

Using serial ports in Supervisor

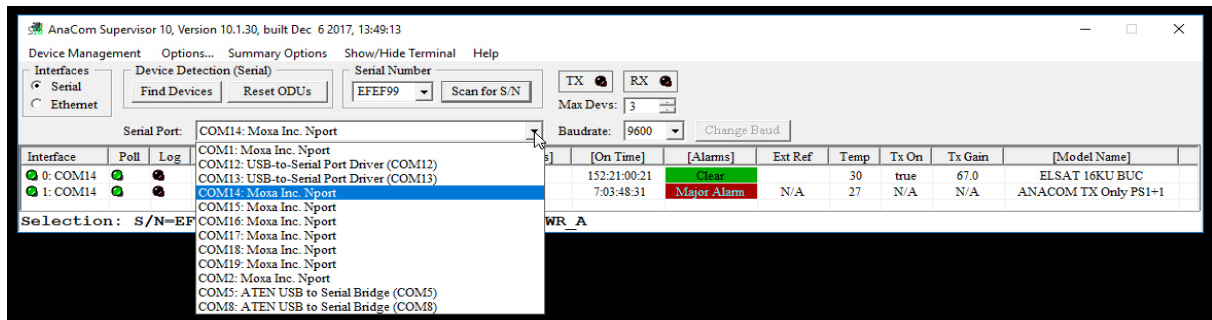
This addendum to user documentation was written in conjunction with the release of Supervisor 10.1.30, and some of the information presented here reflects features available in that or later versions. It is always recommended to download and install the latest version of Supervisor, when made available.

This document is focused on helpful things to know when using serial ports with the AnaCom, Inc. network manager, Supervisor, to monitor and control AnaCom-made equipment. Normally, a system is shipped with cables that will just work out of the box, and reading this document will not be necessary to make a successful serial connection between a PC running Supervisor and AnaCom, Inc. equipment.

Introduction

When Supervisor, (Svr10,) starts up, it will automatically look for serial ports that are available on the system it is running. This search will exclude those ports that are currently in use by other applications.

Upon finding serial ports, the Serial Interface button in the main display will be selectable, and if selected by the user, a drop-down list of the available serial ports will appear. If no serial ports are found, the Serial Interface radio button will remain grayed out.



A serial port can be selected, a baud rate can then be chosen, as well as the maximum number of devices to look for, (the larger the number specified the longer the search will be allowed to take to find all the supposed devices.)

- **Find Devices** will find all available devices on the currently selected serial port
- **Scan for S/N** will look for the single device that has the specified serial number
- **Reset ODU**s will broadcast to all devices connected to the selected serial port to drop back to 1200 baud. This is useful if there is a baud mismatch between Supervisor and devices connected to the serial interface.

It is important to know what serial port the user's ODU's are connected to; Supervisor does not search all serial ports for AnaCom devices, only the one selected by the user in the drop-down menu.

Supervisor takes exclusive use of serial ports for monitoring AnaCom devices; it is therefore not possible for another application to share active ports at the same time.

Discovering Devices

When the user hits the **Find Devices** button, Supervisor sends out a command that requests all devices connected to the selected serial port to respond. By default, the program will look for up to 3 devices, in case that a 1+1 protected system might be present. The user can change the **Max Devs** field to 1, if only one device is known to be present. This will speed up the discovery process.

If we fail to discover devices that we know are present, it may be that they are set at a different baud. Use the **Reset ODUs** command, found in the main window, to reset all devices connected to the selected COM port back to 1200 baud. This will force all connected devices to 1200 baud and reestablish connections.

Once device discovery is running, a button will appear in the main summary window, **Abort Operation**. This allows the user to stop the discovery process if it appears to be taking too long, or if nothing is being found.

Notes:

All AnaCom, Inc. equipment is shipped with serial ports set to 1200 baud by default.

When connecting to multiple devices on a serial port/interface using RS-485, it will be necessary for each device to have a unique packet address on the interface, and if there is a duplicate, then Supervisor will automatically assign new addresses to make them unique. If multiple serial ports are being used, then it is NOT necessary for the packet addresses to be unique across all active ports. *Normally, a user will not have to worry about this.*

Change Baud

The default baud for discovering devices on a serial port is 1200 baud. Once devices are being monitored on a serial port however, the user can change the baud, to something faster if desired. When a different baud is selected than the one currently in use, the **Change Baud** button will become enabled, and can be selected by the user. When selected, Supervisor will broadcast a command on the current serial port interface instructing all devices to change to the new baud, and then polling devices for status will continue.

