in it is stored the next send ring
: 2965 1 : descriptor slot where the port/controller should
: 2966 1 : be polling on and the place to put this commands
: 2967 1 : command packet.
: 2968 1
: 2969 1 : Implicit Outputs :
: 2970 1 : none
: 2971 1
: 2972 1 : Completion Codes :
: 2973 1 : RET_STATUS: Return status passes back to the calling routine
: 2974 1 : the status of the just issued command.
: 2975 1
: 2976 1 : Side Effects :
: 2977 1 :
: 2978 1
: 2979 2 begin
: 2980 2
: 2981 2 local
: 2982 2 REF_NUM, !Stores unique cmd ref number
: 2983 2 GDS_BUF$LOC, !Stores outstanding cmd buffer location
: 2984 2 TEMP; !A place to put the IP read data
: 2985 2
: 2986 2
: 2987 2 ! Before we load up the command packet up
: 2988 2 ! with all this good information get the
: 2989 2 ! next send descriptor slot and a unique
: 2990 2 ! command reference number.
: 2991 2
: 2992 2 GET_NSD (); !Get the next send desc slot
: 2993 2 REF_NUM = GET_CMD$REF (); !Get a unique command ref num
: 2994 2
: 2995 2 ! UQ Port command envelope Header field definition
: 2996 2
: 2997 2 SND_ENVELOPE [.NSD_SLOT, MSG_LENGTH] = SZ GDS; !Load the envelope size
: 2998 2 SND_ENVELOPE [.NSD_SLOT, CREDITS] = ONE; !Load the credit size
: 2999 2 SND_ENVELOPE [.NSD_SLOT, MSG_TYPE] = 0; !load the message type (Sequential)
: 3000 2 SND_ENVELOPE [.NSD_SLOT, CONN ID] = 2; !Load the connection ID (DUP)

```

```

: 3001 2  |
: 3002 2  | : DUP generic command envelope field definition
: 3003 2  |
: 3004 2  | SND_ENVELOPE [.NSD_SLOT, CMD_LREF] = .REF_NUM;      !Load command reference number
: 3005 2  | SND_ENVELOPE [.NSD_SLOT, CMD_HREF] = ZERO;        !Command reference low order
: 3006 2  | SND_ENVELOPE [.NSD_SLOT, UN_LUSED] = ZERO;        !Low order unused
: 3007 2  | SND_ENVELOPE [.NSD_SLOT, UN_HUSED] = ZERO;        !Hi order unused
: 3008 2  | SND_ENVELOPE [.NSD_SLOT, OPCODE] = OP_GDS;        !Load opcode
: 3009 2  | SND_ENVELOPE [.NSD_SLOT, RSVD] = ZERO;            !Reserved field
: 3010 2  | SND_ENVELOPE [.NSD_SLOT, MODIFIER] = ZERO;        !Load modifier field
: 3011 2  |
: 3012 2  | : Call the load outstanding command buffer routine
: 3013 2  | : and load this command into the buffer. The return
: 3014 2  | : from this routine will point us to the buffer location
: 3015 2  | : where this command is stored. Later we can look at
: 3016 2  | : this location to see if the interrupt service routine
: 3017 2  | : has received and process it.
: 3018 2  |
: 3019 2  | GDS_BUF$LOC = LOAD_OUT$STD_BUF (.REF_NUM); !Load the command
: 3020 2  |
: 3021 2  | if .GDS_BUF$LOC eqv OBF_CODE then DECODE ();      !Error if buffer is full
: 3022 2  |
: 3023 2  |
: 3024 2  | : Set the ownership bit to 1 giving this slot
: 3025 2  | : to the port/controller
: 3026 2  |
: 3027 2  | SEND_RING [.NSD_SLOT, OWN_BIT] = PORT_OWNED;
: 3028 2  |
: 3029 2  | : Read the IP register to stimulate port polling
: 3030 2  |
: 3031 2  | TEMP = .RDRX_ADDR [RCIP, RC_ALL];
: 3032 2  |
: 3033 2  | : Time out the port/controller processing the command.
: 3034 2  |
: 3035 2  | : The first test tests the connections ability to
: 3036 2  | : respond to this command without any errors in the SA
: 3037 2  | : register and for the command not timing out.
: 3038 2  |
: 3039 2  | : The second tests the DUP server for good status. If
: 3040 2  | : bad status is sent back then an error code is returned
: 3041 2  | : to the calling routine where the routine "decode" will
: 3042 2  | : decode and take the appropriate recovery. The time
: 3043 2  | : out routine will loop on delaying and checking the hi
: 3044 2  | : bit of the first word in the out$std_buf for a true.
: 3045 2  | : When true signals us that the interrupt service routine
: 3046 2  | : has received the endpacket and no connection errors
: 3047 2  | : were detected.
: 3048 2  |
: 3049 2  |
: 3050 2  | if CTO WAIT (%0'3000', .REF_NUM, .GDS_BUF$LOC) then DECODE ();      !Is return an error
: 3051 2  |
: 3052 2  |
: 3053 2  | : Get the return envelope address from the out$std buf

```

```

: 3054 2      ! at this commands buffer location and check the packet
: 3055 2      ! for good status error and die if bad status was returned
: 3056 2      !
: 3057 2      RET EN$AD = .OUT$STD BUF [.GDS_BUF$LOC, ENV ADR]; !Get the ret env adr
: 3058 2      !
: 3059 2      ! Now test for good status
: 3060 2      !
: 3061 2      !
: 3062 2      if .RET_EN$AD [STATUS] nequ ZERO          !Test the status
: 3063 2      then
: 3064 2      return RET_STATUS = RSE_CODE            !Return a "Response status err" code
: 3065 2      else
: 3066 2      return .RET_STATUS;                    !This ret status is good or bad
: 3067 2
: 3068 1      end;

```

```

000000 004137 000000G      .SBTTL GET.DUST.STATUS GLOBAL ROUTINE DECLARATIONS
                                GET.DUST.STATUS:
000004 005746              JSR      R1, $SAVE2                ;                2948
000006 004737 000000'      TST      -(SP)                ;                2992
000012 004737 000146'      JSR      PC, GET.NSD                ;                2993
000016 010002              MOV      R0, R2                ; *, REF.NUM
000020 013746 000000G      MOV      NSD.SLOT, -(SP)          ;                2997
000024 012746 000054'      MOV      #54, -(SP)              ;
000030 004737 000000G      JSR      PC, BL$MUL                ;
000034 012760 000014 000000G MOV      #14, SND.ENVELOPE(R0)
000042 012701 000002G      MOV      #SND.ENVELOPE*2, R1      ;                2998
000046 060001              ADD      R0, R1                ;
000050 112711 000001'      MOVB    #1, (R1)                ;                2999
000054 112761 000002 000001 MOVB    #2, 1(R1)                ;                3000
000062 010260 000004G      MOV      R2, SND.ENVELOPE*4(R0)   ; REF.NUM, *    3004
000066 005060 000006G      CLR     SND.ENVELOPE*6(R0)        ;                3005
000072 005060 000010G      CLR     SND.ENVELOPE*10(R0)       ;                3006
000076 005060 000012G      CLR     SND.ENVELOPE*12(R0)       ;                3007
000102 112760 000001 000014G MOVB    #1, SND.ENVELOPE*14(R0)    ;                3008
000110 105060 000015G      CLRB   SND.ENVELOPE*15(R0)        ;                3009
000114 005060 000016G      CLR     SND.ENVELOPE*16(R0)       ;                3010
000120 010216              MOV      R2, (SP)                ; REF.NUM, *    3019
000122 004737 000054'      JSR      PC, LOAD.OUT$STD.BUF
000126 010001              MOV      R0, R1                ; *, GDS.BUF$LOC
000130 020127 002001'      CMP     R1, #2001                ; GDS.BUF$LOC, * 3021
000134 001002              BNE     1$
000136 004737 000250'      JSR      PC, DECODE
000142 013700 000000G      1$: MOV      NSD.SLOT, R0          ;                3027
000146 006300              ASL     R0
000150 006300              ASL     R0
000152 063700 000000G      ADD     SE$D, RING, R0
000156 052760 100000 000002 BIS     #100000, 2(R0)
000164 017766 000000G 000004 MOV      @RDRX.ADDR, 4(SP)         ; *, RC$S.REG    3031
000172 016600 000004'      MOV      4(SP), R0                ; RC$S.REG, TEMP
000176 012716 003000'      MOV      #3000, (SP)              ;                3050

```

ZRQB4 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

5-Mar-1984 14:51:26  
5-Mar-1984 14:40:58

VAX-11 Bliss-16 V4.0-579  
DISK\$USER2:[YOUNG,FMT]ZRQB4.B16;3

000202	010246		MOV	R2,-(SP)	; REF.NUM,*	
000204	010146		MOV	R1,-(SP)	; GDS.BUF\$LOC,*	
000206	004737	002116'	JSR	PC,CTO.WAIT		
000212	022626		CMP	(SP)+,(SP)+		
000214	006000		ROR	R0		
000216	103002		BCC	2#		
000220	004737	000250'	JSR	PC,DECODE		
000224	010100		MOV	R1,R0	; GDS.BUF\$LOC,*	3057
000226	006300		ASL	R0		
000230	006300		ASL	R0		
000232	016037	000002G 000000G	MOV	OUT\$STD.BUF+2(R0),RET.EN\$AD		
000240	016000	000002G	MOV	OUT\$STD.BUF+2(R0),R0		3062
000244	005760	000016	TST	16(R0)		
000250	001405		BEQ	3#		
000252	012700	000031	MOV	\$31,R0		3064
000256	010037	000000G	MOV	R0,RET.STATUS		
000262	000402		BR	4#		3066
000264	013700	000000G	MOV	RET.STATUS,R0		
000270	062706	000006	ADD	\$6,SP		2948
000274	000207		RTS	PC		

; Routine Size: 95 words, Routine Base: \$CODE\$ + 2604  
; Maximum stack depth per invocation: 9 words

; 3069 1



ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5 Mar-1984 14:51:26  
5 Mar-1984 14:40:58

VAX-11 Bliss-16 V4.0-579  
DISK\$USER2:([YOUNG.FMT]ZRQB4.B16;3

: C 3070 1  
: C 3071 1  
: C 3072 1  
: C 3073 1  
: C 3074 1  
: C 3075 1  
: C 3076 1  
: C 3077 1  
: C 3078 1  
: C 3079 1  
: C 3080 1  
: C 3081 1  
: C 3082 1  
: C 3083 1  
: C 3084 1  
: C 3085 1  
: C 3086 1  
: C 3087 1  
: C 3088 1  
: C 3089 1  
: C 3090 1  
: C 3091 1  
: C 3092 1  
: C 3093 1  
: C 3094 1  
: C 3095 1  
: C 3096 1  
: C 3097 1  
: C 3098 1  
: C 3099 1  
: C 3100 1  
: C 3101 1  
: C 3102 1  
: C 3103 1  
: C 3104 1  
: C 3105 1  
: C 3106 1  
: C 3107 1  
: C 3108 1  
: C 3109 1  
: C 3110 1  
: C 3111 1  
: C 3112 1  
: C 3113 1  
: C 3114 1  
: C 3115 1  
: C 3116 1  
: C 3117 1  
: C 3118 1  
: C 3119 1  
: C 3120 1  
: C 3121 1  
: C 3122 1

```

*(
global routine EX SUP_PROG *      !Executes supplied program

!..
! Functional Description :
!   This command causes the server to transfer the program from host
!   memory to an area in the controller and start its execution. The
!   host supplies the address and length (in bytes) of a buffer
!   containing the program header and initial load; the starting
!   of the program, its memory requirements and any relocation information
!   needed to run under the server are in the program header in a format
!   which is none of the host business. This command is only legal when
!   the server is in the idle state and return of a successful end packet
!   puts the server into to active state.
!
!   The time out interval for this command is 30 seconds.
!
! Formal Parameters :
!   none
!
! Implicit Inputs :
!   NSD_SLOT      This global storage gets loaded by the routine
!                 'Get_nsd' and in it is stored the next send ring
!                 descriptor slot where the port/controller should
!                 be polling on and the place to put this commands
!                 command packet.
!
! Implicit Outputs :
!   AZFMTR:      Azfmtr is the vector produced by DMCONV program and
!                 is declared in module AZKEL6.
!   DMSA:        These three bound addresses point to specific area
!   OVSA:        in the DM code buffer 'azfmtr' and are used to
!   MDSA:        define the buffer descriptors within this command.
!
! Completion Codes :
!   RET_STATUS:  Return status passes back to the calling routine
!                 the status of the just issued command.
!
! Side Effects :
!   The DM machine in the controller goes from the idle state to the
!   active state on return of a successful return packet.
!..
begin
local
  REF_NUM,          !Stores unique cmd ref number
  ESP_BUF$LOC,     !Stores outstanding cmd buffer location
  TEMP;            !A place to put the read IP register data
!
! Before we load up the command packet up

```

ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5-Mar-1984 14:51:26  
5 Mar-1984 14:40:58VAX 11 Bliss 16 V4.0-579  
DISK\$USER2:([YOUNG.FMT]ZRQB4.B16;3

```

: C 3123 1      ! with all this good information get the
: C 3124 1      ! next send descriptor slot and a unique
: C 3125 1      ! command reference number.
: C 3126 1      !
: C 3127 1      GET_NSD ();                                !Get the next send desc slot
: C 3128 1      REF_NUM = GET_CMD$REF ();                !Get a unique command ref num
: C 3129 1      !
: C 3130 1      ! UQ Port command envelope Header field definition
: C 3131 1      !
: C 3132 1      SND_ENVELOPE [.NSD_SLOT, MSG_LENGTH] = SZ_ESP;      !Load the message length
: C 3133 1      SND_ENVELOPE [.NSD_SLOT, CREDITS] = ONE;          !Load the credits field
: C 3134 1      SND_ENVELOPE [.NSD_SLOT, MSG_TYPE] = 0;          !Define the msg type 'Sequential'
: C 3135 1      SND_ENVELOPE [.NSD_SLOT, CONN_ID] = 2;          !Define the conection ID as DUP
: C 3136 1      !
: C 3137 1      ! DUP generic command envelope field definition
: C 3138 1      !
: C 3139 1      SND_ENVELOPE [.NSD_SLOT, CMD_LREF] = .REF_NUM;    !Load command ref number
: C 3140 1      SND_ENVELOPE [.NSD_SLOT, CMD_HREF] = ZERO;      !Zero Hi order word of cmd ref
: C 3141 1      SND_ENVELOPE [.NSD_SLOT, UN_LUSED] = ZERO;      !Not used in DUP implimentation
: C 3142 1      SND_ENVELOPE [.NSD_SLOT, UN_HUSED] = ZERO;      !Not used in DUP implimentation
: C 3143 1      SND_ENVELOPE [.NSD_SLOT, OPCODE] = OP_ESP;      !Load the command op-code
: C 3144 1      SND_ENVELOPE [.NSD_SLOT, RSVD] = ZERO;          !Not used
: C 3145 1      SND_ENVELOPE [.NSD_SLOT, MODIFIER] = ZERO;
: C 3146 1      !
: C 3147 1      ! Command specific command envelope field definition
: C 3148 1      !
: C 3149 1      !
: C 3150 1      ! Byte count of initial transfer (from bytes 0-3
: C 3151 1      ! of the program header).
: C 3152 1      !
: C 3153 1      SND_ENVELOPE [.NSD_SLOT, BLO_CNT] = .AZFMTR [WRD0]; !Byte count low word
: C 3154 1      SND_ENVELOPE [.NSD_SLOT, BHI_CNT] = .AZFMTR [WRD1]; !Byte count high word
: C 3155 1      !
: C 3156 1      ! Buffer descriptor definition for initial load. First
: C 3157 1      ! byte of this buffer is byte 0 of program header.
: C 3158 1      !
: C 3159 1      SND_ENVELOPE [.NSD_SLOT, BPA_LO] = MDSA;        !Low unibus adrs <0-15>
: C 3160 1      SND_ENVELOPE [.NSD_SLOT, BPA_HI] = ZERO;        !Unibus adrs bits <16-17>
: C 3161 1      SND_ENVELOPE [.NSD_SLOT, QBUS_EXT] = ZERO;      !Q_bus extention adrs
: C 3162 1      SND_ENVELOPE [.NSD_SLOT, RSV] = ZERO;          !Reserved field
: C 3163 1      SND_ENVELOPE [.NSD_SLOT, UBA_CHAN] = ZERO;      !Unibus adaptor channel number
: C 3164 1      SND_ENVELOPE [.NSD_SLOT, RSV0] = ZERO;          !These next four words are not
: C 3165 1      SND_ENVELOPE [.NSD_SLOT, RSV1] = ZERO;          !used in the DUP implementation
: C 3166 1      SND_ENVELOPE [.NSD_SLOT, RSV2] = ZERO;
: C 3167 1      SND_ENVELOPE [.NSD_SLOT, RSV3] = ZERO;
: C 3168 1      !
: C 3169 1      ! These next field definitions are the same
: C 3170 1      ! as above except they are for the overlay
: C 3171 1      ! buffer descriptors. To make life easy for
: C 3172 1      ! me I'll use the same names and just prefix
: C 3173 1      ! them with a $ for uniqueness.
: C 3174 1      !
: C 3175 1      ! The overlay area immediately follows the

```

ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5-Mar-1984 14:51:26  
5 Mar-1984 14:40:58VAX-11 Bliss 16 V4.0-579  
DISK\$USER2:(YOUNG.FMT)ZRQB4.B16;3

```

; C 3176 1      ! initial load image in the program image.
; C 3177 1      !
; C 3178 1      SND_ENVELOPE [.NSD_SLOT, $BPA_LO] = .OVSA;  !Low unibus adrs <0-15>
; C 3179 1      SND_ENVELOPE [.NSD_SLOT, $BPA_HI] = ZERO;  !Unibus adrs bits <16-17>
; C 3180 1      SND_ENVELOPE [.NSD_SLOT, $QBUS_EXT] = ZERO; !Q_bus extention adrs
; C 3181 1      SND_ENVELOPE [.NSD_SLOT, $RSV] = ZERO;     !Reserved field
; C 3182 1      SND_ENVELOPE [.NSD_SLOT, $UBA_CHAN] = ZERO; !Unibus adaptor channel number
; C 3183 1      SND_ENVELOPE [.NSD_SLOT, $RSV0] = ZERO;   !These next four words are not
; C 3184 1      SND_ENVELOPE [.NSD_SLOT, $RSV1] = ZERO;   !used in the DUP implementation
; C 3185 1      SND_ENVELOPE [.NSD_SLOT, $RSV2] = ZERO;   !
; C 3186 1      SND_ENVELOPE [.NSD_SLOT, $RSV3] = ZERO;   !
; C 3187 1      !
; C 3188 1      ! Call the load outstanding command buffer routine
; C 3189 1      ! and load this command into the buffer. The return
; C 3190 1      ! from this routine will point us to the buffer location
; C 3191 1      ! where this command is stored. Later we can look at
; C 3192 1      ! this location to see if the interrupt service routine
; C 3193 1      ! has received and process it.
; C 3194 1      !
; C 3195 1      ESP_BUF$LOC = LOAD_OUT$STD_BUF (.REF_NUM); !Load the command
; C 3196 1      !
; C 3197 1      if .ESP_BUF$LOC eqlv OBF_CODE then DECODE (); !Error if buffer is full
; C 3198 1      !
; C 3199 1      !
; C 3200 1      ! Set the ownership bit to 1 giving this slot
; C 3201 1      ! to the port/controller
; C 3202 1      !
; C 3203 1      SEND_RING [.NSD_SLOT, OWN_BIT] = PORT_OWNED;
; C 3204 1      !
; C 3205 1      ! Read the IP register to stimulate port polling
; C 3206 1      !
; C 3207 1      TEMP = .RDRX_ADDR [RCIP, RC_ALL];
; C 3208 1      !
; C 3209 1      ! Time out the port/controller processing the command.
; C 3210 1      !
; C 3211 1      ! The first test tests the connections ability to
; C 3212 1      ! respond to this command without any errors in the SA
; C 3213 1      ! register and for the command not timing out.
; C 3214 1      !
; C 3215 1      ! The second tests the DUP server for good status. If
; C 3216 1      ! bad status is sent back then an error code is returned
; C 3217 1      ! to the calling routine where the routine "decode" will
; C 3218 1      ! decode and take the appropriate recovery. The time
; C 3219 1      ! out routine will loop on delaying and checking the hi
; C 3220 1      ! bit of the first word in the out$std_buf for a true.
; C 3221 1      ! When true signals us that the interrupt service routine
; C 3222 1      ! has received the endpacket and no connection errors
; C 3223 1      ! were detected.
; C 3224 1      !
; C 3225 1      !
; C 3226 1      if CTO_WAIT (%o'3000', .REF_NUM, .ESP_BUF$LOC) then DECODE (); !Is return an error
; C 3227 1      !
; C 3228 1      !

```

ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5-Mar-1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Bliss-16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: C 3229 1      ! Get the return envelope address from the out$std_buf
: C 3230 1      ! at this commands buffer location and check the packet
: C 3231 1      ! for good status error and die if bad status was returned
: C 3232 1      !
: C 3233 1      RET_EN$AD = .OUT$STD_BUF [.ESP BUF$LOC, ENV_ADR]; !Get the ret env adr
: C 3234 1      !
: C 3235 1      ! Now test for good status
: C 3236 1      !
: C 3237 1      !
: C 3238 1      if .RET_EN$AD [STATUS] nequ ZERO                !Test the status
: C 3239 1      then
: C 3240 1          return RET_STATUS = RSE CODE                !Return a "Response status err" code
: C 3241 1      else
: C 3242 1          return .RET_STATUS;                          !This ret_status 's good or bad
: C 3243 1      !
: C 3244 1      end;
:   3245 1      )

```

3246 1  
3247 1  
3248 1  
3249 1  
3250 1  
3251 1  
3252 1  
3253 1  
3254 1  
3255 1  
3256 1  
3257 1  
3258 1  
3259 1  
3260 1  
3261 1  
3262 1  
3263 1  
3264 1  
3265 1  
3266 1  
3267 1  
3268 1  
3269 1  
3270 1  
3271 1  
3272 1  
3273 1  
3274 1  
3275 1  
3276 1  
3277 1  
3278 2  
3279 2  
3280 2  
3281 2  
3282 2  
3283 2  
3284 2  
3285 2  
3286 2  
3287 2  
3288 2  
3289 2  
3290 2  
3291 2  
3292 2  
3293 2  
3294 2  
3295 2  
3296 2  
3297 2  
3298 2

```

global routine EX LOC_PROG -      !Executes local program

..
! Functional Description :
! Receipt of this command causes the controller to search its local
! media for the named program, load and execute it. Receipt of a
! successful response by the host means that the program is executing
! and the server is in the active state. The time out value for this
! command is specified in the net dust response

! Formal Parameters :
! none

! Implicit Inputs :
! NSD_SLOT      This global storage gets loaded by the routine
!                'Get_nsd' and in it is stored the next send ring
!                descr ptor slot where the port/controller should
!                be polling on and the place to put this commands
!                command packet.

! Implicit Outputs :
! none

! Completion Codes :
! RET_STATUS:   Return status passes back to the calling routine
!                the status of the just issued command.

! Side Effects :
! The DM machine in the controller goes from the idle state to the
! active state on return of a successful return packet.

begin

local
  REF_NUM,      !Stores unique cmd ref number
  ELP_BUFLOC,  !Stores outstanding cmd buffer location
  TEMP;        !A place to store the read IP register data

! Before we load up the command packet up
! with all this good information get the
! next send descriptor slot and a unique
! command reference number.

GET_NSD ();      !Get the next send desc slot
REF_NUM = GET_CMD&REF (); !Get a unique command ref num

! UQ Port command envelope Header field definition

SND_ENVELOPE [NSD_SLOT, MSG_LEN*H] = SZ ELP;      !Load the message size
SND_ENVELOPE [NSD_SLOT, CREDITS] = ONE;          !Load the credit size
SND_ENVELOPE [NSD_SLOT, MSG_TYPE] = 0;          !Define the msg typ 'Sequential'

