



# **POS Surveillance System**

## **Solution Guide**

Version 1.4

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# 1. Introduction

Integrated POS surveillance system comprises several components mainly including point-of-sales, cameras and digital video recorders which are capable of recording transaction data. It provides retail managers and shop or company owner with a complete picture of trade activity and also enables emphasizing of suspected or questionable event such as “Sweet hearting discounts” and flagged transactions including “Voids”, “No Sales” and reducing the time spent on reviewing recorded video. With security being the top of mind for retailers, text overlay of transaction data onto POS surveillance video is quickly becoming the application of choice for fraud-conscious merchants.

## Traditional Security Monitoring vs. POS Surveillance System

Traditional (CCTV) Security Monitoring	POS Surveillance System
<p><b>#On Point-of-sale side:</b></p> <ol style="list-style-type: none"> <li>1. Find out the suspicious transactions</li> <li>2. Get the time of targeted transaction</li> </ol> <p><b>#On surveillance system side:</b></p> <ol style="list-style-type: none"> <li>1. Search the video by the time</li> <li>2. Check the recorded video with transaction data</li> </ol>	<p><b>#On surveillance system side:</b></p> <ol style="list-style-type: none"> <li>1. Find out the suspicious transactions with the time</li> <li>2. Check the recorded video with transaction data</li> <li>3. Remote accessibility via Internet</li> </ol>

### Who can be benefit from POS Surveillance System?

Small family-owned stores to retail chain-stores rely on POS Surveillance System as added security to help in reducing the potential for damage, theft, and fraud. The use of POS Surveillance can also aid in tracking cash transaction to capture fraudulent activities, not only video image but also transaction data, that occur frequently in the retail environment.

## 1.1 Benefits

- **Reduction of losses at shopping centers:** incontrovertible proofs of trade violation (false discount cards, misappropriation of profit, fictitious return of products, imposition of clients, etc.)
- **Enhanced quality of services:** managers possess full information on personnel’s actions, which greatly improves labor discipline. Network features of the system allow the managers to receive information in minutes, even without leaving the office

- **Registration of all purchases** with indication of date, attachment of video record of both salesman and client
- **Centralized control of POS network** over a trade outlet operations from any point of the world via Central Management System
- **Operative real-time management**
- **Powerful analysis toolset:** basic and extended requests, search of specified events.

## 1.2 Features

- **Data synchronization:** Every sales transaction's text information applies to video image
- **Video Text Overlay:** Transaction text message can be displayed or hidden on screen and on the video files.
- **Exception text:** 16 sets of exception event text can be predefined. For example, all the transactions containing the keyword "VOID" will be marked.
- **Quick search:** The data can be searched by product name, price, and channel. Also, combination of words can be used on the search function.
- **Remote control:** Remote playback and text overlay allow users to control the business even they are thousands of miles away from the store.

## 2. Devices Required for POS Surveillance

### System

A POS surveillance system is mainly composed of the devices listed as follows:

- Dome/Fixed Camera
- DVR
- POS/Cash Register
- Receipt Printer/Pole Display (optional)
- Data Converter (optional)

Illustration of POS surveillance system wiring will be shown in the later section: **System Connectivity (with RS232 DB9 Y-cable)**.

### 3. Supported Models

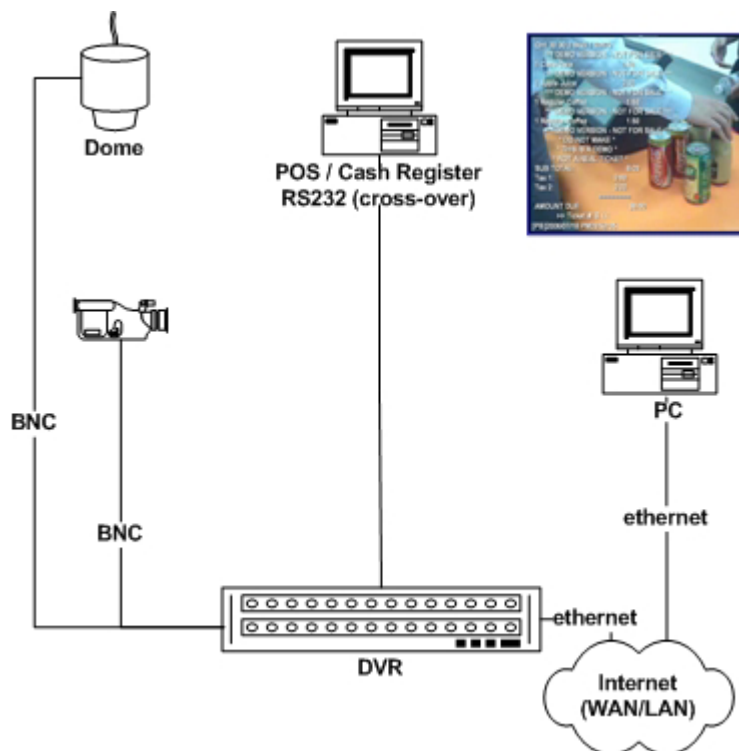
Pole displays/printers that follow the protocols such as EPSON (ESC/POS), PaernerTech, UTC, AEDEX etc. should work fine. For details of various models support, refer to **Appendix C: List of Supported Models**.

#### \*\*\*Data Converter

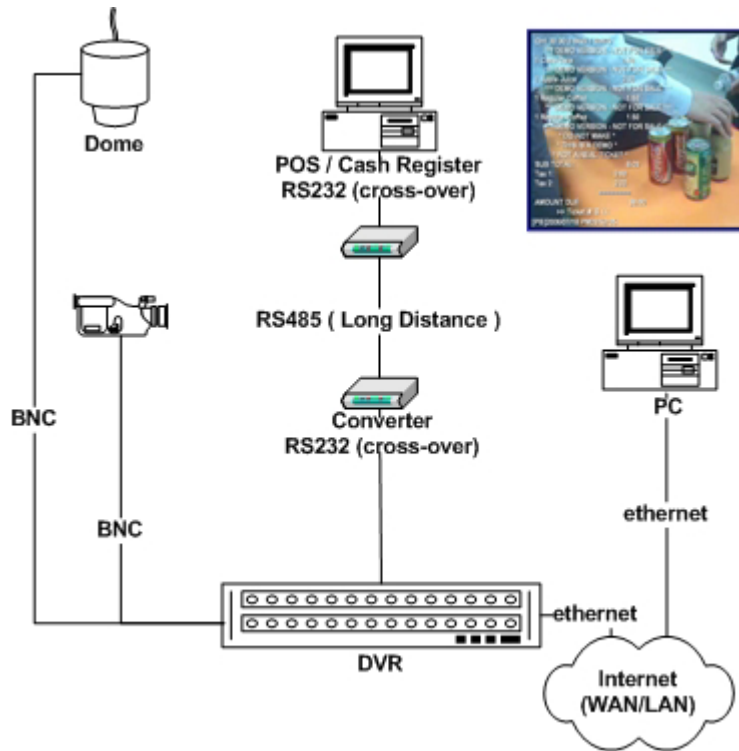
The Data Converter is for text data collecting and transmitting to a single DVR in a POS surveillance system with more than one cash register, especially in the system of large scale such as hypermarkets.

