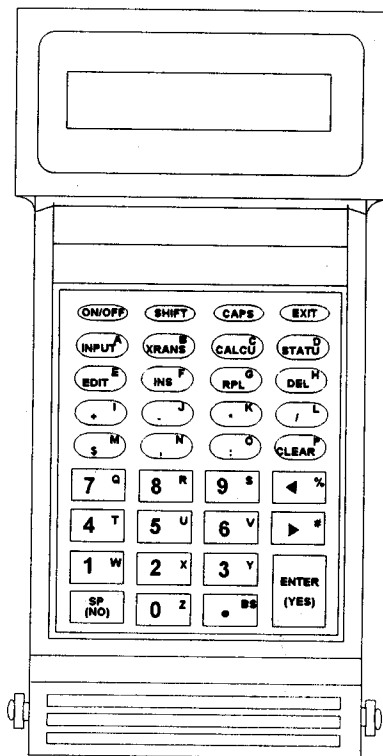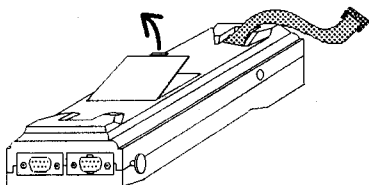# PT-805

USER'S MANUAL

Rev. 1.2   **September, 1994**

Note: *Your PT-805 is installed with a rechargeable NiCd battery pack in its battery compartment. The battery pack has been fully discharged prior to shipment. Please refer to the procedures below for the first time installation.*
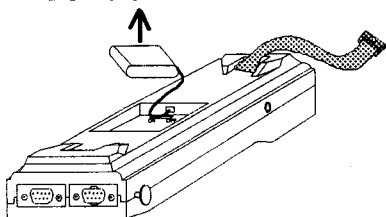
Procedures:

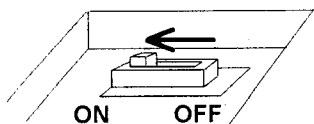1. Remove the hand strap retainer at one end to provide access to the battery cover.

2. Remove the battery cover on the underside of the **PT-805**.

3. Remove the main battery pack from the **PT-805**.

4. Set the Lithium battery backup switch to ON.

5. Insert the main batteries:

   ● NiCd battery:
   First, plug the charge connector of the NiCd battery pack to the **PT-805**, (See figure below). Then place back the whole pack inside the compartment. (reversing step 3).
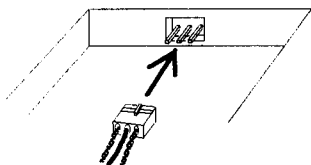
6. Replace the battery cover. (reversing step 1). Replace the hand strap retainer.

7. If you are using NiCd pack, charge the NiCd batteries for **14 to 16 hours.**

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Chapter 5 Interfacing And Communications

Chapter 6 Built-In Keyboard Wedge

Appendix :

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- Microsoft and MS-DOS are registered trademarks of Microsoft Inc.
- IBM, IBM PC, PC/AT and PS/2 are trademarks of International Business Machines Corp.
- Unitech and PC-WAND are registered trademarks of Unitech Electronics Co. Ltd.

Chapter 1   Overview

1.1   Read This First

To prevent injury to personnel or damage to the **PT-805** equipment, warnings
and cautions are included in the appropriate sections of this manual.

Warnings
Warnings, as presented in this manual, are shown as:

> **WARNING**
>
> This information located directly beneath the warning
> label (shown in boldface) provides the information
> associated with the warning label.
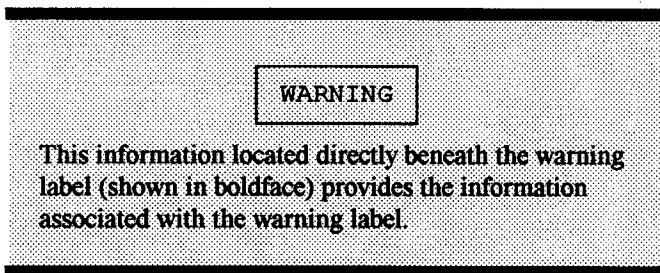
A **WARNING** is an operating procedure, practice, condition, or statement
which, if not strictly observed, could result in damage to the equipment.

All warnings contained in this manual should be read and understood by the
user prior to handling or operating **PT-805** equipment.

Do Not Repair Or Adjust Without Supervision
Equipment that is powered up should not be repaired or adjusted without
supervision. At this time proper safety precautions should be observed with
the **PT-805**, as with all electrical equipment.

Intended Readership
This Manual is intended to serve as a complete reference manual for systems
managers, application developers, and operators. The reader may only read
the required chapters according to his/her requirements. However, in order to
use the unit in the proper way every user should read chapters 1 and 2 .

1.2   Features of the PT-805

The **PT-805** Portable Terminal is a rugged, compact and lightweight handheld data collection device that offers many features for efficient bar code reading and keyboard data entry. The **PT-805** is not only a portable data collector but it can also be used as a PC/AT or PS/2 keyboard wedge. A keyboard wedge is a device used in conjunction with a keyboard to enhance data entry or control of the computer. The **PT-805** is ideal for a wide range of data management applications.
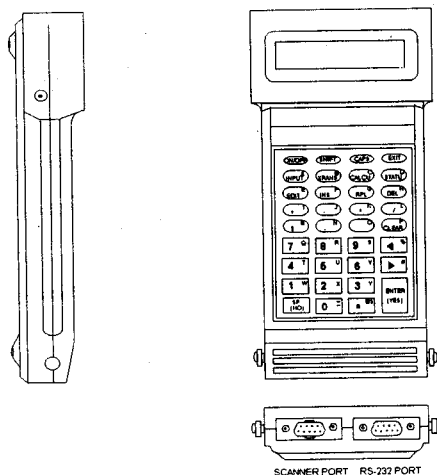
Figure 1-1. **PT-805**

Hardware
- SMT (Surface Mounted Technology)
- Rugged and Durable Design
- 64KB to 256KB user's RAM memory
- 64KB ROM
- 2 line x 16 character Liquid Crystal Display (LCD)
- Real-Time Clock
- Removable Batteries
    - 4 AA-size Alkaline Batteries
    - Rechargeable NiCd Battery Pack
- Recharging circuit of NiCd battery pack with protection from accidental charge of Alkaline batteries
- Onboard Lithium battery for data retention
- A Bar Code Scanner Input Port

- A RS-232 Port
- Built-in PC/AT, PS/2 keyboard wedge function to upload data directly to PC or PS/2 through keyboard port

Software
- Resident operating program (ROP)
- Auto executes user's program when power is turned on
- Decoding software for all major bar code symbologies:
  - UPC-A, UPC-E
  - EAN-13, EAN-8
  - Interleaved 2 of 5
  - Standard Code 39
  - Full ASCII Code 39
  - Codabar
  - MSI
  - Code 128
- Low power monitor for main battery and backup battery
- Auto power off function
- Embedded system diagnostics, data entry application and bar code decoding software
- Automatically accepts barcode input from Wand, CCD or Laser scanner
- Audio buzzer for feedback of key-pressing and barcode reading
- PC keyboard interface driver

The **PT-805** operates on a rechargeable Nickel Cadmium (NiCd) pack or disposable Alkaline batteries. Data can be input through bar code reading or keypad input and stored in RAM memory, backed up by an internal Lithium battery to prevent loss of data for up to **8 months** when the main batteries are removed or replaced. <u>Section 2.3 Type of Batteries</u> contains battery information and should be read prior to operating the **PT-805**.

The Display and Keypad
The large Liquid Crystal Display (LCD) of the **PT-805** can display 2 lines by 16 characters per line for a total of 32 characters. The colorful and versatile keypad supports special characters, upper/lower case letters, user-definable function keys, and numbers.

Data Entry
Data can be entered through the alphanumeric keypad, or via bar code input devices (Wand, CCD or Laser diode scanner). The beeper signals to the operator when a bar code is successfully read or a key is pressed.

Bar Code Input Capability
The **PT-805** supports bar code scanning input and automatically discriminates bar code symbologies. It reads UPC-A, UPC-E, EAN-13, EAN-8, Interleaved 2 of 5, Standard Code 39, Full ASCII Code 39, Codabar, Code

128 and MSI. Each bar code symbology can also be individually enabled or disabled.

Transmitting Data Files
The terminal can communicate directly with other computers and can upload and download ASCII or non-ASCII data files. Data files are transmitted between the **PT-805** and a host computer by the RS-232 interface or a Modem. Chapter 5 provides the details for interfacing the **PT-805** with other systems. **PT-805** also can upload data to PC/AT or PS/2 as a **Keyboard Wedge**.

1.3   Application Development Environment

Resident Operating Program (ROP)
The ROP is a Resident Operating Program in the **PT-805** which consists of a system kernel, I/O drivers, and a built-in data-entry application generator. Through use of the ROP the user can define data collection applications by using the keypad of the **PT-805**. For a detailed description of the ROP, please refer to Chapter 4 Resident Operating Program (ROP). More complicated applications can be created by using the **Job Generator** program.

Job Generator
The **Job Generator** is an MS-DOS or PC-DOS based application program generator. Users can create their own applications by using **Job Generator** with a Personnel Computer and then downloading the generated JOB program to the **PT-805**. A customized data collection program can be created through the supplied macros. The generator will translate it into a data collection application ready to be loaded into the **PT-805** terminal. An operator can edit, erase, review, and modify the built-in operations and enable a variety of terminal operations. After collection, the data can be uploaded to the PC for further processing. For more detailed information about **Job Generator** and the associated macros, please refer to the separate *Job Generator user's manual*.

Related Publications
Other documents published by **Unitech Electronics Co.,Ltd.** directly relate to using the **PT-805** are:
   Job Generator User's Manual

1.4   Conventions Used

The following conventions are observed throughout this manual.

Displayed Messages
Displayed messages are shown in the same format as they are displayed on the terminal screen. For example,

```
PT805 256KB V1.00
>
```

Command Syntax
Command syntax is given in a format useful to performing the task.

Keypad Keys
References to specific keypad keys are shown with the name of the key enclosed in square brackets, For example, Press [ENTER] means to press the key on the keypad that is labeled ENTER. In some cases, ^ or CTRL is used to represent the CONTROL key of a PC .

Chapter 2   Installation

2.1   Battery Considerations

PT-805 is operated by battery power and there are two separate battery power sources for normal operation and memory backup. The main power source can be provided by using a rechargeable NiCd battery pack or 4 AA-size ordinary batteries, placed in the main battery compartment. High capacity Alkaline batteries are recommended for use as the 4 AA-size batteries. A Lithium battery is used to backup the system real time clock and the contents of the RAM memory if the main battery is discharged or removed.

The power circuit of the **PT-805** is designed, in an effective way, to provide the user with a data loss-free environment. The Lithium battery can supply the power for up to 5 years before losing its capability and the power consumption required for backup is very little. However, it may be necessary to replace it in 8 months if the user does not use the power properly.

The power of the Lithium battery is only consumed when the main power source is not available, such as if the main battery is removed or the main battery power is discharged. So if a NiCd battery pack or 4 AA-size batteries are put in the main battery compartment, power is provided to backup the RAM memory and system real time clock, which effectively puts the Lithium battery in a standby condition. The power circuit of the **PT-805** monitors the voltage level from the main power source and automatically connects the Lithium battery for backup once it has detected that no power is coming from the main power source. Under these conditions, the life of the Lithium battery would be 8 months. Therefore it is highly recommended that the main battery always be kept inside the unit and fully charged.

In the event a **PT-805** may not be used for a period of time (for instance 3 weeks or longer) and the main battery is taken out, it is also recommended that the Lithium battery should be physically disconnected to prevent its dissipation by setting the switch right above the main battery compartment to the OFF position. **However, all data contents will be lost in this case.**

After unpacking your **PT-805**, to prepare the **PT-805** properly before use, the user must follow the special procedure and notes described below.

