TECH TIP

VICON TECHNICAL SERVICES GROUP

Subject: Vicon RS422 Data
Product: All RS422 Controlled
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Vicon RS422 Data Connections

Vicon Industries uses the terms *Command* and *Response* to indicate a data signal's direction and function within a CCTV system. In a CCTV system there is one controlling device. With a matrix switching system, the system is under the control of a central processing unit, or CPU. All other components within this system, receiver-drivers, control keypads, etc., are peripheral devices and are controlled by the CPU.

In a smaller system where the pan & tilt cameras are controlled through receiver-driver units (RDU), by a multiplexer for instance, the multiplexer then becomes the CPU as it is the controlling device.

1. *Command*: This is the designator assigned to signals that are generated by the CPU. It can also be called *Data Out.* RS422 data uses a balanced pair of wires; one side of the pair is the positive component (the signal is at a positive level until there is information at which time the signal goes low.). The other side is the negative component (the signal is low until there is information at which time the signal goes positive). From the CPU, or controlling device, the two signals are referred to as *Command Out +* (positive) and *Command Out –* (negative).

    These signals are then connected to the peripheral device (a device being controlled), or a data distribution unit to be connected, in turn, to a number of peripheral devices. The input terminal connections at the peripheral devices are called *Command In +* and *Command In –* (they also can be called *Data In*).

2. *Response:* This is the designator assigned to signals generated from within a peripheral device in answer to a received *Command* signal. Similar to the above, they are referred to as *Response Out +* and *Response Out -.*

    These signals are connected back to the CPU, or controlling device. They connect to terminals labeled *Response In +* and *Response In -.*

Most people would consider a system keypad to be a controlling device because that is where camera selections are made and pan and tilt functions are operated. Before the keypad can do anything, it must wait until polled (receives a *Command* signal) by the CPU. At that time, its waiting information (i.e., pan camera #8 to the right) is transmitted as a *Response* signal back to the CPU. The CPU would then translate the information and send a *Command* signal to Camera # 8.

Some Vicon devices, such as the V1300X-DVC/RVC Intelligent Keypad, or the V1311RB Universal Receiver, are designed to be connected in a daisy-chain configuration, or, point-to-point. These devices have internal amplifiers that regenerate the RS422 signal. For this reason, in addition to the *Command In* and *Response Out* terminal connections, they also have connections for *Command Out* and *Response In.* These secondary outputs and inputs are used for connection to the next downstream component in the control system. When daisy-chaining is not used, these terminals are unused (Exception: place a jumper between any unused *Response In –* terminal to *Ground* to eliminate any data problems caused by external electrical noise).

Some components, such as fiber optic transmitters and receivers do not use connections labeled *Command* and *Response*. They use the terms *Data In* and *Data Out*. A CPU connecting to a fiber optic transceiver would connect *Command Out* + to the transceiver's *Data In* + terminal. The transceiver's *Data Out* + would connect to the CPU's *Response In* + terminal.

RS422 Connection Rules:

- *Command* signals always connect to *Command* signals.

- *Response s*ignals always connect to *Response* signals.

- *Outputs* always connect to *Inputs*.

- *Inputs* always connect to *Outputs*.

- *Positive* polarities always connect to *Positive* polarities.

- *Negative* polarities always connect to *Negative* polarities.