

iTIVO-HD



www.iLinkPro.com

User's Manual

HD



Revision History

Rev	Date	Change Description
2.0	Apr-09	Added updates for iTIVO-HD model
2.1	Jun-09	Updated serial cabling section
2.2	Jan-12	Updated configuration section A.2 for firmware version V3.2

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1 Package Contents

- iTIVO-HD Text Inserter
- 12VDC Adapter
- CAT5 Pigtail Cable
- CAT5 Female Connector

2 Introduction

iTIVO-HD is a device designed for capturing, analyzing, and inserting transaction text generated from electronic cash register (ECR) or point-of-sale (POS) terminal on surveillance video. When integrate iTIVO-HD with CCTV and cash register together, it forms a transaction surveillance system that could effectively reduce fraud sales and thefts.

The iTIVO-HD not only inserting transaction text on the surveillance video but it also has powerful text analyzing capability that, when coupled with external input/output (e.g. cash drawer switch) monitoring, could effectively safeguard your cash.

Every single transaction text fed out from the cash register is being monitored and analyzed within the iTIVO-HD in real-time. If an abnormal transaction (exception) text, e.g. VOID, or an abnormal external event, e.g. abnormal cash drawer opening, is detected the device can trigger an alarm or/and flag the detected exception text or triggered event on monitor screen to alert supervisor in-charge to take necessary action. Transactions or exceptions can be logged in the internal non-volatile memory or transferred to remote PC for logging.

iTIVO-HD also supports both serial and parallel interfacing to suit different types and made of cash registers.

Note:

Interfacing to iTIVO-HD is RS232 interface. If your cash register cannot provide this interface, iTIVO-HD requires register-specific parallel interface board for interface conversion between your cash register and iTIVO-HD. Please indicate your model and made of your cash register to your local dealer before purchasing the parallel interface board.



The above figure shows a typical setup of a transaction surveillance system using iTIVO-HD text inserters.

3 Key Features

Text Display

- Displays up to 10 lines and displays up to 40 characters per line
- Programmable text sizes, text gray scale, and transparent background
- Text can be positioned anywhere on screen
- Programmable scrolling speed, pause and screen clear timers
- Blinking text on flagged transactions
- Text line alignment and compression

Exception Monitoring

- 12 programmable exception texts, e.g. VOID, NOSALE and etc.
- Item value comparison, e.g. less than, greater than, not equal etc.
- Cash drawer sequence monitoring
- 16 exceptions logging

LED Indications

- Video loss, power, communication and alarm indications

Inputs and Outputs

- 2 alarm inputs and 2 alarm outputs
- 1 RS232 ECR/POS port
- 1 RS232 PC programming port or RS485 networking port (Shared)
- 1 Video In: 2:1 interlace composite video, colour or monochrome. NTSC or PAL. 75 ohm, 1Vpp.
- 1 Video Out: 75 ohm, 1Vpp.
- 3 LEDs status ON, COM and ALM and 1 CLR button

Programming

- Simple text-based programming via any serial terminal program, e.g. Microsoft's HyperTerminal. No additional software needed.

Data Logging and Networking (Optional)

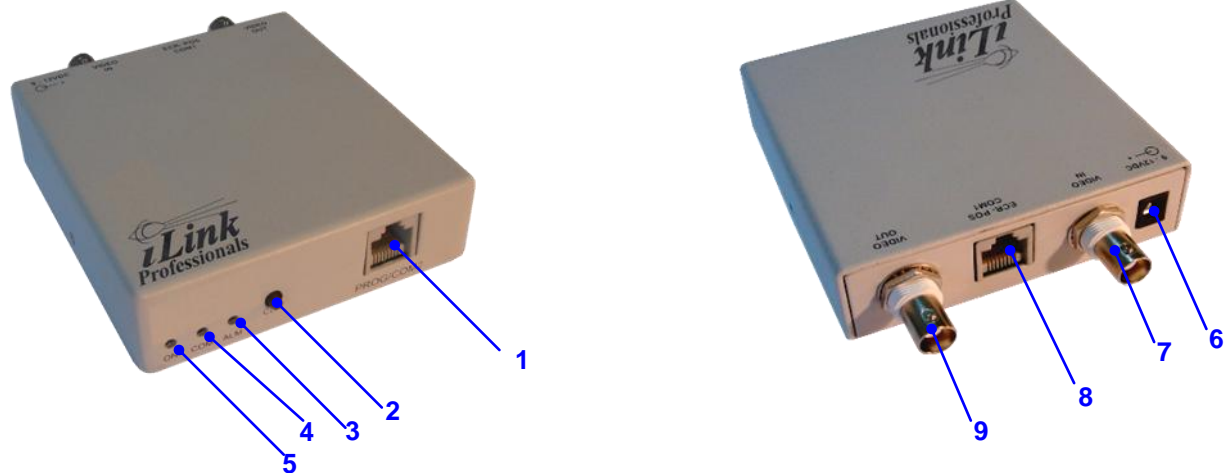
- Can be RS232/485 (built-in) or TCP-IP (optional module)
- Real-time clock for time stamping of occurrence of exceptions
- 128KB non-volatile memory to store up to 1000 exceptions
- 4-channel RS485 board, each channel can support up to 16 devices

Interface Conversion (Optional)

- Parallel to serial conversion board for interfacing to internal impact printer
- LPT to serial conversion module for interfacing to external parallel printer
- RS232-TCPIP module

