DOCUMENTATION OF TSMC SOFTWARE THAT INTERFACES WITH TRAFFIC ANALYSIS PROGRAMS

WA-RD 442.2

Technical Report
August 1997

Washington State Department of Transportation

Washington State Transportation Commission
Planning and Programming Service Center
in cooperation with the U.S. Department of Transportation
Federal Highway Administration

Technical Report
Research Project Agreement No. T9903, Task 70
Fuzzy Neural Seattle

DOCUMENTATION OF TSMC SOFTWARE THAT INTERFACES WITH TRAFFIC ANALYSIS PROGRAMS

by

Cynthia E. Taylor
Research Engineer

Deirdre R. Meldrum
Associate Professor

Department of Electrical Engineering
University of Washington
Seattle, Washington 98195

Washington State Transportation Center (TRAC)
University of Washington, Box 354802
University District Building
1107 NE 45th Street, Suite 535
Seattle, Washington 98105-4631

Washington State Department of Transportation
Technical Monitor
Les Jacobson
Traffic Systems Manager, Northwest Region

Sponsored by

Washington State Transportation Commission
Department of Transportation
Olympia, Washington 98504-7370

Transportation Northwest (TransNow)
University of Washington
135 More Hall, Box 354802
Seattle, Washington 98195

and in cooperation with
U.S. Department of Transportation
Federal Highway Administration

August 1997

TECHNICAL REPORT STANDARD TITLE PAGE

1. REPORT NO.	2. GOVERNMENT ACCESSION NO.	3. RECIPIENT'S CATALOG NO.
WA-RD 442.2		

4. TITLE AND SUBTITLE	5. REPORT DATE
Documentation of TSMC Software That Interfaces with Traffic Analysis Programs	August 1997
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
Cynthia E. Taylor and Deirdre R. Meldrum	
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. WORK UNIT NO.
Washington State Transportation Center (TRAC) University of Washington, Box 354802 University District Building; 1107 NE 45th Street, Suite 535 Seattle, Washington 98105-4631	11. CONTRACT OR GRANT NO. Agreement T9903, Task 70
12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
Research Office Washington State Department of Transportation Transportation Building, MS 47370 Olympia, Washington 98504-7370	Technical report
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

This study was conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration.

16. ABSTRACT

A Fuzzy Logic Ramp Metering Algorithm will address the needs of Seattle's freeway system and overcome limitations of the existing ramp metering algorithm. This project progressed toward implementing and testing a fuzzy neural ramp metering algorithm on-line at the Traffic Systems Management Center (TSMC) for the Washington State Department of Transportation's Northwest Region. Improvements were made to neural network predictors to allow better generalization.

Code was written for the fuzzy ramp metering algorithm and its interface with the pre-existing TSMC code. Of the new code written, approximately 95 percent of it was for the interface, and only 5 percent of it was for the ramp metering algorithm itself. Interfacing the fuzzy controller with the existing TSMC software required modification of 16 pre-existing files related to the ramp metering database, real-time skeleton, and ramp metering and data collector communications.

A method was developed and code was written to directly send metering rates from the VAX computer to the 170 computer and to implement them, whereas previously only a metering rate adjustment had been possible. The operator interface was designed and code was written to enter fuzzy tuning parameters and fuzzy equations. The specifications for each new parameter were designed.

Although this code was written, it has not yet been implemented on-line because of time constraints. Preparation for on-line implementation required more time than anticipated because of the unexpected complexity of the pre-existing TSMC code. On-line implementation and testing will proceed on a WSDOT/TransNow project that begins in September 1997.

In addition to software design, further planning was necessary to ensure smooth implementation and quality performance. The testing plan was developed in greater detail to include software quality testing. Primary and backup study sites were chosen, and an evaluation technique was selected. A risk assessment plan was developed to mitigate future problems.

17. KEY WORDS	18. DISTRIBUTION STATEMENT
Artificial neural networks (ANN), fuzzy logic controller (FLC), traffic data prediction, ramp metering	No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22616

19. SECURITY CLASSIF. (of this report)	20. SECURITY CLASSIF. (of this page)	21. NO. OF PAGES	22. PRICE
None	None	168	

DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. This document is disseminated through the Transportation Northwest (TransNow) Regional Center under the sponsorship of the U.S. Department of Transportation UTC Grant Program and through the Washington State Department of Transportation. The U.S. Government assumes no liability for the contents or use thereof. Sponsorship for the local match portion of the research project was provided by the Washington State Department of Transportation. The contents do not necessarily reflect the official views or policies of the U.S. Department of Transportation, Washington State Transportation Commission, or Washington State Department of Transportation. This report does not constitute a standard, specification, or regulation.

