Tandy 3000
Training Manual

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CHAPTER 1 : INTRODUCTION

1. Brief description of Tandy 3000's features

- 8 MHz 16-bit 80286 with on Chip Memory Management and protection.
- Standard 512K Memory.
  - Expandable to 640K on board
  - Bus addressing supports to 16 Meg Memory
- Standard High Capacity 5 1/4" slim line floppy disk drive.
  - Channel for additional internal floppy disk drive for either a 360K or 1.2M format.
- Channel for optional hard disk drive.
- Seven AT compatible, two XT compatible and one half XT compatible slots for standard peripherals and additional memory expansion (8-slots open).
- True software compatibility with IBM-AT in single-user MS-DOS mode.
- Standard real time clock with CMOS RAM and battery backup.
- Standard serial/parallel adapter.
- Standard AT compatible keyboard.
- Support for optional math co-processor.

2. Way of commercialization

The Tandy 3000 is available in two configurations.

a) 25x-4001: Tandy 3000 floppy based system.
b) 25x-4010: Tandy 3000HD hard disk based system.

The MS-DOS operating system is not included in the configuration and must be ordered separately (25x-4101).
MS-DOS E 03.10.01 and its documentation is (for the time being) only available in English.

DeskMate comes bundled with MS-DOS and is available in following languages: French, German, Dutch, Italian and Spanish.

The Tandy 3000 Utility disk that comes with the Tandy 3000 is English but its documentation has been translated in French, German and Dutch.

Following keyboards are available for the Tandy 3000:

1. The UK keyboard: this is a QWERTY based keyboard with one additional character (£), the English Pound sign.

2. The FR keyboard: this is an AZERTY based keyboard with all French diacritics added.

3. The GR keyboard: this is a QWERTZ based keyboard with all German diacritics added.

3. Operating Systems running on the Tandy 3000

a) MS-DOS version E 03.10.01 and BASIC interpreter 03.11.00.

b) XENIX version 05.00 (not released yet).

4. Software running on the Tandy 3000

Since the Tandy 3000 is AT compatible; most software will run on it.
The DTDA is software compatible with the IBM Monochrome Adapter.
The DGDA supports all the IBM color graphics adapter modes. Custom drivers for the STB Super Res 400 are also compatible with the DGDA.

5. Tandy 3000 Memory Map

6. BIOS Memory Map

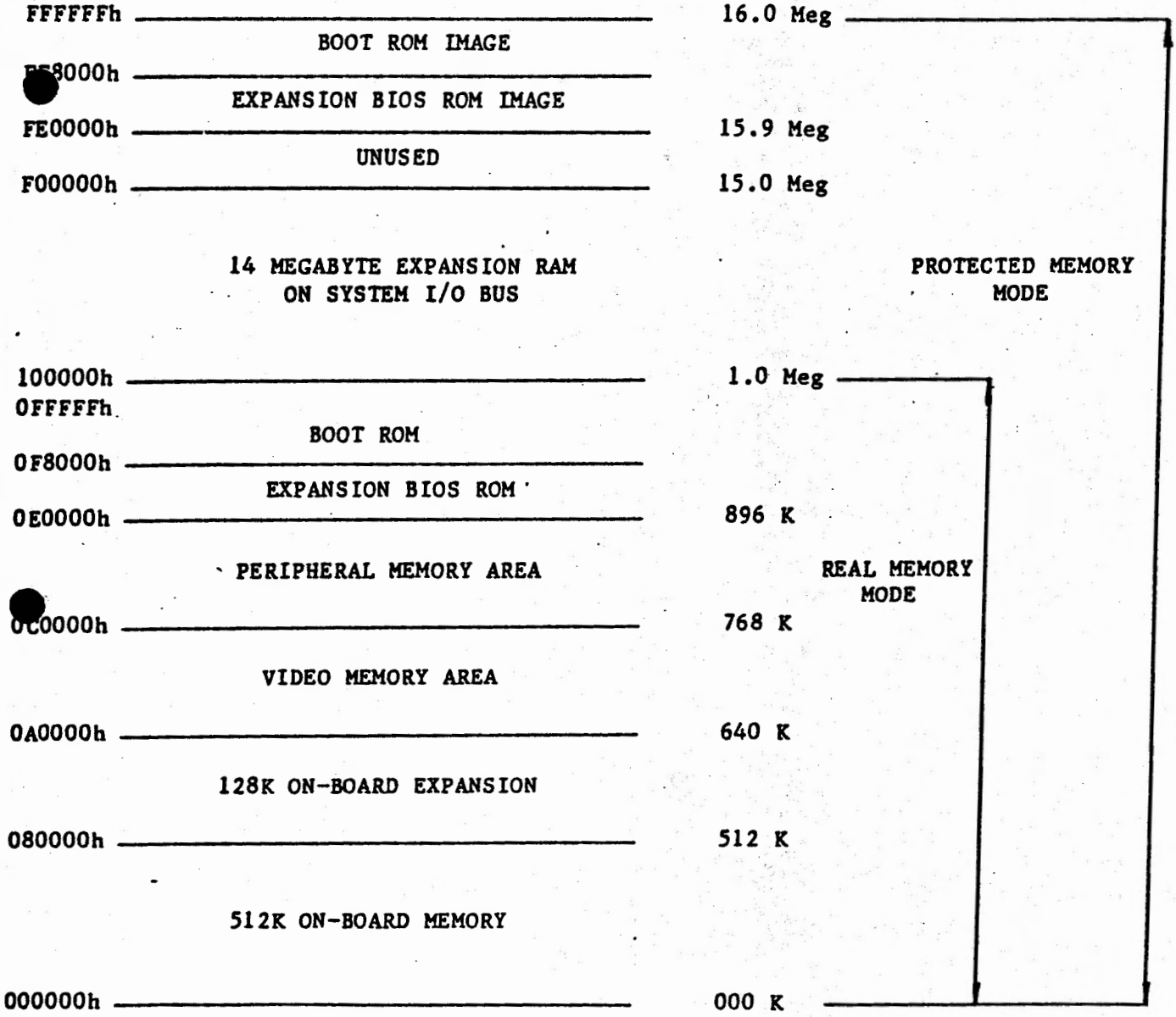
Is based on the Tandy 1000 Memory Map.
See photocopies below.

2.2 System Memory

2.2.1 Memory Configuration

The real address mode is defaulted to at power up, and has a maximum directly addressable range of 1 megabyte.

The protected address mode of the CPU has a maximum directly accessible range of 16 megabytes, and a virtual addressable range of 4 gigabytes. In this mode, memory configuration below the 1 megabyte region remains mapped the same as in real address mode. The on-board ROM locations 0E0000H thru 0FFFFFH are duplicated at addresses FE0000H thru FFFFFFH.



ROM BIOS Data Area

The following table gives the starting offset, and length of each BIOS device driver. This area is located at segment 40:00.

Comm card addresses	0000	8 (1 word per card)
Printer addresses	0008	8 (1 word per printer)
Devices installed	0010	2 (16 bits)
Not used	0012	1
Memory size	0013	2 (1 word)
I/O channel RAM size	0015	2 (1 word)
KBD data area	0017	39
Disk data area	003E	11
Video data area	0049	30
Not used	0067	5
Clock data area	006C	5
KBD Break & Reset flags	0071	3
Not used	0074	4
Printer Timeout counter	0078	4 (1 byte per printer)
Comm Timeout counter	007C	4 (1 byte per card)
KBD extra data area	0080	4 (2 words)

The structure and usage of the Video driver RAM data area is as follows:

HEX Offset From Segment 0040:000	Length and Intended Use
49H	1 byte - current CRT mode (0-7)
4AH	1 word - screen column width
4CH	1 word - byte length of screen
4EH	1 word - address/offset of beginning of current display page
50H	8 words - row/col coordinates of the cursor for each of up to 8 display pages
60H	1 word - current cursor type (See "set cursor type" for correct encoding)
62H	1 byte - current display page
63H	1 word - base address + 4 of the CRT controller card
65H	1 byte - copy of value written to the Mode Select Register
66H	1 byte - current color palette setting

The equipment check BIOS call (INT 11H) and memory size BIOS call (INT 12H) return information from the following data areas:

HEX Offset From Segment 0040:000	Length and Intended Use
10H	Devices installed word
13H	Memory installed word

The structure and usage of the floppy disk driver RAM data area is as follows:

HEX Offset From Segment 0040:0000	Length and Intended Use
3EH	1 byte - drive recalibration status - bit 3-0, if 0 then drive 3-0 needs recal before next seek bit 7 indicates interrupt occurrence
3FH	1 byte - motor status - bit 3-0 drive 3-0 motor is on/off, bit 7 - current operation is write, requires delay
40H	1 byte - motor turn off time out counter (see Timer ISR)
41H	1 byte - disk status - codes defined below
42H	7 bytes - 7 bytes of status returned by the controller during result phase of operation

Value	Error Condition
01H	Illegal Function
02H	Address Mark Not Found
03H	Write Protect Error
04H	Sector Not Found
08H	DMA Overrun
09H	Attempt to DMA Across a 64K Boundary
10H	Bad CRC on Disk Read
20H	Controller Failure
40H	Seek Failure
80H	Device Timeout, Device Failed to Respond

The structure and usage of the RS[illegible] driver RAM data area is as follows:

HEX Offset From Segment 0040:00	Length and Intended Use
00H	4 words - Base address of each one of 4 possible comm cards
7CH	4 words - 1 word timeout count for each of 4 possible comm cards

The structure and usage of the Keyboard driver RAM data area is as follows:

HEX Offset From Segment 0040:0010	Length and Intended Use
17	1 byte - Keyboard shift state flag returned by function 02
	bits 7 - INSERT state active, 6 - CAPS LOCK on/off, 5 - NUM LOCK on/off, 4 - SCROLL LOCK on/off, 3 - ALT key depressed, 2 - CTRL key depressed, 1 - Left SHIFT key depressed, 0 - Right SHIFT key depressed
18	1 byte - Secondary shift state flag
	bits INSERT key depressed, 6 - CAPS LOCK depressed, 5 - NUM LOCK depressed, 4 - SCROLL LOCK NUM LOCK depressed, 4 - SCROLL depressed, 4 - SCROLL LOCK depressed, 3 - Pause on/off, depressed, 3 - Pause on/off, 2,1,0 - not used
19	1 byte - used to store ALT keypad entry
1A	1 word - pointer to beginning of the keyboard buffer
1C	1 word - pointer to end of the keyboard buffer
1E	16 - keyboard buffer (enough for words) 15 - typeahead entries

The structure and usage of the clock service routine is as follows:

HEX Offset From Segment 0040:0000	Length and Intended Use
6CH	1 word - Lease significant 16 bits of clock count
6EH	1 word - Most significant 16 bits of clock count
70H	1 byte - Twenty four hour rollover flag

CHAPTER 2 : TANDY 3000 UTILITIES

1. Introduction

The Tandy 3000 is standard delivered with the Tandy 3000 Utility Disk and Tandy 3000 Installation and Operation Manual.
The manual instructs the user how to configure hardware boards, install them in the Tandy 3000 CPU, and configure the system through the CMOS RAM.

2. Video Adapter

Two video adapters are available for the Tandy 3000:

25-3046 : Deluxe Text Display Adapter (DTDA)
25-3047 : Deluxe Graphics Display Adapter (DGDA)

The DTDA is only able to produce text in 80 columns by 25 lines, on both a VM-1 monochrome monitor as well as on a CM-1 color monitor.
Unlike the Tandy 2000 the VM-1 and CM-1 cannot be used simultaneously on a DTDA. This adapter is intended to be used for data management (word processing database).

The DGDA is a high resolution graphics card, able to produce text in 25 x 80 as well as 50 x 80 using special drivers. The graphics capabilities are:

320 x 200 x 4 color graphics
640 x 200 x 2 color graphics

With special drivers following display modes are possible:

320 x 200 x 16 color graphics
640 x 200 x 4 color graphics
640 x 400 x 2 color graphics

3. Printer Adapter

MS-DOS supports up to three printer devices (LPT1:, LPT2: and LPT3:).
LPT1: or LPT2: reside on the serial/parallel adapter board, LPT3: resides on the IBM Monochrome Adapter board and is principally unusable.

4. Serial Adapter

MS-DOS supports up to two serial devices (COM1: and COM2:).
COM1: or COM2: reside on the Serial/Parallel Adapter board.

5. Tandy 3000 - Hardware Preparation

a. Display Adapter:

- In the case of a DTDA: on the main board, jumper must be set in position E2:E3.
- In the case of a DGDA: on the main board, jumper must be set in position E3:E4.

b. Printer Adapter:

- If printer port is to be used as primary: on the Serial/Parallel Adapter, jumper must be set in position E6:E7.
- If printer port is to be used as secondary: on the Serial/Parallel Adapter, jumper must be set in position E5:E6.
  Note: Primary parallel port must be present in the system before initializing secondary.

c. Serial Adapter:

- If serial port is to be used as primary: on the Serial/Parallel Adapter, jumper must be set in position E9:E10.
  If the dual baud rate (1200/75) is needed; on the Serial/Parallel Adapter, jumpers must be set in positions E1:E2 and E3:E4, otherwise they must be set in positions E1:E3 and E2:E4.

- If serial port is to be used as secondary: on the Serial/Parallel Adapter, jumper must be set in position E8:E9.
  If the dual baud rate (1200/75) is needed, on the Serial/Parallel Adapter, jumpers must be set in positions E1:E2 and E3:E4, otherwise they must be set in positions E1:E3 and E2:E4.
  Note: Primary serial port must be present in the system before initializing secondary.

6. Tandy 3000 - Software Preparation

There exists three versions:

1. UK version 01.00.00
2. FR version 01.00.00
3. GR version 01.00.00

Each version is keyboard dependent. Please notice that the whole keyboard is implemented since it is not completely used by T3000 Utilities. This means however that the correct utility disk must be used with regards to the used keyboard.

The Tandy 3000 utility disk is able to:

1. Format diskettes.
2. Backup diskettes.
3. Perform Shiptrak.
4. Format (HSECT) hard disk.
5. Call Setup.

Setup is able to:

1. Charge system date and time.
2. Specify the number and type of floppy drives.
3. Specify the number and type of hard drives.
4. Specify the amount of memory on main board.
5. Specify the amount of expansion memory.
6. Specify the type of display adapter.

6.1. Setup

The first time a Tandy 3000 is booted, it will either display (in 40 x 25 mode) the configuration if wrong or not.
This depends on the type of video adapter chosen.
Put the T3000 Utility Disk in drive A and hit the reset button.
If you receive the "wrong configuration" message, the process will automatically go into setup.
Otherwise, you'll select point 4 of the T3000 Utility Menu.

Once in setup, you enter the correct date and time, the number of floppy disks and their type, the number of hard disks and their type, the amount of memory on the main board (512 or 640).
The amount of expansion memory (0 if no expansion memory is present), and finally the type of adapter:
For the DTDA you choose the monochrome option.
For the DGDA you choose the color (80) option.

6.2. Making backups of the original utility and MS-DOS disks

A very important point in the Tandy 3000 initialization is to work with backups. One never knows you're unlucky with disk manipulation.
To make a backup of those disks you'll need 3 high density disks, although the original utility and MS-DOS disks are low density ones.

The procedure is:

1. You boot Tandy 3000 Utilities
2. You select option 2 (copy disks)
3. You select a single-drive copy (A: --> A:) and insert appropriate diskette when prompted.

Note that option 2 (copy disks) formats the target disk before starting to copy.

6.3. Initialization of the hard disk

The 20 Meg internal hard disk of the Tandy 3000HD and the 20 Meg hard disk (25-4062) are "type 6". Compare the hard disk configuration with the table below. If the configuration does not match, choose an item in the table whose configuration is less or equal than the hard disks one, e.g., 15 Meg hard disk (26-4156) has 6 heads and 306 cylinders; therefore choose type 1.

Type	Cylinders	Heads	Write Pre-comp	Landing Zone
1	306	4	128	305
2	615	4	300	615
3	615	6	300	615
4	940	8	512	940
5	940	6	512	940
6	615	4	---	615
7	462	8	256	511
8	733	5	---	733
9	900	15	---	901
10	820	3	---	820
11	855	5	---	855
12	855	7	---	855
13	306	8	128	319
14	733	7	---	733
15	..... Reserved			

- Go into T3000 Utility Menu, select "Setup" and modify the hard disk type. Again go into T3000 Utility Menu and select "Format Hard Disk", enter the drive name to be formatted, enter if necessary the CORRECT number of heads and cylinders, leave the interleave factor unused, and enter if necessary the media error map.

- Boot with the MS-DOS System disk in drive A: and if you have a drive with undocumented configuration, you add in the file CONFIG.SYS a line 'DEVICE=HDRIVE.SYS'.

- Re-boot with the system disk in drive A: and perform the two commands:

  a. FDISK: select the correct drive and create a partition on it.
  b. HFORMAT: if the hard disk is to be used as system disk (drive C:), type HFORMAT C:/S otherwise type simply HFORMAT drive:

- Finally, copy the contents of the MS-DOS system and supplemental disk onto the system hard disk.

7. MS-DOS

MS-DOS E03.10.01 is delivered on two disks: the "system disk" that is bootable and the "supplemental disk" that is a data disk.
Figures 1. and 2. show the directories of both disks.

Figure 1

```
 Volume in drive A has no label
 Directory of  A:\                                    System disk

COMMAND  COM    23210  12-06-85   1:00p
ANSI     SYS     4430  10-24-85   1:00p
ASSIGN   COM     1507  10-24-85   1:00p
ATTRIB   EXE    15091  10-24-85   1:00p
BASIC    COM      935  10-24-85   1:00p
BASICA   COM      935  10-24-85   1:00p
BASIC    EXE    66672  10-24-85   1:00p
CHKDSK   COM     7435  10-24-85   1:00p
DISKCOMP COM     4624  10-24-85   1:00p
DISKCOPY COM     2409  10-24-85   1:00p
DISKTYPE COM     1274  10-24-85   1:00p
EDLIN    COM     7261  10-24-85   1:00p
FC       EXE    14576  10-24-85   1:00p
FIND     EXE     6403  10-24-85   1:00p
FORMAT   COM     9627  10-24-85   1:00p
GRAFTABL COM     1201  10-24-85   1:00p
GRAPHICS COM     4716  10-24-85   1:00p
JOIN     EXE    15771  10-24-85   1:00p
KEYBFR   COM     2311   1-20-86   9:19a
KEYBGR   COM     2226   1-20-86   9:24a
KEYBIT   COM     1959  11-15-85   9:19a
KEYBSP   COM     2171  11-15-85   9:17a
KEYBUK   COM     1872  11-15-85   9:15a
LABEL    EXE     2750  10-24-85   1:00p
LF       COM      293  10-24-85   1:00p
LPTDRVR  SYS     3437  10-24-85   1:00p
MODE     COM    38427  10-24-85   1:00p
MORE     COM      282  10-24-85   1:00p
PRINT    COM     8291  10-24-85   1:00p
RECOVER  COM     4050  10-24-85   1:00p
SELECT   COM     1586  10-24-85   1:00p
SHARE    EXE     9304  10-24-85   1:00p
SORT     EXE     1664  10-24-85   1:00p
SUBST    EXE    16611  10-24-85   1:00p
SYS      COM     1958  10-24-85   1:00p
TREE     COM     1510  10-24-85   1:00p
VDISK    SYS     2151  10-24-85   1:00p
MODEVM   SYS      317   2-06-86   4:25p
      38 File(s)     12288 bytes free
```

Figure 2

```
 Volume in drive A has no label
 Directory of  A:\

BACKUP   EXE    21720  10-24-85   1:00p
DEBUG    COM    15552  10-24-85   1:00p
EXE2BIN  EXE     2816  10-24-85   1:00p
FDISK    COM     6750  10-24-85   1:00p
HDRIVE   SYS      788  10-24-85   1:00p
HFORMAT  COM     8700  10-24-85   1:00p
HSECT    COM     2203  10-24-85   1:00p
LIB      EXE    24138  10-24-85   1:00p
LINK     EXE    38422  10-24-85   1:00p
RESTORE  EXE    20156  10-24-85   1:00p
SETUP    COM    24816  10-24-85   1:00p
SHIPTRAK COM      495  10-24-85   1:00p
      12 File(s)    189440 bytes free
```

Supplemental Disk

7.1. Floppy Disk Usage

If MS-DOS is to be used on 1.2M High Density Floppy Disks, you can copy the contents of the supplemental disk onto the MS-DOS system disk.

7.2. Keyboard Customization

The international keyboard driver is loaded and selected by typing:

KEYBUK	for UK keyboard
KEYBFR	for FR keyboard
KEYBGR	for GR keyboard

This command should be inserted in the file called AUTOEXEC.BAT.

7.3. Printer Customization

If the T3000 will be used with a non-IBM compatible Tandy printer, then the device driver called LPDRVR.SYS should be installed. This can be done by adding the line "DEVICE=LPDRVR.SYS" in the file called CONFIG.SYS, selecting the type of printer and printer translation table (see page 4.10) by inserting the MODE command in the AUTOEXEC.BAT file and by resetting the system.

7.4. VM-1 Customization

To obtain a good quality of display on the VM-1, this independently used display adapter, a device driver called MODEVM.SYS should be installed. This is done by adding the line "DEVICE=MODEVM.SYS" in the file CONFIG.SYS and by resetting the system.

8. General use of the Tandy 3000 Utility Disk

8.1. Format diskettes

T3000 Utilities can:
format high density disks in high capacity drives
format low density disks in low capacity drives

T3000 Utilities cannot:
format high density disks in low capacity drives
format low density disks in high capacity drives

8.2. Copy diskettes

T3000 Utilities can:

copy	to
high density disks in high cap.drives	high density disks in high cap.drive
low density disks in high cap.drives	high density disks in high cap.drive
low density disks in low cap.drives	low density disks in low cap.drives

8.3. Prepare system for moving

Whenever a T3000HD has to be moved, the heads of the internal hard disks must be moved to the "landing zone" of the hard disk.
This will avoid that shocks will destroy existing data.
After having chosen option <3> of the T3000 Utilities, power down the system.

8.4. Setup

Has to be used whenever the video display, diskette, hard disk or memory configuration changes, or simply in "low battery" condition.

8.5. Format Hard Disk

Allows entry of the specification of the hard disk (C or D), the number of heads and cylinders, the interleave factor, and the media error map.

CHAPTER 3

TANDY 3000 - EXPANSION OPTIONS

* Deluxe Text Display Adapter (25-3046)

Designed for use with the VM-1 Monochrome Monitor.
Can also be used with the CM-1 Color Monitor. Provides text 80 x 25.
This board is software compatible with the IBM Monochrome Adapter.

* Deluxe Graphics Display Adapter (25-3047)

Offers 640 x 400 resolution in 4 colors or 320 x 200 in 16 colors.
Even though this board offers 640 x 400 resolution, it shall support all the IBM Color Graphics Adapter modes. Custom drivers written for the STB Super Res 400 are 100% compatible with this board.

* 640K Memory Upgrade (26-5162)

The Tandy 3000 comes standard with 512K of memory.
Use the Tandy 1000/2000 128K memory kit to upgrade to 640K on the main board. Refer to the Tandy 3000 installation and operation manual for more details.

* Memory Expansion Board for Tandy 3000 (25-4030)

The Tandy 3000 is a true 16-bit machine and requires 16-bit memory expansion boards. The Memory Expansion Board comes with 512K of memory and is expandable to 2 megabytes using the Tandy 1200 memory kit (25-3062).
This memory board WILL NOT work in the Tandy 1000/2000. On the other hand, the T1000 Memory (Plus) Expansion boards will not work in the T3000.

* Floppy drive kits (25-4050 & 25-4051)

The T3000 comes standard with one 1.2 meg floppy drive for compatibility with the IBM PC/AT. The customer has the option to add a second floppy disk drive, either a 1.2 Meg drive or a 360K drive for compatibility with the Tandy 1000 and IBM PC, PC/XT. Both drive kits are user installable.

* New diskette media (26-422)

Since the Tandy 3000 uses the new high-capacity disk drives, user needs 5 1/4" High Capacity (also called high density) diskettes.

* Serial/Parallel Adapter (25-4034)

A Serial/Parallel adapter is standard in the Tandy 3000. This new board has a DB-25 male connector which will connect to any of our printers. The board also has a DB-9 male RS-232 connector which requires a new RS-232 cable. A customer may wish to add a second serial/parallel adapter. This board also works in the Tandy 1000.

* Hard Disk Expansion

The T3000 HD comes standard with a 20-meg internal hard disk. The customer can add a second internal 20 meg hard disk kit. If the customer purchases a floppy T3000 and wishes to add the first internal hard disk, he'll need to purchase a combination hard disk and floppy controller board and the 20 meg hard disk kit. All hard disk kits require installation.

TANDY 1000 EXPANSION BOARDS THAT DO NOT WORK ON THE T3000.

