# RAYON's serial port sharer product line

Traditionally we have point-to-point connection between one serial port in host and one serial device. If we had application environment to let one serial port in host to control multiple serial devices, then we need to check hardware and software issue. Firstly we need to know the hardware interface in serial port can let multiple devices connected together. For example, RS485 interface can let multiple RS485 device connected together and RS232 interface can't let multiple RS232 device connected together directly. Then we need to confirm electronic signal limitation for multiple devices connected directly. For example we may have RS485 devices connected together directly. The signal ground potential difference between different device may let RS485 signal over IC's common mode voltage limitation. So we may have IC damaged in such condition. Then we need to have ground isolated feature between RS485 devices.

From software issue we may need to have some rule for each connected device to send data without confliction. Generally we may have one master device to handle such transmission rule. One master device may send data to target slave device and poll such slave device to send back data.

RAYON's serial port sharer box is used to solve the hardware structure and security issue. User needs to handle the software issue to let one serial port in host to handle multiple devices.

S232 box is one RS232 master port to handle three RS232 slave port. Generally we may have RS232 interface in PC's COM port. When we need to connect with multiple RS232 devices. We can only let transmit data signal from PC's COM port to receive data signal in multiple connected device. We can't let multiple connected devices' transmit data signal joined together to receive data signal of PC COM port. So we can only send data from PC to connected device. But we can't get data from connected device. S232 box can solve this condition for you. We connect PC's COM port to master port of S232 box. We connect S232 box's slave port to multiple external devices. The data from PC's COM port will be transmitted to every external device simultaneously. Any data from external device will be transmitted to PC's COM port. So it is very easy for one PC's COM port to multiple external devices. But we still need to confirm external device not transmit data simultaneously. It is software issue for application protocol to meet this requirement. For safety issue you can use S232io box to support GROUND isolated feature in all connected devices.

RS232 (voltage meter)

RS232 (current meter)

RS232 (counter)
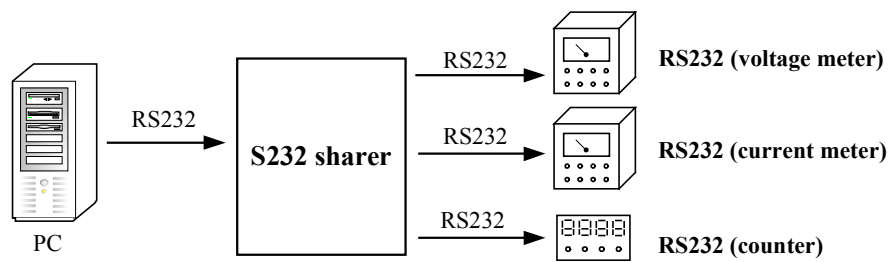
S432 box is one RS485 master port to handle three RS232 slave port. Generally one PLC controller may have RS485 serial port to control multiple RS485 devices. When you need to control RS232 device. Then you need one RS232 to RS485 converter between RS232 device and RS485 network. When you have three RS232 devices to be connected. Then you need three set RS232 to RS485 converter box. Now you can use S432 box to let PLC controller to handle three RS232 devices. Each S432 box just need one loading in RS485 network. In traditional structure you need three sets RS232 to RS485 converter and three loading in RS485 network. For safety issue you can use S432io box to support GROUND isolated feature in all connected devices.

RS232 (voltage meter)

RS232 (current meter)

RS232 (counter)
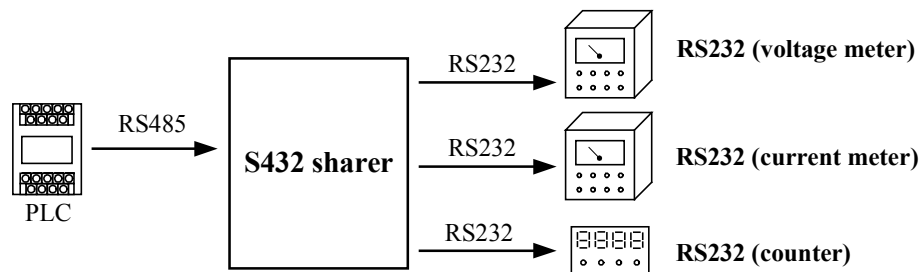
S434 box is one RS485 master port to handle three RS485 slave port. Generally one PLC controller may have RS485 serial port to control multiple RS485 devices. But we have loading limitation in RS485 network. When we have RS485 loading over the limitation in RS485 network. Then we need to use RS485 bridge box to split RS485 network in different segment. Traditionally we need one RS485 bridge box to add one more RS485 segment. When you need to have three extra RS485 segment, then you need three RS485 bridge box and three loading in master RS485 segment. Now S434 box can let your PLC controller creates three extra RS485 segment and just one loading in master RS485 segment. The other problem in traditional RS485 bridge structure is bandwidth usage. When PLC controller sends data in RS485 network, every RS485 device

