

pdp11



**RT-11 V02C**  
**System Release Notes**  
Order No. DEC-11-ORNRA-A-D

digital

# **RT-11 V02C**

## **System Release Notes**

Order No. DEC-11-ORNRA-A-D

### **ABSTRACT**

This document describes the differences between RT-11 V02C and previous releases of RT-11. It also describes the problems and solutions associated with generating and running RT-11 V02C systems. The system manager should read this entire document before generating the system as described in the RT-11 System Generation Manual (DEC-11-ORGMA-A-D).

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## RT-11 V02C SYSTEM RELEASE NOTES

### 1.0 INTRODUCTION

This document describes the differences between RT-11 V02C and previous releases of RT-11. It also describes the problems and solutions associated with generating and running RT-11 V02C systems. The system manager should read this entire document before generating the system as described in the RT-11 System Generation Manual (DEC-11-ORGMA-A-D).

For further information on RT-11 documentation, refer to the RT-11 Documentation Directory (DEC-11-ORDDA-A-D).

### 2.0 DIFFERENCES BETWEEN RT-11 V02C AND EARLIER RELEASES OF RT-11

#### 2.1 Differences Between RT-11 V02C and RT-11 V02B

Outlined below are the major differences between V02C and V02B. See Section 3 for a list of all changes.

1. The system is now distributed on a bootable 7- or 9-track magtape which is readable by PIP.
2. RT-11 now supports the LSI-11 and PDP-11/03 processors.
3. Documentation is provided to allow a second diskette controller as a separate device on the system; see the RT-11 System Generation Manual, Section 4.6.9.
4. Devices that use the .SPFUN request must now have the SPFUN\$ bit set in their device status word (see the RT-11 Software Support Manual, Section 2.5.2.2).
5. The SYSUPD fixed offset location in the resident monitor was changed to contain the monitor release number, rather than the version edit number. For example, SYSUPD in version V02C, the third release of Version 02, contains the number 3.
6. The CR11 card reader handler (CR.SYS) is no longer present in the monitor device tables. It must be interfaced to the system as explained in the RT-11 System Generation Manual, Section 4.6.7.
7. The TJU16 device handler (MM.SYS) is now present in the monitor tables.
8. The size of the resident Single-Job Monitor has increased by 37 (decimal) words; the size of the resident Foreground/Background Monitor has increased by 64 (decimal) words.
9. The SYSLIB routines GETSTR and PUTSTR will work only with RT-11 FORTRAN IV V01C. Errors will result if SYSLIB V06 is used with FORTRAN V01B or if SYSLIB V05 is used with FORTRAN V01C.
10. All known bugs at the time of release have been fixed.

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### 2.2 Differences Between RT-11 V02C and RT-11 V02

Outlined below are the differences, in addition to those listed in Section 2.1, between V02C and V02-01. Where applicable, a chapter reference to the RT-11 System Reference Manual follows the item.

1. BATCH (Chapter 12) and SYSLIB (Appendix O) were added to the system, as well as TJU16, RP11C/RP02, RX11/PX01, and RJS03/4 support.
2. The system macro expansion format no longer defaults to V01 forms. A `..V1..` macro must be specified specifically in an `.MCALL` statement for programs which contain V01 macro calls (Chapter 9).
3. An upper- and lower-case capability has been added to the Editor for those users with upper-/lower-case terminals (Chapter 3).
4. SYSMAC alters the channel byte only if a macro call includes a channel argument (see Section 3.12 of this manual).
5. Several changes have been made in the RT-11 V02C magtape support. Users of RT-11 V02C will be able to read Version 2 magtapes; however, users who try to read V02C magtapes under Version 2 will experience difficulties. The RT-11 V02C magtape handler inserts a "." between the file name and extension in the magtape file header (HDR1). The V02 magtape handler does not expect a "." and as a result does not correctly match file names with a V02C magtape. The Version 2 magtape handler lists files on a V02C magtape as "ABCDEF. MA" rather than "ABCDEF.MAC".

To transfer files from a V02C magtape using the Version 2 magtape handler, use the `.*` transfer mode in PIP. If only selected files are to be transferred, use the PIP `/Q` switch to choose the files to be transferred. The command format appears as:

```
.R PIP
**MAC=MTØ:.* /X/Q
_
```

This assigns the output files a normal RT-11 extension.

