Series 68100A/B Synthesized Sweep Generator Instrument Driver for LabWindows

User's Guide

Version 1.00

Locate the Serial Number decal sheet packaged with the manual, and paste the driver software serial number here.

Serial Number

You will be asked for this number when you call Wiltron Customer Service for support.

Wiltron

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Preface

The 681XXA/B LabWindows Instrument Driver User's Guide provides a tutorial and both general and detailed descriptions of the various functional panels displayed in the LabWindows environment. The user should be familiar with measurements using the applicable WILTRON instrument and with MS- or PC-DOS conventions. A knowledge of LabWindows, while helpful, is not essential. The WILTRON Instrument Drivers software can be used to create executable stand-alone application programs.

Manual Organization

The manual is divided into three sections:

Section 1, General, provides general information and a tree structure for the Instrument Driver function panels.

Section 2, Using the 681XXA/B Driver with LabWindows, provides description and a tutorial for using the driver within the LabWindows environment.

Section 3, Driver References, provides detailed descriptions of the function panels and instrument controls. It also provides sample syntax and a listing of variable-type used in the program.

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Section 1

Introduction to the 681XXA/B Synthesized Sweep Generator Driver for LabWindows

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Introduction to the 681XXA/B Synthesized Sweep Generator Driver for LabWindows

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General

WILTRON Instrument Drivers software provides an easy-to-use tool for developing application programs for applicable microwave systems via the General Purpose Interface Bus (IEEE-488 Bus).

This software contains modules that automatically configure an applicable WILTRON instrument for use on the bus, along with high-level instrument control commands that save you the time required to learn and program the GPIB commands of the instrument. The software automatically checks for proper bus functioning. If a command is sent to a bus instrument and no error is reported, the bus can be assumed to be working correctly.

Requirements

The WILTRON Instrument Driver software is written specifically for the model 681XXA/B.

The WILTRON Instrument Driver requires an IBM PC AT, PS/2, or compatible computer running MS- or PC-DOS, Version 3.0 or later.

The software is delivered on 5-1/4 inch 1.2 Mb Floppy disks and 3-1/2 inch 1.4 Mb floppy disks.

At least 2 MB of memory is required to run the LabWindows program — 4 Mb is recommended.

The WILTRON Instrument Driver software requires National Instruments LabWindows version 2.2 or later.

For Microsoft QuickBASIC*, Professional BASIC, Visual BASIC for DOS, C, Quick C, and Borland C++ and Turbo C++ users, you can use the 681XX Instrument Driver software to produce compatible instrument-control-program code.

* Wiltron strongly recommends that QuickBASIC not be used. Instead, use Microsoft Professional BASIC 7,1, or later, or Visual BASIC for DOS.

Installing Instrument Drivers

This section provides instructions for installing the WILTRON Instrument Drivers. Proceed as follows:

- ☐ Insert the WILTRON driver diskette in your A: or B: drive, as appropriate.
- ☐ Change to the LabWindows, Instruments directory (*drive*\LW\INSTR), and type the following DOS command: COPY A: (B:) *.*. This copies the following four files to the target subdirectory: W681.LBW, W681.LWI, W681.FP, W681.DOC (All four of these files MUST reside within the same subdirectory.)
- ☐ Once the copying is completed, return the driver diskette to a safe storage location.

Overview For LabWindows Users

LabWindows is a software development system for BASIC, C, and C++ programs (see page 1-3 for listing of supported languages). It contains an interactive environment for developing programs with drivers and libraries (functions) for creating data acquisition and instrument control applications. LabWindows contains a comprehensive set of software tools for data analysis, data presentation, and high level instrument control.

The interactive program is an environment for editing and debugging BASIC and C (C++) programs. In the LabWindows environment, you can use the functions in the instrument drivers or libraries to write your program. In addition each function has an interface called a function panel that lets you interactively execute the function or generate code for calling the function.

The interactive program uses extended memory. Programs executed in the interactive program can use up to 16 megabytes of memory, depending on your computer configuration. Programs that run in the interactive program, however, must adhere to the LabWindows subsets for BASIC, C and C++.

Programs developed with the drivers and library functions can be run within the interactive program, or they can be compiled and linked into a stand-alone applicaton (*.EXE) or run-time application (*.RTM) file. To help you create a stand-alone program, LabWindows incorporates utilities that automate the compile and link processes.

The real power of LabWindows lies in the libraries. They have functions for developing all phases of your data acquisition and instrument control system. For controlling the 681XXA/B, Lab Windows has the Instrument Drivers Library. The programs that call this library can be developed with the interactive program. This program has tools that make program development quicker and easier.

LabWindows gives you the capability to execute instrument drivers with the aid of panels and thereby create programs easily. The panels contain items that can be selected to build and execute a driver. The drivers are separately declared in the Instrument Drivers Library.

Two advantages of using LabWindows are:

- ☐ When writing an application program you do not have to remember all of the parameters that belong to the driver.
- ☐ Error reporting is shown automatically in the panels.

Overview for Non-LabWindows Users

Programmers who do not use LabWindows will also benefit from the WILTRON Instrument Driver software:

- ☐ You will not have to know all of the GPIB codes needed to program applications for the 681XX Synthesized Sweep Generator. The driver software effectively manages low-level GPIB I/O operations and native instrument control.
- ☐ You will see greater program reliability because of the driver's extensive error-checking routines.
- ☐ You will see reductions in the time required to develop, test, and debug applications.

Section 2

Using the 681XXA/B Instrument Driver with LabWindows

Section 2
Using the 681XXA/B Instrument Driver with LabWindows

Introduction

This section provides an introduction to the LabWindows environment and a tutorial describing the use of the 681XXA/B driver within LabWindows. This section assumes that you have read Part 1 of the National Instruments *Getting Started with LabWindows* manuals and are generally familiar with the LabWindows screen and principles of navigation within the environment.

General

The following procedure describes how to access LabWindows and load files.

- ☐ Move to the directory containing the LabWindows executable (*.EXE) files. (This directory is usually named \LW.)

- ☐ Type LW.
  This places you in the PROGRAM window of the LabWindows environment (below).

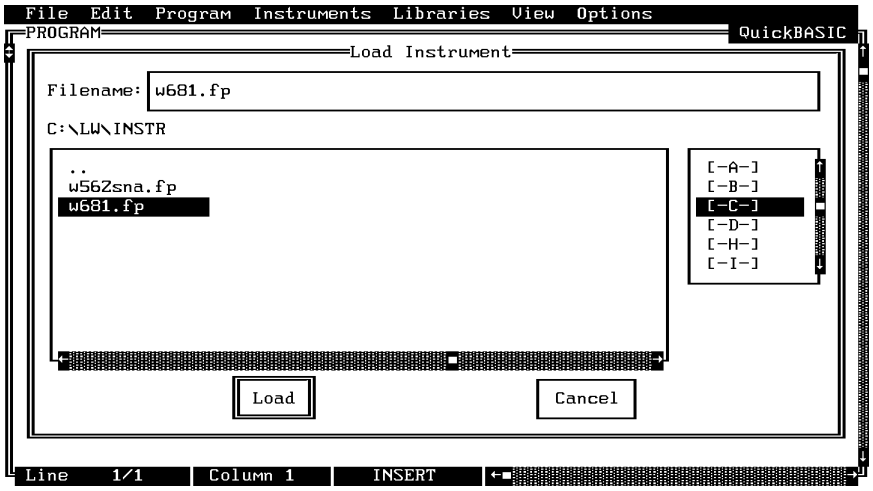
Loading 681XXA/B Driver As Instrument Module

The following procedure describes how load the 681XXA/681XXB (681XXA/B) Driver as an instrument module.

☐ Select **Instruments,** on the top menu bar (below), to display the pull-down menu.

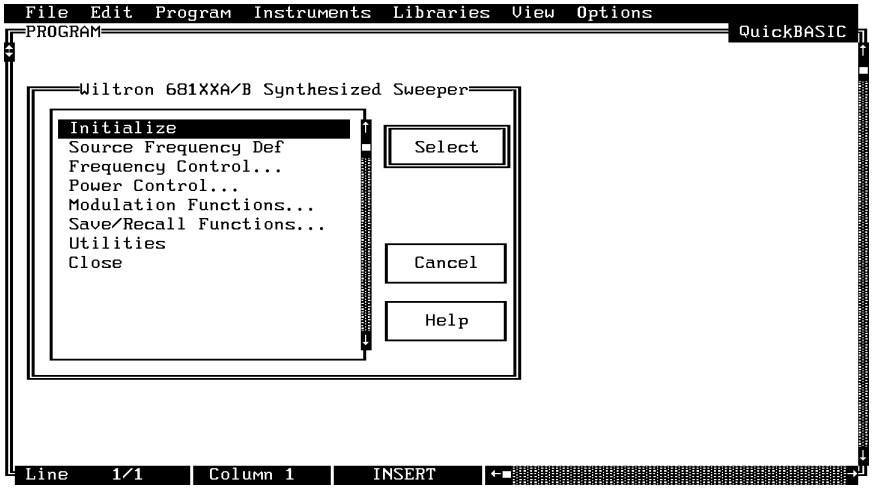
Select **Load,** then change to the \LW\INSTR subdirectory (below).

☐ Move the cursor to **w681.fp** and select **Load.**



☐ Move the cursor to Instruments to display the pull-down menu. The "Wiltron 681XXA/B Synthesized Sweeper" title displays showing that the instrument module is now loaded.

☐ Select **Wiltron 681XXA/B Synthesized Sweeper,** and observe that the 681XXA/B main panel appears (below).

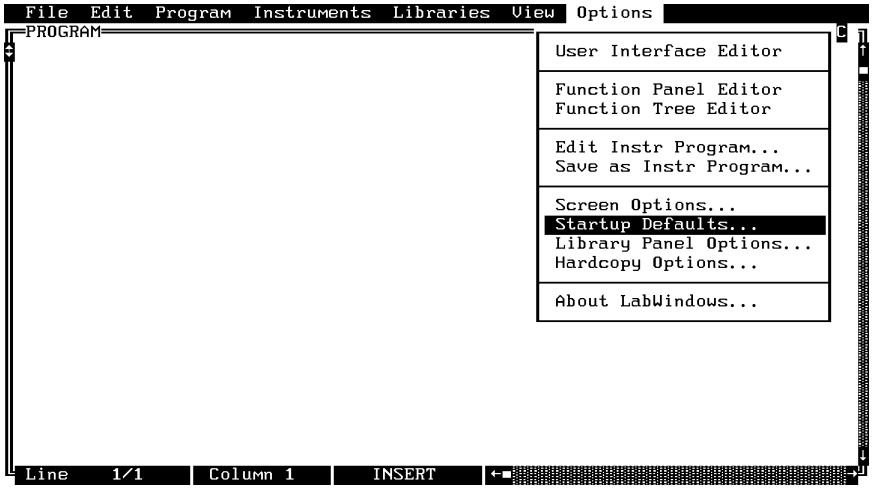


☐ You are now ready to proceed with developing control code using the 681XXA/B instrument driver.

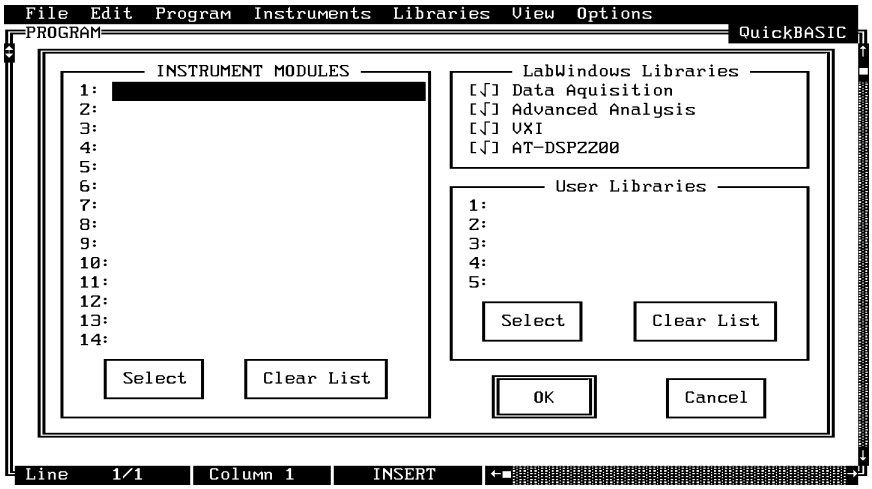
Loading 681XXA/B Driver At Start-up

The 681XXA/B driver can be automatically loaded each time LabWindows is started. The procedure for making this happen is given below.

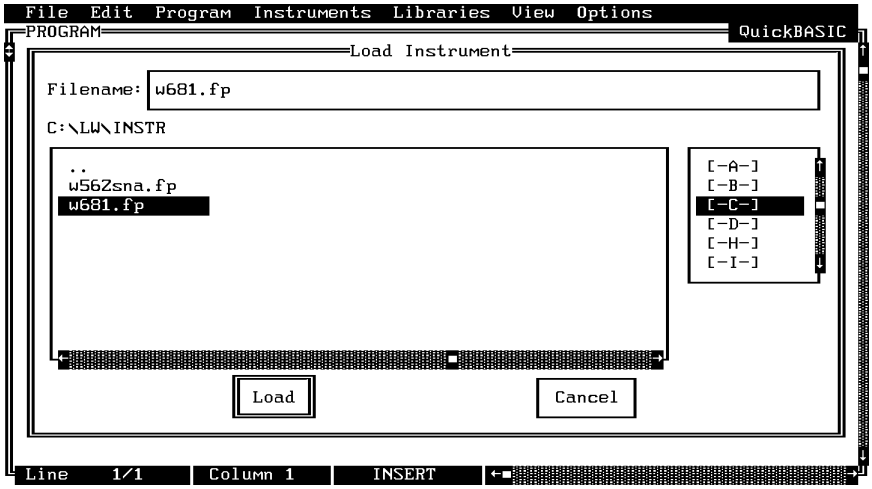
- ☐ Place yourself into the LabWindows PROGRAM window as was described on page 2-3.
- ☐ Select **Options**, on top menu bar, to display the pull-down menu.
- ☐ Select **Startup Defaults.**



- ☐ Choose **Select** to locate the 681XXA/B driver (w681.fp); alternatively, type in the path and file name.

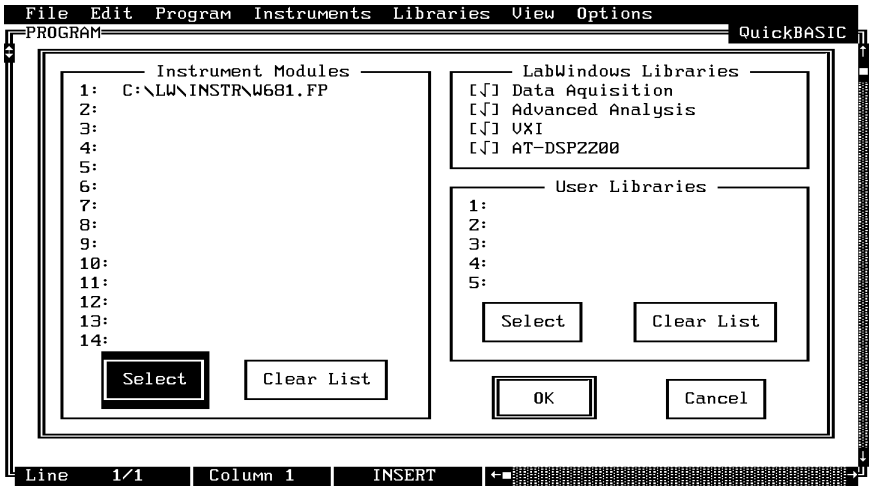


☐ Choose the **\LW\INSTR** subdirectory from the file list.



