

RSX-11M Operating System Internals

Tests/Exercises

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Tests/Exercises

Course Number
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GENERAL INSTRUCTIONS

Tests

Written tests should be taken at the completion of the indicated module. Your instructor will provide specific instructions for each.

Exercises

Exercises will be performed on a live RSX-11M system. Your instructor will provide you with a privileged account. For the SYSGEN, you will be provided with a standalone system. Your instructor will divide the class into small groups, each of which will perform their own SYSGEN.

Some questions require added instructions from your instructor (adding of a new directive to your system). These instructions will be provided by the instructor when needed.

Overview of RSX-11M

TEST/EXERCISE

1. List the major design goals of RSX-11M.
2. List the major features of RSX-11M.
3. List the three major components of RSX-11M and give an example of each.

The System Data Base

TEST/EXERCISE

1. Use the LOOK task to perform the following:
 - A. Determine the following data about the task 'LOOKnn' (where nn is your terminal number):
 - Bits set in the task status words T.STS, T.ST1, and T.ST2
 - The partition in which the task is executing
 - The LUNs in use and the devices assigned to them
 - B. Determine what devices are in the system and how many units there are of each device type.
2. What is the algorithm used to allocate space in the DSR?

Executive Modules

TEST/EXERCISE

Which Executive module contains each of the following:

1. Listheads and pointers used by the system to access the system database.
2. The directive dispatch table.
3. The trap and interrupt vectors.
4. Code that does context switching.
5. System entrance and exit routines.
6. Routines used to insert entries into queues.
7. The routine used to allocate POOL space.

File System Overview

TEST/EXERCISE

Use the LOOK task to perform the following:

1. Determine the actual physical blocks allocated to the file FILE.DAT located on the system disk.
2. Use the LOG option with the LOOK task and locate the LUN used and the VCB of the log file.
3. Access the file FILE.DAT by performing the same steps that the file system performs, (i.e., map to the disk, find the user directory in the MFD, read the header for the user directory, and obtain the retrieval pointers).

System Generation

TEST/EXERCISE

1. Your instructor will provide you with a SYSGEN kit. Follow his instructions and perform Phases 1 and 2 of SYSGEN.
2. Run VMR on the system and save the image.

Physical and Virtual Memory

TEST/EXERCISE

1. Use the LOOK task to perform the following:
 - A. Determine the current subpartitions of GEN and the names of tasks using them.
 - B. Determine what tasks are attached and/or mapped to FCSRES.
 - C. Using the system map, find and diagram the system checkpoint file structure.

2. Indicate the values loaded into the PARS for the following tasks:
 - A. Task is non privileged
Length = 11K words
Loaded in region starting at 00234500

 - B. Task is mapped to a PI common of length 5K words
Length = 5K words
Located at 01443500

 - C. Task is mapped to a non-PI library with base address 120000
Length = 3K words
Located at 00732100

3. How many windows does the task have?

Task Management

TEST/EXERCISE

1. Use the LOOK task to perform the following:
 - A. Install the task TASKA and find it within the STD.
 - B. Run TASKA and find its location within the ATL.
 - C. Find the TCB of the task ...PIP and determine its status and characteristics.
 - D. List the steps performed when a task terminates abnormally.

2. Write a task which will do the following:
 - A. Prompt for input of the name of a task image file.
Use the data contained in the task header and task label blocks to print relevant task information.

System Synchronization

TEST/EXERCISE

Diagram each of the following:

1. How the system processes a software trap.
2. How the system processes a hardware interrupt.
3. How FORK processing works.
4. How the system handles a switch to system state by a privileged task.

Writing Privileged Tasks

TEST/EXERCISE

All of the following are to be privileged tasks.

1. Modify the task POOLA to find the number of free blocks, the largest free block, and the smallest free block in POOL.
2. Write a task which lists the names of all tasks checkpointed in the system checkpoint file(s).
3. Write a task which will create a copy of its TCB in the STD with the name ABCTnn where nn is your terminal number. Task ABCTnn should not be active. Do a TAL command to check the results.
4. Write a task which lists the following for each terminal:
 - Buffer size
 - Terminal type
 - Privilege

System Crashes

TEST/EXERCISE

Using either a CDA generated by one of your privileged tasks or one provided by your instructor, attempt to determine the cause of the crash. Discuss your results with the instructor in Lab.

Directive Processing

TEST/EXERCISE

1. Draw a diagram showing the steps needed to process a directive.
2. Write a directive processing routine to return to the user task the terminal number from which the task is run. The routine can be tested as a privileged task.
3. Write the macros needed to invoke the directive.
4. Include your directive in your system. This will require the following steps:

Rebuild EXCOM2 to include your routine.

Modify the DDT in DRDSP and rebuild EXCOM1.

Run VMR to reconfigure your system.

I/O Processing

TEST/EXERCISE

1. Trace the flow of an I/O request through the I/O system.
2. List the three types of ACPs and indicate the principal differences between them.
3. What checks are performed within DRQIO?

Device Driver Processing

TEST/EXERCISE

1. How are UNIBUS Mapping Registers used?
2. What are the entry points to a device driver and how are they used?
3. Using the LOOK task, determine the status of your terminal by examining the status bits in the UCB.

APPENDIX

Using the LOOK Task

LOOK is a program that runs on RSX-11M/M-PLUS operating systems to read control structures from system pool, secondary pool, and structured disks.

The LOOK task begins with only three links to the system data structures. These are:

- \$DEVHD - Link to the first DCB
- \$PARHD - Link to the first PCB
- \$TSKHD - Link to the first TCB

Commands

Only the first letter of any of the keywords (Read, Scan, etc.) need be entered, but if more than one letter is entered then the whole word must be entered.

ADDRESS

Print the memory or disk address of the last block read.

EXPLODE

Turn on the explode option, which causes all status fields, protection words, and other appropriate fields to be printed bit by bit with corresponding field names and switch settings.

FORMAT="BLOCK": "FORMAT"

Change the default printout format for the specified control block type. See Table A-1 for a list of the default format for each of the control blocks. An acceptable new format for a control block depends on the residence of the block. A memory-resident control block can be defaulted to any memory-resident format; a disk-resident control block can be defaulted to any disk format; and any control block can be defaulted to the dump formats of ASCII, MIXED, OCTAL, and RAD50.

HEAD="LISTHEAD"

Read the control block at the beginning of the specified list.

LOG[:"FILENAME"]

This command creates a file and causes all terminal I/O to be copied to the file in addition to appearing at the terminal. Exiting from LOOK closes the log file. The command -LOG stops logging but does not close the file.

MAP

Allows access to disk-resident data structures.

NEXT[="BLOCK"][:"ADDRESS"]

Read the next of the specified control block. If the block is not specified, LOOK defaults to the next of the last block name referenced. If an address is given, it is used instead of the one in LOOK's control tables.

PRINT[:"FORMAT"]

Print the control block that was just read. If a format is given, it is used instead of the default format, but it does not change the default format.

READ[="BLOCK"][:"ADDRESS"]

Read the control block specified by the current pointer in control tables. If a block is not specified, the default is the last control block referenced. If address is given, then that address is stored as the current address in the control tables.

SCAN="LIST": "NAME"[:PRINT]

Scan the memory-resident control blocks of the specified listhead until one is found that matches the specified name. If a matching name is not found, a scan failure message is printed.

The print option on the end of the command causes all control blocks read in the scan to be printed.

VERIFY

Print the current control block at the end of the execution of each non-null command line. The command -VERIFY turns off the VERIFY switch.

Table A-1 Available Data Blocks

Block Name		Format Name	Location
ADB	Attachment Descriptor	ADB	POOL
AST	Asynchronous System Trap Block	AST	POOL
CQCB	Clock Queue Control Block	CQCB	POOL
DCB	Device Control Block	DCB	POOL
DISK	Disk Data File	OCTAL	DISK
FCB	File Control Block	FCB	ACP
GGEF	Grp.Glbl EF Control Block	GGEF	POOL
HEADER	Disk File Header	HEADER	DISK
HOME	Disk Home Block	HOME	DISK
IOP	I/O Packet	IOP	POOL
ITB	Interrupt Transfer Block	ITB	POOL
LACB	Logical Assignment Control Block	LACB	POOL
LB	Lock Block	LB	POOL
MAB	Mapping Assignment Block	MAB	POOL
MFD	Master File Directory	MFD	DISK
MVL	Mounted Volume List	MVL	POOL
OCB	Offspring Control Block	OCB	POOL
PCB	Partition Control Block	PCB	POOL
SCB	Status Control Block	SCB	POOL
TCB	Task Control Block	TCB	POOL
THEAD	Task Header	THEAD	POOL
UCB	Unit Control Block	UCB	POOL
WB	Window Block	WB	POOL