### 2.3 Differences Between RT-11 V02C and RT-11 V01-15

Outlined below are the differences, in addition to those listed in Sections 2.1 and 2.2, between RT-11 V01-15 and RT-11 V02C. Users upgrading from V01-15 to V02C should be aware of these differences; knowledge of them will make the transition easier. Where applicable, a chapter reference to the RT-11 System Reference Manual follows the item.

1. Most keyboard monitor commands require three characters instead of two. For example, DAT is now required for the DATE command, rather than DA (Chapter 2).
2. The assembly language expansion differs for V02C and V01 macros (Chapter 9).

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3. The device handler interface is different between V01 and V02C. See Appendix H of the reference manual for changes that must be made to user-written device handlers. Additional information about device handlers can be found in the RT-11 Software Support Manual.
4. The .SETTOP programmed request conventions must be more strictly observed (Chapter 9).
5. The programs GTON, GTDIAL, and PIPC have been obsoleted by extended features in V02C.
6. The PR: handler no longer prompts before reading a paper tape; the tape must be in the reader before the command to read is issued. If the tape is not in the reader, an end-of-file condition is returned.
7. EXPAND no longer uses the file SYSMAC.SML for its default macro library; SYSMAC.8K is the default macro library for EXPAND only.
8. Using TT: to provide file input, the CTRL Z end-of-file character no longer needs to be followed by a carriage return.
9. Under the F/B Monitor, calls to the CSI which require terminal input do an implicit .UNLOCK (Chapter 9).
10. The error byte in the system communication area (byte 52) can now have a negative value in conjunction with .SERR (Chapter 9).
11. The system no longer halts on traps to 4 (octal) and 10 (octal); a monitor error message results. The only significant halts are the monitor "system halts" (Chapter 2).
12. Fatal monitor error messages now include the PC address for the offending instruction (Chapter 2).
13. Device handler characteristics such as line printer width are modified via the SET command rather than a patch (Chapter 2).
14. In the Foreground/Background Monitor, the device handler TT: is resident as part of the monitor.
15. When adding handlers to the system, the permanent device names no longer have to be in any particular order (alphabetic or otherwise).
16. When adding handlers to the system, the new monitor device tables contain 14 (decimal) device slots; all are in use.
17. The .SAVESTATUS request does not return an error (code 0) if the channel is not open. This change permits a program to .SAVESTATUS all channels without concern for their being open. The .WAIT request should be used to determine if a channel is open.

## RT-11 V02C SYSTEM RELEASE NOTES

### 2.4 Errors Corrected in V02C

1. The Single-Job Monitor has been fixed to refresh the USR code in the proper place when doing a .CDFN request.
2. The Single-Job Monitor console service now strips the parity bit before printing. It also throws away the echo of an input character if the output buffer is full.
3. The Single-Job Monitor TT: handler is fixed to terminate on the correct word count, return an EOF only if the EOF character was received, and handle SEEKS correctly.
4. The Single-Job .SYNCH code return priority was lowered to zero so that it can properly imitate the Foreground/Background effects.
5. The QMANGR code of the Foreground/Background Monitor has been corrected so that queue elements will be inserted at the end of the queue.
6. Lower-case terminal support in the F/B Monitor has been changed to work correctly with two jobs active.
7. A double CTRL C typed during execution of the .FRUN, .LOAD, and .UNLOAD commands no longer causes a loss of use of the memory allocated.
8. The .FRUN command now closes channel 15 if the program being loaded is not overlaid.
9. The KMON .CLOSE command no longer crashes the system when a channel is open on magtape or cassette.
10. The KMON .ASSIGN:dev command now properly deassigns the specified device.
11. The KMON .DATE command now properly tests for valid data.
12. Cassette file headers have been changed slightly so that they can be read by RSX-11D FILEX. The change has no effect when cassettes are read under RT-11.
13. FILEX no longer aborts when copying from one DECTape to another.
14. The BATCH commands \$CALL, \$COPY, \$CREATE/DOLLARS, and \$DISMOUNT have been corrected to operate properly.
15. EDIT was changed to work properly on machines without a VT11.
16. LIBR has been corrected to properly detect when memory is exceeded. The last line of the entry point table is no longer lost when printed on LS-11 printers.

