Virtual Integrated Design

Getting started with RS232HCT v1.0

1 – The Main Window:

- The main window of RS232HCT can look differently depending on the size of the window and the data loaded but generally looks like the window below.

Main Menu	Open/Close Port Button	Port Setup Button	Run Script Button

RS232HCT, v1.0

File   Edit   Setup   Options   Help

Close Port | Click to Transmit Button

Transmit Hex

F1,76,05,00,00,00,00,55,86,00,00,30

Transmit Window

Click Labels to Change Mode Between Hex and Ascii, Independently.

Open Valve One :F4,76,54,00,00,45,AA,33,32,31,00,00,11
Close Valve One :F4,76,54,00,00,45,AA,23,22,21,00,00,10
Rotate Motor 5 Degrees :F1,76,05,00,00,00,00,55,86,00,00,30
Open Slide Gate :F2,88,00,00,92,AA,10,11,12,00,FF

Receive Hex

Quick Click Window. Double Click Any Line to Transmit the Line.

TX>F47654000045AA333231000011<TX
F47654000045AA333231000011
F17605000000005586000030
F288000092AA10111200FF
F47654000045AA333231000011
F47654000045AA232221000010
F17605000000005586000030
F288000092AA10111200FF
F17605000000005586000030
F47654000045AA333231000011
F47654000045AA232221000010
F17605000000005586000030
F288000092AA10111200FF
F17605000000005586000030

Click and Drag to Change the Size Between the Quick Click Window and the Receive Window.

Scroll Bars Appear When Data Exceeds Window.

Many Right Click Menu Options.

Receive Window

C:\Program Files\Virtual Integrated Design\RS232HCT v1.0\demo.scp

Script Status

Port Status

COM3 Open	19200, None, 8, 1, None	Interval = 100ms	PIC18F252

- The main window is designed to offer a fast and easy interface to transmit and receive RS232 data. The notes around the window show the main features of the interface.

- Enter the data for transmitting in several ways. Type data into the transmit window, paste the data from the clipboard, select it from the script pull down window or load it into the quick click window. Quick click data can be entered into the window by pasting from the clipboard or loading a text file into the window (file menu or right click menu).

- Transmitting also has several methods. To transmit data in the transmit window hit the enter key, click the transmit button, or transmit as the keys are pressed (when "transmit on key" is selected in the Options>TX menu). To select and easily transmit data from the quick click window, simply double click the item in the window.

- View data in either ASCII or hex format in the receive window. In ASCII mode, non-ascii data can be shown as a selectable character or as a hex value in a variety of formats. An "Echo" function (if selected) shows data that is sent for transmission feedback.

2 – The Port Setup Window:

- The port setup window, as its name implies, is how RS232HCT opens the chosen port. The window is shown below.
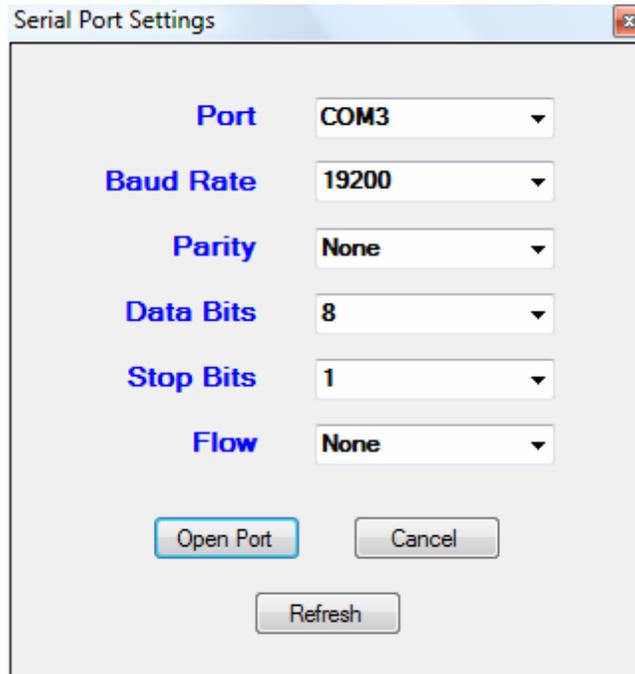

- The window is opened by clicking the port setup button on the main window, clicking the Setup>Port Setup menu item or pressing the F1 key.