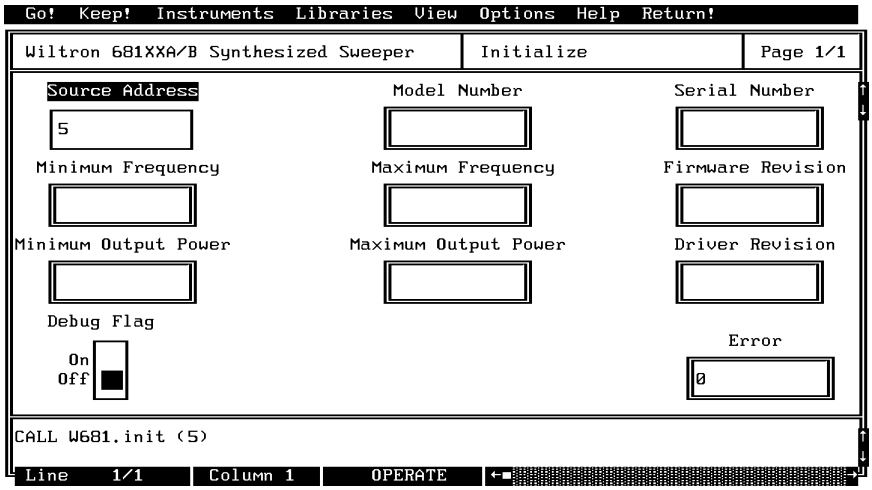
☐ Choose **w681.fp** from the displayed file list, and click on **Load.**

☐ The appropriate path will now be displayed in the INSTRUMENT MODULES window. Select **OK** to exit. The W681 driver will now be loaded automatically each time LabWindows is entered.



Debug Utility

The 681XXA/B LabWindows driver incorporates a unique Debug utility, which should be used for program development only. It should be disabled when compiling stand alone applications.



Error 305 is returned when the instrument has generated an unexpected SRQ. To determine the cause of the SRQ set the **Debug** switch to **On** (Debug%=1), the driver will respond with a specific 3XX error code (Table 2-1).

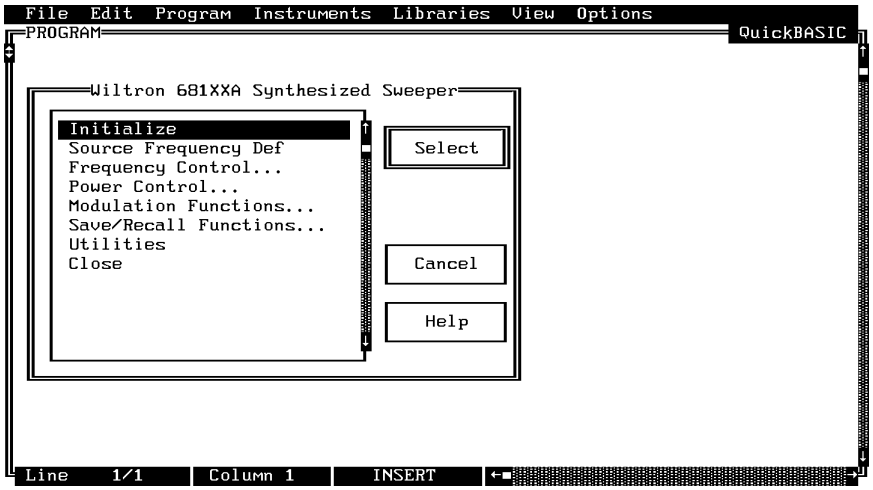
Table 2-1. Error Codes

Error Code	Description
301	Parameter Range Error
302	File Not Found
303	Invalid Filename
310	Disk Failure
311	Self Test Failed
312	Hardware Error

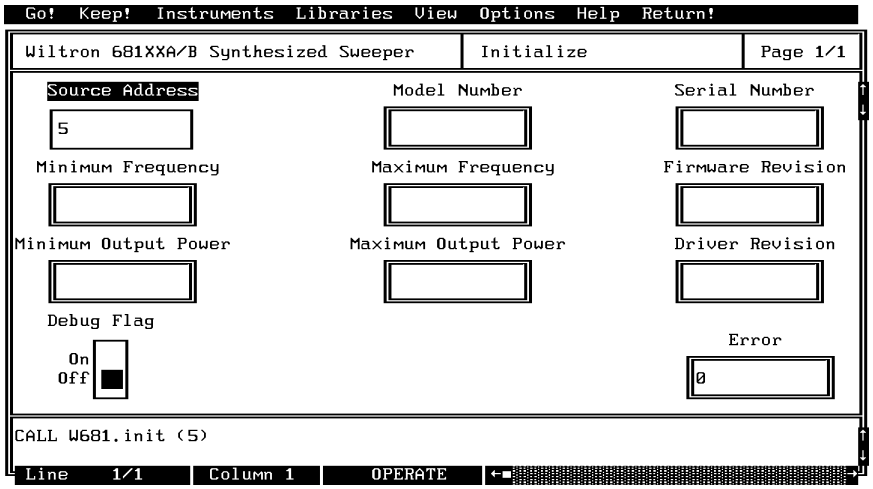
Tutorial

This tutorial takes you through the development of a simple program. This program initializes the 681XXA/B Synthesized Sweeper, assigns sweep frequencies and modulation parameters, and closes the driver. When you have finished stepping through the tutorial, you will have a BASIC program that can be compiled as a DOS executable (*.EXE) file. A Microsoft C program could be produced in the exact same manner by switching the native language to C (under the **Program** menu).

☐ Move cursor to **Instruments** in the top menu bar, and select **Wiltron 681XXA/B Synthesized Sweeper.** This will display the pull-down menu shown below.



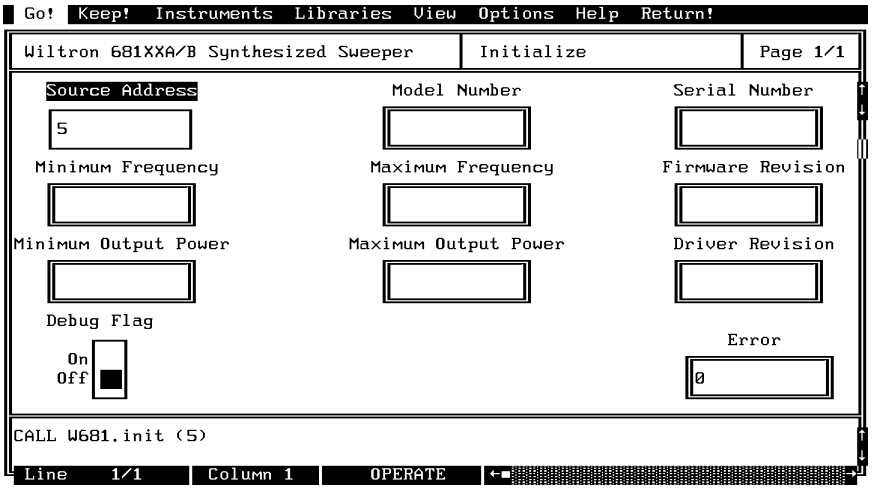
☐ Choose **Select** to display the Initialize panel (below).



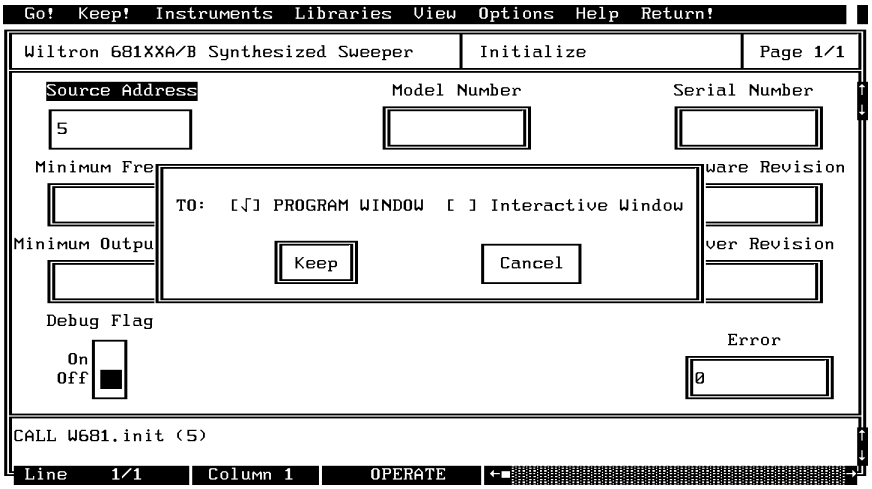
☐ With the **Source Address** highlighted as shown, enter the 681XXA/B GPIB address (a number between 1 and 30; 5 is the default).

☐ Select **Go!** (below) in the top menu bar. If a 681XXA/B is connected and set to GPIB address 5, it will respond by resetting itself and returning an identification string that will fill the **Model Number, Firmware Rev, Minimum Frequency, Maximum Frequency, Serial Number, Minimum Output Power,** and **Maximum Output Power** fields.

☐ Leave Debug Flag set to Off. This switch was discussed on page 2-6.

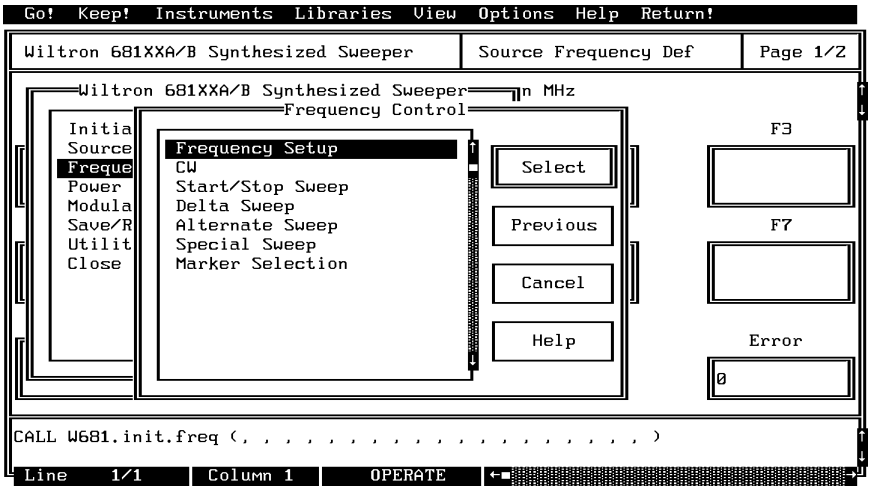


☐ Move the cursor to **Keep!**, in the top menu bar, then choose **Keep** from the next window (below) to select the default option. This transfers the code shown at the bottom of the panel to the PROGRAM window of the LabWindows environment.



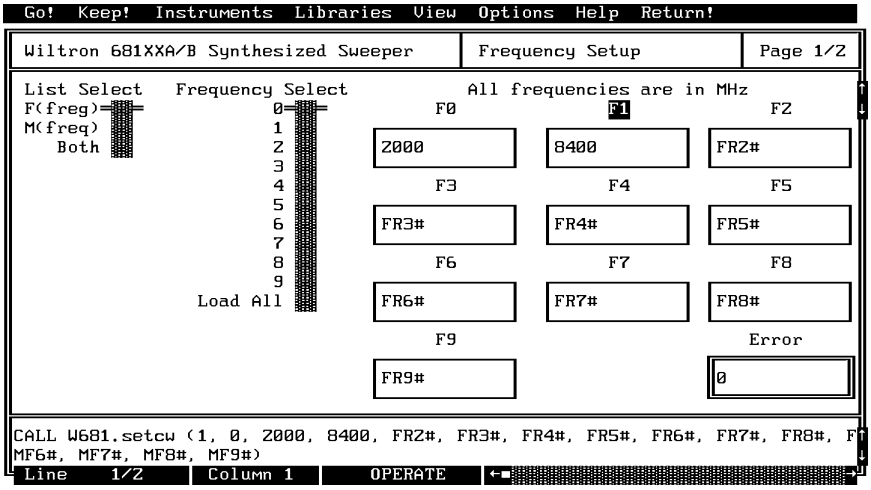
☐ Select **Instruments,** in the top menu bar, then **Wiltron 681XXA/B Synthesized Sweeper** to return to the 681XXA/B Driver main panel.

☐ Select **Frequency Control,** from the main menu, then **Frequency Setup** when the Frequency Control menu appears (below).



☐ Select **F0** (below)**,** and enter **2000** from the keyboard.

☐ With **F1** highlighted, enter **8400** from the keyboard.

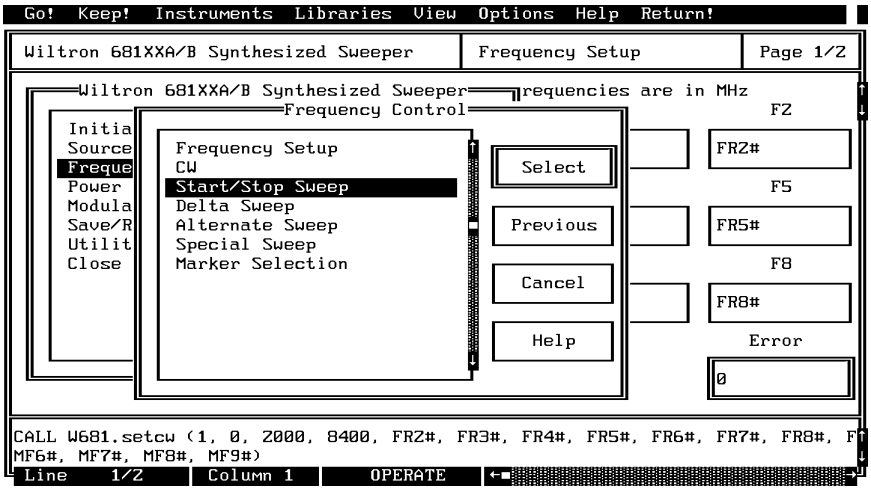


☐ Select **Load All,** from the **Frequency Select** control.

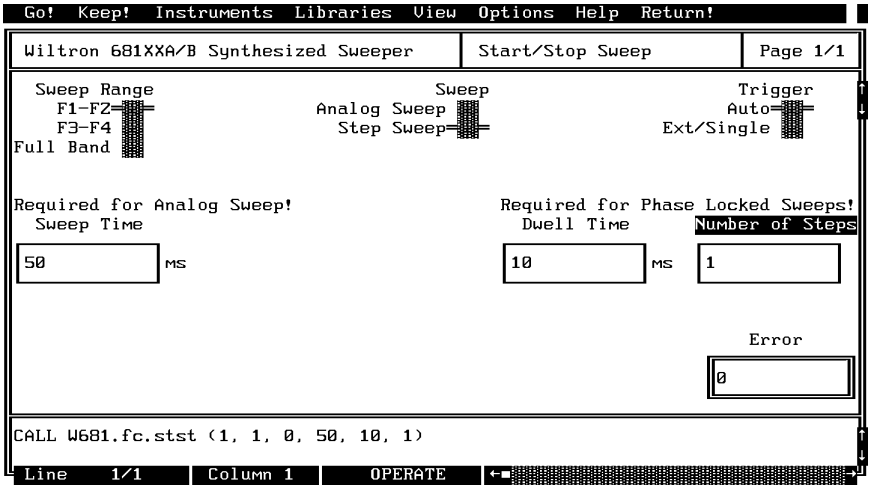
☐ **Select Keep!**, in the top menu bar; then choose **Keep** again when the next menu appears.