TABLE OF CONTENTS

I. CODE STRUCTURE

TMS_CODE Directories

DIR	# FILES	KB
TMS_CODE	**20**	**330**
COMM_PROT	**54**	**3005**
OPC_COMM	177	21665
RMDC_COMM	34	2433
VMS_COMM	33	2881
FDDB	**38**	**1235**
CCTVDB	46	1788
GBLDB	34	1019
GCDB	34	966
OPRTVDB	46	1646
RMDB	72	4175
TEST	82	933
SCHEDDB	31	1145
TOKEN	15	290
VAXPORTDB	56	1965
VMSDB	45	3046
MAP_DIFFERENCES	**44**	**2725**
NOAA_MONITOR	**6**	**363**
RT_SKELETON	**127**	**3219**
TMS_INCLUDE	**10**	**322**
TMS_LIBRARY	**67**	**2472**
UPI_XMIT	**7**	**733**
TMS_CODE TOTAL: 22 DIRS	*1078 FILES*	*58 MB*
TMS_EXE TOTAL: 39 DIRS	*1813 FILES*	*150 MB*
GRAND TOTAL: 61 DIRS	*2891 FILES*	*208 MB*

```
FP_left_arrow_to_buffer tms_library/vms_lib.c   /^int  FP_left_arrow_to_buffer(buffer, n_c
hars, bfr_/
FP_position_cursor      tms_library/vms_lib.c   /^int  FP_position_cursor(buffer, row, col
)/
FP_right_arrow_to_buffer        tms_library/vms_lib.c   /^int  FP_right_arrow_to_buffer(bu
ffer, n_chars, bfr/
HM_command      comm_prot/reset_modem.c /^int  HM_command(channel, command_str)/
HM_hangup       upi_xmit/upi_xmit.c     /^int  HM_hangup(channel)/
HM_initialize   comm_prot/reset_modem.c /^int  HM_initialize(channel)/
HM_reset        upi_xmit/upi_xmit.c     /^int  HM_reset(channel)/
HM_turn_off_DTR upi_xmit/upi_xmit.c     /^int  HM_turn_off_DTR(channel)/
HM_view comm_prot/reset_modem.c /^int  HM_view(channel)/
Mactv_anal      rt_skeleton/actv_anal.c /^main()/
Mbottleneck     rt_skeleton/bottleneck.c        /^main()/
Mbuild_cctvdb   fddb/cctvdb/build_cctvdb.c      /^main()/
Mbuild_fmdb     rt_skeleton/build_fmdb.c        /^main()/
Mbuild_gbldb    fddb/gbldb/build_gbldb.c        /^main()/
Mbuild_gcdb     fddb/gcdb/build_gcdb.c  /^main()/
Mbuild_oprtvdb  fddb/oprtvdb/build_oprtvdb.c    /^main()/
Mbuild_rmdb     fddb/rmdb/build_rmdb.c  /^main()/
Mbuild_rtdb     rt_skeleton/build_rtdb.c        /^main()/
Mbuild_scheddb  fddb/scheddb/build_scheddb.c    /^main()/
Mbuild_vaxportdb        fddb/vaxport/build_vaxportdb.c  /^main()/
Mbuild_vmsdb    fddb/vmsdb/build_vmsdb.c        /^main()/
Mcomm_stats_rpt rt_skeleton/comm_stats_rpt.c    /^main()/
Mcount_tms_lines        count_tms_lines.c       /^main()/
Mcrack_fmdb_dailyfil    rt_skeleton/crack_fmdb_dailyfil.c       /^main()/
Mcrack_fmdb_namefile    rt_skeleton/crack_fmdb_namefile.c       /^main()/
Mcrack_fmdb_snapshot    rt_skeleton/crack_fmdb_snapshot.c       /^main()/
Mdel_actvdb     rt_skeleton/del_actvdb.c        /^main()/
Mdel_cctvdb     fddb/cctvdb/del_cctvdb.c        /^main()/
Mdel_fmdb       rt_skeleton/del_fmdb.c  /^main()/
Mdel_gbldb      fddb/gbldb/del_gbldb.c  /^main()/
Mdel_gcdb       fddb/gcdb/del_gcdb.c    /^main()/
Mdel_oprtvdb    fddb/oprtvdb/del_oprtvdb.c      /^main()/
Mdel_rmdb       fddb/rmdb/del_rmdb.c    /^main()/
Mdel_rtdb       rt_skeleton/del_rtdb.c  /^main()/
Mdel_scheddb    fddb/scheddb/del_scheddb.c      /^main()/
Mdel_vaxportdb  fddb/vaxport/del_vaxportdb.c    /^main()/
Mdel_vmsdb      fddb/vmsdb/del_vmsdb.c  /^main()/
Mdumydata       rt_skeleton/dumydata.c  /^main()/
Mevent_logger   rt_skeleton/event_logger.c      /^main()/
Mfmdb_aggr      rt_skeleton/fmdb_aggr.c /^main()/
Mfmdb_archiver  rt_skeleton/fmdb_archiver.c     /^main()/
Minc_detect     rt_skeleton/inc_detect.c        /^main()/
Mmon_event_log  rt_skeleton/mon_event_log.c     /^main()/
Mnoaa_monitor   noaa_monitor/noaa_monitor.c     /^main()/
Mpatch_cctvdb   fddb/cctvdb/patch_cctvdb.c      /^main()/
Mpatch_gbldb    fddb/gbldb/patch_gbldb.c        /^main()/
Mpatch_gcdb     fddb/gcdb/patch_gcdb.c  /^main()/
Mpatch_oprtvdb  fddb/oprtvdb/patch_oprtvdb.c    /^main()/
Mpatch_rmdb     fddb/rmdb/patch_rmdb.c  /^main()/
Mpatch_scheddb  fddb/scheddb/patch_scheddb.c    /^main()/
Mpatch_vaxportdb        fddb/vaxport/patch_vaxportdb.c  /^main()/
Mpatch_vmsdb    fddb/vmsdb/patch_vmsdb.c        /^main()/
Mread_rtdb      rt_skeleton/read_rtdb.c /^main()/
Mreset_modem    comm_prot/reset_modem.c /^main()/
Mrt_skeleton    rt_skeleton/rt_skeleton.c       /^main()/
Mshutdown_opc_comm      comm_prot/opc_comm/shutdown_opc_comm.c  /^main()/
Mshutdown_rmdc_comm     comm_prot/rmdc_comm/shutdown_rmdc_comm.c        /^main()/
Mshutdown_vms_comm      comm_prot/vms_comm/shutdown_vms_comm.c  /^main()/
Msnap_loop_err  rt_skeleton/snap_loop_err.c     /^main()/
Mstn_aggr       rt_skeleton/stn_aggr.c  /^main()/
Mswitch_tty     comm_prot/switch_tty.c  /^main()/
```

```
Mt_token        fddb/token/t_token.c    /^main()/
Mtms_shutdown   rt_skeleton/tms_shutdown.c      /^main()/
Mtms_startup    rt_skeleton/tms_startup.c       /^main()/
Mupi_xmit       upi_xmit/upi_xmit.c     /^main()/
Mwatch_actv_anal        rt_skeleton/watch_actv_anal.c   /^main()/
Mwatch_bottleneck       rt_skeleton/watch_bottleneck.c  /^main()/
Mwatch_fmdb     rt_skeleton/watch_fmdb.c        /^main()/
Mwatch_rmdc     rt_skeleton/watch_rmdc.c        /^main()/
_align  comm_prot/opc_comm/opc_comm.c   /^struct queue_hdr _align (QUADWORD)   L10_free_li
st/
abort_data_retrieval    comm_prot/opc_comm/opc_comm_sub.c       /^void  abort_data_retriev
al(mpu_no, msg_tail)/
abort_tx_at_driver      comm_prot/opc_comm/opc_comm_sub.c       /^void  abort_tx_at_driver
(port_no)/
abort_tx_wait_rx        comm_prot/opc_comm/opc_comm_sub.c       /^void  abort_tx_wait_rx(p
ort_no)/
add_cluster     comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  add_cluster(cst_
name, cst_body, bo/
add_library     comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  add_library(sign
_name, lib_name, l/
add_message     comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  add_message(sign
_name, msg_name, m/
add_que_to_lib  tms_library/vms_lib.c   /^unsigned short  add_que_to_lib(action_code, sign
_n/
add_queue       comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  add_queue(sign_n
ame, que_name, que/
add_schedule    comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  add_schedule(sch
ed_ptr, unit_no, o/
add_to_list     tms_library/link_sub.c  /^void  add_to_list(entry, pred)/
add_to_list_head_i      tms_library/intlk_queue.c       /^int  add_to_list_head_i(entry, l
ist_head)/
add_to_list_tail_i      tms_library/intlk_queue.c       /^int  add_to_list_tail_i(entry, l
ist_head)/
add_to_partial_list     comm_prot/opc_comm/opc_comm_sub.c       /^void  add_to_partial_lis
t(rx_ubfr)/
add_to_port_device_table        fddb/vaxport/build_vaxportdb.c  /^void  add_to_port_device
_table(VAXPortName, Device/
add_to_rel_list tms_library/vms_lib.c   /^void  add_to_rel_list(vmsdb_tl, entry, rel_pred)
/
add_to_scheddb_list     tms_library/sched_lib.c /^void  add_to_scheddb_list(scheddb_tl, en
try, rel_p/
alloc_and_queue_empty_jhub      comm_prot/tms_comm_sub.c        /^void  alloc_and_queue_em
pty_jhub(data_size)/
alloc_and_queue_empty_vms       comm_prot/vms_comm/vms_comm_sub.c       /^void  alloc_and_
queue_empty_vms(data_size)/
alloc_vms_bfr_list      comm_prot/vms_comm/vms_comm_sub.c       /^void  alloc_vms_bfr_list
()/
assemble_library        tms_library/vms_lib.c   /^unsigned short  assemble_library(lib_bod
y, lib_siz/
assign_initial_camera   comm_prot/opc_comm/cctv_comm_sub.c      /^void  assign_initial_cam
era(port_no)/
assign_joystick_to_monitor      comm_prot/opc_comm/cctv_comm_sub.c      /^void  assign_joy
stick_to_monitor(rx_ubfr)/
assign_sys$input        tms_library/kb_func.c   /^void  assign_sys$input()/
attn_ast_func   comm_prot/opc_comm/opc_comm_sub.c       /^void  attn_ast_func(param)/
auto_menu       comm_prot/rmdc_comm/rmdc_comm_sub.c     /^int  auto_menu()/
break_scheddb_block     tms_library/sched_lib.c /^void  break_scheddb_block(scheddb_tl, bl
ock, req_s/
break_vmsdb_block       tms_library/vms_lib.c   /^void  break_vmsdb_block(vmsdb_tl, block,
 req_size)/
breakthru       tms_library/proc_cntrl.c        /^unsigned long  breakthru(terminal, messa
ge)/
breakthru_with_parameter        tms_library/proc_cntrl.c        /^unsigned long  breakthru
_with_parameter(termid, pr/
build_DPW_DRA   comm_prot/opc_comm/opc_comm_sub.c       /^int  build_DPW_DRA(tx_cmd, drcb_
ptr, list_head)/
```

```
build_FP_arrow_msg      tms_library/vms_lib.c   /^int  build_FP_arrow_msg(buffer, bfr_size
, cm)/
build_FP_flashing_msg   tms_library/vms_lib.c   /^int  build_FP_flashing_msg(buffer, bfr_s
ize, cm)/
build_FP_message        tms_library/vms_lib.c   /^unsigned short  build_FP_message(buffer,
 bfr_size,/
build_FP_msg_header     tms_library/vms_lib.c   /^void  build_FP_msg_header(buffer, auxout
)/
build_FP_multiphase_msg tms_library/vms_lib.c   /^int  build_FP_multiphase_msg(buffer, bfr
_size, cm,/
build_FP_queue  tms_library/vms_lib.c   /^unsigned short  build_FP_queue(buffer, bfr_size,
 q/
build_FP_static_msg     tms_library/vms_lib.c   /^int  build_FP_static_msg(buffer, bfr_siz
e, cm)/
build_all_queue comm_prot/vms_comm/vms_comm_sub.c       /^void  build_all_queue(unit_no)/
build_and_queue_170_date_time   comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  build_and_
queue_170_date_time(unit_no)/
build_and_queue_170_msg comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  build_and_queue_17
0_msg(unit_no, command, pa/
build_and_queue_GIM     comm_prot/opc_comm/opc_comm_sub.c       /^void  build_and_queue_GI
M(unit_no, gim_code, data,/
build_and_queue_HDR     comm_prot/opc_comm/opc_comm_sub.c       /^void  build_and_queue_HD
R(rx_ubfr, command, param)/
build_and_queue_RDAT    comm_prot/opc_comm/opc_comm_sub.c       /^void  build_and_queue_RD
AT(elem_name, elem_type, e/
build_and_queue_REJL    comm_prot/opc_comm/opc_comm_sub.c       /^void  build_and_queue_RE
JL(rx_ubfr, rej_code, data/
build_and_queue_SCH_reply       comm_prot/opc_comm/opc_vms_sub.c        /^void  build_and_
queue_SCH_reply(rx_ubfr, sched_ent/
build_and_queue_TP      comm_prot/opc_comm/opc_comm_sub.c       /^void  build_and_queue_TP
(rx_ubfr)/
build_and_queue_VAX_TIME        comm_prot/opc_comm/opc_comm_sub.c       /^void  build_and_
queue_VAX_TIME(rx_ubfr)/
build_and_queue_VMS_auxout      comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_auxout(unit_no, auxout)/
build_and_queue_VMS_blank_sign  comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_blank_sign(unit_no, clea/
build_and_queue_VMS_diag        comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_diag(unit_no, slot_no)/
build_and_queue_VMS_display     comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_display(unit_no, content/
build_and_queue_VMS_enquire     comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_enquire(unit_no, config_/
build_and_queue_VMS_exit        comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_exit(unit_no, exit_reque/
build_and_queue_VMS_lib_load    comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_lib_load(unit_no, lib_en/
build_and_queue_VMS_load        comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_load(unit_no, slot_no, c/
build_and_queue_VMS_recall      comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_recall(unit_no, slot_no,/
build_and_queue_VMS_reply       comm_prot/opc_comm/opc_vms_sub.c        /^void  build_and_
queue_VMS_reply(rx_ubfr, action_co/
build_and_queue_VMS_reset       comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_reset(unit_no)/
build_and_queue_VMS_view        comm_prot/vms_comm/vms_comm_sub.c       /^void  build_and_
queue_VMS_view(unit_no, slot_no)/
build_and_queue_load_params     comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  build_and_
queue_load_params(unit_no, lp_grou/
build_and_send_video_seq_cmd    comm_prot/opc_comm/cctv_comm_sub.c      /^unsigned short
build_and_send_video_seq_cmd(monit/
build_and_send_video_switch_cmd comm_prot/opc_comm/cctv_comm_sub.c      /^unsigned short
build_and_send_video_switch_cmd(mo/
build_bottleneck_table  rt_skeleton/bottleneck.c        /^build_bottleneck_table(ba_table,
 table_size)/
build_dailyfile_header  rt_skeleton/fmdb_archiver.c     /^unsigned long  build_dailyfile_h
```

```
eader(filename)/
build_dev_port_name_string      fddb/vaxport/build_vaxportdb.c  /^void  build_dev_port_nam
e_string(index, buffer, Dr/
build_dft_stn_aggr_eqns fddb/rmdb/rmdb_sub.c    /^void build_dft_stn_aggr_eqns(tl)/
build_fmdb_daily_filename       tms_library/fmdb_lib.c  /^unsigned long  build_fmdb_daily_
filename(start_tim/
build_fmdb_snapshot_filename    tms_library/fmdb_lib.c  /^unsigned long  build_fmdb_snapsh
ot_filename(start_/
build_full_name fddb/fddb_sub.c /^void build_full_name(full_name, path, file_name, f/
build_inc_det_table     rt_skeleton/inc_detect.c        /^build_inc_det_table(id_table, ta
ble_size)/
build_snapshot_header   rt_skeleton/fmdb_archiver.c     /^unsigned long  build_snapshot_he
ader()/
build_stn_aggr_table    rt_skeleton/stn_aggr.c  /^build_stn_aggr_table(sa_table, table_siz
e)/
build_tap_error tms_library/tap_sub.c   /^void  build_tap_error(line_no, buffer, nchars, t
ex/
build_up_arrow  fddb/fddb_sub.c /^void build_up_arrow(buffer, column, n_col)/
byte_to_float   tms_library/format_db_lib.c     /^void  byte_to_float(str, n_dec)/
byte_to_table   tms_library/table_sub.c /^void  byte_to_table(pointer, byte)/
calc_FP_lib_slot_no     tms_library/vms_lib.c   /^unsigned short  calc_FP_lib_slot_no(vmsd
b_tl, vmsd/
calc_FP_msg_time        tms_library/vms_lib.c   /^unsigned short  calc_FP_msg_time(msg_ent
ry, vmsdb_/
calc_actv_anal  rt_skeleton/actv_anal.c /^void  calc_actv_anal()/
calc_all_lib_slot_no    comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  calc_all
_lib_slot_no(sign_name, ms/
calc_bottleneck rt_skeleton/bottleneck.c        /^calc_bottleneck(ba_table)/
calc_check      comm_prot/tms_comm_sub.c        /^unsigned short  calc_check(message, leng
th)/
calc_fletcher_checksum  comm_prot/vms_comm/vms_comm_sub.c       /^unsigned short  calc_fle
tcher_checksum(msg, msg_le/
calc_inc_det    rt_skeleton/inc_detect.c        /^calc_inc_det(id_table)/
calc_next_20sec_time    rt_skeleton/fmdb_archiver.c     /^unsigned long  calc_next_20sec_t
ime(ref_time, next/
calc_next_22sec rt_skeleton/rt_skeleton.c       /^unsigned long  calc_next_22sec(next_22se
c_time)/
calc_next_due_time      comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  calc_nex
t_due_time(due_time, inter/
calc_offsets    fddb/fddb_sub.c /^void calc_offsets(nt, ref_base)/
calc_stn_aggr   rt_skeleton/stn_aggr.c  /^calc_stn_aggr(sa_table)/
calc_table_checksum     tms_library/table_sub.c /^unsigned short  calc_table_checksum(tabl
e_base, la/
cancel_tms_sched_timer  comm_prot/opc_comm/opc_vms_sub.c        /^void  cancel_tms_sched_t
imer()/
center_justify  tms_library/misc_func.c /^void  center_justify(field_bfr, width)/
change_VAXPort_flag     fddb/vaxport/patch_vaxportdb.c  /^void change_VAXPort_flag(vaxport
db_tl, port_no)/
change_term_char        tms_library/kb_func.c   /^unsigned long  change_term_char(ttchan,
basic_char/
char_in_set     fddb/token/token.c      /^char_in_set(src, table, curr_row)/
check_DOW_mask  fddb/scheddb/scheddb_sub.c      /^unsigned long  check_DOW_mask(string)/
check_ERR_REQ_bit       comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  check_ERR_REQ_bit(
unit_no)/
check_JHUB      comm_prot/tms_comm_sub.c        /^struct jhub *check_JHUB(msg, jh_ubfr)/
check_RFD       comm_prot/opc_comm/opc_comm_sub.c       /^struct opc_rfd  *check_RFD(msg,
drcb_ptr)/
check_SCH_action        comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  check_SC
H_action(action_code, devi/
check_SCH_date_time     comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  check_SC
H_date_time(year, month, d/
check_SCH_interval      comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  check_SC
H_interval(day, hour, minu/
check_VPT_name  comm_prot/tms_comm_sub.c        /^void  check_VPT_name(msg)/
check_cluster   comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  check_cluster(cs
t_name, cst_body, /
```

```
check_date      tms_library/misc_func.c /^unsigned long  check_date(year, month, day)/
check_date_time fddb/scheddb/scheddb_sub.c      /^unsigned long  check_date_time(string, d
ate_time)/
check_drcb_poison       comm_prot/opc_comm/opc_comm_sub.c       /^void  check_drcb_poison(
drcb_ptr, msg)/
check_due_in_dow        tms_library/sched_lib.c /^unsigned long  check_due_in_dow(due_time
64, dow_ma/
check_filename  tms_library/misc_func.c /^unsigned char *check_filename(file_name, buffer)
/
check_fmdb_filename_format      tms_library/fmdb_lib.c  /^unsigned long  check_fmdb_filena
me_format(filename/
check_for_NO_CARRIER    upi_xmit/upi_xmit.c     /^int  check_for_NO_CARRIER(channel)/
check_interval  fddb/scheddb/scheddb_sub.c      /^unsigned long  check_interval(string, in
terval)/
check_library   comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  check_library(ac
tion_code, sign_na/
check_line      fddb/vmsdb/vmsdb_sub.c  /^int  check_line(vmsdb_tl, param_start, param_val
ue/
check_list_unit_no      comm_prot/tms_comm_sub.c        /^void  check_list_unit_no(msg, li
st_head)/
check_message   comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  check_message(si
gn_name, msg_name,/
check_name      fddb/token/t_token.c    /^check_name(table, name)/
check_number    fddb/scheddb/scheddb_sub.c      /^int  check_number(string, bfr_ndx, max_d
igits, max/
check_opc_unit_inactive comm_prot/opc_comm/opc_comm_sub.c       /^void  check_opc_unit_ina
ctive(unit_no)/
check_oper_initials     fddb/scheddb/scheddb_sub.c      /^unsigned long  check_oper_initia
ls(string)/
check_port_inactive     comm_prot/tms_comm_sub.c        /^void  check_port_inactive(port_n
o)/
check_process_interactive       tms_library/proc_cntrl.c        /^unsigned long  check_pro
cess_interactive(interacti/
check_queue     comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  check_queue(sign
_name, que_name, q/
check_reversible        tms_library/tap_sub.c   /^unsigned char  check_reversible (stn_loo
p_name)/
check_rfd_lists comm_prot/opc_comm/opc_comm_sub.c       /^struct opc_rfd  *check_rfd_lists
(handle, unit_no, /
check_rmdb_changed      fddb/rmdb/patch_rmdb.c  /^void  check_rmdb_changed()/
check_rmdc_port_status  comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  check_rmdc_port_st
atus(port_no)/
check_rpt_memory        rt_skeleton/comm_stats_rpt.c    /^void  check_rpt_memory()/
check_schedule  comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  check_schedule(s
ched_ptr, unit_no,/
check_test_packet       comm_prot/opc_comm/opc_comm_sub.c       /^void  check_test_packet(
rx_ubfr)/
check_type_ahead        tms_library/kb_func.c   /^unsigned long  check_type_ahead(ttchan,
count, fir/
check_valid_flag        rt_skeleton/actv_anal.c /^int  check_valid_flag(n_loops, flag)/
check_vms_port_status   comm_prot/vms_comm/vms_comm_sub.c       /^void  check_vms_port_sta
tus(port_no)/
chk_col_name    fddb/fddb_sub.c /^void chk_col_name(tl)/
classify_roadway        tms_library/fddb_lib.c  /^int  classify_roadway(stn_loop_name)/
clear_R0        tms_library/misc_func.c /^int  clear_R0()/
clear_all_event_flags   tms_library/proc_cntrl.c        /^void  clear_all_event_flags(ef_c
luster)/
clear_joystick  comm_prot/opc_comm/cctv_comm_sub.c      /^unsigned short  clear_joystick(m
onitor, unit_no)/
clear_joystick_from_monitor     comm_prot/opc_comm/cctv_comm_sub.c      /^void  clear_joys
tick_from_monitor(rx_ubfr)/
clear_process_event_flag        rt_skeleton/rt_skeleton.c       /^void  clear_process_even
t_flag(proc_name, efc_name/
close_comm_log_file     comm_prot/tms_comm_sub.c        /^unsigned long  close_comm_log_fi
le()/
close_event_log_file    rt_skeleton/event_logger.c      /^void  close_event_log_file()/
```

```
close_files_for_exit    comm_prot/opc_comm/opc_comm_sub.c       /^void  close_files_for_ex
it()/
close_operator_log_file comm_prot/opc_comm/opc_comm_sub.c       /^unsigned long  close_ope
rator_log_file()/
cluster_menu    fddb/vmsdb/patch_vmsdb.c        /^void  cluster_menu()/
cnt_data_col    fddb/fddb_sub.c /^void cnt_data_col(tl)/
code_byte_to_table      tms_library/table_sub.c /^void  code_byte_to_table(pointer, code,
byte)/
code_to_table   tms_library/table_sub.c /^void  code_to_table(pointer, code)/
code_ulong_to_table     tms_library/table_sub.c /^void  code_ulong_to_table(pointer, code,
 ulong)/
code_ushort_to_table    tms_library/table_sub.c /^void  code_ushort_to_table(pointer, code
, ushort)/
col_name_fnd    fddb/fddb_sub.c /^void  col_name_fnd(tl)/
column_layout   rt_skeleton/watch_actv_anal.c   /^int  column_layout()/
column_name_line        fddb/fddb_sub.c /^int column_name_line(tl, table_name, equal_sign,
 d/
comb_adj_scheddb_block  tms_library/sched_lib.c /^void  comb_adj_scheddb_block(scheddb_tl,
 block)/
combine_adjacent_vmsdb_block    tms_library/vms_lib.c   /^void  combine_adjacent_vmsdb_blo
ck(vmsdb_tl, block/
compare_VAX_time        tms_library/misc_func.c /^int  compare_VAX_time(time1, time2)/
complete_col    fddb/cctvdb/cctvdb_sub.c        /^void complete_col(cctvdb_tl)/
complete_new    fddb/fddb_sub.c /^void complete_new(tl)/
connect_joystick        comm_prot/opc_comm/cctv_comm_sub.c      /^unsigned short  connect_
joystick(monitor, new_joy_/
connect_to_mailbox      tms_library/mailbox.c   /^unsigned long  connect_to_mailbox(mbx_na
me, channe/
constant_name   fddb/token/token.c      /^unsigned char *constant_name(value)/
convert_DB_type rt_skeleton/comm_stats_rpt.c    /^void  convert_DB_type(DBType, type_text)
/
convert_HM_result       comm_prot/reset_modem.c /^unsigned char  *convert_HM_result(result
_code)/
convert_VAXPort_flag    fddb/vaxport/vaxportdb_sub.c    /^void convert_VAXPort_flag(flag,
flag_text)/
convert_action_code     tms_library/sched_lib.c /^unsigned char  *convert_action_code(acti
on_code, s/
convert_dow_mask        tms_library/fddb_lib.c  /^int  convert_dow_mask(dow_chars, dow_mas
k)/
convert_loop_error      fddb/rmdb/rmdb_sub.c    /^void  convert_loop_error(error_byte, err
or_text)/
convert_loop_status     fddb/rmdb/rmdb_sub.c    /^void  convert_loop_status(status_byte, s
tatus_text/
convert_non_print_to_space      fddb/token/token.c      /^void convert_non_print_to_space(
begin)/
convert_perm_mask       tms_library/format_db_lib.c     /^int  convert_perm_mask(perm_char
s, perm_mask)/
convert_rpt_status      rt_skeleton/comm_stats_rpt.c    /^void  convert_rpt_status(status,
 status_text)/
convert_sched_type      tms_library/sched_lib.c /^unsigned char  *convert_sched_type(sched
_type)/
convert_start_flag      fddb/vaxport/vaxportdb_sub.c    /^unsigned char  convert_start_fla
g(start_flag)/
convert_status  tms_library/fddb_lib.c  /^void  convert_status(status, status_text, check_
de/
convert_time_to_int     fddb/fddb_sub.c /^int convert_time_to_int(hour, min, time_string)/
convert_to_0x_form      fddb/vaxport/vaxportdb_sub.c    /^void convert_to_0x_form(VAXPortN
ame)/
convert_to_x_form       fddb/vaxport/vaxportdb_sub.c    /^void convert_to_x_form(VAXPortNa
me)/
copy_char       fddb/token/token.c      /^copy_char(dest, src, table, curr_row, cnt)/
copy_chk_cnt    fddb/token/token.c      /^copy_chk_cnt(dest, src, table, curr_row, cnt)/
copy_defaults   fddb/cctvdb/cctvdb_sub.c        /^void copy_defaults(tl, default_index)/
copy_driver_stats       rt_skeleton/comm_stats_rpt.c    /^void  copy_driver_stats()/
copy_esc_new_st fddb/token/token.c      /^copy_esc_new_st(dest, src, table, curr_row, cnt)
/
```

```
copy_flash      tms_library/vms_lib.c   /^void  copy_flash(cm)/
copy_lib_add_slot_no    comm_prot/opc_comm/opc_vms_sub.c        /^void  copy_lib_add_slot_
no(entry_bfr, mlq_body, n_/
copy_lib_del_slot_no    comm_prot/opc_comm/opc_vms_sub.c        /^void  copy_lib_del_slot_
no(data_bfr, entry_bfr, n_/
copy_new_st     fddb/token/token.c      /^copy_new_st(dest, src, table, curr_row, cnt)/
copy_param_lines        fddb/fddb_sub.c /^int copy_param_lines /
copy_port_24hr_stats    rt_skeleton/comm_stats_rpt.c    /^void  copy_port_24hr_stats()/
copy_same_st    fddb/token/token.c      /^copy_same_st(dest, src, table, curr_row, cnt)/
copy_str        fddb/token/token.c      /^copy_str(dest, src, table, curr_row, cnt)/
copy_str_new_st fddb/token/token.c      /^copy_str_new_st(dest, src, table, curr_row, cnt)
/
copy_unit_24hr_stats    rt_skeleton/comm_stats_rpt.c    /^void  copy_unit_24hr_stats()/
copyl_char      fddb/token/token.c      /^copyl_char(dest, src, table, curr_row, cnt)/
copyl_chk_cnt   fddb/token/token.c      /^copyl_chk_cnt(dest, src, table, curr_row, cnt)/
copyl_new_st    fddb/token/token.c      /^copyl_new_st(dest, src, table, curr_row, cnt)/
copyl_same_st   fddb/token/token.c      /^copyl_same_st(dest, src, table, curr_row, cnt)/
copyu_char      fddb/token/token.c      /^copyu_char(dest, src, table, curr_row, cnt)/
copyu_chk_cnt   fddb/token/token.c      /^copyu_chk_cnt(dest, src, table, curr_row, cnt)/
copyu_new_st    fddb/token/token.c      /^copyu_new_st(dest, src, table, curr_row, cnt)/
copyu_same_st   fddb/token/token.c      /^copyu_same_st(dest, src, table, curr_row, cnt)/
count_active_loops      fddb/rmdb/rmdb_sub.c    /^void count_active_loops(tl)
        /
count_actv_anal_eqns    rt_skeleton/actv_anal.c /^int  count_actv_anal_eqns(eqn_file, n_eq
ns, sum_st/
count_lines     count_tms_lines.c       /^int  count_lines(file_name, n_bytes, checksum, o
ut/
count_metered_lanes     fddb/rmdb/rmdb_sub.c    /^void count_metered_lanes(tl)
        /
count_port_entries      fddb/vaxport/build_vaxportdb.c  /^int  count_port_entries(n_unit_e
ntries)/
count_speed_traps       fddb/rmdb/rmdb_sub.c    /^void count_speed_traps(tl)
        /
crack_FP_msg    tms_library/crack_fp_msg.c      /^int  crack_FP_msg(buffer, max_chars, msg
_bfr, msg_/
crack_vms_message       tms_library/vms_lib.c   /^unsigned short  crack_vms_message(vmsdb_
msg, cm, v/
crc_opc_tx_msg  comm_prot/opc_comm/opc_comm_sub.c       /^void  crc_opc_tx_msg(jh_ubfr)/
crc_rmdc_tx_msg comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  crc_rmdc_tx_msg(jh_ubfr)/
create_comm_log_file    comm_prot/tms_comm_sub.c        /^unsigned long  create_comm_log_f
ile()/
create_event_log_file   rt_skeleton/event_logger.c      /^void  create_event_log_file()/
create_fmdb_daily_file  rt_skeleton/fmdb_archiver.c     /^unsigned long  create_fmdb_daily
_file(filename, pa/
create_fmdb_snapshot_file       rt_skeleton/fmdb_archiver.c     /^unsigned long  create_fm
db_snapshot_file(filename,/
create_global_section   tms_library/global_sub.c        /^unsigned long  create_global_sec
tion(name, n_bytes/
create_global_section_ident     tms_library/global_sub.c        /^unsigned long  create_gl
obal_section_ident(name, n/
create_journal_files    comm_prot/opc_comm/opc_comm_sub.c       /^void  create_journal_fil
es()/
create_logical_name     tms_library/logical_name.c      /^unsigned long  create_logical_na
me(logical_name, e/
create_mailbox  tms_library/mailbox.c   /^unsigned long  create_mailbox(mbx_name, channel,
 b/
create_operator_log_file        comm_prot/opc_comm/opc_comm_sub.c       /^unsigned long  c
reate_operator_log_file()/
create_rpt_file rt_skeleton/comm_stats_rpt.c    /^void  create_rpt_file()/
cs_titles       rt_skeleton/watch_rmdc.c        /^cs_titles()/
date_time_to_table      tms_library/table_sub.c /^void  date_time_to_table(pointer)/
deallocate_rfd_blocks   comm_prot/opc_comm/opc_comm_sub.c       /^void  deallocate_rfd_blo
cks(drcb_ptr, debug_id)/
del_que_from_lib        tms_library/vms_lib.c   /^unsigned short  del_que_from_lib(sign_na
me, que_na/
delete_all_global_section       tms_library/global_sub.c        /^unsigned long  delete_al
```

```
l_global_section(name)/
delete_cluster  comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  delete_cluster(c
st_name, unit_no, /
delete_from_rel_list    tms_library/vms_lib.c   /^void  delete_from_rel_list(vmsdb_tl, ent
ry)/
delete_from_scheddb_list        tms_library/sched_lib.c /^void  delete_from_scheddb_list(s
cheddb_tl, entry)/
delete_global_section   tms_library/global_sub.c        /^unsigned long  delete_global_sec
tion(name, ident)/
delete_library  comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  delete_library(s
ign_name, lib_name/
delete_logical_name     tms_library/logical_name.c      /^unsigned long  delete_logical_na
me(logical_name, t/
delete_mailbox  tms_library/mailbox.c   /^unsigned long  delete_mailbox(channel)/
delete_message  comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  delete_message(s
ign_name, msg_name/
delete_queue    comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  delete_queue(sig
n_name, que_name, /
delete_scheddb_entry    comm_prot/opc_comm/opc_vms_sub.c        /^int  delete_scheddb_entr
y(sched_entry)/
delete_schedule comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  delete_schedule(
sched_ptr, unit_no/
dial_HM_number  upi_xmit/upi_xmit.c     /^int  dial_HM_number(channel, phone_number, tone_
pu/
dial_upi_number upi_xmit/upi_xmit.c     /^int  dial_upi_number()/
dial_upi_send_msg       upi_xmit/upi_xmit.c     /^int  dial_upi_send_msg()/
disable_enable_loop     fddb/rmdb/patch_rmdb.c  /^void  disable_enable_loop(disable_flag)/
disassemble_library     tms_library/vms_lib.c   /^unsigned short  disassemble_library(lib_
body, lib_/
display_comm_stats      rt_skeleton/watch_rmdc.c        /^display_comm_stats()/
display_dynamic_params  rt_skeleton/watch_actv_anal.c   /^display_dynamic_params(EqnOffset
, eqn_win_id)/
display_eqn_data        rt_skeleton/watch_actv_anal.c   /^display_eqn_data(EqnOffset, eqn_
win_id)/
display_error_data      rt_skeleton/watch_rmdc.c        /^display_error_data()/
display_history_data    rt_skeleton/watch_bottleneck.c  /^display_history_data()/
display_loop_curr_data  rt_skeleton/watch_fmdb.c        /^display_loop_curr_data(loop_win,
 first_loop, last_/
display_loop_data       rt_skeleton/watch_rmdc.c        /^display_loop_data()/
display_loop_names      rt_skeleton/watch_fmdb.c        /^display_loop_names(loop_win, fir
st_loop, last_loop/
display_loop_work_data  rt_skeleton/watch_fmdb.c        /^display_loop_work_data(loop_win,
 first_loop, last_/
display_meter_rate_data rt_skeleton/watch_rmdc.c        /^display_meter_rate_data()/
display_sc_labels       rt_skeleton/watch_bottleneck.c  /^display_sc_labels(sc)/
display_static_labels   rt_skeleton/watch_actv_anal.c   /^display_static_labels(EqnOffset,
 eqn_win_id, win_r/
display_station_curr_data       rt_skeleton/watch_fmdb.c        /^display_station_curr_dat
a()/
display_station_work_data       rt_skeleton/watch_fmdb.c        /^display_station_work_dat
a()/
display_status  rt_skeleton/watch_rmdc.c        /^display_status()/
display_stn_data        rt_skeleton/watch_rmdc.c        /^display_stn_data()/
display_stn_names       rt_skeleton/watch_fmdb.c        /^display_stn_names()/
display_trap_curr_data  rt_skeleton/watch_fmdb.c        /^display_trap_curr_data()/
display_trap_data       rt_skeleton/watch_rmdc.c        /^display_trap_data()/
display_trap_names      rt_skeleton/watch_fmdb.c        /^display_trap_names()/
display_trap_work_data  rt_skeleton/watch_fmdb.c        /^display_trap_work_data()/
display_vol_data        rt_skeleton/watch_bottleneck.c  /^display_vol_data(sc)/
do_noth_same_st fddb/token/token.c      /^do_noth_same_st(dest, src, table, curr_row, cnt)
/
do_nothing      fddb/token/token.c      /^do_nothing(dest, src, table, curr_row, cnt)/
do_nothing_new  fddb/token/token.c      /^do_nothing_new(dest, src, table, curr_row, cnt)/
dow_mask_to_byte        fddb/fddb_sub.c /^void  dow_mask_to_byte(dow_mask, dow_chars)/
dump_GMS_globals        comm_prot/opc_comm/opc_comm_sub.c       /^void  dump_GMS_globals()
/
```

```
dump_UnitPdStats        fddb/vaxport/vaxportdb_sub.c    /^void dump_UnitPdStats(vaxportdb_
tl, UnitListDB)/
dump_UnitTable  fddb/vaxport/vaxportdb_sub.c    /^void  dump_UnitTable(vaxportdb_tl, flag_
bits_colum/
dump_VAXPortPdStats     fddb/vaxport/vaxportdb_sub.c    /^void dump_VAXPortPdStats(vaxport
db_tl)/
dump_VAXPortTable       fddb/vaxport/vaxportdb_sub.c    /^void dump_VAXPortTable(vaxportdb
_tl)/
dump_actvdb_eqn rt_skeleton/actv_lib.c  /^void  dump_actvdb_eqn(EqnOffset)/
dump_actvdb_name_table  rt_skeleton/actv_lib.c  /^void  dump_actvdb_name_table()/
dump_actvdb_offsets     rt_skeleton/actv_lib.c  /^void  dump_actvdb_offsets(offsets_addres
s)/
dump_actvdb_params      rt_skeleton/actv_lib.c  /^void  dump_actvdb_params()/
dump_actvdb_tl  rt_skeleton/actv_lib.c  /^void  dump_actvdb_tl()/
dump_cctvdb_offsets     tms_library/fddb_lib.c  /^void dump_cctvdb_offsets(offsets_address
)/
dump_cctvdb_params      tms_library/fddb_lib.c  /^ void dump_cctvdb_params(cctvdb_tl)/
dump_cctvdb_tl  tms_library/fddb_lib.c  /^void dump_cctvdb_tl(tl)/
dump_cctvdb_to_table_files      fddb/cctvdb/cctvdb_sub.c        /^void dump_cctvdb_to_tabl
e_files(tl, col_index)/
dump_chk_table  fddb/token/t_token.c    /^void dump_chk_table(table, table_name, dump_mode
)/
dump_df_elem_data       tms_library/fmdb_lib.c  /^void  dump_df_elem_data(buffer, name_lis
t, nt_inde/
dump_disassembled_library       tms_library/vms_lib.c   /^void  dump_disassembled_library(
)/
dump_drcb       comm_prot/opc_comm/opc_comm_sub.c       /^void  dump_drcb(msg, drcb_ptr, r
x_bfr)/
dump_drcb_hdr   comm_prot/opc_comm/opc_comm_sub.c       /^void  dump_drcb_hdr(msg, drcb_pt
r)/
dump_fddb_col_list      tms_library/fddb_lib.c  /^void  dump_fddb_col_list(tl)/
dump_fddb_elements      fddb/fddb_sub.c /^void  dump_fddb_elements(tl, out_file, col_index
, /
dump_fddb_group_table   tms_library/fddb_lib.c  /^void  dump_fddb_group_table(tl)/
dump_fddb_line_buffer   tms_library/fddb_lib.c  /^void  dump_fddb_line_buffer(tl)/
dump_fddb_name_table    tms_library/fddb_lib.c  /^void  dump_fddb_name_table(tl)
        /
dump_fddb_offsets       tms_library/fddb_lib.c  /^void  dump_fddb_offsets(offsets_address)
/
dump_fddb_params        tms_library/fddb_lib.c  /^void  dump_fddb_params(tl)/
dump_fmdb_col_offsets   tms_library/fmdb_lib.c  /^void  dump_fmdb_col_offsets()/
dump_fmdb_data_col      tms_library/fmdb_lib.c  /^int  dump_fmdb_data_col(name_list, n_nam
es, data_c/
dump_fmdb_name_list     tms_library/fmdb_lib.c  /^int  dump_fmdb_name_list(name_list, n_na
mes, cab_n/
dump_fmdb_name_table    tms_library/fmdb_lib.c  /^void  dump_fmdb_name_table()/
dump_fmdb_offsets       tms_library/fmdb_lib.c  /^void  dump_fmdb_offsets(offsets_address)
/
dump_fmdb_params        tms_library/fmdb_lib.c  /^void  dump_fmdb_params()/
dump_fmdb_tl    tms_library/fmdb_lib.c  /^void  dump_fmdb_tl()/
dump_gbldb_offsets      tms_library/fddb_lib.c  /^void  dump_gbldb_offsets(offsets_address
)/
dump_gbldb_params       tms_library/fddb_lib.c  /^void  dump_gbldb_params(tl)/
dump_gbldb_tl   tms_library/fddb_lib.c  /^void  dump_gbldb_tl(tl)/
dump_gbldb_to_table_files       fddb/gbldb/gbldb_sub.c  /^void dump_gbldb_to_table_files(t
l, col_index)/
dump_gcdb_offsets       tms_library/fddb_lib.c  /^void  dump_gcdb_offsets(offsets_address)
/
dump_gcdb_params        tms_library/fddb_lib.c  /^ void  dump_gcdb_params(gcdb_tl)/
dump_gcdb_tl    tms_library/fddb_lib.c  /^void  dump_gcdb_tl(gcdb_tl)/
dump_gcdb_to_table_files        fddb/gcdb/gcdb_sub.c    /^void dump_gcdb_to_table_files(gc
db_tl, col_index)/
dump_jhub       comm_prot/tms_comm_sub.c        /^void  dump_jhub(msg, jh_ubfr)/
dump_jhub_hdr   comm_prot/tms_comm_sub.c        /^void  dump_jhub_hdr(msg, jh_ubfr)/
dump_list       comm_prot/tms_comm_sub.c        /^void  dump_list(list_head)/
dump_list_rel   comm_prot/tms_comm_sub.c        /^void  dump_list_rel(list_head)/
```

```
dump_loop_name_list     fddb/rmdb/rmdb_sub.c    /^void dump_loop_name_list(tl)
        /
dump_loop_table_to_file fddb/rmdb/rmdb_sub.c    /^void  dump_loop_table_to_file(tl, out_fi
le, col_in/
dump_mem        tms_library/dump_mem.c  /^void  dump_mem(memptr, nbytes, addr_offset, base
_a/
dump_oprtvdb_offsets    tms_library/fddb_lib.c  /^void dump_oprtvdb_offsets(offsets_addres
s)/
dump_oprtvdb_params     tms_library/fddb_lib.c  /^ void dump_oprtvdb_params(tl)/
dump_oprtvdb_tl tms_library/fddb_lib.c  /^void  dump_oprtvdb_tl(tl)/
dump_oprtvdb_to_table_files     fddb/oprtvdb/oprtvdb_sub.c      /^void dump_oprtvdb_to_tab
le_files(tl, col_index)/
dump_port_device_table  fddb/vaxport/build_vaxportdb.c  /^void  dump_port_device_table()/
dump_rmdb_offsets       tms_library/fddb_lib.c  /^void  dump_rmdb_offsets(offsets_address)
/
dump_rmdb_params        tms_library/fddb_lib.c  /^void dump_rmdb_params(tl)/
dump_rmdb_tl    tms_library/fddb_lib.c  /^void  dump_rmdb_tl(tl)/
dump_rmdb_to_table_files        fddb/rmdb/rmdb_sub.c    /^void dump_rmdb_to_table_files(tl
, col_index)/
dump_rtdb_col_offsets   tms_library/rtdb_lib.c  /^void  dump_rtdb_col_offsets()/
dump_rtdb_name_table    tms_library/rtdb_lib.c  /^void  dump_rtdb_name_table()/
dump_rtdb_offsets       tms_library/rtdb_lib.c  /^void  dump_rtdb_offsets(offsets_address)
/
dump_rtdb_params        tms_library/rtdb_lib.c  /^void  dump_rtdb_params()/
dump_rtdb_tl    tms_library/rtdb_lib.c  /^void  dump_rtdb_tl()/
dump_scheddb_offsets    tms_library/fddb_lib.c  /^void  dump_scheddb_offsets(offsets_addre
ss)/
dump_scheddb_params     tms_library/fddb_lib.c  /^void  dump_scheddb_params(scheddb_tl)/
dump_scheddb_tl tms_library/fddb_lib.c  /^void  dump_scheddb_tl(scheddb_tl)/
dump_schedule   fddb/scheddb/scheddb_sub.c      /^void  dump_schedule()/
dump_speed_trap_table   fddb/rmdb/rmdb_sub.c    /^void dump_speed_trap_table(tl)
        /
dump_speed_traps_to_file        fddb/rmdb/rmdb_sub.c    /^void dump_speed_traps_to_file(tl
, out_file, col_in/
dump_stn_aggr_list      fddb/rmdb/rmdb_sub.c    /^void dump_stn_aggr_list(tl)
        /
dump_vaxportdb_offsets  tms_library/fddb_lib.c  /^void dump_vaxportdb_offsets(offsets_addr
ess)/
dump_vaxportdb_params   tms_library/fddb_lib.c  /^void  dump_vaxportdb_params(tl)/
dump_vaxportdb_tl       tms_library/fddb_lib.c  /^void dump_vaxportdb_tl(tl)/
dump_vaxportdb_to_file  fddb/vaxport/build_vaxportdb.c  /^void  dump_vaxportdb_to_file()/
dump_video_switch_mon_list      fddb/cctvdb/patch_cctvdb.c      /^void  dump_video_switch_
mon_list(print_unassigned)/
dump_vms_msg_struct     fddb/vmsdb/vmsdb_sub.c  /^void  dump_vms_msg_struct(msg_name, cm)/
dump_vmsdb_offsets      tms_library/fddb_lib.c  /^void  dump_vmsdb_offsets(offsets_address
)/
dump_vmsdb_params       tms_library/fddb_lib.c  /^void  dump_vmsdb_params(vmsdb_tl)/
dump_vmsdb_tl   tms_library/fddb_lib.c  /^void  dump_vmsdb_tl(tl)/
dump_vmsdb_to_table_files       fddb/vmsdb/vmsdb_sub.c  /^void  dump_vmsdb_to_table_files(
tl, col_index)/
enable_disable_unit     comm_prot/opc_comm/opc_comm_sub.c       /^unsigned char  enable_di
sable_unit(unit_no, enable/
err_titles      rt_skeleton/watch_rmdc.c        /^err_titles()/
establish_process_name  tms_library/proc_cntrl.c        /^unsigned long  establish_process
_name(new_process_/
event_log_int_write     rt_skeleton/event_logger.c      /^void  event_log_int_write(event_
code, str1, str2, /
event_logger_write_func rt_skeleton/event_logger.c      /^void  event_logger_write_func(bu
ffer, n_char)/
exit_multi_opc_comm     comm_prot/opc_comm/opc_comm_sub.c       /^void  exit_multi_opc_com
m()/
exit_multi_rmdc_comm    comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  exit_multi_rmdc_co
mm()/
exit_multi_vms_comm     comm_prot/vms_comm/vms_comm_sub.c       /^void  exit_multi_vms_com
m()/
exit_test_opc_comm      comm_prot/opc_comm/opc_comm_sub.c       /^void  exit_test_opc_comm
```

```
()/
exit_test_rmdc_comm     comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  exit_test_rmdc_com
m()/
exit_test_vms_comm      comm_prot/vms_comm/vms_comm_sub.c       /^void  exit_test_vms_comm
()/
extract_name    count_tms_lines.c       /^int  extract_name(source, dest)/
fddb_error      fddb/fddb_sub.c /^void fddb_error(tl, src_ptr, field_start, err_code/
fill_in_date_time       comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  fill_in_date_time(
tx_ubfr)/
find_actvdb_eqn_name    rt_skeleton/actv_lib.c  /^int  find_actvdb_eqn_name(eqn_name)/
find_col_name   fddb/fddb_sub.c /^void  find_col_name(tl)/
find_db_names   comm_prot/opc_comm/opc_comm_sub.c       /^int  find_db_names(drcb_ptr)/
find_duplicate_dev_addr fddb/vaxport/build_vaxportdb.c  /^void  find_duplicate_dev_addr()/
find_err_text   fddb/fddb_sub.c /^unsigned char *find_err_text(err_code)/
find_fddb_cl_name       tms_library/fddb_lib.c  /^int  find_fddb_cl_name(tl, data_col_name
)/
find_fddb_gt_name       fddb/fddb_sub.c /^int find_fddb_gt_name(tl, group_name)/
find_fddb_nt_name       tms_library/fddb_lib.c  /^int  find_fddb_nt_name(tl, element_name,
 type, siz/
find_first_last_port_unit       tms_library/find_first_last.c   /^unsigned long  find_firs
t_last_port_unit(db_type, /
find_gms_names  comm_prot/opc_comm/opc_comm_sub.c       /^int  find_gms_names(drcb_ptr)/
find_grp_name   fddb/fddb_sub.c /^void  find_grp_name(tl)/
find_msg_in_cluster     tms_library/vms_lib.c   /^unsigned short  find_msg_in_cluster(cst_
entry, sig/
find_msg_in_library     tms_library/vms_lib.c   /^unsigned short  find_msg_in_library(lib_
entry, msg/
find_msg_in_queue       tms_library/vms_lib.c   /^unsigned short  find_msg_in_queue(que_en
try, msg_n/
find_ptl_names  comm_prot/opc_comm/opc_comm_sub.c       /^int find_ptl_names(rx_ubfr, drcb
_ptr)/
find_que_in_library     tms_library/vms_lib.c   /^unsigned short  find_que_in_library(lib_
entry, que/
find_slot_no_in_library tms_library/vms_lib.c   /^unsigned short  find_slot_no_in_library(
lib_entry,/
find_string     tms_library/misc_func.c /^unsigned char  *find_string(string, buffer, buff
er/
find_usage_in_multiple_dbs      fddb/vaxport/build_vaxportdb.c  /^void  find_usage_in_mult
iple_dbs()/
find_vmsdb_entry_by_index       comm_prot/vms_comm/vms_comm_sub.c       /^void  *find_vmsd
b_entry_by_index(list_head, index)/
find_vmsdb_entry_by_name        tms_library/vms_lib.c   /^void  *find_vmsdb_entry_by_name(
list_head, name)/
fit_eqn_in_win_col      rt_skeleton/watch_bottleneck.c  /^int  fit_eqn_in_win_col(st_row,
win_col, line_at_b/
fit_largest_unassigned  rt_skeleton/watch_bottleneck.c  /^int  fit_largest_unassigned(st_r
ow, win_col, line_/
fl_delta_time   tms_library/misc_func.c /^float  fl_delta_time(start_time, curr_time)/
flush_input     tms_library/kb_func.c   /^void  flush_input()/
flush_mailbox   tms_library/mailbox.c   /^unsigned long  flush_mailbox(channel, buffer, bu
f_/
flush_opc_comm_queues   comm_prot/opc_comm/opc_comm_sub.c       /^void  flush_opc_comm_que
ues()/
flush_rmdc_queues       comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  flush_rmdc_queues(
)/
flush_type_ahead        tms_library/kb_func.c   /^unsigned long  flush_type_ahead(ttchan,
count, ios/
flush_vms_comm_queues   comm_prot/vms_comm/vms_comm_sub.c       /^void  flush_vms_comm_que
ues()/
fmt_write_comm_msg      comm_prot/tms_comm_sub.c        /^void  fmt_write_comm_msg(event_c
ode, mpu_name, msg/
follow_linked_list_fwd  comm_prot/opc_comm/opc_comm_sub.c       /^follow_linked_list_fwd(l
ist_head, msg)/
follow_linked_list_rev  comm_prot/opc_comm/opc_comm_sub.c       /^follow_linked_list_rev(l
ist_head, msg)/
follow_scheddb_list     tms_library/sched_lib.c /^void  follow_scheddb_list(scheddb_tl, li
```

```
st_head)/
follow_vmsdb_list       tms_library/vms_lib.c   /^void  follow_vmsdb_list(vmsdb_tl, list_h
ead)/
format_ascii_hex        comm_prot/tms_comm_sub.c        /^int format_ascii_hex(buffer, dat
a, n_bytes)/
format_db_element_for_output    tms_library/format_db_lib.c     /^int  format_db_element_f
or_output(tl, buffer, colu/
format_event_log_msg    tms_library/format_el_msg.c     /^void  format_event_log_msg(elm,
write_func)/
format_unit_name        comm_prot/tms_comm_sub.c        /^void  format_unit_name(unit_no,
buffer)/
general_process_startup tms_library/proc_cntrl.c        /^unsigned long  general_process_s
tartup(process_nam/
get_1_char      tms_library/kb_func.c   /^unsigned long  get_1_char(ttchan, ch, iosb)/
get_HM_input    comm_prot/reset_modem.c /^int  get_HM_input(channel, buffer, length, timeo
ut/
get_VMS_cluster fddb/vmsdb/vmsdb_sub.c  /^int  get_VMS_cluster(vmsdb_tl)/
get_VMS_library fddb/vmsdb/vmsdb_sub.c  /^int  get_VMS_library(vmsdb_tl)/
get_VMS_message fddb/vmsdb/vmsdb_sub.c  /^int  get_VMS_message(vmsdb_tl)/
get_VMS_queue   fddb/vmsdb/vmsdb_sub.c  /^int  get_VMS_queue(vmsdb_tl)/
get_actv_anal_eqn       fddb/rmdb/rmdb_sub.c    /^int  get_actv_anal_eqn(tl)/
get_actv_params_from_RMDB       rt_skeleton/actv_lib.c  /^unsigned long  get_actv_params_f
rom_RMDB(RMDBColIn/
get_aggr_vol_occ        comm_prot/opc_comm/opc_comm_sub.c       /^void  get_aggr_vol_occ(r
tdb_offset, first_col, las/
get_btl_neck_eqn        fddb/rmdb/rmdb_sub.c    /^int  get_btl_neck_eqn(tl)/
get_cab_loop_name       fddb/rmdb/rmdb_sub.c    /^int  get_cab_loop_name(dest, src)/
get_cluster     comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  get_cluster(cst_
name, unit_no, cst/
get_cpu_time    tms_library/proc_cntrl.c        /^unsigned long  get_cpu_time(cpu_time_adr
)/
get_device_name tms_library/proc_cntrl.c        /^unsigned long  get_device_name(logical_n
ame, dev_n/
get_fletcher_checksum   comm_prot/vms_comm/vms_comm_sub.c       /^void  get_fletcher_check
sum(msg, msg_len, fp_check/
get_group_name  tms_library/uaf_sub.c   /^unsigned long  get_group_name(user_uic, group_na
me/
get_hex fddb/token/token.c      /^get_hex(dest, src, table, curr_row, cnt)/
get_inc_det_eqn fddb/rmdb/rmdb_sub.c    /^int  get_inc_det_eqn(tl)/
get_iochan      tms_library/kb_func.c   /^unsigned long  get_iochan(device_name, iochan)/
get_library     comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  get_library(sign
_name, lib_name, v/
get_message     comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  get_message(sign
_name, msg_name, v/
get_mpu_name    comm_prot/tms_comm_sub.c        /^unsigned long  get_mpu_name(mpu_no, mpu_
name)/
get_next_actv_line      fddb/rmdb/rmdb_sub.c    /^int  get_next_actv_line(tl)/
get_next_btl_line       fddb/rmdb/rmdb_sub.c    /^int  get_next_btl_line(tl)/
get_next_line   fddb/fddb_sub.c /^unsigned char get_next_line(tl, stream)/
get_next_loop_name      fddb/rmdb/rmdb_sub.c    /^int  get_next_loop_name(dest, src, defau
lt_cab)/
get_nibble      comm_prot/rmdc_comm/rmdc_comm_sub.c     /^unsigned char  get_nibble(byte,
index)/
get_number_from_header  tms_library/misc_func.c /^int  get_number_from_header(label_string
, buffer)/
get_octal       fddb/token/token.c      /^get_octal(dest, src, table, curr_row, cnt)/
get_opc_buffer  comm_prot/opc_comm/opc_comm_sub.c       /^struct jhub  *get_opc_buffer(dat
a_size)  /
get_opc_comm_version    comm_prot/opc_comm/opc_comm_sub.c       /^void  get_opc_comm_versi
on(rx_ubfr)/
get_other_process_id    tms_library/proc_cntrl.c        /^unsigned long  get_other_process
_id(process_name, /
get_param       fddb/fddb_sub.c /^void get_param(tl)/
get_param_value tms_library/kb_func.c   /^int  get_param_value(prompt, buffer, max_chars)/
get_pid tms_library/proc_cntrl.c        /^unsigned long  get_pid(pidadr)/
get_pin_assignments     fddb/rmdb/rmdb_sub.c    /^get_pin_assignments(tl)/
```

```
get_port_device_memory  fddb/vaxport/build_vaxportdb.c  /^void  get_port_device_memory()/
get_port_name   comm_prot/reset_modem.c /^get_port_name(port_name)/
get_proc_info   tms_library/proc_cntrl.c        /^unsigned long  get_proc_info(item_code,
buffer_add/
get_process_name        tms_library/proc_cntrl.c        /^unsigned long  get_process_name(
process_name)/
get_process_priv        tms_library/proc_cntrl.c        /^unsigned long  get_process_priv(
priv_quad_word)/
get_pv  fddb/fddb_sub.c /^int get_pv(bfr, b_offset, /
get_queue       comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  get_queue(sign_n
ame, que_name, vms/
get_rmdc_buffer comm_prot/rmdc_comm/rmdc_comm_sub.c     /^struct jhub  *get_rmdc_buffer(da
ta_size)  /
get_road_location       comm_prot/opc_comm/opc_comm_sub.c       /^void get_road_location(t
l, name_ptr, cl_index)/
get_rpt_memory  rt_skeleton/comm_stats_rpt.c    /^void  get_rpt_memory()/
get_scheddb_block       tms_library/sched_lib.c /^struct rel_list_hdr  *get_scheddb_block(
scheddb_tl/
get_schedule    comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  get_schedule(sch
ed_ptr, unit_no, s/
get_speed_param_name    fddb/rmdb/rmdb_sub.c    /^int  get_speed_param_name(tl, dest, spee
d_ndx)/
get_speed_trap_params   fddb/rmdb/rmdb_sub.c    /^int  get_speed_trap_params(tl)/
get_stn_aggr_eqn        fddb/rmdb/rmdb_sub.c    /^int  get_stn_aggr_eqn(tl)/
get_term_char   tms_library/kb_func.c   /^unsigned long  get_term_char(ttchan, basic_char,
 e/
get_terminal_name       tms_library/proc_cntrl.c        /^unsigned long  get_terminal_name
(terminal_name)/
get_tms_uaf_info        tms_library/uaf_sub.c   /^unsigned long  get_tms_uaf_info(user_nam
e, acct, e/
get_tod_entry   fddb/rmdb/rmdb_sub.c    /^int  get_tod_entry(tl)/
get_token       fddb/token/token.c      /^get_token(dest, src, table)/
get_tty_bit     tms_library/fmdb_lib.c  /^int  get_tty_bit(efc_name, first_tty_bit, num_tt
y_/
get_unit_name   comm_prot/tms_comm_sub.c        /^unsigned long  get_unit_name(mpu_no, opt
ions, unit/
get_unit_status comm_prot/opc_comm/opc_comm_sub.c       /^unsigned char  get_unit_status(u
nit_no)/
get_user_name   tms_library/proc_cntrl.c        /^unsigned long  get_user_name(user_name)/
get_vms_buffer  comm_prot/vms_comm/vms_comm_sub.c       /^struct jhub  *get_vms_buffer(dat
a_size)  /
get_vmsdb_block tms_library/vms_lib.c   /^struct rel_list_hdr  *get_vmsdb_block(vmsdb_tl,
re/
getall_HM_Sregisters    upi_xmit/upi_xmit.c     /^int  getall_HM_Sregisters(channel)/
grp_name_fnd    fddb/fddb_sub.c /^void  grp_name_fnd(tl)/
grp_name_special_case   fddb/cctvdb/cctvdb_sub.c        /^void  grp_name_special_case(cctv
db_tl)/
hash_password   tms_library/uaf_sub.c   /^unsigned long  hash_password(user_name, password
, /
highlight_max_rate      rt_skeleton/watch_bottleneck.c  /^highlight_max_rate()/
idle_all        comm_prot/opc_comm/opc_comm_sub.c       /^int  idle_all(unit_no)/
idle_one        comm_prot/opc_comm/opc_comm_sub.c       /^short  idle_one(unit_no, handle)
/
if      comm_prot/opc_comm/opc_comm.c   /^  if ((cond_code != SS$_WASSET) && (cond_code !=
 S/
in_order_layout rt_skeleton/watch_bottleneck.c  /^int  in_order_layout()/
incident_detect rt_skeleton/inc_detect.c        /^int  incident_detect   \/* Modified Cali
fornia Algo/
init_actvdb_eqn rt_skeleton/actv_anal.c /^void  init_actvdb_eqn(EqnOffset, NameTableNdx, R
MD/
init_actvdb_params      rt_skeleton/actv_lib.c  /^void  init_actvdb_params(n_eqns)/
init_actvdb_tl  rt_skeleton/actv_lib.c  /^void  init_actvdb_tl(base_address, offsets, tl)
  /
init_attn_ast_jhub      comm_prot/tms_comm_sub.c        /^struct jhub  *init_attn_ast_jhub
(jh_ubfr, port_no)/
init_bfr_tracking_params        comm_prot/vms_comm/vms_comm_sub.c       /^void  init_bfr_t
```

```
racking_params()/
init_cctv_rx_jhub       comm_prot/tms_comm_sub.c        /^struct jhub  *init_cctv_rx_jhub(
jh_ubfr, rx_size, /
init_cctv_tx_jhub       comm_prot/tms_comm_sub.c        /^struct jhub  *init_cctv_tx_jhub(
jh_ubfr, tx_size, /
init_cctvdb_data_col_list       fddb/cctvdb/cctvdb_sub.c        /^void init_cctvdb_data_co
l_list(tl, cctvdb_db_base)/
init_cctvdb_params      fddb/cctvdb/cctvdb_sub.c        /^void  init_cctvdb_params(cctvdb_
tl, n_data_columns/
init_cctvdb_tl  tms_library/fddb_lib.c  /^void init_cctvdb_tl(base_address, offsets, tl)/
init_cluster    fddb/vmsdb/vmsdb_sub.c  /^void  init_cluster()/
init_empty_jhub comm_prot/tms_comm_sub.c        /^void  init_empty_jhub(jh_ubfr, jhub_size
)/
init_fddb_params        fddb/fddb_sub.c /^void init_fddb_params(tl, n_data_columns, num_nt
_e/
init_fmdb_tl    tms_library/fmdb_lib.c  /^void  init_fmdb_tl(base_address, offsets)
  /
init_gbldb_data_col_list        fddb/gbldb/gbldb_sub.c  /^void init_gbldb_data_col_list(tl
, gbldb_db_base)/
init_gbldb_params       fddb/gbldb/gbldb_sub.c  /^void  init_gbldb_params(gbldb_tl, n_data
_columns, /
init_gbldb_tl   tms_library/fddb_lib.c  /^void  init_gbldb_tl(base_address, offsets, tl)/
init_gc_unit    comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  init_gc_unit(unit_no, clea
r_dev_status)/
init_gcdb_data_col_list fddb/gcdb/gcdb_sub.c    /^void  init_gcdb_data_col_list(gcdb_tl, g
cdb_db_bas/
init_gcdb_params        fddb/gcdb/gcdb_sub.c    /^void  init_gcdb_params(gcdb_tl, n_data_c
olumns, nu/
init_gcdb_tl    tms_library/fddb_lib.c  /^void  init_gcdb_tl(base_address, offsets, gcdb_t
l)/
init_group_table        fddb/fddb_sub.c /^void init_group_table(tl, table_name)/
init_hex        fddb/token/token.c      /^init_hex(dest, src, table, curr_row, cnt)/
init_jhdriver   comm_prot/tms_comm_sub.c        /^void  init_jhdriver()/
init_library    fddb/vmsdb/vmsdb_sub.c  /^void  init_library()/
init_list_heads comm_prot/opc_comm/opc_comm_sub.c       /^void  init_list_heads()/
init_message    fddb/vmsdb/vmsdb_sub.c  /^void  init_message()/
init_octal      fddb/token/token.c      /^init_octal(dest, src, table, curr_row, cnt)/
init_opc_event_flags    comm_prot/opc_comm/opc_comm_sub.c       /^unsigned long  init_opc_
event_flags()/
init_opc_unit   comm_prot/opc_comm/opc_comm_sub.c       /^void  init_opc_unit(unit_no, cle
ar_dev_status)/
init_oprtvdb_data_col_list      fddb/oprtvdb/oprtvdb_sub.c      /^void init_oprtvdb_data_c
ol_list(tl, oprtvdb_db_bas/
init_oprtvdb_params     fddb/oprtvdb/oprtvdb_sub.c      /^void  init_oprtvdb_params(oprtvd
b_tl, n_data_colum/
init_oprtvdb_tl tms_library/fddb_lib.c  /^void  init_oprtvdb_tl(base_address, offsets, tl)
/
init_queue      fddb/vmsdb/vmsdb_sub.c  /^void  init_queue()/
init_rmdb_data_col_list fddb/rmdb/rmdb_sub.c    /^void init_rmdb_data_col_list(tl, rmdb_db
_base)/
init_rmdb_params        fddb/rmdb/rmdb_sub.c    /^void  init_rmdb_params(rmdb_tl, n_data_c
olumns, nu/
init_rmdb_tl    tms_library/fddb_lib.c  /^void  init_rmdb_tl(base_address, offsets, tl)/
init_rmdc_gc_unit       comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  init_rmdc_gc_unit(
unit_no, clear_dev_status)/
init_rmdc_list_heads    comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  init_rmdc_list_hea
ds()/
init_rmdc_unit  comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  init_rmdc_unit(unit_no, cl
ear_dev_status)/
init_rtdb_tl    tms_library/rtdb_lib.c  /^void  init_rtdb_tl(base_address, offsets, tl)
  /
init_rtrv_params        comm_prot/opc_comm/opc_comm_sub.c       /^void  init_rtrv_params()
/
init_rx_jhub    comm_prot/tms_comm_sub.c        /^struct jhub  *init_rx_jhub(jh_ubfr, rx_s
ize, unit_/
init_scheddb_free_list  fddb/scheddb/scheddb_sub.c      /^void  init_scheddb_free_list(sch
```

```
eddb_tl, base_addr/
init_scheddb_params     fddb/scheddb/scheddb_sub.c      /^void  init_scheddb_params(schedd
b_tl, start_link_l/
init_scheddb_tl tms_library/fddb_lib.c  /^void  init_scheddb_tl(base_address, offsets, sch
ed/
init_schedule   fddb/scheddb/scheddb_sub.c      /^void  init_schedule()/
init_stn_aggr_list      fddb/rmdb/rmdb_sub.c    /^void init_stn_aggr_list(tl)
        /
init_tx_jhub    comm_prot/tms_comm_sub.c        /^struct jhub  *init_tx_jhub(jh_ubfr, tx_s
ize, unit_/
init_tx_rx_jhub comm_prot/tms_comm_sub.c        /^struct jhub  *init_tx_rx_jhub(jh_ubfr, t
x_size, rx/
init_vaxportdb_params   fddb/vaxport/vaxportdb_sub.c    /^void init_vaxportdb_params(tl, n
_VAXPorts, n_unit_/
init_vaxportdb_tl       tms_library/fddb_lib.c  /^void init_vaxportdb_tl(base_address, off
sets, tl)/
init_video_tx_jhub      comm_prot/tms_comm_sub.c        /^struct jhub  *init_video_tx_jhub
(jh_ubfr, tx_size)/
init_vms_list_heads     comm_prot/vms_comm/vms_comm_sub.c       /^void  init_vms_list_head
s()/
init_vms_msg_struct     tms_library/vms_lib.c   /^void  init_vms_msg_struct(cm)/
init_vms_tx_rx_jhub     comm_prot/tms_comm_sub.c        /^struct jhub  *init_vms_tx_rx_jhu
b(jh_ubfr, tx_size/
init_vms_unit   comm_prot/vms_comm/vms_comm_sub.c       /^void  init_vms_unit(unit_no, cle
ar_dev_status)/
init_vmsdb_data_col_list        fddb/vmsdb/vmsdb_sub.c  /^void  init_vmsdb_data_col_list(t
l, vmsdb_db_base)/
init_vmsdb_free_list    tms_library/vms_lib.c   /^void  init_vmsdb_free_list(vmsdb_tl, bas
e_address,/
init_vmsdb_params       fddb/vmsdb/vmsdb_sub.c  /^void  init_vmsdb_params(vmsdb_tl, n_data
_columns, /
init_vmsdb_tl   tms_library/fddb_lib.c  /^void init_vmsdb_tl(base_address, offsets, tl)/
initial_camera_setup    comm_prot/opc_comm/cctv_comm_sub.c      /^void  initial_camera_set
up(oprtv_unit_no, monitor,/
ins_copy_new_st fddb/token/token.c      /^ins_copy_new_st(dest, src, table, curr_row, cnt)
/
ins_new_state   fddb/token/token.c      /^ins_new_state(dest, src, table, curr_row, cnt)/
insert_in_scheddb_by_time       tms_library/sched_lib.c /^int  insert_in_scheddb_by_time(n
ew_entry)/
interpolate_metering_curve      rt_skeleton/watch_bottleneck.c  /^double  interpolate_mete
ring_curve(rmdb_col_ptr, l/
joystick_monitor_to_camera      comm_prot/opc_comm/cctv_comm_sub.c      /^void  joystick_m
onitor_to_camera(rx_ubfr)/
leading_zero_pad        tms_library/format_db_lib.c     /^void  leading_zero_pad(str, leng
th)/
left_justify    tms_library/misc_func.c /^void  left_justify(field_bfr, width)/
link_rmdb_to_rtdb       rt_skeleton/tms_startup.c       /^void link_rmdb_to_rtdb()/
load_HM_Sregister       comm_prot/reset_modem.c /^int  load_HM_Sregister(channel, reg, val
ue)/
load_WRT_B_cmd  comm_prot/opc_comm/cctv_comm_sub.c      /^void  load_WRT_B_cmd(tx_bfr, nex
t_char, wrt_addr, /
load_WRT_R_cmd  comm_prot/opc_comm/cctv_comm_sub.c      /^void  load_WRT_R_cmd(tx_bfr, nex
t_char, wrt_addr, /
load_actv_anal_eqns     rt_skeleton/actv_anal.c /^int  load_actv_anal_eqns(eqn_file)/
load_camera_into_switch_cmd     comm_prot/opc_comm/cctv_comm_sub.c      /^void  load_camer
a_into_switch_cmd(switch_cmd, next/
load_delay_into_bfr     comm_prot/opc_comm/cctv_comm_sub.c      /^void  load_delay_into_bf
r(tx_bfr, next_char, delay/
load_dwell_into_switch_cmd      comm_prot/opc_comm/cctv_comm_sub.c      /^void  load_dwell
_into_switch_cmd(switch_cmd, next_/
load_fmdb_name_table    rt_skeleton/build_fmdb.c        /^unsigned long  load_fmdb_name_ta
ble(filename, num_/
load_monitor_into_switch_cmd    comm_prot/opc_comm/cctv_comm_sub.c      /^void  load_monit
or_into_switch_cmd(switch_cmd, nex/
load_name_table_ndx     fddb/fddb_sub.c /^void load_name_table_ndx(tl)/
load_param      fddb/fddb_sub.c /^int  load_param(tl, db_table_base)/
```

```
load_rtdb_name_table    rt_skeleton/build_rtdb.c        /^void  load_rtdb_name_table(filen
ame, num_entries, /
load_snapshot_namelist  rt_skeleton/build_fmdb.c        /^unsigned long  load_snapshot_nam
elist(namefile_nam/
load_tables     fddb/vaxport/build_vaxportdb.c  /^void  load_tables()/
log_170_data_poll       comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  log_170_data_poll(
unit_no, lane_rate, lane_s/
log_170_error_response  comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  log_170_error_resp
onse(tx_ubfr)/
log_24Hr_port_stats     comm_prot/tms_comm_sub.c        /^void  log_24Hr_port_stats(port_n
o)/
log_24Hr_unit_stats     comm_prot/tms_comm_sub.c        /^void  log_24Hr_unit_stats(unit_n
o)/
log_VMS_msg_in_hex      comm_prot/vms_comm/vms_comm_sub.c       /^void  log_VMS_msg_in_hex
(jh_ubfr, flag_bits)/
log_comm_bfr    comm_prot/tms_comm_sub.c        /^void  log_comm_bfr(msg, jh_ubfr)/
log_comm_event  comm_prot/tms_comm_sub.c        /^void  log_comm_event(event_code, mpu_no,
 msg)/
log_comm_event_cc       comm_prot/tms_comm_sub.c        /^void  log_comm_event_cc(event_co
de, mpu_no, msg, e/
log_comm_msg    comm_prot/tms_comm_sub.c        /^void  log_comm_msg(event_code, mpu_no, m
sg)/
log_comm_msg_cc comm_prot/tms_comm_sub.c        /^void  log_comm_msg_cc(event_code, mpu_no
, msg, ext/
log_drcb        comm_prot/opc_comm/opc_comm_sub.c       /^void  log_drcb(msg, drcb_ptr, rx
_bfr)/
log_drcb_hdr    comm_prot/opc_comm/opc_comm_sub.c       /^void  log_drcb_hdr(msg, drcb_ptr
)/
log_driver_stats        comm_prot/tms_comm_sub.c        /^void  log_driver_stats(port_no)/
log_iosb_fields comm_prot/tms_comm_sub.c        /^void  log_iosb_fields(jh_ubfr)/
log_jhub_hdr    comm_prot/tms_comm_sub.c        /^void  log_jhub_hdr(msg, jh_ubfr)/
log_list        comm_prot/tms_comm_sub.c        /^void  log_list(list_head)/
log_list_rel    comm_prot/tms_comm_sub.c        /^void  log_list_rel(list_head)/
log_name_list   comm_prot/opc_comm/opc_comm_sub.c       /^void  log_name_list(name_list, n
_names, name_size,/
log_tms_common  tms_library/event_log_sub.c     /^void  log_tms_common(msg_type, event_cod
e, msg_tex/
log_tms_event   tms_library/event_log_sub.c     /^void  log_tms_event(event_code, msg_text
)/
log_tms_event_cc        tms_library/event_log_sub.c     /^void  log_tms_event_cc(event_cod
e, msg_text, cond_/
log_tms_mpu_name        tms_library/event_log_sub.c     /^void  log_tms_mpu_name(msg_type,
 event_code, mpu_n/
log_upi_event   upi_xmit/upi_xmit.c     /^void  log_upi_event(event_code, msg_text)/
log_upi_event_cc        upi_xmit/upi_xmit.c     /^void  log_upi_event_cc(event_code, msg_t
ext, cond_/
log_vms_buffer_stats    comm_prot/vms_comm/vms_comm_sub.c       /^void  log_vms_buffer_sta
ts()/
loop_function   fddb/rmdb/rmdb_sub.c    /^ unsigned char loop_function(loop_name)/
loop_titles     rt_skeleton/watch_fmdb.c        /^loop_titles(window)/
mail_cmd_to_rmdc_comm   comm_prot/opc_comm/opc_comm_sub.c       /^unsigned short  mail_cmd
_to_rmdc_comm(rmdc_comm_mb/
mail_list_to_rmdc_comm  comm_prot/opc_comm/opc_comm_sub.c       /^unsigned short  mail_lis
t_to_rmdc_comm(rmdc_comm_m/
mail_msg_to_vms_comm    comm_prot/opc_comm/opc_vms_sub.c        /^unsigned char  mail_msg_
to_vms_comm(action_code, v/
mail_patch_cmd_to_rmdc_comm     fddb/rmdb/patch_rmdb.c  /^unsigned short  mail_patch_cmd_t
o_rmdc_comm(comman/
mail_rmdc_updates       comm_prot/opc_comm/opc_comm_sub.c       /^unsigned short  mail_rmd
c_updates(opc_unit_no)/
manual_menu     comm_prot/rmdc_comm/rmdc_comm_sub.c     /^int  manual_menu()/
map_to_ACTVDB   rt_skeleton/actv_lib.c  /^unsigned long  map_to_ACTVDB()/
map_to_CCTVDB   tms_library/fddb_lib.c  /^unsigned long  map_to_CCTVDB()/
map_to_FMDB     tms_library/fmdb_lib.c  /^unsigned long  map_to_FMDB()/
map_to_GBLDB    tms_library/fddb_lib.c  /^unsigned long  map_to_GBLDB()/
map_to_GCDB     tms_library/fddb_lib.c  /^unsigned long  map_to_GCDB()/
```

```
map_to_OPRTVDB  tms_library/fddb_lib.c  /^unsigned long  map_to_OPRTVDB()/
map_to_RMDB     tms_library/fddb_lib.c  /^unsigned long  map_to_RMDB()/
map_to_RTDB     tms_library/rtdb_lib.c  /^unsigned long  map_to_RTDB()/
map_to_SCHEDDB  tms_library/fddb_lib.c  /^unsigned long  map_to_SCHEDDB()/
map_to_VAXPORTDB        tms_library/fddb_lib.c  /^unsigned long  map_to_VAXPORTDB()/
map_to_VMSDB    tms_library/fddb_lib.c  /^unsigned long  map_to_VMSDB()/
map_to_global_section   tms_library/global_sub.c        /^unsigned long  map_to_global_sec
tion(name, write_a/
match_speed_loops       fddb/rmdb/rmdb_sub.c    /^void match_speed_loops(tl)
        /
mem_sort_rtfmdb_names   fddb/rmdb/rmdb_sub.c    /^void  mem_sort_rtfmdb_names(srt_file)/
memcmpi tms_library/misc_func.c /^int  memcmpi(buffer1, buffer2, count)/
menu2   fddb/cctvdb/patch_cctvdb.c      /^void menu2(tl)/
menu3   fddb/cctvdb/patch_cctvdb.c      /^void menu3(tl)/
menu4   fddb/cctvdb/patch_cctvdb.c      /^void menu4(tl)/
mon_el_write_func       rt_skeleton/mon_event_log.c     /^void  mon_el_write_func(buffer,
n_char)/
move_fmdb_data_to_buffer        rt_skeleton/fmdb_archiver.c     /^int  move_fmdb_data_to_b
uffer(df_bfr, nt_index, fi/
mr_titles       rt_skeleton/watch_rmdc.c        /^mr_titles()/
msleep  tms_library/misc_func.c /^void  msleep(msec)/
multi_menu      comm_prot/opc_comm/opc_comm_sub.c       /^int  multi_menu()/
mvwrtstr        rt_skeleton/watch_actv_anal.c   /^mvwrtstr(window, row, col, string)/
mvwrtstr_attrib rt_skeleton/watch_actv_anal.c   /^mvwrtstr_attrib(window, row, col, string
, attribut/
mvwrtstr_underline      rt_skeleton/watch_fmdb.c        /^mvwrtstr_underline(window, row,
col, string)/
mvwrtstr_vertical       rt_skeleton/watch_bottleneck.c  /^mvwrtstr_vertical(window, start_
row, col, string)/
name_time_titles        rt_skeleton/watch_fmdb.c        /^name_time_titles(cabinet_name)/
nd_compare      fddb/vaxport/build_vaxportdb.c  /^int  nd_compare(entry1, entry2)/
new_column      fddb/fddb_sub.c /^void  new_column(tl)/
new_column_special_case fddb/cctvdb/cctvdb_sub.c        /^void new_column_special_case(tl,
 column_name)/
nt_compare      fddb/vaxport/build_vaxportdb.c  /^int  nt_compare(entry1, entry2)/
nul_to_dest     fddb/token/token.c      /^nul_to_dest(dest, src, table, curr_row, cnt)/
one_bit_mask    tms_library/skel_sub.c  /^unsigned long  one_bit_mask(bit_number)/
output_cctvdb_out_fil   fddb/cctvdb/cctvdb_sub.c        /^void  output_cctvdb_out_fil(tl,
check_default)/
output_gbldb_out_fil    fddb/gbldb/gbldb_sub.c  /^void  output_gbldb_out_fil(tl, check_def
ault)/
output_gcdb_out_fil     fddb/gcdb/gcdb_sub.c    /^void  output_gcdb_out_fil(gcdb_tl, check
_default)/
output_oprtvdb_out_fil  fddb/oprtvdb/oprtvdb_sub.c      /^void  output_oprtvdb_out_fil(tl,
 check_default)/
output_rmdb_out_fil     fddb/rmdb/rmdb_sub.c    /^void  output_rmdb_out_fil(tl, check_defa
ult)/
output_scheddb_out_fil  fddb/scheddb/scheddb_sub.c      /^void  output_scheddb_out_fil()/
output_vmsdb_out_fil    fddb/vmsdb/vmsdb_sub.c  /^void  output_vmsdb_out_fil(vmsdb_tl, che
ck_default/
pack_fmdb_loop  tms_library/pack_lib.c  /^void  pack_fmdb_loop(fmdb_loop, vol, occ, flag,
n_/
pack_fmdb_spd_trap      tms_library/pack_lib.c  /^void  pack_fmdb_spd_trap/
pack_fmdb_station       tms_library/pack_lib.c  /^void  pack_fmdb_station(fmdb_stn, vol, o
cc, flag, /
pack_fp_checksum        comm_prot/vms_comm/vms_comm_sub.c       /^void  pack_fp_checksum(f
letcher_checksum, fp_check/
pack_hi_lo      tms_library/pack_lib.c  /^void pack_hi_lo(param, buffer, lo_byte, hi_byte,
 h/
pack_rtdb_inc_det       tms_library/pack_lib.c  /^void  pack_rtdb_inc_det(rtdb_loop_stn, i
nc_det)/
pack_rtdb_loop  tms_library/pack_lib.c  /^void  pack_rtdb_loop(rtdb_loop, vol, scan_cnt, f
la/
pack_rtdb_spd_trap      tms_library/pack_lib.c  /^void  pack_rtdb_spd_trap/
pack_rtdb_station       tms_library/pack_lib.c  /^void  pack_rtdb_station(rtdb_stn, vol, s
can_cnt, f/
```

```
pack_volocc_summation  tms_library/pack_lib.c  /^void  pack_volocc_summation(packed_summa
tion, n_ti/
pad_FP_number   tms_library/vms_lib.c   /^void  pad_FP_number(number)/
pad_end tms_library/tap_sub.c   /^void  pad_end(buffer, pad_length)/
pad_trailing_blanks     tms_library/utility_func.c      /^void  pad_trailing_blanks(buffer
, padded_length)/
pelco_init      comm_prot/opc_comm/cctv_comm_sub.c      /^void  pelco_init(unit_no, joysti
ck_mode, drop_addr/
perm_mask_to_byte       fddb/fddb_sub.c /^void perm_mask_to_byte(perm_mask, perm_chars)/
port_control    fddb/vaxport/patch_vaxportdb.c  /^void  port_control(vaxportdb_tl, port_no
)/
print_Unit_list fddb/vaxport/vaxportdb_sub.c    /^int  print_Unit_list(vaxportdb_tl)/
print_VAXPortStatus     fddb/vaxport/vaxportdb_sub.c    /^void print_VAXPortStatus(vaxport
db_tl)/
print_VAXPort_list      fddb/vaxport/vaxportdb_sub.c    /^int print_VAXPort_list(vaxportdb
_tl)/
print_cabinet_list      rt_skeleton/watch_bottleneck.c  /^print_cabinet_list()/
print_camera_report     fddb/cctvdb/patch_cctvdb.c      /^void  print_camera_report()/
print_ccbs      tms_library/ccb_subs.c  /^void  print_ccbs(first_channel, number)/
print_data_col_list     rt_skeleton/watch_fmdb.c        /^void print_data_col_list(tl)/
print_db_table  fddb/fddb_sub.c /^void  print_db_table(tl, fddb_file, column_index, /
print_db_table_special_case     fddb/cctvdb/cctvdb_sub.c        /^void  print_db_table_spe
cial_case (tl, fddb_input_/
print_driver_stats      rt_skeleton/comm_stats_rpt.c    /^void  print_driver_stats(out_fil
e)/
print_element_name_list fddb/cctvdb/patch_cctvdb.c      /^void print_element_name_list(tl,
 first_element, la/
print_eqn_list  rt_skeleton/watch_actv_anal.c   /^int  print_eqn_list()/
print_file_comments     fddb/fddb_sub.c /^int  print_file_comments/
print_gc_report fddb/gcdb/patch_gcdb.c  /^void  print_gc_report()/
print_group_name_list   fddb/cctvdb/patch_cctvdb.c      /^void print_group_name_list(tl)/
print_hex_ascii_line    tms_library/dump_mem.c  /^void print_hex_ascii_line(start, count,
addr_offse/
print_n_skipped tms_library/dump_mem.c  /^void print_n_skipped(n_zero, addr_offset)/
print_one_ccb   tms_library/ccb_subs.c  /^void  print_one_ccb(channel)/
print_opr_report        fddb/oprtvdb/patch_oprtvdb.c    /^void  print_opr_report()/
print_port_24hr_stats   rt_skeleton/comm_stats_rpt.c    /^void  print_port_24hr_stats(out_
file)/
print_port_list comm_prot/tms_comm_sub.c        /^int  print_port_list(msg, first_VAXPort,
 last_VAXP/
print_reload_progress   rt_skeleton/build_fmdb.c        /^void  print_reload_progress(sn_f
ilename, tag)/
print_rmdc_report       fddb/rmdb/patch_rmdb.c  /^void  print_rmdc_report()/
print_scheddb_entry     tms_library/sched_lib.c /^void  print_scheddb_entry(out_file, sche
d_entry, a/
print_scheddb_entry_by_index    fddb/scheddb/patch_scheddb.c    /^void  print_scheddb_entr
y_by_index(index, option)/
print_scheddb_list      fddb/scheddb/patch_scheddb.c    /^void  print_scheddb_list(option)
/
print_unit_24hr_stats   rt_skeleton/comm_stats_rpt.c    /^void  print_unit_24hr_stats(out_
file, UnitListDB)/
print_unit_list comm_prot/tms_comm_sub.c        /^int  print_unit_list(msg, first_unit, la
st_unit)/
print_vms_auxout        tms_library/vms_lib.c   /^void  print_vms_auxout(out_file, auxout)
/
print_vms_justify       tms_library/vms_lib.c   /^void  print_vms_justify(out_file, justif
y, justify/
print_vms_line  tms_library/vms_lib.c   /^void  print_vms_line(out_file, phase, line, line
_t/
print_vms_msg_type      fddb/vmsdb/vmsdb_sub.c  /^void  print_vms_msg_type(text, msg_type)
/
print_vms_repeats       tms_library/vms_lib.c   /^void  print_vms_repeats(out_file, label,
 repeat_te/
print_vms_struct_field  fddb/vmsdb/vmsdb_sub.c  /^void  print_vms_struct_field(label, fiel
d, max_len/
print_vms_time  tms_library/vms_lib.c   /^void  print_vms_time(out_file, label, time_text)
```

```
/
print_vmsdb_cluster_entry       tms_library/vms_lib.c   /^void  print_vmsdb_cluster_entry(
out_file, vmsdb_en/
print_vmsdb_entry_by_index      fddb/vmsdb/patch_vmsdb.c        /^void  print_vmsdb_entry_
by_index(list_head, index,/
print_vmsdb_library_entry       tms_library/vms_lib.c   /^void  print_vmsdb_library_entry(
out_file, vmsdb_en/
print_vmsdb_list_names  fddb/vmsdb/patch_vmsdb.c        /^void  print_vmsdb_list_names(lis
t_head, mlq_option/
print_vmsdb_message_entry       tms_library/vms_lib.c   /^void  print_vmsdb_message_entry(
out_file, vmsdb_en/
print_vmsdb_queue_entry tms_library/vms_lib.c   /^void  print_vmsdb_queue_entry(out_file,
vmsdb_entr/
print_vmsdb_report      fddb/vmsdb/patch_vmsdb.c        /^void  print_vmsdb_report()/
proc_term       fddb/token/token.c      /^proc_term(dest, src, table, curr_row, cnt)/
process_ENQ_config      comm_prot/vms_comm/vms_comm_sub.c       /^void  process_ENQ_config
(tx_ubfr)/
process_ENQ_status      comm_prot/vms_comm/vms_comm_sub.c       /^void  process_ENQ_status
(tx_ubfr)/
process_RLI     comm_prot/opc_comm/opc_comm_sub.c       /^void  process_RLI(rx_ubfr)/
process_SCH_message     comm_prot/opc_comm/opc_vms_sub.c        /^void  process_SCH_messag
e(rx_ubfr)/
process_VMS_message     comm_prot/opc_comm/opc_vms_sub.c        /^void  process_VMS_messag
e(rx_ubfr)/
process_VMS_print       comm_prot/opc_comm/opc_vms_sub.c        /^unsigned char  process_V
MS_print(sign_name, vmsdb_/
process_VMS_sign_cmd    comm_prot/opc_comm/opc_vms_sub.c        /^unsigned char  process_V
MS_sign_cmd(action_code, v/
process_cluster fddb/vmsdb/vmsdb_sub.c  /^void  process_cluster(vmsdb_tl)/
process_data_response   comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  process_data_respo
nse(tx_ubfr)/
process_data_retrieval  comm_prot/opc_comm/opc_comm_sub.c       /^void  process_data_retri
eval(rx_ubfr)/
process_enable_disable_loop     comm_prot/opc_comm/opc_comm_sub.c       /^void  process_en
able_disable_loop(rx_ubfr)/
process_equation_file   rt_skeleton/watch_bottleneck.c  /^process_equation_file(cab_index)
/
process_gc_err_resp     comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  process_gc_err_res
p(tx_ubfr)/
process_gc_status       comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  process_gc_status(
tx_ubfr)/
process_get_data        comm_prot/opc_comm/opc_comm_sub.c       /^void  process_get_data(r
x_ubfr)/
process_idle_data       comm_prot/opc_comm/opc_comm_sub.c       /^void  process_idle_data(
rx_ubfr)/
process_input_special_case      fddb/cctvdb/cctvdb_sub.c        /^process_input_special_ca
se(tl)/
process_invalid_partial comm_prot/opc_comm/opc_comm_sub.c       /^void  process_invalid_pa
rtial(rx_ubfr)/
process_library fddb/vmsdb/vmsdb_sub.c  /^void  process_library(vmsdb_tl)/
process_mailbox_command comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  process_mailbox_co
mmand(mbx_command, unit_no/
process_message fddb/vmsdb/vmsdb_sub.c  /^void  process_message(vmsdb_tl)/
process_meter_control   comm_prot/opc_comm/opc_comm_sub.c       /^void  process_meter_cont
rol(rx_ubfr)/
process_monitor_request comm_prot/opc_comm/cctv_comm_sub.c      /^void  process_monitor_re
quest(rx_ubfr)/
process_opc_good_comm   comm_prot/opc_comm/opc_comm_sub.c       /^void  process_opc_good_c
omm(jh_ubfr)/
process_opc_qio_fdt_errors      comm_prot/opc_comm/opc_comm_sub.c       /^void  process_op
c_qio_fdt_errors(msg, jh_ubfr, err/
process_opc_rx_available_errors comm_prot/opc_comm/opc_comm_sub.c       /^void  process_op
c_rx_available_errors(msg, jh_ubfr/
process_opc_tx_errors   comm_prot/opc_comm/opc_comm_sub.c       /^void  process_opc_tx_err
ors(msg, jh_ubfr, err_code/
process_opc_tx_wait_rx_errors   comm_prot/opc_comm/opc_comm_sub.c       /^void  process_op
```

```
c_tx_wait_rx_errors(msg, jh_ubfr, /
process_operator_log_entry      comm_prot/opc_comm/opc_comm_sub.c       /^void  process_op
erator_log_entry(rx_ubfr)/
process_operator_loginout       comm_prot/opc_comm/opc_comm_sub.c       /^void  process_op
erator_loginout(rx_ubfr)/
process_output_special_case     comm_prot/opc_comm/opc_comm_sub.c       /^int  process_out
put_special_case(tl, type, size, p/
process_partial_completion      comm_prot/opc_comm/opc_comm_sub.c       /^struct jhub *pro
cess_partial_completion(rx_ubfr)/
process_queue   fddb/vmsdb/vmsdb_sub.c  /^void  process_queue(vmsdb_tl)/
process_read_write_update       comm_prot/opc_comm/opc_comm_sub.c       /^void  process_re
ad_write_update(rx_ubfr)/
process_request_for_data        comm_prot/opc_comm/opc_comm_sub.c       /^void  process_re
quest_for_data(rx_ubfr)/
process_restart_repeat  comm_prot/opc_comm/opc_comm_sub.c       /^void  process_restart_re
peat (rx_ubfr)/
process_rmdc_err_resp   comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  process_rmdc_err_r
esp(tx_ubfr)/
process_rmdc_good_comm  comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  process_rmdc_good_
comm(jh_ubfr)/
process_rmdc_tx_wait_rx_errors  comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  process_rm
dc_tx_wait_rx_errors(msg, jh_ubfr,/
process_schedule        fddb/scheddb/scheddb_sub.c      /^void  process_schedule()/
process_terminate_data  comm_prot/opc_comm/opc_comm_sub.c       /^void  process_terminate_
data(rx_ubfr)/
process_vms_good_comm   comm_prot/vms_comm/vms_comm_sub.c       /^void  process_vms_good_c
omm(jh_ubfr)/
process_vms_tx_wait_rx_errors   comm_prot/vms_comm/vms_comm_sub.c       /^void  process_vm
s_tx_wait_rx_errors(msg, jh_ubfr, /
process_wild_card_name  comm_prot/opc_comm/opc_comm_sub.c       /^int  process_wild_card_n
ame(rx_ubfr, ques_mark, tx/
prompt_for_unit_enable  comm_prot/opc_comm/opc_comm_sub.c       /^unsigned char  prompt_fo
r_unit_enable(unit_no, dis/
prompt_for_yes_no       tms_library/kb_func.c   /^int  prompt_for_yes_no(msg1, msg2, def)/
queue_read_upi_mbx      upi_xmit/upi_xmit.c     /^unsigned long  queue_read_upi_mbx()/
queued_get_1_char       tms_library/kb_func.c   /^unsigned long  queued_get_1_char(ttchan,
 efn, ch, /
queued_read_from_mailbox        tms_library/mailbox.c   /^unsigned long  queued_read_from_
mailbox(channel, e/
range_check     fddb/fddb_sub.c /^int  range_check(tl, param, offset, type, size, sr/
read_HM_Sregister       upi_xmit/upi_xmit.c     /^int  read_HM_Sregister(channel, reg)/
read_JH_modem_status    comm_prot/tms_comm_sub.c        /^unsigned long  read_JH_modem_sta
tus(channel, modem/
read_TT_modem_status    tms_library/tt_func.c   /^unsigned long  read_TT_modem_status(chan
nel, modem/
read_data_file  rt_skeleton/dumydata.c  /^read_data_file(stream, buffer, size)/
read_df_elem_data       tms_library/fmdb_lib.c  /^unsigned long  read_df_elem_data(elem_na
me, channe/
read_df_hdr_namelist    tms_library/fmdb_lib.c  /^unsigned long  read_df_hdr_namelist(file
name, path/
read_fddb_file  fddb/fddb_sub.c /^int read_fddb_file(tl, fddb_file, fst)/
read_fmdb_namefile      tms_library/fmdb_lib.c  /^unsigned long  read_fmdb_namefile(filena
me, pathna/
read_fmdb_snapshot      tms_library/fmdb_lib.c  /^unsigned long  read_fmdb_snapshot(filena
me, pathna/
read_from_mailbox       tms_library/mailbox.c   /^unsigned long  read_from_mailbox(channel
, buffer, /
read_from_mailbox_nowait        tms_library/mailbox.c   /^unsigned long  read_from_mailbox
_nowait(channel, b/
read_report_list        noaa_monitor/noaa_monitor.c     /^void  read_report_list()/
read_rtfmdb_name_file   tms_library/fddb_lib.c  /^int  read_rtfmdb_name_file(stream, curr_
record, le/
read_type_ahead tms_library/kb_func.c   /^unsigned long  read_type_ahead(ttchan, buffer, b
uf/
remove_from_list        tms_library/link_sub.c  /^void  *remove_from_list(entry)/
remove_from_list_head_i tms_library/intlk_queue.c       /^void  *remove_from_list_head_i(l
```

```
ist_head)/
remove_from_list_tail_i tms_library/intlk_queue.c       /^void  *remove_from_list_tail_i(l
ist_head)/
replace_cluster comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  replace_cluster(
cst_name, cst_body/
replace_library comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  replace_library(
sign_name, lib_nam/
replace_message comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  replace_message(
sign_name, msg_nam/
replace_queue   comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  replace_queue(si
gn_name, que_name,/
replace_schedule        comm_prot/opc_comm/opc_vms_sub.c        /^unsigned short  replace_
schedule(sched_ptr, unit_n/
reschedule_tms_event    comm_prot/opc_comm/opc_vms_sub.c        /^void  reschedule_tms_eve
nt()/
restore_comm_process_name       comm_prot/tms_comm_sub.c        /^void  restore_comm_proce
ss_name()/
restore_tty_process_name        tms_library/proc_cntrl.c        /^void  restore_tty_proces
s_name(old_process_name)/
return_HM_to_cmd_mode   comm_prot/reset_modem.c /^int  return_HM_to_cmd_mode(channel)/
return_scheddb_block    tms_library/sched_lib.c /^struct rel_list_hdr  *return_scheddb_blo
ck(scheddb/
return_to_free_list     comm_prot/opc_comm/opc_comm_sub.c       /^void  return_to_free_lis
t(jh_ubfr)/
return_vmsdb_block      tms_library/vms_lib.c   /^struct rel_list_hdr  *return_vmsdb_block
(vmsdb_tl,/
right_justify   tms_library/misc_func.c /^void  right_justify(field_bfr, width)/
rtfm_compare    fddb/rmdb/rmdb_sub.c    /^int  rtfm_compare(name1, name2)/
run_polling_processes   rt_skeleton/rt_skeleton.c       /^void  run_polling_processes()/
run_process_alt_bit     rt_skeleton/rt_skeleton.c       /^void  run_process_alt_bit(proc_n
ame, efc_name, sta/
run_process_one_bit     rt_skeleton/rt_skeleton.c       /^void  run_process_one_bit(proc_n
ame, efc_name, sta/
run_process_wait        rt_skeleton/rt_skeleton.c       /^void  run_process_wait(proc_name
, start_event_flag/
run_watch_actv_anal     rt_skeleton/actv_anal.c /^void  run_watch_actv_anal(efc_name, star
t_event_fl/
rx_ast_func     comm_prot/opc_comm/opc_comm_sub.c       /^void  rx_ast_func(param)/
scan_rtfmdb_name_file   fddb/rmdb/rmdb_sub.c    /^int scan_rtfmdb_name_file(filename, n_na
mes, n_loo/
scheddb_error   fddb/scheddb/scheddb_sub.c      /^void  scheddb_error(err_msg, print_line,
 first_col/
scroll_fmdb_col_offsets tms_library/fmdb_lib.c  /^void  scroll_fmdb_col_offsets()/
scroll_port_stats       comm_prot/tms_comm_sub.c        /^void  scroll_port_stats(port_no)
/
scroll_rtdb_col_offsets tms_library/rtdb_lib.c  /^void  scroll_rtdb_col_offsets()/
scroll_unit_stats       comm_prot/tms_comm_sub.c        /^void  scroll_unit_stats(unit_no)
/
search_all_cst_for_msg  tms_library/vms_lib.c   /^unsigned short  search_all_cst_for_msg(s
ign_name, /
search_all_lib_for_msg  tms_library/vms_lib.c   /^unsigned short  search_all_lib_for_msg(m
sg_name, v/
search_all_que_for_msg  tms_library/vms_lib.c   /^unsigned short  search_all_que_for_msg(m
sg_name, v/
search_fddb_offset_list tms_library/fddb_lib.c  /^int  search_fddb_offset_list(tl, offset)
/
search_fmdb_name_table  tms_library/fmdb_lib.c  /^int  search_fmdb_name_table(search_name)
/
search_rtdb_name_table  tms_library/rtdb_lib.c  /^int  search_rtdb_name_table(search_name)
/
search_rtdb_offset_list tms_library/rtdb_lib.c  /^int  search_rtdb_offset_list(offset)/
search_sch_for_create_time      tms_library/sched_lib.c /^void  *search_sch_for_create_tim
e(create_time)/
search_sch_for_dev_item tms_library/sched_lib.c /^void  *search_sch_for_dev_item(device_na
me, action/
search_sch_for_start_time       tms_library/sched_lib.c /^void  *search_sch_for_start_time
```

```
(device_name, acti/
select_DB_for_UnitList  fddb/vaxport/patch_vaxportdb.c  /^unsigned char  select_DB_for_Uni
tList()/
select_entry    tms_library/kb_func.c   /^int  select_entry(min, max)/
select_vmsdb_ll_entry   comm_prot/vms_comm/vms_comm_sub.c       /^void  *select_vmsdb_ll_e
ntry(list_head)/
send_HM_cmd     comm_prot/reset_modem.c /^int  send_HM_cmd(channel, cmd_str)/
send_HM_data    comm_prot/reset_modem.c /^int  send_HM_data(channel, data_bfr, n_bytes)/
send_active_rfd_blocks  comm_prot/opc_comm/opc_comm_sub.c       /^void  send_active_rfd_bl
ocks(opc_unit_no)/
send_data_response      comm_prot/opc_comm/opc_comm_sub.c       /^int  send_data_response(
drcb_ptr, flow_control_fla/
send_gc_start_msgs      comm_prot/rmdc_comm/rmdc_comm_sub.c     /^unsigned char  send_gc_s
tart_msgs(unit_no)/
send_msg_to_oper        rt_skeleton/actv_anal.c /^void  send_msg_to_oper()/
send_report     upi_xmit/upi_xmit.c     /^int  send_report(channel, report, n_bytes)/
send_rmdc_gc_start_msgs comm_prot/rmdc_comm/rmdc_comm_sub.c     /^unsigned char  send_rmdc
_gc_start_msgs(unit_no)/
send_rmdc_start_msgs    comm_prot/rmdc_comm/rmdc_comm_sub.c     /^unsigned char  send_rmdc
_start_msgs(unit_no)/
send_to_mon_event_log   rt_skeleton/event_logger.c      /^void  send_to_mon_event_log(msg_
type, event_code, /
send_vms_start_msgs     comm_prot/vms_comm/vms_comm_sub.c       /^unsigned char  send_vms_
start_msgs(unit_no)/
set_2min_timer  rt_skeleton/event_logger.c      /^void  set_2min_timer()/
set_JH_speed_parity     comm_prot/tms_comm_sub.c        /^unsigned long  set_JH_speed_pari
ty(channel, speed,/
set_TT_speed_parity     tms_library/tt_func.c   /^unsigned long  set_TT_speed_parity(chann
el, speed,/
set_joystick_status     comm_prot/opc_comm/cctv_comm_sub.c      /^void  set_joystick_statu
s(unit_no, new_joy_status)/
set_port_partial        tms_library/kb_func.c   /^unsigned long  set_port_partial(ttchan)/
set_port_raw    tms_library/kb_func.c   /^unsigned long  set_port_raw(ttchan)/
set_priority    tms_library/proc_cntrl.c        /^unsigned long  set_priority(new_priority
, prev_pri/
set_process_name        tms_library/proc_cntrl.c        /^unsigned long  set_process_name(
process_name)/
set_roadway_type_bits   fddb/rmdb/rmdb_sub.c    /^void set_roadway_type_bits(tl)/
set_term_char   tms_library/kb_func.c   /^unsigned long  set_term_char(ttchan, basic_char,
 e/
setup_port_for_protocol comm_prot/tms_comm_sub.c        /^unsigned long  setup_port_for_pr
otocol(port_no, pr/
simple_write_to_comm_log        comm_prot/tms_comm_sub.c        /^void simple_write_to_com
m_log(record, n_bytes, err/
skip_char       fddb/token/token.c      /^skip_char(dest, src, table, curr_row, cnt)/
skip_chk_cnt    fddb/token/token.c      /^skip_chk_cnt(dest, src, table, curr_row, cnt)/
skip_new_st     fddb/token/token.c      /^skip_new_st(dest, src, table, curr_row, cnt)/
skip_same_st    fddb/token/token.c      /^skip_same_st(dest, src, table, curr_row, cnt)/
sort_list       tms_library/sort_lib.c  /^void  sort_list(list, record_length, num_records
, /
sort_list_by_db_type    fddb/vaxport/build_vaxportdb.c  /^void  sort_list_by_db_type(list,
 record_length, nu/
sort_rtfmdb_names       fddb/rmdb/rmdb_sub.c    /^unsigned long sort_rtfmdb_names(src_file
1, src_fil/
spawn_DCL_cmd_nowait    tms_library/proc_cntrl.c        /^unsigned long  spawn_DCL_cmd_now
ait(command)/
spawn_noaa_del_cmd      noaa_monitor/noaa_monitor.c     /^void  spawn_noaa_del_cmd()/
squeeze_layout  rt_skeleton/watch_bottleneck.c  /^int  squeeze_layout(line_at_bottom)/
start_cctv_port comm_prot/opc_comm/cctv_comm_sub.c      /^unsigned long  start_cctv_port(p
ort_no)/
start_cctv_unit comm_prot/opc_comm/cctv_comm_sub.c      /^void  start_cctv_unit(unit_no, c
lear_dev_status)/
start_comm_process      rt_skeleton/tms_startup.c       /^unsigned long  start_comm_proces
s(image_name, proc/
start_next_tms_sched    comm_prot/opc_comm/opc_vms_sub.c        /^void  start_next_tms_sch
ed(check_curr)/
```

```
start_noaa_port noaa_monitor/noaa_monitor.c     /^void  start_noaa_port()/
start_noaa_timer        noaa_monitor/noaa_monitor.c     /^void  start_noaa_timer()/
start_opc_port  comm_prot/opc_comm/opc_comm_sub.c       /^unsigned long  start_opc_port(po
rt_no, n_short_to_/
start_process   tms_library/proc_cntrl.c        /^unsigned long  start_process(image_name,
 process_n/
start_processx  rt_skeleton/tms_startup.c       /^unsigned long  start_processx(image_name
, process_/
start_redial_timer      upi_xmit/upi_xmit.c     /^int  start_redial_timer(redial_wait_time
)/
start_rmdc_port comm_prot/rmdc_comm/rmdc_comm_sub.c     /^unsigned long  start_rmdc_port(p
ort_no)/
start_rpt_timer rt_skeleton/comm_stats_rpt.c    /^void  start_rpt_timer()/
start_tms_process       rt_skeleton/tms_startup.c       /^void  start_tms_process(filename
, tms_control_mbx,/
start_upi_port  upi_xmit/upi_xmit.c     /^void  start_upi_port()/
start_vms_port  comm_prot/vms_comm/vms_comm_sub.c       /^unsigned long  start_vms_port(po
rt_no)/
start_vs_port   comm_prot/opc_comm/cctv_comm_sub.c      /^unsigned long  start_vs_port()/
stn_titles      rt_skeleton/watch_fmdb.c        /^stn_titles()/
stop_cctv_port  comm_prot/opc_comm/cctv_comm_sub.c      /^unsigned long  stop_cctv_port(po
rt_no)/
stop_cctv_unit  comm_prot/opc_comm/cctv_comm_sub.c      /^void  stop_cctv_unit(unit_no)/
stop_gc_unit    comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  stop_gc_unit(unit_no)/
stop_noaa_port  noaa_monitor/noaa_monitor.c     /^void  stop_noaa_port()/
stop_opc_port   comm_prot/opc_comm/opc_comm_sub.c       /^unsigned long  stop_opc_port(por
t_no)/
stop_opc_unit   comm_prot/opc_comm/opc_comm_sub.c       /^void  stop_opc_unit(unit_no)/
stop_rmdc_gc_unit       comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  stop_rmdc_gc_unit(
unit_no)/
stop_rmdc_port  comm_prot/rmdc_comm/rmdc_comm_sub.c     /^unsigned long  stop_rmdc_port(po
rt_no)/
stop_rmdc_unit  comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  stop_rmdc_unit(unit_no)/
stop_upi_port   upi_xmit/upi_xmit.c     /^void  stop_upi_port()/
stop_vms_port   comm_prot/vms_comm/vms_comm_sub.c       /^unsigned long  stop_vms_port(por
t_no)/
stop_vms_unit   comm_prot/vms_comm/vms_comm_sub.c       /^void  stop_vms_unit(unit_no)/
stop_vs_port    comm_prot/opc_comm/cctv_comm_sub.c      /^unsigned long  stop_vs_port()/
strcmpi tms_library/misc_func.c /^int  strcmpi(string1, string2)/
strip_leading_blanks    tms_library/format_db_lib.c     /^void  strip_leading_blanks(ptr)/
strip_trailing_blanks   tms_library/format_db_lib.c     /^void  strip_trailing_blanks(ptr)
/
switch_monitor_to_camera        comm_prot/opc_comm/cctv_comm_sub.c      /^void  switch_mon
itor_to_camera(rx_ubfr)/
switch_monitor_to_sequence      comm_prot/opc_comm/cctv_comm_sub.c      /^void  switch_mon
itor_to_sequence(rx_ubfr)/
switch_port     comm_prot/switch_tty.c  /^switch_port(port_name, driver_location, switch_a
ll/
talk_through    comm_prot/reset_modem.c /^int  talk_through(channel)/
terminate_all   comm_prot/opc_comm/opc_comm_sub.c       /^int  terminate_all(unit_no)/
terminate_one   comm_prot/opc_comm/opc_comm_sub.c       /^int  terminate_one(unit_no, hand
le)/
test_menu       comm_prot/opc_comm/opc_comm_sub.c       /^int  test_menu()/
test_unit_select        comm_prot/rmdc_comm/rmdc_comm_sub.c     /^int  test_unit_select()/
time_stamp_rtdb rt_skeleton/rt_skeleton.c       /^unsigned long  time_stamp_rtdb(curr_time
)/
timed_wait_for_1_char   tms_library/kb_func.c   /^unsigned long  timed_wait_for_1_char(ttc
han, timeo/
tnd_compare     fddb/vaxport/build_vaxportdb.c  /^int  tnd_compare(entry1, entry2)/
trans_chk_cnt   fddb/token/token.c      /^trans_chk_cnt(dest, src, table, curr_row, cnt)/
translate_char  fddb/token/token.c      /^translate_char(dest, src, table, curr_row, cnt)/
translate_logical_name  tms_library/logical_name.c      /^unsigned long  translate_logical
_name(logical_name/
trap_titles     rt_skeleton/watch_fmdb.c        /^trap_titles()/
trim_trailing_blanks    tms_library/utility_func.c      /^void  trim_trailing_blanks(buffe
r)/
```

```
turn_off_JH_DTR comm_prot/tms_comm_sub.c        /^unsigned long  turn_off_JH_DTR(channel)/
turn_off_JH_RTS comm_prot/tms_comm_sub.c        /^unsigned long  turn_off_JH_RTS(channel)/
turn_off_TT_DTR tms_library/tt_func.c   /^unsigned long  turn_off_TT_DTR(channel)/
turn_off_TT_RTS tms_library/tt_func.c   /^unsigned long  turn_off_TT_RTS(channel)/
turn_on_JH_DTR  comm_prot/tms_comm_sub.c        /^unsigned long  turn_on_JH_DTR(channel)/
turn_on_JH_RTS  comm_prot/tms_comm_sub.c        /^unsigned long  turn_on_JH_RTS(channel)/
turn_on_TT_DTR  tms_library/tt_func.c   /^unsigned long  turn_on_TT_DTR(channel)/
turn_on_TT_RTS  tms_library/tt_func.c   /^unsigned long  turn_on_TT_RTS(channel)/
two_bit_mask    tms_library/skel_sub.c  /^unsigned long  two_bit_mask(bit_number)/
two_group_layout        rt_skeleton/watch_bottleneck.c  /^int  two_group_layout()/
tx_ast_func     comm_prot/opc_comm/opc_comm_sub.c       /^void  tx_ast_func(param)/
tx_done_rx_ast_func     comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  tx_done_rx_ast_fun
c(param)/
tx_wait_rx_ast_func     comm_prot/opc_comm/opc_comm_sub.c       /^void  tx_wait_rx_ast_fun
c(param)/
ulong_to_table  tms_library/table_sub.c /^void  ulong_to_table(pointer, ulong)/
unit_control    fddb/vaxport/patch_vaxportdb.c  /^void  unit_control(vaxportdb_tl, unit_no
)/
unmap_global_section    tms_library/global_sub.c        /^unsigned long  unmap_global_sect
ion(gbl_addr)/
unpack_170_speed_trap   comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  unpack_170_speed_t
rap/
unpack_170_vol_occ      comm_prot/rmdc_comm/rmdc_comm_sub.c     /^void  unpack_170_vol_occ
(volume, scan_cnt, vs_byte/
unpack_fmdb_loop        tms_library/pack_lib.c  /^void  unpack_fmdb_loop(fmdb_loop, vol, o
cc, flag, /
unpack_fmdb_spd_trap    tms_library/pack_lib.c  /^void  unpack_fmdb_spd_trap/
unpack_fmdb_station     tms_library/pack_lib.c  /^void  unpack_fmdb_station(fmdb_stn, vol,
 occ, flag/
unpack_rtdb_inc_det     tms_library/pack_lib.c  /^void  unpack_rtdb_inc_det(rtdb_loop_stn,
 inc_det)/
unpack_rtdb_loop        tms_library/pack_lib.c  /^void  unpack_rtdb_loop(rtdb_loop, vol, s
can_cnt, f/
unpack_rtdb_loop_stn    tms_library/pack_lib.c  /^void  unpack_rtdb_loop_stn(rtdb_loop_stn
, vol, sca/
unpack_rtdb_spd_trap    tms_library/pack_lib.c  /^void  unpack_rtdb_spd_trap/
unpack_rtdb_station     tms_library/pack_lib.c  /^void  unpack_rtdb_station(rtdb_stn, vol,
 scan_cnt,/
up_arrow        tms_library/fmdb_lib.c  /^void  up_arrow(first_col, num_cols)/
ushort_to_table tms_library/table_sub.c /^void  ushort_to_table(pointer, ushort)/
vaxport_event_msg       fddb/vaxport/vaxportdb_sub.c    /^void  vaxport_event_msg(module_c
ode, msg)/
vaxport_event_msg_cc    fddb/vaxport/vaxportdb_sub.c    /^void  vaxport_event_msg_cc(modul
e_code, msg, cond_/
vms_c_getch     tms_library/kb_func.c   /^int  vms_c_getch()/
vms_c_grabch    tms_library/kb_func.c   /^int  vms_c_grabch()/
vms_c_kbhit     tms_library/kb_func.c   /^int  vms_c_kbhit()/
vms_msg_length  tms_library/vms_lib.c   /^int  vms_msg_length(vmsdb_msg)/
wait_HM_number  comm_prot/reset_modem.c /^int  wait_HM_number(channel, buffer, length, tim
eo/
wait_HM_result  comm_prot/reset_modem.c /^int  wait_HM_result(channel, buffer, length, tim
eo/
wait_for_1_char tms_library/kb_func.c   /^unsigned long  wait_for_1_char(ttchan, ch, iosb)
/
wc_search_dev_name      comm_prot/opc_comm/opc_comm_sub.c       /^int  wc_search_dev_name(
tl, dev_name, drcb_ptr, rx/
wc_search_elem_name     comm_prot/opc_comm/opc_comm_sub.c       /^int wc_search_elem_name(
tl, elem_name, drcb_ptr, r/
wc_search_loop_error    comm_prot/opc_comm/opc_comm_sub.c       /^int wc_search_loop_error
(tl, name_bfr, drcb_ptr, r/
wc_search_loop_name     comm_prot/opc_comm/opc_comm_sub.c       /^int wc_search_loop_name(
tl, name_bfr, drcb_ptr, rx/
wc_search_mlq_name      comm_prot/opc_comm/opc_comm_sub.c       /^int  wc_search_mlq_name(
tl, name_bfr, drcb_ptr, rx/
wc_search_param_tuning_list     comm_prot/opc_comm/opc_comm_sub.c       /^int wc_search_pa
ram_tuning_list(tl, name_bfr, drcb/
```

```
wc_search_rtdb_name     comm_prot/opc_comm/opc_comm_sub.c       /^int wc_search_rtdb_name(
tl, rtdb_name, drcb_ptr, r/
wc_search_scheddb       comm_prot/opc_comm/opc_comm_sub.c       /^int  wc_search_scheddb(n
ame_bfr, drcb_ptr, rx_ubfr/
white_space_break       tms_library/misc_func.c /^unsigned char  *white_space_break(text_p
tr)/
write_dft_stn_aggr_eqns_to_file fddb/rmdb/rmdb_sub.c    /^void write_dft_stn_aggr_eqns_to_
file(tl)/
write_eof_to_mailbox    tms_library/mailbox.c   /^unsigned long  write_eof_to_mailbox(chan
nel, iosb)/
write_fmdb_daily_files  rt_skeleton/fmdb_archiver.c     /^unsigned long  write_fmdb_daily_
files/
write_fmdb_name_files   rt_skeleton/build_fmdb.c        /^unsigned long  write_fmdb_name_f
iles(fmdb_pm, n_na/
write_fmdb_snapshot_file        rt_skeleton/fmdb_archiver.c     /^unsigned long  write_fmd
b_snapshot_file(channel, f/
write_loop_name_list_to_file    fddb/rmdb/rmdb_sub.c    /^void  write_loop_name_list_to_fi
le(tl)/
write_loop_table_to_file        fddb/rmdb/rmdb_sub.c    /^void  write_loop_table_to_file(t
l, table_index, gr/
write_noaa_file noaa_monitor/noaa_monitor.c     /^void  write_noaa_file(rpt_type_ndx, noaa
_time, sta/
write_rec_to_op_log     comm_prot/opc_comm/opc_comm_sub.c       /^unsigned long  write_rec
_to_op_log(buffer, first_c/
write_speed_traps_to_file       fddb/rmdb/rmdb_sub.c    /^void  write_speed_traps_to_file(
tl)/
write_string_to_mailbox tms_library/mailbox.c   /^unsigned long  write_string_to_mailbox(c
hannel, st/
write_string_to_mailbox_nowait  tms_library/mailbox.c   /^unsigned long  write_string_to_m
ailbox_nowait(chan/
write_to_crash_log      tms_library/proc_cntrl.c        /^unsigned long  write_to_crash_lo
g(process_name, te/
write_to_mailbox        tms_library/mailbox.c   /^unsigned long  write_to_mailbox(channel,
 message, /
write_to_mailbox_nowait tms_library/mailbox.c   /^unsigned long  write_to_mailbox_nowait(c
hannel, me/
write_to_operator_log   comm_prot/opc_comm/opc_comm_sub.c       /^unsigned long  write_to_
operator_log(msg, msg_size/
write_to_sort_bfr       fddb/rmdb/rmdb_sub.c    /^void  write_to_sort_bfr(name, type)/
write_vmsdb_cst comm_prot/opc_comm/opc_vms_sub.c        /^void  write_vmsdb_cst(out_file)/
write_vmsdb_mlq comm_prot/opc_comm/opc_vms_sub.c        /^void  write_vmsdb_mlq(vmsdb_col_
ptr, out_file)/
```

```
main [actv_anal.c]
        map_to_RMDB [../tms_library/fddb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_rmdb_tl [../tms_library/fddb_lib.c]
        printf
        STOP
        map_to_GBLDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 431]
                init_gbldb_tl [../tms_library/fddb_lib.c]
        map_to_RTDB [../tms_library/rtdb_lib.c]
                map_to_global_section [see line 431]
                init_rtdb_tl [../tms_library/rtdb_lib.c]
        ASCEFC
        two_bit_mask [../tms_library/skel_sub.c]
        clear_all_event_flags [see line 356]
        fopen
        exit
        count_actv_anal_eqns [actv_anal.c]
                fgets
                pad_end [../tms_library/tap_sub.c]
                        strlen
        rewind
        map_to_global_section [see line 431]
        sprintf
        unmap_global_section [../tms_library/global_sub.c]
                DELTVA
        delete_all_global_section [../tms_library/global_sub.c]
                strlen
                DGBLSC
        create_global_section [../tms_library/global_sub.c]
                strlen
                CRMPSC
        init_actvdb_tl
        memcpy
        init_actvdb_params
        load_actv_anal_eqns [actv_anal.c]
                fgets
                pad_end [see line 450]
                memcmp
                printf
                find_fddb_cl_name [../tms_library/fddb_lib.c]
                        memcmp
                classify_roadway [../tms_library/fddb_lib.c]
                        memcmp
                memcpy
                search_rtdb_name_table [../tms_library/rtdb_lib.c]
                        memcmp
                init_actvdb_eqn [actv_anal.c]
                        memcpy
        fclose
        find_fddb_cl_name [see line 471]
        WFLOR
        READEF
        calc_actv_anal [actv_anal.c]
                get_actv_params_from_RMDB
                printf
                unpack_rtdb_loop_stn [../tms_library/pack_lib.c]
                check_valid_flag [actv_anal.c]
        send_msg_to_oper [actv_anal.c]
                strcpy
                strlen
                memcpy
                printf
        run_watch_actv_anal [actv_anal.c]
                ASCEFC
                printf
                CLREF
                SETEF
```

```
main [bottleneck.c]
        general_process_startup [../tms_library/proc_cntrl.c]
                connect_to_mailbox [../tms_library/mailbox.c]
                        strlen
                        ASSIGN
                strcpy
                printf
                write_to_crash_log [see line 21]
                STOP
                ASCEFC
                clear_all_event_flags [../tms_library/proc_cntrl.c]
                        CLREF
                        printf
                        STOP
                sprintf
                write_string_to_mailbox_nowait [../tms_library/mailbox.c]
                        strlen
                        QIOW
        log_tms_event [../tms_library/event_log_sub.c]
                log_tms_common [../tms_library/event_log_sub.c]
                        strlen
                        write_to_crash_log [see line 21]
                        GETTIM
                        memcpy
                        memset
                        write_to_mailbox_nowait [see line 393]
        map_to_RTDB [../tms_library/rtdb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_rtdb_tl [../tms_library/rtdb_lib.c]
        log_tms_event_cc [../tms_library/event_log_sub.c]
                log_tms_common [see line 414]
        printf
        STOP
        map_to_RMDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 422]
                init_rmdb_tl [../tms_library/fddb_lib.c]
        build_bottleneck_table [bottleneck.c]
                malloc
                build_tap_error [../tms_library/tap_sub.c]
                        sprintf
                        memcpy
                        printf
                        log_tms_event [see line 413]
                exit
                code_to_table [../tms_library/table_sub.c]
                ushort_to_table [../tms_library/table_sub.c]
                ulong_to_table [../tms_library/table_sub.c]
                date_time_to_table [../tms_library/table_sub.c]
                        GETTIM
                        printf
                        memcpy
                fopen
                fgets
                pad_end [../tms_library/tap_sub.c]
                        strlen
                memcmp
                find_fddb_cl_name [../tms_library/fddb_lib.c]
                        memcmp
                classify_roadway [../tms_library/fddb_lib.c]
                        memcmp
                check_reversible [../tms_library/tap_sub.c]
                realloc
                code_byte_to_table [../tms_library/table_sub.c]
                code_ulong_to_table [../tms_library/table_sub.c]
                memcpy
                search_rtdb_name_table [../tms_library/rtdb_lib.c]
                        memcmp
                code_ushort_to_table [../tms_library/table_sub.c]
                atoi
                byte_to_table [../tms_library/table_sub.c]
                fclose
                calc_table_checksum [../tms_library/table_sub.c]
        fclose
        sprintf
        WAITFR
        CLREF
        calc_bottleneck [bottleneck.c]
                unpack_rtdb_loop_stn [../tms_library/pack_lib.c]
                sprintf
                log_tms_event [see line 413]
        SETEF
        READEF
        write_string_to_mailbox [../tms_library/mailbox.c]
                strlen
                QIOW
        exit


        write_to_crash_log [../tms_library/proc_cntrl.c]
                GETTIM
                NUMTIM
                fopen
                fprintf
                fclose
        _PROBER
        _PROBEW
        _INSQHI
        log_comm_event

        write_to_mailbox_nowait [../tms_library/mailbox.c]
                QIOW
```

