

## 1.1 Features

The T1910 and T1910CS units consist of the following features:

Processor BIOS RAM	Intel SL-Enhanced 486SX/33Mhz 128KB flash EPROM (150ns) 4MB Expandable to 20MB (80ns)
Display Ext. Display	T1910: Fluorescent Sidelit Monochrome LCD T1910CS: Dynamic-STN Dual Scan Color LCD VGA 640 x 480 (16 colors of 4096) <i>Does not produce simultaneous display.</i>
FDD HDD	3 1/2" 1.44MB T1910: 120MB T1910CS: 120MB/200MB (17/16msec)
Optional Peripherals	101-key Keyboard (PS/2)
Ports  Keyboard	1 14.5mm PCMCIA Type III (2.01 compliant) 1 9-Pin Serial 1 Parallel/FDD: BI-DIR 1 15-Pin RGB 1 Mouse Quick Port (DCBM) 1 PS/2 Mouse Port ( <i>not usable if DCBM connected</i> ) 1 101-key Keyboard Port (PS/2) 82-Keys, 3mm Travel
Battery Battery Life Recharge Time	NIMH (12V 2600mAH) PART# PA2429URA 2-3 Hrs. 1.5-2 Hrs. (Computer off only)
AC Adapter	Dimensions: 1.02"H x 2.95"W x 5.51"D Weight = 1.0 lbs. T1910: Input: 100-240VAC, Input Frequency: 50-60Hz, Input Power: .5A - .28A (50/60Hz) Output Voltage: 18 VDC, 1.1A  T1910CS: Input: 100-240VAC, Input Frequency: 50-60Hz, Input Power: .4A - .7A (50/60Hz) Output Voltage: 18 VDC, 1.7A
Bundled Software	Toshiba DOS 6.2 w/Enhancements; Windows 3.1; Ultrafont; Microsoft Mouse 2.0.
Dimensions	T1910: 11.8"W x 8.4"D x 2.0"H, 6.5 lbs. T1910CS: 11.8"W x 8.4"D x 2.1"H, 6.8 lbs.

The T1910 Series Computer is shown in Figure 1-1, and its system configuration is shown in Figure 1-2.

