

## Application Note #5482

### FGRIO Signal Replication with 4-20mA Signals

October 16, 2009

#### Background

Freewave FGRIO-Master and FGRIO-Slave radios can be configured in signal replication mode to transmit analog and digital signals wirelessly from a number of slave locations to a single master radio. A common measurement interface for sensing equipment is a 4 to 20mA current output. The current amplitude correlates to a specific measurement (e.g. pressure, temperature, flow rate, etc.). Limitations of the FGRIO-Master drive strength force the output of the signal to be a 1-5V analog voltage. This application note describes the connections to replicate a 4-20mA FGRIO-Slave input as a 1-5V FGRIO-Master output.

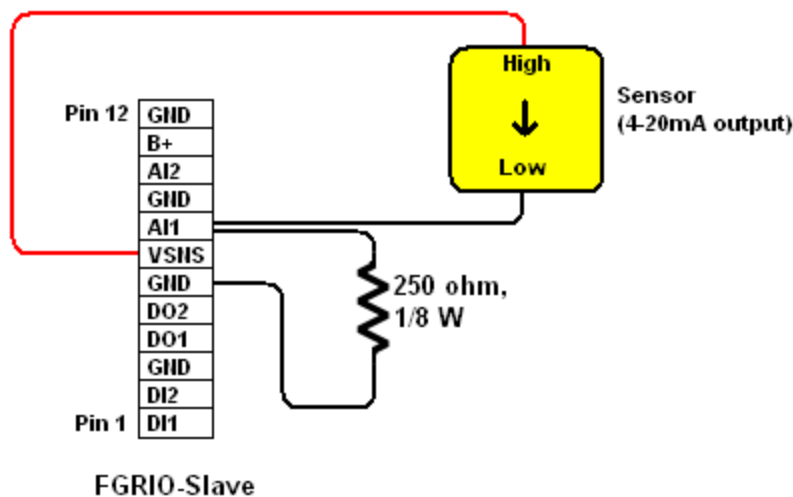
#### Important Note:

Never connect a voltage source to a radio greater than the radio's supply voltage. Doing so may cause irreversible damage to the radio and external equipment.

#### Results:

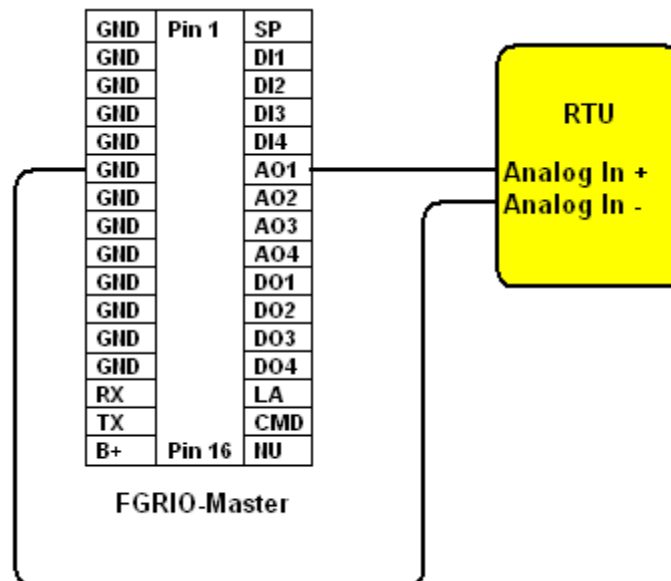
The FGRIO-Slave radio requires an external sense resistor to convert the input signal from 4-20mA to 1-5V. The resistor must be a 250 ohm resistor rated for at least 1/8W power dissipation. Connect the resistor from the output of the sensor to ground. Figure 1 shows a 4-20mA sensor connected to analog input 1.

**Figure 1.** Wiring diagram for 4-20mA input on FGRIO-Slave.



The analog output of the FGRIIO-Master can be connected directly to the RTU as a 1-5V signal. It is important to connect the ground of the RTU to the FGRIIO-Master to provide a current return. Figure 2 shows the analog output 1 of the FGRIIO-Master connected to the RTU.

**Figure 2.** Wiring diagram for 1-5V output from FGRIIO-Master



**Note:**

The analog outputs are low current, so any 4-20mA current sensing resistor on the RTU must be removed. If in doubt as to whether RTU-internal resistors are active, test the link with a full scale input.