Example 1

```
F11>S=TCB:...EDT
F11 -- reading TCB      from address 35560
F11 -- reading TCB      from address 114404
F11 -- reading TCB      from address 113760
F11 -- reading TCB      from address 42354
F11 -- reading TCB      from address 116204
F11 -- reading TCB      from address 114174
F11 -- reading TCB      from address 57330
F11 -- reading TCB      from address 115340
F11 -- reading TCB      from address 115024
F11 -- reading TCB      from address 114614
F11 -- reading TCB      from address 114510
F11 -- reading TCB      from address 52564
F11 -- reading TCB      from address 40034
F11 -- reading TCB      from address 54670
F11 -- reading TCB      from address 57644
F11 -- reading TCB      from address 117460
F11 -- reading TCB      from address 117354
F11 -- reading TCB      from address 45440
F11 -- reading TCB      from address 116310
F11 -- reading TCB      from address 116524
F11 -- reading TCB      from address 115660
F11 -- reading TCB      from address 115234
F11 -- reading TCB      from address 114720
F11 -- reading TCB      from address 113544
F11 -- reading TCB      from address 114300
F11 -- reading TCB      from address 45654
F11 -- reading TCB      from address 52144
F11 -- reading TCB      from address 61114
F11 -- reading TCB      from address 61324
F11 -- reading TCB      from address 61430
F11 -- reading TCB      from address 61534
F11 -- reading TCB      from address 116734
F11 -- reading TCB      from address 51210
F11 -- reading TCB      from address 54774
F11 -- reading TCB      from address 56370
F11 -- reading TCB      from address 114064
F11 -- reading TCB      from address 115444
F11 -- reading TCB      from address 117250
F11 -- reading TCB      from address 43214
F11 -- reading TCB      from address 45334
F11 -- reading TCB      from address 57504
F11 -- reading TCB      from address 47520
F11 -- reading TCB      from address 47730
F11>P
T.LNK  0
T.PRI  101
T.IOC  0
T.CPCB 47230
T.NAM  ...EDT
```

```

T.RCVL 0,47742
T.ASTL 0,47746
T.EFLG 0,0
T.UCB 0
T.TCBL 44240
T.STAT 100000000000000000
T.ST2 001000000000000000
T.ST3 010000000000000000
T.DPRI 101
T.LBN 0,22,1
T.LDV 22232
T.PCB 37070
T.MXSZ 302
T.ACTL 0
T.SAST 0
T.CHR 4
T.TIO 120
T.TKSZ 0
T.ATT 0,0
T.OFF 50014
0
T.SRCT 0
T.RRFL 50020,0
T.OCBH 0,0
T.RDCT 33

```

F11>N

F11 -- reading TCB from address 44240

F11>P

```

T.LNK 44360
T.PRI 101
T.IOC 1
T.CPCB 47230
T.NAM EDTT15
T.RCVL 0,44252
T.ASTL 0,44256
T.EFLG 1001,100000
T.UCB 27622
T.TCBL 44364
T.STAT 000000000000000000
T.ST2 001000000000000001
T.ST3 011010000000000000
T.DPRI 101
T.LBN 0,22,1
T.LDV 22232
T.PCB 41400
T.MXSZ 302
T.ACTL 57504
T.SAST 37602
T.CHR 236
T.TIO 102
T.TKSZ 0
T.ATT 0,0

```

```

T.OFF  44324
      0
T.SRCT  0
T.RRFL  44330,0
T.OCBH  0,4315
T.RDCT  4
F11>R=PCB
F11 -- reading PCB      from address 41400
F11>P
P.LNK   0
P.PRI   101
P.IOC   0
P.NAM   GEN
P.SUB   43550
P.MAIN  37070
P.REL   10212
P.SIZE  302
P.WAIT  0
P.SWSZ  302
P.BUSY  0
P.TCB   44240
P.STAT  00010000000001000
P.HDR   67740
P.PRO   0
P.ATT   37574
F11>R=THEAD
F11 -- reading THEAD   from address 67740
F11>P
H.CSP   1156
H.HDLN  232
H.EFLM  2
H.      44262
H.CUIC  55,301
H.DUIC  55,301
H.IPS   11110000000001111
H.IPC   20064
H.ISP   1232
H.ODVA  0
H.ODVL  0
H.TKVA  0
H.TKVL  0
H.PFVA  0
H.FPVA  0
H.RCVA  0
H.EFSV  0
H.FPSA  0
H.WND   70066
H.DSW   00000000000000001
H.FCS   27662
H.FORT  0
H.OVLY  0
H.VEXT  0

```

```

H.SPRI 5
H.NML 0
H.RRVA 0
H.GARD 70170
H.NLUN 6
H.LUN 35446
H. 37540
H.LUN 21222
H. 41260
H.LUN 35446
H. 0
H.LUN 21222
H. 40140
H.LUN 35326
H. 0
H.LUN 35352
H. 0
F11>R=UCB:35446
F11 -- reading UCB      from address 35446
F11>P
U.OWN 12
U.DCB 35434
U.RED 21554
U.CTL 0
U.STS 00000000
U.UNIT 0
U.ST2 00000000
U.CW1 000100000000000000
F11>R=DCB:35434
F11 -- reading DCB      from address 35434
F11>P
D.LNK 0
D.UCB 35446
D.NAM SY
D.UNIT 0
0
D.UCBL 12
D.DSP 35434
D.MSK 21554,0,0,10000,176,35422,0,3210
D.PCB 1
F11>R=UCB:21554
F11 -- reading UCB      from address 21554
F11>P
U.OWN 0
U.DCB 21514
U.RED 21554
U.CTL 321
U.STS 00000001
U.UNIT 0
U.ST2 00000100
U.CW1 1100000010001000
U.CW2 0000100100000010

```

U.CW3 0000001001100000
U.CW4 0000001000000000
U.SCB 22012
U.ATT 0
U.BUF 2571,165100
U.CNT 52200
U.ACP 117354
U.VCB 370
U.UMB 35560
U.PRM 0,403
U.KRB1 35514

F11>R=DCB:21514

F11 -- reading DCB from address 21514

F11>P

D.LNK 22172
D.UCB 21554
D.NAM DR
D.UNIT 0
3
D.UCBL 50
D.DSP 120102
D.MSK 177477,70,0,177200,377,0,0,377
D.PCB 36714

Example 2

1007 SCAN

F11>S=UCB:DB1

F11 -- READING DCB FROM ADDRESS 20500

F11 -- READING DCB FROM ADDRESS 20540

F11 -- READING DCB FROM ADDRESS 20606

F11>MAP *ACCESS DISC FILE*

F11 -- READING HOME FROM LBN 0/1

F11 -- READING HOME FROM LBN 2/114557

F11 -- READING HOME FROM LBN 2/114562

READ F11>R=MFD:1/P *-PRINT*

F11 -- READING MFD FROM LBN 2/137204 VBN 0/1

DIRECT 1,1 INDEXF .SYS;1

DIRECT 2,2 BITMAP .SYS;1

DIRECT 3,3 BADBLK .SYS;1

DIRECT 4,4 000000 .DIR;1

DIRECT 754,17 RSX11 .SYS;4

DIRECT 730,21 RSX11 .SYS;3

DIRECT 720,15 RSX11 .SYS;2

DIRECT 11604,2 RSX11 .SYS;1

DIRECT 270,24 001001 .DIR;1

DIRECT 554,16 001002 .DIR;1

DIRECT 1300,31 001003 .DIR;1

DIRECT 4666,3 001006 .DIR;1

DIRECT 12150,2 001007 .DIR;1

DIRECT 12467,12 001011 .DIR;1

DIRECT 556,5 001020 .DIR;1

DIRECT 603,2 001024 .DIR;1

DIRECT 2210,6 001034 .DIR;1

DIRECT 605,2 001054 .DIR;1

DIRECT 772,26 001200 .DIR;1

DIRECT 10550,6 002054 .DIR;1

DIRECT 606,2 002200 .DIR;1

DIRECT 1035,41 005054 .DIR;1

DIRECT 647,2 006054 .DIR;1

DIRECT 474,16 007001 .DIR;1

DIRECT 1447,36 007004 .DIR;1

DIRECT 6125,36 007007 .DIR;1

DIRECT 260,2 007010 .DIR;1

DIRECT 11626,5 007021 .DIR;1

DIRECT 4057,26 007022 .DIR;1

DIRECT 7653,10 007025 .DIR;1

DIRECT 10402,1 007026 .DIR;1

NEXT
VIRTUAL
BLOCK F11>N=MFD/P

F11 -- READING MFD FROM LBN 2/137205 VBN 0/2

DIRECT 4077,13 007031 .DIR;1

DIRECT 4112,64 007043 .DIR;1

DIRECT 10577,3 007303 .DIR;1

DIRECT 10600,5 007305 .DIR;1

DIRECT 1313,17 007320 .DIR;1

DIRECT 12766,1 010001 .DIR;1

DIRECT 1161,3 010010 .DIR;1

```

DIRECT 607,2 011024 .DIR;1
DIRECT 454,16 011034 .DIR;1
DIRECT 611,2 012024 .DIR;1
DIRECT 613,2 013024 .DIR;1
DIRECT 615,2 015024 .DIR;1
DIRECT 617,2 017024 .DIR;1
DIRECT 621,2 022024 .DIR;1
DIRECT 623,2 023024 .DIR;1
* DIRECT 625,2 024024 .DIR;1
DIRECT 627,2 025024 .DIR;1
DIRECT 1507,3 026024 .DIR;1
DIRECT 4772,1 031010 .DIR;1
DIRECT 5131,1 031020 .DIR;1
DIRECT 4120,3 031040 .DIR;1
DIRECT 5314,5 031060 .DIR;1
DIRECT 4153,5 042030 .DIR;1
DIRECT 631,2 046020 .DIR;1
DIRECT 632,2 046030 .DIR;1
DIRECT 633,2 054020 .DIR;1
DIRECT 634,2 054030 .DIR;1
DIRECT 635,2 055020 .DIR;1
DIRECT 636,2 055030 .DIR;1
DIRECT 637,2 061020 .DIR;1
DIRECT 640,2 061030 .DIR;1
DIRECT 641,2 070020 .DIR;1