25-1007	Hard Disk Controller Board
25-1009	512K Memory Expansion Board
25-1010	Clock Calendar Mouse Board
25-1011	Memory PLUS Expansion Board

CHAPTER 4

MS-DOS 03.10.01

Quick reference of MS-DOS commands

New commands are:

ATTRIB	:	Sets or displays file attributes
GRAFTABL	:	Installs alternate ASCII characters into memory
JOIN	:	Joins a disk drive to a pathname
KEYBXX	:	Loads alternate keyboard driver
SELECT	:	Selects country dependent information
SETUP	:	Initializes CMOS RAM
SHARE	:	Installs file sharing & locking
SUBST	:	Substitutes a string for a pathname

Commands slightly modified are:

BACKUP	:	Copies hard disk files to floppy disk
CTTY	:	Switches input/output to device
FORMAT	:	Prepares floppy disks for system use
MODE	:	Sets video, printer and communication parameters
PRINT	:	Background printing of up to 10 files

Standard loadable device drivers are:

LPDRVR	:	Printer driver
VDISK	:	Virtual disk driver
HDRIVE	:	Hard Disk driver
ANSI	:	Screen driver
MODEVM	:	Screen driver

Quick Reference To MS-DOS Commands

COMMAND	PURPOSE
ASSIGN	Reassigns drive names
ATTRIB	Sets or displays file attributes
BACKUP	Copies hard disk files to floppy disk
BREAK	Alters CTRL C operation
CHDIR	Changes current or home directories
CHKDSK	Checks MS-DOS diskette
CLS	Clears the video screen
COPY	Copies, appends or combines files
CTTY	Switches input/output to device
DATE	Enters or changes system date
DEL	Deletes files from specified directory
DIR	Displays files from specified directory
DISKCOMP	Compares two diskettes
DISKCOPY	Makes copies of floppy diskettes
DISKTYPE	Tests diskette format
ECHO	Controls display of lines in batch files
ERASE	Deletes specified files
EXE2BIN	Converts *exe* files to binary format
EXIT	Exits from commands to previous level
FC	Compares contents of two files
FDISK	Partitions hard disks
FIND	Searches for specified text
FOR	Executes several items with one command

Chapter 5 / MS-DOS Commands Quick Reference

Quick Reference To MS-DOS Commands

COMMAND	PURPOSE
FORMAT	Prepares floppy disks for system use
GOTO	Jumps to selected routine in batch files
GRAFTABL	Installs alternate ASCII characters into memory
GRAPHICS	Copies screen graphics to printer
HFORMAT	Prepares a hard disk for system use
HSECT	Formats hard sectors on a hard disk
IF	Allows conditional execution in batch files
JOIN	Joins a disk drive to a pathname
KEYBXX	Loads alternate keyboard driver
LABEL	Creates, changes, or deletes volume labels
LF	Suppress line feeds after carriage returns
MKDIR	Creates a new directory
MODE	Sets video, printer, and communication parameters
MORE	Stops screen scroll — awaits key press
PATH	Specifies path to external commands
PAUSE	Suspends batch execution, displays message
PRINT	Background printing of up to 10 files
PROMPT	Creates a new system prompt
RECOVER	Recovers bad sectors on a disk
REM	Allows comments in a batch file
REN	Change (Rename) filenames

Quick Reference To MS-DOS Commands

COMMAND	PURPOSE
RESTORE	Copies files from diskette to hard disk
RMDIR (RD)	Deletes a specified directory
SELECT	Selects country dependent information
SET	Sets one string value to another in the environment or displays the environment
SETUP	Initializes CMOS RAM
SHARE	Installs file sharing and locking
SHIFT	Moves replaceable parameters in batch files
SHIPTRAK	Parks hard disk head for transportation
SORT	Sorts input from keyboard or a file
SUBST	Substitutes a string for a pathname
SYS	Transfers system files to disk
TIME	Displays or sets system time
TREE	Display all disk directories and files
TYPE	Displays contents of specified file
VER	Displays MS-DOS version number
VERIFY	Verifies that files are intact
VOL	Displays volume label of specified disk

How to Use the Command Reference

Command lines can be divided into two parts, the command name and the command parameters. Some parameters are required; others are optional. If you omit an optional parameter, the system provides a *default* parameter. For example, the system defaults to the current drive whenever you omit the drive as part of a pathname.

ATTRIB:

Syntax: ATTRIB [set][drive:]pathname

Semantics: Sets or resets the read-only attribute of a file. Contrary to XENIX ' system of protection, the MS-DOS Attrib is only to be used as protection against overwriting (or destruction) of files. ATTRIB without set/reset parameters displays the current attribute of the file.

BACKUP:

Syntax: BACKUP drive1 [pathname1] drive2 [pathname2] [/S][/M][/A][/P][/D:date][/T:time][/L:filename]

Semantics: New parameters are (with regards to MS-DOS 2.11):

/P
/T
/L

/S: produces a backup of subdirectories also (recursive backup)
/M: backups only files that were modified after last backup.
/A: appends backup files to the one's already existing on the floppy disk.
/P: saves files in a packed (condensed) format. Not considered being compatible with IBM family.
/D: backs up files that were last modified on or after given date.
/T: backs up files that were last modified on or after given time.
/L: creates backup log entry. Contains logbook of performed backup.

Warning: BACKUP removes date and time format different from the U.S. one's. This is a bug and would provisionally be solved by:

SELECT 01
BACKUP ..... /D: mm-dd-yy .....
SELECT appropriate country number.

BREAK:

Syntax: BREAK [ON/OFF]

Semantics: Turns on/off the CTRL BREAK check. Is not effective at MS-DOS command level or in BASIC (interpreter) programs.

CTTY:

Syntax: CTTY device

Semantics: Assign standard input and standard output to given device.
Device can be:

AUX or COM1: the serial port 1
COM2 : the serial port 2
CON : the console

DATE:

Syntax: DATE [dateformat]

Semantics: Enters or changes the system date.
The entered date must correspond with the selected countrycode.

DISKCOPY:

Syntax: DISKCOPY [source drive][destination drive]

Semantics: Performs a mirror-image (track-by-track) backup of a floppy disk onto another. If the target disk is not formatted, DISKCOPY will format it before copying. DISKCOPY is able to perform single-drive backups.

What are possible combinations of disks/drives?

Source		Target	
Drive	Disk	Drive	Disk
High Cap	High Den	High Cap	High Den
High Cap	Low Den	Low Cap	Low Den
High Cap	Low Den	High Cap	Low Den
Low Cap	Low Den	Low Cap	Low Den
Low Cap	Low Den	High Cap	Low Den

FORMAT:

Syntax: FORMAT [drive][/S][/V][/1][/4][/8]

Semantics: Following options (with regards to MS-DOS 02.11) have changed:

/4 is a new option
/P has been removed

FORMAT formats a floppy diskette according to given parameters.

/S: Formats the disks and transfers the system (DOS, BIOS and Command Interpreter).
/V: Formats disk and prompts for a volume label (disk name).
/1: Performs single sided format.
/4: Formats a low density disk in a high capacity drive.
/8: Formats a 8 sector-per-track drive.

GRAFTABL:

Syntax: GRAFTABL

Semantics: loads the fonts of the European (chr$(128) thru chr$(255)) characters into memory. This command is needed when working in graphics mode.
If GRAFTABL is not called, all European characters are represented as a white box.

GRAPHICS:

Syntax: GRAPHICS ptype [/R][/B][/CR][/LF]

Semantics: Reproduces a hi-res screen dump when system is in graphics mode and [SHIFT][PRTSC] is typed.

ptype: can be CGP220, STANDARD, PCMODE, TMODE, DMP110.
/R : black is printed as white and vice versa.
/B : print background color.
/CR : carriage return is end-of-line character.
/LF : line feed is end-of-line character.

JOIN:

Syntax: JOIN drive: pathname /D

Semantics: Joins a disk drive to a specified pathname.
This command could be compared with the XENIX 'mount' command.
If the directory is unexistent, it is created.
The use of the /D option is:
JOIN drive: /D and undoes the effect of JOIN.
This can be compared with XENIX's unmount. This instruction does not remove the disjoined directory.
Once a disk drive is joined, it is only accessible through its pathname and not anymore through its drive specification.
You may not join a drive onto itself. For example:
C> JOIN B: B:\TEST
will make physical drive B: unaccessible from the system.

KEYBXX:

Syntax:

```
KEYBUK /US
KEYBFR /US
KEYBGR /US
KEYBIT /US
KEYBSP /US
```

Semantics: Installs international keyboard driver.

UK stands for QWERTY based keyboard with one additional character, the English Pound sign (£).

FR stands for AZERTY based keyboard with all French accented characters.

GR stands for QWERTZ based keyboard with all German characters.

KEYBIT is undocumented in the MS-DOS Reference Manual and stands for the Italian keyboard. Tandy for the time being does not commercialize this keyboard.

KEYBSP is undocumented in the MS-DOS Reference Manual and stands for the Spanish keyboard. Tandy for the time being does not commercialize this keyboard.

The /US option tells the driver to use the US scan codes rather than the real one's. For instance, on a FR keyboard:

	Real scan code	US scan code
>	29	3E
<	29	3C
\	29	2B

When KEYBXX is active, two special keystrokes permit to switch back and forth between the standard US and the selected keyboard.

<CTRL><ALT><F1> switches to standard US keyboard.
<CTRL><ALT><F2> switches to selected keyboard.

MODE:

Sets parameters for video, RS-232 and printer interface.

MODE [video][characters]

Video: can be CO (or COLOR), BW or MONO
Characters: can be 40 or 80

MODE CO 40 or MODE CO 80 executes interrupt 10H with resp. parameter AX=0001 or AX=0003

MODE BW 40 or MODE BW 80 executes interrupt 10H with resp. parameter AX=0000 or AX=0002
The video RAM resides at segment B800 and is organized as follows:

The even bytes contain the character to be displayed.
The odd bytes contain the attribute of the character.
The attribute of a character determines the foreground and background color of it.
The most significant nibble contains the background color, the least significant nibble contains the foreground color.
The colors can be:

0	black	8	black
1	blue	9	light blue
2	green	A	light green
3	cyan	B	light cyan
4	red	C	light red
5	magenta	D	light magenta
6	yellow	E	light yellow
7	grey	F	white

Whenever the foreground and background colors of a character are the same, the character becomes invisible.

MODE MONO executes interrupt 10H with parameter AX=0007.
This mode emulates a 25-3046 (DTDA) logic on a 25-3047 (DGDA) board. This mode permits to obtain attributes like underline, blink, reverse video and high intensity.
The video RAM resides at segment B000 and is organized as follows:

The even bytes contain the character to be displayed.
The odd bytes contain the character attribute.
The bit pattern of the character attribute determines the "forms" of the character displayed.

bit 0 : underline
3 : high intensity
4 : reverse video
7 : blink

00 : will display the character as invisible.
01 : will display the character as underlined.
07 : will display the character as normal.
0F : will display the character in high intensity.
10 : will display the character in reverse video.
87 : will display the character as blinking

MODE [characters][shift][T]
characters : is 40 or 80
shift : is L or R
T : gives a screen test

L or R permits you to shift left or right the display output.

MODE LPTnumber:characters[/type][,P]
number can be 1, 2 or 3
characters can be 80 or 132
type can be DMP or PC, initializes the printer
,P allows continuous retry of the system check for timeouts.

MODE LPTnumber:=COMserial
redirects parallel printer output to serial interface
number can be 1, 2 or 3
serial can be 1 or 2
the serial channel must be initialized previously.

MODE LPTnumber:timeout
sets timeout delay
number can be 1, 2 or 3
timeout can be LONG or SHORT

MODE trans
defines translation tables for Tandy Printers
trans can be:

DMPXLAT: for use with Tandy Dot Matrix printers (containing 64 European chars in their character set). The translation strategy is as follows:

- whenever possible, the European character is translated in its DMP equivalent (e.g. ê --> ê, ä --> ä).
- in absence of the DMP equivalent, the non-accented equivalent is printed (e.g. a --> a).
- in the worst case the character is replaced by a blank (e.g. α --> b)

This option is needed for use with DMP110, DMP200, DMP420, CGP220.

DWPXLAT: for use with Tandy DW-II printer (old version). This printer does not use microbackspacing. Can be used in either pitch 10 or 12.

DWP10: for use with DW-IIB, DWP410 and DWP510 in pitch 10 settings.

DWP12: for use with DW-IIB, DWP410 and DWP510 in pitch 12 settings.

The daisy wheel translation strategy is as follows:
- whenever possible, the European character is translated in its DWP equivalent (e.g. ä --> ä).
- if in absence of a DWP equivalent, the character is constructed (e.g. â becomes a <backspace><microbackspace> ^).
- in the worst case, the character is replaced by a blank.

NOXLAT: no character translation is performed.
Is intended for users who want to benefit the features of LPDRVR.SYS without having an automatic translation of the European characters.

MODE COM_number: [baud][parity][databits][stopbits][P]
sets the parameters for the serial port.
number can be 1 or 2.
baud can be 110, 150, 300, 600, 1200, 2400, 4800, 9600 or 1200/75.
The latest baudrate is to be used (if wanted) when the jumper on the serial/parallel adapter is set to position E1-E2 and E3-E4.
parity can be N, E or O (default=E)
databits can be 7 or 8 (default=7)
stopbits can be 1 or 2 (default=1)
P allows continuous retry of the system check for timeouts.

MODE printer
sets the printer type
printer can be DMP (Dot Matrix), DWP (Daisy Wheel) or NL (reset)

MODE linefeed
sets printer linefeed on or off
linefeed can be LFOFF or LFON

The optimum selections for the Tandy printers are:

- CGP220	MODE NL MODE DMPXLAT MODE LFOFF
- Dot Matrix Printers	MODE DMP MODE DMPXLAT MODE LFON
- Daisy Wheel Printer DW-II	MODE DWP MODE DWPXLAT MODE LFON
- DW-IIB, DWP410 and DWP510 in pitch 12	MODE DWP MODE DWP12 MODE LFON
- DW-IIB, DWP410 and DWP510 in pitch 10	MODE DWP MODE DWP10 MODE LFON
- DWP220 in pitch 12	MODE DWP MODE DWP12 MODE LFON
- DWP220 in pitch 10	MODE DWP MODE DWP10 MODE LFON

Go into BASIC and execute following program:

a) for French wheels

```
10 REM *** French Wheel printer Driver ***
20 E$=CHR$(27)+"W"+CHR$(2)
30 LPRINT E$;"à";CHR$(&HA1);          : ' a grave
40 LPRINT E$;"ç";CHR$(&HA2);          : ' c cedilla
50 LPRINT E$;"£";CHR$(&HA3);          : ' english pound
60 LPRINT E$;"°";CHR$(&HA6);          : ' degree
70 LPRINT E$;CHR$(&H15);CHR$(&HA9);:' section sign
80 LPRINT E$;"é";CHR$(&HBB);          : ' e acute
90 LPRINT E$;"ù";CHR$(&HBC);          : ' u grave
100 LPRINT E$;"è";CHR$(&HBD);         : ' e grave
110 LPRINT E$;"#";CHR$(&HE3);         : ' hash(#)
```

b) for German wheels

```
10 REM *** German Wheel Printer Driver ***
20 E$=CHR$(27)+"W"+CHR$(2)
30 LPRINT E$;"Ä";CHR$(&HB1);          : ' A trema
40 LPRINT E$;"Ö";CHR$(&HB2);          : ' O trema
50 LPRINT E$;"Ü";CHR$(&HB3);          : ' U trema
60 LPRINT E$;"ä";CHR$(&HB6);          : ' a trema
70 LPRINT E$;"ö";CHR$(&HB7);          : ' o trema
80 LPRINT E$;"ü";CHR$(&HB8);          : ' u trema
90 LPRINT E$;"ß";CHR$(&HFE);          : ' eszet
110 LPRINT E$;"Å";CHR$(&HD2);         : ' A angstrom
120 LPRINT E$;"å";CHR$(&HD3);         : ' a angstrom
140 LPRINT E$;"£";CHR$(&HA3);         : ' english pound sign
150 LPRINT E$;CHR$(&H15);CHR$(&HA9);: ' Section sign
```

PRINT:

Syntax: PRINT [drive:][pathname][/D:device][/B:size]
[/V:value][/M:value][/S:value][/Q:value]
[/T][/C][/P]

Semantics: performs background printing.

/D:device: specifies the output device, default is LPT1: (or PRN:)
/B:size: sets length of internal buffer.
/V:value: sets to number of clock ticks that the computer will wait until printer is available.
/M:value: sets to number of clock ticks PRINT has to print the file, default = 2, range = 1..255
/S:value: specifies time slice value, default = 8

/Q:value: specifies number of files in the print queue, default = 10, range = 4 - 32.
/T: deletes all files in the print queue.
/C: turns on cancel mode.
/P: turns on print mode.

RESTORE:

Syntax: RESTORE drive1 [drive2:][pathname][/S][/P] [/B:date][/A:date][/E:time][/L:time][/M][/N]

Semantics: Restores data that was previously saved by BACKUP.

drive1: is the source drive specification.
drive2:pathname: is the destination directory specification
/S: implies a secursive restore (i.e. the contents of mentioned directory and its subdirectories).
/P: matches the file specification of hidden or read-only files.
/B:date: restores files that were modified before or on given date.
/A:date: restores files that were modified on or after given date.
/E:time: restores files that were modified on or before given time.
/L:time: restores files that were modified on or after given time.
/M: restores files that were modified after last backup.
/N: restores only files that no longer exist on the destination disk.

Warning: As with BACKUP, country 01 must be selected and U.S. date and time formats must be given in the /B, /A, /E, /L options.

SELECT:

Syntax: SELECT country [[keyboard][/US]]

Semantics: Selects country code and creates International Configured MS-DOS disks.

Country can be:

Country Code	Country	Currency Sign	Date Format	Time Format
001	U.S.A.	$	mm-dd-yy	hh:mm:ss.dd
031	The Netherlands	f	dd-mm-yy	hh:mm:ss.dd
032	Belgium	F	dd/mm/yy	hh:mm:ss,dd
033	France	F	dd/mm/yy	hh:mm:ss,dd

Country Code	Country	Currency Sign	Date Format	Time Format
034	Spain	Pt	dd/mm/yy	hh:mm:ss,dd
039	Italy	Lit	dd/mm/yy	hh:mm:ss,dd
041	Switzerland	Fr	dd.mm.yy	hh.mm.ss.dd
044	U.K.	£	dd-mm-yy	hh:mm:ss.dd
045	Denmark	DKR	dd/mm/yy	hh.mm.ss,dd
046	Sweden	SEK	yy-mm-dd	hh.mm.ss,dd
047	Norway	KR	dd/mm/yy	hh.mm.ss,dd
049	Germany	DM	dd-mm-yy	hh.mm.ss,dd
061	Australia	$	dd-mm-yy	hh:mm:ss.dd

Keyboard can be:
US, UK, FR, GR, K or SP.
Whenever this option is given, an automatic backup of system disk (in drive A:) is done on a blank disk (in drive B: if present, otherwise a single drive backup is done), and two files are initialized, i.e. CONFIG.SYS that contains the country code, and AUTOEXEC.BAT that contains KEYBXX.COM.

/US: specifies the explecit use of the U.S. rather than the real scan codes.

Warning: For European users, SELECT may not completely customize MS-DOS for their configuration
Depending on the configuration: LPDRVR.SYS, MODEVM.SYS might be necessary.

SETUP:

Syntax: SETUP

Semantics: Initializes the system configuration that resides in non volatile CMOS RAM.
More information can be found in chapter 2.

SHARE:

Syntax: SHARE [/F:space][/L:locks]

Semantics: Installs file sharing and locking for active networking.
Not explained at this stage.

SHIPTRAK:

Syntax: SHIPTRAK

Semantics: Puts (parks) the heads of a hard drive at the innermost tracks.
Has to be used before the unit is moved.

The landing zone (parking zone) is dependent from disk to disk and is for:

Type	Landing Zone
1	305
2	615
3	615
4	940
5	940
6	615
7	511
8	733
9	901
10	820
11	855
12	855
13	319
14	733

SUBST:

Syntax: [drive:][pathname][/D]

Semantics: Substitutes a string aljas for a pathname. Allows shorthand notation for long pathnames, e.g. subst f: c:\usr\fred\wp\memo

CHAPTER 5 : CONFIGURING THE SYSTEM WITH CONFIG.SYS

1. CONFIG.SYS Commands

BREAK:	sets/resets the BREAK check
BUFFERS:	sets number of sector buffer
COUNTRY:	sets the country code
DEVICE:	installs device driver
FCBS:	specifies the number of FCB'S concurrently opened
FILES:	sets number of open files
LASTDRIVE:	sets maximum number of drives
SHELL:	specifies the command interpreter

2. CONFIG.SYS

- BREAK = [ON/OFF]
  Default (by omission) is BREAK = OFF, this means that <CTRL><C> is ignored during MS-DOS operations.
  The best way to see the action of BREAK = xx is by issuing the command CHKDSK and then hitting the <CTRL><C> key.

- BUFFERS = number
  Sets the number of I/O buffers. Default is 2. How bigger the number of buffers how faster disk access but how smaller available user memory. 1 buffer occupies 512 bytes.

- COUNTRY = number
  Sets the country code. The country code defines the date and time format and the used currency sign.

- DEVICE = device driver
  Loads device drivers at MS-DOS startup.

- FCBS = number1,number2
  Number1 specifies the number of file control blocks that can be opened concurrently.
  Number2 specifies the number of files that are protected against inadvertent closure.

- FILES = number
  Number specifies the number of files that can be accessed. Without this CONFIG.SYS command, the BASIC interpreter can open up to 3 files. If specified in CONFIG.SYS, the BASIC interpreter can open (number-4) files, with a maximum of (theoretically) 255-4 files.

- LASTDRIVE = letter
  Specifies the last valid drive specification. Default = D.
  Will be used in networking and also by the SUBST command.

. SHELL = program
  Specifies an alternate command interpreter.

3. Device Drivers

On MS-DOS E03.10.01 system disk following device drivers are present: ANSI.SYS, LPDRVR.SYS, VDISK.SYS, HDRIVE.SYS and MODEVM.SYS.

. ANSI.SYS is the extended keyboard and display driver and acts analogious as on the T1000/T2000.

. LPDRVR.SYS lets configure the system in order to take full advantage of the printer's abilities.

. VDISK.SYS emulates a virtual disk in RAM.

. HDRIVE.SYS allows usage of an extended range of hard drives on a T3000 system.

. MODEVM.SYS adapts video display on a VM-1 to 50 Hz operation.

4. LPDRVR.SYS

This printer driver is to be used with Tandy Printers that are not IBM compatible in order to obtain correct translation tables through MODE.

IBM compatible printers may also be used when set in IBM emulation mode, but be aware that, even the character sets of the computer is identical to the printer's one, some characters are interpreted and/or filtered. LPDRVR is also incompatible with the GRAPHICS command.

Notice that the instruction set of LPDRVR control codes is the same than the one used in MS-DOS 02.11.22.

Also worthfull knowing is the slight difference in semantics in the ESC W control code between MS-DOS 02.11.21 and MS-DOS E03.10.01.
The ESC W control code will frequently be used to adapt the character translation to non Tandy Printers. Cfr. the DWP-220 printer translation table.

Advance to top of page (form feed)	FF	Advances paper to the next top of page. The printer position is initially top of form. A form feed advances the printer to the top of the next page. To change the number of lines per page use ESCAPE C.
Skip perforation	ESCAPE N;*n*;	Sets the number of lines to skip after printing a page to *n*. Skip is initially set to 0 lines.
Cancel skip perforation	ESCAPE O	Cancels ESCAPE N.
Pass *n* codes directly to the printer	ESCAPE V;*n*;	
Reset (cancel) driver	CAN or DEL	Resets the printer port.
Suppress line feed after carriage return	ESCAPE Y:*n*	If *n* is 0, the line feed suppression is turned off. If *n* is any number greater than 0, the line feed suppression is turned on. Initially line feeds are suppressed.
Repeat char *n* times	FS;n;*char*	Prints a character or string translation *n* times.
Translate *char* to string	ESCAPE W;n; *char;string*	Defines a character to string conversion. See "Converting Printer Code."

PRINTER CONTROL CODES

Function	Code	Result
Set lines per page	ESCAPE C;n;	Sets the page length to *n* lines. *n* is a number in the range of 1 to 127. Lines per page is initially set at 66. Issue this command before setting vertical tabs or form feed.
Set horizontal tabs	ESCAPE D;*n1;n2 n3;...nk*;NUL;	Sets horizontal tab stops at *n1*, *n2*, *n3* and so on. The numbers can be in the range 1-131. When the printer is turned on, the tab stops are automatically set to every 8 columns. Use ESCAPE D to change them. ESCAPE D;0 resets tabs to the initial state.
Set vertical tabs	ESCAPE B;*n1;n2; n3;...nk*;NUL;	Sets vertical tab stops to *n1*, *n2*, *n3*, and so on. The numbers can be in the range 1 to the page length minus 1. When the printer is turned on, no tab stops are set, and the printer advances according to line feeds. Use ESCAPE B to set the tabs. ESCAPE B;0 resets tabs to the initial state.
Horizontal Tab	HT	Tabs to the next horizontal tab stop.
Vertical Tab	VT	Tabs down to the next vertical tab stop.

5. VDISK

Simulates a disk drive but uses the RAM instead of magnetic media.
The features of VDISK are:

- automatic assignment of drive name when created.
- virtual disk can occupy extended memory.
- volume labels can be assigned to virtual disks.

