# How to use APORT box in SCADA environment

Traditionally SCADA system may use Poll & Ack protocol between host and RTU device. We may use RS485 interface for host and multiple RTU connect together. Or we may use serial port sharer as S272 box for RS232 interface environment. We will connect RS232 port in host to master port of S272 box and connect RS232 port of RTU device to slave port of S272 box. But we may have distance limitation in RS232 interface or RS485 interface. Right now we talk about IoT method for network connection without distance limitation. But it is cost too much for current SCADA system to replace by IoT method. It is best for us to use current SCADA system software and device to have network method to overcome distance limitation problem. Fortunately APORT product line in RAYON Technology can provide such solution.

Traditionally SCADA system may use Poll & Ack protocol (ex, MODBUS) between host and RTU. We may send command/data packet from host side to all RTU devices. Then the only one target RTU device may send back Acknowledge/data packet to host. We may use timeout method to confirm the communication between host and RTU device successful or not. So the timing is very important in Poll & Ack protocol environment.

Generally we may use UDP packet or TCP packet in network communication environment. The UDP protocol is based on non-connection method. So we can send UDP packet immediately, but we can not confirm such UDP packet can be received in target IP device. The TCP protocol is based on connection method. So we can confirm TCP packet must be sent to target IP device, but we can not confirm when to send and reach target device. Due to timing is very important in SCADA system, so we can not use TCP method and we can only use UDP method in SCADA environment.

In APORT box we can assign 4 target IP address for each serial port to exchange UDP packet in network communication and data in RS232/RS485 serial communication. When one APORT box's serial port is connected with RTU device, we may assign one IP address for host to communicate. When one APORT box's serial port is connected with host, we may assign up to four IP address for four devices to communicate. When you need to connect host with more than four RTU devices, then we need to use APORT800SR box to work with host. One APORT800SR box may support 8 serial ports as APORT800 box, but we include one serial port sharer to let such 8 serial ports to connect with slave port of serial port

sharer and let master port of serial port sharer for external connection. So we will connect RS232 serial port of host to APORT800SR box. Then we can have 8 serial ports to be used in network communication. Each serial port of APORT800SR box can be assigned 4 target's IP address for 4 RTU devices. So we can connect up to 8*4=32 RTU devices with host now. You can see in following figure for such application environment.
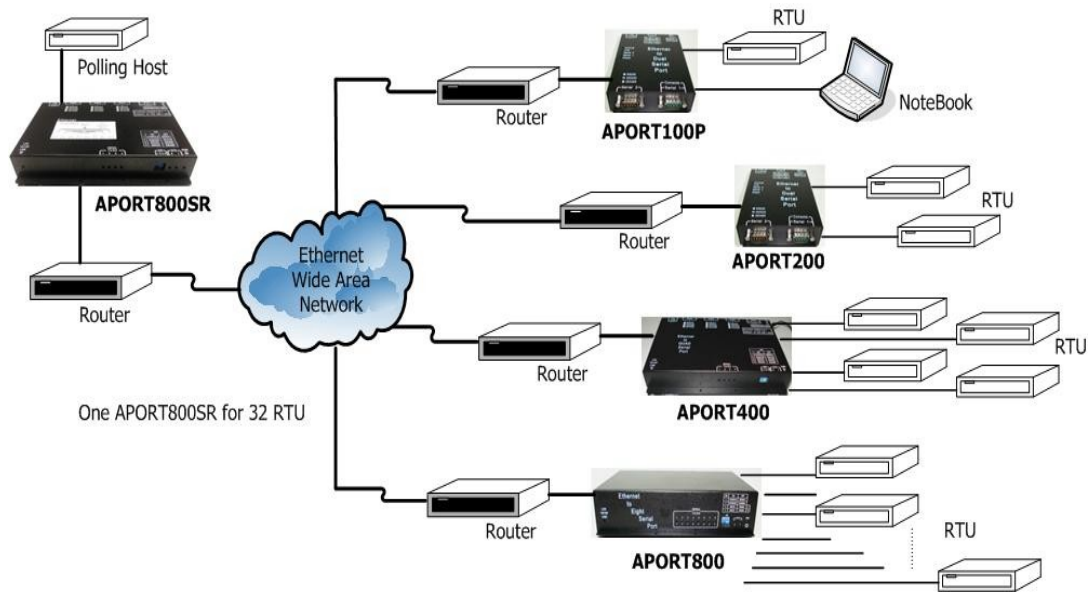
If your application environment might ask one host to connect more than 32 RTU devices, then we may need to add one S272 serial port sharer between host RS232 serial port and each APORT800SR box. The master port of S272 box will connect to host RS232 port. The slave port of S272 box will connect to APORT800SR box. Because we have 7 slave ports in one S272 box, so we can connect up to 32*7=224 RTU devices in application environment as following figure.
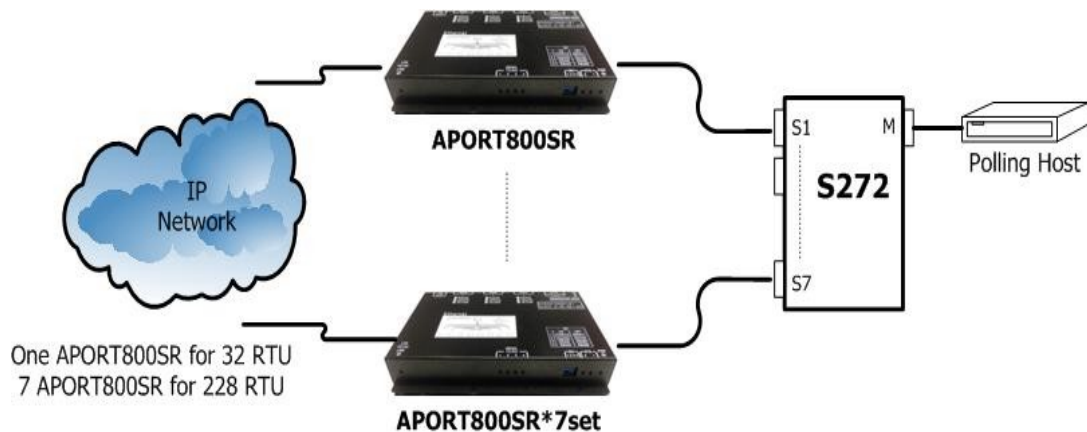
Sometimes we may need to have redundancy feature in SCADA system. When one host may have problem to work, we may need to have redundancy host unit to take control whole system. Because APORT box can assign up to 4 target IP address in each serial port, so can assign 2 target IP address for host. One IP address is for working host and the other IP address is for redundancy host. In normal condition we will send command/data packet from working host and the responding/data packet from RTU device will send to working host and redundancy host. But the redundancy host will skip such data from RTU device and just monitor the working environment. When we find the working host may have problem, then we can use redundancy host to be working host immediately.

Sometimes we may need to connect multiple RTU device in one location and we don't need one APORT box for one RTU device. So we can use APORT100P/APORT200/APORT400/APORT800 box to support 1/2/4/8 serial ports to connect with 1/2/4/8 RTU devices. In normal condition we may use different UDP port number in one APORT box for each serial port. So we can know which UDP port number packet is for which serial port. But we need to have same UDP port number for all serial ports now. In APORT box we have special "UDP Multi-serial mode" to let all serial ports with same UDP port number. So you can have one APORT box to connect your multiple RTU device in same location.

If your application could not meet by this condition, then you can send Email to rayon@ms1.hinet.net or infor@rayontech.com.tw to check with us.