Mark Williams Company

1430 West Wrigntwood
Chicago, Illinois 60614
(312) 472-6659
TWX: 9102211182

REC
6/14/85

June 12, 1985

Gerard Bucas
Commodore
1200 Wilson Ave.
West Chester, PA 19380

Dear Gerard:

Enclosed is our report on Coherent and System V.
Note that this was produced with troff under Coherent.
We have agreed to the kernel enhancements in the
base part of the System Note that Messaging,
Shared memory and Semaphores are extensions not
promised in the kernel.

Sincerely,

Robert Swartz
President

RS:dl
enc.

1) Copy: 128000 S/W group
2) C. Carol, P. Higginbottom
3) B. Welland,
4) E. Hughes
5) Ed Martello
6) G. Robbins, Lee Erickson
7) K. Schmidt.

2) Return to me.

COHERENT Compatability with System V

June 12, 1985

Mark Williams Company
1430 West Wrightwood Avenue
Chicago, Illinois 60614
Telephone: (312) 472-6659

Printed in U.S.A.

Introduction

This document summarizes the compatibility of the present release and future releases of the COHERENT operating system with System V. First, it presents the differences between the present version of COHERENT and System V. Next, it describes System V features with which future COHERENT releases will be compatible. Finally, it notes System V features which will not be supported by future COHERENT releases.

The *COHERENT System Manual*, Mark Williams Company, Chicago, 1985, describes the present version of the COHERENT operating system in detail. The *System V Interface Definition*, Spring 1985, Issue 1, AT&T, describes the System V interface in detail. The information in these documents forms the basis of this summary. Since this summary addresses the portability of System V programs to COHERENT rather than the reverse, it does not mention COHERENT features with no counterparts in System V.

The *System V Interface Definition* partitions the available System V functions into a *base* and *extensions*. The base is subdivided into several sections; this summary considers them in the order in which they appear in the *System V Interface Definition*.

Operating System Services

The most significant part of the System Vbase is a set of 81 *operating system service* routines. The following 61 COHERENT system calls or library routines are essentially compatible with the System V interface base:

access, alarm, chdir, chmod, chown, clearerr, close, creat, dup, exec (6 forms), **exit, _exit, fclose, fdopen, feof, ferror, fflush, fileno, fopen, fork, fread, free, freopen, fseek, fstat, ftell, fwrite, getegid, geteuid, getgid, getpid, getuid, ioctl, link, lseek, pause, pclose, pipe, popen, read, rewind, setgid, setuid, sleep, stat, stime, sync, system, time, times, umask, umount, unlink, utime, wait, write.**

Here *essentially compatible* means that the function and its calling sequence are identical in COHERENT and in System V. The *System V Interface Definition* is more specific than the *COHERENT System Manual* about error conditions and the COHERENT functions should be checked to assure that they set error conditions as specified in System V.

The following 5 COHERENT system calls or library routines are slightly different than their System V counterparts: **abort** (closes open files in System V, not in COHERENT); **kill** (System V allows negative process ids other than -1); **mknod** (file type for regular file 01000000 for COHERENT, 01000000 or 0000000 for System V); **mount** (readonly if flag nonzero in COHERENT, if low bit set in System V); and **signal** (signal values as detailed below).

Four COHERENT system calls or library routines are considerably different than their System V counterparts. System V **open** includes several options which are not implemented in COHERENT currently. System V allows the user to control the operation of the memory allocation routines **calloc, malloc** and **realloc** in a way which COHERENT does not.

The following 11 System V operating system services have no counterpart in COHERENT at present.

fcntl, getcwd, getpgrp, getppid, lockf, mallinfo, mallopt, setpgrp, ulimit, uname, ustat.

Error Conditions

COHERENT includes the external variable **errno** and the header file **errno.h** defining error conditions with symbolic constants, as required by the System V base. The System V base also defines 36 error conditions. COHERENT includes 34 of the required error conditions but does not include **EDEADLK** and **ENOLCK**. As mentioned above, some COHERENT system calls and library routines may return different error codes than those specified for System V.