2.2 Battery Installations

NOTE   Although a Lithium battery is installed it is electrically disconnected during shipment from the manufacturer. Prior to using the **PT-805** for the first time, please set the Lithium battery backup switch to ON. (see installation procedure below)

NOTE   The **PT-805** NiCd battery pack has been fully discharged before shipment. Prior to using the **PT-805** for the first time, charge the NiCd batteries overnight or approximately 14 to 16 hours.

Procedure:

1.   Remove the hand strap retainer at one end to provide access to the battery cover.
2.   Remove the battery cover on the underside of the **PT-805**.
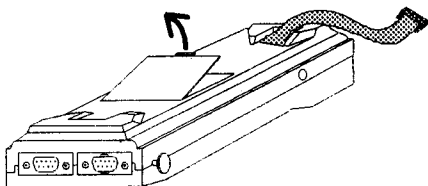
3.   Remove the main battery pack from the **PT-805**.
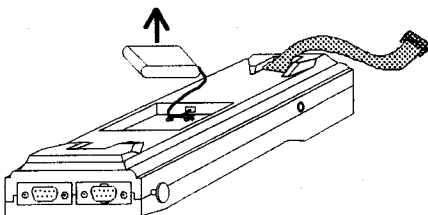
4.   Set the Lithium battery backup switch to ON.
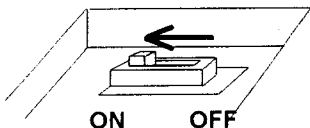
5.   Insert the main batteries:

*   NiCd battery:
     First, plug the charge connector of the NiCd battery pack to the **PT-805**, (See figure below). Then place back the whole pack inside the compartment. (reversing step 3).
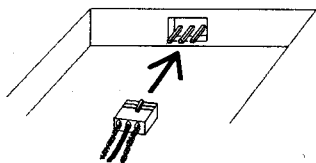
*   Alkaline batteries:
     Orient them as shown by the polarity symbols in the battery compartment.   Make sure that the battery poles are correctly oriented. Skip step 6, when using Alkaline batteries.
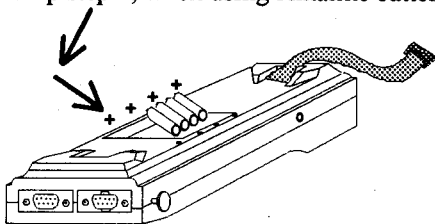
6.   Replace the battery cover and replace the hand strap retainer. (reversing step 2 and 1).

7.   If you are using NiCd pack, charge the NiCd batteries for **14 to 16 hours.**
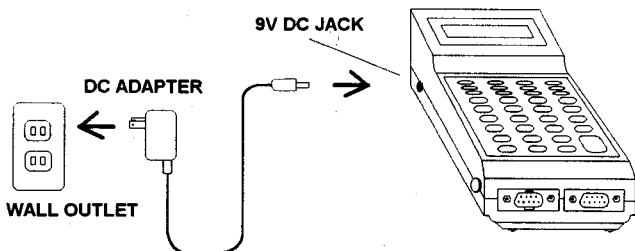
2.3   Type of Batteries

Rechargeable NiCd Battery Pack
One of the power source options for the **PT-805** is the rechargeable NiCd
battery pack, which consists of four AA-size NiCd batteries.   The pack
supplies 4.8V DC power with a capacity of 700 mAH (mA Hour) after being
fully charged.

> **WARNING**
>
> Do not incinerate, crush, or puncture batteries. The
> electrolyte contained in NiCd batteries is composed of
> caustic materials that harmful to eyes and skin.

Alkaline Batteries
Alternately, **PT-805** can use 4 AA-size Alkaline batteries. Use Alkaline
batteries with a capacity of 700 mAH or more (normally with a capacity of
1000 mAH) are recommended.

> **WARNING**
>
> Do not dispose of Alkaline batteries in fire. Do not
> attempt to recharge Alkaline batteries. Do not place
> them in the reader backwards.
> Do not mix with used batteries or other types of
> batteries. They may explode, leak, and cause personal
> injury.

2.4 Backup Battery

The **PT-805** uses an internal 3-Volt CR2032 Lithium battery for backup to the RAM memory and system real time clock when the main battery power is not available, such as being taken out or discharged. Under normal conditions, it takes years of inactivity or storage for the terminal to lose its backup power.

2.5 Low Battery Indication

Main Battery
A low main battery condition is indicated by a **flashing LCD display** when the **PT-805** is in use. When a main battery low condition occurs, the main battery can continue to supply power for about two hours under normal use. The **PT-805** will still work normally, with a flashing LCD indicating a main battery low condition. However it may reach the system power cutoff point and automatically turn off the **PT-805**.

The period of time the **PT-805** may be used before reaching the cutoff point varies due to the power consumption of different scanners. Though it should not cause any data loss, a system cutoff may leave an incomplete transaction in the data collection operation. In this condition the unit continues to backup data and application programs in RAM memory, but it will not function until the batteries have been recharged or replaced.

Lithium Backup Battery
When you turn on a **PT-805** which has had its Lithium battery discharged or physically disconnected by having the on/off switch set to OFF, a backup battery low warning will be shown on the **PT-805** LCD, as follows:

```
REPLACE LITHIUM
BATTERY !
```

In this situation you should check the Lithium battery enable-switch and set the switch to ON if it is in OFF position. Upload your data from the **PT-805** to the PC and have the Lithium battery replaced when the above message is shown with the switch set to ON. Contact your local sales or service representative for replacement of the Lithium battery.

<u>**Battery Service Time**</u>

Information below is provided as a reference. The actual service time may vary due to different application, type of battery, and operating environment. The user should understand the battery power system of **PT-805** described in this chapter for maximum performance.

<u>Continuous Operation:</u>   When data is continuously entered by keypad or WAND scanner.

1500 mAH Alkaline batteries:	12-14 hours
700 mAH NiCd battery pack (fully charged):	8-10 hours

<u>Data Backup:</u>   When the **PT-805** is powered off.

By main battery:

1500 mAH Alkaline batteries:	1.5 years
700 mAH NiCd battery pack (fully charged):	12 months

By Lithium battery: 8 months
(in a situation where the main battery is unavailable)

2.6   Battery Replacement

The main batteries can use NiCd pack or Alkaline Batteries which are the same physical size, and installed in the same battery compartment of the **PT-805** (see Figure 2-1). Please refer to installation procedures in <u>Section 2.1 Battery Considerations</u> for replacement of the main battery. Contact your local sales or service representative for replacement of the backup battery.
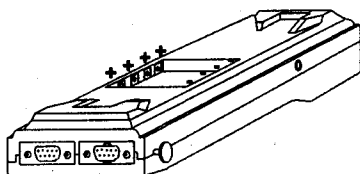
Figure 2-1 Battery Compartment

2.7 Recharging the NiCd Battery Pack

When the **PT-805** gives a low battery indication (flashing LCD), the NiCd batteries need to be recharged. Plug a power adapter into the **PT-805** and into a wall outlet. The installed NiCd battery pack will be fully recharged at the normal rate of 14 to 16 hours (see Figure 2-2).
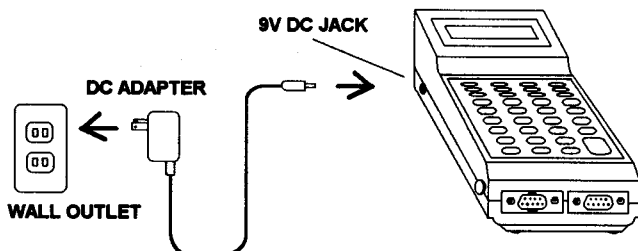
Figure 2-2   **PT-805** with Power Supply

NOTE   The AC-DC power adapter is only for NiCd battery pack recharging. It will not recharge Alkaline batteries.

Charging Consideration
It is important to consider the surrounding temperature whenever you are charging NiCd batteries. The process is most efficient at normal room temperature or slightly cooler. It is essential that you charge batteries within the stated range of 32°F to 113°F (0°C to 45°C).

CAUTION   Charging batteries outside of the specified range could damage the batteries and shorten their life cycle.

Effects of Overcharging Batteries
Overcharging occurs when a battery is left in a charging device after it has been fully charged. NiCd batteries are capable of withstanding a reasonable amount of overcharging at the charging rate provided by a **PT-805** portable terminal and charging modules without any damage being caused. However, if the NiCd batteries are charged for too long, they can sustain a temporary reduction of capacity. A battery left to charge for several weeks may appear to have minimal capacity. This type of failure is remedied by temporarily depleting the battery of its power and recharging it in the charging module to

- 12 -

rejuvenate it. This condition can be prevented by avoiding overcharging for long periods of time. The recommended charge time for NiCd batteries (charged with a portable terminal) is 14 to 16 hours.

2.8   Storage and Safety Precautions

NiCd batteries should be stored in an open circuit condition and placed where there is no risk of accidental shorting or other damage. Although charged NiCd batteries may not be used for several months, the capacity may be reduced due to backup support and internal resistance. They will then require recharging prior to use. NiCd batteries may be stored at temperatures between -4°F and 158°F (-20°C to 70°C), however they may be depleted more rapidly at the high end of this range.

> **WARNING**
>
> Do not short-circuit a battery. Burns may result. Short circuits can occur if a battery is placed where metal tools, coins, or keys may inadvertently contact the terminals.

Chapter 3   Input Method

3.1   A Look at the PT-805
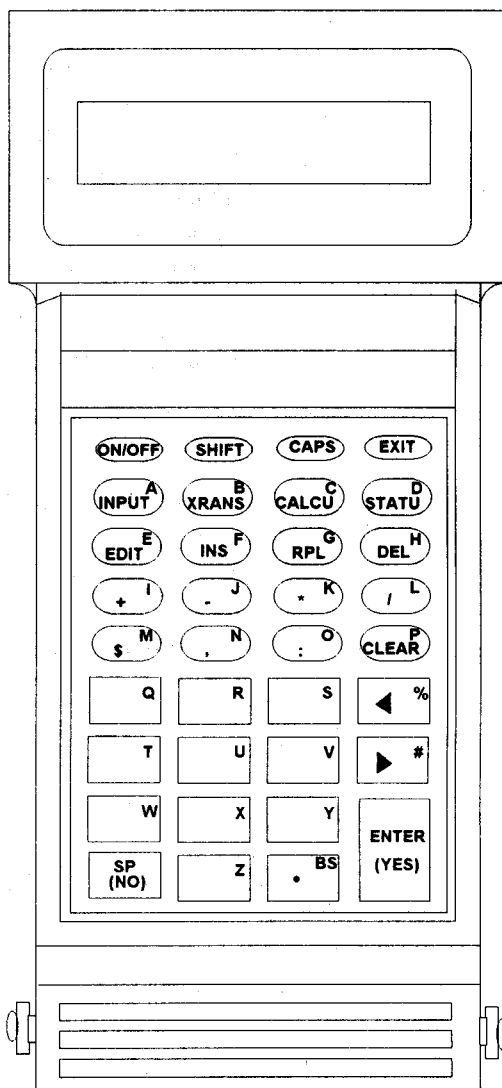
Figure 3-1   **PT-805** Keypad

3.2   Using the Keypad

The **PT-805** keypad consists of control keys, function keys, letter keys, and numeric keys (see Figure 3-1). All keys except **[ON/OFF]** will produce a sound (tone) when pressed. The operation of these function keys on the keypad is described as follows:

3.3   Control Keys

There are three control keys, **[ON/OFF]**, **[SHIFT]**, and **[CAPS]**. Their function are :

<u>[ON/OFF]</u>
Pressing the **[ON/OFF]** key when the **PT-805** is off causes the LCD to display an initial message, followed by a ">" ready prompt. An "OFF" condition occurs when:

- The **[ON/OFF]** key is pressed while the terminal is ON
- The batteries are removed
- The battery voltage is exhausted beyond the low voltage cut-off point.
- The auto power off function is enabled and time out results without any keys being pressed or bar code data input.