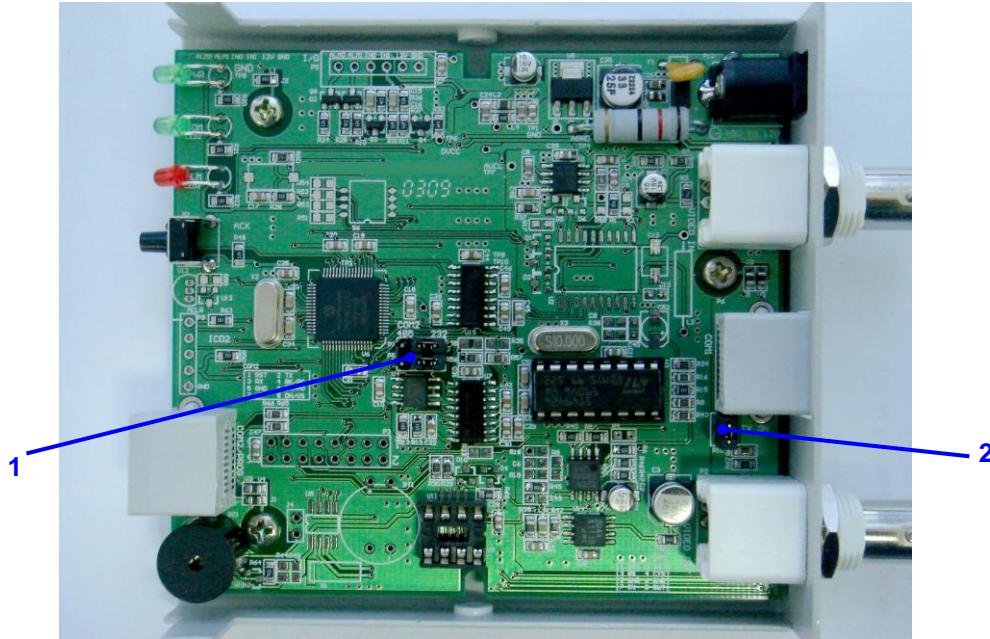
4 Controls, Connections and Jumpers

Controls



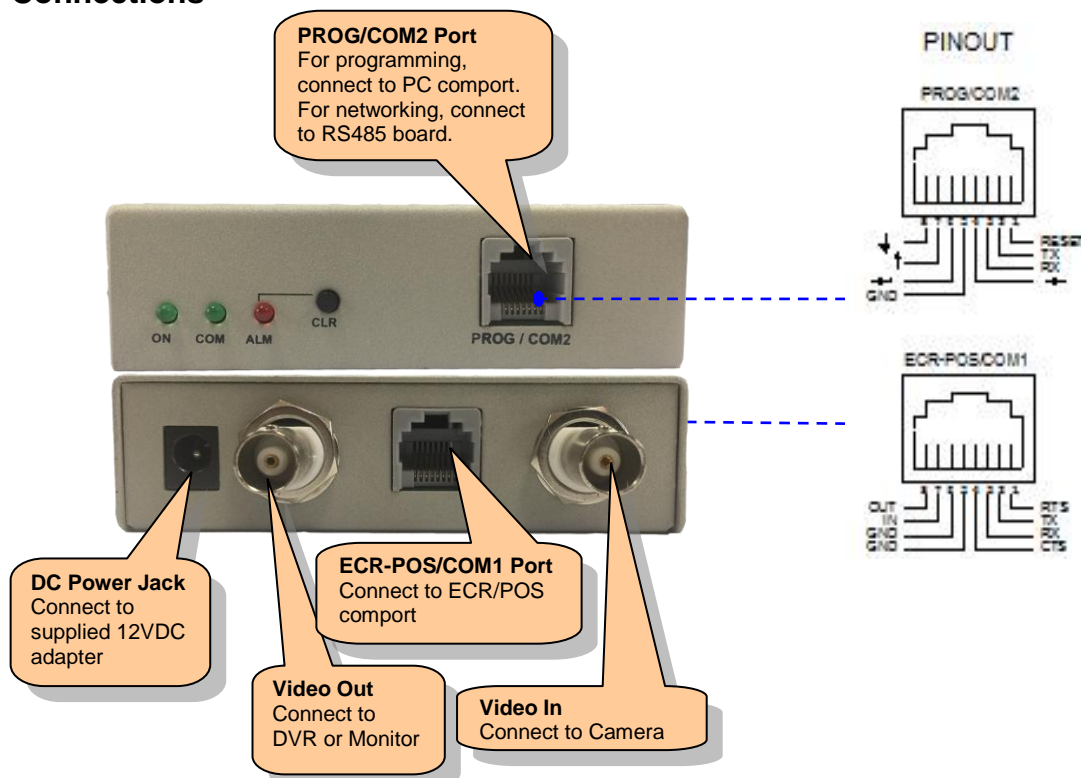
1	PROG/COM2	RJ45 socket for user programming (RS232) and networking (RS485). The unit is set to user programming mode by default through internal jumper.
2	CLR Button	To clear Alarm LED.
3	ALM LED	Alarm/Video loss LED. Alarm Indication It blinks to indicate exception event has been triggered. The number of blinks is corresponding to number of events being triggered, and up to 5 event counts can be shown. A blink is 0.25sec long (0.125sec on/0.125sec off), and cycles for 1.8sec period. Depressing CLR button would clear the alarm indication. Exception events are user defined. Video Loss Indication It turns ON permanently to indicate incoming video signal could not be detected. Depressing CLR has no effect on this indication. Video loss indication always overrides alarm indication.
4	COM LED	To indicate communication data is present on COM1 or COM2.
5	ON LED	Power ON LED
6	12VDC IN	DC socket for 12VDC input, 150mA nominal.
7	VIDEO IN	1Vpp video in. Connect to camera.
8	ECR-POS /COM1	RJ45 socket for serial interfacing (RS232) to POS or ECR serial port.
9	VIDEO OUT	1Vpp video out. Connect to recorder or TV monitor

Jumpers



1	COM2: RS232/RS485 Selection	To configure the interface of com2 be RS232 or RS485. Default is set to RS232.
2	COM1: TX Enable	Inserting jumper to enable TX signal. Default is enable (jumper is short).

Connections



5 Operating Modes

There are two operating modes in the iTIVO-HD: Normal and Simulation.

5.1 Normal Mode

Power on the unit and wait for “READY” text to appear on the TV monitor. The unit is now ready to accept transactions from cash register.

5.2 Simulation Mode

This mode is useful for demonstrating the iTIVO-HD without the present of cash register. Follow the following procedure to activate the simulation mode

1. Power up the device and toggle (press and release) the CLR switch within 1 sec. The COM LED should flash rapidly for 2 sec.
2. Toggle the CLR switch again
3. Wait for “SIMULATION” text to appear on TV monitor.

6 Programming

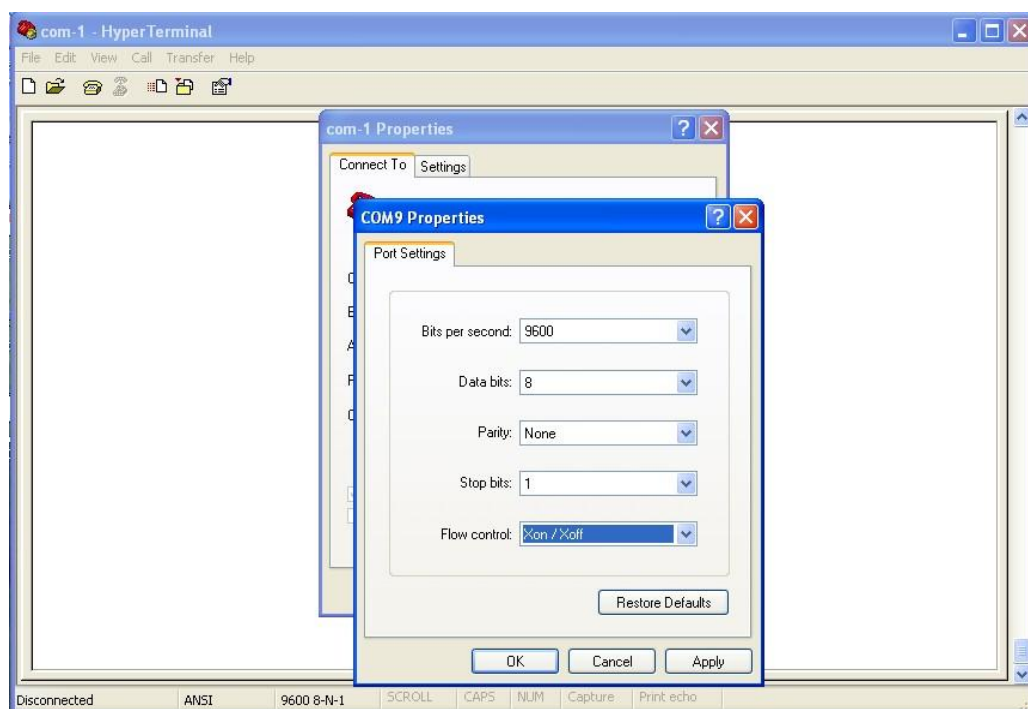
(Important note: The iTIVO-HD text inserter now comes with Config software to make the programming must easier. Please download it from www.ilinkpro.com)

