

TO: Distribution
FROM: Joan Archer
DATE: 30 May 75
RE: Multics Change Requests

Enclosed are copies of Multics Change Requests which were approved from 1 May 75 to 15 May 75.

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Multics Change Request

TITLE: Change the ipc_event call mechanism to use entry variables		STATUS	DATE	
AUTHOR: R. A. Barnes		Written	04/18/75	
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no -Incompatible change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)	Status	P 04/29/75 A 05/06/75	
		Lib. Maint. Tools	Expires	11/06/75
		Sys. Anal. Tools	DOCUMENTATION CHANGES	
		Sys. Prog. Tools	Document	Specify One or More
	355	MPM (Vol, Sect.)	SWG	
	BOS	PLMS (AN #)		
	Salvager	MOSN (Sect.)		
	Ring Zero	MPAM (Sect.)		
	Ring One	MSAM (Sect.)		
	SysDaemon/Admin.	pending changes, Info Segs or ipc changes		
	Runtime	Other (Name)		
	User Cmnd/Subr.	None (Reason)		
Objections/Comments:				

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

SUMMARY:

Change the ipc_event call mechanism to work properly with internal procedures.

REASONS:

Several programs set up event call channels to internal procedures. When these procedures get invoked, they receive invalid display pointers. The only reason these procedures work today is that they do not reference non-local automatic variables or parameters. If MCR 1098 were to be implemented, these programs would stop working. New users of ipc_ could easily fail by referencing non-local variables.

IMPLICATIONS:

The user community must be informed of the interface change to ipc_\$decl_ev_call_chn well before implementation of MCR 1098.

DETAILED PROPOSAL:

Work should proceed in 3 stages:

- 1) The entry ipc_\$decl_event_call_channel must be added, which receives an entry value as its second argument

instead of a pointer. This entry value must be stored in the event call structure and used in calling the procedure at wakeup time. This change will have no ill effect on the system. Programs that work now will continue to work.

- 2) All system callers to `ipc_$decl_ev_call_chn` must be changed to use `ipc_$dcl_event_call_channel`. This involves about thirty procedures.
- 3) After allowing time for users to convert to the new interface, implement MCR 1098 and remove `ipc_$decl_ev_call_chn`.

Page 2

Entry: ipc_\$create_ev_chn

This entry creates an event-wait channel in the current ring.

Usage

```
declare ipc_$create_ev_chn entry (fixed bin(71),
    fixed bin(35));
```

```
call ipc_$create_ev_chn (channel_id, code);
```

1) channel_id is the identifier of the event channel.
(Output)

2) code is a standard status code; see Status Code Values below. (Output)

Entry: ipc_\$delete_ev_chn

This entry destroys an event channel previously created by the process.

Usage

```
declare ipc_$delete_ev_chn entry (fixed bin(71),
    fixed bin(35));
```

```
call ipc_$delete_ev_chn (channel_id, code);
```

1) channel_id is as above. (Input)

2) code is as above. (Output)

Entry: ipc_\$dcl_event_call_channel

This entry changes an event-wait channel into an event-call channel.

Usage

```
declare ipc_$dcl_event_call_channel entry (fixed bin(71), entry,
    ptr, fixed bin, fixed bin(35));
```

```
call ipc_$dcl_event_call_channel (channel_id, procedure,
    data_ptr, priority, code);
```

1) channel_id is as above. (Input)

- 2) procedure ~~ptr~~ ^{the} is a ~~pointer to a~~ procedure entry point to be invoked when an event occurs on the specified channel. (Input)
- 3) data_ptr is a pointer to data to be passed to and interpreted by that procedure entry point. (Input)
- 4) priority is a number indicating the priority of this event-call channel as compared to other event-call channels declared by this process for this ring. If, upon interrogating all the appropriate event-call channels, more than one is found to have received an event, the lowest-numbered priority will be honored first, and so on. (Input)
- 5) code is as above. (Output)

Entry: ipc_\$decl_ev_wait_chn

This entry changes an event-call channel into an event-wait channel.

Usage

```
declare ipc_$decl_ev_wait_chn entry (fixed bin(71),
fixed bin(35));
```

```
call ipc_$decl_ev_wait_chn (channel_id, code);
```

- 1) channel_id is as above. (Input)
- 2) code is as above. (Output)

Entry: ipc_\$drain_chn

This entry resets an event channel so that any pending events (i.e., events which have been received for that channel) are removed.

Usage

```
declare ipc_$drain_chn entry (fixed bin(71), fixed bin(35));
```

```
call ipc_$drain_chn (channel_id, code);
```

- 1) channel_id is as above. (Input)

Multics Change Request

TITLE: Remove backup time setting entries from hcs	STATUS	DATE
AUTHOR: A. Kobziar	Written	04/30/75

<input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL <input type="checkbox"/> Planned for System MR <input type="checkbox"/> Fixes Bug Number(s) _____ <input type="checkbox"/> Documented in MTB _____ <input type="checkbox"/> User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no <input checked="" type="checkbox"/> Performance: <input checked="" type="checkbox"/> Better <input type="checkbox"/> Same <input type="checkbox"/> Worse <input type="checkbox"/> Replaces MCR _____	Category (Check One) <input type="checkbox"/> Lib. Maint. Tools <input type="checkbox"/> Sys. Anal. Tools <input type="checkbox"/> Sys. Prog. Tools <input type="checkbox"/> 355 <input type="checkbox"/> BOS <input checked="" type="checkbox"/> Salvager <input type="checkbox"/> Ring Zero <input type="checkbox"/> Ring One <input type="checkbox"/> SysDaemon/Admin. <input type="checkbox"/> Runtime <input type="checkbox"/> User Cmnd/Subr.	Status A 05/06/75 Expires 11/06/75
	DOCUMENTATION CHANGES	

Objections/Comments:	Document	Specify One or More
	MPM (Vol, Sect.)	
	PLMS (AN #)	57
	MOSN (Sect.)	
	MPAM (Sect.)	
	MSAM (Sect.)	
	Info Segs	
	Other (Name)	
	None (Reason)	

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

SUMMARY:

Change the reloader to call hphcs_\$set_backup_times and delete the corresponding hcs_entry. Delete hcs_\$set_backup_dump_time as the dumper already calls the hphcs version. A warning for the hcs_entries was issued last fall (with MCR 693).

REASONS:

The removal of user settable dates creates a problem whenever links are reloaded under the -debug option because the reloader does not treat the date-time information of each link separately, but rather collectively by using the time in the parent directory. If this directory is created by the reload, then its date-time will be later than the time stored in the link (dir list) record on the dump tape and the normal action is to skip the processing of this record. Adding code for individual link processing would slow down the reloader and not work correctly on multiple incremental tapes; this choice was opted in favor of always reloading links in the -debug case. Also the default setting of the -trim option (which deletes everything in an existing directory that is not in a dir_list record) will be changed from on to off if

the `-debug` option is used. This will prevent deletion of new segments/directories in an existing new directory of the same name.

IMPLICATIONS:

A user reload (`-debug` option) will always replace existing links and segments that are named the same as those found on the tape. Also, trimming (deleting all segments and links in an existing directory that are not on the tape) will not be the default. If trimming is desired, then `-trim` must follow the `-debug` option: `reload -debug -trim`.

Multics Change Request

TITLE: Separate privileges from the access authorization field		STATUS	DATE
AUTHOR: A. Kobziar		Written	05/05/75
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other-explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		JCW	Status
			Expires
		Category (Check One) <input type="checkbox"/> Lib. Maint. Tools <input type="checkbox"/> Sys. Anal. Tools <input type="checkbox"/> Sys. Prog. Tools <input type="checkbox"/> 355 <input type="checkbox"/> BOS <input type="checkbox"/> Salvager <input checked="" type="checkbox"/> Ring Zero <input type="checkbox"/> Ring One <input type="checkbox"/> SysDaemon/Admin. <input type="checkbox"/> Runtime <input type="checkbox"/> User Cmmnd/Subr.	
Objections/Comments:		Info Segs Other (Name) None (Reason)	

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

SUMMARY: Add two new functions, `get_max_authorization` and `get_privileges`, which along with the existing function `get_authorization`, will allow ring 1 circumvention of the SPS entry `hcs_$get_authorization`.

