To: Distribution
From: Betsy Kerr
Date: January 6, 1975
Subject: Multics Change Requests

Enclosed are copies of Multics Change Requests which were approved during the month of December, 1974.
**Title:** Modify adjust_bit_count on MSF!

**Author:** S. Herbst

**Coded in:** XPL/I □ AIM □ other-

**Explain in DETAILED PROPOSAL**

**Planned for System MR**

**Fixes Bug Number(s)**

**Documented in MTB**

**User/Operations-visible**

**Interface change?** □ yes □ no

**Incompatible change?** □ yes □ no

**Performance:** □ Better □ Same □ Worse

**Replaces MCR**

**Category (Check One)**

- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools

**Numbers**

**Fixes Bug**

**Documented in**

**Specify One or More**

**User/Operations-visible**

**Document**

**MTM (Vol, Sect.) Command & Subr.**

**Salvager**

**Ring Zero**

**Ring One**

**Sys.Jaemon/Admin.**

**MPAM (Sect.)**

**Runtime**

**MPAM (Sect.)**

**X User Cmd/Subr.**

**MSAM (Sect.)**

**Objections/Comments:**

**Use these headings:** SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**SUMMARY:**

Fix adjust_bit_count to adjust the bit count of an MSF to the last non-zero word (or character) of the whole MSF. (Currently, it looks only at the last component.)

**REASONS:**

The adjust_bit_count command should operate sensibly on sequential MSF's.

**DETAILED PROPOSAL:** If the last component has something in it, call msf manager $adjust with its computed bitcount and its component number. Otherwise, back up and compute the bit count of the previous component, and so forth.
MULTICS CHANGE REQUEST

TITLE: Fix gis bug which prevents tools source from being fetched when gis is used with no -sys arguments

AUTHOR: A. J. Scherer

SOURCE: (If external; e.g., "User", "Marketing")

CLASSIFICATION | JUSTIFICATION
--- | ---
Incompatible | Marketing
Change | Requirement
Extension | Conformance
Restriction | Consistency
Performance | Improvement
Improvement | Simplification
Reliability | Improvement
Improvement | Generalization
| (Unreported)
| Bug Fix

REASON:
The incorrect specification of the dimensions of the libraries array in gis, tools library was being skipped when no argument "-sys t" was given. As a result the "Entry not found" error message was returned.

SUMMARY:
Fix the bug by correcting the dimension of the array.
TITLE: Increase size of hardcore source archives

AUTHOR: David M. Jordan

SUMMARY:
Modify the hardcore updater to add segments to a source archive until the bit count reaches 2,000,000. (255 pages).

Reasons:
The hardcore updater limits the size of a source archive in order to prevent having to worry about an archive growing past the max seg size. Since the maximum size of a segment has been increased from 64K to 255K, the max size restriction imposed by the updater should be increased by a similar factor (from 450,000 to 2,000,000).
### Multics Change Request

**TITLE:** New Miscellaneous Charging Procedures  
**AUTHOR:** F. C. Smith

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<tr>
<td>other</td>
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**PLANNED FOR SYSTEM:** NA  
**Fixes Bug Number(s):** NA  
**Documented in MTB:** 355

**User/Operations-visible Interface change?** Yes  
**Incompatible change?** No  
**Performance:** Better

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**User Commands/Subr.:**

1. "charge" to enter a miscellaneous charge. This will be equivalent to the present "misc" command.
2. "credit" to enter a credit. This is presently done by entering a negative charge.
3. "dmisc" to remove erroneous charges.

**Reasons:**

- The command "misc" is inconvenient to use. Credits must be entered as negative charges, erroneous entries cannot be removed, it is not possible to examine entries in the miscellaneous charge file without printing the whole file, and charges cannot be entered after a project has been deleted.

**Implications:**

- Entering miscellaneous charges and credits should become easier, less prone to errors, and require fewer handwritten vouchers.

---

**Use these headings:** SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**SUMMARY:**

Add the following commands for restricted system administrators:

1. "charge" to enter a miscellaneous charge. This will be equivalent to the present "misc" command.
2. "credit" to enter a credit. This is presently done by entering a negative charge.
3. "dmisc" to remove erroneous charges.

- Modify the "pmisc" command to allow charges selected by project, date, or both to be printed. Change the output of this command to include the number of the entry printed.
- Accept charges and credits as long as a project is in "projfile", even if it has been deleted.
**SUMMARY:** Install an ALM transfer vector in tools that maps the names of ACL commands and ring bracket commands

- `hp<acl_command>` to `set_acl$hp<acl_command>` and
- `hpset_ring_brackets` to `set_ring_brackets$hpset_ring_brackets`

**REASONS:** These highly privileged commands should be in tools but they can utilize common code in `>sss>set_acl` and `>ss>set_ring_brackets`.

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**Objections/Comments:**

None (Reason) no interface change

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**SUMMARY:** Move `hp` ACL commands to tools

**AUTHOR:** S. Herbst
TITLE: emergency fix to FORTRAN compiler

AUTHOR: D. S. Levin

Category (Check One)
- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools

Category: 355

Document Specified One or More

Comments:

Interface change? [ ] yes [X] no

Compiler will not function without this fix.

Incompatible change? [ ] yes [ ] no

Performance: [ ] Better [X] Same

-Replaces MCR

X - Lang.

