

TSX-Plus Version 6.31

Release Notes

January 22, 1988

1 Miscellaneous changes

1. Additional information has been included in the crash dump routine. Pending fork blocks information is displayed which includes the address of the fork routine, saved registers, and the fork priority. The EMT context of the executing job is displayed.
2. A change to CVAPHY (convert user's virtual address to a physical address) was required. Previous versions of CVAPHY required that R5 point to Q\$BLKN in the I/O queue element. Now R5 must point to Q\$WCNT in the I/O queue element. All other interface requirements are identical with RT-11.

2 Corrected problems

1. A rare problem which could cause corruption of disk directories and possibly the data on those disks has been corrected. A typical symptom would be to find a free space (e.g. with DIRECTORY/FREE) which appeared to be of an erroneously large size, such as 65000 blocks. This would only happen on a device in which tentative files were being converted to unused entries (files created with .ENTER being purged). Because of the frequency of purge activity on COBOL-Plus data segment swap files, there was a good chance that the site of corruption would be near a data segment swap file (DIRECTORY/DELETED showed entries of CBLSWP.SWP). While this correction will prevent further directory corruptions of this type, a device on which this has already happened **must** be corrected.

To reconstruct a device which has been corrupted in this fashion, you must initialize the device and restore its contents from backup media. If your backup is not current or its contents have not been verified by independent tests (since the backup data may also be corrupt), you must be very cautious about the integrity of the data restored. Before initializing the corrupted device, issue the command DIR/PRINT/FULL/BLOCKS *ddn*:. On this listing, look down the columns of block numbers, searching for unused entries of very large sizes, block numbers out of order (smaller than preceding block numbers), and block numbers which increase more than is reasonable based on the expected size (not that shown on the directory listing) of the preceding file. If you find entries of these types, identify all the files which appear to exist in overlapping blocks on the disk. All these files and any backups of them which were taken since the directory was corrupted should be suspected of being corrupted and must be verified. Text files may usually be verified by inspection with an editor; ISAM structures may be verified with the ISAM utility; other file types should be verified as appropriate.

If the directory has only recently been corrupted and not too much damage has occurred, it may be possible to correct the disk with a SQUEEZE operation. Minimally, you must still check the directory as described in the previous paragraph and note the files which are stored in regions of overlapping block numbers. Then, delete the potentially overwritten files, squeeze the device, and restore the correct version of the deleted files from backup.

2. Previously, all completion routines were executed at the job's current priority. Now completion routines scheduled using a real-time EMT (either 11,140 or 21,140) will run at their specified priority either above, at, or below the priority of the mainline code.
3. In the event that terminal input escape activation is enabled and input characters are passed to a terminal input completion routine, a flag byte (-1) is no longer inserted into the terminal input buffer before each character of the escape sequence. This precludes partial handling of escape sequences by a terminal input completion routine and the remainder by the mainline code.
4. The following corrections have been made to SYSMON:
 - A misspelling in the Window Status display has been corrected.
 - A line wrap when no printwindow device was known has been corrected.

TSX-Plus Version 6.3

Release Notes

These release notes describe the differences between TSX-Plus version 6.3 and version 6.2. The *TSX-Plus Documentation Set* incorporates the information described in earlier release notes. In case of any differences between the release notes and the manuals, the release notes take precedence.

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1 Fast mapping to shared run-times and PLAS regions

Three changes have been made to improve the performance of programs that use extended memory PLAS regions or shared run-time systems (e.g., COBOL-Plus and DBL).

The .MAP EMT that is used to map a PLAS window to a section of a PLAS region has been doubled in speed in the common case that the window is already mapped when the .MAP is executed and the new mapping uses at least as many PAR regions as the original mapping. This will be of benefit to all programs that use virtual overlays or virtual arrays.

The system service (EMT) with function code 143, subfunction 1, which is used to map a portion of a shared run-time into the virtual address space of a job has been speeded up by approximately 23%. This results in a performance improvement in existing COBOL-Plus and DBL applications without any change being required in the application or the version of COBOL-Plus or DBL.

A much more dramatic improvement in performance can be gained by new versions of programs that utilize a new shared run-time mapping facility. (This will be used by COBOL-Plus version 6.3 and the next version of DBL.) This facility allows a program to define a set of "regions" in one or more shared run-time systems. The TRAP instruction (rather than EMT) is then used to cause a selected region to be mapped into the virtual address range of the job. The TRAP instruction is used to avoid the overhead involved in general EMT processing. This method of mapping shared run-times is approximately 10 times as fast as the method using EMT function 143, subfunction 1.