Syntax:

DEVICE = VDISK.SYS [stor sec dir /E]

stor	stands for the total size of the virtual disk in Kbytes. Default is 64K bytes.
sec	stands for the sector size of the virtual disk. sec can be 15, 256 or 512. Default value is 128.
dir	is the maximum number of directory entries in VDISK. the number can be between 2 and 255. Default is 64.
/E	specifies that VDISK will reside in extended memory.

6. HDRIVE

Is to be used when hard disk are used whose types are not included in the CMOS memory of the Tandy 3000.

In this case, you should mention to setup a drive type that has fewer or the same number of heads and a fewer or the same number of cylinders. After having called HSECT, include the line 'DEVICE=HDRIVE.SYS' in CONFIG.SYS of the MS-DOS system disk. Having done this, you can now execute FDISK and HFORMAT. Coming at this point, you can now remove 'DEVICE=HDRIVE.SYS' from CONFIG.SYS.
The hard disk is now ready to be used at its full capacity (if less than 32 Megs).

CHAPTER 6

BASIC INTERPRETER

The BASIC Interpreter is a GW-BASIC and is actually commercialized under version: 03.11.00.
The interpreter functionnally does not differ from the one that is running on the Tandy 1000. This chapter describes its features and differences with GW-BASIC 2.02 (version 01.01.00).

1. Invoking the interpreter

The BASIC interpreter can be loaded by typing on of the two commands: BASIC or BASICA.
Using BASICA will increase the compatibility and has following advantages:

- BASIC is loaded in a different memory location
- You can gain space on your program or system disk, since the BASIC.EXE may be stored on a separate disk.

The limitations using BASICA are:

- /I is always on
- The RS-232 buffer is limited to 40K for 1 active RS-232 (COM1:) or to 20K for 2 active RS-232 (COM1: or COM2:).

Options for Loading BASIC

When you load BASIC, you can also specify a set of options, which includes:

BASIC [*pathname*][<*input-file*] [>[>]*output-file*] [/F:*# of files*] [/M:*highest memory location,maximum block size*][/C:*buffer size*] [/S:*record length*][/D][/I]

If you load BASIC by typing BASICA [ENTER], the /I switch is always invoked. Other than that, you have the same options, regardless of how you load BASIC.

Pathname specifies a program to run immediately after BASIC is started.

<Input-file tells BASIC to receive input from *input-file* instead of the usual standard input (the keyboard). This option must follow *pathname* and precede all other options in the command line. Redirection of input and output is discussed later in this chapter.

>[>]*Output-file* redirects BASIC's output to *output-file* instead of the standard output (video display). If you specify 1 greater-than sign, *output file* is overwritten. If you use 2 greater-than signs, it is appended. This option must follow *input file* (if given) and precede all other options in the command line. Redirection of input and output is discussed later in this chapter.

/F: specifies the maximum number of data files that may be open at any one time. If you specify the /F: option, you must also specify the /I option. If you omit this option, the number of files defaults to three. The number of open files that MS-DOS supports depends on the value given for the FILES= command in the CONFIG.SYS file. We recommend that you set FILES=10 for BASIC. BASIC automatically reserves 4 files for internal use. This leaves 6 for BASIC file I/O; thus /F:6 is the maximum supported by MS-DOS when FILES= command is set to 10 in the CONFIG.SYS file.

Each file you specify may use a maximum 190 bytes of memory. Sequential access files always use 190 bytes of memory. The amount of memory a direct access file uses depends on the record size set with the /S: option. Each direct access file uses 62 bytes of memory for the file control block, plus the record size. For example, if you specify a record size of 50 with the /S: switch, the file uses 112 bytes.

/S: specifies the maximum record size for direct access files. If you use the /S: option, you also must specify the /I option. If you omit the /S: option, BASIC assumes 128 bytes.

/C: specifies the size of the receive buffer for each RS232 communications channel present in the system. The maximum amount you can specify depends on the number of RS232 cards present in the system and on the method used to load BASIC.

Loading Method	Number of Ports	Buffer Size
BASIC	1	64K bytes
BASIC	2	32K bytes
BASICA	1	40K bytes
BASICA	2	20K bytes

If you omit the /C: option, BASIC allocates 256 bytes for each receive buffer. The transmit buffer is always 128 bytes.

/M: sets the amount of memory space for BASIC to use by specifying the highest memory location available. Omit this option unless you plan to call assembly-language subroutines. BASIC can only allocate 64K bytes of memory. If you omit this option, the system allocates all 64K bytes of memory to BASIC.

If you plan to load assembly-language programs above BASIC's memory space, specify the optional *maximum block size* parameter to preserve space for both BASIC and your programs. Specify the value for *maximum block size* in blocks of 16 bytes. If you omit this parameter, 4096 blocks are used (16 * 4096 = 65536). This is the same amount reserved for BASIC; therefore, none is preserved for your routines. Specifying /M:32000,2048 allocates a maximum of 32768 bytes; BASIC uses the lower 32000 bytes. This leaves 768 bytes for your routines.

The *maximum block size* option is necessary if you plan to use the SHELL statement. If you do not preserve the memory space, COMMAND loads on top of your assembly-language routines when the SHELL statement executes.

/I tells BASIC not to dynamically allocate space during file operations. If you use the /F or /S switches, then you must specify /I. If you omit /I, BASIC dynamically allocates space. If you load BASIC via BASICA, /I is always invoked.

/D tells BASIC to load the Double Precision Transcendental math package into memory. This lets BASIC routines return double precision values. This package remains resident until you exit BASIC.

3. Video Capabilities

Three screen modes are available: SCREEN0 (text), SCREEN1 (medium resolution) and SCREEN2 (high resolution).

SCREEN ∅: is the text mode. There are 16 colors available. On a VM-1 these 16 colors are mapped into 3 : black, green and high intensity green.
The foreground can be any of the 16 colors, blinking or not. The background can be any of the 8 first colors. On the CM-1 and VM-1 the border is not taken into account.

SCREEN 1: is the medium resolution graphics mode.
The resolution is 320 x 200 and following colors are available:

Nr.	Palette 1	Palette 2
0	Current background color	Current background color
1	Green	Cyan
2	Red	Magenta
3	Brown	High-intensity white

The background color (color nr. 0) can be one of the 16 colors.

SCREEN 2: is the high resolution graphics mode. The resolution is 640 x 400 and only 2 colors are available: black and white (green on VM-1).

4. BASIC keywords

LCOPY: copies all text data on the screen to the printer. Can also be used for hires screen dumps.

LOCK

UNLOCK: only used by the compiler and applicable in a network environment.

5. Warning

Do not use the key ahead feature when invoking the BASIC Interpreter, this can lock up the system.

APPENDIX A

SOME CATALOG NUMBERS

250-9301*	Tandy 3000 (Floppy Disk) CPU
250-9310*	Tandy 3000HD (Hard Disk) CPU
260-9301*	UK Keyboard
262-9301*	FR Keyboard
264-9301*	GR Keyboard
700-9301*	UK Utilities + English Documentation
702-9301*	FR Utilities + French Documentation
704-9301*	GR Utilities + German Documentation
706-9301*	FR Utilities + Dutch Documentation
707-9301*	UK Utilities + Dutch Documentation
250-9101	MS-DOS E 03.10.01
700-4101*	T2000/T3000 DeskMate - English
701-4101*	T2000/T3000 DeskMate - Dutch
702-4101*	T2000/T3000 DeskMate - French
704-4101*	T2000/T3000 DeskMate - German
35-3046	Deluxe Text Display Adapter
25-3047	Deluxe Graphics Display Adapter
26-5111	VM-1
26-5112	CM-1
26-1347	Printer Cable
26-1347B	Printer Cable
26-1399	RS-232 Cable
AW-0027	VM-1 Cable (for use w/ 25-3047)
26-5162	512 to 640K Memory Upgrade
25-4030	Memory Expansion Board for T3000
25-3062	Tandy 1200 Memory Kit (256K per Catalog Number)
25-4050	1.2 Meg Floppy Drive Kit
25-4051	360K Floppy Drive Kit
26-0422	High Density Disk (10 pieces)
26-0412	Double Sided (360K) Disk (10 pieces)
25-4033	Math Co-Processor
25-4034	Serial/Parallel Adapter (also works w/ Tandy 1000)
25-4060	Hard Disk & Floppy Controller Board
25-4062	20 Meg Hard Disk Kit
25-4063	External Hard Disk Cable Kit
26-4156	15 Meg Hard Disk Secondary
26-4172	35 Meg Hard Disk Secondary
25x-4001	Tandy 3000 (Floppy Disk) Complete System
25x-4010	Tandy 3000HD (Hard Disk) Complete System
25x-4101	MS-DOS and DeskMate

ONLY APPLICABLE IN U.S.A.

25-3040	Monochrome Display Adapter
25-3010	VM-3
25-3043	Graphics Display Adapter
25-1025	10 Meg Hard Disk

* Alleen voor intern gebruik
Warehouse, QC, Merchandising, Computer Support

TANDY 3000 SOFTWARE

Cat. Nr.	Name	Version Nr. Comm by Tandy Europe	Does it run on T3000?
	T1000 Software		

25-1140	PFS:File	01.00.00	Y
25-1141	PFS:Report	01.00.00	Y
25-1149	Friday!	02.00.00	Y
25-1152	Multiplan	01.20.00	Y
25-1153	MS-Word	01.00.00	N (needs 02.00.00)
	T2000 Software		

26-5251	MS-GW BASIC Comp.	05.50.00	N
26-5252	MS-Assembler	01.00.00	? (needs 01.01.00)
26-5255	MS-Fortran	01.13.00	N (needs 03.30.00)
26-5256	MS-Pascal	01.13.00	N (needs 03.30.00)
26-5257	RM/Cobol	01.05.00	Y
26-5258	Bysinc 3270	--------	N
26-5259	Bysinc 3700	--------	N
26-5260	Videotext	01.00.00	?
26-5261	Softerm 2000	01.01.00	N? (needs 03.10.00)
26-5300	Lotus 1-2-3	01.00.00 rel 1.A	Y?
26-5302	SuperCalc	01.00.00	?
26-5305	PFS:File	01.00.00	∃ T1000 version
26-5306	PFS:Report	01.00.00	∃ T1000 version
26-5307	PFS:Graph	01.01.00	N (disk media)
26-5309	PFS:Write	01.01.00	N (disk media)
26-5311	Multiplan	01.10.00	∃ T1000 version
26-5352	Dbase II	02.41.00	Y
26x-5325	Offix	1.11	N (needs 1.12)

APPENDIX B

APPENDIX C : KEYBOARD SPECIFICATIONS

International Keyboard Interrupt Service Routines

1. INTRODUCTION

This document provides the functional specification of the international keyboard commands:

KEYBUK.COM [/us]	United Kingdom keyboard
KEYBFR.COM [/us]	French keyboard
KEYBGR.COM [/us]	German keyboard

These commands shall operate on the Tandy 3000 computer and are compatable with the MS-DOS 3.10 operating system. These commands replace the BIOS keyboard interrupt service, int 9h, with the service routine needed to support the international keyboard. The command should be invoked only once per power-up or system restart.

2. INTERFACES

2.1. BIOS DATA INTERFACE

The international keyboard ISRs maintain or use data in the BIOS data area. The data is located in segment 40H and is defined in Table 1.

Table 1. BIOS DATA INTERFACE, segment 40H

OFFSET(in hex)		DEFINITION
17	1 byte	keyboard shift state
	bit 7	INSERT state active
	bit 6	CAPS LOCK active
	bit 5	NUM LOCK active
	bit 4	SCROLL LOCK active
	bit 3	ALT key depressed
	bit 2	CTRL key depressed
	bit 1	left SHIFT depressed
	bit 0	right SHIFT depressed
18	1 byte	LOCKing shift state
	bit 7	INSERT key depressed
	bit 6	CAPS LOCK depressed
	bit 5	NUM LOCK depressed
	bit 4	SCROLL LOCK depressed
	bit 3	pause active
	bit 2	SYS depressed
	bit 1	not used
	bit 0	not used
19	1 byte	ALT keypad entry sum
1A	1 word	pointer to next character in keyboard queue
1C	1 word	pointer to available entry in keyboard queue
1E	16 words	keyboard queue, 14 buffered entries

65	1 byte	video mode select register image
71	1 byte bit 7	BIOS break flag indicates break has been struck
72	1 word =1234H	software re-boot flag re-boot has been requested
80	1 word	keyboard queue start offset
82	1 word	keyboard queue end offset
97	1 byte bit 7 bit 6 bit 5 bit 4 bit 3 =1 bit 2 bit 1 bit 0	Status/LED state send data error-never get ACK from keyboard when sending data send data busy receive data error-keyboard requesting resend ACK received Tandy 3000 flag Tandy 3000 CAP LOCK LED active NUM LOCK LED active SCROLL LOCK LED active

2.2. INTERRUPT INTERFACE

The international keyboard ISRs generate the following interrupts with the calling parameters as specified. These interrupts are generated due to Special Handling of a keystroke sequence.

Table 2. BIOS INTERRUPT INTERFACE

Interrupt level	Function	Keystroke sequence	Entry Parameter	Exit Parameter
5h	PrScr	SHIFT print	none	none
10h	video	pause	AH=0F	AL=CRT mode
15h	SYS req	depress SYS release SYS	AX=8500h AX=8501h	none none
15h	kb queue not empty	key entered in kb queue	AX=9102h	none
1Bh	break	CTRL-SCROLL LOCK	none	none

2.3. HARDWARE INTERFACE

Table 3 describes the ports on the Tandy 3000 which are used by the ISRs.

Table 3. Input/Output ports for the Tandy 3000

port	I/O	Description	
20h	O	1 byte	Interrupt controller chip
		=20h	keyboard interrupt acknowledge
60h	I	1 byte	Read scan code
60h	O		Send command to keyboard
		=ED	set/reset mode indicator lights
		=ED data	indicator lights active
		bit 7-3	not used
		bit 2	CAPS LOCK active
		bit 1	NUM LOCK active
		bit 0	SCROLL LOCK active
		=F4	Enable keyboard
61h	I/O	1 byte	Master Control Register
		bit 1	speaker data out
		bit 0	speaker square wave gate enable
64h	I	1 byte	Read status
		bit 7	parity error
		bit 6	receive time out
		bit 5	transmit time out
		bit 4	inhibit switch
		bit 3	command/data
		bit 2	system flag
		bit 1	input buffer full
		bit 0	output buffer full
	O		Send command to 8042 keyboard controller
		=AD	disable keyboard interface
		=AE	enable keyboard interface
3D8h	O	1 byte	Video Mode Select Register

3. US English Keyboard

The international keyboard ISRs all require the ability to revert to US English keyboard translations. Table 4 describes the translation of scan codes to ASCII codes. Table 5 describes the translations for the numeric keypad.

3.1 Extended ASCII codes

Extended ASCII codes are used to perform functions which are not represented in the standard ASCII set. The extended code is represented by a NULL, 0, ASCII code and an extended code instead of the key scan code. The extended codes are marked in Table 4 with a '*'.

3.2 Special Handling

Certain keystroke combinations causes the keyboard interrupt service routine to perform an action. These keyboard combinations are marked in Table 4 with a '**'.

3.2.1 System Reset

A system reset is performed on the combination of CTRL, ALT and DEL. The reset is a cold boot in the sence that the power-on sequence is executed.

Table 4. Scan code translations for US English Tandy 3000 keyboard

key # - SCAN CODE	NORM CASE (ASCII code)	UPPER CASE (ASCII code)	CTRL CASE (ASCII code)	ALT CASE (ASCII code)
90 - 01	ESC (1B)	ESC (1B)	ESC (1B)	-1
2 - 02	1 (31)	! (21)	-1	ALT1 (78)*
3 - 03	2 (32)	@ (40)	NULL(00)	ALT2 (79)*
4 - 04	3 (33)	# (23)	-1	ALT3 (7A)*
5 - 05	4 (34)	$ (24)	-1	ALT4 (7B)*
6 - 06	5 (35)	% (25)	-1	ALT5 (7C)*
7 - 07	6 (36)	^ (5E)	RS (1E)	ALT6 (7D)*
8 - 08	7 (37)	& (26)	-1	ALT7 (7E)*
9 - 09	8 (38)	* (2A)	-1	ALT8 (7F)*
10 - 0A	9 (39)	((28)	-1	ALT9 (80)*
11 - 0B	0 (30)	) (29)	-1	ALT0 (81)*
12 - 0C	- (2D)	_ (5F)	US (1F)	ALT- (82)*
13 - 0D	= (3D)	+ (2B)	-1	ALT= (83)*
15 - 0E	BS (08)	BS (08)	DEL (7F)	-1
16 - 0F	-> (09)	<- (0F)*	-1	-1
17 - 10	q (71)	Q (51)	DC1 (11)	ALTQ (10)*
18 - 11	w (77)	W (57)	ETB (17)	ALTW (11)*
19 - 12	e (65)	E (45)	ENQ (05)	ALTE (12)*
20 - 13	r (72)	R (52)	DC2 (12)	ALTR (13)*
21 - 14	t (74)	T (54)	DC4 (14)	ALTT (14)*
22 - 15	y (79)	Y (59)	EM (19)	ALTY (15)*
23 - 16	u (75)	U (55)	NAK (15)	ALTU (16)*
24 - 17	i (69)	I (49)	HT (09)	ALTI (17)*
25 - 18	o (6F)	O (4F)	SI (0F)	ALTO (18)*
26 - 19	p (70)	P (50)	DLE (10)	ALTP (19)*
27 - 1A	[(5B)	{ (7B)	ESC (1B)	-1
28 - 1B	] (5D)	} (7D)	GS (1D)	-1
43 - 1C	CR (0D)	CR (0D)	LF (0A)	-1
30 - 1D	CTRL #	CTRL #	CTRL #	CTRL #
31 - 1E	a (61)	A (41)	SOH (01)	ALTA (1E)*
32 - 1F	s (73)	S (53)	DC3 (13)	ALTS (1F)*
33 - 20	d (64)	D (44)	EOT (04)	ALTD (20)*
34 - 21	f (66)	F (46)	ACK (06)	ALTF (21)*
35 - 22	g (67)	G (47)	BEL (07)	ALTG (22)*
36 - 23	h (68)	H (48)	BS (08)	ALTH (23)*
37 - 24	j (6A)	J (4A)	LF (0A)	ALTJ (24)*
38 - 25	k (6B)	K (4B)	VT (0B)	ALTK (25)*
39 - 26	l (6C)	L (4C)	FF (0C)	ALTL (26)*
40 - 27	; (3B)	: (3A)	-1	-1
41 - 28	' (27)	" (22)	-1	-1
1 - 29	` (60)	~ (7E)	-1	-1
44 - 2A	left SHIFT #	left SHIFT#	left SHIFT#	left SHIFT#
14 - 2B	\ (5C)	| (7C)	FS (1C)	-1
46 - 2C	z (7A)	Z (5A)	SUB (1A)	ALTZ (2C)*
47 - 2D	x (78)	X (58)	CAN (18)	ALTX (2D)*
48 - 2E	c (63)	C (43)	ETX (03)	ALTC (2E)*

key # - SCAN CODE	NORM CASE (ASCII code)	UPPER CASE (ASCII code)	CTRL CASE (ASCII code)	ALT CASE (ASCII code)
49 - 2F	v (76)	V (56)	SYN (16)	ALTV (2F)*
50 - 30	b (62)	B (42)	STX (02)	ALTB (30)*
51 - 31	n (6E)	N (4E)	SO (0E)	ALTN (31)*
52 - 32	m (6D)	M (4D)	CR (0D)	ALTM (32)*
53 - 33	, (2C)	< (3C)	-1	-1
54 - 34	. (2E)	> (3E)	-1	-1
55 - 35	/ (2F)	? (3F)	-1	-1
57 - 36	right SHIFT#	right SHIFT#	right SHIFT#	right SHIFT#
106- 37	* (2A)	PrScr**	CPrScr (72)*	-1
56 - 38	ALT #	ALT #	ALT #	ALT #
61 - 39	SP (20)	SP (20)	SP (20)	SP (20)
64 - 3A	CAPS #	CAPS #	-1	CAPS #
70 - 3B	F1 (3B)*	F11 (54)*	F21 $(5E)*	F31 $(68)*
65 - 3C	F2 (3C)*	F12 (55)*	F22 (5F)*	F32 (69)*
71 - 3D	F3 (3D)*	F13 (56)*	F23 (60)*	F33 (6A)*
66 - 3E	F4 (3E)*	F14 (57)*	F24 (61)*	F34 (6B)*
72 - 3F	F5 (3F)*	F15 (58)*	F25 (62)*	F35 (6C)*
67 - 40	F6 (40)*	F16 (59)*	F26 (63)*	F36 (6D)*
73 - 41	F7 (41)*	F17 (5A)*	F27 (64)*	F37 (6E)*
68 - 42	F8 (42)*	F18 (5B)*	F28 (65)*	F38 (6F)*
74 - 43	F9 (43)*	F19 (5C)*	F29 (66)*	F39 (70)*
69 - 44	F10 (44)*	F20 (5D)*	F30 (67)*	F40 (71)*
95 - 45	NUM LOCK#	NUM LOCK#	pause **	NUM LOCK#
100- 46	SCROLL LOCK#	SCROLL LOCK#	break **	SCROLL LOCK#
105- 54	SYS**	SYS**	SYS**	SYS**

Table 5. Numeric key pad Translation for Tandy 3000 keyboard

key # - SCAN CODE	NUM LOCK (ASCII code)	BASE CASE (ASCII code)	CTRL CASE (ASCII code)	ALT CASE (ASCII code)
91 - 47	7 (37)	home (47)*	clr scn (77)*	**
96 - 48	8 (38)	uparrow(48)*	-1	**
101- 49	9 (39)	page up(49)*	top of text and home(84)*	**
107- 4A	- (2D)	- (2D)	-1	-1
92 - 4B	4 (34)	<- (4B)*	reverse word (73)*	**
97 - 4C	5 (35)	-1	-1	**
102- 4D	6 (36)	-> (4D)*	adv word(74)*	**
108- 4E	+ (2B)	+ (2B)	-1	-1
93 - 4F	1 (31)	end (4F)*	ers EOL (75)*	**
98 - 50	2 (32)	dnarrow(50)*	-1	**
103- 51	3 (33)	pg down(51)*	ers EOS (76)*	**
99 - 52	0 (30)	INS # (52)*	-1	**
104- 53	. (2E)	del (53)*	-1	-1 $**

* See Extended ASCII codes
** See Special Handling
# Shift keys
$ Key has meaning when CTRL and ALT are depressed
-1 Invalid key combination

3.2.2 Break

Break is performed on the combination of CTRL and SCROLL LOCK. On a break, the keyboard input queue is emptied, interrupt level 1Bh is executed, and a NULL scan/ASCII code is placed in the keyboard input queue. The break interrupt service is defined in the BIOS with a return from interrupt and may be redefined by an application program.

3.2.3 Pause

Pause is performed on the combination of CTRL and NUM LOCK. The pause delays all system activity except external interrupts until another key other than NUM LOCK is depressed. The keystroke which removes the system from the paused state is not placed in the keyboard queue.

3.2.4 Print Screen

The print screen function is performed on the combination of left or right SHIFT and the print screen key. The BIOS print screen routine is invoked, interrupt level 5h.

3.2.5 System Request

When the Sys key is pressed, interrupt 15h is executed with AX = 8500. When the key is released, interrupt 15h is invoked with AX = 8501. If an application is to use the Sys function, the calling address of the previous int 15h service routine must be preserved, and invoked if AH does not contain 85h.

3.2.5 ALT - Numeric Keypad

When the ALT key is depressed, the user may enter any character code between 1-255 into the system from the keyboard. The user holds down the ALT key and types the decimal value of the character desired on the numeric keypad. When the ALT key is released, the module-256 result is placed in the keyboard queue.

3.2.6 Translate to US keyboard

The international keyboard ISR can translate to the US English keyboard ASCII codes by depressing CTRL, ALT and then F1. US English translations will be in effect until CTRL-ALT and F2 is entered.

3.2.7 Translate to International keyboard

The international keyboard ISR can return from US English translations back to international with the combination of CTRL, ALT and F2.

3.3 Shift Key States

The shift keys are indicated in Table 4 with a '#' and are described below.

3.3.1 Left and Right Shift

These keys shift keys 1-14, 16-28, 31-41, 46-55, 106, and 65-74 to uppercase and shift them back to the base case if the CAPS LOCK key is active. The shift also reverses the NUM LOCK or non-NUM LOCK state of keys 91-93, 96-98, and 101-103.

3.3.2 CTRL

This key temporarily shifts keys 3, 7, 12, 14, 15, 17-28, 31-39, 46-52, 106, 65-74, 43, 91-93, 95, and 100-103 to the control state. The CTRL key is also used with the ALT and DEL keys to cause the system reset function; with the SCROLL LOCK key to cause the break function; with the NUM LOCK key to cause the pause function; and with ALT and F1 or F2 to transition between the internation and US English keyboards.

3.3.3 ALT

This key temporarily shifts keys 2-13, 17-26, 31-39, 46-52, and 65-74 to the ALT state. The ALT key is also used with the CTRL and DEL to cause a system restart and used with the numeric keypad to insert any character code into the keyboard input queue.