```

FILE NUMBER

F11>R=HEADER:625/P

F11 -- READING HEADER FROM LBN 2/115403 VBN 0/647

```

H.IDOF 27
H.MPOF 56
H.FNUM 625
H.FSEQ 2
H.FLEV 401
H.FOWN 24,24
H.FPRO 160000
H.UCHA 200
H.SCHA 0
H.UFAT 1,20,0,1,0,2,0,0,0,0,0,0,0,0,0
I.FNAM 024024
I.FTYP DIR
I.FVER 1
I.RVNO 0
I.RVDT --
I.RVTI ::
I.CRDT 28-JUN-79
I.CRTI 20:41:55
I.EXDT --
M.ESQN 0
M.ERVN 0
M.EFNU 0
M.EFSQ 0
M.CTSZ 1
M.LBSZ 3

```

M.USE 2
M.MAX 314
M.LBN 1/36114
M.LEN 0

F11>R=UFD:1/V *VIRTUAL BLEND*

F11 -- READING UFD FROM LBN 1/36114 VBN 0/1

DIRECT 2751,4 BPRAST .OBJ;1
DIRECT 2753,4 BPRCV .OBJ;1
DIRECT 2755,4 BPRDAT .OBJ;1
DIRECT 2757,4 BPREOJ .OBJ;1
DIRECT 2763,4 BPRER .OBJ;1
DIRECT 2765,4 BPRIC .OBJ;1
DIRECT 2771,4 BPRPF1 .OBJ;1
DIRECT 2773,4 BPRPF2 .OBJ;1
DIRECT 2777,4 BPRPF3 .OBJ;1
DIRECT 3001,4 BPRPF4 .OBJ;1
DIRECT 3003,4 BPRPR .OBJ;1
DIRECT 3007,4 BPRPRF .OBJ;1
DIRECT 3011,4 BPRRM .OBJ;1
DIRECT 3014,4 BPRRT .OBJ;1
DIRECT 3017,4 BPRSPW .OBJ;1
DIRECT 3021,4 BPRSRV .OBJ;1
DIRECT 3763,4 BPRST .OBJ;1
DIRECT 3765,4 BPRTOT .OBJ;1
DIRECT 3767,4 INREQ .OBJ;1
DIRECT 3771,4 LNPRS .OBJ;1
DIRECT 3773,4 OUTREQ .OBJ;1
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0
DIRECT 0,0 . ;0

FILE NUMBER

F11>R=HEADER:3773

F11 -- READING HEADER FROM LBN 2/120551 VBN 0/4015

H.IDOF 27
H.MPOF 56
H.FNUM 3773
H.FSEQ 4
H.FLEV 401
H.FOWN 24,24
H.FPRO 160000
H.UCHA 0
H.SCHA 0
H.UFAT 2,52,0,2,0,2,576,0,0,0,0,0,0,0,0
I.FNAM OUTREQ
I.FTYP OBJ

```

I.FVER 1
I.RVNO 7
I.RVDT 25-APR-79
I.RVTI 10:35:02
I.CRDT 21-FEB-78
I.CRTI 19:03:11
I.EXDT --
M.ESQN 0
M.ERVN 0
M.EFNU 0
M.EFSQ 0
M.CTSZ 1
M.LBSZ 3
M.USE 2
M.MAX 314
M.LBN 1/36204
M.LEN 1

```

*DISK ACCESS
TO READ INTERNAL BUFFER 1*

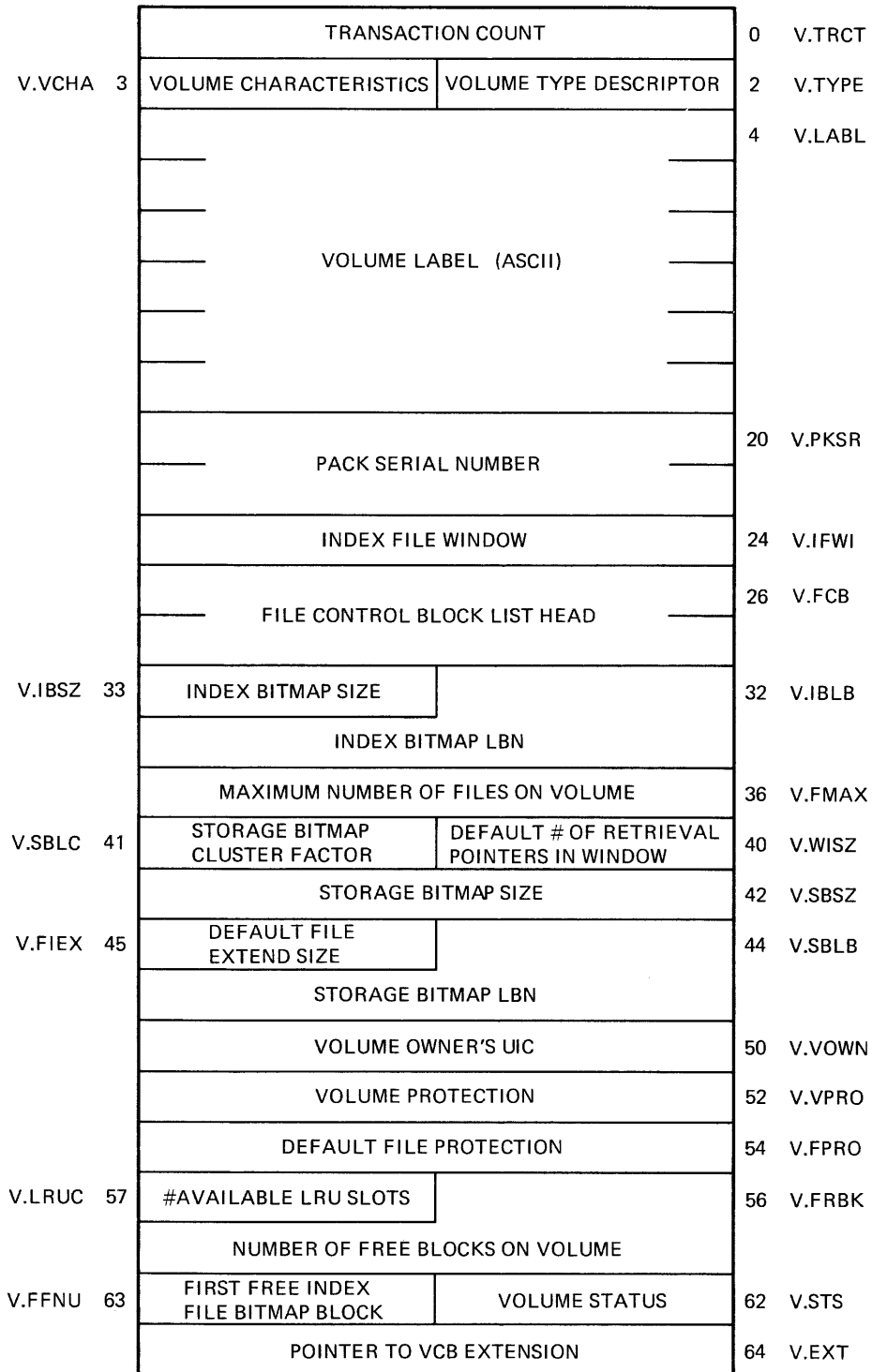
```
F11>R=DISK:1
```

```

F11 -- READING DISK          FROM LBN 1/36204          VBN 0/1
OCTAL 52,1,60434,70531,0,0,140130,0
OCTAL 3000,0,127401,7624,2514,0,21612,143610
OCTAL 2100,0,21612,143660,2100,0,52,1
OCTAL 21612,151740,2100,0,21612,152010,2100,0
OCTAL 34444,3237,2100,0,34444,102716,2100,0
OCTAL 35264,71142,2100,0,52,1,35524,75013
OCTAL 2100,0,73643,76400,2100,0,75416,140700
OCTAL 2100,0,75416,144000,2100,0,75460,111504
OCTAL 2100,0,52,1,124444,7716,2100,0
OCTAL 124632,52077,2100,0,124674,3553,2100,0
OCTAL 125247,7716,2100,0,125247,63534,2100,0
OCTAL 52,1,125507,45726,2100,0,125525,100054
OCTAL 2100,0,125710,4746,2100,0,0,0
OCTAL 2450,1006,125455,77741,2150,326,12,1
OCTAL 127401,7624,1410,1,2,2,12,4
OCTAL 7,0,0,0,34,3,0,6003
OCTAL 0,1,2,30,0,0,0,0
OCTAL 0,0,0,20,4,6001,30,10002
OCTAL 124444,7716,10,326,42,3,326,12667
OCTAL 177506,122667,0,1405,22626,12701,0,167
OCTAL 0,12667,177456,12667,177454,32767,50,4
OCTAL 5017,144016,163253,7011,75460,111504,5401,11017
OCTAL 7016,173,10310,400,7003,21612,143660,5006
OCTAL 13004,124632,52077,52,3,364,0,0
OCTAL 1163,10046,10146,10246,10546,16701,177426,12700
OCTAL 0,12760,0,2,12760,0,14,10160
OCTAL 16,36,4,2002,73643,76400,3004,124674
OCTAL 3553,14001,0,16002,35264,71142,21002,125247
OCTAL 7716,52,3,432,12760,0,20,10046
OCTAL 104377,103540,12702,42,16705,177356,116700,177354
OCTAL 1441,122700,40,1425,122700,60,1416,14
OCTAL 4,3002,35524,75013,11001,42,52,3

```


DATA STRUCTURES AND LISTS



TK-7934

Figure 64 Volume Control Block (VCB)

DATA STRUCTURES AND LISTS

BIT	MASK		
7	200	RESERVED	
6	100	RESERVED	
5	40	RESERVED	
4	20	RESERVED	
3	10	RESERVED	
2	4	RESERVED	
1	2	VS.BMW --	STORAGE BIT MAP FILE IS WRITE ACCESSED
0	1	VS.IFW --	INDEX FILE IS WRITE ACCESSED