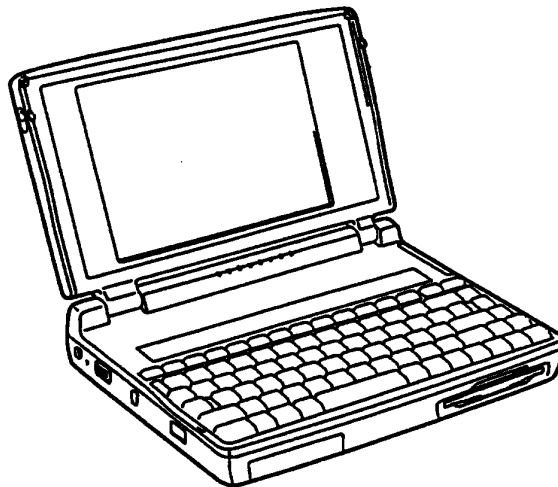


Figure 1-1 T1910 Series Personal Computer

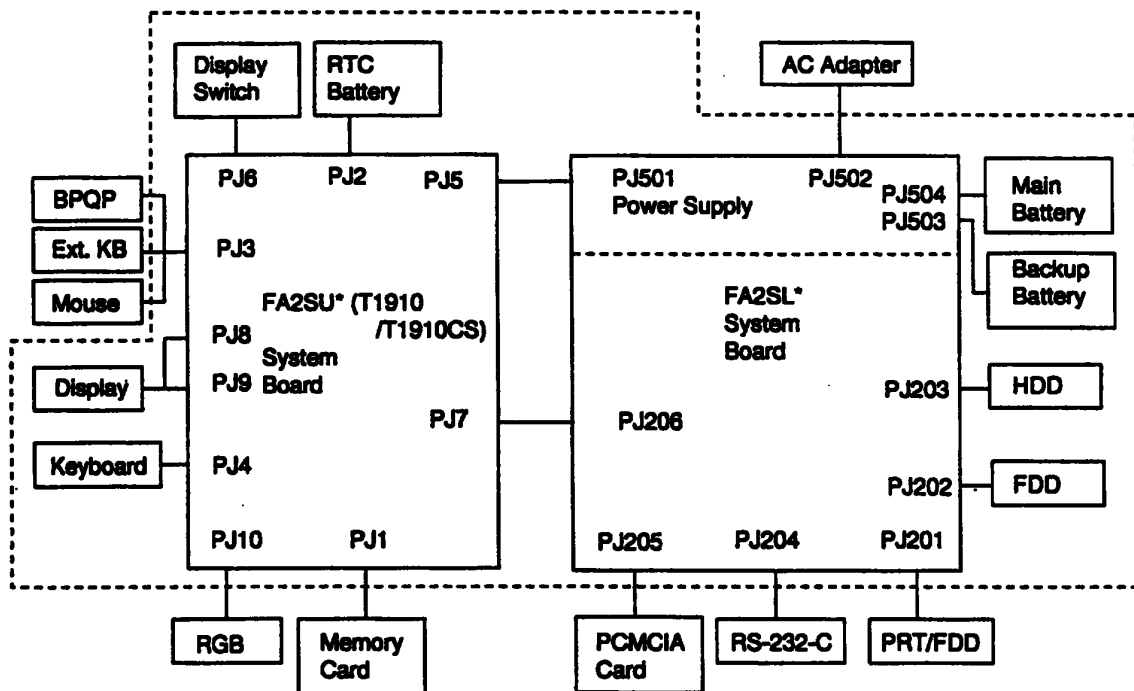


Figure 1-2 T1910 Series System Unit Configuration

## 1.2 System Unit Block Diagram

Figure 1-3 is a block diagram of the T1910 Series system unit.