A new system service (EMT) has been implemented to define the regions in the shared run-time system. Up to 40 regions can be defined by each job. A region can be redefined to perform different mappings at different times, but most commonly a set of regions is defined during program initialization and then the TRAP instruction is used to select the region that is to be mapped as the program executes. The following information is required to define a region:

1. The region index. This is a number in the range 0 to 39 that identifies the region. This index number is later used with the TRAP instruction to select the region being mapped.
2. The number of the Page Address Register (PAR) through which the region is to be mapped. PAR numbers are in the range 0 to 7 and each PAR can map up to 8 Kb. One region is mapped through one PAR (i.e., a region cannot span PAR's). Different regions can be mapped through different PAR's.
3. The size of the region. The size is specified in 64-byte units. Up to a full PAR (8 Kb) can be mapped through a region.
4. The shared run-time system that is being accessed through the region.
5. The offset (in 64-byte blocks) from the beginning of the shared run-time system where the mapping is to begin.

The form of the EMT used to define a region is:

EMT 375

with R0 pointing to an argument block of the following form:

```
.BYTE    2,143
.WORD    par-number
.WORD    offset
.WORD    size
.WORD    region-number
```

This EMT can return the following error codes:

Code	Meaning
1	No shared run-time has been associated with job
2	Region number is invalid
3	Specified size is greater than 128 units of 64-bytes (8 Kb)
5	Specified offset is beyond the end of the run-time

The following sequence of operations must be performed to define and map regions:

1. Associate a shared run-time system with the job by use of the EMT with function code 143, subfunction 0 (see shared run-time chapter of the *TSX-Plus Reference Manual*). This does not cause any portion of the run-time to be mapped into the job's address space but simply specifies which run-time is being referenced by subsequent EMT's.
2. Use the new EMT with function code 143, subfunction 2, to define the regions of the run-time. This simply defines the characteristics of the regions, it does not cause them to be mapped into the job's address space. You may define regions in different shared run-times by associating a different run-time before you use the define-region EMT.
3. When you are ready to map a region into the job's address space, load R0 with the region number you specified when you defined the region, and execute a "TRAP 1" instruction. The carry flag will be cleared following TRAP if the mapping was successful. Carry flag being set indicates that an invalid region number was specified in R0.

If any run-time regions have been defined by the job, the TRAP instruction is dedicated for use in region mapping. If there are no defined run-time regions, the TRAP instruction can be used for other purposes as before. All run-time region definitions are cleared when a program exits or chains. In addition, the following EMT can be used to clear all run-time regions and return the TRAP instruction to its normal function:

```
EMT      375
```

with R0 pointing to the following argument block:

```
.BYTE    3,143
```

2 Improvements to single line editor

1. Additional saved lines:

The method of storing lines in the single line editor data area has been changed. Previously, space was reserved for three records of 80 bytes each; now a 300 byte buffer is used and as many commands as will fit are packed into the area. Typically this means about 10 lines can be saved, but the actual number varies with the length of the commands.

2. RECALL command:

A new "RECALL" keyboard monitor command has been added for use with the single line editor. This command is used to display the set of saved commands and to recall a specific saved command either by specifying an index number or a string that matches the beginning of the command.

The "RECALL/ALL" command is used to display a list of the saved commands. An example of the display is shown below:

```
.RECALL/ALL
 1: RUN TEST
 2: LINK TEST
 3: MACRO TEST
 4: EDIT TEST
```

This is the normal display mode, with the most recent command displayed first. You may select reversed ordering, with most recent displayed last, with the SET RECALL REVERSE command. The SET RECALL NORMAL command re-establishes the normal (default) ordering.

Each saved command is assigned an index number, the most recent being number 1. To recall a specific command using its index number, use a command of the form "RECALL *number*".

You can also recall a command by specifying a string of characters that match the beginning characters of the command to be recalled. The form of this command is "RECALL *string*". For example, the following command would recall the MACRO TEST command: "RECALL MAC". If more than one saved command matches the specified string, the most recent saved command is recalled.

3. Command cycles:

Sometimes a particular cycle of commands is used repeatedly. For example, EDIT, MACRO, LINK, and RUN. If you wish you can now define which commands constitute a cycle and then easily recall them in the order they should be executed. To do this, perform the commands in the cycle the first time. Then use <UP-ARROW> to recall the first command of the cycle and press <PF1><DOWN-ARROW> to mark the beginning of the cycle. After you execute each command in the cycle, press <PF1><UP-ARROW> to recall the next command of the cycle. The cycle is cleared when you enter any new command.

Previous versions of the single line editor used <PF1><DOWN-ARROW> to store a command that was later recalled by pressing <PF1><UP-ARROW>. Since the <PF1><UP/DOWN-ARROW> commands are now used with command cycles, you must now type <PF1><S> to save a command and <PF1><X> to recall it.

4. Overtyping mode:

Previously the single line editor was always in insert mode. As you typed characters any existing characters on the line to the right of the cursor were moved right to make room for the characters being inserted. By typing CTRL-A you can now toggle between insert and overtype mode. In overtype mode, any characters you type in the middle of a line will replace existing characters as you type over them. Insert mode is automatically selected each time you begin to work on a new line.