```



ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Bliss 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 3352 2      ; were detected.
: 3353 2      ;
: 3354 2      ;
: 3355 2      ; if CTO_WAIT (3000, .REF_NUM, .ELP_BUF$LOC) then DECODE (); !Is return an error
: 3356 2      ;
: 3357 2      ;
: 3358 2      ; Get the return envelope address from the out$std_buf
: 3359 2      ; at this commands buffer location and check the packet
: 3360 2      ; for good status error and die if bad status was returned
: 3361 2      ;
: 3362 2      ; RET_EN$AD = .OUT$STD_BUF [.ELP_BUF$LOC, ENV_ADR]; !Get the ret env adr
: 3363 2      ;
: 3364 2      ; Now test for good status
: 3365 2      ;
: 3366 2      ;
: 3367 2      ; if .RET_EN$AD [STATUS] nequ ZERO          !Test the status
: 3368 2      ; then
: 3369 2      ;     return RET_STATUS = RSE_CODE        !Return a "Response status err" code
: 3370 2      ; else
: 3371 2      ;     return .RET_STATUS;              !This ret status is good or bad
: 3372 2      ;
: 3373 1      ; end;

```

000000	004137	000000G	EX.LOC.PROG	SBTTL	EX.LOC.PROG GLOBAL ROUTINE DECLARATIONS	
			JSR	R1,\$SAVE2	:	3246
000004	005746		TST	-(SP)	:	
000006	004737	000000'	JSR	PC,GET_NSD	:	3291
000012	004737	000146'	JSR	PC,GET_CMD\$REF	:	3292
000016	010002		MOV	R0,R2	:	*,REF_NUM
000020	013746	000000G	MOV	NSD,SLOT,-(SP)	:	3296
000024	012746	000054	MOV	#54,-(SP)	:	
000030	004737	000000G	JSR	PC,BL\$MUL	:	
000034	012760	000060 000000G	MOV	#60,SND.ENVELOPE(R0)	:	
000042	012701	000002G	MOV	#SND.ENVELOPE+2,R1	:	3297
000046	060001		ADD	R0,R1	:	
000050	112711	000001	MOV#B	#1,(R1)	:	3298
000054	112761	000002 000001	MOV#B	#2,1(R1)	:	3299
000062	010260	000004G	MOV	R2,SND.ENVELOPE+4(R0)	:	REF_NUM,*
000066	005060	000006G	CLR	SND.ENVELOPE+6(R0)	:	3304
000072	005060	000010G	CLR	SND.ENVELOPE+10(R0)	:	3305
000076	005060	000012G	CLR	SND.ENVELOPE+12(R0)	:	3306
000102	112760	000003 000014G	MOV#B	#3,SND.ENVELOPE+14(R0)	:	3307
000110	105060	000015G	CLRB	SND.ENVELOPE+15(R0)	:	3308
000114	012760	000001 000016G	MOV	#1,SND.ENVELOPE+16(R0)	:	3309
000122	012760	047506 000020G	MOV	#47506,SND.ENVELOPE+20(R0)	:	3313
000130	012760	046522 000022G	MOV	#46522,SND.ENVELOPE+22(R0)	:	3314
000136	012760	052101 000024G	MOV	#52101,SND.ENVELOPE+24(R0)	:	3315
000144	010216		MOV	R2,(SP)	:	REF_NUM,*
000146	004737	000054'	JSR	PC,LOAD_OUT\$STD_BUF	:	
000152	010001		MOV	R0,R1	:	*,ELP_BUF\$LOC
000154	020127	002001	CMP	R1,#2001	:	ELP_BUF\$LOC,*

ZRQB4 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 B116 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

000160	001002		BNE	1\$		
000162	004737	000250'	JSR	PC,DECODE		
000166	013700	000000G	MOV	NSD.SLOT,RO	:	3332
000172	006300		ASL	RO		
000174	006300		ASL	RO		
000176	063700	000000G	ADD	SEND.RING,RO		
000202	052760	100000 000002	BIS	#100000,2(RO)		
000210	017766	000000G 000004	MOV	@RDRX.ADDR,4(SP)	: *,RC\$S.REG	3336
000216	016600	000004	MOV	4(SP),RO	: RC\$S.REG,TEMP	
000222	012716	005670	MOV	#5670,(SP)	:	3355
000226	010246		MOV	R2,(SP)	: REF.NUM,*	
000230	010146		MOV	R1,(SP)	: ELP.BUF\$LOC,*	
000232	004737	002116'	JSR	PC,CTO.WAIT		
000236	022626		CMP	(SP)*,(SP)*		
000240	006000		ROR	RO		
000242	103002		BCC	2\$		
000244	004737	000250	JSR	PC,DECODE		
000250	010100		MOV	R1,RO	: ELP.BUF\$LOC,*	3362
000252	006300		ASL	RO		
000254	006300		ASL	RO		
000256	016037	000002G 000000G	MOV	OUT\$STD.BUF+2(RO),RET.EN\$AD		
000264	016000	000002G	MOV	OUT\$STD.BUF+2(RO),RO	:	3367
000270	005760	000016	TST	16(RO)		
000274	001405		BEQ	3\$		
000276	012700	000031	MOV	#31,RO	:	3369
000302	010037	000000G	MOV	RO,RET.STATUS		
000306	000402		BR	4\$	:	3371
000310	013700	000000G	MOV	RET.STATUS,RO		
000314	062706	000006	ADD	#6,SP	:	3246
000320	000207		RTS	PC		

! Routine Size: 105 words, Routine Base: \$CODE\$ + 3102  
! Maximum stack depth per invocation: 9 words

! 3374 1



ZRQ84  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26

VAX-11 Bliss 16 V4.0 579

5 Mar 1984 14:40:58

DISK\$USER2:[YOUNG.FMT]ZRQ84.B16;3

```

3375 1 global routine SEND_DATA (mslen) - !Performs host >port communications
3376 1
3377 1
3378 1 : Functional Description :
3379 1 : These commands are used to communicate between the initiating host
3380 1 : program and the remote program. Both send and receive commands
3381 1 : specify a host buffer descriptor and a byte count. In the case of
3382 1 : send data, the information in the buffer is read by the remote program
3383 1 : and a send data response sent back to the host to acknowledge receipt.
3384 1 : In the case of receive data the remote program writes data into the
3385 1 : buffer up to the amount specified by the byte count and then sends a
3386 1 : receive data response to the host to notify it of the transmission.
3387 1
3388 1 : The send data and receive data commands are only legal when the
3389 1 : server is in the active state. If the remote program terminates
3390 1 : abnormally, putting the server back in the idle state, outstanding
3391 1 : send data and receive data commands may be lost. In the event that
3392 1 : the specified timeout interval is exceeded, the host program should
3393 1 : issue a get dust status command to see if the remote program is
3394 1 : still running (is. the dup server is active); if it is, the
3395 1 : progress indicator should be remembered and the timeout interval
3396 1 : should be re-installed. If the second timeout expires without a
3397 1 : response and a second get dust status shows the remote program
3398 1 : having made no progress in the interim then the program should be
3399 1 : considered broken and should be aborted.
3400 1
3401 1 : Formal Parameters :
3402 1 : none
3403 1
3404 1 : Implicit Inputs :
3405 1 : NSD_SLOT This global storage gets loaded by the routine
3406 1 : 'Get_nsd' and in it is stored the next send ring
3407 1 : descriptor slot where the port/controller should
3408 1 : be polling on and the place to put this commands
3409 1 : command packet.
3410 1
3411 1 : Implicit Outputs :
3412 1 : none
3413 1
3414 1 : Completion Codes :
3415 1 : RET_STATUS: Return status passes back to the calling routine
3416 1 : the status of the just issued command.
3417 1
3418 1 : Side Effects :
3419 1 : none
3420 1
3421 1
3422 2 begin
3423 2
3424 2 local
3425 2 REF_NUM, !Stores unique cmd ref number
3426 2 SND_BUF$LOC, !Stores outstanding cmd buffer location
3427 2 TEMP; !A place to put read IP register data

```

```
: 3428 2
: 3429 2
: 3430 2      : Before we load up the command packet up
: 3431 2      : with all this good information get the
: 3432 2      : next send descriptor slot and a unique
: 3433 2      : command reference number.
: 3434 2
: 3435 2      GET_NSD ();                !Get the next send desc slot
: 3436 2      REF_NUM = GET_CMD$REF ();    !Get a unique command ref num
: 3437 2
: 3438 2      : UQ Port command envelope Header field definition
: 3439 2
: 3440 2      SND_ENVELOPE [.NSD_SLOT, MSG_LENGTH] = SZ SED;    !Load the message size
: 3441 2      SND_ENVELOPE [.NSD_SLOT, CREDITS] = ONE;        !Load the credit size
: 3442 2      SND_ENVELOPE [.NSD_SLOT, MSG_TYPE] = 0;         !Define the message typ 'Sequential
: 3443 2      SND_ENVELOPE [.NSD_SLOT, CONN_ID] = 2;          !Define the connection ID 'DUP
: 3444 2
: 3445 2      : DUP generic command envelope field definition
: 3446 2
: 3447 2      SND_ENVELOPE [.NSD_SLOT, CMD_LREF] = .REF_NUM;    !Load command reference number
: 3448 2      SND_ENVELOPE [.NSD_SLOT, CMD_HREF] = ZERO;       !Zero Hi order cmd ref number
: 3449 2      SND_ENVELOPE [.NSD_SLOT, UN_LUSED] = ZERO;      !Not used in DUP implimentation
: 3450 2      SND_ENVELOPE [.NSD_SLOT, UN_HUSED] = ZERO;      !Not used in DUP implimentation
: 3451 2      SND_ENVELOPE [.NSD_SLOT, OPCODE] = OP SED;     !Load this commands op code
: 3452 2      SND_ENVELOPE [.NSD_SLOT, RSVD] = ZERO;         !Not used field
: 3453 2      SND_ENVELOPE [.NSD_SLOT, MODIFIER] = ZERO;     !Define the commands modifiers
: 3454 2
: 3455 2      : Command specific command envelope field definition
: 3456 2
: 3457 2
: 3458 2      : Byte count of transfer
: 3459 2
: 3460 2      SND_ENVELOPE [.NSD_SLOT, BLO_CNT] = .mslen;    !Byte count low word
: 3461 2      SND_ENVELOPE [.NSD_SLOT, BMI_CNT] = ZERO;     !Byte count high word
: 3462 2
: 3463 2      : Buffer descriptor definition
: 3464 2
: 3465 2      SND_ENVELOPE [.NSD_SLOT, BPA_LO] = SND_BUF;    !Buffer physical adrs <0 15>
: 3466 2      SND_ENVELOPE [.NSD_SLOT, BPA_HI] = ZERO;      !Buffer physical adrs bits <16-17>
: 3467 2      SND_ENVELOPE [.NSD_SLOT, QBUS_EXT] = ZERO;    !Q_bus extention adrs
: 3468 2      SND_ENVELOPE [.NSD_SLOT, RSV] = ZERO;        !Reserved field
: 3469 2      SND_ENVELOPE [.NSD_SLOT, UBA_CHAN] = ZERO;    !Unibus adaptor channel number
: 3470 2      SND_ENVELOPE [.NSD_SLOT, RSV0] = ZERO;       !These next four words are not
: 3471 2      SND_ENVELOPE [.NSD_SLOT, RSV1] = ZERO;       !used in the UQ Port implimentation
: 3472 2      SND_ENVELOPE [.NSD_SLOT, RSV2] = ZERO;
: 3473 2      SND_ENVELOPE [.NSD_SLOT, RSV3] = ZERO;
: 3474 2
: 3475 2      : Call the load outstanding command buffer routine
: 3476 2      : and load this command into the buffer. The return
: 3477 2      : from this routine will point us to the buffer location
: 3478 2      : where this command is stored. Later we can look at
: 3479 2      : this location to see if the interrupt service routine
: 3480 2      : has received and process it.
```

ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58VAX-11 Bliss 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 3481 2      !
: 3482 2      SND BUF$LOC = LOAD_OUT$STD BUF (.REF_NUM); !Load the command
: 3483 2
: 3484 2      if .SND_BUF$LOC ealu OBF_CODE then DECODE ();      !Error if buffer is full
: 3485 2
: 3486 2      !
: 3487 2      ! Set the ownership bit to 1 giving this slot
: 3488 2      ! to the port/controller
: 3489 2
: 3490 2      SEND RING [.NSD_SLOT, OWN_BIT] = PORT_OWNED;
: 3491 2
: 3492 2      ! Read the IP register to stimulate port polling
: 3493 2
: 3494 2      TEMP = .RDRX_ADDR [RCIP, RC_ALL];
: 3495 2
: 3496 2      !
: 3497 2      ! Time out the port/controller for the response from this
: 3498 2      ! command.
: 3499 2
: 3500 2      ! If the controller times out then:
: 3501 2      ! 1. See what kind of error was returned. If the error
: 3502 2      ! is a type other than a CTO_CODE (controller time out)
: 3503 2      ! then call routine Decode which does the appropriate
: 3504 2      ! action based on the error.
: 3505 2
: 3506 2      ! 2. If the returned error is an CTO_CODE then do a get
: 3507 2      ! dust status and check the progress indicator to look
: 3508 2      ! for an increase, indicating that the remote program is
: 3509 2      ! still running and is not dead.
: 3510 2
: 3511 2      ! If the indicator hasn't changed then assume that the
: 3512 2      ! remote program is dead and return an error code of
: 3513 2      ! RPD_CODE (remote program dead code) and exit.
: 3514 2
: 3515 2      ! If the indicator has changed then assume that the
: 3516 2      ! remote program is still running, save a copy of its
: 3517 2      ! value and reinstate the controller time out delay and
: 3518 2      ! repeat the loop.
: 3519 2
: 3520 2      ! As long as the progress indicator in the remote program
: 3521 2      ! is still increasing this loop will be repeated for ever.
: 3522 2
: 3523 2      ! If the controller doesn't time then return with the return
: 3524 2      ! code returned from routine CTO_WAIT () which could be either
: 3525 2      ! a success or error code by definition of this host code.
: 3526 2
: 3527 2      !
: 3528 2      while TRUE do      !Repeat for ever
: 3529 3      begin
: 3530 3      BREAK;      !Flag control C's
: 3531 3      !
: 3532 3      ! Do a controller time out and determine if the controller
: 3533 3      ! has processed the command or if a fatal error has occurred.

```

ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5 Mar-1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Bliss 16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 3534 3      !
: 3535 3
: 3536 3      if CTO_WAIT (3000, .REF_NUM, .SND_BUF$LOC)      !Is return an error
: 3537 3      then
: 3538 4          begin
: 3539 4          !
: 3540 4          ! If the return status code eq's a CTO_CODE
: 3541 4          ! then see if the remote program is still
: 3542 4          ! running. If it is then save the progress
: 3543 4          ! indicator and repeat the loop else call
: 3544 4          ! routine Decode ().
: 3545 4          !
: 3546 4
: 3547 4          if .RET_STATUS eq'u CTO_CODE      !Is this a controller time out
: 3548 4          then
: 3549 5              begin
: 3550 5
: 3551 5                  REF_NUM = .REF_NUM;
: 3552 5
: 3553 5
: 3554 5                  if GET_DUST STATUS () then DECODE ();      !Get the dust status
: 3555 5
: 3556 5
: 3557 5
: 3558 5                  if .RET_EN$AD [PLO_IND] gtru .PID_SAVE      !Any progress been made
: 3559 5                  then
: 3560 5                      PID_SAVE = .RET_EN$AD [PLO_IND]      !Still running save Pid
: 3561 5                  else
: 3562 5                      return RET_STATUS = RPD_CODE;      !No progress so flag error
: 3563 5                  end
: 3564 4          else
: 3565 4          !
: 3566 4          ! The return status code was not a controller time
: 3567 4          ! out code so something else is wrong. Call the
: 3568 4          ! routine Decode () to find out what went wrong.
: 3569 4          !
: 3570 4          DECODE ()
: 3571 4
: 3572 4          end
: 3573 3      else
: 3574 4          begin
: 3575 4          !
: 3576 4          ! The command has been received by the interrupt service.
: 3577 4          !
: 3578 4          ! Get this commands return envelope address out of the
: 3579 4          ! out$std_buf and check for good return status error and
: 3580 4          ! die if bad status.
: 3581 4          !
: 3582 4          RET_EN$AD = .OUT$STD_BUF [.SND_BUF$LOC, ENV_ADR];      !Get the ret env adr
: 3583 4          !
: 3584 4          ! Test for good status
: 3585 4          !
: 3586 4

```

ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5-Mar-1984 14:51:26  
5 Mar-1984 14:40:58

VAX-11 Blues 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 3587 4      if .RET EN$AD [STATUS] nequ ZERO      !Test the status
: 3588 4      then
: 3589 4          return RET STATUS + RSE CODE      !Return a "Response status err" code
: 3590 4      else
: 3591 4          return .RET_STATUS;              !This ret_status is good or bad
: 3592 4
: 3593 3      end;
: 3594 3
: 3595 2      end;
: 3596 2
: 3597 2      return .RET_STATUS;                  !It won't compile without this here
: 3598 1      end;
    
```

```

000000 004137 000000G      .SBTTL SEND.DATA GLOBAL ROUTINE DECLARATIONS
SEND.DATA:
000004 005746      JSR      R1,$SAVE2      ;      3375
000006 004737 000000'      TST      -(SP)
000012 004737 000146'      JSR      PC,GET.NSD      ;      3435
000016 010002      JSR      PC,GET.CMD$REF      ;      3436
000020 013746 000000G      MOV      R0,R2      ; *,REF.NUM
000024 012746 000054      MOV      NSD.SLOT,-(SP)      ;      3440
000030 004737 000000G      MOV      #54,-(SP)
000034 012760 000034 000000G      JSR      PC,BL$MUL
000042 012701 000002G      MOV      #34,SND.ENVELOPE(R0)
000046 060001      MOV      #SND.ENVELOPE+2,R1      ;      3441
000050 112711 000001      ADD      R0,R1
000054 112761 000002 000001      MOV      #1,(R1)      ;      3442
000062 010260 000004G      MOV      #2,1(R1)      ;      3443
000066 005060 000006G      MOV      R2,SND.ENVELOPE+4(R0)      ; REF.NUM,*      3447
000072 005060 000010G      CLR      SND.ENVELOPE+6(R0)      ;      3448
000076 005060 000012G      CLR      SND.ENVELOPE+10(R0)      ;      3449
000102 112760 000004 000014G      CLR      SND.ENVELOPE+12(R0)      ;      3450
000110 105060 000015G      MOV      #4,SND.ENVELOPE+14(R0)      ;      3451
000114 005060 000016G      CLR      SND.ENVELOPE+15(R0)      ;      3452
000120 016660 000016 000020G      CLR      SND.ENVELOPE+16(R0)      ;      3453
000126 005060 000022G      MOV      16(SP),SND.ENVELOPE+20(R0)      ; MSLEN,*      3460
000132 012760 000000G 000024G      CLR      SND.ENVELOPE+22(R0)      ;      3461
000140 012701 000026G      MOV      #SND.BUF,SND.ENVELOPE+24(R0)      ;      3465
000144 060001      MOV      #SND.ENVELOPE+26,R1      ;      3466
000146 105011      ADD      R0,R1
000150 105061 000001      CLR      (R1)      ;      3468
000154 005060 000030G      CLR      1(R1)      ;      3469
000160 005060 000032G      CLR      SND.ENVELOPE+30(R0)      ;      3470
000164 005060 000034G      CLR      SND.ENVELOPE+32(R0)      ;      3471
000170 005060 000036G      CLR      SND.ENVELOPE+34(R0)      ;      3472
000174 010216      CLR      SND.ENVELOPE+36(R0)      ;      3473
000176 004737 000054'      MOV      R2,(SP)      ; REF.NUM,*      3482
000202 010001      JSR      PC,LOAD.OUT$STD.BUF
000204 020127 002001      MOV      R0,R1      ; *,SND.BUF$LOC
000210 001002      CMP      R1,#2001      ; SND.BUF$LOC,*      3484
000212 004737 000250'      BNE      1$
      JSR      PC,DECODE
    
```

ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5 Mar-1984 14:51:26  
5 Mar-1984 14:40:58

VAX-11 Bias-16 V4.0-579  
DISK#USER2:[YOUNG.FMT]ZRQB4.B16;3

000216	013700	000000G	1\$:	MOV	NSD.SLOT,RO	:	3490
000222	006300			ASL	RO		
000224	006300			ASL	RO		
000226	063700	000000G		ADD	SEND.RING,RO		
000232	052760	100000 000002		BIS	#100000,2(RO)		
000240	017766	000000G 000004		MOV	#RDRX.ADDR,4(SP)	; #,RC#S.REG	3494
000246	016600	000004		MOV	4(SP),RO	; RC#S.REG,TEMP	
000252	104422		2\$:	TRAP	22	:	3529
000254	012716	005670		MOV	#5670,(SP)	:	3536
000260	010246			MOV	R2,-(SP)	; REF.NUM,#	
000262	010146			MOV	R1,-(SP)	; SND.BUF#LOC,#	
000264	004737	002116'		JSR	PC,CTO.WAIT		
000270	022626			CMP	(SP)+,(SP)+		
000272	006000			ROR	RO		
000274	103032			BCC	6\$		
000276	023727	000000G 000011		CMP	RET.STATUS,#11	:	3547
000304	001023			BNE	5\$		
000306	004737	002604'		JSR	PC,GET.DUST.STATUS	:	3554
000312	006000			ROR	RO		
000314	103002			BCC	3\$		
000316	004737	000250'		JSR	PC,DECODE		
000322	013700	000000G	3\$:	MOV	RET.EN#AD,RO	:	3558
000326	026037	000024 000000G		CMP	24(RO),PID.SAVE		
000334	101404			BLOS	4\$		
000336	016037	000024 000000G		MOV	24(RO),PID.SAVE	:	3560
000344	000742			BR	2\$	:	3558
000346	012700	000051	4\$:	MOV	#51,RO	:	3562
000352	000420			BR	7\$		
000354	004737	000250'	5\$:	JSR	PC,DECODE	:	3570
000360	000734			BR	2\$	:	3536
000362	010100		6\$:	MOV	R1,RO	; SND.BUF#LOC,#	3582
000364	006300			ASL	RO		
000366	006300			ASL	RO		
000370	016037	000002G 000000G		MOV	OUT#STD.BUF+2(RO),RET.EN#AD		
000376	016000	000002G		MOV	OUT#STD.BUF+2(RO),RO	:	3587
000402	005760	000016		TST	16(RO)		
000406	001405			BEQ	8\$		
000410	012700	000031		MOV	#31,RO	:	3589
000414	010037	000000G	7\$:	MOV	RO,RET.STATUS		
000420	000402			BR	9\$	:	3591
000422	013700	000000G	8\$:	MOV	RET.STATUS,RO		
000426	062706	000006	9\$:	ADD	#6,SP	:	3375
000432	000207			RTS	PC		

; Routine Size: 142 words, Routine Base: \$CODE\$ + 3424  
; Maximum stack depth per invocation: 9 words

; 3599 1

ZRQB4  
REV C PATCH 0

RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 Bliss 16 V4.0-579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.B16;3

```

: 3600 1 global routine REC_DATA : !Performs host >port communications
: 3601 1
: 3602 1
: 3603 1 : Functional Description :
: 3604 1 : These commands are used to communicate between the initiating host
: 3605 1 : program and the remote program. Both send and receive commands
: 3606 1 : specify a host buffer descriptor and a byte count. In the case of
: 3607 1 : send data, the information in the buffer is read by the remote program
: 3608 1 : and a send data response sent back to the host to acknowledge receipt.
: 3609 1 : In the case of receive data the remote program writes data into the
: 3610 1 : buffer up to the amount specified by the byte count and then sends a
: 3611 1 : receive data response to the host to notify it of the transmission.
: 3612 1
: 3613 1 : The send data and receive data commands are only legal when the
: 3614 1 : server is in the active state. If the remote program terminates
: 3615 1 : abnormally, putting the server back in the idle stae, outstanding
: 3616 1 : send data and receive data commands may be lost. In the event that
: 3617 1 : the specified timeout interval is exceeded, the host program should
: 3618 1 : issue a get_dus' staus command to see if the remote program is
: 3619 1 : still running (is. the dup server is active); if it is, the
: 3620 1 : progress indicator should be remembered and the timeout interval
: 3621 1 : should be re-installed. If the second timeout expires without a
: 3622 1 : response and a second get dust status shows the remote program
: 3623 1 : having made no progress in the interim then the program should be
: 3624 1 : considered broken and should be aborted.
: 3625 1
: 3626 1 : Formal Parameters :
: 3627 1 : none
: 3628 1
: 3629 1 : Implicit Inputs :
: 3630 1 : NSD_SLOT This global storage gets loaded by the routine
: 3631 1 : 'Get_nsd' and in it is stored the next send ring
: 3632 1 : descriptor slot where the port/controller should
: 3633 1 : be polling on and the place to put this commands
: 3634 1 : command packet.
: 3635 1
: 3636 1 : Implicit Outputs :
: 3637 1 : none
: 3638 1
: 3639 1 : Completion Codes :
: 3640 1 : RET_STATUS: Return status passes back to the calling routine
: 3641 1 : the status of the just issued command.
: 3642 1
: 3643 1 : Side Effects :
: 3644 1 : none
: 3645 1 : --
: 3646 1
: 3647 2 begin
: 3648 2
: 3649 2 local
: 3650 2 REF_NUM, !Stores unique cmd ref number
: 3651 2 REC_BUF$LOC, !Stores out$standing cmd buffer locat'on
: 3652 2 TEMP; !A place to put read IP register data

```

```

: 3653 2
: 3654 2
: 3655 2
: 3656 2
: 3657 2
: 3658 2
: 3659 2
: 3660 2
: 3661 2
: 3662 2
: 3663 2
: 3664 2
: 3665 2
: 3666 2
: 3667 2
: 3668 2
: 3669 2
: 3670 2
: 3671 2
: 3672 2
: 3673 2
: 3674 2
: 3675 2
: 3676 2
: 3677 2
: 3678 2
: 3679 2
: 3680 2
: 3681 2
: 3682 2
: 3683 2
: 3684 2
: 3685 2
: 3686 2
: 3687 2
: 3688 2
: 3689 2
: 3690 2
: 3691 2
: 3692 2
: 3693 2
: 3694 2
: 3695 2
: 3696 2
: 3697 2
: 3698 2
: 3699 2
: 3700 2
: 3701 2
: 3702 2
: 3703 2
: 3704 2
: 3705 2

!
! Before we load up the command packet up
! with all this good information get the
! next send descriptor slot and a unique
! command reference number.
!
GET_NSD (); !Get the next send desc slot
REF_NUM = GET_CMD$REF (); !Get a unique command ref num
!
! UQ Port command envelope Header field definition
!
SND_ENVELOPE [.NSD_SLOT, MSG_LENGTH] = SZ_RED; !Load message length
SND_ENVELOPE [.NSD_SLOT, CREDITS] = ONE; !Load credit size
SND_ENVELOPE [.NSD_SLOT, MSG_TYPE] = 0; !Define message type 'Sequential'
SND_ENVELOPE [.NSD_SLOT, CONN_ID] = 2; !Define connection ID 'DUP'
!
! DUP generic command envelope field definition
!
SND_ENVELOPE [.NSD_SLOT, CMD_LREF] = .REF_NUM; !Load command reference number
SND_ENVELOPE [.NSD_SLOT, CMD_HREF] = ZERO; !Zero Hi order cmd ref num
SND_ENVELOPE [.NSD_SLOT, UN_LUSED] = ZERO; !Not used in DUP implimentation
SND_ENVELOPE [.NSD_SLOT, UN_MUSED] = ZERO; !Not used in DUP implimentation
SND_ENVELOPE [.NSD_SLOT, OPCODE] = OP_RED; !Load this commands op-code
SND_ENVELOPE [.NSD_SLOT, RSVD] = ZERO; !Not used field
SND_ENVELOPE [.NSD_SLOT, MODIFIER] = ZERO; !Define this commands modifiers
!
! Command specific command envelope field definition
!
!
! Byte count of transfer
!
SND_ENVELOPE [.NSD_SLOT, BLO_CNT] = RECB_SIZE; !Byte count low word
SND_ENVELOPE [.NSD_SLOT, BHI_CNT] = ZERO; !Byte count high word
!
! Buffer descriptor definition
!
SND_ENVELOPE [.NSD_SLOT, BPA_LO] = REC_BUF; !Low unibus adrs <0-15>
SND_ENVELOPE [.NSD_SLOT, BPA_HI] = ZERO; !Unibus adrs bits <16-17>
SND_ENVELOPE [.NSD_SLOT, QBUS_EXT] = ZERO; !Q_bus extention adrs
SND_ENVELOPE [.NSD_SLOT, RSV] = ZERO; !Reserved field
SND_ENVELOPE [.NSD_SLOT, UBA_CHAN] = ZERO; !Unibus adaptor channel number
SND_ENVELOPE [.NSD_SLOT, RSV0] = ZERO; !These next four words are not
SND_ENVELOPE [.NSD_SLOT, RSV1] = ZERO; !used in the UQ Port implimentation
SND_ENVELOPE [.NSD_SLOT, RSV2] = ZERO; !
SND_ENVELOPE [.NSD_SLOT, RSV3] = ZERO; !
!
! Call the load outstanding command buffer routine
! and load this command into the buffer. The return
! from this routine will point us to the buffer location
! where this command is stored. Later we can look at
! this location to see if the interrupt service routine
! has received and process it.