The contents of CMOS RAM, data and programs are protected by backup battery when the **PT-805** is turned off.

<u>[SHIFT]</u>
The **[SHIFT]** key toggles the keypad between the selection of upper right and the lower left functions on the keys of the keypad. Once the **[SHIFT]** key is pressed, the keypad will change from a normal state to a shifted state and vice versa. In the shift function, the secondary function of the keys are permitted and the cursor on the LCD will be displayed as a flashing black block, "▉" Table 3-1 gives the keypad function in various modes, some keys, such as [ENTER], have the same usage in both normal state and shifted state.

<u>[CAPS]</u>
The **[CAPS]** key toggle the keypad between the selection of upper and lower case letter keys. The **[CAPS]** only has an effect on the letter keys (see Table 3-1).

Table 3-1 Keypad Functions

KEY	[SHIFT]	[SHIFT & CAPS]
INPUT	A	a
XRANS	B	b
CALCU	C	c
STATU	D	d
EDIT	E	e
INS	F	f
RPL	G	g
DEL	H	h
+	I	i
-	J	j
*	K	k
/	L	l
$	M	m
,	N	n
:	O	o
CLEAR	P	p
7	Q	q
8	R	r
9	S	s
4	T	t
5	U	u
6	V	v
1	W	w
2	X	x
3	Y	y
0	Z	z
◄	%	%
►	#	#
•	BS	BS
SP	SP	SP
ENTER	ENTER	ENTER
EXIT	EXIT	EXIT

3.4   Function Keys

There are nine fixed function (non-programmable) keys in the **PT-805** :

[EXIT]   Whenever the **[EXIT]** key is pressed, the terminal exits the current operation and returns to the last function. For example, in the Input Mode, pressing the **[EXIT]** key will return the **PT-805** to the Ready Mode.

[INPUT]   Press this key to enter Input Mode, which allows you to input and edit collected data.

[XRANS]   Press this key to enter Communication Mode. This allows the **PT-805** to transmit collected data to the PC or to receive a Job Generator Program from a PC.

[CALCU]   Press this key to enter Calculator Mode. Four basic arithmetic operations (+, -, * /) are provided. The [(NO)] key will clear the display.

[STATU]   Press this key to enter Status Checking Mode, which permits the verification of free memory and displays how many data records for each form.

[EDIT], [INS], [RPL], [DEL] are provided to view and edit the data in the memory after entering the input function. For a more detailed description, please refer to Section 4.5.2. Editing Data.

[CLEAR]   Press this key to clear the current input buffer all data and set the cursor back to the original position.

3.5   Alphabetic Keys and Special Character Keys

The letter keys are data entry keys. There are 26 of them, one for each letter of the alphabet. First, you must press the **[SHIFT]** key to access the letter keys. The upper case or lower of each key depends on the state of the **[CAPS]** key. The following are returned (see Table 3-1):

- An upper-case letter (**default**).
- An lower-case letter when the [CAPS] toggle is ON.
- A special character, like "+", "-" ,"*" etc., when the [SHIFT] toggle is OFF.

3.6   Numeric and Arrow Keys

The numeric keys [0] - [9] are larger for easy data input. The two arrow keys [◄] and [►] are used to move the cursor when editing data or setting functions.

3.7   Connecting a Wand to the PT-805

To connect a Wand to the **PT-805**, connect the Wand connector into the scanner port on the bottom of the **PT-805** (see Figure 3-2). The **PT-805** can auto-discriminate the type of scanner from Wand, CCD scanner or Laser scanner.

SCANNER PORT
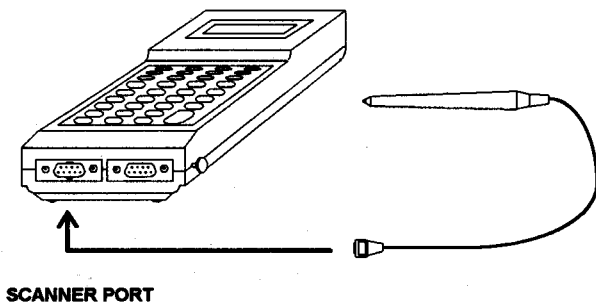
Figure 3-2   Connecting a Wand to the **PT-805**

After connecting the wand to the **PT-805**, power up the terminal. The following label can be read for testing:

WAND

3.8   Connecting a Laser Scanner

The **PT-805** can use the Laser diode scanner without an external power source being required. To connect the Laser diode scanner to the **PT-805**, snap the Laser scanner connector into the scanner port on the bottom of the terminal (see figure 3-3). The **PT-805** can auto-discriminate the type of scanner (Wand, CCD scanner or Laser scanner).

SCANNER PORT
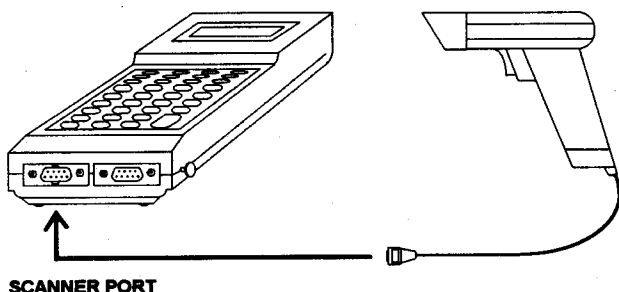
Figure 3-3   Connecting a Laser Scanner to the **PT-805**

After connecting the Laser scanner to the **PT-805**, power up the terminal. Read the following label for testing:

LASER

Chapter 4   Resident Operating Program(ROP)

4.1   Introduction

The Resident Operating Program (ROP) is a program stored in the PT-805 ROM. The ROP serves as an operating system program, managing the PT-805's memory, downloading program, and resident application program. Through the ROP, the user can quickly develop applications for using the PT-805 keypad. In general, the ROP provides the following functions to the user:

- A programming mode which allows the user to define the data collection application.
- Execution of the defined application.
- Receiving a generated program from the Job Generator.
- Sending data to the host.
- Displaying the status of the terminal.
- Arithmetic calculation.

This chapter will give detailed information about using the built-in application program. Knowledge of the general logic flow for bar code processing is assumed.

Operating Flow of the ROP

Figure 4-1 shows the operating flow of the ROP. Each block indicates a function or a "state" that the PT-805 performs. The functions will not be discussed until later in this chapter. As figure 4-1 indicates, by pressing the [ON/OFF] key the PT-805 is powered on, and by pressing the [INPUT] key the prompting message "Input ROP?   (Y/N)" is displayed on the LCD screen. Pressing [(YES)] key will cause the PT-805 to go to the ROP input data function.
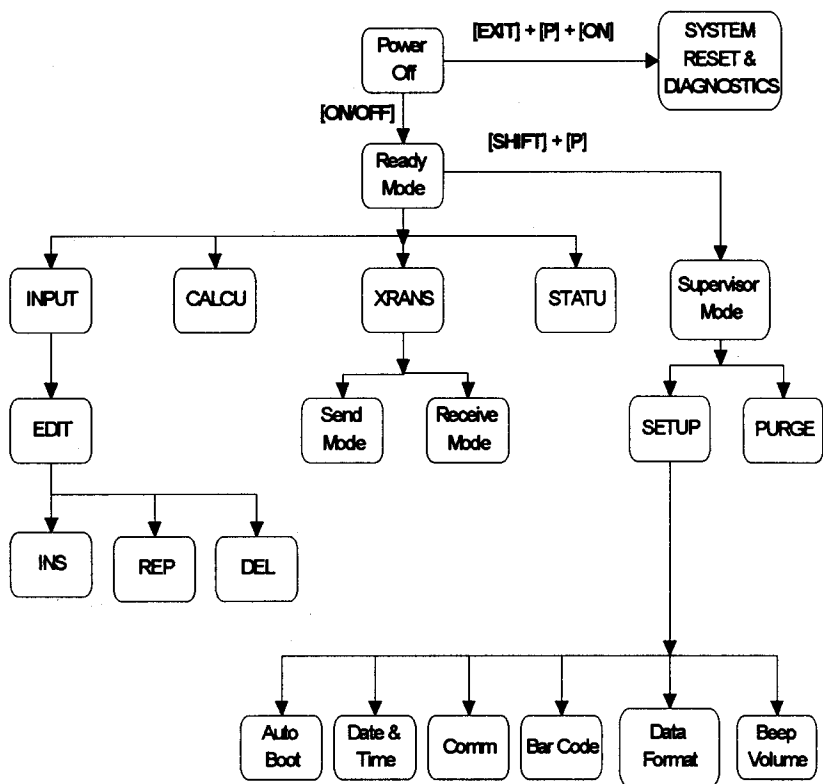
Figure 4-1   System Functions of the PT-805 ROP

4.2   System Reset PT-805 and Enter Diagnostic

There may be an occasion when you want to completely clear out everything that you have stored in the RAM of your **PT-805**. However, this can be a drastic measure if done erroneously. Consequently, the **PT-805** will ask for verification.

To reset the **PT-805**, turn off the terminal, press the [EXIT] , [P] and [ON/OFF] keys simultaneously, and then turn the terminal ON. The screen will display the following message:

```
System Reset ?
     (Y/N)
```

Pressing [(NO)] will not reset the data in the **PT-805**. **Pressing [(YES)] will erase all the information stored in the PT-805 RAM, including files, programs, and parameters.** Then the **PT-805** will ask if you want to run the **Diagnostic** function or not. For more detailed information refer to Appendix A. Built-in Diagnostic Program.

CAUTION   Data will be lost after SYSTEM RESET and some of the data and programs in the RAM memory may not be recovered.

4.3   Power On the Terminal

When you first switch on the **PT-805**, the screen will display a series of status messages indicating the version number, total RAM, and total available RAM:

```
PT805 xxxKB Vn.nn
>▒
```

On the display, the first line shows the model number, how many kilobytes of total RAM (i.e. 256KB) and the version number (e.g. V2.00). The amount of RAM will depend on the **PT-805** model (see ordering information).

<u>Low Voltage Cutoff Point</u>
When pressing the **[ON/OFF]** key the terminal may not be switched on if the batteries are below the low-voltage cutoff point. Replace or recharge the batteries at this time. Another possibility is that the terminal may be powered on, but the screen is flashing. This indicates that the batteries are low and the device can be operated only until the cutoff point is reached. Both of the aforementioned situations will not result in data loss from the memory since a back-up battery is in the **PT-805** as well. For detailed information about batteries, see <u>Chapter 2. Installation.</u>

4.4   Ready Mode

The last line on the display shows the prompt, ">" which indicates that the terminal is in the "READY" mode. At this time the terminal can accept characters from the input devices (keypad or Wand), show the LCD display only, transmit out data to the serial port and respond to the serial port. The functions of ready mode are as follows:

<u>Read Labels in Ready Mode</u>
In ready mode the labels can be read by using wand or a scanner. To test your terminal, scan the following label:

UNITECH

If the **PT-805** is connected to a terminal or a host, the label will be sent to the host through the RS-232 interface provided the proper software is installed on the terminal or host.

Using the Keypad in Ready Mode

The keypad can also be used as an input device. Alternately, the keypad can be used in conjunction with the **ROP** or Job Generator.

Transmitting Data in Ready Mode

In ready mode, labels or characters scanned/read from input devices of the **PT-805** will be sent out via the serial port located on the bottom of the terminal (Refer to Chapter 4, Interfacing and Communications). In ready mode the **PT-805** serves as a dumb terminal to transmit data to a personal computer.

Receiving Data in Ready Mode

Data can be received from the serial port and displayed on the screen. Again, the user should know that the communication parameters must be set properly before receiving data.

