

NOVATECH INSTRUMENTS, INC

INSTRUCTION MANUAL

SOF8

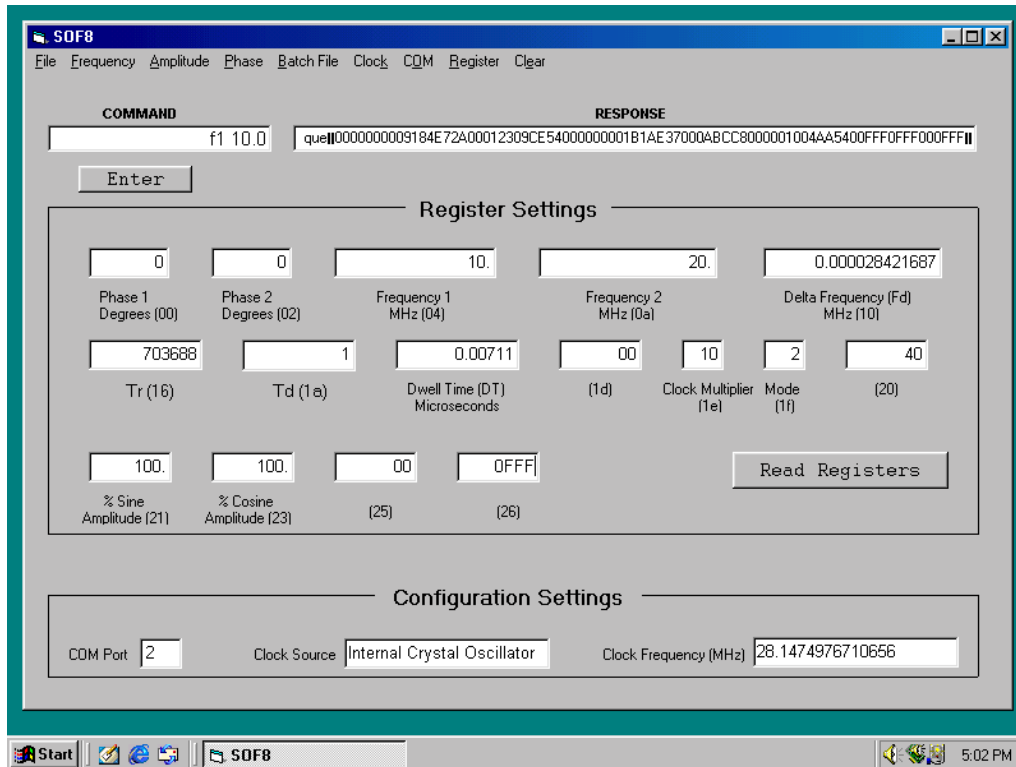


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1.0 Description

1.1 The SOF8 program enables you to program selected Novatech Instruments, Inc. signal generators over a serial interface using drop down menu selections. It also helps users of the signal generator parallel interface since it displays signal generator internal register settings such as the frequency, phase, amplitude, clock multiplier etc. It provides a fast way to learn about many signal generator commands, since the menu selections will generate these commands and allow the user to view them as they are executed. A batch file feature is provided to allow you to execute a sequence of commands and program a time delay between the execution of the commands.

2.0 Installation

2.1 System Requirements. SOF8 was developed with Visual Basic 6. The provided CD contains both the source code and an executable application. SOF8 should run on most computers using the Windows 95® or later operating system.

2.2 Connection. Connect the signal generator to your computer and apply power to the signal generator. See the instructions in the signal generator hardware instruction manual when performing this connection. If you plan to use a USB to serial interface adapter, then install the adapter now using the installation instructions that came with the adapter.

2.3 Install NOVATECH INSTRUMENTS, INC. CD. Place the CD into your CD drive. Click on the Windows® start button and select run. Use the browse button to find the “SOF8 Install/setup.exe” file and then click the OK button. (*Note that there are two setup files on the CD. Do not use the setup file in the support folder.*) An install wizard will then step you through the process of installing the SOF8 program. If you are running Windows 95® you may have to run the setup wizard twice.