REASONS: `hcs_$get_authorization` returns the privilege bits embedded in an unused part of the authorization field. Ring 1 procedures currently store this authorization as an access class. Although the bits used for privileges are ignored in accessibility calculations, it is an error to store these bits, as privileges are dynamic, and a salvager can assume that all bits outside of those defined for the access class should be zero--if any are on then the access class could have been clobbered.

DETAILED PROPOSAL: The new functions will join `get_authorization` in the procedure `get_process_id`. Once obtained from ring 0 the information will be stored in internal static with all undefined bits zeroed, except for the `get_privileges` entry which will always call ring 0, as privileges are dynamic.

```
declare get_max_authorization_entry returns(bit(72)aligned);
declare get_privileges_entry returns(bit(36)aligned);
```


Ver. 3 741022	MULTICS CHANGE REQUEST	MCR 1144
TITLE: Managing syserr log segments in ring 4		STATUS : DATE
AUTHOR: L. Scheffler		Written : 04/23/75
		Status : 04/23/75 A 05/06/75
		Expires : 10/23/75
Planned for System: not applicable		CATEGORY (check one)
Fixes Bug Number(s): not applicable		() Lib. Maint. Tools
Documented in MTB: 103		(<input checked="" type="checkbox"/>) Sys. Anal. Tools
Incompatible Change: no		() Sys. Prog. Tools
User/Operations-visible Interface Change: yes		() 355
Coded in: (<input checked="" type="checkbox"/>) PL/I () ALM () other-see below		() BOS
Performance: () better (<input checked="" type="checkbox"/>) same () worse		() Salvager
DOCUMENTATION CHANGES (specify one or more)		() Ring Zero
MPM (vol,sect) MPAM (sect)		() Ring One
MOSN (sect) MSAM (sect) 2.1,3,8.5		() SysDaemon/Admin
PLMs (AN#) Supervisor I/O		() Runtime
Info Segs		() User Command/Subr
Other MOH		
OBJECTIONS/COMMENTS:		

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

SUMMARY: Install a new program, syserr_log_man, in bound_user_control_, to manage permanent syserr log segments in ring 4.

REASONS: Increased use of the syserr log (particularly for protection auditing) requires a mechanism to keep a permanent on-line copy of the syserr log. Rather than fill up >system_control_dir with possibly many permanent syserr log segments, the mechanism below is proposed. Also, the marketing requirement for protection auditing requires a mechanism of this type.

IMPLICATIONS: Logs will be searched and addressed efficiently. The decision on when a part of the log is obsolete and can be deleted is removed from ring 0. Log summary and analysis tools will be able to refer to a full history of syserr messages, enhancing statistical analyses of system operation of various kinds.

DETAILED PROPOSAL:

Permanent syserr log structure

Permanent syserr log segments will be kept in >system_control_dir>syserr_log_dir. Each time the syserr log is copied from ring 0 (see MTB-103 and MCR-320), a new log segment will be created, named with the date and time of creation, and containing only those syserr messages not previously copied, rethreaded to minimize storage.

A log addressing segment will be maintained containing

- the date and time range of messages
- the sequence number range of messages
- the date and time this log segment was deleted (to help in searching backup maps for old log segments)

This addressing segment allows quick and convenient searching of log segments by log analysis tools (print_syserr_log and daily_syserr_process), since one need not initiate log segments that do not contain relevant messages. It also makes possible automatic round-robin management of the permanent log segments.

Access to permanent syserr logs

To initialize the automatic copying of syserr logs from ring 0 (MCR-820), the directory >system_control_dir>syserr_log_dir must be created manually, and its ACL and ring 4 segment initial ACL set. ACLs should be set as follows. User ID's that only need to read the log should have "s" on syserr_log_dir, and "r" on its ring 4 segment initial ACL. This results in "r" access to both the log addressing segment and the log segments themselves. User ID's that need to be able to copy the syserr log from ring 0 (like the Initializer, or any other process designated to perform automatic log copying) should have "sma" to syserr_log_dir and "rw" on its ring 4 segment initial ACL. This results in "r" access to log segments (because, once the log is copied, the segment should not be modified), and "rw" on the log addressing segment.

The safety switch is set on for all log segments and the log addressing segment, to prevent accidents.

If, during an attempt to copy the syserr log into ring 4, the log addressing segment is missing or damaged, automatic copying of the syserr log from ring 0 is disabled, with a sys_log message on the Initializer terminal. At sites where the loss of syserr messages is not tolerable, the operator can shut the system down before the ring 0 syserr log wraps around over previously uncopied messages.

syserr_log_man entry points:

as_auto_copy_init

auto_copy_init set up this process as the handler for the log copying wakeup from syserr_logger (see MCR-820).

as_auto_copy_log

auto_copy_log copy the syserr log in response to a log copying wakeup.

manual_copy_log

copy the syserr log manually.

All entry points require hphcs_ access. If called without hphcs_ access, they do no damage. The "as_" prefixes indicate special entry points for the answering service, which use sys_log to log errors instead of com_err_.

Multics Change Request

TITLE: New teco Implementation		STATUS	DATE
AUTHOR: D. Levin		Written	04/28/75
- Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL - Planned for System MR - Fixes Bug Number(s) unreported <input checked="" type="checkbox"/> X - Documented in MTB - User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no - Incompatible change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no - Performance: <input checked="" type="checkbox"/> Better <input type="checkbox"/> Same <input type="checkbox"/> Worse - Replaces MCR		Status	A 05/06/75
		Expires	11/06/75
		DOCUMENTATION CHANGES	
Category (Check One)		Document	Specify One or More
<input type="checkbox"/> Lib. Maint. Tools		MPM (Vol, Sect.)	
<input type="checkbox"/> Sys. Anal. Tools		PLMS (AN #)	AN 51
<input checked="" type="checkbox"/> Sys. Prog. Tools		MOSN (Sect.)	
<input type="checkbox"/> 355		MPAM (Sect.)	
<input type="checkbox"/> BOS		MSAM (Sect.)	
<input type="checkbox"/> Salvager		Info Segs	teco.info
<input type="checkbox"/> Ring Zero		Other (Name)	
<input type="checkbox"/> Ring One		None (Reason)	
<input type="checkbox"/> SysDaemon/Admin.			
<input type="checkbox"/> Runtime			
<input type="checkbox"/> User Cmnd/Subr.			
Objections/Comments:			

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

SUMMARY:

Install improved version of the teco editor, which uses EIS coding improvements, uses iox_ instead of ios_, allows editing of segments >64k, and fixes several bugs. The coding will also be brought up to system programming standards.

IMPLICATIONS:

1. The procedure search_file in bound_gedx_ will be called by teco to evaluate regular expressions. This will involve a change to the bind file for bound_gedx_. (This change is covered by another MCR.)
2. The bind file for bound_teco_ will be changed to remove the following names from the segment (the entry points will be retained by the binder): TECO, list_temporary_segments, list_temp_segs.

3. The teco search rules will be changed from (in order searched):

- a) working dir
- b) home dir
- c) >system_library_tools
- d) >system_library_auth_maint

to:

- a) working dir
- b) home dir
- c) containing dir for bound_teco_

Therefore the teco macro library must be in the same directory as bound_teco_.

4. The teco macro library will be brought up to system programming standards. Obsolete or special purpose macros will be eliminated. Embedded pathnames will be eliminated.
5. The teco\$abort implementation has been changed. A user can no longer simulate teco\$abort with a call to signal_.