Beginning with version 10.1.30, Supervisor will instruct devices that have been told to change baud to a new value, to return to the original value if Supervisor cannot verify that they are connected properly at the new rate. This is useful for example, if after connecting successfully at 1200, and then instructed to switch to 57.6k, monitoring is no longer successful.

>Serial Command

At program start, Supervisor uses a standard technique to search for serial ports that are present on the PC it is running on. However, under some unusual circumstances, it is possible that it will fail to find a desired serial interface the user expects to use.

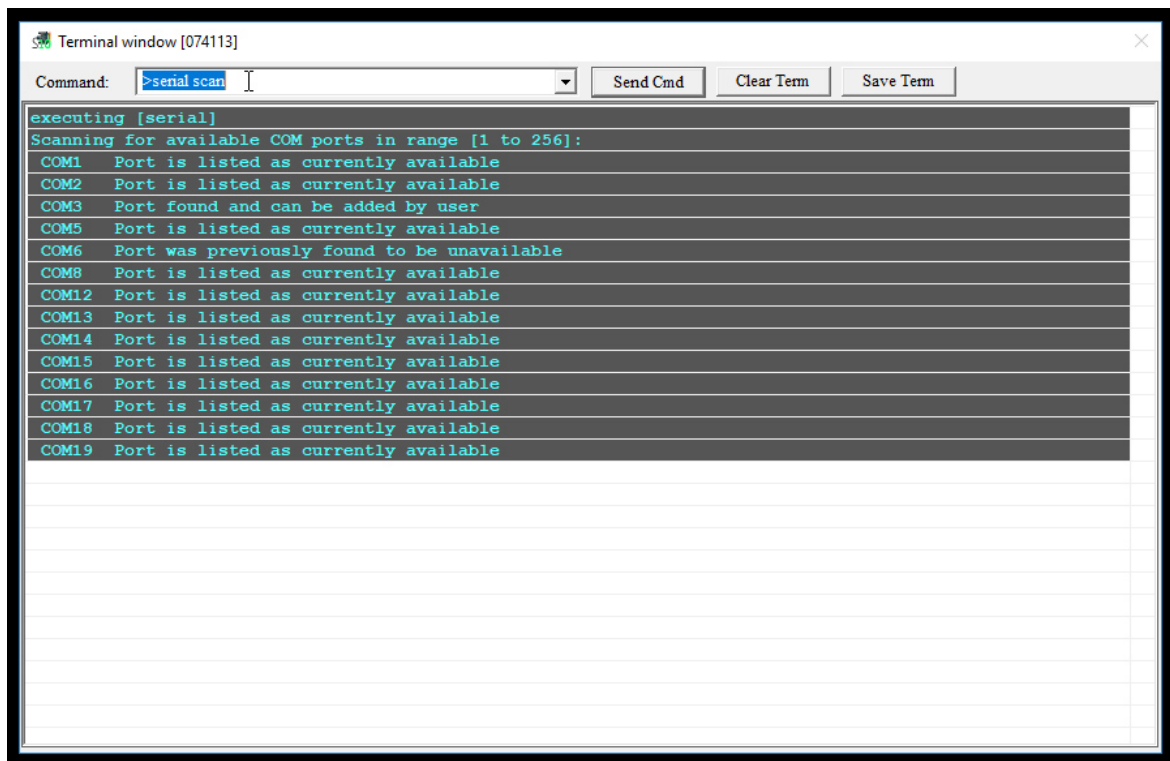
Beginning with version 10.1.30, a feature was added for the user to do a brute force search for all serial ports, COM1 through COM256 that can be accessed by the program. This is done using the Supervisor command: **>SERIAL SCAN** in the terminal window. This scan can take a significant amount of time to complete, ten to fifteen seconds, so please be patient.

Note:

If not visible, Supervisor's terminal window for entering commands and displaying results can be activated by clicking on the **Show/Hide Terminal** button, found in the program's summary window menu bar.