Receiving Commands in Ready Mode

The **PT-805** can be controlled and programmed alternately from a PC or Host. Commands can be sent via the serial port. Some commands, called host commands, are provided to control the terminal in ready mode. This gives flexibility for programmers to write their own applications and controls by using the computer. Table 4-1 gives a summary of the host commands.

Table 4-1   Summary of Host Commands

Host Commands	Response of the PT-805
<ESC> <I> *<form name>* <CR>	INPUT the form specified in *<form name>* directly.
<ESC> <P> *<form name>* <CR>	PURGE the data specified in *<form name>* directly.
<ESC> <X> *<form name>* <CR>	SEND the data specified in *<form name>* directly.
<ESC> <V> <CR>	SEND version number.
<ESC> <D> <CR>	Prepare to RECEIVE a job generated from Job Generator.

For example, to command the **PT-805** to send data to the computer, send to the **PT-805** the command sequence, <ESC> <X> <form name> <CR>, where

<ESC> is the ASCII code 27, <X> is the letter "X", and <CR> is the ASCII code 13. The <form name> specifies the collection application sent. For instance, the "ROP" is used as the form name for the built-in application. The following table shows the activity when host commands are sent to the **PT-805**:

COMPUTER	PT-805	DESCRIPTION
<ESC>XROP<CR>	⟶	Request data in the ROP form.
⟵	<DATA PACKET>	PT-805 sends out the ROP's data (format is described in <u>Section 5.3 Communication Data Format and Protocol</u>)

In fact, host commands are designed to correspond to each of the functions in the ROP. These functions are described later in this chapter.

4.5 INPUT Function

The INPUT function is used to select and execute the data collection programs. A ROP program can be created using the "Set Data Format" in SETUP of supervisor mode. Other programs can be created with the Job Generator program and downloaded to the **PT-805**. A program is composed of the following procedures:

● Prompting Message
● Data Input
● Data Checking
● Data Format

These procedures are continued until the job is terminated by the operator. The INPUT function also allows for the data to be edited. This includes data insertion, deletion, or replacement. Each task is described below:

Prompting Message
The prompting message gives the operator directions as to the data to enter. Messages like "ENTER PRICE", "ENTER SERIAL NO.", etc. aid in the data collection process by organizing the data and allowing even a novice to quickly collect data.

Data Input
Data can be input by a wand, scanner or the keypad.

Data Checking

In order to insure the accuracy of the data collected the ROP has the following checks available for users:

- Bar Code Discrimination
- Length of Data
- Picture or Mask Check

Many bar codes can be interpreted by the **PT-805**. To increase the accuracy of the label reading, it is best to allow only the specific bar code used to be read.

Field length can be checked by defining the minimum and maximum data length. This will reject labels with incorrect lengths. This is especially convenient for bar codes like Interleaved 2 of 5, which may read in the wrong width.

The picture or mask check rejects any data that does not conform to a defined "picture" or "mask". In most applications labels have a fixed format. For example, if a mask was defined where the first three characters are numbers, the fourth character is a letter, and the last three characters are numbers, then 123A456 would be checked and accepted while ABC9DEF would be rejected.

The picture or mask definition is covered in <u>Section 4.9.5 ROP Data Format Setting</u>.

Data Format

In the ROP, data entered is stored in RAM with a specific file format or form. A form is defined as a series of control parameters and collected data. The control parameters include the prompting message, checks, delimiters, etc. The data is composed of records with each record separated by a record delimiter. A record can be composed of multiple fields with each field separated by a field delimiter. Record and field delimiters are chosen according to the after collection processing application. Figure 4-2 shows a sample record.

| Field #1 | F | Field #2 | F | .... | | Field #n | R |

Figure 4-2   Composition of a Record

Where   n: can be up to 16 fields
        F   field delimiter ([,] , [;] , [SPACE] and none)

In Figure 4-2, the letter F represents the field delimiter([,], [;], [SPACE] and none) and the R represents the record delimiter (CR, LF, CRLF and none). Both of them are defined in the "Set Data Format" function. For instance, an application related to an order system may have three fields: ITEM, QUANTITY, and CUSTOMER. With field delimiter "," and record delimiter <CR><LF>, the records of the data, after being entered, would be organized like this:

> CHAIR,10,TOM<CRLF>
> COMPUTER,12,LISA<CRLF>
> DESK,1,SOMEONE<CRLF>

Figure 4-3 shows the data collection sequence for this example. At first, the operator scans a label for field #1, and if the label passes the verification process the next label is scanned for field #2. If the data does not pass the PT-805 checks, the operator needs to scan the label again. After these three fields are scanned, the record is stored in the memory and the operator is returned to the first field to begin the data collection sequence for the next record.
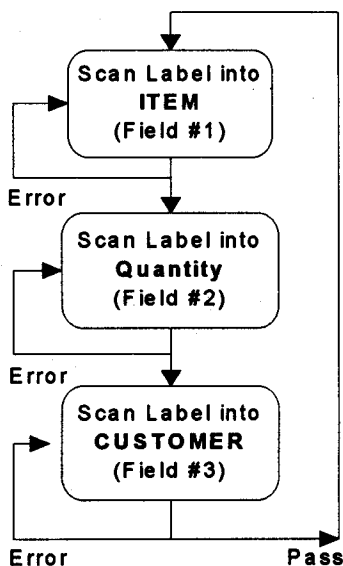
Figure 4-3   Sequence of Collecting a Record

In general, the data structure of a form may be depicted as follow:

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Field #1	F	Field #2	F	....		Field #n	R
Field #1	F	Field #2	F	....		Field #n	R
Field #1	F	Field #2	F	....		Field #n	R
....		....		....		....	
Field #1	F	Field #2	F	....		Field #n	R
Field #1	F	Field #2	F	....		Field #n	R

Figure 4-4 Data Structure of a Sample Form

The format of the record shown in figure 4-4 is the same as the **PT-805** would transmit to your PC except for some control characters used in communication (refer to <u>Section 5.3 Communication Data Format and Protocol</u>). The **PT-805** can format data with various formats and delimiters for conversion to different applications.

The format shown in figure 4-4 can be easily converted to a format that can be used as a data file for programs such as dBASE. A BASIC file format (e.g. "CHAIR",123,"TOM") also can be generated directly by using the comma field delimiter with a special picture (refer to <u>Section 4.9.5 ROP Data Format Setting</u>).

4.5.1   Entering Data

As described above, a <u>form</u> can be generated in the ROP to a specific data collection application. The <u>form</u> generated in the ROP has the form named "ROP". To execute the ROP, press the **[INPUT]** key from the "ready mode". After the INPUT function is selected the screen will display:

```
INPUT ROP?
      (Y/N)
```

Use **[(YES)]** or **[(NO)]** key to select form program. To create other forms, you need a <u>Job Generator</u> to generate applications on a PC and then download to the **PT-805**. To get more information about the Job Generator program, refer to the *Job Generator manual.*

After the INPUT function is executed the display will show the previously created form, for example:

```
┌─────────────────────┐
│ITEM:□□□□□□□□□□       │
│QUANTITY:□□□□□        │
└─────────────────────┘
```

In the above screen, the "ITEM:" is the prompting message, and the small square boxes indicate where the data should be located. If messages and data displayed on the screen exceed 2 lines, then a scroll up will occur. Data entered is rejected by the **PT-805** when it can not pass the checks, at which time the terminal will beep and display a warning message, and request the user to enter the data again.

To back out of the INPUT function, press the **[EXIT]** key. After exiting, no data will be lost until the user uses an editing function or PURGE function in the "Supervisor Mode". The user can go into the INPUT function to continue entering data without loss of data records.

NOTE Note that if a record is not finished before exiting, then it will not be stored into the terminal, and will be lost. The data storage in the ROP is record-oriented and the user should take care that the record is finished before powering off or exiting; otherwise the unfinished record will permanently disappear.

Edit is used to occasionally modify data by insertion, deletion, replacement, etc., while the PURGE deletes all the data stored in the ROP (form).

4.5.2   Editing Data

Occasionally a user may want to view or modify data stored in the **PT-805**. To list or edit data, press the **[EDIT]** key while in the INPUT function, then the display may be, for example:

```
┌─────────────────────┐
│23.3:TOM             │
│      *END*  ←        │
└─────────────────────┘
```

In the upper left corner of the display, the number 23.3 indicates that there are 23 records stored in the form ROP at this time, and three fields in a record. Furthermore, data in the third field of the 23rd record is "TOM". In the bottom left corner, the message, "*END*", indicates that this is the last

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record of the form. The message in the bottom right corner, "←", indicates that the cursor keys can be used to view more data.

If there do not have any data inside the form, then the display will show:

```
┌─────────────────┐
│                 │
│ *No Data*       │
└─────────────────┘
```

Exit from Editing

To exit the editing function, use the [EXIT] key to return to the INPUT function.

In the ROP, the **PT-805** provides an editor with the following functions:

- View Data [◄], [►]   View data from the display.
- [INPUT ^{A}]   Go to top of record
- [0 ^{Z}]   Go to bottom of record
- [SP]   Toggle to change 1 or 10 records per step. The special character 'Δ' will shown on LCD.
- Insertion [INS]   Insert a record.
- Replacement [RPL]   Replace a field.
- Deletion [DEL]   Delete a record.

View Data

After entering the edit mode by pressing the [EDIT] key in the INPUT function, the [◄] or [►] arrows can be used to scroll through the data. The screen will display messages such as "*END*", "*TOP*", "*No Data*", etc. in the bottom left corner of the display to indicate the current position of data scrolled. The bottom right corner will show "←", "←→", and "→", representing the direction that more data can be displayed on the screen. For example:

```
┌─────────────┐ ┌─────────────┐ ┌─────────────┐ ┌─────────────┐
│             │ │23.3:TOM     │ │1.1:345267   │ │2.1:7654378  │
│ *No Data*   │ │   *END* ←   │ │   *TOP* →   │ │        ←→   │
└─────────────┘ └─────────────┘ └─────────────┘ └─────────────┘
```

Insertion -[INS]

In edit mode, to insert data press [INS]. The new **record** is added **after** the currently displayed record. For example, if the display shows:

