Technical Article

LevNet RF™ Receiving and Sending Switch Radio Packets with the RS-232 Serial Box

Product: LevNet RF™ Energy Harvesting with Wireless Protocol Solutions (RS-232 Serial Box) **Article ID:** 09202012-JE/TB-01

Date: September 20, 2012

Summary: This article describes how to interpret a switch radio packet received over an RS-232 serial box, and how to construct and transmit switch radio packets over the serial box.

Information:

Description—Interpreting:

See the Instruction Sheet for the RS-232 Serial Box (WS0RF-300) for information on capturing radio packets from a LevNet RF switch.

A wireless switch packet can be identified by the ORG byte. For a wireless switch, this byte is always 0x 05. A switch radio packet will have 14 bytes, for example:

0x A5 5A 0B 05 10 00 00 00 00 10 2C 6E 30 FA

Understanding wireless switches: LevNet RF energy harvesting switches have 4 possible buttons that can be held down. The names of these buttons are AI, AO, BI, and BO. In America the “I” buttons are the top of the switch and the “O” buttons are the bottom of the switch. “A” and “B” correspond to two separate channels that can exist on the same switch. For each of the four buttons, the radio packet also indicates whether the switch was pressed or released.

For wireless switches, the only information in the data bytes is contained in Data Byte 3 (the byte just after the ORG byte). In the example packet above, the numbers show that there was a press and the AI button was held down. There are several combinations of button presses are releases outlined by the EEP. Some of the basics are:

0x 10 – AI (ON) press
0x 30 – AO (OFF) press
0x 00 – release

Notice the release is typically the same regardless which button is pressed. When releasing the switch the button is no longer pressed, thus a “no button” release is sent.

The ID bytes identify which switch the transmission is coming from. Each radio module has a unique 32 bit (4 byte) ID. The ID for the example packet shown above is 0x 00 10 2C 6E. The ID can use used to filter out packets from transmitter that don't need to be monitored.

Description—Transmitting:

The first step of transmitting is constructing the desired packet to send. For this application note, a rocker switch will be simulated where pressing the top of the rocker would turn the lights on, and pressing the button of the rocker will turn the lights off.

For a physical switch, there needs to be both a press and a release. However, when using rocker mode with an LevNet RF enabled receiver, the receiver only responds to the press packet. Because of this, a release packet is not required to be sent for this application. Thus, the data that needs to be sent for an ON signal is 0x 10, and the data for an OFF signal is 0x 30.

Leviton Mfg. Co., Inc. Lighting & Energy Solutions
20497 SW Teton Avenue, Tualatin, OR 97062 1-800-736-6682 Tech Line: 1-800-959-6004 Fax: 503-404-5594 www.leviton.com/les

In a typical LevNet RF transmitter, the LevNet RF firmware will only transmit a packet with the single ID of the module. The Serial Box can transmit 128 selectable IDs, so that it can act like 128 independent transmitters.

The valid ID range is 0x FF FF 00 00 to 0x FF FF 00 7F. For this application note, the ID 0x FF FF 00 00 will be used.

By following the description of the ESP2 radio packet outlined in the RS-232 Serial Box Instruction Sheet, the following radio packets are constructed.
The ON packet is 0x A5 5A 0B 05 10 00 00 00 FF FF 00 00 30 4E.
The OFF packet is 0x A5 5A 0B 05 30 00 00 00 FF FF 00 00 30 6E.

In the program XVI32 (or other hex editor program) type in the bytes for the ON packet as shown in Figure 1. Then save this to a Text file with a useful name such as “switch on.txt”. Then do the same for the OFF packet and save it under a name such as “switch off.txt”.

In HyperTerminal select Transfer->Send Text File (see Figure 2). Select the file which will be sent to the RS-232 Serial Box. By opening the file “switch on.txt” the ON packet will be sent, and by opening the file “switch off.txt” the OFF packet will be sent.

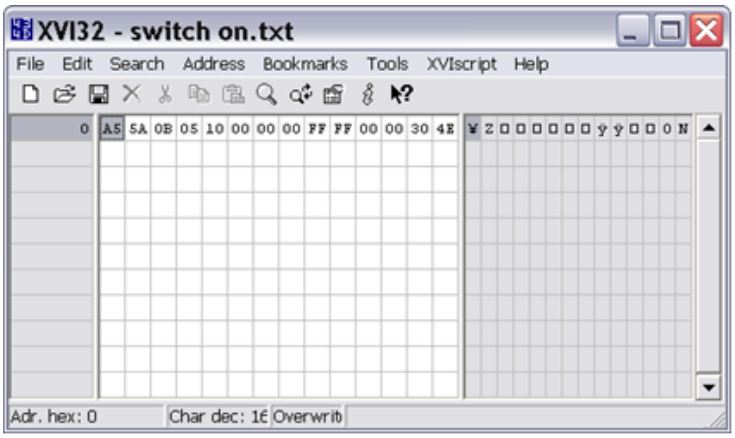

Figure 1

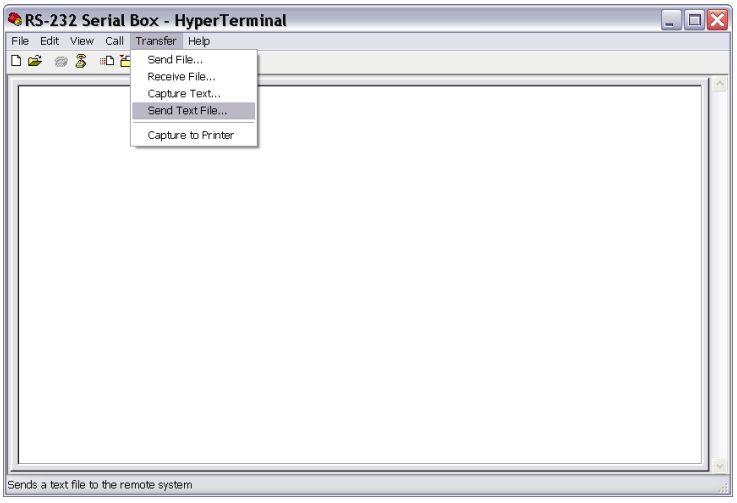

Figure 2

Contact: If you have any questions or concerns, please call LES technical support at (800) 959-6004.

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