Example:

>SERIAL SCAN



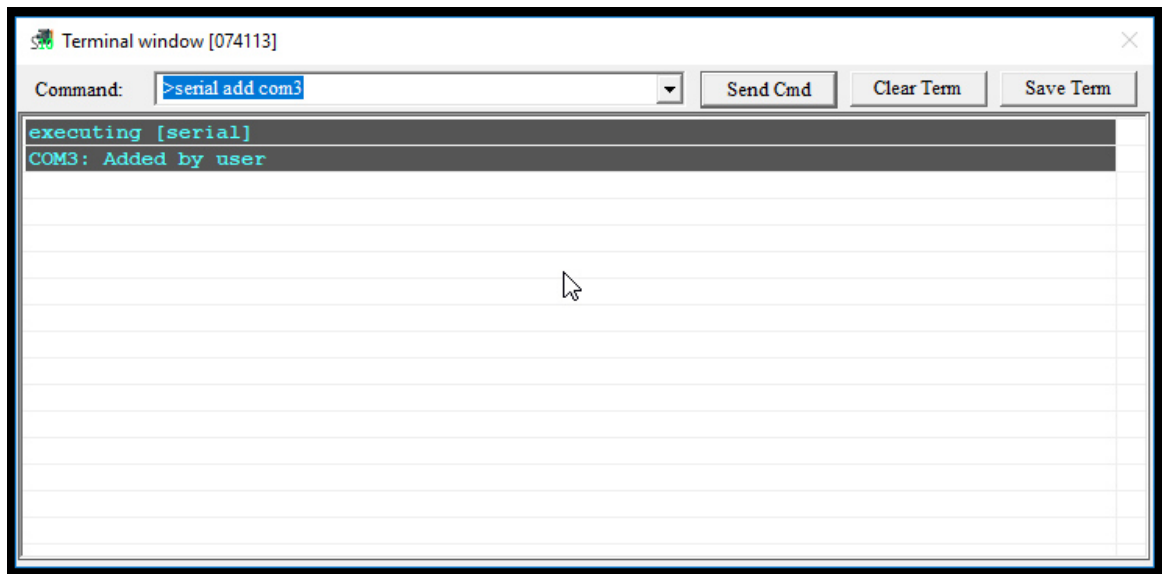
```
Terminal window [074113]
Command: >serial scan
executing [serial]
Scanning for available COM ports in range [1 to 256]:
COM1 Port is listed as currently available
COM2 Port is listed as currently available
COM3 Port found and can be added by user
COM5 Port is listed as currently available
COM6 Port was previously found to be unavailable
COM8 Port is listed as currently available
COM12 Port is listed as currently available
COM13 Port is listed as currently available
COM14 Port is listed as currently available
COM15 Port is listed as currently available
COM16 Port is listed as currently available
COM17 Port is listed as currently available
COM18 Port is listed as currently available
COM19 Port is listed as currently available
```

In the above example, serial ports listed as “currently available” are already available in the Serial Port drop-down menu. Those ports however, listed as “found and can be added by user” are additional ports found using this exhaustive search. Devices listed as unavailable are ports that have been tested, and found to be unavailable to Supervisor, because it could not gain exclusive use of the port.

We can force the addition of any serial port, from COM1 to COM256 inclusive by using the latest Supervisor 10 **>SERIAL** command again. In the above example we found COM3, which in this case is an internal dial-up modem.

Example:

>SERIAL ADD COM3



In the above example, COM3 has been added manually, and can now be selected in the Serial Port drop-down menu.

Note: after devices have been successfully found on a serial port, that port will then appear automatically in the drop-down menu the next time Supervisor is started.

There is a third use of the **>SERIAL** command: "**>SERIAL UPDATE**" which serves to update the Serial Port drop-down menu if a USB-to-Serial adapter was added to the system after Supervisor 10 had been started.

Using the terminal window command field, it is also possible to close an active COM port: **>SERIAL CLOSE COMXX** where XX is the com port number. Any devices being monitored by Supervisor on the specified serial port will be dropped first, before releasing the port.

Example:

>SERIAL CLOSE COM3

Note:s

Supervisor 10, version 10.1.30, must be installed in order to use the **>SERIAL** commands.

At startup, Supervisor scans for serial ports and tests each of them to see if they are available for use before opening any of it's windows. If there are a lot of serial ports that have been

installed in the system, it can take considerable time to get through this testing phase, before Supervisor's main window is opened.

Using RS-485

All AnaCom, Inc. devices support RS-485 in addition to RS-232 for serial connections. The obvious advantage of using RS-485 is that it's balanced/differential transmission standard can support very long cables, (over a kilometer long.) Another advantage is that multiple devices can be attached to an RS-485 cable. For more information, see reference:

<https://en.wikipedia.org/wiki/RS-485>.

AnaCom, Inc. provides a cable, P/N 31415, that converts a standard PC RS-232 DB9 connector to an AnaCom circular 18-pin connector designed to match the RS-485/Ethernet M&C port on all AnaCom, Inc. equipment. For a drawing, please reference:

<http://anacominc.com/drawings/cables/CableDrawingFor31415.pdf>.

