

Adding I/O Points with FGR2-IO-IOE in Serial Modbus Slave Operating Mode

Background

A new operating mode is available to the FGR2-IO-IOE, FGR2-IO-CE and FGR2-IO-C radios that allow users to install it like an expansion module. The new operating mode, called “Serial Modbus Slave”, disables the radio’s transceiver and allows it to respond to polls issued directly to its serial data port. This application note describes some typical applications that need additional I/O points, a new operating mode called Serial Modbus Slave that provides additional I/O points without another wireless link and the simple steps to install a basic system with one FGR2-IO-IOE configured as a radio and one FGR2-IO-IOE configured as a Serial Modbus Slave.

Sample Applications

Oil and Gas

High pressure gas wells require more I/O points than the average gas well because of unique conditions and risks. Pressure-transient tests, used to evaluate underground formations and well performance, require constant monitoring of several tubing and casing levels and need more I/O points than a typical gas well. Adding I/O points allow a cost effective and easy to maintain wireless solution for users.

Multiple well pads have several well heads grouped in a small area to make production and service more efficient. The close proximity of well heads allows producers and automation companies to save money by grouping more I/O points on a single radio link. Adding more I/O points in this case reduces the cost to wirelessly monitor wells.

Water and Wastewater

Tank farms for wastewater treatment for store water for eventual release into a treatment system. Grouping the large tanks together allow treatment plants to reduce the cost to wirelessly monitor level and water quality and control valves. Adding more I/O points to a single wireless link provides treatment operators to cut costs while delivering the benefits of wireless monitoring and control.

“Serial Modbus Slave”

In the Serial Modbus Slave operating mode an I/O radio will disable its transmitter and receiver. The device will only communicate through its data connector. Using RS 485 allows multiple I/O radios configured as Serial Modbus Slave to respond to a single master, in effect providing expandable I/O.

Complete Instructions for One “Serial Modbus Slave”

Order KIT1001IO

The new kit, KIT1001IO, provides users with a single line item for a complete solution. KIT1001IO includes the following devices by default:

- Two FGR2-IO-IOE radios
- One AWR3610SP data interface cable, separate power
- This application note

The following options are available for KIT1001IO:

- AWR3610SJ data interface cable, joined power
- ASC3610DJ data interface cable, with DB9 connector
- ASC2009DC diagnostic interface cable
- EMD1280UW 12 V power supply

Adding I/O Points with FGR2-IO-IOE in Serial Modbus Slave Operating Mode

Configure First FGR2-IO-IOE as Network Slave

The first FGR2-IO-IOE radio acts as a typical network slave. Configure this radio with Tool Suite as you would normally. Take note of the following settings:

- Baud rate
- Data parity
- Serial interface
- Flow control
- Modbus ID

Configure Second FGR2-IO-IOE as Serial Modbus Slave

The second FGR2-IO-IOE radio acts as a local I/O device. Configure this radio with Tool Suite so that its operating mode is "Serial Modbus Slave."

The Modbus ID for this FGR2-IO-IOE must be different than the network slave's Modbus ID to which it will be connected. However, the following settings must match the FGR2-IO-IOE configured as a network slave:

- Baud rate
- Data parity
- Serial interface
- Flow control

Connect Devices

Power both FGR2-IO-IOE radios from the same power supply or battery by connecting to pins 11 (B+) and 12 (Ground) on the I/O terminal strip. Use cable AWR3610SP to connect the data ports. Commands received by the Network Slave and addressed for the Serial Modbus Slave will be sent out the Network Slave's serial port. The Serial Modbus Slave will respond and the data will be transmitted by the Network Slave to the Network Master.

The AWR3610SJ cable joins the power to both radios. With cable AWR3610SJ then only one radio must be connected to the power supply or battery since the cable will join power from one to the other.



Figure 1 – Two FGR2-IO-IOE radios connected with AWR3610SP.

Adding I/O Points with FGR2-IO-IOE in Serial Modbus Slave Operating Mode

Complete Instructions for Multiple “Serial Modbus Slaves”

Configure First FGR2-IO-IOE as Network Slave

Configure the first FGR2-IO-IOE in the same manner as listed in the previous section.

Configure Other FGR2-IO-IOE as Serial Modbus Slave

Users can add more than one radio configured as Serial Modbus Slave to a serial network slave. To do so, users can use a multi-drop 485 configuration. The devices configured as Serial Modbus Slave should use the following settings in Tool Suite:

- Baud Rate Settings
 - o Serial Interface: RS485
 - o Turn On Delay: 0 or higher
 - o Turn Off Delay: 4 or higher
 - o Flow Control: None
 - o Baud Rate and Data Parity should match for all devices.
- Modbus Settings
 - o Modbus Mode: Enabled
 - o Modbus ID: Each device must have a unique Modbus ID

Connect Devices

Connect the devices according to the following wiring diagram. Cables AWR3610SJ can be used to join power or AWR3610SP can be used for powering each device directly.

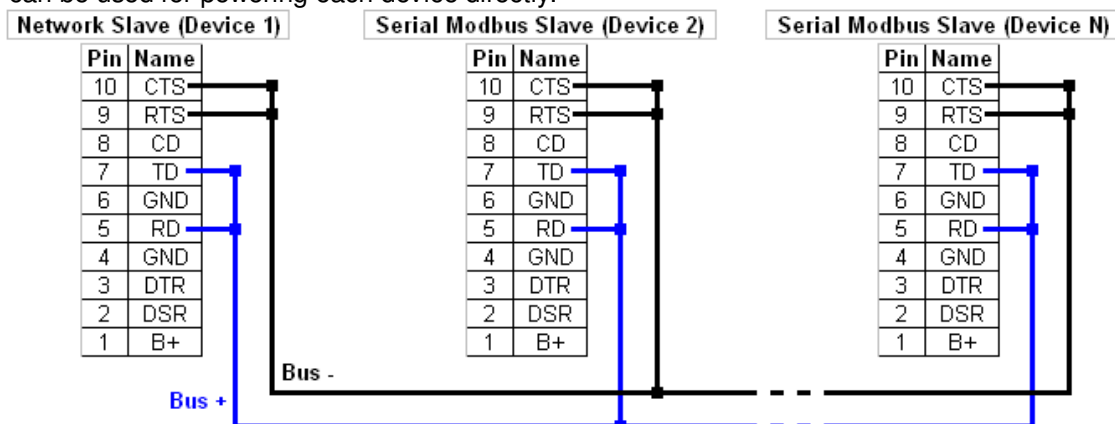


Figure 2 – Wiring diagram for multiple Serial Modbus Slave devices



Figure 3 – FGR2-IO-IOE radio showing data connector pin numbering.