

PT630 User Reference Guide

Version 1.0



NOTICE

This unit is equipped with a Li-ion battery pack. Battery power might be low due to storage. Recharge the battery when required. For procedures on how to charge the battery, please refer to page 5.

Unitech Part Number: 400262



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Chapter 1: Introduction

1.1 Overview

Thank you for choosing product from Unitech Electronic Co. Ltd. PT630 portable data collection terminal is one of the most versatile handheld computers in the market. It is DOS compatible, capable of running most programs, developed under C language. PT630 has many pre-built in functions and it is also self-programmable. Moreover, it has a bundle Windows application, capable to develop many applications, specifically for your business. PT630 is light, weights only 230 grams, has a large liquid crystal display (128 pixel X 64 pixel, capable of displaying 20*8 or 8*4 characters,) rugged, water proof. It also capable of withstand 1.5 meter multiple drops. With all these attributes, we believe PT630 is going to satisfy your needs totally. Depending on you're the particular model you had purchased, your terminal might be equipped with 3 different memory (RAM) configuration, range from 0.5KB, 2.5KB and 4.5MB. PT630 also has offer 3 different optional communication/charging cradles. These are RS232, RS485 (daisy chain data transmission cradle) and telephone modem cradles. Working with PT630's unique universal power adaptor, the cradles will satisfy your PT630's charging and communication needs.

1.2 Support

Over here at Unitech, making you satisfy is our first priority. If at anytime, you find any problem regarding to this terminal or any our other product please feel free to contact us at; www.ute.com.tw-asia, www.ute.com.tw

1.3 Customized PT630

It is highly likely when you receive this terminal; it has already been customized by the system integrator or the system developer to meet your specific application. If this is the case, many operating procedures, mentioned in this manual, may not apply. Please consult your system provider for more information regarding to the customization.



1.4 Technical Specification

Physical

Physical Characteristics				
Dimensions:	165mm x 60mm x 35mm			
Weight:	230g			
Drop Specification:	1.5M multiple free drop to concrete floor			
Display:	128 x 64 pixel; 8 x20 characters or 4 x 12 characters.			
Battery: (include main and backup battery)	One 3.7V/880mAH Li-ion battery; One Cr2032 3V/190mAH Lithium backup battery			
Environmental Sealing:	IP54			
Operating Temperature:	-5C~50° C			
Storage Temperature	-20C~70° C			
Humidity:	5% to 95% RH, not condensed			
Electrostatic Discharge (ESD)	4 KV for contact discharge 8 KV for air discharge			
Back-Lit Display:	Yes			
Keypads:	26 alphanumeric keys + one scan trigger (phosphorescent material)			

Performance

Performance Characteristics				
CPU:	NEC V25 (16 bit); 80XX compatible			
Operating System:	DOS compatible			
Memory:	512KB/2.5MB/4.5MB			
Flash ROM	256KB			
Application Development:	C language, Turbo C, Visual C, JobGen plus (a window based program generator), FormCaching (a built in program generator)			
Communication	RS232 serial communication			
Operating Time	Over 12 hours at 3 bar code scan per sec			
Symbologies	UPC/EAN, Code 39, Interleave 2 of 5, CODABAR, MSI, Code 128, Code 93, Code 32, China Postal Code			
Buzzer	Yes, over 70 dB			
One LED	Dual color; Green for good; Red for bad			



1.5 Quick Start

This section is designed to let you quickly getting familiar with PT630. If you need detail explanation on some of the functions please refer to later chapters for detail explanation.

PT 630 Illustrations



Figure 0-1:PT630 front view



Figure 0-2 PT630 head view



Figure 0-3: PT630 tail view



Figure 0-4: PT630 side view



Figure 0-5: PT630 back view



Figure 0-6: PT630 charging/communication cradle, features 3 types: RS232, RS422 and modem communication



Figure 0-7: Modem or RS422 cradle back



Figure 0-8: RS232 Modem Back view



PT630 Accessories



Figure 0-9: PT630 communication cable (Unitech part number: 1552000160)



Figure 0-10: PT630 Li-ion Battery (Unitech part number: 600538)

Remove Backup Battery Isolator

To prevent power lost during shipping or storage, when you first receive your PT630, its' backup battery is being isolated from the contact pin with a transparent plastic film. Depends on the condition, you may or may not need to remove this isolator. If you have received the unit from the software programmer, it's highly unlikely you need to remove this isolator. However, if the unit is ship directly from our vender, then removing this isolator is probably necessary. Please follow the figures below for removal of the backup batter isolator.