will receive such data. Then the target RS485 device will send back data to PLC controller. In traditional RS485 bridge structure such response data is not just sent back to PLC controller. Such data will send to every RS485 segment via RS485 bridge box. This condition will degrade whole system's life cycle. For example we may use RS485 to fiber converter for long distance connection. When we need to send data over fiber, the optical device will turn ON/OFF. It just likes a bulb. The life cycle of bulb is dependent on turn ON period. So we need to limit the ON period for optical device. When we have one master device need to send data to remote slave device. We will send it. But it is not necessary for data from other slave device to remote slave device. In traditional RS485 bridge structure any data in master RS485 segment will be sent to every RS485 segment. When we use S434 box, we know the data from master controller or other slave segment. Then we will send data from master controller to remote site. But we will not send data from other slave segment to remote site. For safety issue you can use S434io box to support GROUND isolated feature in all connected devices.
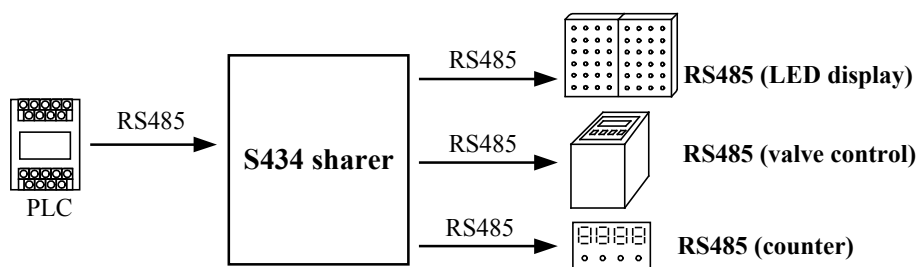
S234 box is one RS232 master port to handle three RS485 slave ports. Generally we may have RS232 interface in PC's COM port. When we need to handle multiple RS485 devices, we need one RS232 to RS485 converter. If you need more RS485 segment, then you need more RS485 bridge box. Now we can connect PC's COM port to S234 box to handle up to three RS485 segments. For safety issue you can use S234io box to support GROUND isolated feature in all connected devices.
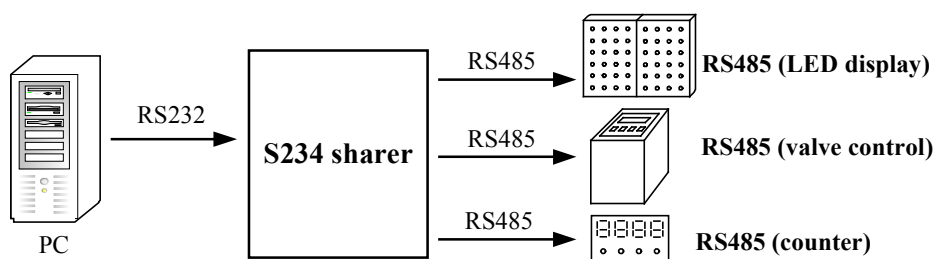
The most important feature for RAYON's serial port sharer product line is GROUND isolated feature. Generally we may have ground potential difference problem in multiple devices connection environment. When the ground potential difference between two connected devices is small, it is no problem for data communication. When the ground potential difference larger, we may have data error generated in communication procedure. When the ground potential difference larger than IC limitation, we may have IC damaged. So it is very important for GROUND isolated feature between two connected device. RAYON's serial port sharer support GROUND isolated feature in every RS232 or RS485 serial port. So you can have double protection between master device and every slave device.

Even though RAYON's serial port sharer box just support one master port to three slave ports. But you can use multiple boxes in bus structure or daisy-chain structure to support more slave ports. In master-slave structure RAYON's serial port sharer can let your RS232 or RS485 devices connected together with GROUND isolated feature.

It is flexible for customer to use economic model (non-Ground isolated port) initially for cost consideration. Then they can have rigid model (GROUND isolated port) later for safety consideration.