

# Wang LapTop Computer

## OVERVIEW

The Wang LapTop Computer is the newest member of the Wang series of Professional Computers. Weighing under fifteen pounds, this computer contains, in one unit, all the tools necessary to create, view, store, print, and transmit valuable information whether at home, on the road, or in the office.

Functioning as a standalone unit, the Wang LapTop is capable of executing many Wang PC applications. And, since Industry-Standard emulation hardware and software is built into the Wang LapTop, users have the flexibility to run numerous IBM PC-compatible applications. In addition, the Wang LapTop can be equipped as a remote VS workstation capable of asynchronous and synchronous communications.

The Wang LapTop hardware consists of a Wang/IBM-compatible keyboard and a high-quality LCD (liquid crystal display). A 10-MB Winchester disk drive and a thermal-transfer printer are both integral to the unit. The system card contains a battery-powered clock and 512 KB of Random Access Memory (RAM).

The Wang LapTop operating system is MS-DOS Release 3.20. Wang enhancements such as the user-friendly menu structure and system utilities guarantee an easy-to-use operating environment. Experienced users have the option of bypassing the system utilities and menus and working

directly in the DOS Command Processor.

Power for the Wang LapTop is drawn from a rechargeable NiCad (Nickel/Cadmium) battery or from an external AC adapter. The internal battery is automatically recharged when the AC adapter is connected.

The Wang LapTop supports both 3 1/2-inch and 5 1/4-inch external diskette drives. Wang system software and Wang applications are available in both media types.

The Wang LapTop packs into a lightweight, durable carrying case that holds the unit as well as peripheral equipment. All the user needs to operate in a fully functional PC environment can be easily carried over the shoulder.

## BASE UNIT

The Wang LapTop is built around an 8086-compatible (CMOS), 16-bit microprocessor that operates at 8 MHz. The processing speed of the Wang LapTop microprocessor is improved at least 10 per cent over the speed of the 8086 chip.

The system is powered from an internal NiCad battery that runs for up to four hours depending on usage. An AC adapter connects directly to the Wang LapTop to recharge the system battery. Recharging requires approximately four hours, and the Wang LapTop is fully functional while the unit is recharging.

A clock is included on the Wang LapTop system board. The





### Wang LapTop Hardware

BASE UNIT	8086-compatible microprocessor/8 MHz Rechargeable NiCad battery AC adapter Battery-powered clock 512-KB RAM High-contrast LCD Full-sized keys with Wang/IBM legends Padded carrying case
Internal Storage Device	10-MB Winchester drive
Integral Printer	Thermal-transfer printer
Expansion Slots	Expansion slot for internal modem Expansion slot for additional 512-KB RAM
Ports	RS-232-C port SCSI (Small Computer System Interface) port Monitor port for optional color monitor 2 telephone ports Numeric keypad port
OPTIONAL HARDWARE	External 3 1/2-inch battery-powered diskette drive External 5 1/4-inch AC-powered diskette drive Acoustic coupler Numeric keypad Serial-to-parallel adapter Memory expansion module 300/1200/2400 bps modem 300/1200 bps modem

battery-powered clock provides accurate date and time continuously, since the clock battery recharges whenever the unit is running from AC power.

The Wang LapTop is shipped standard with 512 KB of RAM. An optional customer-installable board allows users to expand memory to 1 MB by simply removing the back cover of the unit and installing the memory expansion module.

The LCD is state-of-the-art technology designed to provide

twice the contrast ratio of ordinary LCDs. This super-twist LCD gives the impression that it is backlit, but in reality, the high contrast ratio and an unlimited number of tilt positions yields a superior display. The LCD supports bit-mapped (graphics) mode and character (text) mode with resolutions of 640 X 200 or 320 X 200. The screen display of the LCD is a standard 25 lines by 80 characters.

A CGA-compatible display controller is included with each

Wang LapTop. This controller supports Industry-Standard CGA applications on the LCD in monochrome-mode only. By adding an optional color monitor to the Wang LapTop, CGA applications can be fully supported.

When the LCD cover is closed, the Wang LapTop is a compact unit that fits into an ergonomically designed carrying case. The LCD cover opens to reveal the Wang LapTop keyboard. The keyboard is



equipped with full-sized keys that show both Wang and IBM legends. The keyboard contains 76 keys plus 16 special function keys. Optional input devices such as a numeric keypad are also supported.

### STORAGE DEVICES

Both diskette drives, the 3 1/2-inch and the 5 1/4-inch, are external to the main unit. Formatted 3 1/2-inch diskettes offer a storage capacity of 720 KB, while formatted 5 1/4-inch diskettes store 360 KB of information. Both types of diskettes are double-sided double-density.

