```
**********************************************************************************
**********************************************************************************
**
**
**
**      JJJ      III     M     M   M     M   Y   Y
**       J        I     MM  MM   MM  MM   Y   Y
**       J        I     M  M  M   M  M  M    Y Y
**       J        I     M  M  M   M  M  M     Y
**    J  J        I     M     M   M     M     Y
**    J  J        I     M     M   M     M     Y
**     JJ        III    M     M   M     M     Y
**
**
**
**      RRRR     EEEEE   V   V    1      999              1          III    N    N   FFFFF
**      R   R    E       V   V    11     9   9            11    _      I    NN   N   F        0
**      R   R    E       V   V    1      9   9            1    __      I    N N  N   F        0
**      RRRR     EEEE    V  V     1      9999             1   _____    I    N  N N   FFFF     0
**      R  R     E       V V      1         9             1    __      I    N   NN   F        0
**      R  R     E       VV       1         9    ..       1    _       I    N   NN   F        0
**      R   R    EEEEE   V        111    999     ..       111         III   N    N   F
**
**
**
**********************************************************************************
**********************************************************************************
```

ABSTRACT

This document describes the changes to Batch for revision 19.0 of the master disk, from the 18.2 version.

The changes are in some ways extensive: most of them, however, do not directly affect the end user of Batch. Changes are mostly internal to Batch, and also to the operator/administrator interface to Batch (the BATCH program). Also included in this release is group name and project name support for the ACL/User Profile environment of PRIMOS rev 19.0. In addition, Batch is now secured against users being able to spawn jobs as other users, or being able to change job information on jobs which don't belong to them.

This version of Batch will not run on pre-rev 19.0 PRIMOS. Nor will a pre-rev 19.0 Batch run on a rev 19.0 PRIMOS. Also, this version requires re-initialization of the entire batch database due to changes in the format of the database.

1 CHANGES TO THE FILE AND UFD STRUCTURE OF BATCH

The BATCH, BATCHQ and CMDNC0 ufds on the master disk (and as built and
initialized by Batch itself) are all changed at rev 19.0.

1.1 Changes to the BATCH directory

In BATCH, all files are now in compliance with the file naming
standard.   Also, the file "MONITR" has been changed to
"MONITOR.FTN". Insert files ("B$QCOM", "B$COMN", etc.) now have
the suffix ".INS.FTN".

Seven new insert files exist: "PARSE.INS.PMA",
"PARSE_VECTOR.INS.PMA", "B$SWIN.INS.FTN", "B$SWIN.INS.PL1",
"B$COMN.INS.PL1", "B$LOGO.INS.FTN", and "B$LOCK.INS.FTN".

The build files "C_BATCH" and "C_LIST" are now known as
"BATCH.BUILD.CPL" and "BATCH.LIST.CPL".

The "INIT.FTN" module has been replaced with an "INIT.SPL" module.
There are three other new modules for the INIT program named
"PARSE$.PMA", "SNUM.SPL" and "INIT_SUBS.FTN". The "PARSE$.PMA" uses
the two new insert files "PARSE.INS.PMA" and "PARSE_VECTOR.INS.PMA"
mentioned above.

1.2 Changes to the BATCHQ directory

The REV. 19 BATCH subsystem is designed to take advantage of ACL
protection. It grants particular rights to privileged users,
BATCH_SERVICE (the BATCH monitor), SYSTEM, and BATCH administrators,
and grants varying, lesser rights to other users. This allows them
to use the system, but not to access each other's jobs or to access
BATCH files and directories.

If the MFD in which BATCHQ resides is a password directory, BATCHQ
itself must be a password directory. However, neither BATCHQ nor
its subdirectory Q.CTRL may have passwords. If these directories
are given passwords, the BATCH subsystem becomes inoperable.
Therefore, no security exists on a system on which BATCH is running
and in which BATCHQ is a password directory.

All of the "*prog" static-mode image files ("*MONITR", "*FIXBAT",
"*INIT") have been changed to "prog.SAVE". The program names are as
follows: "MONITOR.SAVE", "INIT.SAVE", "FIXBAT.SAVE".

The command file "PH_CO" has been changed to
"START_BATCH_MONITOR.COMI". The command files "C_RSET" and "C_BDIF"
no longer exist; their functionality has been replaced entirely by
the new INIT program.

| A new subufd in BATCHQ, named "OTHER", will now be generated by the
| INIT program in addition to "Q.CTRL" and "CIFILE". This subufd
| holds the files "IN.USE" and "VALID.", which used to reside in
| BATCHQ. OTHER is initialized as a password directory, but may be
| converted to an ACL directory if desired; however, all Batch users
| must have "ALL" access to BATCHQ>OTHER. Because of that
| restriction, it is probably more secure as a password directory.
| Its password is set to the same password as BATCHQ>CIFILE has.

| The CIFILE subufd in BATCHQ must be a password directory at rev
| 19.0. It will also have a default password of "OSIRAS" as released
| on the master disk. Since Batch software is solely responsible for
| creating, deleting and using BATCHQ>CIFILE and BATCHQ>OTHER (which
| has the same password) via the new INIT program, the administrator
| need not know the password. However, he may change it by editing
| Batch source code and rebuilding Batch. See the section on the new
| INIT program.

| The INIT program, when run, will automatically delete all old
| (pre-rev 19.0) files (*MONITR, C_RSET, etc.).

| Not all files are in compliance with the file naming standard in
| BATCHQ - examples are "Q.CTRL", "CIFILE", "SEMFILE", "LOCK.B".
| These are run-time generated files and ufds.

1.3 Changes to the CMDNC0 directory

In CMDNC0, the static-mode image run files are now named "JOB.SAVE",
"BATCH.SAVE", "BATGEN.SAVE", and "$$.SAVE". The files "JOB",
"BATCH", "BATGEN" and "$$" should be deleted.

|2 INSTALLING BATCH

|The build file for Batch automatically installs everything in the right
|places (BATCHQ and CMDNC0). The BATCHQ ufd must contain the
|"START_BATCH_MONITOR.COMI" file, which is present on the U1 partition
|in BATCHQ, as the Batch build file will not create this.

|Once everything is installed, the Batch database must be initialized.
|However, this is only possible if the disk on which BATCHQ resides has
|been converted to a rev 19 partition by FIX_DISK, and if the MFD has
|been converted to an ACL ufd. When this is done, the command:

| R BATCHQ>INIT -RSTQ

|will initialize Batch. Then, BATGEN should be run to set up the queues
for that system. The Batch subsystem now supports 16 queues instead of
6. Once the queues are defined, the Batch subsystem is ready to run.
Now the startup sequence for Batch in C_PRMO must be changed.

In C_PRMO, the sequence:

```
PH BATCHQ>PH_GO
CHAP -nn rlv ts
```

is obsolete and no longer supported. At rev 19.0, Batch has a new
mechanism for starting up the monitor. With the old mechanism, the
above sequence would be performed, and then when the monitor sent the
message "Waiting for BATCH SYSTEM -START" to the system console, the
command:

```
BATCH SYSTEM -START
```

would be issued. This is all obsolete. The new sequence in C_PRMO
should be as follows:

```
BATCH -START -RLV rlv -TS ts
```

where <rlv> and <ts> are decimal numbers, not octal numbers as they
were in the CHAP command. This command replaces the old sequence, and
no longer requires the "BATCH SYSTEM -START" command to be issued later
on after the monitor sent a message. Also, this command can be
executed before the system date and time are set, if desired.

The Batch monitor is no longer spawned as user "SYSTEM". It is spawned
as user "BATCH_SERVICE". Whether or not this username is in the User
Validation File (UVF) is unimportant at this revision; however, the
Batch subsystem now recognizes as privileged users both "SYSTEM" and
"BATCH_SERVICE". These users can display and modify all user's jobs in
the Batch subsystem.

Because the username of Batch is now "BATCH_SERVICE", messages sent by
that user to the console will no longer have the text "*BATCH* " in
front of them. The exceptions are when it is not clear that the
message is coming from the Batch monitor, as is the case with database
invalidation messages. Also, "Executing xxx for user yyy" messages
have "*BATCH* " in front of them still, because they are sent by the
user process spawned to run the batch job.

When the monitor is in operation, the message "Monitor in operation"
will be sent to the console. However, no action need be taken at this
point - the message is simply a notification that the monitor is
finished fixing the database (by running FIXBAT) and is ready to
process Batch jobs.

The BATCH command has been essentially rewritten at rev 19.0. It will
be discussed in further detail later in this document.

As a result of the startup sequence change, the message "Warning: the
batch monitor is still awaiting start-up instructions from the
operator, so jobs are not yet being processed" is no longer necessary
and does not exist.

3 ADMINISTRATIVE CHANGES

3.1 Batch Administrator

The new INIT program allows the specification of the Batch Administrator when run. If not specified, it uses the current user (see the section on the new INIT program for details).

It uses this information to set up the access on the Batch database. A "Batch administrator" is defined as any user with "ALL" access to BATCHQ. Therefore, since users SYSTEM and BATCH_SERVICE are given "ALL" access to BATCHQ, they are automatically Batch administrators.