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17. The Linker /S switch now operates correctly.
18. The JADD, JSUB, and IFETCH functions in SYSLIB now operate properly.
19. The SYSLIB function ILUN now reports on the console terminal the additional information that a logical unit is opened.
20. PIP has been corrected as follows:
  - a. /D returns an error if a file specification appears on the output side of a command string.
  - b. The /D and /R options report a ?FIL NOT FND? message when a \*.\* expansion for the command results in a null input list.
  - c. Files with sequence numbers greater than 0 are ignored in \*.\* transfers from cassette. However, they are still handled properly when a file is split across cassettes.
  - d. The ?NO SYS ACTION? message has changed to ?NO .SYS/.BAD ACTION? and is now reported for attempted operations on both .SYS and .BAD files that lack the /Y switch.
21. PATCHO now accepts 6-digit octal numbers on the right hand side of the WORD command. If a bad patch is made, the output file is not closed. Instead, PATCHO pauses and issues the BAD PATCH message. The user can type CTRL C to abort PATCHO without closing the output file.
22. SRCCOM now ignores blank lines when doing a file compare. It has also been modified so that the first line of each file is compared as well as automatically printed.
23. DUMP now prints the current block number in five octal digits rather than four.
24. The RX11 handler (DX.SYS) now reports errors on references to units 2-7.
25. The RJS03/4 handler (DS.SYS) now correctly pads short word count writes with zeroes to the end of the block.
26. In MACRO and ASEMBL, the D, M, and P error messages were changed to report errors correctly.
27. CREF no longer leaves out random symbols in the CREF map.
28. In ODT, the operation of the R command was corrected, nonprinting characters are no longer printed in response to backslash (only ASCII 0, 11-15, and 40-176 are printed), the r;/ command prints a ?.

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29. The .CSIGEN and .LOCK requests have been corrected to prevent the occurrence of spurious error messages.
30. The .RELEASE request from a foreground job can no longer release a device handler that is resident in the background job.
31. The .WRITE, .WRITW, and .TTYIN macros in SYSMAC.8K were corrected.
32. The .CHCOPY request was corrected so that it clears the pending I/O count when copying an active channel.
33. The .CDFN request now catches attempts to define more than 255 channels.

### 3.0 CHANGES AND RESTRICTIONS

RT-11 V02C users should always keep abreast of RT-11 related notices published by DIGITAL. Changes published in the Software Performance Summary need be made only once and should be made immediately. Changes published in the Digital Software News should be made as soon as possible to systems in use. In addition to continued surveillance of the above documents, the user should be aware of the following notes and restrictions at installation time. In all examples throughout this section, underlined responses represent computer output.

#### NOTE

Patches to the monitor do not become effective until the bootstrap is copied and the monitor rebooted with the following PIP commands:

```
.R PIP<CR>  
*SY:A=MONITR.SYS/U<CR>  
*SY:/O<CR>
```

Patches to other .SYS components do not become effective until the monitor is rebooted with the following PIP commands:

```
.R PIP<CR>  
*SY:/O<CR>
```

These commands must be executed before the patch is tested.

Once you have made the patches to your working system copy, you should immediately create a backup of that copy.

Table 1 lists the version numbers of the monitors and system programs being distributed with RT-11 V02C.

# RT-11 V02C SYSTEM RELEASE NOTES

Table 1  
RT-11 V02C Version Identifications

| System Component     | V02C Identification | How Obtained |
|----------------------|---------------------|--------------|
| Monitors (S/J & F/B) | V02C-02             | Automatic    |
| ASEMBL               | VS02-12             | Listing      |
| BATCH                | V01-04              | /V           |
| CBUILD               | V01-02              | Automatic    |
| CREF                 | V01-04              | Listing      |
| DUMP                 | V02-02              | PATCH        |
| EDIT                 | V02-12              | EV\$\$       |
| EXPAND               | V02-02              | Listing      |
| FILEX                | V02-02              | /V           |
| LIBR                 | V03-03              | Map          |
| LINK                 | V04-04              | Map          |
| MACRO                | VM02-12             | Listing      |
| MBUILD               | V02-03              | Automatic    |
| MSBOOT               | V01-05              | Automatic    |
| MTINIT               | V01-01              | Automatic    |
| ODT                  | V01-02              | Automatic    |
| PATCH                | V01-02              | Automatic    |
| PATCHO               | None                |              |
| PIP                  | V04-06              | /V           |
| PTBUILD              | V02-01              | Automatic    |
| SRCCOM               | V01-03              | /H           |
| SYSLIB               | V6                  | SYSLBV       |

## 3.1 Important Memory Locations in V02C

Table 2 lists the V02C specific memory locations referenced in RT-11 documentation. The locations are documented for the purposes of modification; therefore they do not represent actual memory locations, but addresses in the disk file as accessed by PATCH.