DETAILED PROPOSAL:

1. teco is now coded in Version 2 PL/I.
2. teco will allow any segment up to sys_info\$max_seg_size words in length. The editing buffer size reflects the actual text length and certain editing sequences will result in added overhead.
3. A new teco command, n, is being added to allow a qedx style regular expression search.
4. Red and black shift characters are not included in error messages.

Multics Change Request

TITLE: New Reload Options during System Startup		STATUS	DATE
AUTHOR: D. R. Vinograd		Written	04/30/75
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		Status	A 05/06/75
		Expires	11/06/75
		DOCUMENTATION CHANGES	
Category (Check One)		Document	Specify One or More
<input type="checkbox"/> Lib. Maint. Tools		MPM (Vol, Sect.)	
<input type="checkbox"/> Sys. Anal. Tools		PLMS (AN #)	
<input type="checkbox"/> Sys. Prog. Tools		MOSN (Sect.)	7.3
<input type="checkbox"/> 355		MPAM (Sect.)	
<input type="checkbox"/> BOS		MSAM (Sect.)	
<input type="checkbox"/> Salvager		Info Segs	
<input type="checkbox"/> Ring Zero		Other (Name)	SRB/MOH
<input type="checkbox"/> Ring One		None (Reason)	
<input checked="" type="checkbox"/> SysDaemon/Admin.			
<input type="checkbox"/> Runtime			
<input type="checkbox"/> User Cmmd/Subr.			
Objections/Comments:			

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

SUMMARY:

Replace the "update" command in system_startup_ by two new commands:

```

        reload_notrim
and
        reload_system_release
  
```

The first will call reload with the -notrim control argument and the second will call a new entry point reload\$system_release.

REASONS:

The reload_notrim command is necessary to the maintenance of the development hierarchy. The reload_system_release command is required for system distribution to enable backup to replicate completely the information on a system release tape onto an existant hierarchy.

IMPLICATIONS:

Sites must be advised of the new options and when to use them. The present reload key word will

operate in the same way it does today. The invocation of the `reload_system_release` key word will cause the deletion of any segment or directory in the user's hierarchy that does not conform with the hierarchy description on the release tape.

PROPOSAL:

Two new backup control flags will be created to control directory name trimming and the suppression of "dtm" checking. These flags will only be set by the entry `reload$system_release` and will not be control arguments.

Multics Change Request

TITLE: Fix bug in mst generator		STATUS	DATE
AUTHOR: E. Stone		Written	04/30/75
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR -Fixes Bug Number(s) _____ -Documented in MPB -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		Status	A 05/06/75
		Expires	11/06/75
		DOCUMENTATION CHANGES	
Category (Check One) <input type="checkbox"/> Lib. Maint. Tools <input type="checkbox"/> Sys. Anal. Tools <input checked="" type="checkbox"/> Sys. Prog. Tools <input type="checkbox"/> 355 <input type="checkbox"/> BOS <input type="checkbox"/> Salvager <input type="checkbox"/> Ring Zero <input type="checkbox"/> Ring One <input type="checkbox"/> SysDaemon/Admin. <input type="checkbox"/> Runtime <input type="checkbox"/> User Cmd/Subr.		Document	Specify One or More
Objections/Comments:		MPM (Vol, Sect.)	
		PLMS (AN #) 51	
		MOSN (Sect.)	
		MPAM (Sect.)	
		MSAM (Sect.)	
		Info Segs	
		Other (Name)	
		None (Reason)	

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

SUMMARY:

Change the mst generator to clear the extended access field of ACL entries.

Convert the mst generator to use iox_ and hence to use the tape_mult_, vfile_, and discard_ io modules.

REASONS:

The extended access field of segments whose ACL is specified on the header currently is set to blanks, e.g. 040040040040.

Multics Change Request

TITLE: set_tty command		STATUS	DATE
AUTHOR: R. Coren		Written	04/25/75
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		JWG	Status <u>A 05/06/75</u>
		Category (Check One)	Expires <u>11/04/75</u>
		Lib. Maint. Tools	DOCUMENTATION CHANGES
		Sys. Anal. Tools	
		Sys. Prog. Tools	
		355	
		BOS	
		Salvager	
		Ring Zero	
		Ring One	
		SysDaemon/Admin.	
		Runtime	
		<input checked="" type="checkbox"/> User Cmnd/Subr.	
Objections/Comments: Should reflect error condition when asked to perform illegal operation for type of terminal. " switch" control argument. (Need default switch user i/c)		Document	Specify One or More
		MPM (Vol, Sect.)	Commands AG92
		PLMS (AN #)	
		MOSN (Sect.)	
		MPAM (Sect.)	
		MSAM (Sect.)	
		Info Segs	
		Other (Name)	
		None (Reason)	

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

SUMMARY:

Provide a user command, set_tty, to allow a user to specify his terminal type for the purposes of code conversion, and to set the modes for I/O on his terminal. This replaces the iomode command.

REASONS:

Failure (for whatever reason) to read a terminal's answerback can cause a terminal to behave in an undesirable fashion; the current methods of redress open to the user are both cumbersome and incomplete. The proposed command is flexible enough to cover most situations; in general, the -type control argument by itself is sufficient to do what the user wants.

IMPLICATIONS: None

DETAILED PROPOSAL:

See attached draft MPM documentation.

NOTE: The command uses the Answering Service's "Initial Modes Table", and will recognize the possibility of setting a Selecterm's tabs as soon as the Answering Service does.

name: set_tty, stty

The set_tty command may be used to modify the type of the user's terminal and/or the modes associated with terminal I/O. The type as specified by this command is used for determining character conversion and delay timings, and has no effect on communications line control.

Usage

set_tty -control_args-

where control_args are one or more of the following:

-type device_type causes the user's terminal type to be set to device_type, which may be any one of the following:

1050	(IBM 1050)
2741	(IBM 2741)
TTY37 or tty37	(Teletype Model 37)
TTY33 or tty33	(Teletype Model 33)
TTY38 or tty38	(Teletype Model 38)
tn300 or tn300	(Terminet 300/1200)
ARDS or ards	(ARDS or Tektronix)
ASCII or ascii	(General ASCII terminal)

The default modes for the new terminal type will be turned on.

-modes mode_string sets the modes for terminal I/O according to mode_string, which is a string of mode names separated by commas, each one optionally preceded by "~" to turn the specified mode off. For a list of valid mode names, see the description of the tty_ I/O module in the Subroutines volume of the MPM. Modes not specified in mode_string will be left unchanged. See Notes, below.

-reset turns off all modes which are not set in the default modes string for the current terminal type.

- `-tabs` specifies that the device has software-settable tabs, and that the tabs are to be set. This control argument currently has effect only for Terminet 300-like devices.
- `-print` causes the terminal type and modes to be printed on the terminal. If any other control arguments are specified, the type and modes printed will reflect the result of the command.

Notes

The effect of this command can be viewed as performing the following steps in the specified order:

1. If `-type` is specified, set the specified type, and turn on the default modes for that type.
2. If `-reset` is specified, turn off all modes which are not set in the default modes string for the current terminal type.
3. If `-modes` is specified, turn on and off those modes specified explicitly in the mode_string.
4. If `-tabs` is specified, and the terminal has settable tabs, set the tabs.
5. If `-print` is specified, print the type and modes on the terminal.

Multics Change Request

TITLE: Install new tty dim tools		STATUS	DATE	
AUTHOR: M. Grady		Written	04/29/75	
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)			
	<input type="checkbox"/>	Lib. Maint. Tools	Status	05/06/75
	<input checked="" type="checkbox"/>	Sys. Anal. Tools	Expires	11/06/75
	<input type="checkbox"/>	Sys. Prog. Tools	DOCUMENTATION CHANGES	
	<input type="checkbox"/>	355	Document	Specify One or More
<input type="checkbox"/>	BOS	MPM (Vol, Sect.)		
<input type="checkbox"/>	Salvager	PLMS (AN #)	51	
<input type="checkbox"/>	Ring Zero	MOSN (Sect.)		
<input type="checkbox"/>	Ring One	MPAM (Sect.)		
<input type="checkbox"/>	SysDaemon/Admin.	MSAM (Sect.)		
<input type="checkbox"/>	Runtime	Info Segs		
<input type="checkbox"/>	User Cmmnd/Subr.	Other (Name)		
Objections/Comments:		None (Reason)		

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

SUMMARY:

Install two tools which are useful for tty dim problem analysis:

- 1) tty_dump, - dumps and interprets the ring 0 tty data for a particular person/line.
- 2) tty_analyze, - analyzes tty dim segments which have been extracted from a dump.

REASONS:

These tools have been cleaned up for MCS, and should be installed.

Names: tty_dump,

This command causes the contents of the control blocks and buffers associated with a specified TTY line to be printed on the user's terminal.

Usage

tty_dump identifier

where identifier is one of the following:

1. a person identifier, in which case, if the specified person is logged in from a terminal, the control blocks associated with the communications line to that terminal are dumped;
2. a line identifier of the form used in the "lines file" (e.g. "tty004"). If this form is used, the control blocks associated with the specified line are dumped whether or not the line is dialed up.

Name: tty_analyze,

This command analyzes the contents of a copy of tty_buf which it extracts from a dump. It performs certain tests to verify the consistency of the contents of tty_buf.

Usage:

```
tty_analyze erfno -control_arg-
```

where:

1. erfno is the number of the dump from which the copy of tty_buf is to be extracted.
2. control_arg may be -long (or -lg). If present the contents of each input and output buffer will be printed, otherwise only the addresses of the buffers will be printed.

Multics Change Request

TITLE: Fix bug in pll_abs, fortran_abs, alm_abs		STATUS	DATE
AUTHOR: S. Herbst		Written	05/01/75
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> AIM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		Status	A 05/06/75
		Expires	11/06/75
		DOCUMENTATION CHANGES	
Category (Check One) <input type="checkbox"/> Lib. Maint. Tools <input type="checkbox"/> Sys. Anal. Tools <input type="checkbox"/> Sys. Prog. Tools <input type="checkbox"/> 355 <input type="checkbox"/> BOS <input type="checkbox"/> Salvager <input type="checkbox"/> Ring Zero <input type="checkbox"/> Ring One <input type="checkbox"/> SysDaemon/Admin. <input type="checkbox"/> Runtime <input checked="" type="checkbox"/> User Cmmnd/Subr.		Document	Specify One or More
Objections/Comments:		MPM (Vol, Sect.)	
		PLMS (AN #)	
		MOSN (Sect.)	
		MPAM (Sect.)	
		MSAM (Sect.)	
		Info Segs	
		Other (Name)	
		None (Reason)	no change

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

SUMMARY:

Fix bug in pll_abs (etc.) causing it to abort when a pathname argument is shorter than the appropriate suffix, ie.

.pll, .fortran or .alm

Multics Change Request

TITLE: Make retriever handle up to 250 requests		STATUS	DATE
AUTHOR: M. A. Meer		Written	05/01/75
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)		Status
	<input type="checkbox"/> Lib. Maint. Tools	<input type="checkbox"/> Sys. Anal. Tools	A 05/06/75
	<input type="checkbox"/> Sys. Prog. Tools	<input type="checkbox"/> 355	Expires
	<input type="checkbox"/> BOS	<input checked="" type="checkbox"/> Ring One	11/06/75
		DOCUMENTATION CHANGES	
		Document	Specify One or More
		MPM (Vol, Sect.)	
		PLMS (AN #) 59	
		MOSN (Sect.)	
		MPAM (Sect.)	
		MSAM (Sect.)	
Objections/Comments:		Info Segs	
		Other (Name)	
		None (Reason)	

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

SUMMARY: "

Change the reloader to accept up to 250 retrieve requests (or up to 125 if not the same name as on tape) in a single file.

Also allow up to 50 renames among the requests.

REASONS:

Current limit of up to 50 requests (25 if names not the same as on tape) is sometimes found to be inconvenient by some users.

Ver. 3	MULTICS CHANGE REQUEST	MCR 1157
741022		
TITLE: Replace get_library_segment with the library_fetch command		STATUS : DATE
AUTHOR: Gary C. Dixon		Written : 04/28/75
		Status : 08/12/75
		Expires : 10/28/75
Planned for System: MR 3.0		CATEGORY (check one)
Fixes Bug Number(s): not applicable		<input checked="" type="checkbox"/> Lib. Maint. Tools
Documented in MTB: revised MTB-166 attached		<input type="checkbox"/> Sys. Anal. Tools
Incompatible Change: yes		<input type="checkbox"/> Sys. Prog. Tools
User/Operations-visible Interface Change: yes		<input type="checkbox"/> 355
Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other-see below		<input type="checkbox"/> BOS
Performance: <input type="checkbox"/> better <input type="checkbox"/> same <input checked="" type="checkbox"/> worse		<input type="checkbox"/> Salvager
Replaces MCR: 1058		<input type="checkbox"/> Ring Zero
DOCUMENTATION CHANGES (specify one or more)		<input type="checkbox"/> Ring One
MPM (vol,sect) MPAM (sect)		<input type="checkbox"/> SysDaemon/Admin
MOSN (sect) MSAM (sect)		<input type="checkbox"/> Runtime
PLMs (AN#) AN-51, AN-80		<input type="checkbox"/> User Command/Subr
Info Segs get_library_segment.info, library_fetch.info, pc.info		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Replace the get_library_segment command and all of its assorted control files and its online library search program (get_primary_name_) with the new library_fetch command. The command is documented in the attached writeup.

REASON:

The library_fetch command uses library descriptors to find entries in a library. This allows information about library structure and contents to be concentrated in a library descriptor rather than in the library_fetch command. Since this information is shared by the library_fetch, library_info, library_map, library_print, and library_cleanup commands, libraries can be added or changed without having to modify all of these commands.

library_fetch also implements a full renaming capability for fetched entries, which gls couldn't do. In addition, its search names allow the star convention and its renaming facility uses the equals convention. It provides an output log facility which records when each library entry was fetched from the library.

IMPLICATIONS:

Advantages: Adding or changing the organization of the Multics System Libraries will be easier to do because only the library descriptor program will have to be modified (and perhaps the multics_library_search_ procedure), rather than all of the library maintenance commands. The star convention and full renaming facilities will make it easier to fetch library entries according to the user's needs. These tools can also be

used for user-defined libraries, thus providing a sub-system library maintenance tool.

Disadvantages: Users will have to change from using gls to using library_fetch. Because the overhead of the library descriptor mechanism used by library_fetch is larger than the specialized mechanism used by gls, the response time and CPU time required to fetch a library entry will be longer.

DETAILED PROPOSAL:

The change from gls to lf will be performed according to the following installation plan:

- 1) Install the library_fetch command, library_fetch.info and pending_changes.info (indicating coming deletion of gls).
- 2) delete gls and its control segments and subroutines at some suitable time in the future.

By default, library_fetch will search the same libraries that gls does now.

The Design Review process for library_fetch concluded that the command had too many control arguments, and that the output arguments documented in MTB-166 should be excluded from the final command. This changes has been reflected in the attached document.

From several subsequent Design Reviews on other topics and from discussions with MCR Board members, I have concluded that it is best for a command to have control arguments indicating the defaults, as well as control arguments which vary from the defaults. This has been reflected in the attached document by the introduction of four new arguments: -brief (opposing -long); -no_chase (opposing -chase); -entry (opposing -container and -components); and -omit (opposing -retain). It was much more natural to document the defaults in the resulting command description, and I feel this is generally a good practice.

Care was taken in the attached document to describe first the most often used control arguments.

I have also attached a section of the Library Maintenance PLM referenced by the attached library_fetch documentation which describes how library_fetch uses library descriptors.

Names: library_fetch, lf

The **library_fetch** command copies entries from a library into the user's working directory. Control arguments allow copying the entries into another directory or renaming them as they are copied; select which library entrynames are placed on the copy; allow copying the library entry which contains a matching entry instead of the matching entry itself (e.g., copy the archive which contains a matching archive component); or copying all of the components of the containing entry. A documentation facility is provided for recording in a file the status of each entry which is copied.

This command uses a library descriptor and library search programs, as described in Section IV.

Usage

library_fetch -search_names- -control_args-

where:

1. **search_names** are entrynames which identify the library entries to be copied. The Multics star convention may be used to identify a group of entries with a single search name. Up to 30 search names may be given in the command. If none are given, then any default search names specified in the library descriptor are used.
2. **control_args** are selected from the following list of control arguments and can appear anywhere in the command:

-library library_name,

-lb library_name

identifies a library which is to be searched for entries matching the search names. The Multics star convention may be used to identify a group of libraries to be searched. Up to 30 **-library** control arguments may be given in each command. If none are given, then any default library names specified in the library descriptor are used.

- name, -nm** indicates that all of the names on each matching library entry are to be placed on the copy. See the discussion of naming considerations under "Notes" below.
- primary, -pri** indicates that the first name of each matching library entry is to be placed on the copy. See the discussion of naming considerations under "Notes" below.
- match** indicates that, for each matching library entry, the entrynames which match any of the search names are to be placed on the copy. See the discussion of naming considerations under "Notes" below. This is the default.
- into path** identifies the directory into which library entries are copied and indicates how they are renamed. An absolute or relative pathname may be given. The directory portion of the pathname identifies the directory into which each library entry is copied. The final entryname of the pathname is used to rename each library entryname being placed on the copy, under control of the Multics equal convention. Only one -into control argument may appear in a command line. If -into is not given, matching entries are copied into the user's working directory and no renaming occurs.
- chase** indicates that the target of a matching library link is to be copied.
- no_chase** indicates that a warning message is to be printed when a matching link is found in the library, and that no copying is to occur. This is the default.
- long, -lg** causes the pathname of each matching entry to be printed on the user's terminal as the entry is copied.
- brief, -bf** suppresses printing the pathname of matching entries. This is the default.

- container** causes the library entry which contains each matching entry to be copied, instead of the matching entry itself. See the discussion under "Notes" below.
- components** causes all of the component library entries of a matching library entry to be copied, rather than just the matching entry itself. It also causes all components of a library entry containing a matching component to be copied. See the discussion under "Notes" below.
- entry, -et** causes each matching library entry itself to be copied. This is the default.
- search_name search_name,**
identifies a search name which begins with a minus (-) to distinguish the search name from a control argument. There are no other differences between the search names described above and those given with the **-search_name** control argument. One or more **-search_name** control arguments may be given in the command.
- descriptor ref_name**
gives a reference name which identifies the library descriptor describing the libraries to be searched. If no **-descriptor** control argument is given, then the default library descriptor is used.
- retain, -ret** indicates that library entries which are awaiting deletion from the library (as determined by the library search program) are to be copied.
- omit** indicates that library entries awaiting deletion from the library are to be omitted from the search, and are not to be copied. This is the default.
- output_file file,**
-of file indicates that status information for each copied library entry is to be appended to a file. A relative or absolute pathname of the file may be given. If it does have a suffix of **fetch**, then one is assumed.

library_fetch

library_fetch

- all, -a** indicates that all available status information for copied library entries is to be recorded in the output file.
- default, -dft** indicates that only default status information is to be recorded in the output file. This is the default.

Notes

Any combination of the control arguments governing naming (-name, -primary, and -match) may be given in the command. However, the following groups of control arguments are mutually exclusive, and only one argument from each group may be given in the command: -chase and -no_chase; -long and -brief; -container, -components, and -entry; -retain and -omit; and -all and -default.

An -all or -default control argument may only be specified when the -output_file control argument is also given. The particular status information recorded in the output file for the -default control argument is under the control of the library search program. It includes the information deemed most important for the type of entry contained in the library.

If the file given in the -output_file control argument does not exist, it is created by library_fetch. If it does exist, new status information is appended to the end of the file preserving any previously recorded status. This feature allows the user to build a history of the entries copied out of a library.

When using the -into control argument, care must be taken to insure that the equal name included in the -into pathname can be applied to all names to be placed on each of the copied entries. Name duplications can easily result when more than one library entry matches the search names.

The -container and -components control arguments are provided to facilitate copying all of the library entries included in a given bound segment or related to a given subsystem. For example, by identifying a component of the source archive for a bound segment and using the -container control

library_fetch

library_fetch

argument, the entire source archive is copied into the user's directory. Similarly, by identifying a directory in the library containing all of the component entries of a subsystem and using the `-components` control argument, each component is copied into the user's directory.

When the `-container`, `-components`, or `-chase` control arguments are used, it may happen that none of the entrynames on a copied library entry matches any of the search names. Because the user may have requested that only matching names be placed on the copies, the library search program causes the first entryname to be placed on the copy when one of these three control arguments is used, in addition to any names requested by the user.

Examples

```
library_fetch abbrev.pl1 -into >udd>Multics>user>new_=. =
```

copies the source segment `abbrev.pl1` into the directory `>udd>Multics>user`, renaming the copy `new_abbrev.pl1`.

```
library_fetch bound_runoff_.* -library online
```

copies all of the segments in the online libraries whose names begin with `bound_runoff_` into the user's working directory. This might include the source archive, bindable object archive, bound object segment, and bind listing.

```
if bound_runoff_.* -library online.source -components
```

copies all of the source components from the source archive for `bound_runoff_` into the user's working directory.

```
if qedx.pl1 -components
```

copies all of the source components in the archive containing `qedx.pl1` into the user's working directory.

library_fetch

library_fetch

library_fetch *.alm -lb network.source -into new_*.alm

copies all ALM source segments from the network source library into the user's working directory, and adds new_ to the names placed on each segment.

library_fetch pli_status.info -nm -lb info

copies the pli_status.info segment from the info segment libraries into the user's working directory, copying all entrynames from the library entry onto the copy.

library_fetch *.ec -library online.??????

copies all exec_com segments from the online source and object libraries into the user's working directory.

library_fetch -lb supervisor.bc bound_sss_wired_.*

copies the bind segment from the bindable object archive called bound_sss_wired_.archive. Note that although the object archive itself matches the search name which was given, only the matching archive component is copied because the -container control argument was not given.

library_fetch -lb include stack_frame.incl.*

copies the stack frame declaration include segments for all source languages from the include library into the user's working directory.

TITLE: Fix newline bug in abbrev		STATUS	DATE	
AUTHOR: S. Herbst		Written	05/05/75	
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR -Fixes Bug Number(s) _____ -Documented in MTB -User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)		Status A <u>05/13/75</u>	
	<input type="checkbox"/>	Lib. Maint. Tools	Expires <u>11/12/75</u>	
	<input type="checkbox"/>	Sys. Anal. Tools	DOCUMENTATION CHANGES	
	<input type="checkbox"/>	Sys. Prog. Tools	Document	Specify One or More
<input type="checkbox"/>	355	MPM (Vol, Sect.)		
<input type="checkbox"/>	BOS	PLMS (AN #)		
<input type="checkbox"/>	Salvager	MOSN (Sect.)		
<input type="checkbox"/>	Ring Zero	MPAM (Sect.)		
<input type="checkbox"/>	Ring One	MSAM (Sect.)		
<input type="checkbox"/>	SysDaemon/Admin.	Info Segs		
<input type="checkbox"/>	Runtime	Other (Name)		
<input checked="" type="checkbox"/>	User Cmmnd/Subr.	None (Reason)	no change	
Objections/Comments:				

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

SUMMARY:

Fix abbrev to handle request lines (lines beginning with a period) that do not end in newline.

REASON:

If abbrev is given a request line whose last character is not a newline, it sometimes ignores the last character. Requiring that all command lines passed to the current command processor end in newline is an unnecessary restriction and, in fact, one that is not universally upheld today.

Multics Change Request

TITLE: Implement io_call move_attach		STATUS	DATE
AUTHOR: S. Herbst		Written	05/05/75
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		Status	A 05/13/76
		Expires	11/13/75
		DOCUMENTATION CHANGES	
		Document	Specify One or More
		MPM (Vol, Sect.)	commands
		PLMS (AN #)	
		MOSN (Sect.)	
		MPAM (Sect.)	
		MSAM (Sect.)	
Objections/Comments:		Info Segs	
		Other (Name)	
		None (Reason)	

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

SUMMARY:

Implement the move_attach operation in the io_call command.

REASONS:

Users will be able to call the new entry iox_\$move_attach from command level.

DETAILED PROPOSAL:

"io_call move_attach X Y" looks for an existing block X, aborts if not found, looks for and creates if necessary a block Y, calls iox_\$move_attach with pointers to X and Y, and reports any errors.

(MPM Commands, under io_call)

move_attach OPERATION

The usage of move_attach is:

io_call move_attach switchname target_switchname

where:

1. switchname is the name of an attached I/O switch.
2. target_switchname is the name of a detached I/O switch.

This command moves the attachment of the first I/O switch to the target I/O switch and leaves the first switch in the detached state.

If a control block for the target switch does not exist, one is created.

Multics Change Request

TITLE: Add MPC dumper facility to BOS		STATUS	DATE	
AUTHOR: Noel I. Morris (for D.A. Kayden)		Written	75.05.05	
-Coded in: <input type="checkbox"/> PL/I <input checked="" type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)	Status	A 05/13/76	
		Lib. Maint. Tools	Expires	11/13/76
		Sys. Anal. Tools	DOCUMENTATION CHANGES	
		Sys. Prog. Tools	Document	Specify One or More
		355	MPM (Vol, Sect.)	
	X BOS	PLMS (AN #)		
	Salvager	MOSN (Sect.)	5	
	Ring Zero	MPAM (Sect.)		
	Ring One	MSAM (Sect.)		
	SysDaemon/Admin.	Info Segs		
	Runtime	Other (Name)		
	User Cmmnd/Subr.	None (Reason)		
Objections/Comments:				

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

SUMMARY:

For the purposes of debugging and tracing hardware/firmware/software problems, it is useful to be able to dump MPC storage and trace tables. The new BOS command, MPCD, will provide this capability. An MOSN will be issued describing the use of the MPCD command.

TO: Operations
FROM: Noel I. Morris
DATE: 27 May 75
RE: Command to dump MPC

A new BOS command has been made available to assist programming staff in system development and system malfunction analysis. This command will dump MPC memory and the trace table kept by the MPC.

Usage:

MPCD -devname- -trace- -dump-

devname is the name of a device connected to the mpc. It must be described in the config deck by a PRPH card.

trace will, if present, dump the MPC trace table.

dump will, if present, dump MPC memory.

Note

When dumping the MPC trace table, switch 4 on the appropriate MPC should be placed in the UP position in order to inhibit further tracing.

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Multics Change Request

TITLE: Fix bug in BOS card reading program		STATUS	DATE
AUTHOR: Noel I. Morris		Written	75.05.05
-Coded in: <input type="checkbox"/> PL/I <input checked="" type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		Status	A 05/13/75
		Expires	11/13/75
		DOCUMENTATION CHANGES	
		Document	Specify One or More
Category (Check One) <input type="checkbox"/> Lib. Maint. Tools <input type="checkbox"/> Sys. Anal. Tools <input type="checkbox"/> Sys. Prog. Tools <input type="checkbox"/> 355 <input checked="" type="checkbox"/> BOS <input type="checkbox"/> Salvager <input type="checkbox"/> Ring Zero <input type="checkbox"/> Ring One <input type="checkbox"/> SysDaemon/Admin. <input type="checkbox"/> Runtime <input type="checkbox"/> User Cmmnd/Subr.		MPM (Vol, Sect.)	
		PLMS (AN #)	
		MOSN (Sect.)	
		MPAM (Sect.)	
		MSAM (Sect.)	
		Info Segs	
		Other (Name)	
		None (Reason)	
Objections/Comments:			

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

SUMMARY:

A coding bug in the BOS card reading module causes it to attempt to read more cards after an EOF card is detected.

Proposal:

Fix the bug.

Multics Change Request

TITLE: enable BOS to reside on 7-track tape		STATUS	DATE
AUTHOR: Noel I. Morris		Written	75.05.05
-Coded in: <input type="checkbox"/> PL/I <input type="checkbox"/> ALM <input checked="" type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input checked="" type="checkbox"/> Better <input type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		Status	A 05/13/75
		Expires	11/12/75
		DOCUMENTATION CHANGES	
		Document	Specify One or More
		MPM (Vol, Sect.)	
		PLMS (AN #)	
		MOSN (Sect.)	
		MPAM (Sect.)	
		MSAM (Sect.)	
Objections/Comments:		Info Segs	
		Other (Name)	
		None (Reason)	

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

SUMMARY:
 AFDSC has complained that they are unable to load a BOS tape which was written on 7-track handler. The problem was traced to the BOS 5-card loader. The 5-card loader program attempts to set the bootload handler to 1600 bpi and then read the tape. If the read fails because of a PE/NRZI compatibility check, it tries again after setting the density to 800 bpi. If the handler is a 7-track handler, the SD16 (set density to 1600 bpi) command is rejected. The 5-card loader then uses whatever density that the drive was already set to. If this is not equal to 800 bpi, the tape will not be loaded successfully.

Proposal:
 Change the 5-card loader to set density to 800 bpi first. If a compatibility check occurs, then try 1600 bpi.

Multics Change Request

TITLE: Install new record_io_ and bound_plio2_		STATUS	DATE
AUTHOR: R. Schoeman		Written	05/06/75
-Coded in: <input type="checkbox"/> PL/I <input type="checkbox"/> ALM <input checked="" type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input checked="" type="checkbox"/> Better <input type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)		
	<input type="checkbox"/> Lib. Maint. Tools	DOCUMENTATION CHANGES	
	<input type="checkbox"/> Sys. Anal. Tools	Document	Specify One or More
	<input type="checkbox"/> Sys. Prog. Tools	MPM (Vol, Sect.)	
<input type="checkbox"/> 355	PLMS (AN #)		
<input type="checkbox"/> BOS	MOSN (Sect.)		
<input type="checkbox"/> Salvager	MPAM (Sect.)		
<input type="checkbox"/> Ring Zero	MSAM (Sect.)		
<input type="checkbox"/> Ring One	Info Segs		
<input type="checkbox"/> SysDaemon/Admin.	Other (Name)		
<input checked="" type="checkbox"/> Runtime	None (Reason) <u>No relevant PLM's & no user-visible change</u>		
<input type="checkbox"/> User Cmnd/Subr.			

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

SUMMARY: Install a new record_io_ and a new bound_plio2_.

REASONS: record_io_ in bound_sss_wired_ has been changed to:

- 1) do fast record i/o, i.e. call iox_ directly, for keyed files and delete statements, cases which were excluded in previous version;
- 2) fix several bugs which were found in it which had the effect of excluding some unkeyed cases which could have been done directly from fast handling.

The speed improvement in the cases now handled directly is 15% - 60%. plio2_recio_ in bound_plio2_ required minor changes at its interface with record_io_, and a minor bug was fixed in it.

IMPLICATIONS: There are no user-visible changes, outside of the decreased execution time.

DETAILED PROPOSAL: record_io_ is coded in alm, plio_recio_ is in PL/1.

Multics Change Request

TITLE: Install new user ring tty dim

STATUS

DATE

AUTHOR: S. Herbst

Written

05/02/75

Status

A 05/13/76

Expires

11/13/76

-Coded in: PL/I ALM other-
explain in DETAILED PROPOSAL

Category (Check One)

-Planned for System MR

Lib. Maint. Tools

-Fixes Bug Number(s)

Sys. Anal. Tools

-Documented in MTB

Sys. Prog. Tools

DOCUMENTATION CHANGES

-User/Operations-visible

355

Document

Specify One or More

Interface change? yes no

BOS

MPM (Vol, Sect.)

-Incompatible change? yes no

Salvager

PLMS (AN #) User I/O (57)

-Performance: Better Same
 Worse

Ring Zero

MOSN (Sect.)

-Replaces MCR

Ring One

MPAM (Sect.)

SysDaemon/Admin.

MSAM (Sect.)

Runtime

User Cmmnd/Subr.

Objections/Comments:

Info Segs

Other (Name)

None (Reason)

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

SUMMARY:

Replace the user ring portion of the old tty dim with the IOX dim tty_.

REASON:

IOX conversion.

DETAILED CONVERSION:

tty operations are currently performed as write-arounds by the module tty_attach, which also contains write-arounds for a variety of other converted dims. This change takes out the tty entries and puts them in a separate module tty_ that has the entry tty_attach. The old module tty_attach with tty entries removed is renamed to ios_write_around_.

Multics Change Request

TITLE: Convert bound_command_loop_ to IOX		STATUS	DATE	
AUTHOR: S. Herbst		Written	05/02/75	
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)	Status	A 05/13/75	
	<input type="checkbox"/> Lib. Maint. Tools	Expires	11/13/75	
	<input type="checkbox"/> Sys. Anal. Tools	DOCUMENTATION CHANGES		
	<input type="checkbox"/> Sys. Prog. Tools	Document	Specify One or More	
	<input type="checkbox"/> 355	MPM (Vol, Sect.)		
	<input type="checkbox"/> BOS	PLMS (AN #) Commands		
	<input type="checkbox"/> Salvager	MOSN (Sect.)		
	<input type="checkbox"/> Ring Zero	MPAM (Sect.)		
	<input type="checkbox"/> Ring One	MSAM (Sect.)		
	<input type="checkbox"/> SysDaemon/Admin.	Info Segs		
<input type="checkbox"/> Runtime	Other (Name)			
<input checked="" type="checkbox"/> User Cmnd/Subr.	None (Reason)			
Objections/Comments:				

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

SUMMARY:

Convert bound_command_loop_ to use iox_.

The programs to be changed are:

```

  ioa_                process_overseer_
                    rest_of_ioa_
                    user_real_init_admin_
  
```

REASON: IOX conversion

DETAILED PROPOSAL:

user_real_init_admin_ will try an IOX attachment first and if the I/O module cannot be found will try an IOS attachment. This is done so that users can still specify an IOS outer module. Naming conventions for IOS and IOX modules are different.

Multics Change Request

TITLE: Fix bug in copy_seg_		STATUS	DATE
AUTHOR: S. Herbst		Written	05/06/75
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____		Status	A 05/13/75
		Expires	11/13/75
		DOCUMENTATION CHANGES	
		Document	Specify One or More
		MPM (Vol, Sect.)	
		PLMS (AN #)	
		MOSN (Sect.)	
		MPAM (Sect.)	
		MSAM (Sect.)	
Objections/Comments:		Info Segs	
		Other (Name)	
		None (Reason) no change	

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

SUMMARY:

Change copy_seg_ to handle the case where the target is an existing link to the source segment as a name duplication on the link rather than an attempt to specify the same segment as source and target.

REASONS:

The copy command currently says:

"Attempt to specify the same segment as both old and new".

in the above case, whereas it should say:

"Name duplication. Do you want to unlink the old link etc.?"

TITLE: Fix bug(s) in stu_		STATUS	DATE	
AUTHOR: J. M. Broughton		Written	05/06/75	
-Coded in: <input checked="" type="checkbox"/> PL/I <input type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input checked="" type="checkbox"/> yes <input type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input type="checkbox"/> Better <input checked="" type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)	Status	A05/13/75	
		Lib. Maint. Tools	Expires	1/1/75
		Sys. Anal. Tools	DOCUMENTATION CHANGES	
		Sys. Prog. Tools	Document	Specify One or More
		355	MPM (Vol, Sect.)	AK92 SWG - Subroutine
	BOS	PLMS (AN #)		
	Salvager	MOSN (Sect.)		
	Ring Zero	MPAM (Sect.)		
	Ring One	MSAM (Sect.)		
	SysDaemon/Admin.			
	<input checked="" type="checkbox"/> Runtime			
	User Cmmnd/Subr.			
Objections/Comments:		Info Segs		
		Other (Name)		
		None (Reason)		

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

- SUMMARY:
- 1) Increase precision of certain variables in get_runtime_address, and;
 - 2) Change declaration of the first parameter to, and the return value of decode_runtime_value from fixed bin(17) to fixed bin(35).

REASONS: There is a problem in finding the address of members of PL/I structures and FORTRAN common blocks that contain several large arrays. The precision of the variables in question is not sufficient to adequately handle the large offsets that can be encountered.

The parameter/return value for decode_runtime_value has always been misdeclared. Correct operation has hinged on the fact that fixed bin and fixed bin(35) both occupy a full word. However, the small precision contributes to the above problem and must now be changed.

IMPLICATIONS: User/system programs calling stu_\$decode_runtime_value should be changed to reflect the new declaration of the entry. There is, however, no foreseeable change in PL/I which would prevent those programs which now work correctly from continuing to work.

TITLE: Change operation of delete_ on directories
AUTHOR: S. Herbst

STATUS	DATE
Written	05/07/75
Status	A 05/13/75
Expires	11/13/75

-Coded in: 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 1149

Category (Check One)	
<input type="checkbox"/>	Lib. Maint. Tools
<input type="checkbox"/>	Sys. Anal. Tools
<input type="checkbox"/>	Sys. Prog. Tools
<input type="checkbox"/>	355
<input type="checkbox"/>	BOS
<input type="checkbox"/>	Salvager
<input type="checkbox"/>	Ring Zero
<input type="checkbox"/>	Ring One
<input type="checkbox"/>	SysDaemon/Admin.
<input type="checkbox"/>	Runtime
<input checked="" type="checkbox"/>	User Cmnd/Subr.

DOCUMENTATION CHANGES	
Document	Specify One or More
	MPM (Vol, Sect.)
	PLMS (AN #) Commands
	MOSN (Sect.)
	MPAM (Sect.)
	MSAM (Sect.)
	Info Segs
	Other (Name)
	None (Reason)

Objections/Comments:

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

SUMMARY:

Change delete_ to delete a directory containing message segments and mailboxes.

REASONS:

It is too difficult and confusing to delete such a directory today using the delete_dir command and takes more than one invocation of the command.

DETAILED PROPOSAL:

Replace call to hcs_\$del_dir_tree with some internal code that calls mailbox_\$delete and message_segment_\$delete when necessary. If the delete operation still fails, a message is printed naming the branch on which it failed.

IMPLICATIONS:

hcs_\$del_dir_tree becomes an obsolete interface and can be deleted.

Additional feature: delete_dir will terminate and unsnap links to all branches that are deleted in a subtree.

NOTE: del_dir_tree must remain in ring zero.