NOTE:

The SOF8 program is best viewed with at least an 800 x 600 pixel display setting.

2.4 Run the SOF8 program. Once the wizard has installed the SOF8 program, you must restart your computer. After restarting your computer, you run the SOF8 program by clicking on the Windows® start button and selecting Programs and then Novatech and then SOF8.

2.5 Configure the Communications (COM) port. The first time you run the SOF8 program it will ask you to enter your COM port number and then it will save this number to the disk file named “DDS8mCom.txt”. No other user entered communication settings are needed. The SOF8 program is factory configured to run at 19,200 baud, no parity, 8 data bits and 1 stop bit. The Novatech Instruments, Inc. signal generator is factory configured with these same settings. The SOF8 program provides a COM menu that allows you to change your COM port setting. If you have Windows 98®, you can check your computer’s COM port configuration by going to the Start button and selecting Settings then Control Panel then System and then the Device Manager tab. The COM port configuration can be determined in other versions of Windows® in a similar manner.

2.6 Configure the Clock Source. Novatech Instruments, Inc. signal generators can be configured to use their internal crystal oscillator as the clock source or an external input as the clock source. The generators are shipped from the factory configured to use the internal crystal oscillator and the SOF8 program starts up configured for using the internal crystal oscillator. If you have changed the factory configuration to external clock, then you must go to the SOF8 program clock menu and select external.

3.0 Display Fields and Buttons

3.1 Command Field. The command text field is used to send any valid command to a compatible signal generator. To send a command, type the command in the command field and then hit the return

key or click on the enter button. The generator hardware manual contains a complete list of the valid commands.

3.2 Response Field. The response text field will display responses received from the signal generator. The signal generator always returns an OK after receiving a valid command. If echo is on (this is the default) then the generator will return both an echo of the command and OK. Two vertical lines will also appear and indicate carriage return and line feed. Some menu selections, such as triangle (mode 2) from the frequency menu, will result in more than one command being sent to the generator and the response text field will display multiple returned values. If an invalid command is sent, then a “?” and an error number will be returned. A message box will display the meaning of the “?” error number. The “?” error number is also explained in the signal generator hardware manual. If a que command is sent to the generator, then the generator will return 80 hex characters that indicate the value of internal register settings and these settings will be displayed in the response text field.

3.3 Read Registers Button. When the read register button is clicked, a que command is sent to the signal generator and 80 hex characters are returned. These 80 hex characters are decoded and displayed in the register settings fields. The 80 hex characters describe the status of the internal registers and, as a default, are displayed in engineering units. They can also be displayed as hex values by going to the register menu and selecting display register settings in hex.

3.4 Register Settings Display Section. The register settings text fields store the decoded values returned by the signal generator after you click on the read registers button. Most register fields are labeled with engineering units. All are also labeled with a hex number. The hex number label refers to the address of the hex status response as described in the generator hardware instruction manual. The SOF8 program converts the status response numbers to engineering units where applicable. They can also be displayed as

raw hex values by going to the register menu and selecting display register settings in hex. The register fields cannot be edited.

3.4.1 Phase 1 Register. This text field contains the phase setting for phase P1. The phase can be set from 0 to 16,383. When displayed in engineering units, the phase is shown in units of degrees and is computed using the equation $(n/16384)(360)$ where n is the P1 hex status response returned by the signal generator. The P1 hex status response is found at hex addresses 00 to 01.

3.4.2 Phase 2 Register. This text field contains the phase setting for phase P2. The phase can be set from 0 to 16,383. When displayed in engineering units, the phase is shown in units of degrees and is computed using the equation $(n/16384)(360)$ where n is the P2 hex status response returned by the signal generator. The P2 hex status response is found at hex addresses 02 to 03.