5. RT-11 compatibility:

Most of the single line editor changes have been made to improve compatibility with RT-11. Previously, the word delimiters (for operations like "move-by-word" and "delete-word") were: space, tab, comma, and equal-sign. The word delimiters are now: tab, space, comma, period, slash, colon, equal-sign, and left-square-bracket.

3 Special function to read CL characteristics

A new special function (.SPFUN code 266) has been added to the CL handler. This SPFUN returns current information about the CL unit. The buffer address must start on an even boundary and must be at least 12 words long. The values returned are:

Offset	Contents
0	Handler status word (same as for .SPFUN code 204)
2	CL options flags (same as for .SPFUN codes 250 and 251)
4	Internal status word (see bit description below)
6	Page length
10	Number of skip lines
12	Page width
14	CL unit number (C1 units are 10-17 octal) (low byte)
15	Line number in use as CL unit (high byte)
16	Number of end of file form feeds
20-27	ASCIZ string to send at end of file (can be up to 7 bytes plus one null)

The following bits are defined in the internal status word:

Mask	Meaning
10	Carriage return was the last character transmitted
40	Next read will receive end of file
200	Break being transmitted
4000	DTR has been asserted (explicitly by SET CL _n DTR or setting the option flag, or implicitly by a READ or WRITE request)

Other bits are undefined and may vary.

4 New TSGEN parameter for CL version number

1. A new SET CL command has been added of the form:

```
SET CL VERSION=n
```

where *n* is an appropriate version number. This command sets the version number assigned to the CL handler. This is useful in solving the problem encountered when the error message “?VTCOM-F-Wrong version of XL:” is reported while running VTCOM. Once the correct version number has been determined, it can be permanently set in TSGEN. (See the next item.)

2. A new parameter has been added to TSGEN called CLVRSN, to allow you to force CL to report a particular version number. If CLVRSN is set to zero, then a version number appropriate for your version of RT-11 will be automatically assigned. Forcing CL to report a different number is only necessary when the version number automatically selected is incorrect. This version number is normally only checked by VTCOM.

5 Reinstatement of the KILL EMT

Several versions ago, there was an error in the EMT to kill a detached job which allowed *any* job to be killed with this EMT. However, when this was corrected, numerous objections were raised to the correction. In response, the EMT may again be used to kill any job, but the appropriate privileges are required. If it is used to kill a detached job, then DETACH privilege is required; to kill primary and secondary lines, DETACH privilege is not required. The expected checking is always done for SAME, GROUP, and WORLD privileges. That is: a process may always kill its parent or child, may only kill a different line with the same PPN if it has SAME privilege, may only kill a process with the same project but different programmer number if it has GROUP privilege, and may only kill another job with a different project number if it has WORLD privilege.

This EMT is now equivalent to the keyboard KILL command which has been corrected to check for DETACH privilege when appropriate.

The form of this EMT is:

```
EMT      375
```

with R0 pointing to an argument block like:

```
.BYTE    2,132
.WORD    job_number
```

This EMT may return the following error codes:

<i>Code</i>	<i>Meaning</i>
0	Invalid subfunction code
1	Invalid job number
2	You do not have privilege to kill that job

6 EMT to dismount all logical disks

An EMT is now available to dismount all logical disks. The form of the EMT is:

```
EMT      375
```

with R0 pointing to the following argument block:

```
.BYTE   5,135
.WORD   0
```

The following error code can be returned by this EMT:

<i>Code</i>	<i>Meaning</i>
3	Some channel is opened to a file on the logical disk

This EMT is equivalent to the SET LD EMPTY command. All LD's are completely dismounted, and become inaccessible until remounted. This is unlike the EMT to dismount all files structures which simply removes file structures from the caching tables.

7 EMT to determine or change program name

An EMT is now available to determine or change the name of the current program. This changes the name in the SYSTAT (WHO, SHOW JOBS) display, not the directory name of the executable program image. The form of the EMT is:

```
EMT      375
```

with R0 pointing to the following argument block:

```
.BYTE   sub-function,147
.WORD   buff-addr
```

If *sub-function* is 3 the EMT returns the current program name in RADIX-50 format in the two word buffer pointed to by *buff-addr*. If *sub-function* is 4 the EMT changes the program name to the RADIX-50 format name pointed to by *buff-addr*.

<i>Code</i>	<i>Meaning</i>
2	The name was not specified in RADIX-50 format

8 More intelligent memory checking

The initialization code has been modified to determine the type of addressing environment available (18-bit versus 22-bit addressing) when calculating the physical amount of memory installed. The TSGEN parameter EXTMCH, used to flag whether the CPU was capable of 22-bit addressing, is no longer necessary and has been removed. Physical memory is now correctly sized on computers with a CPU which supports more than 256 Kb of memory but is installed on an 18-bit backplane. In order to execute in a mode comparable to EXTMCH set to zero, do not install more than 248 Kb of memory or specify a MEMSIZ of 248. or less.

