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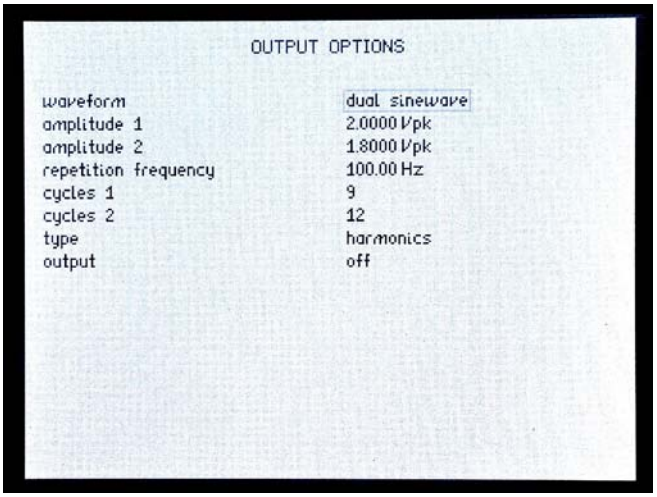
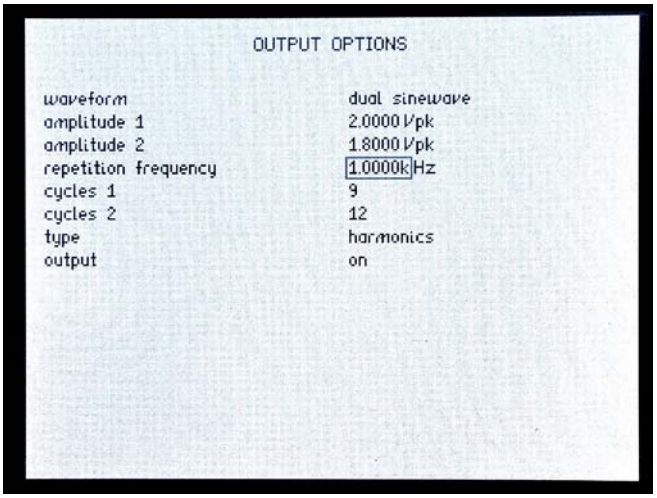
PSM/SLM1700 - feature guide

Introduction

The modified PSM1700 has been designed to provide SLM functionality plus enhanced generator functions and scope modes that can be achieved with existing PSM hardware.
POWER and HARMONIC modes included in the standard PSM instrument have been replaced with SLM and SCOPE modes with corresponding menu options presented by pressing the respective key.
In the following pages, we illustrate the basic operating principle of these new modes using a 'dual sinewave' mode in the output menu to generate a composite signal of two frequency components.
Before proceeding with the examples given below, CH1 and CH2 should be connected to the generator output which can be done using a BNC T-piece and two BCN to BNC cables or the BNC output lead with clips and scope leads for each channel that are provided with the instrument.

Quick start





The SLM function in the SLM1700 will identify either the single largest or the two largest signals within a specified frequency range.

Here we will focus on the 'dual scan' SLM mode and to enable the simulation of a dual signal environment, the generator has been equipped with a 'dual sinewave' option.

From the OUT menu, use the ▼ and ► keys to select the dual sinewave mode.

In this mode, the generator output will combine two sinewave components that can be controlled in both frequency and amplitude.

Numeric values are changed by placing the edit box over the item to be changed, entering numbers from the keypad plus an engineering extension if required then 'Enter'.

Here, a 1kHz repetition frequency is entered with 9 cycles for sinewave 1 and 12 cycles for sinewave 2 resulting in a composite signal comprising 9kHz and 12kHz components.

Then, select output and switch to 'on'.

