TECHNICAL NOTE TNOI11

Title: G3 Port Sharing

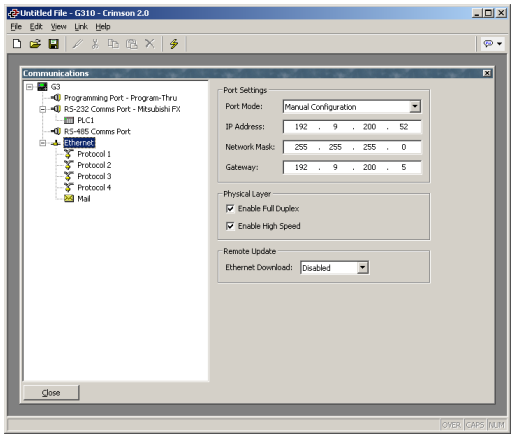
Product(s): G3 HMI Series

G3 PORT SHARING

Red Lion's G3 operator panels now provide a port sharing facility that allows either physical or virtual serial connections to be made to any device connected to the HMI. For example, you may be using the HMI with a small programmable controller, but since the PLC has only a single serial port, you may find yourself continually swapping cables when modifying the ladder program. By sharing the HMI's communications port, you can send data directly to the PLC, either from another serial port on the HMI, or by means of a virtual serial connection made over an Ethernet link.

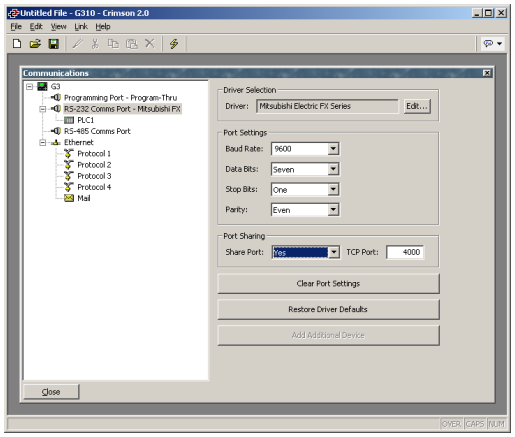
ENABLING TCP/IP

The first configuration step when using port sharing is to enable the HMI's Ethernet port. While you may not choose to use the virtual serial port facility, even the local sharing of ports is based upon the TCP/IP protocol, which will not be available unless Ethernet is enabled. To enable Ethernet, select the Ethernet icon in the Communications window, and select the required configuration mode. For installations where Ethernet is not actually being used, you can select "Manual Configuration" and leave the rest of the options at their defaults.



SHARING THE REQUIRED PORT

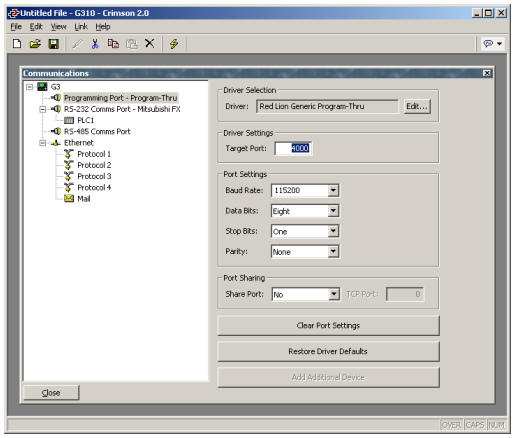
The next step is to share the required port, which is done by selecting Yes in the Share Port property and by optionally entering a suitable TCP/IP port number. This number represents the virtual port that will be used to expose the serial port for access via TCP/IP.



If you leave the port setting at zero, a number of 4000 plus the logical index of the port will be used. (To obtain the logical index of the port, count the port's position in the list, noting that the programming port is always logical port 1.) You may use any number that is not already used by another TCP/IP protocol. If you are stuck for ideas, we recommend numbers between 4000 and 4099.

