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## 1. Introduction

The **CPT-711** is a compact, light-weighted, high performance data terminal designed for all-day, everyday use. It is powered by two AAA size batteries and supported by a rich set of development tools, including a Windows-based application generator, “C” and “Basic” compilers. It uses a brightly lit, easy-to-read 128x64 graphic dots FSTN LCD with back-light and adjustable contrast settings to allow clear reading regardless of the ambient light. With its integrated Laser/CCD barcode scanning unit and built-in RS-232 and IrDA port, the **CPT-711** is ideal for inventory control, document tracking, shop floor management, asset tracking, warehousing and distribution operations.

## **2. General Features and Characteristics**

Basic characteristics of the *CPT-711 Portable Data Terminal* are listed below,

### **2.1 Electrical**

- Operation battery : two AAA size disposable or rechargeable batteries
- Backup battery : 3.0V, 7.0mAh, rechargeable Lithium battery for SRAM & calendar
- Working time: over 100 hours and more than 80,000 readings (with its CPU in low speed mode and 1 reading every 5 seconds).

### **2.2 Environmental**

- Humidity (operating): non-condensed 10% to 90%
- Humidity (storage): non-condensed 5% to 95%
- Temperature (operating): -20 to 60 °C
- Temperature (storage): -30 to 70 °C
- EMC regulation: FCC class A, CE and C-Tick approved
- Shock resistance: 1.2m drop onto concrete

### **2.3 Physical**

- Dimensions: 145mm (L) x 63mm (W) x 33.5mm (H)
- Weight: 180g (including batteries)
- Color: Dark gray
- Material: ABS

### **2.4 CPU**

- Toshiba 16-bit CMOS type CPU
- Dual clock, can be switched to *Low Clock* to save power (refer to the *speed* setting in section 5.3).

## 2.5 Memory

### *Program memory*

- 1 M Bytes flash memory is used to store the program code, font, constant data, and so on.

### *Data memory*

- 1 M Bytes SRAM.

## 2.6 Scanner

The *CPT-711 Portable Data Terminal* can be equipped with Laser or Long Range CCD scanners. Detail specifications are as following:

### *CPT-711L (Laser)*

- Light source: visible Laser diode operating at 670 ± 15nm
- Scan rate: 360 scans per second
- Scan angle: 42° Nominal
- Minimum print contrast: 20% absolute dark/light reflectance at 670nm
- Depth of field: 5 ~ 95 cm, depends on barcode resolution

### *CPT-711C (CCD)*

- Resolution: 0.15mm ~ 1.00mm
- Depth of field: 20cm
- Width of field: 45mm ~ 124mm
- Scan rate: 100 scans/sec
- Ambient Light Rejection:  
1200 lux (Direct Sun-light)  
2500 lux (Fluorescent Light)

## 2.7 Display

- 128x64 graphic dots FSTN LCD display with LED back-light

## **2.8 Keypad**

- 21 rubber keys, including alphanumeric keys, arrow keys, function keys, and scan trigger key.

## **2.9 Indicator**

### ***Buzzer***

- Software programmable audio indicator, 1KHz to 4KHz, low power transducer type.

### ***LED***

- Programmable, dual-color (green and red) LED for status indication.

## **2.10 Communication**

Three kinds of communication are provided: standard RS-232, Infrared, and RF.

- RS-232: Transmission speed up to 115200bps
- Infrared: standard IrDA 1.0 and high speed IR.  
Transmission speed up to 115200bps  
Distance: 5 to 100 cm  
View angle: 30 degrees
- RF: Transmission rate up to 9600bps  
Distance: up to 100 m

## **2.11 Programming Language**

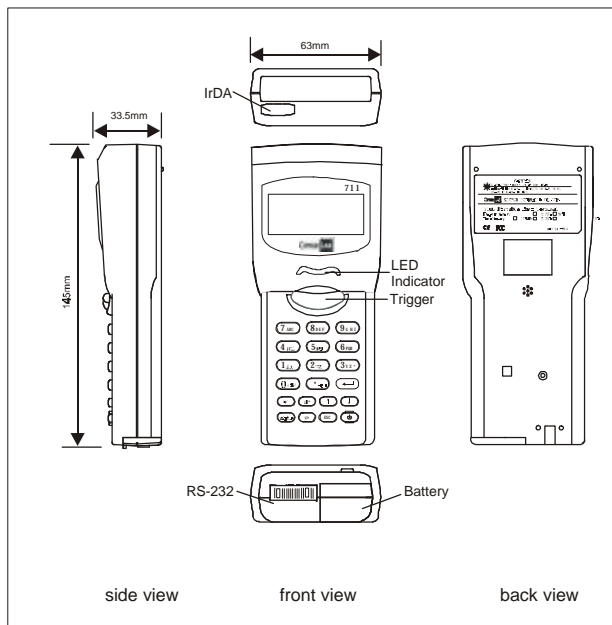
"C", "BASIC", and a Windows-based Application Generator