☐ Select **Instruments,** in the top menu bar, then **Wiltron 681XXA/B Synthesized Sweeper** to return to the 681XXA/B Driver main panel.

☐ Select **Frequency Control** and **Start/Stop Sweep** from the next menus to appear (below).



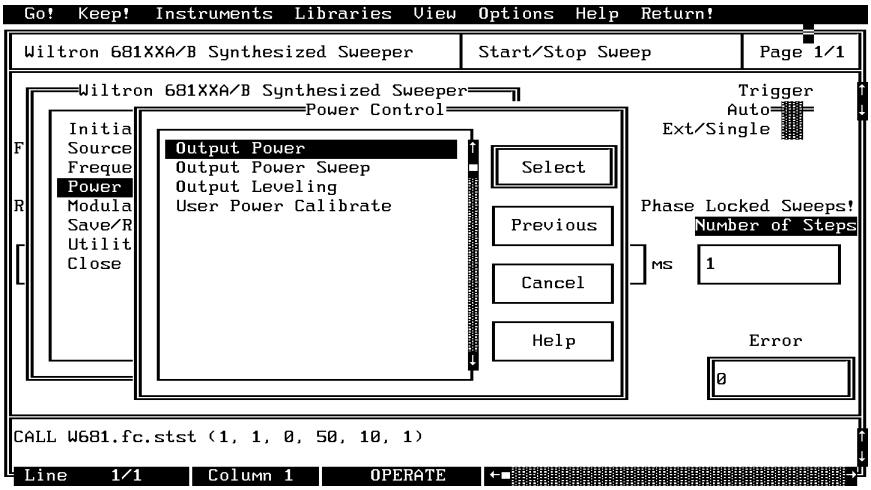
☐ Select **F1–F2** sweep range (below), **Step Sweep, Auto** trigger, and the default settings of **50** ms sweep time, **10** ms dwell time, and **1** step.



☐ Select **Keep!,** in the top menu bar; then choose **Keep** again to add the code to the program window.

☐ Select **Instruments,** in the top menu bar, then **Wiltron 681XXA/B Synthesized Sweeper** to return to the main driver panel.

☐ Select **Power Control** then **Output Power** (below) to display the output power panel (next menu).

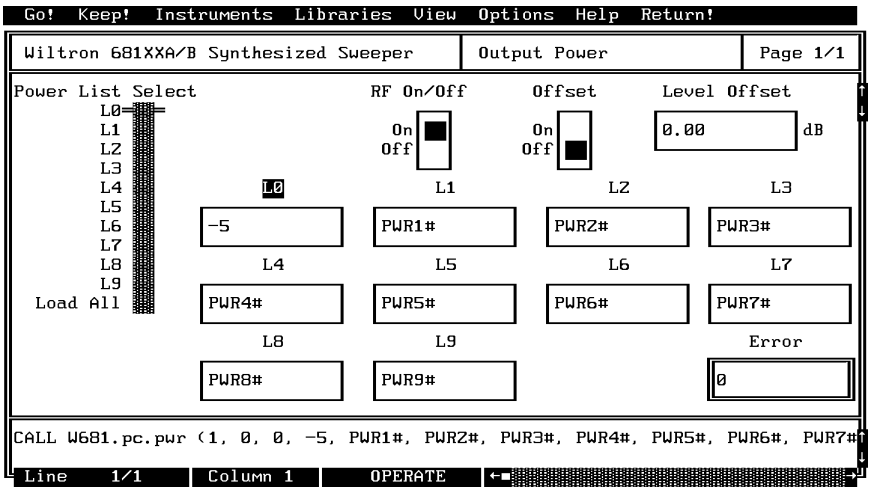


☐ Verify that the **RF On/Off** control (below) is **On.**

☐ Select **L0** on the **Power List Select control.**

☐ Select **RF ON/Off** and **Offset** to be **Off** (defaults).

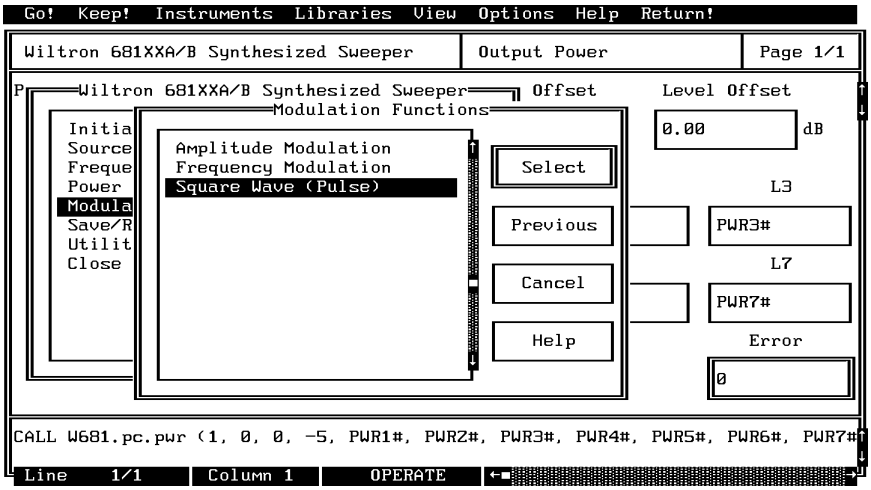
☐ Enter **–5** from the keyboard in the **L0** field.



☐ Select **Keep!,** in the top menu bar; then choose **Keep** again to add the code to the program window.

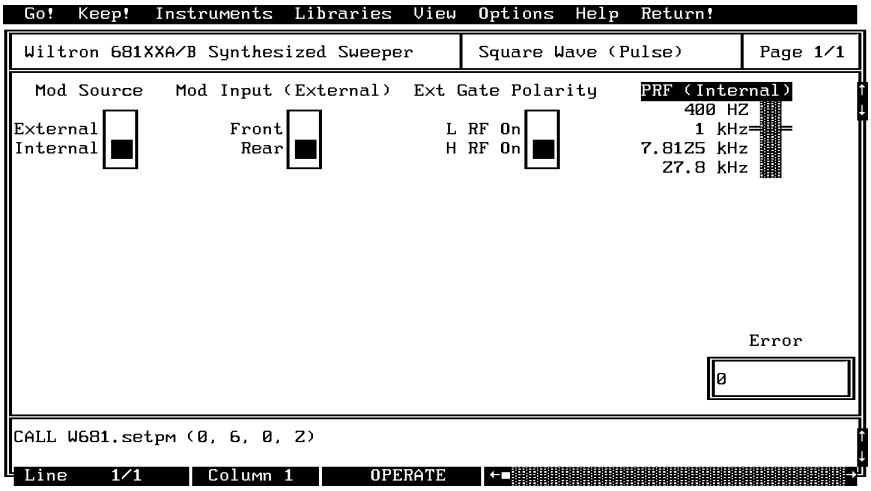
☐ Select **Instruments,** in the top menu bar, then **Wiltron 681XXA/B Synthesized Sweeper** to return to the main driver panel.

☐ Select **Modulation Functions** from the first menu, then **Square Wave (Pulse)** from the second (below) to display the pulse modulation menu (below).



☐ Position **Mod Source** to **Internal** (below).

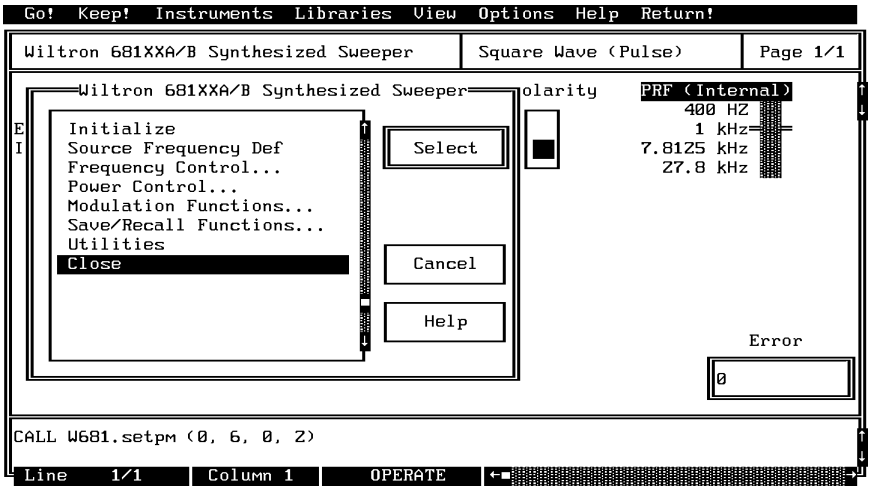
☐ Select **Rear, H RF On,** and **1 kHz** from the available menu options.



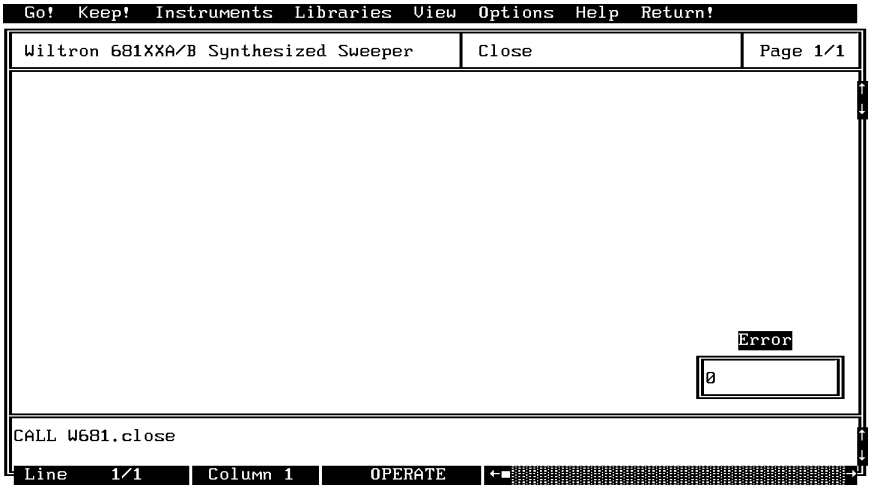
☐ Select **Keep!,** in the top menu bar; then choose **Keep** again to add the code to the program window.

☐ Select **Instruments,** in the top menu bar, then **Wiltron 681XXA/B Synthesized Sweeper** to return to the main driver panel.

☐ Move cursor to **Close** (below) and choose **Select** to display the Close panel

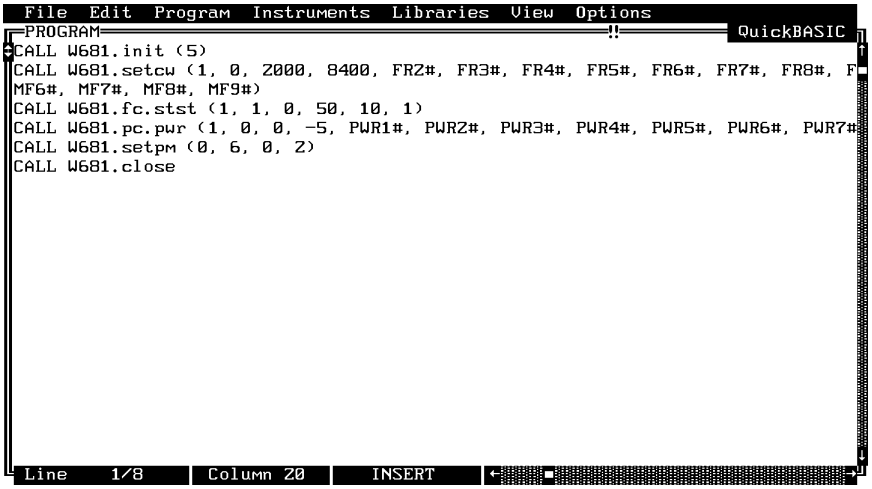


☐ There is nothing you need to do with this panel, except to select **Keep!,** in the top menu bar; then choose **Keep** again to add the code to the program window.

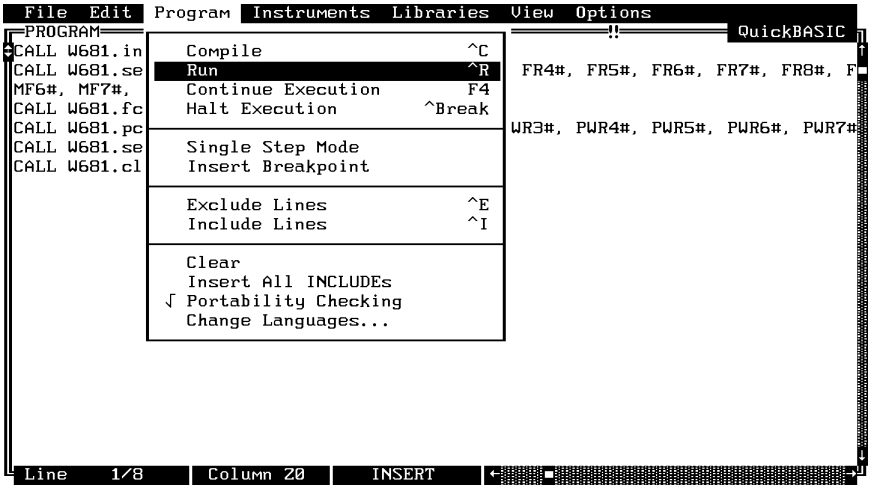


☐ Select **Return!** on the menu panel to return to the PROGRAM area.

☐ The program that you have developed now appears (below).



☐ To test the program, move the cursor to **Program,** in the top menu bar and select **Run** (below) from the pull-down menu.



☐ If there are no program errors triggering a syntax error message, you will see the 681XXA/B Synthesized Sweeper respond to the program code.

☐ After you are satisfied that the program runs correctly, you can use the **Create.EXE** option, on the File menu, to create a stand-alone DOS executable (*.EXE) file. Alternatively, you can use the **Create RTM** option, on the file menu, to create a run-time version (*.RTM) file. That operation is described in the next heading.

☐ To continue with this tutorial, save this program as *\LW\PROGRAMS\681SAMP.BAS*

Creating a Compiled Program

Most programs developed with LabWindows can be compiled with the Microsoft C or BASIC compiler. Some applications, however, become too large to compile and run in the 640 KB DOS memory and must be run within LabWindows or the LabWindows Run-Time System. The LabWindows Run-Time System includes a DOS extender so programs can access up to 16 MB of memory during execution. Programs executed in the run-time system can make calls to any of the LabWindows libraries and instrument drivers. Programs distributed with the run-time system are in a binary format, so the programs cannot be edited.