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```
┌─────────────────┐
│ 23.3:TOM        │
│      *END*    ← │
└─────────────────┘
```

then the record inserted will be the 24th record. The insert function is just like a data entry. Prompting message and error checks are all the same. After all the fields are entered the terminal will return to the edit mode. To insert more records, you need to use [INS] again.

Replacement - [RPL]
Replacing a **field** (not a record) can be done by pressing the [RPL] key in the editor. Any checks associated with the field will be performed and after replacement the terminal will return to edit mode.

Deletion - [DEL]
Pressing [DEL] in edit mode will delete the currently displayed **record** (not only the field) permanently. The deleted record can not be recovered.

4.5.3   Forms Created from Job Generator

Since the **PT-805's** programmability is limited to one form, additional forms may be created using the Job Generator program on a PC. Not only can additional forms be created but more complicated forms as well. Any form can be selected to collect data. The internal process of the Job Generator Program in **PT-805** is quite different from the ROP. The operation flow of the Job Generator Program in **PT-805** is depicted in figure 4-5. The data collection application has some additional processes before and after field and form. They are pre-form, pre-field, verification, post-field and post-form. Each process may also contain Job Generator macros. These macros are used to program the terminal for data collection. For a detail description about Job Generator, refer to the *Job Generator Manual*.

Start of FORM

Pre-form Procss

Pre-field Process

BPS ? YES NO

Display Field Prompting Message

Data Entry(*)

Press [EXIT] ? YES NO

Post-form Process

End of FORM

Verification Process

REN ? YES NO

Store Data (*) in Data Memory

Post-field Process
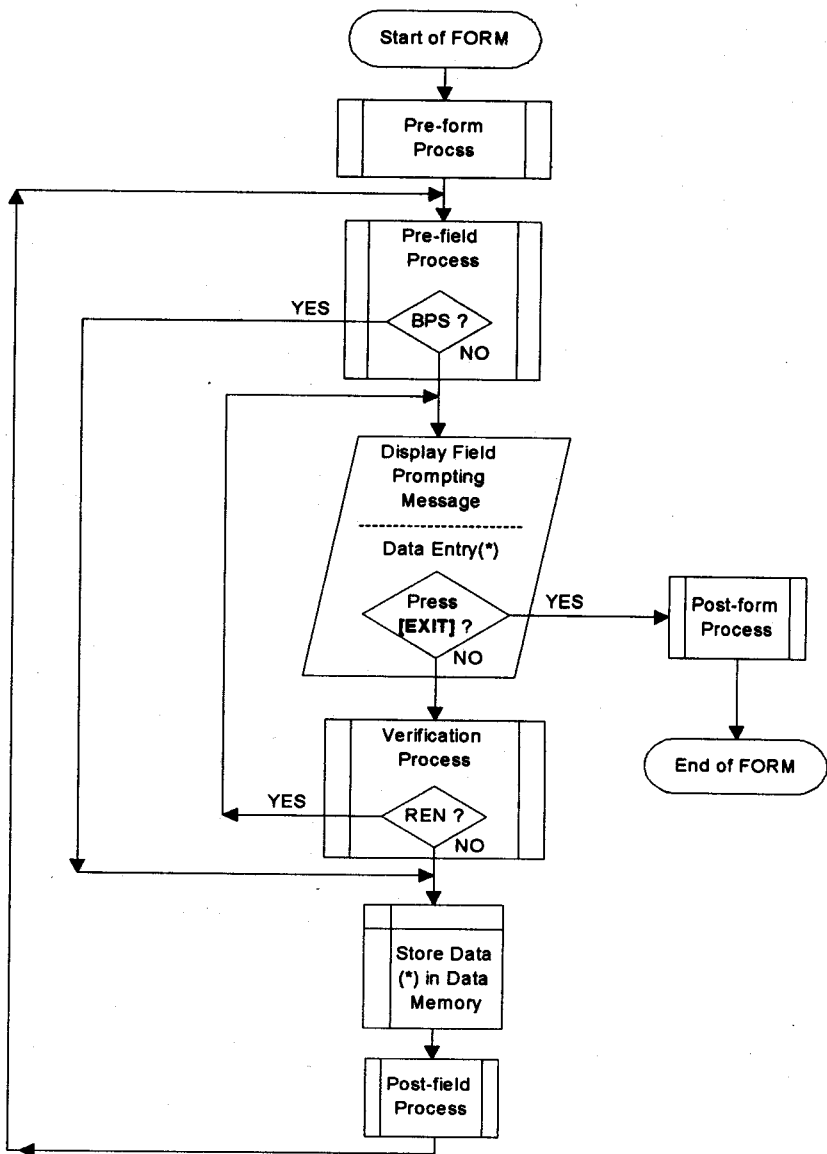
Figure 4-5   Job Generator Program Operation Flow Chart
(For reference only)

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4.6 STATUS Function

A status report will be generated on the LCD display when you press the [STATU]" key from the keypad. Sequentially press [ENTER] key to display the scrolling contents of status as follows :

```
**** STATUS ****
Free : nnnKB
Form #1:ROP
Records:
Form #2:
Records:
...
...
```

In the above screen, it reports following current status in **PT-805**:

- The amount of free space of memory in KB
- The form number, form name, and the number of records collected for that form.

4.7 XRANS Function

This function provides Communications through the RS232 port.

4.7.1 Send

Press [XRANS] key, the **PT-805** will prompt

```
Communication:
Send      (Y/N)
```

Then press [(YES)] key to send data from the **PT-805** to a computer. Note that before data can be sent to a computer through the RS232 interface or a Keyboard Wedge Adapter, the communication parameters and the serial interface connection must be set properly. After selecting "Send" function, the user is also requested to choose <u>forms</u> to be sent:

```
Send ROP ?
       (Y/N)
```

Press [(YES)] if the form is to be sent to the computer and [(NO)] for not. If the user has a Job Generator Program in the **PT-805**, more than one form can be selected.

Occasionally, there may be warning messages if the connection is improper or communication parameters are mismatched between the **PT-805** and computer. Check your RS-232 connection and communication parameter settings if this occurs.

4.7.2   Receive

Press [XRANS] key, the **PT-805** will prompt "Communication Send? (Y/N)". Then press [(NO)] key and **PT-805** will prompt "Communication Receive? (Y/N)". Press [(YES)] key to receive a Job Generator Program as bellow:

```
┌────────────────────┐
│Ready to receive    │
│                    │
└────────────────────┘
```

Receive Job Generator Program

The **PT-805** allows the user to receive a program generated from the Job Generator. The Job Generator is a program generator that runs on MS-DOS. The user can generate an application by using the Job Generator. In general, Job Generator is a menu-driven program which allows the user to generate applications without writing programs. For detailed information, please refer to *Job Generator Manual*.

4.8   Supervisor Mode

The **PT-805** supports a "**Supervisor Mode**" to setup system configuration or
to purge data records in memory. To enter the "**Supervisor Mode**", press
[SHIFT] and **[P]** <u>simultaneously</u> in ready mode. The screen will display as
follow:

```
1-SETUP   2-PURGE
```

4.9   SETUP Function

Select "1" to enter setup mode or "2" to purge mode. Before the **PT-805** can
be operated, some attributes: date & time, communication parameters, bar
code type and form format for the ROP must be entered. Every attribute has a
specific default value (see table 4-2). You do not need to set an attribute if the
desired value is the same as the default value. The modified values will not
change (even if the power is turned OFF) until it is set again or until a
"SYSTEM RESET" is done (refer to <u>section 4.2 System Reset PT-805 and
Enter Diagnostic</u>).

CAUTION   Data will be lost after SYSTEM RESET and some of the data
and programs in the RAM memory may not be recovered.

The settings are divided into six categories:

- ● Auto Boot   Set auto-booting program
- ● Date & Time   System Real-Time Clock
- ● Comm   Communication parameters
- ● Bar Code   Bar Code type selection
- ● Data Format   The data format of the ROP form
- ● Beeper Volume   Adjust beeper volume

Table 4-2   Default Attributes

Group	Attributes	Value Range	Default Value
Auto Boot	Auto Boot FORM	(downloaded form)	none
Date &Time	Date	Conventional	01/01/94
	Time	Conventional	00/00/00
	Auto off	Disable, Enable	Disable
	Period	1-30 minutes	3
Comm	Comm Port	RS232, AT/PS2	RS232
	Baud Rate	300,1200,2400,4800,9600,19200	9600
	Data Bit	7,8	8
	Parity	even,odd,mark,space,none.	none
	CTS/RTS	on, off	off
	Protocol	on, off	on
	Send EOF	on,off	on
	Header	on, off	on
	Interdelay	0-32767 ms	0
Bar Code	UPC/EAN	on, off	on
	UPC-A=EAN	on,off	off
	Send First Digit	on,off	on
	Send Last Digit	on,off	on
	UPC-E=UPC-A	on,off	off
	CODE 39	on, off	on
	Cal. CDV	on,off	off
	F ull ASCII	on,off	on
	Send CDV Digit	on,off	on
	I 2 OF 5	on, off	on
	Cal. CDV	on,off	off
	Send First Digit	on,off	on
	Send Last Digit	on,off	on
	CODABAR	on, off	on
	Cal. CDV	on,off	off
	Start/Stop	on,off	on
	Send CDV Digit	on,off	on
	MSI	on, off	on
	CODE 128	on, off	on
Data Format	Field Number	1-16	1
	Field Prompt	16 characters	none
	Field Picture	32 characters(see Table 4-4)	none
	Min. Length	1-255	1
	Max. Length	1-255	16
	ROP Echo	on, off	off
	Delay	0-32767(ms)	0
	Field Delimiter	[,],[;],[SPACE],none.	[,]
	Record Delimiter	[CR],[LF],[CRLF],none.	CRLF
	Time Stamp	on, off	off
	Long Format	on, off	off
Beeper Volume	Volume	LOUDEST,MEDIUM,QUIETEST and NONE	LOUDEST

4.9.1   Auto Boot Setting

The user can define an auto-booting program when powering up the terminal. When the **PT-805** is turned on, if there is an auto-booting program assigned, this designed program will be executed directly without entering any key. After selecting Auto Boot ,use the [(NO)] key to sequence through the available forms, then press the [(YES)] key to confirm.

```
Auto Boot FORM:
ROP
```

4.9.2   Date & Time Setting

The **PT-805** supports a "Real-Time Clock (RTC)". The clock can be used for the "Time Stamping" function, which adds date and time information after each record. To stamp date and time after a record, refer to <u>Section 4.9.5 ROP Data Format Setting</u>. Press [(YES)] key when **PT-805** prompts "Set Date & Time? (Y/N)". The message:

```
Date: 01/01/94
      ▢▢/▢▢/▢▢
```

will be displayed on the screen. The first line is the current date with the format MM/DD/YY (Month, Day, Year). Enter the month, day, and year as prompted on the second line. For example, to set the date: June, 25, 1994, enter the key sequence: [0][6][2][5][9][4]. To bypass the setting, press the [ENTER] key.

After the date is set, the time will be displayed:

```
Time: 08:30:01
      ▢▢:▢▢:▢▢
```

The first line displayed is the current time in the **PT-805** expressed in the 24 hour system with the format hh:mm:ss (hour, minute, second). In the same way, enter the correct time or just press [ENTER] to bypass the setting or [EXIT] key to exit Time setting.

Set Auto off Timer

After setting the RTC, the following message will be displayed:

```
Auto off:Disable
```

Press the [(NO)] key to toggle Enable or Disable Auto off function and press the [(YES)] key to confirm the setting. If Auto off function is Enable, the following message will displayed:

```
Auto off:Enable
Period:3
```

It is then possible to set the timer value which specifies the duration before the **PT-805** automatically shut off its power. The valid timer setting is from 1 to 30 minutes, by the minute. User may enable the Auto off function and set timer to 5 minutes, then when **PT-805** is in use the power will automatically shut off after the **PT-805** no has operation for a duration of 5 minutes. Turning off the power of **PT-805** through Auto off function is the same as turning it off by pressing the [ON/OFF] key. In any event, any use of **PT-805**, such as bar code scanning, pressing any key, or data input through the RS-232 port will automatically cause the timer to begin a new 5 minute counting cycle. For example, if the **PT-805** is not in use for 3 minutes and the operator presses the [ENTER] key, then **PT-805** will once again start a 5 minute counting cycle for CPU idle time.

4.9.3   Communication Parameters Setting

To send data to the computer or receive a program from the computer, it is necessary to set the communication parameters for the **PT-805**. Press [(YES)] key when **PT-805** prompts as follow:

```
Set Comm?
     (Y/N)
```

The Settings for communication are:

- Comm Port   Select as a RS232 or AT/PS2 function
- Baud Rate   Communication speed.
- Data Bit   Data format in communication.
- Parity   Parity check.
- CTS/RTS   Hardware handshaking.
- Protocol   Protocol between **PT-805** and computer.
- Send EOF   Disable/Enable to attach EOF, 1A hex, when Protocol
              set to off.
- Header   Disable/Enable transmitting header of a file.
- Interdelay Time delay between fields during RS232 function or
              time delay between character during AT/PS2 wedge
              function.

Comm Port

There are two methods to upload **PT-805** data to PC. One is the RS232 port
,another is the PC/AT or PS/2 keyboard port. Please refer to Chapter 6 Built-
in Keyboard Wedge for installation and operation.

