FMCW Radar Sensors

Example of using the 3-wire interface

Desired parameters :

Frequency Range : 9.5 ~ 10.5GHz
Frequency Step : max (guaranteed RS3400X/00)
Sweep Time : 10ms
Sweep Type : SAWTOOTH

Required 3-wire commands:

Given 10ms for a 1GHz sweep, a 5MHz step and a frequency idle time of 50 micro seconds is recommended. This will generate 201 frequency points (accounting for start and stop). The complete sweep time will then be 10.05 ms.

Communication with the FMCW module uses the MicroWire protocol, using Clock, Data and Latch Enable (LE) signals. Data is sent in 32bit words, MSB first. Data is clocked on rising edge of Clock. The word is latched with a high pulse of LE (the LE pin should be held low during data transfer). The LE pulse should be a minimum of 3 ms during the boot sequence and a minimum of 50 ns during frequency setting.

The boot sequence would be as follows (please remember the 3ms latch length):

0x0000 0004
0x0000 4003
0x0540 fffa
 0x1868 2aa8

Thereafter, frequency is programmed with a word defined as:

0x1800 0000 + N*8

where N is an integer and N*11718.75 defines the output frequency in Hz. The last line of the boot sequence programs the frequency of 9,999 996 093.75 Hz, the closes frequency to 10.0 GHz pos-

sible. Programming 9.5GHz would send the word 0x1862 f550 and programming 10.5GHz would send the word 0x186d 6000.

For direct control of the module, along with IF output logging, LabVIEW software may be helpful, using some type of PC interface for the 3 wire / SPI protocol. National Instruments, for example, produces a USB compatible module (NI USB-8451) allowing for easier interfacing, control and programming between the PC and SPI devices.

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