INIT.SPL has been changed so that the BATCH administrator is granted full access rights to the BATCH subdirectories in additon to the BATCHQ ufd before attempting to delete the subdirectories. This is necessary if any of the subdirectories contain any BATCH files, e.g., queue control files or command files.

A Batch administrator can run BATCHQ>FIXBAT and BATCHQ>INIT. He can also do the BATCH commands -STOP, -PAUSE and -CONTINUE. However, only users logged in as SYSTEM or BATCH_SERVICE can manipulate other users jobs. Only SYSTEM or BATCH_SERVICE can use the -HOLD and -RELEASE options on the JOB command. And only the system console can do BATCH -START and successfully abort other users' running jobs. That is, only the system console may abort a running job.

The Batch administrator is also given full access to BATCHQ>BATDEF, so he can change the queue configuration anytime. All other users are given "R" access (read-only). "R" access is necessary for all users who submit Batch jobs, as the JOB program needs to have access to BATCHQ>BATDEF.

3.2 Copying Into BATCHQ>BATDEF

As of rev 19.0, only BATGEN should be used to copy a new queue configuration into BATCHQ>BATDEF. Do not use FUTIL and never use COPY. This is because BATGEN does not delete and re-create BATCHQ>BATDEF when it copies into it. It only overwrites the data.

Therefore, it leaves the specific ACL which the INIT program places on BATCHQ>BATDEF in place. If this is disturbed, users will be unable to submit jobs or do just about anything with Batch. The error messages will probably be "Insufficient access rights. BATDEF missing".

| Also, by using BATGEN, the Batch monitor is immediately notified,
| causing potentially faster turnaround on queue deletions and such.

| ## 3.3 Database Error Logging

| The format of "BATCHQ>ERROR." is changed. Entries are now appended
| to the end of the file. Previously, they overwrote whatever entry
| was already there.

| Also, the format of an entry is itself changed. It now occupies
| only one line in the file, not two. In addition to the information
| describing what part of Batch received the error and what the error
| code was, the username and usernumber (in parentheses) is also
| logged.

| For example, the entry:

| JOHNSON (12) JOB(1004) error=1

| Means that user JOHNSON (user number 12) got a fatal database error
| "End of file" (error code 1) in the JOB program at statement number
| 1004.

4 OTHER GENERAL CHANGES

4.1 Batch Now in V-Mode

All of the Batch subsystem now executes in V-mode. All programs now
do a "RETURN" to exit to Primos (except when errors occur, or when
the "QUIT" command is given in BATGEN command mode), so a subsequent
"START" command will produce a "Program halt at xxx" message. The
old error messages "No restarts allowed" are gone.

4.2 Maximum Quota Exceeded in BATCHQ

Batch now handles the new "Maximum quota exceeded" error at rev 19.0
the way it handles "Disk full" errors. This will be expounded on a
bit more in the section which describes changes to the monitor.

4.3 Long Usernames - 32 Characters

This revision of PRIMOS supports 32-character usernames, and Batch
has been modified to support it also.

In the "BATCH -DISPLAY" tabular report, the "User" field will be
dynamically adjusted to reflect the longest username in the table
(minimum of 8 characters).

In the "JOB -STATUS" tabular report, usernames are assumed to be 8
characters or less in length. If one is more than 8 characters
long, it will be printed on the line by itself, and the job
information will be printed on the next line. Multiple occurances
of that long username that are contiguous will be optimized so that
the username is not output repeatedly.

4.4 Software Interrupt Functionality

The software interrupt functionality (SW$INT) has been integrated
into REV19.0 BATCH. All references to BREAK$ to inhibit or enable
QUITS have been replaced with calls to SW$INT to effectively create
critical sections.

4.5 Solution To The BATCH Database Deadlock

All attempts to attain the BATCH subsystem database lock are now
singularly threaded through a named semaphore in order to assure
prompt service to those processes waiting to obtain the subsystem.
This change along with a change to JOB$0.PLP which closes the queue
file unit before exiting with a file-in-use error is meant to
address the BATCH deadlock situation resulting when multiple,
simultaneous accesses to the same BATCH queue file occur. The file
"SEMFILE" in the BATCHQ ufd is associated with the database lock
named semaphore.

All BATCH subsystem commands and programs now contain onunits to
handle the QUITS condition resulting from a terminal quit. This
onunt simply closes the named semaphore if the user had opened it.

4.6 Batch Monitor Semaphore-Driven

The Batch monitor is now semaphore-driven. Semaphore number -15 is notified by Batch programs when they want the monitor to wake up. In a dormant system, the monitor will automatically wake itself up every 10 minutes.

By making the monitor semaphore-driven, turnaround time for job startup and the detection of aborted jobs should be smaller, and the cost of the Batch monitor on a dormant system should be greatly reduced.

4.7 Database Timeouts

The timeout on files that a Batch program is trying to open is now 60 seconds instead of 30.

4.8 Database Locking Mechanism Change

The Batch subsystem makes use of an 8-word area from 6001/67770 through 6001/67777 inclusive. This area is to control access to the database lock over multiple program invocations (such as a long chain of JOB commands).

4.9 Message State No Longer Reset

The message "(Batch) I have reset your message state to -ACCEPT" is now gone. When Batch needs to send a message to the system console, and the sending user has an overly inhibitive message state, Batch will reset it, then send the message, and then set the state back to what it was.

4.10 System Date and Time Errors

The error message "System time must be set first. (INIT$B)" is now "Date and time not set. (Batch)", and is only issued for the BATGEN and JOB commands, and the INIT program in BATCHQ. The BATCH command can now be run even if the date and time are not set, and the FIXBAT and MONITOR programs in BATCHQ will, as usual, just wait for the date and time to be set before they start running.

4.11 Fixed POLERS

POLER #37550 has been fixed. This was a bug which prevented
execution of jobs from a queue if a previously-defined queue
contained nothing but held jobs.

4.12 Temporary Files Used For Job Initiation

Temporary files generated by the Batch monitor through which Batch
jobs are spawned will be given "$REST:R" access by that monitor so
that the spawned job may open the file for reading. This means that
the spawned job may not change the access on the unit on which that
temporary file is open to reading & writing (or writing only) via
the K$CACC key to SRCH$$.

4.13 Error Messages

Most error messages which output the names of files in BATCHQ or its
subufds now put "BATCHQ>" in front of those names. For example, the
message that the monitor sends when one of its files gets closed is
now:

    BATCHQ>OTHER>IN.USE not open.

4.14 Subsystem-Wide Abbreviations

The Batch subsystem now has abbreviations for most of the options,
commands and subcommands (in BATGEN). These abbreviations will be
listed for each command described below.

Also, the corresponding "Usage:" texts have been modified to have
the options be in upper/lower case, where the upper-case characters
define the abbreviations for the option.

5 CHANGES TO THE BATGEN PROGRAM

5.1 Error Handling

When BATGEN reports an error while in command or subcommand mode, it will now call the subroutine SS$ERR, which will cause the "ER!" prompt to be generated (and command input will be paused) if input is coming from a command file. Otherwise, it will do nothing.

See the description of this routine in the subroutine guide or the Primos manual for more detailed information.

5.2 Initial Values for CPU/Elapsed Time Limits

The initial values for CPTIME and ETIME, when adding a queue, are now "None" for both default and maximum parameters. "None" also means "Infinite".

5.3 Abbreviations

Abbreviations for the BATGEN program are as follows:

-STATUS = -ST,   -DISPLAY = -DP,   FILE = FI or FIL,   BLOCK = BLK,
UNBLOCK = UNBLK,   DELETE = DL,   MODIFY = MOD,   DISPLAY = DP,
STATUS = ST, CPTIME = CPT,   ETIME = ET,   FUNIT = FU, PRIORITY = PRI,
QUIT = Q QU or QUI, TIMESLICE = TS, RLEVEL = RLV, and RETURN = RTN.

6 CHANGES TO THE INIT PROGRAM

|At rev 19.0, the INIT program is rewritten, and now does all of the
|functions that were previously performed by the "C_RSET" and "C_BDIF"
|files in BATCHQ. Those files are no longer in existence.

| ## 6.1 Usage

| To invoke INIT, do:

| R BATCHQ>INIT [-RESET_QUEUES] [-ADMINISTRATOR user]

| The "-RESET_QUEUES" option may be abbreviated to "-RSTQ", and the
| "-ADMINISTRATOR" option may be abbreviated to "-ADMIN".

| "-ADMINISTRATOR" specifies the Batch administrator for this system.
| The <user> parameter should be the name of a user who can login to
| the system. If the "-ADMINISTRATOR" option is not present, the
| current logged-in user is assumed to be the administrator.

The Batch administrator is given "ALL" access to the BATCHQ ufd and all sub-ufds and files. Users "SYSTEM" and "BATCH_SERVICE", also "Batch administrators", are also given "ALL" access to BATCHQ.