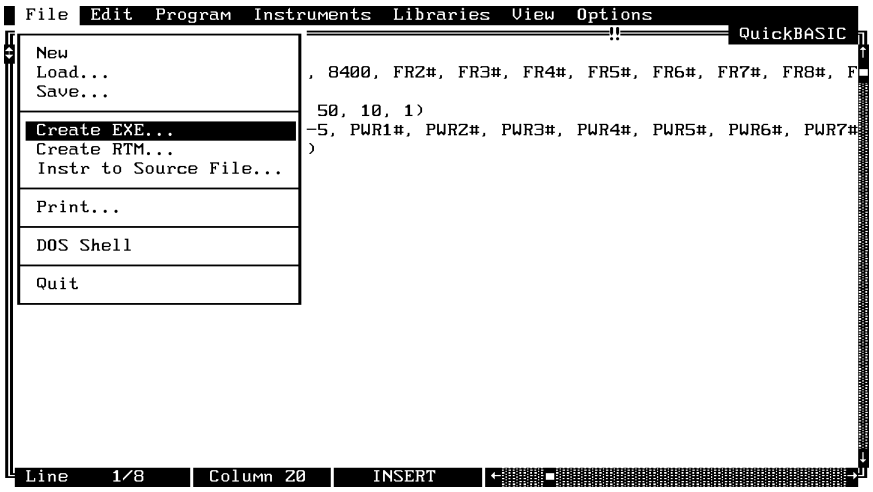
A stand-alone application (*.EXE or *.RTM) that incorporates the 681XXA/B Driver may be created using the Microsoft C or BASIC compilers or LabWindows Run-Time System. To avoid OUT OF MEMORY errors when using the Microsoft QuickBASIC compiler, you must first optimize the 681XXA/B Driver memory usage with the LabWindows FUNNEL.EXE utility (See the *LabWindows User's Manual* for instructions).

The LWMAKE option on the file menu can be used to create an executable file in either BASIC or C. The following provides a step-by-step tutorial for creating a *.EXE file using the BASIC compiler. This tutorial assumes that you have read and are familiar with the LWMAKE utility description in the *Lab Windows User's Manual*.

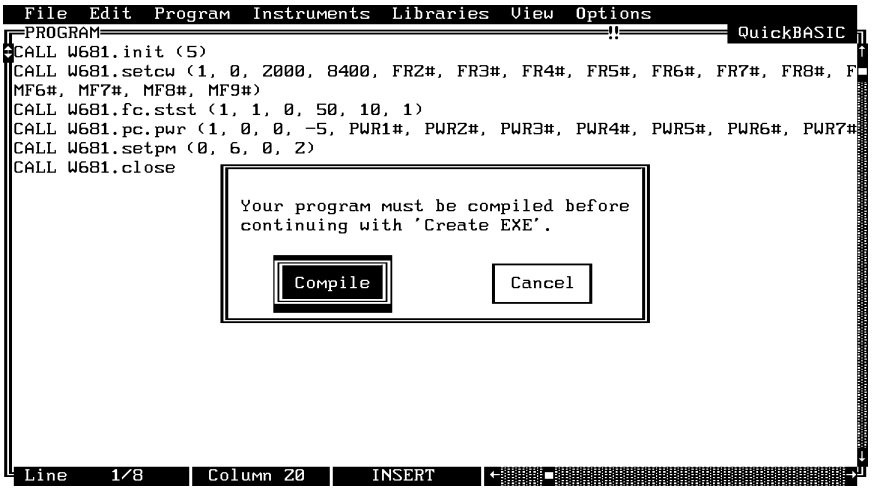
We will start with the program that you completed in the preceeding tutorial. If you did not complete the tutorial, you can type the program listing shown on the preceeding page, and save it as *drive*\LW\PROGRAMS\681SAMP.BAS.

- ☐ Move the cursor to **Instruments,** in the top menu bar, and ensure that the **Wiltron 681XXA/B Synthesized Sweeper** driver is loaded. If it is not loaded, refer to pages 2-4 and 2-5 for instructions.

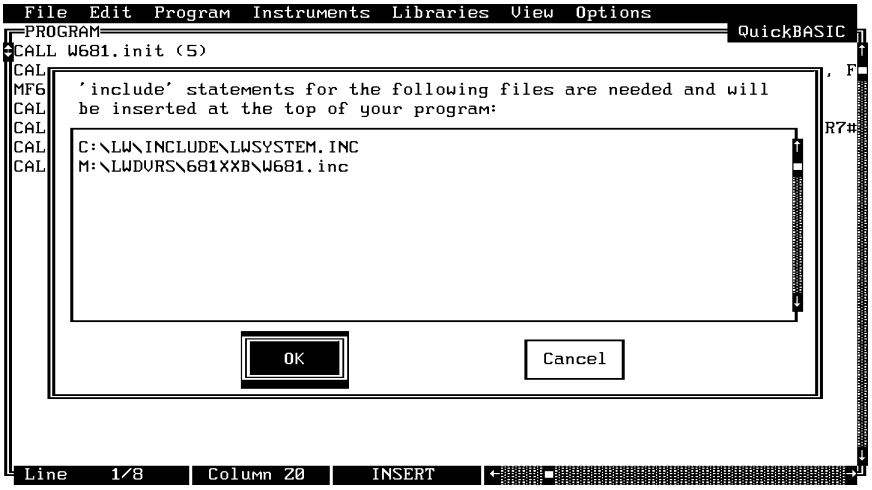
- ☐ Move the cursor to **File,** in the top menu bar, and select **Create EXE** from the pull-down menu (below).



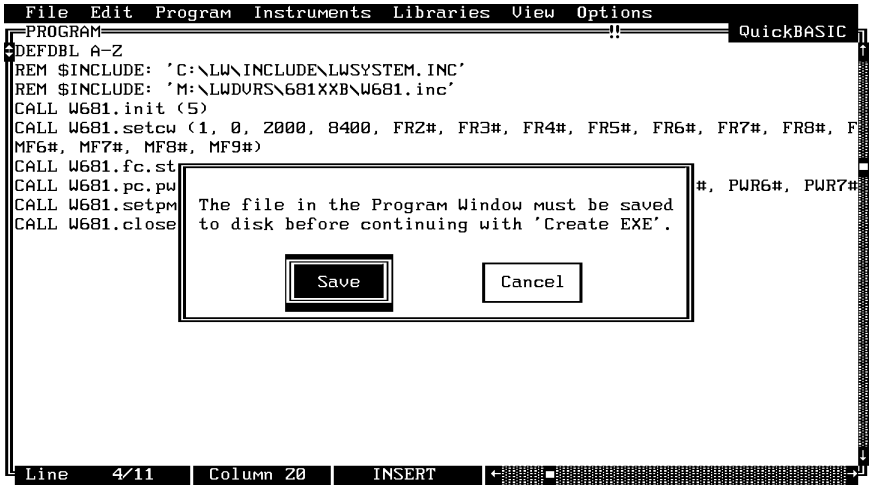
☐ Choose **Compile** (or **Check Syntax**, if you have run the program before), when the next prompt appears.



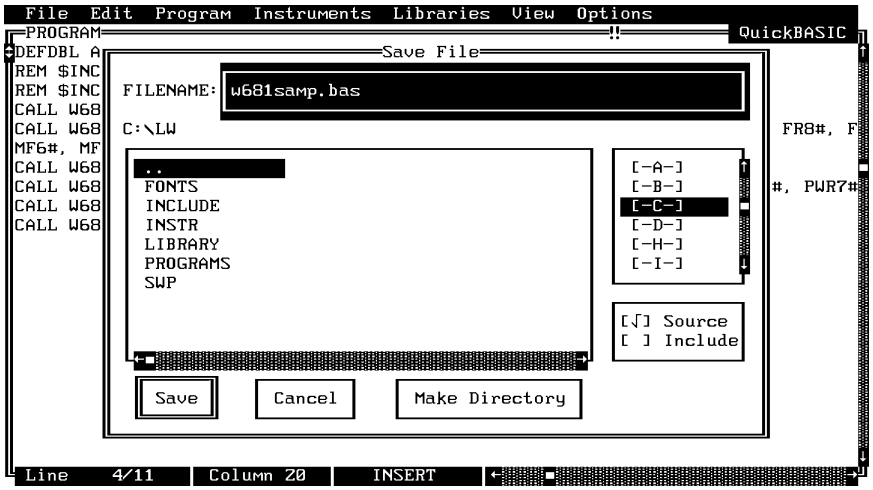
☐ Answer **OK** to the next prompt. This will include calls to the two required files shown in the file list. These files contain code needed to run your application.



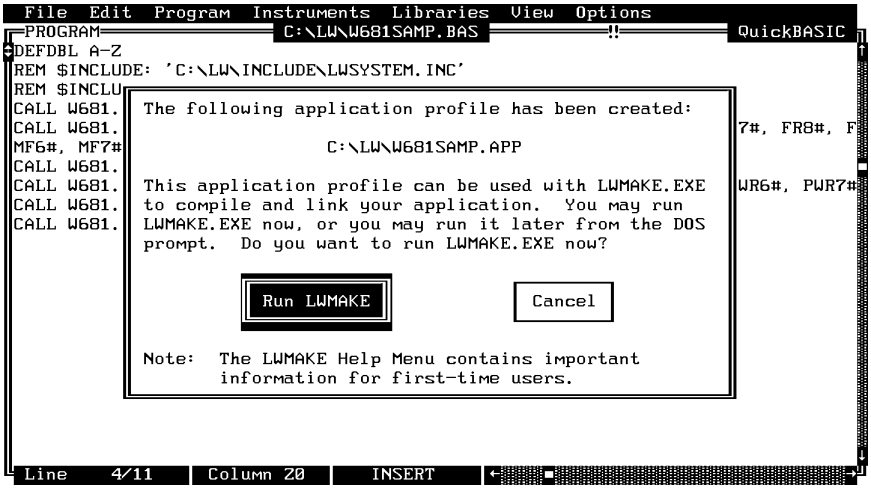
☐ Choose **Save** for the next prompt, below.



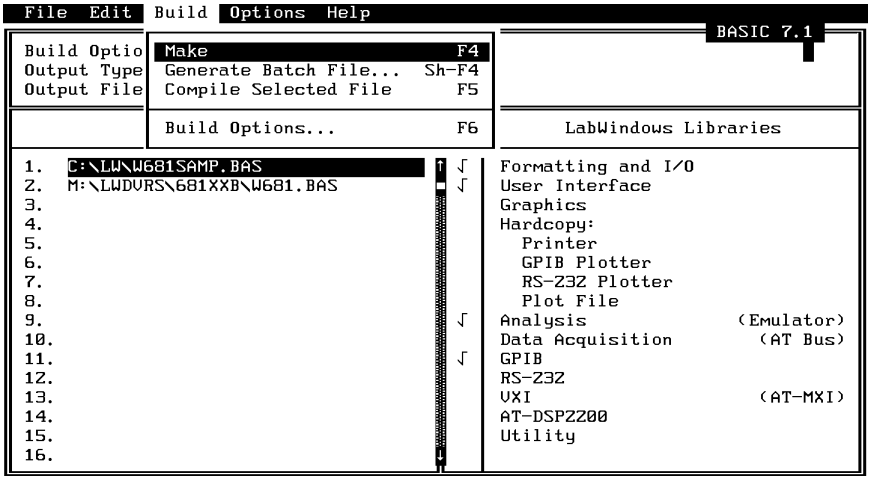
☐ Choose **Save,** again, to save the changes to the file.



☐ Choose **Run LWMAKE,** in the next prompt.



☐ Move cursor to **Build** and choose **Make** from the pull-down menu. (**Note:** This assumes that the compile, link, and output paths have been previously defined under the LWMAKE Options menu.)



☐ At the conclusion of the processing that occurs next, the DOS executable file W681SAMP.EXE will appear in the subdirectory containing the like-named BASIC file. Press <ENTER> to return to the LWMAKE screen. To return to the LabWindows PROGRAM window, select **QUIT-Return to LabWindows** from the **File** menu.

☐ To check your handiwork, choose **DOS SHELL** from the **File** menu. At the ensuing DOS prompt, type W681SAMP to run the program.

Section 3

Driver References

Section 3
Driver References

Introduction

This section lists all the 681XXA/B Instrument Driver function calls in alphabetical order. Throughout this chapter the 681XXA/B Instrument Driver will be referenced as 681XXA/B Instrument Driver.

Function Panel Structure

The 681XXA/B Labwindows Driver contains 20 panels that provide an intuitive method for coding instrument functions. Figure 3-1 shows the hierachial structure of the functional panels. Table 3-1 lists these panels and shows the page number on which they are described.

Table 3-1. Functional Panels

Panel Name	Page No.	Panel Name	Page No.
Alternate Sweep	3-8	Output Power	3-26
AM Modulation	3-34	Output Power Sweep	3-30
Close	3-6	Pulse Modulation	3-42
CW	3-10	Recall Setup	3-44
Delta Sweep	3-12	Save Setup	3-46
Frequency Modulation	3-38	Source Frequency Def	3-20
Frequency Setup	3-36	Special Sweep	3-14
Initialize	3-18	Start/Stop Sweep	3-16
Marker Selection	3-40	User Power Calibrate	3-28
Output Leveling	3-22	Utilities	3-48

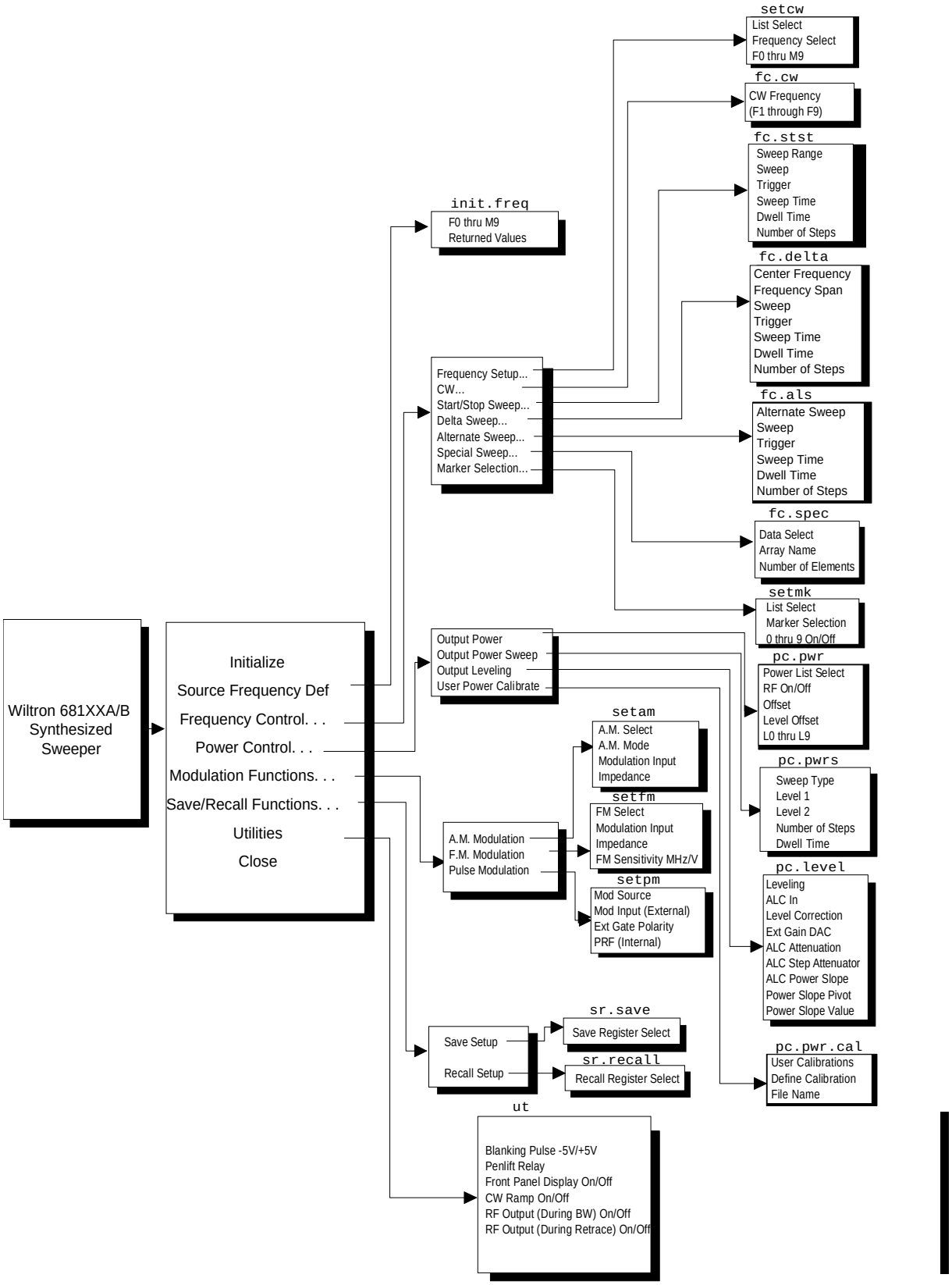
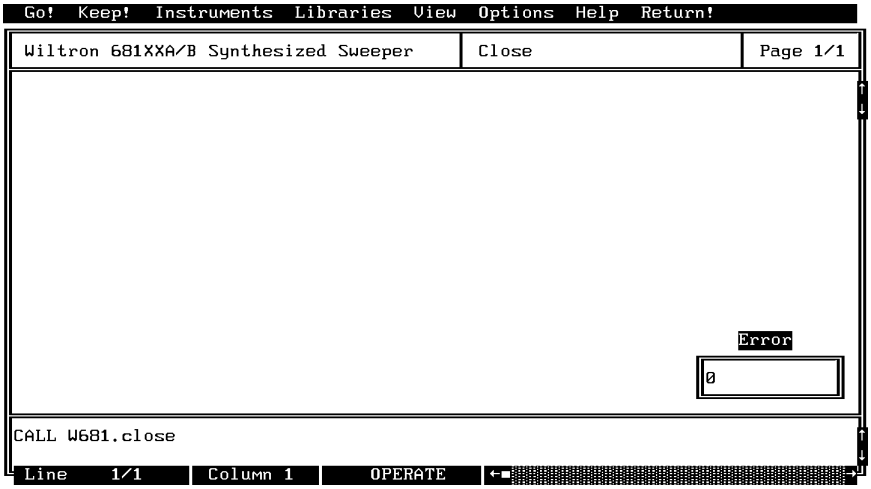