### 4. Integrated System Configuration

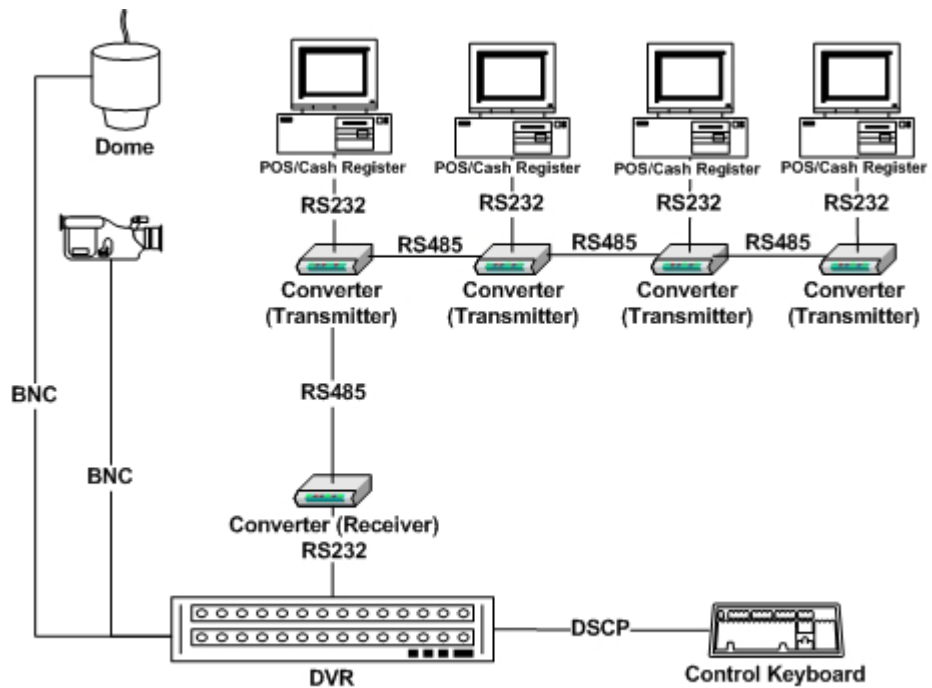
#### ■ Single POS—Direct Connection



■ Single POS—Long Distance (Up to 1 km)



■ Multi-POS Surveillance

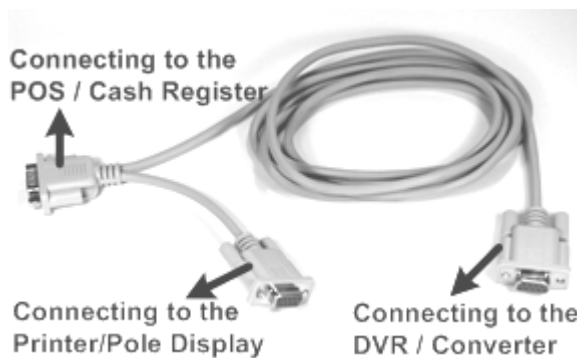


\*\*\* RS232 (cross-over)

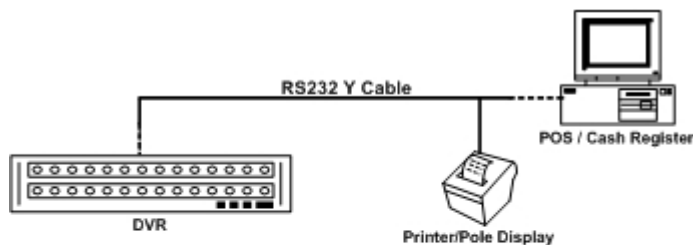
## 5. System Connectivity (with RS232 DB9 Y Cable)


The RS232 DB9 Y Cable (see the figure below) is available in both Text Module and Data Converter packages for easy wiring. Please refer to the Y Cable's figure below for each connector's usage. Also refer to the following diagrams for single / multi- POS connection with the Y Cable.

### Use of RS232 DB9 Y Cable Connectors

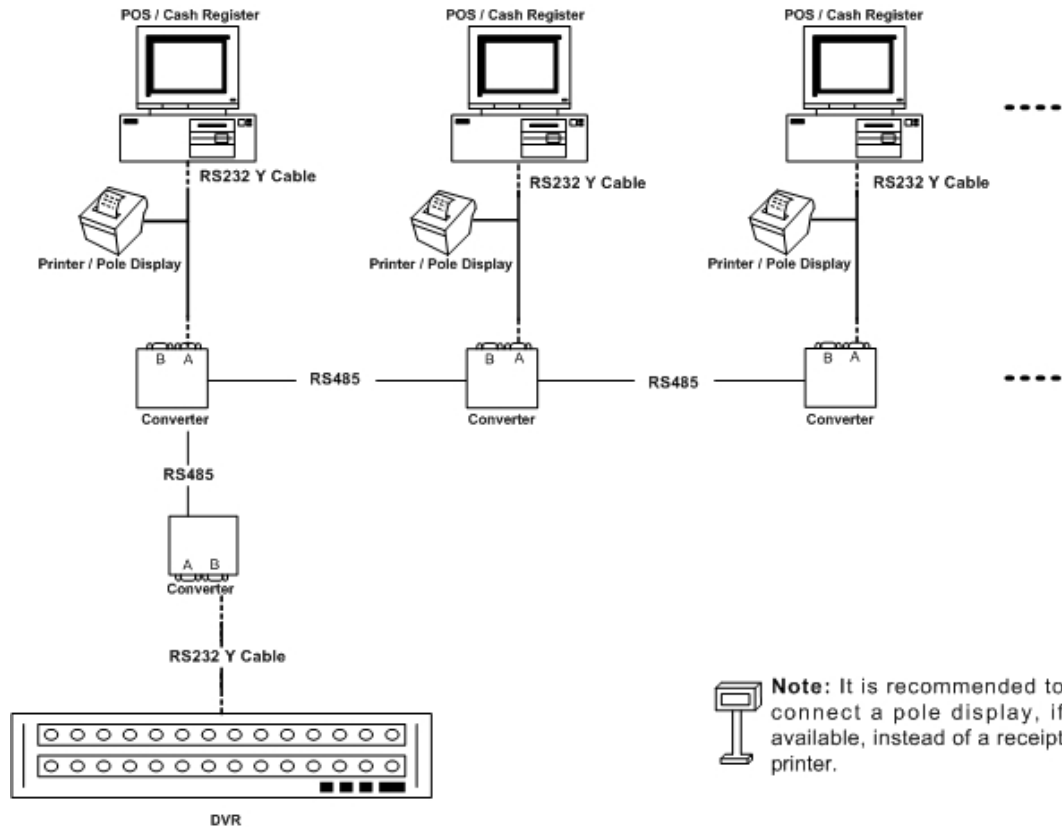


### Single POS Connection via the DB9 Y Cable



 **Note:** It is recommended to connect a pole display, if available, instead of a receipt printer.

## Multi-POS Connection via DB9 Y Cables



## 6. Set-up of Connected Devices

The following sub-sections will explain how to setup the connection of the POS module and the DVR.



## 6.2 OSD Set-up (Local/Remote)

After completing Text Module installation, please carry on the DVR's OSD setup for activating the text function. To setup the Text Overlay function, enter the OSD setup menu with the correct administrator password, and then select "Text Setup".



- Main Menu
1. System Setup
  2. Monitor Setup
  3. Camera Setup
  4. Record Setup
  5. Sequence Setup
  6. Event Setup
  7. Database Setup
  8. Configuration
  9. Video Export
  10. Text Setup
  11. Shutdown

Four items: Text Function, Text Overlay, Exception Text Setup and Input Setup, are found in the sub-menu of "Text Setup." Details of each item are described in the following sections. The column below shows the Text Setup menu.

