**ICS
ELECTRONICS**
division of Systems West Inc.

IEEE 488

APPLICATION BULLETIN

Capturing Serial Communication
for ICS 2399 ANSI to Modbus Converters

INTRODUCTION

ICS's 2399 uses an ANSI Command Table to instruct the 2399 on how to convert the old ANSI commands into Modbus RTU packets. Part of preparing the ANSI Command Table is to make a list of the ANSI commands used in the system. The easiest way to make a list is by spying on the existing ANSI communication and capture a few files. This Application Note describes how to capture the files.

PREPARATION

Download a Terminal Emulation program like RealTerm to an older Windows PC with a serial COM port. If you do not have an older computer with a serial COM port, you can use a laptop and a USB to Serial Converter. You can determine the signal type by examining the connections on the old ANSI Controller. The recommended converter for RS-232 data is ICS's I-7560. For RS-485 data, use an ICS I-7561. Install it on the computer with the Terminal Emulation program.

There are other Terminal Emulation programs you an use but RealTerm has a convenient capture mode that we will use in this Application Note.

Prepare a cable that you can use to connect the computer's COM port to the existing system's ANSI communication path. Every system is a bit different but most ANSI systems use an RS-232 data path with 9-pin or 25-pin connectors. In some cases, the old ANSI controller has screw terminals that you can clip onto to capture the serial data.

Figure 1 shows a 'T' cable with two connectors and a switch that lets you switch between the Transmit and Receive data paths so you can capture both sets of data. The two connectors are wired pin-to-pin and let you insert the 'T' cable in the existing ANSI data path by opening an existing 9-pin connector connection somewhere along the data path. Make from a 9-pin serial cable.

Figure 1 shows pins 1-8 wired for completeness. You can probably get away with just wiring pins 2, 3 and 5 for this application. For 25-pin versions, wire pins 2, 3 and 7 (ground).
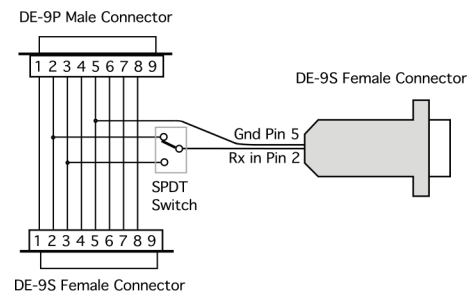

Figure 1   RS-232 'T' Cable

Figure 2 shows a simpler cable with clip leads that can be used to clip on the terminal strip on the back of the old ANSI Controller.
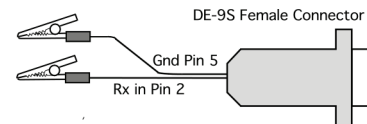

Figure 2   Simple Alligator Clip Cable

WHAT DATA DO WE WANT

We want to capture the commands the existing system controllers sends to the old ANSI Controller at power turn-on and when doing a run. We also want to capture the ANSI Controllers response data at power turn-on and when doing a run. That will let us prepare the ANSI Command Table to replace the old ANSI Controller with a new Modbus device.

SETUP

Insert the 'T' cable in the ANSI data path by breaking in between tow connectors or use the cable in Figure 2 to clip onto the RX and Ground terminals on the old ANSI Controller,

Run RealTerm and you will see the following window (less the captured data) on your screen.

Figure 3   RealTerm Window

Click on the Port tab to enter the port settings. Set the baud rate to the baud rate used in the existing system. Use the Port pull-down arrow to see and select your COM port number. If you are using an internal port, the number is normally 1. If unsure of the port number, open the Device Manager and look at the active COM port numbers. Click the change button to make the changes.

Click on the Display tab and check 'ASCII' in the 'Display as' box.

CAPTURING DATA

Run the system to generate some serial data. You should see yellow messages appear in RealTerm's black window as shown in Figure 3. Flip the cable switch to switch between the TX and RX data lines. The ANSI commands start with a '?' or with an '=' sign. The data line that shows the ANSI commands is the one we want to record first.

TEST RECORDING

Click on the RealTerm Capture tab. Enter 'c:\temp\test.txt' in the file window. Click on Start overwrite to record some data with the system running. After a few seconds of recording, click Stop Capture. Open the test.txt file to be sure it recorded some data. If it did, you can delete the file. If it didn't, you have to troubleshoot the problem since you must be able to make recordings to go forward.

RECORDING

Turn the system control application off. Set RealTerm up to capture a power-on.txt file and start the capture. The names shown here are general terms but you can use any descriptive name as long as it identifies the file Start the system control application on. When it has stabilized, stop the capture.
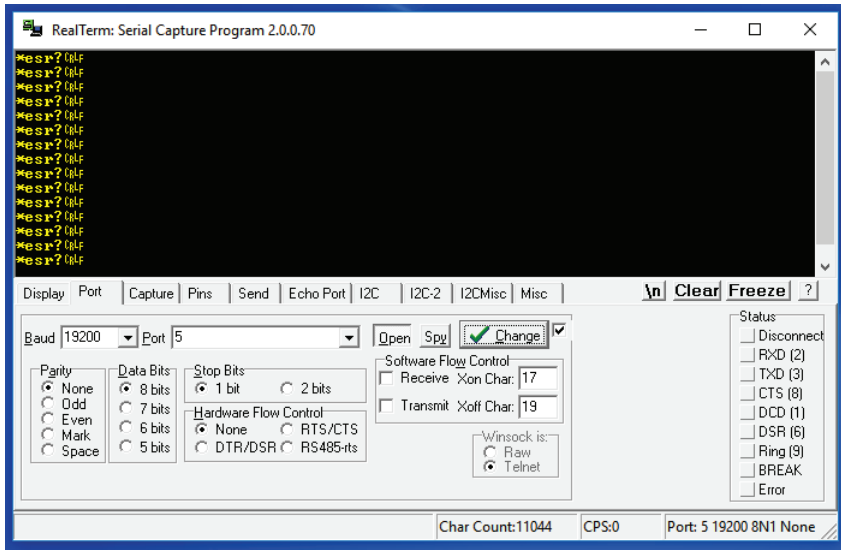
Set RealTerm up to capture a process run and a process_run.txt file. Run the application through one complete cycle.

Flip the switch or move the clip lead to the TX terminal to capture the ANSI Controller responses for power turn-on and for the process run. Clear the display and close the application.

Set RealTerm up to capture a power-on.response txt file and start the capture. Start the system control application on again. When it has stabilized, stop the capture.

Set RealTerm up to capture the process run response data and save a process_run_response.txt file. Run the application through one complete cycle. Close the application and turn power to the ANSI Controller off.

Verify that all four files have data. If you have several different processes, capture a run file for each process and its corresponding responses.