Signals

The System V base defines 13 signals. All COHERENT systems include 9 of the 13 signals. The System V signals **SIGUSR1** and **SIGUSR2** have no counterpart in COHERENT currently. **SIGILL** and **SIGFPE** are included in COHERENT on the PDP-11 but not on other processors.

Library Routines

The System V base defines 152 required library routines. These are subdivided into 93 general routines, 28 standard i/o routines and 30 math routines.

COHERENT currently includes 45 of the 93 general library routines of the System V base. It does not include the routines in the follcwing list; numbers in parentheses indicate several routines described on a single page of the *System V Interface Definition.*

bsearch, clock, conv (5), tzset, isxdigit, isgraph, drand48 (9), ftw, getopt, hsearch (3), lsearch (2), memory (5), putenv, regcmp (2), ssignal (2), strchr, strrchr, strpbrk, strspn, strcspn, strtok, strtod, strtol, tsearch (4).

The COHERENT time conversion routines handle timezones differently than System V. COHERENT defines **tolower** and **toupper** as macros, while System V requires them to be functions and calls the corresponding macros **_tolower** and **_toupper**. The COHERENT random number generator **rand** has the same calling sequence as System V **rand** but does not use the same algorithm, so it does not agree with the semantics specified for System V **rand**.

COHERENT currently includes 20 of the 28 standard i/o functions of the System V base. It does not include **ctermid, setvbuf, tmpfile, tempnam, tempname, vfprintf, vprintf,** or **vsprintf**. In addition, the COHERENT versions of **printf** and **scanf** interpret a few conversions differently from their System V counterparts. The '#', '%E' '%G', and '%X' conversions in System V **printf** are not supported by COHERENT **printf**. The '%n', '%i' and '[' conversions in System V **scanf** are not supported by COHERENT **scanf**.

COHERENT currently includes 42 of the 59 math functions of the System V base. It does not include the error functions erf and erfc, the floating point remainder function fmod, the gamma function, the error routine matherr, or the Bessel functions of the second kind y0, y1 and yn.

Header Files

The System V base defines 43 required header files, of which COHERENT presently includes 11. COHERENT does not presently include fcntl.h, ftw.h malloc.h, memory.h, search.h, string.h, termio.h, unistd.h, ustat.h, values.h, varargs.h, or sys/utsname.h.

As noted above, COHERENT ctype.h does not include macros isgraph, isxdigit, _tolower, or _toupper; it defines tolower and toupper as macros rather than functions. errno.h does not define EDEADLK and ENOLCK, as noted above. COHERENT math.h uses different symbolic names for some constants (such as PI) than its System V counterpart and it does not define a number of constants required by the System V base. signal.h does not define signals SIGFPE, SIGILL, SIGUSR1, and SIGUSR2, as noted above. sys/types.h does not define types off_t and ushort.

Utilities

The System V base does not require any utilities. Section "Other Planned Extensions" discusses utilities in more detail.

Environmental Variables

COHERENT supports environmental variables and normally defines HOME, PATH and TERM as required by the System V base. COHERENT defines time zone information differently than System V, using an environmental variable TIMEZONE which is in a different format than the System V variable TZ. Mark Williams Company believes the COHERENT TIMEZONE format is better than the System V TZ format; TIMEZONE allows the user to specify fractional timezones and to allow daylight savings time conversion to take effect at arbitrary dates, which are important features in the European market.

System-Resident Data Files

COHERENT includes both of the system-resident data files /etc/passwd and /etc/profile required by System V. The format of the COHERENT password file corresponds to the format required for System V, except that the COHERENT encrypted password field does not support the password aging feature of System V. The COHERENT profile file /etc/profile should be updated to define all of the environmental variables required by System V, as noted above.