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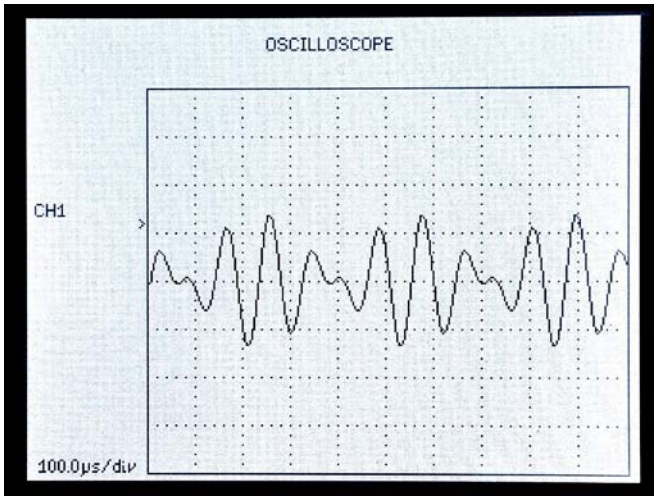
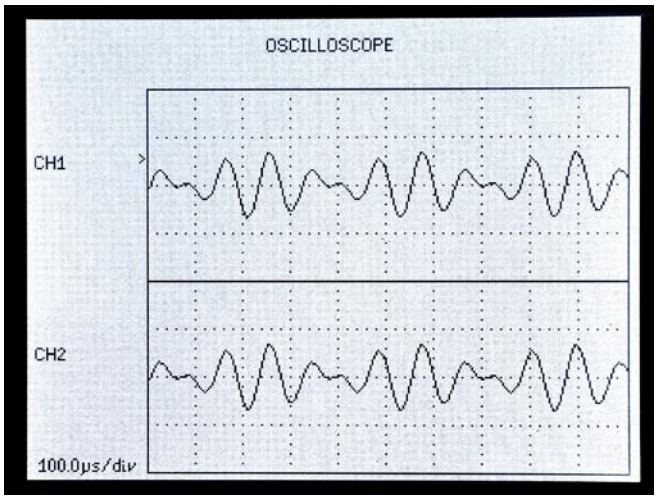
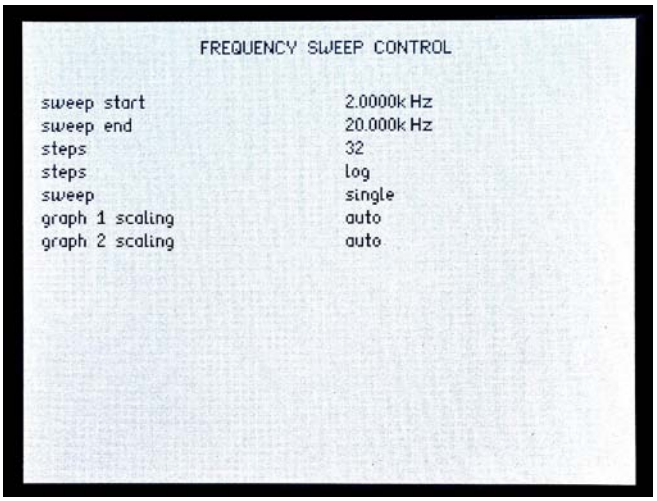


Pressing the SCOPE button, the output signal can be seen and the scope mode will have default ‘auto’ trigger. Pressing the SCOPE button again, scope options are presented. From here, the trigger option can be changed to ‘normal’ and after pressing the home key twice, the scope screen will return with a cursor mark (>) on the left axis. Using the ▲ and ▼ keys, the trigger level can be set to the peak of modulation and a stable waveform should be visible. Timebase can be adjusted using the ◄ and ► keys.



Pressing the GRAPH button, CH1, CH2 or CH1 and CH2 display can be selected.

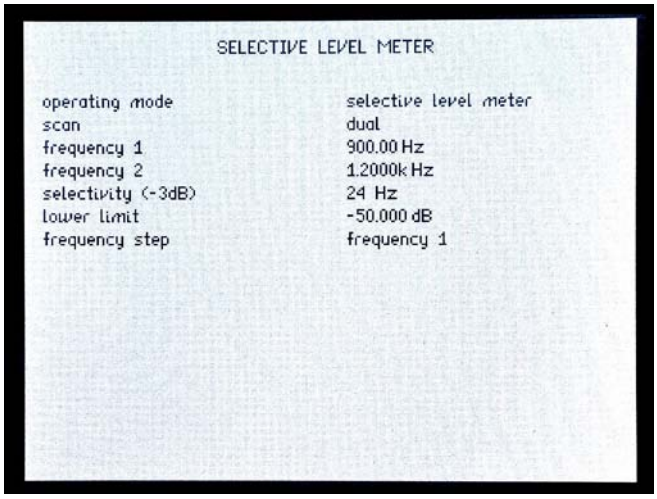
While this example has the same signal on both channels, both channels are independent and can used to show different signals.



Now, press the SWEEP button to present the sweep options.