## 3.2 System Device Handler Information

Table 3 lists pertinent information concerning RT-11 system device handlers. This information is useful when replacing one device with another in the system, modifying device handlers, adding new devices to the system, etc.

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Table 2  
Memory Locations in V02C

| Location | S/J Monitor | F/B Monitor | Other            |
|----------|-------------|-------------|------------------|
| ALTTST   | -           | -           | 12106 (EDIT.SAV) |
| BASE     | 17000       | 20000       |                  |
| CONFIG   | 35300*      | 37300*      |                  |
| CREF1    | -           | -           | 1000 (CREF.SAV)  |
| DSARG    | -           | -           | 14040 (EDIT.SAV) |
| DSSIZ    | 32662*      | 34614*      |                  |
| \$DVSIZ  | 13660       | 14612       |                  |
| DXIOP    | -           | -           | 1214 (DY.SYS)    |
| EBASE    | -           | -           | 2402 (EDIT.SAV)  |
| \$ENTRY  | 16564       | 17724       |                  |
| GTVECT   | 35354*      | 37354*      |                  |
| \$HSIZE  | 13624       | 14556       |                  |
| HW       | -           | -           | 1366 (MT.SYS)    |
| LISTFB   | -           | 26032       |                  |
| LOWMAP   | 16326       | 17326       |                  |
| LP       | -           | -           | 2626 (DUMP.SAV)  |
| MACR1    | -           | -           |                  |
| MAXBLK   | 16314       | 17314       | 7662 (MACRO.SAV) |
| MSGO     | -           | -           |                  |
| MMHSIZ   | 32650*      | 34602*      | 2520 (DUMP.SAV)  |
| MMPNAM   | 35514*      | 37654*      |                  |
| MMSTAT   | 35550*      | 37710*      |                  |
| MTHSIZ   | 32640*      | 34572*      |                  |
| MTPNAM   | 35504*      | 37644*      |                  |
| MTSTAT   | 35540*      | 37700*      |                  |
| PARDEN   | -           | -           |                  |
| \$PNAME  | 16470       | 17630       | 1104 (MT.SYS)    |
| RFSIZ    | 32666*      | 34620*      |                  |
| RP23     | 43260*      | 54556*      |                  |
| \$STAT   | 16524       | 17664       | 1076 (DP.SYS)    |
| STATIN   | 340         | 340         |                  |
| STATOUT  | 340         | 340         |                  |
| TTCNFG   | -           | 21416       |                  |
| TTWIDT   | -           | 21410       |                  |
| UNIMOD   | -           | -           |                  |
| VECTIN   | 37572       | 47314       | 1312 (MM.SYS)    |
| VECTOUT  | 41026       | 50264       |                  |

\*BASE has already been added to these numbers.

| Location | Monitor (Same for S/J and F/B Versions) |      |      |      |      |      |
|----------|-----------------------------------------|------|------|------|------|------|
|          | RK                                      | DT   | DX   | DP   | DS   | RF   |
| BHALT    | 570                                     | 634  | 606  | 652  | 574  | 562  |
| RELLST   | 1610                                    | 1556 | 1564 | 1622 | 1542 | 1504 |