```



ZRQB4  
REV C PATCH 0RDRX DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar-1984 14:51:26  
5-Mar-1984 14:40:58VAX-11 Bliss-16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZRQB4.816;3

```

: 3706 2      !
: 3707 2      REC_BUF$LOC = LOAD_OUT$STD_BUF (.REF_NUM); !Load the command
: 3708 2
: 3709 2      if .REC_BUF$LOC ealu OBF CODE then DECODE ();      !Error if buffer is full
: 3710 2
: 3711 2      !
: 3712 2      ! Set the ownership bit to 1 giving
: 3713 2      ! this slot to the port/controller
: 3714 2      !
: 3715 2      SEND_RING [.NSD_SLOT, OWN_BIT] = PORT OWNED;
: 3716 2      !
: 3717 2      ! Read the IP register to stimulate port polling
: 3718 2
: 3719 2      TEMP = .RDRX_ADDR [RCIP, RC_ALL];
: 3720 2
: 3721 2      !
: 3722 2      ! Time out the port/controller for the response from this command.
: 3723 2
: 3724 2      ! If the controller times out then:
: 3725 2      ! 1. See what kind of error was returned. If the error
: 3726 2      ! is a type other than a CTO_CODE (controller time out)
: 3727 2      ! then call routine Decode which does the appropriate
: 3728 2      ! action based on the error.
: 3729 2
: 3730 2      ! 2. If the returned error is an CTO_CODE then do a get
: 3731 2      ! dust status and check the progress indicator to look
: 3732 2      ! for an increase, indicating that the remote program is
: 3733 2      ! still running and is not dead.
: 3734 2
: 3735 2      ! If the indicator hasn't changed then assume that the
: 3736 2      ! remote program is dead and return an error code of
: 3737 2      ! RPD_CODE (remote program dead code) and exit.
: 3738 2
: 3739 2      ! If the indicator has changed then assume that the
: 3740 2      ! remote program is still running, save a copy of its
: 3741 2      ! value and reinstate the controller time out delay and
: 3742 2      ! repeat the loop.
: 3743 2
: 3744 2      ! As long as the progress indicator in the remote program
: 3745 2      ! is still increasing this loop will be repeated for ever.
: 3746 2
: 3747 2      ! If the controller doesn't time then return with the return code
: 3748 2      ! returned from routine CTO_WAIT () which could be either a success
: 3749 2      ! or error code by definition of this host code.
: 3750 2      !
: 3751 2
: 3752 2      while TRUE do      !Repeat for ever
: 3753 3      begin
: 3754 3      BREAK;      !Flag control C's
: 3755 3      !
: 3756 3      ! Do a controller time out and determine if the controller
: 3757 3      ! has processed the command or if a fatal error has occurred.
: 3758 3

```

```

3759 3
3760 3
3761 3
3762 4
3763 4
3764 4
3765 4
3766 4
3767 4
3768 4
3769 4
3770 4
3771 4
3772 4
3773 5
3774 5
3775 5
3776 5
3777 5
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3781 5
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3786 5
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3788 4
3789 4
3790 4
3791 4
3792 4
3793 4
3794 4
3795 4
3796 3
3797 4
3798 4
3799 4
3800 4
3801 4
3802 4
3803 4
3804 4
3805 4
3806 4
3807 4
3808 4
3809 4
3810 4
3811 4

: IF CTO_WAIT (3000, .REF_NUM, .REC_BUF$LOC)      !Is return an error
: THEN
:   BEGIN
:   : If the return status code eq's a CTO_CODE
:   : then see if the remote program is still
:   : running. If it is then save the progress
:   : indicator and repeat the loop else call
:   : routine Decode ().
:   :
:   IF .RET_STATUS eq'u CTO_CODE      !Is this a controller time out
:   THEN
:     BEGIN
:       REF_NUM = .REF_NUM;
:
:       IF GET_DUST_STATUS () THEN DECODE ();      !Get the dust status
:
:       IF .RET_ENV$AD [PLO_IND] neq .PID_SAVE      !Any progress been made
:       THEN
:         PID_SAVE = .RET_ENV$AD [PLO_IND]      !Still running save Pid
:       ELSE
:         RETURN RET_STATUS = RPD_CODE;      !No progress so flag error
:
:       END
:     ELSE
:       : The return status code was not a controller time
:       : out code so something else is wrong. Call the
:       : routine Decode () to find out what went wrong.
:       :
:       DECODE ()
:
:     END
:   ELSE
:     BEGIN
:       : The command has been received by the interrupt service.
:       :
:       : Get this commands return envelope address out of the
:       : outstd_buf and check for good return status error and
:       : die if bad status.
:       :
:       RET_ENV$AD = .OUTSTD_BUF [.REC_BUF$LOC, ENV_ADR];      !Get the ret env adr
:       :
:       : Test for good status
:       :
:       IF .RET_ENV$AD [STATUS] neq'u ZERO      !Test the status
:       THEN

```

```

: 3812 4      return RET STATUS - RSE CODE      !Return a "Response status err" code
: 3813 4      else
: 3814 4      return .RET STATUS;              !This ret status is good or bad
: 3815 4
: 3816 3      end;
: 3817 3
: 3818 2      end;
: 3819 2
: 3820 2      return .RET STATUS;              !It won't compile without this here
: 3821 1      end;

```

			.SBTTL	REC.DATA	GLOBAL ROUTINE DECLARATIONS	
000000	004137	000000G	REC.DATA::			
			JSR	R1,\$SAVE2	:	3600
			TST	-(SP)		
000004	005746		JSR	PC,GET.NSD	:	3660
000006	004737	000000	JSR	PC,GET.CMD\$REF	:	3661
000012	004737	000146'	MOV	R0,R2	: *,REF.NUM	
000016	010002		MOV	NSD.SLOT,-(SP)	:	3665
000020	013746	000000G	MOV	#54,-(SP)		
000024	012746	000054	JSR	PC,BL\$MUL		
000030	004737	000000G	MOV	#34,SND.ENVELOPE(R0)		
000034	012760	000034 000000G	MOV	#SND.ENVELOPE*2,R1	:	3666
000042	012701	000002G	ADD	R0,R1		
000046	060001		MOVB	#1,(R1)	:	3667
000050	112711	000001	MOVB	#2,1(R1)	:	3668
000054	112761	000002 000001	MOV	R2,SND.ENVELOPE*4(R0)	: REF.NUM,*	3672
000062	010260	000004G	CLR	SND.ENVELOPE*6(R0)	:	3673
000066	005060	000006G	CLR	SND.ENVELOPE*10(R0)	:	3674
000072	005060	000010G	CLR	SND.ENVELOPE*12(R0)	:	3675
000076	005060	000012G	CLR	SND.ENVELOPE*14(R0)	:	3676
000102	112760	000005 000014G	CLR	SND.ENVELOPE*15(R0)	:	3677
000110	105060	000015G	CLR	SND.ENVELOPE*16(R0)	:	3678
000114	005060	000016G	MOV	#170,SND.ENVELOPE*20(R0)	:	3685
000120	012760	000170 000020G	CLR	SND.ENVELOPE*22(R0)	:	3686
000126	005060	000022G	MOV	#REC.BUF,SND.ENVELOPE*24(R0)	:	3690
000132	012760	000000G 000024G	MOV	#SND.ENVELOPE*26,R1	:	3691
000140	012701	000026G	ADD	R0,R1		
000144	060001		CLRB	(R1)	:	3693
000146	105011		CLRB	1(R1)	:	3694
000150	105061	000001	CLR	SND.ENVELOPE*30(R0)	:	3695
000154	005060	000030G	CLR	SND.ENVELOPE*32(R0)	:	3696
000160	005060	000032G	CLR	SND.ENVELOPE*34(R0)	:	3697
000164	005060	000034G	CLR	SND.ENVELOPE*36(R0)	:	3698
000170	005060	000036G	MOV	R2,(SP)	: REF.NUM,*	3707
000174	010216		JSR	PC,LOAD.OUT\$STD.BUF		
000176	004737	000054'	MOV	R0,R1	: *,REC.BUF\$LOC	
000202	010001		CMP	R1,#2001	: REC.BUF\$LOC,*	3709
000204	020127	002001	BNE	1\$		
000210	001002		JSR	PC,DECODE		
000212	004737	000250'	MOV	NSD.SLOT,R0	:	3715
000216	013700	000000G	ASL	R0		
000222	006300					

ZRQ84 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 B1: 16 V4.0 579  
DISK\$USER2: [YOUNG.FMT]ZRQ84.B1: 3

000224	006300		ASL	R0		
000226	063700	000000G	ADD	SEND.RING,R0		
000232	052760	100000 000002	BIS	#100000,2(R0)		
000240	017766	000000G 000004	MOV	#RDRX.ADDR,4(SP)	:	* ,RC\$S.REG 5719
000246	016600	000004	MOV	4(SP),R0	:	RC\$S.REG,TEMP
000252	104422		TRAP	22	:	3753
000254	012716	005670	MOV	#5670,(SP)	:	3760
000260	010246		MOV	R2,-(SP)	:	REF.NUM,*
000262	010146		MOV	R1,-(SP)	:	REC.BUF\$LOC,*
000264	004737	002116'	JSR	PC,CTO.WAIT		
000270	027626		CMP	(SP),,(SP)*		
000272	006000		ROR	R0		
000274	103032		BCC	6\$		
000276	023727	000000G 000011	CMP	RET.STATUS,#11	:	3771
000304	001023		BNE	5\$		
000306	004737	002604	JSR	PC,GET.DUST.STATUS	:	3778
000312	006000		ROR	R0		
000314	103002		BCC	3\$		
000316	004737	000250'	JSR	PC,DECODE		
000322	013700	000000G	MOV	RET.EN\$AD,R0	:	3780
000326	026037	000024 000000G	CMP	24(R0),PID.SAVE		
000334	001404		BEQ	4\$		
000336	016037	000024 000000G	MOV	24(R0),PID.SAVE	:	3782
000344	000742		BR	2\$	:	3780
000346	012700	000051	MOV	#51,R0	:	3784
000352	000420		BR	7\$		
000354	004737	000250	JSR	PC,DECODE	:	3793
000360	000734		BR	2\$	:	3760
000362	010100		MOV	R1,R0	:	REC.BUF\$LOC,* 3805
000364	006300		ASL	R0		
000366	006300		ASL	R0		
000370	016037	000002G 000000G	MOV	OUT\$STD.BUF+2(R0),RET.EN\$AD		
000376	016000	000002G	MOV	OUT\$STD.BUF+2(R0),R0	:	3810
000402	005760	000016	TST	16(R0)		
000406	001405		BEQ	8\$		
000410	012700	000031	MOV	#31,R0	:	3812
000414	010037	000000G	MOV	R0,RET.STATUS		
000420	000402		BR	9\$	:	3814
000422	013700	000000G	MOV	RET.STATUS,R0		
000426	062706	000006	ADD	#6,SP	:	3600
000432	000207		RTS	PC		

; Routine Size: 142 words, Routine Base: \$CODE\$ + 4060  
; Maximum stack depth per invocation: 9 words

; 3822 1

ZROB4  
REV C PATCH 0RDRx DISK FORMATTER  
GLOBAL ROUTINE DECLARATIONS5 Mar 1984 14:51:26  
5 Mar-1984 14:40:58VAX 11 Bliss 16 V4.0 579  
DISK#USER2:[YOUNG.FMT]ZROB4.B16;3

```

: 3823 1 global routine SET_CNTRLR CHAR      !Sets control characteristics
: 3824 1
: 3825 1
: 3826 1
: 3827 1
: 3828 1
: 3829 1
: 3830 1
: 3831 1
: 3832 1
: 3833 1
: 3834 1
: 3835 1
: 3836 1
: 3837 1
: 3838 1
: 3839 1
: 3840 1
: 3841 1
: 3842 1
: 3843 1
: 3844 1
: 3845 1
: 3846 1
: 3847 1
: 3848 1
: 3849 1
: 3850 1
: 3851 1
: 3852 1
: 3853 1
: 3854 1
: 3855 1
: 3856 1
: 3857 1
: 3858 2
: 3859 2
: 3860 2
: 3861 2
: 3862 2
: 3863 2
: 3864 2
: 3865 2
: 3866 2
: 3867 2
: 3868 2
: 3869 2
: 3870 2
: 3871 2
: 3872 2
: 3873 2
: 3874 2
: 3875 2

global routine SET_CNTRLR CHAR      !Sets control characteristics

!..
! Functional Description :
!   The SET CONTROLLER CHARACTERISTICS command is used to set host
!   settable unit characteristics and obtain those unit
!   characteristics that are essential for proper class driver
!   operation. This command never alters the unit's state
!   ("unit online", "unit-available", "unit-offline"). It is
!   meaningless to set host settable characteristics for a unit
!   that is "unit-available" or "unit-offline".

! Formal Parameters :
!   none

! Implicit Inputs :
!   NSD SLOT
!   This global storage gets loaded by the routine
!   'Get_nsd' and in it is stored the next send ring
!   descriptor slot where the port/controller should
!   be polling on and the place to put this commands
!   command packet.

! Implicit Outputs :
!   none

! Completion Codes :
!   RET_STATUS:      Return status passes back to the calling routine
!                   the status of the just issued command.

! Side Effects :
!   Any previously defined controller characteristics will possibly
!   be altered after execution of this command.

begin

local
  REF_NUM,          !Stores unique cmd ref number
  SCC_BUF$LOC,     !Stores outstanding cmd buffer location
  TEMP;            !A place to put read IP register data

!
! Before we load up the command packet up
! with all this good information get the
! next send descriptor slot and a unique
! command reference number.

GET_NSD ();        !Get the next send desc slot
REF_NUM = GET_CMD$REF (); !Get a unique command ref num

!
! UQ Port command envelope Header field definition
!

```

```

: 3876 2      SND_ENVELOPE [.NSD_SLOT, MSG_LENGTH] = SZ_SCC;      !Load message length
: 3877 2      SND_ENVELOPE [.NSD_SLOT, CREDITS] = ONE;      !Load credit size
: 3878 2      SND_ENVELOPE [.NSD_SLOT, MSG_TYPE] = 0;      !Define message type 'Sequential'
: 3879 2      SND_ENVELOPE [.NSD_SLOT, CONN_ID] = 0;      !Define connection ID 'DUP'
: 3880 2      !
: 3881 2      ! MSCP generic command envelope field definition
: 3882 2      !
: 3883 2      SND_ENVELOPE [.NSD_SLOT, CMD_LREF] = .REF_NUM; !Load command reference number
: 3884 2      SND_ENVELOPE [.NSD_SLOT, CMD_HREF] = ZERO;   !Zero Hi order cmd ref num
: 3885 2      SND_ENVELOPE [.NSD_SLOT, UN_LUSED] = ZERO;   !Not used in DUP implimentation
: 3886 2      SND_ENVELOPE [.NSD_SLOT, UN_MUSED] = ZERO;   !Not used in DUP implimentation
: 3887 2      SND_ENVELOPE [.NSD_SLOT, OP_CODE] = OP_SCC; !Load this commands op-code
: 3888 2      SND_ENVELOPE [.NSD_SLOT, RSVD] = ZERO;      !Not used field
: 3889 2      SND_ENVELOPE [.NSD_SLOT, MODIFIER] = ZERO; !Define this commands modifiers
: 3890 2      !
: 3891 2      ! Command specific command envelope field definition
: 3892 2      !
: 3893 2      SND_ENVELOPE [.NSD_SLOT, MSCP_VER] = ZERO;   !MSCP version
: 3894 2      SND_ENVELOPE [.NSD_SLOT, CTL_FLAGS] = ZERO; !Controller flags
: 3895 2      SND_ENVELOPE [.NSD_SLOT, HOST_TOV] = ZERO;   !Host time out value
: 3896 2      SND_ENVELOPE [.NSD_SLOT, RSVD] = ZERO;      !Reserved
: 3897 2      SND_ENVELOPE [.NSD_SLOT, T&D_0] = ZERO;     !Time and Date word 0
: 3898 2      SND_ENVELOPE [.NSD_SLOT, T&D_1] = ZERO;     !Time and Date word 1
: 3899 2      SND_ENVELOPE [.NSD_SLOT, T&D_2] = ZERO;     !Time and Date word 2
: 3900 2      SND_ENVELOPE [.NSD_SLOT, T&D_3] = ZERO;     !Time and Date word 3
: 3901 2      SND_ENVELOPE [.NSD_SLOT, CDP_LO] = ZERO;    !Cntlr dep parameter lo word
: 3902 2      SND_ENVELOPE [.NSD_SLOT, CDP_HI] = ZERO;    !Cntlr dep parameter hi wrd
: 3903 2      !
: 3904 2      ! Call the load outstanding command buffer routine
: 3905 2      ! and load this command into the buffer. The return
: 3906 2      ! from this routine will point us to the buffer location
: 3907 2      ! where this command is stored. Later we can look at
: 3908 2      ! this location to see if the interrupt service routine
: 3909 2      ! has received and process it.
: 3910 2      !
: 3911 2      SCC_BUF$LOC = LOAD_OUT$STD_BUF (.REF_NUM); !Load the command
: 3912 2      !
: 3913 2      if .SCC_BUF$LOC equl OBF_CODE then DECODE (); !Error if buffer is full
: 3914 2      !
: 3915 2      !
: 3916 2      ! Set the ownership bit to 1 giving this slot
: 3917 2      ! to the port/controller
: 3918 2      !
: 3919 2      SEND_RING [.NSD_SLOT, OWN_BIT] = PORT OWNED;
: 3920 2      !
: 3921 2      ! Read the IP register to stimulate port polling
: 3922 2      !
: 3923 2      TEMP = .RDRX_ADDR [RCIP, RC ALL];
: 3924 2      !
: 3925 2      ! Time out the port/controller processing the command.
: 3926 2      !
: 3927 2      ! The first test tests the connections ability to
: 3928 2      ! respond to this command without any errors in the SA

```

```

: 3929 2      : register and for the command not timing out.
: 3930 2      :
: 3931 2      : The second tests the DUP server for good status. If
: 3932 2      : bad status is sent back then an error code is returned
: 3933 2      : to the calling routine where the routine "decode" will
: 3934 2      : decode and take the appropriate recovery. The time
: 3935 2      : out routine will loop on delaying and checking the hi
: 3936 2      : bit of the first word in the out$std_buf for a true.
: 3937 2      : When true signals us that the interrupt service routine
: 3938 2      : has received the endpacket and no connection errors
: 3939 2      : were detected.
: 3940 2      :
: 3941 2      :
: 3942 2      : if CTO_WAIT (3000, .REF_NUM, .SCC_BUF$LOC) then DECODE (); !Is return an error
: 3943 2      :
: 3944 2      :
: 3945 2      : Get the return envelope address from the out$std_buf
: 3946 2      : at this commands buffer location and check the packet
: 3947 2      : for good status error and die if bad status was returned
: 3948 2      :
: 3949 2      : RET EN$AD = .OUT$STD_BUF [.SCC_BUF$LOC, ENV_ADR]; !Get the ret env adr
: 3950 2      :
: 3951 2      : Now test for good status
: 3952 2      :
: 3953 2      :
: 3954 2      : if .RET EN$AD [STATUS] nequ ZERO          !Test the status
: 3955 2      : then
: 3956 2      :     return RET STATUS = RSE CODE          !Return a "Response status err" code
: 3957 2      : else
: 3958 2      :     return .RET STATUS;                  !This ret_status is good or bad
: 3959 2      :
: 3960 1      : end;

```

			.SBTTL SET.CNTRLR.CHAR GLOBAL ROUTINE DECLARATIONS	
000000	004137	000000G	SET.CNTRLR.CHAR::	
			JSR R1,\$SAVE2	3823
000004	005746		TST -(SP)	
000006	004737	000000'	JSR PC,GET.NSD	3871
000012	004737	000146	JSR PC,GET.CMD\$REF	3872
000016	010002		MOV R0,R2	*,REF.NUM
000020	013746	000000G	MOV NSD.SLOT,-(SP)	
000024	012746	000054	MOV #54,-(SP)	3876
000030	004737	000000G	JSR PC,BL\$MUL	
000034	012760	000040 000000G	MOV #40,SND.ENVELOPE(R0)	
000042	012701	000002G	MOV #SND.ENVELOPE*2,R1	
000046	060001		ADD R0,R1	3877
000050	112711	000001	MOVB #1,(R1)	3878
000054	105061	000001	CLRB 1(R1)	3879
000060	010260	000004G	MOV R2,SND.ENVELOPE*4(R0)	REF.NUM,*
000064	005060	000006G	CLR SND.ENVELOPE*6(R0)	3883
000070	005060	000010G	CLR SND.ENVELOPE*10(R0)	3885
000074	005060	000012G	CLR SND.ENVELOPE*12(R0)	3886