- Text Setup
1. Text Function ON
  2. Text Overlay LIVE & PB
  3. Exception Text Setup
  4. Input Setup

### ■ Text Function

When selecting "ON", transaction data will be saved in text database.



**NOTE:** Once the Text Function is set to "ON," remember to assign a port for the POS/cash register or modem under the item **Input Setup**. Further details will be described later.

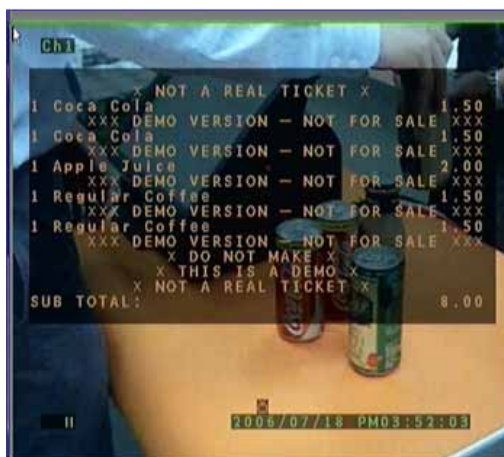
## ■ Text Overlay

Select to show text overlay in LIVE mode, PB mode, or both.

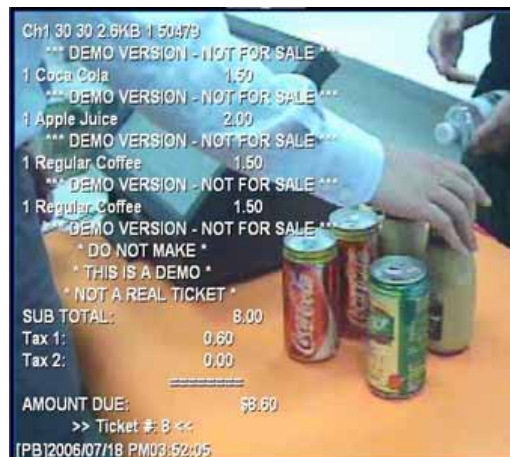
- Available options-- OFF, Only Live, Only PB, Live/PB
- Max lines displayed on OSD : 15 lines
- 42 bytes per line
- Text will be blanked out if no more data input in 8 seconds.
- Line compress feature--- When data length in one line exceeds the limit, the DVR will try to eliminate some continuous space to fit the line length limitation. Thus the text format on screen might differ slightly from print-out.
- Supports only English & West European characters so far.
- Text Overlay only displays in full screen mode.
- PB overlay is only available when PB speed is 1x forward.



**NOTE:** Remote Live— Text Overlay must be active for LIVE;  
Remote PB— Text Overlay must be active for PB. Furthermore, when seeing in Remote LIVE and Remote PB, it is possible to lose text data in low bandwidth network. We recommend using Remote Archive function to archive complete video and use “Local Playback of DVRRemote”, “DVRPlayer” and CMS to playback DRV file in single screen mode as shown below.



LOCAL



REMOTE

■ **Exception Text Setup**

The submenu of the item: Exception Text Setup is shown below.

Except Text Setup	
Exception No.	1
Trigger	OFF
Exception String	NO SALE
By Numerals	OFF
Value	
Value (Upper Limit)	

- Exception No.-----16 sets available
- Trigger----When turned “ON”, those transactions containing “Exception Strings” and meeting “Numerals” conditions will be marked as exceptions in text database and then trigger preset actions such as alarm output, alarm message via e-mail, SMS, etc. Exceptions can also be quickly searched via Text Query in Search menu.
- Exception String---Define Exception String. Max length: 24 bytes. The “Exception String” is case-sensitive. Only exactly matched ones will be marked as exceptions.
- By Numerals
  - \* OFF
  - \* Specific
  - \* Greater Equal Than
  - \* Less Equal Than
  - \* Inside The Range
  - \* Outside The Range

“Exception String” must be defined first before “By Numerals” takes effect. If “By Numerals” is enabled, only transactions that meet both “Exception String” and “By Numerals” conditions will be marked as exceptions and trigger an action.



**NOTE:** Only when Trigger is ON that the transactions will be marked as exceptions in text database. Otherwise, the stored data won't be marked as exceptions.

## ■ Input Setup

The submenu of the item: Input Setup is shown below.

Input Setup	
1. Port Selection	Serial Port
2. Input Source	Direct Connected
3. Camera Selection	1
4. Text Filter	ASCII
5. Manual Filter Setup	
6. Input Process	Canonical
7. Text Baud Rate	9600
8. Text Bits	8
9. Text Stop	1
10. Text Parity	NONE

- Port Selection

It is essential to select a port for either the POS/cash register or modem when the text function is set on. Meanwhile, also check whether the device is connected to the port selected.

Port Selection	
1. Serial Port	Text
2. USB Port-Front	NONE
3. USB Port-Rear Top	NONE
4. USB Port-Rear Bottom	NONE

- Input Source

Select whether the input source is direct connected or connected with the Data Converter. If the input source is direct connected, users may need to go to the next item: **Camera Selection** to select a corresponding camera number.

- Camera Selection

Total 16 camera numbers can be selected.

- Text Filter

Text Filter is for filtering out control codes, so that the transactions data can be read easily. Available options under the item include ASCII, Manual, EPSON (ESC/POS), PartnerTech, etc. For details of supported devices, please refer to **Appendix C: List of Supported Models**. The ASCII table is provided in **Appendix D** for reference.

If it is unable to find supported protocol among the options, please select "Manual" and go to next item to carry on hexadecimal digits input.

- Manual Filter Setup

After entered the Manual Filter Setup menu, users should key in hexadecimal digits. The menu of the item is shown as follows

Manual Filter Setup	
1. Header 1	30
2. Header 2	30

- Input Process

If a Pole Display from a PC based POS will be installed, select <Canonical>. <Non-Canonical> is to be selected when using a Pole Display from a Standalone POS.

- Text Baud Rate, Text Bits, Text Stop & Text Parity

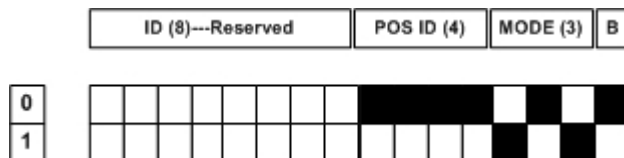
The default settings for these items are listed below:

- \* Text Baud Rate: 9600
- \* Text Bits: 8
- \* Text Stop: 1
- \* Text Parity: None

## 6.3 Data Converter Setting

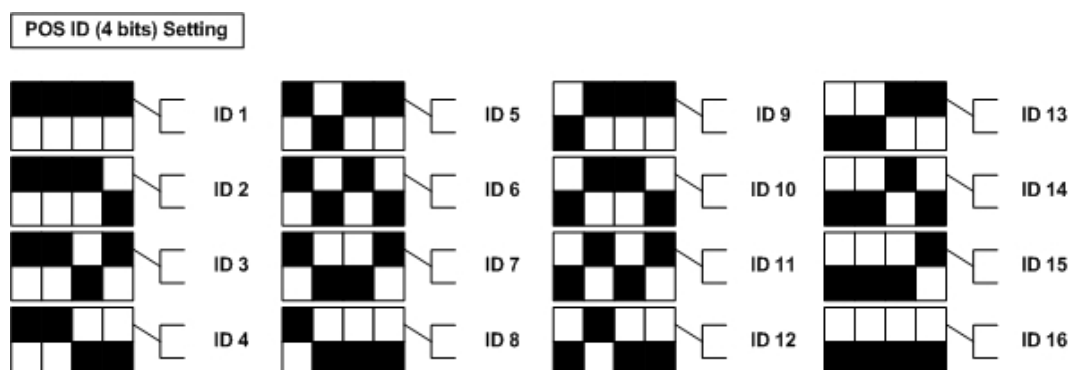
Data Converters are mainly used when users need to connect more than one cash register to a single DVR; see the multi-POS system diagrams in the previous sections. Also refer to the section: **Devices Required for POS Surveillance System** for the description of the Data Converter.