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

SUMMARY: Incoming transfer vector for bound cg did not have an entry required by

FORTRAN. This resulted in a linkage fault whenever an I/O statement was

compiled. Additional name added to transfer vector (cg alm).

IMPLICATIONS:

Compiler will not function without this fix.
MULTICS CHANGE REQUEST

TITLE: Remove queued connect facility from I/O Interfacer

AUTHOR: I/O Interfacer
Noel L. Morris

Directed to System MCR 900

- Removed queued connect facility from I/O Interfacer.
- Explained in DETAILED PROPOSAL.
- Planned for System MCR 2.1
- Fixes Bug Number(s): 2.1
- Documented in MMB
- User/Operations-visible
- Interface change? yes no
- Incompatible change? yes no
- Performance: Better Same
- Replaces MCR

Category (Check One)
Lib. Maint. Tools
Sys. Maint. Tools
Sys. Pr. Tools
Sys. Admin.
Sys. Admin./Service
Sys. Admin./Subr.

Document Specify One or More
SAM (Section, Page)
SMP (Section, Page)

SUMMARY:
The facility for queuing connects in the I/O Interfacer is used by only one DIM. This feature creates a large overhead even when it is not used. The one DIM which uses it can be modified to use a DCW list patching scheme.

Implementation:
1. A new card reader DIM, crz, will be installed which uses a DCW list patching scheme instead of the queued connect feature.
2. The I/O Interfacer will be modified to remove the queued connect mechanism.

Implications:
All current users of the I/O Interfacer will experience a performance improvement. In addition, a smaller amount of wired-down memory will be required for the I/O Interfacer's data bases.
The port logic of the Multics processor can only be wired for system controller memory sizes of 32K, 64K, 96K, 128K, 256K, 512K, or 1024K words. Multics presently requires that the memory size specified on each MEM configuration card match the port logic memory size. The hardware requires this match for all but the high order memory port.

**PROPOSAL**

1. Change Multics initialization to allow the MEM configuration card for the high order memory to specify less memory to be used than is wired in the port logic.

2. Change the BOS BOOT command to make a store fault while clearing memory nonfatal.

**REASONS**

It will be possible to run catalog item CS6183, a 6180 central system with one system controller and 192K of memory.

**IMPLICATIONS**

It will be possible to configure a Multics system with a memory size at any multiple of 1024 words.
### Title: NFS as a Front End for Multics

#### Author: R. W. Franklin

- **Written**: 12/6/74
- **Expires**: 6/1/75

#### Category (Check One):
- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools

#### Status:
- **A**

#### Documentation Changes

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#### Objections/Comments:
Investigate documentation of user interface changes.

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**SUMMARY:** To allow NFS to be used as a Multics Front end software package.

**REASONS:** See MTB 052, Section 20

**IMPLICATIONS:** The user interface is slightly changed prior to Multics log on.
- The Operator Interface is slightly changed.
- A PSI channel in the dn355 is required as is the dedication of 1 191 disc drive.
- The ARDS, MDS2400, & TN1200 will not be operable until MR2.1
- There is a limitation of approximately 30 to 50 simultaneous users until we upgrade to the NFS-2H version sometime next year.

This change "piggybacks" on MR2.0. The user will generate his own Multics/NFS MR2.0 tape.

**DETAILED PROPOSAL:**
- 8 segments in the TTYDIM have been changed.
- 2 Include files have been modified and one new include file has been added.
- 2 bind segments have been modified to accommodate new/deleted entry points.
- The user interface to the TTYDIM remains the same.
- The NFS Code has been modified so as not to affect existing NFS functions.

**NOTE:** Multics components changed to interface with NFS must be carefully monitored for changes to these components in future releases.

For System 3.0 the plan is to more properly integrate NFS with the rest of the system so that these components need not be changed. Multics will be able to run with either Front End system or both if the installation has more than one 355.
Multics Change Request

TITLE: Fix brief bug in "progress"

AUTHOR: M. A. Meer

- Coded in: [X] PL/1 [ ] AIM [ ] other-
  explain in DETAILED PROPOSAL
- Planned for System MR 2.0
- Fixes Bug Number(s) 11b00238
- Documented in MTB

Category (Check One)

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Objections/Comments:

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

SUMMARY: Fixes bug which causes the brief option not to be recognized.

IMPLICATIONS: None

DETAILED PROPOSAL: The number of ARGS was reset after being set in the brief code. This caused the option itself to be treated as part of the input string to be executed.
Multics Change Request

TITLE: Fix bug in calculating cpu time

AUTHOR: P. Green

CATEGORY (Check One):
- Lib. Maint. Tools
- Sys. Anal. Tools
- Other

DOCUMENTATION CHANGES:
- Specify One or More

PLanned for System M3

NA

Fixes Bug Number(s) 254(MIT)

Documented in MFB NA

User/Operations-visible

SOS

Interface change? yes [X] no

Salvager

- Incompatible change? yes [X] no

X Ring Zero

- Performance: Better [X] Same

Ring One

- Replaces MCR NA

SysDaemon/Admin.

Runtime

User Cmd/Subr.

Objections/Comments:

INFO SEGS

Other (Name)

None (Reason)

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

SUMMARY: Prevent taking of interrupts during calculation of cpu time used.

REASONS: Users get incorrectly charged.