The diskette drives interface to the main unit through a Small Computer Systems Interface (SCSI). Up to two diskette drives can be linked together to offer flexible system configurations. The SCSI interface supports up to six optional Industry-Standard SCSI devices.

A 10-MB Winchester disk drive is conveniently housed in the main unit. The half-height, low-power Winchester conserves precious space and power, making this PC not only portable, but easy to use. This unique Winchester drive is insulated with a high tolerance for shock and vibration so that portability of the unit is not hindered. The internal Winchester offers reliable storage and virtually eliminates the need to carry diskette drives and diskettes when traveling.

### INTEGRAL PRINTER

Not only does the Wang LapTop provide internal storage, it offers full print capabilities as well. An Epson MX-80-compatible printer is integral to the Wang LapTop. This thermal printer is capable of near-letter-quality dot matrix printing at 18 cps (characters per second). The integral printer also supports graphics, enlarged, and condensed printing modes.

Two character sets are provided in ROM: WISCII and Southern-European Extended ASCII. Wang applications such as Integrated Word Processing print from the WISCII character set, while most Industry-Standard applications require ASCII.

When used with standard paper, the printer requires a ribbon cartridge. When used with thermal paper, no ribbon cartridge is required. Either single sheets or rolls of paper can be used with the printer; a paper roll attachment is shipped standard with each Wang LapTop.

### INTERNAL MODEM

Wang realizes that remote communications is one of the most important features of a portable PC. The ergonomically designed Wang LapTop has a dedicated expansion slot for an internal modem. Wang offers two optional internal modems; both modems support either synchronous or asynchronous communications and the full Hayes Smartmodem command set. The model WLTC-2-1 is a 300/1200 bps modem and the model

WLTC-2-2 is a 300/1200/2400 bps modem.

### PORTS

In addition to the internal modem slot, an external RS-232-C interface is standard. Optional devices such as external modems or serial printers are supported through this interface. With the addition of an optional serial-to-parallel converter, parallel printers are supported.

Also included with the main unit are two telephone jacks for data communications and a 10-pin port for optional input devices such as the numeric keypad. A monitor port is available for Industry-Standard color monitor support.

### WANG LAPTOP SYSTEM SOFTWARE

The Wang LapTop system software consists of MS-DOS 3.20, and Wang enhancements such as System Utilities, menus, and Industry-Standard emulation.

There are three operating environments within the Wang system software. Wang PC applications, system utilities, and menus run in Wang mode. Industry-Standard Monochrome mode and Industry-Standard Color mode make the Wang LapTop keyboard and screen emulate the modes most widely used in the industry. Many popular IBM-compatible applications run when the system is in Industry-Standard mode.

Industry-Standard applications can be added to the Wang



system menus so that choosing an application automatically puts the system into the correct operating mode. This seamless operating environment makes it unnecessary to restart the system when changing modes.

The Wang LapTop system software includes a unique customer-runnable diagnostic package. Users can isolate hardware problems simply by running a series of diagnostic programs either from diskette or from the Winchester.

## **PROGRAMMING LANGUAGES**

Microsoft GWBASIC Release 3.2 is shipped standard with each Wang LapTop. Other programming languages are available as optional software packages.

## **WANG SYSTEMS NETWORKING**

Wang Systems Networking (WSN) is an optional software package. WSN applications are supported over a point-to-point transport between the Wang LapTop and Wang VS, OIS, PC and other Wang LapTop systems. Included with WSN are file transfer and VS Terminal Emulation services.

WSN file transfer supports complete file exchange between Wang LapTop systems. Only WP documents can be exchanged between Wang LapTop systems and Wang VS, OIS, and PC systems. VS Terminal Emulation allows the Wang LapTop to act as a remote VS workstation. The

Wang LapTop supports VS applications such as Wang OFFICE under VS Terminal Emulation. Applications that down-load microcode to the workstation are not supported on a remote terminal.

## **TERMINAL EMULATION CAPABILITIES**

Wang VS terminal emulation capabilities are provided through the Wang Systems Networking software. In addition, other optional terminal emulation packages are available for the Wang LapTop including Asynchronous (TTY) Terminal Emulation and 2110/VT100 Terminal Emulation.

## **WANG INTEGRATED WORD PROCESSING**

Wang Integrated Word Processing (IWP) is an important option for the Wang LapTop. In tradition with Wang's highly acclaimed word processing packages, IWP provides an easy-to-use menu structure, full formatting and editing capabilities, complete glossary and spelling verifier functions, and much more.

## **OTHER OPTIONAL SOFTWARE**

The Wang LapTop supports software available for the Wang Professional Computer Series. For example, Wang System Glossary, Wang PC Database, and Microsoft Chart 2.0 are optional

software packages for the Wang LapTop Computer.