## **2.12 Accessories**

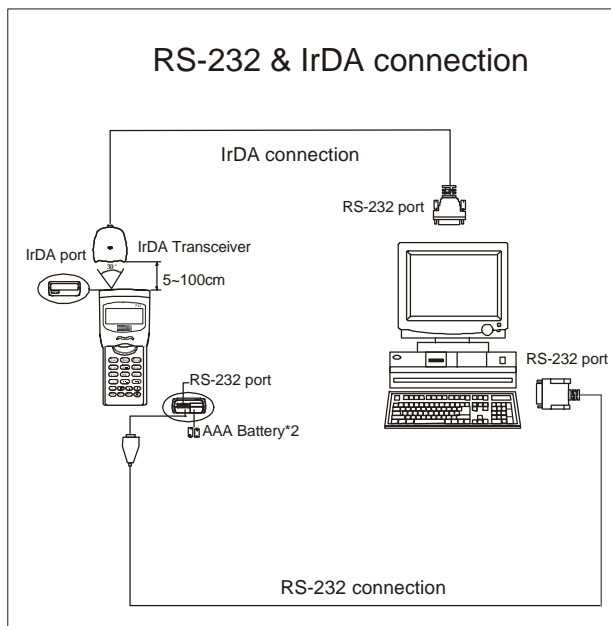
- RS-232 cable
- High speed IR Transceiver
- Cradle
- RF base station

### 3. Hardware Configuration

#### 3.1 Front, Back and Side View

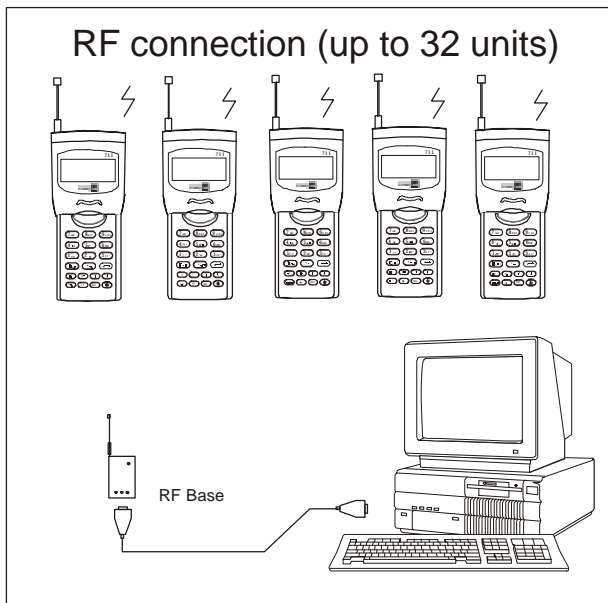


### 3.2 RS-232 connection & IrDA connection





### 3.3 RF connection



## **4. Software Organization**

The *CPT-711 Portable Data Terminal* system software consists of three modules: the *kernel module*, the *system module* and the *application module*.

### **4.1 Kernel module**

Kernel module is the innermost core of the system. It has the highest security and is always protected by the system. Only the failure of flash memory or improperly power off during system restart after updating kernel will the kernel be destroyed. The kernel module ensures that user can always download their own program even the operating system was crashed by user's program. It provides the following services:

- **Program download**
- **Update kernel**
- **Test & Calibrate**

For detail operations, please refer to section 5.4.

### **4.2 System module (the operating system)**

The system module provides the following system services

- **Memory**
- **Setting**
- **Reader**
- **Battery**
- **Test**
- **Download**
- **Version**

For detail operations, please refer to section 5.3.