IMPLICATIONS: none. Fixes bug #254(MIT)

DETAILED PROPOSAL: Reassemble vclock.alm with several calculations of cpu time inhibited.
**TITLE:** Implement `is_mail` active function

**AUTHOR:** S. Herbst

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**Objections/Comments:**
1. Should also work as an Info Segs command.
2. Should return "true" if either old or new mailbox contains mail.

**Use these headings:** SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**SUMMARY:**
Add the entry "is_mail" to the new mail command (see MCR 642).

`is-mail` is an active function that returns true if there is some mail in the user's default ring 1 mailbox and false if there is none.

**REASONS:**
Such an active function can be used when new mail is installed in place of tools commands ("if isnzf") and uninstalled active functions used in exec_com's to see if an old-style mailbox contains mail.
## TITLE: Fix Salvager Bugs

### AUTHOR: A. Kobziar

**-Coded in:** XPL/I [ ] AIM [ ] other-
-explain in DETAILED PROPOSAL

**-Planned for System MR**

**-Fixes Bug Number(s) unreported**

**-Documented in MTR**

**-User/Operations-visible**

**-Interface change? yes [ ] no**

**-Incompatible change? yes [ ] no**

**-Performance: Better [X] Same [ ] Worse**

**-Replaces MCR**

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### Category (Check One)

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**-Expires**

**-Written**

**-Status**

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**Objections/Comments:**

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

### SUMMARY:

1. **salv activator** initializes only a 15 level hierarchy; an attempted salvage of the 16th level will crash the salvager.

2. **salv initializer** does not wait for the operator's console to finish printing messages, which sometimes results in an incomplete "finished salvaging" message.

### DETAILED PROPOSAL:

Pick up the correct value for the hierarchy depth; wait until console finishes printing before returning to BOS.
TITLE: Changed Reloader Design for Access Isolation

AUTHOR: A. Kobziar

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

SUMMARY: 1. Change the handling of upgraded directories to the following:

   The reloader will create an upgraded directory only if the immediate parent already exists. The retriever will not be able to create an upgraded directory; it must already exist on-line if segments at the higher access class are to be retrieved.

2. Add a message to the backup map created by the dumper which contains the access class of a directory if the access class is higher than system low.

IMPLICATIONS: Tape order during a reload is important if missing upgraded directories are involved as there will be no automatic creation of missing parent directories.
TITLE: Modify GCOS Terminology

AUTHOR: R. H. Morrison

PL/I □ ALM □ other

explain in DETAILED PROPOSAL

Planned for System MR

Fixes Bug Number(s)

Documented in MTB

User/Operations-visible Interface change? □ yes □ no

Incompatible change? □ yes □ no

Performance: □ Better □ Same □ Worse

Replaces MCR

Category (Check One)

Document Specifying One or More

Status Expires

Written 11/15/74

Objections/Comments:

SUMMARY: Change the literals in the procedures and INCLUDE files.

REASONS: Console messages now refer to "gcps epa". This is changed to "gcps account id" which has meaning to an outside customer. The user manual already uses "gcps account id".

IMPLICATIONS: A more meaningful term to the customer is used.
**SUMMARY:**

1. `gccscontroltables` extended to recognize all GCOS system options.
   (Bug #gcs0035p)

2. `gccsgoto` extended to implement IF and WHEN control cards.
   (Bug #gcs0035p)

3. Minor unreported bug fixes to `gccsgainpass` and `gccsmmeinos`.

**REASONS:** Fix Bugs

**IMPLICATIONS:** Fewer jobs will require changes to the GCOS job deck.
# Multics Change Request

**MCR 910**

## Summary

**SUMMARY:**
Change an entry in `gcios_daemon_stat` from "rdr21" to "crz".

**REASONS:**
The type code has been changed in the I/O software from "rdr21" to "crz". The daemon must be changed correspondingly.

**IMPLICATIONS:**
The daemon cannot attach a card reader without this change.
TITLE: Rewrite print_syserr_log

AUTHOR: L. Scheffler

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- Coded in: [X] PL/I [ ] AIM [ ] other-
- Planned for System MTR 3.0
- Fixes Bug Number(s)
- Documented in MTR 103
- User/Operations-visible
- Performance: [X] Better [ ] Same [□] Worse
- Replaces MCR 880

Objections/Comments:

---

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

SUMMARY: Rewrite print_syserr_log to

1. add new necessary and/or useful command options;
2. make it know about permanent syserr log segments in the hierarchy;
3. use a gate other than phcs_ring_0.peek to read the current syserr_log;
4. use qedx .*, $, and ^ conventions for string matching.

REASONS:

1. MCh-820 added a mechanism to keep permanent copies of the syserr_log in the hierarchy. print_syserr_log should know about these.
2. With the increased use of the syserr_log for normal operation monitoring data, the command interface needs to be improved and made more flexible.
3. The present print_syserr_log copies the log out of ring 0 before validating the command line. This is backwards.

IMPLICATIONS:

1. print_syserr_log will be more useful as a system analysis tool.
2. The new print_syserr_log will still be compatible with the current syserr_log mechanism.
3. The new command interface will not be compatible with the current one. This may require some system administrators to change their abbrev's and exec_com's.
DETAILED PROPOSAL:

1. The command options will be as follows:

   The next two command options take a single argument, which may be either an unsigned decimal integer (no decimal point), representing a syserr_log sequence number, or a date/time string acceptable to convert_date_to_binary.

