Software Tools Subsystem

Version 8 to Version 8.1 Conversion Guide

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Introduction

Version 8.1 of the Subsystem represents a big change over Version 8, as well as being the last release of the Subsystem targeted for a Primos 18 system. The next release, Version 9, will be targeted for the new operating system, Primos 19. Although this release will run under Primos 19 (if you have gotten it already), you will not have access to some of the newer features, such as Access Control Lists (ACLs) and disk quotas. Estimates for the release date of Version 9 are for around the end of the third quarter of 1983 or at the beginning of the last quarter; the reason for this delay is that as of the writing of this paragraph, we have not yet received our release copy of Primos 19.1. We ask your indulgence in this matter; we are endeavoring to obtain a copy as soon as possible.

This conversion guide is divided into three sections: **Global Changes** discusses the alterations that affect large portions of the user interface; **Status of V8 Commands** and **Status of V8 Subroutines** describe additions, deletions, and modifications made to individual commands and subroutines.

Global Changes

Change in Value of EOS

As described in the V7.1 to V8 Conversion Guide, the value of EOS (end of string) has changed from the value of -2 to 0. This change should not affect the operation of your programs, unless they make (unwise) assumptions as to the value or magnitude of this constant. The purpose of this change is to better support the C language (available as a separate package to Subsystem customers) and to slightly improve run-time performance of the Subsystem in general (it is faster to compare against 0 than -2).

Although a change of this magnitude normally requires the recompilation of all code (yours and ours), we have come up with a scheme whereby we build two Subsystem libraries: one handles EOS being -2, and the other one handles EOS being 0. The library that will be used for a particular object program is determined by whether the program calls 'init' or not -- programs which contain "call init" are assumed to be "old" and get an EOS value of -2. We can get by with this because 'init' hasn't been needed for years; not calling it has caused no ill effects for several releases, although its call was automatically included by 'rp'. This means as long as existing object programs behave (the only ones in doubt are non-Ratfor programs) by calling 'init', use the shared library, and don't muddle with the Subsystem common blocks, they will work perfectly under Version 8.1. Of course, Ratfor programs compiled under Version 8.1 will no longer call 'init' and will receive EOS as 0. (It is still possible to recompile EOS=-2 programs under Version 8.1, but it will not be as convenient.) Locally-written routines (that do not access Subsystem common blocks) can be incorporated into both versions of the library automatically by putting them in the proper source directory and rebuilding the libraries.

This horrendous kluge will not be in effect for more than a couple of releases; good taste prevents us from allowing such an abomination to live any longer than necessary. We are doing it in the first place only to allow users at both your and our sites time to gradually rebuild programs (and because there were threats against our personal safety if we forced recompilation again). We do expect you to recompile all your local programs in the months following the installation of Version 8.1.

In recompiling your code, you should look for several things which could cause problems at execution time with the new library. First, make sure that your code does not depend on the value or magnitude of EOS, except to note that its value is different from the characters returned by 'getlin'. Next, if any of your main programs are introduced by the 'subroutine' keyword, you should recompile them immediately, since they are definitely not going to work with this version of the Subsystem. Third, make sure that none of your code (Ratfor or otherwise) contains an explicit call to the 'init' routine. This routine is no longer needed, and will cause the wrong value of EOS to be used while the compatible library is in use. Finally, if you use the unshared version of the Subsystem library ("nvswtlb") in the loads of your programs, they must be recompiled also. Except for the exceptions noted above, you may recompile your programs at your leisure; but be sure to do it soon, since the compatibility library will disappear eventually.

However, if you must recompile a program which has not been purged of its EOS value dependencies (and therefore must run with the value of EOS used at Version 8), you can do so by first making sure that the program (we are assuming Ratfor here) calls 'init'. Then, compile and load it via the following:

```
rp =src=/lib/swt/v8def.r.i <program>.r _
     -x =src=/lib/swt/v8rptab -o <program>.f
fc <program>.f
ld <program>.b -l v8vswtlb -o <program>
```

In the 'rp' call, the "v8def.r.i" file changes EOS references in your source and the file "v8rptab" changes the strings generated by 'rp' to have the correct terminator. The library call to the "v8vswtlb" library in the 'ld' line will cause the compatability library to be loaded, which does expect EOS to have the value used in Version 8.