3.4.3 Frequency 1 Register. This text field contains the frequency setting for frequency F0 and F1. The engineering units displayed are in Megahertz. The frequency can be set with 48-bits of resolution. (This is 10^{-12} MHz of resolution.) When the frequency is displayed in engineering units and the clock source is external or the clock multiplier has been changed from the default value of ten, then the frequency will be scaled to provide the correct decimal output values. The scaling equation is:

$$F_{out} = (F_c)(F_{clk})(CM)/(28.147497671065)(10)$$

Where: F_{out} = Frequency Output
 F_c = Frequency Command
 F_{clk} = Clock Frequency
 CM = Clock Multiplier

The F0 and F1 register values are found in the hex response at hex addresses 04 to 09.

3.4.4 Frequency 2 Register. This text field contains the frequency setting for frequency F2. The engineering units displayed are in Megahertz. The frequency can be set with 48-bits of resolution. (This is 10^{-12} MHz of resolution.) When the frequency is

displayed in engineering units and the clock source is external or the clock multiplier has been changed from the default value of ten, then the frequency will be scaled to provide the correct decimal output values. The scaling equation is:

$$F_o = (F_c)(F_{clk})(CM)/(28.147497671065)(10)$$

Where: F_o = Frequency Output
 F_c = Frequency Command
 F_{clk} = Clock Frequency
 CM = Clock Multiplier

The F2 register values are found in the hex response at hex addresses 0a to 0f.

3.4.5 Delta Frequency Register. This text field contains the frequency setting for delta frequency F_d . The engineering units displayed are in Megahertz. The delta frequency can be set with 48-bits of resolution. (This is 10^{-12} MHz of resolution.) When the frequency is displayed in engineering units and the clock source is external or the clock multiplier has been changed from the default value of ten, then the frequency will be scaled to provide the correct decimal output values. The scaling equation is:

$$F_{out} = (F_c)(F_{clk})(CM)/(28.147497671065)(10)$$

Where: F_{out} = Frequency Output
 F_c = Frequency Command
 F_{clk} = Clock Frequency
 CM = Clock Multiplier

The F_d register values are found in the hex response at hex addresses 10 to 15.

3.4.6 Tr Register (also called Update Clock). This text field contains the register value that is used in triangle frequency (mode 2) and sawtooth frequency (mode 3) waveform operations. When displayed in engineering units, the hex values are converted to decimal numbers from 5 to 4,294,967,295. T_r is associated with a timing pulse in mode 2 and the repeat time of the waveform in mode 3. The T_r register values are found in the hex response at hex addresses 16 to 19.

3.4.7 Td Register (also called Ramp Rate Clock). This text field contains the register value that determines the rate at which the frequency changes in triangle frequency (mode 2) and sawtooth frequency (mode 3) waveform operations. When displayed in engineering units, the hex values are converted to decimal numbers from 0 to 1,048,575. The T_d register values are found in the hex response at hex addresses 1a to 1c.

3.4.7 Dwell Time. The dwell time text field displays the time delay at each frequency step in triangle frequency (mode 2) and sawtooth frequency (mode 3) waveform operations. There is no signal generator register value for dwell time since it is computed using the status register values in T_d and clock multiplier and also the value in the clock source text field. The computation of the dwell time is described in paragraphs 4.2.2 and 4.2.3.

3.4.8 Register 1d. This register has no engineering units and contains two hex digits. The meaning of the hex digits is described in the signal generator hardware manual.

3.4.9 Clock Multiplier Register. This register is two hex digits long and is described in the signal generator hardware manual. When displayed in hex, the meaning is interpreted by looking at each binary bit in the two hex digits. When displayed in engineering units, the hex values are used with a lookup table to display the setting of the clock multiplier. The clock multiplier register values are found at hex address 1e.

3.4.10 Mode Register. This text field is two hex digits long and is described in the signal generator hardware manual. When displayed in hex, the meaning is interpreted by looking at each binary bit in the two hex digits. When displayed in engineering units, the hex values are used with a lookup table to display the Frequency mode settings. The mode register values are found at hex address 1f.