   -from, -fm X
     If X is a sequence number, print syserr messages starting with the most recent message with sequence number X. If X is a time, print syserr messages from time X (inclusive). (-from may not appear with -last.)

   -to X
     If X is a sequence number, print syserr messages up to and including the most recent message with sequence number X. If X is a time, print syserr messages up to and including time X. (-to requires -from because syserr logs may be kept permanently.)

   -time, -tm X
     Interpret X as a date/time string argument to -from or -to. (This is for compatibility with possible future changes to convert_date_to_binary to accept integer strings such as 741205 as valid dates.)

   -last, -lt N
     print last N syserr messages (may not appear with -from or -after options)

   -no_header, -nhe
     suppress printing of a header

   -class, -cl C1 C2 C3 ...
     print messages in log sorting classes C1, C2, C3, ...
     (0 ≤ Ci ≤ 24)

   -match X1 X2 X3 ...
     print syserr messages containing any of the strings X1. (i ≤ 15) X1 may be any qedx string-matching address string.

   -exclude, -ex X1 X2 X3 ...
     do not print messages containing any of the strings X1. (i ≤ 15) X1 may be any qedx string-matching address string.

   -string, -st X
     treat X as a non-option string argument to -match or -exclude

   The qedx subroutine get_addr_ will be used to do the string matching if a string contains a ., *, $, or ^.

2. print_syserr_log will examine, in addition to the current log, all the permanent syserr log segments kept by copy_syserr_log in system_control_dir/syserr_log_dir.
3. Define a new gate, "audit_gate_{\text{s}}", with ring brackets (0,0,5), and site-defined ACL. This gate will be a repository for programs that monitor system operation, access to which needs to be restricted to site-designated trusted users. Add the entry "audit_gate_{\text{s}}syserr_logger_copy" to call syserr_logger_copy. Change print_syserr_log to use this entry instead of phcs_{\text{s}}ring_{\text{s}}_peek. Remove the entry phcs_{\text{s}}syserr_logger_copy from phcs_{\text{s}}.
**SUMMARY:** Install scheduler allowing longer quanta.

**REASONS:**
The installed scheduler was designed to award longer eligibility quanta to processes that are more demanding of system resources. The feature has been disabled in practice by setting the maximum quantum (last) to 1.0 sec. This is necessary because of the reduction in multiprogramming depth occurring with large amounts of main or bulk memory.

**IMPLICATIONS:** If the new features are not turned on, the default is identical to the installed scheduler.

**DETAILED PROPOSAL:**
The addition of the following parameters and functions to the scheduler to allow the awarding of longer eligibility quanta, while still maintaining good response.

1. No long quantum would be awarded if the sum of the remaining eligibility times would be greater than a new parameter tmax. This has the effect of limiting the commitment of eligibility to a maximum (virtual) time in the future.

2. In order to insure there will always be some core available to run interactive processes, a certain fraction of core defined by the new parameter ocore, is set aside for the use of interactive processes which have not been made eligible within the time tforce (another new parameter) since receiving a wakeup.

3. In addition the management of the eligible queue may be changed by the parameter steh. There are three options, the first is used by the installed scheduler:
   a. Add newly eligible processes to the tail of the eligible queue.
   b. Add noninteracting processes to the tail and add interacting processes to the head, but after other interacting processes.
   c. Add all processes to the head, but after interacting processes.

4. Add a parameter auto ws, which if turned on will normalize the working set estimate returned by page control for a process which has just completed a long quantum to a value closer to that which would have been obtained if the process had just completed a 1.0 sec quantum. This has the effect of providing a more reliable working set estimate in a variable quantum environment, as well as simplifying the tuning of the system with or without the proposed new features turned on.
**Title:** Fix bug in printer code conversion  
**Author:** Noel I. Morris

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- Planned for System M.P. 1
- Fixes Bug Number(s) 355
- Documented in MIB
- User/Operations-visible yes
- Performance: Better
- Replaces MCR

**Objections/Comments:**

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**Summary:**

The printer code conversion module fails to test for page overflow when processing the vertical tab character. In addition, the code produces skips to line 10, 20, ...... when it should produce skips to line 11, 21, ......

**Proposal:**

Correct the code.

**Implications:**

Vertical tabs will now be printed correctly in all (hopefully) circumstances.
### SUMMARY

Add a new entry point to `set_lock` (called `set_lock-test`) which determines if a lock is validly locked without actually locking it.

### Reasons

This feature is needed by the IO Daemon and will be generally useful for other locking applications.

### Detailed Proposal

The new entry point will copy the lock word into local storage and then attempt to lock the copy. The error code will indicate whether or not the lock was validly locked.
**Multics Change Request**

**AUTHOR:** Jerry A. Stern

**SUMMARY:** A number of changes must be made to the IO Daemon in order for it to operate in a multiple access class system.

**Reasons:** Once the Access Isolation Mechanism controls have been installed in the storage system, IPC, and the message segment facility, new restrictions will be imposed. Therefore, changes must be made to insure that these new restrictions do not prevent IO Daemon operation in a multiple access class system.