TK-1847

Figure 65 Volume Status Byte (V.STS in VCB)

VALUE	
11	VT.UNL - UNLABELED TAPE
10	VT.ANS - ANSI LABELED TAPE
1	VT.SL1 - FILES-11 STRUCTURE LEVEL 1

TK-7937

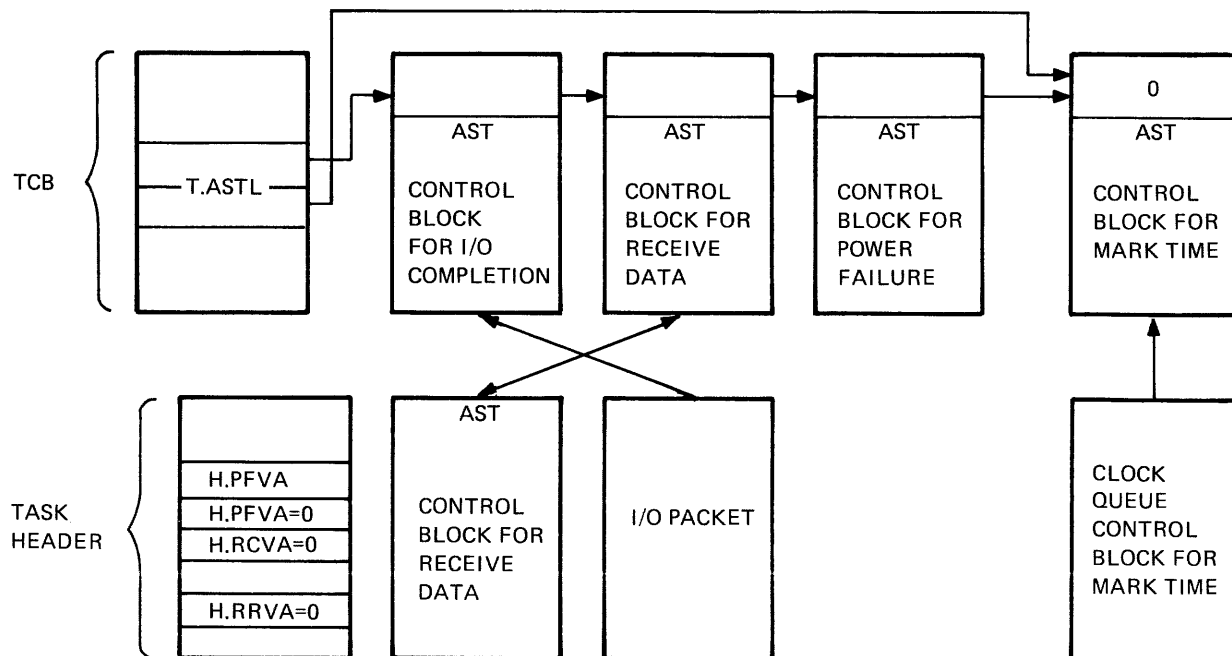
Figure 66 Volume Type Descriptors (V.TYPE in VCB)

DATA STRUCTURES AND LISTS

BIT MASK		
7	200	RESERVED
6	100	RESERVED
5	40	RESERVED
4	20	RESERVED
3	10	VC.PUB SET= SET DEVICE PUBLIC ON DISMOUNT CLEAR = SET DEVICE NON-PUBLIC ON DISMOUNT
2	4	VC.DEA - DEALLOCATE VOLUME ON DISMOUNT
1	2	VC.HLK - UNLOAD VOLUME ON DISMOUNT
0	1	VC.SLK - CLEAR VOLUME VALID ON DISMOUNT

TK-7938

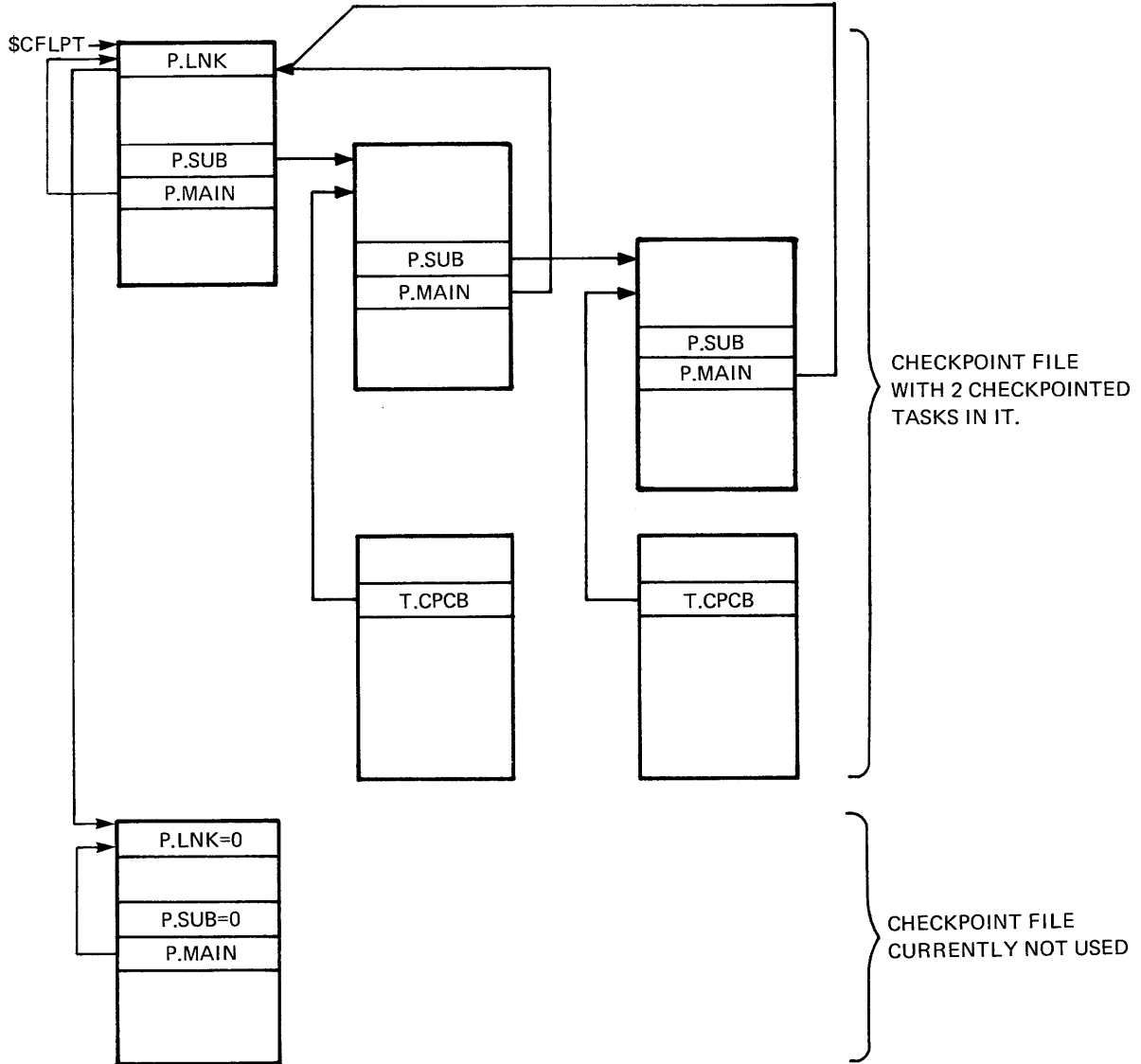
Figure 67 Volume Characteristics (V.VCHA in VCB)



