#5437

DTR to CTS Line Alarm Feature

Nov. 6, 2002

Purpose

Starting with firmware version 2.13 and higher, FGR series radios have a built-in alarm mechanism that will allow an alarm condition that exists at a slave location to be relayed back to a corresponding Slave/Repeater that can trigger a reaction in a PLC or RTU.

Note: This alarm feature only exists between a slave (or multiple slaves) and its corresponding slave/repeater unit. This functionality does not exist in slave to repeater or slave to master relationships.

This application note details the setup and describes the use of this feature. For additional information please contact FreeWave Technologies tech support staff.

FreeWave Radio Setup

Begin by verifying that the installed firmware is version 2.13 or greater. To do this, enter the setup menu of the radio you intend to use for this application. Once in the setup menu, the current firmware version is displayed at the top of the screen on the main menu as in Fig 1.0.

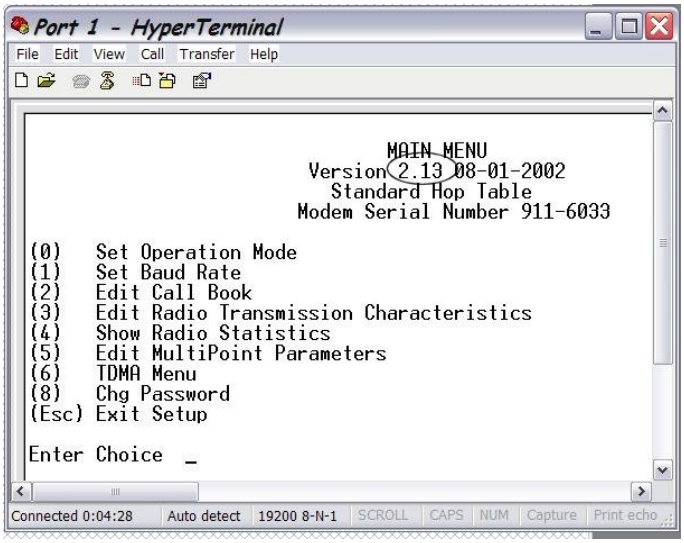

Fig 1.0

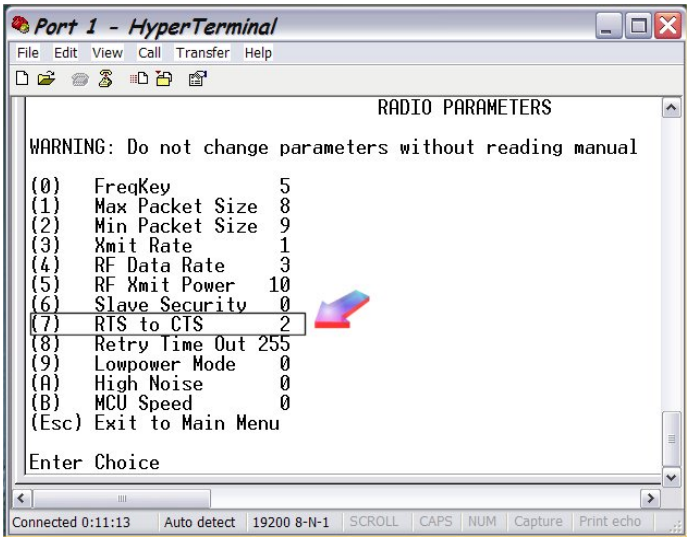

Fig1.1

Next the RTS to CTS option in menu 3 will have to be set to '2' as shown in Fig 1.1. It is essential that this option be activated on both Slave/Repeater and any Slave that will control it.

All additional settings in the menu are set according to the usual practice that is defined in the FreeWave users' manual.

Wiring

Refer to Table 1.0 for a list of FreeWave pin numbers and functions for this part of the setup.

	DTR Line	CTS Line
Board Level FGR series 10 pin header	3	10
Enclosed FGR series DB9	4	8

Table 1.0

A slave radio that is meant to control a slave/repeater needs to have its DTR line tied to the source of the alarm; I.E. a pin that asserts during alarm conditions.

On the slave/repeater end the CTS line will need to be tied into an alarm condition on and RTU, PLC, or some other kind of intelligence. This line will assert in accordance with the state of the DTR line on the slave unit.

Specifics of operation

For a non alarm condition to exist the state of the DTR line on all slaves must be asserted. Conditions such as these will leave the CTS line on the slave/repeater radio in an asserted state duplicating the state of the adjoined slave units.

An alarm condition will be triggered if ANY of the slave units experience a de-assertion of its DTR line. During an alarm condition on any slave (1 or more) the CTS line on the slave repeater will de-assert. Slave units that are not experiencing alarm conditions will be unaffected by this change. Likewise, an additional alarm condition on multiple slaves does not increase the severity of the first alarm.

Once the DTR line of a slave is de-asserted it begins to intermittently send out an alarm to its adjoined slave/repeater. This is done so that the data channel between the slave/repeater, the slaves, and the rest of the network is not blocked. During this time the slave/repeater will receive the intermittent transmissions from the slave and reset a timeout clock. If the slave units DTR line is asserted during this time and the alarm feature fails to exist, the slave/repeater's timeout clock will expire causing the CTS line to assert, ending the alarm condition. If multiple alarm conditions exist, the ending of one alarm will not impact the effects of the other alarms that are being transmitted. Non alarm conditions are an ALL or ALARM condition; with the ALL being that all slave DTR lines are de-asserted.

Note: The DTR line of a slave will be asserted upon the event that power to the radio is lost. However, if power is merely cycled, the DTR line will assert until the slave is able to reconnect into the network and begin transmitting the alarm condition (if it still exists). During this time however the alarm timeout on the master may expire causing its CTS to assert ending the alarm.

The assertion of the Slave/Repeater's CTS relies on the absence of transmissions from any participating slave units. An alarm condition does not guarantee a constant asserted state on the CTS line of the Slave/Repeater due to the intermittent transmissions of the alarm code from the slave. Likewise the alarm is not a permanent flag. It reflects only the current state of the DTR line of any or all of the participating slaves. This attribute is intended for alarms and careful thought should be placed on the use of this feature for any other purpose.

Line Assertion Voltage Table

	RS-232	TTL
Asserted	-3 to -12 Volts	5 Volts
De-Asserted	3 to 12 Volts	0 Volts