build_cctvdb.call


```
555  main [build_cctvdb.c]
556          printf
557          fopen
558          exit
559          time
560          ctime
561          fprintf
562          read_fddb_file [../fddb_sub.c]
563                  get_next_line [../fddb_sub.c]
564                          ftell
565                          fgets
566                          strlen
567                          fseek
568                          convert_non_print_to_space
569                          strip_trailing_blanks [see line 141]
570                          strip_leading_blanks [../../tms_library/format_db_lib.c]
571                  setjmp
572                  fddb_error [see line 129]
573                  sprintf
574                  exit
575          rewind
576          map_to_global_section [../../tms_library/global_sub.c]
577                  strlen
578                  MGBLSC
579          sprintf
580          fddb_error [see line 129]
581          STOP
582          unmap_global_section [../../tms_library/global_sub.c]
583                  DELTVA
584          delete_all_global_section [../../tms_library/global_sub.c]
585                  strlen
586                  DGBLSC
587          create_global_section [../../tms_library/global_sub.c]
588                  strlen
589                  CRMPSC
590          init_cctvdb_tl [../../tms_library/fddb_lib.c]
591          memcpy
592          init_cctvdb_params [cctvdb_sub.c]
593                  init_fddb_params [../fddb_sub.c]
594                          GETTIM
595                          fddb_error [see line 129]
596          init_cctvdb_data_col_list [cctvdb_sub.c]
597                  memset
598          calc_offsets [../fddb_sub.c]
599          load_name_table_ndx [../fddb_sub.c]
600                  find_fddb_nt_name [see line 479]
601          fclose


129                  fddb_error [../fddb_sub.c]
130                          sprintf
131                          strcpy
132                          printf
133                          fprintf
134                          build_up_arrow [../fddb_sub.c]
135                          find_err_text [../fddb_sub.c]
136                                  sprintf
137                          strlen
138                          memcpy
139                          _filbuf

141                  strip_trailing_blanks [../../tms_library/format_db_lib.c]
142                          strlen


479                  find_fddb_nt_name [../../tms_library/fddb_lib.c]
480                          memcmp
```

```
main [build_fmdb.c]
        general_process_startup [../tms_library/proc_cntrl.c]
                connect_to_mailbox [../tms_library/mailbox.c]
                        strlen
                        ASSIGN
                strcpy
                printf
                write_to_crash_log [see line 21]
                STOP
                ASCEFC
                clear_all_event_flags [../tms_library/proc_cntrl.c]
                        CLREF
                        printf
                        STOP
                sprintf
                write_string_to_mailbox_nowait [../tms_library/mailbox.c]
                        strlen
                        QIOW
        log_tms_event [see line 91]
        map_to_RTDB [../tms_library/rtdb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_rtdb_tl [../tms_library/rtdb_lib.c]
        printf
        STOP
        map_to_RMDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 433]
                init_rmdb_tl [../tms_library/fddb_lib.c]
        map_to_global_section [see line 433]
        log_tms_event_cc [../tms_library/event_log_sub.c]
                log_tms_common [see line 92]
        exit
        unmap_global_section [../tms_library/global_sub.c]
                DELTVA
        delete_all_global_section [../tms_library/global_sub.c]
                strlen
                DGBLSC
        create_global_section [../tms_library/global_sub.c]
                strlen
                CRMPSC
        sprintf
        memcpy
        GETTIM
        memset
        load_fmdb_name_table [build_fmdb.c]
                fopen
                printf
                memset
                read_rtfmdb_name_file [../tms_library/fddb_lib.c]
                        fgets
                        strlen
                        memcmp
                        strcpy
                memcpy
                search_rtdb_name_table [../tms_library/rtdb_lib.c]
                        memcmp
                fclose
                exit
        write_fmdb_name_files [build_fmdb.c]
                malloc
                printf
                exit
                memset
                GETTIM
                NUMTIM
                sprintf
                strcpy
                strlen
                strcat
                memcpy
                CREATE
                QIOW
                DASSGN
        NUMTIM
        CVT_VECTIM
        SUB_TIMES
        build_fmdb_snapshot_filename [../tms_library/fmdb_lib.c]
                NUMTIM
                sprintf
        read_fmdb_snapshot [../tms_library/fmdb_lib.c]
                strcpy
                strcat
                strlen
                OPEN
                printf
                PUTMSG
                malloc
                QIOW
                DASSGN
                strchr
                memcmp
                dump_mem [see line 187]
                _filbuf
                check_filename [../tms_library/misc_func.c]
                        strlen
                        find_string [../tms_library/misc_func.c]
                                strlen
                                memcmp
                        memcmp
                find_string [see line 509]
                memcpy
                get_number_from_header [../tms_library/misc_func.c]
                        strlen
                        find_string [see line 509]
                        clear_R0 [../tms_library/misc_func.c]
                        strtoul
        load_snapshot_namelist [build_fmdb.c]
                strcmp
                read_fmdb_namefile [../tms_library/fmdb_lib.c]
                        strcpy
                        strcat
                        strlen
                        OPEN
                        printf
                        malloc
                        QIOW
                        DASSGN
                        strchr
                        memcmp
                        dump_mem [see line 187]
                        _filbuf
                        check_filename [see line 507]
                        get_number_from_header [see line 515]
                free
                malloc
                printf
```

```
540                 search_fmdb_name_table [../tms_library/fmdb_lib.c]
541                         memcmp
542                 memcpy
543         _MOVC3
544         print_reload_progress [build_fmdb.c]
545                 printf
546         write_string_to_mailbox [../tms_library/mailbox.c]
547                 strlen
548                 QIOW
549         write_to_crash_log [see line 21]

 21         write_to_crash_log [../tms_library/proc_cntrl.c]
 22                 GETTIM
 23                 NUMTIM
 24                 fopen
 25                 fprintf
 26                 fclose

 92                 log_tms_common [../tms_library/event_log_sub.c]
 93                         strlen
 94                         write_to_crash_log [see line 21]
 95                         GETTIM
 96                         memcpy
 97                         memset
 98                         write_to_mailbox_nowait [../tms_library/mailbox.c]
 99                                 QIOW

187         dump_mem [../tms_library/dump_mem.c]
188                 print_hex_ascii_line [../tms_library/dump_mem.c]
189                         sprintf
190                         printf
191                 print_n_skipped [../tms_library/dump_mem.c]
192                         printf

433                 map_to_global_section [../tms_library/global_sub.c]
434                         strlen
435                         MGBLSC

507                 check_filename [../tms_library/misc_func.c]
508                         strlen
509                         find_string [../tms_library/misc_func.c]
510                                 strlen
511                                 memcmp

515                 get_number_from_header [../tms_library/misc_func.c]
516                         strlen
517                         find_string [see line 509]
518                         clear_R0 [../tms_library/misc_func.c]
519                         strtoul
```

```
main [build_gbldb.c]
        printf
        fopen
        exit
        time
        ctime
        fprintf
        read_fddb_file [../fddb_sub.c]
                get_next_line [../fddb_sub.c]
                        ftell
                        fgets
                        strlen
                        fseek
                        convert_non_print_to_space
                        strip_trailing_blanks [see line 144]
                        strip_leading_blanks [../../tms_library/format_db_lib.c]
                setjmp
                fddb_error [see line 132]
                sprintf
                exit
        rewind
        map_to_global_section [../../tms_library/global_sub.c]
                strlen
                MGBLSC
        sprintf
        fddb_error [see line 132]
        STOP
        unmap_global_section [../../tms_library/global_sub.c]
                DELTVA
        delete_all_global_section [../../tms_library/global_sub.c]
                strlen
                DGBLSC
        create_global_section [../../tms_library/global_sub.c]
                strlen
                CRMPSC
        init_gbldb_tl [../../tms_library/fddb_lib.c]
        memcpy
        init_gbldb_params
        init_gbldb_data_col_list
        calc_offsets [../fddb_sub.c]
        load_name_table_ndx [../fddb_sub.c]
                find_fddb_nt_name [see line 461]
        fclose



                fddb_error [../fddb_sub.c]
                        sprintf
                        strcpy
                        printf
                        fprintf
                        build_up_arrow [../fddb_sub.c]
                        find_err_text [../fddb_sub.c]
                                sprintf
                        strlen
                        memcpy
                        _filbuf
                strchr
                strip_trailing_blanks [../../tms_library/format_db_lib.c]
                        strlen
                find_fddb_nt_name [../../tms_library/fddb_lib.c]
                        memcmp
```

```
550  main [build_gcdb.c]
551          printf
552          fopen
553          exit
554          time
555          ctime
556          fprintf
557          read_fddb_file [../fddb_sub.c]
558                  get_next_line [../fddb_sub.c]
559                          ftell
560                          fgets
561                          strlen
562                          fseek
563                          convert_non_print_to_space
564                          strip_trailing_blanks [see line 141]
565                          strip_leading_blanks [../../tms_library/format_db_lib.c]
566                  setjmp
567                  fddb_error [see line 129]
568                  sprintf
569                  exit
570          rewind
571          map_to_global_section [../../tms_library/global_sub.c]
572                  strlen
573                  MGBLSC
574          sprintf
575          fddb_error [see line 129]
576          STOP
577          unmap_global_section [../../tms_library/global_sub.c]
578                  DELTVA
579          delete_all_global_section [../../tms_library/global_sub.c]
580                  strlen
581                  DGBLSC
582          create_global_section [../../tms_library/global_sub.c]
583                  strlen
584                  CRMPSC
585          init_gcdb_tl [../../tms_library/fddb_lib.c]
586          memcpy
587          init_gcdb_params [gcdb_sub.c]
588                  init_fddb_params [../fddb_sub.c]
589                          GETTIM
590                          fddb_error [see line 129]
591          init_gcdb_data_col_list [gcdb_sub.c]
592                  memset
593          calc_offsets [../fddb_sub.c]
594          load_name_table_ndx [../fddb_sub.c]
595                  find_fddb_nt_name [see line 474]
596          fclose


129                  fddb_error [../fddb_sub.c]
130                          sprintf
131                          strcpy
132                          printf
133                          fprintf
134                          build_up_arrow [../fddb_sub.c]
135                          find_err_text [../fddb_sub.c]
136                                  sprintf
137                          strlen
138                          memcpy
139                          _filbuf

141                  strip_trailing_blanks [../../tms_library/format_db_lib.c]
142                          strlen


474          find_fddb_nt_name [../../tms_library/fddb_lib.c]
475                  memcmp
```

```
550  main [build_oprtvdb.c]
551          printf
552          fopen
553          exit
554          time
555          ctime
556          fprintf
557          read_fddb_file [../fddb_sub.c]
558                  get_next_line [../fddb_sub.c]
559                          ftell
560                          fgets
561                          strlen
562                          fseek
563                          convert_non_print_to_space
564                          strip_trailing_blanks [see line 141]
565                          strip_leading_blanks [../../tms_library/format_db_lib.c]
566                  setjmp
567                  fddb_error [see line 129]
568                  sprintf
569                  exit
570          rewind
571          map_to_global_section [../../tms_library/global_sub.c]
572                  strlen
573                  MGBLSC
574          sprintf
575          fddb_error [see line 129]
576          STOP
577          unmap_global_section [../../tms_library/global_sub.c]
578                  DELTVA
579          delete_all_global_section [../../tms_library/global_sub.c]
580                  strlen
581                  DGBLSC
582          create_global_section [../../tms_library/global_sub.c]
583                  strlen
584                  CRMPSC
585          init_oprtvdb_tl [../../tms_library/fddb_lib.c]
586          memcpy
587          init_oprtvdb_params [oprtvdb_sub.c]
588                  init_fddb_params [../fddb_sub.c]
589                          GETTIM
590                          fddb_error [see line 129]
591          init_oprtvdb_data_col_list [oprtvdb_sub.c]
592                  memset
593          calc_offsets [../fddb_sub.c]
594          load_name_table_ndx [../fddb_sub.c]
595                  find_fddb_nt_name [see line 474]
596          fclose


129                  fddb_error [../fddb_sub.c]
130                          sprintf
131                          strcpy
132                          printf
133                          fprintf
134                          build_up_arrow [../fddb_sub.c]
135                          find_err_text [../fddb_sub.c]
136                                  sprintf
137                          strlen
138                          memcpy
139                          _filbuf

141                  strip_trailing_blanks [../../tms_library/format_db_lib.c]
142                          strlen


474                  find_fddb_nt_name [../../tms_library/fddb_lib.c]
475                          memcmp
```

build_rmdb.call


```
330  main [build_rmdb.c]
331          printf
332          fopen
333          exit
334          time
335          ctime
336          fprintf
337          read_fddb_file [../fddb_sub.c]
338                  get_next_line [see line 281]
339                  setjmp
340                  fddb_error [see line 5]
341                  sprintf
342                  exit
343          rewind
344          _filbuf
345          malloc
346          init_rmdb_tl [../../tms_library/fddb_lib.c]
347          memcpy
348          init_rmdb_params [rmdb_sub.c]
349                  init_fddb_params [../fddb_sub.c]
350                          GETTIM
351                          fddb_error [see line 5]
352          init_rmdb_data_col_list [rmdb_sub.c]
353                  memset
354          memset
355          calc_offsets [../fddb_sub.c]
356          fddb_error [see line 5]
357          load_name_table_ndx [../fddb_sub.c]
358                  find_fddb_nt_name [see line 216]
359          fclose
360          mem_sort_rtfmdb_names [rmdb_sub.c]
361                  printf
362                  qsort
363                  fopen
364                  sprintf
365                  perror
366                  exit
367                  fprintf
368                  fclose
369                  delete



  5                  fddb_error [../fddb_sub.c]
  6                          sprintf
  7                          strcpy
  8                          printf
  9                          fprintf
 10                          build_up_arrow [../fddb_sub.c]
 11                          find_err_text [../fddb_sub.c]
 12                                  sprintf
 13                          strlen
 14                          memcpy
 15                          _filbuf


281                                  get_next_line [../fddb_sub.c]
282                                          ftell
283                                          fgets
284                                          strlen
285                                          fseek
286                                          convert_non_print_to_space
287                                          strip_trailing_blanks
288                                          strip_leading_blanks
289                                          fddb_error [see line 5]
290                                          longjmp
```

```
416  main [build_rtdb.c]
417          general_process_startup [../tms_library/proc_cntrl.c]
418                  connect_to_mailbox [../tms_library/mailbox.c]
419                          strlen
420                          ASSIGN
421                  strcpy
422                  printf
423                  write_to_crash_log [see line 21]
424                  STOP
425                  ASCEFC
426                  clear_all_event_flags [../tms_library/proc_cntrl.c]
427                          CLREF
428                          printf
429                          STOP
430                  sprintf
431                  write_string_to_mailbox_nowait [../tms_library/mailbox.c]
432                          strlen
433                          QIOW
434          log_tms_event [see line 94]
435          map_to_RMDB [../tms_library/fddb_lib.c]
436                  map_to_global_section [../tms_library/global_sub.c]
437                          strlen
438                          MGBLSC
439                  init_rmdb_tl [../tms_library/fddb_lib.c]
440          printf
441          STOP
442          map_to_global_section [see line 436]
443          log_tms_event_cc [../tms_library/event_log_sub.c]
444                  log_tms_common [see line 95]
445          exit
446          unmap_global_section [../tms_library/global_sub.c]
447                  DELTVA
448          delete_all_global_section [../tms_library/global_sub.c]
449                  strlen
450                  DGBLSC
451          create_global_section [../tms_library/global_sub.c]
452                  strlen
453                  CRMPSC
454          sprintf
455          memcpy
456          GETTIM
457          load_rtdb_name_table [build_rtdb.c]
458                  fopen
459                  printf
460                  memset
461                  read_rtfmdb_name_file [../tms_library/fddb_lib.c]
462                          fgets
463                          strlen
464                          memcmp
465                          strcpy
466                  memcpy
467                  fclose
468                  exit
469          memset
470          strcpy
471          write_string_to_mailbox [../tms_library/mailbox.c]
472                  strlen
473                  QIOW
474          write_to_crash_log [see line 21]

 21          write_to_crash_log [../tms_library/proc_cntrl.c]
 22                  GETTIM
 23                  NUMTIM
 24                  fopen
 25                  fprintf
 26                  fclose


 94          log_tms_event [../tms_library/event_log_sub.c]
 95                  log_tms_common [../tms_library/event_log_sub.c]
 96                          strlen
 97                          write_to_crash_log [see line 21]
 98                          GETTIM
 99                          memcpy
100                          memset
101                          write_to_mailbox_nowait [../tms_library/mailbox.c]
102                                  QIOW
```

```
533  main [build_scheddb.c]
534          printf
535          map_to_VMSDB [../../tms_library/fddb_lib.c]
536                  map_to_global_section [../../tms_library/global_sub.c]
537                          strlen
538                          MGBLSC
539                  init_vmsdb_tl [../../tms_library/fddb_lib.c]
540          STOP
541          fopen
542          exit
543          fgets
544          strspn
545          memcmpi [../../tms_library/misc_func.c]
546                  tolower
547          rewind
548          map_to_global_section [see line 536]
549          unmap_global_section [../../tms_library/global_sub.c]
550                  DELTVA
551          delete_all_global_section [../../tms_library/global_sub.c]
552                  strlen
553                  DGBLSC
554          create_global_section [../../tms_library/global_sub.c]
555                  strlen
556                  CRMPSC
557          init_scheddb_tl [../../tms_library/fddb_lib.c]
558          memcpy
559          init_scheddb_params [scheddb_sub.c]
560                  GETTIM
561                  printf
562          init_scheddb_free_list [scheddb_sub.c]
563                  memset
564                  add_to_scheddb_list [../../tms_library/sched_lib.c]
565          init_schedule [scheddb_sub.c]
566                  memset
567          get_schedule [scheddb_sub.c]
568                  strlen
569                  memset
570                  get_pv [../fddb_sub.c]
571                          get_token
572                          strchr
573                  sprintf
574                  scheddb_error [scheddb_sub.c]
575                          printf
576                          build_up_arrow
577                          _filbuf
578                  memcmpi [see line 545]
579                  process_schedule [scheddb_sub.c]
580                          scheddb_error [see line 574]
581                          sprintf
582                          convert_sched_type [see line 339]
583                          GETTIM
584                          CVT_TO_INTERNAL_TIME
585                          check_due_in_dow [../../tms_library/sched_lib.c]
586                                  DAY_OF_WEEK
587                          get_scheddb_block [../../tms_library/sched_lib.c]
588                                  break_scheddb_block [../../tms_library/sched_lib
.c]
589                          memcpy
590                          insert_in_scheddb_by_time [../../tms_library/sched_lib.c
]
591                                  compare_VAX_time [../../tms_library/misc_func.c]
592                                  add_to_scheddb_list
593                  init_schedule [see line 565]
594                  convert_sched_type [see line 339]
595                  check_date_time [scheddb_sub.c]
596                          strlen
597                          scheddb_error [see line 574]
598                          check_number [scheddb_sub.c]
599                                  strlen
600                                  sprintf
601                                  scheddb_error [see line 574]
602                                  atol
603                          check_date [../../tms_library/misc_func.c]
604                  CVT_VECTIM
605                  check_number [see line 598]
606                  check_interval [scheddb_sub.c]
607                          strlen
608                          scheddb_error [see line 574]
609                          check_number [see line 598]
610                          sprintf
611                  check_DOW_mask [scheddb_sub.c]
612                          toupper
613                          scheddb_error [see line 574]
614                          dow_mask_to_byte [../fddb_sub.c]
615                  compare_VAX_time
616                  check_oper_initials [scheddb_sub.c]
617                          strlen
618                          sprintf
619                          scheddb_error [see line 574]
620                          toupper
621                  memcpy
622                  find_fddb_cl_name [see line 164]
623                  pad_trailing_blanks [see line 474]
624                  find_vmsdb_entry_by_name [see line 73]
625                  memcmp
626          process_schedule [see line 579]
627          follow_scheddb_list [../../tms_library/sched_lib.c]
628                  printf
629                  NUMTIM
630                  STOP
631                  convert_action_code [see line 344]
632          read_fddb_file [../fddb_sub.c]
633                  get_next_line [../fddb_sub.c]
634                          ftell
635                          fgets
636                          strlen
637                          fseek
638                          convert_non_print_to_space
639                          strip_trailing_blanks [see line 142]
640                          strip_leading_blanks [../../tms_library/format_db_lib.c]
641                  setjmp
642                  fddb_error [see line 130]
643                  sprintf
644                  exit


 73          find_vmsdb_entry_by_name [../../tms_library/vms_lib.c]
 74                  memcmp

130                  fddb_error [../fddb_sub.c]
131                          sprintf
132                          strcpy
133                          printf
134                          fprintf
135                          build_up_arrow [../fddb_sub.c]
136                          find_err_text [../fddb_sub.c]
137                                  sprintf
```

```
138                     strlen
139                     memcpy
140                     _filbuf

142             strip_trailing_blanks [../../tms_library/format_db_lib.c]
143                     strlen

164         find_fddb_cl_name [../../tms_library/fddb_lib.c]
165                 memcmp

339         convert_sched_type [../../tms_library/sched_lib.c]
340                 memset
341                 strcpy
```

```
572  main [build_vaxportdb.c]
573          printf
574          get_other_process_id [../../tms_library/proc_cntrl.c]
575                  strlen
576                  GETJPIW
577          exit
578          STOP
579          get_port_device_memory [build_vaxportdb.c]
580                  malloc
581                  vaxport_event_msg [vaxportdb_sub.c]
582                          strlen
583                          strcpy
584                          memcpy
585                          GETTIM
586                          printf
587                          NUMTIM
588                  exit
589                  realloc
590          map_to_RMDB [../../tms_library/fddb_lib.c]
591                  map_to_global_section [../../tms_library/global_sub.c]
592                          strlen
593                          MGBLSC
594                  init_rmdb_tl [../../tms_library/fddb_lib.c]
595          memcmp
596          sprintf
597          vaxport_event_msg [see line 581]
598          add_to_port_device_table [build_vaxportdb.c]
599                  get_port_device_memory [see line 579]
600                  memcpy
601                  convert_to_0x_form [vaxportdb_sub.c]
602          map_to_VMSDB [../../tms_library/fddb_lib.c]
603                  map_to_global_section [see line 591]
604                  init_vmsdb_tl [../../tms_library/fddb_lib.c]
605          map_to_CCTVDB [../../tms_library/fddb_lib.c]
606                  map_to_global_section [see line 591]
607                  init_cctvdb_tl [../../tms_library/fddb_lib.c]
608          map_to_GBLDB [../../tms_library/fddb_lib.c]
609                  map_to_global_section [see line 591]
610                  init_gbldb_tl [../../tms_library/fddb_lib.c]
611          find_fddb_cl_name [see line 167]
612          map_to_OPRTVDB [../../tms_library/fddb_lib.c]
613                  map_to_global_section [see line 591]
614                  init_oprtvdb_tl [../../tms_library/fddb_lib.c]
615          map_to_GCDB [../../tms_library/fddb_lib.c]
616                  map_to_global_section [see line 591]
617                  init_gcdb_tl [../../tms_library/fddb_lib.c]
618          qsort
619          find_usage_in_multiple_dbs [build_vaxportdb.c]
620                  memset
621                  memcmp
622                  memcpy
623                  build_dev_port_name_string [see line 374]
624                  printf
625                  _filbuf
626          find_duplicate_dev_addr [build_vaxportdb.c]
627                  memcmp
628                  build_dev_port_name_string [see line 374]
629                  printf
630                  memset
631                  _filbuf
632          count_port_entries [build_vaxportdb.c]
633                  memset
634                  memcmp
635                  memcpy
636          map_to_global_section [see line 591]
637          vaxport_event_msg_cc [vaxportdb_sub.c]
638                  strlen
639                  strcpy
640                  memcpy
641                  sprintf
642                  GETTIM
643                  printf
644                  NUMTIM
645          unmap_global_section [../../tms_library/global_sub.c]
646                  DELTVA
647          delete_all_global_section [../../tms_library/global_sub.c]
648                  strlen
649                  DGBLSC
650          create_global_section [../../tms_library/global_sub.c]
651                  strlen
652                  CRMPSC
653          memset
654          init_vaxportdb_tl [../../tms_library/fddb_lib.c]
655          memcpy
656          init_vaxportdb_params [vaxportdb_sub.c]
657                  GETTIM
658                  vaxport_event_msg [see line 581]
659          load_tables [build_vaxportdb.c]
660                  memset
661                  memcmp
662                  memcpy
663                  sprintf
664                  vaxport_event_msg [see line 581]
665                  exit
666                  convert_to_x_form
667                  printf


374          build_dev_port_name_string [build_vaxportdb.c]
375                  memset
376                  memcpy
377                  sprintf
378                  memcmp
379                  convert_to_x_form [vaxportdb_sub.c]
```