TK-1812

Figure 68 AST Queue

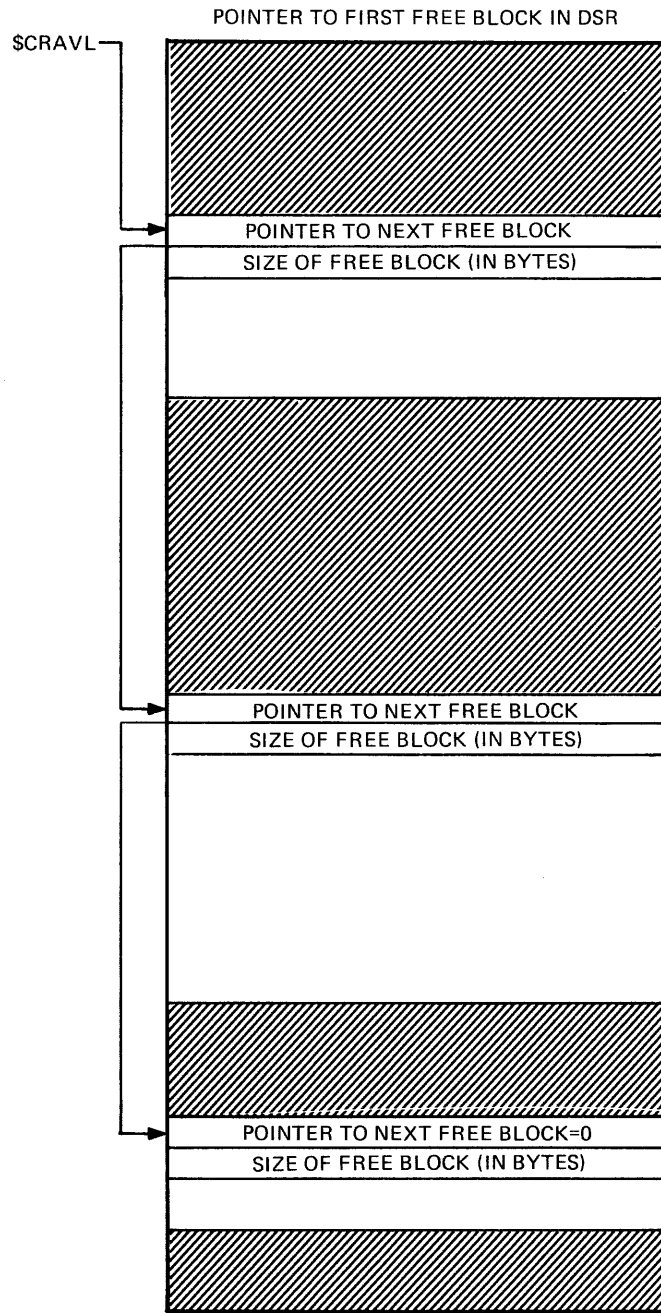
DATA STRUCTURES AND LISTS



TK-1797

Figure 69 Checkpoint File Data Structure

DATA STRUCTURES AND LISTS

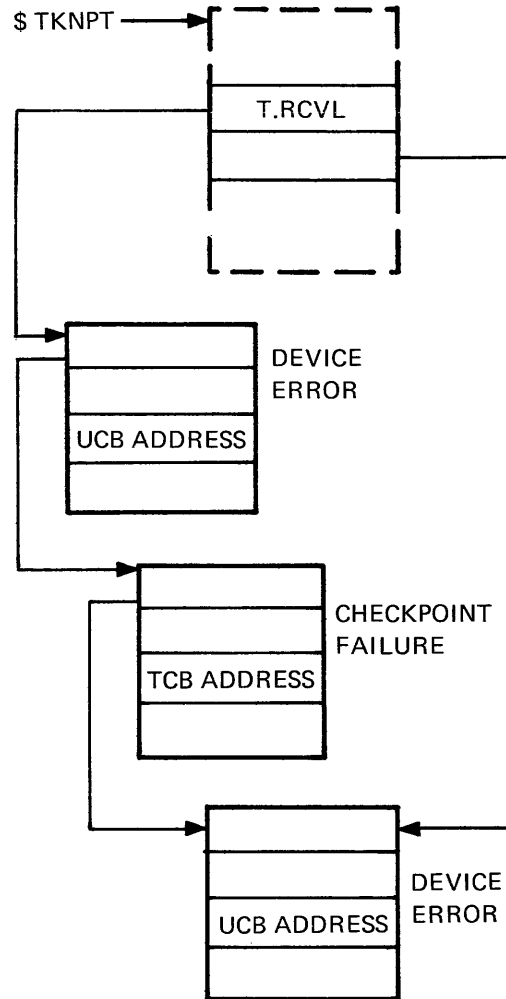


SIZE IN BYTES INCLUDING 2 BYTES FOR POINTER AND
2 BYTES FOR SIZE FIELD

TK-1800

Figure 70 Dynamic Storage Region (DSR)

DATA STRUCTURES AND LISTS



TK-1818

Figure 71 Error Message List

DATA STRUCTURES AND LISTS

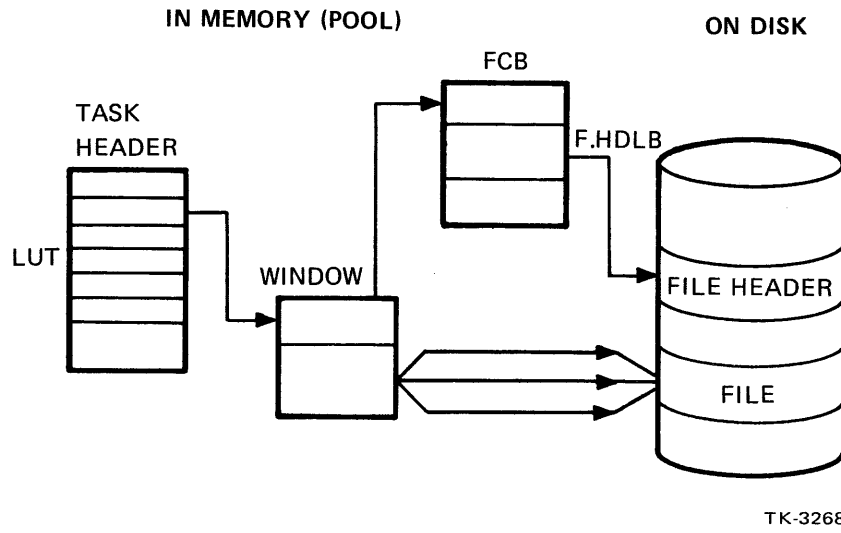
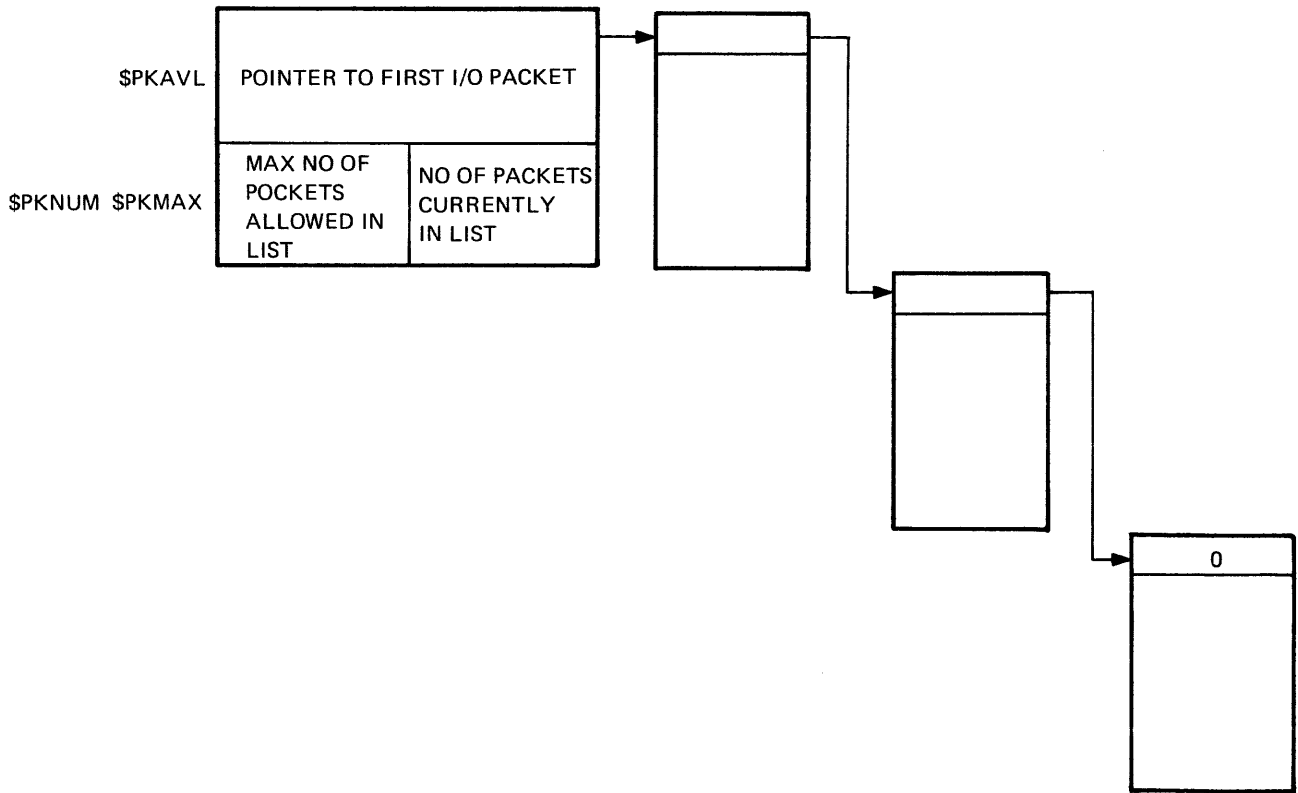


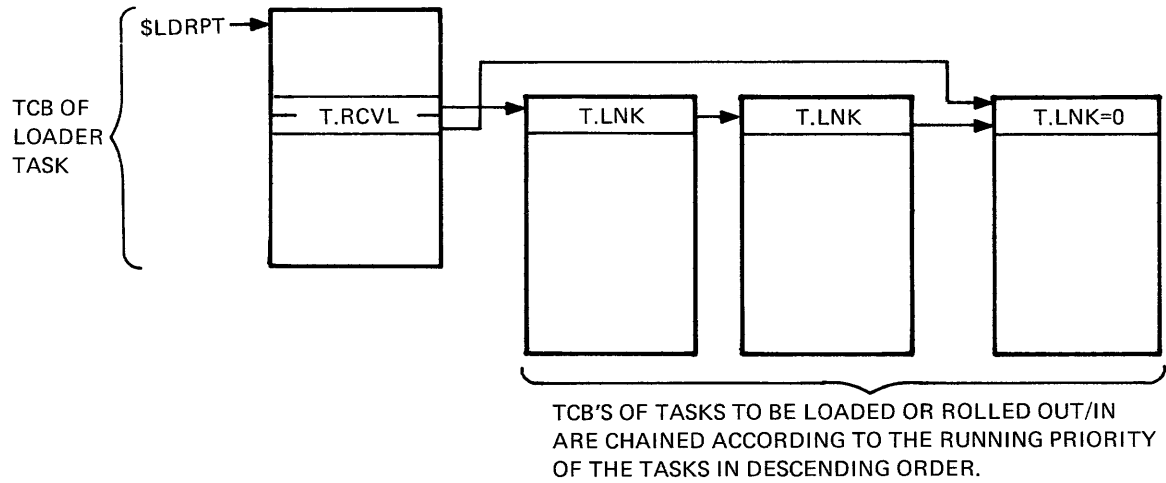
Figure 72 File Open and Close Structures



