CHAPTER 1
INTRODUCTION AND SPECIFICATIONS

1.1 GENERAL DESCRIPTION

The VT180 series of video terminals is a group of personal office computers designed to function in two, quickly accessible operational modes.

1. In computer mode the VT180 operates like a personal computer.

2. In terminal mode the VT180 emulates a VT100 video terminal and can be used as a remote terminal to an external host computer.

The VT180 has the software functionality and features of a VT100 when it is used in terminal mode. If the VT180 is used in computer mode, it will run CP/M prepackaged application programs. It will also offer the user a choice of several programming languages for the development of unique programs.

The VT180 provides local mass memory storage through a dual disk drive. Two more disk drives may be added as an option if more mass storage capacity is needed.

Information and control signals are routed between the VT180, the host computer, and a variety of external devices by four external input/output ports (multipin connectors). The four external ports are:

1. The disk drive port
2. The communications port
3. The printer port
4. The general purpose serial port.

The disk drive port is dedicated to communications between the VT180 processor and the disk drives. The other three ports permit the VT180 processor, when running the proper application programs, to communicate with the host computer and external devices. Among these devices are printers, acoustic couplers, modems, paper tape readers and punches, magnetic cassette and cartridge drives, X-Y plotters, and laboratory instruments.

A fifth port, the console port, is an internal port that permits the VT180 processor to communicate with the terminal keyboard and video screen. This is the port through which CP/M normally routes the system dialog.

1.2 PHYSICAL DESCRIPTION

The VT180 personal office computer consists of three basic units: the VT180 terminal, a detachable keyboard, and a dual disk drive. Figure 1-1 shows these basic units.