6.1 PC Programming using HyperTerminal for Windows 2000/XP

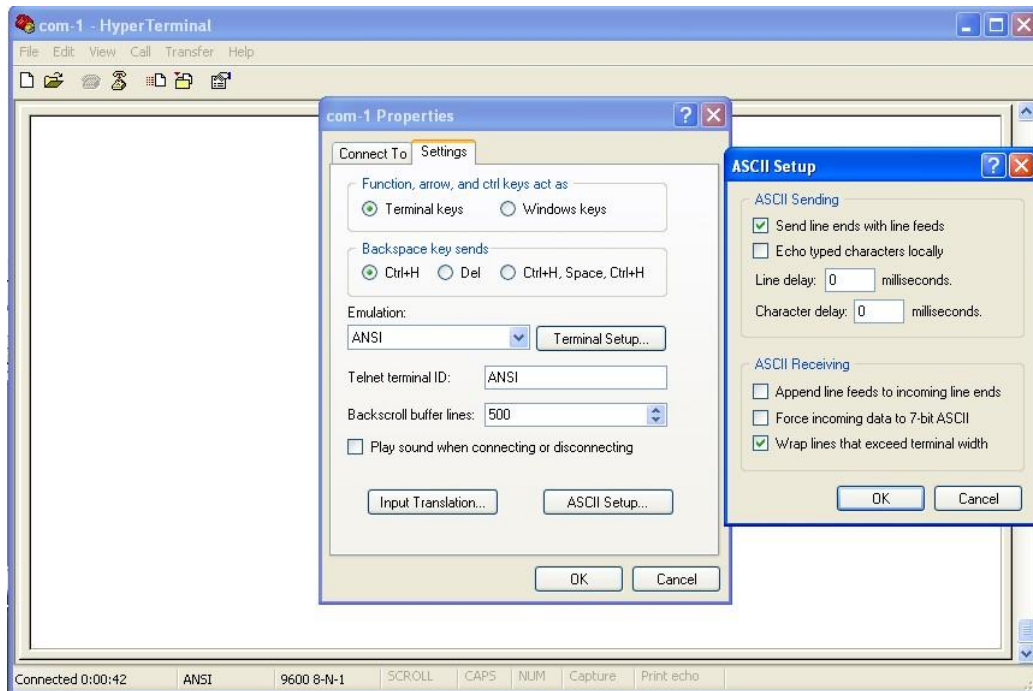
Downloading Procedure (to download configuration file to the device)


1. Connect the PROG port of iTIVO-HD to a PC comport.
2. On PC, invokes Windows HyperTerminal software. Ensure that the serial communication port has the following settings:
-9600 baud, 8-bit data, no parity, 1 stop bit, XON/XOFF flow control.
The setting dialog box is located at:

[FILE][Properties][Configure][Port Settings]

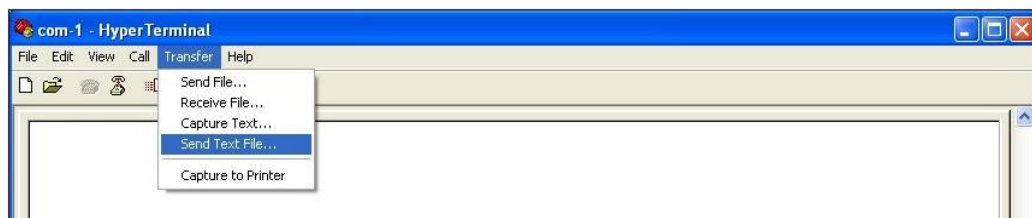


4. Select ANSI emulation mode and disable sending echo. The setting dialog box is located at:
[FILE][Properties][Settings][Emulation] and [ASCII Setup]