000100	112760	000004	000014G	MOV	#4,SND.ENVELOPE+14(RO)	:	3887
000106	105060	000015G		CLRB	SND.ENVELOPE+15(RO)	:	3888
000110	005060	000016G		CLR	SND.ENVELOPE+16(RO)	:	3889
000116	005060	000020G		CLR	SND.ENVELOPE+20(RO)	:	3893
000122	005060	000022G		CLR	SND.ENVELOPE+22(RO)	:	3894
000126	005060	000024G		CLR	SND.ENVELOPE+24(RO)	:	3895
000132	005060	000026G		CLR	SND.ENVELOPE+26(RO)	:	3896
000136	005060	000030G		CLR	SND.ENVELOPE+30(RO)	:	3897
000142	005060	000032G		CLR	SND.ENVELOPE+32(RO)	:	3898
000146	005060	000034G		CLR	SND.ENVELOPE+34(RO)	:	3899
000152	005060	000036G		CLR	SND.ENVELOPE+36(RO)	:	3900
000156	005060	000040G		CLR	SND.ENVELOPE+40(RO)	:	3901
000162	005060	000042G		CLR	SND.ENVELOPE+42(RO)	:	3902
000166	010216			MOV	R2,(SP)	:	3911
000170	004737	000054'		JSR	PC,LOAD.OUT\$STD.BUF	:	
000174	010001			MOV	RO,R1	:	
000176	020127	002001		CMP	R1,#2001	:	
000202	001002			BNE	1\$	:	
000204	004737	000250'		JSR	PC,DECODE	:	
000210	013700	000000G	1\$:	MOV	NSD.SLOT,RO	:	3919
000214	006300			ASL	RO	:	
000216	006300			ASL	RO	:	
000220	063700	000000G		ADD	SEND.RING,RO	:	
000224	052760	100000	000002	BIS	#100000,2(RO)	:	
000232	017766	000000G	000004	MOV	RDRX.ADDR,4(SP)	:	3923
000240	016600	000004		MOV	4(SP),RO	:	
000244	012716	005670		MOV	#5670,(SP)	:	3942
000250	010246			MOV	R2,-(SP)	:	
000252	010146			MOV	R1,-(SP)	:	
000254	004737	002116'		JSR	PC,CTO.WAIT	:	
000260	022626			CMP	(SP)+,(SP)+	:	
000262	006000			ROR	RO	:	
000264	103002			BCC	2\$	:	
000266	004737	000250'		JSR	PC,DECODE	:	
000272	010100		2\$:	MOV	R1,RO	:	3949
000274	006300			ASL	RO	:	
000276	006300			ASL	RO	:	
000300	016037	000002G	000000G	MOV	OUT\$STD.BUF+2(RO),RET.EN\$AD	:	
000306	016000	000002G		MOV	OUT\$STD.BUF+2(RO),RO	:	3954
000312	005760	000016		TST	16(RO)	:	
000316	001405			BEQ	3\$	:	
000320	012700	000031		MOV	#31,RO	:	3956
000324	010037	000000G		MOV	RO,RET.STATUS	:	
000330	000400			BR	4\$	:	3958
000332	013700	000000G	3\$:	MOV	RET.STATUS,RO	:	
000336	062706	000006	4\$:	ADD	#6,SP	:	3823
000342	000207			RTS	PC	:	

; Routine Size: 114 words, Routine Base: \$CODE\$ + 4514  
; Maximum stack depth per invocation: 9 words

; 3961 1



```

: C 3962 1  *(
: C 3963 1  global routine ON LINE =      !Makes a unit come online to a host
: C 3964 1
: C 3965 1  !..
: C 3966 1  ! Functional Description :
: C 3967 1  ! The online command is used to bring a unit "unit-online, set
: C 3968 1  ! host settable unit characteristics and obtain those unit
: C 3969 1  ! characteristics that are essential for proper class driver
: C 3970 1  ! operation. The unit is spun-up, if necessary, and is heads
: C 3971 1  ! are loaded prior to returning the online command's end
: C 3972 1  ! message. Most settable characteristics are set exactly as if
: C 3973 1  ! a set unit characteristics command were issued. Most settable
: C 3974 1  ! characteristics are set after the unit has been successfully spun up
: C 3975 1  ! and any other validity checks have succeeded. Note that the unit's
: C 3976 1  ! host settable characteristics are not altered if the unit is already
: C 3977 1  ! "unit-online".
: C 3978 1
: C 3979 1  ! Formal Parameters :
: C 3980 1  ! none
: C 3981 1
: C 3982 1  ! Implicit Inputs :
: C 3983 1  ! NSD_SLOT      This global storage gets loaded by the routine
: C 3984 1  !                'Get_nsd' and in it is stored the next send ring
: C 3985 1  !                descriptor slot where the port/controller should
: C 3986 1  !                be polling on and the place to put this commands
: C 3987 1  !                command packet.
: C 3988 1
: C 3989 1  ! Implicit Outputs :
: C 3990 1  ! none
: C 3991 1
: C 3992 1  ! Completion Codes :
: C 3993 1  ! RET_STATUS:   Return status passes back to the calling routine
: C 3994 1  !                the status of the just issued command.
: C 3995 1
: C 3996 1  ! Side Effects :
: C 3997 1  ! Any previously defined controller characteristics will possibly
: C 3998 1  ! be altered after execution of this command.
: C 3999 1  !-
: C 4000 1
: C 4001 1  begin
: C 4002 1
: C 4003 1  local
: C 4004 1  REF_NUM,          !Stores unique cmd ref number
: C 4005 1  ONL_BUF$LOC,     !Stores outstanding cmd buffer location
: C 4006 1  TEMP;           !A place to put read IP register data
: C 4007 1
: C 4008 1  !
: C 4009 1  ! Before we load up the command packet up
: C 4010 1  ! with all this good information get the
: C 4011 1  ! next send descriptor slot and a unique
: C 4012 1  ! command reference number.
: C 4013 1  !
: C 4014 1  !
: C 4014 1  GET NSD ();      !Get the next send desc slot

```

```

: C 4015 1      REF_NUM = GET_CMD$REF ();          !Get a unique command ref num
: C 4016 1      !
: C 4017 1      ! UQ Port command envelope Header field definition
: C 4018 1      !
: C 4019 1      SND_ENVELOPE [.NSD_SLOT, MSG_LENGTH] = SZ_ONL;      !Load message length
: C 4020 1      SND_ENVELOPE [.NSD_SLOT, CREDITS] = ONE;          !Load credit size
: C 4021 1      SND_ENVELOPE [.NSD_SLOT, MSG_TYPE] = 0;          !Define message type 'Sequential'
: C 4022 1      SND_ENVELOPE [.NSD_SLOT, CONN_ID] = 0;          !Define connect'on ID
: C 4023 1      !
: C 4024 1      ! MSCP generic command envelope field definition
: C 4025 1      !
: C 4026 1      SND_ENVELOPE [.NSD_SLOT, CMD_LREF] = .REF_NUM;      !Load command reference number
: C 4027 1      SND_ENVELOPE [.NSD_SLOT, CMD_HREF] = ZERO;      !Zero Hi order cmd ref num
: C 4028 1      SND_ENVELOPE [.NSD_SLOT, UNIT_NUM] = .UNIT_NO;      !Select unit to bring online
: C 4029 1      SND_ENVELOPE [.NSD_SLOT, UN_HUSED] = ZERO;      !Not used in DUP implimentation
: C 4030 1      SND_ENVELOPE [.NSD_SLOT, OPCODE] = OP_ONL;      !Load this commands op-code
: C 4031 1      SND_ENVELOPE [.NSD_SLOT, RSVD] = ZERO;          !Not used field
: C 4032 1      SND_ENVELOPE [.NSD_SLOT, MODIFIER] = ZERO;      !Define this commands modifiers
: C 4033 1      !
: C 4034 1      ! Command specific command envelope field definition
: C 4035 1      !
: C 4036 1      SND_ENVELOPE [.NSD_SLOT, RSVD$D] = ZERO;          !Reserved
: C 4037 1      SND_ENVELOPE [.NSD_SLOT, UNT_FLAGS] = ZERO;      !Unit flag field
: C 4038 1      SND_ENVELOPE [.NSD_SLOT, RSVD$0] = ZERO;          !Reserved field
: C 4039 1      SND_ENVELOPE [.NSD_SLOT, RSVD$1] = ZERO;          !Reserved field
: C 4040 1      SND_ENVELOPE [.NSD_SLOT, RSVD$2] = ZERO;          !Reserved field
: C 4041 1      SND_ENVELOPE [.NSD_SLOT, RSVD$3] = ZERO;          !Reserved field
: C 4042 1      SND_ENVELOPE [.NSD_SLOT, RSVD$4] = ZERO;          !Reserved field
: C 4043 1      SND_ENVELOPE [.NSD_SLOT, RSVD$5] = ZERO;          !Reserved field
: C 4044 1      SND_ENVELOPE [.NSD_SLOT, DDP_LO] = ZERO;          !Device dependent parameter
: C 4045 1      SND_ENVELOPE [.NSD_SLOT, DDP_HI] = ZERO;          !Device dependent parameter
: C 4046 1      SND_ENVELOPE [.NSD_SLOT, SHADOW_UNIT] = ZERO;      !Shadow unit
: C 4047 1      SND_ENVELOPE [.NSD_SLOT, COPY_SPEED] = ZERO;      !Copy speed
: C 4048 1      !
: C 4049 1      ! Call the load outstanding command buffer routine
: C 4050 1      ! and load this command into the buffer. The return
: C 4051 1      ! from this routine will point us to the buffer location
: C 4052 1      ! where this command is stored. Later we can look at
: C 4053 1      ! this location to see if the interrupt service routine
: C 4054 1      ! has received and process it.
: C 4055 1      !
: C 4056 1      ONL_BUF$LOC = LOAD_OUT$STD_BUF (.REF_NUM);      !Load the command
: C 4057 1      !
: C 4058 1      if .ONL_BUF$LOC eqv OBF_CODE then DECODE ();      !Error if buffer is full
: C 4059 1      !
: C 4060 1      !
: C 4061 1      ! Set the ownership bit to 1 giving this slot
: C 4062 1      ! to the port/controller
: C 4063 1      !
: C 4064 1      SEND_RING [.NSD_SLOT, OWN_BIT] = PORT_OWNED;
: C 4065 1      !
: C 4066 1      ! Read the IP register to stimulate port polling
: C 4067 1      !

```

```
: C 4068 1      TEMP = .RDRX ADDR [RCIP, RC ALL];
: C 4069 1      !
: C 4070 1      ! Time out the port/controller processing the command.
: C 4071 1      !
: C 4072 1      ! The first test tests the connections ability to
: C 4073 1      ! respond to this command without any errors in the SA
: C 4074 1      ! register and for the command not timing out.
: C 4075 1      !
: C 4076 1      ! The second tests the DUP server for good status. If
: C 4077 1      ! bad status is sent back then an error code is returned
: C 4078 1      ! to the calling routine where the routine "decode" will
: C 4079 1      ! decode and take the appropriate recovery. The time
: C 4080 1      ! out routine will loop on delaying and checking the hi
: C 4081 1      ! bit of the first word in the out$std_buf for a true.
: C 4082 1      ! When true signals us that the interrupt service routine
: C 4083 1      ! has received the endpacket and no connection errors
: C 4084 1      ! were detected.
: C 4085 1      !
: C 4086 1      !
: C 4087 1      if CTO_WAIT (3000, .REF_NUM, .ONL_BUF$LOC) then DECODE (); !Is return an error
: C 4088 1      !
: C 4089 1      !
: C 4090 1      ! Get the return envelope address from the out$std_buf
: C 4091 1      ! at this commands buffer location and check the packet
: C 4092 1      ! for good status error and die if bad status was returned
: C 4093 1      !
: C 4094 1      RET_EN$AD = .OUT$STD_BUF [.ONL_BUF$LOC, ENV_ADR]; !Get the ret env adr
: C 4095 1      !
: C 4096 1      ! Now test for good status
: C 4097 1      !
: C 4098 1      !
: C 4099 1      if .RET_EN$AD [STATUS] nequ ZERO          !Test the status
: C 4100 1      then
: C 4101 1          return RET_STATUS = RSE_CODE        !Return a "Response status err" code
: C 4102 1      else
: C 4103 1          return .RET STATUS;                  !This ret_status is good or bad
: C 4104 1      !
: C 4105 1      end;
: C 4106 1      )*
```

```

: 4107 1 global routine INT$I_SERVICE : INT LNK$TYP novalue = !Init sequence interrupt catcher
: 4108 1
: 4109 1
: 4110 1 : Functional Description :
: 4111 1 : During the initialization sequence the IE bit is defined to be
: 4112 1 : a zero. This means that the host is not requesting interrupts at
: 4113 1 : the completion of steps 1-3.
: 4114 1
: 4115 1 : Note that no interrupt will be generated at the completion of
: 4116 1 : step 4 since this step requires only a small number of time.
: 4117 1
: 4118 1 : This interrupt service routine serves to catch any interrupts that the
: 4119 1 : controller might issue during the initialization sequence. The
: 4120 1 : interrupt is ignored and control is returned.
: 4121 1
: 4122 1 : Formal Parameters :
: 4123 1 : none
: 4124 1
: 4125 1 : Implicit Inputs :
: 4126 1 : none
: 4127 1
: 4128 1 : Implicit Outputs :
: 4129 1 : none
: 4130 1
: 4131 1 : Completion Codes :
: 4132 1 : none
: 4133 1
: 4134 1 : Side Effects :
: 4135 1 : none
: 4136 1
: 4137 1
: 4138 2 begin
: 4139 2 return;
: 4140 1 end;

```

```

000000 000002 .SBTTL INT$I.SERVICE GLOBAL ROUTINE DECLARATIONS
INT$I.SERVICE::
RTI ;

```

4107

```

: Routine Size: 1 word, Routine Base: $CODE$ + 5060
: Maximum stack depth per invocation: 0 words

```

: 4141 1

```

: 4142 1 global routine IS_TIMER (SEQ_NO) = !Init sequence time out
: 4143 1
: 4144 1 !..
: 4145 1 ! Functional Description :
: 4146 1 ! Steps 1-3 of the init sequence, each are required to
: 4147 1 ! complete within 10 seconds. If any of these steps
: 4148 1 ! fails to complete within that period, this is to be
: 4149 1 ! treated as a host detected fatal error.
: 4150 1
: 4151 1 ! This routine will do one us delays for a total of 10
: 4152 1 ! seconds. After each delay the step field is examined
: 4153 1 ! to see if this init sequence has completed.
: 4154 1
: 4155 1 ! Formal Parameters :
: 4156 1 ! SEQ_NO: Indicated which init step is presently being
: 4157 1 ! performed within the RDRX init sequence.
: 4158 1
: 4159 1 ! Implicit Inputs :
: 4160 1 ! none
: 4161 1
: 4162 1 ! Implicit Outputs :
: 4163 1 ! none
: 4164 1
: 4165 1 ! Completion Codes :
: 4166 1 ! TRUE: Indicates to the calling routine that the
: 4167 1 ! indicated init sequence step has timed out.
: 4168 1
: 4169 1 ! FALSE: Indicates to the calling routine that the
: 4170 1 ! indicated init sequence step has not timed
: 4171 1 ! out.
: 4172 1
: 4173 1 ! Side Effects :
: 4174 1 ! If the init sequence step times out and an error
: 4175 1 ! is posted in the sa register then the routine
: 4176 1 ! decode will be call.
: 4177 1 !..
: 4178 1
: 4179 2 begin
: 4180 2
: 4181 2 local
: 4182 2 STEP_VAL : word; !Temp storage of step value
: 4183 2
: 4184 2 STEP_VAL = ZERO; !Make sure the loc is zeroed out
: 4185 2
: 4186 2 !,
: 4187 2 ! Select the step value expected from
: 4188 2 ! this init sequence step.
: 4189 2 !-
: 4190 2
: 4191 2 selectoneu .SEQ_NO of !Select the binary step value
: 4192 2 set
: 4193 2
: 4194 2 [0] :

```

```

: 4195 2          STEP_VAL = %b'0001';          !Step 1 binary value
: 4196 2
: 4197 2          [1] :
: 4198 2          STEP_VAL = %b'0010';          !Step 2 binary value
: 4199 2
: 4200 2          [2] :
: 4201 2          STEP_VAL = %b'0100';          !Step 3 binary value
: 4202 2
: 4203 2          [3] :
: 4204 2          STEP_VAL = %b'1000';          !Step 4 binary value
: 4205 2          tes;
: 4206 2
: 4207 2          !+
: 4208 2          ! Loop on the 100 micro second delay until
: 4209 2          ! either the expected step field is read in
: 4210 2          ! the SA register or the step times out.
: 4211 2          !-
: 4212 2
: 4213 2          incru TIM_OUT from 0 to 15000 do          !Delay for 10 seconds
: 4214 3          begin
: 4215 3          DELAY (C_US);          !Do the delay
: 4216 3          !
: 4217 3          ! Check the step bit to see if it is set yet.
: 4218 3          ! If it is set then return a false indicating
: 4219 3          ! the completion else continue delaying.
: 4220 3          !
: 4221 3
: 4222 3          if .RDRX_ADDR [RCSA, STP_FIELD] eqlu .STEP_VAL then return FALSE;
: 4223 3
: 4224 3          BREAK;          !Service any control C's
: 4225 2          end;
: 4226 2
: 4227 2          !+
: 4228 2          ! This step has not completed within the specified
: 4229 2          ! 10 second time interval. Test the sa register
: 4230 2          ! for any errors posted and report errors if any.
: 4231 2          ! Return a true to the caller indicating the error.
: 4232 2          !-
: 4233 2
: 4234 2          if .RDRX_ADDR [RCSA, ERR_BIT]          !Is the error bit set
: 4235 2          then
: 4236 3          begin
: 4237 3          RET_STATUS = PFE_CODE;          !Indicate the port/fatal error code
: 4238 3          DECODE ();          !Report the error
: 4239 2          end;
: 4240 2
: 4241 2          return TRUE;          !Return a failure to the caller
: 4242 1          end;

```

Address	Label	Code	Comment	Register	Value
000004	162706	000006		06,SP	
000010	005002			CLR R2	: STEP.VAL
000012	016600	000020		MOV 20(SP),R0	: SEQ.NO.0
000016	001003			BNE 11	: 4194
000020	012702	000001		MOV #1,R2	: *.STEP.VAL
000024	000421			BR 41	: 4195
000026	020027	000001	11:	CMP R0,#1	: 4191
000032	001003			BNE 21	: 4197
000034	012702	000002		MOV #2,R2	: *.STEP.VAL
000040	000413			BR 41	: 4198
000042	020027	000002	21:	CMP R0,#2	: 4191
000046	001003			BNE 31	: 4200
000050	012702	000004		MOV #4,R2	: *.STEP.VAL
000054	000405			BR 41	: 4201
000056	020027	000003	31:	CMP R0,#3	: 4191
000062	001002			BNE 41	: 4203
000064	012702	000010		MOV #10,R2	: *.STEP.VAL
000070	005003		41:	CLR R3	: TIM.OUT
000072	013701	000000G	51:	MOV L8CPU,R1	: *.88TMP2
000076	001411		61:	BEQ 91	: 4215
000100	013700	000000G		MOV L8DLY,R0	: *.88TMP1
000104	001404			BEQ 81	: 4204
000106	005066	000004	71:	CLR 4(SP)	: 88TMP
000112	005300			DEC R0	: 88TMP1
000114	001374			BNE 71	: 88TMP2
000116	005301		81:	DEC R1	: 88TMP2
000120	000766			BR 61	: 4222
000122	013700	000000G	91:	MOV RDRX,ADDR,R0	: *.RC1S.REG
000126	016016	000002		MOV 2(R0),2(SP)	: *.STEP.VAL.0
000132	010201			MOV R2,R1	: RC1S.REG.0
000134	011600			MOV (SP),R0	
000136	006200			ASR R0	
000140	006200			ASR R0	
000142	006200			ASR R0	
000144	000300			SWAB R0	
000146	042700	177760		BIC #177760,R0	
000152	020001			CMP R0,R1	
000154	001423			BEQ 111	
000156	104422			TRAP 22	
000160	005203			INC R3	: TIM.OUT
000162	020327	035230		CMP R3,#35230	: TIM.OUT.0
000166	101741			BLOS 51	: 4234
000170	013700	000000G		MOV RDRX,ADDR,R0	: *.RC1S.REG
000174	016066	000002 000002		MOV 2(R0),2(SP)	
000202	100003			BPL 101	
000204	012737	000021 000000G		MOV #21,RET,STATUS	: 4237
000212	004737	000250		JSR PC,DECODE	: 4238
000216	012700	000001	101:	MOV #1,R0	: 4170
000222	000401			BR 121	
000224	005000		111:	CLR R0	: 4147
000226	062706	000006	121:	ADD #6,SP	
000232	000207			RTS PC	





```

: 4244 1 global routine BOOT RDRX -      !Performs RDRX init sequence
: 4245 1
: 4246 1
: 4247 1 : Functional Description :
: 4248 1 :   This routine performs the initialization sequence of the RDRX
: 4249 1 :   RDRX controller.
: 4250 1
: 4251 1 :   The initialization procedure serves to:
: 4252 1
: 4253 1 :   1. Identify the parameters of the host resident communications
: 4254 1 :   region to the port.
: 4255 1
: 4256 1 :   2. Provide a confidence check of port/controller integrity.
: 4257 1
: 4258 1 :   3. Bring the port/controller online to the host (note that the
: 4259 1 :   devices attached to the controller are not thereby brought
: 4260 1 :   online to the class driver.)
: 4261 1
: 4262 1 : Formal Parameters :
: 4263 1 :   none
: 4264 1
: 4265 1 : Implicit Inputs :
: 4266 1 :   ISD_STRUCT      Stores the init sequence read and write data defined
: 4267 1 :   for this program and controller.
: 4268 1
: 4269 1 : Implicit Outputs :
: 4270 1 :   none
: 4271 1
: 4272 1 : Completion Codes :
: 4273 1 :   Success: Is returned to the calling routine if this initialization
: 4274 1 :   sequence was executed successfully.
: 4275 1
: 4276 1 :   Failure: Is returned to the calling routine if this initialization
: 4277 1 :   sequence was not executed successfully.
: 4278 1
: 4279 1 : Side Effects :
: 4280 1 :   Any DM code that might have been running in the DM machine will be
: 4281 1 :   aborted.
: 4282 1
: 4283 1 :   Any outstanding commands or response pertaining to a process using
: 4284 1 :   the controller will be lost.
: 4285 1
: 4286 1 :
: 4287 2 begin
: 4288 2
: 4289 2 local
: 4290 2 TEMP : word;      !Temporary storage location
: 4291 2
: 4292 2
: 4293 2 : The host begins the initialization sequence
: 4294 2 : either by issuing a bus init or by writing
: 4295 2 : any value into the IP register; the port must
: 4296 2 : guarantee that the host will read zeros in SA

```

```
4297 2      ! on the next bus cycle. Initialization then
4298 2      ! sequences through steps 1 4 as per UQSSP.DOC
4299 2      ! Version 1.5.
4300 2
4301 2      ! Write to the IP register and start the init
4302 2      ! sequence going.
4303 2
4304 2
4305 2      WRT_RDRX (RCIP, RC ALL, ONES);          !Begin init sequence
4306 2
4307 2
4308 2      ! This incr loop performs all four steps of the
4309 2      ! initialization sequence described above. The
4310 2      ! SA write and read data is preset into the
4311 2      ! structure ISD_STRUCT and stands for
4312 2      ! "Initialization Sequence Data_STRUCT".
4313 2
4314 2
4315 2      ! If a step time out error occurs the test
4316 2      ! invoking this routine will take the necessary
4317 2      ! retry procedure. A return code of failure is
4318 2      ! returned.
4319 2
4320 2      ! If any SA register compare error is detected after
4321 2      ! a step completion the routine Decode will decode the
4322 2      ! error and load statistical tables up pertanate data.
4323 2
4324 2
4325 2
4326 2      incru SEQ_NO from STEP1 to STEP4 do      !Do the four init seq steps
4327 2      begin
4328 2
4329 2      ! Wait for the controller to load the SA reg
4330 2      ! up with the step data.
4331 2
4332 2
4333 2      if IS_TIMER (.SEQ_NO)                    !Did the Controller time out
4334 2      then
4335 2      begin
4336 2      ! DO SOME STAT TABLE UP DATA TO SHOW
4337 2      ! THE TIME OUT
4338 2
4339 2      PRINTF (.EMSG_STRUCT [MSG10]);
4340 2      return FAILURE;                          !Notify DRS> init of the failure
4341 2
4342 2      end;
4343 2
4344 2
4345 2      ! The controller did not time out so read the SA register
4346 2      ! for the expected step data and compare it to the good
4347 2      ! data stored in ISD_STRUCT.
4348 2
4349 2      ! If the read SA data is not what we expect then return a
```

```

4350 3      : failure code.
4351 3      :
4352 3      : Note that the reserved fields read in the SA register are
4353 3      : or'ed with all ones to mask out the field before compared
4354 3      : to the expected data stored in the structure "ISD_STRUCT".
4355 3      :
4356 3      TEMP = ((.RDRX_ADDR (RCSA, RC_ALL)) or (.RSVD_STRUCT [.SEQ_NO]));
4357 3      :
4358 3      if .TEMP nequ .ISD_STRUCT [.SEQ_NO, ISRD, ISR ALL]      !Compare read to expected
4359 3      then
4360 4          begin
4361 4              :
4362 4              : Load some satistical table up with
4363 4              : some data to indicate that the init
4364 4              : sequence had some trouble.
4365 4              :
4366 4              PRINTF (.EMSG_STRUCT [MSG11]);
4367 4              return FAILURE;          !Return a failure code
4368 3          end;
4369 3      :
4370 3      :
4371 3      : We need to save the micro code
4372 3      : version number if this is step4.
4373 3      : Save the ucode version in UC_VER
4374 3      : if this is step4.
4375 3      :
4376 3      :
4377 3      if .SEQ_NO eqlu STEP4          !Is this seq step 4
4378 3      then
4379 4          begin
4380 4              UC_VER = .RDRX_ADDR (RCSA, SAR_VER);          !Save the ucode version
4381 3          end;
4382 3      :
4383 3      :
4384 3      : This step read data is what we expected so
4385 3      : write the SA register with this steps write
4386 3      : data stored in ISD_STRUCT.
4387 3      :
4388 3      WRT_RDRX (RCSA, RC_ALL,          !Write the SA register
4389 3      .ISD_STRUCT [.SEQ_NO, ISWRT, ISW ALL]);      !Locate the data
4390 2      end;
4391 2      :
4392 2      :
4393 2      : The controller initialization sequence was
4394 2      : done successfully so return a success code.
4395 2      :
4396 2      :
4397 2      return SUCCESS;
4398 1      end;