3.4.11 Register 20. This register has no engineering units and contains two hex digits. The meaning of the hex digits is described in the signal generator hardware manual.

3.4.12 % Sine Amplitude Register (also called Output Shape Key #1). This field contains the sine (I channel) amplitude setting. The value in this register is stored inside the signal generator as a number from 0(off) to 4095. When displayed in engineering units, this number is scaled to display in percent of amplitude using the equation $(n/4095)(100)$, where n is the decimal value of the number in the signal generator hardware register. The % Sine Amplitude register values are found at hex addresses 21 to 22.

3.4.12 % Cosine Amplitude Register (also called Output Shape Key #2). This field contains the cosine (Q channel) amplitude setting. The value in this register is stored in inside the signal generator as a number from 0(off) to 4095. When displayed in engineering units, this number is scaled to display in percent of amplitude using the equation $(n/4095)(100)$, where n is the decimal value of the number in the signal generator hardware register. The % Cosine amplitude register values are found at hex addresses 23 to 24.

3.4.13 Register 25. This register has no engineering units and contains two hex digits. The meaning of the hex digits is described in the signal generator hardware manual.

3.4.14 Register 26. This register has no engineering units and contains four hex digits. The meaning of the hex digits is described in the signal generator hardware manual.

3.5 Configuration Settings Display Section. The configuration settings text fields display values for settings of your computer and your signal generator hardware. You should verify that the values in these fields are correct. You cannot edit these fields. You change them by using the appropriate pull down menu.

3.5.1 COM Port Field. The COM port text field displays the serial communications (COM) port number that the SOF8 program is trying to use. This number must agree with the actual COM port number that your computer has connected to the signal generator hardware. Use the COM menu to change

the value in this field.

3.5.2 Clock Source Field. The clock source text field displays the source, either internal or external, that the SOF8 program assumes is set on your signal generator hardware. This field defaults to internal crystal oscillator. Use the clock menu to change the value in this field.

3.5.3 Clock Frequency (MHz) field. The clock frequency text field displays the value of the signal generator clock that is being used. This field defaults to 28.1474976710656. This is the internal clock frequency set at the factory. Use the clock menu to change the value in this field if needed to make it agree with the actual clock frequency of the signal generator.

4.0 Menus

4.1 File Menu

4.1.1 Copy Registers to Clipboard. Selecting copy registers to clipboard from the file menu will copy all register values from the register settings section into the clipboard. They can then be pasted in a text editor or word processor to provide a permanent record of the settings.

4.1.2 Save Registers to EEPROM. Selecting save registers to EEPROM from the file menu will cause the signal generator to save the current settings of all the signal generator registers into EEPROM. These settings will then be used as the default after the signal generator is powered up or reset.

4.1.3 Exit. Selecting exit from the file menu causes the SOF8 program to quit.

4.2 Frequency Menu

NOTE

If you are using an external clock source or have set the clock multiplier to a value other than 10, you may notice that the frequency command is different than the output frequency. The scale factor needed to reconcile these numbers is described in sections 3.4.3, 3.4.4 and 3.4.5.

4.2.1 Single Tone (Mode 0). Selecting single tone (mode 0) from the frequency menu will display an input box where you can enter a desired frequency in Megahertz from 0.010 MHz to 100 MHz. Click OK and the frequency command and mode command will be sent to the signal generator and displayed in the response text field. The signal generator will immediately begin generating the commanded frequency.

4.2.2 FSK (Mode 1). Selecting FSK (mode 1) from the frequency menu will display an input box that asks you to enter F1 and then a second input box that asks you to enter F2. After clicking OK in the second input box, both frequencies and the mode 2 command will be sent to the signal generator and also displayed in the response text field. The signal generator will immediately begin generating frequency F1. You can then rapidly switch the output between F1 and F2 by using a gate input to the signal generator.