In addition to setting up POS/cash registers, receipt printers and DVR OSD, users also need to set up Data Converters. The dip switch of the Data Converter (see the diagram below) provides various settings for POS ID, Mode and Baud Rate.



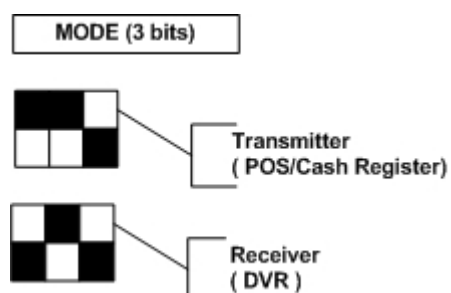
### ■ POS ID Setting

The Data Converter's POS ID should correspond with the cash register's number, i.e. POS ID 1→ Register No.1, POS ID 2→ Register No.2, etc. Please refer to the table below for POS ID setting.



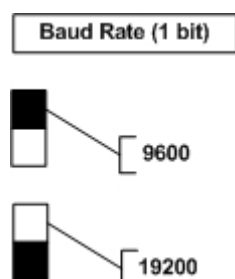
### ■ Mode Setting

Set the mode according to whether the connected device is a transmitter or receiver. Refer to the illustration below for mode setting.



### ■ Baud Rate Setting

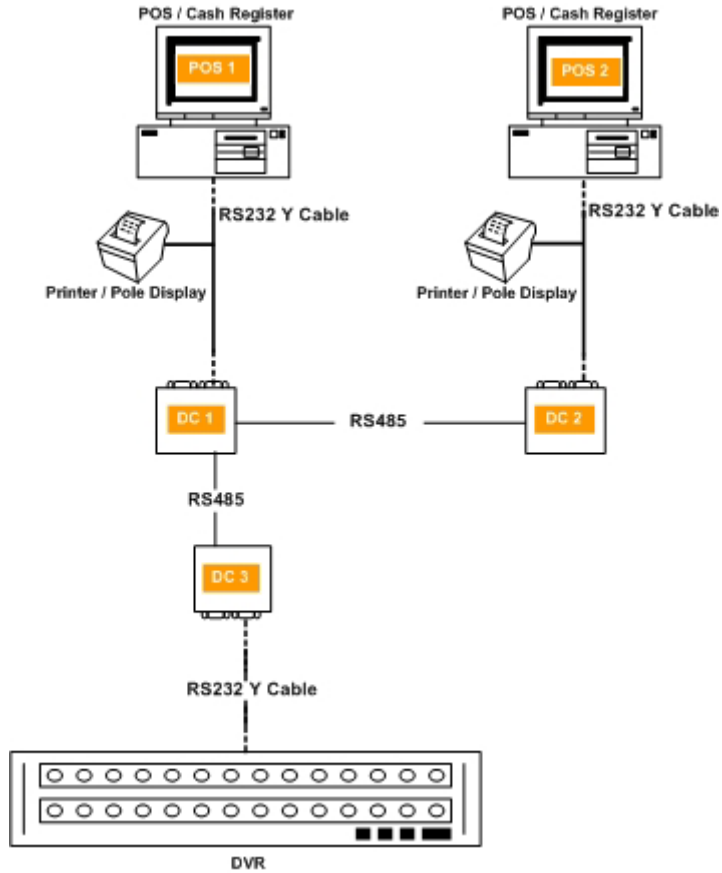
Refer to the illustration below for baud rate designation. The baud rate is subject to the connected device, i.e. POS/cash register.



**NOTE:** The converter attached to the DVR has to be set to a fixed baud rate **9600** only.

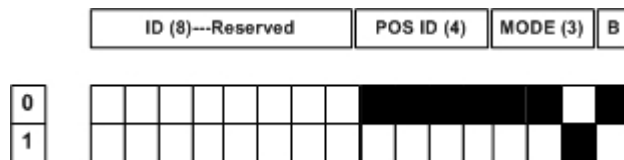
## 6.4 Example of Data Converter Setting

Suppose that there are two POS/ cash registers connecting to a DVR in a POS surveillance system, like the illustration below.

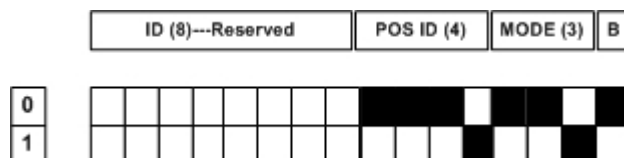


Each Data Converter's **POS ID** and **Mode** should be set as follows.

**DC 1:** POS ID→1 (0000); Mode→Transmitter (001)



**DC 2:** POS ID→2 (0001); Mode→Transmitter (001)



**DC 3:** POS ID→No Function; Mode→Receiver (101)

ID (8)---Reserved								POS ID (4)				MODE (3)			B
0															
1															

## 6.5 POS/Cash Register Setting

Please refer to the user manual of the POS/cash register in use for printer-related setting.

## 7. Text Operation (Local/Remote)

Users could easily investigate specific transactions data via Text Module's text search function, which can be found on the DVR's Search menu. Press the button SEARCH to enter the Search menu, as shown below. Then move the cursor to the Text Query Page under the item: Search By Text.



Users could search transactions data by four conditions: Text, Numerals, Date/Time and Channel on the Text Query Page, as shown below. "AND" operation will apply if multiple conditions are set simultaneously.





**NOTE:** Searching by Numerals is conditional on transaction output format like this:

<u>XXXXXXXX...</u>	50.8
<u>XXX...</u>	30.2

i.e. numerals (unit price) should be set in the very last bits of one line. If not, the database would be hard to separate Numeral from the transaction, which then results in searching by numerals works improperly.

■ **Searching Condition**

- By Text
  - \* OFF
  - \* Specific---- Transactions with the specific keyword will be found.
  - \* AND--- Transactions with the exact two keywords will be found.
  - \* OR--- Any transaction containing one of the two keywords will be found.
  - \* Exception---All triggered exceptions will be listed.



**NOTE:** The search strings mentioned above are case-insensitive -----this differs from “Exception String” setup (see **OSD Set-up > Exception Text Setup > Exception String**).