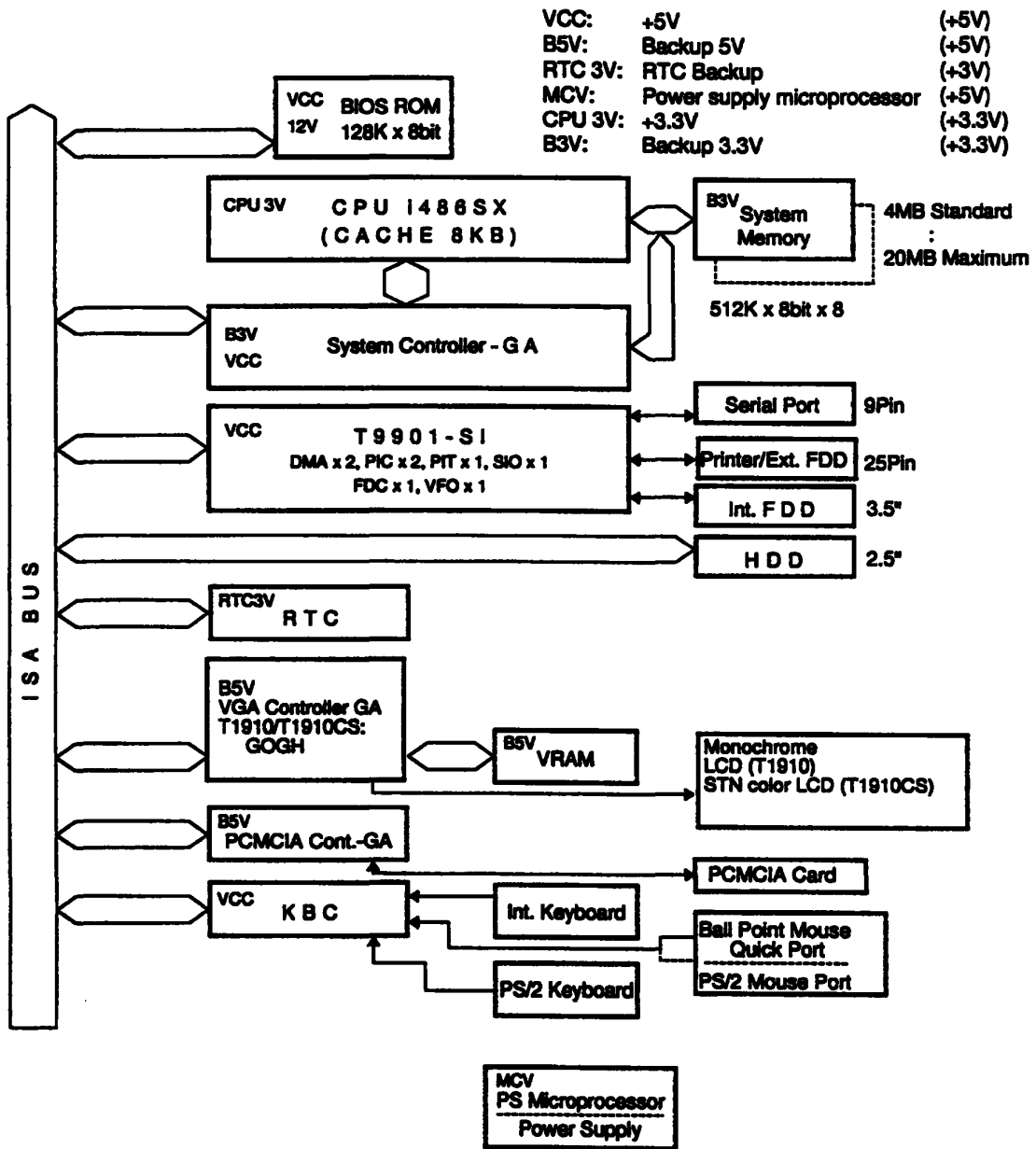


Figure 1-3 T1910 Series System Board Block Diagram

The T1910 Series system board is composed of the following major components:

- ❑ An i486SX-33 CPU
- ❑ Super Integration (SI) T9901, which stores the following components:
  - Two Direct Memory Access Controllers (DMAC): 82C37
  - Two Programmable Interrupt Controllers (PIC): 82C59
  - One Programmable Interval Timer (PIT): 82C54
  - One Floppy Disk Controller (FDC): TC8565
  - One Serial Input/Output Controller (SIO): TC8570
  - One Variable Frequency Oscillator (VFO): TC8568
  - One I/O Controller
  - One Printer Port Controller
  - One Speaker Controller

- ❑ A Real Time Clock (RTC)

One T9934 chip is used. The T9934 has 128 bytes of memory. Fourteen bytes of memory are used for the calendar and clock. The remaining 114 bytes are used for the system configuration data.

OSC (X3) generates 32.768 KHz for RTC.

- ❑ A Keyboard Controller (KBC)

One M37452M4 chip is used.

This KBC includes the keyboard scan controller and keyboard interface controller. The KBC controls the internal keyboard, external keyboard port, PS/2 mouse port, and Ball Point Quick Port.

- ❑ The following memories:

Standard RAM:	4 MB
Cache memory:	8 KB (inside CPU)
BIOS ROM:	128 KB (96 KB are used)
	This ROM contains Initial Reliability Test (IRT), Basic Input/Output System (BIOS), and video BIOS.
Video RAM:	256 KB
	Optional memory cards expand memory to a maximum of 20 MB.

- ❑ VGA display controller

GOGH: This controller controls internal and external VGA compatible display.

OSC(X4) generates 28.322MHz for display controller.

OSC(X5) generates 25.175MHz for display controller.

- **Clock Generator receives 14.31818 MHz (X2) and generates the following frequencies:**
  - 33 MHz for the CPU
  - 14.7456 MHz for the COM
  - 24 MHz for the FDC and VFO
  - 16 MHz is used for GA
  - 14.31818 MHz is used for T9901 (SI)
  - 4.77MHz is used for KBC

□ **Gate Array**

**System Controller Gate Array**

**This gate array has the following functions:**

- CPU Controller
- Memory Controller
  - DRAM Controller
  - Compatible Bus Interface Controller
- SMI Controller
- VL Bus Controller
- Bus Controller
  - Compatible Bus Interface Controller
  - Compatible Access Controller
  - DMAC Controller
  - I/O Controller
- Address Latch Controller
  - 32-Bit to 16-Bit Controller
  - Address Latch
  - DMA Address Generator
  - Refresh Address Generator
- I/O Register
  - Compatible I/O Port
  - Saving the data of the Register (in resume) Controller
  - Toshiba Special Register
- 33 MHz/16.5 MHz Controller
- Data Bus Change Controller
- Data Latch

**PCMCIA Controller Gate Array**

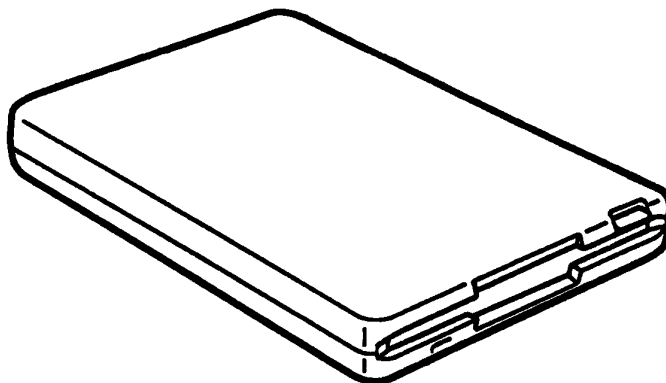
**This gate array has the following functions:**

- Memory Card Controller
  - PCMCIA IC Card Controller
  - Toshiba Modem Card Controller

### 1.3 3.5-inch Floppy Disk Drive

The T1910 Series 3.5-inch Floppy Disk Drive (FDD) is a thin, high-performance reliable drive that supports 720-KB (formatted) 2DD and 1.44-MB (formatted) 2HD 3.5-inch floppy disks.