4.2.3 Triangle (Mode 2). Selecting triangle (mode 2) from the frequency menu will display an input form that enables you to enter parameters to generate a triangle waveform. Enter your desired values for the parameters F1, F2 and Repeat Time (RT) in the fields provided. Click the enter button once you have completed all entries.

Because this is a digital system, there are a discrete number of frequency and time steps available. After the enter button has been clicked, the SOF8 program will check the RT value you entered and suggest changes if your entry does not result in an integral number of clock steps. Verify that the change is acceptable and again click the enter button.

The appropriate commands will now be displayed in the computation results text field. If you are satisfied with the list of commands, click OK and the commands will be sent. The response will be displayed in the response text field. If echo is enabled (the default) then you will see the echoed commands in the response text field.

The triangle waveform will start immediately. This waveform will be repeated continuously until a new command(s) is sent. See Figure 1 for a visual representation of the waveform.

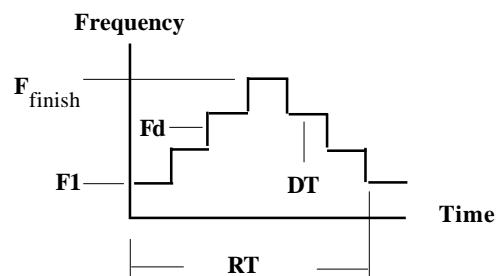


Figure 1: Triangle Waveform (Mode 2)

In Figure 1 the following equations apply:

$$DT = (Td + 1)/(Fclk)(Kp)$$
$$N = RT/(2)(DT) = (F2-F1)/Fd$$
$$Tr = N(Td + 1)$$

Where:

DT = Dwell time in seconds

Td = Signal generator command that determines the number of clock cycles per step. Td can be an integer between 0 and 1,048,575.

Fclk = The clock frequency in Hz
($2^{48} = 28,147,497.6710656$ Hz for the default internal crystal oscillator)

Kp = Clock Multiplier. Must be an integer. Factory default is 10.

RT = Repeat Time in seconds

N = Number of frequency steps from F1 to F2. Must be an integer.

F1, F2 = Frequency in MHz

Fd = Frequency step size in MHz. Can be as small as 10^{-12} Hz.

Tr = $N(Td + 1)$

4.2.3.1 Mode 2 Sync Pulse. In mode 2 a timing sync pulse is generated at the end of each triangle waveform to enable the waveform to be synchronized with external devices. The location of this pulse is determined by the value of register Tr. In order for the sync pulse to remain synchronous with the waveform, it is necessary that Tr be an integer value. Note that Tr is only used in this way in mode 2 and is either not used or is used differently in other modes.

4.2.3.2 Triangle (Mode 2) Example. Assume your desired settings are F1 = 1 MHz, F2 = 51 MHz and RT = 2 Milliseconds and assume you are using the internal clock with Kp = 10. Also, note that the SOF8 program sets Td = 0 in mode 2. This is an arbitrary setting to simplify the computations. Then, using the equations from Figure 1 we get:

$$N = RT/(2)(DT)$$

$$N = (2)(0.001)(28,147,497.6710656)(10)/2$$

$$N = 281474.976710657$$

Since N must be an integer, the SOF8 program will round this to N = 281475 and then use 281475 to compute a revised value of 2.00000017 Milliseconds for RT.

The remaining parameters are found as follows:

$$Fd = (F2 - F1)/N = 0.000177635669$$

$$Tr = N(Td + 1) = N = 281575$$

Verify that this is correct by selecting triangle (mode 2) from the frequency menu and entering F1 = 1 MHz, F2 = 51 MHz and RT = 2 milliseconds and click the Enter and then the OK button. Observe that the SOF8 program displays the commands computed above.

4.2.4 Sawtooth (Mode 3). Selecting sawtooth (mode 3) from the frequency menu will display an input form that enables you to generate a sawtooth waveform. Enter your desired values for F1, F_{finish} and Repeat Time (RT) and then click the enter button. The SOF8 program will check the Repeat Time you entered and may change it if your entry does not represent an integral number of clock cycles. Verify

that the change is acceptable and again click the enter button.