```
Comm Port:RS232    --> RS232,AT/PS2
```

Press **[(NO)]** key to toggle the desire function, then press **[(YES)]** key to
confirm:

Baud Rate

This option sets the communication speed measured in bits per second (bps).
The **PT-805** supports baud rates of **300, 1200, 2400, 4800, 9600, 19200**. It
must be set to the same value the computer is using. Press **[(NO)]** key to
toggle the desire baud rate, then press **[(YES)]** key to confirm:

```
Baud Rate:9600    --> 300,1200,2400,4800,
                      9600,19200.
```

Data Bit

The Data Bit option sets the characters sending to **7** or **8** bits per frame. This
option must be set to the same value as the computer. Use the **[(NO)]** key to
choose **7** or **8** from the screen after the baud rate is set, then press **[(YES)]**
key to confirm your selection.

```
┌─────────────────────┐
│ Data Bit :8         │   --> 7,8
│                     │
└─────────────────────┘
```

Parity

Parity is used to increase the reliability of communication. The **PT-805** supports **even, odd, mark, space** and **none** parity check. Use the **[(NO)]** key to choose these options from the screen after the data bits is set, then press **[(YES)]** key to confirm your selection. Choose an option after Data Bit is set.

```
┌─────────────────────┐
│ Parity    :none     │   --> even,odd,mark,space
│                     │            none
└─────────────────────┘
```

CTS/RTS

The CTS/RTS setting is for handshaking between the **PT-805** and the computer while sending characters. The difference between protocol and CTS/RTS setting is that the first one is handshaking for file transfer and the second is for characters. The CTS/RTS is usually used for hardware handshaking during character transfer. If you are using an IBM PC or some other compatible machine the CTS/RTS should be set to off. Use the **[(NO)]** key to choose these options from the screen after the header is set, then press **[(YES)]** key to confirm your selection.

```
┌─────────────────────┐
│ CTS/RTS  :off       │   -->on, off
│                     │
└─────────────────────┘
```

Protocol

Protocol is used for software handshaking between the **PT-805** and the computer while sending a file or program. It needs to be set to ON while using the UNITECH's communication utility program - Job Generator, and set to off while using a dummy receiving program. Use the **[(NO)]** key to choose these options from the screen after the parity is set, then press **[(YES)]** key to confirm your selection.

```
┌─────────────────────┐
│ Protocol :on        │   -->on,  off
│                     │
└─────────────────────┘
```

If the user wants to write his own communication program to receive data from **PT-805**, then the "**off**" protocol selection is suggested. For writing such a program, refer to Chapter 5 Interfacing And Communications. For detailed

information about protocol definition, also refer to <u>Section 5.3</u> <u>Communication Data Format and Protocol</u>.

Send EOF

The Send EOF setting is only available when Protocol is set to off. When Send EOF is set to on, an EOF code, 1A hex (CTRL-Z),will be appended to the end of data file uploaded from **PT-805** to a Host computer.

```
Send EOF :on         -->on,  off
```

Header

A Header is added before each data packet is transferred to the computer from the **PT-805**. It includes file name and current date and time information. If you are using UNITECH's communication utility program - Job Generator, set this option to ON. Use the **[(NO)]** key to choose these options from the screen after the protocol is set, then press **[(YES)]** key to confirm your selection. Detailed descriptions of the definition of a header can be found in <u>Chapter 5 Interfacing And Communications</u>.

```
Header    : on        -->on,  off
```

Interdelay(ms)

Comm Port is set to RS232

The Interdelay setting is used to set a time delay in milli-seconds between data fields transmitted from the **PT-805** to the Host computer, if the Comm Port is set to RS232. When Protocol is set to off, this setting may be needed to keep pace of data uploading and make sure the receiver has enough time to process the data.

Comm Port is set to AT/PS2

The Interdelay setting will be used to set the time delay between character transmission from the **PT-805** to a PC/AT or a PS/2 keyboard port.

```
Interdelay(ms):
0                     -->0 - 32767 ms
```

4.9.4   Bar Code Setting

Press [(YES)] key when **PT-805** prompts as follow:

```
Set Bar Code?
    (Y/N)
```

Disable/Enable Bar Code Reading
The **PT-805** can read many bar codes simultaneously. However, allowing many bar codes will decrease the reading rate. To increase the reliability of reading labels, codes that are not used should be disabled.

The **PT-805** provides a rich set of major bar code symbologies. The user can select the attributes of each bar code symbology. Use [(NO)] key to toggle the "on" or "off" option for each switch, then press [(YES)] key to set the bar code attributes as follows:

- UPC/EAN group

UPC/EAN	on: Enable UPC/EAN group reading
	off: Disable UPC/EAN group reading
UPC-A=EAN	on: Output UPC-A code 13 digits
	off: Output UPC-A code 12 digits
Send First	on: Send leading digit
	off: Strip leading digit
Send Last	on: Send the last digit
	off: Strip the last digit
UPC-E=UPC-A	on: Expand UPC-E to UPC-A code
	off: Output UPC-E code

- CODE 39 group

CODE 39	on: Enable CODE39 group reading
	off: Disable CODE39 group reading
Cal CDV	on: Enable CDV
	off: Disable CDV
Full ASCII	on: Enable Full ASCII CODE39
	off: Disable Full ASCII CODE39
Send CDV	on: Send the CDV digit
	off: Strip the CDV digit

- Interleaved 2 of 5 group

  | I2 OF 5 | on: Enable I2 OF 5 group reading |

	off: Disable I2 OF 5 group reading
Cal CDV	on: Enable CDV
	off: Disable CDV
Send First	on: Send the leading digit.
	off: Strip the leading digit.
Send Last	on: Send the last digit
	off: Strip the last digit

● CODABAR group

CODABAR	on: Enable CODABAR group reading
	off: Disable CODABAR group reading
Cal CDV	on: Enable CDV
	off: Disable CDV
Start/Stop	on: Send the leading and last digit.
	off: Strip the leading and last digit.
Send CDV	on: Send the CDV digit
	off: Strip the CDV digit

● MSI group

MSI	on: Enable MSI group reading
	off: Disable MSI group reading

● CODE 128 group

CODE 128	on: Enable CODE 128 group reading
	off: Disable CODE 128 group reading

4.9.5   ROP Data Format Setting

The ROP form can be created using the format option in the "1-SETUP" of Supervisor Mode. The following parameters can be set to control the built-in data collection application.

● Field Number	How many fields for a record.
● Prompting Message	Message for the user.
● Picture	Verify the enter data.
● Min. Length	Minimum length of a field.
● Max. Length	Maximum length of a field
● ROP Echo	Echo data to computer.
● Delay after entry	Delay display time after data entry.
● Field Delimiter	Delimiter between fields.
● Record Delimiter	Delimiter between records.

- ● Time Stamp   Stamp time after record.
- ● Long Format   Format of time stamp.

Press [(YES)] key when **PT-805** prompts as follow:

```
┌──────────────────┐
│ Set Data Format? │
│      (Y/N)       │
└──────────────────┘
```

NOTE   The user cannot modify the ROP form format setting when the **PT-805** ROP has stored input data. Otherwise, the error message "Create failure." will be displayed. User will have to purge the data before modifying data format settings.

Field Number
After pressing the [(YES)] key from the above message. The screen will display:

```
┌──────────────────┐
│ How many fields? │
│ 1                │  --> 1 - 16
└──────────────────┘
```

Enter the total number of fields used in a record. For example, if the application has three fields, "ITEM", "QUANTITY", and "CUSTOMER", then enter 3 followed with the [ENTER] key. After you enter the number of fields, the **PT-805** will request the prompting message, picture, and length for each field.

Prompting Message
The prompting message is requested after the **field number** is entered:

```
┌──────────────────┐
│ #1 Fld.Prompt    │
│ _                │  --> 16 characters (max.)
└──────────────────┘
```

Enter the prompting message , for example - "ITEM:". All alphanumeric characters are supported for the message.

Picture

After the prompting message, the picture is requested by the **PT-805**. A picture is a sequence of characters that verify the entered data and format it. The screen for picture entering is:

```
#1 Fld.Picture
_
```
--> 32 characters (max.)

Table 4-4 lists available picture characters used with the ROP. Each lowercase character represents different data qualification attributes. Characters not listed will be treated as constant characters which will be displayed on the screen. The picture characters will be displayed as '□' (small box) on the screen during data collection.

Table 4-4   Available Picture Characters

Picture	Description
a	Only alpha characters are accepted. (A-Z,a-z)
n	Only digits 0-9 , dot ('.'), negative('-') and positive('+').
p	Only digits 0-9.
l	Only lower case alpha characters. (a-z)
u	Only upper case alpha characters. (A-Z)
x	Printable characters. (ASCII code 32 to 127)
z	Full ASCII characters.
%	Control character used to append constant string.
#	Control character used to remove characters.

For example, if you define a picture : **"ppp-pppp"** and the prompting message, for example, is "TEL:", then during input, the screen will show this:

```
TEL:□□□-□□□□
```

The characters entered will pass only if they are one of the digits, 0-9 (Since the picture character **'p'** only accepts digits). Any illegal character will be ejected by the picture function and will cause the system to beep. The character, '-', in this example, is used for display purposes only.

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Control Characters in Picture

Constant characters like the dash '-' in the above example can be included as part of the data. To include constant characters add the control picture character, '%', at the beginning of a picture. For example, the picture : "%ppp-pppp" when entered (for example, "5962300") will include the constant character '-' in the data ("596-2300"). The purpose of the control character '%' is for appending some constant characters automatically to a string of data. Table 4-5 lists examples of applying different pictures to data entry and the results.

NOTE   Note that the '%' control character only can appear at the beginning of a picture.

In Table 4-5, column 1 defines the picture used, column 2 is the screen display, column 3 is the data entered, and the last column shows the data stored. Another control character is '#', which is used to remove unneeded characters. It is sometimes used to mask the start/stop character of a label, since some bar codes have unnecessary start/stop characters. The '#' control character can appear anywhere in a picture.

Table 4-5 Examples of pictures

Picture	Screen	Data Entry	Result
ppp-pppp	□□□-□□□□	5962300	5962300
%ppp-pppp	□□□-□□□□	5962300	596-2300
aaa-aaaa	□□□-□□□□	5962300	rejected
#pp-ppp#	□□□-□□□□	5962300	96230
aa#aaaa	□□□□□□□	UNITECH	UNTECH
###-zzzz	□□□-□□□□	5962300	2300

Field Length

The purpose of the field length setting is to verify the width of data entered. After the picture data is entered the screen will display:

```
┌─────────────────────┐
│#1 Min Length        │
│1                    │--> 1 - 255
└─────────────────────┘
```

```
┌─────────────────────┐
│#1 Max Length        │
│16                   │--> 1 - 255
└─────────────────────┘
```

The length check needs the minimum and maximum lengths.. Width of Data outside the range will be rejected and ensure that the length of data entered is correct.

This constitutes the available parameters for each field. After the field length is entered the ROP will continue on to the next field. By way of practice, you can finish the above example by entering the following values:

Field#	Prompt	Picture	Min Length	Max Length
1	ITEM:	zzzzzzzzzz	5	10
2	QUANTITY:	ppppp	1	5
3	CUSTOMER:	aaaaaaa	1	7

ROP Echo
After all the fields are defined the **ROP Echo** attribute will be requested:

```
┌─────────────────────┐
│ROP Echo:off         │--> on,off
│                     │
└─────────────────────┘
```

Press the [(NO)] key to toggle the options **on** and **off**. The ROP Echo on will cause the data entered to be transmitted to the host right away via serial port during INPUT function. This is used to send data directly to the computer. For field collection the ROP Echo should be off.

Delay after Data Entry
Because the **PT-805** will clear the display at the beginning of each record, a delay after data entry will allow the user to verify the data collection. Generally, a delay of 2000 ms (2 second) will be sufficient:

```
┌─────────────────────┐
│Delay(ms):0          │--> 0 - 32767 ms
│                     │
└─────────────────────┘
```

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Field Delimiter

The Field delimiter character is used to separate fields in a record. Figure 4-2 Composition of a record and Figure 4-4 Data structure of a sample form give an idea about the structure of a record. The user has the following options for field delimiter: [,], [;], [SPACE], and **none**. Normally, the [,] or **none** are chosen for this attribute but can depend upon the destination of the data. The screen for setting field delimiter is:

```
Fld Delim:,        --> [,],[;],[SP]
                       and none
```

Use the [(NO)] key to toggle option for the field delimiter.

Record Delimiter

The record delimiter character is used to separate records in a **form**. Figure 4-4 Data structure of a sample form shows the idea of using a record delimiter in a record. The available options for record delimiters are **CR, LF, CRLF**, and **none**, where **CR** is ASCII code 13, and **LF** is 10. The screen for setting field delimiter is:

```
Rcd Delim:CRLF      --> CR,LF,CRLF,none
```

Again, use the [(NO)] key to choose the option.

Time Stamping Function

The user can append date and time information to each record. If the option is set to ON, then one of following will be added after every record:

> **MMDDYYhhmmss** (Long Format), or
> **MMDDhhmm** (default)

where

MM - Month	hh - Hour
DD - Day	mm - Minute
YY - Year	ss - Second

The time added is from the Real-Time Clock of the **PT-805**. For example, if the current time is July 6, 1994 and 10:15:20, then the stamping time will be:

070694101520 or 07061015 (depending on whether **Long Format** is chosen or not).