CONNECTING VIA ANOTHER PORT

If you want to use another port on the HMI to route data to the shared port, you must select the Generic Program-Thru driver for that port, and configure this driver with the TCP/IP port number of the serial port that you have shared. In the example below, we are routing data from the programming port to a PLC that is connected via the RS-232 communications port…



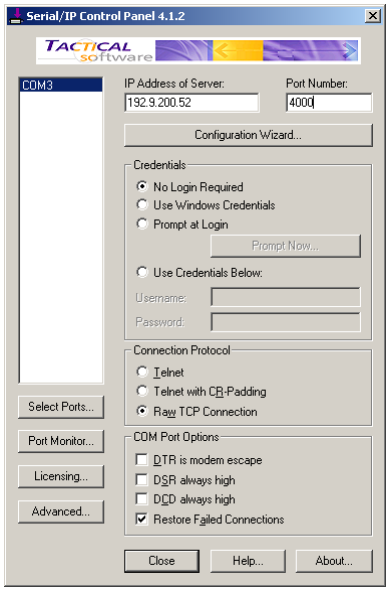
Note that the Baud rate and other port settings do not have to be the same as those for the port, which we are sharing. In the configuration shown above, data to and from the programming software is sent at a higher Baud rate than the data to and from the PLC, with the G3 doing the appropriate buffering and conversion.

In this example, to make use of the shared port you would connect a spare serial port on your PC to the programming port of the G3, and configure the PLC programming software to talk to this COM port. As soon as the PC begins to talk to the PLC, communications between the G3 and the PLC will be suspended, and the G3's two ports will be "connected" in software, so that the PC will appear to be talking directly to the PLC. If no data is transferred for more than a minute, communications between the G3 and the PLC will be resumed.

CONNECTING VIA ETHERNET

Rather than using an additional serial port on your PC and on the HMI, it is possible to use a third-party utility to create what are known as virtual serial ports on your computer. These appear to applications to be physical COM ports, but in fact, they send and receive data to a remote device over TCP/IP. By installing one of these utilities and configuring it to address the G3 HMI, you can have serial access to any devices connected to the HMI without any additional cabling. Indeed, there is no need to have any physical serial ports available on the PC at all—something that is very valuable when working with modern laptops, where a COM port is often an expensive option.

Several third-party virtual serial port utilities are available. On the freeware side, a company called HW Group[1] provides a utility called HW Virtual Serial Port. There are also a number of other freeware port drivers available, most of which seem to be derived from the same source base. On the commercial side, Tactical Software[2] offers a product called Serial/IP for about $100 per port. *It must be said that while the freeware drivers appear to have many contented users, we have found that these drivers have occasional stability problems on certain PCs. Tactical Software's Serial/IP is thus the only package that we are able to support, and the following information assumes that you are using this package.*



To create a virtual serial port, open Serial/IP's configuration screen, and select the name of the COM port you wish to define. This will typically be the first free COM port after the physical ports installed in your PC. In this example, we are using COM3. Next, enter the IP address of the G3, and enter the TCP/IP port number that you allocated when sharing the port. The example above is configured as required by the previous samples in this document. Finally, ensure Raw TCP Connection is selected, and close the Serial/IP dialog.

You will now be able to configure any Windows-based software to use COM3 for download. When the software opens the port, the G3 will suspend communications on the shared port, and then data will be exchanged between the PC software and the remote PLC—*just as if they were connected directly!* When the port is closed, or if no data is transferred for a minute, communications will be resumed. Note that, assuming you've purchased the appropriate number of licenses for Serial/IP, you will be able to create as many virtual ports as you need. This means that you can be connected to multiple devices from the same PC, downloading to each via its respective programming package—*all without plugging or unplugging a single cable!*

[1] http://www.hw-group.com/products/hw_vsp/index_en.html

[2] http://www.tacticalsoftware.com

PURE VIRTUAL PORTS

In some circumstances, you may want to use a spare serial port on a G3 to provide access to a remote device that is not otherwise connected to the HMI. Or you might want to use such a port to connect to a dedicated programming port on a device, even though the G3 is using another port to perform communications with that device. For example, if you have a Red Lion Modular Controller connected to a G3, you will typically communicate using Ethernet or via the Modular Controller's RS-232 port. If you wish to use port sharing to remotely re-program the Modular Controller, you may wish to connect the device's programming port to a spare RS-232 port on the G3 so that you may then share this port via TCP/IP. To do this, configure the port in the usual way, selecting the Virtual Serial Port driver for that port. Then, share the port as described above. This Virtual Serial Port driver performs no communications activity of its own, but still allows the device to be shared for remote access.

LIMITATIONS

Note that some PLC programming packages may not work with virtually or physically shared ports. Issues to watch out for are tight timeouts that do not allow the G3 time to relay the data to the PLC; a reliance on sending break signals or on the manipulation of hardware handshaking lines; or DOS-style port access such that the package cannot "see" the virtual serial ports. Luckily, these issues are rare, and most packages will happily communicate as if they were directly connected to the PLC in question.

SUPPORT

For support on using this feature, contact support@redlion.net, or visit http://www.redlion.net.