### 4.3 Application module

The Application module runs on top of the System module. The *CPT-711 Portable Data Terminal* is preloaded with an application module that runs upon powering the unit up. The following menu will be shown:

- **Execute**
- **Clear Data**
- **Transmit Data**
- **Download Settings**

The arrow keys can be used to select the menu item, and execute it by pressing the *ENTER* key. The function and meaning of each item are as follows:

**Execute** Start the data collection process.  
A new screen appears after *Execute* is selected and the *ENTER* key is pressed, showing the following two prompts:

**Item:**  
**Qty:**

Data can be input from keypad or barcode reader. Pressing the *ENTER* key after the Quantity has been entered will save the data and the system will show the same prompts until the *ESC* key is pressed, which will bring back the main menu.

**Clear Data** To clear all the transaction data.  
A submenu will be shown asking to confirm this action. Once executed, the transaction data will be lost and can not be retrieved. To abort this operation, *No* must be selected when asked to confirm the operation or by pressing the *ESC* key to go back to the main menu.

**Transmit Data** To upload transaction data to the host PC. There are three ways to transmit the data: via RS-232 or Infrared or standard IrDA. Note: terminal COM port settings should match the host PC settings.

**Download Settings** To download the menus and form prompts for the data collection process. The settings should be configured in the *Application Generator*; then downloaded to the terminal. The *Application Generator* allows to define menus and data input forms. For detail operation, please refer to the *Application Generator's Operation Guide*.

#### **4.4 Build your own application module**

There are three software tools available for developing application programs.

- 1. The Application Generator**
- 2. The "BASIC" Compiler**
- 3. The "C" Compiler**

For more information, please contact CipherLab USA or Syntech Information Co., Ltd.

## 5. Operations

Batteries must be fresh and properly loaded before start operation.

### 5.1 Keypad operations

The keypad of *CPT-711* consists of 20 rubber keys and one trigger key. The functions of some special keys are as follows:

<b>ENTER</b>	<i>Enter.</i> This key is for command execution or input confirmation.
<b>BS</b>	<i>Back Space.</i> If pressed down longer than one second, a <i>clear</i> code will be sent.
<b>SP</b>	<i>Space.</i>
<b>UP</b>	<i>Cursor up.</i>
<b>DOWN</b>	<i>Cursor down.</i>
<b>Alpha</b>	<i>The toggle key for Alphabet / Numeral input.</i> When the system is in alpha-mode, a small icon will be shown on the display, and each numeral key can be used to generate one of the three capital letters. For example, numeral <b>7</b> can be used to produce <b>A</b> , <b>B</b> or <b>C</b> . Pressing the same key twice within one second, will call the letter <b>B</b> . Pressing the same key without halting longer than one second, will cause the three letters to be shown in a circulating way. Only when stop

pressing the key for longer than one second or pressing another key, will the system send the real key code to the application program.

#### **FN**

*The function key.*

This key can not be activated alone, it must be pressed with one numeral key at the same time. For example, **FN + 1** generates function #1, **FN + 2** generates function #2, etc (up to 9 functions). Also, this key can be combined with the *UP/DOWN* arrow keys to adjust the contrast of the LCD. And when this key is combined with the **ENTER** key, it will turn ON/OFF the LCD backlit.

#### **ESC**

*Escape.*

Usually this key is used to exit current operation.

#### **POWER**

*Power On/Off.*

To prevent a faulty push, it needs about 1.5 sec continuous pressing to turn On/Off the power.

### **5.2 Application mode**

This is the default operation mode when turning on the power. The operation depends on the application module. Please refer to section 4.4.

### **5.3 System mode**

When pressing the **7**, **9** and **POWER** keys simultaneously, the system will enter the System Mode with which provides the following services:

## 1. Memory

- Size Information** Includes the SRAM (Data memory) size and FLASH (Program memory) size in kilobytes.
- Initialize** To initialize the data memory (RAM). Note that the contents of the data space will be wiped out after memory initialization.
- Test** To test the data memory. For 256 KB SRAM, it takes about 15 seconds to finish the test. Note that the contents of the data space will be wiped out too after memory test.

## 2. Setting

- Clock** To set new date and time.
- Backlit** To set the intensity of LCD back-light and the duration for staying on.  
*Default: High intensity, the lights go off after 20 seconds.*
- Speed** To set CPU running speed. There are five speeds available:  
Full speed, 1/2 speed, 1/4 speed, 1/8 speed and 1/16 speed; which need about 39mA, 22mA, 12mA, 7mA and 5mA, respectively, during normal operation (without scanning or data transmission). If high-speed operation is not required, selecting low CPU speed will save battery power.  
*Default: Full speed*

**Auto Off** Set time threshold for auto power-off when no operation is taking place during that specified period. If this value is set to zero, this function will be disabled.  
*Default: 10 minutes*

