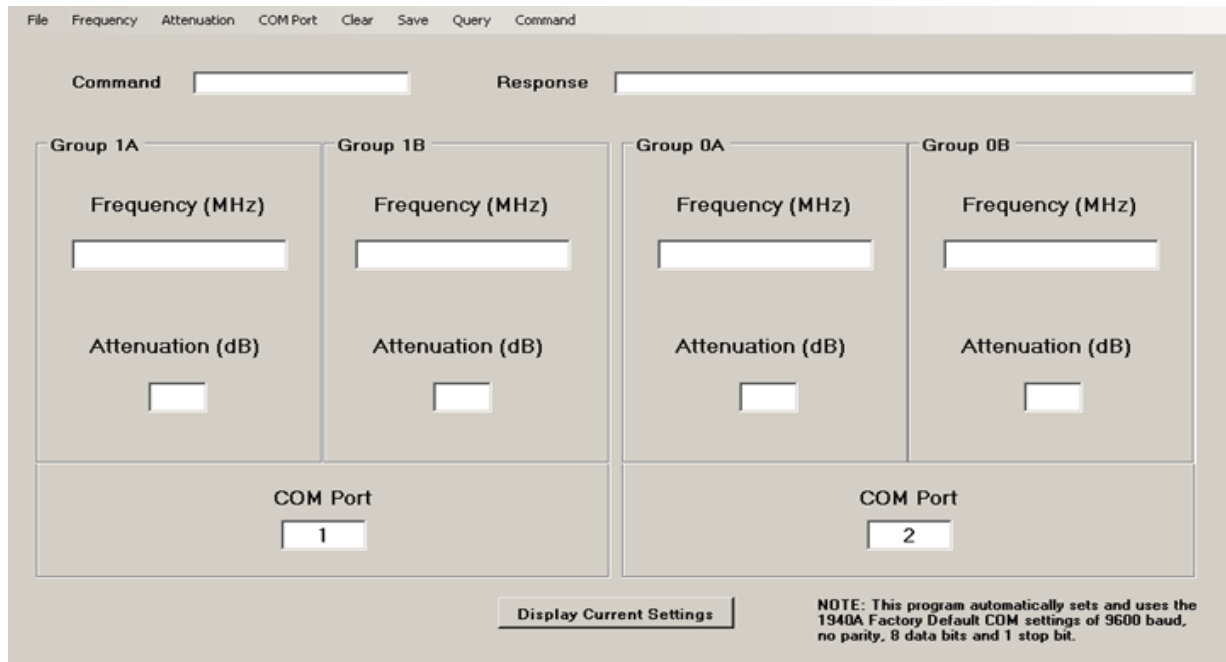


NOVATECH INSTRUMENTS, INC

INSTRUCTION MANUAL Model SOF8_1940



**Software Program
for Controlling the Model 1940
Four Channel DDS Signal Generator
Version N2.0**

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1.0 Description

The SOF8_1940 Software provides a convenient way to control the Model 1940 Four Channel DDS Signal Generator from a Windows computer. It duplicates all the functions that are available from the Model 1940 front panel controls. In addition, it provides a way to store a sequence of settings in a computer file and load these settings in sequence with a programmed dwell time between the loading of each set of settings.

2.0 System Requirements

The SOF8_1940 software program requires a computer that has Windows 2000 or later operating system and has both the .NET Framework v2 and the Microsoft Installer 3.0 programs installed.

3.0 Installation

3.1 The SOF8_1940 program requires a computer that has Microsoft .NET Framework v2 installed in order to operate. The .NET Framework v2 is available for no charge from Microsoft. Many newer software programs require this Framework so it may be installed on your computer. If it is not installed on your computer then you can download it from Microsoft's web site. There are different download files of the .NET Framework v2 depending on the computer that the Framework will be installed on. For example, the x86 class of 32-bit computers takes a different download file than the x64 64-bit class of computers. The Microsoft download files are called Redistributable files and, at the time this document is being written, they are located at:

<http://msdn2.microsoft.com/en-us/netframework/aa731542.aspx>

3.2 To install the .NET Framework v2 you need to download the appropriate file and then double click on it to start the installation process.

3.3 The SOF8_1940 program comes in a setup file. To Install the program simply load the SOF8 CD, navigate to the SOF8_1940 install folder, open the folder and double click the setup file. The installation process will add a shortcut to your desktop and add a shortcut on your Start/Programs menu in a submenu labeled "Novatech".

