DATE: December 3, 1973
TO: Distribution
FROM: M. S. Hodges
SUBJECT: Multics Change Requests

Attached are copies of Multics Change Requests which were approved from November 16 through November 30, 1973.
MULTICS CHANGE REQUEST

TITLE: Change to operator console software and syserr.

AUTHOR: W. Silver

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

CLASSIFICATION

<table>
<thead>
<tr>
<th>Incompatible Change</th>
<th>JUSTIFICATION</th>
<th>Replaced by proposal MCR</th>
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<tbody>
<tr>
<td>X Extension</td>
<td>Conformance to Standard</td>
<td>Implemented in System</td>
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<tr>
<td>X Restriction</td>
<td>Increased Consistency</td>
<td>Objectives/Comments:</td>
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<tr>
<td>X Performance Improvement</td>
<td>Simplification</td>
<td>MSB-108 should be updated and reissued as a MTB.</td>
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<tr>
<td>X Reliability Improvement</td>
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<td>X Bug Fix</td>
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Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

REASONS:
1. Provide a logging mechanism for syserr messages.
2. Provide buffering for operator console messages.
3. Provide a better user interface to the operator console.

IMPLICATIONS:

Operations staff must be trained to use the new operator console interface.
### Hardcore Updater Modifications

**Title:** Hardcore Updater Modifications

**Author:** David M. Jordan

**Source:** (if external) e.g., "User", "Marketing"

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<thead>
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<tr>
<td>Compatibility</td>
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*Replaced by proposal LCR*

**Reasons:**
1. CACL's are being removed; 2. The MSL maintenance routines are becoming non-operable.

**Summary:** Modify the hardcore updater to 1) conform to new access control standards, 2) remove and partially replace the MSL, 3) convert to Version 2 PL/I, 4) generally cleanup.

**Implications:**
1) All hardcore (and salvager) library segments will have ACL's of r **.*,.*,.*, 2) some information previously kept in the MSL will be lost, but most will be obtainable through the Multics Installation System reporting procedures, 3) MSL maintenance procedures (bound_msl_ and bound_lsm_) may be deletable if no one else is using them.

**Notes:** A new procedure to maintain and retrieve information in a system id/update time correspondence database will be written to replace most of the useful information contained in the MSL. The online system MIS reporting routines will be modified to make use of this information.
TITLE: Fix bug in print stale ptp when run on development

AUTHOR: S. Webber

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

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
-----------------|---------------|---------------------------
Incompatible Change | Marketing Requirement | Implemented in System
Extension | Conformance to Standard | Objections/Comments:
Restriction | Increased Consistency |
Performance Improvement | Simplification |
Reliability Improvement | Generalization |
| X | Bug Fix (Unreported) |

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

REASONS: The tool print stale ptp has a constant wired into it which causes the command to fail if run on development.

SUMMARY: Change the constant to a variable which can be set from a value in the sst header.

IMPLICATIONS: None.
MULTICS CHANGE REQUEST

TITLE: Fix bug in dump_segment_command

AUTHOR: T. Casey

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

CLASSIFICATION

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| Unreported Fix |

REASONS: Fix bug in implementation of short argument.

SUMMARY: Original implementation failed to print full address when it passed through a value ending in 100 octal, if the line having that address was within a block of identical lines, printed as "===="

IMPLICATIONS: None.
**MULTICS CHANGE REQUEST**

**TITLE:** Emergency installation of gcos simulator

**AUTHOR:** T. Casey

**SOURCE:** (if external) e.g., "User", "Marketing"

**CLASSIFICATION** | **JUSTIFICATION** | **REASONS/COMMENTS**
--- | --- | ---
Incompatible Change | Marketing Requirement | Implemented in System
Extension | Conformance to Standard | Objections/Comments:
Restriction | Increased Consistency |  
Performance Improvement | Simplification |  
Reliability Improvement | Generalization |  
X Improvement | Unreported |
X | Bug Fix |

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

**REASONS:** gcos simulator stopped working when 21.2 was installed because timer_manager was recompiled for that system. The code generated by the current compiler is more sensitive to bad input argument values than the old one was.

**SUMMARY:** The cpu time passed to timer_manager $cpu call was essentially garbage. The old timer manager set a timer for verify far in the future, which caused no real problem. The bug was found and fixed by reading code, some weeks ago, but not installed then because it was causing no problem. Subsequently, the source and object archives were modified, while the experimental bound segment was not. When the latest system caused it to stop working (timer runouts occurred before the return from timer_manager $cpu_call) the bound segment was installed but source and archives were not.