TK-1815

Figure 73 I/O Packets (Preallocated)

DATA STRUCTURES AND LISTS



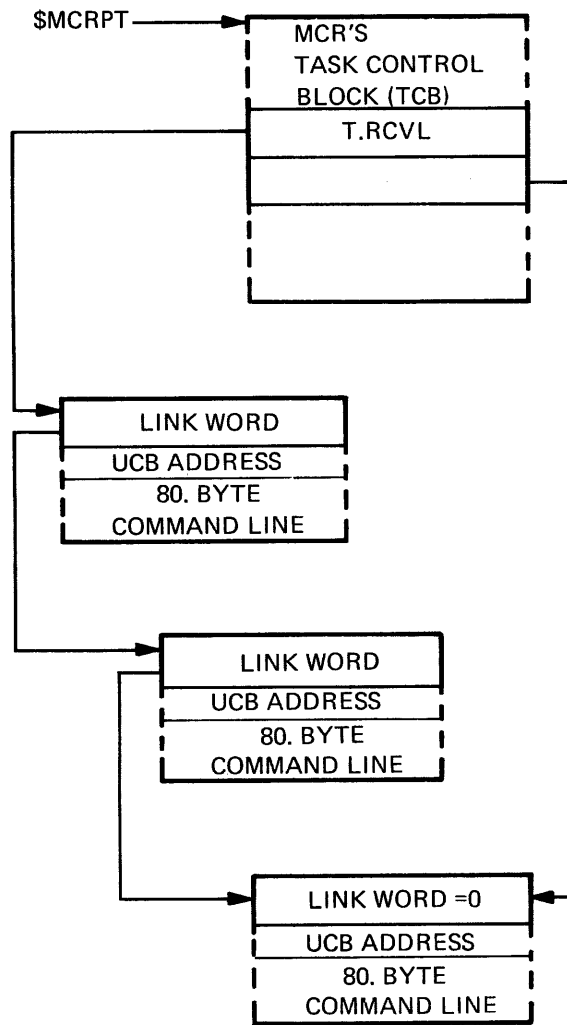
TS.CKP	TS.OUT	
0	0	INVALID
1	1	INITIAL LOAD
1	0	CHECKPOINT WRITE
1	1	CHECKPOINT READ

LOADER QUEUE

TK-1813

Figure 74 Loader Queue

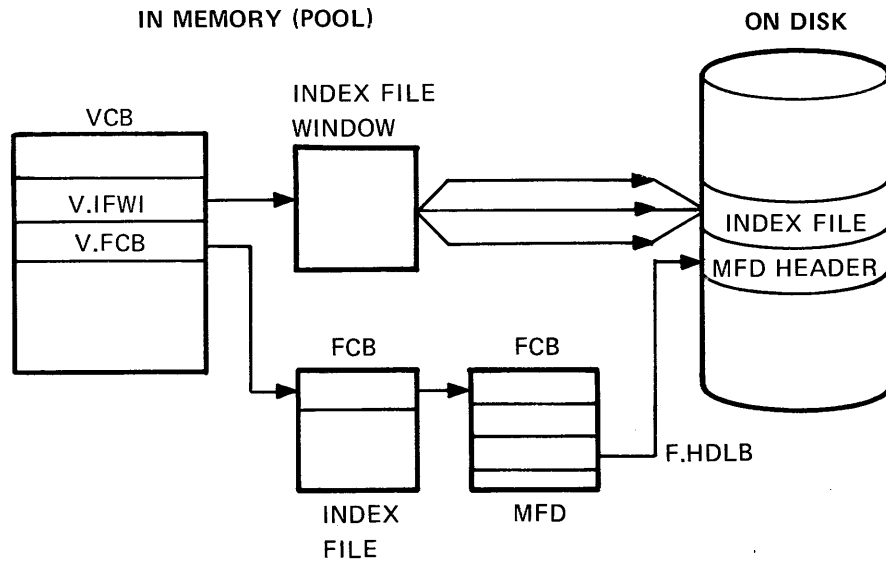
DATA STRUCTURES AND LISTS



TK-1835

Figure 75 MCR Command Line List

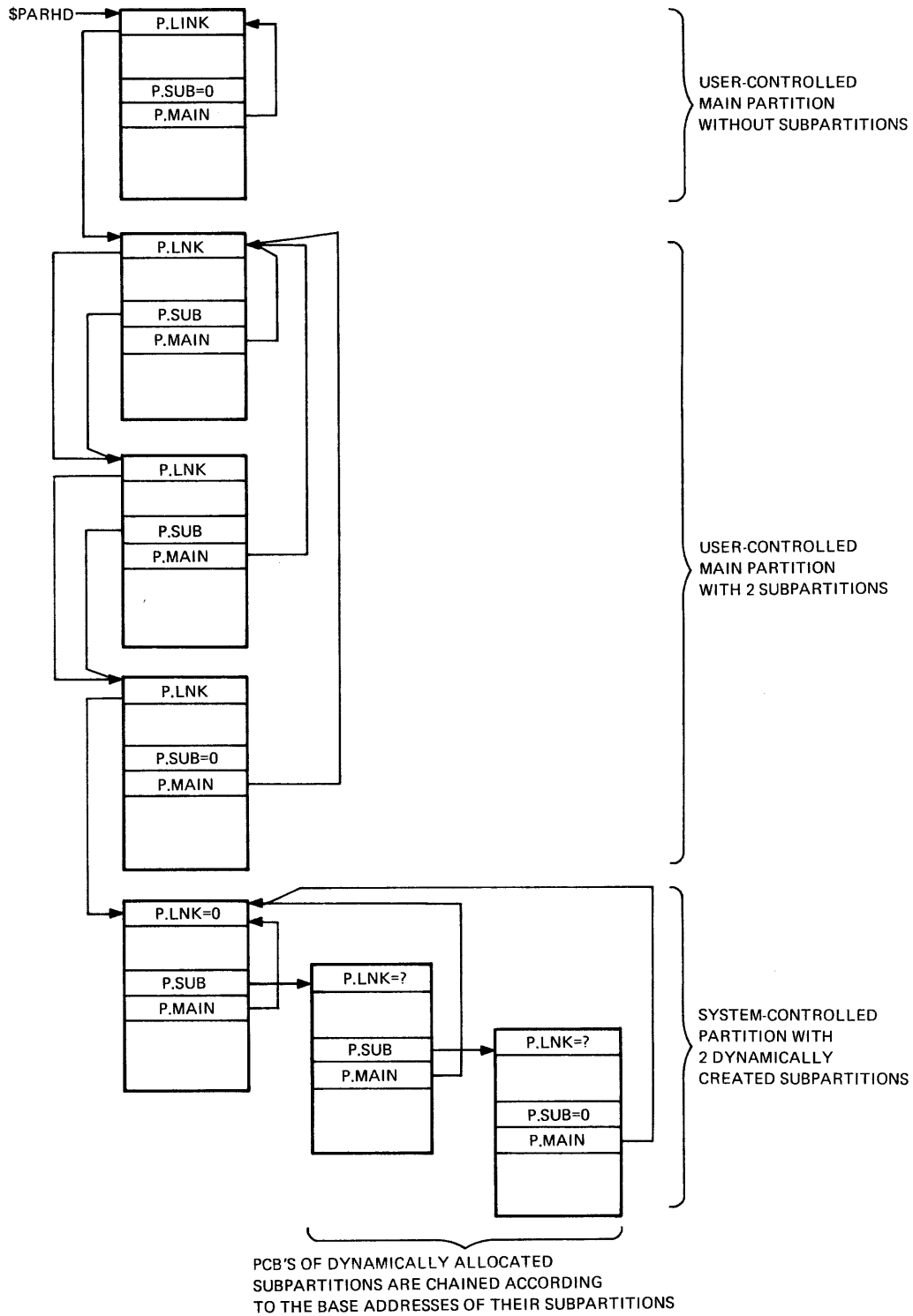
DATA STRUCTURES AND LISTS



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Figure 76 Mounted FILES-11 Volume