If "-RESET_QUEUES" is specified, a new BATDEF file will be created in BATCHQ with no defined queues. If it is not specified, the old one will be left as is. Since the rev 19.0 BATDEF and previous versions of BATDEF are incompatible, this option must be used when the new system is first initialized.

Note: the INIT program does not actively prevent the "wrong" users from running it. But since only Batch administrators will have access to the program, and only they will have sufficient access to BATCHQ to actually initialize anything, there should be no problems with misuse of INIT.

6.2 What INIT Does

The INIT program first obtains the database lock, to wait for other users who might be in the middle of updating the Batch database (which will be wiped out anyway).

It then opens the file "BATCHQ>INIT.BATCH" for reading & writing. This file is held open for the duration of initialization. It is also held open by the Batch monitor while it is running. This way, it is guaranteed that INIT will not be able to run while the monitor is running, and that the monitor cannot be started up while INIT is running.

It then deletes all old (pre-rev 19.0) files which may be hanging around in BATCHQ. These files are: "*INIT", "*FIXBAT", "*MONITR", "C_RSET", "C_BDIF", "PH_GO", "IN.USE", and "VALID.". Also deleted are "INITIALIZE_DATABASE.COMI" and "RESET_DATABASE.COMI", which were present in the pre-release version of rev 19.0 Batch.

The BATCHQ subufds "Q.CTRL", "CIFILE" and "OTHER" are then deleted. Then, the BATCHQ files "MON.SR", "MON.PA", "MON.ST", "ERROR.", "EXECUT", "QUEUE" are all deleted.

Then, if "-RESET_QUEUES" was specified, "BATCHQ>BATDEF" is deleted.

Now, it is time to rebuild the database. The "EXECUT" and "QUEUE" files are built and written in BATCHQ. If "-RESET_QUEUES" was specified, a null queue configuration is written out in "BATCHQ>BATDEF".

Then, the database is unlocked so that the database lock file, "LOCK.B", may be deleted. After it is deleted, the sub-ufds are re-created.

| The "Q.CTRL" sub-ufd is created as an ACL ufd.

| The "CIFILE" and "OTHER" sub-ufds are created as password
| directories, with the current Batch password as the owner password,
| and six blanks as the non-owner password.

| Then, the files "MON.ST", "LOCK.B", and "ERROR." are re-created in
| BATCHQ.

| Now, INIT sets up the access on objects inside BATCHQ.

| On "Q.CTRL", it gives Batch administrators (including, of course,
| users SYSTEM and BATCH_SERVICE) "ALL" access; it gives users in
| group ".BATCH$" "ALL" access; and gives all other users ($REST)
| "LUR" access. The group ".BATCH$" is reserved for Batch and PRIMOS
| use only.   It is part of the security mechanism which prevents user
| A from changing the attributes of a job belonging to user B.   It
| also prevents user A from causing his job to run while logged in as
| user B.

| Then, an access category named "RW.ACAT" is created. It gives "ALL"
| access to Batch administrators, and "RW" access to $REST users. The
| files "LOCK.B", "EXECUT", "QUEUE", and "ERROR." are put in access
| category "RW.ACAT".   This is because all users need to be able to
| read and write those files to run the JOB command.

| The "BATDEF" file is then given a specific acl, in which Batch
| administrators have "ALL" access, and all other users have "R"
| (read) access.

| The access is now all in place. The database is initialized.   INIT
| signals this by re-creating the file "BATCHQ>OTHER>VALID.". It then
| closes "INIT.BATCH" and returns the user to PRIMOS.

| 6.3_Changing_the_Batch_Password

| As released, the password on the CIFILE and OTHER sub-ufds in BATCHQ
| is "OSIRAS". Osiras is the God of the Netherworld, and the Judge of
| the Dead, from Greek mythology. He is also the brother and husband
| of Isis, the Goddess of Fertility.

However, if it is desired to change the password, that is done as follows:

OK, ATTACH BATCH   /* Attach to source ufd.
OK, ED B$LIBF.FTN   /* Edit the fortran library for Batch.
EDIT
LOCATE --- BATCH PASSWORD ---   /* Find the password.
    CALL MOVE('OSIRAS',SUBPAS(1,2),3)   /* --- BATCH PASSWORD ---.
MODIFY /OSIRAS/newpas/   /* Change the password.
    CALL MOVE('newpas',SUBPAS(1,2),3)   /* --- BATCH PASSWORD ---.
FILE

OK, R BATCH.BUILD   /* Rebuild Batch.

It would be wise to set the access on the Batch ufd so that no unauthorized users could read files in it, now that the password has been changed.

The password ("newpas" in the example) must be 6 characters in length or less.

7 CHANGES TO THE FIXBAT PROGRAM

7.1 Check For Password Ufd

The BATCHQ>CIFILE subufd cannot be an ACL ufd. The INIT program explicitly creates CIFILE as a password ufd. However, FIXBAT also checks CIFILE whenever it fixes the database to make sure it is not an ACL ufd. If it is, the following error message will be displayed:

BATCHQ>CIFILE cannot be an ACL ufd. Do R BATCHQ>INIT (FIXBAT)

7.2 Unauthorized Usage

FIXBAT no longer prevents unauthorized usage explicitly; the "No right. Must be logged in as SYSTEM" message no longer exists.

Instead, the access on BATCHQ (including FIXBAT.SAVE) prevents unauthorized use automatically.

7.3 Quits Enabled

FIXBAT now correctly enables quits when -STARTUP is specified.
Previously, this caused the Batch monitor to run with quits
inhibited, which prevented it from receiving asynchronous signals
from the condition mechanism, such as "PH_LOGO$". Now, the monitor
runs with quits enabled.

| The "VALID." file (in BATCHQ>OTHER) is now opened before command
output is turned on (if logging is specified), so multiple monitors
spawned at once will correctly output the message "Multiple monitors
illegal" rather than an obscure "O_LOG" error.

8 CHANGES TO THE JOB PROGRAM

8.1 User Profile Support

Group and project names are assigned to submitted Batch jobs based
on the group and project names of the submitter at submit time, i.e.
when JOB is invoked.

8.2 Change to Display of Job Information

The "JOB -DISPLAY" option now displays the home ufd of the job.

8.3 Change to Warning Message

The message "Your job, #annnn, could be in queue <queue>, but may
not execute due to the afore-mentioned error" is changed so that the
word "afore-mentioned" is replaced by "following". The error
message is now printed after this message, and causes an "ER!"
prompt (which suspends command input), rather than before the
message and raising no error indication.

| ## 8.4 Change to Unauthorized Use Message

| The one remaining "No right. Must be logged in as SYSTEM" message
| in the entire Batch subsystem is output when a user, who is not
| logged in as SYSTEM or BATCH_SERVICE, attempts a -HOLD or -RELEASE
| operation via the JOB command.

| Therefore, the message has been changed to read "No right. Must be
| logged in as SYSTEM or BATCH_SFRVICE".

| ## 8.5 Change to Submission Error Message

| The error message "Command file required as first argument on
| submission" now reads "Command or CPL file required as first
| argument on submission".

8.6 Abbreviations

Abbreviations for JOB options are as follows:

-CANCEL = -CAN, -CHANGE = -CHG, -ABORT = -AB, -RESTART = -RST,
-STATUS = -ST, -DISPLAY = -DP, -ACCOUNTING = -ACCT, -HOME = -HO,
-CPTIME = -CPT, -ETIME = -ET, -PRIORITY = -PRI, -QUEUE = -QUE, and
-FUNIT = -FU.

Notice that the -ACCT option is now considered to be an abbreviation
of the -ACCOUNTING option.

9 CHANGES TO THE BATCH PROGRAM

The BATCH program has been rewritten. The syntax
"BATCH SYSTEM -option" is now obsolete and, if used, will produce an
error message.

9.1 Usage

The BATCH command is now invoked as follows:

For all users:

    BATCH -DISPLAY
          -STATUS

For Patch administrators:

```
BATCH -STOP
      -PAUSE
      -CONTINUE
```

For the system console:

```
BATCH -START [-RLEVEL x] [-TIMESLICE y]
```


9.2 Changes to Display Batch Status

BATCH -DISPLAY works as it did before. It has a minor change; when
the total number of waiting and held jobs is printed, the number of
queues   that   had   waiting and   held job   is   also   displayed
("(n queues)").

9.3 The New Short-Status Command

BATCH -STATUS prints a one-line description of the   status of the
Batch subsystem.   The information on this line describes the number
of waiting and held jobs, the number of queues that have waiting and
held jobs, and the number of executing jobs.   If there are both
waiting and held jobs and executing jobs, the total number of active
batch jobs will also be printed.   If there are no active batch jobs,
"No batch jobs" will be displayed.

9.4 Unauthorized Use

As with FIXBAT, the BATCH program no longer explicitly prevents
unauthorized requests to stop, pause or continue the Batch monitor.
The message "No right. Must be logged in as SYSTEM" is gone.

Instead, the security is now present in the way the INIT program
sets access on BATCHQ.   To stop, pause or continue the Batch
monitor, a user must have "ALL" access to BATCHQ. Only Batch
administrators have this access.