9 New SYSMON window display

```

                                TSX-Plus SYSMON Utility
                                24-Nov-87      13:19:01

***** Window and Print Window Status *****

                                Job Number      = 1

Window ID Number      = 1
Window Terminal Type  = VT100
Window Characteristics

Application keypad
Normal video          Cursor displayed
Screen      Lines.   24   Width . . 80
Scroll reg Top. . 1   Bottom. . 24
Current     Line . 24   Column. . 2
Det scroll Limit. 16   Scrolled. 0

GO: Ascii            G1: UK set
G2: Ascii            G3: Ascii
GL: Mapped to GO    GR: Mapped to GO

Printwindow Dev. = LP :
Printer Type     = 0
Printwindow Printer Capabilities

Line Graphics . . . . . No
U. K. Char Set. . . . . No
DEC Supplemental. . . . . No
Bold characters . . . . . No
Underline characters. . . . No
Double wide characters . . No
Draft & Letter quality. . . No
Letter Quality selected . . No
Ring bell on queueing . . . Yes
Suppress width control. . . No
    
```

The SYSMON system monitoring utility has been enhanced by the addition of a window display. The SYSMON utility can now be used to find out various bits of information about windows and printwindows. This may be useful when debugging programs using windows, or if you simply wish to know what certain window settings are for a particular job.

10 \$STOP and BOOT command enhanced

The \$STOP and BOOT commands have been significantly enhanced from previous versions to support most hardware configurations. It is now possible to boot any available device. The BOOT command supports only the bootstrap device (designated from the COPY/BOOT command) and ignores any file name specified.

11 Miscellaneous changes

1. A minor change has been made to the CL handler for compatibility with the LS handler. If both a page length and a skip count have been set and a new page is ejected because the page is full (number of lines printed = page length - skip count), then if the next character

is a form feed, it is ignored. This has normally only been a problem when using formatters which insert form feed characters after a designated number of lines, where the number of lines exactly corresponds to the number of lines at which CL begins skipping.

2. The SHOW JOBS (SYSTAT, WHO) command now shows the state of jobs which are briefly waiting for miscellaneous system resources as WT instead of RN. The SYSMON "Process Execution Status" screen still gives expanded descriptions of these miscellaneous wait states as it did previously.
3. The following miscellaneous changes have been made to the SYSMON system monitoring utility:
 - The SYSMON terminal display now displays the IND and ERROR settings.
 - The SYSMON message channel display will now display message channel names in RADIX-50 format.
 - The SYSMON CL unit display now shows the amount of the output silo buffer currently in use by an individual CL unit.
4. The SHOW CL command now displays the CL version number.
5. A new subfunction has been added to the EMT that returns information concerning terminal input (EMT 0,116). Subfunction 1 now returns in R0 the number of pending input characters.
6. It is now possible to determine the line number on which subprocesses are executing. This is useful in conjunction with the EMT to initiate a subprocess.

The form of the EMT used to determine a subprocess job number is:

```
EMT      375
```

with R0 pointing to an argument block of the following form:

```
.BYTE      1,110
.WORD      relative-subprocess-number
```

The relative subprocess number is in the range 1 - MAXSEC, and is the same as the number used when switching to a subprocess from the keyboard with the <^W><n> sequence. In absence of an error, this EMT returns in R0 the line number on which the subprocess is running. This EMT can return the following error codes:

<i>Code</i>	<i>Meaning</i>
0	Specified subprocess is not active
1	Invalid relative subprocess number (> MAXSEC)
2	Attempt to issue this EMT from a detached job (Detached jobs are not allowed to create subprocesses)

