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GENERAL

Attractive Desktop Cabinet Selectric Style Keyboard Accounting Style Numeric Pad Full Screen Editing

HARDWARE

280A CPU DMA Data Transfer Separate CRT Microprocessor High Speed Arithmetic Processor Portable Software Definable Function Keys Low Glare Screen

65K RAM Programmable Baud Rates IEEE 488 GPIB Parallel I/O* Parallel I/O Port

2 RS232 Serial Ports (Printer and Modem) 1 RS449 Serial Communication Port to 500K Baud 700K Mass Storage on Dual Minifloppys Optional 1.6 MegaByte Disk Storage Optional 5 or 12 Megabyte Hard Disk

SOFTWARE

PROM Resident Disk Boot and Diagnostic Monitor CP/M* Version 2 Disk Operating System Word Processing Programs Spellbinde r* WordStar Electronic Spread Sheet MicroPlan* Supe rCalc Business Accounting Software TCS MJA Data Base Management Software DBaseII TIM and Others Communication Software CONFER RBTE Screen-Oriented Editor WordMaster Extensive Software Support FORTRAN BASIC PASCAL "C" RATFOR COBOL ASSEMBLER PL/1

*Included with System

CP/M is a Trademark of Digital Research

<u>WARNING</u>: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference. ASSOCIATE Operators Handbook Revision 3.0

Welcome to the ASSOCIATE microcomputer from Data Technology Industries. Your ASSOCIATE is supported with FRIENDS, SOLUTIONS, and RELATIONS all from the same Company.

SOLUTIONS are software answers to your computing questions, while FRIENDS are printers built by Qume, NEC, and Ricoh, and many kinds of other peripheral equipment including low-cost ribbons and printwheels. RELATIONS for the ASSOCIATE are programs to make buying and maintaining your machine easy. Leasing, nationwide service and repair, and much more is available from Data Technology Industries. Call or write for further information or to find the dealer nearest you.

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Chapter 1

INTRODUCTION

Purpose

This operator's handbook provides an introduction to ASSOCIATE operation. It is intended for nontechnical users and contains an introductory description of standard system operation, as well as an overview of software and other ASSOCIATE features. Another publication, the ASSOCIATE Reference Manual, contains a detailed operating description of the ASSOCIATE including modification, addition of optional features, interface to other devices, and available services.

The ASSOCIATE

The following summary is included to familiarize the user with the many features of the ASSOCIATE.

The ASSOCIATE is primarily a single-user computer with emphasis on features required for integration into a commercial or business network environment. Multi-user applications can be approached through either multiple linked ASSOCIATE's or one ASSOCIATE with multiple terminals.

The Z80A microprocessor, the best-supported microprocessor available, is used in the ASSOCIATE. This high-speed, 8-bit microprocessor supplies enough computational power for most single-user applications. The Z80 processing capabilities can be enhanced by the addition of an optional Arithmetic Processor, the AM9511 or AM9512. Numerical computation is supported through the 9511's ability to do 32-bit floating point arithmetic operations such as trigonometric functions, logarithm, exponentials, as well as the normal operations of addition, subtraction, multiplication, and division. With the 9511 option, software library routines in FORTRAN are provided.

Data transfers in the ASSOCIATE are made faster by use of a DMA controller chip, an interrupt controller, and an interval timer. The increased speed of these operations means more real computational capability to the user, in addition to faster system response.

Memory consists of a combination of 65K of Read/Write RAM and 2K of PROM. Virtually all software for the 8080 and Z80 microprocessors requires less than 65K memory, thus, almost all available CP/M software can be run on the ASSOCIATE.

The ASSOCIATE provides 700K or optionally 1.6 Mbytes of disk storage to support the many applications which require one half to one and one half megabyte of mass storage. Two 5.25 inch disk drives double-sided, double-density, are used.

Additional disk storage can be added through the use of a hard disk. This storage can be obtained with the addition of the DataVault, a separate peripheral unit. Or for users who wish an integrated unit, the hard disk drive in the ASSOCIATE PLUS HARD DISK is completely built in.

The ASSOCIATE keyboard and CRT display are handled through an additional microprocessor. This design permits great flexibility in managing data on the CRT. Features such as a "clear to end of line," an addressable cursor, and a 38K baud transfer rate make the display very responsive.

Operator comfort is maximized by an anti-glare screen on the front of the CRT.

The ASSOCIATE keyboard has a selectric format. Additional keyboard features include an accounting-style numeric keypad, cursor movement keys, and function keys. All special keys can be programmed from the main CPU for operation of custom software (see 12.2 "KeyLoader, Programmable Function Key Generator").

Input/output on the ASSOCIATE is oriented toward communication and network requirements of multinode business and commercial applications.

Two RS232 ports are available for interface with devices such as a printer and a modem. Async, bisync, HDLC, and SDLC protocols can be accommodated. An optional interface for RS449 or RS232 serial protocol is available for use in network communications. A high-speed, parallel interface for hard disk is available. Communication for laboratory and instrumentation applications are possible through the optional IEEE 488 communication bus interface.

Other features which give the ASSOCIATE an advantage over many other systems are:

- Power down disk protect The ASSOCIATE can be turned off without risk of damage to inserted diskettes.
- 2. Switching power supply This provides cool reliable service.
- Convenient packaging All hardware is contained in an attractive one piece desktop console.

Chapter 2

STANDARD SYSTEM OPERATION

2.1 Controls and Keyboard Features

Control and keyboard features of the ASSOCIATE are operated as follows:

ON/OFF SWITCH - The ON/OFF Switch is located at the keyboard level under the disk drives. Upon power-up the system attempts to load the Disk Operating System from the lower drive.

<u>RESET</u> <u>SWITCH</u> - The RESET switch is located at the lower right rear of the ASSOCIATE. At RESET, the Disk Operating System is loaded exactly the same as at power-up.

<u>RESET CPU KEY</u> (Control-Shift-RST) - Depressing this key combination unconditionally resets the CPU. The screen is not cleared. When this combination is entered once, a CP/M message is displayed to indicate that the Disk Operating System has been reinitialized. By holding down the Control and Shift keys and entering RST twice in rapid succession, control is transferred to the ASSOCIATE PROM Monitor.

INTENSITY CONTROL - Intensity Control is located at keyboard level under the screen at the left hand side.

<u>CAP LOCK</u> - The CAP LOCK is located at the lower left portion of the keyboard. A CAP LOCK light indicates the status of the CAP LOCK key. The CAP LOCK function is alternately turned ON or OFF by depressing the key. When ON, all alphabetic keys are transmitted from the keyboard in upper case, and other characters remain as shown on the key. For example with the CAP LOCK on, the shift must be depressed with the 3 key to send a #.

LOCAL CLEAR (Control-Delete) - Depressing this key combination clears the screen without affecting the main CPU. The 25th line remains unchanged.

LOCAL CLEAR (Control-Shift-Delete) - Depressing this key combination clears the screen and the 25th line. The clock display remains unchanged. The main processor is not affected.

<u>TOGCLE KEY</u> (RST, Shift-RST, and Control-RST) - Depressing the RST key stops or starts the transfer of data from the CPU to the CRT screen. This key allows the screen to be stopped and restarted to examine data during high speed data transfers.

2. Standard System Operation

2.2 Rear Panel Layout

The features and functions of the rear panel is shown in Figure 1.



Figure 1. Rear Panel Layout

2.3 Disk Operation

Upon Power Up or on RESET, the system will attempt to load the Disk Operating System from Drive A (lower). The diskettes are loaded in the drive as shown in Figure 2. After inserting the diskette, close the drive cover until the latch clicks. Dysan 104/2D or Verbatim DataLife are recommended for the ASSOCIATE, and 204/2D for the ASSOCIATE PLUS. Diskettes should be kept in protective envelopes when not in use. See 13.2 "Care of Diskettes" for further information on diskette care.

If more than two minutes have passed since the last disk activity, the drives will automatically turn off. A RESET or reboot will restart the drive motors. The drive motors MUST be on to insure proper diskette alignment when inserting a diskette! If the disk fails to load, open drive door, wiggle diskette, and close door.

The diskettes are inserted into the ASSOCIATE as shown on the following page.



Figure 2. Diskette Insertion

If the Disk Operating System is successfully booted, the following message will appear on the screen:

61K ASSOCIATE CP/M V2.2.4 - GNAT BIOS Revision Level - Prompt Character A0> ·CP/M Revision Level -User ID Number -CP/M Version

For the ASSOCIATE PLUS, (double track drives) the following message will

appear:

61K ASSOCIATE PLUS CP/M V2.2.4 a-b 80 track & c-d 35 track

The double tracking system also has the ability to read but not write single tracking diskettes. Diskettes written on standard single tracking drive can be read on the double tracking ASSOCIATE PLUS by the convention: A = BOTTOM, DOUBLE TRACKINGC = BOTTOM, SINGLE TRACKINGB = TOP, DOUBLE TRACKINGD = TOP, SINGLE TRACKING

A User ID Number is provided to make the standard ASSOCIATE operation compatible with systems using a hard disk. In the hard disk environment, the disk storage can be allocated with up to 16 ID numbers to allow partitioning of large amounts of data. In this Handbook, all examples will be shown as being executed from Drive A, User 0.

The files on User Space 0 are common to all users. Such commonly used programs as D, PIP, and WordStar should be kept here. Other user areas are accessed by typing:

AO>USER X<cr> AX>

where X is a User ID Number between 0 and 15.

The standard Disk Operating System is CP/M (Control Program Monitor), which was developed by Digital Research of Pacific Grove, California. Chapter 3 of this handbook contains an introduction to CP/M operating features and commands.