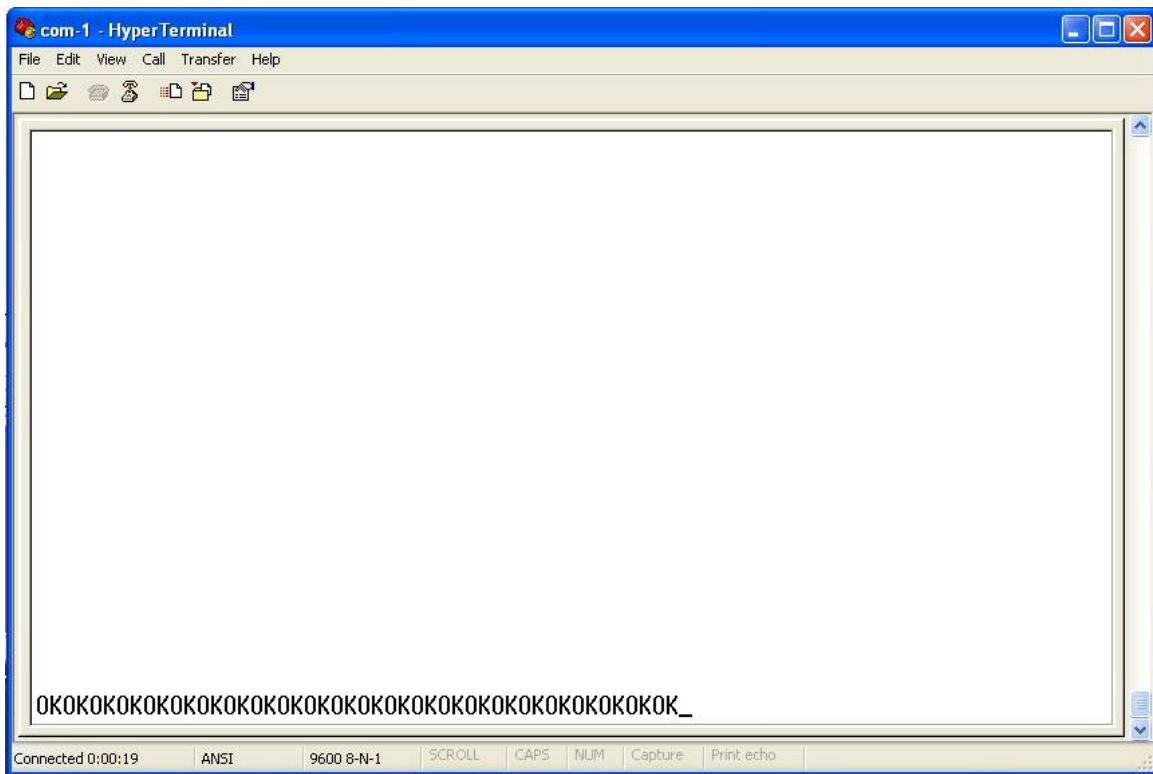


5. Click on the Call icon  to connect.

3. Select **[Transfer][Send Text File]** and choose your configuration file on the file browser. Click OK.



4. The device will return “OK” for each setting being downloaded successfully and show it on the screen of the HyperTerminal. The following screenshot showing 24 settings are successfully downloaded.



Note:
 If the configuration file contains multiple configuration settings, setting of software flow control (XON/XOFF) is mandatory. This is to allow each configuration setting to be saved successfully in the internal EEPROM. iTIVO-HD would return “OK” if a setting is saved successful otherwise “ER” would be returned.

Uploading Procedure (to upload configuration file from the device)

1. Follow step 1 and 2 as stated in *Download Procedure* section.
2. Power up the device and toggle (press and release) the CLR switch within 2 sec.
3. Blinking text “UPLOAD SETTINGS” is displaying on the TV monitor to indicate uploading is in progress.
4. All settings of the device are dumped on the HyperTerminal screen.

```

com-1 - HyperTerminal
File Edit View Call Transfer Help
FIRMWARE REV 2.2.S06
AA55 02 02 15 3A FFXXXXXXXXXXXXXX

AA55 03 04 00 00 00 00 FFXXXXXXXXXXXXXX
AA55 11 09 0A 28 02 9C 13 01 00 01 03 FFXXXXXXXXXXXXXX
AA55 30 0A 01 01 01 00 08 00 03 03 00 08 FFXXXXXXXXXXXXXX
AA55 31 01 1E FFXXXXXXXXXXXXXX
AA55 40 02 00 00 FFXXXXXXXXXXXXXX
AA55 50 02 02 00 FFXXXXXXXXXXXXXX
AA55 60 02 02 01 FFXXXXXXXXXXXXXX
AA55 70 01 40 FFXXXXXXXXXXXXXX
AA55 71 01 00 FFXXXXXXXXXXXXXX
AA55 80 01 00 FFXXXXXXXXXXXXXX
AA55 90 02 00 01 FFXXXXXXXXXXXXXX
AA55 20 13 01 01 00 00 00 00 00 "Void" FFXXXXXXXXXXXXXX
AA55 21 13 01 01 00 00 00 00 00 "NOSALE" FFXXXXXXXXXXXXXX
AA55 22 13 01 01 00 00 00 00 00 "Refund" FFXXXXXXXXXXXXXX
AA55 23 13 01 01 00 00 00 00 00 "COUPON" FFXXXXXXXXXXXXXX
AA55 24 13 01 01 00 00 00 00 00 "PAID OUT" FFXXXXXXXXXXXXXX
AA55 25 13 01 01 00 00 00 00 00 "RETURN" FFXXXXXXXXXXXXXX
AA55 26 13 01 01 00 00 00 00 00 "CANCEL" FFXXXXXXXXXXXXXX
AA55 27 13 01 01 00 00 00 00 00 "Non-sale" FFXXXXXXXXXXXXXX
AA55 28 13 01 01 00 00 00 00 00 "VOID" FFXXXXXXXXXXXXXX
AA55 29 13 00 01 00 00 00 00 00 "" FFXXXXXXXXXXXXXX
AA55 2A 13 00 01 00 00 00 00 00 "" FFXXXXXXXXXXXXXX
AA55 2B 13 00 01 00 00 00 00 00 "" FFXXXXXXXXXXXXXX
  
```

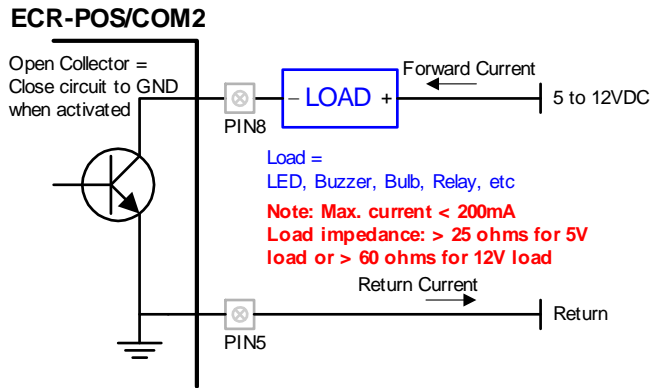
5. The ALM LED should flash rapidly for 1 sec to indicate end of uploading.

6.2 Restoring Factory Default Settings

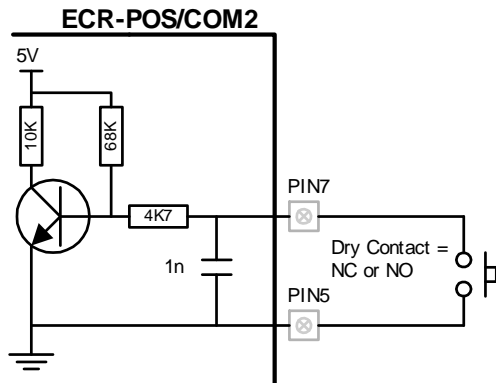
1. Press and hold the CLR switch while power up device. Wait for a short beep approximately 2 sec later after powering up.
2. Release the CLR switch immediately.
3. The following text appears on TV monitor
 Restore Settings 'CLR' = YES ?
 Press 'CLR': 3
4. The device is now prompting for user to confirm the restoration. A 3 sec counter is also displayed while waiting for user to press the 'CLR' switch.
5. Press the CLR switch to confirm the restoration.