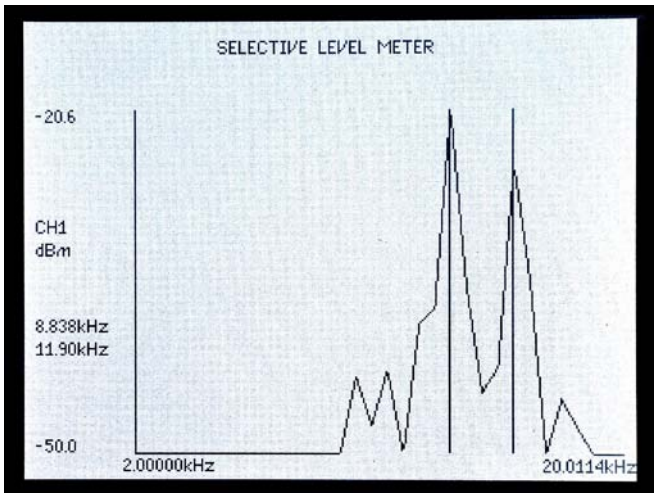
Set the vales as shown here.

Note: While ‘log’ and ‘linear’ step options are available, only log steps are presently implemented



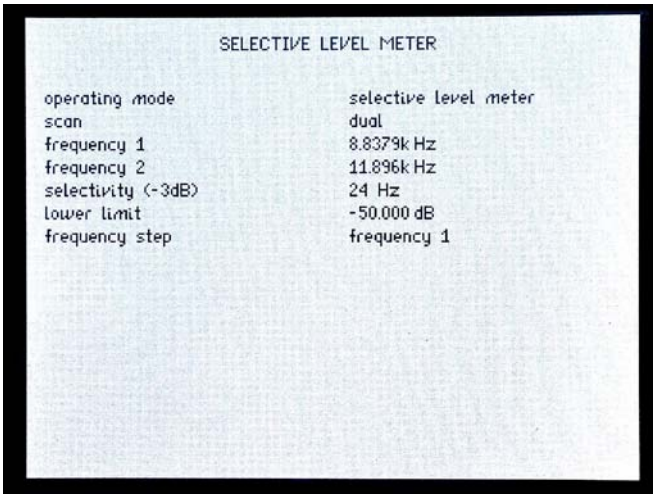
Now press the SLM button to enter the SLM mode and again to see the default mode settings as shown here.

Pressing the SLM button again or the HOME button will return to the SLM screen.



Pressing the START key will now start a sweep with the steps and frequency range that were entered in the frequency sweep menu.

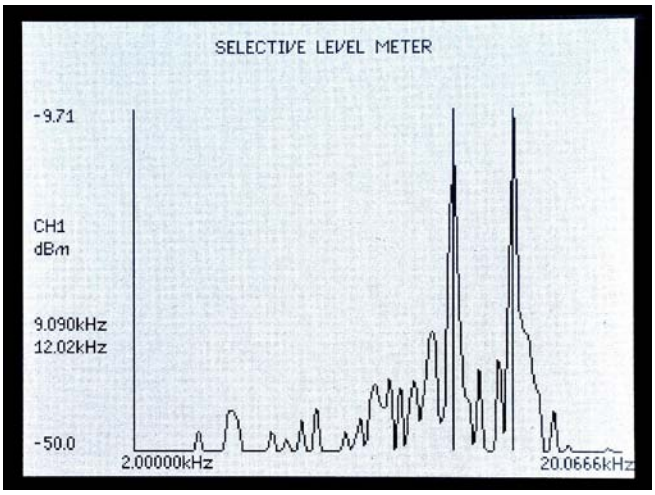
Within the resolution of the sweep steps, the two largest signal components will be marked with cursors and quantified in the left axes.



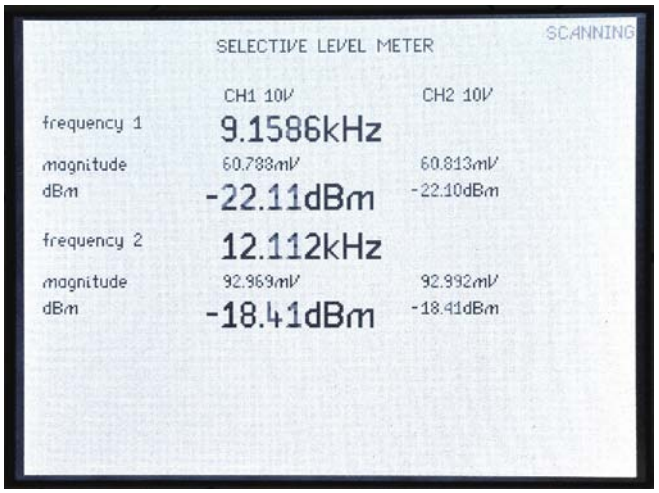
Having identified the largest signals, the frequency 1 and frequency 2 values within the SLM option screen will be updated.