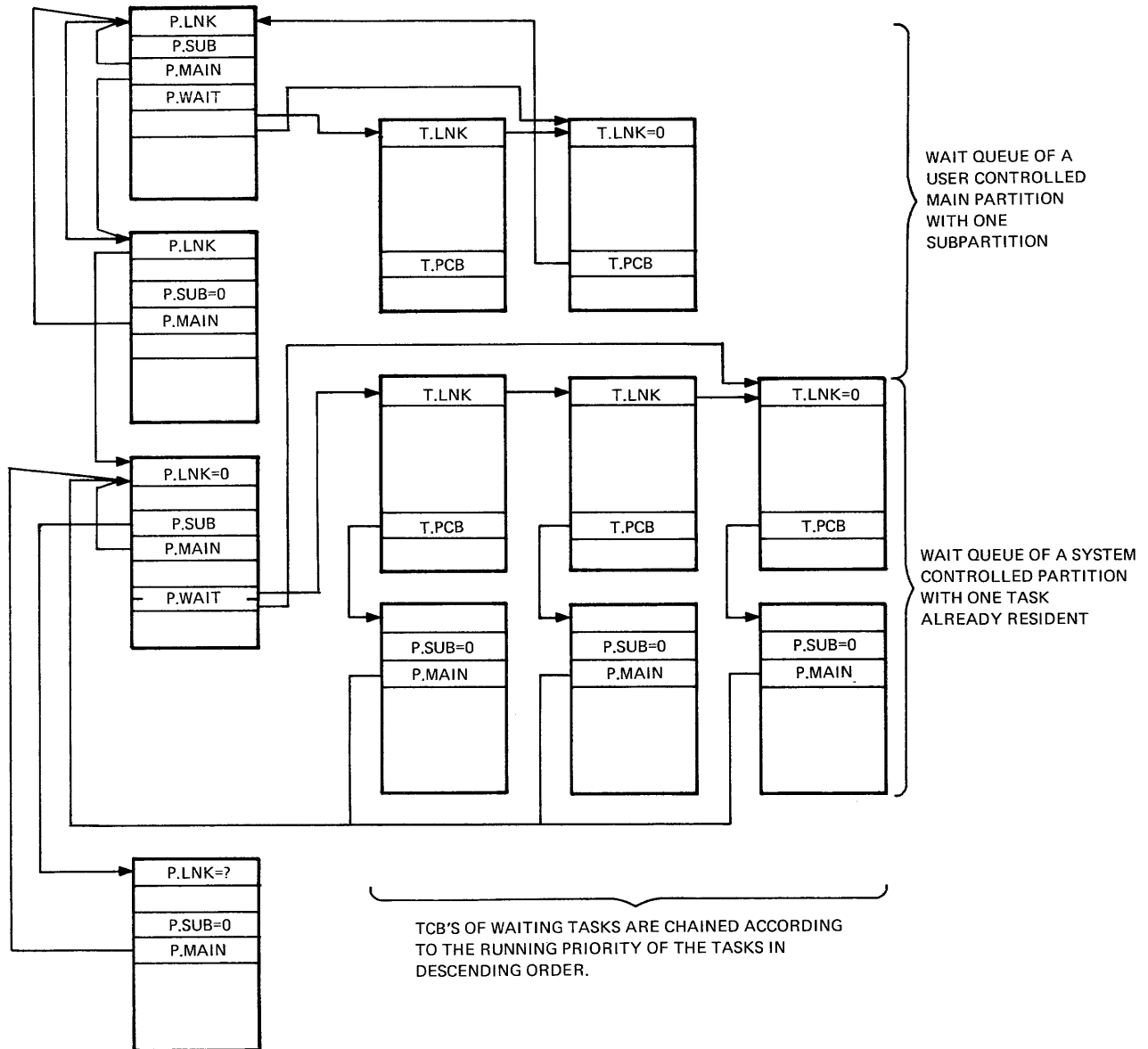
DATA STRUCTURES AND LISTS



TK-1799

Figure 77 Partition List

DATA STRUCTURES AND LISTS

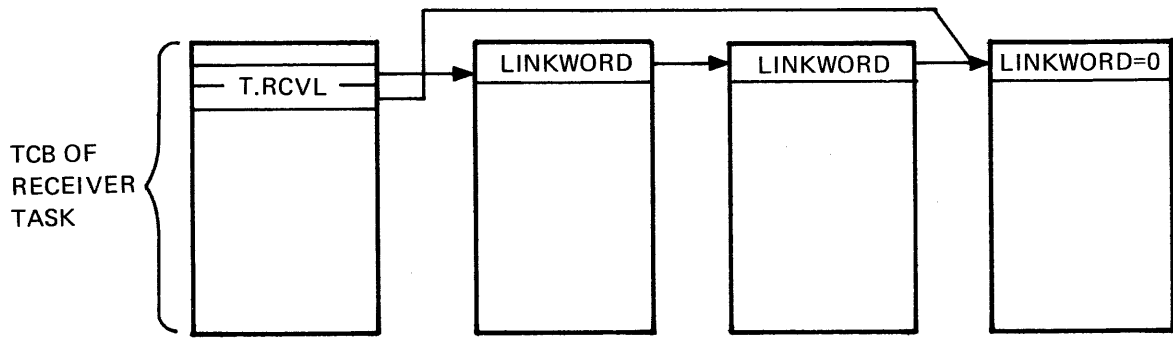


THE PARTITION WAIT QUEUE IS ALWAYS HEADED BY THE MAIN PARTITION CB AND CONTAINS TCB'S OF BOTH TASKS TO BE LOADED THE FIRST TIME AND CHECKPOINTED TASKS.