**IMPLICATIONS:** Library source is no longer current. Planned installation in about two weeks will fix that problem.
TITLE: msa_manager_ bug fix

AUTHOR: G. C. Dixon

SOURCE: local

STATUS: Written

DATE: 11/03/74

CLASSIFICATION: Incompatible

JUSTIFICATION: Marketing

REASONS:
When msa_manager_ attempts to load a non-initialized pointer value using an epp5 pr61140,* instruction, an illegal procedure fault can occur if the contents of pr61140 contains an illegal modifier.

SUMMARY:
Assign a null pointer value to the above location.

IMPLICATIONS:
Random illegal procedure faults will no longer be caused by msa_manager_.

Page 1 of 1
### MULTICS CHANGE REQUEST

**Title:** Fix out-of-message coordinator.

**Author:** T. H. Van Vleck

**Source:** If external, e.g., "User", "Marketing"

**Classification:** Incompatible Change Extension Restriction Improvement Improvement Bug Fix

**Justification:** Marketing Conformance to Standard Consistency Performance Simplification Generalization

**Objections/Comments:**

**Reasons:**

When a wakeup signal is lost, the message coordinator may end up with a stack of un-routed messages in mc_message. Currently, one wakeup is required to cause each message to be routed. Thus, subsequent system execution appears normal, except that the initializer console remains a constant number of messages "behind". Wakeups may be lost for a variety of reasons, such as ITT overflow.

**Summary:**

Modify message_coordiner_trouter to route up to 30 waiting messages to their virtual consoles on any wakeup. Extraneous wakeups are already ignored.

This will cause the coordinator to set back in sync after only a few successful wakeups.

**Implications:**

Eliminate a problem which has caused operational difficulties.
**MULTICS CHANGE REQUEST**

**TITLE:** Fix out in ed_installation_parms.

**AUTHOR:** VanVleck

**SOURCE:** (if external: e.g., "User", "Marketing")

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**CLASSIFICATION | JUSTIFICATION | STATUS | DATE**

| Incompatible | Marketing | Written | 11/21/73 |
| Change | Requirement | Approved | 11/20/73 |
| Extension | to Standard | Rejected | |
| Restriction | Consistency | Postponed | |
| Improvement | Performance | Waiting | |
| Improvement | Reliability | |
| Improvement | Generalization | |
| Unreported | Bug Fix | |

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**Use these headings: REASONS, SUMMARY, IMPLICATIONS, and optionally DETAILED PROPOSAL**

**REASONS:**

There is a bug in ed_installation_parms such that garbage is printed instead of a category name, due to an incorrect call to ioa_.

**SUMMARY:**

This is a one-line change to the call to ioa_.

**IMPLICATIONS:**

Fix out.
MULTICS CHANGE REQUEST

TITLE: Prevent Initializer from looping if a process cannot be destroyed.

AUTHOR: T. H. Van Vleck

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

CLASSIFICATION: Incompatible with Marketing

CHANGE REQUIREMENT: Conformance

EXTENSION: to Standard

RESTRICTION: Consistency

IMPROVEMENT: Performance

IMPROVEMENT: Reliability

IMPROVEMENT: Generalization

Bug Fix #163

SUMMARY:
The change described in MCR-0233 added the ability for the Initializer to block in ring 0 waiting for the process to die. This change adds a new "wait state" to the Initializer for each process, which is entered when the process destruction is requested. When the "stopstop" wakeup is sent by traffic control, the Initializer will complete the process destruction, and create a new process or type a logout message as necessary.

Fairly substantial modifications were necessary to dialog_, common_user_manager_ and absentee_user_manager_.

In the process of making this change it was convenient to split the parsing of the login line into a separate program from the rest of dialog_. This will come in handy if and when we allow user requests for new_proc to be placed in a message segment and to specify arguments like those at login.

IMPLICATIONS:

Eliminate occasional crashes.
MULTICS CHANGE REQUEST

TITLE: Remove installation-dependent ACL's from system tape.

AUTHOR: VanVleck

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

CLASSIFICATION: Incompatible Marketing

JUSTIFICATION: Replaced by proposal MCR

REASONS:

Supervisor gate segments are given their access control lists when the system is loaded from the system tape. Currently, the system tape contains many project names and user names in access control lists which represent local MIT policies concerning who may access specified gates. Most installations will not have, for example, a project named "POO"; or if they do, their POO project probably should not have access to phcs_.