build_vmsdb.call


```
718  main [build_vmsdb.c]
719          printf
720          fopen
721          exit
722          time
723          ctime
724          fprintf
725          read_fddb_file [../fddb_sub.c]
726                  get_next_line [../fddb_sub.c]
727                          ftell
728                          fgets
729                          strlen
730                          fseek
731                          convert_non_print_to_space
732                          strip_trailing_blanks [see line 75]
733                          strip_leading_blanks [../../tms_library/format_db_lib.c]
734                  setjmp
735                  fddb_error [see line 63]
736                  sprintf
737                  exit
738          rewind
739          map_to_global_section [../../tms_library/global_sub.c]
740                  strlen
741                  MGBLSC
742          sprintf
743          fddb_error [see line 63]
744          STOP
745          unmap_global_section [../../tms_library/global_sub.c]
746                  DELTVA
747          delete_all_global_section [../../tms_library/global_sub.c]
748                  strlen
749                  DGBLSC
750          create_global_section [../../tms_library/global_sub.c]
751                  strlen
752                  CRMPSC
753          init_vmsdb_tl [../../tms_library/fddb_lib.c]
754          memcpy
755          init_vmsdb_params [vmsdb_sub.c]
756                  init_fddb_params [../fddb_sub.c]
757                          GETTIM
758                          fddb_error [see line 63]
759          init_vmsdb_data_col_list [vmsdb_sub.c]
760                  memset
761          calc_offsets [../fddb_sub.c]
762          init_vmsdb_free_list [../../tms_library/vms_lib.c]
763                  memset
764                  add_to_rel_list
765          load_name_table_ndx [../fddb_sub.c]
766                  find_fddb_nt_name [see line 646]
767          fclose
768          process_message [see line 115]
769          process_library [see line 167]
770          process_queue [see line 183]
771          process_cluster [see line 104]


 63                  fddb_error [../fddb_sub.c]
 64                          sprintf
 65                          strcpy
 66                          printf
 67                          fprintf
 68                          build_up_arrow [../fddb_sub.c]
 69                          find_err_text [../fddb_sub.c]
 70                                  sprintf
 71                          strlen
 72                          memcpy
 73                          _filbuf

 75  strip_trailing_blanks [../../tms_library/format_db_lib.c]
 76          strlen

104  process_cluster [vmsdb_sub.c]
105          get_vmsdb_block [../../tms_library/vms_lib.c]
106                  break_vmsdb_block [../../tms_library/vms_lib.c]
107          sprintf
108          fddb_error [see line 63]
109          init_cluster [vmsdb_sub.c]
110                  memset
111          memcpy
112          byte_to_table [../../tms_library/table_sub.c]
113          strlen
114          add_to_rel_list [../../tms_library/vms_lib.c]

115  process_message [vmsdb_sub.c]
116          fddb_error [see line 63]
117          init_message [vmsdb_sub.c]
118                  memset
119          memset
120          byte_to_table
121          sprintf
122          center_justify [../../tms_library/misc_func.c]
123                  strlen
124                  memcpy
125                  memset
126          strlen
127          memcpy
128          get_vmsdb_block [see line 105]
129          build_FP_message [../../tms_library/vms_lib.c]
130                  crack_vms_message [../../tms_library/vms_lib.c]
131                          init_vms_msg_struct [../../tms_library/vm
s_lib.c]
132                                  memset
133                          copy_flash [../../tms_library/vms_lib.c]
134                  build_FP_static_msg [../../tms_library/vms_lib.c]
135                          build_FP_msg_header [../../tms_library/vm
s_lib.c]
136                          strlen
137                          toupper
138                  build_FP_flashing_msg [../../tms_library/vms_lib.
c]
139                          build_FP_msg_header
140                          strlen
141                          toupper
142                          FP_position_cursor [../../tms_library/vms
_lib.c]
143                                  sprintf
144                  build_FP_multiphase_msg [../../tms_library/vms_li
b.c]
145                          build_FP_msg_header
146                          strlen
147                          toupper
148                  build_FP_arrow_msg [../../tms_library/vms_lib.c]
149                          build_FP_msg_header
150                          strlen
151                          toupper
152                          FP_right_arrow_to_buffer [../../tms_libra
ry/vms_lib.c]
153                                  strlen
```

```
  154                                     FP_position_cursor [see line 142
]
  155                                   FP_left_arrow_to_buffer [../../tms_libra
ry/vms_lib.c]
  156                                     strlen
  157                                     FP_position_cursor [see line 142
]
  158             calc_FP_msg_time [../../tms_library/vms_lib.c]
  159                     crack_vms_message [see line 130]
  160                     strlen
  161                     atof
  162                     atoi
  163             return_vmsdb_block [../../tms_library/vms_lib.c]
  164                     memset
  165                     combine_adjacent_vmsdb_block [../../tms_library/
vms_lib.c]
  166             add_to_rel_list

  167         process_library [vmsdb_sub.c]
  168             get_vmsdb_block [see line 105]
  169             sprintf
  170             fddb_error [see line 63]
  171             init_library [vmsdb_sub.c]
  172                     memset
  173             memcpy
  174             byte_to_table
  175             strlen
  176             add_to_rel_list
  177             calc_FP_lib_slot_no [../../tms_library/vms_lib.c]
  178                     find_vmsdb_entry_by_name [../../tms_library/vms_
lib.c]
  179                             memcmp
  180                     sprintf
  181             delete_from_rel_list [../../tms_library/vms_lib.c]
  182             return_vmsdb_block [see line 163]

  183         process_queue [vmsdb_sub.c]
  184             get_vmsdb_block [see line 105]
  185             sprintf
  186             fddb_error [see line 63]
  187             init_queue [vmsdb_sub.c]
  188                     memset
  189             memcpy
  190             byte_to_table
  191             strlen
  192             add_to_rel_list
  193             find_vmsdb_entry_by_name [see line 178]
  194             calc_FP_lib_slot_no [see line 177]
  195             delete_from_rel_list
  196             return_vmsdb_block [see line 163]
  197             build_FP_queue [../../tms_library/vms_lib.c]
  198                     find_vmsdb_entry_by_name [see line 178]
  199                     find_msg_in_library [../../tms_library/vms_lib.c
]
  200                             memcmp
  201                     calc_FP_msg_time [see line 158]
  202                     atoi
  203                     sprintf
```

```
main [comm_stats_rpt.c]
        general_process_startup [../tms_library/proc_cntrl.c]
                connect_to_mailbox [../tms_library/mailbox.c]
                        strlen
                        ASSIGN
                strcpy
                printf
                write_to_crash_log [see line 21]
                STOP
                ASCEFC
                clear_all_event_flags [../tms_library/proc_cntrl.c]
                        CLREF
                        printf
                        STOP
                sprintf
                write_string_to_mailbox_nowait [../tms_library/mailbox.c]
                        strlen
                        QIOW
        log_tms_event [see line 94]
        establish_process_name [../tms_library/proc_cntrl.c]
                memset
                strlen
                strcpy
                get_process_name [../tms_library/proc_cntrl.c]
                        memset
                        GETJPI
                strcmp
                get_terminal_name [../tms_library/proc_cntrl.c]
                        memset
                        GETJPI
                set_process_name [../tms_library/proc_cntrl.c]
                        strlen
                        SETPRN
        sprintf
        printf
        exit
        log_tms_event_cc [../tms_library/event_log_sub.c]
                log_tms_common [see line 95]
        STOP
        map_to_RMDB [../tms_library/fddb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_rmdb_tl [../tms_library/fddb_lib.c]
        map_to_GBLDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 448]
                init_gbldb_tl [../tms_library/fddb_lib.c]
        map_to_VMSDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 448]
                init_vmsdb_tl [../tms_library/fddb_lib.c]
        map_to_CCTVDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 448]
                init_cctvdb_tl [../tms_library/fddb_lib.c]
        map_to_OPRTVDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 448]
                init_oprtvdb_tl [../tms_library/fddb_lib.c]
        map_to_VAXPORTDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 448]
                init_vaxportdb_tl [../tms_library/fddb_lib.c]
        map_to_GCDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 448]
                init_gcdb_tl [../tms_library/fddb_lib.c]
        get_rpt_memory [comm_stats_rpt.c]
                malloc
                sprintf
                printf
                printf
                log_tms_event [see line 94]
                exit
        start_rpt_timer [comm_stats_rpt.c]
                GETTIM
                log_tms_event_cc [see line 444]
                NUMTIM
                sprintf
                log_tms_event [see line 94]
                CVT_VECTIM
                strcpy
                strlen
                BINTIM
                ADD_TIMES
                SETIMR
        fclose
        WFLOR
        READEF
        CLREF
        check_rpt_memory [comm_stats_rpt.c]
                sprintf
                log_tms_event [see line 94]
                free
                get_rpt_memory [see line 470]
        copy_port_24hr_stats [comm_stats_rpt.c]
        copy_driver_stats [comm_stats_rpt.c]
                strlen
                CMKRNL
                sprintf
                log_tms_event_cc [see line 444]
                memset
                memcmp
                ASSIGN
                printf
                QIOW
                log_tms_event [see line 94]
                DASSGN
        copy_unit_24hr_stats [comm_stats_rpt.c]
                sprintf
                log_tms_event [see line 94]
        GETTIM
        create_rpt_file [comm_stats_rpt.c]
                fopen
                strerror
                sprintf
                log_tms_event_cc [see line 444]
        print_port_24hr_stats [comm_stats_rpt.c]
                fprintf
                NUMTIM
                log_tms_event_cc [see line 444]
                convert_DB_type [comm_stats_rpt.c]
                        strcpy
                convert_rpt_status [comm_stats_rpt.c]
                        strcpy
                        memcpy
                strcmp
        print_driver_stats [comm_stats_rpt.c]
                fprintf
        print_unit_24hr_stats [comm_stats_rpt.c]
                fprintf
                convert_rpt_status [see line 525]
```

```
534                 sprintf
535                 log_tms_event [see line 94]
536         CANTIM
537         restore_tty_process_name [../tms_library/proc_cntrl.c]
538                 strlen
539                 set_process_name [see line 438]
540                 printf
541                 get_terminal_name [see line 435]
542                 get_pid [../tms_library/proc_cntrl.c]
543                         GETJPI
544                 sprintf


 21         write_to_crash_log [../tms_library/proc_cntrl.c]
 22                 GETTIM
 23                 NUMTIM
 24                 fopen
 25                 fprintf
 26                 fclose

 94         log_tms_event [../tms_library/event_log_sub.c]
 95                 log_tms_common [../tms_library/event_log_sub.c]
 96                         strlen
 97                         write_to_crash_log [see line 21]
 98                         GETTIM
 99                         memcpy
100                         memset
101                         write_to_mailbox_nowait [../tms_library/mailbox.c]
102                                 QIOW
```

count_tms_lines.call


```
main [count_tms_lines.c]
        fopen
        printf
        exit
        time
        ctime
        fprintf
        fgets
        memcmp
        extract_name [count_tms_lines.c]
        strcpy
        strlen
        strcat
        count_lines [count_tms_lines.c]
                fopen
                printf
                fprintf
                fgets
                strlen
                fclose
        fclose
```

```
421  main [crack_fmdb_dailyfil.c]
422          printf
423          scanf
424          flush_input [../tms_library/kb_func.c]
425                  _filbuf
426          strlen
427          toupper
428          check_fmdb_filename_format [../tms_library/fmdb_lib.c]
429                  printf
430                  up_arrow [../tms_library/fmdb_lib.c]
431                          _flsbuf
432                  strlen
433          read_df_hdr_namelist [../tms_library/fmdb_lib.c]
434                  strcpy
435                  strcat
436                  strlen
437                  OPEN
438                  sprintf
439                  malloc
440                  QIOW
441                  free
442                  strchr
443                  memcmp
444                  check_filename [../tms_library/misc_func.c]
445                          strlen
446                          find_string [../tms_library/misc_func.c]
447                                  strlen
448                                  memcmp
449                          memcmp
450                  get_number_from_header [../tms_library/misc_func.c]
451                          strlen
452                          find_string [see line 446]
453                          clear_R0 [../tms_library/misc_func.c]
454                          strtoul
455                  memset
456          exit
457          STOP
458          find_string [see line 446]
459          _filbuf
460          vms_c_getch [see line 375]
461          fprintf
462          fputc
463          dump_fmdb_name_list [../tms_library/fmdb_lib.c]
464                  printf
465                  strlen
466                  fprintf
467                  memcmp
468          fclose
469          memcmp
470          read_df_elem_data [../tms_library/fmdb_lib.c]
471                  memcmp
472                  sprintf
473                  QIOW
474                  memmove
475                  memset
476          dump_df_elem_data [../tms_library/fmdb_lib.c]
477                  printf
478                  fprintf
479                  unpack_fmdb_loop
480                  unpack_fmdb_station
481                  unpack_fmdb_spd_trap
482          free
483          DASSGN
484          strcpy
485          fopen
486          perror

375          vms_c_getch [../tms_library/kb_func.c]
376                  input [../tms_library/kb_func.c]
377                          ASSIGN
378                  QIOW
```

```
427  main [crack_fmdb_namefile.c]
428          printf
429          scanf
430          flush_input [../tms_library/kb_func.c]
431                  _filbuf
432          strlen
433          toupper
434          check_fmdb_filename_format [../tms_library/fmdb_lib.c]
435                  printf
436                  up_arrow [../tms_library/fmdb_lib.c]
437                          _flsbuf
438                  strlen
439          read_fmdb_namefile [../tms_library/fmdb_lib.c]
440                  strcpy
441                  strcat
442                  strlen
443                  OPEN
444                  printf
445                  malloc
446                  QIOW
447                  DASSGN
448                  strchr
449                  memcmp
450                  dump_mem [see line 191]
451                  _filbuf
452                  check_filename [../tms_library/misc_func.c]
453                          strlen
454                          find_string [../tms_library/misc_func.c]
455                                  strlen
456                                  memcmp
457                          memcmp
458                  get_number_from_header [../tms_library/misc_func.c]
459                          strlen
460                          find_string [see line 454]
461                          clear_R0 [../tms_library/misc_func.c]
462                          strtoul
463          exit
464          STOP
465          find_string [see line 454]
466          _filbuf
467          vms_c_getch [see line 381]
468          fprintf
469          fputc
470          dump_fmdb_name_list [../tms_library/fmdb_lib.c]
471                  printf
472                  strlen
473                  fprintf
474                  memcmp
475          fclose
476          strcpy
477          fopen
478          perror


191          dump_mem [../tms_library/dump_mem.c]
192                  print_hex_ascii_line [../tms_library/dump_mem.c]
193                          sprintf
194                          printf
195                  print_n_skipped [../tms_library/dump_mem.c]
196                          printf
```

crack_fmdb_snapshot.call


```
424  main [crack_fmdb_snapshot.c]
425          printf
426          scanf
427          flush_input [../tms_library/kb_func.c]
428                  _filbuf
429          strlen
430          toupper
431          check_fmdb_filename_format [../tms_library/fmdb_lib.c]
432                  printf
433                  up_arrow [../tms_library/fmdb_lib.c]
434                          _flsbuf
435                  strlen
436          read_fmdb_snapshot [../tms_library/fmdb_lib.c]
437                  strcpy
438                  strcat
439                  strlen
440                  OPEN
441                  printf
442                  PUTMSG
443                  malloc
444                  QIOW
445                  DASSGN
446                  strchr
447                  memcmp
448                  dump_mem [see line 191]
449                  _filbuf
450                  check_filename [../tms_library/misc_func.c]
451                          strlen
452                          find_string [../tms_library/misc_func.c]
453                                  strlen
454                                  memcmp
455                          memcmp
456                  find_string [see line 452]
457                  memcpy
458                  get_number_from_header [../tms_library/misc_func.c]
459                          strlen
460                          find_string [see line 452]
461                          clear_R0 [../tms_library/misc_func.c]
462                          strtoul
463          exit
464          STOP
465          find_string [see line 452]
466          _filbuf
467          read_fmdb_namefile [../tms_library/fmdb_lib.c]
468                  strcpy
469                  strcat
470                  strlen
471                  OPEN
472                  printf
473                  malloc
474                  QIOW
475                  DASSGN
476                  strchr
477                  memcmp
478                  dump_mem [see line 191]
479                  _filbuf
480                  check_filename [see line 450]
481                  get_number_from_header [see line 458]
482          vms_c_getch [see line 378]
483          fprintf
484          fputc
485          dump_fmdb_data_col [../tms_library/fmdb_lib.c]
486                  printf
487                  strlen
488                  fprintf
489                  memcmp
490                  unpack_fmdb_loop
491                  unpack_fmdb_station
492                  unpack_fmdb_spd_trap
493          fclose
494          strcpy
495          fopen
496          perror

191          dump_mem [../tms_library/dump_mem.c]
192                  print_hex_ascii_line [../tms_library/dump_mem.c]
193                          sprintf
194                          printf
195                  print_n_skipped [../tms_library/dump_mem.c]
196                          printf

378          vms_c_getch [../tms_library/kb_func.c]
379                  input [../tms_library/kb_func.c]
380                          ASSIGN
381                  QIOW
```

del_actvdb.call


```
436   main [del_actvdb.c]
437           delete_global_section [../tms_library/global_sub.c]
438                   strlen
439                   DGBLSC
440           printf
```

```
436   main [del_cctvdb.c]
437           delete_global_section [../../tms_library/global_sub.c]
438                   strlen
439                   DGBLSC
440           printf
```

del_fmdb.call


```
1   main [del_fmdb.c]
2           delete_global_section
3           printf
```

del_gbldb.call


```
1   main [del_gbldb.c]
2           delete_global_section
3           printf
```

del_gcdb.call


```
1   main [del_gcdb.c]
2           delete_global_section
3           printf
```

del_oprtvdb.call


```
1   main [del_oprtvdb.c]
2           delete_global_section
3           printf
```

```
main [del_rmdb.c]
        delete_global_section [../../tms_library/global_sub.c]
                strlen
                DGBLSC
        printf
```

del_rtdb.call


```
436   main (del_rtdb.c)
437           delete_global_section (../tms_library/global_sub.c)
438                   strlen
439                   DGBLSC
440           printf
```

```
608   main [del_scheddb.c]
609         delete_global_section [../../tms_library/global_sub.c]
610                 strlen
611                 DGBLSC
612         printf
```

del_vaxportdb.call


```
575   main [del_vaxportdb.c]
576           delete_global_section [../../tms_library/global_sub.c]
577                   strlen
578                   DGBLSC
579           printf
```

del_vmsdb.call


```
733   main [del_vmsdb.c]
734           delete_global_section [../../tms_library/global_sub.c]
735                   strlen
736                   DGBLSC
737           printf
```

```
419  main [dumydata.c]
420          set_process_name [see line 298]
421          log_tms_event_cc [../tms_library/event_log_sub.c]
422                  log_tms_common [see line 95]
423          printf
424          STOP
425          general_process_startup [../tms_library/proc_cntrl.c]
426                  connect_to_mailbox [../tms_library/mailbox.c]
427                          strlen
428                          ASSIGN
429                  strcpy
430                  printf
431                  write_to_crash_log [see line 21]
432                  STOP
433                  ASCEFC
434                  clear_all_event_flags [../tms_library/proc_cntrl.c]
435                          CLREF
436                          printf
437                          STOP
438                  sprintf
439                  write_string_to_mailbox_nowait [../tms_library/mailbox.c]
440                          strlen
441                          QIOW
442          log_tms_event [see line 94]
443          map_to_RTDB [../tms_library/rtdb_lib.c]
444                  map_to_global_section [../tms_library/global_sub.c]
445                          strlen
446                          MGBLSC
447                  init_rtdb_tl [../tms_library/rtdb_lib.c]
448          map_to_RMDB [../tms_library/fddb_lib.c]
449                  map_to_global_section [see line 444]
450                  init_rmdb_tl [../tms_library/fddb_lib.c]
451          fopen
452          exit
453          fclose
454          WAITFR
455          CLREF
456          SETEF
457          read_data_file [dumydata.c]
458                  fgets
459                  strlen
460                  sprintf
461                  log_tms_event [see line 94]
462                  memcmp
463          rewind
464          memcmp
465          sprintf
466          find_fddb_cl_name [../tms_library/fddb_lib.c]
467                  memcmp
468          memcpy
469          atoi
470          sscanf
471          search_rtdb_name_table [../tms_library/rtdb_lib.c]
472                  memcmp
473          pack_rtdb_spd_trap [../tms_library/pack_lib.c]
474          atof
475          pack_rtdb_loop [../tms_library/pack_lib.c]
476          READEF

 21          write_to_crash_log [../tms_library/proc_cntrl.c]
 22                  GETTIM
 23                  NUMTIM
 24                  fopen
 25                  fprintf
 26                  fclose

 94          log_tms_event [../tms_library/event_log_sub.c]
 95                  log_tms_common [../tms_library/event_log_sub.c]
 96                          strlen
 97                          write_to_crash_log [see line 21]
 98                          GETTIM
 99                          memcpy
100                          memset
101                          write_to_mailbox_nowait [../tms_library/mailbox.c]
102                                  QIOW

298          set_process_name [../tms_library/proc_cntrl.c]
299                  strlen
300                  SETPRN
```

event_logger.call


```
434  main [event_logger.c]
435          create_event_log_file [event_logger.c]
436                  GETTIM
437                  write_to_crash_log [see line 21]
438                  printf
439                  STOP
440                  NUMTIM
441                  sprintf
442                  strlen
443                  CREATE
444                  CONNECT
445                  PUT
446                  strcpy
447                  FLUSH
448          connect_to_mailbox [see line 353]
449          printf
450          event_log_int_write [event_logger.c]
451                  GETTIM
452                  write_to_crash_log [see line 21]
453                  NUMTIM
454                  sprintf
455                  strlen
456                  PUT
457          write_to_crash_log [see line 21]
458          STOP
459          write_string_to_mailbox_nowait [see line 366]
460          map_to_VAXPORTDB [../tms_library/fddb_lib.c]
461                  map_to_global_section [../tms_library/global_sub.c]
462                          strlen
463                          MGBLSC
464                  init_vaxportdb_tl [../tms_library/fddb_lib.c]
465          find_first_last_port_unit [../tms_library/find_first_last.c]
466                  sprintf
467          exit
468          ASCEFC
469          queued_read_from_mailbox [../tms_library/mailbox.c]
470                  QIO
471          set_process_name [see line 299]
472          set_2min_timer [event_logger.c]
473                  GETTIM
474                  write_to_crash_log [see line 21]
475                  STOP
476                  NUMTIM
477                  sprintf
478                  event_log_int_write [see line 450]
479                  close_event_log_file [event_logger.c]
480                          GETTIM
481                          write_to_crash_log [see line 21]
482                          printf
483                          STOP
484                          NUMTIM
485                          strcpy
486                          strlen
487                          PUT
488                          sprintf
489                          FLUSH
490                          CLOSE
491                  create_event_log_file [see line 435]
492                  CVT_VECTIM
493                  ADD_TIMES
494                  SETIMR
495          fclose
496          WFLOR
497          READEF
498          write_to_mailbox_nowait [see line 101]
499          send_to_mon_event_log [event_logger.c]
500                  strlen
501                  write_to_crash_log [see line 21]
502                  GETTIM
503                  memcpy
504                  memset
505                  write_to_mailbox_nowait [see line 101]
506          format_event_log_msg [../tms_library/format_el_msg.c]
507                  NUMTIM
508                  write_to_crash_log [see line 21]
509                  sprintf
510                  memcpy
511                  strcpy
512          memcmp
513          strcmp
514          FLUSH
515          close_event_log_file [see line 479]
516          sprintf
517          memset
518          PUT
519          CANTIM
520          WAITFR

 21          write_to_crash_log [../tms_library/proc_cntrl.c]
 22                  GETTIM
 23                  NUMTIM
 24                  fopen
 25                  fprintf
 26                  fclose

101                          write_to_mailbox_nowait [../tms_library/mailbox.c]
102                                  QIOW

299          set_process_name [../tms_library/proc_cntrl.c]
300                  strlen
301                  SETPRN

353          connect_to_mailbox [../tms_library/mailbox.c]
354                  strlen
355                  ASSIGN

366          write_string_to_mailbox_nowait [../tms_library/mailbox.c]
367                  strlen
368                  QIOW
```

```
  422   main [fmdb_aggr.c]
  423           general_process_startup [../tms_library/proc_cntrl.c]
  424                   connect_to_mailbox [../tms_library/mailbox.c]
  425                           strlen
  426                           ASSIGN
  427                   strcpy
  428                   printf
  429                   write_to_crash_log [see line 21]
  430                   STOP
  431                   ASCEFC
  432                   clear_all_event_flags [../tms_library/proc_cntrl.c]
  433                           CLREF
  434                           printf
  435                           STOP
  436                   sprintf
  437                   write_string_to_mailbox_nowait [../tms_library/mailbox.c]
  438                           strlen
  439                           QIOW
  440           log_tms_event [see line 94]
  441           map_to_RTDB [../tms_library/rtdb_lib.c]
  442                   map_to_global_section [../tms_library/global_sub.c]
2;TAHITI: /homes/taylorc/TSMC/code\007wq!: Command not found.
  445                   init_rtdb_tl [../tms_library/rtdb_lib.c]
  446           printf
  447           STOP
  448           map_to_FMDB [../tms_library/fmdb_lib.c]
  449                   map_to_global_section [see line 442]
  450                   init_fmdb_tl [../tms_library/fmdb_lib.c]
  451           memset
  452           fclose
  453           WAITFR
  454           log_tms_event_cc [../tms_library/event_log_sub.c]
  455                   log_tms_common [see line 95]
  456           CLREF
  457           memcpy
  458           unpack_rtdb_loop_stn [../tms_library/pack_lib.c]
  459           unpack_rtdb_station [../tms_library/pack_lib.c]
  460           unpack_rtdb_spd_trap [../tms_library/pack_lib.c]
  461           NUMTIM
  462           pack_fmdb_loop [../tms_library/pack_lib.c]
  463           pack_fmdb_station [../tms_library/pack_lib.c]
  464           pack_fmdb_spd_trap [../tms_library/pack_lib.c]
  465           scroll_fmdb_col_offsets [../tms_library/fmdb_lib.c]
  466                   memset
  467           SETEF
  468           READEF
  469           write_string_to_mailbox [../tms_library/mailbox.c]
  470                   strlen
  471                   QIOW
  472           exit
```

fmdb_archiver.call


```
main [fmdb_archiver.c]
        general_process_startup [../tms_library/proc_cntrl.c]
                connect_to_mailbox [../tms_library/mailbox.c]
                        strlen
                        ASSIGN
                strcpy
                printf
                write_to_crash_log [see line 21]
                STOP
                ASCEFC
                clear_all_event_flags [../tms_library/proc_cntrl.c]
                        CLREF
                        printf
                        STOP
                sprintf
                write_string_to_mailbox_nowait [../tms_library/mailbox.c]
                        strlen
                        QIOW
        log_tms_event [see line 88]
        CLREF
        printf
        log_tms_event_cc [../tms_library/event_log_sub.c]
                log_tms_common [see line 89]
        STOP
        map_to_FMDB [../tms_library/fmdb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strleni
                        MGBLSC
                init_fmdb_tl [../tms_library/fmdb_lib.c]
        GETTIM
        calc_next_20sec_time [fmdb_archiver.c]
                NUMTIM
                printf
                log_tms_event_cc [see line 437]
                CVT_VECTIM
                ADD_TIMES
        build_fmdb_snapshot_filename [../tms_library/fmdb_lib.c]
                NUMTIM
                sprintf
        build_fmdb_daily_filename [../tms_library/fmdb_lib.c]
                NUMTIM
                sprintf
        malloc
        exit
        memset
        build_snapshot_header [fmdb_archiver.c]
                strcpy
                strlen
                strcat
                sprintf
                NUMTIM
                printf
                log_tms_event_cc [see line 437]
                log_tms_event [see line 88]
        create_fmdb_snapshot_file [fmdb_archiver.c]
                strcpy
                strcat
                strlen
                CREATE
        create_fmdb_daily_file [fmdb_archiver.c]
                strcpy
                strcat
                strlen
                CREATE
        fclose
        WAITFR
        memcpy
        write_fmdb_snapshot_file [fmdb_archiver.c]
                log_tms_event [see line 88]
                memcpy
                GETTIM
                log_tms_event_cc [see line 437]
                NUMTIM
                sprintf
                QIOW
                DASSGN
                memset
        NUMTIM
        write_fmdb_daily_files [fmdb_archiver.c]
                printf
                log_tms_event [see line 88]
                NUMTIM
                log_tms_event_cc [see line 437]
                build_dailyfile_header [fmdb_archiver.c]
                        strcpy
                        strlen
                        strcat
                        sprintf
                        NUMTIM
                        printf
                        log_tms_event_cc [see line 437]
                        GETTIM
                        log_tms_event [see line 88]
                memcpy
                QIOW
                sprintf
                move_fmdb_data_to_buffer [fmdb_archiver.c]
                        memset
                        _MOVC3
                memmove
                DASSGN
                memset
        READEF
        write_string_to_mailbox [../tms_library/mailbox.c]
                strlen
                QIOW
        SETEF
```

```
main [inc_detect.c]
        general_process_startup [../tms_library/proc_cntrl.c]
                connect_to_mailbox [../tms_library/mailbox.c]
                        strlen
                        ASSIGN
                strcpy
                printf
                write_to_crash_log [see line 21]
                STOP
                ASCEFC
                clear_all_event_flags [../tms_library/proc_cntrl.c]
                        CLREF
                        printf
                        STOP
                sprintf
                write_string_to_mailbox_nowait [../tms_library/mailbox.c]
                        strlen
                        QIOW
        log_tms_event [../tms_library/event_log_sub.c]
                log_tms_common [../tms_library/event_log_sub.c]
                        strlen
                        write_to_crash_log [see line 21]
                        GETTIM
                        memcpy
                        memset
                        write_to_mailbox_nowait [see line 393]
        map_to_RTDB [../tms_library/rtdb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_rtdb_tl [../tms_library/rtdb_lib.c]
        log_tms_event_cc [../tms_library/event_log_sub.c]
                log_tms_common [see line 414]
        printf
        STOP
        map_to_RMDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 422]
                init_rmdb_tl [../tms_library/fddb_lib.c]
        build_inc_det_table [inc_detect.c]
                malloc
                build_tap_error [../tms_library/tap_sub.c]
                        sprintf
                        memcpy
                        printf
                        log_tms_event [see line 413]
                exit
                code_to_table [../tms_library/table_sub.c]
                ushort_to_table [../tms_library/table_sub.c]
                ulong_to_table [../tms_library/table_sub.c]
                date_time_to_table [../tms_library/table_sub.c]
                        GETTIM
                        printf
                        memcpy
                fopen
                fgets
                pad_end [../tms_library/tap_sub.c]
                        strlen
                find_fddb_cl_name [../tms_library/fddb_lib.c]
                        memcmp
                classify_roadway [../tms_library/fddb_lib.c]
                        memcmp
                check_reversible [../tms_library/tap_sub.c]
                memcpy
                search_rtdb_name_table [../tms_library/rtdb_lib.c]
                        memcmp
                realloc
                code_byte_to_table [../tms_library/table_sub.c]
                code_ushort_to_table [../tms_library/table_sub.c]
                code_ulong_to_table [../tms_library/table_sub.c]
                byte_to_table [../tms_library/table_sub.c]
                fclose
                calc_table_checksum [../tms_library/table_sub.c]
        fclose
        sprintf
        WAITFR
        CLREF
        calc_inc_det [inc_detect.c]
                strcpy
                unpack_rtdb_loop_stn [../tms_library/pack_lib.c]
                incident_detect [inc_detect.c]
                pack_rtdb_inc_det [../tms_library/pack_lib.c]
                search_rtdb_offset_list [../tms_library/rtdb_lib.c]
                sprintf
                log_tms_event [see line 413]
                log_tms_common [see line 414]
        SETEF
        READEF
        write_string_to_mailbox [../tms_library/mailbox.c]
                strlen
                QIOW
        exit
```

```
main [mon_event_log.c]
        get_other_process_id [../tms_library/proc_cntrl.c]
                strlen
                GETJPIW
        printf
        exit
        STOP
        establish_process_name [../tms_library/proc_cntrl.c]
                memset
                strlen
                strcpy
                get_process_name [../tms_library/proc_cntrl.c]
                        memset
                        GETJPI
                strcmp
                get_terminal_name [../tms_library/proc_cntrl.c]
                        memset
                        GETJPI
                set_process_name [../tms_library/proc_cntrl.c]
                        strlen
                        SETPRN
        connect_to_mailbox [see line 335]
        flush_mailbox [../tms_library/mailbox.c]
                QIOW
        log_tms_common [see line 95]
        get_iochan [../tms_library/kb_func.c]
                strlen
                ASSIGN
        get_term_char [../tms_library/kb_func.c]
                QIO
        set_port_partial [../tms_library/kb_func.c]
                change_term_char [../tms_library/kb_func.c]
                        QIO
        CREATE_PASTEBOARD
        CHANGE_PBD_CHARACTERISTICS
        CREATE_VIRTUAL_DISPLAY
        queued_get_1_char [../tms_library/kb_func.c]
                QIO
        queued_read_from_mailbox [../tms_library/mailbox.c]
                QIO
        SETIMR
        WFLOR
        READEF
        prompt_for_yes_no [../tms_library/kb_func.c]
                strlen
                printf
                vms_c_getch [see line 364]
                toupper
        _flsbuf
        CANTIM
        format_event_log_msg [../tms_library/format_el_msg.c]
                NUMTIM
                write_to_crash_log [see line 21]
                sprintf
                memcpy
                strcpy
        GETTIM
        NUMTIM
        memset
        sprintf
        CANCEL
        DELETE_PASTEBOARD
        set_term_char [../tms_library/kb_func.c]
                QIO
restore_tty_process_name [../tms_library/proc_cntrl.c]
        strlen
        set_process_name [see line 426]
        printf
        get_terminal_name [see line 423]
        get_pid [../tms_library/proc_cntrl.c]
                GETJPI
        sprintf

connect_to_mailbox [../tms_library/mailbox.c]
        strlen
        ASSIGN

vms_c_getch [../tms_library/kb_func.c]
        input [../tms_library/kb_func.c]
                ASSIGN
```

```
main [noaa_monitor.c]
        general_process_startup [../tms_library/proc_cntrl.c]
                connect_to_mailbox [../tms_library/mailbox.c]
                        strlen
                        ASSIGN
                strcpy
                printf
                write_to_crash_log [see line 21]
                STOP
                ASCEFC
                clear_all_event_flags [../tms_library/proc_cntrl.c]
                        CLREF
                        printf
                        STOP
                sprintf
                write_string_to_mailbox_nowait [../tms_library/mailbox.c]
                        strlen
                        QIOW
        log_tms_event [see line 94]
        set_process_name [see line 296]
        strcpy
        printf
        log_tms_event_cc [../tms_library/event_log_sub.c]
                log_tms_common [see line 95]
        write_to_crash_log [see line 21]
        STOP
        read_report_list [noaa_monitor.c]
                fopen
                strcpy
                perror
                log_tms_event [see line 94]
                write_to_crash_log [see line 21]
                exit
                malloc
                printf
                fgets
                pad_end [../tms_library/tap_sub.c]
                        strlen
                memcmp
                memcpy
                realloc
                fclose
        map_to_GBLDB [../tms_library/fddb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_gbldb_tl [../tms_library/fddb_lib.c]
        map_to_VAXPORTDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 460]
                init_vaxportdb_tl [../tms_library/fddb_lib.c]
        create_logical_name [../tms_library/logical_name.c]
                strlen
                CRELNM
        malloc
        exit
        start_noaa_port [noaa_monitor.c]
                find_fddb_cl_name [../tms_library/fddb_lib.c]
                        memcmp
                strcpy
                printf
                log_tms_event [see line 94]
                write_to_crash_log [see line 21]
                exit
                strcmp
                bit_clr_i
                strlen
                ASSIGN
                log_tms_event_cc [see line 439]
                STOP
                GETDVI
                DASSGN
                sprintf
                QIOW
                memset
                bit_set_i
        start_noaa_timer [noaa_monitor.c]
                GETTIM
                log_tms_event_cc [see line 439]
                NUMTIM
                CVT_VECTIM
                strcpy
                strlen
                BINTIM
                ADD_TIMES
                SETIMR
        QIO
        fclose
        WFLOR
        READEF
        CLREF
        memcmp
        strlen
        time
        realloc
        memcpy
        write_noaa_file [noaa_monitor.c]
                strcpy
                strlen
                memcpy
                fopen
                sprintf
                log_tms_event [see line 94]
                fputc
                ctime
                fputs
                fclose
        spawn_noaa_del_cmd [noaa_monitor.c]
                GETTIM
                log_tms_event_cc [see line 439]
                sprintf
                strlen
                BINTIM
                SUB_TIMES
                ASCTIM
                strcpy
                SPAWN
                log_tms_event [see line 94]
        sprintf
        stop_noaa_port [noaa_monitor.c]
                log_tms_event [see line 94]
                CANCEL
                strcpy
                printf
                log_tms_event_cc [see line 439]
                write_to_crash_log [see line 21]
                memset
                QIOW
                DASSGN
```

```
545                 bit_clr_i
546         CANTIM


296         set_process_name [../tms_library/proc_cntrl.c]
297                 strlen
298                 SETPRN
```

```
  516   main [patch_cctvdb.c]
  517           map_to_CCTVDB [../../tms_library/fddb_lib.c]
  518                   map_to_global_section [../../tms_library/global_sub.c]
  519                           strlen
  520                           MGBLSC
  521                   init_cctvdb_tl [../../tms_library/fddb_lib.c]
  522           printf
  523           STOP
  524           map_to_OPRTVDB [../../tms_library/fddb_lib.c]
  525                   map_to_global_section [see line 518]
  526                   init_oprtvdb_tl [../../tms_library/fddb_lib.c]
  527           map_to_VAXPORTDB [../../tms_library/fddb_lib.c]
  528                   map_to_global_section [see line 518]
  529                   init_vaxportdb_tl [../../tms_library/fddb_lib.c]
  530           fopen
  531           exit
  532           get_iochan [../../tms_library/kb_func.c]
  533                   strlen
  534                   ASSIGN
  535           get_term_char [../../tms_library/kb_func.c]
  536                   QIO
  537           change_term_char [../../tms_library/kb_func.c]
  538                   QIO
  539           setjmp
  540           vms_c_getch [../../tms_library/kb_func.c]
  541                   input [../../tms_library/kb_func.c]
  542                           ASSIGN
  543                   QIOW
  544           toupper
  545           dump_cctvdb_to_table_files [cctvdb_sub.c]
  546                   printf
  547                   translate_logical_name [../../tms_library/logical_name.c]
  548                           strlen
  549                           TRNLNM
  550                           memmove
  551                   build_full_name [../fddb_sub.c]
  552                           strlen
  553                           memcpy
  554                   fopen
  555                   fddb_error [see line 130]
  556                   fclose
  557                   delete
  558                   sprintf
  559                   time
  560                   ctime
  561                   fprintf
  562                   dump_fddb_elements [../fddb_sub.c]
  563                           fprintf
  564                           format_db_element_for_output [../../tms_library/format_d
b_lib.c]
  565                                   sprintf
  566                                   strcpy
  567                                   strip_trailing_blanks [see line 142]
  568                                   process_output_special_case [cctvdb_sub.c]
  569                                   convert_perm_mask [../../tms_library/format_db_l
ib.c]
  570                                           strcpy
  571                                   byte_to_float [../../tms_library/format_db_lib.c
]
  572                                           leading_zero_pad [../../tms_library/form
at_db_lib.c]
  573                                                   strlen
  574                                           strlen
  575                                   strcat
  576                                   strcmp
  577                                   NUMTIM
  578                                   memset
  579           print_data_col_list [patch_cctvdb.c]
  580                   printf
  581                   select_entry [../../tms_library/kb_func.c]
  582                           log10
  583                           printf
  584                           exit
  585                           memset
  586                           vms_c_getch [see line 540]
  587                           longjmp
  588                           atoi
  589                   longjmp
  590                   menu2 [patch_cctvdb.c]
  591                           printf
  592                           vms_c_getch [see line 540]
  593                           toupper
  594                           dump_cctvdb_to_table_files [see line 545]
  595                           print_group_name_list [patch_cctvdb.c]
  596                                   memset
  597                                   strlen
  598                                   memcpy
  599                                   printf
  600                                   select_entry [see line 581]
  601                                   longjmp
  602                                   menu3 [patch_cctvdb.c]
  603                                           printf
  604                                           vms_c_getch [see line 540]
  605                                           toupper
  606                                           print_element_name_list [patch_cctvdb.c]
  607                                                   printf
  608                                                   select_entry [see line 581]
  609                                                   longjmp
  610                                                   menu4 [patch_cctvdb.c]
  611                                                           format_db_element_for_out
put [see line
564]
  612                                                           printf
  613                                                           vms_c_getch [see line 540
]
  614                                                           toupper
  615                                                           strchr
  616                                                           get_param_value [../../tm
s_library/kb_f
unc.c]
  617                                                                   printf
  618                                                                   memset
  619                                                                   vms_c_getch [see
line 540]
  620                                                                   longjmp
  621                                                           process_input_special_cas
e
  622                                                           load_param [see line 437]
  623                                                           longjmp
  624                                           longjmp
  625                           longjmp
  626   output_cctvdb_out_fil [cctvdb_sub.c]
  627           fopen
  628           fddb_error [see line 130]
  629           read_fddb_file [../fddb_sub.c]
  630                   get_next_line [../fddb_sub.c]
  631                           ftell
```

```
                                fgets
                                strlen
                                fseek
                                convert_non_print_to_space
                                strip_trailing_blanks [see line 142]
                                strip_leading_blanks [../../tms_library/format_d
b_lib.c]
                        setjmp
                        fddb_error [see line 130]
                        sprintf
                        exit
                time
                ctime
                fprintf
                printf
                rewind
                fseek
                init_group_table [see line 150]
                print_db_table [../fddb_sub.c]
                        print_file_comments [../fddb_sub.c]
                                fseek
                                get_next_line [see line 630]
                                fprintf
                        copy_param_lines [../fddb_sub.c]
                                fseek
                                get_next_line [see line 630]
                                fprintf
                        format_db_element_for_output [see line 564]
                        print_db_table_special_case [cctvdb_sub.c]
                        printf
                        fprintf
                        strlen
                fclose
        dump_cctvdb_params [../../tms_library/fddb_lib.c]
                dump_fddb_params [see line 280]
                printf
        _filbuf
        print_camera_report [patch_cctvdb.c]
                printf
                vms_c_getch [see line 540]
                toupper
                fopen
                perror
                GETTIM
                STOP
                NUMTIM
                fprintf
                sprintf
                fclose
        dump_cctvdb_offsets [../../tms_library/fddb_lib.c]
                printf
        dump_cctvdb_tl [../../tms_library/fddb_lib.c]
                printf
        dump_video_switch_mon_list [patch_cctvdb.c]
                printf
        set_term_char [../../tms_library/kb_func.c]
                QIO
```