9.5 The Stop Request

BATCH -STOP stops the Batch monitor. The monitor, when it sees this request, will send the message "Operator stop" and will logout. (Note: this message no longer rings the bell).

9.6 The Pause and Continue Functions

BATCH -PAUSE and BATCH -CONTINUE work exactly as they did when they were BATCH SYSTEM -PAUSE and BATCH SYSTEM -CONTINUE.

9.7 Starting Up the Batch Monitor

BATCH -START starts up the Batch monitor. If specified, -RLEVEL and -TIMESLICE specify the CHAP command parameters to be given to the Batch monitor. The defaults are 1 for -RLEVEL, and 20 for -TIMESLICE. The arguments to these options are decimal. The -RLEVEL value must be between 0 and 3, and the -TIMESLICE value must be between 1 and 99. The options "-START", "-RLEVEL" and "-TIMESLICE" may be specified in any order.

9.8 Abbreviations

Abbreviations for options of the BATCH command:

-DISPLAY = -DP, -STATUS = -ST, -RLEVEL = -RLV, and -TIMESLICE = -TS.

10 CHANGES TO THE BATCH MONITOR PROGRAM

10.1 Forced Logout Now Handled

The Batch monitor now handles the new rev 19.0 "LOGOUT$" condition. As a result, force logging out the monitor once will not immediately log it out, but as soon as the monitor gets a chance, it will send the message "Force logout by operator" and log itself out. If this message is sent, then the database is completely intact.

If a forced logout does not immediately cause this message to be sent, then a second force logout of the monitor will cause it to immediately log itself out, which will leave the database in an unknown state. The Batch database will then be unusable until FIXBAT or INIT is run.

10.2 Phantom Logout Info in Log File

When Batch jobs log out, the message "At hh:mm:ss; Phantom nn (ab)normal logout." is entered into the Batch monitor log file (unless those jobs were not spawned by the current monitor process). These messages are asynchronous to any activities the Batch monitor may be performing, so the corresponding "++Finished:id" and "Job xx aborted/completed" messages may not directly follow it in the log file.

It is even possible (with short jobs) for an "Executing xx" message to appear _after_ its corresponding "At hh:mm:ss; Phantom nn logout" message.

10.3 Other Change to Log File

The log file "O_LOG" kept by the Batch monitor has had some format changes. The date is now output whenever it changes as follows: "Date: mm/dd/yy". The time of day is now only output when it is different from the time of day when the last line was output.

10.4 Monitor Should Not Be Restarted

The Batch monitor should not be shut down and started up again while Batch jobs are executing. If it is, the Batch monitor will not have fast turnaround on those jobs terminating. In other words, a job may complete, but the Batch monitor may not recognize that it completed for up to 10 minutes.

This is because the Batch job notifies its spawning process when it terminates, but if the spawning process has logged out, it does no such notify. The Batch monitor, which now sleeps up to 10 minutes at a time between checks, is driven to check for job abortions by those notifies.

10.5 Maximum Quota Exceeded is Handled

When the maximum quota for BATCHG is exceeded by the Batch monitor (usually when it tries to spawn a job), it will send the message "My quota is exceeded. Please help me." to the system console. This message parallels the "My disk is full. Please help me." that the monitor sends when it gets a disk full error.

In both cases, the Batch monitor will not attempt to spawn another job for at least 5 minutes. It may even wait longer if it is not explicitly woken up (notified). A quick way to notify the monitor is to do "BATGEN BATCHG>BATDEF" followed by "FILE".

Table of Contents

SUBJECT: BIND

RELEASE: Rev1.0 BETA

DATE: June 1, 1981

1 New Functionality

BIND is a new linker which creates Fxecutable Program Files (EPFs) for
V-mode and I-mode programs. It is intended as an eventual replacement
for SEG as a linker, while the loading and execution functions will be
carried out by RESUME. It also differs from SEG in that its output
files are relocatable, and with the advent of EPF libraries, they will
be fully recursive as well.

2 Outstanding Problems

The following is a list of problems which are known to exist at BETA
test, and which will be fixed at the general release.

- The SYMBOL command works with relative segment numbers instead
  absolute segment numbers, which renders it useless.

- If a user encounters a file system error when trying to file away
  his FPF at the end of a linking session, BIND aborts to PRIMOS
  without providing the user with a possible recourse.

3 Environment

- The initial release of BIND requires REV19 PRIMOS and REV18 PFTNLB.

4 Installation and Build Procedures

- Standard installation and build procedure.

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Subject: COPY_DISK

Release: 19.1

Date: December 6, 1982

Rev_19.0

1 New Functionality

A new format BADSPT file has been defined in which an individual bad
record can be flagged, rather than the whole track containing the bad
record. COPY_DISK has been modified to use this new format.

Badspot handling has been added to COPY_DISK so that records are not
written to badspots but are mapped to the first available free record
on the target partition.

In order to ensure that badspots are handled correctly, the following
guidelines should be followed:
1) The Record Availability Table for each source partition should be
correct. To ensure this is so, FIX_DISK can be run.
2) There should be enough free records on a source partition being
copied for records falling on badspots an the target partition to be
relocated to.
3) To be safe, it would be wise to keep copies elsewhere in filestore
of all BADSPT files, in case of accidental loss.

2 Cosmetic Difference

Because the disk copy is not complete until after the VERIFY phase is
completed as tidying up of pointers in the MFD may be required, the
messages COPY STARTED, COPY COMPLETED, VERIFY STARTED and VERIFY
COMPLETED have been removed as a user may be tempted to break-in during
the verify phase thinking that all copying has finished.

3 Environment

To clean up a disk after badspot handling has taken place, the FIXRAT
replacement FIX_DISK must be used. If FIX_DISK is not available then
badspot handling must not be performed. The new command line option
-NO_BADS has been provided to turn off badspot handling.

Example: COPY_DISK -NO_BADS -NOVERIFY

The default for COPY_DISK is now no verify. If the user wishes to verify he must specify the new command line option -DO_VERIFY.

4 Performance Improvement

A performance improvement of about 250% has been made for all processors below a P750 when copying partitions with 1040-word blocks. COPY_DISK assumes it is running on a P750 with burst mode disk controller. If this is not so, then to achieve the performance improvement a new option, -LOWEND, should be specified.

Example: COPY_DISK -NOVERIFY -LOWEND

WARNING: The use of the -LOWEND option with a P750 will slow down a disk copy.

5 Error message

*IF YOU DO NOT WISH TO CONTINUE WITHOUT BADSPOT
HANDLING YOU WILL NEED TO RE-MAKE PARTITION xxxxxx*

This message is sent whenever the target partition cannot accommodate the source partition (usually occurs when the source was full and the target has more badspots than the source). The message will appear in conjunction with the message -

NO FREE RECORDS ON PARTITION xxxxxx

Rev 19.1

COPY_DISK now will act as PHYSAV does with respect to the size of a disk, in that it calculates the cylinder limit of a disk from the DSKRAT, and only if it cannot calculate the limit will it ask the user what type of disk he is trying to copy. This is only for the support of the new Winchester disks.

Subject: ED

Release: 19.1

Date: July 21, 1982

New Functionality

A new mode, MODE INFO, has been added. After a user gives the command
MODE INFO, all subsequent carriage returns in command mode will be
interpreted as NEXT commands. In order to enter INPUT mode, the user
must enter the command INPUT. The command MODE NOINFO will return the
user to ordinary operating mode. NOINFO is the default mode.

The new software interrupt handler has been incorporated into the
Editor. The old handler, BREAK$, is still used by the non-shared
editor (NSED) as the new handler is not compatible with NSED.

Outstanding Problems

None.

Environment

This revision of FD should be built and run on revision 19.1 or later
PRIMOS.

Build and Install Procedure

This program may be built and installed by resuming the file
ED>ED.BUILD.CPL.

FIXRAT

    1.   Modified to ignore Rev. 19 ACL's and QUOTA's.

    2.   Modified to conform to Rev. 19 Master Disk Standards.

    * NOTE: All products have been modified to conform to master disk
      standards. For a description of these modifications, please
      read INFO19>STANDARDS.RUNO.

MAKE

    Clarified questions asked about physical device type.
    "80 OR 300MB STORAGE MOD" -> "STORAGE MODULE OR CMD"
    Inform user these are YES or NO questions.

C FIX_DISK.RUNI, INFO19, PRIMOS GROUP, 05/14/82 C CHANGES TO FIX_DISK SINCE FIRST RELEASE TO SDI C COPYRIGHT (C) 1982, PRIME COMPUTER, INC., NATICK, MA 01760

Changes to Fix_disk since first release to SDI.