SUMMARY:

A new facility has been added to the supervisor recently which allows the Initializer to set the ACL of a ring-zero segment. This facility will be used in the system_start_up.ec to set the correct gate ACL's. The system tape header will be modified to give access only to *.SysDaemon.* for those gates which are not available to all users. (Remember, the Initializer's access name will be changed to "Initializer.SysDaemon.z" as described in MCR 041.)

IMPLICATIONS:

The privileged call to set gate ACL's is already being used in system_start_up.ec, so that the facility is known to work. The system_start_up.ec has always been a sensitive segment; this modification does not change the situation. It will no longer be necessary to generate a new system in order to give some user access to privileged gates or to clean up when a privileged user has finished his project. By making the maintenance of these privileged gates easier, installations will be encouraged to keep their system secure.
MULTICS CHANGE REQUEST

TITLE: Fix IO Daemon handling of multi-segment files.

AUTHOR: VanVleck

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

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

Objections/Comments:

Use these headings: REASONS, SUMMARY, IMPLICATIONS, and optionally DETAILED PROPOSAL

REASONS:

When the IO Daemon prints a multi-segment file, it often happens that a line in the file is split across two segments. The printer DCM, when called to write the first part of such a line, has no way of telling that the next call will be a continuation of the line, so it appends a new-line character. This action means that an extraneous new-line character breaks every line which is split across segment boundaries, destroying the lineup of columns.

SUMMARY:

There is no reasonable way to explain to the printer DIM or DCM what action is desired here, since neither module has any concept of multi-segment file. Modifying the "file" DIM and the PL/I stream I/O mechanisms to prevent the splitting of a line across a segment boundary would not catch all cases of multi-segment file generation (e.g., PL/I listing files). The best place to fix this peculiar problem seems to be in the IO daemon program, which does know that it is processing a multi-segment file and can check for this case.

The modification involves providing a buffer, which will be filled with the two parts of the split line, and will be written
Fix IO Daemon handling of multi-segment files.

out by a special call in the IO daemon program.

Some reasonable maximum size for the buffer must be chosen -- say 512 characters. If the line which is split is longer than this, then the daemon will act as it does today.

IMPLICATIONS:

Better-looking output will be produced. A little bit of extra code will be executed for each multi-segment file break.
MULTICS CHANGE REQUEST

| TITLE: | Fix bug in ARDS charging. |
| STATUS | DATE |
| Written | 11/02/73 |
| Approved | 11/30/73 |
| Postponed | |
| Expired | 5/30/74 |

| AUTHOR: | VanVleck |
| SOURCE: | (if external: e.g., "User", "Marketing") |

| CLASSIFICATION | JUSTIFICATION |
| Incompatible | Marketing |
| Change | Requirement |
| Extension | Conformance |
| Restriction | Consistency |
| Performance | |
| Improvement | Simplification |
| Reliability | |
| Improvement | Generalization |
| Objections/Comments: | |
| Bug Fix | |

Use these headings: REASONS, SUMMARY, IMPLICATIONS, and optionally DETAILED PROPOSAL

REASONS:

Use of 1200-baud lines is currently charged incorrectly. A missing line of code in "device_acct_" causes attached devices to be charged connect time from the beginning of the session instead of from the last update, so that the charges go 1, 2, 3, 4, 5, ... instead of 1, 1, 1, 1, ... |

SUMMARY:

This is a one line fix to device_acct_.

IMPLICATIONS:

Charges will be correct.
MULTICS CHANGE REQUEST

| TITLE: Modify disk accounting programs to use new quota primitives. |
| AUTHOR: VanVleck |
| SOURCE: (if external: e.g., "User", "Marketing") |
| Status | Date |
| Written | 11/02/73 |
| Approved | 11/20/73 |
| Rejected | |
| Postponed | |
| Withdrawn | |
| Expires | 5/20/74 |

ReASONS:

When system 21.0 was installed, the time-page-product cell in the directory was expanded from fixed bin (35) to fixed bin (71), to avoid meter overflow in large directories. New quota-manipulation entries were added to hcs_, which perform the same function as the old ones but have a fixed bin (71) argument for the time-page-product. The accounting system must be modified to use the new hcs_ entries.

SUMMARY:

Two administrative tools are directly affected: these are sweep and reset_disk_meters. These two programs will call the new hcs_ entries instead of the old ones.

The declaration of the segment "disk_stat", which contains the disk usage meters, must be reformatted to hold the larger value. This change will require recompilation of the programs charge_disk and disk_stat_print.