**Detailed Proposal:**

1. Driver processes, which could have different authorizations currently test for the existence of a Coordinator process by attempting to set a lock. This means writing in a common segment. To avoid this problem, a new "test" entry will be added to set_lock. (See accompanying MCR).

2. Each driver status segment must have an access class equal to the driver authorization. Therefore, instead of placing these segments in a single directory, they will each be placed in an upgraded subdirectory.

3. The Coordinator data segments holding requests read from message segments and associated request descriptors will be kept in a system-high subdirectory to adequately protect this information. Hence, it will be necessary for the Coordinator to copy each request into the appropriate driver status segment. (The request descriptor is already copied.)
TITLE: Handling of non-SysDaemon IO Drivers

THOR: Jerry A. Stern

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

SUMMARY: Modify the IO Coordinator to handle non-SysDaemon drivers in a more flexible yet more secure manner.

REASONS: The current organization of IO Daemon assumes that all driver processes use the "IO" person ID. This implies that projects having their own private drivers cannot be given control of these drivers. Because the IO password cannot be disclosed, non-SysDaemon drivers must still be logged in by operations. This situation discourages the easy use of remote non-SysDaemon drivers. Despite this severe restriction, however, the IO Coordinator is still not secure against subversion by arbitrary user processes due to the fact that it cannot now securely determine the identity of a new driver process.

Detailed Proposal: 1) Change the "project" keyword in the IO Daemon parms file to "driver_userid" to allow specification of both person and project IDs. The person ID can be "#". If driver_userid is not specified for a device class, the default will be IO.SysDaemon.

2) Require new drivers to add a message to a message segment reserved especially for this purpose. The process group ID and authorization of each process requesting to be a driver can then be determined securely and compared to the driver_userid for the indicated device class.

3) Remove per-driver information on which the Coordinator depends from driver modifiable segments. Keep this information in the device table entry for the device associated with a given driver. This prevents a legitimate driver from harming the Coordinator or other drivers.
4) For wakeups sent to the Coordinator after the initial new driver wakeup, require that the event message contain the device table index of the device assigned to the driver. A quick comparison of the process ID obtained from the wakeup to a stored process ID in the device table can then validate the sender of the wakeup.
**Multics Change Request**

**TITLE:** Page Labels for Printed Output

**AUTHOR:** Jerry A. Stern

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**Status**

- **Written:** 12/06/74
- **Status:** A
- **Expires:** 01/07/75

**DOCUMENTATION CHANGES**

- **FMF (Vol., Sect.)**
- **PLMS (AN #)** AN 58
- **MOSN (Sect.)**
- **MPAM (Sect.)**

**Interface change?** Yes

**Performance:** Same

**Replaces MCR**

**Objections/Comments:** Permit different labels at top and bottom of page

---

**SUMMARY:** Modify the IO Daemon to place header and footer page labels on each page of printed output as requested by the user. (See the accompanying MCR "New Control Arguments for the dprint Command.")

**Reasons:** This feature is required by Air Force Data Services Center and is generally useful at all sites.

**Detailed Proposal:**

1) Modify the printer DIM to accept a new order call which allows specification of a page label. Once page labels have been specified, they will be placed in the top and bottom margins of each page of output subsequently printed. Such labeling will not be performed when no endpage mode is enabled. Page labeling will be cancelled by an order call specifying a null label.

2) Modify the IO Daemon driver program to check each dprint request for the page label option and to make the above order call where necessary.
**SUMMARY:** Modify the IO Daemon to place an access class banner on the head sheet and tail sheet of each printout.

**Reasons:** This feature is required by Air Force Data Services Center and will be generally useful at the sites that use the Access Isolation Mechanism.

**Detailed Proposal:**

1. The access class of a printout will normally be equal to the authorization of the process that requested the printout. If this access class is represented by a null string, then the access class banner will be omitted.

2. Add a new keyword to the IO Daemon parms file called "min-banner" which specifies the minimum access class banner for a given device class. If the printout access class as computed above is less than min-banner, the min-banner will be used instead. If min-banner is not specified, the default is the "min-access-class" for the device class.

3. Modify the head sheet and tail sheet programs to add the access class banner. The first component of the access class (i.e., the level or first category) will be printed in big letters. The full access class will be printed in regular type.
TITLE: Access Class Ranges for IO Daemon Device

AUTHOR: J.A. Stern

- Coded in: PL/I
- Planned for System 3.0
- Fixes Bug Number(s) 129
- Documented in MTB 355
- User/Operations-visible
- Interface change? Yes
- Incompatible change? No
- Performance: Better

Category (Check One)
- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools
- MPM (Vol, Sect.)
- PLMS (AN #) ANSY
- MOSN (Sect.)
- MPAM (Sect.)
- M3AM (Sect.)

Objections/Comments:
- Info Segs
- Other (Name)
- None (Reason)

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

SUMMARY: Modify the IO Coordinator to associate a range of access classes with each device class and to distribute requests to drivers in accordance with these ranges.

Reasons: This feature is required by Air Force Data Services Center and will be generally useful at other sites that use the Access Isolation Mechanism.

Detailed Proposal: 1) Add two new keywords to the IO Daemon parms file called "min access_class" and "max access_class". These keywords specify the access range for a device class. If min access_class is not specified, the default is system low. If max access_class is not specified, the default is min access_class.