# RT-11 V02C SYSTEM RELEASE NOTES

Table 3  
System Device Handler Information

| Entry #                            | Octal Offset | Device Name |        | Device Code | Handler Size (Bytes) | Device Size <sub>8</sub> | Status Word |
|------------------------------------|--------------|-------------|--------|-------------|----------------------|--------------------------|-------------|
|                                    |              | ASCII       | RAD50  |             |                      |                          |             |
| 1                                  | 0            | TT          | 100040 | 4           | 500                  | 0                        | 4           |
| 2                                  | 2            | DS          | 15770  | 16          | 320                  | 2000*                    | 100016      |
| 3                                  | 4            | RK          | 71070  | 0           | 342                  | 11300                    | 100000      |
| 4                                  | 6            | RF          | 70560  | 12          | 270                  | 2000                     | 100012      |
| 5                                  | 10           | PR          | 63320  | 7           | 174                  | 0                        | 40007       |
| 6                                  | 12           | PP          | 63200  | 10          | 132                  | 0                        | 20010       |
| 7                                  | 14           | MT          | 52140  | 11          | 4300                 | 0                        | 12011       |
| 8                                  | 16           | LP          | 46600  | 3           | 306                  | 0                        | 20003       |
| 9                                  | 20           | DT          | 16040  | 1           | 322                  | 1102                     | 100001      |
| 10                                 | 22           | CT          | 12740  | 13          | 3710                 | 0                        | 12013       |
| 11                                 | 24           | MM          | 51510  | 20          | 4700                 | 0                        | 12020       |
| 12                                 | 26           | BA          | 6250   | 4           | 4076                 | 0                        | 4           |
| 13                                 | 30           | DP          | 15600  | 21          | 434                  | 116110                   | 100021      |
| 14                                 | 32           | DX          | 16300  | 22          | 670                  | 756                      | 102022      |
| -                                  | -            | CR          |        | 14          | 1326                 | 0                        | 40014       |
| *RJS03. The RJS04 has 4000 blocks. |              |             |        |             |                      |                          |             |

## 3.3 Linker

### 3.3.1 Changes

1. The V04 Linker (RT-11 V02C and V02B) is the result of dramatic performance improvements to the V03 Linker (RT-11 V02). One of the optimizations makes use of resident library directories; the library directories are read into memory and kept there until no longer needed.

The Linker needs approximately 10.5K of user space for this optimization to take effect. The Linker will function in less space, but performance deteriorates as memory decreases; the 10.5K point marks a sharp drop in the performance curve.

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Users with 16K of memory, therefore, should be careful when loading handlers and options if concerned about link times. The F/B Monitor uses 3.5K, GT ON uses 1.25K, and handlers use from 100 (decimal) to 1000 (decimal) words each. If many of these options are invoked, the Linker will be left with less than 10.5K and will be unable to benefit from the major optimizations.

For the same reasons, the /S switch should not be used unless absolutely necessary. It disables several optimizations for the accompanying gain in symbol table space.

The user may combine object modules using the librarian, such as combining the modules in FORLIB and SYSLIB. Doing so makes it easier to specify the command string when linking some FORTRAN programs but can also cause the link time to be more than twice as long. This is because the FORTRAN library is almost at the maximum entry point limit that the Linker can keep resident in memory in 16K or larger memory configurations.

2. The CHAIN\$ bit in the job status word for LINK.SAV is set.

### 3.3.2 Restrictions

1. If a file of zero length is accidentally specified as input to the Linker, the Linker may malfunction when generating the link map. If this happens, type two CTRL C's to return to the monitor.
2. If relocatable code is to be linked for the foreground, no location may be filled more than once (using location counter arithmetic); any such location may be improperly relocated during the FRUN and may cause program or system failure. (See the RT-11 System Reference Manual, Section 6.3, for further information.)
3. If two or more libraries are used in a link, they should be specified on the same command line.
4. The Linker may print the message ?HARD I/O ERROR? when it exceeds memory.

### 3.4 Librarian

#### 3.4.1 Changes

1. The V02 Librarian (RT-11 V02) had a bug that caused it to produce faulty library directories. Although these libraries were acceptable to the V03 Linker (RT-11 V02), the improved V04 Linker (RT-11 V02C and V02B) is sensitive to the bug and will not operate correctly on libraries built with the V02 Librarian. To correct the problem, libraries built with the V02 Librarian need only be run through the V03 Librarian; the result will be a correct library.

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For example, if LIB.OBJ is an existing library built with the V02 Librarian, it can be prepared for use under the V04 Linker as follows:

```
.R LIBR                (V03 Librarian)
*LIB=LIB
```

It is recommended that all existing libraries be modified at once, as soon as this kit is received, to avoid possible confusion as to which libraries have been modified and which have not. Modified libraries will work with both V03 and V04 Linkers.