The T1910 Series FDD is shown in Figure 1-4, and specifications are listed in Table 1-1.



*Figure 1-4 3.5-inch FDD*

*Table 1-1 3.5-inch FDD Specifications*

Item	2-MB mode	1-MB mode
Storage capacity (KB)		
Unformatted	2,000	1,000
Formatted	1,311	737
Number of heads	2	2
Number of cylinders	80	80
Access time (ms)		
Track to track	3	3
Average	181	181
Head settling time	15	15
Recording track density (tpi)	135	135
Data transfer rate (Kbps)	500	250
Rotation speed (rpm)	300	300
Recording method	Modified Frequency Modulation (MFM)	

## 1.4 2.5-inch Hard Disk Drive

The Hard Disk Drive (HDD) is a random access non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-winchester type magnetic heads.

The T1910 Series supports a 120 MB or 200 MB HDD.

A T1910 Series HDD is shown in Figure 1-5, and specifications are listed in Table 1-2.

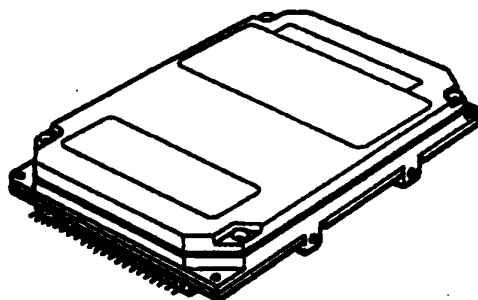


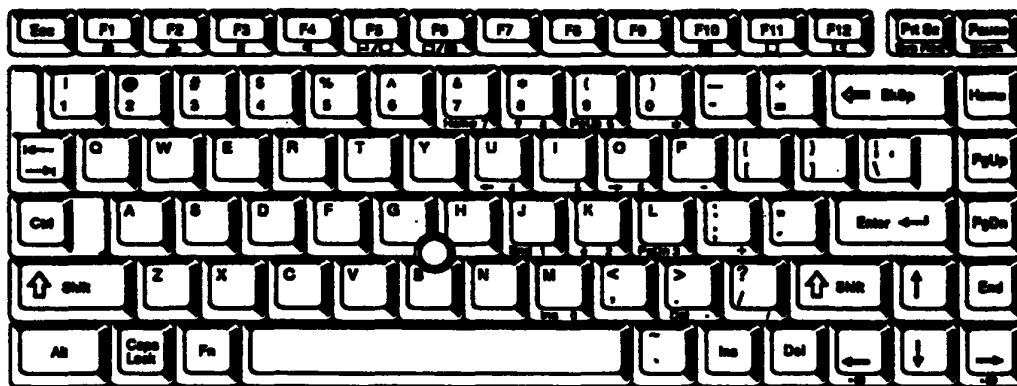
Figure 1-5 2.5-inch HDD

Table 1-2 2.5-inch HDD Specifications

	120 MB		200MB	
	(CP2124)	(MK2124FC)	(MK2224FC)	(ST9235A)
Storage capacity (MB) Formatted	121.6	130.1	213.0	209.7
Number of disks	2	2	2	3
Data heads	4	4	4	6
Data surfaces	4	4	4	6
Tracks per surface	1,123	1,155	1,560	985
Sectors per track	53 (+1)	55 (+1)	-	32
Bytes per sector	512	512	512	512
Access time (ms)				
Track to track	10	5	3	5
Average	17	17	12	16
Maximum	35	36	25	30
Rotation speed (rpm)	3,743	3,200	4,000	3449
Data transfer rate (bps) To/from media	18 M	15.3 M	18.9 to 31.6 M	4M
Interleave	1:1	1:1	1:1	1:1
Recording method	2-7 RLL	1-7 RLL	1-7 RLL	1-7 RLL

## 1.5 Keyboard

The 82-(USA) or 84-(European) keyboard is mounted on the T1910 Series system unit, and is connected to the keyboard controller on the system board through a 19-pin flat cable. The keyboard is shown in Figure 1-6.