7 IN and OUT Connections

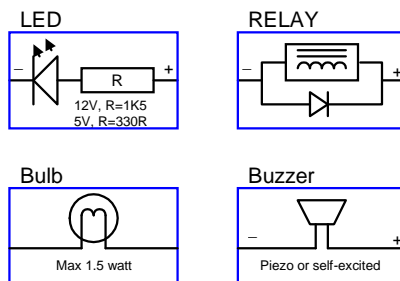
OUT Connection (Alarm Out)



IN Connection (Alarm Trigger/Cash Drawer)



Examples of External Load

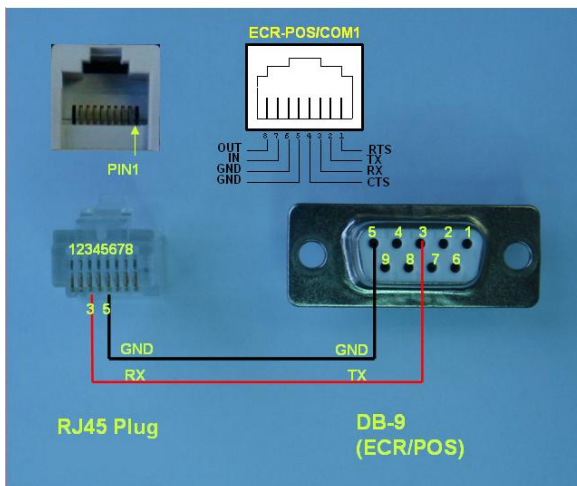


8 Serial Cable and Wiring

This section shows the possible ways of wiring up the iTIVO-HD and your cash register via serial interface. It may defer depending on your cash register. Please study the serial port of your cash register carefully before choosing the correct cable wiring. The wiring diagrams showing here assumed that the pinout of your cash register's serial port (DB9 connector) follows the standard Data Terminal Equipment (DTE) pinout.

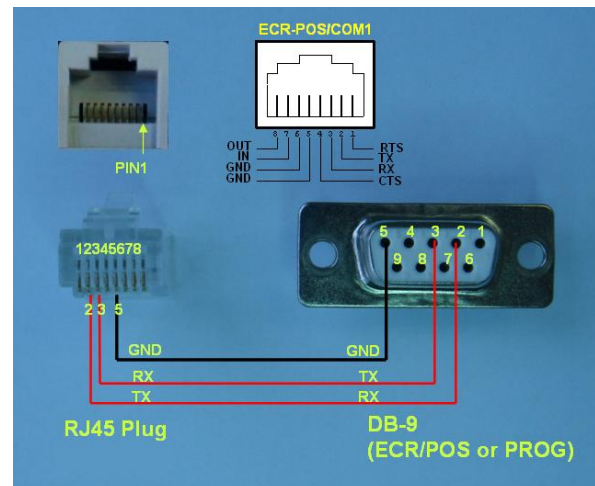
CAUTION:
 Some registers are having power pin, usually 5V or 12V on their DSUB9 connector for powering external peripheral like scanner and pole display. Be extremely careful NOT to use any of these power pin when wiring the cable. Check your cash register hardware manual if you are not sure.

8.1 ECR-POS/COM1 Cable and Wiring



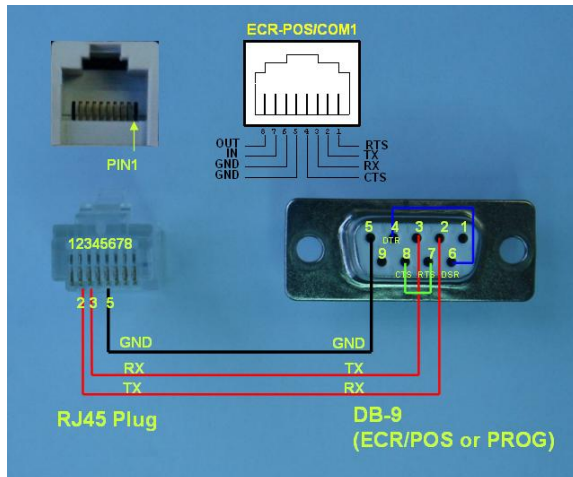
Minimum Wiring

This cable is suitable for 1) register that is able to configure its serial port as plain text output without hardware flow control. 2) TX signal tapping (via DB-9 Y cable). 3) interface conversion board (see *Interface Conversion* section)

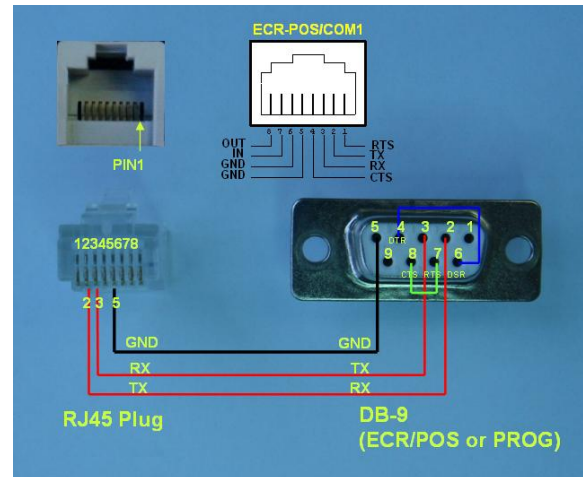


Wiring with TX and RX

This cable is suitable for 1) printer emulation without flow control. 2) pole display emulation without flow control. 3) plain text output without flow control. **Internal TX jumper must be short if emulation is required.** This cable can also be used for **PC programming** (PROG/COM2).

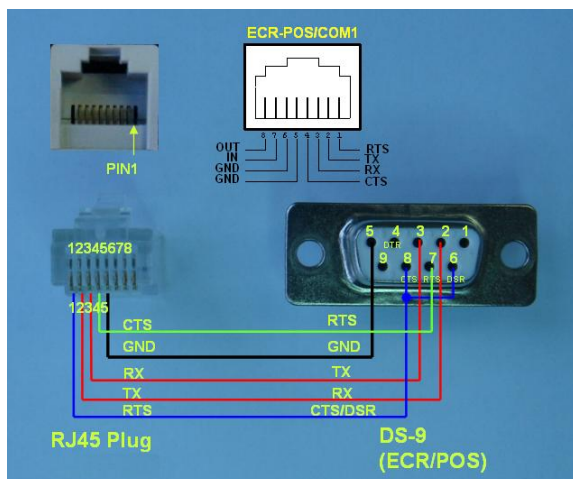


Wiring with TX, RX and Flow-control Loopback
 This cable is suitable for 1) printer emulation with flow control. 2) pole display emulation with flow control. 3) plain text output with flow control. **Internal TX jumper must be short if emulation is required.** This cable can also be used for **PC programming** (PROG/COM2).