The per-project disk usage totals in "orclfile" and "use_totals" is already fixed bin (71), so the rest of the accounting programs will not be affected.
Modify disk accounting programs to use new quota primitives.

11/02/73

Because this problem has now happened three times in the history of the system, and has required extraordinary efforts every time to repair the damage, the disk usage measurement programs will be modified to include an appropriate "quillibility test," which will check that the charge increment for a directory is not wildly inconsistent with the current occupancy and time since the last run of the program. If the program detects any problems, it can issue a warning message, which will alert us to the possibility of a supervisor bug immediately.

IMPLICATIONS:

The "disk_stat" data base is completely re-created every night, so that no installation problems should ensue.
MULTICS CHANGE REQUEST

TITLE: Set TIMAX for Initializer to 1 second
       Instead of 0.

AUTHOR: Van/Jack

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

CLASSIFICATION

Incompatible
Change
Extension
Restriction
Performance
Improvement
Improvement
Bug Fix

JUSTIFICATION

Marketing
Conformance
To Standard
Increased
Consistency
Implementation
Generalization

REASONS:

During problems with the initializer (since fixed) we noticed that its extremely high scheduling priority made it impossible for any other process to get much done if the initializer was in a loop. Sometimes, system programmers could have patched the problem except that they could not get the CPU time necessary to make the patch. Furthermore, the standard procedure in this case is for the operator to enter POS manually and use BLAST to tell all users that the system will go down in one minute, and then to issue a GO so that users may write out their editing; if the initializer is looping, users will not be able to finish their work.

It was also noted that, under heavy load, the TIMAX of 0 for the initializer caused the scheduler to preempt any time the initializer was ready to run, and it was feared that this was damaging response on a one-CPU system under heavy load.

SUMMARY:

We performed an experiment to see what would happen if the initializer's TIMAX was set to 1. A "set-timax 1" command was added to system_start_to.so so that the initializer would have its TIMAX set to 1 every time the system came up. There were no
Set TIMAX for Initializer to 1 second instead of 0.

Observe negative affects; logging didn't slow down noticeably, nor did system performance change observably.

We are currently running with a TIMAX of 1 on the Initializer.

By changing one line in tc_init, we can have 1 second be the default value. It looks like this won't do any harm and may help if the system has problems.

IMPLICATIONS:

When this change is installed, one line from system_start_up, etc can be removed, and one less message will be typed during system startup.
**MULTICS CHANGE REQUEST**

<table>
<thead>
<tr>
<th>TITLE:</th>
<th>Fix bug in truncate command when called with no arguments</th>
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<tbody>
<tr>
<td>AUTHOR:</td>
<td>C. T. Clingen</td>
</tr>
<tr>
<td>SOURCE:</td>
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<td>X Bug Fix</td>
<td>#210</td>
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Use these headings: REASONS, SUMMARY, IMPLICATIONS, DETAILED PROPOSAL (Optional)

**REASONS:** When truncate is called with no arguments, it reports the error and then prints out garbage.

**SUMMARY:** A variable is not properly initialized; the fix is to initialize it to a blank character string and in one case, make an assignment to it before it is used.

**IMPLICATIONS:** None. This fix has been made and checked out.
TITLE:  Fix bug in trace

AUTHOR:  M. J. Grady

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

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
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Incompatible Change | Marketing Requirement | Implemented in System
Extension | Conformance to Standard | 
Restriction | Increased Consistency | Objections/Comments:
Performance Improvement | Simplification | 
Reliability Improvement | Generalization | 
Unreported | Bug Fix | 

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

REASONS:  Fix a bug in trace which incorrectly computes the length of the line to be printed on PRT 300's.

SUMMARY:  Change two lines of code on trace

IMPLICATIONS:  None
TITLE: Implementation of the GL15 remote computer interface

AUTHOR: M. J. Grady

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

CLASSIFICATION

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REASONS: The capability to run remote I/O devices must be added to Multics.

SUMMARY: Design and code a ring 4 DIM and DCM to implement the remote computer interface, and modify the TTY DIM to run high-speed synchronous devices.

IMPLICATIONS AND

DETAILED PROPOSAL: See MSB-110. Note that the MSB does not describe the ring 4 code as both a DIM and DCM. The DCM was created because the answering service requires asynchronous I/O which is not supported by the ios_interface. The DIM-DCM interface is similar to tw_tty DIM interface.
<table>
<thead>
<tr>
<th>TITLE:</th>
<th>Install new version of trace_stack.</th>
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<tbody>
<tr>
<td>AUTHOR:</td>
<td>T. H. van Vleck</td>
</tr>
<tr>
<td>SOURCE:</td>
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<td>Bug Fix</td>
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<td>Bug Fix</td>
<td>#138 (half)</td>
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Use these headings: REASONS, SUMMARY, IMPLICATIONS, and optionally DETAILED PROPOSAL

**REASONS:**

This version of trace_stack uses the new fault information primitives created by Melanie Weaver and described in MCR-055.