Macro Definition Changes

The Subsystem definition files have been changed to clean up some old definitions and add some new ones. The old values INH and ENB, which are used with the Primos 'break$' routine, have been changed to DISABLE and ENABLE, respectively. The values of PRIMOS_KEYS and PRIMOS_ERRD have been changed to contain the current names of those respective files. The names MAXUSERNAME and MAXPACKEDUSERNAME have been added to help interface with the 'date' routine; these values should also be used when dealing with login names (warning: Primos 19 will allow much longer names, so using these constants will ease your transition to the new operating system for programs which process login names).

New Subsystem Libraries

There have been many additions to the Subsystem libraries for this release. Two new libraries, "v8vswtlb" and "nv8vswtlb", have been added to provide compatability for programs which were compiled with Version 8 and must have EOS at the old value. There is a new library, "shortlb", which contains short-callable routines to provide Ratfor/Fortran programmers with operations that before this time were available only to assembly language programs. The Subsystem math library, "vswtml", contains new routines which provide double precision functionality. Finally, the support library for the Portable Pascal compiler has been renamed to "p4clib", to lessen confusion with the Prime Pascal library.

Deleted Subsystem Libraries

The pattern-matching library, "vpatlb", has been merged with the standard Subsystem library, and is therefore no longer needed. All programs that used to be loaded with this library can be loaded with the standard Subsystem library (automatically included by 'ld'). The old version of the Portable Pascal compiler library, "pasclib", has been removed (as noted above); Subsystem managers should make sure that this library is removed from =lib= to avoid having users access an older copy of the routines formerly in this library.

New Subsystem Template

The Subsystem template file has been enhanced by the addition of the template "=phonelist=". The 'phone' program was changed to use this template so that the user may set a private value for this template and use personal phone number lists.

Command Interpreter Enhancements

Terminal configuration (suppressed output and duplex) are restored properly after a command aborts and between execution of commands on a command line.

There are two new variables, "_eof" and "_newline", which have been documented.

There is now documentation in the _User's Guide to the Software Tools Command Interpreter_ about restrictions that the Subsystem administrator can impose on Subsystem users in terms of which commands may be executed.

Update to SWTSEG

The Subsystem segmented loader has been updated to Primos version 18.3. This will solve most problems with loading the output of the current compilers; the temporary solution for program loading as described in the newsletter is no longer needed.

Status of Version 8 Commands

This section summarizes the user-visible changes that have been made to Subsystem commands for Version 8.1. It is divided into several subsections: obsolete commands, superseded commands, modified commands, enhanced commands, and unchanged commands. The final subsection is a summary of commands that are new for the Version 8.1 release.

Obsolete Commands

The commands in this subsection were part of the Version 8 Subsystem, but are not included in the Version 8.1 release. Most of them were used only by certain shell programs and have outlived their usefulness. In other cases, the commands were relics of past Subsystems, and either were no longer useful, or no longer worked.

lex
: The lexical analyzer for the SSPL compiler has been removed because support of the compiler no longer exists.

opt6800
: The Motorola 6800 code generator for the SSPL compiler has been removed because there is no longer any support for the compiler.

opt8080
: The Intel 8080 code generator for the SSPL compiler has been removed because there is no longer any support for the compiler.

sspl
: Support for the Small Systems Programming Language compiler (SSPL) has been removed from the Subsystem, because it enjoyed very limited use.

Superseded Commands

The commands in this subsection are not part of the Version 8.1 Subsystem; their functionality has been subsumed by other commands. Each entry describes the command and options you can use to get the same results.

No commands are superseded at Version 8.1.

Modified Commands

The commands listed in this subsection have been modified for the Version 8.1 release and are no longer completely compatible with their Version 8 counterparts. Each entry gives a brief description of the changes, but before using any of these commands, please check the corresponding Reference Manual entry to be sure of the command's exact behavior.

No commands are modified at Version 8.1.