The appropriate commands will now be displayed in the computation results text field. If you are satisfied with the list of commands, click OK and the commands will be sent. The response will be displayed in the response text field. If echo is enabled (the default) then the echoed commands and “OK” will appear. If echo is disabled then only “OK” will appear.

The sawtooth waveform will immediately begin. This waveform will be repeated continuously until a new command(s) is sent. See Figure 2 below for a visual representation.

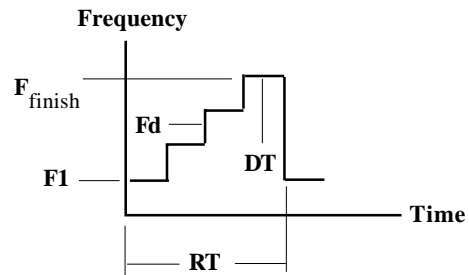


Figure 2: Sawtooth Waveform

In Figure 2 the following equations apply:

$$RT = (2)(Tr + 1)/(Fclk)(Kp)$$

$$DT = (Td + 1)/(Fclk)(Kp)$$

$$N = (2)(Tr + 1)/(Td + 1) - 1$$

$$F_{finish} = F1 + (Fd)(N)$$

Where:

DT = Dwell time in seconds

Td = Determines the number of clock cycles per step. Must be an integer between 0 and 1,048,575.

Fclk = The clock frequency in Hz
($2^{48} = 28,147,497.6710656$ Hz for the default internal crystal oscillator)

Kp = Clock multiplier. Must be an integer. Factory default is 10.

RT = Repeat Time in seconds

Tr = Determines the Repeat Time (RT). Must be an integer between 5 and 4,294,967,295.

$F1, F_{\text{finish}}$ = Frequency in MHz

Fd = Frequency step size in MHz. Can be as small as 10^{-12} Hz.

N = The number of frequency steps. Must be an integer.

4.2.4.1 Mode 3 Sync Pulse. A sync pulse is provided to enable the ramped frequency sawtooth waveform to be synchronized with external devices. The value $(Tr)(DT)$ determines the location of the Sync pulse on the time axis.

4.2.4.2 Mode 3 Example. Assume you desire to set $F1 = 1.0$ MHz, $F_{\text{finish}} = 6.0$ MHz and the Repeat Time $(RT) = 5$ Milliseconds. Also assume you are using the internal crystal oscillator and the default clock multiplier (Kp) of 10. To simplify the equations, the SOF8 program sets $Td = 1$ in mode 3. We first calculate the value of Tr needed to set $RT = 5$ Milliseconds using the equations in Figure 2 as follows:

$$Tr = (RT)(Fclk)(Kp)/2 - 1$$
$$Tr = (0.005)(28,147,497.6710656)(10)/2 - 1 = 703,686.44177664$$

Since Tr must be an integer, we round this to 703,686. Next we recalculate RT using the rounded value for Tr as follows:

$$RT = (2)(Tr + 1)/(Fclk)(Kp)$$
$$RT = 4.99999686 \times 10^{-3} \text{ Seconds}$$

This value for RT is the closest we can come to 5 Milliseconds. Finally we calculate the value for N and Fd as follows:

$$N = (2)(Tr + 1)/(Td + 1) - 1 = 703,686 \text{ Steps}$$
$$Fd = (F_{\text{finish}} - F1)/N = 0.000007105442 \text{ MHz}$$

Verify that this is correct by selecting sawtooth (mode 3) from the frequency menu and entering $F1 = 1$ MHz, $F_{\text{finish}} = 5$ MHz and $RT = 5$ milliseconds and click the Enter and then the OK button. Observe that the SOF8 program displays the commands computed above.