The red light on the disk drive indicates which disk drive was last accessed.

2.4 Write Protect

Diskettes with valuable or master data can be write protected by covering the small slot on the left edge of the diskette with opaque tape. This will allow the disk to be read from, but not written to, thereby insuring that valuable data will not inadvertently written over and lost. It is recommended that all Diskettes provided with the system be write protected and stored in a safe location. Use a copy for daily operation.

In addition, it is recommended that back-up copies be made of disks with important data.

2.5 PROM Monitor

If the Disk Operating System is not found at power up, a second RESET takes the PROM Monitor to the command level. The following message will be displayed on the screen:



Functions available at the Command Level in the PROM Monitor are described in Chapter 4 of this handbook.

2.6 Default Parameters

Several parameters may be changed by the operator or software. The default values for these parameters are:

List Device Baud Rate	3	9600
Modem Port Baud Rate	=	300
Network Port Baud Rate	=	300
Network Port Configuration	-	RS232
Screen Turnoff Timeout	=	20 minutes
Disk Drive Motor Timeout	=	2 minutes

2.7 Graphics PROM

The CRT is capable of displaying 128 different characters. Ninety-six of these are the complete set of the ASCII "printable" characters. The remaining 32 are available as special characters. The standard set of special characters is designed for use in communication applications. An alternative set of graphic characters can be optionally ordered for the ASSOCIATE. Complete documentation of these characters and their use is given in the Technical Reference Manual.

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Chapter 3

Disk Operating System

3.1 Introduction to CP/M

The standard disk operating system for the ASSOCIATE is CP/M (Control Program/Monitor from Digital Research). With CP/M, software is transportable from one system to another. ASSOCIATE users can take advantage of the many programs available through the CP/M Users' Group and other sources.

CP/M includes a control program, utilities, and an assembler. It has a complete range of abilities to handle disk files, including dynamic allocation of disk space.

Programs included in CP/M are:

STAT	Status of Disk and I/O
PIP	Peripheral Interchange Program
ASM	8080 Assembler
DDT	Dynamic Debugger
LOAD	HEX to COM file translation
SUBMIT	Automatic Program Submission

In the ASSOCIATE the CP/M Devices are assigned as:

CON:	=	CRT display and keyboard
LST:		List connector on rear panel
PUN:	=	Modem connector on rear panel
RDR:	=	Modem connector on rear panel

Further information on the Input/Output assignments and functions is available in Section 3-15 of the Technical Reference Manual.

The following tables provide a reference to Control Features, Built-in Commands, and Status Commands for the ASSOCIATE operator. This information is summary only; for detailed information see the CP/M Users Manual.

Table 1 lists the CP/M Control Features that allow interaction with CP/M. These control entries can be keyed in at the command level or in any program that uses the system line input feature. This includes PIP, DDT, ASM, and SYSGEN. Note that these Control Features are executed immediately; no carriage return is necessary. Table 1. CP/M Control Features

Keyboard Entry	Function
Control C	Reboot CP/M from current Drive
Control E	Carriage Return and Line Feed on the Screen Only (not actually entered in
	commend)
Control P	Switch list device on or
	off in parallel with the CRT
Control R	Display corrected input buffer
Control S	Hold output to the console
Control U	Cancel input line back to last carriage return
Control X	Erase input to last Carriage Return
Backspace	Cancel last character
<cr></cr>	Transmit current information as entered

CP/M filenames are specified in the format <filename>.<filetype>. A <filename> is any 8 character ASCII string excluding "*" and "," and ".". A <filetype> is any three characters of this set.

"Wild Card" characters may be used when specifing file names. These characters are used in or in place of file names to simplify operations as follows:

* Where the character asterisk appears as a substitute for <filename>, the command applies to all <filename>s with the indicated <filetype>. An asterisk can be substituted for <filename> or <filetype> to act on all <filename>s or <filetype>s.

For example, *.BAK means all the files with the file type "BAK".

? A question mark can be substituted for any single character in specifying a file, resulting in any character being acceptable in that character position.

For example, EXAM?.BAS would include the files EXAM1.BAS, EXAM2.BAS, EXAMX.BAS, etc.

Table 2 provides a listing of the CP/M Built-in Commands for displaying information. They can be issued at the CP/M Command Level.

.

Keyboard Entry	Function
DIR	Provides a directory listing of files on the selected drive
ERA <filename>.<filetype></filetype></filename>	Erases the named files
REN <filename>.<filetype></filetype></filename>	The file to the right of the
= <file name="">.<file type=""></file></file>	equal sign is renamed with the name specified on the left of the equal sign
SAVE <m> <file name="">.<file type=""></file></file></m>	Save m (where m is a decimal number) 256 byte blocks of
TYPE <filename>.<filetype></filetype></filename>	memory into the named file Display the file specified on the CRT

Table 2. CP/M Built-In Commands

Table 3 indicates common <filetype>'s and their meaning:

Table 3. CP/M File Types

<filetype></filetype>	Generic Category
.ASM	Assembler Source File
.BAK	Backup file
.BAS	BASIC Source File
.CAL	SuperCalc Data File
.CSD	CalcStar Data File
. COB	COBOL Source File
. COM	Memory Image File (i.e., "command" file produced by LOAD). Normally a directly executable program.
• DOC	Documentation File
• FOR	FORTRAN Source File
HEX	Machine code in "HEX" format
.INT	Intermediate File
.KEY	Programmable Function Key Source File
.LIB	Library routines
•MAC	Macro Assembler Source File
•OVR	Overlay File
.PAS	Pascal Source File
.PFK	Programmable Function Key Codes
.PLI	PL/1 Source File
.PRL	Page Relocatable Machine Code File
.PRN	Listing File
.RAT	Rational FORTRAN Source file
.REL	Relocatable Machine Code File
.SUB	Submit Files
.TBL	MicroPlan Data Table
•\$\$\$	Temporary Files created and normally erased by the editor and utilities
	euror and utilities

3.2 STAT - Status

STAT is a program which gives status information on the ASSOCIATE. Table 4 indicates some Status Commands available for checking system status.

Table 4. Status Commands

Comma nd

Function

STAT	Print remaining disk space
STAT *.*	Print disk space of all files
STAT <file name="">.<file type=""></file></file>	Print disk space of this file
STAT DEV:	Print I/O device assignments
STAT VAL:	Print all device assignment
	possibilities
STAT m:=n:	Assign driver m to device n

3.3 PIP - Peripheral Interchange Program

PIP, which stands for Peripheral Interchange Program, is a program which provides the ability to move data from one location to another in the ASSOCIATE. Disk files can be copied from one drive to another, or files can be sent to the I/O devices.

The format for invoking PIP is as follows:

PIP

in which case the user is prompted with a "*".

العادية فأجاد فالمتحفية كالمعيود الصحير بالمحاد والمار المتعاورات

or

```
PIP <d>=<s1>,<s2>...,<sn>[p]
```

where:

<d> is the destination <sl>, <s2>, etc. are source files; <sn> any number of files can be moved.

and

[p] is optional parameter string.

The following example illustrates how to copy a file from disk A to disk B while changing the name:

PIP B:NEW.DOC=A:PROG.DOC

To copy a file from disk B to disk A, leaving the name the same on the new version:

PIP A:=B:TEST.BAS

To copy all files of <filetype> DOC to disk B: and to verify transfer:

PIP B:=A:*.DOC[ov]

To copy a file from one drive to another when different User IDs are in use, follow the procedure in this example:

AO>PIP E:=A:TEST.DOC[g5]

This will copy TEST.DOC from Drive A, User 5 to Drive E (User 0).The destination E will pick up its User ID from the current User ID (0 in this example); the source User ID (5) comes from the bracketed information.

See the CP/M manual for complete details on using PIP.

3.4 ASM - 8080 Assembler

ASM is a standard 8080 assembler. The assembler reads assembly language source statements from a file on disk and produces 8080 machine language in Intel hex format, It can be initiated by entering:

ASM <file name>
or ASM <file name>.<pl><p2><p3>

where <filename> is the name of a file on disk with a <filetype> of ASM which contains the assembly language source statements.

<Pl> is the source disk
<P2> is the object destination
<P3> is the print file destination

The choices for Pl,P2,and P3 are:

- A = Bottom disk
- B = Top disk
- X = Console
- Z = Output Suppressed

An assembler for the full Z80 instruction set code is available as an option through Data Technology Industries.

3.5 DDT - Dynamic Debugging Tool

DDT stands for Dynamic Debugging Tool and is used to debug machine language programs. DDT allows the user to step through a program, examining memory and CPU registers as they change. It can also do simple assembly/disassembly on code in memory. The debugger is initiated by typing one of the following commands:

DDT

DDT <filename>.<filetype>

where, <filename> is the name of the program to be loaded and tested and <filetype> is HEX or COM.

Table 5 summarizes the DDT control statements. [] indicates optional parameters.