7. A new TSGEN parameter (PHONE) has been added to control whether lines generated with the \$PHONE flag may be treated as local lines. In all versions, lines generated without the \$PHONE flag are always treated as local lines – this has not changed. However, on lines generated with the \$PHONE flag, the carrier signal (DCD) was monitored each time the line was started (initial carriage return was pressed). If carrier was present while the line was starting, then carrier was continuously monitored during the session and the TIMEOUT and OFFTIM parameters were used to log the job off if carrier was lost, and to hang up the line (drop DTR) when the job was logged off. If carrier was not present while the line was being started, then the line was treated as a local line and the TIMEOUT and OFFTIM parameters had no effect for that session. This presented some problems with certain communications devices which did not present the carrier signal until some time after the first carriage return. In particular, either the line would not be hung up OFFTIM units after the job logged off and would then not be available for use by anyone else, or if the line was hung up without logging off, then the next person using that line had immediate access to the same account and privileges. The new PHONE parameter is used to control this optional local treatment of lines with the \$PHONE flag. When PHONE is set to 0, then the behavior is identical to that in previous versions as described above. However, when PHONE is set to 1, then the local behavior is never allowed for lines with the \$PHONE flag – carrier is always monitored for them and the TIMEOUT and OFFTIM parameters will always be in effect for them. This parameter is global and affects all lines which use the \$PHONE flag.
8. The TSGEN parameters NCSILO, NCXOFF and NCXON are now modifiable with TSX-MOD. Additional checking has been added to TSGEN to filter out unreasonable values for these parameters. Note that the maximum allowable silo size is 255 bytes and the minimum silo sizes are 32 bytes for terminals and 16 bytes for CL lines, although we recommend large silos on CL lines used for file transfer. The maximum values for the XON/XOFF points are one-half of the silo size minus two. Actual SILO sizes specified within LINDEF and CLDEF blocks override the defaults for that line, but are constrained to the same limits.
9. Subprocesses and detached jobs now inherit their default form name (specified by the FORM command) from their primary line.
10. A change has been made to the information passed to device handlers when performing a directory operation (lookup, enter, etc.) on non-disk directories (e.g., mag tape). Word 5 of the I/O queue element (Q.BUFF) now points to words containing the RAD50 file name and extension. The word in front of the one pointed to contains the RAD50 device name. The device name, file name, and extension are as specified by the user (i.e., ASSIGN translation has not been performed). This is compatible with RT-11.
11. Extended memory regions allocated for handlers such as DU and MU now acquire unique names that will not conflict with those of other copies of the same handler. This makes it possible to run multiple copies of the DU handler (each copy having a different name, of course). Be sure to supply the appropriate options to the DEVDEF macro for the second handler. Default options are only automatically applied to recognized handler names.
12. The real-time system service with function code 140, subfunction 14, used to gain exclusive use of the CPU, no longer locks the USR module. This allows it to now be used from within completion routines.

13. CCL has been altered to support RT-11 version 5.04C KMON commands. Although the commands are now accepted and processed by CCL, you must have the correct version of RT-11 (and therefore the corresponding utilities) in order to provide the functionality necessary to execute these commands.
14. All of the magtape handlers are now distributed in both hardware and file structured formats. The hardware handlers are named *ddHRD.TSX* — where *dd* designates the name of the device (MM, MT, MS, or MU). Substitution of the hardware-only handlers for the file-structured handlers can provide significant savings in system size. For example, on extended Unibus systems the magtape handlers must reside in the unmapped portion of TSX (the low 40 Kb). Use of the hardware-only MT handler saves more than 2 Kb — enough to add several more time-sharing lines in a system which had been limited by the 40 Kb restriction. The major drawback of using the hardware-only magtape handlers is that, without the file-structured module, the devices are only accessible by specialized utilities (such as ARK, Back/Rest, BUP, and BUR) which do not use file-structured requests. PIP (the normal COPY command) may *not* be used to access a hardware-only magtape handler.
15. The PRO/TSX-Plus installation program, INSTSX, now unloads the DZ handler upon exit. This reduces the probability that PRO/TSX-Plus will be unable to start because of its size. If attempting to start TSX still yields the "... system generated too large" message, unload all handlers possible. The SHOW MEM command should list only IOPAGE, PI, DW, and RMON above the background space (..BG..).

12 Corrected problems

1. If a large number of features were generated (generally many terminals and communication lines), the system could halt. The system would report either no error or a Kernel mode trap with the argument value greater than 177000. The error occurred shortly following TSX-Plus start-up. When forcing a crash dump, some of the TSX-Plus overlay regions contained addresses above 177000 (which is above the top of any possible physical memory).
2. It was possible for a large burst of unsolicited input on a line which had never been logged on or used as a CL line to corrupt the lowest portion of physical memory. This would eventually lead to unpredictable system errors.
3. The system could crash with a KTP-Kernel mode trap in overlay MIO where the argument value was the base of TSEMT + 4140. This would occur when a system I/O mapping operation completed while an I/O request was active to DU or MU.
4. A kernel mode trap could occur if EMT with function code 161, subfunction 1, was executed to select the current process window and the specified window number was 0.
5. If a program executed with the RUN/LOCK command on the primary line was aborted with a CTRL-C, and the job had subprocesses active, it was possible to receive a dot prompt on the primary line.
6. A problem with the security of lines using the system password feature was corrected.
7. The \$STOP command was corrected so that pending spool files are immediately terminated upon request.