Fixed bug in not writing out correct DSKRAT. Ufd compression now puts ACL immediately after object it protects. Aborts if certain internal tables overflow (very unlikely). Makes sure entries in password ufds have default ACL pointers. Aborts if ufd nesting exceeds maximum specified. Fixed bug where badspots were not being added on disk errors. Now checks validity of file names in directory entries. Disallow partitions newer than current version of fix_disk. Will correct current record address of DSKRAT file if it is wrong. Puts number of cylinders into DSKRAT header for -convert_19. Fixed bug in handling physical device numbers with high-order bit set. Initialize partition type when recreating DSKRAT header. Fixed bug in searching for BADSPT file in MFD. Now prints names of files and Access Categories with ACL error messages. User-Visible changes: 1.) Event logging is re-enabled if necessary when running fix_disk with the

-comdev option. 2.) -Interactive option will allow user to rebuild DSKRAT if the disk

version number is an unknown or illegal value. 3.) When fix_disk prints out allowable options, it will now print out

the description for the -interactive option (which was omitted before). 4.) When running fix_disk with -comdev option on a disk with Priority Acls, fix_disk will restore the Priority Acls on the disk after adding it.

Internal byg fixes:

1.) Fix_disk will not compress the MFD if the BOOT entry is missing.

2.) Fix_disk will no longer hang on certain bad ufd entries.

3.) Fix_disk willnow check for disk read error in all places where DAM

files are handled.

4.) Fix_disk was giving erroneous Directory/Tree Used Incorrect

messages due to a bug in the quota checking code.

Subject: FSULIB

Release: 1.04

Date: 12/6/82

1 Description

This is the place for common subroutines used by the futil replacement
commands. It is not being released for general user use. The calling
sequences and functions performed can be changed without notice. If
any of the subroutines ever get released on their own then they will be
documented and supported like any other released product. The routines
here are supported as if they were part of the futil replacement
commands; which are LD, COPY, RWLOCK, PROTECT, and DELETE.

Included in the build is the building of the file FSULIB>BIND.SAVE
which in turn is used to load the commands.

2 Environment

Needs PRIMOS 19.0.65 or greater. (19.0.respin)

3 Installation and Build Procedures

Needs to be run before building the following products: LD, COPY,
RWLOCK, PROTECT, and DELETE.

4 Problems Fixed

Fixed a bug in VFY$ that causes VFY$ to call ERRPR$ with a key of
K$NRTN which is not allowed in an EPF.

Fix the bug that prevented Futil to run under Primos II.

Subject: LOGPRT

Release: REV19.0

DATE: June 29, 1982

1   New Functionality

     The functionality added to the LOGPRT command for REV19 provides
for three new event types for logging System events and five new event
types for logging Network events.

     The command line to invoke LOGPRT is as follows ([] indicates
optional parameter):

          R TOOLS>LOGPRT [<outtreename>] [opt> <opt> ...]

<outtreename>   The destination for LOGPRT's output.   If 'TTY' is
specified, the output will be to the user's terminal. If <outtreename>
is omitted, output will be to the file 'LOGLST' (or 'NETLST' for
network) in the home UFD. Any other specification will be taken as a
treename to which the output will be directed.

<opt> An option keyword, possibly followed by subfields.   All option
keywords begin with a hyphen and may be abbreviated to a unique left
substring (with the exception of the -PURGE option).

The modifications which were made only affect the -TYPE option:

-TYPE t1 t2 ...Process entries only of the indicated types.   The   new
types added for the rev19.0 version of LOGPRT are:

System Event Types

MCHECK Machine checks (not including memory parity)

QUIET Primos entering Quiet machine check mode
       (happens after 1024 ECC errors since cold start)

BADENT Bad LOGREC entries

Network_Event_Types

When specifying network event types, the -NET option must be specified
before the -TYPE option, otherwise LOGPRT will try to match the system
types.

        NPXTHR   NPX was throttled on transmit or receive

        NPXRCV   NPX got an unanticipated receive status

        NPXCLR   NPX master's circuit was cleared with an unexpected
                  clearing cause

        NPXSEQ   NPX found a sequence error in bounce detect

        NPXCON   NPX got an unexpected circuit status in call setup

2 Bug_Fixes

        Input logging files for both system and network events are no
        longer located in the directory CMDNC0 on logical disk zero.
        System input logging files are located in the ufd 'LOGREC*' on
        logical disk zero. Network input logging files are located in the
        ufd 'PRIMENET*' on logical disk zero. System logging file names
        are in the form 'LOG.MM/DD/YY', and network logging file names are
        in the form 'NET_LOG.MM/DD/YY', where 'MM/DD/YY' is either the
        date on which a cold start of the machine was performed or when an
        EVENT_LOG -ON command was issued from the system console to enable
        event logging.

        The input event logging file may be specified by including the
        pathname of the file after the '-INPUT' option on the LOGPRT
        command line. If the network event logging file is specified,
        '-NET' should be the first option on the command line. If an
        input event logging file is not specified, LOGPRT uses the most
        recently created log file found in the respective directories,
        LOGREC* or PRIMENET*.

The 'HELP' display now causes the tty screen to scroll. Type anything but upper- or lower-case 'q', 'qu', 'qui', or 'quit' to continue display.

DSWPARITY checking now dependent on whether processor is either a 750 or 850. Code assumes bit interpretation is similar.

'D' board now is 'J' board in DSWPARITY.

LFERNEXT now taken in positive sense, therefore, XOR in code not done.

'DELETE' option now correctly spools output file before deleting it as described in 'HELP' display.

ABSTRACT

MAGNET has been split into MAGNET and MAGLIB. There have been no changes to the modules. MAGNET contains the user interface while MAGLIB has all the internals.

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Subject: PHYSAV, PHYRST

Release: 19.1

Date: December 6, 1982

Rev 19.0

1 New Functionality

1.1 Badspot Handling

A new format BADSPT file has been defined in which an individual bad
record can be flagged, rather than the whole track containing the
bad record. PHYSAV has been modified to use this new format.

Badspot handling has been added to PHYRST so that records are not
written to badspots but are mapped to the first available free
record on the target partition.

In order to ensure that badspots are handled correctly,   the
following guidelines should be followed:
1) The Record Availability Table for each source partition should be
correct. To ensure this is so, FIX_DISK can be run.
3) There should be enough free records on a source partition being
saved for records falling on badspots an the target partition to be
relocated to.
3) To be safe, it would be wise to keep copies elsewhere in
filestore of all BADSPT files in case of accidental loss.

To clean up a disk after badspot handling has taken place, the
FIXRAT replacement FIX_DISK must be used.   If FIX_DISK is not
available then badspot handling must not be performed.   The new
command line option -NO_BADS has been provided in PHYRST to turn off
badspot handling.

Example: PHYRST -NO_BADS

1.2 New Option to PHYSAV

A new option, -LOWEND, has been added to PHYSAV at rev 19.0 to
enable users to gain maximum performance.   This option should be
specified when running PHYSAV on any machine below a P750.
N.B. If -LOWEND is not specified for a machine below a P750 then a
performance degredation will occur.

2 Fixes

POLER 32189 has been fixed at rev 19.0. PHYSAV now works when a user uses REN after having broken-in when asked the question *WRITE NEXT LOG. TAPE (YES/NO)?*.

PHYSAV can now write more than one logical tape when used with an Integrated Formatter.

Physav will now save partitions of up to 40 heads (600 support).

Physav will now cope with EOT when performing a GAP operation during error recovery and continue correctly onto the next tape with the same logical tape number.

Physav will now work when user types REN after having broken in when given the message *END OF REEL, MOUNT REEL* and then *UNIT NO:*

Phyrst will not now tell user to run fix_disk when in verify mode.

3 Error Messages.

EOT DETECTED WHILE DOING ERROR RECOVERY WILL CONTINUE WITH SAVE

IF EOT is detected while Physav is recovering from an unrecoverable error then the current record will be saved and written on to the next reel. Physav will write the trailer labels on the current tape and ask for the new tape and continue.

*IF YOU DO NOT WISH TO CONTINUE WITHOUT EADSPOT
HANDLING YOU WILL NEED TO RE-MAKE PARTITION xxxxxx*

This message is sent whenever the target partiton cannot accommodate the source partition (usually occurs when the source was full and the target has more badspots than the source). This message will appear in conjunction with the message -

NO FREE RECORDS ON PARTITION xxxxxx

Rev 19.1

At Rev 19.1 both PHYSAV and PHYRST have been enhanced for the RABBIT disks, and the streamer tape drives.
No changes are necessary for Cartridge tape drives.

PHYSAV

New command line option :-

-SPEED { 25 | 100 }

This option is for streaming tape drives only and will set the speed of
the drive.   The default speed is 100 IPS but the user may wish to
change the speed to 25 IPS especially if his system is being heavily
used, when 25 IPS may run faster.
This option has no effect on any other tape drive.

For the new winchester disks, Physav will pick up their cylinder limit
from the number of records on the partition, as before 19.1 . However,
if this figure cannot be calculated for any reason, e.g. if saving
multiple partitions, the user will be asked which type of disk he is
attempting to save.
The cylinder limits of each partition being saved will be put into the
tape header, in words 261 to 270, so that PHYRST can pick it up,
without having to restore the DSKRAT onto disk before deciding that it
cannot restore.

PHYRST

New command line option :-

-SPEED { 25 | 100 }

Same as for PHYSAV. This option has no effect under PRIMOS II.