Command	Syntax	Function
Α	A[<start-address>]</start-address>	Enter assembly language mnemonics with
		operands, where <start-address> is the hex starting address for the online assembly.</start-address>
D	D[<start-address>]</start-address>	Display memory in hexadecimal and ASCII
	D[<start-address>, <end-address>]</end-address></start-address>	from the current display address or from <start-address>, optionally to <end-address></end-address></start-address>
F	F <start-address>,</start-address>	Fill memory with constant data equal to
	<pre><e nd-address="">, <hex-constant></hex-constant></e></pre>	hex-constant
G	<pre>G[<address> [,<breakpoint1> [,<breakpoint2>]]]</breakpoint2></breakpoint1></address></pre>	Begin execution with optional breakpoints
I	I <file name=""></file>	Initialize a standard input control block
L	L[< start- add re ss>]	The three forms of this
	L[<start-address>, <end-address>]</end-address></start-address>	command disassemble machine code using assembler mnemonics
М	<pre>M<start-address>,</start-address></pre>	Move a memory segment from source to destination ss>
R	R <bias-address></bias-address>	Read currently initialized file
S	S <start-address></start-address>	Substitute memory values
Т	T[<number-of -steps="">]</number-of>	Trace program execution
U	U[<numbe r-of-steps="">]</numbe>	Untraced program execution monitoring
Х	X[<cpu-register>]</cpu-register>	Examine and optionally alter the CPU state

Table 5. DDT Control Statements

3.6 LOAD - Object Code Loader

LOAD converts from Intel HEX format files, resulting from an assembly, into binary memory image COM files. To use:

AO>LOAD <filename>

3.7 SUBMIT - Automatic Program Execution

SUBMIT allows an ordered sequence of files to be executed from a prepared command file. The screen editor is used to prepare the command file. Submit files are executed by:

AO>SUBMIT <filename>.sub

SUBMIT must be run with the A disk drive selected and write enabled.

3.8 Interface - CP/M I/O

BDOS is the part of CP/M which handles the operating system functions. Access to common peripherals is accomplished by passing a function number and information address to the BDOS. The function number is passed in Register C, while the information address is passed in Register pair D.E. These functions, described in detail in the Interface Guide in the CP/M manual, are accessed by a call to location 0005H.

3.9 ED - Line Editor

CP/M includes a line editor which can be used to fill simple editing requirements. See CP/M documentation for details. For program editing, WordMaster, the N option of WordStar or the /l option of Spellbinder are recommended. Word processing can be done with Spellbinder or WordStar. This page intentionally blank.

Chapter 4

PROM Monitor

4.1 General Description

The PROM Monitor program is entered at power-up by a RESET if the Disk Operating System is not available, or from the Operating System by two RESETS in rapid succession. Operator commands available are briefly described in the table below. The PROM Monitor also contains functions (used by the Monitor Commands) which are available to users. See Chapter 7 of the Reference Manual for a complete description of commands and functions.

Boot to disk from the PROM Monitor Command level is accomplished by issuing the PROM Command A or B. After boot to disk, the PROM is disabled so that a full 65K of RAM is available. Entering Control-Shift-RST twice in rapid succession will return to the PROM Monitor from CP/M.

The syntax conventions used in specifying the format of commands are:

- a) CAPITALIZED items are entered as shown;
- b) Lower case items enclosed by < > symbols are user supplied parameters;
- c) Optional items are enclosed in [].
- d) Either a space or comma may be used to separate fields
- e) All commands except A, B, and Z require a carriage return

Two very useful features of the PROM monitor are:

Allows loading the Disk Operating System (DOS) from either the A or B drive. If it is suspected that Drive A has a problem, load DOS from B.

Provides ability to test read/write memory without the use of the disk drives or operating system. This is important because correct operation of operating system depends on working memory.

4.2 Command-Summary

	Table 6. Opera	ator Commands
Command	Syntax	Function
Α	Α	Boot Disk Operating System from Drive A (lower)
В	В	Boot Disk Operating System from
С	C <transfer-address></transfer-address>	Drive B (upper) Call external
	[, <parml>[,<parm2>]]</parm2></parml>	subroutine with HL=parml, DE=parm2
D	D <start-address>,</start-address>	Display memory in
	<end-address></end-address>	Hex and ASCII
F	F <start-address>, <end-address>, <fill-character></fill-character></end-address></start-address>	Fill memory
G	G[<transfer-address> [,<breakpoint> ,breakpoint>]]</breakpoint></transfer-address>	Go to address with optionally set breakpoints
Н	H <start-address>, <end-number></end-number></start-address>	Compute Hex sum and difference
K	K <start-address>, <end-address></end-address></start-address>	Calculate check value for memory range (to determine ifmemory accidentally
		modified)
M	M <start-address>, <end-address>, <destination-address></destination-address></end-address></start-address>	Move a block of memory
0	0 <jump-address>, <destination-address></destination-address></jump-address>	Calculate relative offset (to determine if in 255 byte range)
Ρ	P <serial-port>,<dup></dup></serial-port>	Port echo (Make ASSOCIATE a terminal) <dup>=0 for full, 1 for half</dup>
QO	QO <port, value=""></port,>	Output value to port
QI	QI <port></port>	Query port
R	$R[\langle bias \rangle]$	Input a hex file to memory
S	S <start-address></start-address>	Display or alter memory
Т	T <start-address>,</start-address>	Test memory
	<end-address></end-address>	(destructive)
V	V <start-address>, <end-address> <compare-address></compare-address></end-address></start-address>	Verify the contents of memory
X	X['] [<register-name>]</register-name>	Examine or modify CPU registers
Y	Y <search-string></search-string>	Search all memory for search string
Ζ	Ζ	Print top of User RAM

Chapter 5

Utility Software

The utility software programs described herein are provided to assist customers in the operation of their systems.

Command syntax varies with the program. See the description of the individual program for special syntax. Generally, keying in the program name followed by a carriage return invokes and transfers control to the program. Control-C, the CP/M system reboot, will ordinarily force an exit from a program. Unless otherwise indicated, a RETURN is required after each USER Entry.

Capital letters under USER ENTRY or COMPUTER RESPONSE, indicate that the command must be keyed (or appears) exactly as shown. Entries or responses shown in lower case letters indicate that the entry is optional.

5.1 BANR - Print Big Letters

BANR can print big letters on an output listing. It can be used for labeling listings or dating information on listings.

The individual letters of the enlarged word are 14 lines high and 14 characters wide (10 characters in the formation of the letter plus 4 spaces). The size of the word to be enlarged is naturally limited by the line width of the output device. For example, an 80 character printer would be limited to enlarging words of 5 characters or less.

The big letters are output to the system list device. Control-C returns control to CP/M.

USER ENTRY			COMPUTER RESPONSE						
1.	User types		1.	Carriage	return	and	line	feed.	
	BANR <wl> <w2></w2></wl>	<wn></wn>	2.	Computer words,	-			•	

5.2 COMPARE - Compare Disk Files

This program is used to compare two disk files on a byte-by-byte basis starting with the low-order sector and byte. The compare identifies nonmatching bytes and prints sector and byte position of unequal compares and then displays the sectors in hex and ascii for operator comparison:

eg. ++FILES UNEQUAL AT FILE 1, IN SECTOR 0001 AT BYTE 01 FILE 2, IN SECTOR 0001 AT BYTE 01

At this point the compare may be optionally continued--with or without an offset. The program will provide instructions. Both primary and secondary names must be specified when invoking COMPARE

or the program will be unable to locate files. If "?" or "*" is used in the second filename, the corresponding character or field is taken from the first filename. For example,

COMPARE A:NAME1.EXT B:NAME2.EXT

If a file does not exist or is not completely named, the program will indicate:

++CAN'T OPEN FILE 1 ++CAN'T OPEN FILE 2

If the two files match, a matching message plus the length of the files will be given:

FILES MATCH, LENGTH IS 007 (HFX) SECTORS

Control is returned to CP/M after the compare-end message.

USER ENTRY

COMPUTER RESPONSE

1. User types COMPARE and the names of the two files to be compared. Computer responds with a message regarding status of the compare.

5.3 COPY - Copy All or Part of a Disk

COPY enables the copying of all, or part, of one disk to another between drives A and B. The program prompts the user with a menu of available options.

USER ENTRY

COMPUTER RESPONSE

1. COPY

1. COPY - 2.03 as of 23-SEP-80

"D"=SPECIFY SOURCE, TARGET DISKS "A"=COPY ALL TRACKS "O"=COPY OPERATING SYSTEM TRACKS "F"=COPY FILES "E"=EXIT TO CP/M

2.<option>

2. Computer executes the option specified.

Specifying a choice other than those indicated will result in the following message:

?ILLEGAL COMMAND

If a copy is successful, the computer will so indicate and will then repeat the options:

COPY COMPLETE: NO ERROR(S) WERE DETECTED

If any errors were detected, the copy will continue through to completion. This allows reading and recovery of data on damaged disks.

5.4 DUMP - Dump Disk

This program is used to dump disk data, showing the contents in both hexadecimal and ASCII format. The area to be dumped may be selected by:

File name;
 Track;
 Track and Sector;
 Group

Other options in DUMP allow:

VALIDATE	Read every sector on disk
MAP	Display allocation map
PARMS	Print disk parameters
HELP	Get Help information
EDIT	Edit disk sectors, given
	track and sector

Specify HELP in DUMP for further information.

The VALIDATE option attempts to read every sector on the disk. The currently logged disk will be selected if no drive is specified. If a read error occurs during the validation, the sector and track numbers of the error are printed. The read requests operate through the BIOS read routines which are normally set for 10 retries.

The DUMP request may be specified completely on the command line:

egs. DUMP NAME.FIL DUMP TRACK 7 DUMP TRACK 0 SECTOR 1 DUMP GROUP 15 DUMP B:VALIDATE

Note that the full name (primary and extension) must be used when specifying a file name. Track, sector, and group may be abbreviated with the single letters T,S, and G in the command line:

```
egs. DUMP T 7
DUMP T 0 S 1
DUMP G 15
```

Track or sector numbers outside the range of the disk will result in an "incorrect sector number" or "incorrect track number." Output is labeled by track and sector for easy identification.