- By Value
  - \* OFF
  - \* Specific
  - \* Greater Equal Than
  - \* Less Equal Than
  - \* Inside The Range
  - \* Outside The Range
- By Date
- By Channel---All or a specific channel

#### ■ **Searching Result**

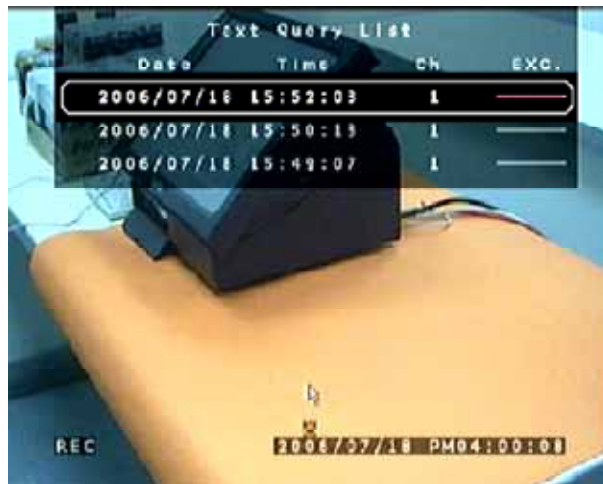
After determining the research condition(s), move the cursor down to “Text Query List” and press ENTER for searching result. In the Text Query List, Date/Time, Channel and Type will be shown (like event list); see the example below.

To search for the apple string “By Text,” users should select “Specific” and input “APPLE” in the Item editing page. Refer to the following figures.





Then, move the cursor down to “Text Query List” and press ENTER for searching result. See the figure below.



- EXC. is the abbreviation of Exception.
- The EXC. column will show Exception Strings if searching by “Exception.”
- Strings of more than 7 digits will be abbreviated.  
 ex. VOID → “VOID”  
 NO SALE → “NO SALE”  
 BASKETBALL → “BASK...”  
 EXC. will show “-----” when searching by other criteria.

In the Text Query List, if the cursor is moved to a specific item (see the above figure) and any key other than “ENTER” is pressed, the DVR will enter the “preview playback” mode. The mode enables quick return to the Text Query List without destroying the list page, so that saves time for calling the list. There is no text overlay in “preview playback”. Press ESC to go back to the Text Query List. Refer to the following picture for the example of the preview playback mode.



Press ENTER to confirm an item, the DVR will enter the playback mode. Refer to the following picture for the example of the playback mode.



## ■ Export

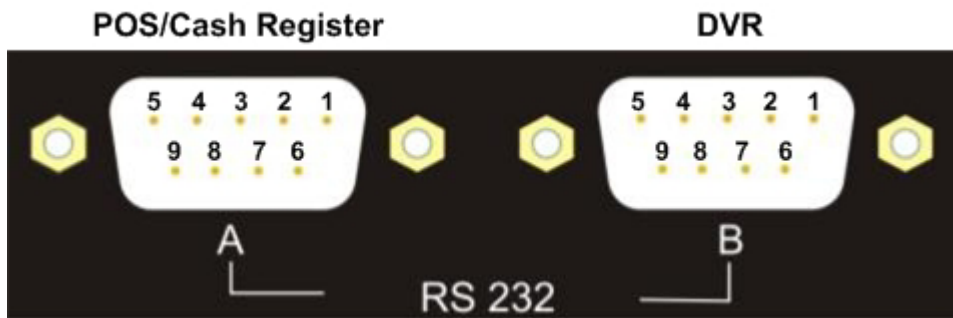
- AVI
  - No text overlay support when exporting AVI format
- DRV
  - Text overlay is only present in DRV format. Users can use “Local Playback of DVRRemote”, “DVRPlayer” and CMS to playback DRV file.

Text overlay will show when playback DRV file is in full screen mode.



**NOTE:** We recommend using the “ezBurn” function to export DRV file when users have located the wanted video.

## Appendix A: Pin Definition of RS232 DB9 Male



### RS232-A for POS/Cash Register (Half-duplex)

Pin	Definition
1	-
2	RX
3	-
4	-
5	GND
6	-
7	-
8	-
9	-

### RS232-B for DVR (Full-duplex)

Pin	Definition
1	-
2	RX
3	TX
4	-
5	GND
6	-
7	RTS
8	CTS
9	-

## Appendix B: POS Menu Tree

The table below is the POS menu tree.

Item	Level 1	Level 2	Level 3	
Text Setup	1.Text function	<ON><OFF>		
	2.Text overlay	<ON><OFF>		
	3.Exception Setup	1.Exception No.	<1>~<16>	
		2.Trigger	<ON><OFF>	
		3.Exception String	Ex: <NO SALE>,<VOID>,<CANCEL>, <RETURN>,<COUPOUND>,<DISCOUNT>	
		4.By Numerals	<OFF>,<Specific>,<Greater Equal Than>, <Less Equal Than>,<Inside The Range>, <Outside The Range>	
	4.Input Setup	1.Port Selection	<Text>,<NONE>,<Dial-In/Out>	
		2.Input Source	<Dyna-D70DC>,<Direct Connected>	
		3.Camera Select	<1> ~ <16>	
		4.Text Filter	<ASCII>,<Manual>,<EPSON (ESC/POS)>, < EPSON (ESC/POS)-PD>,<PartnerTech>, <UTC>,<AEDEX>,<ADM787/788>, <DSP800>	
		5.Manual Filter Setup		
		6.Text Baud Rate	<9600>,<19200>,<38400>,<57600>,<150>, <300>,<600>,<1200>,<2400>,<4800>	
		7.Text Bits	<6>,<7>,<8>	
		8.Text Stop	<1>,<2>	
		9.Text Parity	<None>,<Odd>,<Even>	

## Appendix C: List of Supported Models

The supported models for pole displays, printers, and POS machines are listed below.

<b>Pole Display</b>	<b>Printer</b>	<b>POS Machine</b>
Cache Technology VFD-202T	Citizen CBM-1000 II	Acula AQ-812
Citizen C2202	Citizen CT-S300	IBM SurePOS 700
Digipos CD5220	Dell T200	Samsung ER-380M
Emax Pole Display	Epson TM-T88II/ TM-T88III/ TM-T88IV	Samsung ER-655
Epson DM-D Series	Epson TM-T90	Senor POS
Logic Controls LD9000	Epson TM-930 II	
Logic Controls PD3000	Epson RP-U420	
Logic Controls PD6000	IBM SureMark TF6	
Logic Controls TD3000	IBM SureMark TM6	
Magellan	Ithaca iTherm 280	
Partnertech CD5220	Ithaca POSJet 1000	
Posiflex ICD-2002	POS-X Xr500	
Posiflex PD 302	Samsung SRP350	
Posiflex PD 303	Sensor TP-288	
Posiflex PD-2100	Star TSP100 futurePRNT	
Posiflex PD-2200	Star TSP600	
POS-X Xp8000	Star TSP700	
Scales	Star TSP800	
Sibnet	TPG (Axiohm) A794	
STAR SCD400-PD	WP-520(ESC/POS)	
Soteke VFD2025		
Soteke VFD2029		
TEC		
Toledo 8217		
TYSSO VFD Series		
Ultimate Technology PD1100XL		
Wedderburn DS-770		