2) Add another new keyword called "queue_group" that specifies the name of the group of queues that correspond to a given device class. This allows more than one device class to be associated with a single queue group and thereby makes it possible to partition requests from a given queue group into multiple access class ranges. If queue_group is not specified, the default queue group name is taken to be the device class name (as it is today).

3) Modify the IO Coordinator to examine the access class of each request message read from a message segment and to assign this request to the device class having the appropriate access class range.
SUMMARY:
Currently, the list of relative syntax functions used in a set of reductions is stored as an entry variable array, TOKEN_FCN. Convert this array to a static label array transfer vector which invokes the proper relative syntax function.

REASONS:
The only thing which prevents relative syntax functions from being PL/I quick internal procedures is the fact that they are assigned to the entry variable array when the array is initialized. By eliminating the need for the array, we therefore make the syntax functions quick blocks.

An additional benefit of eliminating the entry variable array is that we need not generate a dummy relative syntax function to initialize the array when no syntax functions are used in the reductions. This eliminates the clunky dummy relative syntax function which was created mainly to eliminate a PL/I compiler warning message about referencing the un-initialized entry variable array.

IMPLICATIONS:
Relative syntax functions will be more efficient to use in rdc-compiled translators.
TITLE: Fix bug in check.mst

AUTHOR: R F Mabee

SUMMARY:
The utility get_defltth_ doesn't work for all cases. get_collection_ is modified to use information in the object map instead of calling get_defltth_. get_defltth_ is deleted as no other module calls it.

REASONS:
get_defltth_ attempts to determine the length of a definitions section by following all threads in it. It miscalculates the length if the last item is a definition or name, causing subsequent searches to fail. This results in many spurious "not found" messages in the checker output. The information get_defltth_ works so hard to get is readily available from decode_object_.

IMPLICATIONS:
The checker should run somewhat faster, and produce correct output.
MULTICS CHANGE REQUEST  

**TITLE:** Change trace control arguments

**AUTHOR:** S. E. Barr

**STICKY NOTES:**

- Status
- User/Operations-visible
- Performance?
- Replaces MCR

**REASONS:**

- Planned for System MR 3
- Fixed Bug Number(s)
- Documented in MTB 12

**IMPACT:**

- Category: Lib. Maint. Tools
- Category: Sys. Anal. Tools
- Category: Sys. Prog. Tools

**DOCUMENTATION CHANGES:**

- Specify One or More

**SUMMARY:**

Change some of the trace control argument names as given in MTB 12 to new names and change the control argument format to be consistent with probe.

**PROPOSAL:**

The current implementation:

1. control argument format

   -control_arg- optional_arg

   If the optional_arg is present, it is assumed to be an entry and the control_arg applies to that entry. If no optional_arg is present, the control_arg applies to all entries in the trace table.

2. control arguments

   -status
   -list the template
   -st
   -list the parameters for a given procedure being traced (or for all procedures in the trace table)
   -information
   -print
   -list all the procedures in the trace table
   -pr

The proposed implementation:

1. control argument format:

   -control_arg- arg

   If the arg is "*" the control_arg applies to all procedures in the trace table. Otherwise, arg is assumed to be a procedure name and the -control_arg- applies only to it.
2. control arguments

-template list the template
-tp
-status * list the procedures in the trace table
-st *
-status entry_name list the tracing parameters of entry_name.
**TITLE:** Modify cancel_abs_request error message.

**AUTHOR:** Steve Herbst

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**Objections/Comments:**
Also true for cdr.

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**SUMMARY:** Change cancel_abs_request's error message:

```text
cancel_abs_request: No request found.
```

to include the name of the absin segment and the queue searched (unless "-all" is used).
Title: Fix bug in syserr_logger

Author: B. Silver

Summary: Fix bug in syserr_logger that causes paged syserr_log to get into an inconsistent state. The bug involves syserr_logger referencing data in syserr_log before it locks it.
**SUMMARY:**

The `io_call` command `print_iocb` function does not work, due to a bug in the code. The bug should be fixed.

**REASONS:**

It would be nice to have the `print_iocb` function working.

**IMPLICATIONS:** None

**DETAILED PROPOSAL:** Fix the bug.
**TITLE:** file_dim performance improvement

**AUTHOR:** M. Grady

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**Objections/Comments:** Emergency fix for 2.0

Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**SUMMARY:** The file_dim, which is used by many system programs (esp. gcos), uses a cs1 instruction to copy data from buffer to segment. In the two most common uses of file_, the 9 and 36 bit element sizes, it would be much more efficient to use an mlr instruction.

**REASONS:** Performance improvement. Also the sys/m hardware sometimes fails on certain types of cs1 instructions.

**IMPLICATIONS:** Could be construed as programming around a hardware bug.

**DETAILED PROPOSAL:** Recode the file_dim to special case the 9 + 36 bit element sizes.
TITLE: Fixes for handling cpu time

AUTHOR: Paul A. Green

- Coded in: FL/I [ ] ALM [ ] other -
  - explain in DETAILED PROPOSAL
- Planned for System MR NA
- Fixes Bug Number(s): 301
- Documented in MTE NA
- User/Operations-visible
  - Interface change? [ ] yes [x] no
  - Incompatible change? [ ] yes [x] no
  - Performance: [ ] Better [x] Same
  - Replaces MCR

Category (Check One):
- Lib. Maint. Tools
- Sys. Anal. Tools
- Sys. Prog. Tools
- Document

- Specify One or More

expires 12/13/74

Objections/Comments:

Use these headings: SUMMARY, REASONS, IMPlications, DETAILED PROPOSAL (Optional)

SUMMARY: Fix bug #301 - erroneous discrepancy messages on initializer terminal. Fix unreported bug in computation of gate meters.