*Figure 1-6 Keyboard*



## 1.6 Monochrome LCD (T1910)

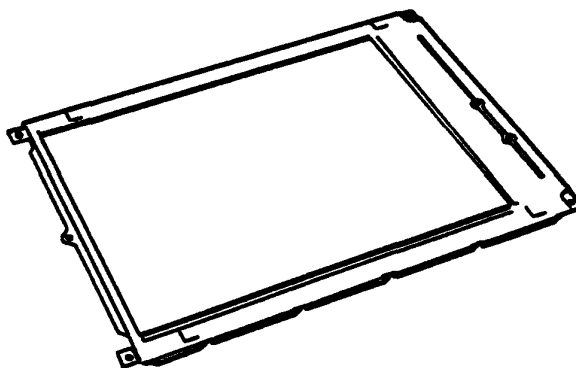
The monochrome Liquid Crystal Display (LCD) is composed of an LCD module, a Fluorescent Lamp (FL), and an FL inverter board.

### 1.6.1 Monochrome LCD Module

The T1910 monochrome LCD supports 640x480 pixels with a Video controller and 64 levels of gray. The video controller includes the functions of the Video Graphics Array (VGA).

The LCD receives vertical and horizontal synchronizing signals, 8-bit data signals (4-bit upper block data signals and 4-bit lower block data signals), and shift clock for data transmission. All signals are CMOS-level compatible.

The sidelit LCD is shown in Figure 1-7, and its specifications are listed in Table 1-3.



*Figure 1-7 Monochrome LCD*

*Table 1-3 Monochrome LCD Specifications*

Item	Specifications
Number of Dots (dots)	640 x 480
Dot pitch (mm)	0.30 (W) x 0.30 (H)
Display area (mm)	198 (W) x 150 (H)
Contrast	17:1 (typically)
FL current (mA)	5.0
FL frequency (KHz)	42

## 1.6.2 Monochrome Fluorescent Lamp (FL) Inverter Board

The FL inverter board supplies the high frequency current needed to illuminate the FL. The specifications for the FL inverter board are listed in Table 1-4.

*Table 1-4 Monochrome FL Inverter Board Specifications*

Item			Specifications
Input	Voltage	(VDC)	5
	Power	(W)	2.2
Output	Voltage	(VAC)	950
	Current	(mA)	4.2
	Frequency	(KHz)	38.5

## 1.7 STN Color LCD (1910CS)

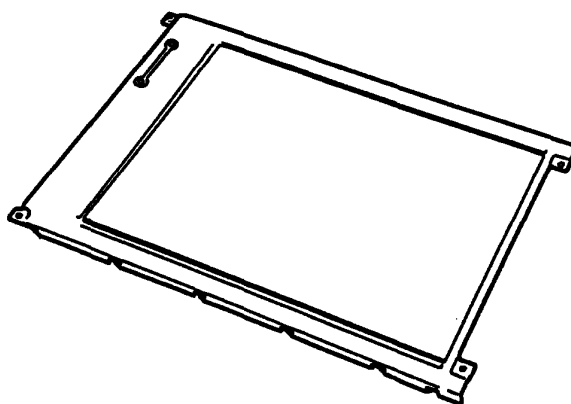
The STN Color Liquid Crystal Display (LCD) contains an LCD module, a Fluorescent Lamp (FL), and an FL inverter board.

### 1.7.1 STN Color LCD Module

The T1910CS STN color LCD is backlit and supports 640x480 pixels with a Video controller. This video controller includes the functions of Video Graphics Array (VGA).

The T1910CS's LCD receives vertical and horizontal synchronizing signals, 16-bit data signal (8-bit upper block data signals and 8-bit lower block data signals), and shift clock for data transmission. All signals are CMOS-level compatible.

The STN LCD is shown in Figure 1-8, and specifications are listed in Table 1-5.



*Figure 1-8 STN Color LCD*

*Table 1-5 STN Color LCD Specifications*

Item		Specifications
Number of Dots	(dots)	640x480
Dot pitch	(mm)	0.07xRGBx0.275
Display area	(mm)	195 (W)x147 (H)
Contrast		18:1 (Typically)
FL current	(mA)	6.0
FL frequency	(KHz)	42

## 1.7.2 STN Color Fluorescent Lamp (FL) Inverter Board

The FL inverter board supplies high frequency current to light the LCD's Fluorescent Lamp. The specifications for the FL inverter are listed in Table 1-6.