## Appendix D: ASCII Table

Dec	Hex	Char	Description	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
0	0	NUL	null	32	20	SPACE	64	40	@	96	60	`
1	1	SOH	start of heading	33	21	!	65	41	A	97	61	a
2	2	STX	start of text	34	22	"	66	42	B	98	62	b
3	3	ETX	end of text	35	23	#	67	43	C	99	63	c
4	4	EOT	end of transmission	36	24	\$	68	44	D	100	64	d
5	5	ENQ	enquiry	37	25	%	69	45	E	101	65	e
6	6	ACK	acknowledge	38	26	&	70	46	F	102	66	f
7	7	BEL	bell	39	27	'	71	47	G	103	67	g
8	8	BS	backspace	40	28	(	72	48	H	104	68	h
9	9	TAB	horizontal tab	41	29	)	73	49	I	105	69	i
10	A	LF	new line	42	2A	*	74	4A	J	106	6A	j
11	B	VT	vertical tab	43	2B	+	75	4B	K	107	6B	k
12	C	FF	new page	44	2C	,	76	4C	L	108	6C	l
13	D	CR	carriage return	45	2D	-	77	4D	M	109	6D	m
14	E	SO	shift out	46	2E	.	78	4E	N	110	6E	n
15	F	SI	shift in	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	data link escape	48	30	0	80	50	P	112	70	p
17	11	DC1	device control 1	49	31	1	81	51	Q	113	71	q
18	12	DC2	device control 2	50	32	2	82	52	R	114	72	r
19	13	DC3	device control 3	51	33	3	83	53	S	115	73	s
20	14	DC4	device control 4	52	34	4	84	54	T	116	74	t
21	15	NAK	negative acknowledge	53	35	5	85	55	U	117	75	u
22	16	SYN	synchronous idle	54	36	6	86	56	V	118	76	v
23	17	ETB	end of trans. block	55	37	7	87	57	W	119	77	w
24	18	CAN	cancel	56	38	8	88	58	X	120	78	x
25	19	EM	end of medium	57	39	9	89	59	Y	121	79	y
26	1A	SUB	substitute	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	escape	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	file separator	60	3C	<	92	5C	\	124	7C	
29	1D	GS	group separator	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	record separator	62	3E	>	94	5E	^	126	7E	~
31	1F	US	unit separator	63	3F	?	95	5F	_	127	7F	DEL

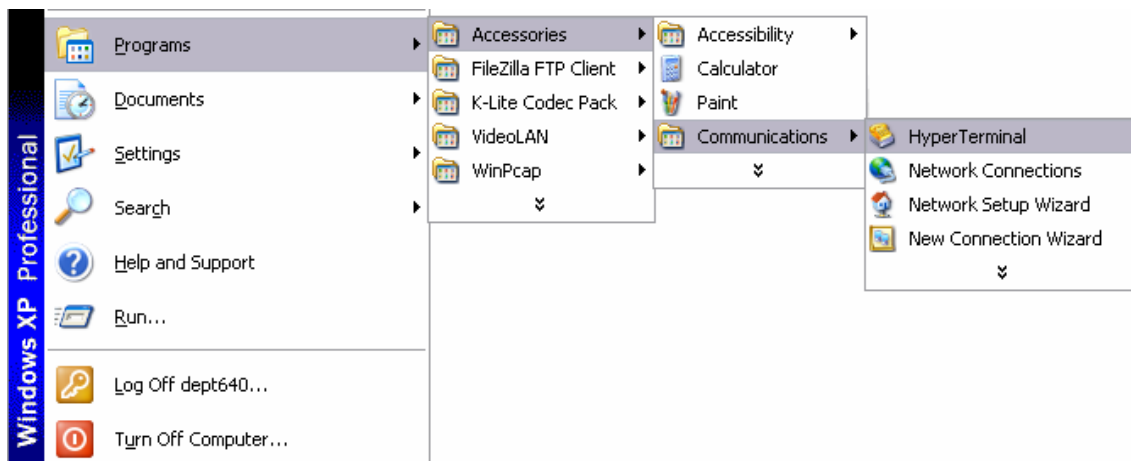


## Appendix E: Collect Text Data from a POS Machine

If users are having trouble connecting a POS machine to the DVR, please collect text data of the POS machine for investigation. Follow the steps below to do so.

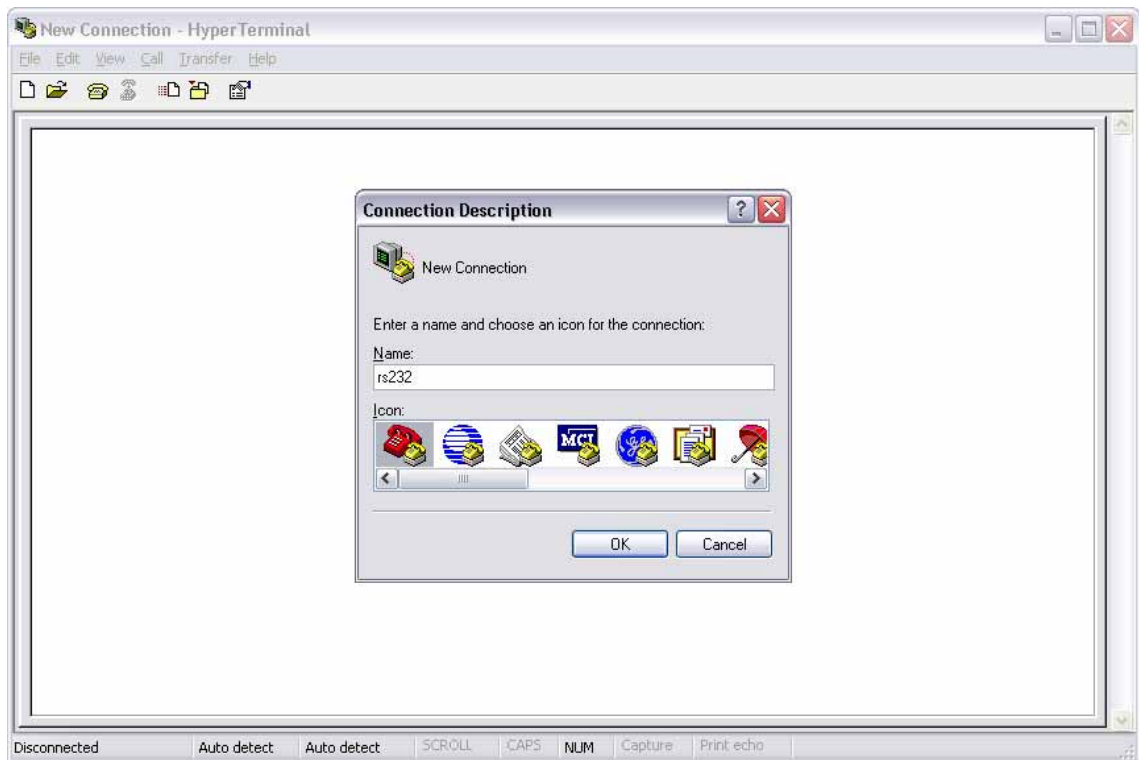
**Step 1.** Directly connect the POS machine and a PC via the RS232 DB9 Y cable provided within the POS module.