**Power On** There are two possible selections: **Program Resume**, which starts from the program being used during the last session before the last power-off; and **Program Restart**, which starts with a new program.  
*Default: Program Resume*

### 3. Reader

**Reading test** To test the reading performance of the scanner. Following are the default enabled symbologies:

**Code 39**  
**Industrial 25**  
**Interleave 25**  
**Codabar**  
**Code 93**  
**Code 128**  
**UPCE**  
**UPCE with ADDON 2**  
**UPCE with ADDON 5**  
**EAN8**  
**EAN8 with ADDON 2**  
**EAN8 with ADDON 5**  
**EAN13**  
**EAN13 with ADDON 2**  
**EAN13 with ADDON 5**

Other symbologies, must be enabled through programming.



#### 4. Battery

**Main** Show voltage of the main battery power. If the main battery voltage is low, a battery icon (power-low indicator) will be shown on the LCD screen. The available power will be less than 25% of fresh batteries, The terminal will continue to work normally for a short period of time.

**Backup** Show voltage of the backup battery.

#### 5. Test

**Buzzer** To test the buzzer with different Frequency/Duration. Press **ENTER** key to start / stop the test.

**LCD & LED** To test LCD display and LED indicator. Press **ENTER** key to start / stop the test.

**KBD** To test the rubber keys.  
Press a key and the result will be shown on the LCD display. Note that the **FN** key should be used in conjunction with numeral keys.

#### 6. Download

**RS-232** To download the user program via RS-232 port. The transmission speed can be up to 115200 bps.

**Docking** To download the user program via communication cradle (charger). The transmission speed can be up to 115200 bps.

**IR** To download the user program via high speed IR transceiver. The transmission speed can be up to 115200 bps.

**IrDA** To download the user program via standard IrDA. The transmission speed can be up to 115200 bps.

## 7. Version

**Version Info** To show version information, including Hardware version, Firmware version, Serial Number and Manufacturing Date.

## 5.4 Kernel mode

Press the **7**, **9** and **POWER** keys simultaneously to enter the System mode, then power off and press **I**, **7** and **POWER** key simultaneously to enter the kernel mode which provides the following services:

**Program download** To download user program. The download procedure is same as download program in system mode. Please refer to the above section.

**Update kernel** To update system kernel. Sometimes the kernel might be changed for improving performance or other reasons. This function allows you to keep the kernel updated. The update procedure is same as download user program, but note that after updating the kernel, please do not power off until the system restart itself.

**Test & Calibrate** To perform a burn-in test and fine tuning the system clock. This function is for manufacture purpose only.

## **6. Troubleshooting**

- a) Does not power up after pressing **POWER** key.
  - Change the batteries.
- b) Does not power up after changing batteries.
  - Check if the batteries are properly installed with battery cap firmly closed.
  - If problem persists, call for service.
- c) Battery-low indicator is on,
  - Change the batteries.
- d) Cannot download application program from the host to the *CPT-711 Portable Data Terminal* or vice versa, via RS-232 port.
  - Check if the RS-232 cable is plugged tightly, then,
  - Check if host communication parameters (COM port, baud rate, data bits, parity, stop bit) match the *CPT-711 Portable Data Terminal's*.
- e) Cannot download application program from the host to the *CPT-711 Portable Data Terminal* or vice versa, via IrDA port.
  - Check if the IrDA transceiver tightly connected to host's COM port, then

- Check if host communication parameters (COM port, baud rate, data bits, parity, stop bit) matched portable's.
  - Check if the *CPT-711 Portable Data Terminal* is properly positioned within the reading range: (5 to 100cm, 30 degree solid angle) of the IrDA transceiver.
- f) Keypad does not work properly,
- Turn off the power then press the **7**, **9** and **POWER** keys simultaneously to enter the kernel mode operation.
  - From the system menu, select the **Test** and then its sub-item **KBD**.
  - Perform the key-in test.
  - If problem persists, call for service.
- g) Scanner does not scan,
- Check if symbologies used are enabled, or
  - Check if battery-low indicator is shown on the LCD display. If yes, change the batteries.
  - If problem persists, call for service.
- h) Abnormal responses,
- Open the battery cap and re-load the batteries.
  - Enter system menu by pressing **7**, **9** and **POWER** keys simultaneously.
  - Check if the *CPT-711 Portable Data Terminal* can have a correct response by performing entering data.
  - If problem persists, call for service.