3.4 The SOF8_1940 vN2.0 setup file requires Microsoft Installer 3.0 to operate. Microsoft Installer 3.0 comes pre-installed on new computers with Windows XP or later operating systems. If your computer does not have Microsoft Installer 3.0 then you will need to download it from the Microsoft web site. The Microsoft Installer 3.0 is a free download. At the time this document is being written the Microsoft Installer download site is located at:

<http://www.microsoft.com/downloads/details.aspx?familyid=5FBC5470-B259-4733-A914-A956122E08E8&displaylang=en>

3.5 The SOF8 CD contains the x86 version of the .NET Framework v2 and the Microsoft Installer 3.0 as a convenience to our customers. However, we do not warrant that these are the correct versions for your computer and we do not provide support for the installation of these programs

4.0 Keyboard Operation

The SOF8_1940 program can be operated using a keyboard only, no mouse. To use the keyboard you first hold down the Alt Key and hit the Enter Key. You can now navigate the menus with the up/down and right/left arrow keys.

5.0 Communication with the 1940A

5.1 To communicate with the 1940A you must connect one or two serial cables from your computer to the serial connector(s) on the rear of the 1940A. You will need one cable to control two channels of the 1940A. You will need two cables to control all four channels of the 1940A. If your computer does not have a serial port(s) then you can use a USB to Serial Port adapter. The USBGEAR Model USBG-2X232 dual serial port adapter has been tested by Novatech Instruments. However any commercially available USB to Serial adapter should work. The USBG-2X232 can be found at:

<http://www.usbserial.com/USBG-2X232.html>

5.2 You will need to enter the COM port number(s) into the SOF8_1940 software in order to communicate to the 1940A. Once the SOF8_1940 software knows the COM port number(s) it will automatically configure the COM port's baud rate, parity and number of data bits and stop bits.

5.3 To find the appropriate COM port number(s) you can navigate to the Windows Start/Settings/Control Panel then double click on the System Icon. A dialog window appears and select the Hardware tab and then click on the Device Manager button. A tree view will appear and you can find the COM ports available by expanding the Ports selection.

5.4 COM Menu.

The Model 1940A has two serial ports called Group 0 and Group 1. To communicate with the 1940A you must enter into the SOF8_1040 software the COM Port numbers on your computer that are connected to each of these 1940A serial ports. To enter the COM port number into the SOF8_1940 software, go to the COM Menu and select Group 0 or Group 1. An input box will appear and you should enter the COM port number and hit OK. Enter just the integer number for the COM port. Do not enter the characters "COM". The SOF8_1940 software stores the values you enter for the COM ports in a configuration file so that these values only have to be entered when you initially set up the program or when a COM port number changes.

6.0 SOF8_1940 Display Fields

All of the display fields are Read Only so you cannot type information directly into these fields. The fields are labeled Command, Response, Frequency, Attenuation or COM. The Frequency and Attenuation fields can display the current settings of the 1940A. You control the 1940A using the pull down menus or by loading settings from a file. The Command field will display the command sent to the 1940A after using a menu selection to send a command. The Response field will display the response received back from the 1940A. To populate the Frequency and Attenuation fields with the current 1940A settings, you click on the Display Current Settings button or select the Query/Display Current Settings menu.

7.0 Files (Scripts)

The SOF8_1940 software can load a sequence of settings from a text file into the 1940A Signal Generator. This is similar to running a script. The contents of the file must conform to a specific format. This format is described in the File Menu/Save Settings section, paragraphs 8.22 to 8.25. You can load the settings from the file one line at a time and program a dwell time from 0 to 9999 seconds after loading each line. This process is described in the File Menu/Load Settings section 8.1.

8.0 File Menu

8.1 File/Load Settings

This menu selection will bring up a dialog window to enable you to select a file to load. Once you select the file and click the open button in the dialog box, the settings in the file will be loaded into the 1940A. The file selected must have the settings in the exact same format as described in the File Menu/Save Settings Menu described in paragraphs 8.22 to 8.25. This file may be created by using the File/Save Settings menu or it can be created by using a text editor like Notepad. Do not use a word processor to create or edit the file because word processors may add undesirable hidden characters. The SOF8_1940 program will load a line from the file, wait the amount of seconds as indicated by the Dwell Time and then go to the next line. There is no limit to the number of lines in the file as long as all the lines are in the proper format.

8.2 File/Save Settings

8.21 This menu selection enables you to save the settings currently displayed by the SOF8_1940 program. These displayed settings can be different from the settings in the 1940A Signal Generator because the displayed settings are not automatically updated after you change a 1940A Frequency or Attenuation value. For this reason it is a good idea to click on the Displayed Settings button to update the displayed settings just prior to selecting File/Saved Settings.