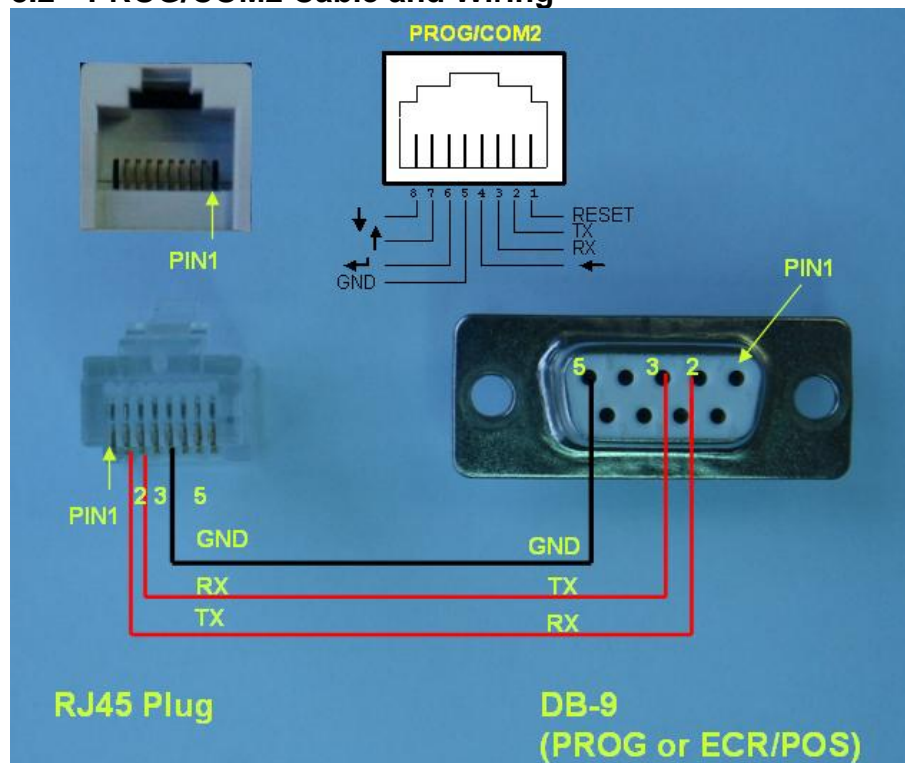
Wiring with TX, RX and Flow-control Loopback (Alternative)

This cable is suitable for 1) printer emulation with flow control. 2) pole display emulation with flow control. 3) plain text output with flow control. **Internal TX jumper must be short if emulation is required.** This cable can also be used for **PC programming** (PROG/COM2).



Wiring with TX, RX and Flow-control
 This cable is suitable for 1) printer emulation with flow control. 2) pole display emulation with flow control. 3) plain text output with flow control. **Internal TX jumper must be short if emulation is required.** Prevention of data overrun (lost of transaction data due to memory overflow if baud rate is too fast) is always guaranteed in this connection.

8.2 PROG/COM2 Cable and Wiring



This is only one of the possible ways of wiring up the programming cable. Refer to *ECR-POS/COM1 Cable and Wiring* section for other alternatives.

8.3 Standard Pinout of RS-232 Interface

The table below shows the standard pinout of a DTE DB-9 connector.

DTE(Data Terminal Equipment)

DB-9 Male (PC, POS, ECR)		
Pin	Signal	I/O
1	DCD	IN
2	RX	IN
3	TX	OUT
4	DTR	OUT
5	GND	-
6	DSR	IN
7	RTS	OUT
8	CTS	IN
9	RI	IN

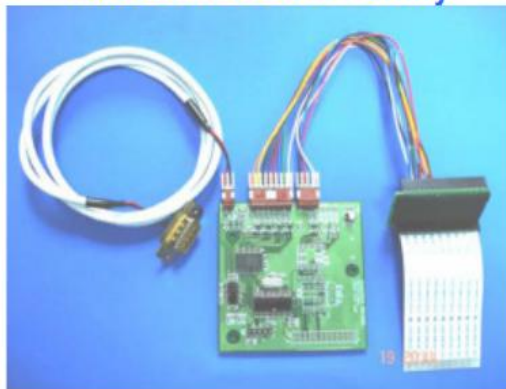
9 Interface Conversion

Sometimes, if there are no spare serial ports available on a register, interface conversion is required.

9.1 Internal Printer to Serial Interface Card

This is an optional add-on card (PI4ECR) specific to particular model of cash register being used. The interface card has to plug onto the printer's interface header of a cash register. Please refer to compatibility list and card installation guide for more details.

Model : PI4ECR Family



CAUTION:

Ensure power is OFF before inserting this card.

9.2 Centronics Printer to Serial Interface Module

Centronics printer is also known as LPT printer. This interface module, together with associated cables, converts the Centronics interface to serial interface. Please refer to *LPT (Centronics) to Serial Interface Conversion, Cable and Installation* document for more details.



10 Operating Characteristics

Input Power

- Input voltage: 9-12VDC
- Current consumption: 150mA typical
- Protection: Polyswitch fuse @ 400mA trip current. Reverse voltage protection.

Digital Inputs

- Dry contact or TTL logic levels

Digital Outputs

- Open collector
- Sink current up to 200mA

Video Input/Output

- Signal Level: 1Vpp, 75 ohm termination.
- Video standard: 2:1 interlace composite video. Compatible to Monochrome, PAL, or NTSC.

ECR/POS COM1

- Compliant to EIA-232 standard, +-10V level.
- Bauds: 2400, 4800, *9600, 19200, 28800, 38400, 57600.
- Optional parity bit supported
- Hardware(RTS/CTS) or software (XON/XOFF) flow control supported
- 15KV ESD protection

PROG/COM2 (Programming port)

- Compliant to EIA-232 standard, +-10V level.
- Bauds: 2400, 4800, *9600, 19200, 28800, 38400, 57600.
- Optional parity bit supported
- Software (XON/XOFF) flow control supported
- 15KV ESD protection

Environmental

- Storage Temperature: -20 °C to +85 °C
- Operation Temperature: -10 °C to 55 °C
- Humidity: 20 to 90% RH (Non-condensing)

Physical

- Weight: 400g, device only.
- Dimension: 103L, 98W, 28H. In mm.

11 Warranty

One year limited warranty from the date of purchase.

A Appendix

A.1 Command Packet Format

Packet Format (in ASCII Text)

[AA55][CMD][LEN][PAYLOAD][FFXXXXXXXXXXXX]

Field Explanation

- [AA55]: 4-character field. This field contains the fix pattern to indicate start of packet.
- [CMD]: 2-character field. This field contains the command byte of a packet. Refer to *Configuration File* section for explanation of each command. In hexadecimal value.
- [LEN]: 2-character field. This field contains the length of the payload. In hexadecimal value.
- [PAYLOAD]: The length of this field depends on LEN value. This field contains the configuration payload.
- FFXXXXXXXXXXXXX: This field contains the 14-character fixed pattern to indicate end of packet.

iTIVO-HD will return “OK” for every valid packet.

Note: All values in a packet are hexadecimal format, except the end-of-packet pattern.