2. The \$CHAIN bit in the job status word for LIBR.SAV is set.

### 3.4.2 Restrictions

.CSECTs and .GLOBL entry points are treated alike. If a duplicate library entry is found, it is flagged and not added to the library.

### 3.5 Monitor

#### 3.5.1 Changes

1. The Single-Job Monitor scroller code was changed to set the scroll line width to 80 for 17-inch display tubes and to 72 for 12-inch tubes.
2. The file name of the running foreground or background job is located in the job's impure area. For more information, consult the RT-11 Software Support Manual, Section 2.5.3.
3. The request identification number specified to a .MRKT request must not be within the range of codes from 177400-177777; these codes are reserved for system use.
4. A device handler may now have its abort entry point taken on every job abort, regardless of whether it has an active transfer in progress, by setting the HNDLR\$ bit in the device status word. (See the RT-11 Software Support Manual, Section 2.5.2.2.)
5. The resident monitors (RMON) are the following sizes in V02C (sizes are in decimal words):

|    | <u>Single-Job</u> | <u>Foreground/Background</u> |
|----|-------------------|------------------------------|
| DP | 1736              | 3623                         |
| DS | 1698              | 3585                         |
| DT | 1699              | 3586                         |
| DX | 1814              | 3701                         |
| RF | 1686              | 3573                         |
| RK | 1707              | 3594                         |

## RT-11 V02C SYSTEM RELEASE NOTES

### 3.5.2 Patches

1. The .SPFUN request in the S/J Monitor tests the wrong bit in the \$STAT table. The following patch corrects the problem.

```
.R PATCH<CR>
_
PATCH Version number
FILE NAME--
*MONITR.SYS/M<CR>
*17000;0R
*324\    0    101<CR>
*0,22310/10000 2000<CR>
*E
_
.R PIP<CR>
*SY:A=SY:MONITR.SYS/U<CR>
*SY:/O<CR>
_
```

The new monitor version will be RT-11SJ V02C-02A.

2. The following patch will correct a problem in the USR swapping code in the S/J Monitor.

```
.R PATCH<CR>
_
PATCH Version number
FILE NAME--
*MONITR.SYS/M<CR>
*17000;0R
*0,6050/62705 167<LF>
0,6052/ 12    522<CR>
*0,6576/xxxxx 13702<LF>
0,6600/ xxxxxx 54<LF>
0,6602/ xxxxxx 10562<LF>
0,6604/ xxxxxx 5160<LF>
0,6606/ xxxxxx 62705<LF>
0,6610/ xxxxxx 12<LF>
0,6612/ xxxxxx 167<LF>
0,6614/ xxxxxx 177236<CR>
*324\    101    102<CR>
*E
_
.R PIP<CR>
*SY:A=SY:MONITR.SYS/U<CR>
*SY:/O<CR>
_
```

where xxxxxx means that the contents are irrelevant.

The new monitor version will be RT-11SJ V02C-02B.

### 3.5.3 Restrictions

1. If output is sent to the terminal via the TT: handler and .TTYOUT at the same time, the output via .TTYOUT will be fragmented.

## RT-11 V02C SYSTEM RELEASE NOTES

2. On return from a .LOOKUP or .ENTER issued to a special device (bit 12 set in device status word; e.g., magtape or cassette), R0 will contain a pointer into the user's device block and not the file length (LOOKUP) or space allocated (ENTER). This is not serious for magtape or cassette since the file length and space allocated are not known in advance for these sequential devices, but it is a restriction on user-written handlers for special devices where this information may be known. There is currently no mechanism available for special device handlers to pass such information back to the monitor for return to the user program.
3. The positions of the TT: and BA: devices in the monitor's device tables should not be altered.
4. The message handler in F/B does not check for a word count of zero before queueing a send or receive data request. Since RT-11 distinguishes a send from a receive by complementing the word count, a .SDATW of zero words will be treated as a .RCVDW of zero words by the message handler. A word count of zero should be avoided when using the message handler.