8. If a job had one or more active subprocesses and used a logoff command file and answered "Yes" to "active subprocesses ... are you sure?" then the question would scroll infinitely and the job could not be aborted or logged off, although it could be killed.
9. A ?MON-F-Trap to 4 would occur when attempting to log off if the TSGEN parameter MAXSEC was zero.
10. A change was made to allow DFLMEM to be 64 Kb in non-swapping systems (TSGEN parameter SWAPFL = 0). A previous attempt to correct this problem resulted in utility programs aborting with a ?MON-F-Trap to 4 unless DFLMEM was restricted to 56 Kb. Now the utilities run correctly in a non-swapping system with DFLMEM = 64. All jobs in a non-swapping system are allocated a memory slot equal to DFLMEM plus the size of the job context region (currently 6 Kb). However, ordinary programs may only use up to 56 Kb so that a copy of the simulated RMON may be mapped into the program space. Virtual programs (those not requiring RMON mapping) are allowed up to HIMEM amount of space in swapping systems and up to DFLMEM amount of space in non-swapping systems. Programs may be flagged as virtual by any of the following conditions:
 - program high limit exceeds 56 Kb
 - program has been SETSIZ'ed to greater than 56 Kb
 - word 0 of the .SAV image contains the RAD50 value for "VIR"
 - word 44 (JSW) of the save image has the VIRT\$ bit (2000) set
11. The handling of .READC completion routines has been changed to make the operation compatible with RT-11. Previously, if a read hit end of file, a subsequent .READC would return with the carry flag set and error code 0 in the EMT error byte (location 52) but the operation would be started. Now, if the end-of-file status is pending when a .READC is issued, the carry flag is set on return and 0 is in 52 but the operation is not started. The end-of-file status is cleared by the first operation (.WAIT, .READC, .READ, etc.) performed on the channel. Once the end-of-file status has been reported and cleared, subsequent .READC operations proceed normally.
12. A kernel mode trap could occur if an EMT argument block was positioned within 6 words of the end of a PLAS region.
13. Window errors:
 - The process windowing system used to transmit a command to the terminal to enable or disable text cursor display each time the window was refreshed. This command is used by VT200 terminals and is ignored by DEC VT100 terminals but caused problems for some non-DEC VT100 compatible terminals. The cursor enable/disable command is now only transmitted if the terminal type is VT200.
 - When VT100 type terminals were set in both reverse and wide mode, the terminal was switched to a subprocess which did not use reverse video, and then the terminal was switched back, reverse mode was lost. This is due to VT10x terminals not processing multiple parameters in a SET MODE operation. Separate SET MODE sequences are now issued for each mode when the terminal type is VT100.

14. The .RCTRL0 EMT that is used to reset CTRL-O was being ignored when executed by a program such as DIR that was executed by a CCL command.
15. A loop that could not be aborted by CTRL-C would occur if a command file was called with the literal string "^1" as an argument and the command file used "^1" to indicate a parameter insertion. Now it still produces a loop, but the loop can be aborted by typing CTRL-C.
16. System function 144, subfunction 0, to get information about a specified job returned status indicating the privilege of the job issuing the EMT rather than of the specified job.
17. No job number was reported on the crash dump analysis.
18. A global region could have been eliminated several times by the same job with the effect that the region either could not be removed when it was not in use or could be removed when currently attached, as the use count was then inaccurate.
19. Previously the DATE would not allow a date to be entered past the year 1989. The DATE command now allows dates through 1999. This is compatible with the RT-11 DATE command.
20. The initialization code now fetches the RT-11 device handler in order to open the IND and UCL files. An error message is displayed when any of the TSGEN file specifications for swap, plas, spool, IND, or UCL files contain an invalid file name.
21. The message receive EMTs now correctly return an error code of 4 indicating that the message was truncated when the receive buffer size is less than the actual message text. The truncated message is placed in the receiver's buffer.
22. It was possible to obtain a "USR err # 1" when mixing operations on devices with normal directories with those on devices which had been initialized with an extended directory entry size. Note that no system utilities make use of extended directory entry sizes.
23. The SHOW MOUNTS command would fail with a "Trap to 4" on a nested LD when the mount table was full.
24. The SHOW MOUNTS command would sometimes not show intervening levels of nested LD's.
25. TSAUTH would give a Trap to 4 error when no accounting file was present and neither a Y or N was typed to the question "Do you want to initialize a new authorization file?"
26. TSXUCL would "Trap to 4, Abort location = 4524" if TSXUCL.TSX was missing.
27. When a user reassigned his system physical device and attempted to issue UCL commands, UCL was disabled system wide and all lines would report the following error messages when attempting to invoke UCL (for command definition or execution): ?KMON-F-User-defined commands not supported by system (U\$CL=0).
28. CL corrections:
 - If the SET HOST command were issued from a command file, it was possible that not all pending terminal output would be flushed to the screen prior to establishing the cross-connection.

- If a break signal was being transmitted on a CL line while the SET HOST command was issued for the same CL unit, then after breaking the cross-connection the SET CLn RESET command would not halt continued transmission of the break signal. As before, such a break can be halted by sending a 0.5 second break signal (<^A>). Now, it is also automatically halted on breaking the cross-connection. Note that it is usually incorrect to be transmitting a continuous break signal while establishing a cross-connection.