Example

AA55 02 02 12 3A FXXXXXXXXXXXX

Command byte is 02 hex
 Data length is 02 hex
 1st data byte is 12 hex
 2nd data byte is 3A hex

This command means set the display offset at x position 12h and y position 3Ah (refer to A.2 for command description)

A.2 Configuration File and Command Description

The following listing lists the default configuration file (iTIVO-HD_cfg.txt). It is recommended that you make a copy of this file before editing it.

```

=====
DATA PACKET FORMAT
=====
AA55 CMD LEN D[0] D[1] .. D[LEN-1] FFXXXXXXXXXXXXX
|   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   | +- Footer
|   |   |   |   |   |   |   |   | Data payload
|   |   |   |   |   |   |   |   | Length of data payload
|   |   |   |   |   |   |   |   | Comandnd code
+-----+-----+-----+-----+ Header
  
```

Note 1: All values (except footer) in a data packet must be in hexadecimal format.

Note 2: In the following presentation of the configuration description, value with 0x prefix means the value is in hexadecimal format. Otherwise, it means the value is in decimal format. Do not add 0x in your data packet. It is only for presentation purpose.

Note 3: The default comport setting is 9600, 8-bit, 1 stop bit, no parity, no hardware flow control (CTS/RTS is off)

=== STV Display Offset ===

```

-----
; CMD = 0x02
; LED = 2 (0x02)
-----
; Data Field Value Default Meaning/*Default
-----
; D0 X_Off 3-60 21 (0x15) x offset
; D1 Y_Off 0-255 58 (0x3A) y offset
-----
AA55 02 02 15 3A FFXXXXXXXXXXXX

```

=== STV Display Attribute ===

```

-----
; CMD = 0x03
; LED = 4 (0x04)
-----
; Data Field Value Default Meaning/*Default
-----
; D0 Char_Brightness 0-7 7 (0x07) 0: full black, 7: full white
; D1 Background_Brightness 0-7 1 (0x01) 0: full black, 7: full white
; D2 Background_ON 0-2 1 (0x01) OFF/*char only/ON
; D3 Char_Size 0-2 0 (0x00) *small/medium/large
-----
AA55 03 04 07 02 01 00 FFXXXXXXXXXXXX

```

=== Text Transparent Mode === (For Revision R03 & R04 board only)

```

-----
; CMD = 0x04
; LEN = 1 (0x01)
-----
; Data Field Value Default Meaning/*Default
-----
; D0 Transparent_ON 0-1 1 (0x01) OFF/*ON
-----
AA55 04 01 01 FFXXXXXXXXXXXX

```

=== STV Print Text Control ===

```

-----
; CMD = 0x11
; LED = 8 (0x08)
-----
; Data Field Value Default Meaning/*Default
-----
; 0 Num_Display_Line 1-10 10 (0x0A) number of lines
; 1 Num_Character 20-40 40 (0x28) number of characters per line
; 2 Scroll_Timer 0-255 2 (0x02) 1: 128ms
; 3 Clear_Timer 0-255 156 (0x9c) 1: 128ms (default 20 sec)
; 4 Except_Timer 0-255 19 (0x13) 1: 128ms (default 2.5 sec)
; 5 Scroll_Mode 0-1 1 (0x01) with scroll timer/*without timer
; 6 Clear_Mode 0-1 0 (0x00) *with screen clear timer/continuous
; 7 Exception_Mode 0-1 1 (0x01) with exception timer/*without timer
; 8 Line_Mode_Formatting 0-4 3 (0x03) 0: no formatting
; 1: left justified
; 2: right justified
; 3: *fit string into one line
; 4: fit string into two lines
-----
AA55 11 09 0A 28 01 9C 13 01 00 01 03 FFXXXXXXXXXXXX

```

=== Transaction Exceptions ===

```

-----
; CMD = 0x20 - 2B or 0x2n, where n is the index of an exception.
; LEN = 19 (0x13)
-----
; Data Field Value Default Meaning/*Default
-----
; D0 Exception_Enable 0-1 1 (0x01) disable/enable
; D1 String_Match 0-1 1 (0x01) ignore/matching
; D2 Val_Compare_Operator 0-4 0 (0x00) none/less/greater/negative/equal
-----

```

```

; D3-6 Price_Value 4-byte see below price value in BCD format, xx_xx.xx
; D7-18 Sting 12-byte see below maximum 11 chars (plus null)
;
; Note: Exception 0x2B is reserved for drawer monitoring if drawer alarm is enable
; (see ALARM1). The exception string must match the string when a sale transaction
; is tender, e.g. "CASH"
;
-----

```

```

AA55 20 13 01 01 00 00 00 00 "Void" FFXXXXXXXXXXXX
AA55 21 13 01 01 00 00 00 00 "NOSALE" FFXXXXXXXXXXXX
AA55 22 13 01 01 00 00 00 00 "Refund" FFXXXXXXXXXXXX
AA55 23 13 01 01 00 00 00 00 "COUPON" FFXXXXXXXXXXXX
AA55 24 13 01 01 00 00 00 00 "PAID OUT" FFXXXXXXXXXXXX
AA55 25 13 01 01 00 00 00 00 "RETURN" FFXXXXXXXXXXXX
AA55 26 13 01 01 00 00 00 00 "CANCEL" FFXXXXXXXXXXXX
AA55 27 13 01 01 00 00 00 00 "Non-sale" FFXXXXXXXXXXXX
AA55 28 13 01 01 00 00 00 00 "VOID" FFXXXXXXXXXXXX
AA55 29 13 00 01 00 00 00 00 "" FFXXXXXXXXXXXX
AA55 2A 13 00 01 00 00 00 00 "" FFXXXXXXXXXXXX
AA55 2B 13 00 01 00 00 00 00 "" FFXXXXXXXXXXXX

```

=== Alarm 1-2 ===

```

;
-----
; CMD = 0x30
; LEN = 10 (0x0A)
;
-----
; Data Field Value Default Meaning/*Default
;
; --ALARM1--
; D0 Enable 0-1 1 (0x01) OFF/*ON
; D1 Exception_Trigger_Src 0-4 1 (0x01) none/*all/1st half/2nd half/0x2B(drawer)
;
; D2 Input_Trigger_Src 0-4 1 (0x01) none/*all/INP1/INP2/INP1_DRAWER
; D3 Output_Level 0-1 0 (0x00) *LOW/HIGH
; D4 Input_Trigger_Timer 0-255 8 (0x08) 1: 128ms (default 2 secs)
;
; --ALARM2--
; D5 Enable 0-1 0 (0x01) OFF/ON
; D6 Exception_Trigger_Src 0-3 3 (0x03) none/*all/1st half/2nd half
; D7 Input_Trigger_Src 0-3 3 (0x03) none/*all/INP1/INP2
; D8 Output_Level 0-1 0 (0x01) LOW/HIGH
; D9 Input_Trigger_Timer 0-255 8 (0x08) 1: 128ms (default 2 secs)
;
-----
AA55 30 0A 01 01 01 00 08 00 03 03 00 08 FFXXXXXXXXXXXX