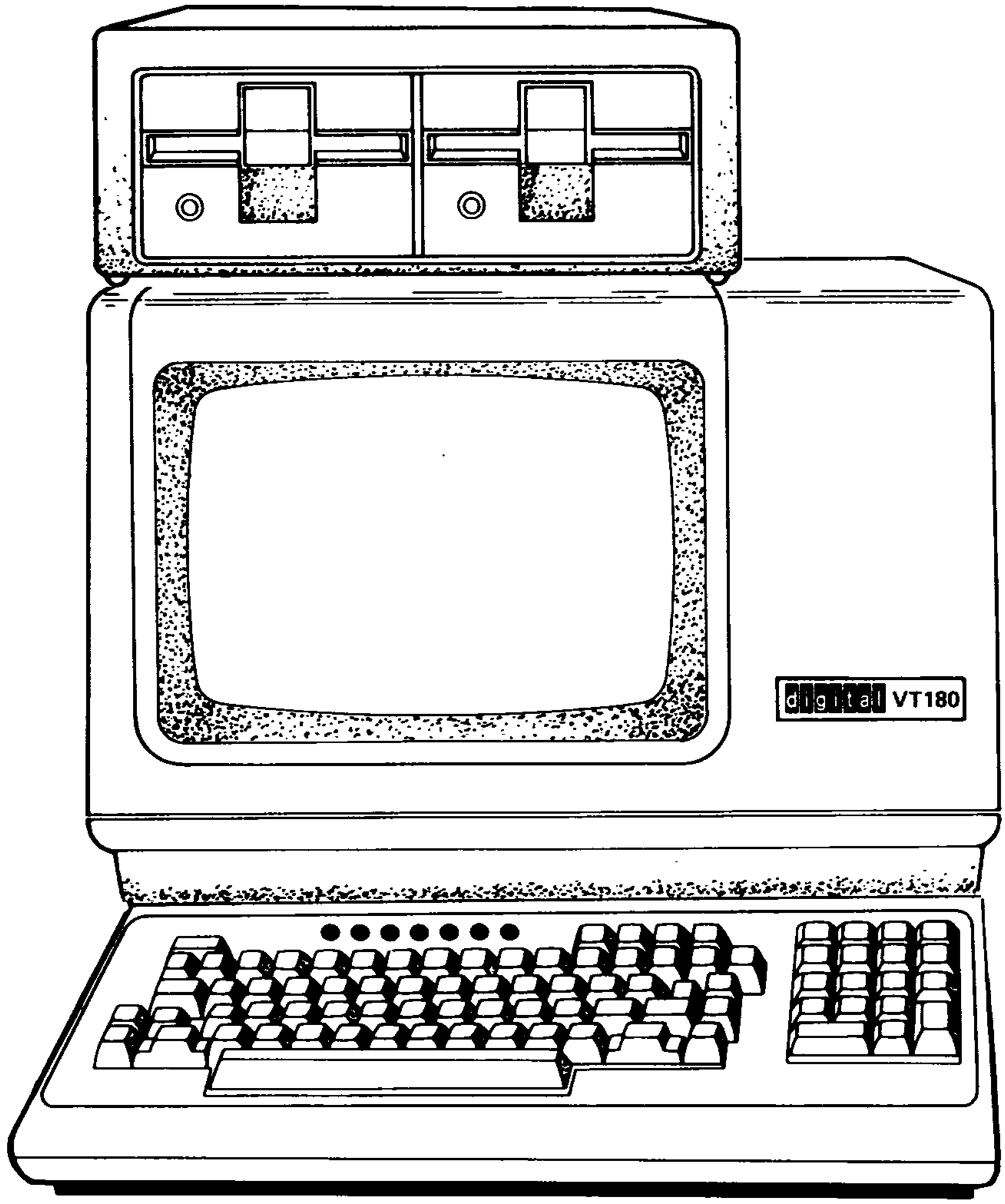

Figure 1-1 The VT180 Personal Office Computer

The VT180 terminal contains the following basic subunits and optional subunits.

1. Basic subunits

   - CRT video monitor
   - Power supply
   - Backplane, wire frame, and radio frequency (RF) shield
   - Terminal controller module
   - CP/M processor module (VT18X control module)
   - VT180 paddle board

2. Optional subunits

   - Advanced video option (AVO)
   - Additional dual disk drive

The keyboard is a replaceable unit of the VT180. It is connected to the rear of the terminal cabinet by an attached, three-conductor power and signal cable. The main keyboard contains a key arrangement similar to an ordinary typewriter. In addition to the standard typewriter keys, there are special function keys that permit the user to generate escape sequences, control sequences, and cursor control commands. The main keyboard also contains seven LED indicators, which show the current terminal status. A keypad placed next to the main keyboard contains a second set of numeric keys and special function keys. The numeric keys duplicate the numeric keys on the main keyboard and are useful for certain number-handling programs. A small speaker mounted inside the keyboard case provides audio feedback and attention signals (keyclicks and bells) for the user.

The two disk drives of the basic VT180 are installed in a mounting box that contains the power supply for the drives. The power switch for the drives is located on top of the mounting box. Input/output control and data signals appear on two EIA connectors located on the rear of the mounting box. One connector is used to connect the disk drives to the rear of the VT180 terminal. The second connector is used when the system is expanded with an additional disk drive unit.

1.3 VT180 SPECIFICATIONS

1.3.1 System Physical Dimensions

One or two RX180 disk drives may be installed on the top of the monitor or next to either side of the monitor. The overall dimensions of the various system configurations are listed in Table 1-1.

Table 1-1 System Configuration Dimensions

Configuration	Width	Height	Depth
One RX180 on the top of the monitor	45.72 cm (18.00 in)	47.62 cm (18.75 in)	57.78 cm (22.75 in)
Two RX180s on the top of the monitor	45.72 cm (18.00 in)	58.42 cm (23.00 in)	57.78 cm (22.75 in)
One or two RX180s on the side of the monitor	79.37 cm (31.25 in)	36.83 cm (14.50 in)	57.78 cm (22.75 in)

1.3.2 Unit Physical Dimensions

Table 1-2 lists the dimensions and weight of each component of the VT180.

Table 1-2 Physical Specifications of Components

Component	Height	Width	Depth	Weight	Minimum Table Depth
Monitor	36.83 cm (14.5 in)	45.72 cm (18 in)	36.20 cm (14.25 in)	13.6 kg (30 lb)	NA*
Keyboard	8.89 cm (3.5 in)	45.72 cm (18 in)	20.32 cm (8 in)	2.0 kg (4.5 lb)	51.4 cm (20.25 in)
Dual Disk Drive RX180	10.79 cm (4.25 in)	33.49 cm (13.19 in)	30.32 cm (11.94 in)	7.3 kg (16 lb)	NA*

*NA = Not applicable

1.3.3 Environmental Specifications

Operating Specifications

Temperature	10° C (50° F) to 40° C (104° F)
Relative humidity	10% to 90%
Maximum wet bulb	28° C (82° F)
Minimum dew point	2° C (36° F)
Altitude	2.4 km (8,000 ft)

Nonoperating Specifications

Temperature	–40° C (–40° F) to 66° C (150.8° F)
Relative humidity	0% to 95%
Altitude	9.1 km (30,000 ft)