patch_gbldb.call


```
  519  main [patch_gbldb.c]
  520          map_to_global_section [../../tms_library/global_sub.c]
  521                  strlen
  522                  MGBLSC
  523          printf
  524          STOP
  525          init_gbldb_tl [../../tms_library/fddb_lib.c]
  526          fopen
  527          exit
  528          get_iochan [../../tms_library/kb_func.c]
  529                  strlen
  530                  ASSIGN
  531          get_term_char [../../tms_library/kb_func.c]
  532                  QIO
  533          change_term_char [../../tms_library/kb_func.c]
  534                  QIO
  535          setjmp
  536          vms_c_getch [../../tms_library/kb_func.c]
  537                  input [../../tms_library/kb_func.c]
  538                          ASSIGN
  539                  QIOW
  540          toupper
  541          dump_gbldb_to_table_files [gbldb_sub.c]
  542                  printf
  543                  translate_logical_name [../../tms_library/logical_name.c]
  544                          strlen
  545                          TRNLNM
  546                          memmove
  547                  build_full_name [../fddb_sub.c]
  548                          strlen
  549                          memcpy
  550                  fopen
  551                  fddb_error [see line 130]
  552                  fclose
  553                  delete
  554                  sprintf
  555                  time
  556                  ctime
  557                  fprintf
  558                  dump_fddb_elements [../fddb_sub.c]
  559                          fprintf
  560                          format_db_element_for_output [../../tms_library/format_d
b_lib.c]
  561                                  sprintf
  562                                  strcpy
  563                                  strip_trailing_blanks [see line 142]
  564                                  process_output_special_case [gbldb_sub.c]
  565                                  convert_perm_mask [../../tms_library/format_db_l
ib.c]
  566                                          strcpy
  567                                  byte_to_float [../../tms_library/format_db_lib.c
]
  568                                          leading_zero_pad [../../tms_library/form
at_db_lib.c]
  569                                                  strlen
  570                                          strlen
  571                                  strcat
  572                                  strcmp
  573                                  NUMTIM
  574                                  memset
  575          print_data_col_list [patch_gbldb.c]
  576                  printf
  577                  select_entry [../../tms_library/kb_func.c]
  578                          log10
  579                  printf
  580                  exit
  581                  memset
  582                  vms_c_getch [see line 536]
  583                  longjmp
  584                  atoi
  585          longjmp
  586          menu2 [patch_gbldb.c]
  587                  printf
  588                  vms_c_getch [see line 536]
  589                  toupper
  590                  dump_gbldb_to_table_files [see line 541]
  591                  print_group_name_list [patch_gbldb.c]
  592                          memset
  593                          strlen
  594                          memcpy
  595                          printf
  596                          select_entry [see line 577]
  597                          longjmp
  598                          menu3 [patch_gbldb.c]
  599                                  printf
  600                                  vms_c_getch [see line 536]
  601                                  toupper
  602                                  print_element_name_list [patch_gbldb.c]
  603                                          printf
  604                                          select_entry [see line 577]
  605                                          longjmp
  606                                          menu4 [patch_gbldb.c]
  607                                                  format_db_element_for_out
put [see line 560]
  608                                                  printf
  609                                                  vms_c_getch [see line 536
]
  610                                                  toupper
  611                                                  strchr
  612                                                  get_param_value [../../tm
s_library/kb_func.c]
  613                                                          printf
  614                                                          memset
  615                                                          vms_c_getch [see
line 536]
  616                                                          longjmp
  617                                                  process_input_special_cas
e
  618                                                  load_param [see line 440]
  619                                                  longjmp
  620                                          longjmp
  621                  longjmp
  622          output_gbldb_out_fil [gbldb_sub.c]
  623                  fopen
  624                  fddb_error [see line 130]
  625                  read_fddb_file [../fddb_sub.c]
  626                          get_next_line [../fddb_sub.c]
  627                                  ftell
  628                                  fgets
  629                                  strlen
  630                                  fseek
  631                                  convert_non_print_to_space
  632                                  strip_trailing_blanks [see line 142]
  633                                  strip_leading_blanks [../../tms_library/format_db
_lib.c]
  634                  setjmp
  635                  fddb_error [see line 130]
  636                  sprintf
```

```
637                     exit
638             time
639             ctime
640             fprintf
641             printf
642             rewind
643             fseek
644             init_group_table [see line 150]
645             print_db_table [../fddb_sub.c]
646                     print_file_comments [../fddb_sub.c]
647                             fseek
648                             get_next_line [see line 626]
649                             fprintf
650                     copy_param_lines [../fddb_sub.c]
651                             fseek
652                             get_next_line [see line 626]
653                             fprintf
654                     format_db_element_for_output [see line 560]
655                     print_db_table_special_case [gbldb_sub.c]
656                     printf
657                     fprintf
658                     strlen
659             fclose
660     dump_gbldb_params [../../tms_library/fddb_lib.c]
661             dump_fddb_params [see line 231]
662     _filbuf
663     set_term_char [../../tms_library/kb_func.c]
664             QIO


130             fddb_error [../fddb_sub.c]
131                     sprintf
132                     strcpy
133                     printf
134                     fprintf
135                     build_up_arrow [../fddb_sub.c]
136                     find_err_text [../fddb_sub.c]
137                             sprintf
138                     strlen
139                     memcpy
140                     _filbuf

142             strip_trailing_blanks [../../tms_library/format_db_lib.c]
143                     strlen

150     init_group_table [../fddb_sub.c]
151             memset
152             memcpy

231     dump_fddb_params [../../tms_library/fddb_lib.c]
232             printf
233             NUMTIM
234             STOP

440     load_param [../fddb_sub.c]
441             get_token
442             fddb_error [see line 130]
443             pad_end [../../tms_library/tap_sub.c]
444                     strlen
445             find_fddb_nt_name [../../tms_library/fddb_lib.c]
446                     memcmp
447             printf
448             atol
449             range_check [../fddb_sub.c]
450                     strlen
451                     fddb_error [see line 130]
452                     sprintf
453                     strcmp
454                     atoi
455     strcmp
456     memset
457     strcpy
458     atoi
459     pad_trailing_blanks [../../tms_library/utility_func.c]
460             strlen
461     memcpy
462     perm_mask_to_byte [../fddb_sub.c]
```

```
  508   main [patch_gcdb.c]
  509           map_to_GCDB [../../tms_library/fddb_lib.c]
  510                   map_to_global_section [../../tms_library/global_sub.c]
  511                           strlen
  512                           MGBLSC
  513                   init_gcdb_tl [../../tms_library/fddb_lib.c]
  514           printf
  515           STOP
  516           map_to_VAXPORTDB [../../tms_library/fddb_lib.c]
  517                   map_to_global_section [see line 510]
  518                   init_vaxportdb_tl [../../tms_library/fddb_lib.c]
  519           fopen
  520           exit
  521           get_iochan [../../tms_library/kb_func.c]
  522                   strlen
  523                   ASSIGN
  524           get_term_char [../../tms_library/kb_func.c]
  525                   QIO
  526           change_term_char [../../tms_library/kb_func.c]
  527                   QIO
  528           setjmp
  529           vms_c_getch [../../tms_library/kb_func.c]
  530                   input [../../tms_library/kb_func.c]
  531                           ASSIGN
  532                   QIOW
  533           toupper
  534           dump_gcdb_to_table_files [gcdb_sub.c]
  535                   printf
  536                   translate_logical_name [../../tms_library/logical_name.c]
  537                           strlen
  538                           TRNLNM
  539                           memmove
  540                   build_full_name [../fddb_sub.c]
  541                           strlen
  542                           memcpy
  543                   fopen
  544                   fddb_error [see line 130]
  545                   fclose
  546                   delete
  547                   sprintf
  548                   time
  549                   ctime
  550                   fprintf
  551                   dump_fddb_elements [../fddb_sub.c]
  552                           fprintf
  553                           format_db_element_for_output [../../tms_library/format_d
b_lib.c]
  554                                   sprintf
  555                                   strcpy
  556                                   strip_trailing_blanks [see line 142]
  557                                   process_output_special_case [gcdb_sub.c]
  558                                   convert_perm_mask [../../tms_library/format_db_l
ib.c]
  559                                           strcpy
  560                                   byte_to_float [../../tms_library/format_db_lib.c
]
  561                                           leading_zero_pad [../../tms_library/form
at_db_lib.c]
  562                                                   strlen
  563                                           strlen
  564                                   strcat
  565                                   strcmp
  566                                   NUMTIM
  567                                   memset
  568   print_data_col_list [patch_gcdb.c]
  569           printf
  570           select_entry [../../tms_library/kb_func.c]
  571                   log10
  572                   printf
  573                   exit
  574                   memset
  575                   vms_c_getch [see line 529]
  576                   longjmp
  577                   atoi
  578           longjmp
  579           menu2 [patch_gcdb.c]
  580                   printf
  581                   vms_c_getch [see line 529]
  582                   toupper
  583                   dump_gcdb_to_table_files [see line 534]
  584                   print_group_name_list [patch_gcdb.c]
  585                           memset
  586                           strlen
  587                           memcpy
  588                           printf
  589                           select_entry [see line 570]
  590                           longjmp
  591                           menu3 [patch_gcdb.c]
  592                                   printf
  593                                   vms_c_getch [see line 529]
  594                                   toupper
  595                                   print_element_name_list [patch_gcdb.c]
  596                                           printf
  597                                           select_entry [see line 570]
  598                                           longjmp
  599                                           menu4 [patch_gcdb.c]

  130           fddb_error [../fddb_sub.c]
  131                   sprintf
  132                   strcpy
  133                   printf
  134                   fprintf
  135                   build_up_arrow [../fddb_sub.c]
  136                   find_err_text [../fddb_sub.c]
  137                           sprintf
  138                   strlen
  139                   memcpy
  140                   _filbuf

  142           strip_trailing_blanks [../../tms_library/format_db_lib.c]
  143                   strlen
```

patch_oprtvdb.call


```
main [patch_oprtvdb.c]
        map_to_OPRTVDB [../../tms_library/fddb_lib.c]
                map_to_global_section [../../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_oprtvdb_tl [../../tms_library/fddb_lib.c]
        printf
        STOP
        map_to_global_section [see line 518]
        init_oprtvdb_tl
        fopen
        exit
        get_iochan [../../tms_library/kb_func.c]
                strlen
                ASSIGN
        get_term_char [../../tms_library/kb_func.c]
                QIO
        change_term_char [../../tms_library/kb_func.c]
                QIO
        setjmp
        vms_c_getch [../../tms_library/kb_func.c]
                input [../../tms_library/kb_func.c]
                        ASSIGN
                QIOW
        toupper
        dump_oprtvdb_to_table_files [oprtvdb_sub.c]
                printf
                translate_logical_name [../../tms_library/logical_name.c]
                        strlen
                        TRNLNM
                        memmove
                build_full_name [../fddb_sub.c]
                        strlen
                        memcpy
                fopen
                fddb_error [see line 130]
                fclose
                delete
                sprintf
                time
                ctime
                fprintf
                dump_fddb_elements [../fddb_sub.c]
                        fprintf
                        format_db_element_for_output [../../tms_library/format_d
b_lib.c]
                                sprintf
                                strcpy
                                strip_trailing_blanks [see line 142]
                                process_output_special_case [oprtvdb_sub.c]
                                convert_perm_mask [../../tms_library/format_db_l
ib.c]
                                        strcpy
                                byte_to_float [../../tms_library/format_db_lib.c
]
                                        leading_zero_pad [../../tms_library/form
at_db_lib.c]
                                                strlen
                                        strlen
                                strcat
                                strcmp
                                NUMTIM
                                memset
        print_data_col_list [patch_oprtvdb.c]
                printf
                select_entry [../../tms_library/kb_func.c]
                        log10
                        printf
                        exit
                        memset
                        vms_c_getch [see line 536]
                        longjmp
                        atoi
                longjmp
                menu2 [patch_oprtvdb.c]
                        printf
                        vms_c_getch [see line 536]
                        toupper
                        dump_oprtvdb_to_table_files [see line 541]
                        print_group_name_list [patch_oprtvdb.c]
                                memset
                                strlen
                                memcpy
                                printf
                                select_entry [see line 577]
                                longjmp
                                menu3 [patch_oprtvdb.c]
                                        printf
                                        vms_c_getch [see line 536]
                                        toupper
                                        print_element_name_list [patch_oprtvdb.c]
                                                printf
                                                select_entry [see line 577]
                                                longjmp
                                                menu4 [patch_oprtvdb.c]
                                                        format_db_element_for_out
put [see line 560]
                                                        printf
                                                        vms_c_getch [see line 536
]
                                                        toupper
                                                        strchr
                                                        get_param_value [../../tm
s_library/kb_func.c]
                                                                printf
                                                                memset
                                                                vms_c_getch [see
line 536]
                                                                longjmp
                                                        process_input_special_cas
e
                                                        load_param [see line 437]
                                                        longjmp
                                                longjmp
                                        longjmp
                                longjmp
                        output_oprtvdb_out_fil [oprtvdb_sub.c]
                                fopen
                                fddb_error [see line 130]
                                read_fddb_file [../fddb_sub.c]
                                        get_next_line [../fddb_sub.c]
                                                ftell
                                                fgets
                                                strlen
                                                fseek
                                                convert_non_print_to_space
                                                strip_trailing_blanks [see line 142]
                                                strip_leading_blanks [../../tms_library/format_db
_lib.c]
```

```
                setjmp
                fddb_error [see line 130]
                sprintf
                exit
        time
        ctime
        fprintf
        printf
        rewind
        fseek
        init_group_table [see line 150]
        print_db_table [../fddb_sub.c]
                print_file_comments [../fddb_sub.c]
                        fseek
                        get_next_line [see line 626]
                        fprintf
                copy_param_lines [../fddb_sub.c]
                        fseek
                        get_next_line [see line 626]
                        fprintf
                format_db_element_for_output [see line 560]
                print_db_table_special_case [oprtvdb_sub.c]
                printf
                fprintf
                strlen
        fclose
dump_oprtvdb_params [../../tms_library/fddb_lib.c]
        dump_fddb_params [see line 228]
_filbuf
print_opr_report [patch_oprtvdb.c]
        printf
        vms_c_getch [see line 536]
        toupper
        fopen
        perror
        GETTIM
        STOP
        NUMTIM
        fprintf
        sprintf
        convert_status [../../tms_library/fddb_lib.c]
                strcpy
                memcpy
        fclose
set_term_char [../../tms_library/kb_func.c]
        QIO

        fddb_error [../fddb_sub.c]
                sprintf
                strcpy
                printf
                fprintf
                build_up_arrow [../fddb_sub.c]
                find_err_text [../fddb_sub.c]
                        sprintf
                strlen
                memcpy
                _filbuf

        strip_trailing_blanks [../../tms_library/format_db_lib.c]
                strlen

load_param [../fddb_sub.c]
        get_token
        fddb_error [see line 130]
pad_end [../../tms_library/tap_sub.c]
        strlen
find_fddb_nt_name [../../tms_library/fddb_lib.c]
        memcmp
printf
atol
range_check [../fddb_sub.c]
        strlen
        fddb_error [see line 130]
        sprintf
        strcmp
        atoi
strcmp
memset
strcpy
atoi
pad_trailing_blanks [../../tms_library/utility_func.c]
        strlen
memcpy
perm_mask_to_byte [../fddb_sub.c]
```

```
main [patch_rmdb.c]
        map_to_RMDB [../../tms_library/fddb_lib.c]
                map_to_global_section [../../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_rmdb_tl [../../tms_library/fddb_lib.c]
        printf
        STOP
        map_to_VAXPORTDB [../../tms_library/fddb_lib.c]
                map_to_global_section [see line 397]
                init_vaxportdb_tl [../../tms_library/fddb_lib.c]
        compare_VAX_time
        exit
        connect_to_mailbox [see line 327]
        fopen
        get_iochan [../../tms_library/kb_func.c]
                strlen
                ASSIGN
        get_term_char [../../tms_library/kb_func.c]
                QIO
        change_term_char [../../tms_library/kb_func.c]
                QIO
        setjmp
        check_rmdb_changed [patch_rmdb.c]
                prompt_for_yes_no [../../tms_library/kb_func.c]
                        strlen
                        printf
                        vms_c_getch [../../tms_library/kb_func.c]
                                input [../../tms_library/kb_func.c]
                                        ASSIGN
                                QIOW
                        toupper
                mail_patch_cmd_to_rmdc_comm [patch_rmdb.c]
                        printf
                        write_to_mailbox_nowait [see line 100]
        vms_c_getch [see line 422]
        toupper
        dump_rmdb_to_table_files
        print_data_col_list [patch_rmdb.c]
                printf
                select_entry [../../tms_library/kb_func.c]
                        log10
                        printf
                        exit
                        memset
                        vms_c_getch [see line 422]
                        longjmp
                        atoi
                longjmp
                menu2 [patch_rmdb.c]
                        printf
                        vms_c_getch [see line 422]
                        toupper
                        dump_rmdb_to_table_files
                        print_group_name_list [patch_rmdb.c]
                                memset
                                strlen
                                memcpy
                                printf
                                select_entry [see line 435]
                                longjmp
                                menu3 [patch_rmdb.c]
                                        printf
                                        vms_c_getch [see line 422]
                                        toupper
                                disable_enable_loop [patch_rmdb.c]
                                        printf
                                        select_entry [see line 435]
                                        longjmp
                                        memcpy
                                        prompt_for_yes_no [see line 419]
                                        _filbuf
                                print_element_name_list [patch_rmdb.c]
                                        printf
                                        select_entry [see line 435]
                                        longjmp
                                        menu4 [patch_rmdb.c]
                                                format_db_element_for_out
put [../../tms_library/format_db_lib.c]
                                                        sprintf
                                                        strcpy
                                                        strip_trailing_bl
anks [../../tms_library/format_db_lib.c]
                                                                strlen
                                                        process_output_sp
ecial_case
                                                        convert_perm_mask
 [../../tms_library/format_db_lib.c]
                                                                strcpy
                                                        byte_to_float [..
/../tms_library/format_db_lib.c]
                                                                leading_z
ero_pad [../../tms_library/format_db_lib.c]
                                                                        s
trlen
                                                                strlen
                                                        strcat
                                                        strcmp
                                                        NUMTIM
                                                        memset
                                                printf
                                                vms_c_getch [see line 422
]
                                                toupper
                                                strchr
                                                get_param_value [../../tm
s_library/kb_func.c]
                                                        printf
                                                        memset
                                                        vms_c_getch [see
line 422]
                                                        longjmp
                                                process_input_special_cas
e
                                                load_param
                                                check_rmdb_changed [see l
ine 418]
                                                longjmp
                                        dump_loop_table_to_file
                                        dump_speed_traps_to_file
                                        longjmp
                                mail_patch_cmd_to_rmdc_comm [see line 427]
                                _filbuf
                                longjmp
                output_rmdb_out_fil
                dump_rmdb_params [../../tms_library/fddb_lib.c]
                        dump_fddb_params [see line 171]
                        printf
```

```
511         _filbuf
512         print_rmdc_report [patch_rmdb.c]
513                 printf
514                 vms_c_getch [see line 422]
515                 toupper
516                 fopen
517                 perror
518                 GETTIM
519                 STOP
520                 NUMTIM
521                 fprintf
522                 sprintf
523                 convert_status [../../tms_library/fddb_lib.c]
524                         strcpy
525                         memcpy
526                 fclose
527         dump_rmdb_offsets [../../tms_library/fddb_lib.c]
528                 printf
529         dump_rmdb_tl [../../tms_library/fddb_lib.c]
530                 printf
531         dump_fddb_name_table [../../tms_library/fddb_lib.c]
532                 printf
533         dump_fddb_col_list [../../tms_library/fddb_lib.c]
534                 printf
535         set_term_char [../../tms_library/kb_func.c]
536                 QIO



100                         write_to_mailbox_nowait [../../tms_library/mailbox.c]
101                                 QIOW

171         dump_fddb_params [../../tms_library/fddb_lib.c]
172                 printf
173                 NUMTIM
174                 STOP


327         connect_to_mailbox [../../tms_library/mailbox.c]
328                 strlen
329                 ASSIGN
```

```
548  main [patch_vaxportdb.c]
549          map_to_RMDB [../../tms_library/fddb_lib.c]
550                  map_to_global_section [../../tms_library/global_sub.c]
551                          strlen
552                          MGBLSC
553                  init_rmdb_tl [../../tms_library/fddb_lib.c]
554          printf
555          STOP
556          map_to_GBLDB [../../tms_library/fddb_lib.c]
557                  map_to_global_section [see line 550]
558                  init_gbldb_tl [../../tms_library/fddb_lib.c]
559          map_to_VMSDB [../../tms_library/fddb_lib.c]
560                  map_to_global_section [see line 550]
561                  init_vmsdb_tl [../../tms_library/fddb_lib.c]
562          map_to_CCTVDB [../../tms_library/fddb_lib.c]
563                  map_to_global_section [see line 550]
564                  init_cctvdb_tl [../../tms_library/fddb_lib.c]
565          map_to_OPRTVDB [../../tms_library/fddb_lib.c]
566                  map_to_global_section [see line 550]
567                  init_oprtvdb_tl [../../tms_library/fddb_lib.c]
568          map_to_VAXPORTDB [../../tms_library/fddb_lib.c]
569                  map_to_global_section [see line 550]
570                  init_vaxportdb_tl [../../tms_library/fddb_lib.c]
571          map_to_GCDB [../../tms_library/fddb_lib.c]
572                  map_to_global_section [see line 550]
573                  init_gcdb_tl [../../tms_library/fddb_lib.c]
574          fopen
575          perror
576          exit
577          get_iochan [../../tms_library/kb_func.c]
578                  strlen
579                  ASSIGN
580          get_term_char [../../tms_library/kb_func.c]
581                  QIO
582          change_term_char [../../tms_library/kb_func.c]
583                  QIO
584          setjmp
585          vms_c_getch [see line 481]
586          toupper
587          print_VAXPort_list [vaxportdb_sub.c]
588                  printf
589                  select_entry [../../tms_library/kb_func.c]
590                          log10
591                          printf
592                          exit
593                          memset
594                          vms_c_getch [see line 481]
595                          longjmp
596                          atoi
597                  longjmp
598          change_VAXPort_flag [patch_vaxportdb.c]
599                  printf
600                  convert_VAXPort_flag [vaxportdb_sub.c]
601                          strcpy
602                  vms_c_getch [see line 481]
603                  toupper
604                  prompt_for_yes_no [../../tms_library/kb_func.c]
605                          strlen
606                          printf
607                          vms_c_getch [see line 481]
608                          toupper
609                  bit_clr_i
610                  longjmp
611          port_control [patch_vaxportdb.c]
612                  printf
613                  convert_status [../../tms_library/fddb_lib.c]
614                          strcpy
615                          memcpy
616                  vms_c_getch [see line 481]
617                  toupper
618                  prompt_for_yes_no [see line 604]
619                  memset
620                  longjmp
621          print_Unit_list [vaxportdb_sub.c]
622                  printf
623                  sprintf
624                  select_entry [see line 589]
625                  longjmp
626          unit_control [patch_vaxportdb.c]
627                  printf
628                  convert_status [see line 613]
629                  convert_start_flag [vaxportdb_sub.c]
630                  vms_c_getch [see line 481]
631                  toupper
632                  prompt_for_yes_no [see line 604]
633                  memset
634                  longjmp
635          dump_vaxportdb_params [../../tms_library/fddb_lib.c]
636                  printf
637                  NUMTIM
638                  STOP
639          _filbuf
640          dump_VAXPortPdStats [vaxportdb_sub.c]
641                  printf
642                  convert_DB_type [vaxportdb_sub.c]
643                          strcpy
644          select_DB_for_UnitList [patch_vaxportdb.c]
645                  printf
646                  vms_c_getch [see line 481]
647                  toupper
648                  longjmp
649          dump_UnitPdStats [vaxportdb_sub.c]
650                  printf
651                  sprintf
652          dump_UnitTable [vaxportdb_sub.c]
653                  printf
654                  convert_status [see line 613]
655                  convert_start_flag
656                  strcmp
657                  sprintf
658          dump_VAXPortTable [vaxportdb_sub.c]
659                  printf
660                  convert_DB_type [see line 642]
661                  convert_VAXPort_flag [see line 600]
662                  convert_status [see line 613]
663          print_VAXPortStatus [vaxportdb_sub.c]
664                  printf
665                  vms_c_getch [see line 481]
666                  toupper
667                  fopen
668                  perror
669                  GETTIM
670                  STOP
671                  NUMTIM
672                  fprintf
673                  sprintf
674                  convert_DB_type [see line 642]
675                  convert_status [see line 613]
```

```
676                 fclose
677         set_term_char [../../tms_library/kb_func.c]
678                 QIO


478   get_param_value [../../tms_library/kb_func.c]
479         printf
480         memset
481         vms_c_getch [../../tms_library/kb_func.c]
482                 input [../../tms_library/kb_func.c]
483                         ASSIGN
484                 QIOW
485         longjmp
```

```
   64                      fddb_error [../fddb_sub.c]
   65                              sprintf
   66                              strcpy
   67                              printf
   68                              fprintf
   69                              build_up_arrow [../fddb_sub.c]
   70                              find_err_text [../fddb_sub.c]
   71                                      sprintf
   72                              strlen
   73                              memcpy
   74                              _filbuf

   76                      strip_trailing_blanks [../../tms_library/format_db_lib.c]
   77                              strlen

   84              init_group_table [../fddb_sub.c]
   85                      memset
   86                      memcpy

  131                                     crack_vms_message [../../tms_library/vms_lib.c]
  132                                             init_vms_msg_struct [../../tms_library/v
ms_lib.c]
  133                                                     memset
  134                                             copy_flash [../../tms_library/vms_lib.c]

  135                                     build_FP_static_msg [../../tms_library/vms_lib.c
]
  136                                             build_FP_msg_header [../../tms_library/v
ms_lib.c]
  137                                             strlen
  138                                             toupper

  145                                     build_FP_multiphase_msg [../../tms_library/vms_l
ib.c]
  146                                             build_FP_msg_header
  147                                             strlen
  148                                             toupper

  149                                     build_FP_arrow_msg [../../tms_library/vms_lib.c]
  150                                             build_FP_msg_header
  151                                             strlen
  152                                             toupper
  153                                             FP_right_arrow_to_buffer [../../tms_libr
ary/vms_lib.c]
  154                                                     strlen
  155                                                     FP_position_cursor [see line 143
]
  156                                             FP_left_arrow_to_buffer [../../tms_libra
ry/vms_lib.c]
  157                                                     strlen
  158                                                     FP_position_cursor [see line 143
]

  179                                     find_vmsdb_entry_by_name [../../tms_library/vms_
lib.c]
  180                                             memcmp

  264              dump_fddb_params [../../tms_library/fddb_lib.c]
  265                      printf
  266                      NUMTIM
  267                      STOP

  285              dump_mem [../../tms_library/dump_mem.c]
  286                      print_hex_ascii_line [../../tms_library/dump_mem.c]
  287                              sprintf
  288                              printf
  289                      print_n_skipped [../../tms_library/dump_mem.c]
  290                              printf

  663      main [patch_vmsdb.c]
  664              map_to_VMSDB [../../tms_library/fddb_lib.c]
  665                      map_to_global_section [../../tms_library/global_sub.c]
  666                              strlen
  667                              MGBLSC
  668                      init_vmsdb_tl [../../tms_library/fddb_lib.c]
  669              printf
  670              STOP
  671              get_iochan [../../tms_library/kb_func.c]
  672                      strlen
  673                      ASSIGN
  674              exit
  675              get_term_char [../../tms_library/kb_func.c]
  676                      QIO
  677              set_port_partial [../../tms_library/kb_func.c]
  678                      change_term_char [../../tms_library/kb_func.c]
  679                              QIO
  680              setjmp
  681              vms_c_getch [../../tms_library/kb_func.c]
  682                      input [../../tms_library/kb_func.c]
  683                              ASSIGN
  684                      QIOW
  685              toupper
  686              cluster_menu [patch_vmsdb.c]
  687                      printf
  688                      vms_c_getch [see line 681]
  689                      toupper
  690                      follow_vmsdb_list [../../tms_library/vms_lib.c]
  691                              printf
  692                      _filbuf
  693                      print_vmsdb_list_names [patch_vmsdb.c]
  694                              printf
  695                              select_entry [../../tms_library/kb_func.c]
  696                                      log10
  697                                      printf
  698                                      exit
  699                                      memset
  700                                      vms_c_getch [see line 681]
  701                                      longjmp
  702                                      atoi
  703                              print_vmsdb_entry_by_index [patch_vmsdb.c]
  704                                      printf
  705                                      dump_mem [see line 285]
  706                                      crack_vms_message [see line 131]
  707                                      dump_vms_msg_struct [vmsdb_sub.c]
  708                                              printf
  709                                              print_vms_struct_field [vmsdb_sub.c]
  710                                                      strlen
  711                                                      printf
  712                                              print_vms_msg_type [vmsdb_sub.c]
  713                                                      printf
  714                                              print_vms_auxout [../../tms_library/vms_l
ib.c]
  715                                                      fprintf
  716                                              print_vms_justify [../../tms_library/vms_
lib.c]
  717                                                      fprintf
  718                                      build_FP_static_msg [see line 135]
  719                                      crack_FP_msg [../../tms_library/crack_fp_msg.c]
```

```
  720                                     sprintf
  721                             build_FP_flashing_msg [see line 139]
  722                             prompt_for_yes_no [../../tms_library/kb_func.c]
  723                                     strlen
  724                                     printf
  725                                     vms_c_getch [see line 681]
  726                                     toupper
  727                             build_FP_multiphase_msg [see line 145]
  728                             build_FP_arrow_msg [see line 149]
  729                             print_vmsdb_message_entry [../../tms_library/vms
_lib.c]
  730                                     fprintf
  731                                     dump_mem [see line 285]
  732                                     print_vms_auxout [see line 714]
  733                                     print_vms_line [../../tms_library/vms_li
b.c]
  734                                             fprintf
  735                                             print_vms_justify [see line 716]
  736                                     print_vms_time [../../tms_library/vms_li
b.c]
  737                                             fprintf
  738                                     print_vms_repeats [../../tms_library/vms
_lib.c]
  739                                             fprintf
  740                                     strlen
  741                                     sprintf
  742                             _filbuf
  743                             print_vmsdb_library_entry [../../tms_library/vms
_lib.c]
  744                                     fprintf
  745                                     dump_mem [see line 285]
  746                                     strlen
  747                                     sprintf
  748                             print_vmsdb_queue_entry [../../tms_library/vms_l
ib.c]
  749                                     fprintf
  750                                     dump_mem [see line 285]
  751                                     print_vms_time [see line 736]
  752                                     print_vms_repeats [see line 738]
  753                                     strlen
  754                                     sprintf
  755                             print_vmsdb_cluster_entry [../../tms_library/vms
_lib.c]
  756                                     fprintf
  757                                     dump_mem [see line 285]
  758                                     strlen
  759                                     sprintf
  760             longjmp
  761     dump_vmsdb_to_table_files [vmsdb_sub.c]
  762             printf
  763             translate_logical_name [../../tms_library/logical_name.c]
  764                     strlen
  765                     TRNLNM
  766                     memmove
  767             build_full_name [../fddb_sub.c]
  768                     strlen
  769                     memcpy
  770             fopen
  771             fddb_error [see line 64]
  772             fclose
  773             delete
  774             sprintf
  775             time
  776             ctime
  777                     fprintf
  778             dump_fddb_elements [../fddb_sub.c]
  779                     fprintf
  780                     format_db_element_for_output [../../tms_library/format_db
_lib.c]
  781                             sprintf
  782                             strcpy
  783                             strip_trailing_blanks [see line 76]
  784                             process_output_special_case [vmsdb_sub.c]
  785                             convert_perm_mask [../../tms_library/format_db_li
b.c]
  786                                     strcpy
  787                             byte_to_float [../../tms_library/format_db_lib.c]
  788                                     leading_zero_pad [../../tms_library/forma
t_db_lib.c]
  789                                             strlen
  790                                     strlen
  791                             strcat
  792                             strcmp
  793                             NUMTIM
  794                             memset
  795             follow_vmsdb_list [see line 690]
  796             _filbuf
  797             print_data_col_list [patch_vmsdb.c]
  798                     printf
  799                     select_entry [see line 695]
  800                     menu2 [patch_vmsdb.c]
  801                             printf
  802                             vms_c_getch [see line 681]
  803                             toupper
  804                             dump_vmsdb_to_table_files [see line 761]
  805                             print_group_name_list [patch_vmsdb.c]
  806                                     memset
  807                                     strlen
  808                                     memcpy
  809                                     printf
  810                                     select_entry [see line 695]
  811                                     menu3 [patch_vmsdb.c]
  812                                             printf
  813                                             vms_c_getch [see line 681]
  814                                             toupper
  815                                             print_vmsdb_list_names [see line 693]
  816                                             memset
  817                                             gets
  818                                             strlen
  819                                             memcpy
  820                                             dump_mem [see line 285]
  821                                             find_vmsdb_entry_by_name [see line 179]
  822                                             follow_vmsdb_list [see line 690]
  823                                             print_element_name_list [patch_vmsdb.c]
  824                                                     printf
  825                                                     select_entry [see line 695]
  826                                                     menu4 [patch_vmsdb.c]
  827                                                             format_db_element_for_out
put [see line 780]
  828                                                             printf
  829                                                             vms_c_getch [see line 681
]
  830                                                             toupper
  831                                                             strchr
  832                                                             get_param_value [../../tm
s_library/kb_func.c]
  833                                                                     printf
  834                                                                     memset
```

```
  835                                                     vms_c_getch [see
 line 681]
  836                                                     longjmp
  837                                                process_input_special_ca
se [see line 467]
  838                                                load_param [see line 585
]
  839                                                longjmp
  840                                        longjmp
  841                        longjmp
  842          output_vmsdb_out_fil [vmsdb_sub.c]
  843                  fopen
  844                  fddb_error [see line 64]
  845                  memcmp
  846                  read_fddb_file [../fddb_sub.c]
  847                          get_next_line [../fddb_sub.c]
  848                                  ftell
  849                                  fgets
  850                                  strlen
  851                                  fseek
  852                                  convert_non_print_to_space
  853                                  strip_trailing_blanks [see line 76]
  854                                  strip_leading_blanks [../../tms_library/format_d
b_lib.c]
  855                          setjmp
  856                          fddb_error [see line 64]
  857                          sprintf
  858                          exit
  859                  time
  860                  ctime
  861                  fprintf
  862                  printf
  863                  rewind
  864                  fseek
  865                  init_group_table [see line 84]
  866                  print_file_comments [../fddb_sub.c]
  867                          fseek
  868                          get_next_line [see line 847]
  869                          fprintf
  870                  print_vmsdb_cluster_entry [see line 755]
  871                  print_db_table [../fddb_sub.c]
  872                          print_file_comments [see line 866]
  873                          copy_param_lines [../fddb_sub.c]
  874                                  fseek
  875                                  get_next_line [see line 847]
  876                                  fprintf
  877                          format_db_element_for_output [see line 780]
  878                          print_db_table_special_case [vmsdb_sub.c]
  879                                  fprintf
  880                                  print_vmsdb_message_entry [see line 729]
  881                                  print_vmsdb_library_entry [see line 743]
  882                                  print_vmsdb_queue_entry [see line 748]
  883                          printf
  884                          fprintf
  885                          strlen
  886                  fclose
  887          dump_vmsdb_params [../../tms_library/fddb_lib.c]
  888                  dump_fddb_params [see line 264]
  889                  printf
  890          print_vmsdb_report [patch_vmsdb.c]
  891                  printf
  892                  vms_c_getch [see line 681]
  893                  toupper
  894                  fopen
  895                  perror
  896                  GETTIM
  897                  STOP
  898                  NUMTIM
  899                  fprintf
  900                  sprintf
  901                  convert_status [../../tms_library/fddb_lib.c]
  902                          strcpy
  903                          memcpy
  904                  fclose
  905          dump_vmsdb_offsets [../../tms_library/fddb_lib.c]
  906                  printf
  907          dump_vmsdb_tl [../../tms_library/fddb_lib.c]
  908                  printf
  909          set_term_char [../../tms_library/kb_func.c]
  910                  QIO
```

read_rtdb.call


```
439   main [read_rtdb.c]
440           printf
441           ASCEFC
442           STOP
443           two_bit_mask [../tms_library/skel_sub.c]
444           CLREF
445           WFLOR
446           READEF
447           exit
448           GETTIM
449           NUMTIM
```

reset_modem.call


```
466  main [reset_modem.c]
467          printf
468          get_port_name [reset_modem.c]
469                  printf
470                  scanf
471                  strlen
472                  toupper
473          flush_input [../tms_library/kb_func.c]
474                  _filbuf
475          strlen
476          ASSIGN
477          STOP
478          GETDVI
479          prompt_for_yes_no [../tms_library/kb_func.c]
480                  strlen
481                  printf
482                  vms_c_getch [see line 415]
483                  toupper
484          exit
485          vms_c_getch [see line 415]
486          toupper
487          talk_through [reset_modem.c]
488                  printf
489                  gets
490                  strlen
491                  toupper
492                  HM_command [reset_modem.c]
493                          send_HM_cmd [see line 2]
494                          printf
495                          convert_HM_result [see line 13]
496                          wait_HM_result [see line 6]
497          HM_view [reset_modem.c]
498                  memset
499                  printf
500                  send_HM_cmd [see line 2]
501                  convert_HM_result [see line 13]
502                  exit
503                  get_HM_input [see line 9]
504                  memcpy
505          _filbuf


   2          send_HM_cmd [reset_modem.c]
   3                  strlen
   4                  QIOW
   5                  printf

   6          wait_HM_result [reset_modem.c]
   7                  GETTIM
   8                  printf
   9                  get_HM_input [reset_modem.c]
  10                          sprintf
  11                          printf
  12                          QIOW
  13                  convert_HM_result [reset_modem.c]
  14                          strcpy
  15                  memset
  16                  memcmp
  17                  msleep [../tms_library/misc_func.c]
  18                          SCHDWK
  19                          log_tms_event_cc [../tms_library/event_log_sub.c]
  20                                  log_tms_common [../tms_library/event_log_sub.c]
  21                                          strlen
  22                                          write_to_crash_log [../tms_library/proc_
```

```
cntrl.c]
  23                                                  GETTIM
  24                                                  NUMTIM
  25                                                  fopen
  26                                                  fprintf
  27                                                  fclose
  28                                          GETTIM
  29                                          memcpy
  30                                          memset
  31                                          write_to_mailbox_nowait [../tms_library/m
ailbox.c]
  32                                                  QIOW
  33                          HIBER
  34                  atoi
  35                  dump_mem [../tms_library/dump_mem.c]
  36                          print_hex_ascii_line [../tms_library/dump_mem.c]
  37                                  sprintf
  38                                  printf
  39                          print_n_skipped [../tms_library/dump_mem.c]
  40                                  printf
  41                  strlen
  42                  fl_delta_time [../tms_library/misc_func.c]
  43                          GETTIM
  44                          printf
  45                          SUB_TIMES
  46                          CVTF_FROM_INTERNAL_TIME

 415          vms_c_getch [../tms_library/kb_func.c]
 416                  input [../tms_library/kb_func.c]
 417                          ASSIGN
 418                  QIOW
```

```
main [rmdc_comm.c]
        fopen
        printf
        exit
        fclose
        check_process_interactive
        write_to_crash_log
        STOP
        sprintf
        create_comm_log_file [see line 31]
        log_comm_event_cc [see line 65]
        log_comm_event [see line 5]
        general_process_startup
        establish_process_name
        init_rmdc_event_flags
        restore_comm_process_name [../tms_comm_sub.c]
                strlen
                set_process_name
                log_comm_msg [see line 75]
                log_comm_event_cc [see line 65]
                get_terminal_name
                log_comm_event [see line 5]
                get_pid
                sprintf
        init_jhdriver [../tms_comm_sub.c]
                strlen
                CMKRNL
                printf
                log_comm_event_cc [see line 65]
                write_to_crash_log
                restore_comm_process_name [see line 166]
                STOP
        map_to_RTDB
        map_to_RMDB
        map_to_GCDB
        map_to_VAXPORTDB
        compare_VAX_time
        find_first_last_port_unit
        init_rmdc_list_heads
        get_proc_info
        CLREF
        get_iochan
        get_term_char
        change_term_char
        connect_to_mailbox
        flush_mailbox
        alloc_and_queue_empty_jhub [see line 59]
        start_rmdc_port [rmdc_comm_sub.c]
                sprintf
                log_comm_event [see line 5]
                bit_clr_i
                setup_port_for_protocol [../tms_comm_sub.c]
                        memcmp
                        strlen
                        ASSIGN
                        log_comm_event_cc [see line 65]
                        CMKRNL
                        log_comm_event [see line 5]
                        sprintf
                        QIOW
                log_comm_event_cc [see line 65]
                DASSGN
                set_JH_speed_parity [../tms_comm_sub.c]
                        strcpy
                        sprintf
                        QIOW
                turn_on_JH_RTS [../tms_comm_sub.c]
                        QIOW
                turn_on_JH_DTR [../tms_comm_sub.c]
                        QIOW
                QIOW
                init_rmdc_gc_unit [rmdc_comm_sub.c]
                        init_gc_unit [rmdc_comm_sub.c]
                                log_comm_event [see line 5]
                        init_rmdc_unit [rmdc_comm_sub.c]
                                log_comm_event [see line 5]
                bit_set_i
        get_unit_status [rmdc_comm_sub.c]
        send_rmdc_gc_start_msgs [rmdc_comm_sub.c]
                send_gc_start_msgs [rmdc_comm_sub.c]
                        log_comm_event [see line 5]
                        build_and_queue_170_msg [rmdc_comm_sub.c]
                                sprintf
                                log_comm_event [see line 5]
                                get_rmdc_buffer [see line 55]
                                init_tx_rx_jhub [../tms_comm_sub.c]
                                        sprintf
                                        log_comm_event [see line 5]
                                        memset
                                add_to_list_tail_i
                                SETEF
                                log_comm_event_cc [see line 65]
                        build_and_queue_170_date_time [rmdc_comm_sub.c]
                                sprintf
                                log_comm_event [see line 5]
                                get_rmdc_buffer [see line 55]
                                init_tx_rx_jhub [see line 236]
                                add_to_list_tail_i
                                SETEF
                                log_comm_event_cc [see line 65]
                        log_comm_msg [see line 75]
                        log_driver_stats [../tms_comm_sub.c]
                                log_comm_msg [see line 75]
                                sprintf
                                simple_write_to_comm_log [see line 130]
                                FLUSH
                                printf
                                write_to_crash_log
                        log_24Hr_port_stats [../tms_comm_sub.c]
                                sprintf
                                log_comm_msg [see line 75]
                        log_24Hr_unit_stats [../tms_comm_sub.c]
                                sprintf
                                log_comm_msg [see line 75]
                        sprintf
                send_rmdc_start_msgs [rmdc_comm_sub.c]
                        log_comm_event [see line 5]
                        build_and_queue_170_msg [see line 232]
                        build_and_queue_170_date_time [see line 243]
                        build_and_queue_load_params [rmdc_comm_sub.c]
                                log_comm_event [see line 5]
                                sprintf
                                get_rmdc_buffer [see line 55]
                                init_tx_rx_jhub [see line 236]
                                add_to_list_tail_i
                                SETEF
                                log_comm_event_cc [see line 65]
                        log_comm_msg [see line 75]
```

```
279                     log_driver_stats [see line 252]
280                     log_24Hr_port_stats [see line 259]
281                     log_24Hr_unit_stats [see line 262]
282                     sprintf
283             queued_get_1_char
284             _filbuf
285             queued_read_from_mailbox
286             WFLOR
287             READEF
288             write_string_to_mailbox
289             exit_multi_rmdc_comm [rmdc_comm_sub.c]
290                     stop_rmdc_port [rmdc_comm_sub.c]
291                             sprintf
292                             log_comm_event [see line 5]
293                             CANCEL
294                             log_comm_event_cc [see line 65]
295                             DASSGN
296                             remove_from_list_head_i
297                             return_to_free_list
298                             stop_rmdc_gc_unit [rmdc_comm_sub.c]
299                                     stop_gc_unit [rmdc_comm_sub.c]
300                                             log_comm_event [see line 5]
301                                     stop_rmdc_unit [rmdc_comm_sub.c]
302                                             log_comm_event [see line 5]
303                             bit_clr_i
304                     log_comm_event [see line 5]
305                     log_comm_event_cc [see line 65]
306                     set_term_char
307                     printf
308                     restore_comm_process_name [see line 166]
309                     close_comm_log_file [see line 22]
310                     exit
311             exit_test_rmdc_comm [rmdc_comm_sub.c]
312                     stop_rmdc_port [see line 290]
313                     printf
314                     prompt_for_yes_no
315                     prompt_for_unit_enable [rmdc_comm_sub.c]
316                             format_unit_name [../tms_comm_sub.c]
317                                     sprintf
318                                     printf
319                             prompt_for_yes_no
320                             printf
321                     set_term_char
322                     restore_comm_process_name [see line 166]
323                     close_comm_log_file [see line 22]
324                     exit
325             multi_menu [rmdc_comm_sub.c]
326                     CANCEL
327                     printf
328                     CLREF
329                     timed_wait_for_1_char
330                     toupper
331                     FLUSH
332                     prompt_for_yes_no
333                     exit_multi_rmdc_comm [see line 289]
334             process_mailbox_command [rmdc_comm_sub.c]
335                     sprintf
336                     log_comm_event [see line 5]
337                     build_and_queue_170_msg [see line 232]
338                     build_and_queue_load_params [see line 270]
339             remove_from_list_head_i
340             SETEF
341             log_comm_bfr [../tms_comm_sub.c]
342                     get_mpu_name [see line 6]
343                     write_to_crash_log
344                     log_comm_msg [see line 75]
345                     GETTIM
346                     printf
347                     NUMTIM
348                     sprintf
349                     fmt_write_comm_msg [see line 21]
350                     simple_write_to_comm_log [see line 130]
351                     format_ascii_hex [../tms_comm_sub.c]
352                             memset
353                     memcpy
354                     memset
355                     crack_FP_msg
356                     FLUSH
357             return_to_free_list
358             process_rmdc_tx_wait_rx_errors [rmdc_comm_sub.c]
359                     check_rmdc_port_status [rmdc_comm_sub.c]
360                             log_comm_event [see line 5]
361                     return_to_free_list
362                     log_comm_msg [see line 75]
363                     log_comm_event [see line 5]
364                     log_comm_event_cc [see line 65]
365                     log_iosb_fields [../tms_comm_sub.c]
366                             sprintf
367                             simple_write_to_comm_log [see line 130]
368                             FLUSH
369                             printf
370                             write_to_crash_log
371                     memset
372                     add_to_list_tail_i
373                     SETEF
374             memcmp
375             process_rmdc_good_comm [rmdc_comm_sub.c]
376                     log_comm_event [see line 5]
377                     check_rmdc_port_status [see line 359]
378                     sprintf
379             process_data_response [rmdc_comm_sub.c]
380                     log_comm_event [see line 5]
381                     sprintf
382                     unpack_170_vol_occ [rmdc_comm_sub.c]
383                     get_nibble [rmdc_comm_sub.c]
384                     pack_rtdb_loop
385                     memcpy
386                     log_170_data_poll [rmdc_comm_sub.c]
387                             log_comm_event [see line 5]
388                             log_comm_msg [see line 75]
389                             sprintf
390                             simple_write_to_comm_log [see line 130]
391                             unpack_170_speed_trap [rmdc_comm_sub.c]
392                             memcpy
393                             strcpy
394                             FLUSH
395                             printf
396                             write_to_crash_log
397             process_gc_status [rmdc_comm_sub.c]
398                     log_comm_event [see line 5]
399             CANTIM
400             process_rmdc_err_resp [rmdc_comm_sub.c]
401                     log_comm_event [see line 5]
402                     GETTIM
403                     log_comm_event_cc [see line 65]
404                     log_170_error_response [rmdc_comm_sub.c]
405                             log_comm_msg [see line 75]
406                             sprintf
```

```
407                         simple_write_to_comm_log [see line 130]
408                         FLUSH
409                         printf
410                         write_to_crash_log
411         process_gc_err_resp [rmdc_comm_sub.c]
412                 log_comm_event [see line 5]
413                 GETTIM
414                 log_comm_event_cc [see line 65]
415         build_and_queue_170_msg [see line 232]
416         add_to_list_head_i
417         fill_in_date_time [rmdc_comm_sub.c]
418                 GETTIM
419                 log_comm_event_cc [see line 65]
420                 ADD_TIMES
421                 NUMTIM
422                 DAY_OF_WEEK
423         crc_rmdc_tx_msg [rmdc_comm_sub.c]
424                 calc_check [../tms_comm_sub.c]
425         QIO
426         GETTIM
427         NUMTIM
428         log_comm_msg [see line 75]
429         check_rmdc_port_status [see line 359]
430         scroll_port_stats [../tms_comm_sub.c]
431         scroll_unit_stats [../tms_comm_sub.c]
432                 sprintf
433                 log_comm_msg [see line 75]
434         check_ERR_REQ_bit [rmdc_comm_sub.c]
435                 log_comm_event [see line 5]
436         FLUSH
437         stop_rmdc_port [see line 290]
438         init_rmdc_gc_unit [see line 222]
439         stop_rmdc_gc_unit [see line 298]
440         ADD_TIMES
441         SETIMR
442         build_and_queue_170_date_time [see line 243]

443 read_JH_modem_status [../tms_comm_sub.c]
444         QIOW

445 test_menu [rmdc_comm_sub.c]
446         CANCEL
447         printf
448         CLREF
449         auto_menu [rmdc_comm_sub.c]
450                 CANCEL
451                 printf
452                 CLREF
453                 stop_rmdc_port [see line 290]
454                 format_unit_name [see line 316]
455                 vms_c_getch
456                 toupper
457                 flush_rmdc_queues [rmdc_comm_sub.c]
458                         remove_from_list_head_i
459                         printf
460                         return_to_free_list
461                         CLREF
462                 init_rmdc_event_flags
463                 init_rmdc_gc_unit [see line 222]
464                 get_unit_status
465                 send_rmdc_gc_start_msgs [see line 229]
466                 stop_rmdc_gc_unit [see line 298]
467                 test_unit_select [rmdc_comm_sub.c]
468                         flush_rmdc_queues [see line 457]
469                         stop_rmdc_gc_unit [see line 298]
470                         print_unit_list [../tms_comm_sub.c]
471                                 format_unit_name [see line 316]
472                                 printf
473                                 _filbuf
474                                 select_entry
475                         printf
476                         prompt_for_unit_enable [see line 315]
477                         init_rmdc_event_flags
478                         init_rmdc_gc_unit [see line 222]
479         manual_menu [rmdc_comm_sub.c]
480                 CANCEL
481                 printf
482                 CLREF
483                 stop_rmdc_port [see line 290]
484                 format_unit_name [see line 316]
485                 vms_c_getch
486                 toupper
487                 flush_rmdc_queues [see line 457]
488                 test_unit_select [see line 467]
489                 stop_rmdc_gc_unit [see line 298]
490                 build_and_queue_170_msg [see line 232]
491                 build_and_queue_170_date_time [see line 243]
492                 send_rmdc_gc_start_msgs [see line 229]
493                 build_and_queue_load_params [see line 270]
494         format_unit_name [see line 316]
495         get_unit_status
496         vms_c_getch
497         toupper
498         print_port_list [../tms_comm_sub.c]
499                 printf
500                 select_entry
501         sleep
502         restore_comm_process_name [see line 166]
503         exit
504         start_rmdc_port [see line 198]
505         _filbuf
506         FLUSH
507         exit_test_rmdc_comm [see line 311]
508         prompt_for_yes_no
509         enable_disable_unit [rmdc_comm_sub.c]
510                 prompt_for_yes_no
511         flush_rmdc_queues [see line 457]
512         stop_rmdc_port [see line 290]
513         prompt_for_unit_enable [see line 315]
514         test_unit_select [see line 467]
515         set_term_char
516         close_comm_log_file [see line 22]

517 turn_off_JH_DTR [../tms_comm_sub.c]
518         QIOW

519 turn_off_JH_RTS [../tms_comm_sub.c]
520         QIOW

521 tx_done_rx_ast_func [rmdc_comm_sub.c]
522         add_to_list_tail_i
523         SETEF
524         log_comm_event_cc [see line 65]


  1 _align [rmdc_comm_sub.c]
  2         init_empty_jhub [../tms_comm_sub.c]
  3                 memset
```

```
4           add_to_list_tail_i
5           log_comm_event [../tms_comm_sub.c]
6                   get_mpu_name [../tms_comm_sub.c]
7                           memset
8                           strlen
9                           memcpy
10                          get_port_name [../tms_comm_sub.c]
11                                  memset
12                                  strlen
13                                  memcpy
14                          get_unit_name [../tms_comm_sub.c]
15                                  memset
16                                  strcpy
17                                  strlen
18                                  memcpy
19                                  strcmp
20                  write_to_crash_log
21                  fmt_write_comm_msg [../tms_comm_sub.c]
22                          close_comm_log_file [../tms_comm_sub.c]
23                                  GETTIM
24                                  NUMTIM
25                                  strcpy
26                                  strlen
27                                  PUT
28                                  sprintf
29                                  FLUSH
30                                  CLOSE
31                          create_comm_log_file [../tms_comm_sub.c]
32                                  GETTIM
33                                  NUMTIM
34                                  strcpy
35                                  strcat
36                                  strlen
37                                  CREATE
38                                  CONNECT
39                                  sprintf
40                                  PUT
41                                  FLUSH
42                          strcpy
43                          GETTIM
44                          NUMTIM
45                          sprintf
46                          strlen
47                          memcpy
48                          PUT
49                          printf
50                          FLUSH
51                          write_to_crash_log
52          sprintf
53          free

54  attn_ast_func [rmdc_comm_sub.c]
55          get_rmdc_buffer [rmdc_comm_sub.c]
56                  sprintf
57                  log_comm_event [see line 5]
58                  remove_from_list_head_i
59                  alloc_and_queue_empty_jhub [../tms_comm_sub.c]
60                          malloc
61                          log_comm_event [see line 5]
62                          init_empty_jhub [see line 2]
63                          return_to_free_list
64          log_comm_event [see line 5]
65          log_comm_event_cc [../tms_comm_sub.c]
66                  get_mpu_name [see line 6]
67                  write_to_crash_log
68                  fmt_write_comm_msg [see line 21]
69          init_attn_ast_jhub [../tms_comm_sub.c]
70                  memset
71          add_to_list_tail_i
72          SETEF

73  check_JHUB [../tms_comm_sub.c]
74          sprintf
75          log_comm_msg [../tms_comm_sub.c]
76                  get_mpu_name [see line 6]
77                  write_to_crash_log
78                  fmt_write_comm_msg [see line 21]
79          free

80  check_VPT_name [../tms_comm_sub.c]
81          memcmp
82          printf
83          dump_mem
84          _filbuf

85  check_list_unit_no [../tms_comm_sub.c]
86          printf
87          dump_jhub_hdr [../tms_comm_sub.c]
88                  printf
89          _filbuf

90  check_port_inactive [../tms_comm_sub.c]
91          log_comm_event [see line 5]

92  dump_jhub [../tms_comm_sub.c]
93          dump_jhub_hdr [see line 87]
94          dump_mem

95  dump_list [../tms_comm_sub.c]
96          printf

97  dump_list_rel [../tms_comm_sub.c]
98          printf

99  init_cctv_rx_jhub [../tms_comm_sub.c]
100         sprintf
101         log_comm_event [see line 5]
102         memset

103 init_cctv_tx_jhub [../tms_comm_sub.c]
104         sprintf
105         log_comm_event [see line 5]
106         memset

107 init_rx_jhub [../tms_comm_sub.c]
108         sprintf
109         log_comm_event [see line 5]
110         memset

111 init_tx_jhub [../tms_comm_sub.c]
112         sprintf
113         log_comm_event [see line 5]
114         memset

115 init_video_tx_jhub [../tms_comm_sub.c]
116         sprintf
117         log_comm_event [see line 5]
118         memset
```

```
119  init_vms_tx_rx_jhub [../tms_comm_sub.c]
120          sprintf
121          log_comm_event [see line 5]
122          memset

123  log_comm_msg_cc [../tms_comm_sub.c]
124          get_mpu_name [see line 6]
125          write_to_crash_log
126          fmt_write_comm_msg [see line 21]

127  log_jhub_hdr [../tms_comm_sub.c]
128          sprintf
129          log_comm_msg [see line 75]
130          simple_write_to_comm_log [../tms_comm_sub.c]
131                  PUT
132                  printf
133                  write_to_crash_log
134          FLUSH
135          printf
136          write_to_crash_log

137  log_list [../tms_comm_sub.c]
138          log_comm_msg [see line 75]
139          sprintf
140          simple_write_to_comm_log [see line 130]
141          FLUSH
142          printf
143          write_to_crash_log

144  log_list_rel [../tms_comm_sub.c]
145          log_comm_msg [see line 75]
146          sprintf
147          simple_write_to_comm_log [see line 130]
148          FLUSH
149          printf
150          write_to_crash_log
```

```
421  main [rt_skeleton.c]
422          map_to_RTDB [../tms_library/rtdb_lib.c]
423                  map_to_global_section [../tms_library/global_sub.c]
424                          strlen
425                          MGBLSC
426                  init_rtdb_tl [../tms_library/rtdb_lib.c]
427          log_tms_event_cc [../tms_library/event_log_sub.c]
428                  log_tms_common [see line 94]
429          printf
430          STOP
431          general_process_startup [../tms_library/proc_cntrl.c]
432                  connect_to_mailbox [../tms_library/mailbox.c]
433                          strlen
434                          ASSIGN
435                  strcpy
436                  printf
437                  write_to_crash_log [see line 20]
438                  STOP
439                  ASCEFC
440                  clear_all_event_flags [../tms_library/proc_cntrl.c]
441                          CLREF
442                          printf
443                          STOP
444                  sprintf
445                  write_string_to_mailbox_nowait [../tms_library/mailbox.c]
446                          strlen
447                          QIOW
448          log_tms_event [see line 93]
449          calc_next_22sec [rt_skeleton.c]
450                  GETTIM
451                  NUMTIM
452                  CVT_VECTIM
453                  ADD_TIMES
454          SCHDWK
455          ASCEFC
456          clear_all_event_flags [see line 440]
457          fclose
458          HIBER
459          GETTIM
460          time_stamp_rtdb [rt_skeleton.c]
461                  NUMTIM
462                  CVT_VECTIM
463                  SUB_TIMES
464                  ADD_TIMES
465          READEF
466          SETEF
467          run_polling_processes [rt_skeleton.c]
468                  CLREF
469                  log_tms_event [see line 93]
470                  run_process_one_bit [rt_skeleton.c]
471                          ASCEFC
472                          sprintf
473                          log_tms_event [see line 93]
474                          SETEF
475                  SETIMR
476                  WAITFR
477                  READEF
478                  clear_process_event_flag [rt_skeleton.c]
479                          ASCEFC
480                          sprintf
481                          log_tms_event [see line 93]
482                          CLREF
483                  WFLOR
484                  CANTIM
```

```
485          run_process_wait [rt_skeleton.c]
486                  sprintf
487                  log_tms_event [see line 93]
488                  SETEF
489                  SETIMR
490                  one_bit_mask [../tms_library/skel_sub.c]
491                  WFLOR
492                  READEF
493                  CANTIM
494                  CLREF
495          scroll_rtdb_col_offsets [../tms_library/rtdb_lib.c]
496                  memset
497          run_process_one_bit [see line 470]
498          run_process_alt_bit [rt_skeleton.c]
499                  ASCEFC
500                  sprintf
501                  log_tms_event [see line 93]
502                  CLREF
503                  SETEF
504          exit



 20          write_to_crash_log [../tms_library/proc_cntrl.c]
 21                  GETTIM
 22                  NUMTIM
 23                  fopen
 24                  fprintf
 25                  fclose

 93          log_tms_event [../tms_library/event_log_sub.c]
 94                  log_tms_common [../tms_library/event_log_sub.c]
 95                          strlen
 96                          write_to_crash_log [see line 20]
 97                          GETTIM
 98                          memcpy
 99                          memset
100                          write_to_mailbox_nowait [../tms_library/mailbox.c]
101                                  QIOW


 94                  log_tms_common [../tms_library/event_log_sub.c]
 95                          strlen
 96                          write_to_crash_log [see line 20]
 97                          GETTIM
 98                          memcpy
 99                          memset
100                          write_to_mailbox_nowait [../tms_library/mailbox.c]
101                                  QIOW
```