Charging

Before using PT630, main battery must be installed and fully charged. The PT630 is equipped with 3.7V 880m.A.H Lithium-Ion battery (Unitech part number: 600538). It should take 2 to 3 hour to fully charge the main battery. To charge the main battery, mount the unit on the cradle; connect the power adaptor from the back of the cradle to any power outlet. While charging, the LED above the power icon will display red, when it is fully charged the LED will turn green.

Install Main Battery

- 1. Remove the battery door from the PT630 by turn the screw on the battery cover to the left.
- Insert the battery into the main battery chamber by slide the head (2 point sticking out) into the locking position first.
- 3. Reinstalled the battery door and tighten the screw on the battery door again.

Cradle

Main battery can only be charged through attaching to the PT630 charging/communication cradle (part number: PT063-1~3) or a quick charging/communication cable (part number: 600361).

Cradle LED Icons

will flash, showing that the data is transferring. When PT630 is transferring data with the host computer, this LED will flash, showing that the data is transferring.

This icon indicates the charging of the main unit. When the cradle is charging the main battery; the led will be red; when fully charged, the light will turn green.

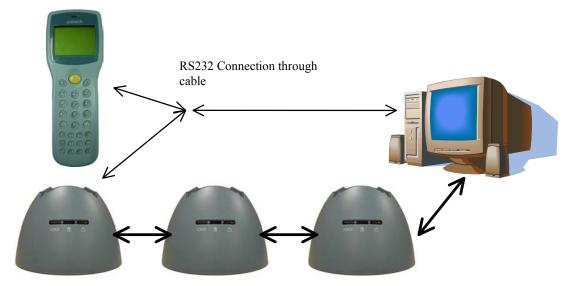


is LED light shows the power status of the cradle itself. When its' lit, it indicates the cradle is powered.

Power On

After fully charging the unit, when the charging LED turns green, you are now ready to turn on the unit. Press the power key () on the keypad to turn on the PT630!

Communication with the Host



RS485 multi unit communication



1. 6 Interface Ports

PT630 does its' communication via a RS232 communication port located at the tail of the unit. You can connect the unit via the communication cable to a PC's RS232 jack for data transfer or connect through cradle for communication.

1.7 Using the Keyboard

The keypad of PT630 consists of 27 rubber keys; the keyboard is configuring into three different modes: **numeric mode**, **command mode**, and **alphabetic mode**. All keys except key may produce a sound (tone) when pressed. Keys of upper four rows have larger size for easier key-pressing to input numbers.

- [] When the unit is off, pressing the needed to press and hold down the n
- [CMD] pressing the [CMD] key plus the desire command key (located at the end of the keypad) sets the keyboard to out put command functions
- **[ESC]** In **command** or **Supervisor mode**, pressing the **[ESC]** key to jump back to the pervious menu.



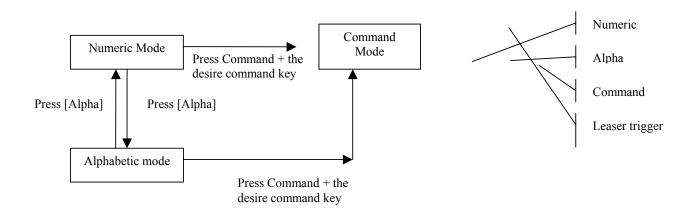


Figure 0-11: PT630 Keypad layout

Numeric mode

Keyboard of the PT630 is initialized to normal mode after powered on. In normal mode, the cursor is a block sign and the keyboard is mainly used to input numeric data and use F1-F4 four function-keys.



COMMAND mode

Press [CMD] key sets the keyboard to command mode. In command mode, the cursor type keeps same and the keyboard is mainly used to input special characters, make hot-key function, and use F5-F8 four function-keys.

ALPHA mode

Press [ALPHA] key to toggle between normal mode and alpha mode of keyboard. In alpha mode, the cursor is an underscore sign and the keyboard is available to input upper case letters. In alpha mode, every numeric key contains 3 characters individually. You need to press the key once to get the first character, twice to get the second character and 3 times to get the third character. The characters cycles back to the first character again.

For example:

First press [ALPHA] to switch the system to alpha mode, the cursor type will be changed from block to underscore To enter 'A', press the key "A" once

To get "B", press the same key twice

To get "C", press the same key 3 times.