```

SBTTL BOOT.RDRX GLOBAL ROUTINE DECLARATIONS  
BOOT.RDRX::

Address	Label	Code	Comment	OpCode	Register/Value	Symbol
000004	162706	000006		JSR	R1,\$SAVE4	4244
000010	017746	000000G		SUB	#6,SP	
000014	012700	177777		MOV	@RDRX.ADDR,(SP)	4305
000020	010077	000000G		MOV	#1,R0	
000024	005003			MOV	R0,@RDRX.ADDR	
000026	010346		1\$:	CLR	R3	4326
000030	004737	005062'		MOV	R3,(SP)	4333
000034	005726			JSR	PC,IS.TIMER	
000036	006000			TST	(SP)+	
000040	103007			ROR	R0	
000042	013746	000024G		BCC	2\$	4340
000046	012746	000001		MOV	EMSG.STRUCT+24,-(SP)	
000052	010600			MOV	#1,(SP)	
000054	104417			MOV	SP,R0	SP,*
000056	000427			TRAP	17	
000060	013700	000000G	2\$:	BR	3\$	4341
000064	016066	000002 000002		MOV	RDRX.ADDR,R0	4356
000072	010300			MOV	2(R0),2(SP)	*,RC\$S.REG
000074	006300			MOV	R3,R0	SEQ.NO,*
000076	016604	000002		ASL	R0	
000102	056004	000000G		MOV	2(SP),R4	RC\$S.REG,TEMP
000106	010302			BIS	RSVD.STRUCT(R0),P4	*,TEMP
000110	006302			MOV	R3,R2	SEQ.NO,*
000112	006302			ASL	R2	
000114	020462	000000G		ASL	R2	
000120	001410			CMP	R4,ISD.STRUCT(R2)	TEMP,*
000122	013746	000026G		BEQ	4\$	
000126	012746	000001		MOV	EMSG.STRUCT+26,-(SP)	4366
000132	010600			MOV	#1,(SP)	
000134	104417			MOV	SP,R0	SP,*
000136	022626		3\$:	TRAP	17	
000140	000440			CMP	(SP)+,(SP)+	4367
000142	020327	000003	4\$:	BR	6\$	4360
000146	001015			CMP	R3,#3	SEQ.NO,*
000150	013700	000000G		BNE	5\$	
000154	016066	000002 000004		MOV	RDRX.ADDR,R0	4380
000162	016600	000004		MOV	2(R0),4(SP)	*,RC\$S.REG
000166	042700	177760		MOV	4(SP),R0	RC\$S.REG,*
000172	105037	000000G		BIC	#177760,R0	
000176	150037	000000G		CLRB	UC.VER	
000202	013700	000000G	5\$:	BISB	R0,UC.VER	4389
000206	016066	000002 000006		MOV	RDRX.ADDR,R0	
000214	016201	000002G		MOV	2(R0),6(SP)	*,RC\$S.REG
000220	010160	000002		MOV	ISD.STRUCT+2(R2),R1	*,RC\$M.REG
000224	005203			MOV	R1,2(R0)	RC\$M.REG,*
000226	020327	000003		INC	R3	SEQ.NO
000232	101675			CMP	R3,#3	SEQ.NO,*
000234	012700	000001		BLOS	1\$	
000240	000401			MOV	#1,R0	4287
000242	005000		6\$:	BR	7\$	
000244	062706	000010	7\$:	CLR	R0	4244
000250	000207			ADD	#10,SP	
				RTS	PC	

H15

ZRQB4 RDRX DISK FORMATTER  
REV C PATCH 0 GLOBAL ROUTINE DECLARATIONS

5 Mar-1984 14:51:26  
5 Mar 1984 14:40:58

SEQ 0189  
VAX 11 Bliss 16 V4.0 579 Page 86  
DISK\$USER2:(YOUNG.FMT)ZRQB4.B16;3 (23)

Routine Size: 85 words, Routine Base: \$CODE\$ + 5316  
Maximum stack depth per invocation: 13 words

4399 1

SE  
EE  
VJ  
D1  
EL  
SE

```
4400 1 global routine INIT_COM_AREA = !Inits DUP Protocol communication area
4401 1
4402 1
4403 1 : **
4404 1 : Functional Description :
4405 1 : After initialization step 3 the port controller clears out
4406 1 : the communication area's ring buffers.
4407 1 :
4408 1 : This routine first makes sure that this protocol is accom-
4409 1 : plished by the port before proceeding.
4410 1 :
4411 1 : If the port did its part of the protocol then the communic-
4412 1 : ations area is initialized as follows:
4413 1 :
4414 1 : 1. Defines from the contiguous data storage structure
4415 1 : "COM_AREA" the header area address, receive ring
4416 1 : address and the send ring address (these structures
4417 1 : are initially declared as reference structures and
4418 1 : require an address to be defined as its value per
4419 1 : BLISS language conventions).
4420 1 :
4421 1 : 2. Clears the interrupt indicators and adaptor purge
4422 1 : (ring base -1, -2, -3, -4) defined as "HEAD_AREA".
4423 1 :
4424 1 : 3. Loads the receive and send descriptors with the values:
4425 1 : a. Envelope low, high and Q_bus address
4426 1 : b. Reserved field
4427 1 : c. Flag bit
4428 1 : d. Ownership bit
4429 1 :
4430 1 : 4. Load the receive envelope message length field with the
4431 1 : buffer size in bytes.
4432 1 :
4433 1 : 5. Initialize the Outstanding command buffer to reflect
4434 1 : that all slots are unused.
4435 1 : Formal Parameters :
4436 1 : none
4437 1 :
4438 1 : Implicit Inputs :
4439 1 : HEAD_AREA, RECEIVE_RING, SEND_RING, COM_AREA
4440 1 :
4441 1 : Implicit Outputs :
4442 1 : The communication area as a result of this
4443 1 : routine will be initialized for next program
4444 1 : to remote program communications per DUP and
4445 1 : UQSSP specifications.
4446 1 :
4447 1 : Completion Codes :
4448 1 : TRUE: Error code to indicate the port controller has
4449 1 : not fulfilled its part of the DUP protocol.
4450 1 :
4451 1 : FALSE: An error code to indicate the port controller
4452 1 : has fulfilled its part of the DUP protocol.
```

```
4453 1      !
4454 1      ! Side Effects :
4455 1      !     none
4456 1      !
4457 1      !
4458 1      !     begin
4459 2
4460 2      !
4461 2      ! * Make sure that the controller has done its part of
4462 2      ! the DUP protocol by clearing out the ring buffers.
4463 2      ! If the rings are not cleared out then return with
4464 2      ! an error code of true.
4465 2      !
4466 2
4467 2      !     incru i from 2 to RING_SIZE  1 do          !Test all blocks for zeros
4468 2          !
4469 2          !     incru j from WRD0 to WRD1 do          !Test all words for zeros
4470 2              !
4471 2              ! Test this word for zeros.  If not zeros then exit
4472 2              ! this routine with an "communication area init"
4473 2              ! error code to indicate the Protocol violation.
4474 2              !
4475 2          !
4476 2          !     if .COM AREA [.i, .j, WORD_REF] nequ ZERO then return CIE_CODEF;
4477 2          !
4478 2      !
4479 2      ! * The port did its part of the protocol so now
4480 2      ! define the address locations of the HEAD_AREA,
4481 2      ! RECEIVE_RING and SEND_RING from the contiguous
4482 2      ! storage declared by COM AREA.
4483 2      !
4484 2      !
4485 2      ! HEAD_AREA = COM_AREA;          !Define the Header area
4486 2      ! RECEIVE_RING = COM_AREA [REC_BASE];  !Define the receive ring area
4487 2      ! SEND_RING = COM_AREA [SND_BASE];    !Define the send ring area
4488 2      !
4489 2      !
4490 2      ! * Not quite sure if the port has to clear out
4491 2      ! the header area of the communications area
4492 2      ! so I'll clear it out here just in case.
4493 2      !
4494 2      !
4495 2      !     incru i from WRD0 to WRD3 do
4496 2          ! HEAD_AREA [.i, WORD_REF] = ZEROS;
4497 2          !
4498 2      !
4499 2      ! * Load up the Send Ring descriptors with an envelope address,
4500 2      ! define the "Flag bit" to = 1 (interrupt requested), define
4501 2      ! the "Ownership bit" to = 0 (owned by host) and load the
4502 2      ! Reserved field with zeros (per DUP spec).
4503 2      !
4504 2      !
4505 2      !     incru i from 0 to SND ALLOCATE  1 do
```

```

4506 3      begin
4507 3      SEND_RING [., LO_EN$AD] = SND_ENVELOPE [., CMD_LREF]; !Low order envelope adress for all sys
4508 3      SEND_RING [., HI_EN$AD] = ZERO; !High-order portion of an 18 bit U/Q bus adrs
4509 3      SEND_RING [., QB_EXT] = ZERO; !Q_bus extention
4510 3      SEND_RING [., D$RSVD] = ZERO; !Reserved field
4511 3      SEND_RING [., FLAG_BIT] = SET_FLG; !Flag bit whose meaning varies depending on dsc state
4512 3      SEND_RING [., OWN_BIT] = HOST_OWNED; !Indicates whether dsc is host or port owned
4513 2      end;
4514 2
4515 2      !*
4516 2      ! Load up the Receive Ring descriptors with an envelope
4517 2      ! address, define the "Ownership bit" = 1 (owned by port),
4518 2      ! define the "Flag bit" to = 1 (Interrupts requested) and
4519 2      ! the reserved field set to zeros (per DUP spec).
4520 2      !-
4521 2
4522 2      incru i from 0 to REC_ALLOCATE - 1 do
4523 3          begin
4524 3              RECEIVE_RING [., LO_EN$AD] = REC_ENVELOPE [., CMD_LREF];
4525 3              RECEIVE_RING [., HI_EN$AD] = ZEROS;
4526 3              RECEIVE_RING [., QB_EXT] = ZEROS;
4527 3              RECEIVE_RING [., D$RSVD] = ZEROS;
4528 3              RECEIVE_RING [., FLAG_BIT] = SET_FLG;
4529 3              RECEIVE_RING [., OWN_BIT] = PORT_OWNED;
4530 3          end;
4531 2
4532 2      !*
4533 2      ! Reset the communications area pointer to
4534 2      ! their initial state.
4535 2      !
4536 2
4537 2      NRD_SLOT = 1; !Start ring pointer at zero
4538 2      NSD_SLOT = -1; !Start ring pointer at zero
4539 2      NXT_CRN = ZERO; !Start unique cmd ref num at one
4540 2
4541 2      !*
4542 2      ! Set the response envelope message length size equal
4543 2      ! to the buffer size in bytes starting at text + 0.
4544 2      !-
4545 2
4546 2      incru i from 0 to REC_ALLOCATE - 1 do
4547 3          REC_ENVELOPE [., MSG_LENGTH] = RB_SIZE*2; !Convert to bytes before loading
4548 2
4549 2      !*
4550 2      ! Init the outstanding command buffer as follows:
4551 2      ! 1. Indicate that all slots are unused by loading
4552 2      ! the unique value %o'100000'.
4553 2      ! 2. Clear the envelope adrs words to zero.
4554 2      !-
4555 2
4556 2      incru i from 0 to REC_ALLOCATE - 1 do
4557 3          begin
4558 3              OUT$STD_BUF [., CMD WRD] = %o'100000'; !Define the slot as unused

```



```

4559 3      OUT$STD_BUF [.i, ENV ADR] = ZERO;      !Clear out the envelope adrs field
4560 2      end;
4561 2
4562 2      !+
4563 2      ! No errors detected by this routine so
4564 2      ! return with an non error code of false.
4565 2      !
4566 2
4567 2      return PAS_CODE;
4568 1      end;

```

```

0000 004137 000000G      .SBTTL INIT.COM.AREA GLOBAL ROUTINE DECLARATIONS
INIT.COM.AREA::
0004 012701 000004      JSR      R1,$SAVE3      ;      4400
0010 005002      MOV      #4,R1      ; *,I      4467
0012 010100      1$: CLR      R2      ; J      4469
0014 060200      2$: MOV      R1,RO      ; I,*      4476
0016 006300      ADD      R2,RO      ; J,*
0020 005760 000000G      ASL      RO
TST      COM.AREA(RO)
0024 001403      BEQ      3$
0026 012700 000001      MOV      #1,RO
0032 000207      RTS      PC
0034 005202      3$: INC      R2      ; J      4469
0036 020227 000001      CMP      R2,#1      ; J,*
0042 101763      BLOS     2$
0044 062701 000002      ADD      #2,R1      ; *,I      4467
0050 020127 000022      CMP      R1,#22     ; I,*
0054 101755      BLOS     1$
0056 012737 000000G 000000G      MOV      #COM.AREA,HEAD.AREA      ;      4485
0064 012737 000010G 000000G      MOV      #COM.AREA+10,RECEIVE.RING      ;      4486
0072 012737 000030G 000000G      MOV      #COM.AREA+30,SEND.RING      ;      4487
0100 005000      CLR      RO      ; I      4495
0102 010001      4$: MOV      RO,R1      ; I,*      4496
0104 063701 000000G      ADD      HEAD.AREA,R1
0110 005011      CLR      (R1)
0112 062700 000002      ADD      #2,RO      ; *,I      4495
0116 020027 000006      CMP      RO,#6      ; I,*
0122 101767      BLOS     4$
0124 005003      CLR      R3      ; I      4505
0126 010301      5$: MOV      R3,R1      ; I,*      4507
0130 006301      ASL      R1
0132 006301      ASL      R1
0134 010102      MOV      R1,R2
0136 063702 000000G      ADD      SEND.RING,R2
0142 010346      MOV      R3,-(SP)      ; I,*
0144 012746 000054      MOV      #54,-(SP)
0150 004737 000000G      JSR      PC,BL$MUL
0154 062700 000004G      ADD      #SND.ENVELOPE+4,RO
0160 010012      MOV      RO,(R2)
0162 010100      MOV      R1,RO      ;      4508
0164 063700 000000G      ADD      SEND.RING,RO

```

00170	062700	000002		ADD	#2,R0		
00174	012710	040000		MOV	#40000,(R0)	:	4512
00200	022626			CMP	(SP)+,(SP)+	:	4506
00202	005203			INC	R3	: I	4505
00204	020327	000003		CMP	R3,#3	: I,*	
00210	101746			BLOS	5\$		
00212	005003			CLR	R3	: I	4522
00214	010301		6\$:	MOV	R3,R1	: I,*	4524
00216	006301			ASL	R1		
00220	006301			ASL	R1		
00222	010102			MOV	R1,R2		
00224	063702	000000G		ADD	RECEIVE.RING,R2		
00230	010300			MOV	R3,R0	: I,*	
00232	000300			SWAB	R0		
00234	106000			RORB	R0		
00236	006000			ROR	R0		
00240	006000			ROR	R0		
00242	142700	000077		BICB	#77,R0		
00246	062700	000004G		ADD	#REC.ENVELOPE+4,R0		
00252	010012			MOV	R0,(R2)		
00254	010100			MOV	R1,R0	:	4525
00256	063700	000000G		ADD	RECEIVE.RING,R0		
00262	062700	000002		ADD	#2,R0		
00266	012710	140000		MOV	#140000,(R0)	:	4529
00272	005203			INC	R3	: I	4522
00274	020327	000003		CMP	R3,#3	: I,*	
00300	101745			BLOS	6\$		
00302	012737	177777	000000G	MOV	#-1,NRD.SLOT	:	4537
00310	012737	177777	000000G	MOV	#-1,NSD.SLOT	:	4538
00316	105037	000000G		CLRB	NXT.CRN	:	4539
00322	005000			CLR	R0	: I	4546
00324	012760	000074	000000G	MOV	#74,REC.ENVELOPE(R0)	: *,*(I)	4547
00332	062700	000100		ADD	#100,R0	: *,I	4546
00336	020027	000300		CMP	R0,#300	: I,*	
00342	101770			BLOS	7\$		
00344	005000			CLR	R0	: I	4556
00346	012760	100000	000000G	MOV	#-100000,OUT\$STD.BUF(R0)	: *,*(I)	4558
00354	005060	000002G		CLR	OUT\$STD.BUF+2(R0)	: *(I)	4559
00360	062700	000004		ADD	#4,R0	: *,I	4556
00364	020027	000014		CMP	R0,#14	: I,*	
00370	101766			BLOS	8\$		
00372	005000			CLR	R0	:	4458
00374	000207			RTS	PC	:	4400

Routine Size: 127 words, Routine Base: \$CODE\$ + 5570  
 Maximum stack depth per invocation: 7 words

```

4569 1    global routine copy (fff, ttt, length) = !copy a string
4570 2      begin
4571 2        incru i from 0 to .length by 2 do
4572 3          .ttt + .i - .(.fff + .i)
4573 1      end;
```



RDR4 RDR4 DISK FORMATTER  
% C FAITH 0 GLOBAL ROUTINE DECLARATIONS

5 Mar 1984 14:51:26  
5 Mar 1984 14:40:58

VAX-11 B1:es 16 V4.0 579  
DISK:USER2:[YOUNG.FMT]ZROB4.B16:5

SEQ 0176  
Page 93  
(24)

COMMAND LINE IF ILPS

BLISS/POP11/LIST ZROB4.B16 EN:NOEIS/SOURCE-PAGE:53

Size: 1614 code + 0 data words  
Run time: 01:09.3  
Elapsed time: 03:21.1  
User CPU Min: 3964  
System CPU Min: 19086  
Memory used: 514 pages  
Compilation Complete

RDRX

RDRX DISK FORMATTER

5 Mar 1984 14:54:53  
5 Mar 1984 14:41:21

0001 0  
0002 0  
0003 0  
0004 0  
0005 1  
0006 1  
0007 1  
0008 1  
0009 1  
1545 1  
1546 1  
1547 1  
1548 1

```

MODULE ZROB5 (@TITLE RDRX DISK FORMATTER
IDENT = 'REV C PATCH 0',
ADDRESSING MODE (ABSOLUTE),
ENVIRONMENT (NOEIS)) =

BEGIN

LIBRARY 'ZROBBO.L16' ;           !Define RDRX Formatter library

REQUIRE 'BLSMAC.REQ' ;        !Define Bliss macro require file

@SBTTL 'LAST ADDRESS AND SETUP SECTION'

```

1549 1  
1550 1  
1551 1  
1552 1  
1553 1  
1554 1  
1555 1  
1556 2  
1557 2  
1558 2  
1559 2  
1560 2  
1561 2  
1562 2  
1563 2  
1564 2  
1565 2  
1566 2  
1567 2  
1568 2  
1569 2  
1570 2  
1571 2  
1572 2  
1573 2  
1574 2  
1575 2  
1576 2  
1577 2  
1578 2  
1579 2  
1580 2  
1581 2  
1582 2  
1583 2  
1584 2  
1585 2  
1586 2  
1587 2  
1588 2  
1589 2  
1590 2  
1591 2  
1592 2  
1593 2  
1594 2  
1595 2  
1596 2  
1597 2  
1598 1

!.  
! The LASTAD macro must be the final statement (except .end) in a pro  
! gram. The call generates an even address reflecting the first word of  
! memory unused by the program.  
!.

LASTAD

!.  
! Hardcoded P-TABLES  
!  
! These optional hardware P-TABLES are located (when present) between  
! the "LASTAD" macro and the ".END" statement. These hardware P TABLES  
! are above and beyond the default hardware P TABLE located in the main  
! body of the program. These P-TABLES wind up appended to the BIN file  
! of the diagnostic, just as though the supervisor or the "SETUP" utility  
! had built them there. Thus the diagnostic can be "pre-parameterized"  
! by the programmer.  
!  
! If this hardcoded P\_TABLE section is not wanted then define "number" in  
! the BGNSETUP macro to zero and omitt BGNPTAB and ENDTAB macros.

Coding sample is as follows:

```
LASTAD
BGNSETUP (Number)      !Number of P-TABLES
BGNPTAB
(DATA)
(DATA)
(DATA)
ENDPTAB
BGNPTAB
(DATA)
(DATA)
(DATA)
ENDPTAB
ENDSETUP
.END
```

```
BGNSETUP (1);
BGNPTAB
#0'172150', #0'154', 4, 0
ENDPTAB
ENDSETUP
```

.TITLE ZRQBS RDRX DISK FORMATTER



RDY DISK FORMATTER  
C PATCH 0 LAST ADDRESS AND SETUP SECTION

5 Mar 1984 14:54:53  
5 Mar 1984 14:41:21

VAX 11 Bliss 16 V4.0 579  
DISK\$USER2:[YOUNG.FMT]ZROB5.B16;2

SEQ 0200  
Page 4  
(2)

COMMAND QUALIFIERS

BLISS/PDP11/LIST ZROB5.B16/EN:NOEIS/SOURCE+PAGE:53

2e: 1 code - 9 data words  
Run Time: 00:07.3  
Lapsed Time: 00:22.9  
Lines/CPU Min: 13186  
Execs/CPU Min: 66585  
Memory Used: 106 pages  
Compilation Complete



```

1      ; THIS SHORT SUBROUTINE ALLOWS THE FORMATTER TO WORK ON EITHER
2      ; AN F-11 OR J 11 BY LOADING EITHER A 1 OR A 5 INTO GLOBAL LOCATON
3      ; L$CPU. THE DELAY COUNTER IS MULTIPLIED BY THIS VALUE, WHICH IS
4      ; THE RATIO OF THE CPU SPEEDS.
5
6      000005      ORION  -      5      ;RELATIVE CPU SPEEDS
7      000001      LCP    -      1
8
9      000003      LCPTYP -      3      ;KDF11 PROCESSOR TYPE CODE
10
11 000000      .PSECT $CPU$
12
13 000000      SETCPU::
14 000000 010046      MOV     RO,-(SP)
15 000002 012767 000001 000000G      MOV     #LCP,L$CPU
16 000010 000007      MFPT
17 000012 020027 000003      CMP     RO,#LCPTYP      ;11 23?
18 000016 001403      BEQ     10$      ;YES, MULTIPLIER OF 1
19 000020 012767 000005 000000G      MOV     #ORION,L$CPU      ;NO, SET MULTIPLIER OF 5
20 000026 012600      10$:  MOV     (SP)+,RO
21 000030 000207      RTS     PC
22      000001      .END

```

COL TABLE

000001 LCPTYP= 000003 LSCPU - \*\*\*\*\* GX ORION = 000005 SETCPU 00000000 002

05. 000000 000  
000000 001  
08 000032 002  
WORDS DETECTED: 0

ACTUAL MEMORY USED: 45 WORDS ( 1 PAGES)  
MIC MEMORY: 20060 WORDS ( 77 PAGES)  
USED TIME: 00:00:06  
CPU.OBJ,SETCPU.LIS/-SP=SETCPU.MAC

FILE RDRX FORMATTER LIBRARY MODULE

ttl MACRO DEFINITIONS

```

no
WRT RDRX (O, FIELDNAM, IMAGE) =
begin
local
  RC%M_REG;
RC%M_REG = .RDRX_ADDR [O, RC_ALL];
RC%M_REG <#fieldexpand (FIELDNAM)> = IMAGE;
(.RDRX_ADDR + #val*O) = .RC%M_REG;
end%

```

ap Protocol Macros Declarations

```

REC_BASE =
  HDR_SIZ, 0, 0, 16, 0%;
SND_BASE =
  HDR_SIZ + REC_ALLOCATE , 0, 0, 16, 0%;

```

macro to clear out the DUP send data text buffer before requesting input form operator. This by default puts a null byte at the end of the ascii input.

```

CLR_SBUF =
  incru i from 0 to SNDB_SIZE - 1 do
    SND_BUF [i] = ZEROS;%

```

macro to clear out the DUP send data text buffer before requesting input form operator. This by default puts a null byte at the end of the ascii input.

```

CLR_RBUF =
  incru i from 0 to ESZ_RED - 1 do
    msgadr+i = ZEROS;%

```

general purpose word reference field select

```

WORD_REF =
  0, 16, 0%;

```

ral

## T DIFINITIONS

```
BIT15 = %0'100000'.
BIT14 = %0'40000'.
BIT13 = %0'20000'.
BIT12 = %0'10000'.
BIT11 = %0'4000'.
BIT10 = %0'2000'.
BIT09 = %0'1000'.
BIT08 = %0'400'.
BIT07 = %0'200'.
BIT06 = %0'100'.
BIT05 = %0'40'.
BIT04 = %0'20'.
BIT03 = %0'10'.
BIT02 = %0'4'.
BIT01 = %0'2'.
BIT00 = %0'1'.
!
BIT9 = BIT09.
BIT8 = BIT08.
BIT7 = BIT07.
BIT6 = BIT06.
BIT5 = BIT05.
BIT4 = BIT04.
BIT3 = BIT03.
BIT2 = BIT02.
BIT1 = BIT01.
BIT0 = BIT00.
```

## ENT FLAG DEFINITIONS

EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION

```
EF_START = 32,           ! START COMMAND WAS ISSUED
EF_RESTART = 31,        ! RESTART COMMAND WAS ISSUED
EF_CONTINUE = 30,       ! CONTINUE COMMAND WAS ISSUED
EF_NEW = 29,            ! A NEW PASS HAS BEEN STARTED
EF_PWR = 28,           ! A POWER-FAIL/POWER-UP OCCURRED
```