Figure 3-1. Function Panel Tree

close

Function Panel Name: Close

Description: This function closes the GPIB communications with the 681XXA/B.



Controls:

None

Input Parameters: None.

Output Parameters: None.

Error: LabWindows error codes only 220 to 240.
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Close communications with the driver.
CALL W681.close
```

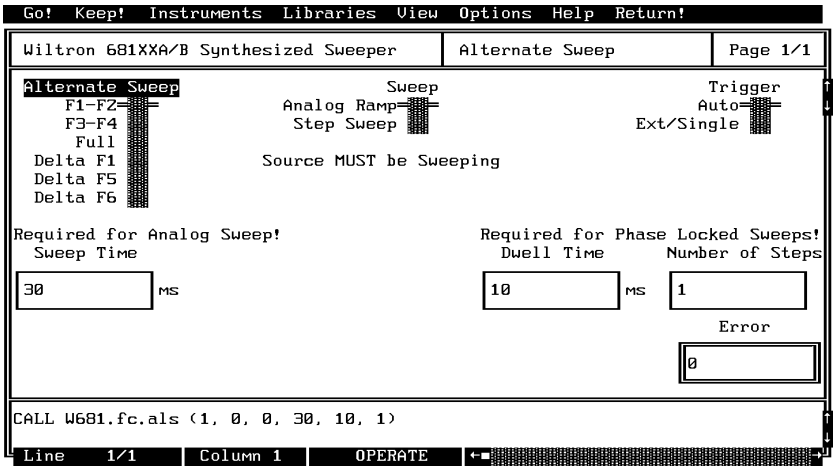
Microsoft C:

```
/* Close communications with the driver. */
W681_close
```

fc.als

Function Panel Name: Alternate Sweep

Description: This function lets users alternate an existing analog ramp or phase-locked sweep with another like-type sweep. The source must be sweeping prior to using this function or no action is taken.



Controls:

Alternate Sweep: Lets users select the sweep range that will alternate with the primary sweep: F1–F2, F3–F4, Full, Delta F5 (Δ F5), Delta F6 (Δ F6), Delta F1 (Δ F1).

Sweep: Lets users select an analog or a phase-locked (digitally stepped) alternate sweep.

Trigger: Lets users select the triggering source for the alternate sweep:

- **Auto:** Sweep is triggered automatically by the 681XXA/B.
- **Ext/Single:** Sweep can be triggered manually by supplying a TTL pulse to pin 13 of the rear panel AUX I/O connector. The ability to launch a single sweep internally is currently inoperative.

Sweep Time: Lets users enter the time required for one analog sweep (no entry required for phase-locked sweep).

Dwell Time: Lets users enter the dwell time between adjacent frequency steps for a phase-locked sweep (no entry required for analog sweep).

Number of Steps: Lets users enter the number of frequency steps for a phase-locked sweep (no entry required for analog sweep).

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details	Range
ALTS%	Integer	Alternate Sweep	1, F1–F2 (D) 2, Full Band 3, F3–F4 4, Delta F1 5, Delta F5 6, Delta F6	N/A
SWEEP%	Integer	Sweep Type	0, Analog Ramp (D) 1, Step Sweep	N/A
TRIGG%	Integer	Trigger Conditions	0, Auto (D) 1, Ext/Single (Currently inoperative)	N/A
SWEEPT#	Real	Analog Sweep Time	30 ms (D)	30 ms to 99 s.
DTIME#	Real	Phase-locked Dwell Time	10 ms (D)	1 ms to 99 s.
NUMST%	Integer	Number of Steps For Phase Locked Sweeps	1 (D)	1 to 10,000 steps.

Output Parameters: None.

Error: LabWindows error codes 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Selects sweep to alternate with main sweep.
CALL W681.fc.als (ALTS%, SWEEP%, TRIGG%, SWEEPT#, DTIME#, NUMST%)
```

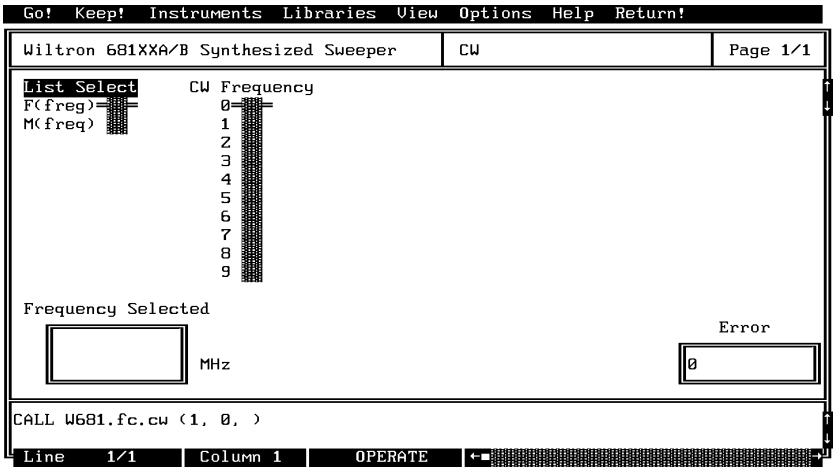
Microsoft C:

```
/*Selects sweep to alternate with main sweep. */
W681_fc.als (ALTS, SWEEP, TRIGG, SWEEPT, DTIME, NUMST)
```

fc.cw

Function Panel Name: CW

Description: This function lets users select the desired CW output frequency from the values already stored in the 681XXA/B frequency registers (F1 thru F9).



Controls:

List Select: Lets users select the F0–F9 frequency set or the M0–M9 frequency set.

CW Frequency: Lets users select CW output frequency from one of the twenty user-defined frequency registers: F0 through F9 or M0 through M9 (see setcw function, page 3-35).

Frequency Selected: Returns the CW frequency currently stored in the selected register, in MHz.

Input Parameters:

Variable Name	Variable Type	Description	Details
LS%	Integer	List Select	1 = F(freq) 2 = M(freq)
FREQSEL%	Integer	The frequency of operation	1–9

Output Parameters:

Variable Name	Variable Type	Description	Details
FSEL#	Double Precision	Frequency returned from 681XXA/B.	

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Select a CW frequency and value.
CALL W681.fc.cw (LS%,FREQSEL%,FSEL#)
```

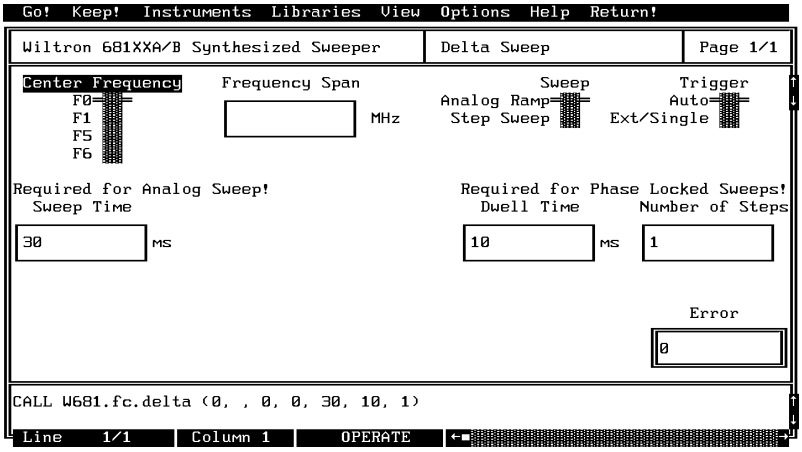
Microsoft C:

```
/* Select a CW frequency and value.*/
W681_fc_cw (LS,FREQSEL,FSEL)
```

fc.delta

Function Panel Name: Delta Sweep

Description: This function lets users set a center frequency and span for the sweep range.



Controls:

Center Frequency: Lets users select (Delta- F (Δ Fn) center frequency) a frequency storage location: 1, 5, or 6.

Frequency Span: Lets users select a sweep width (span) in MHz. The 681XXA/B will sweep upwards in frequency from *Center – (span/2) to Center + (span/2).*

Sweep: Lets users select either an analog or a phase-locked digitally stepped sweep.

Trigger: Lets users select the triggering source for the delta sweep:

- **Auto:** Sweep is triggered automatically.
- **Ext/Single:** Sweep can be triggered manually by supplying a TTL pulse to pin 13 of the rear panel AUX I/O connector. The ability to launch a single sweep internally is currently inoperative.

Sweep Time: Lets users enter the time required for one analog sweep.

Dwell Time: Lets users enter the dwell time for a phase-locked sweep.

Number of Steps: Lets users enter the number of frequency steps for a phase-locked sweep.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details	Range
CFREQ%	Integer	Center Frequency	1, F1 (D) 5, F5 6, F6	
FSPAN#	Double Precision	Frequency Span(MHz)		(Analog Sweep) 1 MHz to full range of 681XXA orB. (Digital Sweep) 1 kHz to full range of 681XXA or B.
SWEEP%	Integer	Sweep Type	0, Analog Ramp (D) 1, Step Sweep	
TRIGG%	Integer	Trigger Conditions	0, Auto (D) 1, Ext/Single (Currently inoperative)	
SWEEPT#	Double Precision	Analog Sweep Time	30 mSec (D)	30 ms to 99 s.
DTIME#	Double Precision	PhaseLocked Dwell Time	10 mSec (D)	1 ms to 99 s.
NUMST%	Integer	Number of Steps For Phase Locked Sweeps	1 (D)	1 to 10,000 steps

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Selects delta sweep.
CALL W681.fc.delta (CREQ%, FSPAN#, SWEEP%, TRIGG%, SWEEPT#,
DTIME#, NUMST%)
```

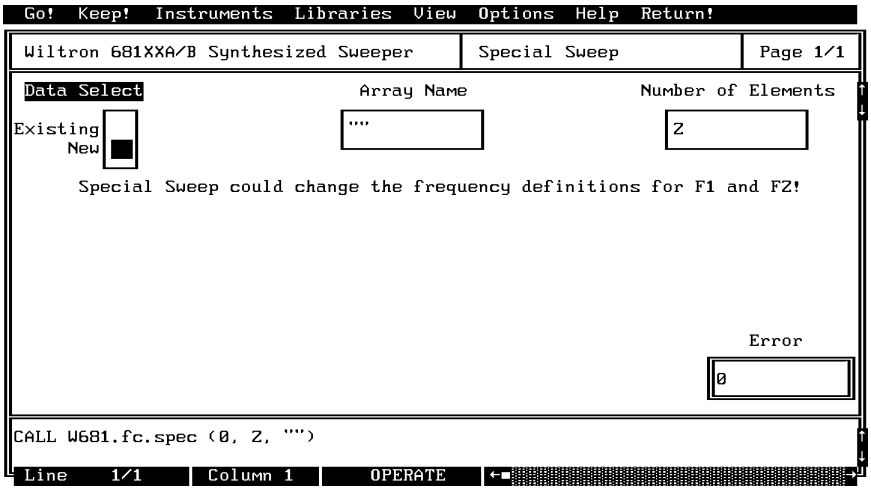
Microsoft C:

```
/* Selects delta sweep. */
W681_fc_delta (CREQ, FSPAN, SWEEP, TRIGG, SWEEPT, DTIME, NUMST);
```

fc.spec

Function Panel Name: Special Sweep

Description: This function lets users specify frequencies and the order that the frequency will be output. The operator can specify up to 1000 discrete frequencies.



Controls:

Data Select: Lets users select between new and existing *.wsw (disk file) data.

Array Name: Lets users enter the name of the data-array holding the new or existing data. If no array name is entered, the special sweep will still be generated. However, it will not be stored to disk in the current default directory.

Number of Elements: Enter the number of frequencies for a user-defined special sweep. The number of steps = (the number of frequencies –1).

Input Parameters: Same as controls.

Variable Name	Variable Type	Description	Details
DSEL%	Integer	Data select	0 = New data file 1 = Existing data file
DPTS%	Integer	Number of Elements	Number of frequencies to be entered or recalled.
TEST$	String	File Name	If no file name is entered the special sweep is still generated but not saved. The driver automatically appends a ".wsw" extension to the user-entered filename. The file is saved to the current default directory.

Output Parameters: None.