The trace_stack command will perform more reliably in several cases, and will be less vulnerable to system changes, since the new fault information primitives embody much of the implementation-dependent code.

**SUMMARY:**

All modules of bound_trace_stack change.

**IMPLICATIONS:**

Minor changes have been made to the output format. If a pointer argument points to a character string longer than 4 characters, the contents of the string will be printed in parentheses.

A new program called "extract_source_line" has been added, which is called by print_source_line and which could be called by debug when it wishes to obtain a source line.
TITLE: Fix locking bug in find

AUTHOR: A. Kobziar

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

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
--- | --- | ---
Incompatible Change | Marketing Requirement | Implemented in System
Extension | Conformance to Standard | Objections/Comments:
Restriction | Increased Consistency |
Performance Improvement | Simplification |
Reliability Improvement | Generalization |
X Improved | X Bug Fix #207 |

REASONS: If `find $ dir` is called with a pathname of ">..." it will leave the root locked. Depending on the load on the system this can deteriorate performance or even crash the system.

SUMMARY: Change `find` to return "argerr" for erroneous pathnames.
TITLE: BOS should not set masks in memory controllers from which it is not receiving interrupts.

AUTHOR: R. Mullen

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

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

REASONS: BOS will hang if it attempts to read or set masks in memory controllers for which the running cpu is not the control processor.

SUMMARY: The memory on each cpu port can be tested with the `rscr` instruction to determine if the running cpu is the control processor.

IMPLICATIONS: None

DETAILED PROPOSAL: This check can be placed naturally in `pet` port info where it will be executed whenever bos is entered or exited, before masks are read or set.
## MULTICS CHANGE REQUEST

<table>
<thead>
<tr>
<th>TITLE:</th>
<th>Type message on printer error in BOS</th>
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<tbody>
<tr>
<td>AUTHOR:</td>
<td>N. I. Morris</td>
</tr>
<tr>
<td>SOURCE:</td>
<td>(if external) e.g., &quot;User&quot;, &quot;Marketing&quot;</td>
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### STATUS DATE
- Written: 11/19/73
- Approved: 11/27/73
- Rejected
- Postponed
- Withdrawn
- Expires: 5/27/74

### CLASSIFICATION

<table>
<thead>
<tr>
<th>Incompatible Change</th>
<th>Marketing Requirement</th>
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<tbody>
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<td>Generalization</td>
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<td>X Bug Fix #156</td>
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### JUSTIFICATION

<table>
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### Objections/Comments:

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

### REASONS:

The printer can halt during BOS dumps with no indication of the malfunction on the operator's console.

### SUMMARY:

Print message when bad status is received from the printer.
# MULTICS CHANGE REQUEST

## Title
Fix "all 5's" bug in full_ipc

## Author
Robert Mullen

## Source
(if external) e.g., "User", "Marketing"

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

**Reasons:** Presently full ipc does not verify that an event_channel_name is legal before copying itt messages, if the message is a device signal. The ensuing error creates an unnecessary answering service dump.

**Summary:** This can be prevented by verifying the event_channel_name in all cases.

**Implications:** This fix has been tested on development machine and does not seem to have any further implications.
TITLE: gcos_daemon bug fixes

AUTHOR: P. Haber

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

CLASSIFICATION | JUSTIFICATION | Replaced by proposal MCR
--- | --- | ---
Incompatible Change | Marketing Requirement | Implemented in System
Extension | Conformance to Standard | Objections/Comments:
Restriction | Increased Consistency | 
Performance Improvement | Simplification | 
Reliability Improvement | Generalization | 
Unreported | Bug Fix | 

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

REASONS:
1) Include file lost during installation retyped.
2) Default condition handler was established in a subroutine which returned.
3) References to unimplemented "gees" bit in absentee include file detected.

SUMMARY:
a) Move default condition handler to main procedure.
b) Retype in missing include file.
c) Delete references to "gees" bit in absentee include file.

IMPLICATIONS:
a) Will allow daemon to take faults w/o terminating.
b) Replacement of missing source
c) Avoids setting extraneous bit

Note: Change a) in summary already implemented in Phoenix.