4.2.5 BPSK (Mode 4). Selecting BPSK (mode 4) from the frequency menu will display an input box that asks you to enter $F1$ and then a second input box that asks you to enter phase $P1$ and then a third input

box that will ask you to enter phase $P2$. After clicking OK in the third input box, the frequency, phase and mode 4 commands will be sent to the signal generator and also displayed in the response text field. The signal generator will immediately begin generating frequency $F1$. You can then rapidly switch the phase of $F1$ between phase $P1$ and phase $P2$ by setting a gate input on the signal generator low or high.

4.3 Amplitude Menu

4.3.1 Sine Amplitude. Selecting sine amplitude from the amplitude menu will display an input box that asks you to enter your desired amplitude for the I channel. The I channel is the same as the sine output channel. The amplitude is 12-bit programmable. You must enter an integer number between 0 and 4096. Entering 0 will turn off the output. Entering 4096 will command the signal generator to 100% output. Entering a number between 0 and 4095 will command the signal generator to scale the output by the ratio of the number entered divided by 4096. After clicking OK, the amplitude command will be sent to the signal generator and also displayed in the response text field.

4.3.2 Cosine Amplitude. Selecting Cosine amplitude from the amplitude menu will display an input box that asks you to enter your desired amplitude for the Q channel. The Q channel is the same as the cosine output channel. The amplitude is 12-bit programmable. You must enter an integer number between 0 and 4096. Entering 0 will turn off the output. Entering 4096 will command the signal generator to provide 100% output. Entering a number between 0 and 4095 will command the signal generator to scale the output by the ratio of the number entered divided by 4096. After clicking OK the amplitude command will be sent to the signal generator and also displayed in the response text field.

4.4 Phase Menu

4.4.1 P1 Output Phase. Selecting P1 Output Phase from the phase menu will display an input box that asks you to enter your desired phase for the P1 register. The phase is 14-bit programmable. You must enter an integer number between 0 and 16383.

Entering 0 will command the signal generator output to be 0 degrees phase. Entering a number between 1 and 16383 will command the signal generator to scale the P1 phase by the ratio of the number entered divided by 16384. After clicking OK the phase command will be sent to the signal generator and also displayed in the response text field.

4.4.2 P2 Output Phase. Selecting P2 output phase from the phase menu will display an input box that asks you to enter your desired phase for the P2 register. The phase is 14-bit programmable. You must enter an integer number between 0 and 16383. Entering 0 will command the signal generator output to be 0 degrees phase. Entering a number between 1 and 16383 will command the signal generator to scale the P2 phase by the ratio of the number entered divided by 16384. After clicking OK the phase command will be sent to the signal generator and also displayed in the response text field.

4.5 Batch File Menu

4.5.1 Batch File Menu. Selecting the batch file menu displays an input form that enables you to enter a sequence of commands and dwell times, save this sequence and run this sequence by sending the commands to the signal generator. When you save the command sequence it is stored in the disk file "CommandSequence.txt". The sequence of commands consists of any valid signal generator command. The valid signal generator commands are shown in the signal generator hardware manual. Each command must be on a separate line by itself. In addition to valid signal generator commands, you can also include comments and dwell times. Comment lines must start with the "#" character. Dwell times must appear on a line by themselves and start with the word "dwell" followed by a space and then the desired time in seconds. Dwell times must be integers, so the smallest dwell time setting available is 1 second. The batch file must end with a "#" character. The following is an example of a Batch File:

```
# This file sets the F1
# frequency to
# 12 MHz for 10 seconds and
# then turns the amplitude
# off on the sine (I) channel
m 0
f1 12.0
dwell 10
v1 0
#
```

4.6 Clock Menu

4.6.1 Internal Crystal Oscillator. The internal crystal oscillator selection on the clock menu is the factory default. A check mark next to this menu selection means that the internal crystal oscillator is selected. This check mark will remain until you select external from the clock menu and enter your external clock frequency. Once you select external and enter an external clock frequency, the check mark next to the internal crystal oscillator will disappear. The internal crystal oscillator runs at 28.1474976710656 MHz. The clock multiplier in the signal generator is set to 10 at the factory, so, the actual system clock frequency is 281.474976710656 MHz when it is shipped from the factory.

