

TDI p-System

INTERNAL ARCHITECTURE REFERENCE MANUAL



**T A B L E
O F
C O N T E N T S**

INTRODUCTION	1-3
PURPOSE OF THIS MANUAL	1-3
A BRIEF HISTORY OF THE SYSTEM	1-5
CODE FILE FORMAT	2-3
INTRODUCTION	2-3
CODE SEGMENTS	2-3
Code Segments and Byte Sex	2-6
Routine Dictionary	2-7
Routine Code	2-7
The Constant Pool/Real Constants	2-8
The Relocation List	2-15

Table of Contents

Segment Reference List	2-19
Linker Information	2-22
CODE FILE ORGANIZATION	2-29
The Segment Dictionary	2-29
Assembler-Generated Code Files	2-36
THE P-MACHINE	3-3
OVERVIEW	3-3
Emulative Execution	3-4
The Stack and the Heap	3-4
Code Segments	3-5
Device I/O	3-7
CODE SEGMENT ENVIRONMENTS	3-8
Segment Information Blocks (SIBs)	3-8
Environment Records (E_Recs)	3-13
TASK ENVIRONMENTS	3-17
P-MACHINE INSTRUCTIONS	3-22
The Intrinsic P_MACHINE	3-22
P-MACHINE REGISTERS	3-25
CURPROC	3-25
CURTASK	3-26
EREC	3-26
EVEC	3-26
IORESULT	3-27
IPC	3-27

Table of Contents

MP	3-27
READYQ	3-28
SP	3-28
FAULTS	3-29
EXECUTION ERRORS	3-31
P-CODE INSTRUCTIONS	3-40
Instruction Parameters	3-42
Dynamic Operands	3-43
Activation Records	3-47
P-CODE DESCRIPTIONS	3-49
STANDARD PROCEDURES	3-182
UNIT I/O PROCEDURES	3-183
STRING PROCEDURES	3-191
COMPILER PROCEDURES	3-196
CODE POOL PROCEDURES	3-201
CONCURRENCY PROCEDURES	3-207
MISCELLANEOUS PROCEDURES	3-209
LONG INTEGERS	3-211
Number Format	3-211
Long Integer Constants	3-213
LONGOPS Routines	3-215
DECOPS Routines	3-216

Table of Contents

Processor-Specific Information	3-224
8086/8088/LSI-11/6809/9900	3-224
68000	3-224
Z80/8080/6502	3-225
HP-87	3-225
LOW-LEVEL I/O	4-3
THE I/O SUBSYSTEM	4-3
DEVICE I/O ROUTINES	4-8
Calling the RSP/IO	4-9
Devices and Device Numbers	4-10
User-Defined Devices	4-10
CONTROL Parameters	4-11
IORESULT and Completion Codes	4-13
Logical Disk Structure	4-14
Physical Sector Addressing Mode	4-15
Physical Sector Numbers	4-16
Physical Sector Size	4-17
THE RSP	4-18
Calling Mechanisms	4-18
UNITREAD and UNITWRITE	4-19
Parameter Description	4-19
Parameter Stack Format	4-21
UNITBUSY	4-22
UNITWAIT	4-23
UNITCLEAR	4-24
UNITSTATUS	4-24

Table of Contents

RSP Responsibilities	4-25
Special Character Output Handling	4-25
Blank Compression Code (DLE's)	4-26
Carriage Return - Line Feed	4-26
NOCRLF Bit	4-27
Special Character Input Handling	4-27
EOF Character	4-28
ALPHALOCK Character	4-29
Other Characters	4-29
NOSPEC Bit	4-30
Translation for Subsidiary Volumes	4-30
BIOS	4-32
Design Goals	4-32
Completion Codes	4-33
Calling Mechanisms	4-34
Console	4-34
Printer	4-35
Disks	4-35
Remote	4-36
User-Defined Devices	4-36
Character Codes	4-37
BIOS Responsibilities	4-39
Console	4-39
Console Output Requirements	4-39
Console Output Options	4-41
Console Input Requirements	4-43
Console Input Options	4-43

Table of Contents

START/STOP	4-44
FLUSH	4-45
BREAK	4-46
Type-Ahead	4-47
Input Character Mask	4-47
Initialization and Control	4-48
Console Status	4-50
Printer	4-50
Printer Output Requirements	4-51
Printer Input Requirements	4-52
Printer Initialization and Control . . .	4-52
Printer Status	4-53
Disk	4-53
Mapping Blocks on Physical Sectors . .	4-53
Bootstrap Location	4-54
Physical Sector Mode	4-55
Disk Output Requirements	4-56
Disk Input Requirements	4-57
Disk Initialization and Control	4-57
Disk Status	4-57
Remote	4-58
Remote Output Requirements	4-58
Remote Input Requirements	4-58
Remote Initialization and Control . . .	4-59
Remote Status	4-59
User-Defined Devices	4-59
Special BIOS Calls	4-60
System Output	4-60

Table of Contents

System Input	4-60
System Initialization and Control	4-60
System Status	4-61
BIOS CALLING CONVENTIONS	4-62
PROCESSOR-SPECIFIC BIOS CALLS	4-64
8086/8088	4-64
8080/Z80	4-67
6502	4-69
6809	4-71
68000	4-73
THE OPERATING SYSTEM	5-3
OVERVIEW OF THE OS	5-3
P-MACHINE SUPPORT	5-5
The Heap: An Overview	5-5
MARK and RELEASE	5-5
NEW and VARNEW	5-6
DISPOSE and VARDISPOSE	5-7
PERMNEW and PERMDISPOSE	5-7
Heap Implementation	5-8
Unit Organization	5-8
Heap Globals	5-9
Tactics	5-11
Run-Time Environment	5-12

Table of Contents

THE CODE POOL	5-13
Fault Handling	5-18
Concurrency	5-20
I/O SUPPORT	5-22
FIBs	5-22
Directories	5-24
VARIETIES OF I/O	5-25
Record I/O	5-25
Screen I/O	5-25
Block I/O	5-25
Text I/O	5-26
PROGRAM EXECUTION	6-3
BUILDING A RUN-TIME ENVIRONMENT	6-3
QUICKSTARTING PROGRAMS	6-5
Program Invocation Overview	6-6
Segment Dictionary Structure	6-10
PED Structure	6-13

Table of Contents

APPENDICES

A: P-MACHINE OPCODES (Alpha)	A-3
B: P-MACHINE OPCODES (Numeric)	A-7
C: P-MACHINE INTRINSICS	A-11
D: PASCAL DEFINITIONAL RSP	A-12
E: PASCAL DEFINITIONAL BIOS	A-19
F: ASCII TABLE	A-27
G: GLOSSARY	A-28
INDEX	I-1