## RIORITY LEVEL DEFINITIONS

```
PRI07 = %0'340'.
PRI06 = %0'300'.
PRI05 = %0'240'.
PRI04 = %0'200'.
PRI03 = %0'140'.
PRI02 = %0'100'.
PRI01 = %0'40'.
PRI00 = %0'0'.
```

## RATOR FLAG BITS

VL = 4'  
JT = 10'  
DR = 20'  
DU = 40'  
SR = 100'  
AM = 200'  
OE = 400'  
NT = 1000'  
RI = 2000'  
XE = 4000'  
BE = 10000'  
ER = 20000'  
OE = 40000'  
OE = 100000'

message selection literals

MSG0 = 0.	!Select message 0
MSG1 = 1.	!Select message 1
MSG2 = 2.	!Select message 2
MSG3 = 3.	!Select message 3
MSG4 = 4.	!Select message 4
MSG5 = 5.	!Select message 5
MSG6 = 6.	!Select message 6
MSG7 = 7.	!Select message 7
MSG8 = 8.	!Select message 8
MSG9 = 9.	!Select message 9
MSG10 = 10.	!Select message 10
MSG11 = 11.	!Select message 11
MSG12 = 12.	!Select message 12
MSG13 = 13.	!Select message 13
MSG14 = 14.	!Select message 14
MSG15 = 15.	!Select message 15
MSG16 = 16.	!Select message 16
MSG17 = 17.	!Select message 17
MSG18 = 18.	!Select message 18
MSG19 = 19.	!Select message 19
MSG20 = 20.	!Select message 20
MSG21 = 21.	!Select message 21
MSG22 = 22.	!Select message 22
MSG23 = 23.	!Select message 23
MSG24 = 24.	!Select message 24
MSG25 = 25.	!Select message 25
MSG26 = 26.	!Select message 26
MSG27 = 27.	!Select message 27
MSG28 = 28.	!Select message 28
MSG29 = 29.	!Select message 29
MSG30 = 30.	!Select message 30

## miscellaneous literals

```

FAILURE = 0,           !Failure return code
SUCCESS = 1,          !Success return code
BLK0 = 0,             !Selects block 0 of struct
BLK1 = 1,             !Selects block 1 of struct
BLK2 = 2,             !Selects block 2 of struct
BLK3 = 3,             !Selects block 3 of struct
WRD0 = 0,             !Selects word 0 of block
WRD1 = 1,             !Selects word 1 of block
WRD2 = 2,             !Selects word 2 of block
WRD3 = 3,             !Selects word 3 of block
WRD4 = 4,             !Selects word 4 of block
WRD5 = 5,             !Selects word 5 of block
WRD6 = 6,             !Selects word 6 of block
SRD = 0,              !Select the read word (1st) in ISD_STRUCTURE
SWRT = 1,             !Select the write word (2nd) in ISD_STRUCTURE
TEP1 = 0,             !Initialization sequence step one
TEP4 = 3,             !Initialization sequence step two
TRUE = 1,             !True indicator
FALSE = 0,            !False indicator
SET_FLG = 1,          !Set the indicated flag to one
LR_FLG = 0,           !Clear the indicated flag to zero
ONE = 1,              !Ones data type
ZERO = 0,             !Zero data type
ONES = %b'177777',   !All ones data type
ZEROS = 0,            !All zeros data type
$LIMIT = 16,          !Allowable number of units to format
M_SIZE = 8192,        !Size of DM buffer size
CT_SIZE = 4096,       !Size of fct buffer size

```

Command opcode bits 6 and 7 indicate the type of message  
(command, end or attention message). The following literals  
define these field values.

```

MD$MSG = %b'00',     !Command opcode message type
TT$MSG = %b'01',     !Attention opcode msg type
ND$MSG = %b'10',     !End opcode message type

```

```

: Error code literals
:
PAS_CODE = #0'00'.      !Pass code
CIE_CODE = #0'01'.      !Communication area init error
CTO_CODE = #0'11'.      !Controller time out error
PFE_CODE = #0'21'.      !Port fatal error
RSE_CODE = #0'31'.      !response status error
PVE_CODE = #0'41'.      !Host/Controller out of sequence
RPD_CODE = #0'51'.      !Remote program died error code
PSE_CODE = #0'61'.      !Port/host synchronous error
MLE_CODE = #0'71'.      !Message length error code
UEC_CODE = #0'101'.     !Unknown end code error
APR_CODE = #0'201'.     !Adaptor purge request error
UIN_CODE = #0'301'.     !Unknown interrupt error code
ATN_CODE = #0'401'.     !Attention msg received
CMD_CODE = #0'501'.     !Command msg received
SEX_CODE = #0'601'.     !Serious exception error received
IVC_CODE = #0'701'.     !Invalid command error received
UMT_CODE = #0'1001'.    !Unknown message type
OBF_CODE = #0'2001'.    !Out standing buffer full error
OSE_CODE = #0'3001'.    !Outstd_buffer out of sync error
UMN_CODE = #0'4001'.    !Unknown message number
FRE_CODE = #0'5001'.    !File read error code from load media
:
: Dup Protocol literals
:
: Note:
: The values assigned to the literals
: REC_SIZ, SND_SIZ are represented in
: powers of 2 notation per DUP spec.
:
: By redefining these two literals the
: communications area allocation and init
: sequence is automatically handled and
: no other parameter modification is needed.
:
: Further more the send and receive rings
: can be of different lengths. However the
: maximum value allowed is 7 (2**7 = 128 slots)
: per DUP spec.
:
REC_SIZ = 2,           !Define number of receive slots
SND_SIZ = 2,           !Define number of send slots

```



```

: This one is tricky: (Hdr siz)
: The communication area is defined to be a
: contiguous Blockvector (two words per block)
: data segment of size, Rec allocate + Snd allocate +
: Hdr siz. The two words per block coming from the
: two words needed to represent the ring descriptors.

: Hdr siz is then really + 2 or 4 words of storage
: to represent the interrupt and purge indicators.

HDR_SIZ = 2,                                !Define com area header size 4 words

REC_ALLOCATE = 1*REC_SIZ,                   !Define receive ring allocation
SND_ALLOCATE = 1*SND_SIZ,                   !Define send ring allocation
:
: Ring size equals the total number of ring descriptors
: (number of 2 word blocks) allocated within the
: communications area.
RING_SIZE = REC_ALLOCATE + SND_ALLOCATE + HDR_SIZ,

: The RB_SIZ by definition, DUP spec, must be
: a minimum of 60 bytes long (30 words) 64 bytes
: overall. The additional 2 words for the UQ
: port information is accounted for in azkel2
: when the storage is allocated.

RB_SIZE = 30,                                !Number of "words" in response buffer

: The biggest command I'll ever send will
: be (I hope) will be 40 bytes, 42 overall,
: and again the UQ port 2 words is allowed
: for in azkel2.

SB_SIZE = 20,                                !Number of "words" in send buffer
:
: Send DUP cmd text buffer size
SNOB_SIZE = 37,
: Byte count to send to RDRX Formatter
SNOB_COUNT = 16,
: Receive DUP cmd text buffer size
RECB_SIZE = 120,
: Descriptor owned by port
PORT_OWNED = 1,
: Descriptor owned by host
HOST_OWNED = 0,

```

## : Delay interval values

: An argument of one results in a 100us delay.

: A roman numeral notation is used to denote values of delay arguments. The notation is as follows:

: I (1), V (5), X (10), L (50), C (100), D (500), M (1000)

: Any symbol following another of equal or greater value adds to its value, as II = 2, XI = 11.

: Any symbol preceding one of greater value subtracts from the second and the remainder added to the first as XIV = 14, LIX = 59.

ONE_SEC = 10000.	!One second delay argument
C_US = 1.	!100 micro sec delay argument
CC_US = 2.	!200 micro sec delay argument
CCC_US = 3.	!300 micro sec delay argument
XC_US = 4.	!400 micro sec delay argument
D_US = 5.	!500 micro sec delay argument

## : RDRX register offsets

RCIP = 0.  
RCSA = 1.: Command packet opcodes  
(See note following)

OP_ABO = %0'1'	!Abort command
OP_ACC = %0'20'	!Access command
OP_AVL = %0'10'	!Available command
OP_CCD = %0'21'	!Compare controller data command
OP_CMP = %0'40'	!Compare host data command
OP_DAP = %0'17'	!Determine access path
OP_ERS = %0'22'	!Erase command
OP_FLU = %0'23'	!Flush command
OP_GCS = %0'02'	!Get command status command
OP_GUS = %0'03'	!Get unit status command
OP_ONL = %0'11'	!Online command
OP_RD = %0'41'	!Read command
OP_RPL = %0'24'	!Replace command
OP_SCC = %0'04'	!Set controller characteristics command
OP_SUC = %0'12'	!Set unit characteristics command
OP_WR = %0'42'	!Write command
OP_MRD = %0'30'	!Maintenance read command
OP_MWR = %0'31'	!Maintenance write command

! End message and serious exception encodes  
(see note following)

OP\_END = %0'200', !End packet flag  
OP\_SEX = %0', !Serious exception end packet

! MSCP Attention message encodes

OP\_AVA = %0'100', !Available attention message  
OP\_DUP = %0'101', !Duplicate unit number attention message  
OP\_ACP = %0'102', !Access path attention message  
OP\_RLC = %0'103', !Reset command limit attention message

! The following are the dup op code commands

OP\_GDS = %0'1', !Get dust status  
OP\_ESP = %0'2', !Execute supplied program  
OP\_ELP = %0'3', !Execute local program  
OP\_SED = %0'4', !Send data  
OP\_RED = %0'5', !Receive data  
OP\_ABT = %0'6', !Abort program

NOTE:

End message opcodes (also called encodes) are formed by adding the end message flag to the command opcode. For example, a READ command's end message contains the value OP.RED + OP.END in its opcode field. The Invalid command end message contains just the end message flag (i.e., OP.END) in its opcode field. The serious exception opcode shown above (i.e., OP.SEX + OP.END) in its opcode field.

Commands opcode bits 6 and 7 indicate the type of message (command, end or attention message). Command opcodes bits 3 through 5 indicate the command category (immediate, sequential or no-sequential) and whether or not the command includes a buffer descriptor.

See MSCP document appendix "A 1 NOTE:" for more information on this topic.

! DUP encode message types

EOP\_GDS = OP\_GDS + OP\_END, !Get dust status  
EOP\_ESP = OP\_ESP + OP\_END, !Execute supplied program  
EOP\_ELP = OP\_ELP + OP\_END, !Execute local program  
EOP\_RED = OP\_RED + OP\_END, !Receive data  
EOP\_SED = OP\_SED + OP\_END, !Send data  
EOP\_ABT = OP\_ABT + OP\_END, !Abort program

```

: MSCP encode message types
:
: EOP_ABO = OP_ABO * OP_END.           !Abort command
: EOP_ACC = OP_ACC * OP_END.           !Access command
: EOP_AVL = OP_AVL * OP_END.           !Available command
: EOP_CCD = OP_CCD * OP_END.           !Compare controller data command
: EOP_CMP = OP_CMP * OP_END.           !Compare host data command
: EOP_ERS = OP_ERS * OP_END.           !Erase command
: EOP_FLU = OP_FLU * OP_END.           !Flush command
: EOP_GCS = OP_GCS * OP_END.           !Get command status command
: EOP_GUS = OP_GUS * OP_END.           !Get unit status command
: EOP_ONL = OP_ONL * OP_END.           !Online command
: EOP_RD = OP_RD * OP_END.             !Read command
: EOP_RPL = OP_RPL * OP_END.           !Replace command
: EOP_SCC = OP_SCC * OP_END.           !Set controller characteristics command
: EOP_SUC = OP_SUC * OP_END.           !Set unit characteristics command
: EOP_WR = OP_WR * OP_END.             !Write command
: EOP_MRD = OP_MRD * OP_END.           !Maintenance read command
: EOP_MWR = OP_MWR * OP_END.           !Maintenance write command
: EOP_SEX = OP_SEX * OP_END.           !Serious exception
:
: Dup Command message envelope
: byte sizes beginning at text.0
: of the command envelope.
:
: SZ_GDS = 12.                         !Get dust status size
: SZ_ESP = 40.                         !Execute supplied program size
: SZ_ELP = 48.                         !Execute local program size
: SZ_RED = 28.                         !Receive data size
: SZ_SED = 28.                         !Send data size
: SZ_ABT = 12.                         !Abort program size
:
: MSCP Command message envelope
: byte sizes beginning at text.0
: of the command envelope.
:
: SZ_SCC = 32.                         !Set Controller characteristics
: SZ_ONL = 36.                         !On line command

```

```

:
: The following are the expected number of bytes
: in a commands end packet transmitted by the
: communications mechanism to the host.
:

```

```

: DUP command end message sizes
:

```

```

ESZ_GDS = #DECIMAL '22',      !Get dust status end packet size
ESZ_ESP = #DECIMAL '12',      !Execute supplied prog end packet size
ESZ_FLP = #DECIMAL '16',      !Execute local prog end packet size
ESZ_RED = #DECIMAL '48',      !Receive data end packet size
ESZ_SED = #DECIMAL '48',      !Send data end packet size
ESZ_ABT = #DECIMAL '12',      !Abort program end packet size

```

```

: MSCP command end message sizes
:

```

```

ESZ_SCC = #DECIMAL '28',      !Set controller characteristics
ESZ_ONL = #DECIMAL '44',      !On line command

```

```

: DUP STANDALONE FLAG MODIFIER
:

```

```

DUP_STND = 1,

```

```

: JDT Trap Vector
:

```

```

O_TVEC = #0 14 ;

```

\*sbttl FIELD DECLARATIONS\*

field

Definitions:

ISD\_FIELD - Initialization Sequence Data Field

ISRD - Initialization Sequence Read = 0

ISWRT - Initialization Sequence Write = 1

S1R - Step One Read

S1W - Step One Write

etc.

ISD FIELD

```

set
:
: Miscellaneous status register field
: reference declarations.
:
RC_ALL = [0, 16, 0],           !RDRX word access
ERR_BIT = [15, 1, 0],         !Error bit
ISR_ALL = [0, 16, 0],         !Initialize sequence read word
ISW_ALL = [0, 16, 0],         !Initialize sequence write word
STP_FIELD = [11, 4, 0],       !All step bit fields
SA_GO = [0, 1, 0],           !Status register GO bit
ERR_CODE = [0, 11, 0],       !SA register fatal error code
:
: Step one read SA register field reference
:
S1R_STEP = [11, 1, 0],        !Step one step bit
S1R_NV = [10, 1, 0],         !No host inter vec settable adrs
S1R_QB = [9, 1, 0],          !22-bit addressing support
S1R_DI = [8, 1, 0],          !Enhanced diag implementation
S1R_RSVD = [0, 8, 0],        !Reserved field
:
: Step one write SA register field reference
:
S1W_WR = [14, 1, 0],          !Diag wrap around
S1W_CRING = [11, 3, 0],       !Number of C-ring slots 'pwr of 2'
S1W_RRING = [8, 3, 0],        !Number of R-ring slots 'pwr of 2'
S1W_IE = [7, 1, 0],          !Init Sequence interrupt request
S1W_VADR = [0, 7, 0],        !Interrupt vector address
:
: Step two read SA register field reference
:
S2R_STEP = [12, 1, 0],        !Step two step bit
S2R_PTYP = [8, 3, 0],         !Port type number
S2R_BIT7 = [7, 1, 0],        !Echoed IE bit from step one write
S2R_WR = [6, 1, 0],          !Echoed bit 14 from step one write
S2R_CRING = [3, 3, 0],        !Echoed bits 3-5 from step one write
S2R_RRING = [0, 3, 0],        !Echoed bits 0-2 from step one write
:
: Step two write SA register field reference
:
S2W_LRBASE = [0, 16, 0],      !Ring base lower address
S2W_PI = [0, 1, 0],          !Adapter purge interrupt request
:
: Step three read SA register field reference
:
S3R_STEP = [13, 1, 0],        !Step three step bit
S3R_RSVD = [8, 3, 0],         !Reserved
S3R_IE = [7, 1, 0],          !Echoed IE bit from step one write
S3R_VADR = [0, 7, 0],        !Echoed VADR from step one write
:
: Step three write SA register field reference
:
S3W_PP = [15, 1, 0],          !Purge & Poll test request
S3W_HRBASE = [0, 15, 0],     !Ring base high address

```

```
:  
: Step four read SA register field reference  
:  
S4R_STEP = [14, 1, 0],           !Step four step bit  
S4R_RSVD = [8, 3, 0],           !Reserved  
S4R_MOD = [4, 4, 0],            !Controller u CODE version  
S4R_VER = [0, 4, 0],            !Controller u CODE version  
:  
: Step four write SA register field reference  
:  
S4W_RSVD = [8, 8, 0],           !Reserved  
S4W_BURST = [2, 6, 0],          !Max number longwords per NPR xfer  
S4W_LF = [1, 1, 0],            !Last fail request  
S4W_GO = [0, 1, 0]              !Go bit  
tes,
```



old declaration to define the interrupt  
indicator and purge words of the communications  
area.

HDR FIELD =

set

Header Word Ringbase 4

RESERVED [0, 0, 16, 0].

Header Word Ringbase 3

RSVD = [1, 0, 8, 0].

ADP CH [1, 8, 8, 0].

Header Word Ringbase 2

CMD INT = [2, 0, 16, 0].

Header Word Ringbase 1

RSP\_INT = [3, 0, 16, 0]

tes.

!!  
!! field declaration to define the fields within  
!! the send and receive ring descriptors.  
!!

DSC FIELD =

set

!! Low order envelope address

LO\_EN\$AD = [0, 0, 16, 0],

!! High order 18 bit unibus or Qbus address

HI\_EN\$AD = [1, 0, 2, 0],

!! Q\_Bus extention address

QB\_EXT = [1, 2, 4, 0],

!! Reserver field

D\$RSVD = [1, 6, 8, 0],

!! Flag bit

FLAG BIT = [1, 14, 1, 0],

!! Ownership bit

OWN\_BIT = [1, 15, 1, 0]

tes,

```
!-  
!- field declaration to define the fields within  
!- message envelope buffers.  
!-
```

```
ENV FIELD =
```

```
set
```

```
!-
```

```
! UQ Port envelope header field declaration
```

```
!-
```

```
MSG_LENGTH = [0, 0, 16, 0],           !Message length  
CREDITS = [1, 0, 4, 0],               !Credits  
MSG_TYPE = [1, 4, 4, 0],             !Message type  
CONN ID [1, 8, 8, 0],                !Connection ID
```

```

! DUP/MSCP command and response envelope header
! field declaration

```

```

CMD_LREF = [2, 0, 16, 0].      !Command Ref number low word
CMD_HREF = [3, 0, 16, 0].      !Command Ref number high word
UNIT_NUM = [4, 0, 16, 0].      !Unit selection field
UN_LUSED = [4, 0, 16, 0].      !Unused low word
UN_HUSED = [5, 0, 16, 0].      !Unused high word
TYP$MSG = [6, 6, 2, 0].        !End code message type
OPCODE = [6, 0, 8, 0].         !Opcode
ENDCODE = [6, 0, 8, 0].        !Opcode
E$FLAG = [6, 8, 8, 0].         !End message flag field
RSVD = [6, 8, 8, 0].           !Reserved
STATUS = [7, 0, 16, 0].       !Status
MODIFIER = [7, 0, 16, 0].      !Modifier

```

```

!..
! DUP command and response envelope parameter
! field declarations

```

```

!..
! ABORT command and response envelope parameter
! field declaration

```

```

! No parameters declared
!
! response FIELD
! No parameters declared

```

```

!..
! GET DUST STATUS command and response envelope
! parameter field declaration

```

```

! COMMAND FIELD
! No parameters declared
!
! response FIELD

```

```

PLO_EXT = [8, 0, 16, 0].       !Program Extension low word
PHI_EXT = [9, 0, 8, 0].        !Program Extension high word
F$LAGS = [9, 8, 8, 0].         !Flags
FLG_B0 = [9, 8, 1, 0].         !Flag field bit 0
FLG_B1 = [9, 9, 1, 0].         !Flag field bit 1
FLG_B2 = [9, 10, 1, 0].        !Flag field bit 2
FLG_B3 = [9, 11, 1, 0].        !Flag field bit 3
PLO_IND = [10, 0, 16, 0].      !Progress indicator low word
PHI_IND = [11, 0, 16, 0].      !Progress indicator high word
TIM_OUT = [12, 0, 16, 0].      !Time out

```

```

: EXECUTE SUPPLIED PROGRAM command and response
: envelope parameter field declaration

```

```

: COMMAND FIELD

```

```

BLO_CNT = [8, 0, 16, 0],      !Byte count low word
BHI_CNT = [9, 0, 16, 0],      !Byte count high word
BPA_LO = [10, 0, 16, 0],      !Buffer physical adrs bits <0-15>
BPA_HI = [11, 0, 2, 0],       !Buffer physical adrs bits <16 17>
QBUS_EXT = [11, 2, 4, 0],     !Q bus extention
RSV = [11, 6, 2, 0],          !Reserved field
UBA_CHAN = [11, 8, 8, 0],     !Unibus adaptor channel number
RSV0 = [ 12, 0, 16, 0],       !These next four words are not
RSV1 = [ 13, 0, 16, 0],       !in the UQ port implementation.
RSV2 = [ 14, 0, 16, 0],
RSV3 = [ 15, 0, 16, 0],

```

```

: These next field definitions are the same
: as above except they are for the overlay
: buffer descriptors. To make life easy for
: me I'll use the same names and just prefix
: the names with a $ for uniqueness.

```

```

$BPA_LO = [16, 0, 16, 0],     !Buffer physical adrs bits <0 15>
$BPA_HI = [17, 0, 2, 0],      !Buffer physical adrs bits <16 17>
$QBUS_EXT = [17, 2, 4, 0],    !Q bus extention
$RSV = [17, 6, 2, 0],         !Reserved field
$UBA_CHAN = [17, 8, 8, 0],    !Unibus adaptor channel number
$RSV0 = [ 18, 0, 16, 0],      !These next four words are not
$RSV1 = [ 19, 0, 16, 0],      !in the UQ port implementation.
$RSV2 = [ 20, 0, 16, 0],
$RSV3 = [ 21, 0, 16, 0],

```

```

: response FIELD
: No parameters declared

```

```

: EXECUTE LOCAL PROGRAM command and response
: parameter field declaration

```

```

: COMMAND FIELD

```

```

PN_0 = [8, 0, 16, 0],        !Program name word 0
PN_1 = [9, 0, 16, 0],        !Program name word 1
PN_2 = [10, 0, 16, 0],       !Program name word 2

```

```

: response FIELD

```

```

version = [8, 0, 16, 0],      !Version
TIME OUT = [9, 0, 8, 0],      !Time out
FLAGS = [9, 8, 8, 0],         !Flags

```

C.

```
SEND DATA RECEIVE DATA command and response
parameter field declaration
```

```
COMMAND FIELD
byte count, buffer descriptor are the same
as Execute Supplied Program parameters
```

```
response FIELD
byte count is the same
as Execute Supplied Program parameters
```

```
MSCP command and response envelope parameter
field declarations
```

```
SET CONTROLLER CHARACTERISTICS command and response
parameter field declaration
```

COMMAND FIELD

```
MSCP_VER = [ 8, 0, 16, 0].
CTL_FLAGS = [ 9, 0, 16, 0].
MOST_TOV = [ 10, 0, 16, 0].
RSVD = [ 11, 0, 16, 0].
T&D_0 = [ 12, 0, 16, 0].
T&D_1 = [ 13, 0, 16, 0].
T&D_2 = [ 14, 0, 16, 0].
T&D_3 = [ 15, 0, 16, 0].
CDP_LO = [ 16, 0, 16, 0].
CDP_HI = [ 17, 0, 16, 0].
```

```
!MSCP version
!Controller flags
!Most time out value
!Reserved
!Time and Date word 0
!Time and Date word 1
!Time and Date word 2
!Time and Date word 3
!Cntlr dep parameter lo word
!Cntlr dep parameter hi wrd
```

RESPONSE FIELD

```
!MSCP_VER = [ 8, 0, 16, 0].
!CTL_FLAGS = [ 9, 0, 16, 0].
CTL_TOV = [ 10, 0, 16, 0].
CSVRSN = [ 11, 0, 8, 0].
CHVRSN = [ 11, 8, 8, 0].
CID_0 = [ 12, 0, 16, 0].
CID_1 = [ 13, 0, 16, 0].
CID_2 = [ 14, 0, 16, 0].
CID_3 = [ 15, 0, 16, 0].
```

```
!Same as cmd field
!Same as cmd field
!Cntlr time out value
!Cntlr S/W, F/W, u code rev num
!Cntlr H/W rev num
!Cntlr identifier wrd 0
!Cntlr identifier wrd 1
!Cntlr identifier wrd 2
!Cntlr identifier wrd 3
```

! ONE LINE COMMAND command and response  
parameter field declaration

COMMAND FIELD

RSVD*	= [ 8, 0, 16, 0].	!Reserved
UNT_FLAGS	= [ 9, 0, 16, 0].	!Unit flag field
RSVD#0	= [ 10, 0, 16, 0].	!Reserved field
RSVD#1	= [ 11, 0, 16, 0].	!Reserved field
RSVD#2	= [ 12, 0, 16, 0].	!Reserved field
RSVD#3	= [ 13, 0, 16, 0].	!Reserved field
RSVD#4	= [ 14, 0, 16, 0].	!Reserved field
RSVD#5	= [ 15, 0, 16, 0].	!Reserved field
DCP_LO	= [ 16, 0, 16, 0].	!Device dependent parameter
DDP_HI	= [ 17, 0, 16, 0].	!Device dependent parameter
SHADOW_UNIT	= [ 18, 0, 16, 0].	!Shadow unit
COPY_SPEED	= [ 19, 0, 16, 0].	!Copy speed

RESPONSE FIELD

MUNT_CODE	= [ 8, 0, 16, 0].	!Multi-unit code
UNT_FLAGS	= [ 9, 0, 16, 0].	!Same as cmd field
RSVD#0	= [ 10, 0, 16, 0].	!Same as cmd field
RSVD#1	= [ 11, 0, 16, 0].	!Same as cmd field
UID_0	= [ 12, 0, 16, 0].	!Unit ident word 0
UID_1	= [ 13, 0, 16, 0].	!Unit ident word 1
UID_2	= [ 14, 0, 16, 0].	!Unit ident word 2
UID_3	= [ 15, 0, 16, 0].	!Unit ident word 3
MTID_LO	= [ 16, 0, 16, 0].	!Media type ident word 0
MTID_HI	= [ 17, 0, 16, 0].	!Media type ident word
SHADOW_UNIT	= [ 18, 0, 16, 0].	!Same as cmd
SHA_STATE	= [ 19, 0, 16, 0].	!Shadow state
USZ_LO	= [ 20, 0, 16, 0].	!Unit size lo word
USZ_HI	= [ 21, 0, 16, 0].	!Unit size hi word
VSN_LO	= [ 22, 0, 16, 0].	!Volume serial num lo word
VSN_HI	= [ 23, 0, 16, 0].	!Volume serial num hi word

tes.

```
! *
! Send Receive command buffer field definition
! *
```

```
RECR_FIELD =
  set
  MSG_NUM = [0, 0, 12, 0],
  MSG_TYP = [0, 12, 4, 0],
  MSG_TXT = [1, 0, 16, 0]
  tes,
```

```
! *
! Outstanding command buffer field declarations
! *
```

```
OUT$FIELD =
  set
  CMD_WRD = [0, 0, 16, 0],           !Command word ref "word 0 of slot"
  REC_FLG = [0, 15, 1, 0],         !Command received indicator flag
  CMD_REF = [0, 0, 8, 0],          !Command reference field
  ENV_ADR = [1, 0, 16, 0]          !Envelope adrs field
  tes;
```



## \*sbtt1 LINKAGE DECLARATIONS

linkage

: Call lnk\$typ

: This specifies that the PDP 11 JSR and RTS instructions  
 : are used by the compiled code, and that the parameters  
 : with standard parameters locations are passed using  
 : register 5 (R5) as the argument pointer with the register  
 : usage as follows:

Register	Usage
0	Value return register, non-preserved
1 4	Preserved
5	Argument pointer
6	Stack pointer
7	Program counter

CALL\_LNK\$TYP = call (standard).