AnaCom, Inc. provides a standard cable, P/N 31336, that allows for a serial RS-232 connection to all AnaCom devices, ODUs and protection switch controllers. This will also work with most USB to Serial RS-232 adapters. For a drawing, please reference:

<http://www.anacominc.com/drawings/cables/31336.pdf>.

RS-485 Full-Duplex Connection

AnaCom equipment, including the cable mentioned above, P/N 31415, supports a 4-wire full-duplex implementation of RS-485. The cable, in this case, contains an in-line converter. The PC or USB serial adapter that this cable is plugged into must be able to supply sufficient current to enable the embedded converter. This won't always be the case.

When a 1+1 protection system is being monitored using an RS-485 full-duplex connection, the protection switch and the two XCVRs/BUCs, (ODUs,) are all wired in parallel. That means the Tx+ lines are all wired together, and similarly, the Tx-, Rx+, and Rx- lines. The three devices cannot speak to each other, they are each only aware of Supervisor.

Notes:

When using cable P/N 31415 to connect the monitoring PC to the protection switch, the PS-to-ODU interconnects can use cables, P/N 31197 or P/N 32998, to connect the protection switch to the two ODUs.

If making your own 4-wire RS-485 cable to run from the monitoring PC to the protection switch, it is important to connect pin 12 to pin 18, (connected to ground,) in the 18-pin circular connector, to tell the protection switch that the system is using a full-duplex RS-485 connection scheme.

RS-232 Connection

If we connect to a 1+1 system using an RS-232 cable, such as P/N 31336, we can still use the RS-485 interconnect cable P/N 31197 to connect the protection switch to the two ODUs in the system. In this case however, the PS-to-ODU connections are running half-duplex. This is

necessary so that the protection switch can do the RS-485 to RS-232 conversion. When half-duplex is used, the Tx+ lines are connected to the Rx+ lines, and similarly for Tx- to Rx-.

If a 1+1 system is configured for Ethernet, with the Ethernet interconnect cables, P/N 32998, used to connect the protection switch to the two ODUs, we can revert back to using an RS-232 serial connection using cable, P/N 31336. Beginning with Rev 81 firmware the protection switch can be configured by the user to force an RS-485 interconnect between the protection switch and the ODUs, when Ethernet interconnect cables are being used, using the command **PORT_CONNECTIONS**.

The Protection Switch will normally switch operation between Ethernet (default) and RS-485 by whether or not a cable connected to any of the 18-pin ports on the protection switch had pin 12 connected to pin 18. With the latest revision of the ARM-based protection switch, this default behavior can be over-ridden. This is so that a 1+1 system can potentially ship with only one set of interconnects - the Ethernet cables.

In the example below, we force the use RS-485 on the two ODU ports of a protection switch:

```
COMMAND> PORT_CONNECTIONS
```

```
PORT_CONNECTIONS AUTO
```

```
Port Connector Pin 12 status: ODU A=Open, ODU B=Open, PS=Open
```

```
COMMAND> PORT_CONNECTIONS RS485
```

```
COMMAND> PORT_CONNECTIONS
```

```
PORT_CONNECTIONS RS485
```

```
Port Connector Pin 12 status: ODU A=Grounded, ODU B=Grounded, PS=Open
```

```
COMMAND> SAVE
```

If the port_connections command has been previously used to force an RS-485 connection between a protection switch and ODUs that are using Ethernet cables, then to return to using Ethernet, this command is used, this time with the AUTO argument. This will cause the protection switch to return to it's default mode of reading pin 12 in the interconnect cables to figure out what to do.

Example:

```
COMMAND> PORT_CONNECTIONS AUTO
```

Notes:

Cable P/N 31197 has pin 12 connected to pin 18 and is used to connect a protection switch to ODUs where RS-485 is to be used. The PORT_CONNECTIONS command cannot be used to over-ride this default setup. When these cables are connected to the protection switch ODU ports, then only RS-485 can be used.

Cable P/N 32998 is used to connect a protection switch to ODUs when Ethernet will be used using Supervisor. If the port_connections command is used to over-ride this default setup, these cables can then be used in a serial setup.

Cable P/N 31336 is a DB9-connector based serial port cable connecting a monitoring computer to the protection switch via RS-232. When this is done, the protection switch to ODU(s) connection is made using half-duplex , or simplex, RS-485.

Cable P/N 32999 is a RJ45 Ethernet cable connecting a computer or router to the PS. This cable is only used in an Ethernet setup.