- The "Port" combo box is loaded with a list of all ports that are recognized by windows.

- The button on the lower left shows "Open Port" when the port is closed and "Close Port" when the port is open.

- The baud rate can either be selected from the available options or manually entered into the "Baud Rate" combo box. Baud rates from 1 to 1000000 can be entered and set providing the hardware is capable of the speed.

- Parity can be none, odd, even, mark or space.

- Data bits can be 7 or 8.

- Set Stop bits to 1 or 2.

- Lastly, Flow can be set to None, Xon/Xoff, Hardware or both Xon/Xoff and Hardware. Hardware handshaking can not be used at the same time as the DTR and RTS control line set and clear functions on the Advanced>Port menu.
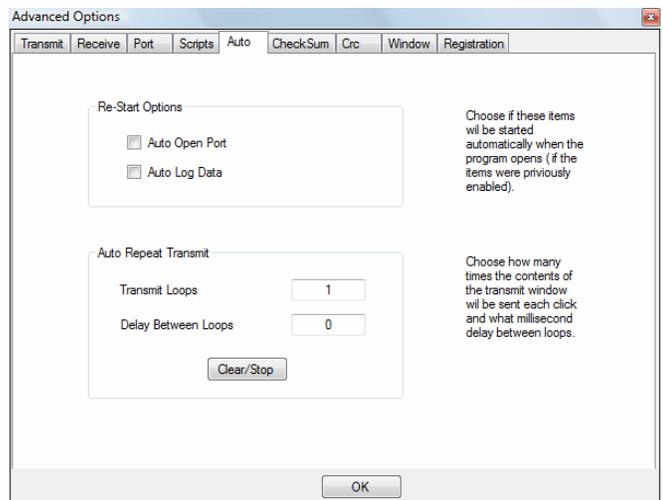
3 – The Advanced Window:

- The "Transmit" tab of the "Advanced" options menu can cause data to be inserted before the transmit text (string) or at the end of the string.

- There also is an option to insert a delay, in milliseconds between transmitted bytes.
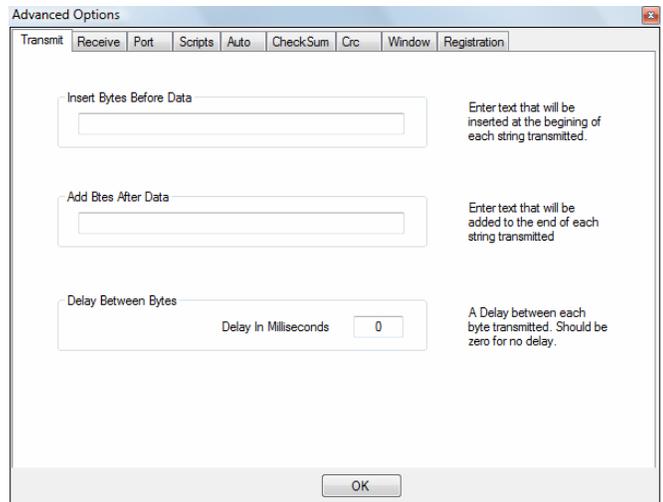
- The "Receive" tab allows adjustment of how the data is represented in the receive window.

- When in ASCII receive mode non-ascii data (such as carriage returns 0x0D) can be viewed as hex bytes in a variety of formats. Non-ascii data can also be viewed with substitute characters.

- "Break Byte" will start a new line in the receive window every time the specified byte is received.