### 3.6 PIP Restrictions

1. PIP does not produce an error message when an attempt is made to zero a magtape that has been write-protected; i.e., a write ring is not inserted in the back of the reel.
2. When the /O switch is used to reboot, the original system device must be mounted. If it is not mounted, the system must be rebooted manually.
3. If the /S switch is used to compress the device, the /O switch cannot be used to reboot.
4. If the position of PIP on the system device changes, the /O switch cannot be used to reboot.
5. PIP magtape operations require a system that includes at least 12K words of memory.
6. Under a diskette system, at least 12K words of memory are necessary for PIP cassette operations.
7. PIP cassette operations using the /A or /B switches require at least 12K words of memory.
8. PIP will attempt to move .BAD blocks when a command string specifies \*.\*X/Y.
9. If the output file is too small, PIP prints the message ?OUT ERR?.
10. If just a carriage return is typed in response to the PIP prompting asterisk, the message ?FIL NOT FND? is printed.

### 3.7 BATCH Restrictions

When a LET statement specifies a value of a variable as 134 (ASCII);  
e.g.,

```
LET A=134
```

and the variable A is subsequently used in the BATCH stream, BATCH may crash. To keep this from happening, avoid the use of a BATCH variable to introduce a backslash into the BATCH stream. Where the backslash character is required in a data line, use two backslash characters;  
e.g.,

```
$JOB/RT11
.R PATCH
*FILE.SAV
*327 \\10210
*E
$EOJ
```

### 3.8 RP11C/RP02 Support

The RP11C controller requires that I/O to the disk involve transfers of even numbers of words only. Odd numbers of words can be read, but when written, the word count is increased by 1 and the last word of the buffer is duplicated to complete the transfer.

User programs must, therefore, be careful to read and write only even numbers of words when the RP11 disk is involved. RT-11 makes no check to determine if the word count is even and the resulting transfer may not be what the user expected.

Since most programs transfer in units of 256 words, this restriction is not a problem for many applications. Problem areas concern only those that write odd numbers of words on RP11/RP02/RP03 disks.

For more information, consult the PDP-11 Peripherals Handbook.

### 3.9 Magtape Support

#### 3.9.1 Changes

The system programs MBUILD, MSBOOT, MBOOT, and MTINIT were added. See the RT-11 System Generation Manual, Section 4.3, for further information.

#### 3.9.2 Restrictions

1. When a magtape fills up, a program will print ?OUT ERR? since the magtape handler returns a hard error when the tape is full. This applies to all RT-11 system components that access the magtape handler.

## RT-11 V02C SYSTEM RELEASE NOTES

2. The procedure for patching 7-track magtape for special densities has changed; see the RT-11 System Generation Manual, Section 4.6.2.
3. RT-11 magtape operations require a system that includes at least 12K words of memory.

### 3.10 Line Printer Support

#### 3.10.1 Changes

The LP.SYS handler supports LS-11 control characters via a SET command. See the RT-11 System Reference Manual, Table 2-5, for further information.

#### 3.10.2 Restrictions

The LS-11 line printer does not interrupt when it is initially off-line and is placed on-line after a transfer is started. It is necessary to type CTRL C and reissue the transfer after placing the LS-11 on-line.

### 3.11 CT.SYS and MT.SYS Handler Restrictions

If the cassette or magtape handlers are made resident with the LOAD command and a job using either device is aborted while a tape file is open, the handler must be UNLOADED and reLOADED before it will allow processing of any new files. This is caused by flags internal to the handler, which cannot be reset unless a file is closed or a fresh copy of the handler is brought into memory.

The normal procedure is not to keep CT or MT handlers resident. Users should also avoid .PURGE for files open on MT or CT.

### 3.12 SYSMAC.SML, SYSMAC.8K Changes

1. There was a problem in the Version 2 system macro libraries that caused the channel number to be automatically set to zero if a macro call was made using only the ".area" argument.

This problem has been corrected in V02C and V02B at a slight increase in the number of words required for the expanded macro code as detailed below. In V02C (V02B) SYSMAC, the channel byte is only altered if a macro call includes a channel argument. If it does not, the channel byte is left unaltered unless the particular request requires a channel number of zero, in which case it is automatically cleared.