**Step 2.** Under Windows XP system, find the “Hyper Terminal” program as shown below.

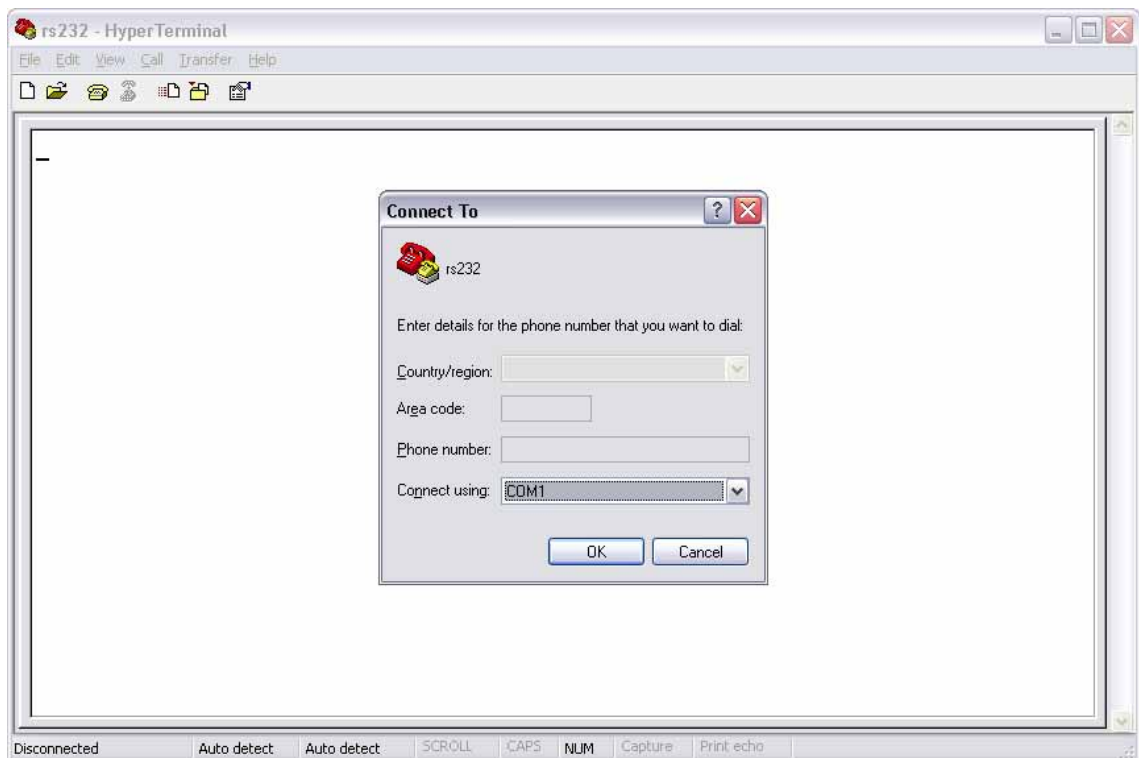


Windows Vista system does not have the “Hyper Terminal” program. To use the program in Vista system, first please copy two files from the Windows XP system: the application file “**hypertrm.exe**” under folder “C:\Program Files\Windows NT\” and the system file “**hypertrm.dll**” under folder “C:\Windows\System32\”. The application file can be saved to any destination, whereas the system file has to be saved under the same folder “C:\Windows\System32\” in Vista system as well. Then double click on the application file and the program can be used in Vista system.

**Step 3.** When program started, create a new connection. If the “Connection Description” window did not pop out, click on <File> menu and select <New Connection>. Click on <OK> once a name is entered and an icon is selected.