REASONS: Bug Fixes

Implications: None

Detailed Proposal: Change init_processor.alm to initialize pds$cpu_time and prds$last_recorded_time for idle process. Change gate_macros.incl.mexp to turn on inhibit bit while calculating cpu times. Change tc_data and tc_init to eliminate earlier attempt to fix bug #301 and eliminate movdef pseudo-op, respectively. (movdef requires old object segment format).
MULTICS CHANGE REQUEST

TITLE: error_table_ codes for tape_ansi_ I/O Module

AUTHOR: Ross E. Klinger

Planned for System: MR SR2.1
Fixes Bug Number(s): not applicable
Documented in HTB: HTB-127 tape_ansi_
Incompatible Change: no
User/Operations-visible Interface Change: no
Coded into: ( )PL/I ( )ALM ( )other-see below
Performance: ( )better ( )same ( )worse

DOCUMENTATION CHANGES (specify one or more)
MPM (vol, sect) MPAM (sect)
MOSN (sect) MSAM (sect)
PLMs (AN#) 
Info Segs 
Other

None (reason) no documentation necessary

OBJECTIONS/COMMENTS:

Headings are: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (optional)

SUMMARY: 1) Add 4 new codes to error_table_.
2) Remove 1 code from error_table_.
3) Change 1 error_table_ code message.

REASON: 1) The tape_ansi_ I/O Module reports errors which are not defined by existing codes.
2) The code not_ascii_subset, which was added to the error_table_ specifically for the I/O Module, is no longer required.
3) The existing codes bad_valid and bad_tapeid are currently multiple names for the same message, "Invalid volume identifier." As 3 identifying constructs are now used with tapes (volume name, slot id, and volume identifier), the message for bad_tapeid should refer to the volume name.

IMPLICATIONS: 1) The I/O Module will be able to report all errors.
2) None - not_ascii_subset is, and will not be, used.
3) Distinction can be made between invalid volume name and invalid volume identifier. Neither code is presently used.
DETAILED PROPOSAL:

1) Add the following 4 codes to the error_table:

- discrepant_block_count: dsbkct, Read and recorded block counts do not agree.
- valid_expiration: invexp, File expiration date exceeds that of file set.
- unexpired_volume: unexpvl, Cannot continue processing an unexpired volume.
- uninitialized_volume: uninitvl, Cannot continue processing an uninitialized volume.

2) Remove the code not_ascii_subset from the error_table.

3) Make the existing code bad_tapeid a unique entry:

bad_tapeid: badtpid, Invalid volume name.
**Multics Change Request**

**TITLE:** Implement new Peripheral status reporting mechanism  
**AUTHOR:** Noel I. Morris

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**Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)**

**SUMMARY:**
Implement table-driven status reporting mechanism as described in MTB-145. Initially, implement the mechanism for printer, card reader, and card punch. At a later time, the mechanism can be extended for tape status reporting.

**Implications:**
The amount of code in the system for specialized device status reporting will decrease.
### Multics Change Request

**TITLE:** Additions to the PIT

**AUTHOR:** F. C. Smith

- **Coded in:** PL/I
- **Planned for System MR:** NA
- **Fixes Bug Number(s):** 355
- **User/Operations-visible Interface change?** Yes
- **Performance:** Better
- **Replaces MCR**

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<th>Category (Check One)</th>
<th>DOCUMENTATION CHANGES</th>
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<tr>
<td>Lib. Maint. Tools</td>
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<th>Objections/Comments:</th>
<th>Info Segs</th>
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<tbody>
<tr>
<td>Don't install until another MCR on user_info is approved and new user_info is ready to install.</td>
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**STATUS**

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**SUMMARY:**

Create entries in the PIT for the memory units and terminal I/O operations used by previous processes in the current session. Modify cpg to copy the memory units for previous processes from answer_table to the PIT at process initialization.

**Reasons:**

Procedures which supply users with information about usage by past processes in the current session or about usage totals for a session can currently obtain only the figure for CPU usage. They also need access to the total memory units, and when Multics starts to charge for terminal I/O, they will need the figures for terminal I/O operations.

**Implications:**

Users will be able to obtain accurate usage figures for a session. Procedures which do not reference this information will not be affected.
**Title:** "if" command  
**Author:** C. C. Zethraeus  

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- **Expires:** 6/24/75  
- **Data:** 12-10-74  
- **Written:** 12/18/74  
- **Status:** A 12/24/74  
- **Expires:** 6/24/75

**Document Changes**
- Document  
- Specify One or More

**MPM (Vol, Sect.)** Vol. 3, Sect. 9  
**PLMS (AN #)** AN 51  
**MOEM (Vol, Sect.)**  
**MOAM (Sec.)**

**Objections/Comments:** We are hesitant to unleash this on the general user community at this time.

**Use these headings:** SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**SUMMARY:** Add an "if" command to the supported Multics command repertory, which is analogous to the exec_com "&if" control line.