Enhanced Commands

Commands in this subsection have been functionally enhanced for the Version 8.1 release, but remain compatible with their Version 8 counterparts.

bmerge
: Updated to handle new object code format.

bnames
: Updated to handle new object code format.

copyout
: Updated to use new spooler library.

define
: Enhanced to allow dollar signs in identifiers (to be compatible with 'rp').

dmach
: Installed in the correct location (it is supposed to be in "=lbin=").

f77c
: Now handles the "-u" option to list undefined variables and routines (its default behavior), and allows new levels of optimization.

fc
: Added "-k" option to list compilation statistics.

fsize
: Gives the number of records in a file system object as the default, and has "-w" option to list sizes in words

(like 'lf').

hd

Gives record size for unnormalized records, searches all possible disks instead of stopping at the first one that it could not size, and has new verbose option "-v".

include

Continues to process input despite errors in opening included files, and handles more deeply nested include calls.

ld

Added "-b" option to handle the C language library, added "-f" option to provide full map, and updated "-u" option to issue "ma 6" instead of "ma 3" to increase load speed.

lps

Updated to use the newer spool library, accepts more than one disk pack specification to indicate spool directories to be searched, prefixes the currently printing spooler entry with an asterisk, modified the "-q" option to provide more verbose information, queue entry lists are now prefixed by a label indicating on which disk partition the queue was found, and the "-c" option no longer allows cancellation of print files on remote spool queues.

macro

Now accepts the "-e" option to allow the escaping of characters.

mon

Accepts new commands "?", "x", and "q".

os

Includes speed enhancements and accepts "-x" option to reverse the order in which it outputs the overstrikes (needed for Printronix printers).

pc

Extended the "-f" option to handle the new map options, meaning of the "-q" option changed so that the meaning of the levels is now reversed.

pg

Calls the extended 'page' subroutine to allow search by pattern, etc. See the Reference Manual entry for both the 'pg' command and the 'page' subroutine for more information.

phone

Changed to use the new template "=phonelist=", to allow private phone lists to be used.

plgc

Extended the "-f" option in the same manner as 'pc', added the "-p" option to control short-call routine generation, and added the "-s" option to control copying of constant subroutine parameters.

plpc

Added "-q" option to control listing of warning messages.

pr

Now kicks the spooler after the file has been spooled.

radix

Prints on standard output instead of the error output, as stated in the Reference Manual entry.

rp

No longer generates calls to the 'init' routine and transliterates single character constants correctly. New 'b' option to prevent mapping of long identifiers or identifiers which contain upper case letters, and new 'h' option to force the output of Hollerith constants rather than quoted string constants.

se

Handles more terminal types, handles more and longer lines, and fixed errors caused by an uninitialized variable. Documentation has been added for "oss" and "osf" options, "&" pattern element, ";" and "#" line number elements, and extended message command.

sp

Now kicks the spooler after the file has been spooled.

who

Added the "-q" option to suppress printing of header lines.

Unchanged Commands

This subsection lists the commands that have no user-visible changes made for Version 8.1.

```
alarm         ar             arg            args
argsto        as11           as6800         as8080
banner        basename       basys          batch
block         bs             bs1            bug
bugfm         bugn           bye            cal
case          cat            cd             cdmlc
cdmlcl        change         chat           chown
clear         clock          cmp            cn
cobc          cobcl          col            common
como          copy           cp             crypt
csubc         ctime          cto            date
day           dbg            ddlc           declare
declared      del            des            detab
diff          dmach          dnum           dprint
drop          dump           e              echo
ed            ek             else           entab
error         esac           eval           exit
f77cl         fcl            fdmlc          fdmlcl
fdmp          fi             field          file
files         find           fixp           fmt
focld         forget         fos            fsubc
goto          guess          guide          help
history       hp             if             imi
index         installation   intel          iota
join          kill           kwic           lam
last          length         lf             lib
line          link           lk             locate
log           login_name     mail           memo
mkcl          mkclist        mkdir          mklib
mktree        mkusr          moot           mot
mt            mv             nargs          news
old_ar        out            p4c            p4cl
passwd        pause          pcl            ph
phist         plgcl          plpcl          pmac
pmacl         primos         print          profile
publish       pwd            pword          quote
raid          rcl            rdcat          rdextr
rdjoin        rdmake         rdprint        rdproj
rdsel         rdsort         rduniq         retract
rf            rfl            rmusr          rnd
rot           rsa            rtime          save
scroll        sema           sep            set
sh            show           shtrace        size
slice         sol            sort           source
speling       spell          ssr            st_profile
stacc         stats          stop           subscribe
substr        symbols        systat         tail
take          tc             tee            template
term
```

New Commands

This subsection lists commands that are new for Version 8.1.

brefs
: Provide a list of caller-callee pairs for an object file.