## RT-11 V02C SYSTEM RELEASE NOTES

The following macro calls expand into one more word than V02-01 if either SYSMAC.8K or SYSMAC.SML is used:

|         |             |        |
|---------|-------------|--------|
| .CHCOPY | .RENAME     | .READC |
| .CSTAT  | .REOPEN     | .READW |
| .DELETE | .SAVESTATUS | .WRITE |
| .ENTER  | .SPFUN      | .WRITC |
| .LOOKUP | .READ       | .WRITW |

The following macro calls expand into two more words than in V02-01 if the new SYSMAC.SML is used. If SYSMAC.8K is used, these do not require any additional space:

|         |          |         |
|---------|----------|---------|
| .CDFN   | .MRKT    | .SDATC  |
| .CNTXSW | .PROTECT | .SDATW  |
| .CMKT   | .RCVD    | .SFPA   |
| .DEVICE | .RCVDC   | .TRPSET |
| .GTIM   | .RCVDW   | .TWAIT  |
| .GTJB   | .SDAT    |         |

2. The PDP-11/03 and LSI-11 Processor Status Word instructions .MFPS and .MTPS were added to SYSMAC.

### 3.13 MACRO/ASEMBL

The PDP-11/03 and LSI-11 Processor Status Word (PS) word operator instructions .MFPS and .MTPS have been added to the permanent symbol table.

Line numbers cannot be greater than 999 per page.

### 3.14 ODT Changes

1. ODT now tests the processor status word (PS) to determine if it is running on a PDP-11/03 or LSI-11.
2. The PS is not saved when ODT is started at the START location, relative 172. If the user's PS must be saved, ODT must be patched at relative locations O.STRT and O.STRT+2. Location O.STRT is 236 from the link address.

For example, if ODT is linked at 1000, then ODT is patched at locations 1236 and 1240. The patches to the PS at ODT start are:

|          | <u>Old Content</u> | <u>New Content</u>     |                 |
|----------|--------------------|------------------------|-----------------|
|          |                    | <u>PDP-11/03 (LSI)</u> | <u>PDP-11's</u> |
| O.STRT   | 240                | 106767                 | 4767            |
| O.STRT+2 | 240                | 177604                 | 4642            |

## RT-11 V02C SYSTEM RELEASE NOTES

### 3.15 RX11 Device Handler (DX.SYS) Restriction

The RX11 diskette controller does not use an NPR interface. The device handler must use a program loop to transfer data from a buffer in the RX11 controller. Consequently, the RX11 device handler will spend a lot of time at interrupt level 5 when doing data transfers to or from the RX01. This may be of significance to users who have communications equipment interrupting at level 4. They may discover that use of the RX11 simultaneously with communications equipment will cause loss of data due to overrun errors.

The bootstrap changes the RX11 driver priority to run at level 0 if the processor is a PDP-11/03 or LSI-11. This is not possible on other processors because their multiple-level interrupt structure may cause a fatal monitor stack overflow. On processors other than the PDP-11/03 or LSI-11, the interrupt priority of the communications or data acquisition devices may have to be changed to interrupt at a priority greater than the RX11.

### 3.16 FILEX Restriction

An error message is generated if an attempt is made to transfer from cassette or magtape. FILEX does not support cassette or magtape operations.

### 3.17 EDIT

#### 3.17.1 Changes

1. The size of the Editor text buffer has been increased to 1356 characters.
2. EDIT now automatically increases the number of lines displayed on a 17-inch display tube. The text buffer contains 30 lines; the command area displays 8 lines.

#### 3.17.2 Restrictions

1. EDIT magtape operations require a system that includes at least 12K words of memory.
2. If the output file is too small to fit the input file plus edits, an error message will appear when the file is full and all edits will be lost. To avoid this problem, specify the size of the output file needed when the output file is specified.

## RT-11 V02C SYSTEM RELEASE NOTES

### 3.18 KB.MAC Changes

Make the following corrections to the listing of the KB.MAC handler in Appendix B of the RT-11 Software Support Manual. These changes should be made to page B-4 on the lines indicated.

```
9      ;      3) INSTALL IT AS DEVICE "KB:",AS DESCRIBED IN SECTION 5.3
17     ;
18     ;      STAT= HIGH ORDER BYTE=0,LOW ORDER BYTE=24
19     ;
```

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Did you find errors in this manual? If so, specify by page.

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Did you find this manual understandable, usable, and well-organized? Please make suggestions for improvement.

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Is there sufficient documentation on associated system programs required for use of the software described in this manual? If not, what material is missing and where should it be placed?

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