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Re: Application Note

To: Global Distribution

Application Note Using SmartStix™ I/O with MiniOCS

Overview

The combination of a MiniOCS and SmartStix™ I/O enables a wide variety of possible applications. These include but are not limited to: Packaging, Material Handling, Test Equipment, Small Industrial Machines, Pump Stations, Motion Control, Pick and Place, Assembly, Water Treatment, Extruders, RTU, SCADA, Process Monitoring, Distributed Control, Injection molding, Process Control, Trash Compacting, Counting/Timing, and much more.

This combination has many advantages including:

- Compact size
- Affordable price
- Ideal for standalone or network applications
- Wide range of I/O and network options
- Easy to setup and operate



SmartStix I/O modules are connected to the MiniOCS (or other OCS product) via the CsCAN Network and communicate using CsCAN Protocol. (DeviceNet is not an option.)

Why Use the MiniOCS and SmartStix?

While the MiniOCS alone has a wide variety of I/O combinations in its 20 plus models, it sometimes comes up short of the exact I/O needed for a specific application. The addition of one or two SmartStix I/O modules will quite often do the trick. (As many as 253 SmartStix modules could be configured.) This Application Note shows just how to make this combination work.

Setting Up the Hardware

1. The first requirement is a MiniOCS WITH the CsCAN Network option. There are 11 plus models to choose from including DC and AC I/O, Analog (Voltage and Current) I/O, and High Speed Counter – PWM/Pulse Train.
2. Second is one or more SmartStix I/O modules selected from 6 or more models.
3. 4 wire CAN Network cable.
4. 24 Vdc power for the MiniOCS, SmartStix I/O, and the Network.

5. Cscape software 6.0 or later.

Make sure each device (MiniOCS and SmartStix I/O module) has a unique Network ID. For the MiniOCS, the Default ID is 253 and if a different ID is desired, change it using the System menu. For the SmartStix I/O modules, set the Network ID using the two 16 position rotary switches on each module.

Wiring Considerations

The Network requires the standard 4 wire, plus shield, CAN (Control Area Network) cable. Wire all segments in a Daisy Chain configuration as shown in the figure below. Up to 4 segments of 1500ft (500 meters) each may be used to obtain the required distance. If more than one segment is needed, use up to three CAN repeaters (HE200CGM100) to connect them together.

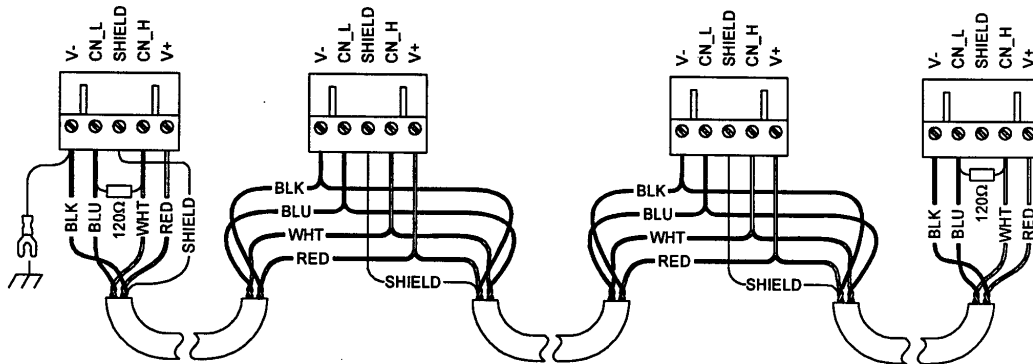


Figure 1 – CAN Wiring

Note: The V- wire should be connected to a good ground at one place only. The V+ wire should be connected to a 24Vdc power source. The cable shield should be connected to the SHIELD terminal at one end only, per cable segment.

Cscape™ Setup

Data is sent to a SmartStix I/O module using the Net Put Remote I/O function and received using the Net Get Remote I/O function. These Remote I/O functions have a built in heartbeat feature that monitors communication and triggers appropriate action in the event of a failure.

At power-up, all SmartStix I/O modules will exhibit the following behavior:

1. All Digital Outputs are Off until Digital Output data is received from the MiniOCS.
2. The module expects to receive Digital Output data at least every 2 seconds.
3. The module transmits a Heartbeat every second.
4. The module transmits its Digital Input Data, only when a Digital Input changes state.

5. If Digital Output data is received, and then not received for 2 seconds, the outputs are turned Off.
6. At power-up, a request for Directed Data is transmitted to the CsCAN Network.
7. Digital Inputs are read and loaded into Produced Words 1 and 2.
8. Power-up self-test result is loaded into Produced Word 3; if tests passed, only PUP bit is on.
9. The module's Device Class Number and Firmware Version number are loaded into Produced Word 4.
10. All four Produced Global Data words are transmitted to the CsCAN Network.

If the above listed behavior is what is desired for your application, then the minimum exchange can be as little as receiving one word from an Input module or sending one word to an Output module.

Get Remote I/O Function Block

This function handles receiving data from a Remote I/O device and places the received data in a set of registers specified by the user. This function passes power flow if the function is actively receiving data / heartbeat messages from the remote I/O device. This function stops passing power flow if it has not received data / heartbeat messages from the remote I/O device for 2000 milliseconds.