29. SYSMON corrections:

- The [NO]PAGE option on the terminal display screen remained unchanged when the SET TT [NO]PAGE command was issued.
- The terminal display screen did not wrap properly when there were too many activation characters to fit on one line.
- If there were more than a total of 17 primary lines, detached lines, and subprocesses, the process execution status display would sometimes scroll.
- Previously the cursor was placed in the lower right corner of the screen when the display was completed. Because of this any messages sent to a terminal running SYSMON were not seen. This could also cause some problems with the screen scrolling improperly. In order to correct this problem, the cursor is now placed in the lower left corner of the screen.
- SYSMON did not display more than 15 messages and requests.
- SYSMON did not properly clear messages off the screen as they were removed from each channel.
- SYSMON swapped the cross-connected line number and the number of form feeds to be appended to the end of a file in the CL unit display.
- SYSMON improperly referred to the CL input buffer as a ring buffer instead of a silo buffer.

30. TSXMOD corrections:

- DEVXMR was not changed by assigning it a new value.
- Declaring a new DETACH command file did not set the "changes made" flag.

31. CCL version 3.000 corrections:

- DIFFERENCES command now performs standard numeric interpretation on /START and /END switch values rather than assuming decimal values.

32. The following device handler problems have been resolved:

- A .READC or .WRITC operation that had a specified word count of 0 (i.e., a seek operation) was previously treated as a NOP and the completion routine was not entered. The completion routine is now entered immediately. The operation is still not passed to the device handler.
- The job mask used for .TIMIO and .CTIMIO incorrectly masked the job number to 5 bits, causing problems for job numbers greater than 31.

- Various unusual problems occurred when an illegal value was specified to a device handler SET option (such as an option restricted to only allow decimal or octal numeric values).
- When a job issues the .ABTIO request, it no longer enters all handlers at their abort entry points, but only the handler to which the specified channel is open.
- A Kernel mode trap would occur when either the DD or CT handler was loaded and abort entry was selected (IOABT set to 1). This was caused by a non-zero word placed in the handler image (by RT-11 version 5.4 MACRO) at the CQE address; and the assumption by TSX-Plus that this non-zero word was the address of a valid queue element. Both CQE and LQE are now cleared in memory following handler initialization and when reloading following handler SET options.
- The LS handler could have caused loss of characters on other DL(V)11 ports when the print buffer contained characters which were ignored by the LS handler. The implementation of the LS handler lowered the machine priority to 4 but could potentially loop at this priority until it a printable character was found. Input character on other DL ports could have been overrun by subsequent input characters if the machine remained at priority 4 for too long. The FORTRAN REWIND statement is an example of the type of code which could have caused problems. (The REWIND implementation pads the output buffer with NULL characters).
- The MM and MT magtape handlers returned errors on SPFUNs 377 (write EOF), 376 (forward one block), and 373 (rewind) when they were used as mapped I/O devices (MAPIO specified on their DEVDEF declaration in TSGEN) and when the user's buffer was located above 256 Kb in physical memory.

33. The PRO/TSX-Plus installation program INSTSX would corrupt itself if run from RT-11 Version 5.4 and the DZ handler was not loaded.

13 Documentation additions and corrections

1. To the description of the R[UN] command, add the two new switches from version 6.20: NOWINDOW disables process windowing during program execution, and SCCA suppresses control-C abort during program execution.

The minimum switch identification is listed below:

B[ypassn]
 D[ebug]
 H[igh]
 I[opage]
 L[ock]
 M[emlock]
 NONI[nteractive]
 NOW[indow]
 O[dt]
 S[inglechar]
 SC[ca]
 T[ransparent]

2. The behavior of high-efficiency terminal mode is significantly different when invoked as a program attribute (RUN/HIGH or installed with the /HIGH attribute) from its effect when it is invoked as a program controlled terminal option. In particular, most special input character processing is *not* bypassed unless one or more special activation characters is defined. For example, a program started with RUN/HIGH still allows switching to a sub-process whereas when invoked as a program controlled terminal option the control-W character is not interpreted by TSX-Plus and is passed through to the program.
3. This is a clarification of the rules for command file echoing. Command files may be invoked either explicitly with an @ sign, or implicitly by just naming the command file. Whether or not the command file is echoed as it is processed depends both on how it was invoked and on the current setting of the TT QUIET or NOQUIET mode. If a command file is invoked with an @ sign, then it is echoed if TT is set NOQUIET (VERIFY) and not echoed if TT is set QUIET (NOVERIFY). However, if the command file is invoked implicitly (without the @ sign), then it is not echoed and the TT [NO]QUIET mode does not apply. Explicit control of command file echoing in either mode of invocation is also available with the “^ (” and “^)” sequences.
4. In order to use DEC multi-national character sets with process windowing, the terminal must be in VT200 mode with either 7-bit or 8-bit controls, and must transmit 8-bit characters (we recommend 8 bit, no parity). TSX-Plus must recognize the terminal as a VT200 type and must be set for both software and hardware eight-bit handling. For example:

```
SET TT (n) VT200,8BIT,BITS=8,NOPARITY
```

The SET WINDOW command must be issued **after** the terminal is known to be a VT200 type. If these conditions are not met, then a typical symptom would be that accented characters displayed on one window would be incorrectly redisplayed as ASCII after switching to another window and then switching back.