Error: LabWindows error codes only 220 to 240. If debug 3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Lets operator enter frequencies in Gigahertz for a user-defined (special) sweep.
CALL W681.fc.spec (DSEL%,DPTS%,TEST$)
```

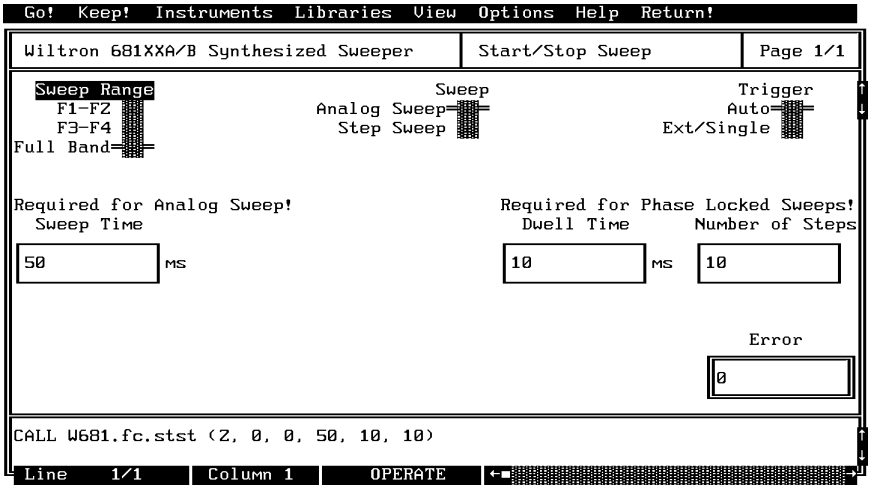
Microsoft C:

```
/* Lets operator enter frequencies in Gigahertz for a user-defined  (special) sweep. */
W681_fc_spec  (DSEL,DPTS,TEST)
```

fc.stst

Function Panel Name: Start/Stop Sweep

Description: This function lets users select the 681XXA/B sweep range. The function uses the existing definitions for CW frequencies. The user has the opportunity to select the source trigger conditions and set sweep time — if in analog sweep. Or they can select dwell time and number of steps — if in phase locked sweep.



Controls:

Sweep Range: Lets users select the primary sweep range: F1–F2, F3–F4, or Full band.

Sweep: Lets users select an analog or a phase-locked (digitally stepped) primary sweep.

Trigger: Lets users select the triggering source for the primary sweep:

Auto: Sweep is triggered automatically by the 681XXA/B.

Ext/Single: Sweep can be triggered manually by supplying a TTL pulse to pin 13 of the rear panel AUX I/O connector. The ability to launch a single sweep internally is currently inoperative.

Sweep Time: Lets users enter the time required for one analog sweep (no entry required for phase-locked sweep).

Dwell Time: Lets users enter the dwell time between adjacent frequency steps for a phase-locked sweep (no entry required for analog sweep).

Number of Steps: Lets users enter the number of frequency steps for a phase-locked sweep (no entry required for analog sweep).

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details	Range
SWRANGE%	Integer	Sweep Range	1,F1–F2 2, Full Range (D) 3, F3–F4	N/A
SWEEP%	Integer	Sweep Type	0, Analog Ramp (D) 1, Step Sweep	N/A
TRIGG%	Integer	Trigger Conditions	0, Auto (D) 1, Ext/Single (Currently inoperative)	N/A
SWEEPT#	Double Precision	Analog Sweep Time	30 mSec (D)	30 ms to 99 s
DTIME#	Double Precision	PhaseLocked Dwell Time	0 mSec (D)	1 ms to 99 s.
NUMST%	Integer	Number of Steps For Phase Locked Sweeps	1 (D)	1 to 10,000 steps.

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Selects a primary (main) sweep.
CALL W681.fc.stst (SWRANGE%, SWEEP%, TRIGG%, SWEEPT#, DTIME#,
NUMST%)
```

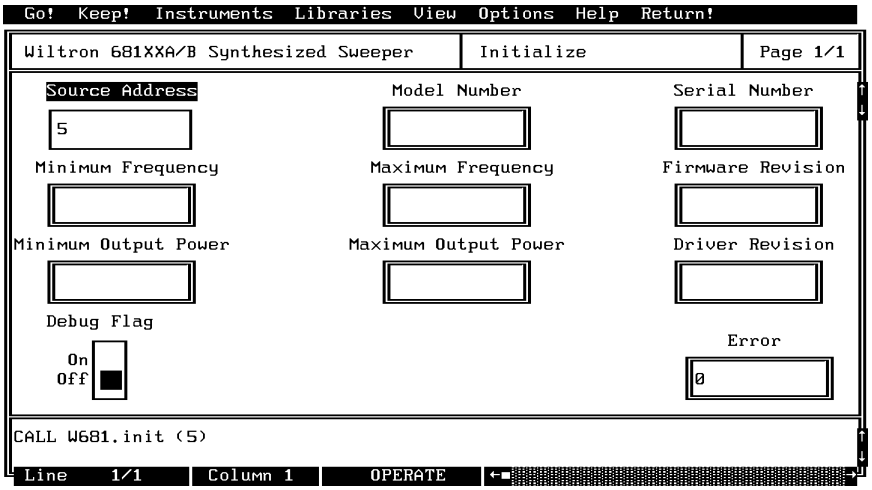
Microsoft C:

```
/* Selects a primary (main) sweep. */
W681_fc.stst (SWRANGE, SWEEP, TRIGG, SWEEPT, DTIME, NUMST)
```

init

Function Panel Name: Initialize

Description: This function opens the GPIB communication with the 681XXA/B and sets it to its preset state. The device configuration must already be completed.



Controls:

Source Address: Lets users enter a GPIB address for the 681XXA/B. The factory-set default address is 5.

Model Number: Displays the returned 681XXA/B model number.

Firmware Rev: Displays the returned firmware revision level.

Minimum Frequency: Displays the returned minimum frequency for a full band sweep.

Maximum Frequency: Displays the returned maximum frequency for a full band sweep.

Serial Number: Displays the returned 681XXA/B serial number.

Minimum Output Power: Displays the returned minimum output power to which the 681XXA/B can be set.

Maximum Output Power: Displays the returned maximum output power to which the 681XXA/B can be set.

Driver Rev.: Displays the driver's revision level.

Debug Flag: Lets users turn the Debug Utility on or off. This utility is discussed on page 2-6.

Input Parameters: Same as controls.

Variable Name	Variable Type	Description	Details	Range
ADD%	Integer	GPIB Address	1–9, 5 (D)	1 to 31

Output Parameters:

Variable Name	Variable Type	Description	Details
LOWF$	String	Returned minimum frequency	681XXA/B OI string is parsed to supply values for the string variables shown in this table
HIGH$	String	Returned maximum frequency	
MODEL$	String	Returned model number	
SWRV$	String	Returned software revision number	
MINPWR$	String	Returned minimum power level	
GPWR$	String	Returned guaranteed power level	
SSN$	String	Returned instrument serial number	

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Initializes the 681XXA/B.
CALL W681.init (ADD%)
```

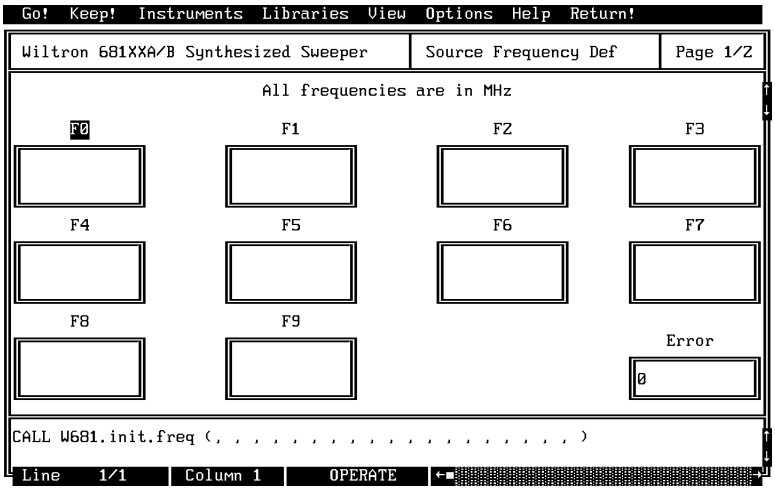
Microsoft C:

```
/* Initializes the 681XXA/B. */
W681_init (ADD)
```

init.freq

Function Panel Name: iSource Frequency Def(inition)

Description: This function returns the values of the frequencies (F0–F9, M0–M9) that are presently stored in the 681XXA/B storage registers. All frequencies are returned in megahertz. There are no operator inputs.


Go! Keep! Instruments Libraries View Options Help Return!
Wiltron 681XXA/B Synthesized Sweeper
Source Frequency Def
Page 1/2
All frequencies are in MHz
F0
F1
F2
F3
F4
F5
F6
F7
F8
F9
Error
0
CALL W681.init.freq (, , , ,

Input Parameters: None.

Output Parameters:

Variable Name	Variable Type	Description
F0# thru F9#	Double Precision	CW frequencies active in the storage registers.
M0# thru M9#	Double Precision	CW frequencies active in the storage registers.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Get the value for up to twenty frequencies.
W681.init.freq (F0#,F1#,F2#,F3#,F4#,F5#,F6#,F7#,F8#,F9#
M0#,M1#,M2#,M3#,M4#,M5#,M6#,M7#,M8#,M9#)
```

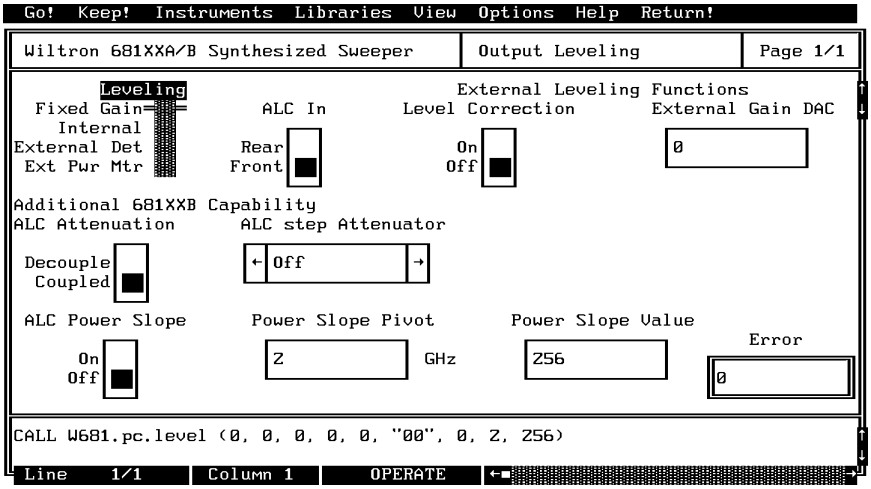
Microsoft C:

```
/* Get the value for up to nine frequencies. */
W681_init_freq (F0,F1,F2,F3,F4,F5,F6,F7,F8,F9
M0,M1,M2,M3,M4,M5,M6,M7,M8,M9)
```

pc.level

Function Panel Name: Output Leveling

Description: This function lets users select the power leveling mode(s).



Controls:

Leveling Lets users select the leveling mode for the output power.

Fixed Gain: ALC is disabled. The RF Level DAC and step attenuator (if installed) control the relative power level. Power is not detected at any point, and the absolute power level is uncalibrated.

Internal: Output power is leveled using an internal detector in the directional coupler to sample the output signal.

External Det: Output power is leveled using an external detector to sample the output signal.

Ext Pwr Mtr: Output power is leveled by using the "recorder voltage" from an external power meter. The 681XXA/B is compatible with power meters having a ±1 V full scale analog output.

ALC In: Lets user select rear or front panel ALC input for external leveling.

External Leveling Functions:

Level Correction:	Turns the leveling correction from the external detector or power meter on or off.
Ext Gain DAC:	Allows adjustment of the external-level-gain DAC to optimize loop stability.Enter a value between 0 and 256.
ALC Step Attenuation:	Couples or decouples the step attenuator from the ALC loop.
ALC Step Attenuator:	Pressing the right arrow turns the optional step attenuator on and increases it in 10 dB steps to 110 dB.
ALC Power Slope:	Lets users turn ALC power slope on or off. Power slope compensates for system, cable, and waveguide varations due to changes in frequency.
Power Slope Pivot:	Lets user enter a model-dependent frequency value for the power slope pivot point. Pivot point can be any frequency within the range of the instrument.
Power Slope Value:	Lets user enter a value for the ALC slope DAC of between 0 and 256.

Input Parameters: (D) is default setting

Variable Name	Variable Type	Description	Details	Range
LEV%	Integer	Leveling	0, Fixed Gain (D), 1, Internal 2, Ext Det 3, Ext Pwr Mtr	N/A
ALCCP%	Integer	ALC Attenuation	0, Coupled (D) 1, Decouple	
LVC%	Integer	Level Correction	0, Off (D) 1, On	N/A
EXG%	Integer	Ext Gain Cal	0, Off (D) 1, On	N/A
EXDAC#	Double Precision	Ext Gain DAC	0 (D)	0 to 255
ALCIN%	Integer	ALC In	0, Front (D) 1, Rear	N/A
ATT$	String	ALC Step Attenuator	"00" = Off (D) "01" = 10 dB "02" = 20 dB "03" = 30 dB "04" = 40 dB "05" = 50 dB "06" = 60 dB "07" = 70 dB "08" = 80 dB "09" = 90 dB "10" = 100 dB "11" = 110 dB	N/A
ALCPS%	Integer	ALC Power Slope	0, Off (D) 1, On	
PVT#	Double Precision	Power Slope Pivot		
VL%	Integer	Power Slope Value		

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Select the leveling mode.
CALL W681.pc.level (LEV%,ALCCP%,LVC%,EXG%,EXDAC#,
ALCIN%,ATT$,ALCPS%,PVT#,VL%)
```

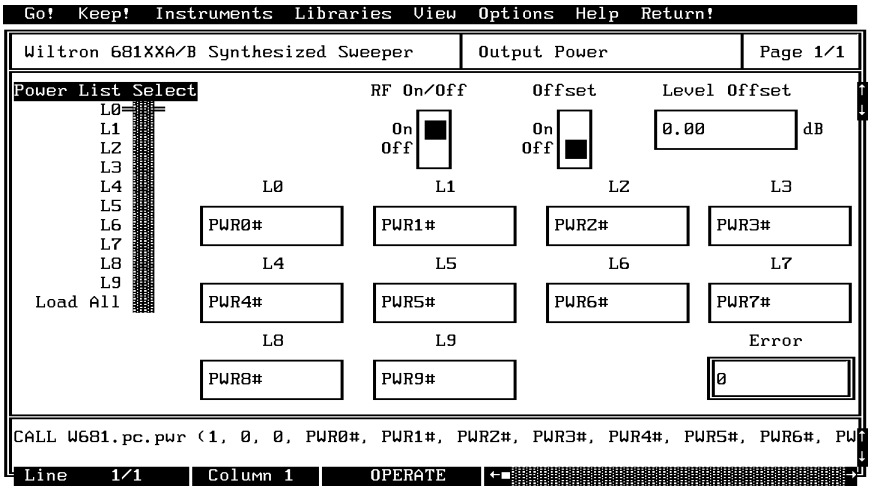
Microsoft C:

```
/* Select the leveling mode. */
W681.pc_level (LEV,ALCCP,LVC,EXG,EXDAC,
ALCIN,ATT,ALCPS,PVT,VL)
```

pc.pwr

Function Panel Name: Output Power

Description: This function lets users set the output power level using an editable list of values. It also provides for turning the level offset function on or off and setting its value.



Controls:

Power List Select: Lets users select a power level parameter for loading in the 681XXA/B.

L0 – L9: Opens the selected parameter and lets its value to be set and selected as the instrument output power level.

Load All: Opens all parameters and lets their value be set and the L9 parameter selected as the instrument output power level.

RF On/Off: Lets users turn the RF output power on or off.

Offset: Lets users turn the Level Offset function on or off.

Level Offset: Lets user enter a level offset value, when the function is turned on. This value compensates for a device in the output line that alters the level of the output power signal before being applied to the device-under-test.

L0 thru L9: Provide for entering power level values.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details	Range
PWRSEL%	Integer	Power List Select	0 = L0 (D) 1 = L1 2 = L2 3 = L3 4 = L4 5 = L5 6 = L6 7 = L7 8 = L8 9 = L9 10 = Load All	
OTP%	Integer	RF On/Off	0 = Off 1 = On (D)	
LEVOFF#	Double Precision	Level Offset	Value of Power Offset	+100 dB to –100 dB
LVLP%	Integer	Level Offset On/Off	0, Off (D) 1, On	N/A
PWR0# thru PWR9#	Double Precision	L0 thru L9		Model dependent.

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Set output power.
CALL W681.pc.pwr
(PWRSEL%,OTP%,LEVOFF#,LVLP%,PWR0#,PWR1#,PWR2#,PWR3#,PWR4#,PW
R5#,
PWR6#,PWR6#,PWR7#,PWR8#,PWR9#)
```

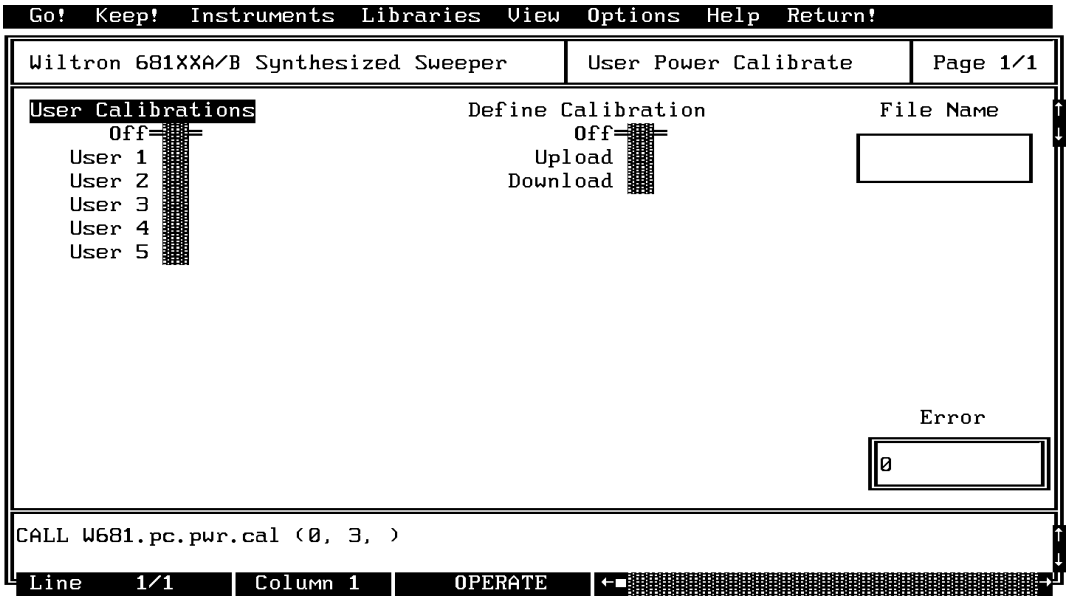
Microsoft C:

```
/* Set output power. */
W681_pc_pwr (PWRSEL,OTP,LEVOFF,LVLP,PWR0,PWR1,PWR2,PWR3,
PWR4,PWR5,PWR6,PWR6,PWR7,PWR8,PWR9)
```

pc.pwr.cal

Function Panel Name: User Power Calibrate

Description: This function lets users enable and disable up to five internal power level correction tables created using the 681XXB User Cal feature. This function also permits the user to upload and download the user cal cata for all five table from an external computer. The purpose of the User Cal feature is to provide compensation for power level variations caused by external switching, amplifiers, couplers, and cables in the test setup.



Controls:

User Calibrations: Lets users activate a numbered, pre-defined, power level-flatness-correction table stored within the 681XXB.

Define Calibration:

Off: Lets users turn the level-correction feature off.

Upload: Uploads to disk all five of the level-correction tables stored in the 681XXB to the filename specified in the "File Name" field.

Download: Downloads data from the disk "File Name" file to the 681XXB that fills all five memory "User x" locations in the 681XXB.

CAUTION

Downloading data from the disk overwrites any data that was previously stored in these User x memory locatgions.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details
UCAL%	Integer	User Calibration	0 =Off (D) 1 = User 1 2 = User 2 2 = User 3 4 = User 4 5 = User 5
DCAL%	Integer	Define Cal	1 = Off(D) 2 = Upload 3 = Download
FAME$	String	File Name	8 characters maximum

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Set user cal feature power.
CALL W681.pc.pwr.cal (UCAL%,DCAL%,FAME$)
```

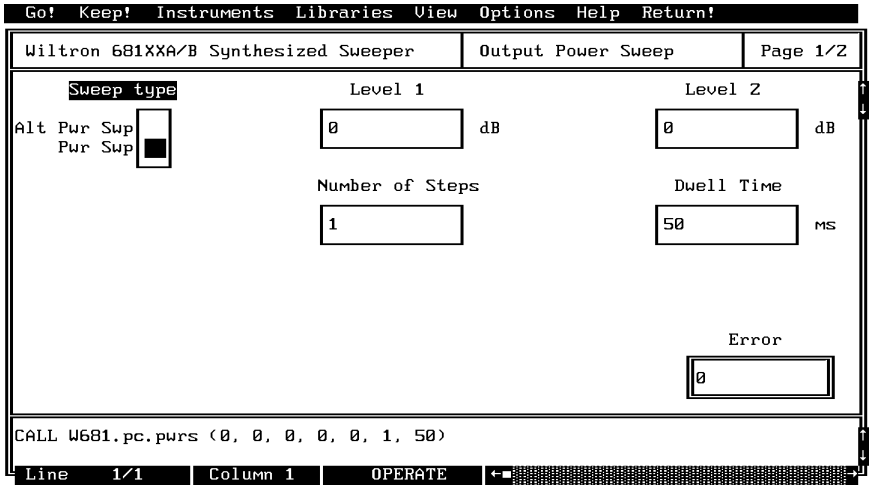
Microsoft C:

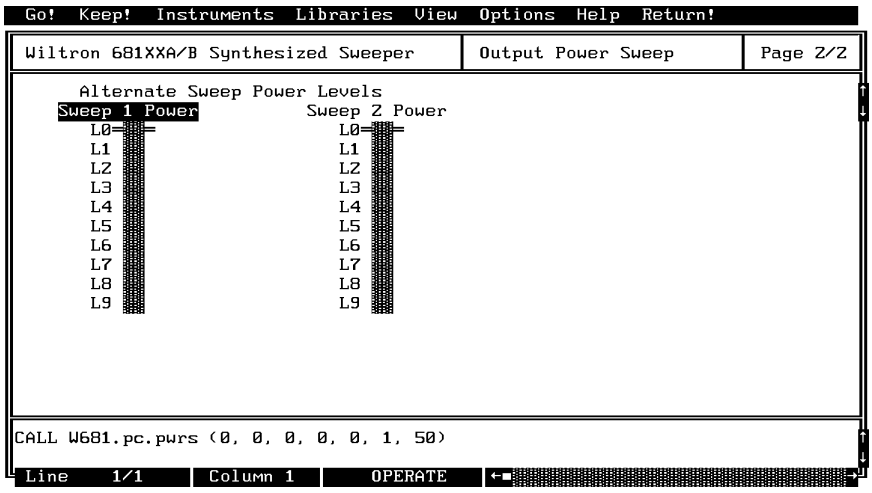
```
/* Set user cal feature power. */
W681_pc_pwr_cal (UCAL,DCAL,FAME)
```

pc.pwrs

Function Panel Name: Output Power Sweep

Description: This function lets users set up the power sweep mode of operation.





Controls:

Sweep Type: Lets users select the sweep type.

Level 1 : Lets users enter the setting in dBm for the start power level value. This is the start value for the power sweep.

Level 2 : Lets users enter the setting in dBm for the stop power level value. This is the stop value for the power sweep.

NOTE

Power sweep can be from high to low or low to high power levels. Therfore, the Level 1 (start) power could be higher or lower than the Level 2 (stop) power.

Number of Steps: Lets users enter the number of discrete power points (steps) at which the sweep will pause (as set using Dwell Time control).

Dwell Time: Lets users enter the length of time they want the power sweep to remain (dwell) at each step.

Alternate Sweep Power Levels

Sweep 1 Power: Lets users select L0–L9 as the Alternate Sweep Level 1parameter. *(Press the <Page Down> key to access the page 2 function panel.)*

Sweep 2 Power: Lets users select L0–L9 as the Alternate Sweep Level 2 parameter. *(Press the <Page Down> key to access the page 2 function panel.)*

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details	Range
PST%	Integer	Sweep Type	0 = Pwr Swp (D) 1 = Alt Pwr Swp	N/A
LVL1#	Real	Level 1 Output Power	0 dBm (D)	Depends on particular 681XXA model and whether Option 2X Step Attenuator is fitted. Refer to 681XXA Operation Manual for details.
LVL2#	Real	Level 2 Output Power	0 dBm (D)	Same as above.
NUMST%	Integer	Number of Steps from Level 1 to Level 2	1 step (D)	0.01 to full power of instrument, which is model dependent.
DWT#	Real	Dwell Time At Each Step	50 ms (D)	1 ms to 99 s.
LVLS1%	Integer	Sweep 1 Power	Alternate Sweep 1 Power	Same as LVL1 above
LVLS2%	Integer	Sweep 2 Power	Alternate Sweep 2 Power	Same as LVL1 above

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Define the power sweep.
CALL W681.pc.pwrs (PST%,LVL1#,LVL2#,NUMST%,DWT#,LVLS1%,LVLS2%)
```

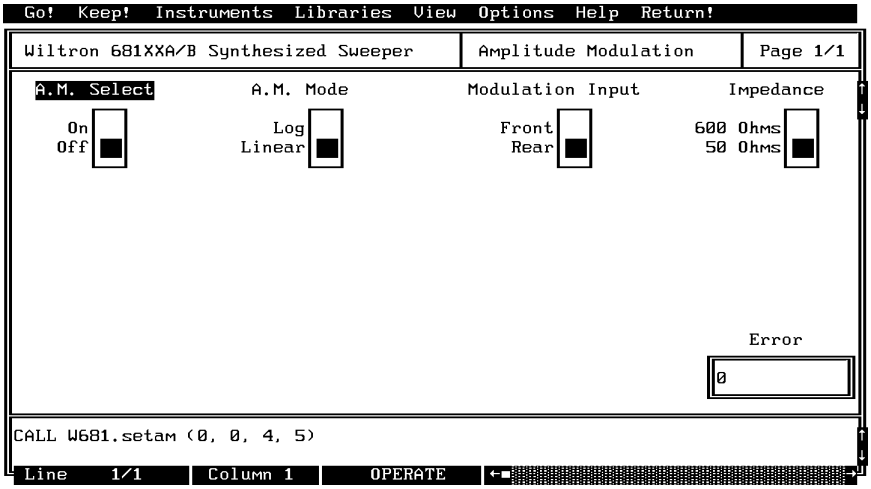
Microsoft C:

```
/* Define the power sweep. */
W681_pc_pwrs (PST,LVL1,LVL2,NUMST,DWT,LVLS1,LVLS2)
```

setam

Function Panel Name: Ampliltude Modulation

Description: This function lets users set amplitude modulation (AM) parameters.



Controls:

A.M. Select: Lets users turn AM modulation on or off.

A.M. Mode: Lets users choose between log and linear AM modes.

Log: In this mode, sensitivity is 10 dB/V and the 681XXA accepts a wider range of input signal from the external signal generator. For every –1V input, the RF output level decreases by 10 dB. For every +1V input, the RF output level increases by 10 dB.

Linear: In this mode, sensitivity is 100%/V and the 681XXA accepts a –1V to +1V input signal from an external signal generator. The amplitude of the RF output changes linearly as the AM input changes.

Mod Input: Lets users select front or rear panel AM IN connector.

Impedance: Lets users select 50Ω or 600Ω input impedance.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details
FON%	Integer	AM On:	0, Off (D) 1, On
STYPE%	Integer	AM Mode select	0, Linear (D) 1, Log
INSEL%	Integer	Front or Rear panel AM INPUT select	0, Rear (D) 1, Front (Currently inoperative)
ZSEL%	Integer	Impedance select	0, 50 Ohm (D) 1, 600 Ohm

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Set modulation values for AM.
CALL W681.setam (FON%,STYPE%,INSEL%,ZSEL%)
```

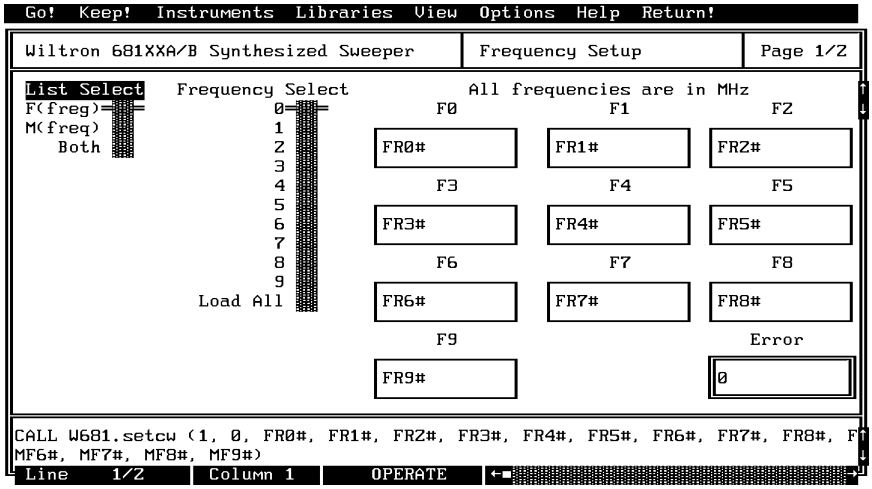
Microsoft C:

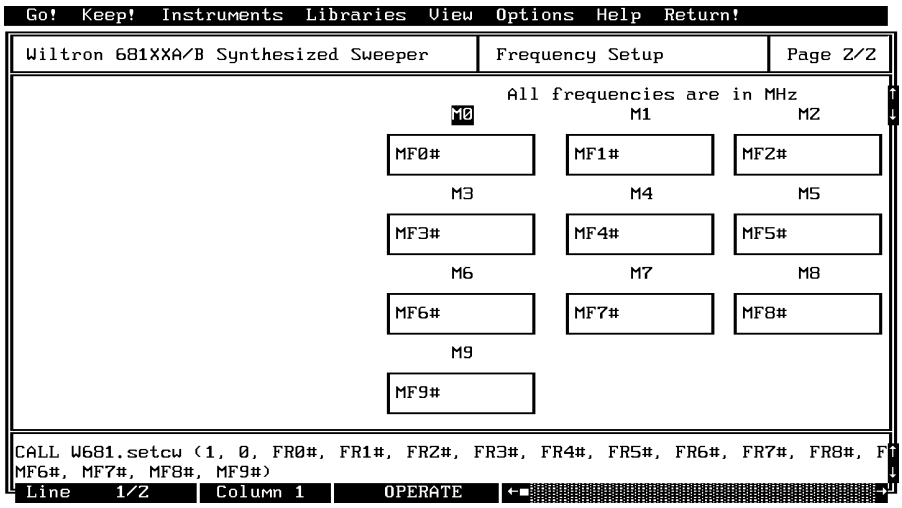
```
/* Set modulation values for AM. */
W681_setam (FON,STYPE,INSEL,ZSEL)
```

setcw

Function Panel Name: Frequency Setup

Description: This function lets users define frequencies for any of the twenty 681XXA/B storage registers.





Controls:

List Select: Lets users select the F0-F9 set, M0-M9 set, or both sets for assignment of frequency values. If "Both" is selected, all defined frequencies will be loaded and the 681XXA/B will be set to output the M-frequency selection (1–9 on Frequency Select control).

Frequency Select: Lets users select any single frequency storage location, or to select all twenty at one time. If more than one frequency is to be defined, the switch must be set to the Load All position. *Press the <Page Down> key to call up page 2 and the Mx set for assigning frequency definitions*

F0 thru F9
M0 thru M9: Let users enter a frequency value in MHz for storage in the applicable location (register).

Input Parameters:

Variable Name	Variable Type	Description
FREQSEL%	Integer	Selects Frequencies 1–20, where 20 loads all frequencies.If any other value, it selectively loads that value into the corresponding register. If a selective load is used, that frequency then becomes the active output frequency. If load all is selected (10), then frequency register 9 (F9) becomes the active output when the function is complete.
FRx#	Real	Frequency to be loaded into the storage registers.
MFx#	Real	Frequency to be loaded into the storage registers.

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Select a cw frequency storage location and load frequency value.
CALL W681.setcw
(FREQSEL%,FR0#,FR1#,FR2#,FR3#,FR4#,FR5#,FR6#,FR7#,FR8#,
FR9#,MF0#,MF1#,MF2#,MF3#,MF4#,MF5#,MF6#,MF7#,MF8#,MF9#)
```