Place one Net Get Remote I/O function block near the beginning of the ladder program for each Remote I/O device from which you expect to receive information. The Remote I/O function should normally be enabled all the time. The N (Num Words) is set to 1 to 4 depending on the amount of data to be received.

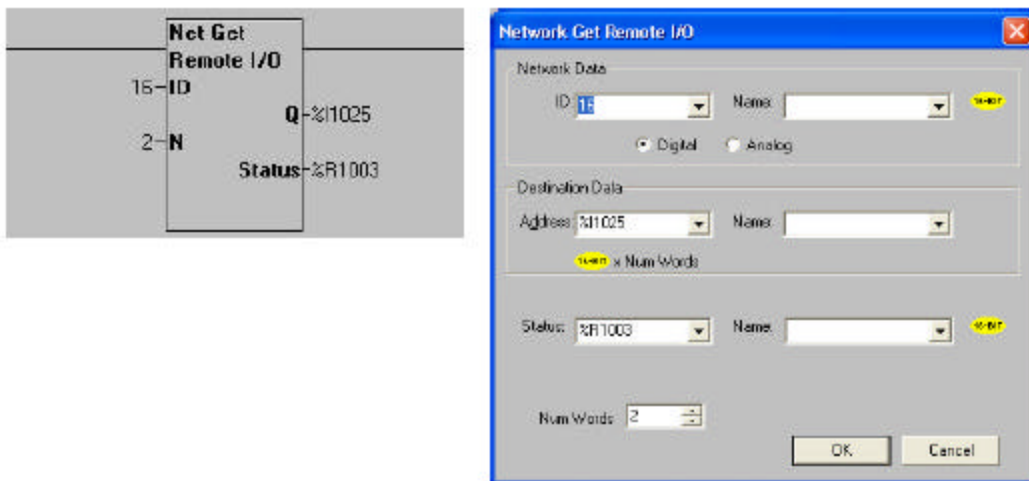


Figure 2 – Get Remote I/O Function Block and Parameter Screen

See the *Cscape™* Help file for details of data word content. (The first two contain up to 32 Input bits.)

Put Remote I/O Function Block

This function handles sending data to a Remote I/O device and gets the send data from a set of registers specified by the user. This function passes power flow if the remote I/O device is functioning normally. This function does not pass power flow if the remote I/O device has not sent a heartbeat in 2000 milliseconds. This function sends heartbeat messages to the output device every 1000 milliseconds. The default remote I/O operation is to expect heartbeat messages at least every 2000 milliseconds; otherwise the outputs are turned off (or their configured default state). Data is normally transmitted on change of state. If the remote I/O device loses power; the I/O state is also sent when it resumes operation.

Place one Net Put Remote I/O function block near the beginning of the ladder program for each Remote I/O device to which you expect to send information. The Remote I/O function should normally be enabled all the time. The N (Num Words) is set to 1 to 8 depending on the amount of data to be sent.

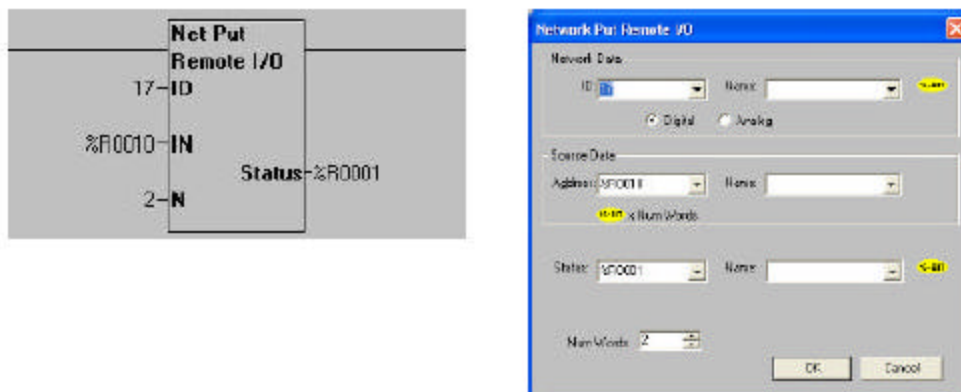


Figure 3 - Put Remote I/O Function Block and Parameter Screen

See the *Cscape* Help file for details of data word content. (The first two contain up to 32 Output bits.)

In addition to monitoring inputs and sending outputs, each SmartStix I/O module is configured to send and receive heartbeat signals and outputs can be told what to do if communication is interrupted between it and the MiniOCS. The default heartbeat time is 1000 milliseconds. If no heartbeat signal is received from the MiniOCS for 2000 milliseconds, an output module will set the outputs to off unless commanded to do otherwise. The heartbeat send time may be set to any time between 0.0 and 25.5 seconds. If set to 0.0, the heartbeat is disabled. The heartbeat Life Expectancy (timeout) may be set to any value between 0.0 and 25.5 seconds. If set to 0.0, the timeout is disabled. The value should normally be set to twice the receive heartbeat time.

For additional information, please call Tech Support, toll free: 877-665-5666, press 3 or 317-916-4274, press 3. You can also send questions by e-mail: techsppt@heapg.com.

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