In addition to Wang application software, many off-the shelf, Industry-Standard applications run on the Wang LapTop when the system is in Industry-Standard mode.

## **OPTIONAL HARDWARE**

External diskette drives can be ordered for the Wang LapTop. Valid configurations include using up to two 5 1/4-inch diskette drives or one 3 1/2-inch and one 5 1/4-inch diskette drive.

Random access memory is expandable to 1 MB. A customer-installable 512-KB memory module mounts easily into an expansion slot of the Wang LapTop.

A full-size numeric keypad is offered as an optional input device. The modular numeric keypad plugs directly into the Wang LapTop's keyboard and can be adjusted for comfortable data entry. The Wang LapTop integral keyboard remains fully functional when the numeric keypad is connected.

Data communications away from the office often require the use of an acoustic coupler. Wang offers an optional compact acoustic coupler that packs conveniently into the accessories bag of the Wang LapTop's carrying case.

## **DOCUMENTATION**

The Wang LapTop Computer is fully documented. A complete documentation set including



installation instructions, user's guides, and reference material is shipped with each system.

## SYSTEM SPECIFICATIONS

### Physical Specifications



#### Dimensions

##### Depth

11.9 inches (30.2 cm)

##### Width

13.9 inches (35.3 cm)

##### Height

4.00 inches (10.2 cm) with cover closed

##### Weight

14.25 pounds (6.59 kg) with battery, printer, Winchester, LCD, keyboard

#### Weight - Accessories

##### Carrying case

2.0 pounds (0.91 kg)

##### Accessories bag

1.25 pounds (0.57 kg)

##### AC adapter

3.75 pounds (1.7 kg)



### Power Requirements

#### Domestic AC Adapter

Output 21 VDC 1.6A

Input 90 - 130 VAC 50/60 Hz

UL, CSA approved

#### International AC Adapter

Output 21 VDC 1.6A

Input 220 - 250 VAC

#### System Battery

Output 12 VDC 1.2AH

(10-sub C Cells)

### Environmental Requirements

#### Temperature Range (Operating)

50° to 104°F (10° to 40°C)

#### Humidity Range (Operating)

15% to 85% relative humidity, noncondensing

#### Temperature Range (Storage)

0° to 120°F (-18° to 49°C)

#### Temperature Range (Shipping)

-40° to 140°F (-40° to 60°C)

5 to 90% relative humidity

### Durability Tolerance

#### Vibration Tolerance

2 g's 10 Hz

#### Shock Tolerance

50 g's (10 msec on any axis)

### Display Characteristics of LCD

#### Screen Size

9.5 inches (24.1 cm) active area

25 rows by 80 columns

#### Screen Resolution

320 X 200 bit-mapped in Industry-Standard mode

640 X 200 character or bit-mapped in Wang or Industry-Standard mode

### 3 1/2" Diskette Drive (External)

#### Model WLTC-1-2

#### Capacity (formatted)

720 KB

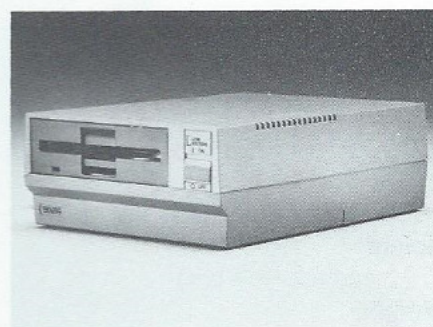
Double-sided double-density

#### Rotation Speed

300 RPMs  $\pm$  1.5%

#### Data Transfer Rate

250 kilobits per second



#### Dimensions

##### Disk Size

3 1/2 inches

##### Depth

8.25 inches (20.9 cm)

##### Width

5.6 inches (14.2 cm)

##### Height

2.75 inches (7.0 cm)



Weight with internal battery  
3.75 pounds (1.7 kg)

### **5 1/4" Diskette Drive (External)**

**Model WLTC-1-1**

**Capacity (formatted)**

360 KB

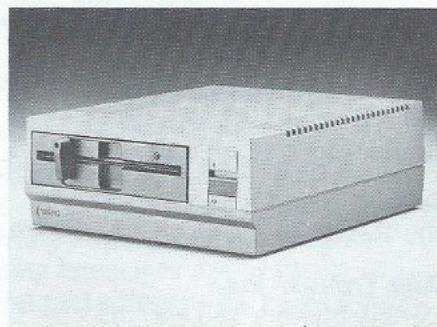
Double-sided, double-density

**Rotation Speed**

300 RPMs  $\pm$  1.5%

**Data Transfer Rate**

250 kilobits per second



### **Dimensions**

**Disk Size**

5 1/4 inches

**Depth**

9.9 inches (25.1 cm)