14 Known problems and restrictions

1. The BYPASS special function (SPFUN 371) is not supported under TSX-Plus. Only the DU and MU handler implement this SPFUN. Utilities (such as MSCPCK) and system functions (such as JREAD, JWRITE, etc.) which use this SPFUN will not execute under TSX-Plus.
2. There is a discrepancy between RT-11 and TSX-Plus activation on CTRL-Z and CTRL-C typed in response to the command string interpreter (.CSIGEN, .CSISPC, .GTLIN).
3. RT-11 allows a .MAP EMT with a region id equal to zero; TSX-Plus requires that a valid region id (returned from a .CRRG) must be specified for the .MAP EMT to function.
4. Command factoring is performed only for CCL commands. This differs from RT-11. For example,

```
COPY SY:A.(MAC,COM) DK:
```

is a valid command, but

R PIP DK:*.*=SY:A.(MAC,COM)

is not.

5. If an IND control file is installed with special privileges, the privileges are lost after execution of a program or keyboard command. This can be circumvented by installing an ordinary command file with the desired privileges which then invokes the IND program.
6. If so many jobs are locked in memory that not enough user memory is available to start another job, then attempting to switch to a subprocess can permanently "freeze" the line.
7. If the program controlled terminal option N is used to suspend command file input and a .GTLIN is done, then command file input cannot be restored. This sequence is usually used to require operator response — in this case, use the optional *type* argument to the .GTLIN request to force terminal input rather than disabling command file input.
8. If the device from which a command file is being read is squeezed during execution of the command file, then the command file pointer will be invalid and unpredictable behavior will result. The behavior depends on the contents of the disk after the squeeze at the location of the command file prior to the squeeze. This is yet another good reason for mounting devices prior to using them. The SQUEEZE command checks that no other users have mounted or allocated the device and that no other jobs have I/O channels open to the device.
9. If a log file is opened and then many characters are displayed via .TTYOUT requests from within a completion routine, the job may hang.
10. Programs which corrupt data in the simulated RMON area can receive erroneous error messages and may hang until the system is rebooted.
11. Expiration of repeated .MRKT requests delays expiration of an outstanding .TWAIT request.
12. The break sentinel character does not activate entry to the completion routine if the job is already in terminal input state (TI).
13. Use of a function key past the end of a field width limit can leave an escape character in the input buffer.
14. Field width limit is ignored for command file input.
15. If input is accepted through a terminal input completion routine and escape activation is also enabled, then the program will receive a "minus 1" byte (377 octal) preceding each character of the escape sequence.
16. When using the EMT to disassociate a shared run-time, any previous real-time mapping is also lost.
17. If two messages are sent at the same time to one job waiting for message completion, the message completion routine is entered twice with the last message which was queued.
18. Professional Series Computers:
 - (a) Using defined keys after setting the Pro console (PI handler) into VT220 mode may cause Pro/TSX-Plus to hang or crash. Do not send the sequence to enable VT220 mode (<ESC>[?39h) to the Pro console.

- (b) Sending the terminal reset sequence "<ESC>c" to the Pro console may cause Pro/TSX-Plus to hang or crash. Do not send this sequence or use the SETUP RESET command on the Pro console. SETUP options which are not supported and should not be used on the Pro console are listed in the Pro/TSX-Plus Installation Guide.
 - (c) The SETUP utility is not supported on the Professional. See the PRO/TSX-Plus SETUP supplement for more details.
19. When .ABTIO is issued under RT-11, R5 contains the address of the channel status word (CSW) on entry to the device handler abort code. Under TSX-Plus, the CSW resides in user job space and is not directly accessible by device handlers. For this reason, device handler abort entry code should compare with Q.UCSW rather than Q.CSW in order to implement abort requests on specific channels.
 20. When .ABTIO is issued under TSX-Plus, pending I/O operations which contain completion requests will be queued as normal I/O completions with the hard error bit set in the CSW. Note that the error will be reported on the first operation to the channel following an .ABTIO.
 21. The TSGEN parameter SEGBLK must be less than 4096 (less than 2 megabytes) due to the implementation of the cache control tables and the PDP-11 architectural design of 8 Kb per mapping register. Version 6.3 restricts generalized cache to less than 4096 blocks, previous versions did not.
 22. Programs which use .SPFUN requests to do absolute track and sector reads or writes on single density floppies via the DY handler should not use I/O mapping. In particular, when using single density interchange diskettes with FILEX in an RX02 drive, the FILEX program must be locked in low memory to bypass the need to map the transfer through the system I/O buffers.

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