- "Add New Line" will start a new line in the receive window each time the "Time Interval" from the main menu has expired if new data is available.
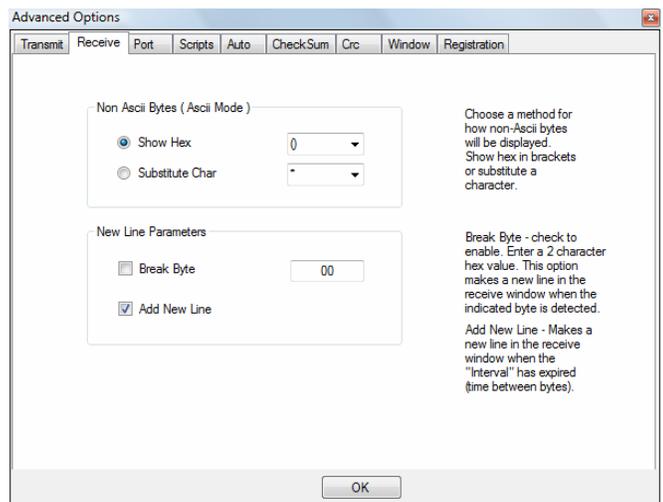
- The "Auto" tab sets selections to happen automatically in the program.

- "Auto Open Port" will open the port automatically if it was open when RS232HCT was shut down last.

- "Auto Repeat Transmit" will send the data in the transmit window the number of times indicated in the "Transmit Loops" box with the indicated delay between each string transmitted.

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3 – The Advanced Window (continued):

- Use the "Port" tab to change the state of the DTR and RTS data lines of the RS232 port. This is useful to power a small circuit from these lines.

- Changing the states of the DTR and RTS lines will only work when the port flow control is set to "None".
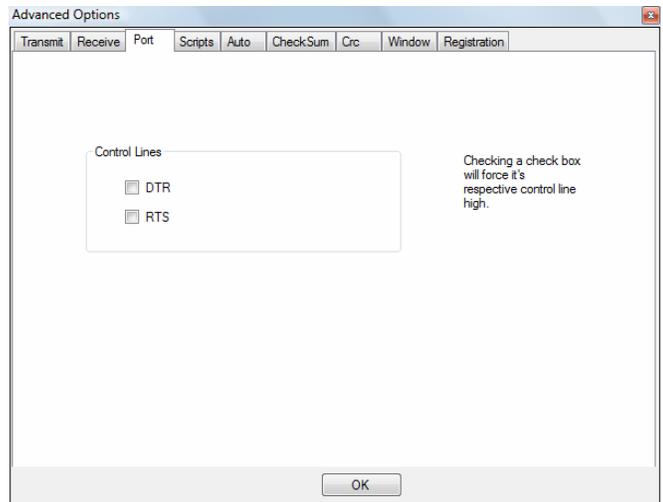
- The "Scripts" tab is a page that helps generate script file entries and sets parameters.

- Scripts are a list of three line groups that have the information to transmit a line of data. The three line group has <u>data</u>, <u>delay</u> and <u>wait string</u> lines (in that order).

  <u>Data</u> – characters or bytes to transmit. A comment can proceed the data with a "Line Character" between.

  <u>Delay</u> – in seconds before next group. Should be 0 for no delay.

  <u>Wait String</u> – waits for the data on the line to be received or exits the script run with error if the wait time is exceeded. Leave this line blank with carriage return if no data waiting is required.

- Edit the script file entry in the window and click the "Copy Entry To Clipboard" button.

- The "Open Script" button will open a blank Notebook page to start writing a script on.

- The "Wait Timeout " (in seconds) is used when a script is "Run" from the main window. When data is present on line 3 of a script entry, RS232HCT will wait for the "Wait Timeout" value and if no data is received that matches the data in line 3, will timeout and exit the script and show an error. If the data is received the script will run to the next line.

- The "Line Character" is a single Ascii character that separates the comment data and the transmit data in the first line of the entry.

  NOTE: The "Line Character" is also used to separate the comment and transmit data in the Quick Click window.