**Width**

8.3 inches (21.1 cm)

**Height**

3.5 inches (8.9 cm)

**Weight**

6.0 pounds (2.7 kg)

### **Winchester Disk Drive (Internal)**

**Disk Size**

3 1/2 inches

**Capacity (formatted)**

10 MB

### **Rotation Speed**

2322 RPMs  $\pm$  1.5%

### **Data Transfer Rate**

3.2 megabits per second

### **Integral Printer**

#### **Printing Mechanics**

**Printing Method**

Thermal/thermal-transfer

Impact, dot matrix, 24 X 1 pin arrangement

**Printing Speed**

Pica - 18.0 characters per second

Condensed - 32.4 characters per second

**Printing Direction**

Unidirectional

**Carriage Speed**

45.72 mm per second

**Carriage Movement**

1/360 inch minimum

**Print Head Life**

5 million characters

**Number of Copies**

one original

### **Characters**

**Character Sets**

WISCII

Southern-European Extended

ASCII

**Character Size**

Pica - 2.258 mm wide X

2.399 mm high (16 dots X

17 dots)

Condensed - 1.129 mm wide X

2.399 mm high (16 dots X

17 dots)

**Characters Per Inch (cpi)**

Pica - 10 cpi, 80 characters

maximum per line

Enlarged - 5 cpi, 40 characters

maximum per line

Condensed - 18 cpi, 132 characters maximum per line

Enlarged and Condensed -

9 cpi, 72 characters maximum per line

### **Paper Movement**

**Paper Feed**

Method - friction-feed

Speed - 28.2 mm per second

Direction - forward and backward

**Line Feed**

Paper Feed Key - 1/12 inch

Line Spacing Setting -

n/216 inch, default - 1/6 inch

### **Ribbon**

Type - one-time thermal-transfer

Life - 40,000 characters (pica)

Width - 6.35 mm

Length - 100 m

Wang Thermal-Transfer Ribbon (3-pack) 725-1370

### **Paper**

**Plain**

Wang - Roll (8 1/2 in. X 100 ft) 615-0288

Wang - Cut-sheet

(500 sheets, 8 1/2 X 11 in.) 615-0286

Mitsubishi - Roll, Tokkibishi or equivalent

Mitsubishi - Cut-sheet, Tokkibishi N or equivalent

**Thermal**

Wang - Roll (8 1/2 in. X 100 ft) 615-0289

Wang - Cut-sheet (200 sheets, 8 1/2 X 11 in.) 615-0287

Mitsubishi - Roll or Cut-sheet, F-200U7N or equivalent



---

## **SPECIFICATIONS FOR OPTIONAL EQUIPMENT**

### **Internal Modem (Optional)**

#### ***Model WLTC-2-1***

Industry-Standard Hayes  
Command Set-compatible

Bell 212A-compatible when operating at 1200 bps, asynchronous and synchronous operation

Bell 103-compatible when operating at 0-300 bps, asynchronous operation

#### ***Model WLTC-2-2***

Industry-Standard Hayes  
Command Set-compatible

CCITT V.22 bis QAM modulation  
2400 bps  
Asynchronous and synchronous operation

CCITT V.22 PSK modulation  
1200 and 600 bps  
Asynchronous and synchronous operation

Bell 212A-compatible PSK modulation  
1200 bps  
Asynchronous and synchronous operation

Bell 103-compatible FSK modulation  
300 bps  
Asynchronous operation

### **Numeric Keypad (Optional)**

#### ***Model WLTC-4-1***

##### ***Dimensions***

Depth  
6.25 inches (15.9 cm)  
Width  
4.0 inches (10.2 cm)  
Height  
0.75 inches (1.9 cm)  
Weight  
0.50 pounds (.23 kg)

### **Acoustic Coupler (Optional)**

#### ***Model WLTC-2-3***

##### ***Dimensions***

Depth  
4.0 inches (10.2 cm)  
Width  
4.0 inches (10.2 cm)  
Height  
3.8 inches (9.6 cm)  
Weight  
1.0 pounds (.50 kg)

### **Memory Expansion Module (Optional)**

#### ***Model WLTC-3-1***

#### ***512-KB Memory Expansion Card***

### **Supported Color Monitors (Optional)**

Wang PC-PM105  
Taxan 630  
Taxan 640

*Standard Warranty Applies*

---

**WANG**

ONE INDUSTRIAL AVENUE  
LOWELL, MASSACHUSETTS 01851  
TEL. (617) 459-5000  
TWX 710-343-6769, TELEX 94-7421

---

*Wang Laboratories, Inc., reserves the right to change specifications without prior notice.*