*Table 1-6 STN Color FL Inverter Board Specifications*

Item		Specifications
Input	Voltage (VDC)	5
	Power (W)	6
Output	Voltage (VAC)	1,100
	Current (mA)	6.0
	Frequency (KHz)	42

## 1.8 Power Supply

The power supply uses a power supply microprocessor to monitor and regulate the voltages used within the T1910 Series computers. It contains the following functions:

1. Determines if the AC adapter or battery is connected to the computer.
2. Detects DC output and circuit malfunctions.
3. Controls the LED indicator and speaker.
4. Turns the battery charging system on and off and detects a fully charged battery.
5. Determines if the power can be turned on and off.
6. Provides more accurate detection of a low battery.
7. Calculates the remaining battery capacity.

The power supply output rating is specified in Table 1-7.

*Table 1-7 Power Supply Output Rating*

Use for	Name	DC voltage (V)	Regulation tolerance (%)	Maximum current (mA)	Ripple (mV)
System logic, FDD, HDD, Display	VCC	+5	±5	3,500	100
RS-232C, Flash ROM	12V	+12	±5	120	240
RAM, CPU	B3V	+3.3	±5	755	66
RS-232C	M12V	-7 to -12.6	-	10	-

## 1.9 Batteries

The T1910 Series has three types of batteries:

- Main battery pack
- Backup battery
- Real Time Clock (RTC) battery

Specifications for these batteries are listed in Table 1-8.

*Table 1-8 Battery Specifications*

Battery name	Material	Output voltage	Capacity
Main battery	Nickel Metal Hydride	12 V	2,600 mAH
Backup battery	Nickel Metal Hydride	1.2 V	1,100 mAH
RTC battery	Lithium-Vanadium	3.0 V	50 mAH

### 1.9.1 Main Battery

The removable main battery pack is the computer's main power source when the AC adapter is not attached. The main battery recharges the backup battery when the system's power is on. The backup and main battery maintain the state of the computer when you enable AutoResume.

#### Battery Indicator

The Battery indicator is located on the top cover, and shows the status of the removable battery pack, power supply and AC adapter.

The status of each can be determined by color:

- Orange    The battery is being charged. (AC adapter is attached.)
- Green    The battery is fully charged. (AC adapter is attached.)
- No light    The AC adapter is disconnected from the computer or the AC adapter is connected, but it cannot charge the battery for one of the following reasons:
  - The battery is extremely hot. Allow the computer and the battery to reach room temperature before attempting to charge the battery.
  - The battery is almost fully discharged. The battery will not begin charging immediately in this state, it will begin charging a few minutes after the AC adapter is connected.
  - The AC adapter is not receiving power.

## 1.9.2 Battery Charging Control

Battery charging is controlled by a microprocessor that is mounted on the power supply. The microprocessor controls whether the charge is on or off and detects a full charge when the AC adapter and battery are attached to the computer. The system charges the battery using quick charge or trickle charge.

When the AC adapter is attached, there are two types of charge: quick charge when the system is powered off and trickle charge when the system is powered on.

*Table 1-9 Time Required For Battery Charges*

	<b>Charging time</b>
<b>Quick charge (power off)</b>	About 2.3 hours (T1910) About 1.4 hours (T1910CS)
<b>Trickle charge (power on)</b>	About 48 hours

### Quick Battery Charge

If the one of the following occurs, the battery quick-charge process stops.

1. The battery becomes fully charged
2. The AC adapter or battery is removed.
3. The battery or AC adapter output voltage is abnormal.
4. The charge current is abnormal.

### Trickle Battery Charge

When the main battery is fully charged and the AC adapter is attached, the power supply microprocessor automatically changes quick charge to trickle charge.

### 1.9.3 Backup Battery

The backup battery maintains data for AutoResume. The power source used to back-up the AutoResume data is determined according to the following priority:

AC adapter > Main battery > Backup battery

The backup battery is charged by the main battery or AC adapter when the system is powered on. Table 1-10 shows the charging time and data preservation period of the backup battery.

*Table 1-10 Backup Battery Charging/Data Preservation Time*

		Time
Charging Time	Power On	16 H
	Power Off (with AC Adapter)	60 H
	Power Off (Without AC Adapter)	Doesn't charge
Data preservation period (full charge)		8 H

### 1.9.4 RTC Battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-11 shows the charging time and data preservation period of the RTC battery.

*Table 1-11 RTC Battery Charging/Data Preservation Time*

		Time
Charging Time	Power On	48 H
	Power Off	Doesn't charge
Data preservation period (full charge)		1 month