1.8 Triggering Scanner Module

The PT630 can be used with a built-in integrated laser scanner module to input data. The built-in decoder reads most barcode labels.

The user should keep laser window clean to prevent low reading rate of distorted bar code input signal.

1.9 Application Development Environment

The system of PT630 provides DOS functions and device drivers for application development, including bar code decoding, keypad input, display output, serial input/output communication, real-time-clock access and power management control.

The PT630 can be programmed by the high-level Windows-based JobGen Plus program generation software. It can also be programmed by commonly used C compilers including Microsoft C, Borland C and Turbo C. An executable program generated by JobGen Plus or created by a compiler is downloaded to the unit and run on the unit.

JobGen Plus

JobGen Plus is a Windows-based program generator that gives the user an ease-of-use and comprehensive terminal application developing environment. Through the use of JobGen Plus, user can design an application program for a data collection terminal by simply drawing the data collection sequence on paper, and thus, requires minimum programming skills.

For more detailed programming information, please refer to PT630 Programming Reference Manual, JobGen Pro User's Manual.



Chapter 2 Power System

2.1 Power System

Main Power

The terminal is operated by a rechargeable 3.7V 880mAH rated Li-Ion battery pack. The main battery should be sufficient to for daily operation up to 12 hours. However, since the actual operation may vary, it is possible to result a shorter operating hours.

Backup Power

An onboard 3V 190mAH Lithium battery (CR2032) is used as the secondary power source to back up the data in RTC (real time clock chip) and RAM memory to provide users a data-loss free environment.

Normally the PT630 gets power from main power source to back-up RTC and RAM and puts the Lithium battery in standby state. When the main power source is removed or below the level to back-up the RAM and RTC properly, the power circuit of the PT630 automatically switches to the Lithium battery for back up. It is recommended that the main battery be always placed inside the unit with enough capacity for back-up purpose in which case the Lithium battery can supply the power for up to **3 years** before consuming all its capacity up.

It is important to know that once the power in the backup battery used up, all data within the terminal will be lost. So it is very important to backup all data when replacing backup battery.

2.2 Power Low Indication

Main Battery

When the main power source reaches the battery low condition, a warning message as right will be shown on the LCD when PT630 is powered on or a **battery low icon sign** will emerge on the right sidebar of LCD.

! WARNING ! MAIN BATTERY VOLTAGE LOW

When the main battery low occurs, the main battery can continue to supply power for about $20 \sim 40$ minutes per scan /5 second, however the unit may reach the system power cutoff point and automatically turn itself off. Meanwhile the unit continues to back up the data of

point and automatically turn itself off. Meanwhile the unit continues to back-up the data contents in RTC and RAM, but it cannot be powered up until the batteries have been recharged or replaced.

Lithium Backup Battery

When the Lithium backup battery doesn't have enough capacity to back up the system, the message as right will be shown on LCD when the unit is powered on. In this situation you should upload your data from the terminal immediately and replace a new Lithium battery.

! WARNING ! Backup BATTERY LOW



2.3 Battery Replacement

Main Battery

- Make sure the unit is turned off.
- Turn over the unit; unscrew the battery door lock screw by turning the screw left for quarter turn.
- Slide the main battery pack from battery compartment.
- Insert the new main battery into the socket.

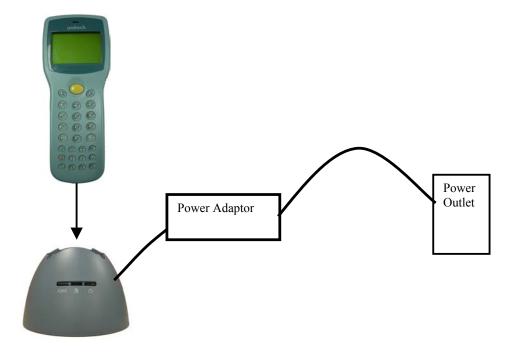
Remove battery pack

- Remove the main battery as previously described.
- Important! Once the backup battery is removed from the unit, all data within the unit will lost, please backup all files before you remove the backup battery.
- Insert a new battery into the holder.
- Put the backup battery cap back on.
- Re-installed the main battery, cold star the new unit.

Make sure to back up your data in terminal before making the replacement the lithium back up battery.

2.4 Recharging the Battery Pack

When the terminal shows "Main battery low" message, the battery needs to be recharged. Plug in the power adaptor into a power outlet and connect the other end to the power outlet of the PT063, mount the terminal into the cradle, the LED light on the cradle will turn red, meaning charging has begun. When the battery is fully charged, the LED will turn green. This should take 2 to 3 hours.