Directory Tree Structure

COHERENT currently does not include the directory /usr/tmp. Except for this directory, the COHERENT directory tree structure includes the minimal directory tree structure required by the System V base.

Special Device Files

COHERENT includes the special device files /dec/console, /dev/null and /dev/tty required by the System V base. The System V terminal interface termio.h is considerably different than the COHERENT terminal interface sgtty.h.

Kernel Extension

The System V kernel extension defines 17 operating system services and two end-user utilities. COHERENT currently supports four of the operating system service routines: **acct, chroot, profil,** and **ptrace. nice** is recognized by COHERENT but has no effect. COHERENT does not currently include **msgctl, msgget, msgrcv, msgsend, semctl, semget, semop, shmat, shmctl, shmdt,** or **shmget.**

COHERENT includes the required header file **sys/acct.h** but does not include the other four header files required by the System V kernel extension, namely **sys/ipc.h, sys/msg.h, sys/sem.h,** and **sys/shm.h.** COHERENT **sys/types.h** does not define the type **key_t.** COHERENT does not include the end-user utilities **ipcrm** and **ipcs.**

Other Planned Extensions

The *System V Interface Definition* includes a section describing additional extensions to the base. However, it does *not* describe the extensions in detail, rather, it notes that the extensions should currently be considered preliminary. This summary therefore will not discuss these extensions. COHERENT currently includes all utilities in the basic utilities extension except **uname.**

The final section of the *System V Interface Definition* describes future directions. This summary will not address these.

Simple Changes

This section and the following section outline in brief plans for making COHERENT more compatible with the System V base. This section details some simple changes to COHERENT which should be made as soon as possible.

The operating system services **abort, getcwd, getpgrp, getppid, kill, mknod, mount, setpgrp, uname,** and **ustat** should be added or should be changed to be made compatible with the System V base. The error conditions **EDEADLK** and **ENOLCK** should be added. Signal names **SIGILL, SIGFPE, SIGUSR1,** and **SIGUSR2** should be added. The header files **math.h, string.h, ustat.h, values.h, sys/types.h,** and **sys/utsname.h** should be added or modified. Directory **/usr/tmp** should be added.

Later Changes

This section details substantive changes to COHERENT which will be made after the changes mentioned above. A future COHERENT release will include the file control and file locking features of the System V base, namely **fcntl** and **lockf**, plus the header files **fcntl.h** and **unistd.h**. It will include the necessary changes to **open**. It will include the routines **mallinfo** and **mallopt** which allow the user to control the operation of **malloc**, plus the appropriate changes to the memory allocation routines **calloc**, **malloc**, and **realloc** and the header file **malloc.h**. It will include routine **ulimit** to allow control of user file sizes.

Remaining Incompatibilities

The changes outlined above will make COHERENT compatible with the System V base operating system services, error conditions, signals, system-resident data files, and directory tree structure.

The remaining incompatibilities with the System V base are in library routines, header files, the environmental variable **TZ**, and the terminal interface for special device file **/dev/tty**. Mark Williams Company does *not* intend to make COHERENT completely compatible with these System V features. Mark Williams Company also does not intend to make COHERENT completely compatible with the System V kernel extensions.

To the best of Mark Williams Company's knowledge, the changes outlined above will *not* be incompatible with objects generated on a current release of the COHERENT system. This forward compatibility of source and object programs cannot be assured if the COHERENT libraries are made compatible with the System V libraries.

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User Reaction Report

To keep this manual and COHERENT free of bugs and facilitate future improvements, we would appreciate receiving your reactions. Please fill in the appropriate sections below, detach and mail to us. Thank you.

Mark Williams Company
1430 W. Wrightwood Avenue
Chicago, IL 60614

- -

Name:

Company:

Address:

Phone:

Date:

Version and hardware used:

Did you find any errors in the manual?

Can you suggest any improvements to the manual?

Did you find any bugs in the software?

Can you suggest improvements or enhancements to the software?

Additional comments: