

TO: Distribution  
 FROM: Grace Ackerman-Lewis  
 DATE: April 4, 1976  
 SUBJECT: Installation of MSS 28.0

The hardcore system 28-0 was installed on Sunday, February 15, 1976. This system is a complete reorganization of the storage system, such that: 1) All pages of the same segment are allocated in the same physical volume 2) On each physical volume an array is kept with one entry for each physical record (1024 word) of the volume. 3) On each Physical volume an array is kept with one entry for each segment stored in the volume. 4) Each physical volume is registered. These changes are for the purpose of: 1) Reducing the amount of lost information. 2) Reducing the amount of system resources used by the backup facility.

(the major parts of this feature will be in a later release)  
 3) Provide for handling a large number of disks. 4) Providing the capability for removable disk packs. 5) Improve the operator interface. The system libraries were updated on February 24, 1976 at 20:08.

### I. System Change Log

#### Chng MGR

#### Change

- # 1553 ---- Change to allow deletion of non-bootload CPU without crashing the system
- # 1554 ---- Change to keep blank error messages from overwriting the syserr log.
- # 1555 1582,1576  
Change to reorganize the way information is stored in the Multics system.

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## II. Segment Change Log

<u>Segment Name</u>	<u>Bound Segment</u>	<u>Change #</u>
acc_list.pl1	bound_file_system	R 1555
acc_name.pl1	bound_system_faults	R 1555
accept_fs_disk.pl1	bound_disk_util	A 1555
access_class_check.pl1	bound_priv_procs	R 1555
access_mode.pl1	bound_system_faults	R 1555
acl.pl1	bound_file_system	R 1555
acl_.pl1	bound_file_system	R 1555
activate.pl1	bound_system_faults	R 1555
activate_segs.pl1	bound_process_creation	R 1555
active_hardcore_data.alm	-	R 1555
admin_gate_.mexp	-	R 1555
append.pl1	bound_file_system	R 1555
asd_.pl1	bound_file_system	R 1555
assign_device.pl1	bound_file_system	D 1555
backup_load.pl1	bound_reloader_	R 1555
backup_load_dir_list.pl1	bound_reloader_	R 1555
bk_arg_reader_.pl1	bound_reloader_	R 1555
bk_input.pl1	bound_reloader_	R 1555
bk_ss_.alm	bound_reloader_	R 1555
bootstrap1.alm	-	R 1555
boundfault.pl1	bound_system_faults	R 1555
bulk_store_control.alm	bound_page_control	R 1555
call_bos.pl1	bound_file_system	R 1555
change_dtem.pl1	bound_file_system	R 1555
check_gate_acl_.pl1	bound_file_system	R 1555
check_vtoce_branch.pl1	bound_salvager	A 1555
chname.pl1	bound_file_system	R 1555
collect_free_core.pl1	bound_temp_1	R 1555
config.pl1	bound_active_1	R 1555
copy_fdump.pl1	bound_file_system	R 1555
create_vtoce.pl1	bound_vtoc_man	A 1555
dc_pack.pl1	bound_active_1	R 1555
deactivate.pl1	bound_system_faults	R 1555
deactivate_segs.pl1	bound_process_creation	R 1555
debug_check.pl1	bound_error_wired	R 1554
del_dir_tree.pl1	bound_file_system	R 1555
delentry.pl1	bound_file_system	R 1555
delete_pd_records.pl1	bound_process_creation	R 1555
delete_segs.pl1	bound_tc_wired	R 1555
delete_vtoce.pl1	bound_vtoc_man	A 1555
device_control.alm	bound_page_control	R 1555
dir_control_error.pl1	bound_system_faults	R 1555
dir_dump.pl1	bound_salvager	A 1555
disk_control.pl1	bound_process_creation	R 1555

## II. Segment Change Log (continued)

<u>Segment Name</u>	<u>Bound Segment</u>	<u>Change #</u>
disk_error_data.alm	bound_page_control	A 1555
disk_init.pl1	bound_temp_1	R 1555
disk_table_.pl1	-	A 1555
emergency_shutdown.alm	-	R 1555
error_table_.et	-	R 1555
evict_page.alm	bound_page_control	R 1555
ex_acl.pl1	bound_mseg_prim	R 1555
fim.mexp	-	R 1555
find_.pl1	bound_system_faults	R 1555
find_dirsegno.pl1	bound_system_faults	R 1555
find_entry.pl1	bound_system_faults	R 1555
fm_checksum_.alm	bound_system_faults	D 1555
free_store.alm	bound_page_control	R 1555
fs_get.pl1	bound_system_faults	R 1555
fs_search.pl1	bound_system_faults	R 1555
fsout.pl1	bound_disk_util_wired_	R 1555
fsout_vol.pl1	bound_disk_util_wired_	A 1555
get_aste.pl1	bound_system_faults	R 1555
get_pathname_.pl1	bound_system_faults	R 1555
get_ptrs_.alm	bound_page_control	R 1555
get_pvtx.pl1	bound_vtoc_man	A 1555
grab_aste.pl1	bound_process_creation	R 1555
hash.pl1	bound_system_faults	R 1555
hcs_.mexp	-	R 1555
hphcs_.mexp	-	R 1555
init_branches.pl1	bound_init_2	R 1555
init_collections.pl1	bound_init_1	R 1555
init_disk_pack_.pl1	-	A 1555
init_empty_root.pl1	bound_temp_1	A 1555
init_hardcore_gates.pl1	bound_temp_2	R 1555
init_proc.pl1	bound_process_creation	R 1555
init_processor.alm	-	R 1555
init_pvt.pl1	bound_temp_1	A 1555
init_root_dir.pl1	bound_temp_2	R 1555
init_sst.pl1	bound_temp_1	R 1555
init_sys_var.pl1	bound_temp_2	R 1555
init_vtoc_man.pl1	bound_temp_2	A 1555
initialize_dims.pl1	bound_temp_1	D 1555
initialize_kst.pl1	bound_process_creation	R 1555
initializer_gate_.mexp	-	A 1555
initiate.pl1	bound_system_faults	R 1555
initiate_search_rules.pl1	bound_file_system	R 1555
io_init.pl1	bound_io_init	R 1555
lobm_init.pl1	bound_io_init	D 1555
lobm_init.pl1	bound_temp_1	A 1555
level_0_.pl1	bound_file_system	R 1555
link_snap.pl1	bound_system_faults	R 1556
list_dir.pl1	bound_file_system	R 1555
list_inact_all.pl1	bound_file_system	R 1555

## II. Segment Change Log (continued)

<u>Segment Name</u>	<u>Bound Segment</u>	<u>Change #</u>
load_vol_map.pl1	bound_disk_util	A 1555
lock.pl1	bound_system_faults	R 1555
make_branches.pl1	bound_init_2	R 1555
make_msf_.pl1	bound_fsm_	R 1555
make_sdw.pl1	bound_init_1	R 1555
make_segs_paged.pl1	bound_temp_1	R 1555
makeunknown.pl1	bound_system_faults	R 1555
master_dir_control_.pl1	-	A 1555
mdc_.mexp	-	A 1555
move_file_map.pl1	bound_system_faults	D 1555
oc_data_init.pl1	bound_temp_1	R 1555
on_line_salvager.pl1	bound_salvager	R 1555
page.alm	bound_page_control	R 1555
page_error.alm	bound_page_control	R 1555
page_fault.alm	bound_page_control	R 1555
pc.pl1	bound_page_control	R 1555
pc_wired.pl1	bound_page_control	R 1555
pd_util.alm	bound_page_control	R 1555
periph_io.pl1	bound_util_print	R 1555
plm.pl1	bound_process_creation	R 1555
post_purge.alm	bound_page_control	R 1555
privileged_mode_ut.alm	bound_priv_1	R 1555
protection_audit_.pl1	bound_system_faults	R 1555
put_aste.pl1	bound_system_faults	A 1555
pxss.alm	-	R 1555
quota.pl1	bound_file_system	R 1555
quotaw.pl1	bound_page_control	R 1555
read_disk.pl1	bound_disk_util_wired_	A 1555
reclassify.pl1	bound_priv_procs	R 1555
reload.pl1	bound_reloader_	R 1555
ring_zero_meter_limits_ASCII_	-	R 1555
ringbr_.pl1	bound_file_system	R 1555
salv_activator.pl1	bound_salvager	A 1555
salv_check_map.pl1	bound_salvager	R 1555
salv_check_ptr.pl1	bound_salvager	R 1555
salv_check_thread.pl1	bound_salvager	R 1555
salv_clean_ast.pl1	bound_salvager	R 1555
salv_data.alm	-	R 1555
salv_delete_names.pl1	bound_salvager	A 1555
salv_err_msg.pl1	bound_salvager	A 1555
salv_print.alm	bound_salvager	A 1555
salv_print_online.pl1	bound_salvager	A 1555
salv_rebuild_acl.pl1	bound_salvager	R 1555
salv_rebuild_directory.pl1	bound_salvager	R 1555
salv_rebuild_names.pl1	bound_salvager	R 1555

## II. Segment Change Log (continued)

<u>Segment Name</u>	<u>Bound Segment</u>	<u>Change #</u>
salv_truncate.pl1	bound_salvager	R 1555
salvage_directory.pl1	bound_salvager	R 1555
salvage_entry.pl1	bound_salvager	R 1555
salvage_pv.pl1	bound_salvager	A 1555
salvager.pl1	bound_salvager	A 1555
search_ast.alm	bound_system_faults	A 1555
seg_fault.pl1	bound_system_faults	R 1555
segment_mover.pl1	bound_system_faults	A 1555
set.pl1	bound_file_system	R 1555
set_disk_table_loc.pl1	bound_file_system	A 1555
set_sons_lvid.pl1	bound_file_system	A 1555
setfaults.pl1	bound_system_faults	R 1555
shutdown.pl1	bound_file_system	R 1555
shutdown_switch.alm	bound_priv_1	R 1555
signal_.pl1	bound_sss_wired	R 1555
star_.pl1	bound_file_system	R 1555
start_cpu.pl1	bound_process_creation	R 1555
status_.pl1	bound_system_faults	R 1555
stop_cpu.pl1	bound_process_creation	R 1555
sum.pl1	bound_system_faults	R 1555
syserr_log_check.pl1	bound_error_active	R 1554
syserr_log_init.pl1	bound_temp_1	D 1555
syserr_log_init.pl1	bound_temp_2	A 1555
syserr_real.pl1	bound_error_wired	R 1554
system_startup_.pl1	-	R 1555
tape_io.pl1	-	R 1555
tc_init.pl1	bound_init_2	R 1555
template_address_space.pl1	bound_system_faults	R 1555
thread.pl1	bound_page_control	R 1555
truncate.pl1	bound_file_system	R 1555
truncate_vtoce.pl1	bound_vtoc_man	R 1555
update_kste_access.pl1	bound_system_faults	R 1555
update_vtoce.pl1	bound_vtoc_man	A 1555
updateb.pl1	bound_system_faults	D 1555
utility_print.pl1	bound_util_print	R 1555
validate_entry.pl1	bound_system_faults	R 1555
verify_label_.pl1	-	A 1555
verify_lock.pl1	bound_file_system	R 1555
vm_vlo.pl1	bound_salvager	A 1555
vtoc_attributes.pl1	bound_system_faults	A 1555
vtoc_interrupt.pl1	bound_disk_util_wired_	A 1555
vtoc_man.pl1	bound_vtoc_man	A 1555
wired_plm.pl1	bound_tc_wired	R 1555
wired_shutdown.pl1	bound_tc_wired	R 1555
 <u>Include Files</u>		
add_type.incl.alm		A 1555

## II. Segment Change Log (continued)

<u>Segment Name</u>	<u>Bound Segment</u>	<u>Change #</u>
add_type.incl.pl1		A 1555
ast.incl.alm		R 1555
ast.incl.pl1		R 1555
aste.incl.alm		R 1555
aste.incl.pl1		R 1555
backup_preamble_header.incl.pl1		R 1555
bk_nss_info.incl.pl1		R 1555
bk_ss_.incl.pl1		R 1555
bulk_store_data.incl.pl1		A 1555
bulk_store_mailbox.incl.alm		R 1555
bulk_store_mailbox.incl.pl1		R 1555
cmp.incl.alm		R 1555
cmp.incl.pl1		R 1555
create_branch_info.incl.pl1		R 1555
device_error.incl.pl1		A 1555
dir_acl.incl.pl1		R 1555
dir_control_err.incl.pl1		R 1555
dir_entry.incl.pl1		R 1555
dir_header.incl.pl1		R 1555
dir_link.incl.pl1		R 1555
dir_name.incl.pl1		R 1555
dirlockt.incl.pl1		A 1555
disk_pack.incl.alm		A 1555
disk_pack.incl.pl1		A 1555
disk_table.incl.pl1		A 1555
dmp_r_info.incl.pl1		A 1555
dskdcl.incl.pl1		A 1555
ename.incl.pl1		R 1555
error_interp.incl.pl1		A 1555
fgbx.incl.alm		A 1555
fgbx.incl.pl1		A 1555
fm.incl.pl1		R 1555
fs_dev_types.incl.pl1		A 1555
fs_vol_label.incl.alm		A 1555
fs_vol_label.incl.pl1		A 1555
fsdct.incl.alm		R 1555
fsdct.incl.pl1		R 1555
fsdisk_errcodes.incl.pl1		A 1555
fsdisk_errors.incl.pl1		A 1555
fsmap.incl.alm		R 1555
fsmap.incl.pl1		R 1555
intk_card.incl.pl1		A 1555
make_sstnt_entry.incl.pl1		R 1555
null_addresses.incl.alm		R 1555
null_addresses.incl.pl1		R 1555
page_info.incl.alm		R 1555
pomap_header.incl.pl1		R 1555
ptw.incl.alm		R 1555
ptw.incl.pl1		R 1555

## II. Segment Change Log (continued)

Segment Name	Bound Segment	Change #
pvt.incl.alm		A 1555
pvt.incl.pl1		R 1555
quota_cell.incl.pl1		A 1555
salv_data.incl.pl1		R 1555
sc_info.incl.pl1		A 1555
sit_init.incl.alm		R 1555
sit_template.incl.alm		R 1555
sst.incl.alm		R 1555
sst.incl.pl1		R 1555
static_handlers.incl.alm		R 1555
static_handlers.incl.pl1		R 1555
system_free_seg.incl.pl1		R 1555
vol_map.incl.alm		A 1555
vol_map.incl.pl1		A 1555
vtoc_buffer.incl.pl1		A 1555
vtoc_header.incl.pl1		A 1555
vtoce.incl.alm		A 1555
vtoce.incl.pl1		A 1555
vtoce_pc_sws.incl.pl1		A 1555

**Bindfiles**

bound_active_1.bind		R 1555
bound_disk_util.bind		A 1555
bound_disk_util_wired.bind		A 1555
bound_error_active.bind		R 1555
bound_error_wired.bind		R 1555
bound_file_system.bind		R 1555
bound_init_1.bind		R 1555
bound_init_2.bind		R 1555
bound_io_init.bind		R 1555
bound_page_control.bind		R 1555
bound_printer_util_.bind		R 1555
bound_priv_1.bind		R 1555
bound_salvager.bind		R 1555
bound_system_control_.bind		R 1554
bound_system_faults.bind		R 1555
bound_temp_1.bind		R 1555
bound_temp_2.bind		R 1555
bound_util_print.bind		R 1555
bound_vtoc_man.bind		A 1555

## III. Bound Segment Change Log

<u>Bound Segment</u>	<u>Change</u>	
bound_vtoc_man	added:	create_vtoce delete_vtoce get_pvtx truncate_vtoce vtoc_man
bound_fsim	replaced:	make_msf_
bound_active_1	replaced:	config
bound_sss_wired	replaced:	signal_
bound_init_2	replaced:	init_branches make_branches tc_init
bound_error_active	replaced:	syserr_log_check
bound_disk_util	added:	accept_fs_disk load_vol_map
bound_disk_util_wired	added:	fsout fsout_vol read_disk vtoc_interrupt
bound_error_wired	replaced:	debug_check syserr_real
bound_io_init	replaced: deleted:	io_init lobm_init
bound_mseg_prim	replaced:	ex_acl
bound_util_print	replaced:	periph_io utility_print
bound_priv_1	replaced:	privileged_mode_ut shutdown_switch
bound_priv_procs	replaced:	access_class_check reclassify
bound_init_1	replaced:	init_collections make_sdw



bound_reloader_	replaced:	backup_load backup_load_dir_list bk_arg_reader_ bk_input bk_ss_ reload
bound_salvager	added:	salv_print salv_print_online salv_delete_names salv_err_msg check_vtoce_branch salvager salv_activator salvage_pv vm_vio salv_check_ptr salv_check_thread salvage_entry salv_check_map salvage_directory salv_rebuild_acl salv_rebuild_names salv_rebuild_directory salv_truncate dir_dump salv_clean_ast on_line_salvager
bound_temp_1	added:	init_pvt lobm_init init_empty_root
	replaced:	disk_init init_sst collect_free_core

## III. Bound Segment Change Log (continued)

<u>Bound Segment</u>	<u>Change</u>	
	deleted:	make_segs_paged initialize_dims syserr_log_init
bound_temp_2	added:	init_vtoc_man syserr_log_init
	replaced:	init_root_dir init_sys_var init_hardcore_gates
bound_process_creation	replaced:	start_cpu stop_cpu initialize_kst init_proc plm grab_ast activate_segs deactivate_segs delete_pd_records
bound_file_system	added:	set_disk_table_loc set_sons_lvid
	replaced:	del_dir_tree delentry truncate quota append acl asd_ ringbr_ acl_ acc_list_ change_dtem list_inacl_all set chname star_ list_dir dc_pack verify_lock call_bos shutdown copy_fdump initiate_search_rules check_gate_acl_ level_0_ deleted:
	deleted:	assign_device

## III. Bound Segment Change Log (continued)

<u>Bound Segment</u>	<u>Change</u>
bound_page_control	added: disk_error_data replaced: page_fault pd_util page post_purge device_control page_error free_store quotaw pc pc_wired get_ptrs_ disk_control thread bulk_store_control evict_page
bound_system_faults	added: search_ast vtoc_attributes put_aste segment_mover replaced: acc_name_ fs_get update_kste_access access_mode sum validate_entryp seg_fault lock activate hash find_ find_dirsegno find_entry get_pathname_ initiate fs_search link_snap status_ makeunknown get_aste setfaults boundfault deactivate dir_control_error protection_audit_ template_address_space

## III. Bound Segment Change Log (continued)

<u>Bound Segment</u>	<u>Change</u>
	deleted: fm_checksum_ move_file_map updateb
bound_tc_wired	replaced: delete_segs wired_plm wired_shutdown

## IV. Header Change Log

The hardcore header has changed in the following manner:

## Collection 1

Added: disk\_seg  
bound\_disk\_util\_wired  
bound\_disk\_util  
rdisk\_seg  
vtoc\_buffer\_seg

Chnged: fsdct  
pvt  
pd\_map\_seg  
pds, pdf  
page\_fault\_histogram

## Collection 2

Added: bound\_vtoc\_man  
dirlockt\_seg  
salv\_abs\_seg\_00 thru  
salv\_abs\_seg\_15  
vtoc\_seg0 thru vtoc\_seg7

Chnged: bound\_file\_system  
set\_disk\_table\_loc  
set\_sons\_lvid  
bound\_system\_faults  
deactivate  
ktsrch  
lock  
put\_aste  
search\_aste  
vtoc\_attributes  
bound\_temp\_2  
init\_vtoc\_man

## Collection 3

Added: disk\_table

IV. Header Change Log (continued)

init\_disk\_pack  
verify\_label  
master\_dir\_control