Charging Consideration

It is important to consider the surrounding temperature whenever you are charging the Li-Ion battery pack. 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). Charging batteries outside of the specified range could damage the batteries and shorten their life cycle.

Effects Of Overcharging Batteries



Overcharging may occur when a Li-Ion rechargeable battery is charged in regular or quick charging rate after it has been fully charged, but there is no risk of overcharging while charged in trickle charging rate.

A battery left to charge for several weeks may appear to have minimal capacity. This type of failure can be remedied by temporarily depleting the battery of its power and recharging it to rejuvenate it. This condition can be prevented by avoiding overcharging for long periods of time or always using PT063 to charge the batteries of terminal. The PT063 starts the charging process in quick charging rate and switches to trickle charging rate when it detects the battery is fully charged.

2.5 Storage and Safety Precautions

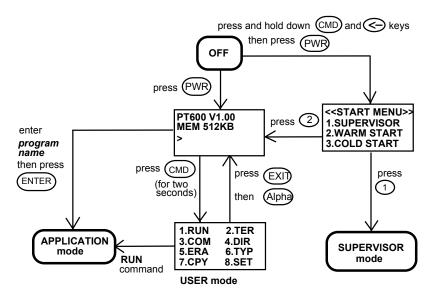
Batteries should be stored in an open environment condition and placed where there is no risk of accidental shorting or other damage. Although charged Li-Ion batteries may be left unused for several months, their capacity may be reduced due to back up and internal resistance. If this happens they will require recharging prior to use. Li-Ion batteries may be stored at temperatures between -4°F and 158°F (-20°C to 70°C).

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Chapter 3: Operation

PT630 is set up such a way that there are several operating modes. The system of terminal may operate in various modes for different purposes. The figure below shows the operating flow of the terminal. The following diagram summarized the ways to switch between different modes.



System configurations are categorized in two groups, users can select "8.SET" command in User mode to set general system configurations or enter Supervisor mode to set advanced system configurations. The **Supervisor mode** is also protected with password checking to prevent unauthorized personnel from changing the system configuration. (For PT630 detail setup procedures p lease refer to PT630 Technical Binder)

3.1 Ready Mode

The terminal performs a Power-On-Test and Warm-Start when it is switched on. After the Warm Start, the system enters Ready mode and shows the Ready mode prompt.

Ready mode prompt



The first line indicates the model code and version number (e.g. V1.00). The second line shows the size of the total installed RAM (i.e. 4608 KB). The third line prompts a ">" which indicates that the terminal passed the Power-on-test and is ready to be used.

3.2 User Mode and System Commands

There are eight system commands: RUN, TER, COM, DIR, ERA, TYP, CPY, and SET. Each command can be invoked through menu-selection in **User mode**. User can press [CMD] key for two seconds in **Ready mode** to enter **User mode**.



User mode prompt

(1) RUN	(2) TER
(3) COM	(4) DIR
(5) ERA	(6) TYP
(7) CPY	(8) SET

Select the corresponding number, 1-8, or press $[\leftarrow]$ and $[\rightarrow]$ to highlight a command then hit [ENT] to select a system command. Pressing the [EXIT] key (hit [CMD], then [ALPHA]) returns to **Ready mode**.

RUN

When invokes the **RUN** command, the system shows a screen as right and you may press the $[\rightarrow]$ key to toggle the loaded program and hit [ENT] to run the program. The program may also be executed on the terminal by entering the program name directly in Ready mode.

< RUN PROGRAM>

NULL

This command puts the terminal in either terminal emulation mode or FormCaching application mode depending on which function you select. Please see chapter 4 for detail on how to configure and use FormCaching. In terminal emulation mode, the terminal serves as a dumb terminal to transmit data to or receive data from a Host computer. In this mode, data input from bar code reader or keyboard is displayed on screen and output to RS-232 port. Data received from the serial port is displayed on the LCD screen. Communication parameters, such as baud rate, data bits, parity, stop bits and flow control, must be set to be

<u>COM</u> This command puts the terminal in Kermit server mode. The following indicates the available Kermit commands at the Host/PC side:

<u>Command</u> <u>Description</u>

send filename Send a file from the Host/PC to terminal and store it in the terminal's

RAM disk.

compatible with the destination in order to send data properly.

get filename Get a file from the terminal to the Host/PC disk.

remote dir List files of the terminal's RAM disk.

remote del filename

Delete a data file stored in the terminal's RAM disk.