Each GROUP consists of sixteen sectors, sometimes split across track boundaries. There are 169 groups numbered from zero to 168. The drive number need not be specified in VALIDATE. The currently logged disk will be selected if no drive is specified. The format for using the EDIT command is:

T x S y EDIT where x and y are the track and sector to be edited.

This sector will be pulled from the disk and displayed on the screen. Any byte can then be edited by specifing the address in hex followed by a return. The current value will be displayed and the new value entered in hex followed by a return. After editing, the sector is rewritten to the diskette by entering the command "WRITE". The command "STOP" will abort the edit.

EDIT is particularly useful in restoring files that have been accidentally erased. This is done by changing the "e" preceding a file name to a 0 in the directory located on track l.

5.5 EJEC - Send Form Feed to List Device

This program sends a form feed (OCH), carriage return, and null (zero character) to the list device. It can be used to separate listings with space for readabililty or to start a listing at the top of a new form.

USER ENTRY

COMPUTER RESPONSE

1. EJEC

1. The computer causes a form feed on the list device.

5.6 FREE - Indicates Memory Space

FREE prints on the screen the decimal number of bytes available in the TPA memory space.

5.7 BAUD - Select Baud Rate

This program allows selection of the baud rate for the CRT, modem, and list ports. The BAUD program provides prompts for selection of the devices and BAUD rates, or it may be driven from the command line as follows:

BAUD [Ax] [By] [Cy]

5.8 FORMAT - Formats or Verifies Disks

In the format mode, this program formats and clears disks. New diskettes from the manufacturer are unformatted and must be formatted before use. High quality double-sided, double-density media must be used. In the verify mode, the program verifies that disks are readable and are formatted in the correct manner. FORMAT is used for standard disks with drives A and B. The format operation performs the VERIFY procedure immediately after it concludes. Version 3.45 and later of the FORMAT program allow formatting on either the 48 Track Per Inch or the 96 Track Per Inch drives used on the ASSOCIATE PLUS. Version 3.48 and later will set the default system type to the type of the diskette currently logged in.

The program prompts the user as follows:

ASSOCIATE Disk Format Double Density Ver 3.48 7-July-82

Options:

"F": Format disk "V": Verify disk

"D": Select disk to format or verify "S": Select system type

"R": Continuous read track (^C to stop)
"W": Continuous write track (^C to stop)

"B": Break to DDT "E": Exit to CP/M (Insert system disk first)

Selected drive is upper, 35 tracks, 48 tracks per inch Selection:

The continuous read function is available for track and index alignment of disk drives. Use with Dysan 224/2A alignment diskette.

Continuous write can be used to check early and late precompensation. (This is of interest only to the technician.)

VERIFY produces the following message when an error is detected:

VERIFY ERROR AT TRACK-SECTOR tt-ss

where tt is the track number and ss is the sector number in hex.

Note that the read in the Verify mode has only one try at reading because it does not go through the retry read routines in the BIOS. The Verify can therefore be expected to produce an occasional error. Attempt to reverify before condemning a diskette or drive.

5.9 PRINT - Prints ASCII Files

This program prints any ASCII format file. A Control-Z in the file will terminate printing of the file. A carriage return in the file will result in a carriage return and line feed sent to the printer. The full name (filename and filetype) must be specified. TABS are expanded by PRINT to every 8th character position.

COMPUTER RESPONSE

1. PRINT arg1 arg2 arg3 ..

USER ENTRY

 The computer prints the file until a Control-Z is typed or the file is completely printed.

where each argn is an option or a complete filename to printed.

The options for the print program are:

\$dstr	The data string 'str' will be printed as part of the
	title page and heading lines.
\$cnnn	Set characters per line to nnn. Default=132.
\$e	Page ejec (form feed)
Şf	Use form feeds - Default
\$nf	Do not use form feeds
\$pnnn	Sets physical lines per page to nnn and turns on
	pagination. (used only if \$nf option is selected)
\$wnnn	Sets line width to nnn (default = 132)
\$lnnn	Sets lines to print per page to nnn and enables pagina-
	tion (default = 58)
\$pnnn	Enable pagination. Set lines per page to nnn (Default=66)
\$np	No Pagination performed
\$t	Print title pages containing file names and data if non-
	null.
\$nt	Suppress title page printing - Default
\$h	Print heading lines at top of pages. (default)
\$nh	Suppress heading lines.

5.10 D - Sorted Directory

The D program is an easy-to-use directory of the disks. It is easier to use and provides more information than the DIR directory. For a listing of the currently logged disk:

USER ENTRY

COMPUTER RESPONSE

1. User types D

1. Computer displays directory

Several options are available for use with D. For a directory of a disk other than the currently logged disk enter the following:

USER ENTRY

COMPUTER RESPONSE

1. User types D B:

 Computer displays directory of B drive

For a directory of selected fields the D program accepts wild card field designations as in PIP. If for example , a listing of the HEX files is desired:

USER ENTRY

COMPUTER RESPONSE

1. User types D *.HEX

 Computer displays the directory of all the HEX files on the currently logged disk

D will not display files marked as "System" (see STAT program documentation in the CP/M manual for description) unless the SS option is included in the command line. For example, to display all files on the current disk:

USER ENTRY

COMPUTER RESPONSE

	Use r	type s		\$S			Computer displays complete directory of all files on currently logged disk.
1.	User	type s	D	B:*.COM	\$S	1.	Computer displays all COM files on B drive.

The options U, V and F are entered in a manner similar to the S option.

The U option will display the files in all user spaces.

The V option will display an expanded directory including the user number (UN) and the file attribute (AT). The user numbers range from 0 to 15. The file attributes are: W for write protected, and S for System file. For example:

D *.FOR SUVS

will display an expanded directory of all the FORTRAN files on the disk.

The F option gives a fast directory showing only file names.

Additional information regarding the number of files available and remaining disk space is displayed at the bottom of the directory.

5.11 INIT - User Defined Initialization

The INIT program is a system utility to initialize an ASSOCIATE. This initialization can be used to set the hardware configuration upon start up or reset, and it can also be used to customize application programs for optimal operation on the ASSOCIATE.

This program accomplishes this by performing the following functions:

1. setting the list baud rate.

- 2. setting the modem baud rate.
- 3. automatically chaining to a specified START program.
- 4. passing an argument string to the START program.
- 5. loading the programmable keyboard from a specified file.
- 6. setting the iobyte and iobyte extension
- 7. setting up all of the CP/M defaults in O page

To accomplish the above functions, the following files must be present on the diskette:

INIT.COM

The initialization program. It can be run under this name or renamed for specific application programs. It is referred to as INIT in this handbook.

<FILENAME>.PFK Programmable Function Key Codes. This file is sent to the CRT to define the function keys for the specific application. The <FILENAME> is defined in Line 6 in the DAT file.

<FILENAME>.DAT

The setup parameters used by INIT are contained in this editable ASCII data file. These system parameters consist of 11 lines as defined below. A carriage return and line feed must be included for each unused line. This <FILENAME> must match the name of the initialization program.

1997 - N. 19			
Line		Item/ Function	æfault if blank
line	1.	User program string l	no action
line	2.	User program string 2	no action
line	3.	List (printer) port baud rate	not changed
		(50,75,110,134,150,300,600,1200,1800,	· · · · · · · · · ·
		2000,2400,3600,4800,7200,9600,19200)	
line	4.	FILENAME for START program	
line	5.	Default argument string for START program	•
		This string is passed if there are no	
		PARAMETERS on the command line. Maximum	
		45 characters.	
line	6.	File NAME to be sent to console	FILENAME.PFK
		(Extension defaults to PFK)	
line	7.	Modem port baud rate code	not changed
line	8.	IOBYTE, IOBEXT (0-255)	not changed
line	9.	date (year, month, day)	no action
		(1981,12,23)	
line	10.	User number 0-15	not changed
line	11.	Drive number A-P (UPPER case)	not changed

The INIT program is executed upon power up or can be run by the following command:

INIT <FILENAME>.<EXT>

Where <FILENAME>.<EXT> is the name of a file to be passed. As an example of using the INIT program, suppose you wish to customize a program called BLASTO so that it automatically runs upon startup, sets the printer speed to 1200, and loads the function keys from a function key file. In addition to the BLASTO program, the three other files needed on the diskette are:

INIT.COM	(Initialization)
INIT.DAT	(Initialization Data)
BLASTO.PFK	(Programmable Function Key Data)

To create the INIT.DAT file use WordMaster, WordStar, or other editor. The file would consist of the lines as below (the comments are not part of the line)

Line l	; user defined data
Line 2	; user defined data
1200	; Printer baud rate
BLASTO	; start filename
	; no parameters passed
BLASTO.PFK	; pfk filename
	; modem baud rate - not changed
	; no change to I/O setup
1981,12,23	; date - year,month,day
	; user number
	; drive number ·

To create the function key file BLASTO.PFK, use an editor in conjunction with the PFK program. See Section 12.2 for a summary of the PFK program operation.

The BLASTO program is now executed upon startup, reset, or by giving it the command INIT.

If you do not wish to have it run upon startup, rename the INIT.COM and INIT.DAT files, to the desired name, for example, BL.COM This can be accomplished by:

AO>REN BL.COM=INIT.COM AO>REN BL.DAT=INIT.DAT

And now BLASTO is run with the command

AO>BL

Note that you cannot rename it BLASTO.COM as this would create a name conflict with the program that you wish to run.

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5.12 SYSGEN - System Generator

The program SYSGEN provides the capability of moving the Disk Operating System from one diskette to another. It is used by entering:

AO>SYSGEN

The program then prompts the operator to identify the source drive and the destination drive for the transfer.