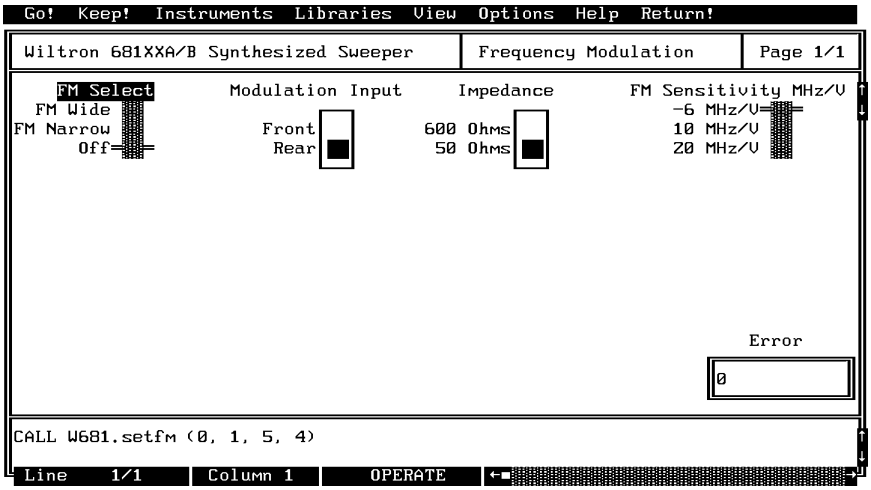
Microsoft C:

```
/* Select a cw frequency storage location and load frequency value. */
W681_setcw (FREQSEL,FR0,FR1,FR2,FR3,FR4,FR5,FR6,FR7,FR8,
FR9,FR0,MF1,MF2,MF3,MF4,MF5,MF6,MF7,MF8,MF9)
```

setfm

Function Panel Name: Frequency Modulation

Description: This function lets users set modulation parameter for frequency modulation using an external modulation source.



Controls:

FM: Lets users select FM bandwidth or turn FM on or off.

FM Wide: Select the wide FM mode that allows for maximum deviations of 100 MHz.

FM Narrow: Select the narrow FM mode that allows for maximum deviations of 50 MHz.

Mod Input: Lets users select front or rear panel FM IN connector. *(Currently, only the rear panel input can be programmed.)*

Impedance: Lets users select 50Ω or 600Ω input impedance.

FM Sensitivity MHz/V: Lets users enter the FM sensitivity value.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details
FON%	Integer	FM	0 = Off (D) 1 = On 2 = Wide 3 = Narrow
MODIN%	Integer	Modulation Input	3 = Front 4 = Rear (D)
IMPED%	Integer	Impedance	5 = 50 Ohms (D) 6 = 600 Ohms
SENS#	Real	FM Sensitivity in MHz/Volt	1 = 6 MHz/V 2 = 10 MHz/V 3 = 20 MHz/V

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Setup 681XXA for external fm.
CALL W681.setfm (FON%,MODIN%,IMPED%,SENS#)
```

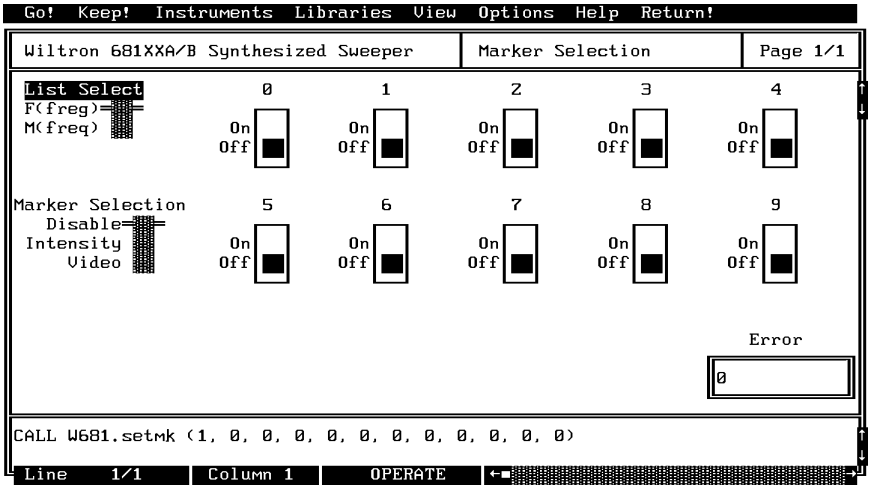
Microsoft C:

```
/* Setup 681XXA for external fm. */
W681_setfm (FON,MODIN,IMPED,SENS)
```

setmk

Function Panel Name: Marker Selection

Description: This function lets users set video and intensity markers.



Controls:

List Select: Lets users select the F0–F1 or M0–M1 frequency set.

Marker Selection: Lets users disable markers or select between Intensity and Video markers.

Disable: Disables the frequency markers.

Intensity: Enables an intensified dot to mark the frequency, provided the selected marker frequency is within the selected frequency range. (Only available in analog sweep mode.)

Video: Enables a video pulse to mark the frequency, provided the selected marker frequency is within the selected frequency range.

0 thru 9: Turns marker on or off at the frequency stored in locations F0 thru F9 or M0 thru M9, based on the position of the List Select control.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details
MKSEL%	Integer	Marker Select	0, Disable (D) 1, Intensity 2, Video
F1% Thru F9%	Integer	Marker:1–9	0, Off (D) 1, On

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Set markers.
CALL W681.setmk (MKSEL%,F1%,F2%,F3%,F4%,F5%,F6%,F7%,F8%,F9%)
```

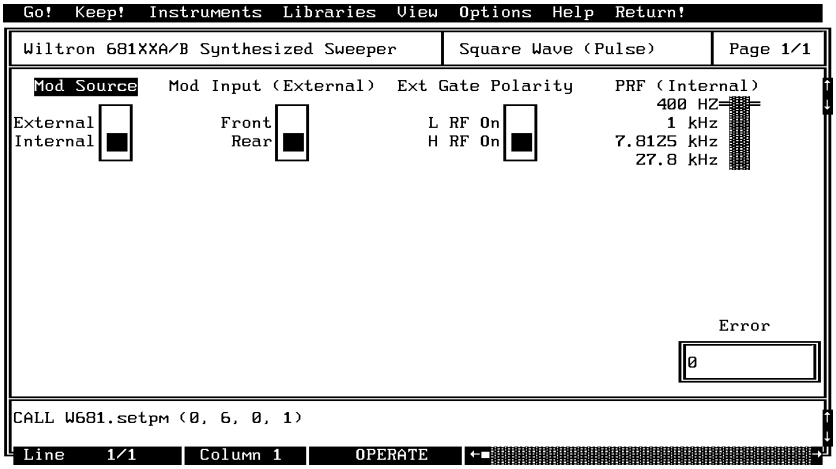
Microsoft C:

```
/* Set markers. */
W681_setmk (MKSEL,F1,F2,F3,F4,F5,F6,F7,F8,F9)
```

setpm

Function Panel Name: Square Wave (Pulse)

Description: This function lets users set square wave modulation parameters.



Controls:

Mod Source: Lets users select a square wave modulation source: External or Internal. The external mode allows an external TTL level square wave to modulate the RF output.

Mod Input: Lets users select front or rear panel ⌐¬ IN connector.

Ext Gate Polarity: Lets users select the polarity of the square wave signal (L [low], or H [high]) that turns the RF on.

PRF (Internal): Lets users select the internal square wave generator's output modulating frequency, 400 Hz, 1 kHz, 7.8125 kHz, or 27.8 kHz.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details
MODS%	Integer	Modulation Source	0, Internal (D) 1, External
MODIN%	Integer	Modulation input select	0, Rear 1, Front (Currently inoperative)
XSP%	Integer	Modulating signal Polarity select	0, H RF On 1, L RF On
IPRF%	Integer	PRF (Internal) select	1, 400 Hz 2, 1 kHz 3, 7.8125 kHz 4, 27.8 kHz

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Set pulse modulation parameters.
CALL W681.setpm (MODS%,MODIN%,XGP%,IPRF%)
```

Microsoft C:

```
/* Set pulse modulation parameters. */
W681_setpm (MODS,MODIN,XGP,IPRF)
```

sr.recall

Function Panel Name: Recall Setup

Description: This function lets users recall an existing source setup from the 681XXA/B internal memory.

Controls:

Recall Register: Lets users select the storage register containing the setup they wish to recall.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details
REG%	Integer	Storage Register, 1 Thru 9	1, (D)

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Recall stored setups.
CALL W681.sr.recall (REG%)
```

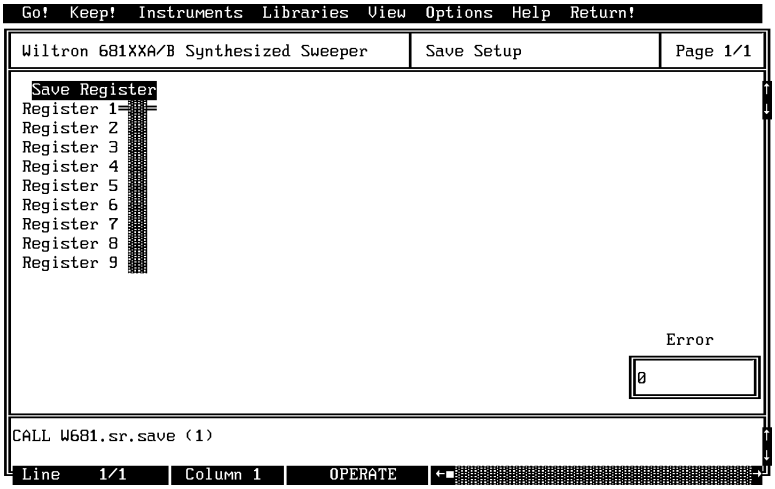
Microsoft C:

```
/* Recall stored setups. */
W681_sr.recall (REG)
```

sr.save

Function Panel Name: Save Setup

Description: This function lets users save an existing setup to the 681XXA/B internal memory.



Controls:

Save Register: Lets users select a storage register for storing a setup they may wish to recall at a later time.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details
REG%	Integer	Save Register, 1 Thru 9	1, (D)

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Recall stored setups
CALL W681.sr.save (REG%)
```

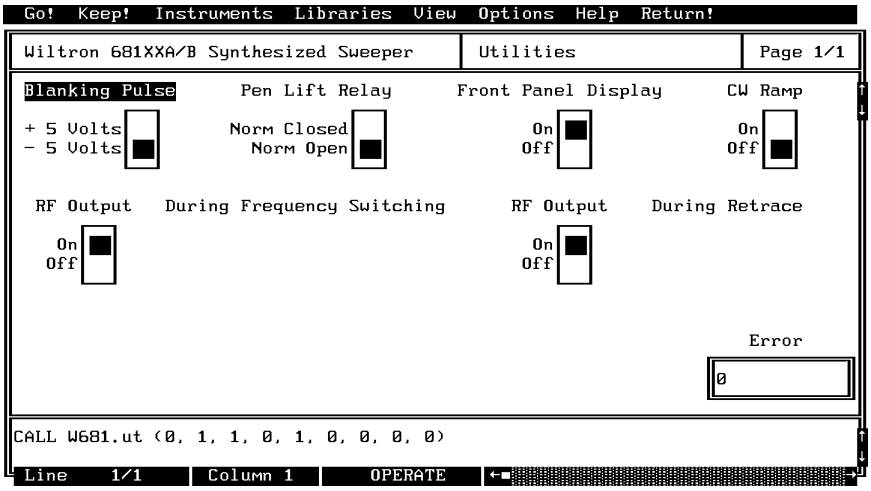
Microsoft C:

```
/* Recall stored setups */
W681_sr.save (REG)
```

ut

Function Panel Name: Utilities

Description: This function lets users define many additional functions typically used for advanced applications. It also controls the 681XXA/B during frequency switching and retrace.



Controls:

Blanking Pulse: Lets users select rear panel supplied blanking pulse to be ±5 volts during sweep retrace.

Pen Lift Relay: Lets users select between normally open (NO) and normally closed (NC) for the 681XXA pen lift relay.

Front Panel Disp: Lets users turn the front panel displays on or off.

CW Ramp: Lets users turn the CW Ramp function on or off. This function causes a 0–10 volt horizontal ramp to be supplied to the rear panel HORIZONTAL OUTPUT connector during CW operations.

RF Output – During Frequency Switching: Lets users turn the RF output on or off during bandswitching.

RF Output – During Retrace: Lets users turn the RF output on or off during sweep retracing.

Input Parameters: (D) is default setting.

Variable Name	Variable Type	Description	Details
BLNKP%	Integer	Blanking Pulse	0, –5 Volt (D) 1, +5 Volt
RFFS%	Integer	RF During Bandswitching	0, Off 1, On (D)
RFDR%	Integer	RF During Retrace	0, Off 1, 0n (D)
PLR%	Integer	Pen Lift Relay	0, Normally Open (D) 1, Normally Closed
FPD%	Integer	Front Panel Display	0, Off 1, On (D)
CWR%	Integer	Rear Panel CW Ramp Out	0, Off (D) 1, On

Output Parameters: None.

Error: LabWindows error codes only 220 to 240
3XX Instrument Specific (Page 2-8)

Program Examples:

Quick BASIC:

```
REM Set blanking, CW ramp, RF output (during freq switching and retrace),
penlift relay, front panel display, and hi resolution values.
CALL W681.ut (BLNKP%,RFFS%,RFDR%,PLR%,FPD%,CWR%)
```

Microsoft C:

```
/* Set blanking, CW ramp, RF output (during freq switching and retrace), penlift
relay, front panel display, and hi resolution values. */
W681_ut (BLNKP,RFFS,RFDR,PLR,FPD,CWR)
```

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!

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