cc
: Compiles a C program with the Subsystem C compiler. **This program is only available to customers who have also licensed the C language compiler package.**

ccl
: Compiles and loads a C program. **This program is only available to customers who have also licensed the C language compiler package.**

isph
: Allows shell files to determine whether they are running in a phantom environment. This is useful for scripts which might attempt to write to the terminal unless their output is redirected.

lorder
: Provides the ordering of a library necessary for a one-pass load.

splc
: Compiles an SPL program.

splcl
: Compiles and loads an SPL program.

sprint
: Filters formatter output for a NEC Spinwriter and provides similar functionality to 'dprint.'

tsort
: Performs topological sort of caller-callee pairs for ordering library routines.

ucc
: Compiles and loads a C program, ala Unix(tm). **This program is only available to customers who have also licensed the C language compiler package.**

vcg
: Generates V-mode object code for Prime 50-Series computers. Allows the ambitious installation to write "front-ends" for local implementations of compilers. **This program is only available to customers who have also licensed the C language compiler package.**

vcgdump
: Displays the input files for 'vcg' in a semi-readable format; useful for debugging compiler "front-ends." This program is only available to customers who have also licensed the C language compiler package.

yesno
: Provides selective input filtering.

Status of Version 8 Subroutines

This section summarizes the user-visible changes to the Subsystem library routines. It is divided into several subsections: obsolete routines, superseded routines, modified routines, enhanced routines, unchanged routines and new routines.

Obsolete Routines

The routines listed here were only used by other library routines. Since their services are no longer required, they have been deleted.

No routines were obsoleted at Version 8.1.

Superseded Routines

The following routines have been subsumed by other more powerful routines. Each entry names the Version 8.1 routine that performs the same function.

at$
: Use 'at$swt'. Its name was changed to avoid naming conflicts with a Primos 19 routine.

Modified Routines

The routines listed in this subsection have been modified so that they are no longer compatible with their Version 8 counterparts. Although each entry briefly describes the changes that have been made, you should examine the corresponding Reference Manual entries to determine the exact behavior of the routines.

file$p
: Updated for Prime Pascal version 18.3/18.4 release, which is incompatible with previous releases.

init
: Modified to allow use of the compatibility library (funeral notices will soon appear in a Subsystem new-

sletter near you).

init$p
Updated for Prime Pascal version 18.3/18.4 release, which is incompatible with previous releases.

Enhanced Routines

The routines listed in this subsection have additional functionality in the Version 8.1 release, but remain compatible with their Version 8 counterparts.

addset
Cleaned up code and is now part of the standard Subsystem library.

amatch
Cleaned up code and is now part of the standard Subsystem library.

call$$
Modified to handle the "output suppressed" bits.

cant
Changed its error message to the one specified in the Reference Manual.

catsub
Cleaned up code and is now part of the standard Subsystem library.

dmpcm$
Also prints the current EOS value, which is currently stored in the common block.

dodash
Cleaned up code and is now part of the standard Subsystem library.

esc
Cleaned up code and is now part of the standard Subsystem library.

filset
Cleaned up code and is now part of the standard Subsystem library.

getccl
Cleaned up code and is now part of the standard Subsystem library.

locate
Cleaned up code and is now part of the standard Subsystem library.

makpat
: Cleaned up code and is now part of the standard Subsystem library.

maksub
: Cleaned up code and is now part of the standard Subsystem library.

match
: Cleaned up code and is now part of the standard Subsystem library.

omatch
: Cleaned up code and is now part of the standard Subsystem library.

page
: Handles the page count correctly, allows pattern searching, and has been modified to provide better performance.

patsiz
: Cleaned up code and is now part of the standard Subsystem library.

stclos
: Cleaned up code and is now part of the standard Subsystem library.

vfyusr
: Checks the length of its argument, and immediately returns if the argument string is too long to be a legal login name.

vt$def
: Uses Primos C1IN instead of T1IN for faster response.

vt$get
: Uses Primos C1IN instead of T1IN for faster response.

vt$gsq
: Uses Primos C1IN instead of T1IN for faster response.

vt$ndf
: Uses Primos C1IN instead of T1IN for faster response.

vt$pos
: Supports positioning for Hewlett-Packard terminals.