4.6.2 External. You should only select external from the clock menu if you have changed the clock source from internal to external on the signal generator. (Internal clock source is the factory default.) Selecting external from the clock menu will display an input box that asks you to enter the frequency of your external clock source. After you enter your external clock frequency, click the OK button. A check mark will now appear next to the external selection on the clock menu and the SOF8 program will base all frequency calculations on this external clock frequency. The clock source text field in the configuration settings section of the display will now show the frequency you entered for the external clock.

4.6.3 Clock Multiplier. Selecting clock multiplier from the clock menu will display an input box that asks you to enter your desired clock multiplier. Enter your desired value for the clock multiplier and click

OK. A clock multiplier command, Kp, will then be sent to the signal generator to change the signal generator clock multiplier to the value you entered. The Kp command will be displayed in the response text field. Note that this command sends the clock multiplier as a hex number. The new value you entered for the clock multiplier will now be used by the SOF8 program in all frequency calculations. The allowable clock multipliers are 1, which means bypass the clock multiplier and use the external clock frequency directly, and 4 to 20. You should not set the clock multiplier to a value larger than 10 when using the internal crystal oscillator since this will cause the system clock to be above the maximum limit of 300 MHz.

4.7 COM Menu

4.7.1 Set COM Port Number. Selecting set COM Port Number from the COM menu will allow you to change your COM port setting. It will display an input box that asks you to enter the serial communications (COM) port number that is connected to the signal generator. Enter the correct COM port number and click OK. (If you do not know the COM port number and you have Windows 98®, you can check your computer's COM port configuration by going to the Start button, select Settings then Control Panel then System and then the Device Manager tab. The COM port configuration can be determined in other versions of Windows® in a similar manner.)

The COM port number you entered will be saved to the file "DDS8mCom.txt" and displayed in the COM port text field in the configuration settings section of the display. The COM port number is the only communications setting you have to enter since all the other serial communications settings, like baud rate etc., are preset to be compatible with the signal generator hardware.

4.8 Register Menu

4.8.1 Display Register Settings in Hex. Selecting display register settings in hex from the register menu

will cause all the text fields in the register settings section of the display to appear as hex numbers. These are the raw register status settings as returned by the signal generator. The meaning of these hex numbers can be found in the signal generator hardware manual. The status of some of the signal generator registers requires knowing the on/off state of each bit in the status word. The hex numbers can be used to determine these bit values. A check mark next to this menu selection means that it is selected.

4.8.1 Display Register Settings in Engineering Units. Selecting display register settings in engineering units from the register menu will cause most of the text fields in the register settings section of the display to appear in engineering units instead of appearing as hex numbers. The frequency values will be scaled based on the clock frequency and clock multiplier values shown in the configuration settings section of the display. Some of the status register settings will still appear as hex numbers. These can be interpreted using the signal generator hardware manual. A check mark next to this menu selection means that it is selected.

4.9 Clear Menu

4.9.1 Clear Display. Selecting clear display from the clear menu will remove all text from the command and response text fields and also clear other messages that may linger on the display after some types of communication errors.

4.9.2 Reset to Last Saved Settings. Selecting reset to last saved settings from the clear menu will reset all signal generator registers to the values stored in EEPROM memory the last time a save command was processed. This has the same effect as cycling power.

4.9.3 Clear Saved Settings and Restore Factory Defaults. Selecting clear saved settings and restore factory defaults will clear the saved values currently in the signal generator EEPROM memory and restore the factory default EEPROM memory settings.

5.0 Troubleshooting

5.1 Communication Errors. It is very rare, but possible, for communication errors to lock up the SOF8 program's serial communication capability. If this happens, then it may be necessary to shutdown your computer and cycle power on and off.