Alternatively, the source for the system may be a file designated as follows:

AO>SYSGEN [<Filename>.<Filetype>]

5.13 TIME - Display Real Time

The TIME program displays the current date and time from the Real Time Clock, and if the \$S option is given, sets the video board software clock to the hardware Real Time Clock.

USER ENTRY	· COMPUTER RESPONSE
TIME	Computer prints: 12:23:41.594 Friday September 26
TIME \$S	As above and turns on the video processor clock at the end of the 25th line.

5.14 S10PORTS.LIB - Sample I/O Port Definitions

This file is provided on the standard system diskette to provide definitions of the input/output devices on the processor board.

5.15 VPRINT - Screen Print

This system utility gives the ability to transfer the information on the CRT screen to either a printer or a disk file.

To use: give the following command from the CP/M command level:

AO>VPRINT

which will copy the screen to the printer, or

AO>VPRINT <FILENAME>.<FILETYPE>

which will copy the screen data to the specified disk file.

Chapter 6

LANGUAGE OPERATION

Optional programming language software includes MBASIC, FORTRAN, PASCAL, COBOL, ASSEMBLER, RATFOR, PL/1, and C.

6.1 BASIC 80 - Interpreter

MBASIC, Microsoft Extended Disk Basic, is an extensive implementation of BASIC for 8080 and Z80-based microcomputers. Its features are comparable to those of BASICs found on minicomputers and large mainframes. Some valuable features of Microsoft BASIC are:

- Matrices up to 255 dimensions
- IF-THEN-ELSE and nested IF-THEN-ELSE
- Immediate execution of statements
- Full PRINT USING for formatted output
- Random Files
- Up to 255 files per floppy disk
- Can be compiled
- and many other BASIC extensions

The CP/M version of BASIC is supplied on diskette from Data Technology Industries. When purchased for an ASSOCIATE, several programs are provided on the diskette in addition to the standard programs supplied, in order to make operation of MBASIC easier. These are:

MB.COM	MBAS IC	Loade r		
MB.PFK	MBASIC	ASSOCIATE	Function	key codes
MB.DAT	Data fi	le for ASS	SOCIATE an	d MBASIC

Upon receiving your MBASIC diskette, it is recommended that a copy be made for everyday use and the original stored in a safe place for back up. From the master work disk, different configurations and various working diskettes can be made. A work diskette for day to day processing should have:

MB.COM	MBASIC Loader
MB.PFK	MBASIC ASSOCIATE Function key code
MB.DAT	Data file for ASSOCIATE and MBASIC
MBASIC.COM	MBASIC
D.COM	Sorted Directory
PIP.COM	Peripheral Interchange Program

After booting CP/M, MBASIC is executed by:

AO>MB

or with a file designated:

s

```
AO>MB [<file name>][/F:<number-of-files>]
[/M:<highest-memory-location>]
```

where,

<filename> denotes a program to be run immediately
<number-of-files> sets the number of files that may be
 open at any one time during the execution of a BASIC program.
<highest-memory-location> sets the highest memory location
 that will be used by MBASIC.

A function key overlay is provided with MBASIC when purchased from Data Technology Industries to identify the operation of the function keys.

Alternatively, MBASIC can be run without use of the loader and function keys by the command:

AO>MBASIC

The system will reply:

37769 Bytes Free BASIC Rev 5.2 [CP/M version] Copyright 1977 (c) by Microsoft OK

MBASIC can now be used in direct mode or for program creation. An alternate procedure for invoking MBASIC is the following:

AO>MBASIC [<file name>][/F:<number-of-files>] [/M:<highest-memory-location>]

6.2 FORTRAN - Compiler

Microsoft's FORTRAN (FORmula TRANslator) for 8080 and Z80-based microcomputers implements the American National Standards Institute version as described by ANSI document X3.9-1966, approved on March 7, 1966. It also contains a number of extensions to the language and some restrictions. The language, including extensions and restrictions, is fully described in Microsoft's FORTRAN-IV manual.

There are four programs supplied in Microsoft's FORTRAN - a compiler, a linking loader, a FORTRAN library, and Macro Assembler.

To create, link, load, and run a FORTRAN program:

Create a Source File

A source file is created following the standard format for FORTRAN source programs using WordMaster, the N option of WordStar, the /l option of SpellBinder, Ed or another editor.

File names should have the extension FOR.
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Compile the Source File

First do a simple syntax check by specifying the following:

AO>F80 ,=<filename>

This command compiles <filename> without producing an object or listing file. To compile and produce an object and listing file:

A0>F80 <file name l>, <file name 2>=<file name >

A relocatable file (<filenamel>.REL) and listing file (<filename2>.PRN) will be created.

Loading, Executing and Saving the Program

L80 is used to link programs and execute the resulting load module. For example to link two programs and execute:

A0>L80 <file name 1>, <file name 2>/G

To load a program into memory and execute it:

A0>L80 <filename>/G

To save a memory image:

AO>L80 <file name >, <file name 3>/N/E

The system will reply with 3 numbers. The last is the number of 256-byte pages used.

To execute, simply type <filename3> at the CP/M prompt.

6.3 RATFOR - Rational FORTRAN

RATFOR is a preprocessor which converts source code written in Rational FORTRAN into standard FORTRAN for use with the compiler and linker described in the previous section. Rational FORTRAN provides the capability to write FORTRAN programs in a structured programming environment. Language operation is as described in <u>Software Tools</u> by Kernigen and Plauger.

The RATFOR compiler is used in conjunction with the FORTRAN compiler as:

A source file with the filetype RAT is created using WordMaster, the N option of WordStar, the /l option of SpellBinder, Ed or another editor.

Invoke the RATFOR compiler by:

A0>RF6 <filename>

This creates a FORTRAN source file <filename>.FOR. This FORTRAN file should compiled as described above.

6.4 M80 - Z80 Assembler

Microsoft's MACRO-80 provides an optionally available Z80 Assembler ability on the ASSOCIATE. As with Microsoft's FORTRAN, there are three steps involved in the use of the Z80 Assembler.

Create a Source File

Create a source file following the standard format for M80 Macro-Assembler code using the 1/ option of SpellBinder, WordMaster, the N option of WordStar, Ed or other editor. MACRO-80 filenames should have the extension MAC.

Assemble the Source File

To invoke the MACRO-80 assembler, specify M80 at the CP/M command level:

A0>M80

or

AO>M80 =<filename>

When the assembler asks for parameters with an asterisk, enter:

*[<file name 1>][,file name 2]=<file name>

A relocatable file (<filenamel>.REL) and listing file (<filename2>.PRN) will be created. The optional parameter TTY: or LST: may be substituted for Filename 2 to send a listing to the console or to the printer.

Loading, Executing and Saving the Program

Follow the procedure described for FORTRAN to load, execute and save the program. The optional debugger ZSID can be used as a symbolic debugging aid with MACRO-80 generated code. The programs are linked and run with the L80 linker.

See the M80, BASCOM or FORTRAN manuals for further information on the linking process.

6.5 PASCAL/Z - Compiler

PASCAL/Z is a PASCAL compiler for the Z80 written by Ithaca InterSystems. It is based on the PASCAL user manual and report by Jensen & Wirth, and has been optimized for the Z80 with CP/M. It produces fast efficient "COM" files for direct execution from CP/M. The compile sequence is:

- Using an editor create a PASCAL source file with the filetype .PAS.
- 2. AO>PASCAL <file name >.ABC

where A = source disk for .PAS file B = destination disk for .ASM file output C = list disk or device (X = printer)

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3. AO>ASMBL <filename>.ABC

where A = source disk for .ASM file B = destination disk for .HEX file C = destination disk for .PRN file (X = printer)

4. AO>LINK S:D:<filename>

where S: is the source drive D: is the destination drive

6.6 <u>COBOL</u> - Compiler

Microsoft's COBOL-80, which runs on 8080 and 280-based microcomputers, brings the world's most widely used computer programming language to ASSOCIATE users. COBOL-80 is comparable to COBOL systems found on minicomputers and mainframes. It gives ASSOCIATE users access to the many programs written in COBOL. Microsoft's COBOL is based on the 1974 ANSI standard and contains all Level 1 features and most useful Level 2 options for the "Nucleus" and for Sequential, Relative, and Indexed file handling. Features include the STRING, UNSTRING, COMPUTE, SEARCH, and PERFORM (VARYING/UNTIL) verbs, as well as condition names, compound conditions, and abbreviated conditions. COMP-3 data format is available, and a batch-style debug technique is implemented.

6.7 PL/1 - Compiler

PL/I-80 is a PL/l compiler for the Z80 written by Digital Research. It produces fast efficient "COM" files for direct execution from CP/M. The compile sequence is:

- 1. Using an editor create a PL/1 source file with the filetype .PLI.
- 2. AO>PLI <file name >.\$ sl s7

where s1 - s7 are compile options

3. AO>LINK <file name>

which links the relocatable files with the run time library.

6.8 BASCOM - BASIC Compiler

Microsoft's BASCOM Basic Compiler gives the ability to compile BASIC programs written with either the MBASIC interpreter or with an editor. The compile generates relocatable object code that may be linked with assembly language, FORTRAN, or COBOL programs. The language, including extensions and restrictions, is fully described in Microsoft's BASCOM Compiler manual.

There are five programs supplied in Microsoft's BASCOM - a compiler, a linking loader, a BASCOM library, Macro Assembler, and a run time library: BRUN.