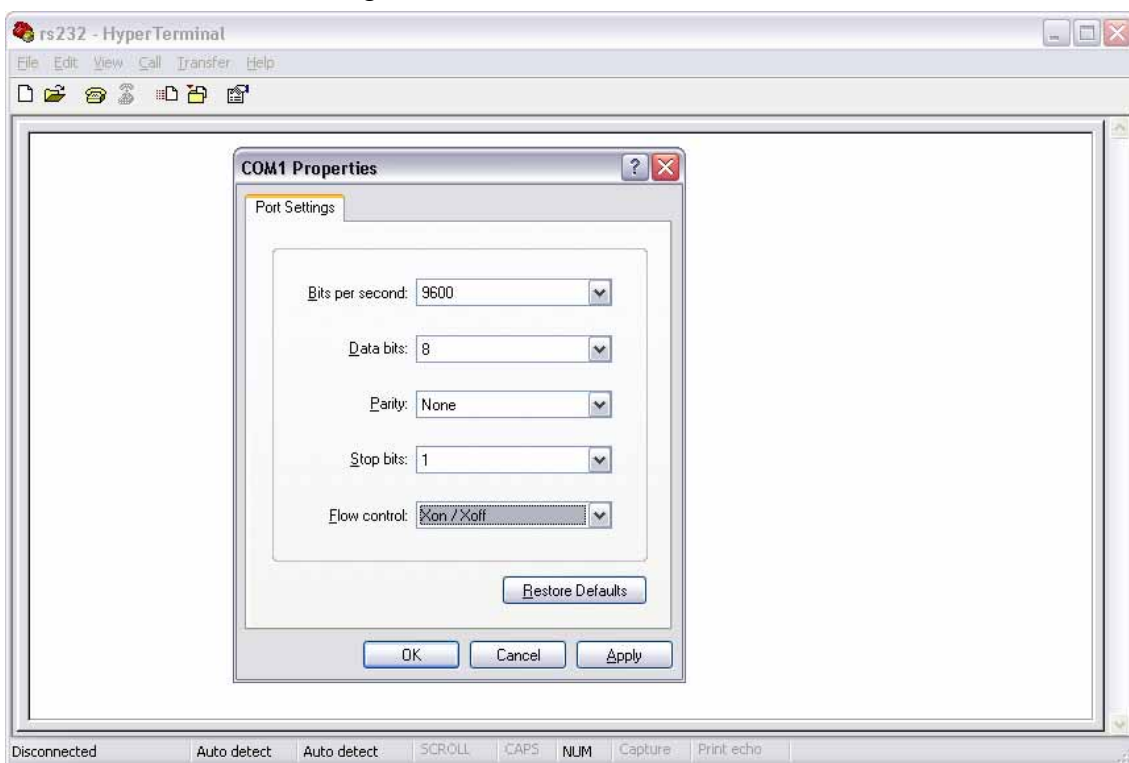


**Step 4.** Select the corresponding port of the connection and click on <OK>.

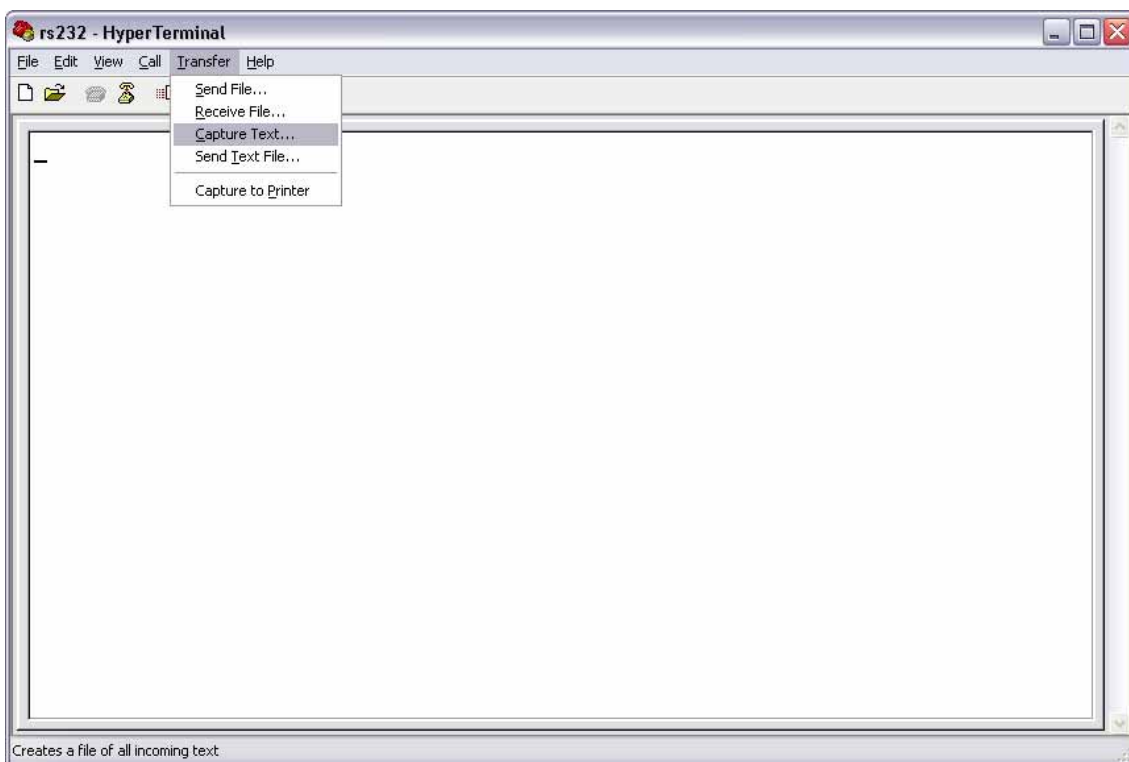


## Solution Guide

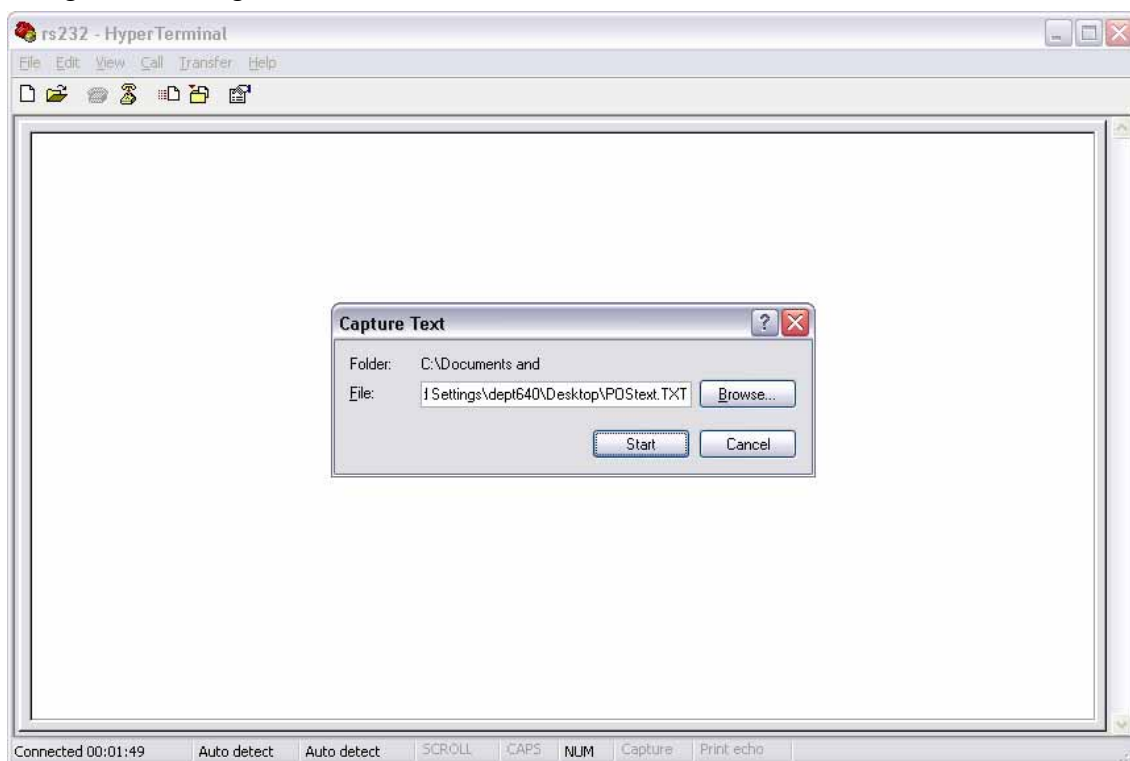
**Step 5.** Configure the port settings. The flow control has to be set to <Xon/Xoff>. Click on <OK> to confirm the settings.



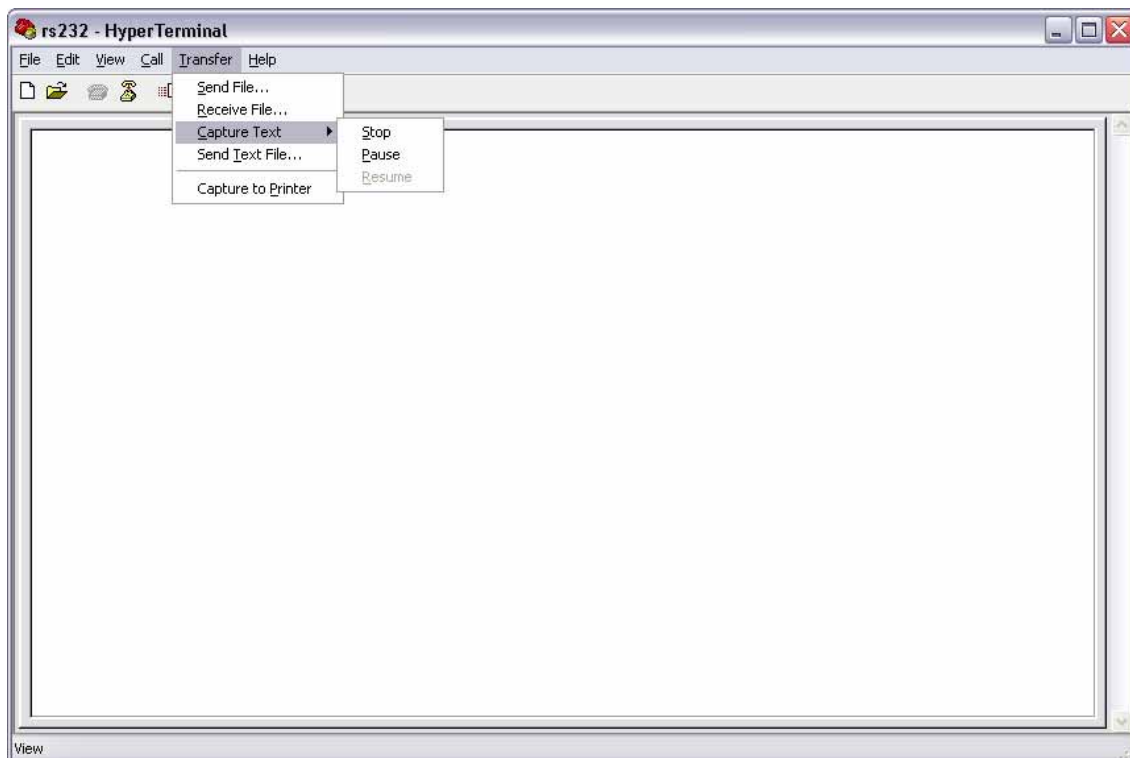
**Step 6.** Click on <Transfer> menu and select <Capture Text>.



**Step 7.** Select a destination folder and a filename of the text data file. Then click on <Start> to begin collecting text data of the POS machine.



**Step 8.** Click on <Transfer> menu and move to <Capture Text> item can choose to stop or pause the collection of text data.



**Step 9.** When the text data is collected, send the text file to the responsible contact for further investigation.