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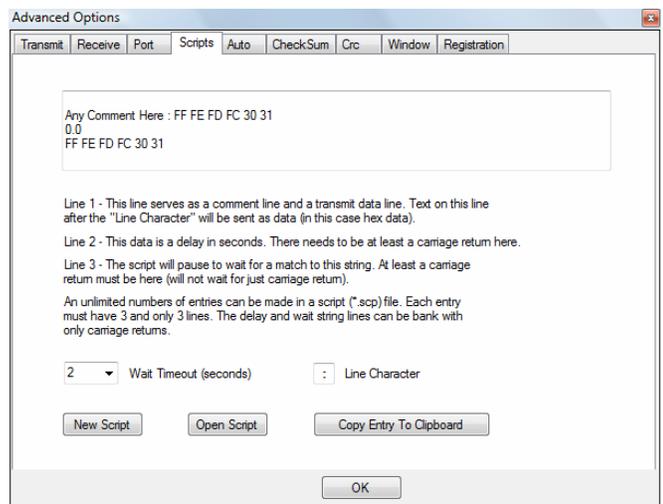
3 – The Advanced Window (continued):

- The "Checksum" tab shows the options to select and test checksums.

- Select a non-inverted, 1's complement or 2's complement checksum and 1 or 2 bytes.

- Enter data in the test window and click the "Calculate" button to view the result.

- The options selected here will determine how a checksum will be added to the transmitted data. The index value determines the first byte of the string that will be used (zero based index).

- The "Modbus CRC" tab will allow us to add a 16-bit, 2 byte, low byte / high byte CRC value to the end of each transmitted string.

- The calculation can be checked the same as the checksum above.

- Omega, Inc. RS232 devices use this CRC calculation as well as many industrial RS232 devices.

- MODBUS is a trademark of Modicon, Inc., Industrial Automation Systems.

- The "Window" tab shows the "Stay On Top" function. If the check box is checked the RS232 main window will stay on top of all other windows.
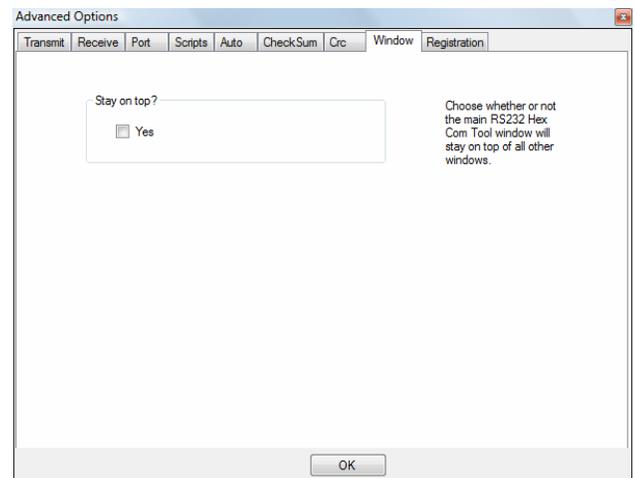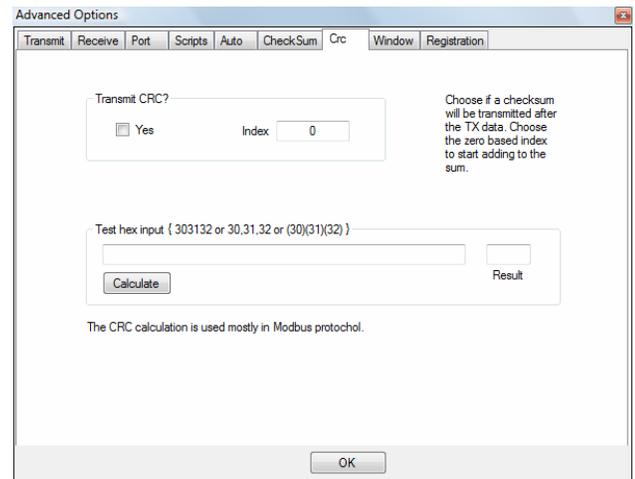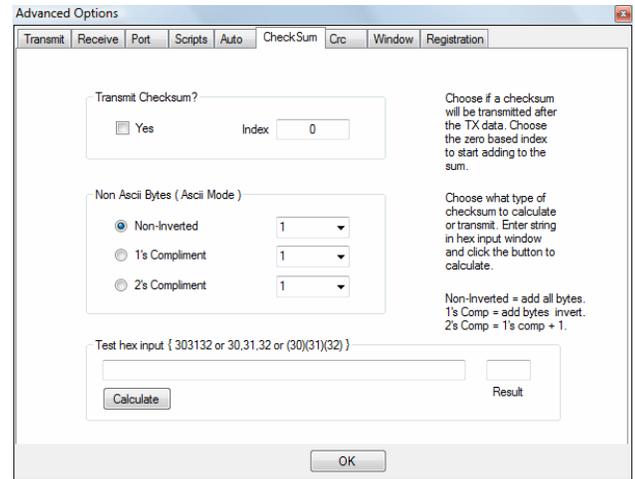
4 – The Quick Click Window:

- The Quick Click window from the previous picture looks like this:

```
Open Valve One :F4,76,54,00,00,45,AA,33,32,31,00,00,11
Close Valve One :F4,76,54,00,00,45,AA,23,22,21,00,00,10
Rotate Motor 5 Degrees :F1,76,05,00,00,00,00,55,86,00,00,30
Open Slide Gate :F2,88,00,00,92,AA,10,11,12,00,FF
```

- In this case, the Quick Click window is loaded with four lines that have descriptive comments before the actual data. The data is proceeded with a "Line Character" that is specified on the "Scripts" tab of the "Advanced" menu. The default value is a colon ":".

- Data can be opened in the Quick Click window from a file or pasted into the window from the clipboard.

- The data that is in the window just fills the window but does not exceed the window size. If one or more lines were added, a vertical scroll bar would appear on the right side of the window.

- A helpful option of the program is the splitter control at the bottom of the Quick Click window. The window can be made bigger (and the receive window made smaller) by clicking and dragging the splitter down until the desired size is reached.

5 – Communicating with a Device:

To communicate with an RS232 device:

- Determine the port setup parameters and enter them in the "Port Setup" window (port, baud rate, parity, data bits, stop bits and flow control).

- Determine if ASCII data or hex data (binary) will be sent. Clicking on the transmit and receive labels will change the state. Normally both labels should match modes (both transmit or both receive) but there are occasions were they might need to be set opposite of each other.

- Determine how received data will be formatted. Should there be commas or spaces between the received bytes? A new line will be set in the receive window when the "Time Interval" elapses (if data is available). The interval can be set from 10ms to 1000ms in seven increments. The "Time Interval" can be found under Options>Rx>Time Interval on the main menu.

- If each return string will be different but each string will have a carriage return the Advanced>Receive page "Break Byte" can be set to 0D (the hex value for carriage return). If the "Break Byte" is used, un-check the "Add New Line" checkbox on the Advanced>Receive page.

- If received ASCII data will have some non-ascii bytes such as 0x0D(carriage return), the non-ascii bytes can be shown with parenthesis, brackets or a substitute character. These parameters are also set on the Advanced>Receive page.

5 – Communicating with a Device (continued):

- The Advanced>Window page has a option to make the RS232 Hex Com Tool window always available, just check the "Stay On Top" check box on the page.

- Add a name to the window on the status bar by entering the name (i.e. 18F252) and double click the status bar. The name will be transferred to the farthest right status box. [1]

- If there will be several strings sent, make a text file in notepad or other text editor. Enter each string on a separate line. Put comments at the beginning of each line separated from the data by colons or what ever the "Line Character" option on the "Advanced" page is set to. Save the file. Load the file into the quick click window in the "File" menu. [1]

- To transmit any of the strings in the quick click window just double click the string. [1]

- Save the setup to a device profile (*.pfl) in Setup>Export Pfl. The default name will be the window name entered earlier. [1]

- Open the port and begin (or just click the transmit arrow and the port will be open automatically).

[1] These options are not required but will help make repetitive tasks with the same devices much easier.