To create, link, load, and run a BASCOM program:

Create a Source File

A source file is created following the standard format for BASCOM source programs using an editor. BASCOM filenames should have the extension BAS. Programs may alternatively be created with the MBASIC interpreter and saved in ASCII format.

Compile the Source File

First do a simple syntax check by specifying the following:

AO>BASCOM ,=<filename>

This command compiles <filename> without producing an object or listing file. To compile and produce an object and listing file:

A0>BASCOM <file name l>,<file name 2>=<file name >

A relocatable file (<filenamel>.REL) and listing file (<filename2>.PRN) will be created.

Loading, Executing and Saving the Program

To link programs using LINK-80 and execute the resulting load module. For example to link two programs:

AO>L80 <file name l>,<file name 2>/G

To load a program into memory and execute it:

A0>L80 <filename>/G

To save a memory image:

A0>L80 <file name >, <file name 3>/N/E

The system will reply with 3 numbers. The last is the number of 256-byte pages used. To execute the program simply type <filename3> after the CP/M prompt.

6.9 C - Compiler

Chapter 7

WORD PROCESSING

Word Processing is the creation and modification of text using a computer. Text can be easily manipulated and revised, and can be reformatted with a few simple commands. The ASSOCIATE's function keys are programmed to perform frequently used commands, such as writing a file to disk, deleting words and re-aligning margins. Templates are provided with Spellbinder, and WordStar to identify the appropriate functions at a glance. The descriptions in this section are intended as summaries only are and not intended to replace the documentation included with the programs. Please refer to that documentation for complete operating details.

7.1 Spellbinder

. .

A powerful Word Processor and Office Management Package called Spellbinder is included with the ASSOCIATE. Spellbinder is easy to learn and use, yet has the facility to perform varied functions such as complex sorting, forms handling, and mail merge, in addition to the normal text manipulation features found in most word processors. It is CP/M compatible, screen-oriented, and has integrated printing. Both initial entry of text and alteration of previously entered text are performed directly on screen. Text manipulation such as block moves and global searches can be done by the press of a key. Formatting can be easily altered by simple changes to a Print Table, and true print image can be verified at the touch of a button.

Spellbinder's features are too numerous to list in this handbook. The SpellBinder manual includes a "Tutorial" with self-paced instruction is provided for the novice user.

Setup

It is recommended that a copy of the distribution disk be made for a work copy and that the original be stored in a safe place for back-up. In addition to the Spellbinder files several other standard files are normally included on the Spellbinder working diskette:

SBI.COM	Spellbinder Loader
SB.PFK	Spellbinder Function Keys
SBI.DAT	Loader Configuration File
D.COM	Sorted Directory
PIP.COM	Peripheral Interchange Program
COPY.COM	Diskette Copying Program

It is recommended that working files be directed to another disk, (on the B: drive) and that the Spellbinder disk be reserved for Spellbinder files only (use a Write Protect Tab).

The INIT program has been configured as a Spellbinder loader. For complete details, of INIT set up and operation see Section 5.11 of this handbook.

Printer Baud Rate

Printer Baud Rate output is controlled by line 3 of the SBI.DAT file. To configure the baud rate for any given printer, simply use Spellbinder to edit this file. Then restart Spellbinder to set baud rate after changing.

Normal Operation

After booting CP/M, you invoke Spellbinder by:

AO>SBI

which loads the Keyboard Function Keys and SpellBinder.

Function Keys

A function key overlay is provided with Spellbinder to identify the operation of function keys for word processing. This overlay makes operation of most Spellbinder functions self-evident.

NOTE: Normal SpellBinder files do not include carriage returns & line feeds, making it impossible to view the file at the system level using the TYPE command. In order to convert SpellBinder files into system files use the /l option when writing such files to disk. For example:

Write Filename?SBI.DAT/1

7.2 WordStar

A powerful word processor and text formatter called WORDSTAR is optionally available to ASSOCIATE users. WORDSTAR represents a significant advancement in providing extremely comprehensive, yet easy to learn and use, facilities for text transcription, manipulation, and composition. It is a CP/M compatible, screen-oriented, word processing system with integrated printing. Both initial entry of text and alteration of previously entered text are performed directly on screen. Most formatting functions take place immediately, resulting in the display of a true print image; additional enhancements are performed during printout.

WORDSTAR's features are too numerous for listing in this handbook. For a complete description, see the "WORDSTAR User's Guide", As an example of its capabilities, this "Operator's Handbook" and the "ASSOCIATE Reference Manual" were written and formatted using WORDSTAR.

Setup

The standard programs that come on the WordStar diskette as supplied with the ASSOCIATE are:

WS.COM	WordStar for ASSOCIATE and Qume Sprint 5
WSOVLYR.OVR	WordStar overlay
WSMSGS.OVR	Message file
INSTALWS.COM	WordStar configuring program
WS.PFK	Function key codes

WP.COM	. WordStar loader
WS.DAT	Loader configuration file
D.COM	Sorted Directory
PIP.COM	Peripheral Interchange Program

It is recommended that a copy of this disk be made for a work copy and this original be stored in a safe place for back up. From the master work disk, different configurations and various working diskettes can be made. A work diskette for day to day word processing should have all of the above except INSTALWS.COM.

The WS.COM program in the work disk is not necessarily the same as the master disk because it may have been generated by the install for printers other than the Qume Sprint 5.

Operation of the configuration programs in the ASSOCIATE environment are as follows:

INSTALWS allows the user to change many of the input/output characteristics of WordStar. Because many different application programs use the name INSTALL, this program has been renamed with the WS in it. Using option "B" during INSTALL allows modification of an existing WS.COM file and creation of a new WS.COM with different characteristics. This would be used for operation with a different printer. It is NOT recommended that any changes be made to the Terminal or any other parameters except the printer. INSTALWS is a program supplied by Micropro (renamed by Data Technology Industries) and is documented in the WordStar Operators Guide. Please see this guide for complete instructions.

The INIT program has been configured as a Wordstar Loader. For complete details of INIT set up and operation see Section 5.11 of this handbook.

Printer Baud Rate

Printer Baud Rate output is controlled by line 3 of the WP.DAT file. To configure the baud rate for any given printer, simply use the N editing option of WordStar to edit this file. Then restart WordStar to set baud rate after changing parameter.

Normal Operation

After booting CP/M, you invoke WORDSTAR in one of several ways:

A0>WP

which will bring up WordStar with no file identified.

To directly edit a file use the form:

AO>WP <filename>

Include disk drive and <filetype> as necessary.

Direct to Edit with New File on Different Disk. This method is for

extremely long files, where the new file must be placed on a different diskette because of space limitations. The new drive specified will receive the edited version of the document:

AO>WP <filename> <drive:>

Function Keys

A function key overlay is provided with WordStar to identify the operation of the function keys for word processing. This overlay makes operation of most WordStar functions self-evident.

NOTE: When editing system files and programs, it is essential that the "N" option be used; otherwise line feeds and carriage returns will be incorrectly entered into file and may cause compilation errors.

7.3 SpellGuard

Spelling checking programs operate by comparing words in text file with words in a dictionary file. Every word in the text file is checked against the dictionary file. If a match is not found, it is flagged for an operator decision on its correctness. Note that spelling checking programs do not verify correct use of words, only that the word matches a dictionary word.

A spelling program called SpellGuard is optionally available with the Associate. Spellguard is run by the command:

A0>SP

after which the user is prompted from a menu.

Spellguard can be optionally run from WordStar by selecting the R (run) option followed by SP.

7.4 SpellStar

A spelling checking program called **SpellStar** is optionally available. SpellStar is written by MicroPro and runs in conjunction with WordStar.

Chapter 8

FINANCIAL MODELING

8.1 MicroPlan

An electronic spread sheet program, MicroPlan, is supplied with the ASSOCIATE. MicroPlan is an easy to learn, easy to use tool for financial modeling, numerical manipulation, and table generation. It is a CP/M compatible and screen-oriented, with integrated printing. Both initial entry of data and alteration of previously entered data are performed directly on screen.

Details of MicroPlan operation are given in its own manual.

In addition to the standard MicroPlan files, in order to give full use of the ASSOCIATE features several additional files are provided. These are:

MP.COM	MicroPlan Loader
MP.PFK	MicroPlan ASSOCIATE Function key codes
MP.DAT	Data file for ASSOCIATE and MicroPlan

Upon receiving your MicroPlan it is recommended that a copy of this disk be made for a work copy and this original be stored in a safe place for back up. From the master work disk, various working diskettes can be made.

After booting CP/M, you invoke MicroPlan by:

AO>MP

A function key overlay is provided with MicroPlan to identify the operation of the function keys. This overlay makes operation of most functions self-evident.

Printer Baud Rate

Printer Baud Rate output is controlled by line 3 of the MP.DAT file. To configure the baud rate for any given printer, simply use the /l option of SpellBinder, or the N editing option of WordStar to edit this file. The baud rate will then be set upon starting MicroPlan.

s

8.2 SuperCalc

Another powerful numerical modeling program called SuperCalc is optionally available to ASSOCIATE users. SuperCalc represents a significant advancement in providing extremely comprehensive, yet easy to learn and use, facilities for financial modeling, numerical manipulation, and table generation. It is a CP/M compatible and screen-oriented, with integrated printing. Both initial entry of data and alteration of previously entered data are performed directly on screen. Calculation takes place immediately, resulting in fast display of data for quick decision making.

SuperCalc's features are too numerous for listing in this handbook. For a complete description, see the SuperCalc Manual.