```

== Drawer Timer==

```

;
-----
; CMD = 0x31
; LED = 1 (0x01)
;
-----
; Data Field Value Default Meaning/*Default
;
; D0 Drawer_timeout 0-255 30 (0x1E) 1: 1.024 sec (default 30 sec)
;
-----
AA55 31 01 1E FFXXXXXXXXXXXX

```

=== Input Level 1-2 ==

```

;
-----
; CMD = 0x40
; LEN = 2 (0x02)
;
-----
; Data Field Value Default Meaning/*Default
;
; D0 INP1_Level 0-1 0 (0x00) *LOW/HIGH
; D1 INP2_Level 0-1 0 (0x00) *LOW/HIGH
;
; Note: LOW means contact closed. HIGH means contact open.
;
-----
AA55 40 02 00 00 FFXXXXXXXXXXXX

```

=== COM1 (ECR port) for firmware version V3.2 or higher ===

```

;
-----
; CMD = 0x50
; LEN = 2 (0x02)
;
-----
; Data Field Value Default Meaning/*Default
;
; D0 Parity | Baudrate 0-8 2 (0x02) 2K4/4K8/*9K6/14k4/19K2/28K8/38K4/57K6/115K2
;
; Note: 0x00-0x08, no parity (8-bit mode)
;
-----

```

```

;
; Note2: 0x10-0x18, with parity (9-bit mode).
; 9-bit mode accepts both odd and even
; parity bit.
;
; D1 Autobaud | SW_Flow 0-1 16 (0x10) D1 Autobaud SW_Flow (XON/XOFF)
;
; -----
; 0x00 No No
; 0x01 No Yes
; *0x10 Yes No
; 0x11 Yes Yes
;
; -----
AA55 50 02 02 10 FFXXXXXXXXXXXX

```

=== COM2 (PROG port), for firmware version **V3.2 or higher** ===

```

;
; CMD = 0x60
; LEN = 2 (0x02)
;
; -----
; Data Field Value Default Meaning/*Default
; -----
; D0 Parity | Baudrate 0-8 2 (0x02) 2K4/4K8/*9K6/14k4/19K2/28K8/38K4/57K6/115K2
; Note1: 0x00-0x08, no parity (8-bit mode)
; Note2: 0x10-0x18, with parity (9-bit mode).
; 9-bit mode accepts both odd and even
; parity bit.
;
; D1 Software_Flow_Cntl 0-1 1 (0x01) NO/*YES, software flow control (XON/XOFF)
;
; -----
AA55 60 02 02 01 FFXXXXXXXXXXXX

```

=== COM1 (ECR port), for firmware version **V3.1 or lower** ===

```

;
; CMD = 0x50
; LEN = 2 (0x02)
;
; -----
; Data Field Value Default Meaning/*Default
; -----
; D0 Parity | Baudrate 0-6 2 (0x02) 2K4/4K8/*9K6/19K2/28K8/38K4/57K6
; Note1: 0x00-0x06, no parity (8-bit mode)
; Note2: 0x10-0x16, with parity (9-bit mode).
; 9-bit mode accepts both odd and even
; parity bit.
;
; D1 SW_Flow_Cntl 0-1 0 (0x00) *NO/YES, software flow control (XON/XOFF)
;
; -----
AA55 50 02 02 00 FFXXXXXXXXXXXX

```

=== COM2 (PROG port), for firmware version **V3.1 or lower** ===

```

;
; CMD = 0x60
; LEN = 2 (0x02)
;
; -----
; Data Field Value Default Meaning/*Default
; -----
; D0 Parity | Baudrate 0-6 2 (0x02) 2K4/4K8/*9K6/19K2/28K8/38K4/57K6
; Note1: 0x00-0x06, no parity (8-bit mode)
; Note2: 0x10-0x16, with parity (9-bit mode).
; 9-bit mode accepts both odd and even
; parity bit.
;
; D1 Software_Flow_Cntl 0-1 1 (0x01) NO/*YES, software flow control (XON/XOFF)
;
; -----
AA55 60 02 02 01 FFXXXXXXXXXXXX

```

=== Buzzer Volume ===

```

;
; CMD = 0x70
; LEN = 1
;
; -----
; Data Field Value Default Meaning/*Default
; -----
; D0 Buzzer_Volume 0-96 64 (0x40) Note: 0x00 = buzzer off
;
; -----
AA55 70 01 40 FFXXXXXXXXXXXX

```

=== Force Carriage-return (CR) ===

(CR is inserted when the max number of character is reached for a line)

```

; CMD      = 0x71
; LEN      = 1 (0x01)
;-----
; Data     Field                Value   Default   Meaning/*Default
;-----
; D0      CR_Enable             0-1    0 (0x00)  *disable/enable
;-----
AA55 71 01 00 FFXXXXXXXXXXXX

=== Printer Type and Emulation ===
;-----
; CMD      = 0x80
; LEN      = 2 (0x02)
;-----
; Data     Field                Value   Default   Meaning/*Default
;-----
; D0      Printer_type_emu      0-1    0 (0x00)  *emulation/filter
;                                     *0: emulation for TM-U88, SP1300
;                                     1: filter for TM-U88, SPR270, UP-360
;                                     TM-U210A
;-----
; NOTE: Remove jumper P10 (tx pin of COM1) if external printer is connected on the same cable
;-----
AA55 80 01 00 FFXXXXXXXXXXXX

=== Alarm Log and Print on COM2 ===
;-----
; CMD      = 0x90
; LEN      = 2 (0x02)
;-----
; Data     Field                Value   Default   Meaning/*Default
;-----
; D0      Alarm_Log             0-1    0 (0x00)  *disable/enable
;                                     Note: disable also clear log history
; D1      COM2_Print_Mode       0-1    1 (0x00)  disable/*alarm/com1->com2 pass thru
;-----
AA55 90 02 00 01 FFXXXXXXXXXXXX

=== OTHER COMMANDS ===
Upload all setting : AA55 F0 00 FFXXXXXXXXXXXX
Upload alarm logs  : AA55 E0 00 FFXXXXXXXXXXXX
*Set time          : AA55 A0 07 HH MM SS DT MM YY DY FFXXXXXXXXXXXX /* in BCD format */
*Show time         : AA55 A1 00 FFXXXXXXXXXXXX
Note *: if real-time-clock is present

```

A.3 Supported Character Set and Character Mapping

Supported Character Set

Alpha Numeric	0 ~ 9, a ~ z, A ~ Z
Symbols	\$%?./:-+= `

Character Mapping

ASCII Character	iTIVO-HD Character
;	:
\	/
Others	Space character

A.4 Display Font, Tone and Transparent Background