3.3.4 SCROLL LOCK

This key is interpreted by appropriate application programs as indicating that the use of cursor control keys should cause windowing over the text rather than cursor movement. When the SCRODL DOCK key is depressed, the keyboard ISR toggles the the current shift state of the SCROLL key. It is the responsiblity of the application program to perform the windowing functions. When CTRL is depressed with SCROLL LOCK, the BREAK function is performed.

3.3.5 NUM LOCK

This key shifts keys 90-93, and 95-104 to upper case. When the key is depressed, the NUM LOCK indicator is toggled and the action is reversed. NUM LOCK is temporarily reverse when the left or right shift keys are depressed. When CTRL is depressed with NUM LOCK, the PAUSE function is performed.

3.3.6 CAPS LOCK

This key shifts keys 17-26, 31-39, and 46-52 to upper case. When the CAPS LOCK key is depressed, the CAPS LOCK indicator is toggled and the action is reversed. The CAPS LOCK function is temporarily reversed when the left or right shift keys are depressed.

3.3.6 INSERT

The INSERT key does not shift any keystrokes, but the status of the INSERT key is reported with the other shift keys on int 16h, function 2. When the INSERT key is depressed, the INSERT indicator is toggled. It is the responsiblity of the application program to respond to INSERT requests.

4.0 United Kingdom English Keyboard

This section describes the different keyboard behavior when the UK English keyboard command, KEYBUK, has been invoked and the translate to US English keystoke sequence (CTRL-ALT and F1) is not in effect. When the Translate to US English command is in effect, KEYBUK operates as described in Section 3.0. Table 6 shows the keys which behave differently on the UK English keyboard.

Table 6. Scan code translations for UK English Tandy 3000 keyboard

key # - SCAN CODE	NORM (ASCII)	UPPER (ASCII)	CTRL (ASCII)	ALT (ASCII)	CTRL-ALT (ASCII)
3 - 03		" (22)			
4 - 04		£ (9C)			
41 - 28		@ (40)			` (60)
1 - 29	\ (5C)	| (7C)			
14 - 2B	# (23)	~ (7E)			

5.0 French Keyboard

This section describes the different keyboard behavior when the French keyboard command, KEYBFR, has been invoked and the translate to US English keystoke sequence (CTRL-ALT and F1) is not in effect. When the Translate to US English command is in effect, KEYBFR operates as described in Section 3.0. Table 7 shows the keys which behave differently on the French keyboard.

Table 7. Scan code translations for French Tandy 3000 keyboard

key # - SCAN CODE	NORM CASE (ASCII)	UPPER (ASCII)	CTRL (ASCII)	ALT (ASCII)	CTRL-ALT (ASCII)
2 - 02	& (26)	1 (31)			
3 - 03	e acute (82)	2 (32)			@ (40)
4 - 04	" (22)	3 (33)			# (23)
5 - 05	' (27)	4 (34)			` (60)
6 - 06	((28)	5 (35)			{ (7B)
7 - 07	S (15)	6 (36)			^ (5E)
8 - 08	e grave (8A)	7 (37)			
9 - 09	! (21)	8 (38)			| (7C)
10 - 0A	C (87)	9 (39)			
11 - 0B	a grave (85)	0 (30)			
12 - 0C	) (29)	o (F8)	-1		} (7D)
13 - 0D	- (2D)	_ (5F)	US (1F)		
17 - 10	a (61)	A (41)	SOH (01)	ALTA (1E)*	
18 - 11	z (7A)	Z (5A)	SUB (1A)	ALTZ (2C)*	
27 - 1A	cir **	dia **			[(5B)
28 - 1B	$ (24)	* (2A)			] (5D)
31 - 1E	q (71)	Q (51)	DC1 (11)	ALTQ (10)*	
40 - 27	m (6D)	M (4D)	CR (0D)	ALTM (32)*	
41 - 28	` (97)	% (25)			
1 - 29	< (3C)	> (3E)			\ (5C)
14 - 2B	mu (E6)	£ (9C)			~ (7E)
46 - 2C	w (77)	W (57)	ETB (17)	ALTW (11)*	
52 - 32	, (2C)	? (3F)	-1	-1	
53 - 33	; (3B)	. (2E)			
54 - 34	: (3A)	/ (2F)			
55 - 35	= (3D)	+ (2B)			

* Extended ASCII code
** Special Handling
-1 Invalid keyboard sequence

5.1 Special Handling

The French keyboard has the ability to place a circumflex (^) or a diaresis (..) upon some keys. This is performed by first entering the circumflex or diaresis and then the character that accompanies it. If the accompanying character is an extended ASCII code, then a NULL ASCII and scan code is placed in the keyboard queue. If the accompanying character is not allowed, a beep is produced on the speaker, then the circumflex or diaresis and the accompanying character are placed in the keyboard queue. The tables below defines the valid accompanying characters and the output of the sequence. The circumflex is represented with a

^, ASCII code 5EH, and the diaresis is represented as with filled square, ASCII FEH.

Valid circumflex (^) accompanying characters

char	ASCII code	new scan/ASCII code
a	61	0083
e	65	0088
i	69	008C
o	6F	0093
u	75	0096
SP	20	1A5E

Valid diaresis (..) accompanying characters

char	ASCII code	new ASCII code	
a	61	0084	
e	65	0089	
i	69	008B	
o	6F	0094	
u	75	0081	
y	79	0098	
A	41	008E	
O	4F	0099	
U	55	009A	
SP	20	1AFE	(also beeps)

5.2 CAPS LOCK key

The CAPS LOCK key for the French keyboard effect key 40, scan code 27h, and does not effect key 52, scan code 32h. This is due to placing the M key on a non-alphabetic US English key, and placing a non-alphabetic key on the M key. Also, the CAPS LOCK key shifts keys 1-9, 0, -, and =.

6.0 German Keyboard

This section describes the different keyboard behavior when the German keyboard command, KEYBGR, has been invoked and the translate to US English keystoke sequence (CTRL-ALT and F1) is not in effect. When the Translate to US English command is in effect, KEYBGR operates as described in Section 3.0. Table 8 shows the keys which behave differently on the German keyboard.

Table 8. Scan code translations for German Tandy 3000 keyboard

key # - SCAN CODE	NORM (ASCII)	UPPER (ASCII)	CTRL (ASCII)	ALT CASE (ASCII)	CTRL-ALT (ASCII)
3 - 03		" (22)			@ (40)
4 - 04		S (15)			
7 - 07		& 26)			
8 - 08		/ (2F)			| (7C)
9 - 09		((28)			{ (7B)
10 - 0A		) (29)			} (7D)
11 - 0B		= (3D)			
12 - 0C	BETA (E1)	? (3F)	-1		
13 - 0D	acute **	grave **			~ (7E)
22 - 15	z (7A)	Z (5A)	SUB (1A)	ALTZ (2C)*	
27 - 1A	u dia(81)	U dia(9A)			[(5B)
28 - 1B	+ (2B)	* (2A)			] (5D)
40 - 27	o dia(94)	O dia(99)			
41 - 28	a dia(84)	A dia(8E)			
1 - 29	< (3C)	> (3E)			\ (5C)
14 - 2B	# (23)	^ (5E)			
46 - 2C	y (79)	Y (59)	EM (19)	ALTY (15)*	
53 - 33		; (3B)			
54 - 34		: (3A)			
55 - 35	- (2D)	_ (5F)	US (1F)		

* Extended ASCII code
** Special Handling
-1 Invalid keyboard sequence

6.1 Special Handling

The German keyboard has the ability to place a grave (`) or an acute (') upon some keys. This is performed by first entering the grave or acute and then the character that accompanies it. If the accompanying character is an extended ASCII code, then a NULL ASCII and scan code is placed in the keyboard queue.If the accompanying character is not allowed, a beep is produced on the speaker, then the grave or acute and the accompanying character are placed in the keyboard queue. The tables below defines the valid accompanying characters and the output of the sequence. The grave is represented with a `, ASCII code 60H, and the acute is represented with a ', ASCII code 27H.

Valid grave (`) accompanying characters

Char	ASCII code	new scan/ASCII code
a	61	0085
e	65	008A
i	69	008D
o	6F	0095
u	75	0097
SP	20	0D60

Valid acute (') accompanying characters

char	ASCII code	new ASCII code
a	61	00A0
e	65	0082
i	69	00A1
o	6F	00A2
u	75	00A3
E	45	0090
SP	20	0D27

6.2 CAPS LOCK Keys

The CAPS LOCK key for the German keyboard effects keys 27H, u diaresis, 40H, o diaresis, and 41H, a diaresis, in addition to the regular alphabetic keys.

APPENDIX D : TANDY 3000 INSTALLATION MANUAL

T3000 INSTALLATION MANUAL

This document gives a guideline for proper installation of a T3000 Computer System.

It does not claim to be complete since most commercialized equipment is delivered with an Owner's Manual that offers you explicit information.

* What would you do?

- Please read and re-read carefully all installation procedures before to proceed. Any mis-installation can lead to irreversible problems.
- Please read C.S.I.S. nr. 139 that treats the handling of customer installable boards.

* What material is needed?

250-4001 = T3000 Floppy Disk System - 512K RAM - QWERTY keyboard - English documentation
or 252-4001 = T3000 Floppy Disk System - 512K RAM - AZERTY keyboard - French documentation
or 254-4001 = T3000 Floppy Disk System - 512K RAM - QWERTZ keyboard - German documentation
or 256-4001 = T3000 Floppy Disk System - 512K RAM - AZERTY keyboard - Dutch documentation
or 257-4001 = T3000 Floppy Disk System - 512K RAM - QWERTY keyboard - Dutch documentation

or 250-4010 = T3000 HD Hard Disk System - 512K RAM - QWERTY keyboard - English documentation
or 252-4010 = T3000 HD Hard Disk System - 512K RAM - AZERTY keyboard - French documentation
254-4010 = T3000 HD Hard Disk System - 512K RAM - QWERTZ keyboard - German documentation
or 256-4010 = T3000 HD Hard Disk System - 512K RAM - AZERTY keyboard - Dutch documentation
or 257-4010 = T3000 HD Hard Disk System - 512K RAM - QWERTY keyboard - Dutch documentation

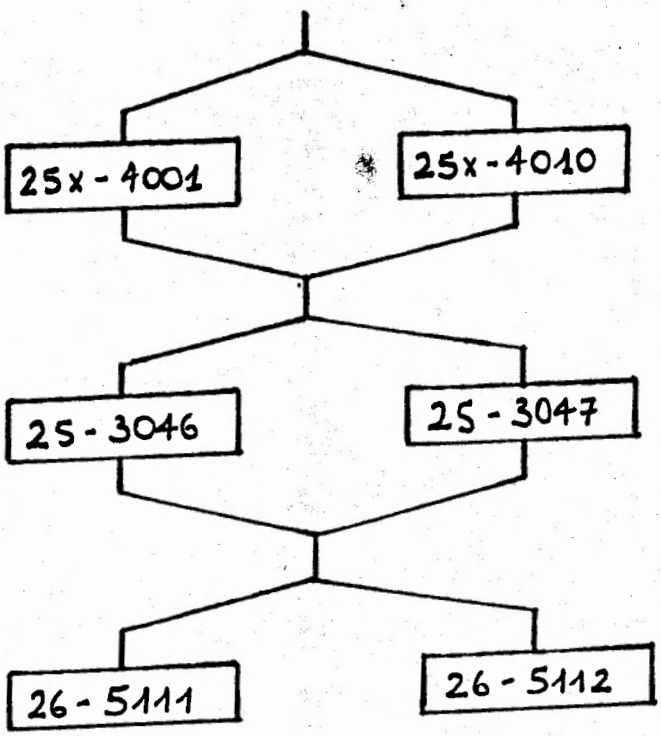
25-3046 = 1 Deluxe Text Display Adapter (or abbreviated DTDA) and User's/
Installation Manual and cable for VM-1.
or 25-3047 = 1 Deluxe Graphics Display Adapter (or abbreviated DGDA) and
User's Manual

26-5111 = VM-1 Monochrome Monitor
or 26-5112 = CM-1 Color Monitor

26-0422 = High Density Diskettes
A Philips screwdriver

* What combinations are possible?
==========

Below is a schematic that can explain the possible combinations.



* What are the recommended combinations?

A 25-3046 DTDA is best used with a VM-1 monitor.
A 25-3047 DGDA is best used with a CM-1 monitor.

* What can be ordered separately?

1. Printer Cable 26-1347

The connector of the cable used on a T3000 is different from the one's used on a T1000 or T2000 computer (DB 25 looks like old RS-232, don't confuse).

2. RS-232 Adapter Cable 26-1399

The connector of the RS-232 cable used on a Tandy 3000 is different from the one's used on a T1000 or T2000 computer (DB 9).

3. VM-1 Cable AW-0027

The connector on the computer side of the cable that connects a VM-1 to the T3000 is different from the one used with a T2000.
IMPORTANT: This cable is included in 25-3046 DTDA and is therefore only needed when the customer wants to connect a VM-1 to a 25-3047 DGDA.

4. MS-DOS + BASIC + DeskMate 25x-4101

This item contains:
a) MS-DOS E03.10.01 disks and English MS-DOS and BASIC reference manuals.
b) English version of DeskMate 01.01.00.
eventually c) Local translation of DeskMate 01.01.00.
Possible catalog numbers are:
250-4101 : MS-DOS E03.10.01 + DeskMate English
251-4101 : MS-DOS E03.10.01 + DeskMate Dutch
252-4101 : MS-DOS E03.10.01 + DeskMate French
254-4101 : MS-DOS E03.10.01 + DeskMate German

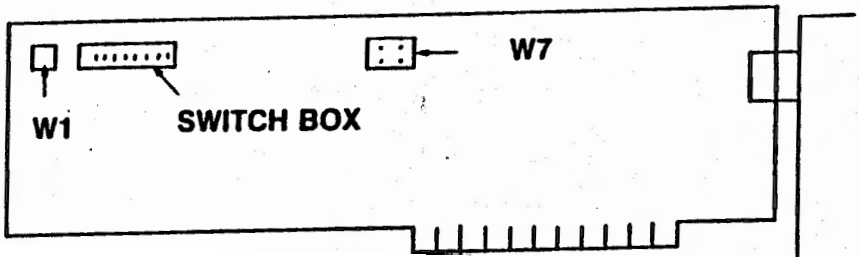
a. Preparation of the DTDA

- Carefully unpack the DTDA from its packing.
- Place the card in a safe place.

b. Preparation of the DGDA

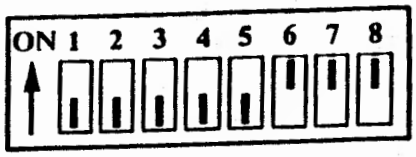
- Carefully unpack the DGDA from its packing.
- Locate the switch box. See Figure 1.

Figure 1



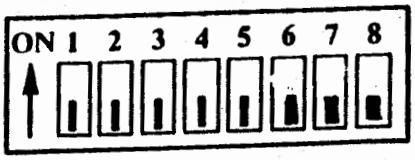
- For use with CM-1 monitor, set the switches in the position as described on Figure 2.

Figure 2



- For use with VM-1 monitor, set the switches in the position as described on Figure 3.

Figure 3



- Place the card in a safe place.

c. Serial/Parallel Adapter Preparation

- Remove the fan filter.
- Open the T3000 CPU following Figure 4 and Figure 5.

Figure 4

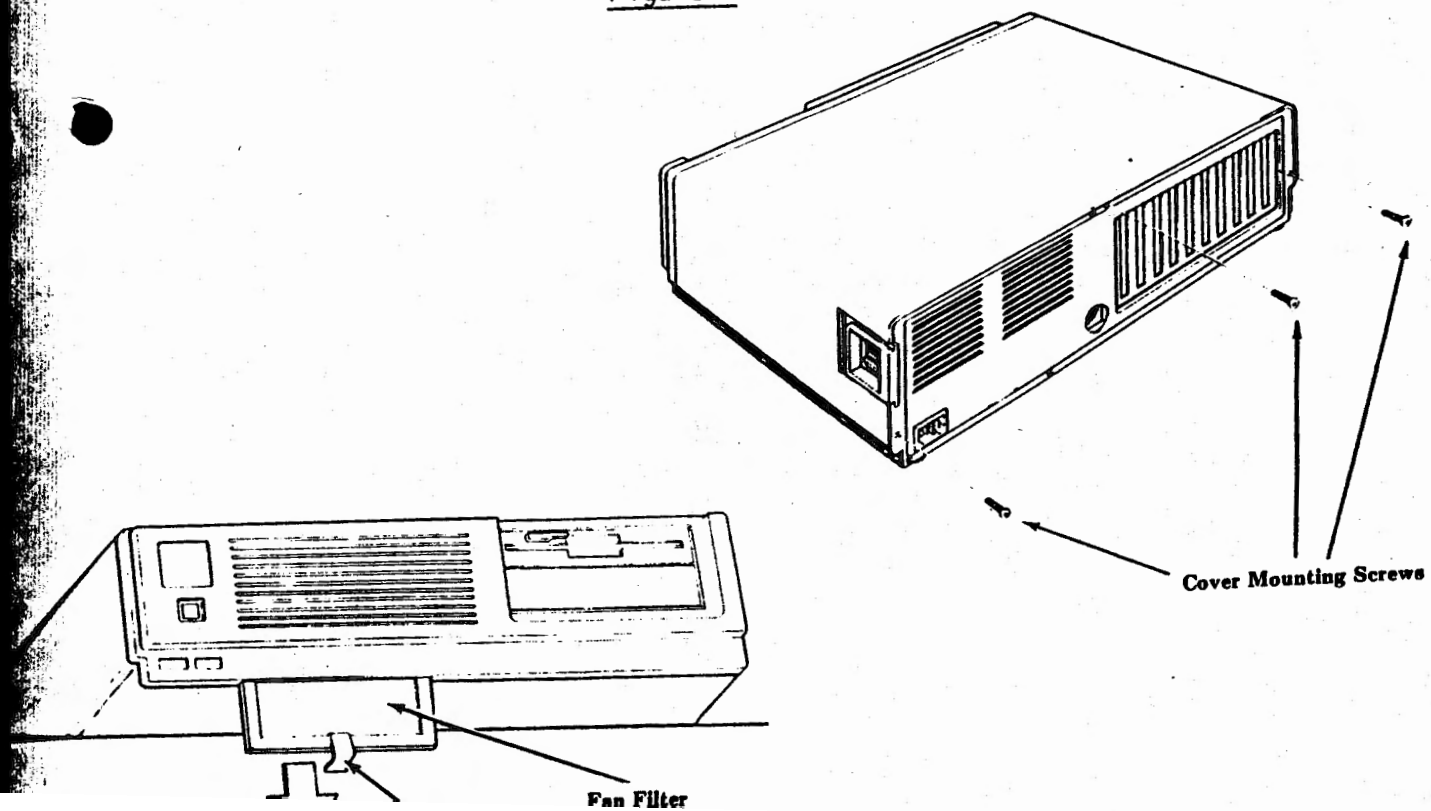
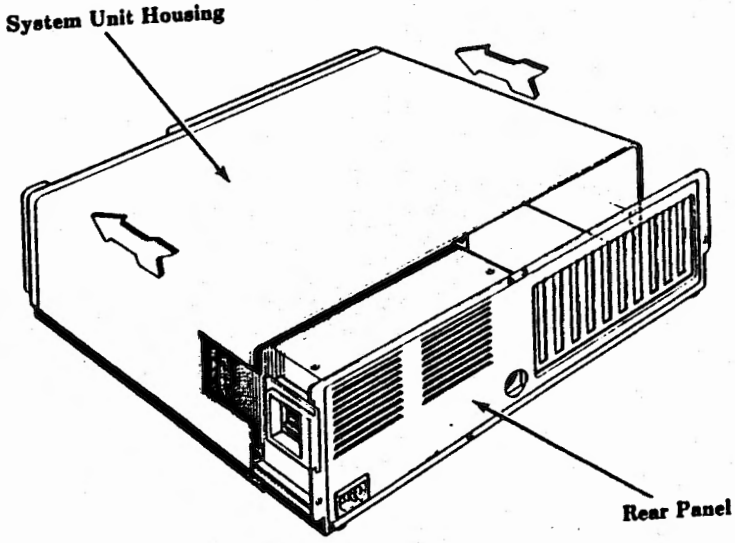
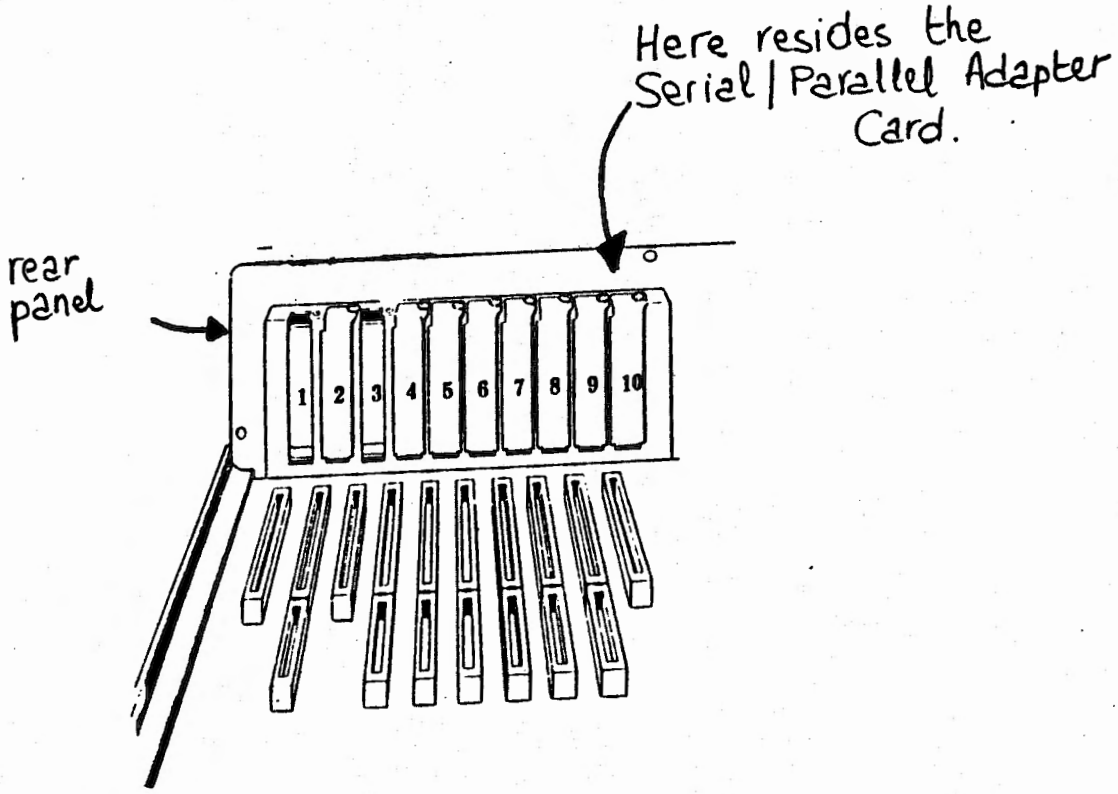


Figure 5



- Locate the Serial/Parallel Adapter Card in slot 10 (thus rightmost). See Figure 6.

Figure 6

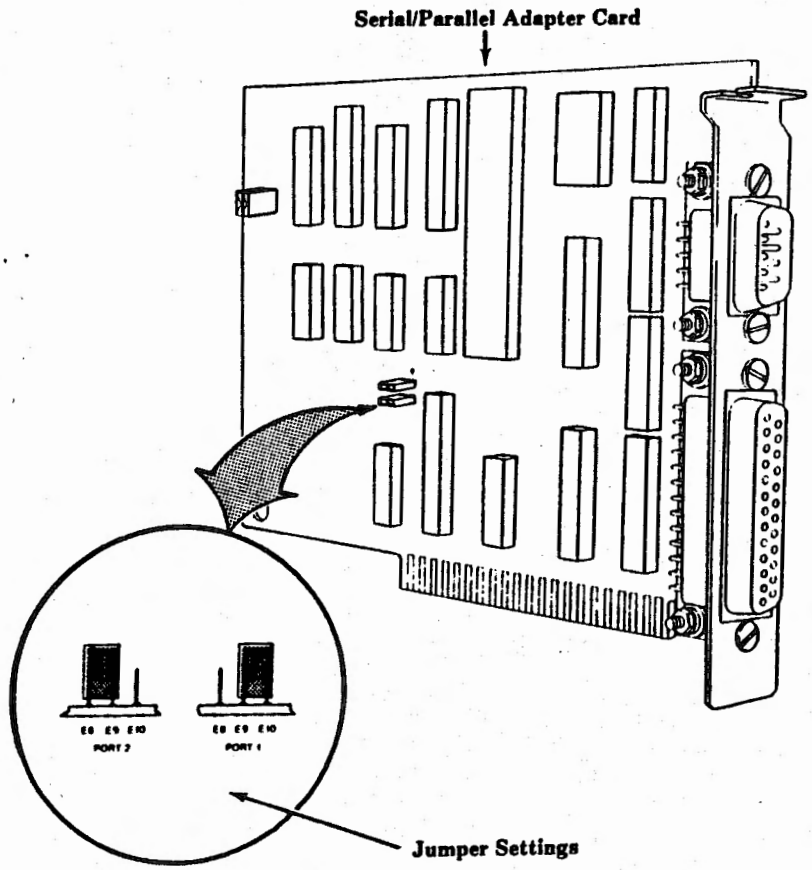


- Remove the Serial/Parallel Adapter Card by removing the screw that anchors the card to the slot. Hold the top of the card and pull it up and out of the slot.