If SuperCalc is purchased from Data Technology Industries, several programs are provided on the diskette in addition to the standard programs supplied, in order to give full use of the ASSOCIATE features. These are:

SCI.COM	SuperCalc Loader	
SC.PFK	SuperCalc ASSOCIATE Function key code	s
SCI.DAT	Data file for ASSOCIATE and SuperCalc	

Upon getting your SuperCalc it is recommended that a copy of this disk be made for a work copy and this original be stored in a safe place for back up. From the master work disk, different configurations and various working diskettes can be made. A work diskette for day to day processing should have:

SCI.COM	SuperCalc Loader
SC.PFK	SuperCalc ASSOCIATE Function key code
SCI.DAT	Data file for ASSOCIATE and SuperCalc
SC.COM	Supe r Calc
SC.OVR	SuperCalc Overlay
D.COM	Sorted Directory
PIP.COM	Peripheral Interchange Program

After booting CP/M, you invoke SuperCalc by:

A0>SCI

Printer Baud Rate

Printer Baud Rate output is controlled by line 3 of the SCI.DAT file. To configure the baud rate for any given printer, simply use the /l option of SpellBinder, or the Nediting option of WordStar to edit this file. The baud rate will then be set upon starting SuperCalc.

When purchased from Data Technology Industries, a function key overlay is provided with SuperCalc to identify the operation of the function keys. This overlay makes operation of most SuperCalc functions self-evident.

ASSOCIATE OPERATOR'S HANDBOOK

Chapter 9

ACCOUNTING SOFTWARE

9.1

Data Technology Industries includes a comprehensive accounting package with the ASSOCIATE for endusers. The package is broken into Accounts Receivable, Accounts Payable, Payroll, and General Ledger. Each part can operate as a single unit, or with the other parts to form a complete accounting system. Optional inventory packages and client ledger modules designed to operate with the system are also available. The entire system

- (1) Provides profit and loss statements
- (2) Provides monthly balance sheet and cash flow statements
- (3) Provides extensive management reports to control all items involving receivables and payables such as ageings.
- (4) Provides complete billing and paying systems including check writing and regular payment/invoice generation.

Ope ration

The system is started by first loading MBASIC by typing:

AO>MBASIC

If you do not presently possess MBASIC, a copy may be purchased from DTI.

The next screen presents some brief data on MBASIC. A command is now given to run the desired module. For example to run Accounts Payable, enter:

RUN "AP MENU"

Note the quotation marks and that the command must be in capital letters. The screen will respond with a list of options and you may begin data entry.

After the payroll and other modules have been run and data entered, an "end of period processing" program prepares the inputs for the general ledger, and the information copied to the ledger for final preparation of monthly profits, for example.

Orde ring

To receive a copy of the Accounting Software, fill out and return the Enduser Registration Card to Data Technology Industries.

9.2 MJA - Multi Journal Accounting

The Multi Journal Accounting system (MJA) is a complete small business software system composed of five modules; General Ledger, Payroll, Accounts Receivable, Accounts Payable, and Order Entry/Inventory. Each module may be operated in a standalone fashion or as a subsidiary in an integrated system. Automatic postings to the General Ledger provide the capability to maintain up-to-date business records and to print financial statements.

The accountant will find the MJA a useful bookkeeping tool for maintaining accounting data. This complete accounting system will allow the user to maintain control, improve profitability and become more competitive through timely and accurate business data.

The General Ledger (GL) is the heart of the accounting system. It serves as the consolidation point for all **subsidiary** activity. Automatic postings from the Payroll (PY) system (Earnings Report and Employee checks), from the Accounts Receivable (AR) (Sales Journal and Cash Receipts Journal) and from the Accounts Payable (AP) (Purchase Journal and Cash Disbursements) allow up-to-date, complete financial records to be maintained. Additionally, the Order Entry/Inventory (IN) System makes automatic postings to the A/R Sales Journal and to the A/P Purchase Journal.

When ordering any (or all) of the MJA sub-systems, you will receive a Distribution Program Disk(s), a Demonstration Data Disk, an MJA Overview and a Users Guide. Each one of the MJA subsidiary systems is composed of several programs. These programs are contained on the Distribution Program Disk(s). The Demonstration Data Disk is provided to allow you to immediately bring the MJA system up for familiarization and operator training.

In order to ensure a successful installation, it is recommended that you follow the sequence of steps outlined below:

..... VERIFY THAT YOU HAVE RECEIVED THE FOLLOWING:

- 1) MJA Program Distribution Disk
- 2) MJA Demonstration Data Disk
- 3) Sub-System User's Guide

If any of the above are missing, contact Data Technology Industries Customer Service.

Printer Baud Rate

Printer Baud Rate output is controlled by line 3 of the MJA.DAT file. To configure the baud rate for any given printer, simply use /l option of SpellBinder, or the Nediting option of WordStar to edit this file. The baud rate will then be set upon starting MJA.

ASSOCIATE OPERATOR'S HANDBOOK

Chapter 10

DATA BASE MANAGEMENT

Data Base Management Systems are extremely useful for storing data in an easy-to-retrieve format which is independent of the programs which access it. Most systems are equipped with a report-writer for ease of report writing, screens for data entry, and other useful features.

The descriptions in this section are intended as summaries only and are not intended to replace the documentation included with the programs. Please refer to that documentation for complete operating details.

10.1 dBASE II

dBASE II is one of several data base managers supported on the ASSOCIATE. It is easy to learn and use for simple applications yet has capability to perform complex operations. It is a CP/M compatible and screen-oriented.

If dBASE II is purchased from Data Technology Industries, several additional files are provided on the diskette to support the template and keyboard enhancements. These are:

DB.COM	r .	dBASE	II	Loa de	r.				
DB.PFK		dBASE	II	ASSOC	IATE	Funct	ion	ke y	code s
DB.DAT		Data	file	for	ASSOC	IATE	and	dBAS	SE II

Upon receiving your copy of dBASE II it is recommended that a copy of this disk be made for a work copy and this original be stored in a safe place for back up. From the master work disk, different configurations and various working diskettes can be made. Note that it is not necessary to do an install if dBASEII is purchased from DTI; the program will already be properly configure for the ASSOCIATE.

After booting CP/M, you invoke dBASEII by:

AO>DB

Printer Baud Rate

Printer Baud Rate output is controlled by line 3 of the DB.DAT file. To configure the baud rate for any given printer, simply use the /l option SpellBinder, or the Nediting option of WordStar to edit this file. The baud rate will then be set upon starting dBASE II.

When purchased from Data Technology Industries, a function key overlay is provided with dBASE II to identify the operation of the function keys. This overlay makes operation of many of dBASE II's functions self-evident.

10.2 DataStar

DataStar is a program for easy generation of screen oriented data for entry forms.

10.3 T.I.M.

T.I.M. Total Information Management is an easy to use records management program. Any number of data files may be created, each of which may contain up to 32,767 records, consisting of a maximum of 40 separate data fields. Field length is 60 characters and the combination of all fields may as great as 2400 characters.

Information is arranged by the computer and placed in the data file. The user can manipulate the file and generate sub-files, reports, forms letters, mailing labels, invoices, and view the file.

10.4 Additional DBMS Software

Additional Data Base Management and File Management software available from Data Technology Industries includes CONDOR, MDBS and QUIC-N-EASI. For further information, please contact Data Technology Industries.

Chapter 11

COMMUNICATION SOFTWARE

The descriptions in this section are intended as summaries only and not intended to replace the documentation included with the programs. Please refer to that documentation for complete operating details.

11.1 CONFER - Conversation Terminal Emulator

The CONFER program, allows asynchronous ASCII communications between the system running the program and some other facility, called the 'remote device.' The program is easily configurable for such options as baud rate, parity, duplex, etc. Once the selected options are set, a customized version of the program may be SAVE'd on disk. In addition, the program contains built-in 'handshakes' that allow sending and receiving files to a number of different manufacturers' computers, including IBM, DEC, and UNIVAC. A 'line monitor' mode aids in debugging communications problems.

The following options and others may be set or changed by the user using a menu format. All options are fully explained in the CONFER Manual.

Communications device port Duplex (echo) Auto LF Characters for menu and break Host type Baud rate Parity Line monitor mode Printer on/off Send a File to a Remote device Receive a File from a Remote device

Start the program by entering

A0>CONFER

The program will sign on as follows:

CONFER - Host-ASSOCIATE conversational terminal emulator Vx.xx

Communications port is yy

Type chl for menu, ch2 for break.

At this point you are in conversational mode. In conversational mode, you are in direct communication, through the selected port, with the remote device. All characters received are sent to the screen. TAB characters are expanded to every eighth column. All characters typed at the keyboard are sent to the remote device, except for the following:

When the 'menu character' is typed, the program enters the menu. The initial 'menu character' is displayed in the sign-on message shown above.

To exit the program, enter the menu by typing the 'menu character' and then type ctrl-C in the menu prompt field.

11.2 RBTE - Remote Batch Terminal Emulator

RBTE is normally used on an ASSOCIATE to communicate over a modem and phone lines with an IBM computer in one of the IBM protocols such as 3780, 2780, 3741, or 2770.