For the new Winchester disks PHYRST will pick up from the DSKRAT what
size of disk the user is trying to restore to.   PHYRST will compare
that with the size of the disk on tape and any discrepancy will be
reported to the user AND the disk will not be restored.

The report from PHYRST will now inform the user what type of disks are
on tape:-

E.G.

PARTITIONS SAVED
050460   BACK1   80 OR 300 MB
030462   BACK2   600MB

N.B.

It is not possible for PHYRST to know if a disk is a 80 or 300 MB disk,
as they both have the same cylinder limit.

New Error Message

UNEQUAL SIZE DISKS
THE DISK IS A 34MB DISK NUMBER 460
THE DISK ON TAPE IS A 68MB DISK NUMBER 20460

PHYRST will then re-prompt for which disks are to be restored.

The first shipment of software from PRIME engineering was a version called
19.1.B1 (also known as 19.1.M1). This version was used at all 19.1 test
 sites.
The new version, 19.1.B2, contains a number of critical bug fixes, i.e.
,
19.1.B2 = 19.1.B1 + <bug fixes>.

This list describes the fixes of major concern.
The fields 'Reported', 'Product', and 'ID' were used internal to PRIME
Engineering.

  Reported : 8/31/82   Product   : PRIMOS   ID
   : 920
  Problem Description:--

  |A control-P or "break" received into Primos via a Lynx line will caus
e |
  |Primos to halt with a pointer fault.
      |
  |
      |
  |
      |
  | This problem effects the operation of the NEC spinwriter.
      |
  |
      |
  |
      |
  |
      |

  Solution Description:---

  |The input handler for TTY protocol which is coded in the AMLC dim but
 is |
  |also used by the Lynx async dim returns info about whether an XON or
XOFF |
  |character was seen. The logic which check for this in the Lynx async
 dim |
  |did not properly check this condition, and hence, would sometimes att
empt |
  |to perform XON or XOFF action when not required using an out-of-range
      |
  |parameter and cause a system halt. The solution is (1) perform better
 range|
  |checking in the Lynx async dim, and (2) be sure to clear the return A
-reg |
  |value in the TTY input handler when not receiving an XON or XOFF.
      |

1 New Badspot Support

In order to support an unlimited number of badspots there can be no
intermediate badspot table between preloader and AINIT. This means
that the LMAP and PDMAP must be initialized by the preloader directly.
However, if the PDMAP is available the LMAP may be generated from it,
meaning the preloader need only generate the initial PDMAP.

    The PDMAP currently resides in SEG14 and is 'one to one' and
wired, but because of its location it is not possible for the preloader
to initialize it directly. What is needed is an area to hold the PDMAP
until after *COLDS has been read in to memory. This area will be
record 0 of the primary paging partition (the first 8 records are free
because an LMAP index of 0 is not valid). The preloader will generate
a complete PDMAP and write it into the record addressed by PAGREL (the
first available paging record), AINIT will then read this record into
the correct location, generate the corrected LMAP indices and enable
paging.

2 Split Paging Devices

If the desired paging partition has any badspots it must be split.
This is required in order to pass the badspot information to PRIMOS
during coldstart. Currently there a two rules governing the use of
split paging partitions:

    RULE #1   A split paging partition must be called "PAGING"
                   This is for both the primary and alternate
                   paging partitions.

    RULE #2   If COMDEV = PAGDEV for the primary paging partition
                   its name does not have to be "PAGING".

    Notice that if it is desired to use the file system portion of
both the primary and alternate paging partitions and the primary is not
COMDEV, both names must be "PAGING". This generates a conflict when it
comes time to add the disks or access them across the network.

    As part of the badspot project these rules will be eliminated. A
split paging partition may have any legal PRIMOS file name. The
preloader will check for a split partition by comparing the number of
records field in the DSKRAT header (number of file system records) to
the total number of records availably on the partition. The total
number of records is calculated using the equation (records per track *
cylinders * number of heads). The number of records per track is 9 for
our current drives and the number of heads is extracted from the PDEV.
At Rev 19 there is a new field for cylinders in the DSKRAT header, if
this field is not valid the default value of 823 will be used. This
field will not be valid in the case of a pre-Rev 19 disk.

3 NEW MAGTAPE FUNCTIONALITY

At rev. 19.1, full support has been added for the Rabbit cartridge tape
drive and the streaming magtape drive. Most of the changes are
transparent as the operation and programming of these drives is very
similar to previous Prime magnetic tape drives. For information beyond
that provided below, refer to the user instruction supplied with these
products.

3.1 ASSIGN Command Changes

To support these new drives, the format of the Primos ASSIGN
command for magtapes has changed by the addition of the -RETENSION
option at rev. 19.1, the -SPEED option at rev.'19.0, and the object
'3200' to the density option at rev. 19.0. The format of the ASSIGN
command is now as follows:

```
              ASSIGN MTn [-ALIAS MTm] [<options>]
              ASSIGN MTX  -ALIAS MTn  [<options>]
              options: [ -WAIT ]
                       [ -MOUNT ]
                       [ -RETENSION ]
                       [ -TPID <id> ]
                       [ -7TRK | -9TRK ]
                       [ -SPEED {25 | 100} ]
                       [ -RINGON | -RINGOFF ]
                       [ -DENSITY {800 | 1600 | 3200 | 6250} ]
```

The -RETENSION option is used with the Rabbit cartridge tape drive
and ignored for all other type magtape drives.

The -SPEED option is used with the Streamer and is ignored for all
other type magtape drives.

The 3200 bpi argument to the -DENSITY option (-DENSITY 3200) is
obeyed by the Streamer. For other type magtape drives, it is sent to
the operator or to the drive as is normal, regardless of whether that
drive accepts this density normally.

3.2 ASSIGNing Rabbit Cartridge Tape Drives

Rabbit cartridge tape drives are the same as other Prime magtape
drives for most ASSIGN command options. -ALIAS and -WAIT work as
before. MTX, -TPID, -MOUNT, -7TRK, -9TRK, -RINGON, -RINGOFF, and
-DENSITY all require operator intervention. -SPEED is ignored.

-RETENSION has an effect particular to this drive only: because

of their design, it may be necessary to 'retension' a rabbit tape cartridge to avoid errors and damage to tapes. A tape cartridge will normally only have to be retensioned when one of the following is true:

1. It is a new tape cartridge.

2. Use of the cartridge produces an excessive number of errors. (Preventative maintainance procedures such cleaning the magnetic tape head and transport may also be necessary).

3. The cartridge is suspected of having undergone physical shock or exposure close to or beyond recommended temperature extremes (41 - 113 F, 5 - 45 C) or humidity extremes (20% to 90% noncondensing).

4. The tape cartridge has been improperly be stored. Cartridges should be stored on-edge (i.e. with the metal base vertical). If stored any other way, the tape may begin to drop off the open reel tape hubs.

If any of above conditions are true, the tape cartridge should be retensioned before use to acquire even tensioning in the cartridge to stabilize the tape-to-head pressure and properly "stack" the tape on the reels evenly. Retensioning is accomplished by loading the cartridge in a drive and assigning the drive using the -RETENSION option in the ASSIGN command. The tape will then be retension, by being fast-forwarded to end-of-tape and then being rewound to the begining-of-tape. The operation takes approximately two to three minutes with a 4800 foot tape cartridge.

3.3 ASSIGNing Streamer Magtape Drives.

Streamer magtape drives are the same as other Prime magtape drives for most ASSIGN command options. -ALIAS and -WAIT work as before. MTX, -TPID, -MOUNT, -7TRK, -9TRK, -RINGON, and -RINGOFF all require operator intervention. -RETENSION is ignored.

The -DENSITY option is automatically processed without operator intervention to set the tape density the next time a mounted tape is positioned at load point. Currently only 1600 bpi and 3200 bpi are used by the Streamer. 800 bpi and 6250 bpi are accepted, but are ignored. If a density is not given in an ASSIGN command that assigns a streaming tape drive, the density automatically defaults to 1600 bpi.

The option -SPEED is also automatically processed without operator intervention to set the tape speed at any time without operator intervention. Currently, only 25 ips and 100 ips are accepted when the drive is at 1600 bpi. The Streamer will default to 50 ips when running at 3200 bpi. If no speed is specified in an ASSIGN command that assigns a streaming tape drive, the speed automatically defaults to 25 ips.

3.4 Programming the Streamer and the Rabbit Cartridge Drive.

In general, both drives are program compatible with previous Prime
magtape drives. Specifically, the following commands apply, except as
noted (note some are new or are modified):

Octal	Hexadecimal	Meaning
000040	0020	Rewind to BOT.
022100	2440	Backspace one file mark.
062100	6440	Backspace one record.
022220	2490	Write file mark.
062200	6480	Forward one record.
022200	2480	Forward one file mark.
100000	8000	Select drive and return status.
140000	C000	Return device id: Streamer = 000013 octal (version 4 controller). Rabbit Cart. = 000113 octal (version 5 controller).
042220	4490	Write record, one character per record.
042620	4590	Write record, two characters per record.
042200	4480	Read record, one character per record.
042600	4580	Read record, two characters per record.
100020	8010	Erase a three-inch gap on tape (Streamer (version 4 controller) only).
100040	8020	Rewind, unload, and place drive drive offline (Streamer (version 4 controller) only).
100100	8040	Set density to 1600 BPI (Streamer (version 4 controller) only).
100140	8060	Enable front panel density select switch (Version 3 controller only). Set density to 3200 BPI (Streamer (version 4 controller) only).
100160	8070	Set speed to 25 IPS (Streamer (version 4 controller) only).
100200	8080	Set speed to 100 IPS (Streamer (version 4 controller) only).
100220	8090	Retension tape (Rabbit cartridge (version 5 controller) only).