1.3.4 Electrical Specifications

Line voltage (Single-phase, two-wire) (Switch-selectable)	95 Vrms to 128 Vrms 187 Vrms to 268 Vrms
Line frequency	50 Hz operation = 49–51 Hz 60 Hz operation = 59–61 Hz
Current	3.0 Arms maximum at 115 Vrms 1.5 Arms maximum at 230 Vrms

1.4 VIDEO DISPLAY CHARACTERISTICS

CRT	30 cm (12 inch diagonal measure, P4 phosphor)
Format	24 lines of 80 characters or 14 lines of 132 characters (selectable)

Character	7 dot by 9 dot matrix with descenders
Character size	
80-column mode	3.35 mm by 2.0 mm (0.132 in by 0.078 in)
132-column mode	3.35 mm by 1.3 mm (0.132 in by 0.051 in)
Active display size	203 mm by 127 mm (8 in by 5 in)
Character set	96-character ASCII subset (upper- and lowercase, numbers, and punctuation)
Cursor type	Keyboard-selectable, blinking block character or blinking underline

1.5 KEYBOARD

General	83-key detachable unit with a 1.9 m (6 ft) coiled cord attached
Key layout	65-key arrangement and sculpturing similar to a standard typewriter; with 18-key numeric keypad
Numeric keypad	18-key with period, comma, minus, enter, and four general purpose function keys
Visual indicators	Seven LEDs; three are dedicated — ON-LINE, LOCAL, and KBD LOCKED; four are user-programmable

1.6 AUDIBLE SIGNALS

Keyclick	Sound simulates a typewriter
Bell	Sounds upon receipt of BEL code; sounds eight characters from the right margin (keyboard-selectable)
Multiple bell	Sounds upon detection of an error in set-up save or recall operation

1.7 COMMUNICATION CHARACTERISTICS

Type	EIA RS232
Speeds (Baud rate)	Full duplex: 50, 75, 110 (two stop bits), 134.5, 150, 200, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 9600, and 19,200
Code	ASCII
Character format	Asynchronous
Character size	Seven or eight bits; keyboard-selectable (If 8-bit characters are selected, the eighth bit is always space.)

Parity	Even, odd, or none (keyboard-selectable)
Synchronization	Keyboard-selectable via automatic generation of XON and XOFF control codes

1.8 DISK DRIVE CHARACTERISTICS

Performance

Rotational speed	300 r/min nominal
Access time	
Track to Track Average	25 ms maximum
Average	335 ms maximum
Settling time	20 ms maximum
Track density	48 tracks/in (TPI)
Number of tracks	40
Recording density	2768 bits/in (BPI)
Transfer rate	125K bytes/s
Latency (average)	100 ms
Sectoring	Soft
Head load time	50 ms maximum

Storage capacity (bytes MFM)

Unformatted (per disk)	250,000
Formatted	184,320
(nine records/track)	
Per track	4,608
Per sector	512

Error Rates (with SHUGART SA104 media or equivalent)

Soft read errors	1 per 10^9 bits read
Hard read errors	1 per 10^{12} bits read
Seek errors	1 per 10^6 seeks

Media Type

Industry standard flexible disk oxide on 0.08 mm (0.003 in) Mylar™	133.4 mm (5.25 in) square jacket

Mylar™ is a trademark of DuPont de Nemours & Company, Inc.

1.9 RELATED DOCUMENTATION

1.9.1 Digital Hardware and Software Documentation

The following is a list of Digital hardware and software documentation containing information of possible interest to users of the VT180 personal office computer.

Title	Document Number
VT180 Series Pocket Service Guide	EK-VT18X-PS
VT180 User's Guide	AA-M044A-TV
VT18X Unpacking Guide	EK-VT18X-PG
VT18X Upgrade and System Test Guide	ED-VT18X-IN
CP/M Reference Manual	AA-M054A-TV
Pocket Reference Card	EK-VT18X-RC

These documents can be ordered from:

Digital Equipment Corporation
Accessories and Supplies Group
P.O. Box CS2008
Nashua, New Hampshire 03061

1.9.2 Other Documentation

Title	Order From
Intel 8080 Microcomputer Systems User's Manual	Intel Corporation 3065 Bowers Avenue Santa Clara, California 95051
Zilog Z80 Technical Manual	Zilog, Inc. 10340 Bubb Road Cupertino, California 95014
EIA Specifications RS-232-C and RS-170	Electronic Industry Association EIA Engineering Department 2001 Eye Street, N.W. Washington, D.C. 20006
ANSI Standards X3.41-1974, X3.64-1977, 3.4-1977	Sales Department American National Standards Institute 1430 Broadway New York, N.Y. 10018