- Check that the jumpers are set as described:

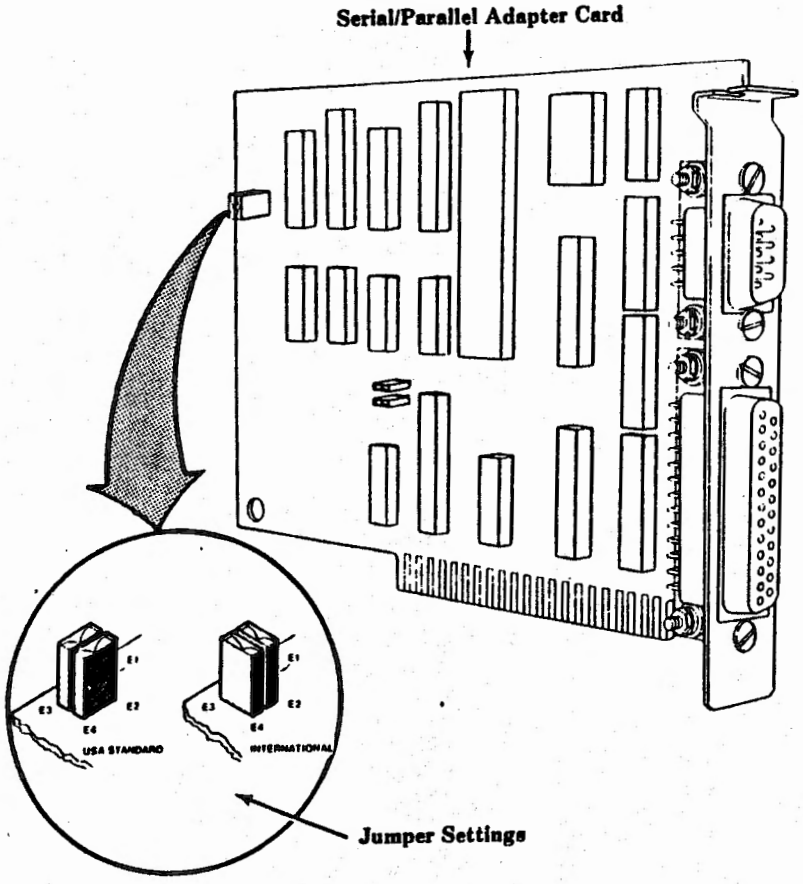
  . the serial port 1 must be selected, this means that the pins E9 and E10 must be connected by a jumper. See Figure 7.

Figure 7



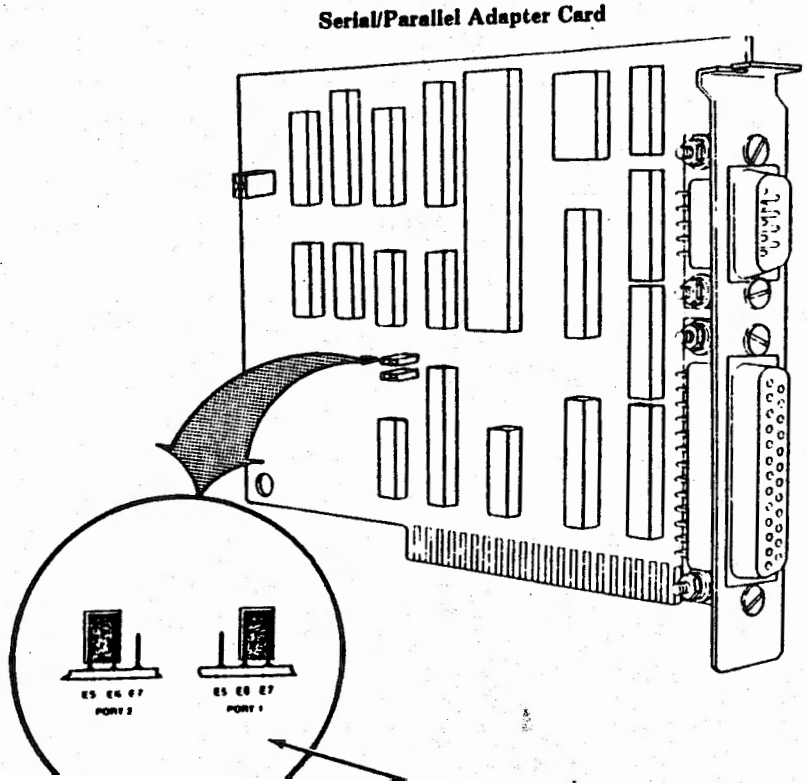
. the U.S.A. transmission rate must be selected, this means pins E1 and E3 must be connected by a jumper and pins E2 and E4 must be connected by a jumper. See Figure 8.

Figure 8



. the parallel port must be selected, this means that pins E6 and E7 must be connected by a jumper. See Figure 9.

Figure 9

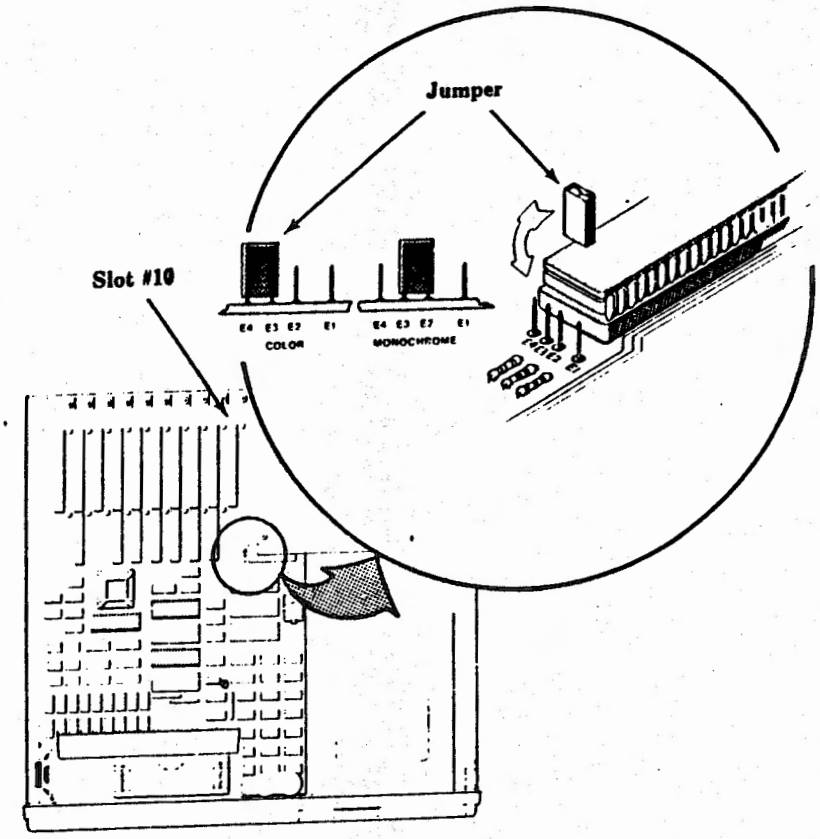


- Once the jumpers are correctly set, you may place the board on a safe place.

d. Main Logic Board Preparation

- Locate the Color/Monochrome Setting Jumper. See Figure 10.

Figure 10



- In case of installation of a 25-3046 (DTDA), check that pins E2 and E3 are connected by a jumper.
- In case of installation of a 25-3047 (DGDA), check that pins E3 and E4 are connected by a jumper.
- Remove the screw on top of slot #1 on the back panel of the system unit and remove the slot cover from the panel.
- Install the video display card (DTDA or DGDA) on the main board in the slot connector #1 (the leftmost), or #3.
- Check that the end of the card with the metal slot covering is correctly seated in the rear panel slot, the front end of the card fits into the corresponding plastic slot behind the fan housing, and the card is security mounted in the slot connector on the main board.

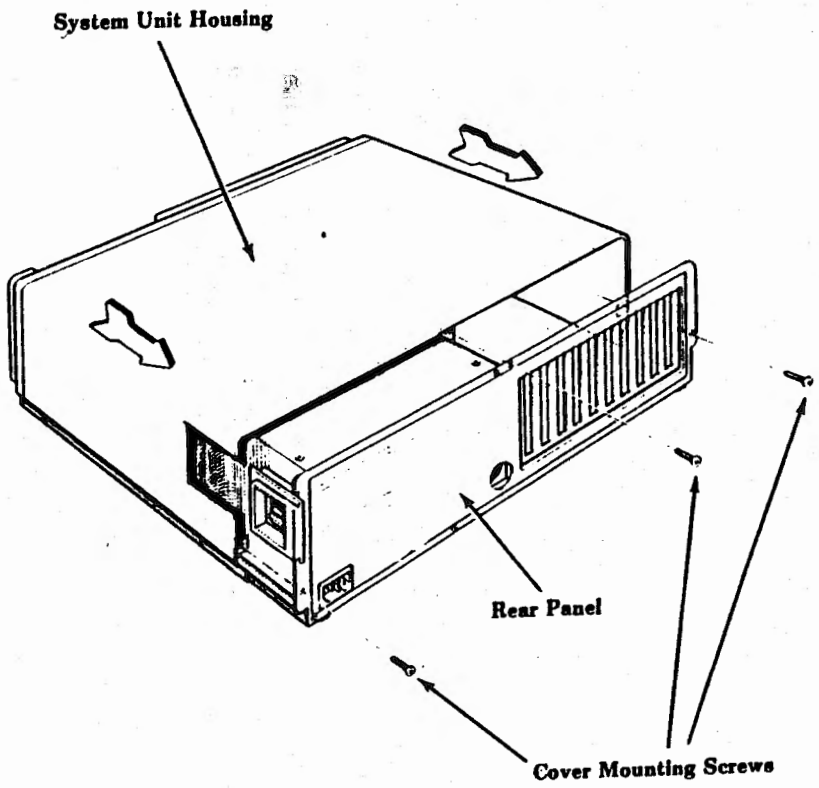
- Install the Serial/Parallel Adapter Card on the main board in the slot connector #10 (rightmost).

- Check that the end of the card with the metal slot covering is correctly seated in the rear panel slot, and the card is security mounted in the slot connector on the main board.

- If you have a T3000 HD with an internal hard disk (25x-4010), note the Drive Type Number and hard disk Media Error Map on the top disk of the disk drive chassis. Write these numbers on attached "System Worksheet".

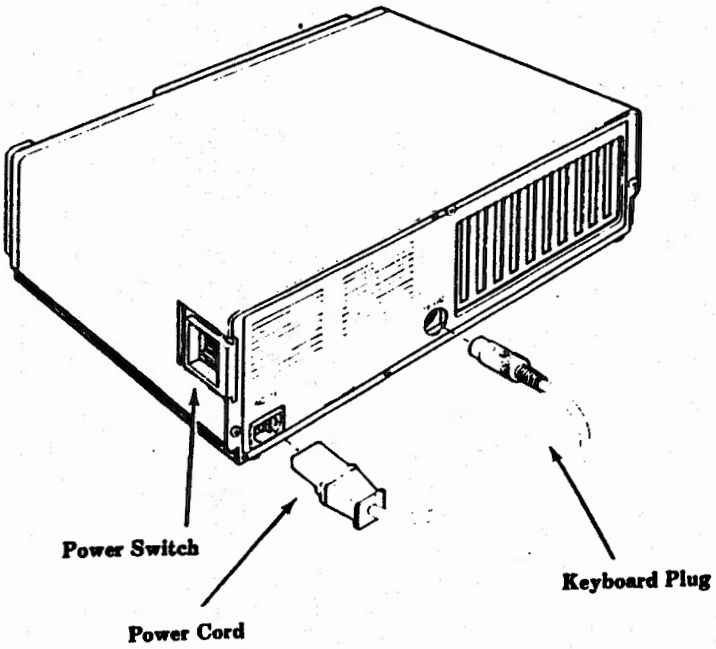
- Close the unit and replace the three cover screws. See Figure 11.

Figure 11



- Replace the fan filter and be sure to insert the filter with the Velcro tab at the bottom of the filter.
- After replacing the cover, connect the monitor cable with your monitor to the video display card.
- Plug the keyboard into the rear of the system unit.
- Be sure the power switch is OFF.
- Plug the power cord in the AC outlet.
- The system is now ready to be used for the first time.
- Set power switch to "ON" position.
- Put the Tandy 3000 Utility Disk in drive A and press the reset button.

Figure 12



SYSTEM WORKSHEET

This System Worksheet provides a convenient space in which you can keep up-to-date information about your Tandy 3000 system. Record all the hardware information you need to run the Setup configuration program. Update this list every time you add memory, hard or floppy disk drives, or a new video display card to your system.

The Worksheet also contains a section for you to record the flawed cylinders and heads for one or two hard disk drives.

Floppy Disk Drives

Type of primary disk drive High Capacity

Type of secondary disk drive _____

Hard Disk Drives

Drive type number of primary hard disk drive _____

Drive type number of secondary hard disk drive _____

Base Memory

Total base memory size: 512K or 640K

Expansion Memory

Total expansion memory size: _____ K

Video Adapter Card

Type of primary video adapter card _____

SYSTEM WORKSHEET

Media Error Map

Primary disk drive:		Secondary disk drive	
Flawed Heads	Cylinders	Flawed Heads	Cylinders

IF YOU SEE	YOU DO
1) BIOS ROM version 01.00.00 Compatibility Software (C) 1985 Phoenix Software Associates Ltd., All Rights Reserved Licensed to Tandy Corp. 00512k Base Memory, 00000k Expansion Time-of-day clock stopped Invalid configuration information please run SETUP program Strike the F1 key to continue	Press <F1> and goto step 3.
IF YOU SEE	
2) Tandy 3000 Utilities Version 01.00.00 Copyright 1985 Tandy Corp. All rights reserved SELECT AN OPTION 1 FORMAT DISKETTE 2 COPY DISKETTE 3 PREPARE SYSTEM FOR MOVING 4 SETUP 5 FORMAT HARD DISK 9 END UTILITIES SELECT THE ACTION DESIRED ?	Type <4><ENTER>

YOU SEE	YOU DO
3) Phoenix Software Asc. Ltd Configuration Setup Program Ver. 1.1 (C) Copyright 1985 This program is used to store system configuration information into battery backed memory in your computer. It is necessary to run this program when any memory, disk drives, or monitors, are added or removed from your system, or to set the battery maintained time or date. Press <enter> to continue ...	Press <ENTER>
4) Are these correct ? [Y or N] The battery maintained date is: 01/30/1986 The battery maintained time is: 08:48:03	Type <N>
5) The battery maintained date is: 01/30/1986 If this date is correct type <enter> If this date is not correct type the correct date using numbers separated by slashes. For example type 05/21/1986 <enter> meaning May 21, 1986. ?	Enter the current date

YOU SEE	YOU DO
6) If this time is correct type <enter> If this time is not correct type the correct time using military (24 hours) time separated by colons. For example type 13:05:00 <enter> meaning exactly 1:05pm. ? The battery maintained time is: 08:48:25	Enter the current time
7) Are these correct ? [Y or N] The battery maintained date is: current date The battery maintained time is: current time	Type <Y>
8) The following information is required for correct operation of your computer. The current settings of your options: Diskette Drive A: is 1.2M Diskette Drive B: is NONE Fixed Disk Drive C: NOT INSTALLED Fixed Disk Drive D: NOT INSTALLED System Base memory is 512K Expansion Memory is OK Prime Video Adapter is MONOCHROME	Type <N><ENTER>

YOU SEE	YOU D
Are these options correct (Reply Y or N then <enter>) ?	
9) Your diskette drive types are set to Diskette Drive A: is 1.2M Diskette Drive B: is NONE Are these drive types correct (Y or N) ?	Type <N><ENTER>
10) What type is diskette drive A: 0 if this drive is not installed 1 if capacity is 360 kilobytes 2 if capacity is 1.2 megabytes) (0,1 or 2) ?	Type <2> <ENTER>
11) What type is diskette drive B: 0 if this drive is not installed 1 if capacity is 360 kilobytes 2 if capacity is 1.2 megabytes) (0,1 or 2) ?	Type <0> <ENTER>

YOU SEE	YOU D
12) Your fixed disk types are set to Fixed Disk Drive C: is TYPE 6 Fixed Disk Drive D: is NOT INSTALLED Are these drive types correct (Y or N) ?	Type <N> <ENTER>
13) How many fixed disk drives are installed in your system ? (0, 1, or 2) ?	If you have a T3000 floppy disk system type: <0><ENTER> and goto step 15 If you have a T3000 HD system type: <1><ENTER>
14) What type is fixed drive C: (1 to 15) ?	Type <6><ENTER>
15) Base memory is that memory positioned so as to be available to MSDOS programs. System Base Memory is 512K Is this correct (Y or N) ?	Type <N><ENTER>

YOU SEE	YOU D
16) What is the total size of the base memory installed in your system in K (Standard configurations are 256, 512, or 640) ?	Type 512 <ENTER>
17) Expansion memory is positioned at a high address and available to MSDOS only for special functions. Expansion Memory is 0K Is this correct (Y or N) ?	Type <N><ENTER>
18) What is the total size of the expansion memory installed in your system in K (Standard configurations are 512, 1024, ...) ?	Type <0><ENTER>

YOU SEE	YOU DO
19) The primary display is used by the system following boot. If more than one video adapter is installed in your system you must select one as primary. See your installation manual for details of option switch settings that might also be needed. Prime Video Adapter is MONOCHROME Is this correct (Y or N) ?	Type <N><ENTER>
20) Use the number code to indicate the primary display adapter 0 EGA 1 Color graphic (40 columns) 2 Color graphic (80 columns) 3 Monochrome ?	If you have installed a DTDA (25-3046) Type <3><ENTER> If you have installed a DGDA (25-3047) Type <2><ENTER>
21) The following information is required for correct operation of your computer. " The current settings of your options : " The current settings of your system " Are these options correct (Reply Y or N then <enter>) ?	Type <Y>
22) Your system must now be rebooted. Press <ctrl><alt><del> for new config	You press <CTRL><ALT><DEL>

BACKUP of UTILITY and MS-DOS disks

YOU SEE	YOU DO
23) Tandy 3000 Utilities Version 01.00.00 Copyright 1985 Tandy Corp. All rights reserved SELECT AN OPTION 1 FORMAT DISKETTE 2 COPY DISKETTE 3 PREPARE SYSTEM FOR MOVING 4 SETUP 5 FORMAT HARD DISK 9 END UTILITIES SELECT THE ACTION DESIRED ?	Type <2><ENTER>
24) WHICH DRIVE CONTAINS SOURCE DISKETTE ?	Type <A><ENTER>
25) WHICH DRIVE CONTAINS TARGET DISKETTE ?	Type <A><ENTER>
26) INSERT TARGET DISKETTE FOR FORMAT AND PRESS "ENTER" WHEN READY	Take out the T3000 UTILITY Disk and place a blank high density diskette in drive A, close the drive door, press <ENTER>

YOU SEE	YOU DO
27) FORMATTING	WAIT
28) INSERT SOURCE DISKETTE - PRESS "ENTER"	Take out the formatted disk and put the T3000 UTILITY disk in drive A, close the drive door, and press <ENTER>
29) COPYING	WAIT
30) INSERT TARGET DISKETTE FOR COPY AND PRESS "ENTER" WHEN READY	Same action as step 26)
31) INSERT SOURCE DISKETTE - PRESS "ENTER"	Same action as step 28)
32) INSERT TARGET DISKETTE FOR COPY AND PRESS "ENTER" WHEN READY	Same action as step 26)
33) COPY COMPLETE followed by the Tandy 3000 UTILITY Menu	Repeat steps 23) through 32) in order to make copies of the MS-DOS System disk and the MS-DOS supplemental disk
34) The Tandy 3000 UTILITY Menu	You place all master disks in a safe place. If you have a T3000 floppy system type <9><ENTER> and skip all following steps, you are now ready to use MS-DOS. If you have a T3000 HD system type <5><ENTER>

YOU SEE	YOU DO
35) TANDY 3000 FORMAT Version 01.00.00 Copyright 1985 Tandy Corp. All rights reserved Which hard drive do you want to format (C/D) ?	Type <C><ENTER>
36) All data on drive C will be DESTROYED: Do you want to continue (Y/N) ?	Type <Y><ENTER>
37) Hard drive C is type 6 Number of heads = 4 Number of cylinders = 614 Is this correct (Y/N) ?	Type <Y><ENTER>
38) Do you want to flag defective tracks (Y/N) ?	If the Media Error Map is empty then type <N><ENTER> and goto step 40)
39) Enter next head, cylinder pair and press <ENTER> to quit ?	Enter the contents of the Media Error Map by typing the number of head, a comma and the number

YOU SEE

40) FORMATTING ....

41) The T3000 Utility Menu.

42)
```
BIOS ROM version 01.00.00
Compatibility Software (C) 1985
Phoenix Software Associates Ltd.,
All Rights Reserved
Licensed to Tandy Corp.

00512k Base Memory, 00000k Expansion
Current date is Fri  1-31-1986
Enter new date (mm-dd-yy): 01-31-86
Current time is 15:47:47.59
Enter new time:
```

43) A>

YOU DO

of cylinder, and then press <ENTER>
If finished, type immediately <ENTER>

Wait until the format process has finished and you return back to the T3000 Utility Menu Software sectoring and moving MS-DOS on hard disk.

Remove the T3000 Utility disk, place the MS-DOS system disk in drive A: and press the <RESET> button

Type date and time of the day.

If you have a - UK keyboard type:
KEYBUK <enter>
- FR keyboard type:
KEYBFR <enter>
- GR keyboard type:
KEYBGR <enter>

YOU SEE	YOU DO
44) A>	Replace the MS-DOS system disk by the MS-DOS supplemental disk and type: FDISK <ENTER>
45) Tandy 3000 Hard Disk Setup Utility Version 01.00.00 Copyright 1985 Tandy Corp. All rights reserved. FDISK Options Current Hard Disk Drive: 1 Choose one of the following: 1. Create DOS Partition 2. Change Active Partition 3. Delete DOS partition 4. Display Partition Data 5. Select Next Hard Disk Drive 6. Select Previous Hard Disk Drive Enter Selection --> Press ESC to exit to MSDOS.	Type <1> <ENTER>

YOU SEE	YOU DO
46) Tandy 3000 Hard Disk Setup Utility Version 01.00.00 Copyright 1985 Tandy Corp. All rights reserved. Create DOS Partition Current Hard Disk Drive: 1	Type <Y><ENTER>
47) System needs to reboot Insert system disk in Drive A Press any key to reset the system	Replace the MS-DOS supplemental disk by the MS-DOS system disk and press the <RESET> button
48) BIOS ROM version 01.00.00 Compatibility Software (C) 1985 Phoenix Software Associates Ltd., All Rights Reserved Licensed to Tandy Corp. 00512k Base Memory, 00000k Expansion Current date is Fri 1-31-1986 Enter new date (mm-dd-yy): 01-31-86 Current time is 15:47:47.59 Enter new time:	Repeat step 43.
49) A>	Replace the MS-DOS system disk by the MS-DOS supplemental disk and type: HFORMAT C: /S <ENTER>

YOU SEE	YOU DO
50) **Insert DOS disk in drive A: and strike ENTER when ready**	Replace the MS-DOS supplemental disk by the MS-DOS system disk and press <ENTER>
51) **WARNING, ALL DATA ON NON-REMOVABLE DISK DRIVE C: WILL BE LOST! Proceed with Format (Y/N)?**	Type <Y><ENTER>
52) A>	Type: COPY *.* C: <ENTER>
53) A>	Replace the MS-DOS system disk by the MS-DOS supplemental disk and type: COPY *.* C: <ENTER>
54) A>	The hard disk is now completely ready to boot and to to run MS-DOS applications.