Multics Change Request

TITLE: Increase the size of IMP DIM link tables.		STATUS	DATE
AUTHOR: Raj Kanodia		Written	05/08/75
-Coded in: <input type="checkbox"/> PL/I <input checked="" type="checkbox"/> ALM <input type="checkbox"/> other- explain in DETAILED PROPOSAL -Planned for System MR _____ -Fixes Bug Number(s) _____ -Documented in MTB _____ -User/Operations-visible Interface change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Incompatible change? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no -Performance: <input checked="" type="checkbox"/> Better <input type="checkbox"/> Same <input type="checkbox"/> Worse -Replaces MCR _____	Category (Check One)		
	<input type="checkbox"/>	Lib. Maint. Tools	DOCUMENTATION CHANGES
	<input type="checkbox"/>	Sys. Anal. Tools	
	<input type="checkbox"/>	Sys. Prog. Tools	
<input type="checkbox"/>	355		
<input type="checkbox"/>	BOS	Document	Specify One or More
<input type="checkbox"/>	Salvager	MPM (Vol, Sect.)	
<input checked="" type="checkbox"/>	Ring Zero	PLMS (AN #)	
<input type="checkbox"/>	Ring One	MOSN (Sect.)	
<input type="checkbox"/>	SysDaemon/Admin.	MPAM (Sect.)	
<input type="checkbox"/>	Runtime	MSAM (Sect.)	
<input type="checkbox"/>	User Cmmnd/Subr.	Info Segs	
Objections/Comments:		Other (Name)	
		None (Reason)	

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

SUMMARY:

At present, the IMP DIM link tables permit at most 84 simultaneous Network connections to foreign hosts. With recent increase in the number of ~~foreign~~ hosts that are on the Network and in constant communication with mit-multics, (approximately 72), the situation has reached a crisis proportion with only 12 connection being available for users (some of which get paralyzed due to an NCP bug.)

The proposed change will ~~xxxxxxxxxxxx~~ double the size of the tables.

Ver. 3	MULTICS CHANGE REQUEST	MCR 1173
741022		
TITLE: Add commenting capability to reduction_compiler language		STATUS DATE
AUTHOR: Gary C. Dixon		Written 05/05/75
		Status 05/13/75
		Expires 11/05/75
Planned for System: MR 3.0		
Fixes Bug Number(s): not applicable		CATEGORY (check one)
Documented in MTB: not applicable		() Lib. Maint. Tools
Incompatible Change: no		() Sys. Anal. Tools
User/Operations-visible Interface Change: yes		(<input checked="" type="checkbox"/>) Sys. Prog. Tools
Coded int (<input checked="" type="checkbox"/>)PL/I ()ALM ()other-see below		() 355
Performance: ()better (<input checked="" type="checkbox"/>)same ()worse		() BOS
		() Salvager
DOCUMENTATION CHANGES (specify one or more)		() Ring Zero
NPM (vol,sect) MPAM (sect)		() Ring One
MOSN (sect) MSAM (sect)		() SysDaemon/Admin
PLMs (AN#) AN51		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Allow comments to be included in a set of reductions.

REASONS:

Comments would make it possible to write a more understandable set of reductions which can be more easily maintained. They would provide a mechanism for the author of the set of reductions to express his ideas and intentions for the reductions.

A comment mechanism was included in the original design for the reduction language, but was omitted from the final implementation because time pressures prevented a decision on a good set of comment delimiters. Subsequent thought on the matter and discussions with rdc users have lead to the proposal detailed below.

IMPLICATIONS:

It will be easier for the author to express the intended function of a set of reductions, thereby conveying additional information to subsequent maintainers of an rdc translator.

DETAILED PROPOSAL:

The comments are intended for use as a header for a group of reductions, or to clarify the meaning to the reader of a single reduction. It is desirable that the comments be used in such a way that they do not obscure the otherwise simple organization of a reduction statement. The following convention was chosen to promote this pattern of usage:

The characters \" begin a comment in the reduction language, which ends with the next newline character.

Examples of expected usage are:

```
\" Pass one: all tokens are scanned to identify labels
\" and to count the tokens in the input string.
pass1 / <name> / set_label LEX / \
      / / / LEX / skip \
```

and

```
label / <is_it> / [ptr=complicated] / \
      \" when it is, make sure ptr is updated to
      \" reflect complicated relationship.
      / <any> / ERROR(5) / \
```

The choice of delimiters was based upon three factors:

1. Maintaining upwards compatibility with existing rdc translators. It is likely that no translators besides the reduction_compiler use \" in their syntax specifications, and \" is not legal in any other field of a reduction statement except as the end-of-statement delimiter. An end-of-statement delimiter followed by a \" is an impossible sequence in the current reduction language because the field following the end-of-statement delimiter is the label field of the next statement, and labels cannot contain \" characters.
2. Providing a commenting convention similar to one of the existing conventions. The PL/I convention could not be used without changing the comment delimiters because the set of reductions is already contained as a comment in the PL/I source segment, and PL/I comments cannot contain nested PL/I comments. The ALM convention was chosen because of the beneficial restrictions it places on the format of comments. The ALM \" comment delimiter had to be replaced by \" to differentiate a comment from the beginning of a quoted string. In many ways, an escaped quote (\\") is an appropriate comment delimiter.
3. Not introducing any new break characters into the reduction language. In general, adding break characters to a language is a non-upwards compatible change because it causes the compiler to translate differently any existing source segments coded in any language.

Ver. 3	MULTICS CHANGE REQUEST	MCR 1174
741022		
TITLE: Fix bug in reduction_compiler_		STATUS DATE
		Written 05/05/75
AUTHOR: Gary C. Dixon		Status 06/13/75
		Expires 11/05/75
Planned for System: MR 3.0		
Fixes Bug Number(s): Unreported Bug		CATEGORY (check one)
Documented in MTB: not applicable		() Lib. Maint. Tools
Incompatible Change: yes		() Sys. Anal. Tools
User/Operations-visible Interface Change: yes		(<input checked="" type="checkbox"/>) Sys. Prog. Tools
Coded in: (<input checked="" type="checkbox"/>) PL/I () ALM () other-see below		() 355
Performance: () better () same (<input checked="" type="checkbox"/>) worse		() 80S
		() Salvager
DOCUMENTATION CHANGES (specify one or more)		() Ring Zero
MPM (vol,sect) MPAM (sect)		() Ring One
MOSN (sect) MSAM (sect)		() SysDaemon/Admin
PLMs (AN#) AN51		() Runtime
Info Segs		() User Command/Subr
Other		
OBJECTIONS/COMMENTS:		

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

SUMMARY:

Make reduction_compiler_ (the translation subroutine for the reduction_compiler) properly translate any PL/I statement used as a semantic statement. Currently, it does not properly translate a statement which contains two PL/I atoms not separated by an operator. For example, it translates

```
{if able = 5 then go to quit}
```

as

```
ifaole=5thengotoquit;
```

instead of as

```
if able = 5 then go to quit;
```

REASONS:

The documentation for the reduction_compiler states that any PL/I statement can be used as a semantic statement.

DETAILED PROPOSAL:

The problem will be solved by putting a space in the output before every token in a semantic statement, with the following exceptions.

1. No space will be placed between the last token of a semantic statement and its ending semi-colon statement delimiter.
2. No space will be placed between an argument in a subprogram call and any comma delimiter which follows it.

3. No space will be placed between a quoted string and any token which follows it, in order to handle bit string constants (eg, "101"b).
4. No space will be placed between any of the following pairs of characters which have a special meaning in the PL/I language:
 -> >= <= ^= ^> ^<
5. No space will be placed between any minus sign (-) and the token which follows, in order to handle signed numeric constants.

In addition, the semantic statements appearing in the same pair of brackets will be placed on different lines in the output segment.

To do this, four new break characters must be added to the reduction language:

^ - = ;

IMPLICATIONS:

Advantages: the reduction_compiler will stop generating bad PL/I code for semantic statements. Code for semantic statements will be output in a more readable format.

Disadvantages: existing programs which use the reduction_compiler may have to be changed if they use any of the new break characters in an absolute token specification with other characters. For example, able-baker is now one specification but would become three after the change unless enclosed in quotes. This is not deemed a serious drawback because no code generated by the reduction_compiler has been installed yet.

The extra reductions required to properly translate a semantic statement add about 10% more virtual CPU time to the rdc compilation of a translator. However since compiler response time is still noticeably good, and since the reduction_compiler is a lightly-used tool, this performance degradation is not very significant.