TK-1796

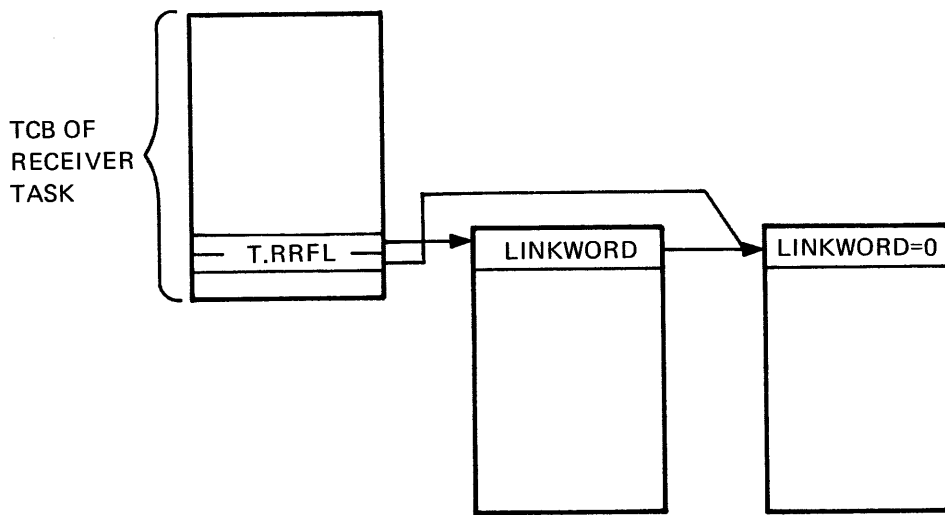
Figure 78 Partition Wait Queue

DATA STRUCTURES AND LISTS



TK-1814

Figure 79 Send/Receive Data Queue



TK-1816

Figure 80 Send/Receive-by-Reference Queue

DATA STRUCTURES AND LISTS

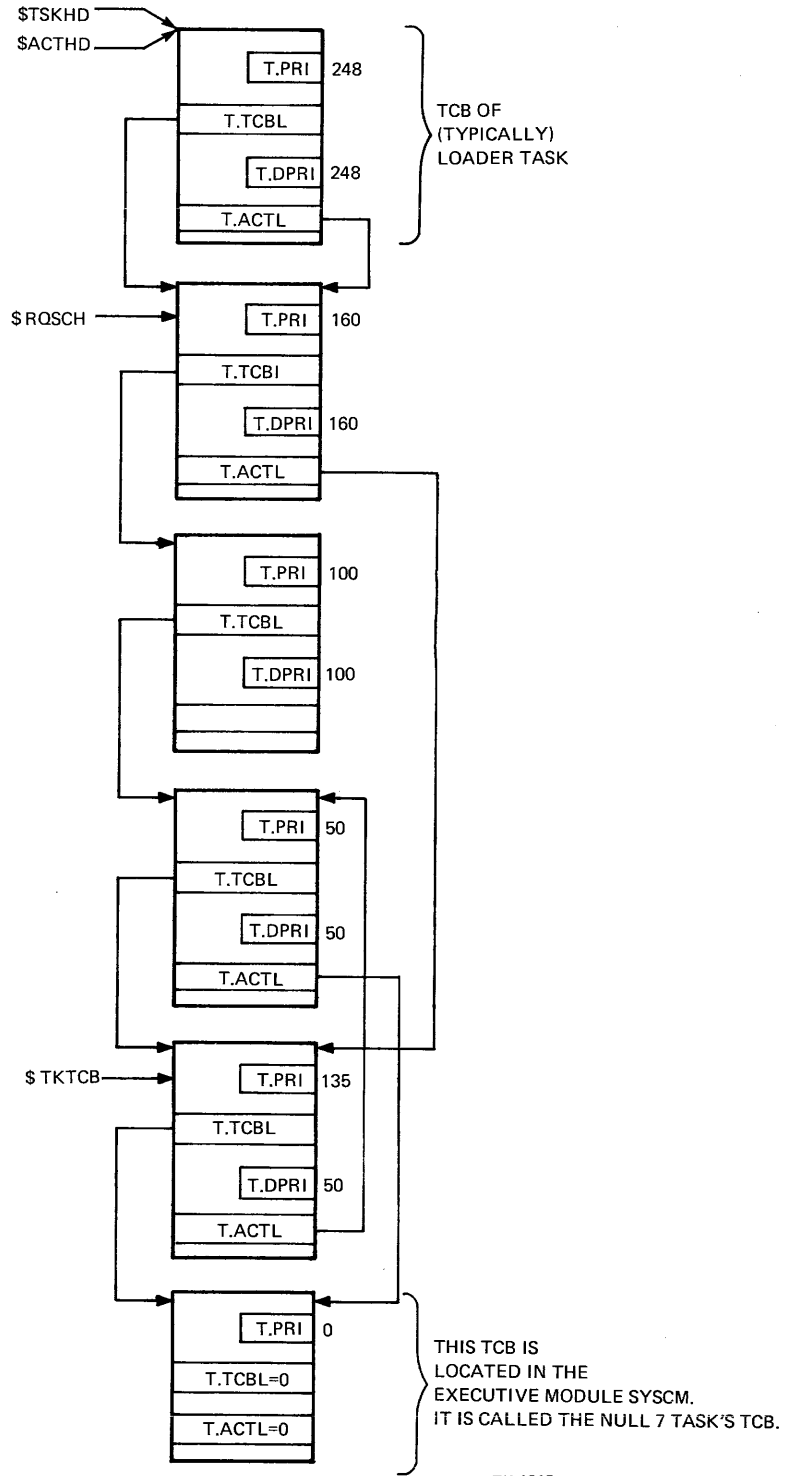
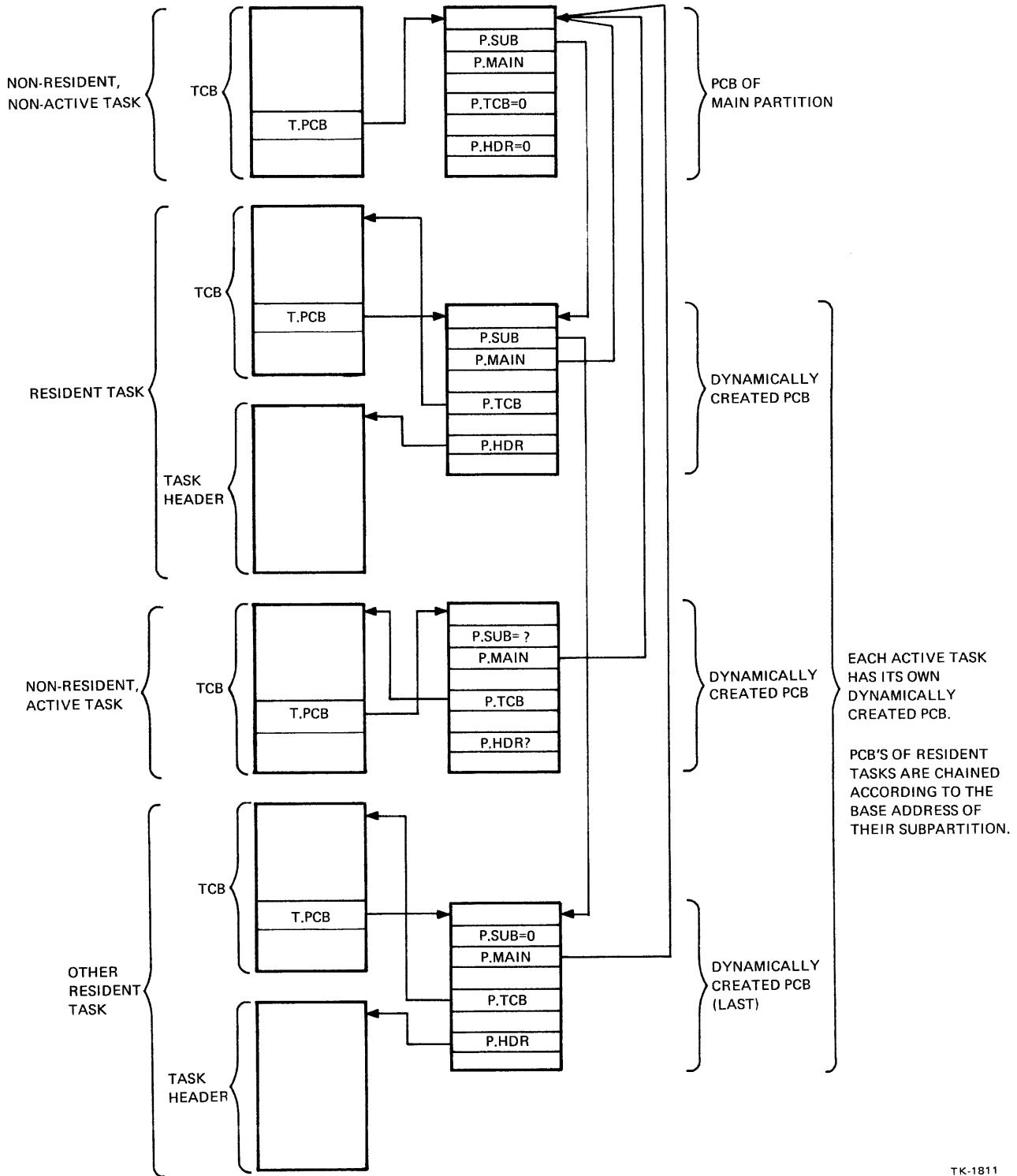


Figure 81 System Task Directory (STD) and Active Task List (ATL)

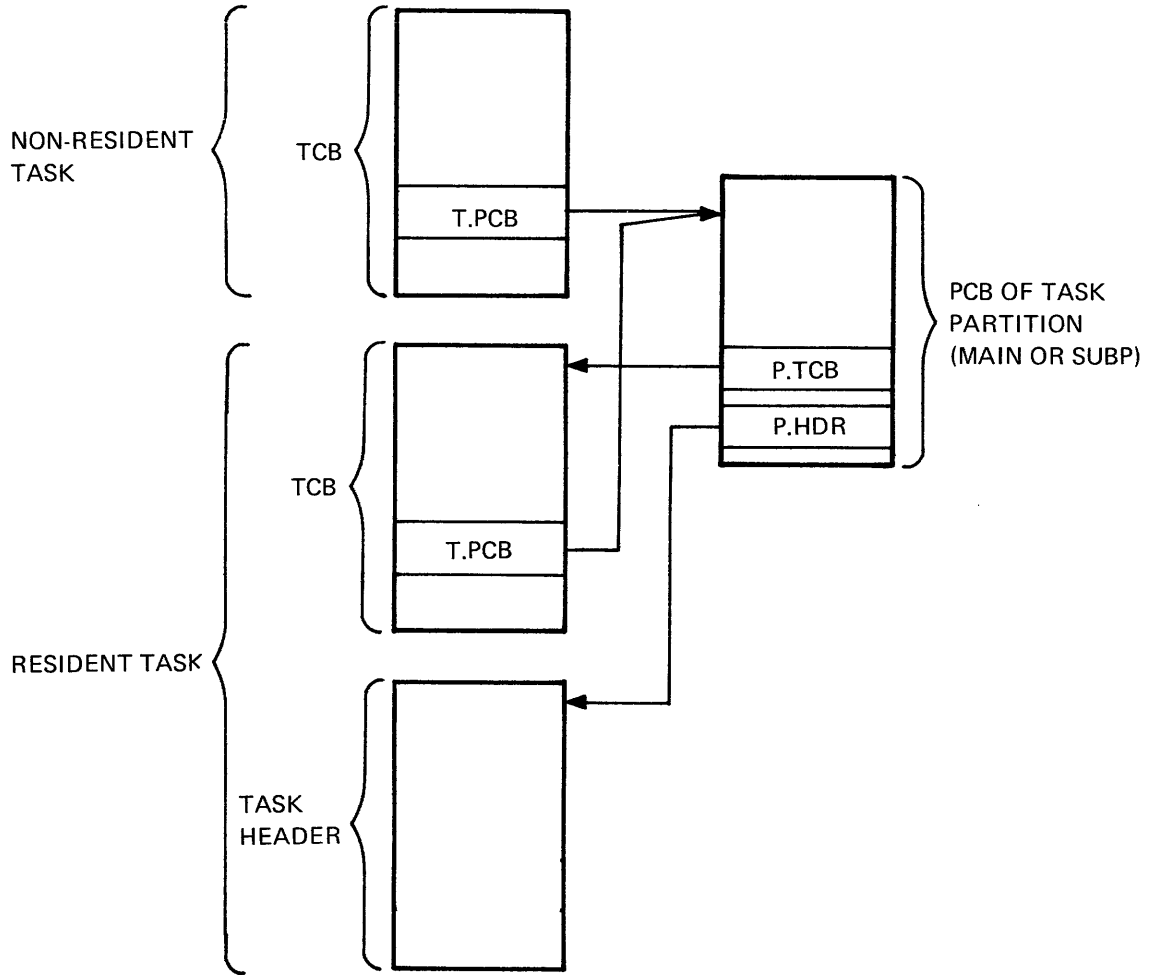
DATA STRUCTURES AND LISTS



TK-1811

Figure 82 TCB, Task Header, and PCB Interrelationship:
System Controlled Partition

DATA STRUCTURES AND LISTS



TK-1795

Figure 83 TCB, Task Header, and PCB Interrelationship:
User Controlled Partition

DATA STRUCTURES AND LISTS

Table 1 Macros* Which Define Data Structure Offsets

Data Structure	Macro
Asynchronous System Trap Control Block	PKTDF\$
Attachment Descriptor Block	PCBDF\$
Clock Queue Control Block	CLKDF\$
Device Control Block (DCB)	DCBDF\$
Error Message Block (EMB)	EMBDF\$
File Control Block (FCB)	F11DF\$
FILES-11 Window Block	F11DF\$
Group Global Event Flags Block	PKTDF\$
Interrupt Transfer Block	ITBDF\$
I/O Packet	PKTDF\$
Logical Assignment Control Block (LCB)	LCBDF\$
Locked Block List Node	F11DF\$
Mapping Assignment Block	SCBDF\$
Mounted Volume List Entry (MVL)	MTADF\$
Offspring Control Block (OCB)	PKTDF\$
Partition Control Block (PCB)	PCBDF\$
Status Control Block (SCB)	SCBDF\$
Task Addressing Window Block	HDRDF\$
Task Control Block (TCB)	TCBDF\$
Task Header	HDRDF\$
Unmounted Volume List Node (UVL)	MTADF\$
Unit Control Block (UCB)	UCBDF\$
Volume Control Block (VCB)	F11DF\$

*All macros are found in [1,1]EXEMC.MLB.