CUSTOMIZATION OF MS-DOS

a) Preparation

1. Boot your system by pressing the <RESET> button.
   Floppy disk users must put their MS-DOS system disk in drive A:

2. Enter date and time, if necessary.

3. In case of a QWERTY keyboard, type: KEYBUK <ENTER>
   In case of an AZERTY keyboard, type: KEYBFR <ENTER>
   In case of a QWERTZ keyboard, type: KEYBGR <ENTER>

b) Keyboard

An autoexecution file called AUTOEXEC.BAT should be created that loads automatically the correct keyboard driver. You can do that by typing:

```
TYPE CON >AUTOEXEC.BAT <ENTER>
ECHO OFF <ENTER>
KEYBxx <ENTER>
<CTRL><Z> <ENTER>
```

xx stands for UK, FR or GR depending on your type of keyboard.

c) Printer

If you have a Tandy printer of following type:

- Tandy Daisy Wheel Printers
- Tandy Dot Matrix Printers
- Tandy 'IBM Compatible' Dot Matrix Printers
  in Tandy mode settings.
  CGP-220

You should install the printer driver called LPDRVR.SYS.
You can do that by typing:

```
TYPE CON >CONFIG.SYS <ENTER>
DEVICE = LPDRVR.SYS <ENTER>
<CTRL><Z> <ENTER>
```

In order to have correct interpretation of line feeds, carriage returns, character sets, you would add to the AUTOEXEC file the following:

1. In the case of a CGP-220, type:

```
TYPE CON >>AUTOEXEC.BAT <ENTER>
MODE NL <ENTER>
MODE DMPXLAT <ENTER>
MODE LFOFF <ENTER>
<CTRL><Z> <ENTER>
```

2. In the case of a DMP-Printer, type:

```
TYPE CON >>AUTOEXEC.BAT <ENTER>
MODE DMP <ENTER>
MODE DMPXLAT <ENTER>
MODE LFON <ENTER>
<CTRL><Z> <ENTER>
```

3. In the case of a DW-II, type:

```
TYPE CON >>AUTOEXEC.BAT <ENTER>
MODE DWP <ENTER>
MODE DWPXLAT <ENTER>
MODE LFON <ENTER>
<CTRL><Z> <ENTER>
```

4. In the case of a DW-IIB, DWP-410 or DWP-510 in pitch 10 setting, type:

```
TYPE CON >>AUTOEXEC.BAT <ENTER>
MODE DWP <ENTER>
MODE DWP10 <ENTER>
MODE LFON <ENTER>
<CTRL><Z> <ENTER>
```

5. In the case of a DW-IIB, DWP-410 or DWP-510 in pitch 12 setting, type:

```
TYPE CON >>AUTOEXEC.BAT <ENTER>
MODE DWP <ENTER>
MODE DWP12 <ENTER>
MODE LFON <ENTER>
<CTRL><Z> <ENTER>
```

6. In the case of a DWP-220, contact your National Customer Service.

d) Video

If you have a computer system with a VM-1 monitor, you should install an additional device driver called MODEVM.SYS.

You can do that by typing:

```
TYPE CON >>CONFIG.SYS
DEVICE = MODEVM.SYS <ENTER>
<CTRL><Z>
```

Note: Anytime CONFIG.SYS is altered you should reboot the system in order to install effectively the device drivers.

APPENDIX E : MS-DOS CSR TRAINING GUIDE

STUDY GUIDE

Customer Service Representative
Training

MS-DOS SUPPORT TRAINING

Written by
Ken Moak

Stock # CSR-1040

This material was specifically designed for the exclusive use of

Tandy/Radio Shack Customer Service Representative Training

Director, Computer Training Programs
Tandy Corporation/Radio Shack
Fort Worth, Tx, 76102, U.S.A.

INTRODUCTION, OBJECTIVES, AND PREREQUISITES

The MS-DOS Support Training Course, CSR-1040, is a self-paced computer based course that is taught on a Tandy 1000 with a color monitor. It was designed to be used with the student following the course exercises in the Student Guide and practicing commands on a Tandy 2000.

The overall objective of this course is to teach the basic fundamentals of MS-DOS using Tandy/Radio Shack computers. By the end of your course you will be able to:

Use MSDOS commands with proper syntax, and switches.

Explain the difference, and use both internal and external commands.

Explain the advantages, the limitations, and the commands used with subdirectories.

Create and edit batch files.

Install special device drivers (ANSI.SYS and the printer dump utilities) and change system defaults such as the number of files and buffers opened.

Install MSDOS onto a hard drive and be able to backup the system.

Explain and use commands that are machine specific.

Diagnose and correct common problems that may occur.

COMPUTER BASED COURSEWARE

The course consist of 7 lessons on one diskette. There are questions to test your comprehension of the material presented in the Student Guide. After completion of this course a test will be given. After these test have been completed return them to:

Computer Training Programs
1300 One Tandy Center
Ft Worth Texas, 76102

The following commands can be used to control the courseware diskette.

START	This command will cause the courseware to be loaded into memory
<ALT><O>	This two key combination will cause the course to be executed after being loaded into memory.
<SPACE BAR>	Is used to proceed to the next screen of information.
<I>	Will display the current page number.
<P>	Will display the previous page.
<N>	Displays the next page (a page may be several screens long)
<T>	Takes you out to the topic menu
<ES	Will allow a user to exit to DOS to practice commands (<ALT><O> to resume)
<J>	Jump to a specified page

WARNING Jumping to a blank page may cause the system to lock up.

MATERIALS REQUIRED TO RUN THIS COURSE

To properly take this course you should have the following:

1. A Tandy 1000 with color monitor, CM2
2. A Tandy 2000 and monitor.
3. One courseware diskette and one Student Practice Diskette.
4. Your study guide.
5. MS-DOS Instruction Manuals

INSTRUCTIONS FOR RUNNING THE COURSEWARE

1. Turn on the Tandy 1000 and boot the system using an MS-DOS system diskette.
2. Place the courseware diskette in the current drive and enter START. A message will be displayed instructing you to press <ALT><O> to execute. Press <ALT><O>.
3. You will then see a main menu. Select lesson one.
4. The <SPACE BAR> should be pressed to display the next screen of information. You may stop at any time. Press <I> to display the current page number. Remember this number, so you can return to the place where you left the course. The system will not automatically return you to this page. Press <T> to return to the menu.
5. The next time you run the course, the system will display the menu, select the lesson that you want, and then press <J> to jump, and enter the page number displayed in step 4 above.

MSDOS OBJECTIVES

Lesson 1

When you have successfully completed this lesson you will be able to:

Identify and explain which machines that Tandy/Radio Shack sells that operate on MSDOS, and a brief history of the versions of MSDOS that have been released for each machine, and common problems with these versions.

Lesson 2

When you have successfully completed this lesson you will be able to:

Explain the difference between internal and external commands, and know the syntax for common commands that will not be covered in later lessons.

Lesson 3

When you have successfully completed this lesson you will be able to:

Explain the purpose and limitations of the use of subdirectories.

Use commands such as MKDIR, CD, RMDIR, CHKDSK, and PATH.

Lesson 4

When you have successfully completed this lesson you will be able to:

Create BATCH files to access programs in subdirectories, create more complex BATCH files such as ones with replacable parameters.

Edit files using EDLIN.

Lesson 5

When you have successfully completed this lesson you will be able to:

Configure your system for more files and buffers, and install device drivers.

Lesson 6

When you have successfully completed this lesson you will be able to:

Explain the installation and backup procedures used for the hard drive systems.

Lesson 7

When you have successfully completed this lesson you will be able to:

Use machine specific command and utilities.

LESSON ONE

1. What versions of MS-DOS have been released for:

Tandy 2000	Tandy 1200	Tandy 1000

2. What versions of MS-DOS may require hardware modifications:

Tandy 2000	Tandy 1200	Tandy 1000

LESSON TWO
Common Commands

1. An _____ command is executed from RAM memory, and is loaded during boot up.

2. An _____ command is loaded and executed like a program.

3. An _____ command can only be executed in the current directory, unless a search or execution path is specified.

4. External commands must have an extension of _____ or _____ or _____.

5. List the internal commands.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

6. What special characters can be used in filenames?
_____

7. A filename will be truncated after ____ characters and the extension will be truncated after ____ characters.

8. A switch, filespec, or argument, are types of _____ used for additional control of a command.

9. What two characters can be used as wild cards? ___ ___

10. The _____ command can be used with _____ language programs to enable the <BREAK> key, however it will have no effect on programs written in the _____ language.

11. Which Tandy computers must have DEVICE=ANSI.SYS stated in the CONFIG.SYS file during boot up before the CLS command will work?_____

12. The switch that causes files to be verified while being copied is _____.

12. When using the DIR command, the _____ switch will cause the output to be displayed a screen at a time. The _____ switch displays the files in the wide format.

13. On which model computers will MS-DOS format the disk when using the DISKCOPY command?_____ _____

14. On which model computer is there an easier way for the customers to make a backup rather than using DISKCOPY?_____

15. What parameters should be used with the format command to:

    A. Transfer the system files_____

    B. Add a volume name_____

16. What does the ? mean when formatting a diskette on the Tandy 1000 or 2000? _____

17. On the Tandy 1200, what MODE command would allow the display to be shifted right? _____

18. On a Tandy 1000, what command should be used if a customer is getting all of their printouts double linespaced?
_____

19. What command is used to allow all programs to be displayed on a color TV rather than a color monitor?_____

20. What is the limit to the number of files that can be in the print queue at one time?_____

21. What command will stop all printing and empty the print queue?_____

22. What command will display the files in the print queue?
_____

23. You cannot use a pathname after the PRINT command to print files in another directory or drive.(True or False)

24. What command can be used to display the current pathname as the DOS prompt? _____

25. The RECOVER command can be used to recover a complete disk, therefore it is not important to keep a good set of backups. (True or False)_____

26. The best use for RECOVER is to recover _____ space, not files.

27. When renaming files, a wild card cannot be used as this could cause files to be accidentally overwritten.(True or False)

28. What command should be used to update the operating system on a hard disk?_____

29. The _____ command is used to display files stored in ASCII format to the screen.

30. The ____ redirects the output of a program or a command to another device, or stores it in a newly created file.

31. The ____ both redirects output to another device and adds the output to an existing file.

32. The ____ redirects input for a program or command.

33. The ____ takes the output from one command or program and uses it for the input for another command or program.

34. What are the three MS-DOS filters?

_____ _____ _____

35. Which FIND command parameter should be used alone?_____

36. What switch will allow FIND to be accept either uppercase or lowercase characters? _____

37. What character should be used in the following command to cause the listing of the file to be displayed one page at a time? TYPE filename ____ MORE

38. What SORT parameter will cause the sorts to occur from Z to A? _____

The STUDENT PRACTICE DISK is for use on a Tandy 2000. Files will be modified during use. Make and use a backup copy. DO NOT COPY THIS DISK ONTO A HARD DRIVE FOR USE WITH THIS COURSE. After booting the system on the backup copy of the STUDENT PRACTICE DISK, enter each of the following commands.

```
DIR
DIR /P
DIR /W
DIR *.EXE

TYPE PHONE.DAT
TYPE PHONE.DAT | MORE
TYPE PHONE.DAT | SORT > PRN

COPY *.?AT TEST
TYPE TEST
```

Note the .BAT files and the .DAT files were combined. This is a problem often encountered when a directory name does not exist or is not entered correctly.

```
COPY PHONE.DAT+PHONE1.DAT PLIST.DAT
TYPE PLIST.DAT | SORT +15 > TEST
TYPE TEST
```

You should notice that the file TEST, created earlier, was deleted and the new one only contains the data sorted by column 15 (the first name field). If you want to append data onto the end of a file, use the >> symbol.

The example of the RECOVER command will be performed last due to the possible damage to the data files on this diskette.

```
VOL
VER
PROMPT $p
```

This will cause the current directory path to be displayed as the MS-DOS prompt.

```
PROMPT $e[0;68;"dir";13p
PROMPT
PRESS the <f10) key
```

This example will demonstrate how the PROMPT command may be used to reassign the values on a keyboard.

LESSON THREE
Directory Commands

1. What is the maximum number of characters in a pathname? ___

2. What is the maximum number of files in the root directory? _____

3. What is the maximum number of files in a subdirectory? _____

4. What command is used to create a directory? _____

5. What command is used to remove a directory? _____

6. What command is used to move into a directory? _____

7. What command should be used periodically to check the directory for allocation errors?_____

8. What command should be used to attempt to correct problems discovered with CHKDSK? _____

9. What is the command used to verify that a file is contiguous?_____

10. If a file is non-contiguous, what should be done to make the file contiguous?_____

11. The path command will look for files with what extension?_____ _____ _____

12. Which CPU's version of MS-DOS does not come with the TREE command?_____

Boot a Tandy 2000 with the STUDENT PRACTICE DISK and enter the following commands.

```
DIR
LESSON3.BAT
```

This batch file will build subdirectories, reconfigure the system to search the subdirectories and execute the commands as if they were in the current directory.

```
DIR
DIR \BIN
```

Notice that the external commands are in the \BIN directory and the batch files are in the \BAT directory.

```
D \.
HKDSK
HKDSK /V
HKDSK *.* /V
```

These examples of CHKDSK demonstrate the use of the command to:

1. Simply check the directory structure
2. Check the directory structure and display the files as it performs its verification. You will notice that the three hidden files (IO.SYS, MSDOS.SYS, STUDENTD.ISK) are displayed at the first part of the listing.
3. The system is checked the same as above and the files are checked to see if they are contiguous. Any files that were not contiguous were displayed at the end of execution.

If errors were detected, CHKDSK /F should be executed so that CHKDSK can attempt to fix the errors that it encountered

```
D TEST2
OPY A:\BAT A:\TEST2
D TEST2
```

Since the directory was not empty, the directory could not be removed.

```
EL \TEST2
```

answer No to the prompt

This will demonstrate how the system will prompt if all files in a directory are going to be removed.

```
EL TEST2 < YES
```

This is a very simple example of the redirection of input. The file YES contained the answers to system prompts. This can be a very useful form of redirection. This can also be very dangerous when used with commands that may erase or change the data contained on the diskette.

```
D test2
```

Because the files were removed in the example above on redirecting input, the directory may now be removed.

LESSON FOUR
EDLIN and Batch File Commands

Is EDLIN an internal or external command?_____

The editor should only be used on _____ files?

When the editor is used, it creates a backup file. What is the extension on the backup file?_____

The _____ command can be used to prevent command lines from being displayed when a batch file is being executed.

What will the command
R %f IN (C:\ C:\SCR C:\BAT) DO DIR %f do?_____

Boot a Tandy 2000 with the STUDENT PRACTICE DISK and enter the following commands.

```
LIN TEST.BAT
R %%F IN (A:\BAT\1.BAT a:\BAT\2.BAT a:\3.BAT) DO TYPE %%F
KDSK /F < YES
 %1 = 1 GOTO PART1
M  TEST 1 was NOT used
use The batch file will now end
TO END
ART1
R
M  TEST 1 was used
ND
6>
```

The batch file that was just entered can be executed by typing in TEST and pressing enter. It will perform the following functions.
1. Type out each of the batch files listed
2. It will run CHKDSK and, if any problems are encountered, it will take the response from the file YES so that now operator interaction would be required.
3. If the batch file was executed as TEST 1, the file will respond with the REM TEST 1. If any other number or name follows the filename TEST, it will respond REM TEST 1 was not used.

This file will demonstrate the use of the FOR, IF, Replacement parameters, GOTO and label commands

LESSON FIVE
Batch Files and Config.sys

1. What is the name of the system configuration file and what directory must it remain in?_____ ___

2. Which command in the configuration file is most likely to increase the speed of the system?_____

3. What is a common device driver that may be required by applications programs?_____

4. What is the name of the batch file that is executed at the end of the boot up process?_____

Boot a Tandy 2000 with the STUDENT PRACTICE DISK and enter the following commands.

NOTE:
While the several of the MS-DOS manuals give examples of how to move the COMMAND.COM file to a subdirectory, this is not recommended. Floppy drive machines are likely to experience problems when diskettes are swapped if every diskette is not configured with the command interpreter, located in the same subdirectory.

To demonstrate the difference the CONFIG.SYS file can have on system speed, execute the following commands. At the MSDOS prompt type

MENU <ENTER>

Note the speed of execution.

REN CONFIG.SYS CONFIG.OLD

This is to prevent the system from executing these file.

REBOOT THE SYSTEM

MENU <ENTER>

You should notice a considerable difference in the speed of execution. System commands such as COPY that require disk access will also be affected. Hard disk drive systems will not benefit as much due to the increased speed of the hard disk.

REN CONFIG.OLD CONFIG.SYS
REBOOT THE SYSTEM

The MENU.BAT file that was used in the previous section and the files 1.BAT, 2.BAT 3.BAT... are samples of how batch files may be used to make the system easier for inexperienced users. Parameters can be passed through the batch file just as if the the user had changed directories and typed in the startup command themselves. The command MENU could be added to the autoexec.bat file to make the "menu" display upon bootup.

A sample of a batch file (P.BAT) that will search the data file PHONE.DAT and display any numbers that meet the replacement parameter is included. To use the file, enter in upper case the batch file name (P), followed by the search name or number. Use the following commands.

LESSON SIX
Hard Disk Commands

1. What is the name of the batch file that can be executed to prepare a 2000 with a hard disk for use?_____

2. To prepare a Tandy 1000 primary hard disk, what commands would be required? (in order)

   _____

   _____

   _____

   _____

3. What single command can be used to format and prepare the Tandy 1200 hard disk? _____

4. What switch MUST be used with FORMAT to format the hard disk on a Tandy 1200?_____

5. What Tandy 1000 or 1200 command will tell MS-DOS to use a drive other than the one specified?_____

6. What command will save all files and subdirectories on a primary hard disk?_____

7. What command is used to restore all of the files that were saved with the previous command?_____

8. What command should be executed before turning a Tandy 1200 off if the system is to be moved?_____

LESSON SEVEN
Machine Specific Commands

1. If your Tandy 2000 has two floppy drives, what is the preferred command to use to make copies of diskettes?_____

2. What command is used to format a diskette on the Tandy 2000 so that it can be read by a Tandy 1000, 1200 or an IBM PC?_____

3. What command line must be added to a Tandy 2000 CONFIG.SYS file so that graphics may be screen printed?_____

4. What command must be used before graphics may be screen printed on a Tandy 1000 or 1200?_____

Boot a Tandy 2000 with the STUDENT PRACTICE DISK and enter the following commands.

This practice session is on using the RECOVER command. Because of the difficulty in restoring the files, this section was not done in lesson 2 with the rest of the common MS-DOS commands.

```
RECOVER COMMAND.COM
DIR
```

Note the file name did not change on the first example.

```
RECOVER A:
DIR
```

Note the file names. This is the reason that RECOVER should only be used on a directory as a last effort. To recover the use of the files, it would require each of the files to be identified and renamed to its former name.

MS-DOS COURSE
CSR-1040
ADDENDUM

MS-DOS 3.0 on the Tandy 3000 is very similar to the MS-DOS 2.11.xx that runs on the Tandy 1200. This addendum will only discuss new commands or commands that have been modified.

The new commands on MS-DOS 3.0 are:

ATTRIB	GRAFTABL
JOIN	KEYBxx
SELECT	SHARE
SUBST	

The first commands discussed are miscellaneous commands the second set are commands used primarily with a system used in a network.

MISCELLANEOUS COMMANDS

GRAFTABL

GRAFTABL loads the character definition for ASCII characters 128-255 into memory. When the Deluxe Graphics Display Adapter is used, only the first 128 ASCII characters will be defined and usable unless GRAFTABL is executed.

JOIN

JOIN drive: pathname /D

The JOIN command joins a disk drives root directory onto a specified path. The following parameters are recognized:

drive: is the drive to be joined

pathname is the path to which the drive is joined

/D turns off the effects of a previous join

KEYBxx

KEYBUK [/US]	United Kingdom
KEYBGR [/US]	Germany
KEYBFR [/US]	France

KEYBxx replaces the current ROM BIOS keyboard program with an international keyboard program to allow MS-DOS to produce accented characters used in some countries. To produce an accented character press and release the the appropriate dead key (accent key) and then press the character to be accented. The following parameter is recognized:

/US tells KEYBxx that character scan codes are to be converted to US scan codes.

To return to the US keyboard layout from a KEYBxx program, press <CTRL> <ALT> <F1>. To return to the selected KEYBxx program, press <CTRL> <ALT> <F2>. To have a KEYBxx program loaded automatically by MS-DOS use the SELECT command.

SELECT

SELECT country [[keyboard][/US]]

SELECT changes the country code or creates an internationally configured backup MS-DOS diskette. Once the codes have been used the date, time, currency symbol and decimal separator for the country selected will be substituted for the US characters pressed on the keyboard. The following parameters are recognized:

country is the country code that MS-DOS uses to select the date and time format, the currency symbol and the decimal separator. If you only specify the country in the SELECT command, the current configuration is changed to the new country code. If you also specify keyboard a new MS-DOS diskette is created. Refer to the MS-DOS 3.0 reference manual for the country codes.

keyboard specifies a 2-character identifier of the keyboard layout. Refer to the MS-DOS 3.0 reference manual for available codes.

NETWORK COMMANDS

ATTRIB

ATTRIB [set][drive:]pathname

Attrib sets or resets read-only attributes of a file, or displays the attributes of a file. The ATTRIB command can be used to force a read-only condition to allow file sharing over a network. The following parameters can be used:

set can be either a +R or a -R. +R sets the read-only attribute of a file ON and a -R set the attribute OFF.

drive: is the disk drive containing the file you wish to reference.

pathname is the path to the file you wish to reference.

SHARE

SHARE [/F:space][/L:locks]

SHARE installs file sharing for active networking. The following parameters are recognized:

/F:space allocates file space (in bytes) for record filesharing information. Each file open needs the length of the full filename plus 11 bytes.

/L:locks allocates the number of locks allowed in record filesharing.

Once SHARE is used MS-DOS will check all read and write request until the system is reset. If a system is used in a network environment the SHARE command may be added to the AUTOEXEC.BAT file.

SUBST

SUBST [drive:][pathname][/D]

The SUBST substitutes a string alias for a pathname. SUBST with no parameters displays the names of the current virtual drives. The following parameters are recognized:

drive: is the drive you wish to be replaced.

pathname is the path you wish to be substituted in place of drive.

MODIFIED COMMANDS

The following MS-DOS commands have been modified on MS-DOS version 3.0.

BACKUP
MODE
RESTORE
GRAPHICS
PRINT

BACKUP

The BACKUP command has had three switches added. They are the /P /T /L.

/P saves the file copies in a "packed" format that conserves diskette space. WARNING IBM BACKUP/RESTORE compatibility can be lost if this switch is used.

/T backs up only those files that were last modified at or after a certain time.

/L creates a backup log entry in the file specified. If not specified the file is given the name BACKUP.LOG and is placed in the root directory of the diskette. This file contains the date, time, filenames and diskette number that contains the file. This option can make restoring backups easier and faster.

MODE

The MODE command has a trans option that translates the video characters for Tandy printers during screen printing. Trans can be:

DMPXLAT - for Tandy DMP printers
DWPXLAT - for Tandy DWPII printers
DWP10 - for Tandy DWPIIB, DWP410, or DWP510 printers with 10 pitch settings
DWP12 - for Tandy DWPIIB, DWP410, or DWP510 printers with 12 pitch settings
NOXLAT - returns transactions to the default setting (no translation)

PRINT

PRINT has five new options /B /U /M /S /Q. These option have the following effects.

/B sets the size in bytes of the internal buffer. Increasing the size of the buffer can result in faster PRINT operations.

/U specifies the number of computer clock ticks that PRINT waits until the printer is available. If PRINT waits longer than this value it gives up its time slice.

/M specifies how many computer clock ticks PRINT can have to print a file. The value is 2 clock ticks and can be in a range from 1 to 255.

/S specifies the time slice value.

/Q selects the number of files allowed in the print queue. The number of files can be in the range of 4 to 32, the default is 10.

RESTORE

RESTORE has had several new switches added.

/B only restores those files that were last modified on or before the given date.

/A only restores those files that were last modified on or after the given date.

/E only restores those files that were last modified on or earlier than the given time

/L only restores those files that were last modified on or later than the given time

/M only restores those files that have been modified since the last backup

/N only restores those files that no longer exist on the destination disk.

16. A customer with a Tandy 1200 cannot get the CLS command to work. What command line should be added to the CONFIG.SYS file?_____

17. What command syntax would be used to check the file TEST.TXT to see if it is contiguous?_____

18. What single command is used on a Tandy 1000 to prepare a hard disk drive?_____

19. What command captures keyboard input and writes it to a file?
_____

20. A customer has a problem getting diskettes formatted with a Tandy 2000 and PCMAKER to read without errors on a Tandy 1200. What is the most likely problem?_____

21. What does a ? mean when formatting a disk on a Tandy 1000 or 2000?_____

22. During bootup, a system displays garbage and then continues to boot up what file is most likely the problem?
_____

23. When using the PROMPT command to program the function keys a customer keeps getting the command line displayed as the prompt rather than the keys reassigned. What command line is most likely left out of the CONFIG.SYS file?_____

24. What is the maximum number of files that may be in the print que at any time?_____

25. What command will remove all files from the print queue?
_____

26. What is the command syntax to sort the data in the file TEST.DAT and list this output to the printer?
_____

27. What command would be used to list an ASCII (TEST.TXT) file to the screen one page at a time?_____

28. A customer calls in with a Tandy 1000 a DMP2100 printer and MS-DOS 02.11.41, and is getting unpredictable results (locks up, commands not working properly, etc). What should you suspect?_____

29. If a disk has had RECOVER run on it, what must be done to the files before they can be used again?(circle your choice)
    A. Nothing needs to be done
    B. CHKDSK /F must be run on the disk
    C. They must be identified and renamed
    D. FIXDSK must be used
    E. None of the above

30. Which of the following commands cannot be used with a wild card?
    A. CHKDSK
    B. TYPE
    C. REN
    D. PRINT
    E. None of the above

MS-DOS Test

Name_____ Unit #_____ Date_____

Directions: Fill in the blank with your answer.