shutdown_opc_comm.call


```
436   main [shutdown_opc_comm.c]
437           ASCEFC
438           printf
439           STOP
440           get_other_process_id [../../tms_library/proc_cntrl.c]
441                   strlen
442                   GETJPIW
443           exit
444           _filbuf
445           SETEF
```

shutdown_rmdc_comm.call


```
436   main [shutdown_rmdc_comm.c]
437           ASCEFC
438           printf
439           STOP
440           get_other_process_id [../../tms_library/proc_cntrl.c]
441                   strlen
442                   GETJPIW
443           exit
444           _filbuf
445           SETEF
```

```
436   main [shutdown_vms_comm.c]
437           ASCEFC
438           printf
439           STOP
440           get_other_process_id [../../tms_library/proc_cntrl.c]
441                   strlen
442                   GETJPIW
443           exit
444           _filbuf
445           SETEF
```

```
439  main [snap_loop_err.c]
440          printf
441          fopen
442          perror
443          exit
444          map_to_RTDB [../tms_library/rtdb_lib.c]
445                  map_to_global_section [../tms_library/global_sub.c]
446                          strlen
447                          MGBLSC
448                  init_rtdb_tl [../tms_library/rtdb_lib.c]
449          STOP
450          prompt_for_yes_no [../tms_library/kb_func.c]
451                  strlen
452                  printf
453                  vms_c_getch [see line 393]
454                  toupper
455          ASCEFC
456          two_bit_mask [../tms_library/skel_sub.c]
457          CLREF
458          WFLOR
459          NUMTIM
460          fprintf
461          unpack_rtdb_loop_stn [../tms_library/pack_lib.c]
462          fclose
```

stn_aggr.call


```
396  main [stn_aggr.c]
397          general_process_startup [../tms_library/proc_cntrl.c]
398                  connect_to_mailbox [../tms_library/mailbox.c]
399                          strlen
400                          ASSIGN
401                  strcpy
402                  printf
403                  write_to_crash_log [see line 21]
404                  STOP
405                  ASCEFC
406                  clear_all_event_flags [../tms_library/proc_cntrl.c]
407                          CLREF
408                          printf
409                          STOP
410                  sprintf
411                  write_string_to_mailbox_nowait [../tms_library/mailbox.c]
412                          strlen
413                          QIOW
414          log_tms_event [../tms_library/event_log_sub.c]
415                  log_tms_common [../tms_library/event_log_sub.c]
416                          strlen
417                          write_to_crash_log [see line 21]
418                          GETTIM
419                          memcpy
420                          memset
421                          write_to_mailbox_nowait [see line 394]
422          map_to_RTDB [../tms_library/rtdb_lib.c]
423                  map_to_global_section [../tms_library/global_sub.c]
424                          strlen
425                          MGBLSC
426                  init_rtdb_tl [../tms_library/rtdb_lib.c]
427          log_tms_event_cc [../tms_library/event_log_sub.c]
428                  log_tms_common [see line 415]
429          printf
430          STOP
431          map_to_RMDB [../tms_library/fddb_lib.c]
432                  map_to_global_section [see line 423]
433                  init_rmdb_tl [../tms_library/fddb_lib.c]
434          build_stn_aggr_table [stn_aggr.c]
435                  malloc
436                  build_tap_error [../tms_library/tap_sub.c]
437                          sprintf
438                          memcpy
439                          printf
440                          log_tms_event [see line 414]
441                  exit
442                  code_to_table [../tms_library/table_sub.c]
443                  ushort_to_table [../tms_library/table_sub.c]
444                  ulong_to_table [../tms_library/table_sub.c]
445                  date_time_to_table [../tms_library/table_sub.c]
446                          GETTIM
447                          printf
448                          memcpy
449                  fopen
450                  fgets
451                  pad_end [../tms_library/tap_sub.c]
452                          strlen
453                  memcpy
454                  search_rtdb_name_table [../tms_library/rtdb_lib.c]
455                          memcmp
456                  find_fddb_cl_name [../tms_library/fddb_lib.c]
457                          memcmp
458                  classify_roadway [../tms_library/fddb_lib.c]
459                          memcmp
460                          memset
461                          realloc
462                          code_byte_to_table [../tms_library/table_sub.c]
463                          code_ushort_to_table [../tms_library/table_sub.c]
464                          code_ulong_to_table [../tms_library/table_sub.c]
465                          byte_to_table [../tms_library/table_sub.c]
466                          fclose
467                          calc_table_checksum [../tms_library/table_sub.c]
468          fclose
469          sprintf
470          WAITFR
471          CLREF
472          calc_stn_aggr [stn_aggr.c]
473                  unpack_rtdb_loop_stn [../tms_library/pack_lib.c]
474                  strcpy
475                  pack_rtdb_station [../tms_library/pack_lib.c]
476          SETEF
477          READEF
478          write_string_to_mailbox [../tms_library/mailbox.c]
479                  strlen
480                  QIOW
481          exit

394          write_to_mailbox_nowait [../tms_library/mailbox.c]
395                  QIOW

 21          write_to_crash_log [../tms_library/proc_cntrl.c]
 22                  GETTIM
 23                  NUMTIM
 24                  fopen
 25                  fprintf
 26                  fclose
```

```
454  main [switch_tty.c]
455          printf
456          strlen
457          CMKRNL
458          exit
459          map_to_RMDB [../tms_library/fddb_lib.c]
460                  map_to_global_section [../tms_library/global_sub.c]
461                          strlen
462                          MGBLSC
463                  init_rmdb_tl [../tms_library/fddb_lib.c]
464          STOP
465          map_to_GBLDB [../tms_library/fddb_lib.c]
466                  map_to_global_section [see line 460]
467                  init_gbldb_tl [../tms_library/fddb_lib.c]
468          map_to_CCTVDB [../tms_library/fddb_lib.c]
469                  map_to_global_section [see line 460]
470                  init_cctvdb_tl [../tms_library/fddb_lib.c]
471          map_to_OPRTVDB [../tms_library/fddb_lib.c]
472                  map_to_global_section [see line 460]
473                  init_oprtvdb_tl [../tms_library/fddb_lib.c]
474          map_to_VAXPORTDB [../tms_library/fddb_lib.c]
475                  map_to_global_section [see line 460]
476                  init_vaxportdb_tl [../tms_library/fddb_lib.c]
477          setjmp
478          vms_c_getch [see line 399]
479          toupper
480          sprintf
481          switch_port [switch_tty.c]
482                  memcmp
483                  strlen
484                  ASSIGN
485                  printf
486                  exit
487                  CMKRNL
488                  DASSGN
489                  strcmp
490                  prompt_for_yes_no [../tms_library/kb_func.c]
491                          strlen
492                          printf
493                          vms_c_getch [see line 399]
494                          toupper
495                  bit_clr_i
496                  CANCEL
497          get_port_name [switch_tty.c]
498                  printf
499                  scanf
500                  strlen
501                  toupper
502          dump_UnitTable [../fddb/vaxport/vaxportdb_sub.c]
503                  printf
504                  convert_status [../tms_library/fddb_lib.c]
505                          strcpy
506                          memcpy
507                  convert_start_flag [../fddb/vaxport/vaxportdb_sub.c]
508                  strcmp
509                  sprintf
510          print_Unit_list [../fddb/vaxport/vaxportdb_sub.c]
511                  printf
512                  sprintf
513                  select_entry [../tms_library/kb_func.c]
514                          log10
515                          printf
516                          exit
517                          memset
518                          vms_c_getch [see line 399]
519                          longjmp
520                          atoi
521                  longjmp
522  strcpy
523  dump_VAXPortTable [../fddb/vaxport/vaxportdb_sub.c]
524          printf
525          convert_DB_type [see line 176]
526          convert_VAXPort_flag [../fddb/vaxport/vaxportdb_sub.c]
527                  strcpy
528          convert_status [see line 504]
529  print_VAXPort_list [../fddb/vaxport/vaxportdb_sub.c]
530          printf
531          select_entry [see line 513]
532          longjmp


176  convert_DB_type [../fddb/vaxport/vaxportdb_sub.c]
177          strcpy

399  vms_c_getch [../tms_library/kb_func.c]
400          input [../tms_library/kb_func.c]
401                  ASSIGN
402          QIOW
```

```
472  main [t_token.c]
473          convert_non_print_to_space [token.c]
474          dump_chk_table [t_token.c]
475                  printf
476                  constant_name [token.c]
477          fopen
478          perror
479          exit
480          memset
481          fgets
482          printf
483          check_name [t_token.c]
484          strlen
485          dump_mem [see line 222]
486          tolower
487          get_token [token.c]
488                  nul_to_dest [token.c]
489                  char_in_set [token.c]
490                          tolower
491          constant_name
492          memcmp
493          leading_zero_pad [see line 370]


222          dump_mem [../../tms_library/dump_mem.c]
223                  print_hex_ascii_line [../../tms_library/dump_mem.c]
224                          sprintf
225                          printf
226                  print_n_skipped [../../tms_library/dump_mem.c]
227                          printf

370                  leading_zero_pad [../../tms_library/format_db_lib.c]
371                          strlen
```

```
434  main [tms_shutdown.c]
435          printf
436          prompt_for_yes_no [../tms_library/kb_func.c]
437                  strlen
438                  printf
439                  vms_c_getch [see line 388]
440                  toupper
441          exit
442          connect_to_mailbox [see line 356]
443          STOP
444          flush_mailbox [../tms_library/mailbox.c]
445                  QIOW
446          log_tms_event [see line 94]
447          ASCEFC
448          SETEF
449          CLREF
450          get_other_process_id [../tms_library/proc_cntrl.c]
451                  strlen
452                  GETJPIW
453          read_from_mailbox [../tms_library/mailbox.c]
454                  QIOW
455          strcmp


 94          log_tms_event [../tms_library/event_log_sub.c]
 95                  log_tms_common [../tms_library/event_log_sub.c]
 96                          strlen
 97                          write_to_crash_log [see line 21]
 98                          GETTIM
 99                          memcpy
100                          memset
101                          write_to_mailbox_nowait [../tms_library/mailbox.c]
102                                  QIOW

356          connect_to_mailbox [../tms_library/mailbox.c]
357                  strlen
358                  ASSIGN

388          vms_c_getch [../tms_library/kb_func.c]
389                  input [../tms_library/kb_func.c]
390                          ASSIGN
391                  QIOW
```

```
426  main [tms_startup.c]
427          printf
428          get_device_name [../tms_library/proc_cntrl.c]
429                  strlen
430                  GETDVIW
431          STOP
432          get_proc_info [../tms_library/proc_cntrl.c]
433                  GETJPI
434          fopen
435          exit
436          fclose
437          create_logical_name [../tms_library/logical_name.c]
438                  strlen
439                  CRELNM
440          create_mailbox [../tms_library/mailbox.c]
441                  strlen
442                  CREMBX
443          flush_mailbox [../tms_library/mailbox.c]
444                  QIOW
445          start_processx [tms_startup.c]
446                  strlen
447                  CREPRC
448          read_from_mailbox [../tms_library/mailbox.c]
449                  QIOW
450          _filbuf
451          ASCEFC
452          clear_all_event_flags [see line 358]
453          start_tms_process [tms_startup.c]
454                  start_processx [see line 445]
455                  printf
456                  STOP
457                  read_from_mailbox [see line 448]
458          strcpy
459          map_to_RTDB [../tms_library/rtdb_lib.c]
460                  map_to_global_section [../tms_library/global_sub.c]
461                          strlen
462                          MGBLSC
463                  init_rtdb_tl [../tms_library/rtdb_lib.c]
464          log_tms_event_cc [../tms_library/event_log_sub.c]
465                  log_tms_common [see line 95]
466          map_to_FMDB [../tms_library/fmdb_lib.c]
467                  map_to_global_section [see line 460]
468                  init_fmdb_tl [../tms_library/fmdb_lib.c]
469          map_to_RMDB [../tms_library/fddb_lib.c]
470                  map_to_global_section [see line 460]
471                  init_rmdb_tl [../tms_library/fddb_lib.c]
472          link_rmdb_to_rtdb [tms_startup.c]
473                  memset
474                  memcpy
475                  search_rtdb_name_table [../tms_library/rtdb_lib.c]
476                          memcmp
477                  printf
478                  memcmp
479                  search_fmdb_name_table [../tms_library/fmdb_lib.c]
480                          memcmp
481          start_comm_process [tms_startup.c]
482                  strlen
483                  CREPRC


 95                  log_tms_common [../tms_library/event_log_sub.c]
 96                          strlen
 97                          write_to_crash_log [see line 21]
 98                          GETTIM
 99                          memcpy
100                          memset
101                          write_to_mailbox_nowait [../tms_library/mailbox.c]
102                                  QIOW

358  clear_all_event_flags [../tms_library/proc_cntrl.c]
359          CLREF
360          printf
361          STOP
```

```
  1  HM_hangup [upi_xmit.c]
  2          send_HM_cmd [upi_xmit.c]
  3                  strlen
  4                  QIOW
  5                  log_tms_event_cc [../tms_library/event_log_sub.c]
  6                          log_tms_common [../tms_library/event_log_sub.c]
  7                                  strlen
  8                                  write_to_crash_log [../tms_library/proc_cntrl.c]
  9                                          GETTIM
 10                                          NUMTIM
 11                                          fopen
 12                                          fprintf
 13                                          fclose
 14                                  GETTIM
 15                                  memcpy
 16                                  memset
 17                                  write_to_mailbox_nowait [../tms_library/mailbox.
c]
 18                                          QIOW
 19          wait_HM_result [upi_xmit.c]
 20                  GETTIM
 21                  log_tms_event_cc [see line 5]
 22                  get_HM_input [upi_xmit.c]
 23                          sprintf
 24                          log_tms_event [../tms_library/event_log_sub.c]
 25                                  log_tms_common [see line 6]
 26                          QIOW
 27                          log_tms_event_cc [see line 5]
 28                  memcmp
 29                  msleep [../tms_library/misc_func.c]
 30                          SCHDWK
 31                          log_tms_event_cc [see line 5]
 32                          HIBER
 33                  atoi
 34                  fl_delta_time [../tms_library/misc_func.c]
 35                          GETTIM
 36                          printf
 37                          SUB_TIMES
 38                          CVTF_FROM_INTERNAL_TIME

324          set_process_name [../tms_library/proc_cntrl.c]
325                  strlen
326                  SETPRN


447  log_upi_event_cc [upi_xmit.c]
448          printf

449  main [upi_xmit.c]
450          memset
451          general_process_startup [../tms_library/proc_cntrl.c]
452                  connect_to_mailbox [../tms_library/mailbox.c]
453                          strlen
454                          ASSIGN
455                  strcpy
456                  printf
457                  write_to_crash_log [see line 8]
458                  STOP
459                  ASCEFC
460                  clear_all_event_flags [../tms_library/proc_cntrl.c]
461                          CLREF
462                          printf
463                          STOP
464                  sprintf
465                  write_string_to_mailbox_nowait [../tms_library/mailbox.c]
466                          strlen
467                          QIOW
468          log_tms_event [see line 24]
469          set_process_name [see line 324]
470          strcpy
471          printf
472          log_tms_event_cc [see line 5]
473          write_to_crash_log [see line 8]
474          STOP
475          connect_to_mailbox [see line 452]
476          map_to_GBLDB [../tms_library/fddb_lib.c]
477                  map_to_global_section [../tms_library/global_sub.c]
478                          strlen
479                          MGBLSC
480                  init_gbldb_tl [../tms_library/fddb_lib.c]
481          map_to_VAXPORTDB [../tms_library/fddb_lib.c]
482                  map_to_global_section [see line 477]
483                  init_vaxportdb_tl [../tms_library/fddb_lib.c]
484          start_upi_port [upi_xmit.c]
485                  find_fddb_cl_name [../tms_library/fddb_lib.c]
486                          memcmp
487                  strcpy
488                  printf
489                  log_tms_event [see line 24]
490                  exit
491                  strcmp
492                  strlen
493                  ASSIGN
494                  log_tms_event_cc [see line 5]
495                  STOP
496                  GETDVI
497                  DASSGN
498                  sprintf
499                  bit_clr_i
500                  QIOW
501                  set_TT_speed_parity [../tms_library/tt_func.c]
502                          QIOW
503                  turn_on_TT_RTS [../tms_library/tt_func.c]
504                          memset
505                          QIOW
506                  turn_off_TT_DTR [../tms_library/tt_func.c]
507                          memset
508                          QIOW
509                  bit_set_i
510          HM_reset [upi_xmit.c]
511                  HM_turn_off_DTR [upi_xmit.c]
512                          turn_off_TT_DTR [see line 506]
513                          log_tms_event_cc [see line 5]
514                          msleep [see line 29]
515                  sprintf
516                  convert_HM_result [upi_xmit.c]
517                          strcpy
518                  log_tms_event [see line 24]
519                  set_TT_speed_parity [see line 501]
520                  strcpy
521                  printf
522                  log_tms_event_cc [see line 5]
523                  send_HM_cmd [see line 2]
524                  wait_HM_result [see line 19]
525                  msleep [see line 29]
526                  return_HM_to_cmd_mode [upi_xmit.c]
527                          msleep [see line 29]
```

```
528                     memset
529                     QIOW
530                     log_tms_event_cc [see line 5]
531                     wait_HM_result [see line 19]
532             sprintf
533             convert_HM_result [see line 516]
534             exit
535             HM_initialize [upi_xmit.c]
536                     send_HM_cmd [see line 2]
537                     wait_HM_result [see line 19]
538             getall_HM_Sregisters [upi_xmit.c]
539                     read_HM_Sregister [upi_xmit.c]
540                             sprintf
541                             log_tms_event [see line 24]
542                             send_HM_cmd [see line 2]
543                             wait_HM_number [upi_xmit.c]
544                                     GETTIM
545                                     log_tms_event_cc [see line 5]
546                                     get_HM_input [see line 22]
547                                     atoi
548                                     fl_delta_time [see line 34]
549                             wait_HM_result [see line 19]
550             queue_read_upi_mbx [upi_xmit.c]
551                     READEF
552                     log_tms_event_cc [see line 5]
553                     queued_read_from_mailbox [../tms_library/mailbox.c]
554                             QIO
555                     sprintf
556             fclose
557             WFLOR
558             READEF
559             CLREF
560             CANTIM
561             dial_upi_send_msg [upi_xmit.c]
562                     dial_upi_number [upi_xmit.c]
563                             GETTIM
564                             log_tms_event_cc [see line 5]
565                             turn_on_TT_DTR [../tms_library/tt_func.c]
566                                     memset
567                                     QIOW
568                             dial_HM_number [upi_xmit.c]
569                                     strcpy
570                                     sprintf
571                                     log_tms_event [see line 24]
572                                     strlen
573                                     send_HM_cmd [see line 2]
574                                     wait_HM_result [see line 19]
575                             sprintf
576                             log_tms_event [see line 24]
577                             HM_turn_off_DTR [see line 511]
578                             convert_HM_result [see line 516]
579                             msleep [see line 29]
580                             read_TT_modem_status [../tms_library/tt_func.c]
581                                     memset
582                                     QIOW
583                             queue_read_upi_mbx [see line 550]
584                             fl_delta_time [see line 34]
585                             start_redial_timer [upi_xmit.c]
586                                     CVTF_TO_INTERNAL_TIME
587                                     SETIMR
588                                     log_tms_event_cc [see line 5]
589                     send_report [upi_xmit.c]
590                             GETTIM
591                             log_tms_event_cc [see line 5]
592                             READEF
593                             log_tms_event [see line 24]
594                             read_TT_modem_status [see line 580]
595                             check_for_NO_CARRIER [upi_xmit.c]
596                                     QIOW
597                                     log_tms_event_cc [see line 5]
598                                     memmove
599                                     memcmp
600                                     memset
601                             sprintf
602                             convert_HM_result [see line 516]
603                             send_HM_data [upi_xmit.c]
604                                     QIOW
605                                     log_tms_event_cc [see line 5]
606                             fl_delta_time [see line 34]
607                             msleep [see line 29]
608                     queue_read_upi_mbx [see line 550]
609                     SETIMR
610                     log_tms_event_cc [see line 5]
611                     sprintf
612                     convert_HM_result [see line 516]
613                     log_tms_event [see line 24]
614                     HM_turn_off_DTR [see line 511]
615                     start_redial_timer [see line 585]
616             HM_turn_off_DTR [see line 511]
617             write_to_mailbox_nowait [see line 17]
618             stop_upi_port [upi_xmit.c]
619                     CANCEL
620                     strcpy
621                     printf
622                     log_tms_event_cc [see line 5]
623                     log_tms_event [see line 24]
624                     turn_off_TT_RTS [../tms_library/tt_func.c]
625                             memset
626                             QIOW
627                     turn_off_TT_DTR [see line 506]
628                     QIOW
629                     DASSGN
630                     bit_clr_i
```

```
_align [vms_comm.c]
        main
        init_bfr_tracking_params
        fopen
        printf
        exit
        fclose
        check_process_interactive [../../tms_library/proc_cntrl.c]
                GETJPI
        write_to_crash_log [../../tms_library/proc_cntrl.c]
                GETTIM
                NUMTIM
                fopen
                fprintf
                fclose
        STOP
        sprintf
        create_comm_log_file [../tms_comm_sub.c]
                GETTIM
                NUMTIM
                strcpy
                strcat
                strlen
                CREATE
                CONNECT
                sprintf
                PUT
                FLUSH
        log_comm_event_cc [../tms_comm_sub.c]
                get_mpu_name [../tms_comm_sub.c]
                        memset
                        strlen
                        memcpy
                        get_port_name [../tms_comm_sub.c]
                                memset
                                strlen
                                memcpy
                        get_unit_name [../tms_comm_sub.c]
                                memset
                                strcpy
                                strlen
                                memcpy
                                strcmp
                write_to_crash_log [see line 10]
                fmt_write_comm_msg [../tms_comm_sub.c]
                        close_comm_log_file [../tms_comm_sub.c]
                                GETTIM
                                NUMTIM
                                strcpy
                                strlen
                                PUT
                                sprintf
                                FLUSH
                                CLOSE
                        create_comm_log_file [see line 18]
                        strcpy
                        GETTIM
                        NUMTIM
                        sprintf
                        strlen
                        memcpy
                        PUT
                        printf
                        FLUSH
                write_to_crash_log [see line 10]
        log_comm_event [../tms_comm_sub.c]
                get_mpu_name [see line 30]
                write_to_crash_log [see line 10]
                fmt_write_comm_msg [see line 45]
        general_process_startup [../../tms_library/proc_cntrl.c]
                connect_to_mailbox [../../tms_library/mailbox.c]
                        strlen
                        ASSIGN
                strcpy
                printf
                write_to_crash_log [see line 10]
                STOP
                ASCEFC
                clear_all_event_flags [../../tms_library/proc_cntrl.c]
                        CLREF
                        printf
                        STOP
                sprintf
                write_string_to_mailbox_nowait [../../tms_library/mailbox.c]
                        strlen
                        QIOW
        establish_process_name [../../tms_library/proc_cntrl.c]
                memset
                strlen
                strcpy
                get_process_name [../../tms_library/proc_cntrl.c]
                        memset
                        GETJPI
                strcmp
                get_terminal_name [../../tms_library/proc_cntrl.c]
                        memset
                        GETJPI
                set_process_name [../../tms_library/proc_cntrl.c]
                        strlen
                        SETPRN
        init_vms_event_flags
        restore_comm_process_name [../tms_comm_sub.c]
                strlen
                set_process_name [see line 98]
                log_comm_msg [../tms_comm_sub.c]
                        get_mpu_name [see line 30]
                        write_to_crash_log [see line 10]
                        fmt_write_comm_msg [see line 45]
                log_comm_event_cc [see line 29]
                get_terminal_name [see line 95]
                log_comm_event [see line 66]
                get_pid [../../tms_library/proc_cntrl.c]
                        GETJPI
                sprintf
        init_jhdriver [../tms_comm_sub.c]
                strlen
                CMKRNL
                printf
                log_comm_event_cc [see line 29]
                write_to_crash_log [see line 10]
                restore_comm_process_name [see line 102]
                STOP
        map_to_VMSDB [../../tms_library/fddb_lib.c]
                map_to_global_section [../../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_vmsdb_tl [../../tms_library/fddb_lib.c]
        map_to_OPRTVDB [../../tms_library/fddb_lib.c]
```

```
129             map_to_global_section [see line 124]
130             init_oprtvdb_tl [../../tms_library/fddb_lib.c]
131         map_to_VAXPORTDB [../../tms_library/fddb_lib.c]
132             map_to_global_section [see line 124]
133             init_vaxportdb_tl [../../tms_library/fddb_lib.c]
134         compare_VAX_time [../../tms_library/misc_func.c]
135         find_first_last_port_unit [../../tms_library/find_first_last.c]
136             sprintf
137         init_vms_list_heads
138         get_proc_info [../../tms_library/proc_cntrl.c]
139             GETJPI
140         get_iochan [../../tms_library/kb_func.c]
141             strlen
142             ASSIGN
143         get_term_char [../../tms_library/kb_func.c]
144             QIO
145         change_term_char [../../tms_library/kb_func.c]
146             QIO
147         connect_to_mailbox [see line 71]
148         flush_mailbox [../../tms_library/mailbox.c]
149             QIOW
150         alloc_and_queue_empty_vms
151         start_vms_port
152         send_vms_start_msgs
153         queued_get_1_char [../../tms_library/kb_func.c]
154             QIO
155         _filbuf
156         queued_read_from_mailbox [../../tms_library/mailbox.c]
157             QIO
158         CLREF
159         WFLOR
160         READEF
161         write_string_to_mailbox [../../tms_library/mailbox.c]
162             strlen
163             QIOW
164         exit_multi_vms_comm
165         exit_test_vms_comm
166         multi_menu
167         strcpy
168         memcpy
169         build_and_queue_VMS_blank_sign
170         find_vmsdb_entry_by_name [../../tms_library/vms_lib.c]
171             memcmp
172         find_msg_in_library [../../tms_library/vms_lib.c]
173             memcmp
174         build_and_queue_VMS_recall
175         build_FP_message [../../tms_library/vms_lib.c]
176             crack_vms_message [../../tms_library/vms_lib.c]
177                 init_vms_msg_struct [../../tms_library/vms_lib.c]
178                     memset
179                 copy_flash [../../tms_library/vms_lib.c]
180             build_FP_static_msg [../../tms_library/vms_lib.c]
181                 build_FP_msg_header [../../tms_library/vms_lib.c]
182                 strlen
183                 toupper
184             build_FP_flashing_msg [../../tms_library/vms_lib.c]
185                 build_FP_msg_header
186                 strlen
187                 toupper
188                 FP_position_cursor [../../tms_library/vms_lib.c]
189                     sprintf
190             build_FP_multiphase_msg [../../tms_library/vms_lib.c]
191                 build_FP_msg_header
192                 strlen
193                 toupper
194             build_FP_arrow_msg [../../tms_library/vms_lib.c]
195                 build_FP_msg_header
196                 strlen
197                 toupper
198                 FP_right_arrow_to_buffer [../../tms_library/vms_lib.c]
199                     strlen
200                     FP_position_cursor [see line 188]
201                 FP_left_arrow_to_buffer [../../tms_library/vms_lib.c]
202                     strlen
203                     FP_position_cursor [see line 188]
204         build_and_queue_VMS_display
205         build_and_queue_VMS_lib_load
206         find_que_in_library [../../tms_library/vms_lib.c]
207             memcmp
208         memcmp
209         remove_from_list_head_i [../../tms_library/intlk_queue.c]
210             _REMQHI
211             log_comm_event [see line 66]
212         _ADAWI
213         log_comm_msg [see line 105]
214         log_comm_bfr [../tms_comm_sub.c]
215             get_mpu_name [see line 30]
216             write_to_crash_log [see line 10]
217             log_comm_msg [see line 105]
218             GETTIM
219             printf
220             NUMTIM
221             sprintf
222             fmt_write_comm_msg [see line 45]
223             simple_write_to_comm_log [../tms_comm_sub.c]
224                 PUT
225                 printf
226                 write_to_crash_log [see line 10]
227             format_ascii_hex [../tms_comm_sub.c]
228                 memset
229             memcpy
230             memset
231             crack_FP_msg [../../tms_library/crack_fp_msg.c]
232                 sprintf
233             FLUSH
234         log_VMS_msg_in_hex
235         return_to_free_list
236         QIOW
237         process_vms_tx_wait_rx_errors
238         process_vms_good_comm
239         process_ENQ_status
240         process_ENQ_config
241         QIO
242         GETTIM
243         NUMTIM
244         check_vms_port_status
245         scroll_port_stats [../tms_comm_sub.c]
246         scroll_unit_stats [../tms_comm_sub.c]
247             sprintf
248             log_comm_msg [see line 105]
249         FLUSH
250         stop_vms_port
251         init_vms_unit
252         stop_vms_unit
253         build_and_queue_VMS_exit
254         build_and_queue_VMS_enquire
```

watch_actv_anal.call


```
main [watch_actv_anal.c]
        printf
        map_to_RMDB [../tms_library/fddb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_rmdb_tl [../tms_library/fddb_lib.c]
        STOP
        map_to_GBLDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 430]
                init_gbldb_tl [../tms_library/fddb_lib.c]
        map_to_ACTVDB
        map_to_RTDB [../tms_library/rtdb_lib.c]
                map_to_global_section [see line 430]
                init_rtdb_tl [../tms_library/rtdb_lib.c]
        get_iochan [../tms_library/kb_func.c]
                strlen
                ASSIGN
        get_term_char [../tms_library/kb_func.c]
                QIO
        set_port_partial [../tms_library/kb_func.c]
                change_term_char [../tms_library/kb_func.c]
                        QIO
        exit
        vms_c_getch [see line 390]
        toupper
        print_eqn_list [watch_actv_anal.c]
                printf
                select_entry [../tms_library/kb_func.c]
                        log10
                        printf
                        exit
                        memset
                        vms_c_getch [see line 390]
                        longjmp
                        atoi
        dump_actvdb_eqn
        _filbuf
        dump_actvdb_name_table
        dump_actvdb_params
        dump_actvdb_offsets
        set_term_char [../tms_library/kb_func.c]
                QIO
        get_tty_bit [../tms_library/fmdb_lib.c]
                ASCEFC
                printf
                STOP
                READEF
                _FFC
                SETEF
        one_bit_mask [../tms_library/skel_sub.c]
        ASCEFC
        two_bit_mask [../tms_library/skel_sub.c]
        column_layout [watch_actv_anal.c]
        CREATE_PASTEBOARD
        CHANGE_PBD_CHARACTERISTICS
        CREATE_VIRTUAL_DISPLAY
        PASTE_VIRTUAL_DISPLAY
        DRAW_LINE
        mvwrtstr [watch_actv_anal.c]
                strlen
                PUT_CHARS
                STOP
        display_static_labels [watch_actv_anal.c]
                mvwrtstr [see line 486]
                get_actv_params_from_RMDB
                printf
                exit
                sprintf
                DRAW_LINE
                STOP
        queued_get_1_char [../tms_library/kb_func.c]
                QIO
        WFLOR
        READEF
        CLREF
        CANCEL
        DELETE_PASTEBOARD
        NUMTIM
        sprintf
        mvwrtstr_attrib [watch_actv_anal.c]
                strlen
                PUT_CHARS
                STOP
        display_dynamic_params [watch_actv_anal.c]
                get_actv_params_from_RMDB
                printf
                exit
                strcpy
                mvwrtstr [see line 486]
                sprintf
        display_eqn_data [watch_actv_anal.c]
                sprintf
                strcpy
                mvwrtstr_attrib [see line 507]
                mvwrtstr [see line 486]
        SET_CURSOR_ABS
```

watch_bottleneck.call


```
main [watch_bottleneck.c]
        printf
        map_to_RTDB [../tms_library/rtdb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_rtdb_tl [../tms_library/rtdb_lib.c]
        STOP
        map_to_RMDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 425]
                init_rmdb_tl [../tms_library/fddb_lib.c]
        get_iochan [../tms_library/kb_func.c]
                strlen
                ASSIGN
        get_term_char [../tms_library/kb_func.c]
                QIO
        set_port_partial [../tms_library/kb_func.c]
                change_term_char [../tms_library/kb_func.c]
                        QIO
        exit
        malloc
        process_equation_file [watch_bottleneck.c]
                fopen
                perror
                exit
                fgets
                pad_end [../tms_library/tap_sub.c]
                        strlen
                memcpy
                trim_trailing_blanks [../tms_library/utility_func.c]
                        strlen
                memcmp
                printf
                _filbuf
                find_fddb_cl_name [../tms_library/fddb_lib.c]
                        memcmp
                classify_roadway [../tms_library/fddb_lib.c]
                        memcmp
                check_reversible [../tms_library/tap_sub.c]
                search_rtdb_name_table [../tms_library/rtdb_lib.c]
                        memcmp
                atoi
                strcpy
                fclose
        sort_list [../tms_library/sort_lib.c]
                memcmp
        vms_c_getch [see line 385]
        toupper
        memset
        print_cabinet_list [watch_bottleneck.c]
                printf
                select_entry [../tms_library/kb_func.c]
                        log10
                        printf
                        exit
                        memset
                        vms_c_getch [see line 385]
                        longjmp
                        atoi
        strcpy
        find_fddb_cl_name [see line 456]
        _filbuf
        memcpy
        in_order_layout [watch_bottleneck.c]
                printf
        two_group_layout [watch_bottleneck.c]
                sort_list [see line 466]
                printf
        squeeze_layout [watch_bottleneck.c]
                fit_largest_unassigned [watch_bottleneck.c]
                fit_eqn_in_win_col [watch_bottleneck.c]
        search_rtdb_name_table [see line 461]
        get_tty_bit [../tms_library/fmdb_lib.c]
                ASCEFC
                printf
                STOP
                READEF
                _FFC
                SETEF
        one_bit_mask [../tms_library/skel_sub.c]
        ASCEFC
        two_bit_mask [../tms_library/skel_sub.c]
        CREATE_PASTEBOARD
        CHANGE_PBD_CHARACTERISTICS
        CREATE_VIRTUAL_DISPLAY
        PASTE_VIRTUAL_DISPLAY
        DRAW_LINE
        sprintf
        mvwrtstr [watch_bottleneck.c]
                strlen
                PUT_CHARS
                STOP
        display_sc_labels [watch_bottleneck.c]
                mvwrtstr [see line 510]
                sprintf
                mvwrtstr_attrib [watch_bottleneck.c]
                        strlen
                        PUT_CHARS
                        STOP
                DRAW_LINE
                STOP
        queued_get_1_char [../tms_library/kb_func.c]
                QIO
        WFLOR
        READEF
        CLREF
        CANCEL
        DELETE_PASTEBOARD
        NUMTIM
        display_vol_data [watch_bottleneck.c]
                printf
                _filbuf
                exit
                unpack_rtdb_loop_stn [../tms_library/pack_lib.c]
                sprintf
                mvwrtstr_attrib [see line 517]
                mvwrtstr [see line 510]
                interpolate_metering_curve [watch_bottleneck.c]
        highlight_max_rate [watch_bottleneck.c]
                strcpy
                sprintf
                mvwrtstr_attrib [see line 517]
                memcpy
        display_history_data [watch_bottleneck.c]
                sprintf
                mvwrtstr [see line 510]
                mvwrtstr_attrib [see line 517]
                memcpy
```

watch_bottleneck.call


```
550             memset
551         SET_CURSOR_ABS
552         set_term_char [../tms_library/kb_func.c]
553             QIO

385         vms_c_getch [../tms_library/kb_func.c]
386             input [../tms_library/kb_func.c]
387                 ASSIGN
388             QIOW
```

```
417  main [watch_fmdb.c]
418          map_to_RTDB [../tms_library/rtdb_lib.c]
419                  map_to_global_section [../tms_library/global_sub.c]
420                          strlen
421                          MGBLSC
422                  init_rtdb_tl [../tms_library/rtdb_lib.c]
423          printf
424          STOP
425          map_to_RMDB [../tms_library/fddb_lib.c]
426                  map_to_global_section [see line 419]
427                  init_rmdb_tl [../tms_library/fddb_lib.c]
428          map_to_FMDB [../tms_library/fmdb_lib.c]
429                  map_to_global_section [see line 419]
430                  init_fmdb_tl [../tms_library/fmdb_lib.c]
431          vms_c_getch [see line 378]
432          toupper
433          dump_fmdb_params [../tms_library/fmdb_lib.c]
434                  printf
435                  NUMTIM
436          _filbuf
437          exit
438          dump_fmdb_col_offsets [../tms_library/fmdb_lib.c]
439                  printf
440          dump_fmdb_name_table [../tms_library/fmdb_lib.c]
441                  printf
442          dump_fmdb_offsets [../tms_library/fmdb_lib.c]
443                  printf
444          dump_fmdb_tl [../tms_library/fmdb_lib.c]
445                  printf
446          get_iochan [../tms_library/kb_func.c]
447                  strlen
448                  ASSIGN
449          get_tty_bit [../tms_library/fmdb_lib.c]
450                  ASCEFC
451                  printf
452                  STOP
453                  READEF
454                  _FFC
455                  SETEF
456          one_bit_mask [../tms_library/skel_sub.c]
457          ASCEFC
458          two_bit_mask [../tms_library/skel_sub.c]
459          setjmp
460          print_data_col_list [watch_fmdb.c]
461                  printf
462                  select_entry [../tms_library/kb_func.c]
463                          log10
464                          printf
465                          exit
466                          memset
467                          vms_c_getch [see line 378]
468                          longjmp
469                          atoi
470                  longjmp
471          memcpy
472          CREATE_PASTEBOARD
473          CHANGE_PBD_CHARACTERISTICS
474          CREATE_VIRTUAL_DISPLAY
475          PASTE_VIRTUAL_DISPLAY
476          DRAW_LINE
477          name_time_titles [watch_fmdb.c]
478                  mvwrtstr [watch_fmdb.c]
479                          strlen
480                          PUT_CHARS
481                          STOP
482          loop_titles [watch_fmdb.c]
483                  mvwrtstr_underline [watch_fmdb.c]
484                          strlen
485                          PUT_CHARS
486                          STOP
487          display_loop_names [watch_fmdb.c]
488                  memcpy
489                  mvwrtstr [see line 478]
490                  search_fmdb_name_table [../tms_library/fmdb_lib.c]
491                          memcmp
492          trap_titles [watch_fmdb.c]
493                  mvwrtstr_underline [see line 483]
494          display_trap_names [watch_fmdb.c]
495                  memcpy
496                  mvwrtstr [see line 478]
497                  search_fmdb_name_table [see line 490]
498          stn_titles [watch_fmdb.c]
499                  mvwrtstr_underline [see line 483]
500          display_stn_names [watch_fmdb.c]
501                  memcpy
502                  memcmp
503                  mvwrtstr [see line 478]
504                  vms_c_getch [see line 378]
505          mvwrtstr [see line 478]
506          queued_get_1_char [../tms_library/kb_func.c]
507                  QIO
508          WFLOR
509          READEF
510          CLREF
511          CANCEL
512          DASSGN
513          DELETE_PASTEBOARD
514          sprintf
515          NUMTIM
516          display_loop_work_data [watch_fmdb.c]
517                  sprintf
518                  mvwrtstr [see line 478]
519          display_station_work_data [watch_fmdb.c]
520                  sprintf
521                  mvwrtstr [see line 478]
522          display_trap_work_data [watch_fmdb.c]
523                  sprintf
524                  mvwrtstr [see line 478]
525          display_loop_curr_data [watch_fmdb.c]
526                  unpack_fmdb_loop
527                  sprintf
528                  mvwrtstr [see line 478]
529          display_station_curr_data [watch_fmdb.c]
530                  unpack_fmdb_station
531                  sprintf
532                  mvwrtstr [see line 478]
533          display_trap_curr_data [watch_fmdb.c]
534                  unpack_fmdb_spd_trap
535                  sprintf
536                  mvwrtstr [see line 478]
537          SET_CURSOR_ABS

378          vms_c_getch [../tms_library/kb_func.c]
379                  input [../tms_library/kb_func.c]
380                          ASSIGN
381                  QIOW
```

```
main [watch_rmdc.c]
        map_to_RTDB [../tms_library/rtdb_lib.c]
                map_to_global_section [../tms_library/global_sub.c]
                        strlen
                        MGBLSC
                init_rtdb_tl [../tms_library/rtdb_lib.c]
        printf
        STOP
        map_to_RMDB [../tms_library/fddb_lib.c]
                map_to_global_section [see line 417]
                init_rmdb_tl [../tms_library/fddb_lib.c]
        vms_c_getch [see line 376]
        toupper
        dump_rtdb_params [../tms_library/rtdb_lib.c]
                printf
                NUMTIM
        _filbuf
        exit
        dump_rtdb_col_offsets [../tms_library/rtdb_lib.c]
                printf
        dump_rtdb_name_table [../tms_library/rtdb_lib.c]
                printf
        dump_rtdb_offsets [../tms_library/rtdb_lib.c]
                printf
        dump_rtdb_tl [../tms_library/rtdb_lib.c]
                printf
        get_iochan [../tms_library/kb_func.c]
                strlen
                ASSIGN
        get_tty_bit [../tms_library/fmdb_lib.c]
                ASCEFC
                printf
                STOP
                READEF
                _FFC
                SETEF
        one_bit_mask [../tms_library/skel_sub.c]
        ASCEFC
        two_bit_mask [../tms_library/skel_sub.c]
        setjmp
        print_data_col_list [watch_rmdc.c]
                printf
                select_entry [../tms_library/kb_func.c]
                        log10
                        printf
                        exit
                        memset
                        vms_c_getch [see line 376]
                        longjmp
                        atoi
                longjmp
        memcpy
        CREATE_PASTEBOARD
        CHANGE_PBD_CHARACTERISTICS
        CREATE_VIRTUAL_DISPLAY
        PASTE_VIRTUAL_DISPLAY
        mvwrtstr [watch_rmdc.c]
                strlen
                PUT_CHARS
                STOP
        loop_titles [watch_rmdc.c]
                mvwrtstr_underline [watch_rmdc.c]
                        strlen
                        PUT_CHARS
                        STOP
display_loop_names [watch_rmdc.c]
        sprintf
        mvwrtstr [see line 471]
trap_titles [watch_rmdc.c]
        mvwrtstr_underline [see line 476]
display_trap_names [watch_rmdc.c]
        sprintf
        mvwrtstr [see line 471]
stn_titles [watch_rmdc.c]
        mvwrtstr_underline [see line 476]
display_stn_names [watch_rmdc.c]
        memcpy
        memcmp
        mvwrtstr [see line 471]
        vms_c_getch [see line 376]
err_titles [watch_rmdc.c]
        mvwrtstr [see line 471]
mr_titles [watch_rmdc.c]
        mvwrtstr [see line 471]
        mvwrtstr_underline [see line 476]
cs_titles [watch_rmdc.c]
        mvwrtstr_underline [see line 476]
        mvwrtstr [see line 471]
queued_get_1_char [../tms_library/kb_func.c]
        QIO
WFLOR
READEF
CLREF
CANCEL
DASSGN
DELETE_PASTEBOARD
NUMTIM
sprintf
display_loop_data [watch_rmdc.c]
        unpack_rtdb_loop [../tms_library/pack_lib.c]
        sprintf
        mvwrtstr [see line 471]
display_trap_data [watch_rmdc.c]
        unpack_rtdb_spd_trap [../tms_library/pack_lib.c]
        sprintf
        mvwrtstr [see line 471]
display_stn_data [watch_rmdc.c]
        unpack_rtdb_station [../tms_library/pack_lib.c]
        sprintf
        mvwrtstr [see line 471]
display_error_data [watch_rmdc.c]
        NUMTIM
        printf
        STOP
        sprintf
        mvwrtstr [see line 471]
display_comm_stats [watch_rmdc.c]
        sprintf
        mvwrtstr [see line 471]
display_meter_rate_data [watch_rmdc.c]
        sprintf
        mvwrtstr [see line 471]
        memcpy
        memset
display_status [watch_rmdc.c]
        convert_status [../tms_library/fddb_lib.c]
                strcpy
                memcpy
```

```
543                 mvwrtstr [see line 471]
544           SET_PHYSICAL_CURSOR


376           vms_c_getch [../tms_library/kb_func.c]
377                 input [../tms_library/kb_func.c]
378                       ASSIGN
379                 QIOW
```

II. VAX-170 COMMUNICATIONS

VAX <--> 170 Communications:

These notes supplement HNTB's documentation, clarifying when each command is issued and what parameters of interest it contains. See HNTB documentation for bit specifications and parameters sent.