The status codes returned are compatible with previous magtape
controller status codes.

Users are warned of the start/stop time characteristics of the Streamer
tape drive and are referred to the Streamer user manual for more
information.

4 External Logout

The initial attach point will now be preserved dkuring the execution of
external logout.

5 ICS1 controller support

The ICS1 is a communications controller which has eight asynchronous
lines, and optionally, one synchronous line. ICS1 controllers contain
a microprocessor and RAM memory. At cold start and warm start time,
software is downline loaded into the ICS1 in order for it to operate.

At Primos revision 19.1, ICS1 support is limited to asynchronous line
support, and bisynchronous support using T$SLC0 and RJE only.

5.1 Primos commands

ICS1   support   resulted   in changes to some Primos commands.   A
description of these changes follow.

5.1.1 STATUS

The STATUS commands has a new option COMM which will display a table
describing the communcations controllers present in the system.

5.1.2 USAGE

USAGE will display three new parameters:

```
%ASYNC  - cpu percentage used for ICS1 async support
%SYNC   - cpu percentage used for ICS1 sync support
%ICS    - cpu percentage used for ICS1 interface support
```

5.1.3 Errors reported for ASSIGN and AMLC commands

When using the ASSICN or AMLC commands on an ICS1 line, the
following errors may be reported:

    Bad parameter.
      An invalid line speed was specified.

    Device not available.
      Although a particular ICS1 controller is present and
      configured, it has had a failure and is no longer
      available.

    Operation unsuccessful.
      An attempt to change the line's configuration was

temporarily unsuccessful. A subsequent attempt
should be successful.

5.2 Primos cold start

5.2.1 New directive - ICS JUMPER

A new cold start directive has been introduced for use with ICS1
controller configurations. At revision 19.1, the directive

        ICS JUMPER a b c

is used to set certain line speeds. This is analogous to
re-connecting the line speed jumper wires on an AMLC board. The
arguments to the ICS1 JUMPER directive are the three desired line
speeds, typed as octal integers. Speeds a, b, c are selected by
specifying line config parameters whose second octal digit is 5, 6,
7 respectively. For example, a config of 2613 would select the
second speed specified by ICS1 JUMPER. Default values, if the
directive is not specified, are the same as for the AMLC (75, 150,
and 1800 bps).

5.2.2 AMLCLK restrictions

For an AMLC, the AMLCLK directive allows a way to select a line
speed based on the AMLC's internal clock rate. This means that
hundreds of different speeds may be selected. The ICS1 controller
uses hardware such that its line can only run at one of fifteen
specific speeds, namely 50, 75, 110, 150, 200, 300, 600, 1200, 1800,
2400, 3600, 4800, 7200, 9600, and 19200 bps.

Even with ICS1 support, the syntax and method of calculating the
argument for AMLCLK remains the same. If a argument corresponding
to other than one of the above fifteen speeds is specified on a
system containing ICS1 controllers, selecting that speed for an ICS1
line will cause an error to be reported and that line speed will not
be changed.

5.2.3 Downline load file

Each ICS1 contains RAM into which specific code and data must be
loaded at cold start. The code and data is contained in the file
ICS1.DLL which must be located in ufd CMDNC0 on the command
partition.

5.3 Primos warm start

If any ICS1 controllers are in a system, warm starting Primos will take significantly longer that without such controllers. A message:

               SYSTEM WARM STARTING, PLEASE WAIT

is printed out at the system console terminal to indicate that the system warm start procedure has begun. When warm start is complete, the *** WARM START *** message will be printed, as usual.

6 Error messages

6.1 Cold start directive-related errors

Certain errors may be reported during cold start which are the result of incorrect use of cold start directives. These error messages and the reason for each is as follows:

    Illegal AMLCLK arg specified for ICS controllers
        An attempt was made to specify via AMLCLK a baud rate
        that the ICS1 does not support. If this error occurs,
        the system will still continue cold start procedure, but
        the "programmable clock" baud rate may not be selected
        for ICS1 lines. This baud rate may still be selected
        for AMLC lines, however.

    BAD ICS DIRECTIVE: xxxxxx
        The specified ICS directive either does not exist, or
        has been specified incorrectly. The system will still
        continue cold start procedure, but this invalid directive
        will be ignored.

6.2 Errors indicating possible hardware failure

The following errors can occur during cold start and warm start and indicate possible hardware problems. The particular device is identified by its device address as printed in the message (e.g., 'device ZZ').   (XXXXXX and YYYYY are error codes used in diagnosing the particular failure.) The system will continue to run, however, the particular device mentioned will no longer be available for use.   To eliminate the error message, the next time the system is shut down, the indicated device must be physically removed from the system backplane.

        IPQCS error XXXXXX YYYYY stopping device ZZ
        ipqcs - IF$CDF failed for device ZZ: codes are XXXXXX YYYYY
        Error while booting device ZZ
         Controller returned Y words of (hex) status: XXXX
        Controller has not responded

```
           Error while loading device ZZ
          Controller codes: 8001, XXXX
           Error while loading device ZZ
```

6.3 Errors indicating internal software problems

The following error messages can occur during cold start and warm start
indicate internal problems with Primos and/or ICS1 support software.
In some cases, the error may be serious enough that cold start will be
aborted. Because of the transient nature of some errors, the error may
not occur on subsequent cold starts, therefore, another attempt should
be made at cold starting the system. If an error persists, however, a
serious internal software problem is probably indicated. Physically
removing all ICS1 controllers from the system backplane will usually
allow the system to run normally. In other cases, the system may
continue to run, but some or all of the MDLC, ICS1, and AMLC
controllers may not be available for use after cold start has
completed. If all of these controllers are required, the system should
be shut down and another attempt should be made at cold starting.
Software-related error messages are:

```
     No timed notify available for pcc$ht: system may hang
     Error while starting AMINIT: amlno mismatch = XXX,
       aminit error = YYYYYY
     Mismatch of CCPAT and AMLCOM.
      Unused controller = X
      Remaining AMLCs = Y
     [other error text] allocating ICS1 free pool
     No seg. 0 buffer space
     No phantom interrupt handler
     Error while loading device ZZ
       Timed notify not available.
       System will hang if controller fails to respond.
     IPQN codes XXXXXX YYYYYY
       Error while loading device ZZ
```

6.4 ICS1 downline load error messages

The file ICS1.DL is contained in top-level ufd DOWN_LINE_LOAD*. This
file contains a run image of the software which is loaded into each
ICS1 controller at cold start and warm start. The following error
messages will be generated if this file is not correct or not present.
Some examples of how this situation might occur are FIX_DISK has
truncated the file, insufficient access rights on the ufd, incorrect
rebuild of the file. These error messages may be printed during cold
start and warm start, and if any occur the downline load file should be
restored from backup media or rebuilt from source.

```
     Error while loading device ZZ.
     DL file not formatted for DMT.
```

```
        Error while loading device ZZ
    DL file packets are too large.
      Error while loading device ZZ
    No data packets in DL file.
      Error while loading device ZZ
    Program too large for controller
      Error while loading device ZZ
```

If the message

    [other error text]. Error while booting device ZZ.

occurs the downline load file could not be accessed probably because
the file or the ufd do not exist or access was not permitted.

6.5 Warning messages

The following messages which can be printed out during cold start and
warm start are warnings only. and indicate hardware which either cannot
be identified or although not operating perfectly can still be used.
The system will continue to cold start. but the indicated controller
will not be available.

```
    Broken async lines
    Unknown controller with communication device address
      Controller device address is ZZ
      It returned an i.d. code of YYYYYY
    Unknown MDLC-style device i.d.
      Controller device address is ZZ
      It returned an i.d. code of YYYYYY
```


7 Async logical line number assignment

In a system which includes both AMLC and ICS1
controllers, logical line numbers are assigned
beginning with AMLCs.
When all AMLCs have been allocated,
ICS1 line numbers are then assigned
starting at the next 16 ('20) line boundary.
For example, if a system has two 16-line AMLCs
and three ICS1s, line numbers would be
assigned as follows:

```
        AMLC        Lines  0 - 17
        AMLC              20 - 37
        ICS1              40 - 47
        ICS1              50 - 57
        ICS1              60 - 67
```

Note   that   if   NTUSR   is   set   small   enough   for   a   given   hardware

configuration, it may not be possible to login on an ICS1 line.