Unchanged Routines

No user-visible changes have been made to the routines listed in this subsection.

```
atoc          bponu$         c$end          c$incr
c$init        chkarg         chkinp         chkstr
chunk$        close          cof$           cpfil$
cpseg$        create         ctoa           ctoc
ctod          ctoi           ctol           ctomn
ctop          ctor           ctov           date
decode        delarg         delete         dgetl$
dmark$        dmpfd$         dopen$         dputl$
dread$        dsdbiu         dsdump         dseek$
dsfree        dsget          dsinit         dtoc
dwrit$        edit           encode         enter
equal         error          exec           execn
expand        fcopy          filcpy         filtst
findf$        finfo$         first$         flush$
follow        gcd            gcdir$         gcifu$
gctoi         gctol          geta$f         geta$p
geta$plg      getarg         getch          getfd$
getkwd        getlin         getto          getvdn
getwrd        gfnam$         gfnarg         gitoc
gklarg        gltoc          gtattr         gtemp
gttype        gvlarg         icomn$         index
init$f        init$plg       input          invmod
iofl$         ioinit         isadsk         isatty
itoc          jdate          ldseg$         ldtmp$
length        lookup         lopen$         lsallo
lscmpk        lscomp         lscopy         lscut
lsdel         lsdrop         lsdump         lsextr
lsfree        lsgetc         lsgetf         lsinit
lsins         lsjoin         lslen          lsmake
lspos         lsputc         lsputf         lssubs
lstake        ltoc           lutemp         mapdn
mapfd         mapstr         mapsu          mapup
markf         mkdir$         mkfd$          mkpa$
mktabl        mktemp         mktr$          mntoc
move$         open           parscl         parsdt
parstm        prime          print          ptoc
putch         putdec         putlin         putlit
pwrmod        readf          remark         remove
reonu$        rewind         rmfil$         rmseg$
rmtabl        rmtemp         rtn$$          rtoc
scopy         sctabl         sdrop          seekf
set_copy      set_create     set_delete     set_element
set_equal     set_init       set_insert     set_intersect
set_remove    set_subset     set_subtract   set_union
seterr        sprot$         st$lu          stake
strbsr        strcmp         strim          strlsr
substr        swt            sys$$          t$clup
t$entr        t$exit         t$time         t$trac
tcook$        tgetl$         tmark$         tputl$
tquit$        tread$         trunc          tscan$
tseek$        ttyp$f         ttyp$l         ttyp$q
```

ttyp$r
ttyp$v
twrit$
type
upkfn$
vt$alc
vt$clr
vt$db
vt$db1
vt$db2
vt$db3
vt$del
vt$dsw
vt$err
vt$idf
vt$ier
vt$out
vt$put
vt$rdf
vtclr
vtenb
vtgetl
vtinfo
vtinit
vtmove
vtmsg
vtoc
vtopt
vtpad
vtprt
vtputl
vtread
vtstop
vtterm
vtupd
wind
wkday
writef
zmem$

New Routines

The routines listed in this section are new for the Version 8.1 release.

abq$xs
Adds an entry to the bottom of a queue.

at$swt
Provides interlude to Primos ATCH$$ (formerly 'at$').

atq$xs
Adds an entry to the top of a queue.

dacos
Returns the double precision inverse cosine value of its argument.

dasin
Returns the double precision inverse sine value of its argument.

dbexp
Returns the double precision exponentiation of its argument to the base of the natural logarithms.

dbsqrt
Returns the double precision square root of its argument.

dflot
Returns the double precision float of its long integer argument.

drand
Returns a double precision random number.

get$xs
Returns a character from an array by using efficient indexing and byte-swapping operations.

gky$xs
Returns the current CPU keys.

isnull
Test to see if a given file is the null device.

mkq$xs
Initializes a hardware-defined queue.

pek$xs
Returns the value in a given memory location (performs a peek operation).

pok$xs
Changes the value in a given memory location (performs a poke operation).

put$xs
Put a character into an array by using efficient indexing and byte-swapping operations.

rbq$xs
Returns the value removed from the bottom of a queue.

rdy$xs
Returns the character that was typed at a terminal, if any.

rtq$xs
Returns the value removed from the top of a queue.

s1c$xs
Implements an atomic set-and-test operation.

s2c$xs
Implements an atomic set-and-test operation on a double-word.

sky$xs
Changes the value of the CPU keys.

stk$xs
Sets and reads the value of the stack extension pointer.

tsq$xs
Returns the number of entries in a queue.