Error Request

Sent in startup sequence following load parameters.
Also sent following a NAK response.

Error Detail

Sent in response to error request.
Contains last restart time, time duration of last power outage, general error bits, error bits for ramp lanes 1, 2, and 3 (bulbs out, loop detector failure).

170 Response

Sent in response to date/time, meter control, idle, reset, lp1, lp2, and lp3.
There is a 1 bit difference in Command byte between ACK and NAK. This error bit is set when any failure bit is set or cleared in ERROR DETAIL.

Date/Time

Sent every 6 hours to resynchronize 170 with VAX.

Data Poll

Sent every 20 seconds. Seperate poll and data reponse for each 170.
Parameter specifies metering rate adjustment.

Data Response

Sent in response to data poll.
Contains ramp rate, lane status (local, bottleneck, override condition), volume, occupancy, erro flags (short pulse, chatter, etc) speed traps data.

Meter Control

Sent as needed.
Parameter specifies start or stop of central or TOD metering.

Idle

Sent when 170 sends NAK instead of ACK. Idles are then sent every 20 seconds until an ACK response. 170 Startup sequence occurs when an IDLE/ACK exchange occurs.

Reset

Reset (set all bits) for startup.
Also sent following error request??
Parameter specifies what to reset: loops, counters, 170 s/w, or comm protocol.

Load Parameters 1

Sent in startup sequence following date/time.
Also sent when lp1 change occurs from OPC or PATCH.
If change is only in lp1, then lp2 and lp3 are not sent.
Contains Local metering table, minimum and maximum metering rates, queue adjustment parameters, etc.

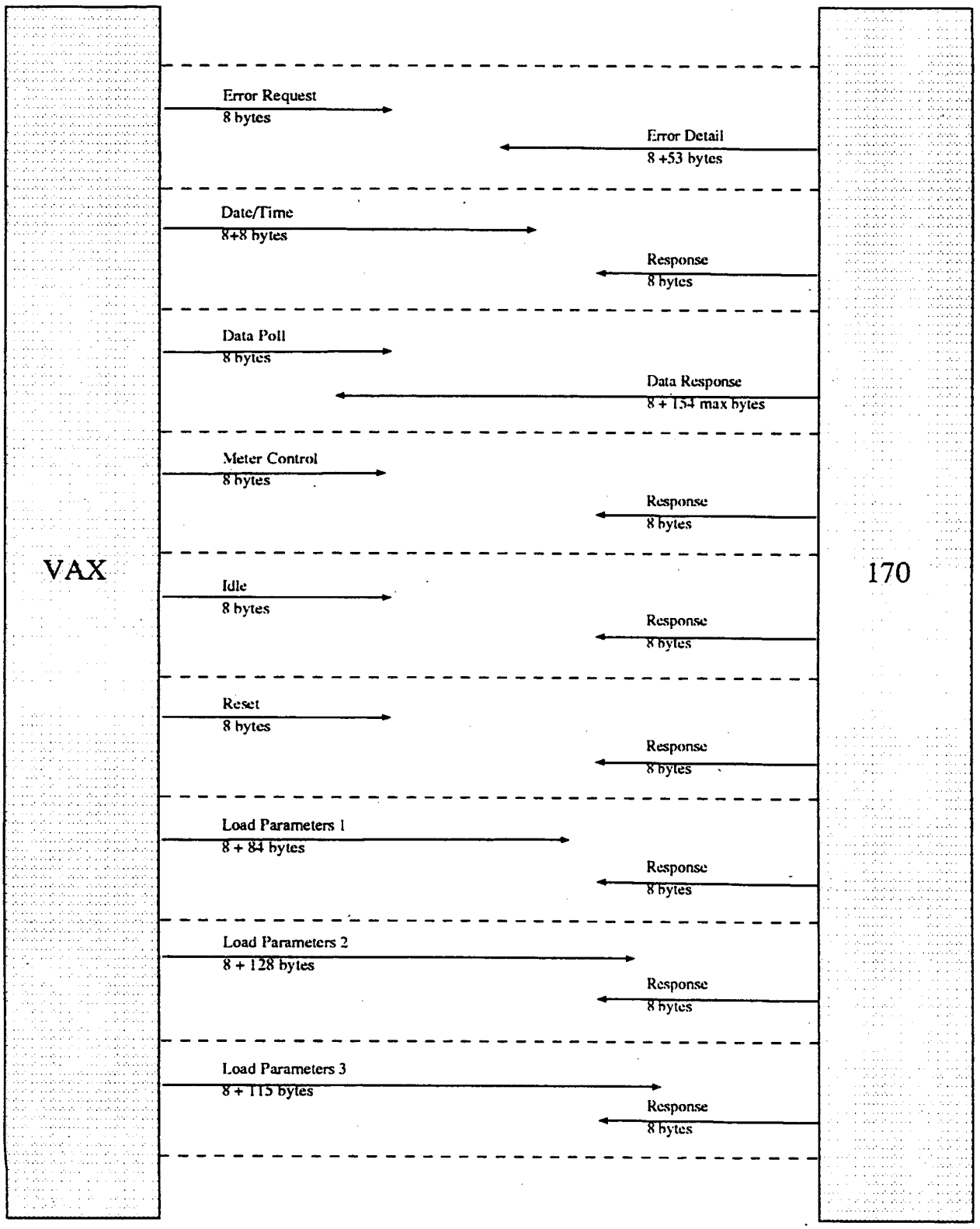
Load Parameters 2

Sent in startup sequence following load parameters 1.
Also sent when load parameter change occurs from OPC or PATCH.
Contains TOD metering table.

Load Parameters 3

Sent in startup sequence following load parameters 2.
Also sent when load parameter chance occurs from OPC or PATCH.
Contains loop function codes, speed trap parameters, data validity parameters,
data switch (data collector or ramp meter), # of actives loops, number of metered lanes,
control switch (Central or TOD), etc.

VAX <--> 170 Communication



RMDC_COMM

Ramp Meter/Data Collectors Communications Handler

In main RMDC_COMM processing loop, check for tms shutdown, proces keyboard interrupts (such as go to test menu), process mailbox interrupts (such as update 170 parameters), process data received from 170s, process buffers ready to send to 170s, and send data polls to 170s.

- The cmd_list contains protocol commands, which are used by OPC_COMM
- **find_first_last_port_unit** -- Finds first and last VAX port, and first and last unit by searching the port_device_table, which was built prior offline [fddb/vaxport/build_vaxport.c]. The first port is the first one that has the same db_type. The last port is the last one that has the same db_type. The ports were previously sorted by db_type in sort_list_by_db_type [fddb/vaxport/build_vaxport.c]
- **start_rmdc_port** invoked in multi_port startup enables all ports
- In startup, **send_rmdc_start_msgs** calls:
  - **build_and_queue_170_msgs**
  - **build_and_queue_170_date_time**
  - **build_and_queue_load_parameters** [in rmdb_comm_sub.c] initializes 170 parameters
    - Check that port correspondings to RM/DC rather than gate controller
    - Get port number (calculated from unit_no passed in) and check that it is good
    - Make sure port is in correct mode: test versus multi
    - Calculate RMDB column pointer from unit_no
      and obtain drop address from data column
    - **get_rmdc_buffer** -- get 266 byte Tx/8 transmission buffer
    - **init_tx_rx_jhub** -- initialize the buffer
    - Fill in header fields of buffer, such as drop address, port #
    - Build one of three transmission messages from parameters in data column
      - LOAD_PARAM1
      - LOAD_PARAM2
      - LOAD_PARAM3
    - **add_to_list_tail_i** -- put buffer at end of transmission queue
    - Set flag RMDC_V_TX_WAIT_RX to indicate ready to transmit to 170

- <u>In main processing loop:</u>
  - Changes in RMDC are made through mailbox interrupts, which are sent from OPC_COMM. The mailbox message contains the command and the unit number (from which the rmdb column pointer can be calculated). It only processes 1 command at a time.

    process_mailbox_command [in rmdc_comm_sub] switches based on the command, which include start metering, stop metering, load parameters, reset loops, reset communications, and reset counters. For load parameters, it checks to see if any of the update flags are set for the given data column. There are different update bits for load parameters 1, load parameters 2, load parameters 3 (the group to which each element

belongs is assigned in the rmdb name table [fddb/rmdb/rmdb_tbl.c]). This means that load parameters 1 can be sent without sending load parameters 2 and 3. If update flag is set (0x00 means don't update), the new parameters or commands are sent to the 170. It then clears the update flag.

Updates to RMDC can occur in two ways:

1) Update flag can be set in **process_read_write_update** [comm_prot/opc_comm/opc_comm_sub.c], which is called from opc_comm in response to mailbox command. It in turn calls **mail_rmdc_updates**, which calls **mail_cmd_to_rmdc_comm** (using the command OPC_RMDC_LOAD_PARAM meaning a message is sent from OPC_COMM to RMDC_COMM), which calls **write_to_mailbox_nowait**.

2) Update flag can be set in **patch_rmdb** when user selects modification. **patch_rmdb** calls **check_rmdb_changed**, which calls **mail_patch_cmd_to_rmdc_comm**, which calls **write_to_mailbox_nowait**. The mailbox command used in this case is OPC_RMDC_LOAD_PARAM (see /tms_include/tms_system.h for definitions of mailbox commands, not to be confused with the VAX to 170 commands defined in rmdc_comm.h). In this case, RMDC_COMM handles the command directly rather than going through the OPC_COMM

NOTE on protection: **process_read_write_update** checks the user's permission to see if they can make changes to the RMDB. For all load parameters, the permission established in rmdb_tbl.c (which can be overriden in rmdb_input.fil) is that anyone can view the load parameters, and the managers, supervisors, and operators can change the RMDB (trainees cannot). **patch_rmdb** does not require that the user has permission.

NOTE on journalling: **process_read_write_update** writes to rmdb_journal.fil whenever a change is made to the RMDB. It writes the column name, operator initials, time of change, followed by element name = new value. **patch_rmdb** does not write to the journal file when a change is made! The journal file was opened by **create_journal_file** [comm_prot/opc_comm/opc_comm_sub.c], which is called from opc_comm upon startup. The journal file is closed by **close_file_for_exit** [comm_prot/opc_comm/opc_comm_sub.c] by **exit_test_opc_comm** upon shutdown either from opc_comm menu or main shutdown flag.

- Process data received from 170s
  - **process_rmdc_good_comm** [in rmdc_comm_sub.c]-- process 170 buffer that has no error. Check retry count, status, etc.
  - response command indicates whether M170_ACK, DATA_RESP, etc.
  - **process_data_response** [in rmdc_comm_sub.c]
    called when tx_header says DATA POLL
    - the received 170 buffer (-> tx_ubfr) is passed in
    - check for RMDC (make sure it's not a gate controller)

- calculate pointer to rmdb column from unit_no given in received buffer
- calculate pointer to buffer that has been received from 170 and call it rx_ubfr
- Calculate how long the buffer should be and make sure it's that length
- Copy 170s calculated local metering rates 1, 2, and 3 from received buffer to RMDB
- Get lane status 1, 2, and 3 from 170 buffer and copy into RMDB
- **unpack_170_vol_occ** for each loop in 170-- extracts volume and scan count from received 170 buffer
- For each loop in 170, get data validity flag
- If the operator disabled bit is set, set it to OPER_DISABLED
- **pack_rtdb_loop** -- enters lane volume, scan count, and data validity flag into RTDB
- **log_170_data_poll** to file rmdc_comm_x.log

- Process buffers that are ready to be sent to 170s
  These buffers were queued in build_and_queue_170_msg (see below), and may be of type IDLE_COMM, REST, METER_CTL, GATE_STATUS, DATA_POLL, ERROR_REQ, or GATE_ERR_REQ
  - If RMDC_M_TX_WAIT_RX flag is set
    - For each port and while buffers are still on the queue
      Transmit buffer with system command SYS$QIO

- For each port and for each unit, data polling takes place

  Note: The non-active ports are skipped over if the VAXPort for that data column is "NO_PORT" or "NO_CTRL" when the port_device_table is built [in fddb/vaxport/build_vaxport.c]. The user defined default data columns have NO_PORT, which is why they are not treated as real devices.

build_and_queue_170_msg [in rmdc_comm_sub.c]
- Get port # (calculated fromm unit_no, which was passed in)
- Make sure port is in correct mode -- multi_mode
- Calculate the drop address from the unit_no
- **get_rmdc_buffer** of appropriate size
  8 byte Tx/8 used by IDLE_COMM, REST, METER_CTL, GATE_STATUS
  8 byte Tx/266 used by DATA_POLL, ERROR_REQ, GATE_ERR_REQ
- **init_tx_rx_jhub** -- initialize the buffer
- Fill in header fields, such as drop address, port #, 170 command, and 170 parameter (such as metering rate adjustment)
- **add_to_list_tail_i** -- puts buffer on end of queue (called tx_wait_rx_list) uses a build-in VMS function _INSQTI. Queue is later transmitted by $QIO.
- Set event flag RMDC_V_TX_WAIT_RX to indicate a buffer is waiting to be transmitted

III. REAL-TIME SOFTWARE

TMS_STARTUP

Supplemental notes to HNTB's documentation

To Start System:
1) Rebuild databases off line if any changes have been made:
See HNTB documentation for list of **build_xxxdb.exe** and input files required. Note that build_rtdb and build_fmdb are not off-line builds, but run from tms_startup.

2) Run **TMS_STARTUP.EXE** [./rt_skeleton/tms_startup.c] to start mains. This is not called from a .com file.

- Creates all permanent mailboxes so that process can assign channels to them as they startup: TMS_CONTROL_MBX, EVENT_LOG_MBX, RMDC_COMM_M_MBX, RMDC_COMM_T_MBX, OPC_COMM_M_MBX, OPC_COMM_T_MBX, VMS_COMM_M_MBX, VMS_COMM_T_MBX, UPI_XMIT_MBX, MON_EVT_LOG_MBX
- Start event logger and wait to make sure successfully started.
- Create permanent Event Flag Clusters
- Starts upi_xmit, noaa_monitor, build_rtdb, and build_fmdb
- map_to_RTDB, map_to_FMDB, and map_to_RMDB. link_rmdb_to_rtdb.
- Start dumydata, stn_aggr, inc_detect, bottleneck, fmdb_aggr, fmdb_archiver, rt_skeleton
- Starts communications handlers MULTI_RMDC, MULRI_OPX_XOMM, MULTI_VMS_COMM with call to

  cond_code = start_comm_process("MULTI_RMDC_COMM", "MULTI_RMDC_COMM", 0,
  ast_limit, bio_limit, byte_limit, dio_limit, status_flag,
  &pid, input_dev_name, output_dev_name, error_dev_name);

Calls function for each main using start_tms_process

start_tms_process("BOTTLENECK", tms_control_mbx, 1,
input_dev_name, output_dev_name, error_dev_name);

Note: The parameters given are the same for each main (were assigned in prior call to *get_device_name*) and will not need to be changed for FUZZYMETER. Just need to add an extra call to start_tms_process here. Sub-functions don't need modification.

Note: First parameter called filename is image name.

Note: Although this starts main for TAPS, it does not run calculations until rt_skeleton calls it every 20 seconds. It does build tables, but then waits for flag with system utility WAITFR.

Note: Although the watch_bottleneck event flag clusters are associated here, the main is not started here.

start_tms_process [./rt_skeleton/tms_startup.c] sets privilege descriptors, status flag, and then calls

cond_code = start_processx(filename, filename, 0,
0, status_flag, &pid, input_dev_name, output_dev_name, error_dev_name);

start_processx [./rt_skeleton/tms_startup.c]

- Builds descriptors for image name, process name, SYS$INPUT, SYS$OUTPUT, SYS$ERROR
- Build process quota list
- Start process using VMS system service

  cond_code = SYS$CREPRC(pid, &image, &sys_input, &sys_output, &sys_error,
  priv_ptr, quotas, &prcnam, 0, 0, 0, status_flag);

  SYS$CREPRC is the function that actually starts a main from a main!

SYS$CREPRC

- process address - where CREPRC writes process ID
- image - char pointer to file name
- input - SYS$INPUT
- output - SYS$OUTPUT
- error - SYS$ERROR
- prvadr - privilages of process
- quota - max subprocess, max ASTs, etc
- prcname - process name 1-15 chars
- baspri - base priority of process. 31 is highest, 0 is lowest. Real time priorities 16-31.
- uic - user ID code to assign to process
- mbxunt - mailbox # to send termination message to when process deleted
- stsflag - status flag where each bit has a symbolic name for options, like detached, hyber, etc.

TMS_SHUTDOWN

Tms_shutdown sets the shutdown flag for the communications handlers: multi_opc_comm, test_opc_comm, multi_rmdc_comm, test_rmdc_comm, multi_vms_comm, test_vms_comm, upi_xmit, noaa_monitor, and real time processes. Each of these mains checks to see if the shutdown bit is set before completing the next loop. "Run TMS_SHUTDOWN" initiates shutdown.

Note: **stop_tms.com** is not normally used. @STOP_TMS aborts the processes and does not give control to exit_handling routines. It is used after a failed startup to get rid of all TMS processes. It shuts down stop_tms.com, event_logger, rt_skeleton, dumydata, stn_aggr, inc_detect, bottleneck, read_rtdb, fmdb_aggr, fmdb_archiver, noaa_monitor, upi_xmit, multi_opc_comm, multi_rmdc_comm, multi_vms_comm.

- Display shutdown banner on screen
- Prompt to screen to verify shutdown
- **connect_to_mailbox** TMS_CONTROL_MBX and flush it
- **connect_to_mailbox** EVENT_LOG_MBX and send the TMS_SHUTDOWN message
- Set the shutdown bit for multi_opc_comm, *test_opc_comm*, multi_rmdc_comm, *test_rmdc_comm*, multi_vms_comm, *test_vms_comm*, upi_xmit, noaa_monitor, and *rt_common* (the ones in italics are not shutdown in stop_tms.com). The rt_common flag (RT_V_SHUTDOWN_START) is used for all of the real time processes, which include rt_skeleton, dumydata, stn_aggr, inc_detect, bottleneck, fmdb_aggr, fmdb_archiver, and event_logger. In **rt_skeleton**, if RT_V_SHUTDOWN_START is set, then set the RT_V_SHUTDOWN_TMS flag. The real-time processes check for the shutdown tms flag, which is synchronized by the 20 sec tick.
  - Associate to the event flag cluster with system call SYS$ASCEFC
  - Set the shutdown flag (for example, OPC_V_SHUTDOWN_TMS) with system call SYS$SETEF
  - If the flag was clear, no problem
  - Else if the flag was not clear, clear it and reset it.
  - Print to screen that flag was successfully set.
- Loop until **read_from_mailbox** returns message "FMDB_ARCHIVER Terminating"

Note: Read_rtdb checks a different shutdown flag, masked by RR_M_SHUTDOWN_TMS. In call SYS$READEF, results are written to efc_bits, and bitwise check is done later to check shutdown. Where does RR_M_SHUTDOWN_TMS get set? RR_V_20_sec_tick is set by run_process_alt_bit.

Note: tms_shutdown waits until fmdb_archiver is shut down, then says shut down is complete. How is it that fmdb_archiver is the last process to shut down?

RT_SKELETON

Description of algorithm and system utilities used. RT_SKELETON associates and initializes event flags, then enters loop. Every 20 seconds, it starts up polling processes (multi_rmdc_comm, test_rmdc_comm, and dummy_data). It starts traffic analysis programs (stn_aggr, inc_detect, and bottleneck), then scrolls RTDB. At this point, the databases are stable. The communications handlers are run (multi_opc_comm, test_opc_comm, multi_vms_comm, and test_vms_comm). The monitoring programs are run (watch_rmdc, watch_fmdb, watch_btlneck, and read_rtdb). Stay in loop until shut down tms event flag turns on.

rt_skeleton [../rt_skeleton/rt_skeleton.c]

- **map_to_RTDB**
  - **map_to_global_section**
  - **init_rtdb_tl**
- **general_process_startup**
  - **connect_to_mailbox**
  - **write_to_crash_log**
  - Associate to event flag cluster
  - Clear all event flags
- **log_tms_event**
  - **log_tms_common**
    write_to_crash_log
    get time
    compose message
    write_to_mailbox_nowait
- **calc_next_22sec** -- begin data polling 2 seconds after 20 sec clock tick to allow time for 170 data responses to return
- Associate to WATCH_RMDC Event Flag Cluster
  Clear All Event Flag Bits
  Initialize WATCH_RMDC 20 Second Tick EF Bit Number
  Associate to W_RMDC_TTYS Event Flag Cluster
  Clear All Event Flag Bits
- Repeat above for WATCH_FMDB
- Repeat for WATCH_BTLNECK
- Repeat for READ_RTDB
- Close stdin, stdout, stderr
- While SHUTDOWN_TMS event flag is clear
  - Get current time with system utility SYS$GETTIM
  - **time_stamp_rtdb** with current time. The start time for the previous 20 second period is located at the rtdb new column base, and the end time is located right after the start time.
  - Test SHUTDOWN_TMS event flag (EF) with call to
    cond_code = SYS$READEF(RT_V_SHUTDOWN_TMS, &efc_bits);
    If set, then set SHUTDOWN_TMS bit so each process can terminate

cond_code = SYS$SETEF(RT_V_SHUTDOWN_TMS);
Continue with loop, with each process checking to see if it should shutdown.

- Call **run_polling_processes** (see below for details) to start MULTI_RMDC_COMM, TEST_RMDC_COMM, and DUMMY_DATA using run_process_one_bit.
- Call **run_process_wait** (see below for details) to start TAPS. Wait for each to complete before starting next.
  run_process_wait("STN_AGGR", RT_V_STN_AGGR_START, RT_V_STN_AGGR_DONE, 1000);
  run_process_wait("INC_DETECT", RT_V_INC_DETECT_START, RT_V_INC_DETECT_DONE, 1000);
  run_process_wait("BOTTLENECK", RT_V_BOTTLENECK_START, RT_V_BOTTLENECK_DONE, 1000);

  Note: Additional call needed to run_process_wait added for fuzzymeter.
  The event flags RT_V_FUZZYMETER_START, RT_V_FUZZYMETER_DONE, RT_M_FUZZYMETER_START, RT_M_FUZZYMETER_DONE must be defined in tms_realtime.h, along with their corresponding event flag masks.

  Note: Event flags with _V are used in SYS$CLREF, SYS$READEF, SYS$SETEF, and SYS$SETMR. The _V is the process name described by a defined #, not a flag in that sense that it can't turn on and off. The flag is internal to the system, and the _V is just used to indicate which event. The _M is 128-bit mask used in bitwise AND with efc_bits, and bitwise OR with ef_mask. Each event flag mask has only one of its 128 bits on.

- **scroll_rtdb_col_offsets** [in tms_library/rtdb_lib.c] makes room for the latest data by moving data columns down one.
  - rtdb_cl is an array of offsets to data columns. Rather than moving the data itself, the data offset is incremented by one. The offset to the last data column is relocated to the first offset so that the same memory can be reused.
  - The first data column is initialized to zero (not the offset itself, but where it points to).
- Call **run_process_one_bit** to start operator/console communications
  run_process_one_bit("MULTI_OPC_COMM", &opc_comm_efc_m, OPC_V_20_SEC_TICK);
  run_process_one_bit("TEST_OPC_COMM", &opc_comm_efc_t, OPC_V_20_SEC_TICK);
  run_process_one_bit("MULTI_VMS_COMM", &vms_comm_efc_m, VMS_V_20_SEC_TICK);
  run_process_one_bit("TEST_VMS_COMM", &vms_comm_efc_t, VMS_V_20_SEC_TICK);
  Associate to process event flag cluster with SYS$ASCEFC, then start event flag to begin process with SYS$SETEF.
- Call **run_process_alt_bit** to start WATCH_RMDC, WATCH_FMDB, WATCH_BTLNECK, and READ_RTDB with
  run_process_alt_bit("WATCH_RMDC", &watch_rmdc_efc, &wr_v_20_sec_tick);
  run_process_alt_bit("WATCH_FMDB", &watch_fmdb_efc, &wf_v_20_sec_tick);

run_process_alt_bit("WATCH_BTLNECK", &watch_btlneck_efc, &wb_v_20_sec_tick);
run_process_alt_bit("READ_RTDB", &read_rtdb_efc, &rr_v_20_sec_tick);
This function starts a process which uses an alternating bit start. The difference between this function and run_process_one_bit is the extra step of toggling the start_event_flag (flip all bits). It uses *SYS$SETEF(*start_event_flag)* to start process.

Note: WATCH_FUZZYMR will need to be started here. watch_fuzzymr_efc will need to be added to tms_realtime.h, along with the corresponding 20_sec_tick definitions. wf has already been used for watch_fmdb and cannot be reused for watch_fuzzymr.

- Test SHUTDOWN_TMS event flag with call to
*cond_code = **SYS$READEF**(RT_V_SHUTDOWN_TMS, &efc_bits);*

run_polling_processes -- starts MULTI_RMDC_COMM, TEST_RMDC_COMM DUMMY_DATA and waits for completion or timeout

- Clear active bits and done bits for MULTI_RMDC_COMM, TEST_RMDC_COMM, and DUMMY_DATA using SYS$CLREF.
- Call **run_process_one_bit** to start MULTI_RMDC_COMM, TEST_RMDC_COMM, and DUMMY_DATA
- Set timer with SYS$TIMR for 1 second, during which time polling message are built and queued. Wait for timer flag RT_V_SKEL_TIMER to finish with SYS$WAITFR, then clear flag with SYS$CLREF -- A 1 second delay.
- Read event flags to see if MULTI_RMDC_COMM, TEST_RMDC_COMM, or DUMMY_DATA is active with call
cond_code = SYS$READEF(RT_V_MULTI_RMDC_COMM_ACTIVE, &efc_bits);
Note: All three processes use the same flag RT_V_MULTI_RMDC_COMM_ACTIVE.

- Do below for all three processes:
- If the result is still equal to the mask, then the process is active -- Bitwise AND efc_bits with mask (of form RT_M_*_ACTIVE)
  - Clear active event flag (of form RT_V_*_ACTIVE) using SYS$CLREF so it can be rechecked later.
  - If process is done (Bitwise AND with mask of RT_M_*_DONE is still equal to mask)
    - Clear done flag (of form RT_V_*_DONE) using SYS$CLREF so it can be rechecked later
  - Else the process is not done. Build a polling mask (Bitwise AND polling_done_mask with RT_M_*_DONE)
- Else the process is not active. The polling mask remains blank.

- If the polling mask is still blank, all processes are done. Return.

- Set timer with SYS$TIMR for 10 seconds.
- While processes (MULTI_RMDC_COMM, TEST_RMDC_COMM, or DUMMY_DATA) are still running and timer still running

- Build wait mask -- Bitwise AND of processes that are not completed and timer mask.
- Sit and wait until a processes completes or timeout -- using SYS$WFLOR
- Read the event flag using SYS$READEF to set efc_bits.
  Note: efc_bits represents all 3 processes.
- Repeat below for all 3 processes:
- If the process is done (Bitwise AND of efc_bits with RT_M_*_DONE)
  - Clear the done flag (of form RT_V_*_DONE) with SYS$CLREF
  - Zero that bit in polling mask for the event that completed --
    using one's complement of event mask Bitwise ANDed with polling mask
  - If all processes are done (polling mask is zeroed)
    Cancel the timer with SYS$CANTIM and return

run_process_wait -- Used to start TAPS. Waits for completion before returning.

- SYS$SETEF is system utility that sets event flag, such as RT_V_BOTTLENECK_START. Bottleneck.c checks this flag to see when to run calculation loop.
  cond_code = SYS$SETEF(start_event_flag);
  The cond_code WASCLR means that the event flag was previously clear, as expected.
- Set a timer that sets event flag RT_V_SKEL_TIMER when reaching timeout (converted wait time given as argument).
  cond_code = SYS$SETIMR(RT_V_SKEL_TIMER, &timeout, 0, WAIT_TIMER_ID, 0);
- Build wait_mask
  done_ef_mask = one_bit_mask(done_event_flag);
  wait_mask = done_ef_mask | RT_M_SKEL_TIMER;
  One_bit_mask creates a 128 bit mask with 1 bit set to indicate which event.
  Here, the done_event_flag (such as RT_V_BOTTLENECK_START) is set by the function that was started by SYS$SETEF. | performs a bitwise OR, so that wait_mask turns on when the function completes or times out. Note that _M is used here, not the _V used above in SYS$SETIMR.
- SYS$WFLOR sits and waits for either of two event flags, the function times out or is completed. Note that the _V is used here, same as in WAITIMR, so the _M is not redundant in wait_mask.
  cond_code = SYS$WFLOR(RT_V_SKEL_TIMER, wait_mask);
- Read the event flags
  cond_code = SYS$READEF(RT_V_SKEL_TIMER, &efc_bits
  This command sets efc_bits.
- Check if process done bit is set. The done_ef_mask is a 1 bit mask for done_event_flag. If this bit is still on after bitwise and with efc_bits, then process was done. Cancel timer with SYS$CANTIM and clear done bit with SYS$CLREF.
  if ((efc_bits & done_ef_mask) == done_ef_mask)
- Check if timeout bit is set. If RT_M_SKEL_TIMER bit is still set after bitwise and with efc_bits, then timeout occured. If so, clear start bit with SYS$CLREF, clear done bit with SYS$CLREF, and issue timeout error message.
  else if ((efc_bits & RT_M_SKEL_TIMER) == RT_M_SKEL_TIMER)

ERROR HANDLING

FDDB_ERROR [fddb/fddb_sub.c]

Called from **get_inc_det_eqn, get_btl_neck, eqn**, and **get_stn_aggr_eqn**. Will be called from **get_fuzzy_eqn** too.

- Builds error message.
- Calculate number of columns by src_ptr - field_start where field_start is current column in source. src_ptr not used for anything else.
- **find_err_text** (in fddb_sub.c) finds text for that error code (error code may be returned from **get_token**), such as invalid char, invalid term, invalid paramter, etc. If NO_ERR_CODE, search is skipped.
- If fddb_error_mode is FILE_TERMINAL or FILE_DETACHED, write error message to fddb_error_file. Note that fddb_error_mode is set to FILE_TERMINAL in build_rmdb
- Unless FILE_DETACHED, write error message to screen.

Error handling functions called from taps

Note on event codes. The event codes are in hex. The upper 4 hexadecimals indicate which function sent the message [defined in tms_include/event_common.h]. The lower two bit indicates the condition code severity [defined in tms_include/tms_system.h]. The lower 4 hexadecimals, excluding the last 3 bits (the word must end in either a 0 or 8), are used as the error code. The 1st nibble of the error code is always 8, although it is not clear what this means. The error codes are only unique within the main, not system wide. They become unique because they are bitwise or'd with the function event codes.

build_tap_error -- called from **get_fuzzy_eqn**

log_tms_event -- sends message to *TMS Event Logger*

Pass in event_code and msg_txt.

Note on event codes: The event codes are defined in the beginning of the main taps programs, such as bottleneck.c. Examples of event codes include FUZ_BUILD_ERR, FUZ_COMPLETE, FUZ_MAP_GBL, FUZ_OVERFLOW, FUZ_START, FUZ_ST_COMPL, FUZ_TERMINATE, etc.

log_tms_common --The module_name is a global initialized at the beginning of main

write_to_mailbox_nowait

log_tms_event_cc -- sends message with condition code to *TMS event logger*

Pass in event_code, msg_text, and cond_code.

log_tms_common

write_to_mailbox_nowait

log_tms_mpu_name

write_to_mailbox_nowait

Error handling functions in comm_prot

log_comm_event - Log a message to the *TMS Event Logger*

Passed variables include error_code (which is 0x00000000 if not appropriate or no error?), unit_no, and error_msg

```
/* Flag Bit Usage in mpu_no:                                    */
/*      COMM_LOG_M_MODULE_NAME  Use module name for logging     */
/*        COMM_LOG_M_PORT_NO  Low 16 bits are a Port Number     */
/*      COMM_LOG_M_FORCE_FILE  Force write to log file, even if disabled */
/*        COMM_LOG_M_NO_FILE  No logging to file, even if enabled */
/*      COMM_LOG_M_FORCE_SCR  Force write to screen, even if disabled */
/*      COMM_LOG_M_NO_SCREEN  No logging to screen, even if enabled */
/*          Note: the FORCE bits have precedence over the NO bits */
```

log_comm_event_cc - Log a message with a condition code to the *TMS Event Logger*

get_mpu_name
get_port_name
get_unit_name
write_to_crash_log
fmt_write_comm_msg
close_comm_log_file
create_comm_log_file
write_to_crash_log

log_comm_msg - Log a message to *Comm Handler Log File*

Pass event code, mpu_no (module/port/unit # w/Flag bits), msg to write
Always called from a comm handler.
get_mpu_name (see above)
write_to_crash_log
fmt_write_comm_msg (see above)

log_comm_msg_cc - Log a message with a condition code to *Comm Handler Log File*

VI. TRAFFIC ANALYSIS PROGRAMS (TAPS)

BOTTLENECK

bottleneck [../rt_skeleton/bottleneck.c] starts up main, builds bottleneck analysis table, and then waits for event flag from real time skeleton to do calculation

- **general_process_startup**
  - **connect_to_mailbox**
  - **write_to_crash_log**
  - Associate to event flag cluster
  - Clear all event flags
- **log_tms_event**
  - **log_tms_common**
    write_to_crash_log
    get time
    compose message
    write_to_mailbox_nowait
- **map_to_RTDB**
  - **map_to_global_section**
  - **init_rtdb_tl**
- **map_to_RMDB**
  - **map_to_global_section**
  - **init_rmdb_tl**
- **build_bottleneck_table (see below)**

- <u>While</u> SHUTDOWN_TMS event flag is clear
  - Wait for bottleneck start event flag with SYS$WAITFR
    This flag gets set in rt_skeleton by SYS$SETEF
  - Clear bottleneck start flag with SYS$CLREF
  - **calc_bottleneck (see below)**
  - Set bottleneck done flag with SYS$SETEF
  - Test shutdown flag with SYS$READEF
    cond_code of SS$_WASCLR means don't shutdown
    cond_code of SS$_WASSET means shutdown

build_bottleneck_table - Parses the bottleneck equation file line by line, searches for cabinet name in RMDB, roadway type, reversible type, station names in RTDB, and writes it all to bottleneck analysis table. (see following bottleneck table description)

- Initial memory allocation for bottleneck table
- write header to table: start table label, number of sets, table size, date/time
- open bottleneck equation file
- Initialize counters, pointers, and line type
- While not EOF, read line of equation file

Example of 1 set:

ES-170D:_MN_Btl=ES-170D:_MN_Stn+ES-170D:_MNH__5-ES-172R:_MN_Stn-ES-172R:_MNH__5-ES-172R:_MN_X_1

Wts:ES-159R= 51,ES-151R= 36,ES-146R= 13

- Switch based on type of line:

1) SKIP_EQN -- do nothing.
   EQN_FIRST is next action.

2) EQN_FIRST -- beginning of an storage rate equation.
   Calculate pointer to beginning of set
   Get index in RMDB for cabinet name (7 chars) with **find_fddb_cl_name**
   classify_roadway returns roadway_type (7 possibilities of form *_ROADWAY) by comparing 3 chars after : (MMS in this case)
   check_reversible returns rv_type (NB, SB, or NR of form *_SET_START) by comparing chars [9,10] of line buffer (MS in this case is nonreversible). It's used to indicate the beginning of a set.
   Write begin set label to table
   Calculate pointer to station in RMDB, later used to get occupancy threshold.
   add_sub_code = BA_ADD_VOL initially
   Initialize # loops and # weights/ equation
   EQN_CONTINUE is next action

3) EQN_CONTINUE -- parse a station in storate rate equation.
   Get station name from line buffer
   Search for station name (16 chars) in RTDB with **search_rtdb_name_table** and find index to it. This index will be used to get volume from this station
   Calculate pointer to station in RTDB
   Write station pointer to table
   Increment # of loops
   If + sign is next
      BA_ADD_VOL -- add in volume for this station to calculate storage rate
      If more stations on line, repeat
      else EQN_CONTINUE and get next line
   else if - sign is next
      BA_SUB_VOL -- subtract volume for this station to calculate storate rate
      If more stations on line, repeat
      else EQN_CONTINUE and get next line

else done reading line -- WTS_FIRST and get next line

4) WTS_FIRST -- beginning of weights line.
   Check to make sure line begins with "Wts:"
   WTS_CONTINUE

5) WTS_CONTINUE -- Parse a cabinet name in weights line.
   Get index in rmdb for cabinet name with **find_fddb_cl_name**
   Calculate pointer to station in RMDB
   Get weight from line buffer and write to table
   Increment # of weights
   If more weights on same line -- repeat for next station
   else more weights continued on next line --
      get next line and then WTS_CONTINUE
   else no more stations --
      check for errors, then EQN_FIRST

- Close equation file
- Write number of sets and table size into table header
- Write table end label, check sum (calc. # bytes in table)
- Trim table size

BTN_TABLE -- Description of what it looks like in memory

LABELS	ITEM	# BYTES	DESCRIPTION
table_base->	code	1	BA_TABLE_START (oxF2)
	ushort	2	number of sets
	ulong	4	table size
	date_time	struct size	struct system_time
			(end of table header)
			(beginning of sets)
set_start ->	code	1	rv_type
(Also EQN_FIRST)			(NB, SB, or NR of form *_SET_START)
	byte	1	bytes in set
	code	1	roadway_type
			(NB, NC, NH, SB, SC, or RV
			of form *_ROADWAY)
	ulong	4	col_ptr for cabinet name in RMDB
			(end of set header)
			(begin SR stations)
EQN_CONT	code	1	add_sub_code
			(BA_ADD_VOL for the first one)
	ushort	2	rtdb_offset to station name in RTDB
			(end of station)
Repeat above (add_sub_code and rtdb_offset) for every station in storage rate calc for this set			
			(done with SR stations)
			(begin ramp weightings)
WTS_FIRST	code	1	wt_code -- numerical but char string
			This is both the action code (<100) and
			the weight itself.
	ulong	4	col_ptr to cabinet name with above weight
			(end of a ramp weighting)
Repeat above (wt_code and col_ptr) for every cabinet affected by this set's calc. rate adj			
			(done with ramp weightings)
			(label end of set)
	code	1	BA_SET_END -- code for end of set
			where 1 set for each metering rate calc
			(end of a set)
			(begin next set)
Repeat for each set (every ramp that has bottleneck metering), including set header			
			(end of all sets)
			(label end of table)
	code	1	TABLE_END
	short	2	check sum - # of bytes in table
			(end of table)

calc_bottleneck -- processes the bottleneck analysis table 1 line at a time to clacu-late bottleneck adjustment rate, which is sent through data poll. Gets cabinet index, checks bottleneck flags, checks occupancy threshold. Calculates storate rate. Sums weights, calculates metering rate adjustment for each cabinet the bottleneck affects. If the new adjustment is more restrictive, use it in place of the old adjustment. Store the name of the bottleneck cabinet that changed the metering rate for each cabinet.

- For all data columns in RMDB
  - Skip if data column for min, max, default or prot mask
  - Initialize the metering rate to minimum adjustment
  - Initialize the rate adjustment index to bogus -- not set by any cabinet
- Initialize pointer to beginning of bottleneck table
- Skip past table header
- While not end of table
  - Get action code from table
    If action code < 100, it is a weight. Get weight and reset action code to WEIGHT
  - Switch for action code:
    - 1) Reversible type (3 forms of form BA_*_SET_START)
      This is the beginning of a set -- initialize counters, flags
    - 2) Roadway type (7 types of form *_ROADWAY) -- get RMDB parameters.
      Get index for current station
      Get flag for incident forcing bottleneck calculation
      Get flag for operator permitting bottleneck calculation
      Get occupancy threshold for bottleneck calculation
    - 3) BA_ADD_VOL or BA_SUB_VOL -- for each station in storage rate equation
      Calculate pointer to station in RTDB for calculating storage rate
      unpack_rtdb_loop_stn
      If first station
      If bottleneck was not forced on -- check that bottleneck conditions are met
      If operator disabled bottleneck, skip to next equation set
      If no usable data, skip to next equation set
      If not enough good data, skip to next equation set
      If not enough loops, skip to next equation set
      If occupancy is less than bottleneck threshold, skip to next set
      Accumulate storage rate with station volume
    - 4) WEIGHT -- for each weight used to calculate metering rate
      If first weight in equation, save pointer to start of weights
      Add to accumulate sum of weights
      Increment # of upstream ramps affected by this bottleneck
      Note: Get next weight and skip cabinet name for now -- get later
    - 5) BA_SET_END -- when finished summing weights
      Calculate storage/sum_weights
      Initialize a pointer to start of weights
      For each weight in bottleneck calculation
      Get weight
      Calculate metering rate = weight*storage/sum_weights

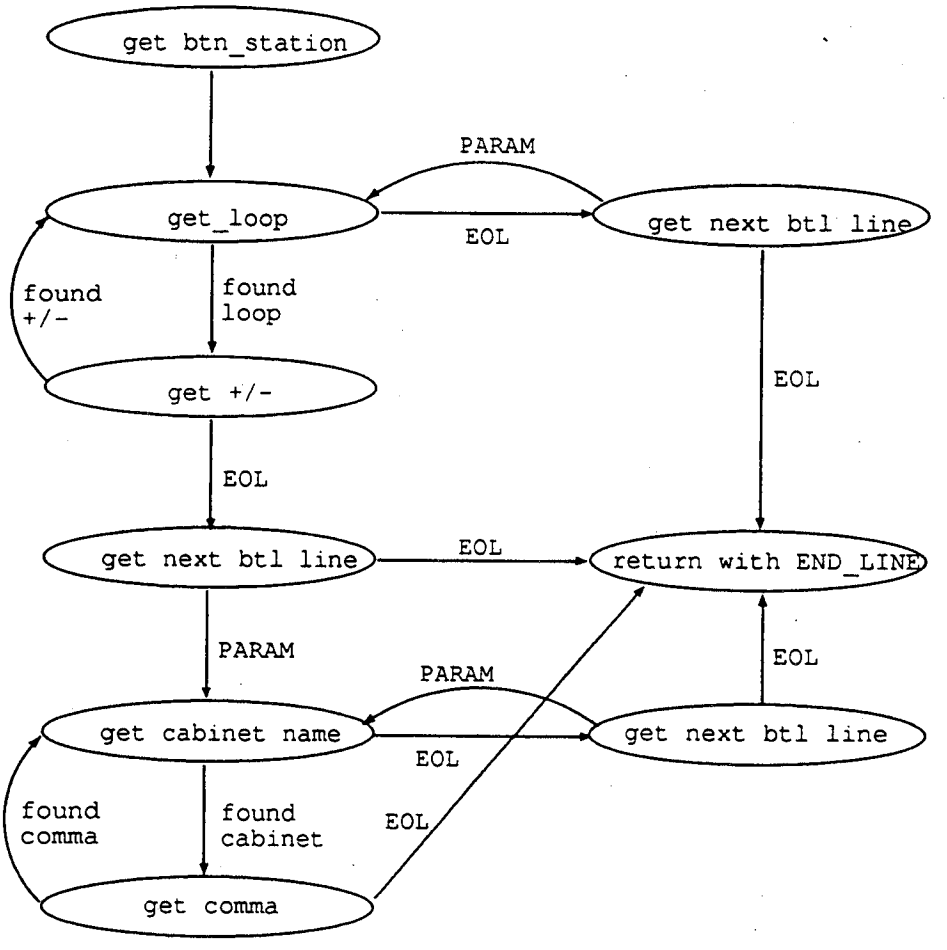
Calculate pointer to adjusted cabinet in RMDB
Get index to name of adjusted cabinet
Check for overflow
Get metering rate that may have been set by previous bottleneck calculation
If new metering rate adjustment is greater (more restrictive) than previous
update ramp metering rate for that cabinet
update index to current cabinet name (which set metering rate)

- 6) TABLE_END -- return (this exits infinite loop)

GUIDE TO ACTION CODES FOR CALC_BOTTLENECK

ACTION	DEFINED (in taps.h)	DESCRIPTION
BA_TABLE_START	0xF2	Beginning of Bottleneck Analysis table
---------One of these three reversible types is first byte in each set----------		
BA_NR_SET_START	0xC0	Non-reversible set start
BA_NB_SET_START	0xC1	Northbound set start
BA_SB_SET_START	0xC2	Southbound Set Start
----------One of these 7 roadway types is 3rd byte in each set----------		
NB_ROADWAY	0xB0	Northbound Mainline Lanes of form *MN***
NC_ROADWAY	0xB1	Northbound Collector/Distributor of form *CN***
NH_ROADWAY	0xB2	Northbound HOV Lanes of form *MNH***
SB_ROADWAY	0xB3	Southbound Mainline lanes of form *MS***
SC_ROADWAY	0xB4	Southbound Collector/Distributor
SH_ROADWAY	0xB5	of form *MSH***
RV_ROADWAY	0xB6	Reversible lanes of form *R__***
----------For each station in storage rate equation, begin with one of these codes----------		
----------followed by index to station in RTDB ----------		
BA_ADD_VOL	0xD4	Add this volume to calc. storage rate
BA_SUB_VOL	0xD5	Subtact this volume to calc. storage rate
----------For each weighted ramp in metering rate equation----------		
WEIGHT	<100	Both weight and action code
BA_SET_END	0xC3	End of a set
TABLE_END	0xFF	End of calculation table

READ BOTTLENECK EQUATION



WATCH_BOTTLENECK

watch_bottleneck is started offline, although event flags are created in tms_startup.

- **process_equation_file** opens btl_neck.eqn (the same file created by build_rmdb and used by bottleneck.c)
  - Duplicates the code in bottleneck.c that reads each line, parses each equation, searches for cabinet name in data base, classifies roadway type, check reversibility, process weights line, wrx.
- Sorts the cabinet list in ascending order
- Initialize storage of calculations
- A menu appears on screen and user chooses from **print_cabinet_list**
- Write equations onto screen
- Sit and wait for tick from rt_skeleton.
  - **display_vol_data** -- do metering rate calculations for each station/loop. If occupancy is not usable, **interpolate_metering_curve**
  - **highlight_max_rate**
  - **display_history_data** -- displays last times, cabinet names, and rate adjustments
  - Prompt to exit

INC_DET_TABLE -- Description of what it looks like in memory

LABELS	ITEM	# BYTES	DESCRIPTION
			(begin table)
table_base->	code	1	ID_TABLE_START (0xF1)
	ushort	2	number of sets
	ulong	4	table size
	date_time	struct size	struct system_time
			(end of table header)
			(beginning of sets)
	code	1	rv_type -- start set of this reversible type (NB, SB, or NR of form *_SET_START)
	byte	1	bytes in set
	code	1	ID_THIS_STN (0xD2)
	ushort	2	offset to this station in RTDB (to get occ)
	code	1	ID_DWNSTR_STN (OxD3)
	ushort	2	offset to downstream station in RTDB (to get occupancy)
	code	1	roadway_type (NB, NC, NH, SB, SC, or RV of form *_ROADWAY)
	ulong	4	col_ptr to cabinet in RMDB (to get k1, k2, and k3 parameters)
	byte	1	ID_SET_END -- code for end of set
			(end of a set)
			(begin next set)
Repeat for each set (every incident detection site)			
			(end of all sets)
			(label end of table)
	code	1	TABLE_END
	short	2	check sum -- # of bytes in table
			(end of table)

Incident Detection

inc_detect [./rt_skeleton/inc_detect.c] starts up main, builds incident detection table, and then waits for event flag from real time skeleton to do test

- **general_process_startup**
  - **connect_to_mailbox**
  - **write_to_crash_log**
  - Associate to event flag cluster
  - Clear all event flags
- **log_tms_event**
  - **log_tms_common**
    write_to_crash_log
    get time
    compose message
    write_to_mailbox_nowait
- **map_to_RTDB**
  - **map_to_global_section**
  - **init_rtdb_tl**
- **map_to_RMDB**
  - **map_to_global_section**
  - **init_rmdb_tl**
- **build_inc_det_table** (see below)

- While SHUTDOWN_TMS event flag is clear
  - Wait for inc_detect start event flag with SYS$WAITFR --
    This flag gets set in rt_skeleton by SYS$SETEF
  - Clear inc_detect start flag with SYS$CLREF
  - **calc_inc_det (see below)**
  - Set inc_detect done flag with SYS$SETEF
  - Test shutdown flag with SYS$READEF
    cond_code of SS$_WASCLR means don't shutdown
    cond_code of SS$_WASSET means shutdown

build_inc_det_table - Parses the incident equations input file, searches for indices to data for upstream and downstream stations (to get occupancies later) in RTDB and to cabinet (to get threshold parameters later) in RMDB. Writes action codes and data pointers to incident table (see description on next page).

- Initial memory allocation for incident table
- Write header to table: start table label, number of sets, table size, date/time (see description of functions that write to table)
- Open incident detection equation file
- Initialize counters
- While not EOF, read next line of equation file
  Example of 1 set:
  ES-158R:MMS_Inc = ES-158R:MMS_Stn & ES-156R:_MS_Stn
  - Get index in rmdb for cabinet name (7 chars) with **find_fddb_cl_name --** Used later to get k1, k2, and k3 thesholds for that cabinet
  - **classify_roadway** returns roadway_type (7 possibilities of form *_ROADWAY) by comparing 3 chars after : (MMS in this case)
  - **check_reversible** returns rv_type (3 possibilities of form *_SET_START) by comparing chars [9,10] of line buffer (MS in this case is nonreversible)
  - Get this station name from line buffer (15 chars)
  - Get index in RTDB for this station name with **search_rtdb_name_table --** this index will later be used to get occupancy data from this upstream station
  - Get downstream station name from line buffer (15 chars)
  - Get index in RTDB for downstream station name with **search_rtdb_name_table --** this index will later be used to get occupancy data from this downstream station
  - Check for errors
  - Calculate bytes in set
  - If not enough memory for new set in table, allocate more memory the size of ADDTL_ALLOC
  - **Write reversible type** (of form *_SET_START) **and bytes in set** to table
  - Calculate offset for this station in RTDB
  - **Write ID_THIS_STN code and offset in RTDB** to table
  - Calculate offset for downstream station in RTDB
  - **Write ID_DWNSTR_STN code and offset in RTDB** to table
- Close incident equation file
- **Write # of sets to table**
- **Write table size to table**
- **Write TABLE_END code** to table
- Calculate **checksum** (make sure table size matches calculated size) and write to table
- Trim table size
- Calculate table base

calc_inc_det -- processes the incident detection table 1 line at a time to obtain 3 threshold parameters, the previous incident detection state, and volumes for upstream and downstream stations.

