Windfreak SynthUSBii Serial Communications

This information is preliminary 7/2013

Talking to the SynthUSBii unit is done through USB via a virtual serial / com port. The drivers supplied by WFT must be installed on your PC before communication can happen. After plugging in the hardware the com port will need to be identified, then used for any subsequent communication.

The SynthUSBii comes with software that uses these commands to easily control and program the device through its intuitive GUI, but some advanced users may want to make their own software and/or run on a different OS than Windows. These commands can be tested through serial communications terminals such as this free program: https://sites.google.com/site/terminalbpp/ for Windows and other possible solutions for Linux and OSX.

The first character of any communication to the SynthUSBii unit is the command. (It is case sensitive.) What this character tells the unit to do is detailed below. Ideally a "package" is sent all at once. For example a communication for programming the frequency of the LO to 1GHz would be sent as "f1000.0" (without the quotes).

For commands that return information from the SynthUSBii unit, such as reading the firmware version, it is advisable to send the command and then read the bytes returned fairly quickly to get them out of the USB buffer in your PC.

f) RF Frequency Now (MHz) 1000.000
o) set RF On(1) or Off(0) 1
h) set RF High(1) or Low(0) Power 1
a) set RF Power (0=mimimum, 3=maximum) 3
v) show firmware version
e) write all settings to eeprom
x) set internal reference (external=0 / internal=1) 1
l) set lower frequency for sweep (MHz) 995.000
u) set upper frequency for sweep (Mhz) 1005.000
s) set step size for sweep (MHz) 2.500
t) set step time is 0.300 ms
g) run sweep (on=1 / off=0) 0
c) set continuous sweep mode 0
P) Pulse On time is 1 ms
O) Pulse Off time is 1 ms
j) continuous pulse mode 0
p) get phase lock status (lock=1 / unlock=0) 1
H0) PLL Register 0 3E80000

H1) PLL Register 1 8008FA1
H2) PLL Register 2 18015E42
H3) PLL Register 3 4B3
H4) PLL Register 4 A10424
H5) PLL Register 5 400005
+) Model Type
-) Serial Number 2
?) help

Please keep in mind that the device expects the format shown. For example if you send simply just an “f” the processor will sit there and wait for the rest of the data and may appear locked up. If you dont send the decimal point and at least one digit afterward, it will have unexpected results. Also, please send data without hidden characters such as a carriage return at the end.

Writing to the PLL registers H0 – H5 is not recommended. This is for experimental purposes only for very experienced PLL programmers. Changing these registers will negatively affect how the microcontroller automatically calculates them with the “f” command.

After programming a particular setting, you may enter “?” to get the above list returned to you. The numbers that follow each setting are the actual values programmed. You may also type the command and then a “?” to get a single value back. For example an “a?” as taken from the above set would return a value of 3. This value comes back with a /n termination character.

During development if the device seems to stop working properly, come back and always send a “?” and check all of the values carefully. For example, a value of “0” returned for x means the SynthUSBii is expecting an external reference and it has nothing to lock to.

Note: Changing the x value to 0 mutes the 10MHz crystal oscillator and make the SynthUSBii unable to phase lock. There are small vias on the PCB that will allow you to bring in your own 10MHz signal, but this is untested. Keep amplitude below 3.3Vpp. See schematic for details.