Make sure set the terminal communication parameters to match the host/PC system before proceeding data communication. Hit [ESC] Ready mode.

DIR This command shows the files in the RAM disk with the following information:

- The list of file names stored in the RAM DISK.
- The size of program execution area.
- The amount of free RAM DISK space left.

ERA This command deletes a file from RAM disk of terminal. After the file has been deleted, it can not be recovered.

< ERASE FILE >

SCAN.EXE

TYP This command dumps the content of a file on the terminal's LCD. The content of the file will be displayed 128 (16 character x 8 line) characters at a time. Press any key to show the next page or hit [CMD] then [ALPHA] keys to return to **User mode prompt**. If you try to display a program or binary file, you may only see unintelligible characters.

< TYPE FILE >
SCAN.DAT



<u>CPY</u> This command allows users to make copy of data from a source device to a destination device. The source device may be a file, COM (serial input), CON (keyboard), and the destination device may be a file, COM(serial output), CON(LCD display).

Source Dest. Function file1 file2 copy file1 to file2 COM output content of file1 to serial port file1 file1 CON output content of file1 to LCD COM file2 input data from serial port and store in file2 CON file2 input data from keyboard and store in file2, press [CMD] and then [ALPHA] key to end the data input

SET This command allows users to set system date and time, assign laser

feature and enable to display power-on logo

(see next section).

<SYSTEM SETUP>
1.DATE & TIME
2.SCANNER
3.DISPLAY
4.KEYPAD
5 EXIT

3.3 Configure the Terminal in SET command

There are three categories of general system configuration available in SET command. Select the corresponded number, 1-3, to set system date/time, assign scanning feature and enable power-on Logo display. Hit [CMD] then [ALPHA] keys to return to **User mode prompt**.

<SYSTEM SETUP>
1.DATE & TIME
2.SCANNER
3.DISPLAY
4.KEYPAD
5.EXIT

3.3.1 DATE & TIME:

Setting system clock & calendar

When selects "1.DATE & TIME" in SET command menu, the screen as right will be shown on terminal's LCD and let you set the system date and time of Real Time Clock chip (RTC). The system date and time can be retrieved in application and used as time stamp for data collection.

DATE-TIME SETUP 1998/01/01 08:00:00

The second line shows the current date in the format YYYY/MM/DD (year/month/day).

If you want to reset the system date to January 1, 1997, then enter [1][9][9][7],[0][1],[0][1]. Or press [ENT] key to skip the system date setting.

The third line shows the current time. The way to set system time is similar to set system date described above. The format of system time is expressed in 24 hour of HH:MM:SS (hour:minute:second).

3.3.2 SCANNER:

PEN SCAN KEY

The system software of terminal decodes all major bar code symboloies including Code 39, Code 128, Codabar, Code 93, I25, EAN, UPC, China Post code, etc. Use the $[\rightarrow]$ key to toggle among selection in each category, then press [ENT] to confirm.

SCANNER Enable / disable bar code decoding.

When pen scanner is used on PT630, user can setup whether pressing trigger key to enable pen scanner. If **ENABLE** is selected, user must press and hold down trigger to scan barcode label. If **DISABLE** is selected, user can directly scan barcode label without

pressing trigger key. Enable / Disable (Optional).

LASER AIM Enable / disable laser beam point target on a distance barcode.(for long range PT630LR

only; optional).



VERIFICATION Enable / disable double check scanned barcode.3.3 DISPLAY: Enable/disable power-

on logo display

ENABLE Show system logo when power-on. **DISABLE** Do not show system logo when power-on.

KEYPAD: Allow user to set UPPER / LOWER case of character.

EXIT: Leave the SET (setting) environment.

3.4 Upload/Download by ESC Command

The way to upload/download by Kermit server described in section 3.2 will need the operator to set the terminal to Kermit server mode by selecting user command "3.COM" in User mode or calling system function in application program.

The hardware and software of terminal is designed that the unit can be woken up (turned on) by input from the serial port. Besides this way, the terminal can also be instructed to process the data communication by remote ESC commands through built-in MULTI communication protocol .(please refer to PT630 Technical Binder for detail information)

After linking the terminal to a PC/host through RS232 interface a communication program running on host first sends a few of dummy bytes to the terminal and delay for about 500 mini-second to remotely wake up the unit. Then the program can send out a data pack of a remote ESC command that matches the MULTI protocol to the terminal and instruct the terminal for certain process.