: Int\_ink\$typ

: Specifies that a routine will be called only by a PDP-11  
 : hardware or software interrupt and will be returned via  
 : the RTI instruction. Register usage is as follows:

Register	Default usage
0-5	Preserved
6	Stack pointer
7	Program pointer

INT\_LNK\$TYP = interrupt (standard);

literal

CODES FOR SUPERVISOR SERVICE CALLS

C\$RESERV	= 0.	!PRESERVED FOR THE SUPERVISOR.
C\$ETST	= 54.	!BLISS ENDTST SIGNIFY END OF TEST.
C\$BSUB	= 2.	!BLISS BGNSUB SIGNIFY START OF SUBTEST.
C\$ESUB	= 55.	!BLISS ENDSUB--SIGNIFY END OF SUBTEST.
C\$BSEG	= 4.	!BGNSEG--SIGNIFY START OF SEGMENT.
C\$ESEG	= 56.	!BLISS ENDSEG--SIGNIFY END OF SEGMENT.
C\$CLP1	= 53.	!BLISS CKLOOP--CHECK IF LOOP ON ERROR, WITHOUT A LABEL.
C\$RDBU	= 7.	!READBUS--READ TYPE OF BUS
C\$ESCAPE	= 52.	!BLISS ESCAPE--ESCAPE INNER BLOCK
C\$INIT	= 9.	!ENDINIT SIGNIFY END OF INITIALIZE CODE.
C\$CLEAN	= 10.	!ENDCLN- SIGNIFY END OF CLEAN-UP CODE.
C\$TPRI	= 11.	!TRAPPRI--SET TRAP PRIORITY
C\$PNTB	= 12.	!PRINTB -PRINT BASIC EXPANSION OF ERROR INFO.
C\$PNTX	= 13.	!PRINTX--PRINT NON-BASIC EXPANSION OF ERROR INFO.
C\$PNTS	= 14.	!PRINTS--PRINT A STATISTICAL REPORT.
C\$PNTF	= 15.	!PRINTF -PRINT A FORCED MESSAGE.
C\$INLP	= 16.	!INLOOP--TEST IF PROGRAM IS IN AN ERROR LOOP.
C\$RFLA	= 17.	!RFLAGS--RETRIEVE FLAG SETTINGS OF THE DRS
C\$BRK	= 18.	!BREAK -BREAK TO THE SUPERVISOR.
C\$MSG	= 19.	!ENDMSG--END A BLOCK OF ERROR REPORTING CODE.
C\$DRPT	= 20.	!DORPT--CALL STATISTICAL REPORT CODE.
C\$RPT	= 21.	!ENDRPT--SIGNIFY END OF STATISTICAL REPORT.
C\$GETB	= 22.	!GETBYTE- GET A BYTE FROM AN XXDP+ DATA FILE
C\$GETW	= 23.	!GETWORD--GET A WORD FROM AN XXDP+ DATA FILE
C\$GPLO	= 24.	!GPLOAD--GET PARAMETERS OF THE LOAD DEVICE
C\$MEM	= 25.	!MEMORY -GET POINTER TO FREE MEMORY.
C\$EXIT	= 51.	!BLISS EXIT--UNCONDITIONALLY EXIT TEST, SUBTEST, OR SEGMENT.
C\$RESET	= 27.	!BRESET--BUS RESET.
C\$OPEN	= 28.	!OPEN AN XXDP+ DATA FILE FOR READ
C\$CLOS	= 29.	!CLOSE THE OPEN XXDP+ DATA FILE
C\$CVEC	= 30.	!CLRVEC--RESTORE AN INTERRUPT VECTOR.
C\$SVEC	= 31.	!SETVEC--SETUP AN INTERRUPT VECTOR.
C\$GPRI	= 32.	!GETPRI--GET PRIORITY LEVEL.
C\$SPRI	= 33.	!SETPRI--SET PRIORITY LEVEL.
C\$GPHRD	= 34.	!GPHARD--GET H.W. P-TABLE ADR. SPECIFIED
C\$GMAN	= 35.	!GMANI--GET MANUAL INTERVENTION.
C\$DCLN	= 36.	!DOCLN--CALL CLEANUP CODE.
C\$CEFG	= 37.	!CLREF--CLEAR EVENT FLAG.
C\$SEFG	= 38.	!SETEF--SET EVENT FLAG.
C\$REFG	= 39.	!READEF--READ EVENT FLAG.
C\$MANI	= 40.	!MANUAL -DETERMINE IF MANUAL INTERVENTION USED
C\$DODU	= 41.	!DODO--DROP UNITS
C\$AU	= 42.	!ENDAU--SIGNIFY END OF ADD UNITS CODE
C\$DU	= 43.	!ENDDU--SIGNIFY END OF DROP UNITS CODE
C\$ERSF	= 44.	!ERRSF--SYSTEM FATAL ERROR.
C\$ERDF	= 45.	!EWRDF -DEVICE FATAL ERROR.
C\$ERHRD	= 46.	!ERRHRD--MEDIA HARD ERROR.
C\$ERSOFT	= 47.	!ERRSOFT--MEDIA SOFT ERROR.
C\$ERROR	= 48.	!ERROR- DIAG. MODIFIABLE ERROR CALL
C\$AJTO	= 49.	!ENDAUTO--SIGNIFY END OF AUTO CODE
C\$CLCK	= 50.	!CLOCK -GET ADDRESS OF CLOCK TABLE
C\$QIO	= 255;	!QIO CALLS

```

literal
:
: GET PARAMETER CODES
:
: REQUEST TYPES (BITS 0, 1, 2)
G$PRML = 0,           !LOGICAL
G$PRMA = 1,           !ADDRESS
G$PRMD = 2,           !DATA
G$DISP = 3,           !DISPLAY
G$XFER = 4,           !TRANSFER

: DEFAULT (BIT 3)
G$NO = 0 * 8,         !NO
G$YES = 1 * 8,        !YES

: RADIX (BITS 4, 5, 6)
G$RADB = 0 * 16,      !BINARY
G$RADO = 1 * 16,      !OCTAL
G$RADD = 2 * 16,      !DECIMAL
G$RADL = 5 * 16,      !LOGICAL
G$RADA = 6 * 16,      !ASCIZ

: OFFSET (BITS 9-15)
G$OFFSIZE = 254,      !OFFSET MAXIMUM SIZE
G$OFFSET = 1 * 256,  !MULTIPLIER FOR GPRM'S AND GMANI
X$OFFSET = 1 * 256,  !MULTIPLIER FOR XFER'S.

: COUNT (BIT 7)
G$CNTOP = 1 * 128,   !COUNT OPTION INDICATOR

: EXCEPTION (BIT 8)
G$EXCP = 1 * 256,    !EXCEPTION FLAG
G$LOLIM = 1,         !LOW LIMIT EXCEPTION
G$HILIM = 2,         !HIGH LIMIT EXCEPTION

: TRANSFER CONDITIONS
X$ALWAYS = 0 * 16,   !XFER
X$TRUE = 1 * 16,     !XFERT
X$FALSE = 2 * 16,   !XFERF

macro
  ERROR =
  L$ERROR (C$ERROR)
*;

linkage
  L$ERROR = trap;

```

```
macro
ERRDF (ERRNUM, MSGPTR, ROUT) =
begin
builtin DECX;
if #length gtr 3
then #errormacro ('TOO MANY ARGUMENTS SPECIFIED')
#fi;
DECX (C$ERDF, ERRNUM, MSGPTR, ROUT);
end
*;
```

```
macro
ERRHRD (ERRNUM, MSGPTR, ROUT)
begin
builtin DECX;
if #length gtr 3
then #errormacro ('TOO MANY ARGUMENTS SPECIFIED')
#fi;
DECX (C$ERHRD, ERRNUM, MSGPTR, ROUT);
end
*;
```

```
macro
ERRSF (ERRNUM, MSGPTR, ROUT) =
begin
builtin DECX;
if #length gtr 3
then #errormacro ('TOO MANY ARGUMENTS SPECIFIED')
#fi;
DECX (C$ERSF, ERRNUM, MSGPTR, ROUT);
end
*;
```

```
macro
ERRSOFT (ERRNUM, MSGPTR, ROUT) =
begin
builtin DECX;
if #length gtr 3
then #errormacro ('TOO MANY ARGUMENTS SPECIFIED')
#fi;
DECX (C$ERSOFT, ERRNUM, MSGPTR, ROUT);
end
*;
```

```

macro
  FEQUAL =
    begin
      global literal
    .
  ! FUNCTION LEVEL I/O DEFINITIONS
  !
    Q.IOFN = 2.
    Q.IOLN = 4.
    Q.IOEF = 6.
    Q.IOSB = 10.
    Q.IOAE = 12.
    Q.IOPL = 14.
    IS.SUC = 1:
  end
  *;

```

```

!DIRECTIVE FUNCTION
!DIRECTIVE LOG UNIT NO.
!DIRECTIVE EVENT FLAG
!DIRECTIVE STATUS BLOCK
!DIRECTIVE AST ENTRY
!DIRECTIVE PARAMETER LIST
!REQUEST WAS SUCCESSFUL

```

```

macro
  EQUALS =
    global literal
  !
  ! BIT DEFINITIONS
  !
  BIT15 = %o'100000'.
  BIT14 = %o'40000'.
  BIT13 = %o'20000'.
  BIT12 = %o'10000'.
  BIT11 = %o'4000'.
  BIT10 = %o'2000'.
  BIT09 = %o'1000'.
  BIT08 = %o'400'.
  BIT07 = %o'200'.
  BIT06 = %o'100'.
  BIT05 = %o'40'.
  BIT04 = %o'20'.
  BIT03 = %o'10'.
  BIT02 = %o'4'.
  BIT01 = %o'2'.
  BIT00 = %o'1'.
  !
  BIT9 = BIT09.
  BIT8 = BIT08.
  BIT7 = BIT07.
  BIT6 = BIT06.
  BIT5 = BIT05.
  BIT4 = BIT04.
  BIT3 = BIT03.
  BIT2 = BIT02.
  BIT1 = BIT01.
  BIT0 = BIT00.

```

```

!
!
! EVENT FLAG DEFINITIONS
! EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
!
EF_START   = 32.           !START COMMAND WAS ISSUED
EF_RESTART = 31.           !RESTART COMMAND WAS ISSUED
EF_CONTINUE = 30.          !CONTINUE COMMAND WAS ISSUED
EF_NEW     = 29.           !A NEW PASS HAS BEEN STARTED
EF_PWR     = 28.           !A POWER-FAIL/POWER-UP OCCURRED

```

```

!
! PRIORITY LEVEL DEFINITIONS
!

```

```

PRI07 = %0'340'.
PRI06 = %0'300'.
PRI05 = %0'240'.
PRI04 = %0'200'.
PRI03 = %0'140'.
PRI02 = %0'100'.
PRI01 = %0'40'.
PRI00 = %0'0'.

```

```

!
! OPERATOR FLAG BITS
!

```

```

EVL = %0'4'.
LOT = %0'10'.
ADR = %0'20'.
IDU = %0'40'.
ISR = %0'100'.
UAM = %0'200'.
BOE = %0'400'.
PNT = %0'1000'.
PRI = %0'2000'.
IXE = %0'4000'.
IBE = %0'10000'.
IER = %0'20000'.
LOE = %0'40000'.
HOE = %0'100000'.

```

```

%;

```

```

macro
BREAK =
T$RAP (C$BRK)

```

```

%;

```

```

macro
BRESET =
T$RAP (C$RESET)

```

```

%;

```

```

macro
  DELAY (MULT) =
  begin
    external L$CPU, L$DLY;
    local $$TMP2;
    $$TMP2 = .L$CPU * MULT;
    while .$$TMP2 neq 0 do
      begin
        begin
          decru $$TMP1 from .L$DLY to 1 do
            begin
              local $$TMP : volatile;
              $$TMP = 0;
            end;
          end;
          $$TMP2 = .$$TMP2 - 1;
        end;
      end;
    end;
  *;

macro
  RFLAGS (LOC) =
  LOC = L$RFLAGS (C$RFLA)
  *;

linkage
  L$RFLAGS = trap (register = 0);

macro
  READBUS =
  (L$READBUS (C$RDBU))
  *;

linkage
  L$READBUS = trap : VALUECBIT clearstack;

macro
  MEMORY (MEMLOC) =
  MEMLOC = L$MEMORY (C$MEM)
  *;

linkage
  L$MEMORY = trap (register = 0);

macro
  INLOOP =
  (L$INLOOP (C$INLP))
  *;

linkage
  L$INLOOP = trap : VALUECBIT clearstack;

```

```

macro
  MANUAL =
    (L$MANUAL (C$MANI))
*;

linkage
  L$MANUAL = trap : VALUECBIT clearstack;

macro
  CKLOOP =
    'f (T$RAPRO (C$CLP1)) then
      leave T$$TAG ;
*;

macro
  ESCAPE =
    'f (T$RAPRO (C$ESCAPE)) then
      leave T$$TAG ;
*;

macro
  EXIT
  begin
    T$RAPRO (C$EXIT);
    leave T$$TAG ;
  end;
*;

macro
  EXIT_TST =
  begin
    T$RAPRO (C$EXIT);
    return;
  end;
*;

compiletime
  $BGNTST = 0,
  $BGNSUB = 0,
  $BGNSEG = 0,
  $TSTNUM = 1,
  $SUBNUM = 1,
  $SEGNUM = 1,
  $PUSHLEV = 0,
  $POPLEV = 8,
  T$TEMP = 0,
  T$CODE = 0,
  C$COUNT = 0;

```

```

!THIS FLAG IS SET AT BGNTST AND CLEARED AT ENDTST
!THIS FLAG IS SET AT BGNSUB AND CLEARED AT ENDSUB
!THIS FLAG IS INCREMENTED AT BGNSEG AND DECREMENTED AT ENDSEG
!THIS VARIABLE IS USED TO GENERATE THE TEST LABEL
!THIS VARIABLE IS USED TO GENERATE THE SUBROUTINE LABEL
!THIS VARIABLE IS USED TO GENERATE THE SEGMENT LABEL
!THIS VARIABLE IS USED WITHIN SEGMENT NESTINGS
!THIS VARIABLE IS USED WITHIN SEGMENT NESTINGS
!THIS VARIABLE IS USED TO GENERATE GPRM'S/GMANI'S
!THIS VARIABLE IS USED TO GENERATE GPRM'S/GMANI'S
!COUNTER USED IN VARIOUS MACROS

```



```

macro
  BGNINIT =
  routine LINIT : novalue =
  begin
*
macro
  BGNAU =
  routine LAU : novalue =
  begin
*
macro
  BGNAUTO =
  routine LAUTO : novalue =
  begin
*
macro
  BGNCLN =
  routine LCLEAN : novalue =
  begin
*
macro
  BGNDU =
  routine LDU : novalue =
  begin
*
macro
  BGNRPT =
  routine LRPT : novalue =
  begin
*
macro
  LASTAD =
  psect
  code = $XYZ$;

  global routine $END LINK : novalue =
!
! THE FOLLOWING DATA STRUCTURE MUST BE IN
! A ROUTINE AND NOT AT 'MODULE' LEVEL,
! OTHERWISE THE PRESENT COMPILER COMPLAINS.
!
  begin
  forward
  T$FREE : vector [1]          psect ($XYZ$);
  global BL$LAS : vector [2]   psect ($XYZ$)
  initial (T$FREE, ((T$FREE  BL$LAS [2]) / 2));
  global bind
  L$LAST = BL$LAS [2];          !THE ADDR OF THE WORD AFTER T$SIZE
*

```

```

macro
  BGNSETUP (NUM) .
    global bind
    T$PTHV = NUM;

    compiletime
    !
    ! P$PTR = 0, THIS USED TO BE TRUE BUT CALCULATIONS FOR POINTERS WERE OFF
    !
    P$PTR = 4,
    P$NUM = 0;
    assign (P$NUM, NUM)
    psect pl't = $XYZ$;
*;

macro
  ENDOSETUP .
    if P$NUM neq 0
      then errormacro ('ERROR IN PTABLE BLOCK )
    if;
    global T$FREE : vector [1]          psect ($XYZ$) initial (0);
    !
    ! THIS LOCATION MAY GET OVERWRITTEN WITH NO PROBLEM
    !
    end;
*;

macro
  BGNPTAB =
    assign (P$NUM, P$NUM + 1)
    PTABS (
*;

macro
  PTABS [ ] .
    !
    ! ASSIGN (P$PTR, P$PTR + (2 * ($LENGTH + 4))) THIS USED TO BE TRUE BUT CALCULATIONS FOR POINTERS WERE OFF
    !
    assign (P$PTR, P$PTR + (2 * ($length + 2)))
    if P$NUM eq 2
      then
        bind $LAS1 = uplit (0);
      else
        bind $name ('$LAS', $number (P$NUM)) = uplit (L$LAST + P$PTR);
    if;
    bind
    $name ('$REM', $number (P$NUM)) = plit ($remaining);
*;

```

```

macro
  ENDP1AB -
  )
  *assign (PT$NUM, PT$NUM - 2)
* ;

macro
  T$$TAG -
  *name ('T$', #number ($TSTNUM), #number ($SUBNUM), #number ($SEGNUM))
* ;

macro
  BGNTST -
  *if $BGNSUB neq 0
  *then
    *errormacro ('BGNTST" IN SUB')
    *exitmacro
  *f'
  *if $BGNSEG neq 0
  *then
    *errormacro ("BGNTST" IN SEG )
    *exitmacro
  *f'
  *if $BGNTST neq 0
  *then
    *errormacro ("BGNTST" IN TST')
    *exitmacro
  *f'
  *assign ($PUSHLEV, 0)
  *assign ($POPLEV, 8)                !DCR'D TO 0;<0=ERROR
  *assign ($SUBNUM, 0)
  *assign ($SEGNUM, 0)
  *assign ($BGNTST, 1)
  routine *name ('T$', #number ($TSTNUM)) : novalue =
  begin
    label T$$TAG;
    T$$TAG: begin
* ;

macro
  BGNSEG -
  *assign ($PUSHLEV, $PUSHLEV + 1)
  *assign ($SEGNUM, $SEGNUM + 1)
  *assign ($BGNSEG, 1)
  *if $PUSHLEV gtr 8
  *then *errormacro ('TOO MANY "BGNSEG"S')
  *f'
  do begin
    label T$$TAG;
    T$$TAG: begin
      T$RAPRO (C$BSEG);
* ;

```

```

macro
  BGNSUB
  *f $BGNSEG neq 0
  *then
    *errormacro ( BGNSUB IN SEG' )
    *exitmacro
  *f
  *f $BGNSUB neq 0
  *then
    *errormacro ( BGNSUB IN SUB )
    *exitmacro
  *f
  *ass'gn ($BGNSUB, 1)
  *ass'gn ($SUBNUM, $SUBNUM + 1)
  *du begin
    label T$$TAG;
    T$$TAG: begin
      T$RPRO (C$BSUB);
  *;

macro
  BGNMSG (NAME) =
  forward routine $name ('M$', NAME) : novalue;
  global routine NAME : novalue =
  begin
    $name ( M$, NAME ) ();
    L$MSG (C$MSG);
  end;
  routine $name ( M$, NAME ) : novalue =
  begin
  *;

linkage
  L$MSG = trap;

macro
  BGNSRV (ISR) =
  global routine ISR (OLDPSW, OLDPC) : L$ISR novalue =
  begin
  *;

linkage
  L$ISR = interrupt;

macro
  ENDSRV =
  end;
  *;

```

```
macro
  ENDSRV MODPRI (PRIORITY) =
  *f PRIORITY gtr 7
    *then
      *errormacro ( PRIORITY MUST BE 0 TO 7' )
      *exitmacro
    *else
      OLDPSW <5,3> = PRIORITY;
  *f
  ENDSRV
*;

macro
  ENDMMSG =
  end;
*;

macro
  ENDINIT =
  end;
  global routine L$INIT : novalue =
  begin
    LINIT ();
    T$RAP (C$INIT);
  end;
*;

macro
  ENDAU =
  end;
  global routine L$AU : novalue =
  begin
    LAU ();
    T$RAP (C$AU);
  end;
*;

macro
  ENDAUTO =
  end;
  global routine L$AUTO : novalue =
  begin
    LAUTO ();
    T$RAP (C$AUTO);
  end;
*;

macro
  ENDCLN =
  end;
  global routine L$CLEAN : novalue =
  begin
    LCLEAN ();
    T$RAP (C$CLEAN);
  end;
*;
```

```

macro
  ENDDU
  end;
  global routine L$DU : novalue =
  begin
    LDU ();
    T$RAP (C$DU);
  end;
*;

macro
  ENDRPT =
  end;
  global routine L$RPT : novalue =
  begin
    LRPT ();
    T$RAP (C$RPT);
  end;
*;

macro
  ENDTST =
  $if $BGNTST eql 0
  $then
    $errormacro ('MISSING "BGNTST"')
    $exitmacro
  $fi
  end
end;
  global routine $name ('T', $number ($TSTNUM)) : novalue =
  do
    $name ('T', $number ($TSTNUM)) ()
    while T$RAP (C$TST);
    $assign ($TSTNUM, $TSTNUM + 1)
    $assign ($BGNTST, 0)
    $if (($PUSHLEV + $POPLEV) 8) neq 0
    $then $errormacro ('TEST CONTAINS UNEQUAL "BGNSEG"S AND "ENDSEG S')
    $f'
  $f'
*;

macro
  ENDSUB =
  $if $BGNSUB eql 0
  $then
    $errormacro ('MISSING "BGNSUB"')
    $exitmacro
  $f'
  end
end
  while (T$RAPRO (C$ESUB));
  $assign ($BGNSUB, 0)
  $f'
*;

```

```

macro
  ENDSTL
  assign ($POPLEV, $POPLEV 1)
  if $POPLEV lss 0
    then errormacro ('TOO MANY "ENDSEG"S')
  if
;

!THE TEST FOR PROPER NESTING IS IN MACRO "ENDTST"
!
  end
end
while (T$RAPRO (C$ESEG));
assign ($BGNSEG, 0)
;

linkage
T$RAPRO = trap (register = 0);

macro
SETVEC (VECADD, ROUT, PRIOR) =
L$SETVEC (C$SVEC, PRIOR, ROUT, VECADD, 3)
;

linkage
L$SETVEC = trap (standard, standard, standard, standard);

macro
SETPRI (PRIOR) =
L$SETPRI (L$SPRI, PRIOR)
;

linkage
L$SETPRI = trap (register = 0);

macro
CLRVEC (VECADD) =
L$CLRVEC (C$CVEC, VECADD)
;

linkage
L$CLRVEC = trap (register = 0);

macro
PRINTB [] =
begin
builtin sp;
name ('D$ERR', #length) (C$PNTB, REVERSEACTUALS (#remaining), #length, .sp);
end
;