8 Synchronous line usage on the ICS1

At Primos rev 19.1, bisynchronous support is limited to the RJE X80 and
HASP products and bisync T$SLC0 use.   The following changes and
additions should be noted:

8.1 T$SLC0

8.1.1 Model id

When T$SLC0 is called with a key of 7 note that the value returned
for an ICS1_controller must be interpreted as a decimal value to
obtain the model id number for the controller.

8.1.2 Error messages

There are additional error messages which can occur when using T$SLC
with an ICS1 sync line.   These error messages indicate internal
software problems. Should one of these errors occur, the sync line
indicated should be unassigned, reassigned, and the application
using T$SLC started up again. If the error persists, a serious
internal software problem is indicated and sync service on that
controller will not be available.   The error messages which can
occur are

        SMLCzz   ICS CONFIGURATION FAILURE
        SMLCzz   ICS CONTROL FAILURE

where zz indicates the line on which the failure occurred.

9   LOGPRT

At rev 19.1, LOGPRT has been modified to handle the new PACL (Priority
ACL) system event log entry. A PACL entry is written to the log file
whenever a priority ACL is set on a disk.

Subject: RUNOFF

Release: 19.1

Date: June 6, 1981

New_Functionality

This version includes the major bug fixes which were submitted for
18.4.

Environment

This revision of RUNOFF should be build and run on revision 19.0 or
later PRIMOS.

Build_and_Install_Procedure

This program may be built and installed by resuming the file
RUNOFF>RUNOFF.Build.CPL.

SUBJECT: SEG

RELEASE: Rev19.1

DATE: December 6, 1982

1 New Functionality

- SEG now automatically loads SPLLIB whenever the Pure Fortran
  Library is loaded. The subcommands LI and PL do this. The result
  is that Rev19.0 SEG cannot be run on any system which does not have
  the SPL library.

- The default stack address when using the SPLIT command is now
  4000/150000. This is to allow debug capability of these modules
  with HPSD or VPSD. Any program which the range between 150000 and
  170000 can restore the stack to its old address by invoking the
  SPLIT command with these arguments,

        SP 100000 4000 170000 ext_stack_segno

  where the 'ext_stack_segno' can be any segment other than 4035 that
  the user is not currently using.

- Since rev18, the start_address has been initialized to the null
  pointer (i.e. 177777/0) rather than 0/0 which it was before.

2 Problems Fixed

POLER NO.	Description
20795,37978	SEG no longer dedicates any file units, except 13 which is is used for the maps. This unit has to be dedicated in order to support the functionality outlined in PDR3524 (see Map subcommand in LOAD subprocessor).
36524	SEG now reports error if user loads a SEG file in the VLOAD subprocessor.
34205	SEG no longer leaves a temp file in the UFD when using the -LOAD command line option.
32068	SEG now warns the user if he redefines a common block shorter than a segment to one longer than a segment.
27021	Stack overflow and extension stacks now work.

32187,30102   All known and reported bugs with the MODIFY
                     command now work.

41718   SEG no longer has any problems running rev15
                     or rev16 runfiles. (fixed at rev18.2)

3 Responses

POLER NO.   Description

34484   problem: DELETE subcommand in SEG aborts
                              command file if file is not present.
                     response: This is only a problem when this command
                              is used at the beginning of a session to
                              ensure that old file does not cause
                              problems. In fact, SEG truncates the
                              existing file and starts from scratch,
                              so that this command can be removed from
                              the command file without any problem.

32730   problem: Start address is sometimes wrong.
                     response: The value indicated in the map does not
                              have any meaning if the SPLIT command is
                              used, so it should be ignored.

36423   problem: Main program must have ECB in link frame.
                     response: Restriction originally intended to get
                              users to be aware that they were
                              programming in V-mode, but now we want
                              to discourage practice of putting ECBs
                              in procedure frame because future linkers
                              will have OS place programs dynamically,
                              hence ECB will not be pure.

29718   problem: Default start address has been changed
                              since rev17 from 0/0 to 177777/0.
                     response: This is really a correction of a mistake.
                              The default start address is supposed
                              to be the null pointer, for which all
                              Prime products use 177777/0. (This is
                              because that value corresponds to an
                              address which cannot exist)
                              Prior to rev18 SEG was the only product
                              which used 0/0 as null pointer.

4 Problems which could not be reproduced

      POLER NO.   Description

      35795   Full procedure segment produces *REFERENCE
                          TO UNDEFINED SEGMENT* when loading IFTNLB. Using
                          the program provided with the POLER form, this
                          problem did not occur at this time.

      45446   Executing a SEG file bounded by quotes produces
                          some error message. This functionality appears
                          to work fine at this time. Could not reproduce
                          problem.

5 Outstanding Problems

      POLER NO.   Description

      40634   SEG will not run rev 14 runfiles.

      36475   SEG uses segment 4035 for its symbol
                          table.

6 CMDSEG

At rev 19.0 CMDSEG has been completly rewritten. The following
enhancements/fixes have been made.

- The user DOES NOT have to be attached to the directory SEG.

- The resulting has a meaningful name taken from the name of the
  segment directory.

- CMDSEG is now written in CPL.

- CMDSEG and CMDSG1 have been combined into one program.

CMDSEG is invoked by:

- R SEG>CMDSEG <run filename>

CMDSEG may also be invoked :

- R SEG>CMDSEG

CMDSEG will then prompt for the pathname of the segment directory.

7 Environment

- This version of SEG requires Rev19 Primos, Rev19 PFTNLIB, and rev19.0 SPLLIB.

8 Installation and Build Procedures

- Standard installation and build procedure.

- This version of SEG.BUILD.CPL will not operate correctly with rev18.2 SEG, but is compatible with all earlier versions of rev18 SEG.

Subject : V-mode Fortran Library

Release : Rev. 19.1

Date : June 14, 1982

1. New Functionality

    NAMELIST read / write blocks can now support up to 247
        items. See the F77 information file for specific
        details.

    PL1G can now reference floating point values with
        exponential numbers between 1 and 4 digits.

2. Problems Fixed

    A. The following Polers have been fixed :

        11985 F$INQF no longer closes any Command_Input_File
              which the user happens to have open at the time
              of inquiry.

        22050 MIN [F$MI11] is now a separate module, and
              gives correct results if the arguments are
              within legal bounds.

        23929 F$I077 B-formats no longer produce garbage
              characters at the end.

        27250 F$I077 does correct outputs with leading zeros
              only when necessary.

        28524 SQRT allows more accurate comparisons between
              returned results.

        28987 F$CLOS This is a duplicate of 40213.

        29335 P$ATOA handles exponents greater than 2 digits.

        29556 DEXP returns 1.0 if its argument is 0.0 .

        29621 F$I077 now accepts P-format statements with
              surrounding blanks.

        29743 This is a duplicate of 23929.

        30110 P$ATOA traps numbers with multiple decimal
              points and delivers an error message.

30249 F$IOFTN operates properly on multiple, internal sequential commas.

31162 This is a duplicate of 23929.

31191 This is a duplicate of 47450.

31198 NAMEQ$ now checks for lower case 'a'.

31488 F$IO77 handles non-word aligned charcter output from internal formats correctly.

32166 F$IOFTN now handles encodes of non-word aligned characters correctly.

32365 P$ATOA now correctly handles rounding of floating point numbers.

32688 F$STRANS2 signals error conditions properly.

32724 FTN evaluations of complex absolute values no longer overflow if the argument is within legal bounds.

32927 This is a duplicate of 31488.

33786 F$IO77 now allows lower-case formattors in uncompiled format statements.

34122 F$CLOS This is a duplicate of 40213.

35139 FTN evalutaions of numbers to the zeroth power will return an appropriate form of 1.

35387 F$IOFTN now accepts B-format statements which may be surrounded with blanks.

36353 DYNTS to SEM$OP and SEM$CL are now available.

36670 This is a duplicate of 36353.

37051 System error messages are now correct.

37913 VM$__ attempts more intelligent mag tape error recovery.

40213 F$CLOS can delete a scratch file from a passworded UFD, providing that the program is initiated by a user with owner status.

40357 This is a duplicate of 22050.

40608 This is a dupliacte of 37051.

40721 F$IOFTN will now take a user-supplied ERR=
      return statement on a bad format specifier.

41864 This is a duplicate of 40213.

43074 This is a duplicate of 31488.

45260 This is a duplicate of 32166.

46976 F$I077 error returns now operate only on
      statements within their jurisdiction.

47450 F$CLOS now closes the correct file unit.

48003 This is a duplicate of 47450.

48230 This is a duplicate of 37051.

3. Outstanding Problems

    A. There are some outstanding Polers listed in the on-line
        POLERS data base.

4. Changes

        A. NAMELIST support for F77 has been unshared as we
            needed the room in the shared library (and NAMELIST
            was thought to be little used).

        B. Two more logical units were added to the IOCS system
            for use by PL1. The units are 140 and 141 for
            printer units 0 and 1, respectively. FTN / F77
            programs may reference these units as well.

        C. The block that determines whether or not the Library
            is initialized is now located in the Command
            Processor Stack, which we are running under upon
            entry.