1. What three filters are available in MS-DOS?
   _____ _____ _____

2. What is the maximum number of buffers allowed?_____

3. What is the maximum number of buffers recommended in the course?
   _____

4. What command should be used to check the directory structure for errors?
   _____

5. What three files were recommended to be left in the \ directory when setting up a hierarchical directorys system?
   _____ _____ _____

6. Which Tandy/Radio Shack computer does not format the diskettes, if needed, when using DISKCOPY?_____

7. In what order (by extension) does MS-DOS attempt to execute an external command?_____ _____ _____

8. What is the maximum number of files (hidden or visible) allowed in the root directory?_____

9. What is the exact command syntax used to allow MS-DOS to search the \ directory, \BIN directory and the \DOS directory to find and execute external commands?
   _____

10. Using a Tandy 2000, a customer wishes to screen print high resolution graphics on a DMP2100P what command line must be used and what two-key combination is used to execute the graphics screen print?_____ _____

11. What Tandy 2000 command is used to format a disk so that a Tandy 1000 will be able to read it?_____

12. The PAUSE command is used in a batch file to allow the system to prompt a user for input. (True or False) _____

13. What command can be used to reassign the values of the keyboard?
    _____

14. A customer has a Tandy 2000 and whenever they attempt to sort a large file in dBASE II they get an error message.

    'BAD COMMAND READING DRIVE x'
    Abort, Retry or Ignore

    What should you first suspect?_____

15. A customer with a Tandy 1000 complains that everything printed is double line spaced. What command should be used to correct this?_____

Tandy 3000 Training Manual

Naninne, February 20 and 21, 1986

Dept. 01-039

GENERAL INTRODUCTION

As you know the TANDY 3000 is an IBM A.T. compatible hardware and software.

These computer have in basic configuration:

- CPU iapx 286 8Mhz instead of 6Mhz for IBM (33.3% faster)
- 512K bytes RAM
- 1 serial line
- 1 parallel line
- 1 speaker
- 1 keyboard UK/FR/GR/US
- 1 RTC on integrated IC
- 1 cmos under battery for configuration storage
- 10 expansion slots
- work under MS-DOS or under XENIX

It exists in 2 basic versions:

- 25-4001 - 1 Floppy 1.2M bytes + controller
- 25-4010 - 1 Floppy 1.2M bytes +
  - 1 hard 20M + floppy/hard controller

DESKTOP DESCRIPTION

The external design is similar than the IBM A.T. one.

It can support up to 4 drives 2 floppies and/or 2 hards
3 internal half height and
1 external Hard

The primary floppy (drive A:) is the upper one
The door for the second room can cover or the second floppy(drive B:)
or the second hard (drive D:)

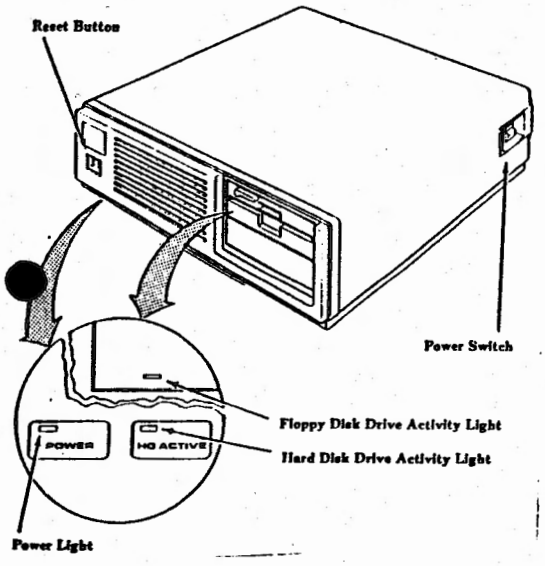
The primary hard (drive C:) is on the lower room.

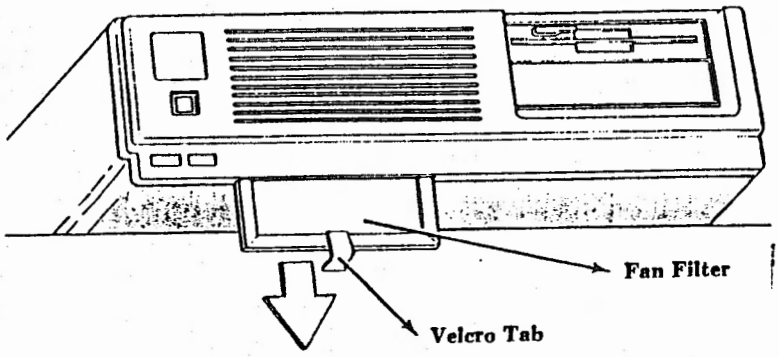
For the second floppy you have the choice between 2 units
1.2Mbytes (25-4150)
360Kbytes as IBM XT or TANDY 1000 (25-4151)

For the hard drive 2 models exit
20 Mbytes half eight(2 internals possible (25-4161)
40 Mbytes full eight(1 internals possible (25-4162)

At the bottom left corner we find the power light
the HD activity light(for both HD)

A true RESET button (red) replace the desable keyboard switch of IBM





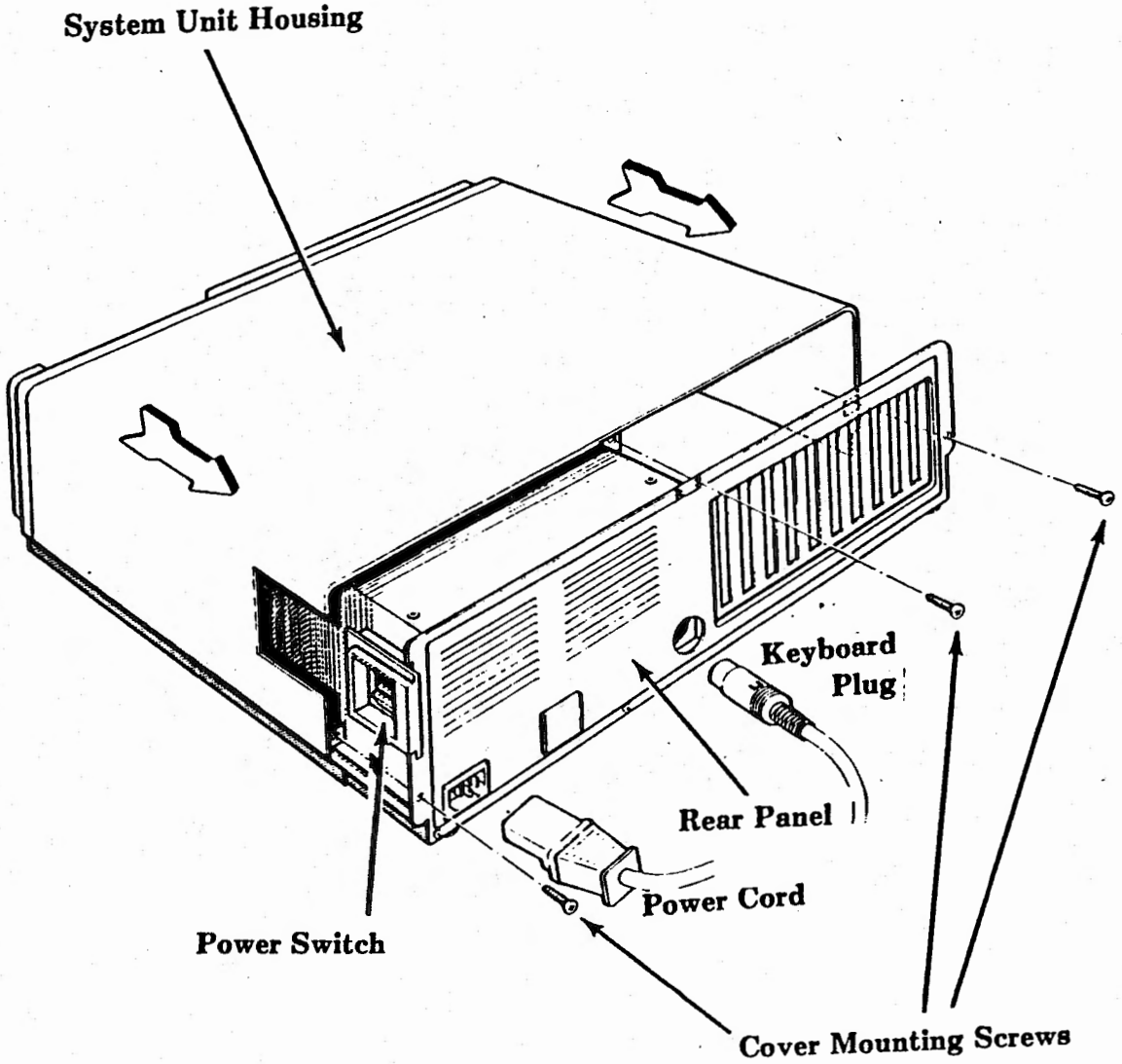
The cooling FAN is in the front of the computer and a filter protect elctronics parts from durties. This filter can be removed for aninin or computer opening . To do that just tie up the front of the puter, remove the velcro tab and pull on it.

The power switch is at the right panel
On the back we
The power connector
The keyboard jack
10 door for optional board
- 2 of them are already used
The 10th one for the serial/parallel one
WARNING: The DB9 is for the serial line
The DB25 is for the parallel line

for this board some special cable are required
printer cable 26-1347 It exist in 3 version but only the
printer connector is different
serial cable 26-1399

The 9th one for the drives controller.

Of course it is not enough . At least 1 expansion should be added , the video one. To be able ta add board first we have to open the computer. For that just remove the 3 bigger screws and remove the cover.



One times open we can discover the computer itself and we can recognise

- The 80286
- The BIOS ROM
- The power supply
- The drive with the hard error map
- the fan
- the speaker
- the 512K RAM
- the battery for real time clock IC and cmos RAM for setup
- 10 expansion slots
  - 7 are AT compatible (#2,4,5,6,7,8,9)
  - 2 are XT compatible (#1,3)
  - 1 is half lenght XT board compatible (#10 already use by serial/parallel board)

This board can also be extended with

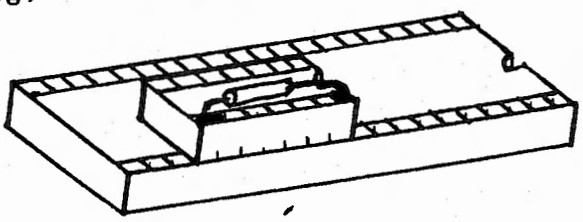
- 128K RAM to get 640K ram (MS-DOS maximum)

for that you need
  a) buy the kit 26-5162
  b) insert chip at location U99 to U116
  c) insert a jumper E13-E14 (near U49)

- Math coprocessor 80287

for that you need
  a) buy the kit 24-4033
  b) No instruction up to now

WARINIG : if no 80287 is plugged be sure than a terminator is inserted (see drawing)

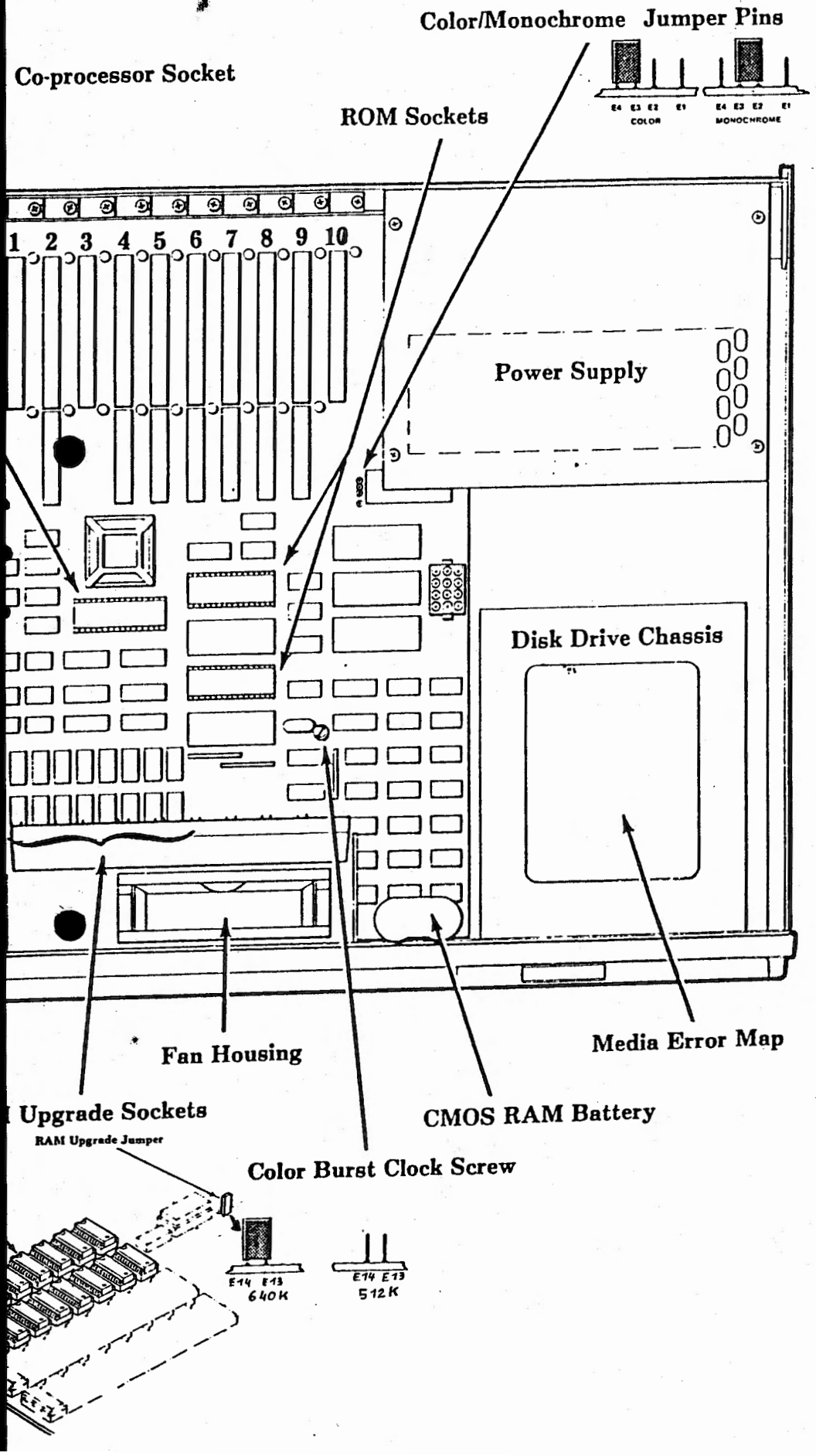


- Optional ROM (No kit available at this time only socquet are free)

- Video mode

A jumper locate near power supply determine the mode of the video
  E2-E3 mode monochrome
  E3-E4 mode color

Every year , It should be necessary to replace the battery by a new one . This battery will be available at National Parts . To remove them just
  pull on the battery(to disconnect the velcro strip)
  unplug the cable from connector J12
  plug the new battery
  connect the battery with the VELCRO strip (be sure the contact is right)


Color/Monochrome Jumper Pins
E4 E3 E2 E1
COLOR
E4 E3 E2 E1
MONOCHROME
Co-processor Socket
ROM Sockets
1 2 3 4 5 6 7 8 9 10
Power Supply
Disk Drive Chassis
Fan Housing
Media Error Map
Upgrade Sockets
RAM Upgrade Jumper
CMOS RAM Battery
Color Burst Clock Screw
E14 E13
640K
E14 E13
512K

GENERAL RECOMMANDATION

Before seen the different upgrade know at this time . Let's remember some recommandation for the manipulation of the installable card. You already read them on the CTI INF:03 or the CSIS:139 (memo from RON STEGALL). If you didn't remember it , I recommand you to read them with a particular attention and make them understood to every body.

The main point of this memo are:

- UNPLUG COMPUTER AND WAIT AT LEAST 10 SECOND
- GROUND YOURSELF TO THE CHASSIS OF THE COMPUTER
- AVOID KNOW STATIC GENERATORS (PLASITC,CARPET)
- HANDLE OPTION BOARD BY THEIR OUTSIDE BOARDS .AVOID TOUCHING WITH COMPONENTS AND/OR CIRCUIT
- READ & RE-READ INSTRUCTION TO MAKE CERTAIN YOU ARE RIGHT.

DEO UPGRADE

HE MINIMUM REQUIRED UPGRADE IS THE VIDEO ADAPTOR

To be able to work with the T3000 , we need a video adaptor.
2 models exist 25-3046 DTDA Deluxe TEXT Display adaptor
will accept only text processing
25-3047 DGDA Deluxe GRAPHIC Display adaptor
will permit text and graphic
processing

Both of them can be connected on a VM1 or a CM1

D T D A UPGRADE

- The recommanded use of the DTDA is with a VM1.
This kit include a special cable (AW-0027) to connect a VM1 .

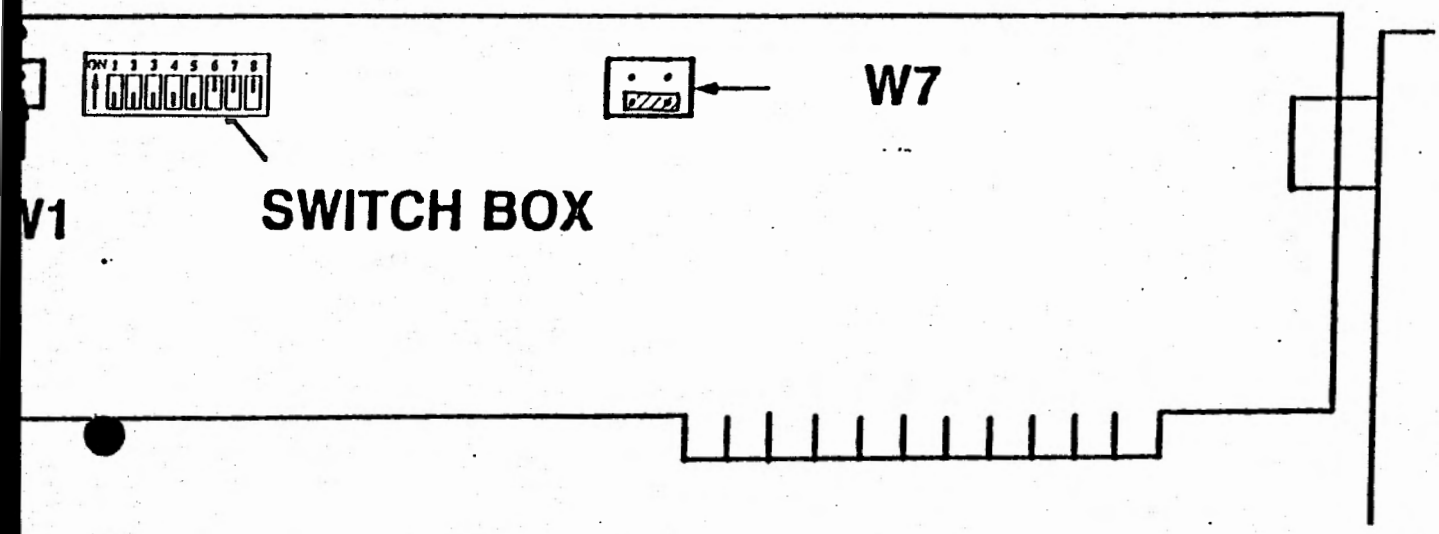
- MODIFICATION::
a) set on main logic board the jumper E2-E3
b) set the board in slot #1 or #3

D G D A UPGRADE
** *** *** *** ***

- The recommanded use of the DGDA is with a CM1.

- If a customer want a VM1 a additional cable should be ordered at ational parts under reference AW-0027

- MODIFICATION::
  a) set on main logic board the jumper E4-E3
  b) on DGDA board set dipswitch #1,2,3,4,5 OFF
     set dipswitch #6,7,8 ON
     unjump W1, W7 upper
     jump W7 lower
  c) set the board in slot #1 or #3



DRIVE UPGRADE

As you now , the computer can support up to 4 drives. 2 floppies and 2 hard drives.
In standard 2 kinds of controller exist:

with the 25-4001 a floppy disk only controller board
with the 25-4010 a floppy/hard disk controller board

This means ,if we want to upgrade a 25-4001 with the HD capabilities we have first to change the controller board by get a 25-4060

The available drives are

1.2Mbytes high density floppies	25-4050
360Kbytes low density floppies	25-4051
20Mbytes half size hard	25-4062
40Mbytes full size hard	25-4061

- - - - - - - - - - - - - - - - - -

Let's remember few general characteristics about drives
The capacity of a drive is influenced by few characteristic

- qty of head
- max qty of cylinders
- size of diskette
- density of media

4 major densities exist
single density 48 TPI (used in mod 1)
double density 48 TPI (used in 2,3,4,12,1000 ,3000-360K disk)
double density 96 TPI (used in 2000)
High density 96 TPI (used in 3000)

The quality of the density warranty more or less track per inch.
warranty more or less bit per track.

The single density 48 TPI wasn't very usefull now it is often replace by the double density 48 TPI
The high density diskette are the new media types used in the T3000 and permit 2 times more bit per track than 48/96 TPI diskette
The double density 96TPI may also called double track

- Format of bit

3 major formats exist:

FM	frequency modulated
MFM	modified frequency modulated
MMFM	modified modified frequency modulated

The format of bit permit to store more or less bits per track
MFM store 2 times more than FM
MMFM store 2 times more than MFM or 4 times more than FM
MMFM is not used in TANDY computers
many people assimilated FM to single density
MFM to double density
It was true but now MFM is also used in high density

It is important that you undertand those things and USED THE RIGHT DISKETTE WITH THE RIGHT COMPUTER

Cat #	density	TPI	#cyl	size	side	computer
	single	48	34	5"	1	1
26-0406	double	48	40	5"	1	1,3,4,4p
26-0410	double	96	80	5"	2	2000
26-0412	double	48	40	5"	2	1000
26-0422	high	96	80	5"	2	3000
26-4906	double	48	77	8"	1	2,12,16,16b,6000
26-4960	double	48	77	8"	2	12,16,16b,6000

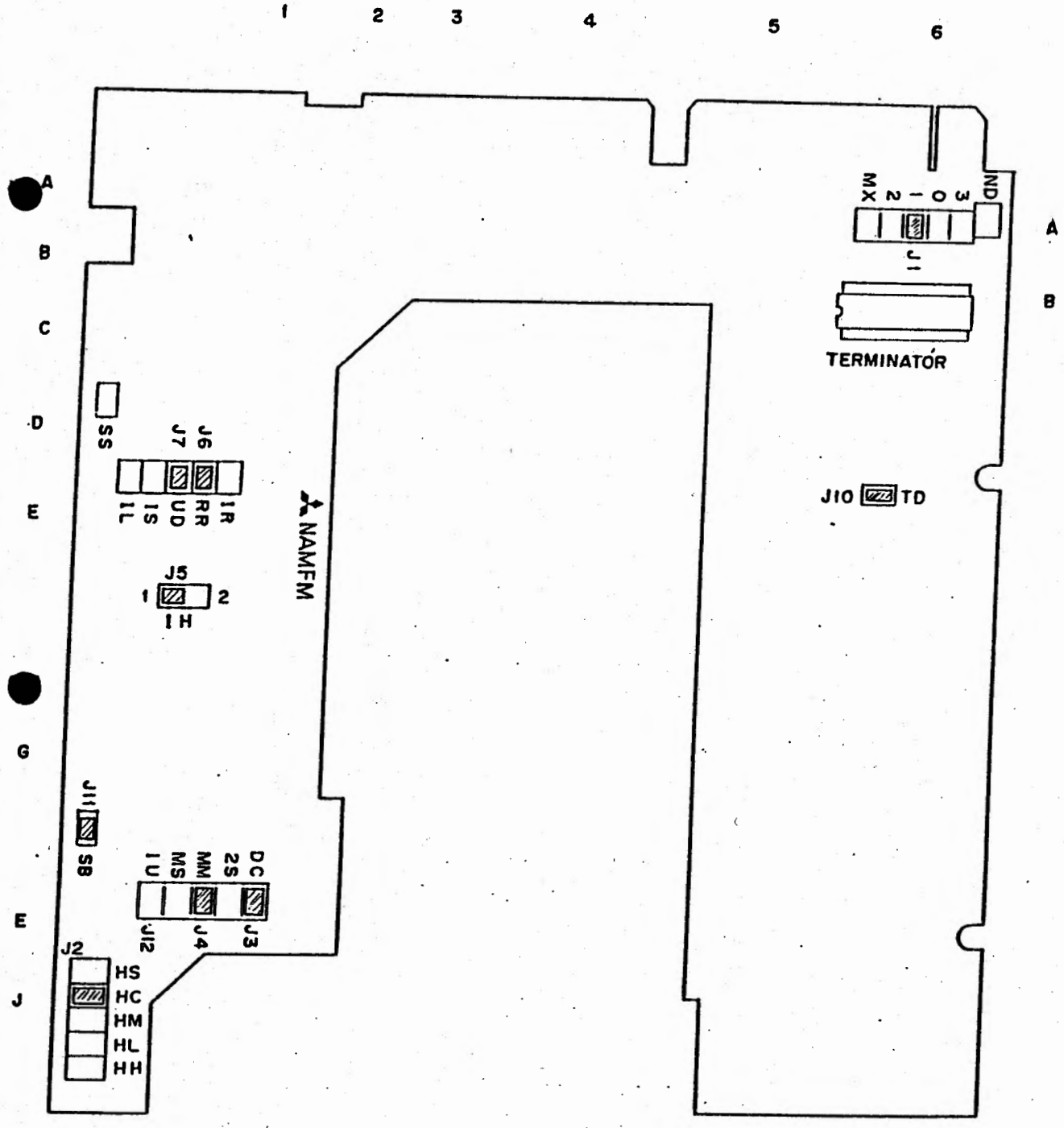
few internal disk combination are possible.