The modem used must be capable of providing the synchronous clock signal to the ASSOCIATE. The cable connecting the ASSOCIATE and the modem is a CA-62A as follows:

RBTE ASSOCIATE to MODEM Cable

DB25S (ASSOCIATE MODEM Port)

DB25P (MODEM)

Pin	# Function	Pin #
1	Chas Ground	1
2	Tx Data (out)	2
3	Rx Data (in)	3
4	Request to Send (out)	4
5	Clear to Send (in)	5
17	Data Set Ready (in)	6
7	Sig Ground	7
6	Rec'd line sig (in)	8
15	Trans Clock (in)	15
20	Data Term Ready (out)	20
24	Trans Clock (out)	24

To use the SIO devices on the ASSOCIATE CPU board in the manner RBTE requires, several jumper options must be set on the board. These are:

External clocking of SIO 0 A - Modem port
 Data Set Ready to B Sync

Cut	JP21-1	from	JP21-2	Jumpe r	JP21-2	to	JP21-4
Cut	JP23-1	from	JP23-2	Jumpe r	JP23-2	to	JP23-3
				Jumpe r	JP23-2	to	JP23-4
				Jumpe r	JP21-3	to	JP31A-2

Note that these changes will prevent the modem port from working with asynchronous modems. To use with an asynchronous modem change the options back to original state.

Operation. After connecting the modem to the ASSOCIATE modem port, insert the diskette into the system with the RBTE program on it. Refer to the RBTE Operator's Manual for a detailed operational description of the program.

.Chapter 12

ADDITIONAL PROGRAMS

The descriptions in this section are intended as summaries only and not intended to replace the documentation included with the programs. Please refer to that documentation for complete operating details.

12.1 WordMaster

WordMaster, an optional screen editor, is designed to provide screen editing capabilities for program editing. WordMaster includes the following features for program editing:

-Inspection and updating of text files through CRT -Movement to any point in file via Control Keys -Functions to position the cursor by page, line, word and character -Continuously updated display -Context editing including searches, global replacements, and text moves

If WordMaster is purchased from Data Technology Industries, in addition to the standard programs supplied, several programs are provided on the diskette to give full use of the ASSOCIATE features. These are:

WMI.COM	WordMaster Loader
WM.PFK	WordMaster ASSOCIATE Function key codes
WMI.DAT	Data file for ASSOCIATE and WordMaster

A function key overlay is provided to identify the operation of the function keys.

WordMaster can be invoked from the command level of CP/M by issuing the following command:

A0>WMI [<disk>:]<filename>.<filetype> [<disk>]

This specifies that the file <filename>.<filetype> is to be edited. The first <disk> represents an optional drive name A: or B: to specify the disk drive on which the original file resides; if omitted, the current drive will be used. The second <disk> is the drive name for the edited text; if omitted, the edited text will be placed on the same drive as the source text.

WordMaster starts off in the Video Mode when called; normally an operator will stay in the Video Mode to enter text and perform simple manipulations of that text. The text being worked on is shown on the CRT and constantly updated as it is added to or changed. Depressing the ESC key allows entry to the Command Mode where other functions are available, including the ability to End the edit and write the results out to disk, or bring in an entire file to work on. Entering V and carriage return brings back the Video Mode and allows the operator to see the results of the command functions.

See WordMaster Manual for complete list of commands.

12.2 KEYLOADER - PFK Programmable Function Key Generator

KEYLOADER is a program that provides the user with the ability to define the operation of the Function Keys and Special keys and the 25th line on the ASSOCIATE Microcomputer. Creation of function key files and use of the function keys is a three step process as follows:

1. Create a function key source file with an editor.

2. Process the source file with the KEYLOADER program to produce a loadable function key file.

AO>PFK <filename>

3. Load the function keys by transmitting the processed file to the CRT. This can be done by the CP/M command 'type <filename>.PFK', with a custom loader, or with the INIT program.

The source file consists of function key equates and commands. The equate statements take the form of:

Key=definition

where a key is identified as:

the ten function keys: F0 F1 F2 F3 F4 F5 F6 F7 F8 F9
the five cursor control keys: LEFT DOWN UP RIGHT H(ome)
the fourteen keys on the numeric pad:
 . 0 1 2 3 4 5 6 7 8 9 - + ENTER
andthetwo optional keys:
 X1 (Under 0 key) and X2 (Under ENTER KEY)

To include the shift or control functions, the key names are preceded with s or c. For the shift and control key function together, the key name is preceded with both letters.

and the definition may be:

1) an ASCII string enclosed in single or double quotes

2) the name of another function key

KEYLOADER commands may also be included in the source file.

It is sometimes necessary to include non-printable or control characters in a function key command. This can be done in two ways: for a control character, precede the character with the character $\hat{}$. Or by preceding the hexadecimal representation of the character with a \backslash .

Standard filetypes for the KEYLOADER program are KEY, ASM and PFK. These are used as follows:

Filename.KEY normally ASCII command and definitions source files.

- Filename.ASM Assembly and M80 format code strings output by the CODE command.
- Filename.PFK ASCII control and character strings which will load the function keys when sent to the CRT.

The program is entered as follows:

PFK	<filename>.[<ftype>]</ftype></filename>	Take commands from disk file. Filetype default is KEY.
PFK		Loads PFK program and take commands and definitions from the keyboard.

Upon program entry if no file is given , the user will be prompted with a help menu.

The 'processed' pfk files are in the proper format to be sent directly to the CRT. This may be done with the type command, the BASIC print statement, the assembly language subroutine ZPRINT, or with the INIT program.

Further information on KEYLOADER operation is given in a separate manual.

Punched unprinted templates are available from Data Technology Industries at a nominal charge.

12.3 Character Generator

CHARGEN is a OEM support program used to design character sets for the character PROM in the CRT processor. Use of this program requires the capability to program 2716 PROMs.

12.4 AUTHOR - Computer Aided Instruction

Author is a program useful for creating and running course material in a Computer Aided Instruction mode. Using the INIT program each course can be completely customized for use in the ASSOCIATE.

Chapter 13

OPERATING CONSIDERATIONS

13.1 Unpacking and Packing

Observe the following precautions while unpacking and setting up your ASSOCIATE:

Unpack carefully. Save all packing materials. If return is necessary, the same shipping box, if undamaged, may be used.

Report shipping damage immediately to shipper and to Data Technology Industries Customer Service or to Customer Service Dept of supplier if the System was not purchased directly from Data Technology Industries.

Dummy diskettes with felt head protectors must be kept in the disk drives whenever transporting the ASSOCIATE. Failure to do so may void warranty. Upon unpacking, store these in a safe place where they can be found for use during transportation.

Keep the ASSOCIATE out of the sun, as the sun can cause damage to the sunscreen as well as ruin floppy disks (see 13.2 below).

13.2 Care of Diskettes

The following guidelines will help insure the long life of your diskettes and the safeguarding of valuable data:

- 1. Keep diskette in its protective envelope when not in use.
- 2. Do not touch or attempt to clean the exposed surface.
- 3. Do not eat, drink or smoke while handling a diskette.
- Print labels prior to attaching to diskette. Use only felt tip pens for correcting labels. Do not make erasures on diskette.
- 5. Do not expose the diskette to excessive heat or sun. Don't store inside automobile.
- 6. Do not fold or bend the diskette.
- 7. Do not place heavy objects on diskettes or force too many into a storage box.
- 8. Do not use near magnetized objects. Magnetic fields can destroy the data.

- 9. Replace diskette if it becomes creased, folded, torn or contaminated by fluids, smoke or dust.
- 10. Frequently make back up copies of diskettes with important data just in case of unanticipated problems.

13.3 Maintenance

The ASSOCIATE requires a very low level of maintenance, but should be given the tender loving care that high performance, sophisticated equipment deserves. This includes:

Screen Cleaning. Use a soft lint cloth to remove any dirt or lint from the anti-glare screen. A lint cloth suitable for this purpose is available from Data Technology Industries.

Case Cleaning. Use a damp cloth periodically on the case to keep it clean. Acetone, alcohol, or other solvents are not recommended.

Keyboard. Use a damp cloth for cleaning the keyboard. Liquids which may run down into the keyboard circuitry are not recommended.

Disk Drive. No user level maintenance is required on the disk drives. Only qualified trained technicians should attempt head cleaning or drive service.

CRT Screen. Remove Anti-Glare screen by gently lifting starting at one corner. Wipe the CRT face lightly with a damp cloth. Dust on the CRT may cause the image to appear fuzzy.

FAN Filter. Remove and clean filter as necessary. Filter is located on the bottom right side of the unit. Grill and filter simply snap in and out.

13.4 In Case of Difficulty

This section describes procedures for identifying and isolating system problems. If a problem occurs it is suggested that the user or service person perform these tests before calling Data Technology Industries.

To locate a problem it is necessary to identify the area in the system which is causing it. It is recommended that the following things be considered before calling the supplier or Data Technology Industries.

Power. If the system is completely dead the problem may be in the fuse or power supply. Check the fuse on the rear of machine and replace if necessary. Fan operation shows that AC power is present and that the fuse is OK.

Disk Drives. Because of the mechanical nature of the disk drives, it is expected that they will have a higher likelihood of problems then the electronics. If the System will not boot from the lower drive, insert the System disk in the top drive and type "B" at the PROM Monitor Command level. If the System still will not boot, try another diskette (the diskette may be bad). If neither drive will boot this indicates a problem at the Main board level and not with the drive.

Diagnostics. Several diagnostics are available for checking components of the ASSOCIATE. Refer to the PROM Monitor Section for a description of a memory test. Refer to Technical Reference Manual for a description of other diagnostics available on the system. Please note any problems that occur during any of these tests to pass on to the service personnel.

13.5 Return Procedure

In the event that equipment must be returned for repair, it should be suitably packed for shipment (see 13.1 above). Failure to package properly may result in voiding the warranty or violating the terms of the service contract.

If the ASSOCIATE was purchased from a system house or dealer, contact them rather than Data Technology Industries. For return to Data Technology Industries, call Customer Service to obtain instructions and return authorization.

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