For instance, the terminal will automatically execute the system routine to upload a file after receiving the valid "File upload" ESC command. Meanwhile the program running on the host should follow the control flow of MULTI protocol and process to receive the data.

For detailed description of each ESC command and protocol, please see the PT630 Programming Reference Manual.



Chapter 4 Built-in Application: FormCaching
The system of terminal includes a built-in application, FormCaching. It allows users to create a data entry application by specifying field prompt, type, length, input method and delimiter, etc. without writing program and loading to the terminal.

4.1 Specification of FormCaching

DATA FIELD DEFINITION: maximum field number=8				
	Category	Range	Description	
1	FIELD PROMPT	max.16 characters	set field prompting	
2	MIN/MAX	1-32	set minimum field length	
	DATA LENGTH		and maximum field length	
3	DATA TYPE	1.NUMERIC	numeric data (0~9) or	
		2.ALPHANUM	alphanumeric data (20H~FCH)	
4	DEVICE TYPE	1.KEY ONLY	input by keyboard only,	
		2.SCAN ONLY	bar code scanning only or	
		3.BOTH	both	
D.	DATA RECORD DEFINITION			
	Category	Range	Description	
5	BETWEEN	1.Append screen	specify to clear or append	
	FIELD	2.Clear screen	screen between two fields	
6	FIELD	1., 2.;	assign field delimiter	
	DELIMITER	3.Space 4.Tab		
7	RECORD	1.CR 2.LF	assign record delimiter	
	DELIMITER	3.CRLF		
8	DATE STAMP	1:NONE	specify format of Date stamp	
	FIELD	2.YYYYMMDD		
		3.MMDD		
		4.MMDDYYYY		
		5.DDMM		
		6.DDMMYYYY		
9	TIME STAMP	1:NONE 2.HHMM	specify format of Time	
	FIELD	3.HHMMSS	stamp	
9	FIELD DELAY	0-6	specify time delay between	
			each record input in second	



4.2 How to Create a FormCaching

FORM CACHING 1:YES 2:NO OTHER:EXIT

You will need to enter Supervisor mode and select "4.FORM" category in order to set the configuration of FormCaching (refer to the *PT630 Programming Reference Manual* for how to enter the Supervisor mode). After selecting the "4.FORM" in Supervisor mode, the screen will show as above. The system will first ask user to specify four categories of the field specification including *field prompt, data length, data type* and *device type* of each data field. After completion to define all data fields, the user should hit [CMD] then [ALPHA] keys to end the setup of field specification. This step also determines the number of fields in each record and you may continue to set the rest six categories of record specification including *between field, field delimiter, record delimiter, date stamp field, time stamp field and field delay*.

When the FormCaching application is executed, a data file named FORM.DAT will be created to store data. The system will not allow the user to redefine FormCaching if the FORM.DAT is existed. It is necessary to delete the FORM.DAT in order to change the configuration of FormCaching.

4.3 How to Run FormCaching

When FormCaching is enabled, the built-in application can be run by selecting "2.TER" command in User mode and then select "2.FORM CACHING". The FormCaching application will follow the setting as defined to display prompting, get input and store data in the file named FORM.DAT. Hit [CMD] then [ALPHA] keys to end FormCaching and return to system Ready mode. User may use [←] key to browse a previous data record, [→] key to step to next record, press [C] key to clear the record and then input new values of every field of this record. After collecting data, the FORM.DAT file can be uploaded to host either by invoking kermit server in User mode described in section 3.2 or remote ESC command described in 3.4.

4.4 Default Setting of FormCaching

In default, the FormCaching is initialized with settings as shown in the table below.

DATA FIELD SPECIFICATION: field number=2	
Category	Setting
Field #1 FIELD PROMPT	ITEM:
DATA LENGTH	32
DATA TYPE	ALPHANUM
DEVICE TYPE	BOTH
Field #2 FIELD PROMPT	QTY:
DATA LENGTH	4
DATA TYPE	NUMERIC
DEVICE TYPE	KEY ONLY
DATA RECORD SPECIFICATION	
Category	Setting
BETWEEN FIELD	Append screen
FIELD DELIMITER	,
RECORD FELIMITER	CR
DATE STAMP FIELD	NONE
TIME STAMP FIELD	NONE
FIELD DELAY	0