1 Floppy system
1.2 M FD
2 Floppies system
1.2M FD (standard) + 1.2M FD (25-4150) or 360K FD (25-4151)
1 Floppy + 1 Hard disk
1.2M FD (standard) + 20M HD (25-4160+25-4162 or standard)
1.2M FD (standard) + 40M HD (25-4160+25-4161)
2 Floppies + 1 hard disk
1.2M FD (standard) + 1.2M FD (25-4150) or 360K FD (25-4151)
+ 20M HD (25-4160+25-4162 or standard)
1 Floppy + 2 Hard disks
1.2M FD (standard) + 20M HD (25-4160+25-4162 or standard)
+ 20M HD (25-4162)

If one built in HD is used you may add a second external one for that you need the cable 26-4163 and a secondary unit.

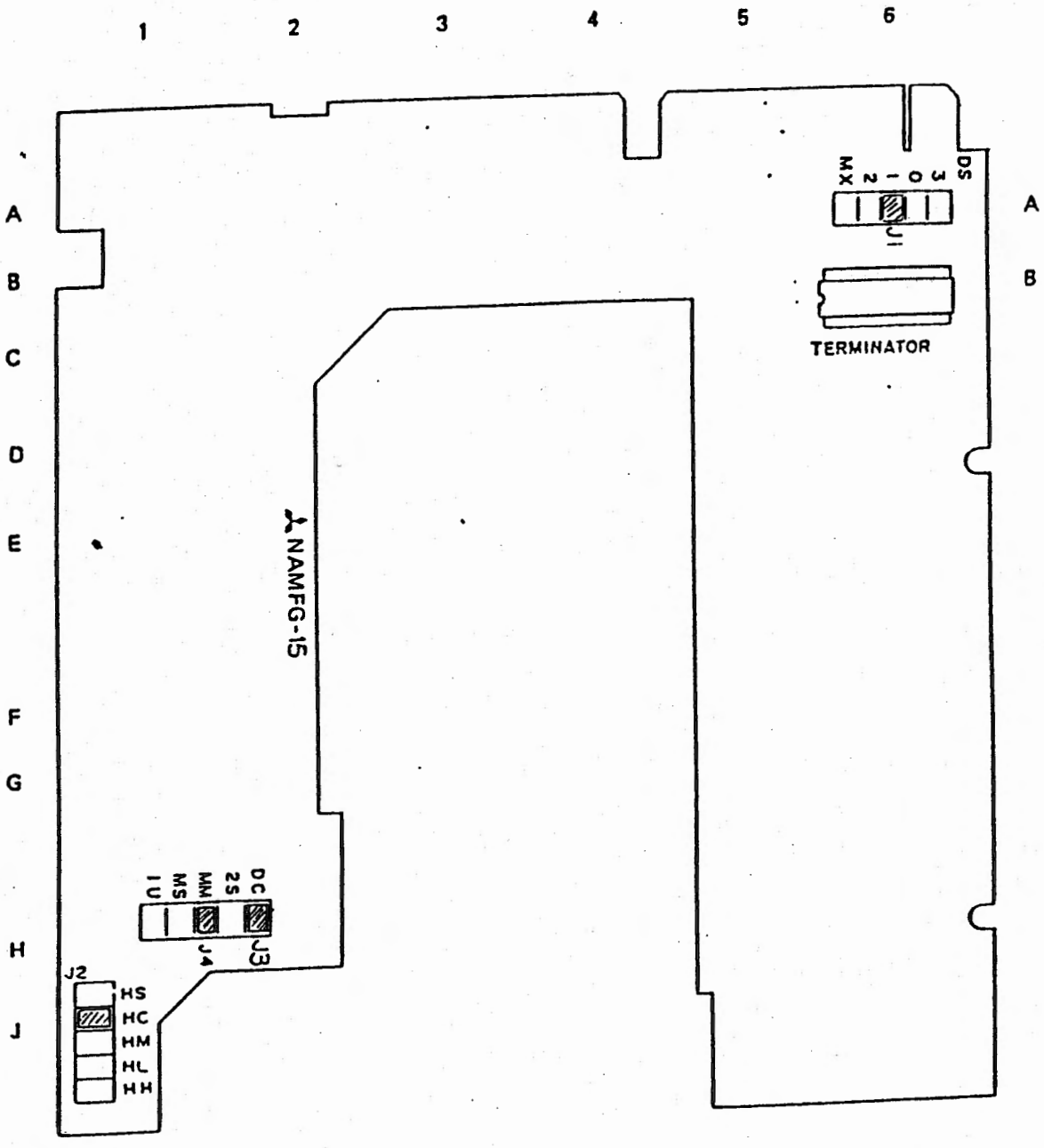
1.2 M F.D. UPGRADE (high density)

a) check jumper TD,DS1,RR,UD,IHI,DC,MM,SB,HC must be set
b) insert the 4 silent block
c) insert the drive
d) connect the 4 screws
e) connect power and control cable



360 K F.D. UPGRADE

a) check jumper DS1,DC,MM,HC must be set
b) insert the 4 silent block
c) insert the drive
d) connect the 4 screws
e) connect power and control cable



To be able to install an hard disk on a 3000 we must first be sure the system already include a hard disk /floppy controller . Only an originate 25-4001 will not have such controller.

FD / HD CONTROLLER

The controller HD/FD can support up to 2 floppies and 2 HD. It contain a internal table with 15 type of HD available.

It is available under ref 25-4060

To install it

a) Check jumper on HD cont board E5-E6, E2-E3 and E7-E8 must be set

b) Disconnect the floppy cable on the controller

c) Remove all expansion slot (th^e floppy controller will be disregard)

d) Remove the card guide (above the fan)

e) Insert the LED activity light at its place

f) Reinstall all board except the FD controller

g) Reinsert the HD /FGD controller at slot #9 instead FD controller

h) Connect the connector on the LED cable at J6 location on HD/FD cont (the 2 wires at back panel side)

i) reinstall the card guide

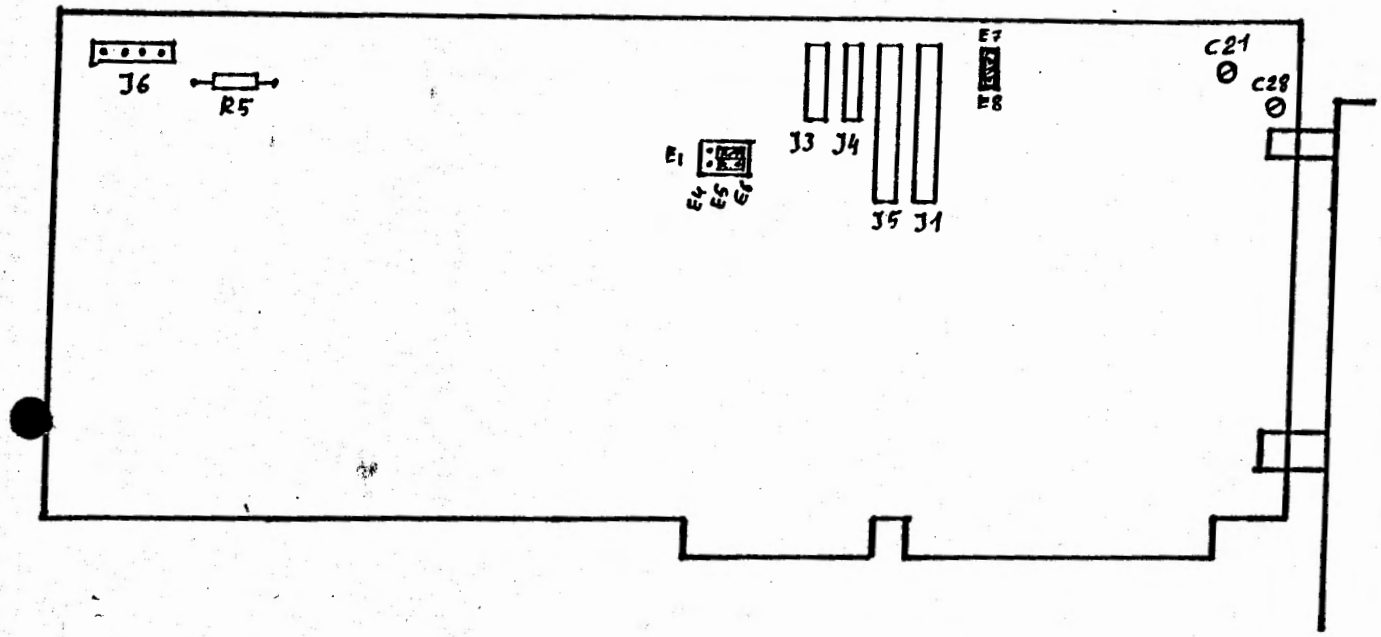
j) Now you are able to install physically the HD bubble.

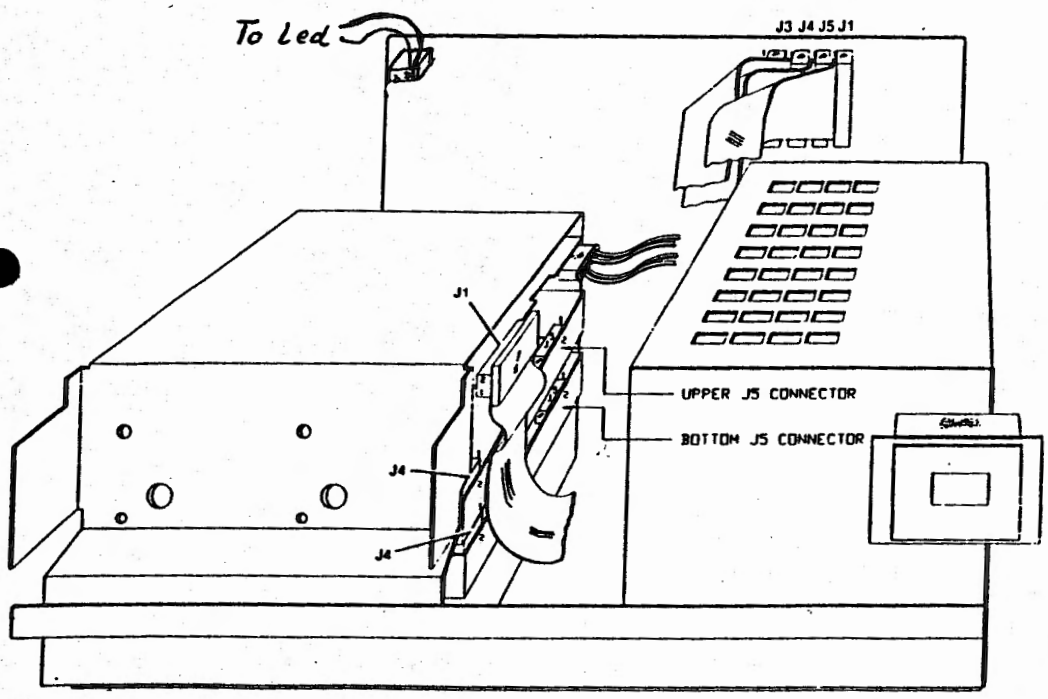
k) Once the bubble installed connect the HD control cable (larger one) at J5

l) Connect the data cable (20 pins one) of the primary HD at J4 location

m) Connect the data cable (20 pins one) of the secondary HD (If any) at J3 location

n) connect the floppy cable at J1 location


J6
R5
E1
E4
E5
E6
J3
J4
J5
J1
E7
E8
C21
C28


To Led
J3 J4 J5 J1
J1
UPPER J5 CONNECTOR
BOTTOM J5 CONNECTOR
J4
J4

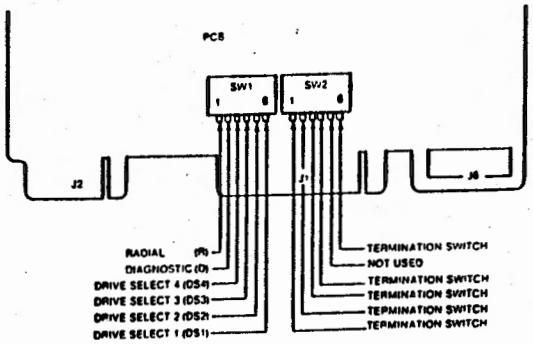
CONDARY 20 M HD INSTALLATION

If MITSUBISHI drive check the dipswitch on the bubble
SW2 all OFF
SW1 1,5 ON 2,3,4,6 OFF

If SEAGATE drive Remove the resistor terminator pack
set jumper DS2,RADIAL
Remove jumps DS1,DS3,DS4,WRITE FAULT,LIFE TEST,
RECOVERY MODE

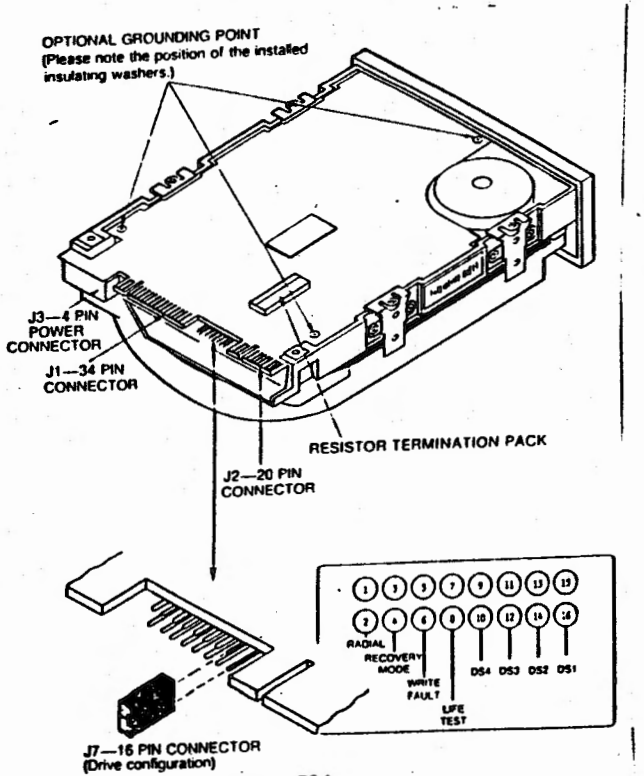
insert the 4 silent block
insert the drive
connect the 4 screws
connect power
connect the Control cable (which come from primary HD)
connect the data cable at the bubble for one side and at J3 for the
[redacted]ner side

TSUBISHI CONNECTION



	SW1 (Switch Block 1) 1	2	3	4	5	6	SW2 (Switch Block 2) 1	2	3	4	5	6
First HD	On	Off	Off	Off	Off	On	On	On	On	On	On	On
Second HD	On	Off	Off	Off	On	Off	Off	Off	Off	Off	Off	Off

AGATE CONNECTION



RIMARY 20 M HD INSTALLATION

he first HD must be connected at the bottom of the drive holder. You ust first install the HD controller board and save the 4 large silent lock

a) If MITSUBISHI drive check the dipswitch on the bubble
SW2 all ON
SW1 1,6 ON 2,3,4,5 OFF

If SEAGATE drive Insert the resistor terminator pack
set jumper DS1,RADIAL
Remove jumps DS2,DS3,DS4,WRITE

AULT,LIFE TEST,

RECOVERY MODE

a) check the dipswitch on the bubble
SW2 all ON
SW1 1,6 ON 2,3,4,5 OFF
b) install the 4 large silent block at the bubble
c) Diconnect the floppy cable from the controller
d) disconnect the power cable from drives
e) remove the load resistor
f) Remove the drive chassis
g) mount the bubble on the chassis and attach it with the 4 crews
h) Connect the HD control and data cable on bubble
i) Reinstall the drives chassis
j) Reconnect the drives power (the cable which went at load sistor goes to bubble power)
k) connect the HD control cable (larger one) at J5
1) Connect the data cable (20 pins one) of the primary HD at J4 cation
m) connect the floppy cable at J1 location

MORY UPGRADE INSTALLATION

levels of memory upgrade exist in the 3000

1st level — On the main logic board to expand 512K to 640K

r that you need
a) buy the kit 26-5162
b) insert chip at location U99 to U116
c) insert a jumper E13-E14 (near U49)

2nd level — before do it You must be sure to have 640K on in logic board . This upgrade consist in one optional board on an pansion slot and have 512K ram inside

r that you need
a) buy the kit 26-4030
b) check the # of the board
c) set the dipswitch correctly (see table)
d) Insert the board in a AT compatible slot

3rd level — Each memory board can be extend to 2Mbytes

r that you need
a) buy two kits 26-3062
b) Remove the last non full memory exp board (if e last one is full go back in level 2
c) insert chips on memory board
d) change dipswitch following thow many bank are nnected.
e) Reinsert board

si phase can be repeated 3 times per expansion board .Only when a exp ard is full you can connect another one the # of board must follow

Memory Expansion Board Dip Switch Settings

1. Set dip switches 5 and 6 On (0) or Off (1) as follows:

Dip Switches 5 and 6		
0	0	If only bank 0 contains memory chips.
1	0	If banks 0 and 1 contain memory chips.
0	1	If banks 0,1 and 2 contain memory chips.
1	1	If banks 0,1,2 and 3 contain memory chips.

Note: Dip switches 7 and 8 are not used.

2. Set the start address of memory bank 0 by setting dip switches 1-4 On (0) or Off (1). The dip switches are to be set on 1 megabyte boundaries depending upon whether the Memory Expansion board is the 1st, 2nd, 3rd... or last (7th), Memory Expansion board in the computer.

	Dip Switches 1234	Start Address of Bank 0	Start Address of Bank 1	Start Address of Bank 2	Start Address of Bank 3
1st Brd.	1000	100000	180000	200000	280000
	0100	200000	280000	300000	380000
2nd Brd.	1100	300000	380000	400000	480000
	0010	400000	480000	500000	580000
3rd Brd.	1010	500000	580000	600000	680000
	0110	600000	680000	700000	780000
4th Brd.	1110	700000	780000	800000	880000
	0001	800000	880000	900000	980000
5th Brd.	1001	900000	980000	A00000	A80000
	0101	A00000	A80000	B00000	B80000
6th Brd.	1101	B00000	B80000	C00000	C80000
	0011	C00000	C80000	D00000	D80000
7th Brd.	1011	D00000	D80000	E00000	E80000
	0111	E00000	E80000	* N/A	* N/A

* N/A = Not Available

MEMORY UPGRADE

APACITY OF SYSTEM	KIT	BOARD	DIPSWITCH 12345678
512 K	STANDARD	MAIN LOGIC BOARD	Jump E13-E14
640 K	26-5162	MAIN LOGIC BOARD	
1.152 M	25-4030	1st external board	100000XX
1.664 M	25-3062 *2	1st external board	100010XX
2.176 M	25-3062 *2	1st external board	100001XX
2.688 M	25-3062 *2	1st external board	100011XX
3.200 M	25-4030	2nd external board	110000XX
3.712 M	25-3062 *2	2nd external board	110010XX
4.224 M	25-3062 *2	2nd external board	110001XX
4.736 M	25-3062 *2	2nd external board	110011XX
5.248 M	25-4030	3rd external board	101000XX
5.760 M	25-3062 *2	3rd external board	101010XX
6.272 M	25-3062 *2	3rd external board	101001XX
6.784 M	25-3062 *2	3rd external board	101011XX
7.296 M	25-4030	4th external board	111000XX
7.808 M	25-3062 *2	4th external board	111010XX
8.320 M	25-3062 *2	4th external board	111001XX
8.832 M	25-3062 *2	4th external board	111011XX
9.344 M	25-4030	5th external board	100100XX
9.856 M	25-3062 *2	5th external board	100110XX
10.368 M	25-3062 *2	5th external board	100101XX
10.880 M	25-3062 *2	5th external board	100111XX
11.392 M	25-4030	6th external board	110100XX
11.904 M	25-3062 *2	6th external board	110110XX
12.416 M	25-3062 *2	6th external board	110101XX
12.928 M	25-3062 *2	6th external board	110111XX
13.440 M	25-4030	7th external board	101100XX
13.952 M	25-3062 *2	7th external board	101110XX
14.464 M	25-3062 *2	7th external board	101101XX
14.976 M	25-3062 *2	7th external board	101111XX

e can also connect a second serial/adaptor on a T3000 . A kit
ferenced 25-4034 can be ordered and 2 jumper select if your board is a
imary or a secondary

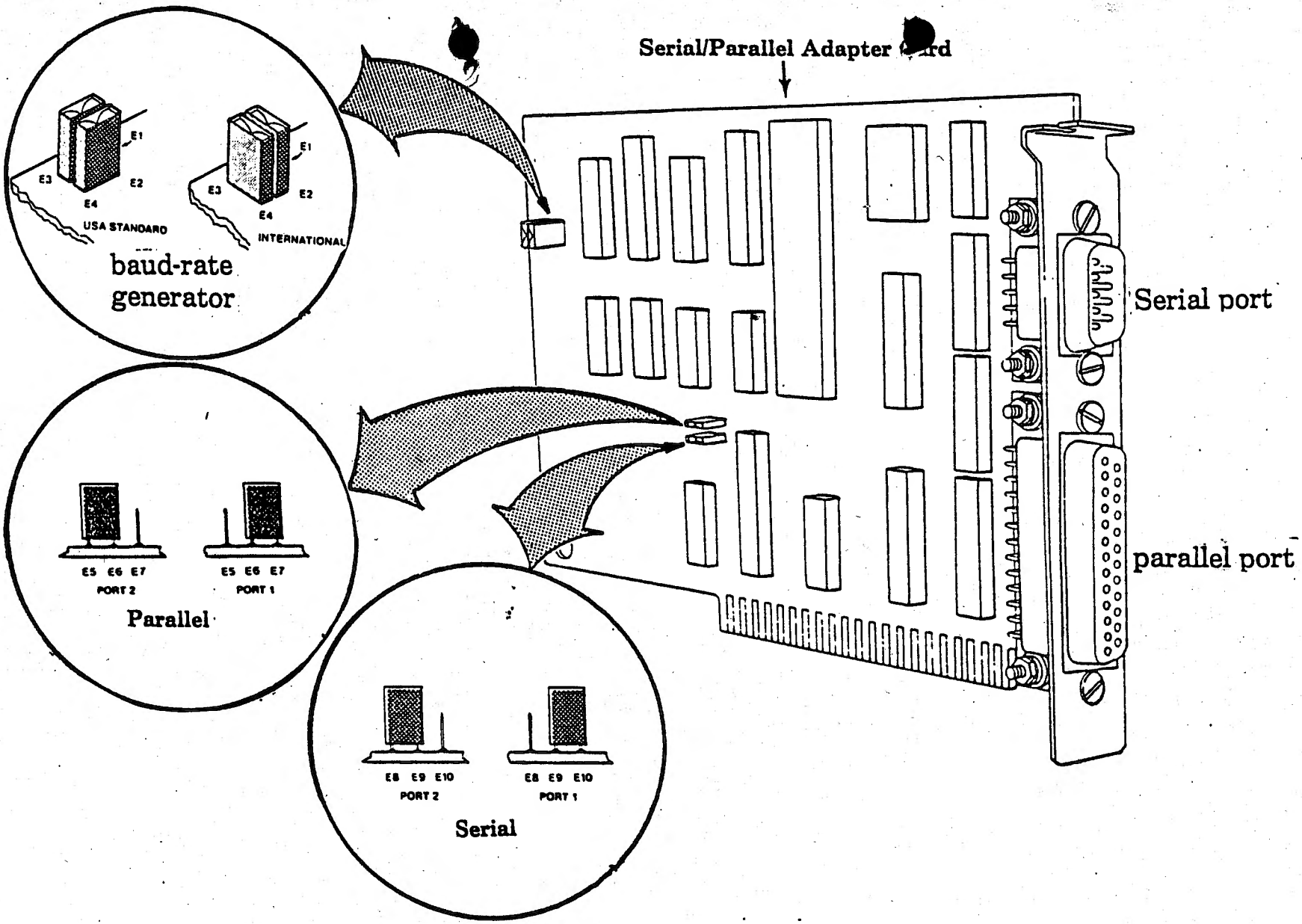
rmally for the second board

a) buy the kit 26-4034
b) set the jumper E8-E9 COM2
c) set the jumper E5-E6 LPT2
d) set the jumpers E2-E4, E1-E3 USA STANDARD
e) plug the board

h board primary or secondary can have 2 mode of work for the serial
e

USA STANDARD the receive and the transmit clock are the same
for that set the jumpers E2-E4, E1-E3
INT STANDARD the receive and the transmit clock are different
for that set the jumpers E1-E2, E3-E4

ember the DB9 is for serial line the special cable is 26-1399
the DB25 is for parallel line the special cable is 26-1347


Serial/Parallel Adapter Card
E1
E3
E2
E4
USA STANDARD
INTERNATIONAL
baud-rate generator
E5 E6 E7
PORT 2
PORT 1
Parallel
E8 E9 E10
PORT 2
PORT 1
Serial
Serial port
parallel port