- Initialize pointer to beginning of incident table
- Skip past table header
- While not TABLE_END
  - Get action code from table
  - Switch for action code:

    1) Rv_type of form ID_*_SET_START (3 types) -- This is the beginning of a set. Skip past bytes_in_set and continue.

    2) Roadway type (7 types) -- get RMDB parameters. The structure element name varies for different road types, which is why there is a diferent action code for each road type.

        Get index for current station
        Get occupancy difference parameter
        Get relative occupancy difference parameter
        Get downstream occupancy threshold parameter

    3) ID_THIS_STATION

        Get pointer to "new" data column in RTDB
        Get new this_station occupancy
        Get pointer to "current" data column in RTDB
        Get PrevIncDetState from current data column using **unpack_rtdb_loop_stn**
        Get current this_station occupancy
        Get previous incident detection state
        Get pointer to "minus20" data column in RTDB
        Get minus20 this_station occupancy
        Calculate average occupancy from past three samples

    4) ID_DWNSTR_STN

        Get pointer to "new" data column in RTDB
        Get new dwnstr_station occupancy
        Get pointer to "current" data column in RTDB
        Get current dwnstr_station occupancy
        Get pointer to "minus20" data column in RTDB
        Get minus20 dwnstr_station occupancy
        Calculate average occupancy from past three samples

    5) ID_SET_END

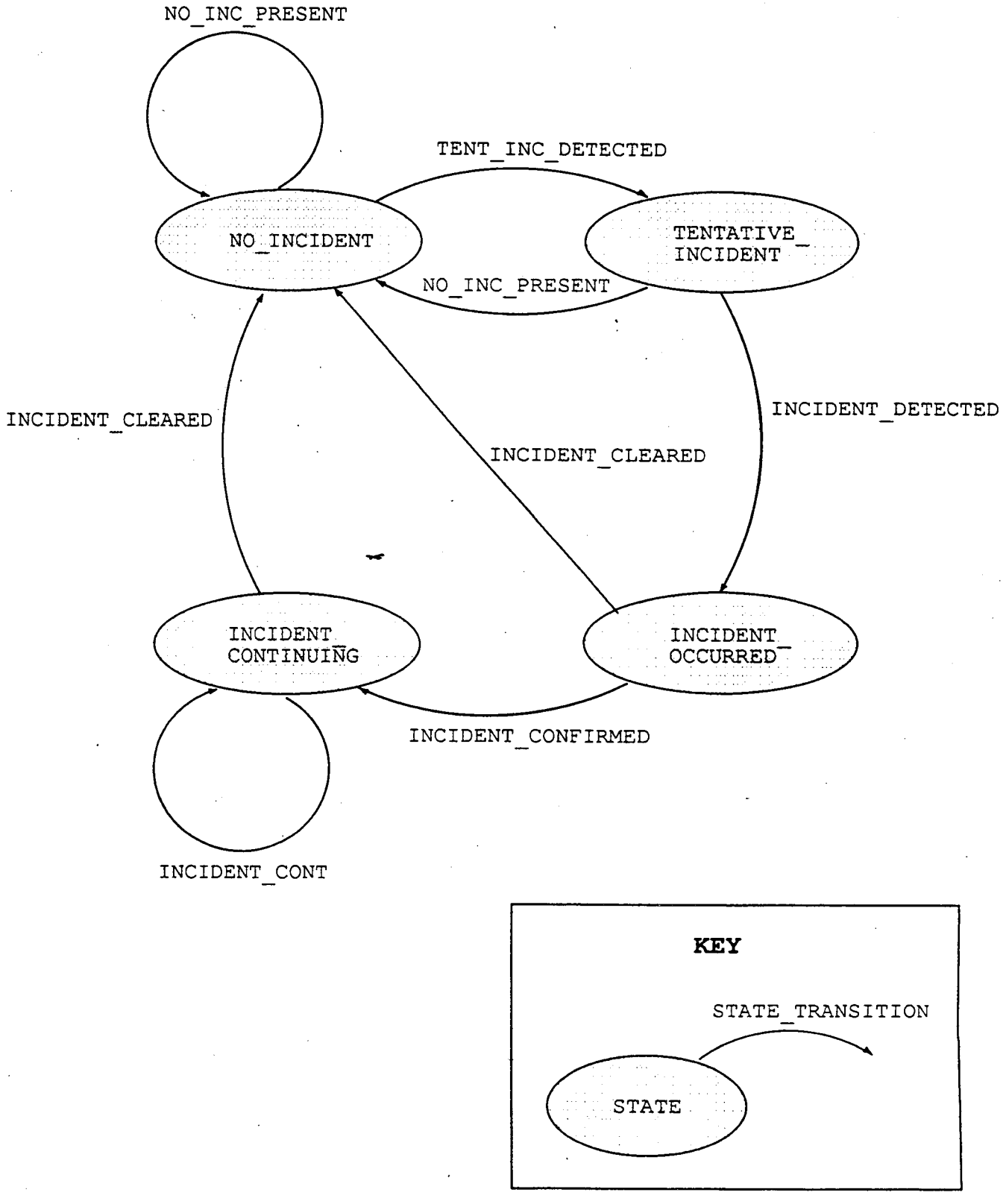
        Calculate k1, k2, and k3 -- incident detection parameters
        Get state change from
            state_change = **incident_detect** (ThisStnOcc, DwnstrStnOcc,
                PrevIncDetState, &NewIncDetState, k1, k2, k3);
            NewIncDetState is set by incident_detect.
        Get var_ptr for station in RTDB, new data column
        Put the new state into RTDB using **pack_rtdb_inc_det**
        Get index to name of station given offset in RTDB --
            using **search_rtdb_offset_list**
        Switch based on state transition

1) NO_INC_PRESENT (stay in NO_INC state)
   Do nothing
2) TENT_INC_DETECTED (from NO_INC to TENT_INC)
   Write state change and mesage to log (compose message that contains roadway, direction, milepost, location, and station name)
3) INCIDENT_DETECTED (from TENT_INC to INC_OCCURED)
   Write state change and message to log
4) INCIDENT_CONFIRMED (from INC_OCCURED to INC_CONT)
   Write state change and message to log
5) INCIDENT_CONT (stays in INC_CONT)
   Write state change and message to log
6) INCIDENT_CLEARED (INC_CONT to NO_INC)
   Write state change and message to log

incident_detect -- Performs actual incident detection algorithm. Three checks to see if an incident has occured. Updates state (the pointer to new state was passed so change is effective in calc_inc_det, although it still needs to be put into RTDB) and returns transition (see state transition diagrahm)

- Calculate occupancy_difference between stations = upstream - downstream
- If occupancy_difference > k1 (upstream greater than downstream by 10%)
  - Calculate relative_occupancy = occupancy_difference/this_stn_occupancy
  - If relative_occupancy > k2 (40)
    - If previous state was NO_INCIDENT
      If relative_occupancy < k3 -- Extra qualification to reach TENTATIVE
        new state = TENTATIVE_ACCIDENT
      Else
        new state = NO_INCIDENT
    - Else if previous state was TENTATIVE_INCIDENT
      new state = INCIDENT_OCCURRED
    - Else if previous state was INCIDENT_OCCURRED
      new state = INCIDENT_CONTINUING
    - Else previous state was INCIDENT_CONTINUING
      new state = INCIDENT_CONTINUING
- Else
  new state = NO_INCIDENT

INCIDENT DETECTION STATE TRANSITION DIAGRAHM



V. DATABASES

DATA BASE BUILD

To build all of the data bases in Table 1, run build_all_db.com

Table 1: Files Related to Off-line Data Base Builds

Mains for Offline Builds	Input file that is Used	Temp File that is Created
build_cctvdb	cctvdb_input.fil	
build_gbldb	gbldb_input.fil	
build_gcdb	gcdb_input.fil	
build_oprtvdb	oprtvdb_input.fil	
build_rmdb	rmdb_input.fil	loop_names.lst speed_traps.lst station_names.lst btl_neck.eqn* inc_det.eqn* stn_aggr.eqn* actv_anal.eqn* rtfmdbname.srt
build_scheddb	scheddb_input.fil	
build_vaxportdb	none	
build_vmsdb	vmsdb_input.fil	

*Note: these files are used by the Traffic Analysis Programs (bottleneck, incident detection, and station aggregation) to create a table of pointers to the RTDB.

Table 2: Files Related to On-line Data Base Builds

Main for Online Build	Function that calls it	Temp File that is Used
build_fmdb	tms_startup	rtfmdbname.srt
build_rtdb	tms_startup	rtfmdbname.srt

DEFAULT SPECIFICATION IN RMDB

There are two stages of default specification:

1) Upon compilation, the Default data column in /fddb/rmdb/rmdb_tbl.c is initialized into global memory (likewise for the other "Predefined" data columns which include Minimum, Maximum, and EP_MASK). The fddb_name_table is initialized here as well. The fddb_name_table structure contains default values, but these simply references the ones in the Default data column.

2) During off-line run of build_rmdb, the rmdb_input.fil is processed. The beginning of this file contains "User Defined Default" columns (see next page). Only the exceptions to the Default data column (from rmdb_tbl.c) need to be specified, which reduces the complexity of the rmdb_input.fil. The values listed here supercede those of the Default data column. If "MAXIMUM, MINIMUM, DEFAULT, or EP_MASK" columns are defined, these values supercede those that were compiled in step 1), and are used as the Predefined for all data columns.

"User Defined Default" columns (see list on next page) are then used as defaults for the remaining cabinets in the rmdb_input.fil (to make it easier to specify parameters for a similar group of cabinets) Only the exceptions to the "User Defined Default" columns needs to be specified. These exceptions supercede those listed in the "User Defined Default" columns. Only the group names for which there are exceptions *need* to be listed; however it is OK to list all of them. Group names must be in the order specified in the HNTB documentation (pg 121). The RMDB is built from the rmdb_input.fil, so the cabinet names must be given even if no exceptions are listed

Defaults Columns used in RMDB_INPUT.FIL

This table indicates which data columns use which user-defined default column. The user defined default columns appear without an equal sign, such as { PM-020 } while a column which uses a default will appear with an equal sign such as {ES-TR1R = PM-020}.
Note: these are not permanent -- this table is from 4/96.

User Defined Default Column	Columns which use it for default parameters
PM-003	none
PM-020	ES-TR1R ES-116R ES-117R ES-137 ES-146R ES-504Rn ES-506R ES-822 ES-881 ES-889R
PM-023	none
PM-123	ES-TR8R ES-TD1R PM-123 ES-TR8R ES-TD1R ES-TD1R
PM-103	ES-TR7R ES-TR7R
PM-120	ES-TR6R ES-188
PM-100	ES-TR4R ES-WS2D ES-139R ES-151R ES-168R ES-175R ES-825R
A45-123	ES-689R ES-730R
A45-120	ES-716R ES-726R
A45-100	ES-681R ES-710R ES-740R
AM-003	ES-TR2R
AM-020	ES-134R ES-136R ES-141R ES-156R ES-158R ES-163R ES-174R ES-187R ES-207R
AM-023	none
AM-100	ES-149R
AM-103	none
AM-120	ES-181R ES-193R ES-203R
AM-123	none

NoMeter	ES-TR3D ES-TD1D ES-TD2D ES-TD3D ES-WS1D ES-059D ES-068D ES-069D ES-074D ES-079D ES-086R ES-087R ES-088D ES-090D ES-092R ES-093D ES-094R ES-098D ES-100R ES-101R ES-102R ES-104D ES-105D ES-108D ES-111R ES-118R ES-121R ES-123D ES-124D ES-125R ES-126D ES-128D ES-130D ES-132D ES-143D ES-145D ES-148D ES-152D ES-154D ES-159R ES-161D ES-165D ES-167D ES-170D ES-172R ES-177D ES-179D ES-186D ES-189D ES-201D ES-213D ES-264D ES-265D ES-502D ES-514D ES-516R ES-519R ES-520D ES-521R ES-522R ES-524R ES-525R ES-528D ES-531R ES-533D ES-535D ES-538D ES-539D ES-540D ES-541D ES-542D ES-543D ES-544D ES-610D ES-612D ES-614D ES-616R ES-617D ES-619D ES-621D ES-622D ES-623D ES-625D ES-626D ES-628D ES-630D ES-632D ES-633D ES-634R ES-638R ES-642R ES-647R ES-651D ES-653R ES-660D ES-662R ES-667D ES-672D ES-676D ES-677D ES-678D ES-682R ES-684D ES-687R ES-693R ES-694R ES-696D ES-698D ES-704D ES-706D ES-708D ES-709D ES-711R ES-717R ES-720D ES-722D ES-724D ES-731R ES-734D ES-736D ES-738D ES-739D ES-741R ES-742D ES-761D ES-810D ES-812D ES-814D ES-818D ES-820D ES-826D ES-827D ES-852D ES-854D ES-855D ES-857D ES-858D ES-860D ES-861D ES-878D ES-883D ES-885D ES-891D ES-896D ES-900R ES-903D ES-910D ES-912D ES-916D ES-924D ES-928D ES-932D ES-940D ES-992D ES-994D
I90-100	ES-920R
I90-020	ES-863R ES-876R ES-879R ES-887R ES-893R
I90-120	ES-900R ES-908R ES-935R ES-945R

STRUCTURE OF RMDB (Ramp Metering Data Base)

STRUCTURE NAME	ARRAY SIZE	DESCRIPTION
1) rmdb_offsets		Offsets to other items in RMDB
2) rmdb_parameters		Contains parameters for all groupsr Approx. 300 parameters in each data column
3) fddb_line_buffer		Contains pointer to current source Position in source file, position of comments, work_buffer
4) fddb_group_table	19 group names	Group names

Internal_Controls, 170_Data, 170_Parameters_at_VAX, 170_Global_Parameters, Data_Validity_Parameters, Loop_table, Speed_traps, Lane1_parameters, Lane2_parameters, Lane3_parameters, Station_aggregation_parameters, Incident_detect_parameters, Bottleneck_analysis_parameters, Activation_analysis_parameters

5) fddb_output_list	approx 300	Group names and parameter names
6) fddb_data_col_list	n_data_columns	Name of each field device (beginning with min, max, default, and ep_mask), index to default data column, file location of data column, line number in file, relative pointer to data column
7) fddb_name_table		num_nt_entries Names of elements in name table, type, size, flag, and offset to this data element
8) rm_dc_data_col	n_data_columns	Contains each element in data column (approx 300)
9) loop_name_list	n_data_columns	Array of loop names for each 170

BUILD_RMDB

Build_rmdb opens and reads rmdb_input.fil, builds RMDB, creates temporary files (loop_names.lst, inc_det.eqn, btl_neck.eqn, speed_traps.lst, stn_aggr.eqn, station_names.lst, actv_anal.eqn) which are later used to build tables in global memory for traffic analysis programs. It also sorts names, loops, stations and speeds traps and writes them to "rtfmdbname.srt" to be used for later creation of RTDB and FMDB. Build_rmdb appears deceptively simply, but in fact, starts a long chain of events, calling function upon function.

BUILD_RMDB [/fddb/rmdb/build_rmdb.c]

- Declare variables -- Most of these are globals defined in fddb.h or rmdb.h
- The three fddb_state_table structures (**fst_cnt_dcol, fst_ld_param, fstr_read_jnl**) are initialized in the file fddb_fst.c upon compilation. These are state transition tables that contain pointers to functions called from rmdb_fddb_file! The other two tables (fst_tbl_name and fst_grp_cmt) are used from **patch_rmdb** when the user chooses to write rmdb_output.fil.
- Initialize global sort buffer parameters. Sort_bfr, max_sort_bfr, n_loops, n_stations, n_speed_traps, and n_names are globals that are written by **write_to_sort_bfr** [/fddb/rmdb/rmdb_sub.c] when called from **write_speed_traps_to_file, get_stn_aggr_eqn** , *and* **write_loop_name_list_to_file.**
- Open rmdb_error.fil, which is later written to in sub-functions called from read_fddb_file.

  Note: There are several fopen parameters unique to VMS. "mbf=2" is for multi-buffer count. This equals 2 for all files. "mbc=69" is for multiblock count, the number of blocks varying from file to file. "rop=wbh" is for record processing operations, and WBH means write behind. In files that are read from, "rop=RAH" for read ahead.

- Open the rmdb_input.fil
- Initialize the file pointer in the file_list (a global struct in rmdb.h but not actually part of RMDB. However, the rmdb_table_list does point to this structure, so this information is available wherever rmdb_tl is passed.)
- Initialize the pointers in **rmdb_tl** (often called **tl** in sub-processes) of struct type rmdb_table_list. This global struct defined in rmdb.h contains *absolute* pointers to each *table* within the RMDB. Although rmdb_tl is not actually part of the RMDB, it is essentially a quick pointer reference to everything in RMDB except rmdb_offsets and rm_dc_data_col. It contains 3 pointers to parts not in the RMDB, including rmdb_base, rmdb_file_pointers, and rmdb_stn_aggr_table. (The **rmdb_offsets**, on the other hand, are the 1st part of the RMDB and contain *relative* offsets to each part of the RMDB)
- The # of data columns is initialized to 4 to account for the Predefined data columns (min, max, default, and ep_mask). These rm_dc_data_col are predefined upon compilation, initialized in rmdb_tbl.c. The number of data columns is later incremented in the function **new_column** of /fddb/fddb_sub.c.
- Initialize the temporary line buffer. This struct, fddb_line_buffer, is the 3rd item in the RMDB. It's used in fddb/rmdb/read_fddb_file and get_next_line to parse the current line of rmdb_input.fil

- Count the # of data columns in rmdb_input.fil with call to **read_fddb_file** (see process description for details). The argument **fst_cnt_dcol** is what tells the read_fddb_file to simply count data columns rather than load them.. Whenever a curly brace is found, fst_cnt_dcol points to the function **cnt_data_col**, where the **data_col_list_size** is incremented. This is the first of 3 calls to read_fddb_file, passing a different function state table (fst) each time.
- Determine total size of RMDB in bytes. Three structs in the RMDB are an array of size n_data_columns: fddb_data_col_list, rm_dc_data_col, and loop_name_list. The remaining structs in the RMDB are of fixed size upon compilation. (see document "Structure of RMDB" for description).

- **map_to_global_section** [/tms_library/global_sub.c] to see if RMDB already exists in global memory. map_to_global_section builds descriptors for global section name, then maps to global system using system utility SYS$MGBLSC
  SYS$MGBLSC(inadr, gbl_addr, PSL$C_USER, flags, &gblnam, &ident, 0);
  inadr is start and end of address *to* map to. gbl_addr is the start and end address that *were* mapped to. ident is the version # of global section, where an exact match is required.
  If returned cond_code == NORMAL, then RMDB already exists, in which case **unmap_global_section** and **delete_all_global_section**. unmap_global_section deletes virtual access space using system call
  cond_code = SYS$DELTVA(gbl_addr, retadr, PSL$C_USER);
  gbl_addr is beginning and end address to be deleted, and retadr returns beginning and end addresses of section actually deleted. PSL$C_USER sets access mode so that privileges are needed to delete global section. delete_all_global_section builds descriptors and uses system utility SYS$DGBLSC to mark global section for deletion.
- **create_global section** [/tms_library/global_sub.c]
  cond_code = create_global_section(section_name, bytes_required, gbl_addr);
  The section name was initialized to "TMS_RMDB." create_global_section builds descriptors for global section name and creates RMDB using system utility SYS$CRMPSC, which associates a specified section of address space with specified physical addresses (both creates and maps). gbl_addr is an array returned by SYS$CRMPSC containing actual beginning and ending address of RMDB in global memory. If returned cond_code == SS$_NORMAL, then the global section already exisited and was mapped to -- the previous delete did not work properly because there is another process that mapped to the old RMDB. Successful creation returns SS$_CREATED.

- Calculate the bytes_provided from returned gbl_addr, and make sure it is less than bytes_required.
- If TEST_RMDB is defined, create RMDB in process memory only (not global), so that it's deleted when application finishes running.

- Initialize the RMDB *using* the absolute pointer in rmdb_tl
  - *init_rmdb_tl(gbl_addr[0], &offsets, &rmdb_tl);* [in /tms_library/fddb_lib.c]
    Calculates *absolute* pointers to each table in RMDB. base_address is passed in as gbl_addr[0]. Absolute pointers = base_address + relative offsets (which were previously calculated when determining size of RMDB).
  - *memcpy(gbl_addr[0], &offsets, sizeof(struct rmdb_offsets));*

Relative offsets were previously calculated when determining size of RMDB.
Copy offsets struct to beginning of RMDB. This is 1st item in RMDB.

- *init_rmdb_params(&rmdb_tl, n_data_columns, num_nt_entries);*
  (these are rmdb_tl->pm_ptr->...). Item 2 in RMDB.
  Call init_fddb_params to handle FDDB parameters.
  Initialize parameters unique to RMDB:
  data base type = RMDB_TYPE, sum_metered_lanes = 0
  For RTDB and FMDB, set n_names, n_loops, n_stations, and n_speed_traps to 0.
- *memcpy(rmdb_tl.gt_ptr, &group_table, size_group_table);*
  Global array of group_table was initialized in rmdb_tbl.c upon compilation.
  Copy group table into RMDB. Item 4 in RMDB.
- *memcpy(rmdb_tl.ol_ptr, &output_list, size_output_list);*
  Global array of output_list was initialized in rmdb_tbl.c upon compilation.
  Copy output_list into RMDB. Item 5 in RMDB.
- ***init_rmdb_data_col_list(&rmdb_tl, rmdb_db_base);***
  For each field device (data_col_list_size was previously determined by 1st call to read_rmdb_file), set the name to null, dft_column, file_loc, and lineno to -1. The name and dft_column are updated later in **new_column**. Calculate offset to the rm_dc_data_col corresponding to each field device.
- *memcpy(rmdb_tl.nt_ptr, &name_table, size_name_table);*
  Name_table is initialized in rmdb_tbl.c upon compilation.
  Copy info for each element into RMDB. Item #7 in RMDB.
- *memset(rmdb_tl.ln_ptr, NUL, n_data_columns * sizeof(struct loop_name_list));*
  Calculate size of loop_name_list and set to NULL in RMDB. The loop name table for each data column is later updated in **get_pin_assignments**. Item #9 in RMDB.
- Skip rm_dc_data_col for now. They are subsequently built by sub-function **new_column**.
- Reinitialize line buffer. rmdb_tl->lb_ptr was already set to temp_lb for 1st call to read_fddb_file. Item #3 in RMDB.

- **calc_offsets** [in /fddb/fddb_sub.c]
  converts the compile time pointers to relative offsets (stored in rmdb_tl.nt_ptr[i].offset) for each name table element by subtracting out ct_default (base address of default rm_dc_data_col at compile time)
- Copy the Predefined data columns (ct_minimum, ct_maximum, ct_default, and ct_ep_mask exists as global variables initialized in rmdb_tbl.c at compile time) into the RMDB data columns. Initialize the global pointers ct_minimum_ptr, ct_maximum_ptr, ct_default_ptr, and ct_ep_mask_ptr. The number of data columns is updated to its minimal 4, and is later incremented during **new_column** function.

- Open the temporary files that will be written to by read_rmdb_file's subfunctions. These files include LOOP_NAMES.LST, STATION_NAMES.LST, SPEED_TRAPS.LST, STN_AGGR.EQN, INC_DET.EQN, BTL_NECK.EQN, and ACTV_ANAL.EQN. The equation files are later used during startup of the traffic analysis programs to build tables in memory.
- **read_fddb_file** (see function description for details) reads rmdb_input_file, creates data columns and writes to temporary files. The argument fst_ld_parameters contains the function

state tables, indicating what function to call given the delimiter type returned by **get_next_line** [/fddb/fddb_sub.c]. This is the 2nd call to read_fddb_file.

- **load_name_table_ndx** [/fddb/fddb_sub.c] calls **find_fddb_nt_name** to get the offset to the "_NameTableNdx " field in the fddb_name_table (the RMDB struct that contains element names and relative offsets to them). For each data column, the "_NameTableNdx " field is set to the numerical index for that data column (between 0 and n_data_col_list).
- Close temporary files.

- Open file RMDB_JOURNAL.FIL, which contains real-time changes that were made to the RMDB from the operator console during previous operation of TSMC.
- Call **read_fddb_file** to read rmdb_jnl_file, using function state table **fst_read_jnl**. This is the 3rd call to read_fddb_file. **fst_read_jnl** points to **find_col_name** when it encounters a curly bracket. It points to **find_grp_name** when it encounters a square bracket. However, the journal files do not contain group names, only column names and changes made. When it encounters a parameter, it points to **get_param**, which should update the RMDB. However, this code does not work for some reason. get_param does work correctly when used with fst_ld_param, so the problem is probably not within get_param. Possibly the problem is that the current group is incorrect. For further details on journal file, see rmdb_journal.frm.

- Set global line buffer input to file terminal (disables generation of debugging output file).

- Call **mem_sort_rtfmdb_names** [/fddb/rmdb/rmdb_sub.c] to sort the station names, speed traps, and loops in ascending order using system call
  qsort(sort_bfr, n_names, (RTDB_NAME_LENGTH+1), rtfm_compare);
  The arguments sort_bfr (containing names) and n_names are globals that were previously updated by **write_to_sort_bfr** [/fddb/rmdb/rmdb_sub.c] when called from **write_speed_traps_to_file, get_stn_aggr_eqn** , and **write_loop_name_list_to_file.** Sorted list is written to "rtfmdbname.srt" and used in build_rtdb.c to create RTDB.

READ_FDDB_FILE [in build_rmdb.c]

Called 3 times from build_rmdb main. read_fddb_file reads each line in rmdb_input.fil with call to **get_next_line**, then searches state table until it finds the current state and line_type. The corresponding function is called. The behavior of read_fddb_file depends entirely on what input file it is reading and what function state table is used. This documentation will describe the behavior for the load parameter function state table because it is by far the most complex.

- Initialize current state to 0 index of state table (corresponding to NO_COLUMN). The function state table was initialized in fddb_fst.c upon compilation. The state table name was passed in as an argument.
- Initialize line buffer (global struct in RMDB).
- While not end of rmdb_input.fil
  - *line_type = **get_next_line**(tl, fddb_file);*
    Returns line_type of comment, curly_brace, square_bracket, or parameter. (See function description for details). Line is stored in tl->lb_ptr->line_buffer
  - **setjmp** saves stack environment for later use by longjmp. If error occurred in get_next_btl_line, then **longjmp** restores environment.
  - While not end of state table
    - Search table until the current state and line_type match those indexed in table. The table contains an array of structs of the form *{state, line_type, err_msg, before, function_pointer, after, and new state}*. *Before* indicates how to process comments before the function call, and *after* indicates how to process comments after the function call. This search is linear, always starting at the beginning of the table and scanning until it finds the state/line_type or until end of table.
    - Process comments before function call based on fst[i].before
      - If within comment block, update end of comment block
      - If CMT_PREV, save comment block in previous name/group
      - Otherwise skip comment processing
    - Get pointer to function from state table.
    - Call function. For fst_ld_parameters, this can be **new_column, complete_new, grp_name_fnd, get_param,** or **complete_col**. See function descriptions for details.
    - Process comments after function call based on fst[i].after
      - If INIT_CMT, save location as start of a comment block
      - If CLR_CMT, clear comment block variables
      - Otherwise no comment processing
    - Get new state from function state table. States include NO_COLUMN, NOCOL_CMT, COL_NAME, GRP_NAME, PARAM_ST, CMT_STATE, CMT_BLANK, FF_STATE, and END_TABLE.
    - Save last line type in line_buffer->prior_line
    - If current state is DONE_FIL, return. Otherwise exit inner loop (go read next line). DONE_FIL becomes next state if the line_type encountered is end of file.

GET_NEXT_LINE [/fddb/fddb_sub.c]

Called from read_fddb_file to read next line of input file. Returns line_type: END_FILE,

FORM_FD, BLANK_L, COMMENT, CURLY_BR, SQ_BKT, or PARAM. The line_type constants [defined in /fddb/fddb.h] consist of 8 bits (constants 0x11 through 0x17). If the 8th bit is set, this indicates a truncated record.

- Get current line of input file and store in line buffer
- Increment line number in rmdb_tl->lb_ptr->line_no
- Initialize work buffer pointer and offset
- Check for end of file
- Calculate length of line
- Check line byte by byte for a form feed.
  - If "\f" is found, store the FF position in file
    - If FF is first byte in line, adjust file position to continue after FF and return FORM_FD
    - Else adust file position to reread FF and continue processing
- Check to see if record is truncated --
  If line doesn't end with "\n", record is bad -- set truncated_record bit flag to TRUNC_REC
  Otherwise, line is not truncated -- set flag to 0x00.
- BLANK_L returned if line is null
- COMMENT returned if line's first nonblank char is ";"
- CURLY_BR returned if line's first nonblank char is "{"
- SQ_BKT returned if line's first nonblank char is "["
- PARAM returned otherwise

FUNCTIONS CALLED FROM READ_FDDB_FILE

Read_fddb_file calls several functions. Which functions are called depends on the function state table, an argument passed to read_fddb_file from build_rmdb. The function state table provides a pointer function to process the current state and line_type from the input file that is being read.

The table below indicates the name of each function state table, what function calls read_fddb_file, and what functions that table uses.

Table Name	Called from	Functions called
fst_cnt_dcol	build_rmdb	cnt_data_col
fst_ld_param	build_rmdb	new_column, complete_new, grp_name_fnd, get_param, complete_col
fst_tbl_name	build_cctvdb, build_gbldb, build_gcdb, build_oprtvdb build_vmsdb	col_name_fnd
fst_grp_cmt	build_cctvdb, build_gbldb build_gcdb, build_oprtvdb build_vmsdb	chk_col_name, grp_name_fnd
fst_read_jnl	build_rmdb	find_col_name, find_grp_name, get_param

DESCRIPTION OF FUNCTIONS CALLED FROM READ_FDDB_FILE

cnt_data_col [/fddb/fddb_sub.c] -- increments the # of data columns whenever a line begins with "{"

- Call **column_name_line** [/fddb/fddb_sub.c] to crack 'table_name = default" into its three parts. Returns either P_NAME_FOUND, P_NAME_EQUAL_FOUND, or P_NAME_VALUE_FOUND
- Increment data_col_list_size (a parameter in RMDB) unless it is one of the four Predefined data columns.

new_column [/fddb/fddb_sub.c] -- creates new data column, loads default values whenever line begins with a "{", and increments n_data_col_list_size.

- Call **column_name_line** [/fddb/fddb_sub.c] to crack 'table_name = default" into its three parts. Returns either P_NAME_FOUND, P_NAME_EQUAL_FOUND, or P_NAME_VALUE_FOUND
- If data column is one of 4 Predefined data columns, don't create a new data column
  - set current_tl_index to predefined index

    - **init_group_table** to predefined data column (from current_tl_index) -- see function description below.
- **new_column_special_case** -- Initializes station aggregation list and sets DataSwitch for current column (see function description below for details)
- Make sure that n_data_col_list (counted in this function) is less than the n_data_col_list (previously counted in 1st call to read_fmdb_file)
- Copy table_name (of form ES-****) into data column
- Update current_tl_index to n_data_col_list
- **init_group_table** -- This is a temporary table to store location of group names in rmdb_input.fil. It is reused for each data column and contains data for only one data column.
    - Copy current column name (last read in new_column) into the group table gt[0].name.
    - Set current group index to zero -- this points to current column name
    - For cabinet (gt[o]), set before_pos, name_pos, and after_pos to file position in line buffer
    - Initialize group names (1 through end of group table)
      Set before_pos, name_pos, and after_pos to -1
- Find default_index
    - If no default name was given, use Predefined default.
    - Otherwise, search for the provided default_table_name using **find_fddb_cl_name**, which returns an index to a data column. Set default index to the user specified data column.
- Specify default_index in data column and copy defaults to data column.
- Increment n_data_col_list
- **new_column_special_case** -- Initializes station aggregation list and sets DataSwitch for current column
    - **init_stn_aggr_list** [/fddb/rmdb/rmdb_sub.c]
        - Get pointer to station aggregation list
        - For each station of list
            - Set station name to null
            - Set # of loops to 0
            - Set all loop names to 0 for that station
    - Calculate pointer to current data column
    - If one of Predefined data columns, set data switch to NOT_RM_DC and return
    - Set data switch to RAMP_MTR, DATA_STN, or NOT_RM_DC based on cabinet name
        - Get cabinet name from line buffer. Check char 6 to determine data switch type.
        - Set col_ptr->_DataSwitch

complete_col [/fddb/rmdb/rmdb_sub.c]

Called when another "{" is found or end of file -- finishes previous data column
Return if Predefined column
Otherwise, call several functions (for details, see function descriptions elsewhere):

- **write_loop_name_list_to_file**
  Get pointer to current data column
  If the data column is for a ramp meter/data station,
- **count_active_loops** -- counts NActiveLoops for a data column
  For all loops in 170
- **count_metered_lanes** -- counts NMeteredLanes and MLanesMask for a data column

- **set_roadway_type_bits** -- set bit of RoadTypeMask according to roadway type
- **count_speed_traps** -- count the # of active speed traps for a given data column and write to _NSpeedTraps
- **match_speed_loops** [/fddb/rmdb/rmdb_sub.c] -- For all speed traps in a data column, find matching upstream loop for a given downstream loop and write to data column
- **write_speed_traps_to_file** -- For a particular data column, writes speed traps to file speed_traps.lst and to global sort buffer.
- **build_dft_stn_aggr_eqns** -- fills in the struct rmdb_stn_aggr_table for a particular data column. This consists of copying in the station name, # of loops in 170, and the loop names.
- **write_dft_stn_aggr_eqns_to_file** -- For each station in a given data column, copy station and loops from station aggregation table to temp buffer. Then write entire equation to stn_aggr.eqn.

complete_new [/fddb/fddb_sub.c] -- combined functions of complete past column and start new column. Called when next "{" is encountered in rmdb_input.fil

- **complete_col** (see above description)
- **new_column** (see above description)

grp_name_fnd [/fddb/rmdb/rmdb_sub.c]-- Called when a "[" is encountered in rmdb_input.fil. Searches for group name in fddb_group_table (which contains 19 group names) to obtain group index, stores *current* group index in pm->grp_ndx, and stores file position for comment block. This is later used in **process_input_special_case** (see **get_param** below) to get group type.

- Call **get_token** to extract group name from square bracket string
- Call **find_fddb_gt_name** to return group index for given group name
- Set gt[group_index].before_pos to to start of comment block before group name
- Set gt[group_index].name_pos and .after_pos to current file position in line buffer
- Call **grp_name_special_case** -- this function does nothing for BUILD_RMDB

get_param [/fddb/fddb_sub.c] -- Called to process parameter line. Loads parameter(s) in data column of RMDB.

- While not end of line, process parameters
  - Call **get_token** to find_next_parameter in line buffer -- this just skips over blanks and commas to point to parameter
  - Call **process_input_special_case** to check for special cases based on current grp_index and return ld_result:
    - If PIN_ASSIGNMENTS, **get_pin_assignments** (see function description)
    - If SPEED_TRAP_PARAMS, **get_speed_trap_params**
    - If TIME_OF_DAY_TABLE, **get_tod_entry** (see function description)
    - If STN_AGGR_EQNS, **get_stn_aggr_eqn** (see function description)
    - If INC_DETECT_EQNS, **get_inc_det_eqn** (see function description)
    - If BTLNECK_ANAL_EQNS, **get_btl_neck_eqn** (see function description)

    - If ACTIVATION_ANAL_EQN, **get_actv_anal_eqn**
    - Note: In future code, If FUZZY_PARAMETER, **get_fuzzy_params**
    - Note: In future code, If FUZZY_EQNS, **get_fuzzy_eqn**
    - Otherwise not a special case
  - If not a special case, call **load_param** to put parameter into data column (see function description)
  - If successful load (ld_result == DONE), continue processing line
  - Otherwise, handle error

find_col_name [/fddb/fddb_sub.c] -- Called during journal file read. Parses a column name from the input line, searches for index to that column in RMDB, and updates pm->current_tl_index.

- Call **column_name_line** to crack input line into 3 parts: 'Column_Name = Default'
- Search for column_name in RMDB and return index to it with call to **find_fddb_cl_name**.
- Update current index

find_grp_name [/fddb/fddb_sub.c] -- Called during journal file read. Parses a group name from the input line, searches for the group name in group table, updates current group index, pm->grp_ndx.

- Call **get_token** to extract group name from square brackets of input line.
- Search for group name in group table (which contains 19 names) with call to **find_fddb_gt_name** and return index to group
  Note that not all of names in group table are used in RMDB. Stn_aggr_eqns, inc_detect_eqns, btlneck_anal_eqns, and activation_anal_eqns are groups not included in RMDB.
- Update current group index
- Call **grp_name_special_case** -- Does nothing for BUILD_RMDB

DESCRIPTION OF SUBFUNCTIONS CALLED BY COMPLETE_COL

- **write_loop_name_list_to_file** [/fddb/rmdb/rmdb_sub.c] -- Write loop name to file "Loop_names.lst" and to global sort buffer.
  Get pointer to current data column
  If the data column is for a ramp meter/data station,
    - For all loops in the 170
      - Write the loop name to file_list.loop_name_file (called "LOOP_NAMES.LST")
      - Write the loop name to global sort buffer, sort_bfr with call to **write_to_sort_bfr**

- **count_active_loops** [/fddb/rmdb/rmdb_sub.c] -- counts NActiveLoops for a data column
  For all loops in 170
    - Check if function exists for that loop in col_ptr->loop_table[i].function
      If nonzero, then increment # of active loops

- **count_metered_lanes** [/fddb/rmdb/rmdb_sub.c] -- counts NMeteredLanes and MLanes-Mask for a data column
    - Get pointer to current data column
    - For all loops in 170
      - If 4th and 5th character of loop name are "_P"
        - Increment # of metered lanes
        - Check if char 6 of loop name is 1, 2, 3
          set corresponding bit in MLanesMask (an 8 bit flag)

- **set_roadway_type_bits** [/fddb/rmdb/rmdb_sub.c] --set bit of RoadTypeMask according to roadway type
    - Get pointer to data column
    - Initialize RoadTypeMask to 0x00
    - For all loops in 170
      - **classify_roadway** type for loop (7 possible types of form **_ROADWAY)
      - Set bit in col_ptr->_RoadTypeMask for roadway_type -- each roadway type has a corresponding bit in _RoadTypeMask

- **count_speed_traps** [/fddb/rmdb/rmdb_sub.c] -- count the # of active speed traps for a given data column and write to _NSpeedTraps
    - Get pointer to data column
    - For all speed traps in that data column
      - If speed trap has a nonzero downstream loop
        Increment # of speed traps
    - Write # of speed traps to col_ptr->_NSpeedTraps

- **match_speed_loops** [/fddb/rmdb/rmdb_sub.c] -- For all speed traps in a data column, find matching upstream loop for a given downstream loop and write to data column
    - Get pointer to data column
    - For all speed traps in data column
      - Search through loop in 170 until find upstream loop that corresponds to a given down-

stream loop.
    - Write matched upstream loop to col_ptr->speed_traps[i].upstr_loop

- **write_speed_traps_to_file** [/fddb/rmdb/rmdb_sub.c] -- For a particular data column, writes speed traps to file speed_traps.lst and to global sort buffer.
    - Get pointer to data column
    - Make sure data column is of type RAMP_MTR or DATA_STN
    - For all speed traps in that data column, write to file "speed_traps.lst"
        - Write station and loop name, "speed_trap", and index for that speed trap within 170.
          Example: "ES-TD1R:MMN__T1 SPEED_TRAP ; Speed Trap 1"
            - Write speed trap name to global sort buffer with call to **write_to_sort_bfr**

- **build_dft_stn_aggr_eqns** [/fddb/rmdb/rmdb_sub.c] -- fills in the struct rmdb_stn_aggr_table for a particular data column. This consists of copying in the station name, # of loops in 170, and the loop names.
    - Get pointer to data column
    - Make sure data column is a RAMP_MTR or DATA_STN, otherwise return.
    - For all loops in 170
        - **classify_roadway** type
        - Convert the roadway_type from to an index by subtracting NB_ROADWAY, the first constant in listing of roadway types
        - If the current loop_name is a speed trap (char 5 equals 'S'), don't include it
        - If num_loops is set to -1, this means equation was specified in rmdb_input.fil. Don't build a default equation for this station.
        - If num_loops equals zero, copy station name from line buffer to station aggregation table
        - Copy loop name from line buffer to station aggregation table
        - Increment # of loops for this station
        - Error if # of loops exceeds LOOPS_PER_STATION, the max allowed.

- **write_dft_stn_aggr_eqns_to_file** [/fddb/rmdb/rmdb_sub.c] -- For each station in a given data column, copy station and loops from station aggregation table to temp buffer. Then write entire equation to stn_aggr.eqn.
    - Get pointer to data column
    - Make sure data column is RAMP_MTR or DATA_STN, otherwise return
    - For all stations (for a given point on the roadway, it is possible to have up to seven roadway types: NB, NC, NH, SB, SC, SH, and RV)
        - For all loops in that station
          Copy loop_name from station aggregation table to a temp buffer
        - Write station name (15 chars) =loop_name1+loop_name2, etc...
          Example: "ES-TR1R:MMN_Stn=MMN___1+MMN___2+MMN___3+MMN___4"

DESCRIPTION OF SUBFUNCTIONS CALLED BY GET_PARAM

get_pin_assignment [/fddb/rmdb/rmdb_sub.c] --Parses line of form 'pin_name =parameter_value' and stores loop name, loop function, and pin # in loop name table for that data column.

- Get pointer to current data column (current_index was set by **new_column**)
- Call **get_token** to get parameter name from input line (will be "pin1" through "pin40")
- Handle special case for EP_MASK
- Call **get_token** to get parameter_value (7 chars such as " _MMNRA_2") from input line
- Return if current data column is one of Predefined -- pin assignment not valid
- Convert pin # to from ascii to integer
- If param_value is "NONE"
  - set loop name to null
  - set pin_function to 0
  - Set speed trap loops to 0
- Check for duplicate pin #
- Copy param_value from line buffer into loop name table for that data column (this writes over null initialized in build_rmdb)
  (tl->line_ptr into loop_name[pin_no][0])
- Set loop function and pin # within that data column
- If DISABLED, set loop_status to DISABLE
- If pin is for speed trap, make sure speed trap is OK.

get_tod_entry [/fddb/rmdb/rmdb_sub.c] -- processes a tod entry of rmdb_input.fil and writes into data column

- Get parameter name from input line with **get_token**
- Obtain index to parameter name with call to **find_fddb_nt_name** (it returns the relative offset to that element from the col_ptr)
- Calculate pointers to data column, tod_ptr, min_tod_ptr, and max_tod_ptr for that data column
- Get equal sign from input line with **get_token**
- If current index equals the Predefined data column EP_MASK_INDEX
  - Get ep_mask
  - set tod_ptr->hour to ep_mask
- Get time parameter (hour and minute) from line
- Make sure time parameter is greater than min_time and less than max_time
- get "on" from input line
- get DOW (day of week) from input line
- get "@"
- get rate
- If rate_buffer equals "OFF", set rate to 0x00.
- Else if rate_buffer equals "Traffic", set rate to 0xFF

- Else set rate to rate_buffer converted from ascii to integer
- Set hour, min, dow, and rate for tod entry in data column.

get_stn_aggr_eqn [/fddb/rmdb/rmdb_sub.c] -- processes a station aggregation equation from rmdb_input.fil and writes it to files "stn_aggr.eqn", "station_names.lst", and to global sort buffer. It doesn't write these to RMDB. Stn_aggr builds the station aggregation table from "stn_aggr.eqn".

Get pointer to data column
- Make sure data column is of type RAMP_METER or DATA_STN. Otherwise return.
- Check that station name in aggregation equation matches the one give for this data column
- **classify_roadway** given station name -- returns 1 of 7 road_types of form **_ROADWAY
- Convert roadway type to an integer index by subtracting NB_ROADWAY, the first in listing of roadway type constants
- Initialize # of loops in station aggregation of data column to -1 to prevent default equation from being built later. This is later incremented in **build_dft_stn_aggr_eqns**, which is called from **new_column**
- Get equal sign from input line
- DONE if no loops
  - Read each loop name until end of line
  - Check for errors. Return if too many loops, loop name doesn't match those given under pin assignments for that cabinet, or not at least 1 loop in equation.
  - Build equation (format is same as in rmdb_input.fil) to a temp buffer
- Write temp buffer to file "stn_aggr.eqn"
- Write station name to file"station_names.lst"
- Write station name to global sort buffer with call to **write_to_sort_bfr**

get_inc_det_eqn [/fddb/rmdb/rmdb_sub.c] -- processes incident detection equation in rmdb_input.fil and writes it to file inc_det.eqn. These parameters are not written to RMDB. Instead, inc_detect builds the incident detection table from "inc_det.eqn."

get pointer to current data column
- Parse input line to get cabinet name with call to **get_cab_loop_name**
- Parse input line to get equal sign with call to **get_token**
- Parse input line to get this_stn with call to **get_next_loop_name**
- Check that station name matches the one that was given in cabinet line of input file
- Get dwnstr_stn of incident detection pair from input line with call to **get_cab_loop_name**
- Build equation in temp buffer (same format as that in rmdb_input.fil)
- Print temp buffer to file "inc_det.eqn"

get_btl_neck_eqn [/fddb/rmdb/rmdb_sub.c] -- read bottleneck equation from input line and write bottleneck and weight equations to file "btl_neck.eqn". These parameters are not written to RMDB. Instead, bottleneck builds the bottleneck table from "btl_neck.eqn."

Get pointer to current data column

- Initialize indices for loops and weights to zero
- Get bottleneck station from input line (15 chars)
  - Get cabinet name with call to **get_token**
  - Get loop name with call to **get_token**
- Make sure the bottleneck station name matches the one most recently read from **new_column**
- Get equal sign and put in loop operator
- Read all loops from bottleneck equation (see diagram "Read Bottleneck Equation")
- Read all weights from weights equation (see diagram "Read Bottleneck Equation")
- In case of END_LINE, **get_next_btl_line**
- Write bottleneck equation to "btl_neck.eqn"
- Write weight equation to "btl_neck.eqn"

load_param [/fddb/fddb_sub.c] -- called from get_param if not one of the special cases. Gets parameter name and value from input line and puts into data column

- Get parameter name from input file with call to **get_token**
- Search for parameter name in element name table with call to **find_fddb_nt_name** and return offset relative to beginning of data column
- Calculate pointer to parameter in data column by adding the column pointer (which was passed in as an argument) to relative offset
- Select parsing table based on field type. Field types (0x00-0x49) are found in tms_system.h

  NOTE: The field type names containing a 1 are scaled by 0.1 when they're used. These include UBYTE1, UBYTE1P, SBYTE1P, USHORT1, USHORT1P, SSHORT1, and SSHORT1P. This way they save memory because they're not stored as floats. Although elements of this type are premultiplied by 10 in the Predefined Data Columns in rmdb_tbl.c, they are entered as floats in rmdb_input.fil. This factor of 10 difference is accounted for in the parse table struct (see tok_tabl.c). The parse table for these field types tells **get_token** to write over the decimal point, modifying the input line buffer. The effect is multiplying the input by 10 and converting from a float to an integer. That's why the subsequent call to **atol** in load_param is able to convert from ascii to an integer.

- Get parameter value from input line with call to **get_token** with appropriate parse table
- Process parameter -- switch based on parameter type
  - Cast parameter name's pointer to proper type
  - Make sure parameter value is within acceptable range with call to range_check. Range_check compares with the Minimum and Maximum Predefined Data Columns for that element (not specific to field type).
  - Write parameter value to RMDB

STRUCTURE OF RTDB (Real Time Data Base)

STRUCTURE NAME	ARRAY SIZE	DESCRIPTION
1) rtdb_offsets	1	Offsets to other items in RTDB
2) rtdb_params	1	Creation time, db_type, # processes, # of name table entries, etc
3) rtdb_reg_process	1	Process ID's, bit masks to track processes
4) unsigned long	NUM_RTDB_COLUMNS	offsets for RTDB data ptrs
5) rtdb_name_table	rtfm_n_names	element name, type, size, and offset to data
6) data_col	NUM_RTDB_COLUMNS	

BUILD_RTDB

BUILD_RTDB maps to RMDB, calculates size of RTDB, allocates memory for RTDB, and initializes RTDB. See description of RTDB structure in rtdb_struct.frm. The structures are initialized in tms_include/rtdb.h.

BUILD_RTDB [//build_rtdb.c]

- Started from tms_startup and executed once
- maps to RMDB
- Calculate n_bytes_data_elems (total # of data bytes/sample) by added # of loops, # of stations, and # of speed traps, which were tallied by BUILD_RMDB.
- Calculate bytes required for RTDB and offsets to items in RTDB
  1. rtdb_offsets to other items in RTDB
  2. rtdb_params -- oddball creation parameters
  3. rtdb_reg_process -- bit masks
  4. array of offsets to RTDB data_cols
  5. rtdb_name_table -- array of element names, type, size and offset
  6. data_col -- real time data
- **map_to_global_section** [/tms_library/global_sub.c] to create RTDB
- **create_global_section** for RTDB
- Make sure enough memory to fit RTDB
- Initialize RTDB
  1. copy offsets (that were calculated previously) into RTDB
  2. Initialize the FMDB parameters
  3. Set bit masks
  4. Calculate offsets for each data column
  5. Call **load_rtdb_name_table** [in build_rtdb.c]. Opens "rtfmdbname.srt", which was created by BUILD_RMDB and contains a sorted list of every loop, station, and speed trap. Initializes the rtdb_name_table. For each element, initializes type, element size, element offsets, and element name.
  6. Zero out all of the data columns

Related Functions:

- The NEW data column is updated when **run_polling_processes** [in rt_skeleton/rt_skeleton.c] calls **multi_rmdc_comm** [in comm_prot/rmdc_comm]
- **scroll_rtdb_col_offsets** [in tms_library/rtdb_lib.c] makes room for the latest data by moving data columns down one. It is called from **rt_skeleton** after TAPS have completed.
  - rtdb_cl is an array of offsets to data columns. Rather than moving the data itself, the data offset is incremented by one. The offset to the last data column is relocated to the first offset so that the same memory can be reused.
  - The first data column is initialized to zero (not the offset itself, but where it points to).
- **read_rtdb.c** [rt_skeleton/read_rtdb.c] is called from rt_skeleton every 20 seconds, but does nothing! It was put there in anticipation of future processing.