```
Time Stamp : off  --> on,off
```

Use the **[(NO)]** key to set the option.

Long Format of Time Stamping
When Time Stamp is set to on, choose MMDDYYhhmmss or MMDDhhmm time stamping format toggle the Long Format option.

```
Long Format:off  --> on,off
```

Use the **[(NO)]** key to set the option.

4.9.6   Beeper Volume Setting

Press **[(YES)]** key when the **PT-805** prompts as follow:

```
Set Beep Volume?
     (Y/N)
```

The **PT-805** supports beeper volume options LOUDEST, MEDIUM, QUIETEST and NONE. Use the **[(NO)]** key to sequence through the options, then the **[(YES)]** key to confirm.

```
Volume:LOUDEST   --> LOUDEST,MEDIUM,
                     QUIETEST,NONE
```

In general, an audible beep will be generated after a key-pressing or a successful bar code reading. The four level volume settings are available for defining the audible indicator of key-pressing or successful bar code reading.

4.10   PURGE Function

Purge is used to erase **all collected data** in the ROP or Job Generator Program. To enter the "Supervisor Mode", press [SHIFT] and [P] simultaneously in ready mode. Select the "2-Purge" option, the display will show (if there is no Job Generator Program in the **PT-805**):

```
* Purge data *
ROP (Y/N)
```

Press [(YES)] key to delete all data from the ROP, or [(NO)] for not delete.
If Job Generator Program exists, press the [(NO)] key to select and the [(YES)]key to confirm.

CAUTION   The data deleted **cannot** recovered. Be careful before you purge
your data.

User cannot delete the Job Generator Program, only the data, by using the **PT-805** keypad. There are two methods to delete the Job Generator Program.

Method 1:   Re-download the new Job Generator program.
Method 2:   Using the **PT-805** "SYSTEM RESET".

CAUTION   Data will be lost after SYSTEM RESET and some of the data
and programs in the RAM memory may not be recovered.

Chapter 5   Interfacing And Communications

5.1   Interface Requirements

The RS-232 DB-9 Pin Connector
The 9-pin connector is used to connect the **PT-805** to a computer, a terminal, a modem, or a wedge terminal. It is located on the bottom of **PT-805**. The RS-232C interface for the **PT-805** includes the following signals:

PIN #	SIGNAL
1	+9 VDC Battery Charger Voltage Input
2	RXD
3	TXD
4	DTR
5	GND
6	(not used)
7	RTS
8	CTS
9	RI

The **PT-805** is wired as Data Terminating Equipment (DTE).

RS-232C
RS-232C is designed for short distances and is generally not used for long data lines. However, the RS-232C can be used successfully over longer distances if there is a "clean" electrical environment in the building. Because RS-232C is not a differential interface, the presence of significant electrical noise over longer cable runs could interfere with communications.

Connecting the PT-805 to a Computer
To connect the **PT-805** to a computer, such as an IBM PC/AT, use the following cable configuration. See Figure 5-1 for the cable pin-outs and Figure 5-2 shows the connection of **PT-805** to the computer. In general, an AT DB-9 to DB-9 cable can be used to connect the **PT-805** directly to a PC.
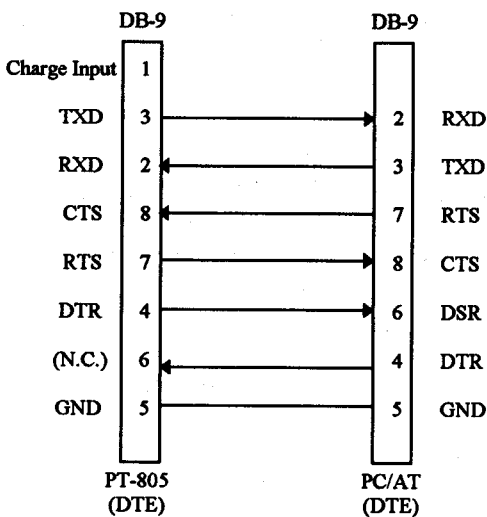
DB-9				DB-9	
Charge Input	1				
TXD	3	————————→	2		RXD
RXD	2	←————————	3		TXD
CTS	8	←————————	7		RTS
RTS	7	————————→	8		CTS
DTR	4	————————→	6		DSR
(N.C.)	6	←————————	4		DTR
GND	5	————————	5		GND

PT-805
(DTE)

PC/AT
(DTE)

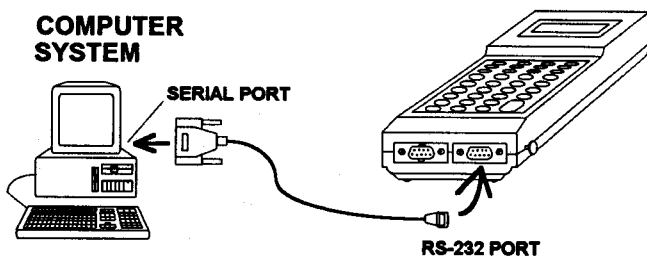Figure 5-1   Cable for PT-805 and Computer

Figure 5-2 Connecting the PT-805 to a Computer

Connecting the PT-805 to DCE Devices

To connect the **PT-805** to a modem (see Figure 5-3) or other ASCII device (wired as DCE) to the terminal, use the cable depicted in the following figure. There are many commercially available RS-232 compatible modems that are suitable for use with the **PT-805**. Refer to the manual supplied with the modem for proper attachment guide lines.
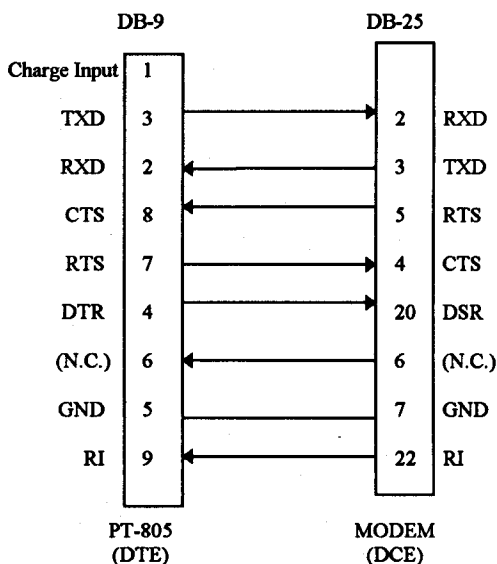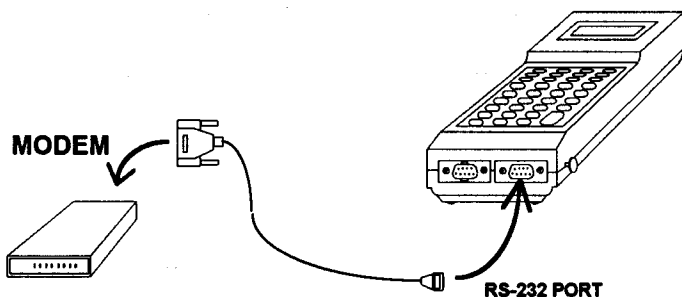

Figure 5-3 Cable for PT-805 and MODEM

Figure 5-4 Connecting the PT-805 to a Modem

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5.2   Communication Software

A general communication program, PTCOMM or PTCOMM Plus, that can
be used to communicate between the **PT-805** and a PC. The program runs on
a PC XT/AT. Instructions for this program can be found on the
communication program disk. The program provides following facilities:

- Upload data to PC
- Download Job generated by Job Generator
- Dial and hang-up using a modem connected to a telephone.
- Purge data from PC.

Contact your local representative for the communication program for the **PT-805** if necessary.

Software Handshaking (XON/XOFF)
The **PT-805** provides a software standard handshaking scheme, XON/XOFF
(i.e. CTRL-Q and CTRL-S).

5.3   Communication Data Format and Protocol

The basic data structure of a form is shown in Figure 4-4. The
communication data format varies in different communication protocols. The
PT-805 supports a special protocol based on ACK/NAK scheme and a **none**
protocol. Both formats are different. To set the protocol option, refer to
Section 4.9.3 Communication Parameters Setting.

Protocol Off
Figure 5-8 shows the data format transmitted in protocol off.

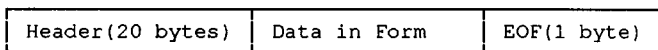| Header(20 bytes)	Data in Form	EOF(1 byte)

Figure 5-8   Data Format with protocol off

Where the header includes:

- Form name   In the ROP, the only form is "ROP". When using Job
                 Generator there may be several forms with different
                 form names. The width of a form name is fixed at 8
                 bytes.

● Time   Contains current time information with format MMDDYYhhmmss.

The EOF (1A hex) will be attached at end of data file, if Send EOF is set to on.

Note that the header can be set to off eliminating these 20 bytes of information. In general, the header is used as recognition of start of form, while the EOF is recognized as end of form.

Protocol On
If the protocol is set to ON, the following data format will be sent to the PC:

| SOH | Header | STX | Data in form | ETX | BCC |

Figure 5-9   Data Format In Communication with protocol on.

Where
SOH   Start Of Header, 1 byte, the value is 01 HEX.
Header   same as stated above.
STX   Start Of text, 1 byte, the value is 02 HEX.
ETX   End Of text, 1 byte, the value is 03 HEX.
BCC   Block Check Character which is equal to the numerical sum of all bytes from <u>SOH</u> to <u>ETX</u>; i.e.

$$BCC = \sum_{SOH}^{ETX} (c)$$

Where (c) = the content of DATA.

Receiving programs can use this byte to check the accuracy of data received.

The following shows the communication protocol sequences:

Step	Computer				PT-805			

Step	Computer					PT-805		

1   <----   ENQ (05 HEX)

2   ACK(06HEX)---->

3   <----

SOH	Header	STX	Data Form #1	ETX	BCC

4   ACK/NAK
     (06/15HEX)---->

5   <----

SOH	Header	STX	Data Form #2	ETX	BCC

6   ACK/NAK
     (06/15HEX)---->
     ....
     ....
     ....

n-2   <----

SOH	Header	STX	Data Form #n	ETX	BCC

n-1   ACK/NAK
      (06/15HEX)---->

n   <----   EOT (04 HEX)

1)   The **PT-805** sends an ENQ (05 Hex) code to indicate a "ready to send" request to the computer.

2)   The computer program responds with an ACK (06 Hex) code within 5 seconds. Otherwise, a time-out error will occur. The message "Time out error" or "Protocol error" will be displayed on screen. The user should try again or check to see if any error was made.

3)   The **PT-805** will start sending blocks of data files to the computer in the format shown previously.

4)   Upon receiving the data block, the computer should respond with an ACK code for successful reception. Otherwise, a NAK code (15 Hex) is sent. If a NAK is received, the **PT-805** will re-send the same block. If it still fails after three attempts have been made, the message "Data Error" will be displayed on the screen. The hardware should be checked at this point. Contact a service engineer if the problem can not be corrected.

5)   When transmission is finished, the **PT-805** will send an END Of Transmission (EOT) code (04 Hex) to the computer.

Chapter 6   Built-In Keyboard Wedge

6.1   Installation

The **PT-805** provides two convenient ways to upload your data to a computer. A RS232 standard interface is the conventional method. But, some user's application programs do not support RS232 input driver. The **PT-805** provides you the another way to send your collected data to your application program through the keyboard port. It is the simplest way to work with your program.

There are two parts to install **PT-805** as a keyboard wedge.

- **PT-805** Keyboard Wedge Adapter
- One of the following cables
  - PC/AT Adapter Cable   P/N# 155102-0050
 - PS/2 Adapter Cable   P/N# 155102-0080

In order to install properly before use, please refer to following steps.

Step 1:   Turn off your computer first.

Step 2:   Unplug your keyboard connector from computer keyboard port.

Step 3:   Connect the proper Adapter Y-cable between keyboard and computer.

Step 4:   Plug the Keyboard Wedge Adapter into the Adapter cable DB-25 connector. It does not need any external power. Please refer to the following diagram.

Keyboard

Keyboard Port

PC

Adapter Y-Cable

Keyboard Wedge
Adapter
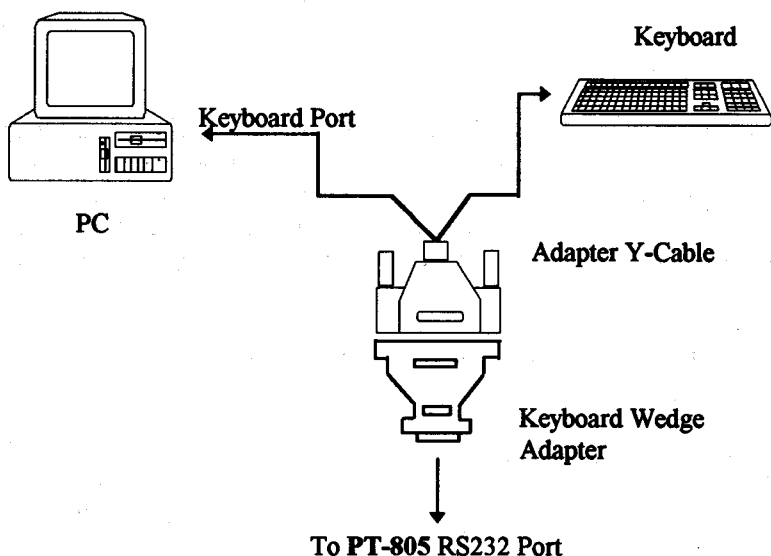
To **PT-805** RS232 Port

Step 5: Plug the Keyboard Wedge Adapter DB-9 connector into the PT-805 RS232 port.

Step 6: Power up your PC. Your application program will run as usual.

Step 7: Set the **PT-805** Comm Port parameter as a "AT/PS2" in "Set Comm" of Supervisor mode. The **PT-805** is ready to send now.

6.2   Uploading Data to PC/AT or PS/2

Ready Mode
In Ready Mode, user can operate the **PT-805** built-in keyboard wedge function as an input device. The scanning data or keyed-in data will be sent to the PC right away and displayed on the **PT-805's** LCD. But, this data will not be stored in the **PT-805** memory.

If your computer misses characters from the **PT-805**, you may need to increase the interdelay (inter-character delay). See "Section 4.9.3 Communication Parameters Setting".

Send Mode of XRANS

The **PT-805** can also send collected data to a PC through the keyboard port. Press the **[XRANS]** key, the **PT-805** will prompt "Communication Send? (Y/N)". Then press **[(YES)]** key to start uploading data to PC.

If your computer misses characters from the **PT-805**, you may need to increase the interdelay (inter-character delay). See "Section 4.9.3 Communication Parameters Setting".

NOTE   After uploading, please unplug the **PT-805**, but leave the Keyboard Wedge Adapter and the adapter cable connected together. Otherwise, your keyboard will not work.

Appendix A : Built-In Diagnostic Program

The **PT-805** supports a diagnostic program to verify the terminal itself. **When there has been a service procedure on the H/W or S/W, such as maintenance, repair or upgrade, the system should be verified by executing this diagnostic program.** It supports several routines to check the LCD, keypad, RS-232 port and Memory. It should be noted that the diagnostic program will destroy any data in the PT-805. Hence, before using the diagnostic program, make sure you have saved all data. To enter diagnostic mode, using "SYSTEM RESET":

1. Turn off the **PT-805**.
2. Press the [EXIT], the [/ ^{P}] and the [ON/OFF] keys <u>simultaneously</u>.
3. Press the [(YES)] to reset the terminal.

Then a diagnostic program request message will be displayed on the LCD:

```
< DIAGNOSTIC >
(Y/N)?
```

Press [(YES)] to enter this mode or [(NO)] to exit the diagnostic function and return to the "Ready Mode". If you choose [(YES)], the LCD will be displayed:

```
1-LCD     2-KBD
3-232     4-MEM
```

Press [EXIT] to exit the diagnostic function and return to the "Ready Mode".

LCD verify
Choose the option "1-LCD" from the diagnostic menu to test the LCD. The LCD will display 32 characters of all printable characters (ASCII 32 to 127). Any inconsistencies shown on the screen indicates a defective LCD.

```
!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!
```

KEYPAD verify

If the keypad verify routine "2-KBD" is chosen, Any key pressed will be shown on the LCD. For example, if you press the [ENTER] key:

```
> KEYPAD  TEST <
Key->ENTER
```

To exit this mode, press [EXIT] then [(YES)].

RS-232 verify

To test the RS-232 port, the user will have to loop back (connect pins 2 and 3) first, and then press any key to start verification. The LCD will show "RS-232 OK" if the test passed. Otherwise, an error message "RS-232 ERR" will be displayed.

```
>  RS232 TEST  <
RS-232 OK
```

Memory verify

When selecting the "4-MEM" to verify memory function, the LCD will show

```
<<MEMORY  TEST>>
Bankx OK
```

Where x is from 3 to 0.(64K Bytes each Bank). The memory size depends on the users order. After testing of all banks, the PT-805 starts the memory backup testing. First a fixed pattern of data is stored into RAM memory, then the PT-805 turns itself off and waits for the user to turn it on again to verify the backup memory. After turning on the PT-805 again, the LCD will show the message below when memory backup test is passed.

```
--- BACKUP OK---
```

If memory test indicates an error, please contact your local sales or service representative.

Appendix B : Error Messages

■ **Error at MACRO: nnn Pre-Form.**

A run time error occurred at the nnnth line macro of the pre-form process.

Correct the pre-form process macro in Job Generator.

■ **Error at MACRO: nnn Pre-Fld.**

A run time error occurred at the nnnth line macro of the pre-field process.

Correct the pre-field process macro in Job Generator.

■ **Error at MACRO: nnn Verifica.**

A run time error occurred at the nnnth line macro of the verification process.

Correct the verification process macro in Job Generator.

■ **Error at MACRO: nnn Post-Fld.**

A run time error occurred at the nnnth line macro of the post-field process.

Correct the post-field process macro in Job Generator.

■ **Error at MACRO: nnn Post-Form.**

A run time error occurred at the nnnth line macro of the post-form process.

Correct the post-form process macro in Job Generator.

■ **Time out error.**

The **PT-805** did not receive data from the RS-232 port within a predetermined amount of time.

Check the RS-232 connection and communication parameters. Verify it matches the correct parameters.

■ **Format unmatched.**

User has entered a field length that is out of range or the wrong characters.

■ **Write failure.**
   The Memory has a bad sector(s) or the Memory is full.

■ **Create failure.**
   Failed to created a form in the **PT-805** ROP. This will happen if the user tries to re-modify the ROP form format setting when the **PT-805** ROP has stored input data.
   It should be purged of all ROP data before re-configuring the ROP form format.

■ **Buffer Overflow.**
   PT-805 detected a buffer overflow error while receiving data from RS-232 port.
   Add a flow control, XON/XOFF in your program on the host or PC. Decrease the baud rate.

■ **JOB error.**
   PT-805 found erroneous data in a JOB while downloading.
   Check the JOB and the communication parameters.

■ **DATA error.**
   PT-805 received incorrect data while downloading a JOB which included data file.
   Check the format of the included data file to see if it matches the corresponding form's format.

■ **Record length exceed 256.**
   The record length setting of ROP exceeds 256 characters or error setting.
   Re-enter the correct range length.

■ **Parity error.**
   PT-805 received an error character frame parity while in communication.
   Check the communication parameters and connection. Verify that they match the set value.

■ **Protocol error.**
   PT-805 received an error control character while in communication.
   Check the communication parameters. Verify that they match the set value.

■ **Memory full.**
   PT-805 has no free memory for storage.
   Upload your data to host or PC and purge it.

Appendix C : Specifications

■ **Memory:**
  - ROM: 64K Byte for ROP (Resident Operation Program)
  - RAM: 64 / 128/ 256K Byte CMOS SRAM

■ **Display:**
  - 2 line x 16 characters standard LCD
    with 5 x 7 dot matrix characters

■ **Keypad:**
  - 35 key membrane keypad

■ **Power Supply:**
  - Main Battery:
      - NiCd rechargeable 700 mAH battery pack
      - 4 AA-size Alkaline batteries
  - Backup battery:
      - CR2032 3V 190 mAH Lithium battery

■ **Power Consumption:**
  - Operating voltage: +5V ± 10%
  - Operating current: 30 mA , scanner excluded

■ **Operating Environment:**
  - Operating Temperature: $0°C$ - $50°C$ ($32°F$ - $122°F$)
  - Storage Temperature: $-20°C$ - $70°C$ ($-4°F$ - $158°F$)
  - Humidity: 5 - 95% RH

■ **I/O Connectors:**
  - +9V DC adapter (for NiCd battery charging)
  - DB-9 Squeeze type scanner Port
  - DB-9 male RS-232/Keyboard Wedge Box interface port.

■ **Weight:**
  - 470 g (16.5 oz with batteries)

■ **Dimension:**
  - L x W x H = 90 x 203 x 45 (mm)
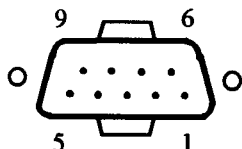   = 3.54 x 7.99 x 1.77 (inches)

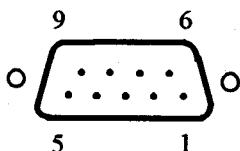# Appendix D : Pin Assignment of Connectors

(a) Battery Charging Jack

Pin No.	Signal
1 (Center)	+9 VDC
2	GND

(b) Scanner Port

Pin No.	Signal
1	(I)Start of Scan
2	(I)Bar Signal
3	(O)Good Read
4	N.C.
5	(I) Switch Trigger
6	(O)Power Enable
7	GND
8	GND
9	(O)+5V DC

(c) RS-232 Port

Pin No.	Signal
1	(I)+9 VDC Input
2	(I)RXD
3	(O)TXD
4	(O)DTR
5	GND
6	N.C.
7	(O)RTS
8	(I)CTS
9	(I)RI