8.22 After selecting File/Saved Settings you will be presented with a dialog window that enables you to create a new text file or navigate to an existing text file. If you save the settings to an existing file, the current contents of the file will be overwritten. (You will get a warning prior to overwriting a file.) The information stored in the file will be in the following format:

```
399.999999 099.999999 60 40 0 0000  
009.999999 000.999999 20 00 1 0000
```

8.23 The first line above refers to Group 0 settings (the two channels on the right side of the 1940A when viewed from the front) and the second line refers to Group 1 settings (the two channels on the left side of the 1940A when viewed from the front). The numbers on each line represent the following:

Frequency of Channel A in MHz
Frequency of Channel B in MHz
Attenuation of Channel A in dB
Attenuation of Channel B in dB
Group Number
Dwell Time in Seconds

8.24 You must include leading and trailing zeros. Also, exactly one space must separate each value and there can be no spaces at the end of a line. For example, a setting of 9 MHz would be entered as 009.000000. The allowable frequency settings are from 000.200000 to 399.999999. The allowable attenuation settings are 00, 10, 20, 30, 40, 50 or 60. The Group Number is either a 0 or a 1. Group 0 indicates the two channels on the right side of the 1940A when facing the front and Group 1 indicates the two on the left. The allowable dwell settings are 0000 to 9999.

8.25 The SOF8_1940 always saves a Dwell time of 0000. This 0000 value can be edited using a text editor such as Notepad and can have any number from 0000 to 9999. Word processors should NOT be used to edit this file because word processors may embed undesirable hidden characters in the file.

8.3 File/Append Settings

This menu selection operates the same as the File/Saved Settings menu selection in paragraph 8.2 above, except the settings are added to the end of the file and the current information in the file is not overwritten.

9.0 Frequency Menu

9.1 The Frequency Menu is used to set the output frequency of any of the four frequency channels. These four channels are 0A, 0B, 1A and 1B. Physically these are located on BNC's on the rear panel in sequence from left to right as viewed from the front of the 1940A.

9.2 Frequency/Set 0A Frequency

This selection will recall an input box where you should enter the desired frequency in Megahertz for channel 0A. Enter a number from 0.200000 to 399.999999. Leading and trailing zero's are not required. Do not enter any text characters such as MHz etc. Click ok and a command will be sent to the 1940A and this command will be displayed in the SOF8_1940 Command Field. Use the same procedure for the menu selections for channels 0B, 1A and 1B.

10.0 Attenuation Menu

The Attenuation Menu is used to set the output Attenuation of each of the four output channels.

10.1 Attenuation/Set 0A Attenuation

This menu selection will recall an input box where you should enter the desired attenuation for output channel 0A in dB. Enter 0, 10, 20, 30, 40, 50 or 60. Do not enter units characters such as dB etc. Click ok and a command will be sent to the 1940A. This command will also be displayed in the SOF8_1940 Command Field. Use the same procedure for setting the attenuation on channels 0B, 1A and 1B.

11.0 Clear Menu

11.1 Clear/Clear Display

This menu selection will clear all the fields on the SOF8_1940 program's display except the COM port fields. This command does not change any settings inside the 1940A Signal Generator.

11.2 Clear/Clear 1940A

This menu selection will cause the clear command to be sent to the 1940A. This command clears the EEPROM and the RAM memory in the 1940A and restores the factory default settings to these memory locations. The factory default settings on all channels are 10 MHz output frequency and zero attenuation.

12.0 Save Menu

The Save Menu allows you to save the current RAM settings into EEPROM. EEPROM memory is nonvolatile. This means information stored in EEPROM is not lost when the power is turned off. When power is applied to the 1940A it loads the values from EEPROM memory into RAM memory and the RAM memory determines the current output settings of the 1940A. If you change the frequency or the amplitude on any channel, this will change the value in RAM memory but it will not change the value in EEPROM. Thus, if you turn the power off on the Model 1940, the current RAM settings will be lost. The factory ships the 1940A with EEPROM memory that contains frequency settings of 10MHz on all channels and attenuation settings of zero on all channels.

12.1 Save/Save Current Settings

This menu selection will cause a command to be sent to the 1940A that tells the 1940A to copy the current settings from RAM memory into EEPROM memory.

When the power is turned off and back on in the future, the last saved values in EEPROM are loaded back into RAM.

13.0 Query Menu

13.1 Query/Display Current Settings

This menu selection will send a RAM memory query command to the 1940A. The 1940A will then return the current frequency and attenuation settings in RAM and these settings will be displayed in the SOF8_1940 display fields.

13.2 Query/Display Backup Settings

This menu selection will send an EEPROM query command to the 1940A. The 1940A will then return the frequency and attenuation settings stored in EEPROM and these settings will be displayed in the SOF8_1940 display fields. The EEPROM memory is considered a backup memory because it contains the frequency and attenuation settings that will be loaded into RAM and become the current settings after a power cycle.

14.0 Command Menu

The Command menu enables you to send an ASCII command to the Group 0 (0A and 0B) and Group 1 (1A and 1B) channels of the 1940 Signal Generator. Group 0 channels are on the right side of the 1940 Signal Generator as viewed from the front and Group 1 channels are on the left side of the 1940 Signal Generator as viewed from the front. See the 1940A data sheet for a listing of these commands. The ASCII commands perform identical functions to those you can perform using the various SOF8_1940 menus.

15.0 Display Current Settings Button

Clicking this button performs the same function as selecting the Query/Display Current Settings menu selection. See paragraph 13.1