Automatic Switching from RS232 to RC Mode

Application Note **AN1001**

Introduction

In many computer controlled application, it may be useful to allow the controller to switch back to the RC mode during operation. This would typically used to let an operator to take over the control of a robotic vehicle upon computer problem, or simply to manually move it into position. This Application Note describes the simple circuitry that must be used to operate all Roboteq controllers of the AX family, to perform this function.

Technique Description

While the Roboteq controllers can operate in either RC Radio or RS232 mode, the RS232 Data Input and RC Pulse Input 1 share the same pin on the connector. External hardware is therefore needed to switch this pin from the RS232 source or the RC Radio. these two mode so that the controller can only operate in one of the modes at any given time.

The diagram below shows the external hardware required to perform such a switch.

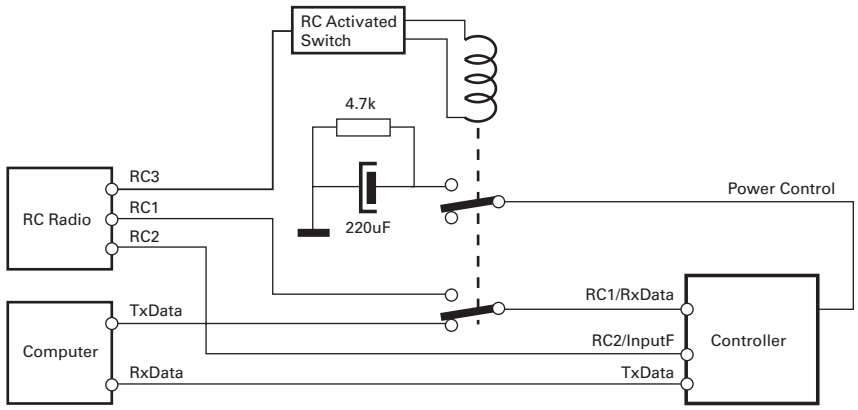

FIGURE 1. Switching circuit schematic

A third RC channel is used to activate a dual-throw relay. When the radio is Off, or if it is On with the channel 3 Off, the relay contact brings the RS232 signal to shared input to the shared input. The second relay contact maintains the Power Control wire floating, so that the controller remains on.

When the RC channel 3 is On, the relay activates and brings the RC radio signal 1 to the shared input. The second relay contact brings a discharged capacitor onto the Power Control wire causing the controller to reset. Resetting the controller is necessary in order to revert the controller in the RC mode. Note: the controller which must be set to default in the RC mode after reset or power on.

The switching sequence goes as follows:

Upon controller power On with Radio Off, or Radio On with RC ch3 Off

Controller immediately goes into RC mode (default mode). Since RC ch3 is Off, the relay is Off and the controller's RC1/RxData is connected to the RS232 output.

- Computer must send 10 consecutive Carriage Returns. Controller enters RS232 mode

Controller is On, Radio is On, RC ch3 On

- Controller is reset, returning to RC mode
- Controller will output the continuous parameter strings on the RS232 output. Computer thus knows that RC mode is currently active. Computer sends Carriage Return strings to try to switch controller back in RS232 mode. Since the RS232 line is not connected to the controller, mode will not change

Controller is on, Radio is turned off (or Radio on with RC ch3 off)

- Relay deactivates. RS232 now connected to shared input
- String of Carriage Returns now received by controller.
- Computer looks for OK prompt to detect that RS232 mode is now active. Then resumes normal operation.

Note: Wait 5 seconds for the capacitor to discharge before attempting to switch to RC mode if doing this repeatedly. Controller will not reset otherwise.

Figure 2 below is a State Diagram representation of the controller's operation upon various event combinations.

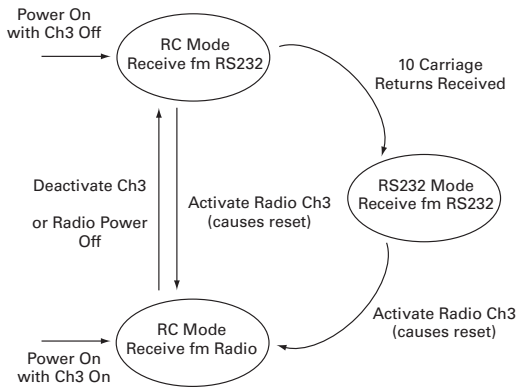

FIGURE 2. Switching State Diagram

Parts Supply

The relay, capacitor and resistor are available at any electronics store. Component values may be substituted with different ones of values within plus of minus 50% those published in this Application Note.

The relay contacts should be rated at 100mA.

The RC Activated Switch may be purchased from specialized RC parts reseller. Visit www.roboteq.com/links.shtml for suggested vendors.

As an alternative, you may use a standard RC servo mechanically coupled to a dual throw switch to replace the to the RC Activated Switch and the relay.