```

```

macro
  PRINTX []
  begin
    builtin sp;
    #name ('D$ERR', #length) (C$PNTX, REVERSEACTUALS (#remaining), #length, .sp);
  end
*;

macro
  PRINTS []
  begin
    builtin sp;
    #name ('D$ERR', #length) (C$PNTS, REVERSEACTUALS (#remaining), #length, .sp);
  end
*;

macro
  PRINTF []
  begin
    builtin sp;
    #name ('D$ERR', #length) (C$PNTF, REVERSEACTUALS (#remaining), #length, .sp);
  end
*.

macro
  !
  ! MAKE A ARGUMENT LIST THAT IS THE REVERSE OF THE ONE PASSED IN.
  !
  REVERSEACTUALS (A) [] =
  #f #length eq 1
  #then A
  #else REVERSEACTUALS (#remaining), A
  #f
*;

linkage
D$ERR1 - trap (standard, standard, register = 0);

linkage
D$ERR2 = trap (standard, standard, standard, register = 0);

linkage
D$ERR3 = trap (standard, standard, standard, standard, register = 0);

linkage
D$ERR4 = trap (standard, standard, standard, standard, standard, register = 0);

linkage
D$ERR5 = trap (standard, standard, standard, standard, standard, standard, register = 0);

linkage
D$ERR6 - trap (standard, standard, standard, standard, standard, standard, standard, register = 0);

```



```

linkage
D$ERR7 = trap (standard, standard, standard, standard, standard, standard, standard, standard, standard, register = 0);

```

```

linkage
D$ERR8 = trap (standard, standard, standard, standard, standard, standard, standard, standard, standard, standard, register = 0);

```

```

linkage
D$ERR9 = trap (standard, standard, standard, standard, standard, standard, standard, standard, standard, standard, standard, register = 0);

```

```

macro
GPHARD (UNIT, POINTER) =
(POINTER - L$GPHARD (C$GPHRD, UNIT))
*

```

```

linkage
L$GPHARD = trap (register = 0);

```

```

macro
CLOSE =
T$RAP (C$CLOS)
*

```

```

macro
OPEN (FILENAME) =
D$FILE (C$OPEN, FILENAME)
*

```

```

macro
GETWORD (DEST) =
GET_DATA (C$GETW, DEST)
*

```

```

macro
GETBYTE (DEST) =
GET_DATA (C$GETB, DEST)
*

```

```

macro
GET_DATA (code, DEST) =
begin
  if D$GET (code, DEST)
    then (builtin r0; DEST = .r0; 1)    !CASE FOR CARRY SET (COMPLETE)
    else (0)                            !CARRY CLEAR = END OF FILE
  end
*

```

```

linkage
D$GET trap (register = 0) : VALUECBIT clearstack;

```

```

macro
  GETPRI (PRIO) =
  PRIO = (D$FILE (C$GPRI))
*;

macro
  DORPT =
  L$DORPT (C$DRPT)
*;

linkage
  L$DORPT = trap;

macro
  DODU (UNIT) =
  L$DODU (C$DODU, UNIT)
*;

linkage
  L$DODU = trap (register = 0);

macro
  DOCLN =
  L$DOCLN (C$DCLN)
*;

linkage
  L$DOCLN = trap;

macro
  READEF (EFN) =
  L$READEF (C$REFG, EFN)
*;

linkage
  L$READEF = trap (register = 0) : VALUECBIT clearstack;

macro
  CLOCK (TYPE, POINTER) =
  *if *identical (TYPE, L)
  *then
    M$CLCK (POINTER, %o'114')
    *exitmacro
  *f'
  *if *identical (TYPE, P)
  *then
    M$CLCK (POINTER, %o'120')
    *exitmacro
  *else
    *errormacro ('TYPE MUST BE L OR P')
  *f'
*;

```

```

macro
  M$CLCK (POINTER, KIND) =
  begin
    if L$CLCK (C$CLCK, KIND)
      then (builtin r0; POINTER = .r0; 1) !! IS THE CASE FOR CARRY SET.
        !OTHERWISE KNOWN AS "COMPLETE"
      else (0)
        !0 IS THE CASE FOR CARRY CLEAR.
        !OTHERWISE KNOWN AS "INCOMPLETE"
    end
  end
*;

linkage
  L$CLCK = trap (register - 0) : VALUECBIT clearstack;

linkage
  D$FILE = trap (register = 0);

linkage
  T$RAP = trap;

macro
  GMANIL (MSGADR, DATADR, MASK, DFLT) =
  begin
    builtin DECX;
    $assign (T$CODE, G$PRML or G$RADL)
    M$DFLT (DFLT, T$TEMP);
    $assign (T$CODE, T$CODE or T$TEMP)
    DECX (C$GMAN, %0'404', DATADR, T$CODE, MSGADR, MASK);
  end
*;

macro
  GMANID (MSGADR, DATADR, RADIX, MASK, LOW, HIGH, DFLT) =
  begin
    builtin DECX;
    $assign (T$CODE, G$PRMD)
    M$RAD (RADIX, T$TEMP);
    $assign (T$CODE, T$CODE or T$TEMP)
    M$DFLT (DFLT, T$TEMP);
    $assign (T$CODE, T$CODE or T$TEMP)
    DECX (C$GMAN, %0'406', DATADR, T$CODE, MSGADR, MASK, LOW, HIGH);
  end
*;

```

```

macro
  GMANIA (MSGADR, DATADR, RADIX, LOW, HIGH, DFLT) =
  begin
    builtin DECX;
    #if #identical (A, RADIX)
      #then #errormacro ('INVALID RADIX')
    #fi
    #assign (T$CODE, G$PRMA)
    M$RAD (RADIX, T$TEMP);
    #assign (T$CODE, T$CODE or T$TEMP)
    M$DFLT (DFLT, T$TEMP);
    #assign (T$CODE, T$CODE or T$TEMP)
    DECX (C$GMAN, #o'405, DATADR, T$CODE, MSGADR, LOW, HIGH);
  end
#;

```

```

macro
  M$RAD (IN, OUT) =
  #if #identical (IN, B)
    #then
      #assign (OUT, G$RADB)
      #exitmacro
  #fi
  #if #identical (IN, O)
    #then
      #assign (OUT, G$RADO)
      #exitmacro
  #fi
  #if #identical (IN, D)
    #then
      #assign (OUT, G$RADD)
      #exitmacro
  #fi
  #if #identical (IN, L)
    #then
      #assign (OUT, G$RADL)
      #exitmacro
  #fi
  #if #identical (IN, A)
    #then
      #assign (OUT, G$RADA)
      #exitmacro
  #fi
  #errormacro ('ILLEGAL RADIX')
#;

```

```

macro
  M$DFLT (DFLT, OUT) =
  #if #identical (YES, DFLT)
    #then #assign (OUT, G$YES)
  #else
    #if #identical (NO, DFLT)
      #then #assign (OUT, G$NO)
    #else #errormacro ('INCORRECT DEFAULT')
    #fi
  #fi
#;

```

```

comp let me
  C$TSCT      = 0,
  D$BGNSFT    = 0,
  D$BGNRPT    = 0,
  D$GNSW      = 0,
  D$APTS      = 0,
  D$AU        = 0,
  D$DU        = 0,
  D$ERRTBL    = 0,
  D$SETUP     = 0,
  D$POINTER   = 0,
  C$ITCNT     = 0;

```

```

macro
  BGNPROT (A, B, C) =
    global L$PROT : vector [3] psect ($code$)
    initial (A, B, C);

```

```

*;

```

```

macro
  ENDPROT

```

```

*;

```

```

macro
  DISPATCH (DSNUM) =
    global D$PCNT : vector [1] psect ($code$)
    initial (DSNUM);
    #assign (C$TSCT, 1)
    FORDEC (DSNUM) !DECLARE ROUTINE NAMES FORWARD' OR 'EXTERNAL
    #assign (C$TSCT, 1)
    global L$DISPATCH : vector [DSNUM] psect ($code$)
    initial (
      LOADTS (DSNUM)
    );

```

```

*;

```

```

macro
  LOADTS (TSTNMS) [] =
    #assign (C$ITCNT, TSTNMS)
    #name ('T', #number (C$TSCT))
    #assign (C$ITCNT, C$ITCNT - 1)
    #assign (C$TSCT, C$TSCT + 1)
    #if #number (C$ITCNT) eq 0
      #then #exitmacro
    #else
      LOADTS (C$ITCNT)
    #fi

```

```

*;

```

```

*;

```

```
macro
FORDEC (TSTNMS) [] =
$assign (C$ITCNT, TSTNMS)
external routine $name ('T', $number (C$TSCT)) : novalue;
$assign (C$ITCNT, C$ITCNT - 1)
$assign (C$TSCT, C$TSCT + 1)
$if $number (C$ITCNT) eq 0
$then $exitmacro
$else FORDEC (C$ITCNT)
$if
```

```
;
```

```
macro
POINTER (PNTR) [] =
$POINT (PNTR);
psect plit = $code$;
;
```

```
macro
  $POINT (PNTR) [] -
  $if $identical (ALL, PNTR)
    $then
      $assign ($BGNSFT, 1)
      $assign ($BGNRPT, 1)
      $assign ($GNSM, 1)
      $assign ($APTS, 1)
      $assign ($AU, 1)
      $assign ($DU, 1)
      $assign ($ERRTBL, 1)
      $assign ($SETUP, 1)
      $assign ($POINTER, 1)
      $exitmacro
  $if:
  $if $identical (NONE, PNTR)
    $then
      $assign ($POINTER, 1)
      $exitmacro
  $if:
  $if $identical (SFT, PNTR)
    $then
      $assign ($BGNSFT, 1)
      $assign ($POINTER, 1)
  $if:
  $if $identical (RPT, PNTR)
    $then
      $assign ($BGNRPT, 1)
      $assign ($POINTER, 1)
  $if:
```

```
    if identical ($W, PNTR)
        then
            assign ($GNSW, 1)
            assign ($POINTER, 1)
    if:
    if identical (APTSTAT, PNTR)
        then
            assign ($APTS, 1)
            assign ($POINTER, 1)
    if:
    if identical (AU, PNTR)
        then
            assign ($AU, 1)
            assign ($POINTER, 1)
    if:
    if identical (DU, PNTR)
        then
            assign ($DU, 1)
            assign ($POINTER, 1)
    if:
    if identical (TBL, PNTR)
        then
            assign ($ERRTBL, 1)
            assign ($POINTER, 1)
    if:
    if identical (SETUP, PNTR)
        then
            assign ($SETUP, 1)
            assign ($POINTER, 1)
    if:
    $POINT ($remaining);
*;
```



```

macro
  BGNSW (NAM) =
    psect own = $code$;
    psect global = $code$;
    forward L$NDSW: vector [1];
    global
      L$SWLEN : vector [1]          psect ($code$)
      initial ((L$NDSW - L$SWLEN) / 2);
    *if *length eql 0
      *then *exitmacro
      *else global bind NAM = L$SW;
    *if
  *;

macro
  ENDNSW =
    global L$NDSW : vector [1]          psect ($code$);
    psect global = $GLOB$;
    psect own = $own$;
  *;

macro
  BGNHW (NAM) =
    psect global = $code$;
    psect own = $code$;
    forward L$NDHW : vector [1];
    global L$HWLEN : vector [1]        psect ($code$)
    initial ((L$NDHW - L$HWLEN) / 2);
    *if *length eql 0
      *then *exitmacro
      *else global bind NAM = L$HW;
    *if
  *;

macro
  ENDHW =
    global L$NDHW : vector [1]          psect ($code$);
    psect own = $own$;
    psect global = $GLOB$;
  *;

macro
  ERRIBL =
    psect global = $code$;
    global ERRIBL : vector [1];
    global ERRNBR : vector [1];
    global ERRMSG : vector [1];
    global ERRBLK : vector [1];
    psect global = $GLOB$;
  *;

```

```

macro
  HEADER (FILNAM, REVLEV, DEPO, TIME, TYPE, PRI) =
  %if 0%POINTER eql 0
    %then
      %errormacro ( MISSING POINTER MACRO' )
      %exitmacro
  %f'
  external                                     !TO RESOLVE REFERENCES IN OTHER SKELS
    L$SOFT, T$PTHV, L$RPT, L$INIT, L$CLEAN,
    L$LAST, L$HARD, L$DVTYP, L$DESC, L$DU, L$AU, L$AUTO;
  compiletime
    C$REVISION = 3,
    C$EDIT = 3;
  forward
    ERRYP : vector [1],
    L$SWLEN : vector [1],
    L$HWLEN : vector [1],
    L$PROT : vector [3],
    L$DISPATCH : vector [DS$NBR_OF_TESTS];
  global bind
    L$ERRTBL = ERRYP,
    L$SW = L$SWLEN * 2,
    L$HW = L$HWLEN * 2;
  compiletime EMT_E$LOAD = %o'104035';
  %assign (C$COUNT, 8 %charcount (FILNAM));
  global L$NAME : vector [4] psect (%code$);
  %if %charcount (FILNAM) gtr 7
    %then
      %errormacro ('NAME TOO BIG')
      %exitmacro
  %f'
  %initial (FILNAM, rep C$COUNT of byte (0));
  global L$REV : vector [1] psect (%code$)
  %initial (byte (REVLEV), byte (DEPO));
  global bind L$DEPO = L$REV * 1;
  global L$UNIT : vector [1] psect (%code$)
  %initial (%if 0%SETUP eql 0
    %then 0
    %else T$PTHV
    %f);
  global L$TIML : vector [1] psect (%code$)
  %initial (TIME);
  global L$MPCP : vector [1] psect (%code$)
  %initial (L$HARD);
  global L$SPCP : vector [1] psect (%code$)
  %initial (%if 0%BGNSFT eql 0
    %then 0
    %else L$SOFT
    %f);
  global L$HPTP : vector [1] psect (%code$)
  %initial (L$HW);
  global L$SPTP : vector [1] psect (%code$)
  %initial (%if 0%GNSW eql 0
    %then 0
    %else L$SW
    %f);

```

```

global L$LADP : vector [1]          psect ($code$)
  initial (L$LAST);
global L$STA : vector [1]          psect ($code$)
  initial (0);
global L$CO : vector [1]          psect ($code$)
  initial (0);
%if (1 - TYPE) neq 0
  %then %if TYPE neq 0
    %then
      %errormacro ('DIAG. TYPE MUST BE 0 OR 1')
      %exitmacro
    %fi;
%fi;
global L$DTYP : vector [1]          psect ($code$)
  initial (TYPE);
global L$APT : vector [1]          psect ($code$)
  initial (0);
global L$DTP : vector [1]          psect ($code$)
  initial (L$DISPATCH);
global L$PRIO : vector [1]          psect ($code$)
  initial (PRI);
global L$ENVI : vector [1]          psect ($code$)
  initial (0);
global L$EXP1 : vector [1]          psect ($code$)
  initial (0);
global L$MREV : vector [1]          psect ($code$)
  initial (byte (C$REVISION), byte (C$EDIT));
global L$EF : vector [2]           psect ($code$)
  initial (0, 0);
global L$SPC : vector [1]          psect ($code$)
  initial (0);
global L$DEVP : vector [1]          psect ($code$)
  initial (L$DVTYP);
global L$REPP : vector [1]          psect ($code$)
  initial (%if O$BGNRPT eql 0
    %then 0
    %else L$RPT
  %fi);
global L$EXPA : vector [1]          psect ($code$)
  initial (0);
global L$EXPS : vector [1]          psect ($code$)
  initial (0);
global L$AUT : vector [1]          psect ($code$)
  initial (%if O$AU eql 0
    %then 0
    %else L$AU
  %fi);
global L$DUT : vector [1]          psect ($code$)
  initial (%if O$DU eql 0
    %then 0
    %else L$DU
  %fi);
global L$LUN : vector [1]          psect ($code$)
  initial (0);
global L$DESP : vector [1]          psect ($code$)
  initial (L$DESC);
global L$LOAD : vector [1]          psect ($code$)
  initial (EMT_E$LOAD);

```

```

global L$EIP : vector [1]          psect ($code$)
    initial (if 0$ERRTBL eq 0
        then 0
        else L$ERRTBL
        $fi);
global L$ICP : vector [1]          psect ($code$)
    initial (L$INIT);
global L$CCP : vector [1]          psect ($code$)
    initial (L$CLEAN);
global L$ACP : vector [1]          psect ($code$)
    initial (L$AUTO);
global L$PRT : vector [1]          psect ($code$)
    initial (L$PROT);
global L$TEST : vector [1]         psect ($code$)
    initial (0);
global L$DLX : vector [1]          psect ($code$)
    initial (0);
global L$HIME : vector [1]         psect ($code$)
    initial (0);
global L$CPU : vector [1]          psect ($code$)
    initial (1);
$;

:compiletime
X$XFER_SKIP = $o'001004',          !THIS IS A NO-OP, I.E., "XFER .PC + 2"
T$HILIM     = 0.
T$LOLIM     = 0.
T$EXCP      = 0.
C$ATLO      = 0.
GP$COUNT   = 0.
C$ATHI      = 0.

macro
DEVYIP (TYP) =
    global L$DVTYP : vector [(#charcount (TYP) / 2) + 1]
        psect ($code$)
        initial (TYP);
$;

macro
DESCRIPT (DESC) =
    global L$DESC : vector [(#charcount (DESC) / 2) + 1]
        psect ($code$)
        initial (DESC);
$;

macro
XFER (LAB) =
M$XFER (LAB, X$ALWAYS);
$;

```

```

macro
  XFERT (LAB) =
  M$XFER (LAB, X$FALSE)
*;

macro
  XFERT (LAB) =
  M$XFER (LAB, X$TRUE)
*;

macro
  M$XFER (LAB, FLAVOR) =
  forward
    $name ( $L , LAB);
  ! GENERATE THE XFER :
  psect own = $code$;
  own $name ( '$' , LAB);
  initial (((($name ('$L' , LAB) - $name ('$' , LAB)) * X$OFFSET) *
    G$XFER * FLAVOR);
  psect own = $own$;
*;

macro
  $L (LAB) =
  ! GEN A LABEL FOR OFFSET CALC AND FILL IT
  ! WITH A NO OP
  psect own = $code$;
  own
    $name ( '$L' , LAB) : initial (X$XFER SKIP);
*;

macro
  BGNHRD =
  forward L$NDHRD : vector [1];
  global L$HRDLN : vector [1]          psect ($code$)
  initial (((L$NDHRD - L$HRDLN) / 2) 1);
  global bind L$HARD = L$HRDLN + 2;
*;

macro
  BGNSFT =
  forward L$NDSFT : vector [1];
  global L$SFTLN : vector [1]          psect ($code$)
  initial (((L$NDSFT - L$SFTLN) / 2) 1);
  global bind L$SOFT = L$SFTLN + 2;
*;

macro
  ENDHRD =
  global L$NDHRD : vector [1]          psect ($code$);
*;

```

```

macro
  ENDSFT =
  global L$NDSFT : vector [1]          psect ($code$);
  ;

macro
  GPRMA (MSGADR, DATADR, RADIX, LOW, HIGH, DFLT, COUNT) =
  %assign (GP$COUNT, GP$COUNT + 1)      !GEN. UNIQUE NAMES
  %assign (T$EXCP, 0)
  %assign (T$CODE, 0)
  %assign (C$COUNT, 4)                   !4 ARGS. COUNT IS 'OPTIONAL
  NO_A_RADIX (RADIX);
  NO_ODD_ADR (DATADR);
  OFFSET_SIZE (DATADR);
  %assign (T$CODE, G$PRMA + (DATADR * G$OFFSET))
  M$RAD (RADIX, T$TEMP);
  %assign (T$CODE, T$CODE or T$TEMP)
  M$DFLT (DFLT, T$TEMP);
  %assign (T$CODE, T$CODE or T$TEMP)
  M$EXCP (LOW,HIGH)                       !LOAD LOW AND HIGH LIMITS.
  %if COUNT gtr 1
    %then
      %assign (T$CODE, T$CODE or G$CNTOP)
      %assign (C$COUNT, C$COUNT + 1)
  %fi
  global %name ( GP$, %number (GP$COUNT)) : vector [C$COUNT] psect ($code$)
  initial (T$CODE, MSGADR, T$LOLIM, T$HILIM
    %if (C$ATLO or C$ATHI) neq 0
      %then , T$EXCP
    %fi
    %if COUNT gtr 1
      %then , (COUNT / 2));
    %else );
  %fi
  %assign (C$ATLO, 0)                      !
  %assign (C$ATHI, 0)
  ;

```

```

macro
GPRM (MSGADR, DATADR, RADIX, MASK, LOW, HIGH, DFLT, COUNT) =
%assign (GP%_COUNT, GP%_COUNT + 1)          !GEN. UNIQUE NAMES
%assign (T$EXCP, 0)
%assign (T$CODE, 0)
%assign (C$COUNT, 5)                        !5 ARGS.
NO A RADIX (RADIX);
NO ODD ADR (DATADR);
OFFSET SIZE (DATADR);
%assign (T$CODE, G$PRM + (DATADR * G$OFFSET))
M$RAD (RADIX, T$TEMP);
%assign (T$CODE, T$CODE or T$TEMP)
M$DFLT (DFLT, T$TEMP);
%assign (T$CODE, T$CODE or T$TEMP)
M$EXCP (LOW,HIGH)                            !LOAD LOW AND HIGH LIMITS.
%if COUNT gtr 1
%then
%assign (T$CODE, T$CODE or G$CNTOP)
%assign (C$COUNT, C$COUNT + 1)
%fi
global %name ('GP%', %number (GP%_COUNT)) : vector [C$COUNT] psect (%code%)
initial (T$CODE, MSGADR, MASK, T$LOLIM, T$HILIM
%if (C$ATLO or C$ATHI) neq 0
%then , T$EXCP
%fi
%if COUNT gtr 1
%then , (COUNT / 2));
%else );
%fi
%assign (C$ATLO, 0)                          !
%assign (C$ATHI, 0)
%;

```

```

macro
GPRML (MSGADR, DATADR, MASK, DFLT, COUNT) =
%assign (GP%_COUNT, GP%_COUNT + 1)          !GEN. UNIQUE NAMES
%assign (T$EXCP, 0)
%assign (T$CODE, 0)
%assign (C$COUNT, 3)                        !3 ARGS. COUNT IS 'OPTIONAL'
NO ODD ADR (DATADR);
OFFSET SIZE (DATADR);
%assign (T$CODE, G$PRML + (DATADR * G$OFFSET))
M$RAD (L, T$TEMP);
%assign (T$CODE, T$CODE or T$TEMP)
M$DFLT (DFLT, T$TEMP);
%assign (T$CODE, T$CODE or T$TEMP)
%if COUNT gtr 1
%then
%assign (T$CODE, T$CODE or G$CNTOP)
%assign (C$COUNT, C$COUNT + 1)
%fi
global %name ('GP%', %number (GP%_COUNT)) : vector [C$COUNT] psect (%code%)
initial (T$CODE, MSGADR, MASK
%if COUNT gtr 1
%then , (COUNT / 2));
%else );
%fi
%assign (C$ATLO, 0)                          !
%assign (C$ATHI, 0)
%;

```

```

macro
M$EXCP (LOW, HIGH) =
  * f (C$ATLO or C$ATHI) neq 0
    *then
      *assign (T$CODE, T$CODE or G$EXCP)
      *assign (C$COUNT, C$COUNT + 1)
  *f
  *f C$ATLO neq 0
    *then
      *assign (T$EXCP, T$EXCP or G$LOLIM) !LOW LIMIT WAS INDIRECT I.E. <a,N>
      *assign (T$LOLIM, (LOW / 2))
    *else
      *assign (T$LOLIM, LOW)
  *f
  *f C$ATHI neq 0
    *then
      *assign (T$EXCP, T$EXCP or G$HILIM) !HI LIMIT WAS INDIRECT
      *assign (T$HILIM, (HIGH / 2))
    *else
      *assign (T$HILIM, HIGH)
  *f
* ;

macro
GP$ATLO (OFFSET) =
  *assign (C$ATLO, 1)
  OFFSET
* ;

macro
GP$ATHI (OFFSET) =
  *assign (C$ATHI, 1)
  OFFSET
* ;

macro
NO_A_RADIX (RADIX) =
  *if *identical (A, RADIX)
    *then *errormacro ('INVALID RADIX')
  *f
* ;

macro
NO_ODD_ADR (OFFSET) =
  *assign (T$TEMP, OFFSET and 1) !YE OLD MASK
  *if T$TEMP neq 0
    *then *errormacro ('OFFSET IS ODD')
  *f
* ;

```



```
macro
  OFFSET SIZE (OFFSET) =
  *if (G$OFFSIZE - OFFSET) lss 0
    *then *errormacro ('OFFSET TOO BIG')
  *f'
```

\*;

```
macro
  DISPLAY (ARG) =
  global GP$DISP : vector [2]      psect ($code$)
  initial (G$DISP, ARG);
```

\*;

•