TECH TIP

VICON TECHNICAL SERVICES GROUP

This Tech Tip is designed to acquaint the reader with the basic fundamentals of RS232 data, one of the three most common types of serial data standards in use today for system component inter-communications.

1. RS232 or EIA-232 Standard

The RS232, or EIA-232, standard is the most common form of serial communications in use today, found on computers and a wide variety of industrial and commercial products. It is a low cost solution for low bandwidth communications. RS232 is used in low noise environments and only in short applications; typically less than 100 feet (30 meters) but most commonly less than 50 feet (15 meters).

RS232 operates over an unbalanced line; that is, it requires one wire for one way communications (Simplex) and a ground wire for a voltage reference. Bi-directional communications (Duplex) would require a second wire plus the ground reference. A typical bi-directional RS232 communications line would use one shielded pair of wires. This standard uses a bipolar voltage signal with typical voltage swings of +15 volts dc to -15 volts dc to differentiate between logic level "1" and logic level "0". During periods when communications are idle, the line is negative with respect to ground.

The standard only dictates the logic levels. Connector styles and pin configurations vary by manufacturer and application. The most common connectors used for this standard are the DB9 and DB25 types but others, terminal boards or the RJ45, may be found.

The data is usually asynchronous, or, without timing. In order to bring some order to an otherwise unchecked data stream, *Flow Control* is used. Flow Control can be either hardware generated or software generated. In hardware flow control, voltage levels on control wires are manipulated to either a high or a low level to start or stop the data flow. These lines are called *CTS* (**C**lear **T**o **S**end) and *RTS* (**R**eady **T**o **S**end). As the names imply, these signals indicate that a receiving device is ready to accept data or a transmitting device is ready to send data. The hardware method requires the use of additional wires in the cable as signaling circuits.

In software flow control, sometimes called X-on/X-off, data bits are sent to control the flow. Since the flow control is inherent in the data stream, additional signaling wires are not needed.

2. RS232 Vicon Protocol

A typical application for RS232 communications in a Vicon CCTV system would be a host computer, such as a card access system controller, that would provide camera to monitor selection in response to alarms in the card access system. With one exception (the V1411 series), all Vicon Video Matrix Switching Systems can accept external host computer control.

As noted above, RS232 Flow Control can be either the hardware or software type. When used with a *Vicon* Matrix System, *hardware flow control must be used with all CPU series except the V1500 (V1500: software flow control only)*. If the RTS and CTS connections are not used, the communications may be unreliable. Baud rates, parity enable, etc. are selected through the Matrix CPU software.

The control commands are standard ASCII commands and are described in a Host RS232 Command manual provided with each Matrix CPU. The protocol is non-proprietary. If you did not receive a manual with your system, please contact the Vicon Industries Customer Care Department (800-645-9116) for a copy, or see our website at www.vicon-cctv.com.

All commands sent to a CPU must be framed properly; that is, each command must be preceded by a *Start of Header* (SOH - Control A,) and followed by a Carriage Return (Enter). Incorrect formatting, parity errors, etc. will be rejected by the system CPU.

3. Connections

Table 1 illustrates the Host Port connections for the V1300 & V1400 series CPU products when controlled by a standard computer communications port.

VPS System		Host Computer	
Host RS232 Port		9-Pin	25-Pin
Pin	Signal	Connector	Connector
2	TxD	2	3
3	RxD	3	2
4	RTS	8	5
5	CTS	7	4
7	Sig Gnd	5	7

Table 1

Table 2 illustrates the Host Port connections for the V1500 series CPU when controlled by a standard computer communications port.

V1500		Host Computer	
Host Term Box		9-Pin	25-Pin
Screw	Signal	Connector	Connector
3	TxD	2	3
4	RxD	3	2
7	Sig Gnd	5	7

Table 2

For additional information on Host Computer control, see Tech Note 1400-0001-14-00, *VPS RS232 Control with HyperTerminal™*.