**REASONS:** This command rounds out the facility provided by the "do" command.

**IMPLICATIONS:** In order to provide compatibility with the current, SPS-documented "if" command, the proposed "if" is implemented as an extension to the current "if". However, the proposed MPM write-up (attached) describes only the usage of "if" with logical active functions, for simplicity and consistency with exec_com.

**DETAILED PROPOSAL:** See attached MPM write-up. The modified version of "if" is available for use in >udd>m>ccz>re>if on System M in Phoenix; the source is in >udd>m>ccz>pl1_source.archive as the if.pl1 component. A help-file is in >udd>m>ccz>re>if.info. The MPM write-up is in >udd>m>ccz>re>if.runoff.
Name: if

This command provides conditional execution of one of two command lines. It may also be called as an active function.

Usage

if truth-value -then cl -else c2

1) truth-value is either "true" or "false".
2) -then the literal character string.
3) cl command line executed if truth-value is "true".
4) -else the literal character string.
5) c2 command line executed if truth-value is "false".

The "-then cl" portion and the truth-value must be supplied; all the other parts may be omitted. If truth-value is "true", then cl is passed to the command processor. If truth-value is "false", then c2 is passed to the command processor. If the "-else c2" portion is omitted, and truth-value is "false", no action will be taken. If the "-else c2" portion is supplied, it must come after the "-then cl" portion. Command lines to be executed will be passed to the user's current command processor procedure via a call to cu_sco. If either the cl or the c2 argument is omitted, no action will result.

Usage as an Active Function

(if truth-value -then cl -else c2)

Either cl or c2 is selected as described above, and is returned as the value of the active function. If the selected string was not provided, a null string is returned. It is not required that cl and c2 be command lines.
Example

If the user has an abbrev, CWD, for:

do "if [exists directory &1] -then ""cwd &1"
    -else ""ioa_No\directory\x&1."""

then the following command line checks for errors before calling the change_wdir command:

CWD fred

Note that the arguments to the command processor contain blanks and so are in quotes.
**SUMMARY:** Recode 1 patch to use `installation_tools_$add_acl_entries` instead of `installation_tools_$add_acl`.

**REASON:**

`installation_tools_$add_acl` is obsolete.
<table>
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<tr>
<th>TITLE:</th>
<th>Fix bug in ring_l_patch_</th>
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<tr>
<td>AUTHOR:</td>
<td>Larry Johnson</td>
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Use these headings: SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**SUMMARY:**

ring_l_patch_ must change the ring number of the pointer to the area being patched to 1.
Fix status reporting bug in I/O Interfacer

AUTHOR: Noel I. Morris

SUMMARY:
If a channel termination due to an error occurs when a DCW list is first connected, the DCW list offset reported to the user of the I/O Interfacer is incorrect. This condition is a special case since the first instruction DCW must be copied into a protected place in the hardcore ring.

Proposal:
Modify the I/O Interfacer to recognize this special case and correctly report the DCW list offset.
**TITLE:** Fix I/O Interfacer Bug in computing DCW list connect index

**AUTHOR:** Noel I. Morris

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**Use these headings:** SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**SUMMARY:**

Since connects in the I/O Interfacer are not done directly to the user's DCW list, a "special" list index must be computed for connecting to a user's DCW list. The connect is actually done to an IDCW which performs a reset status and continue operation. This IDCW is followed by a TDCW which transfers to the correct place in the user's DCW list and sets the relative addressing mode in the IOM channel. If the I/O Interfacer user's workspace buffer becomes wired down at a location that is greater than the location of the special IDCW/TDCW pair, a negative connect list index will be computed. This number should really be taken mod 256K to provide a proper addressing offset.

**Implementation:**

Correct the code to take the list index mod 256K.

**Implication:**

Certain unexplained "funnies" (e.g. the inability to mount tapes at certain times) may disappear.
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<tr>
<th>TITLE:</th>
<th>Fix bug preventing deletion of bootloader CPU.</th>
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<tbody>
<tr>
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<td>STATUS</td>
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<td>REASONS:</td>
<td>It doesn't work.</td>
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**Multics Change Request**

**TITLE:** Zero unwanted interrupts in system controllers  
**AUTHOR:** Bernard S. Greenberg

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**AUTHOR:** Bernard S. Greenberg  
**Written:** 12/20/74  
**Status/Expires:** 12/24/74/75

**STATUS DATE**

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**Objections/Comments:**

Use these headings: **SUMMARY, REASONS, IMPLICATIONS, DETAILED PROPOSAL (Optional)**

**SUMMARY:** Zero all interrupt cells in non-bootload memory controllers at system initialization time.

**REASONS:** Reliability. A frequent cause of reconfiguration failure is the existence of pending interrupts from previous bootloads in non-bootload system controllers. These interrupts causes random action by a CPU being added at the time EIMA switches are thrown.

**IMPLICATIONS:** Increased success rate of CPU reconfiguration.

**DETAILED PROPOSAL:** Change start_cpu to issue SSCR instructions directed at all non-bootload controllers, zeroing their interrupt cells, at the time it now sets the masks in these controllers. Furthermore, have it check the EIMA switch setting on these controllers so that a syserr message stating the wrong EIMA switch will result instead of 'ATTEMPT TO TERMINATE INITIALIZER PROCESS' when an attempt to set these masks fails because of a wrongly set switch.