In this case, it is clear that the sweep is successful and we can go straight to an SLM scan.

If the desired signals are not detected, the frequency range, number of sweep steps or selectivity can be adjusted.

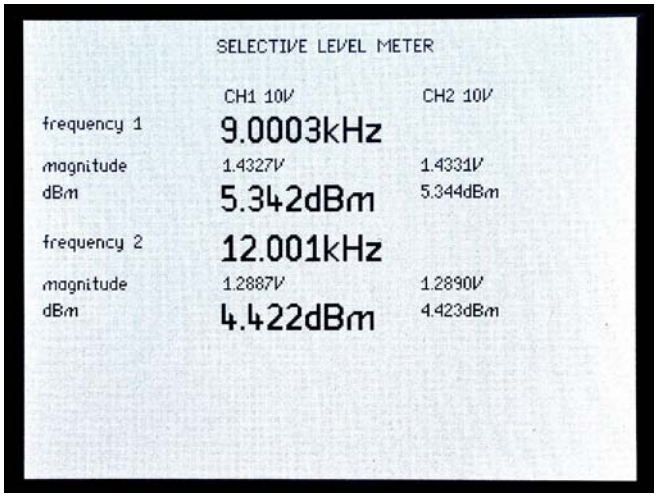


Here, the increased frequency resolution resulting from a 100 step sweep rather than the default 32 step sweep is illustrated.



After completing a successful sweep, press the ENTER key to begin an automatic SLM scan.

The SLM1700 will automatically scan around the identified signal frequencies with smaller sweep steps and increasing selectivity.



On completion of the scan, measurements will continue and using the ▲ and ▼ keys, the generator signal level can be changed to illustrate real time measurements of two frequency locked voltages.

Using the ► and ◄ keys, frequency 1 can be manually stepped up or down.
Manual control of frequency 2 can be achieved after selecting frequency 2 under the ‘frequency step’ option of the SLM menu.

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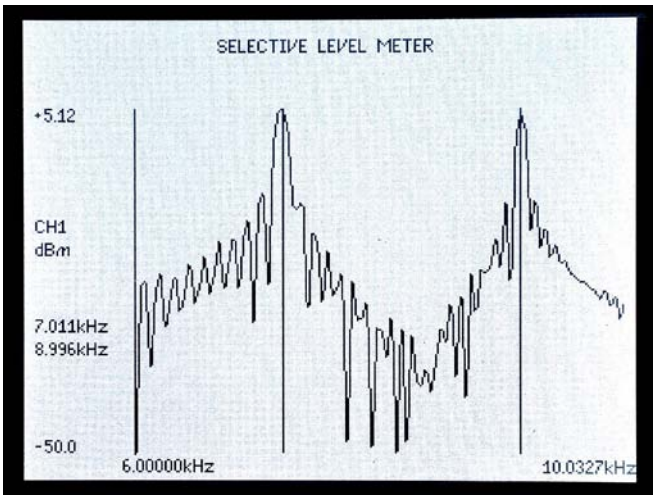


By selecting a frequency sweep range that is reasonably close to the anticipated signal points, increased sensitivity is achieved and harmonic lobes associated with harmonic analysis and broad selectivity can be seen.

Note: The SLM1700 is presently configured to expect a difference of at least 15% between two frequency components. So, two frequency components of say 8kHz and 9kHz would not be differentiated.

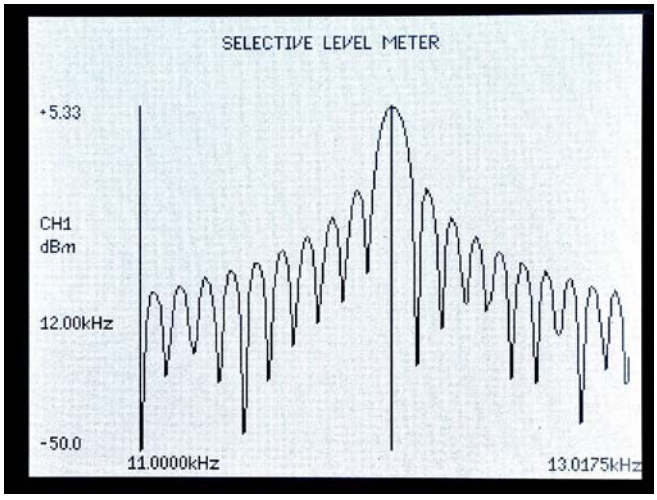
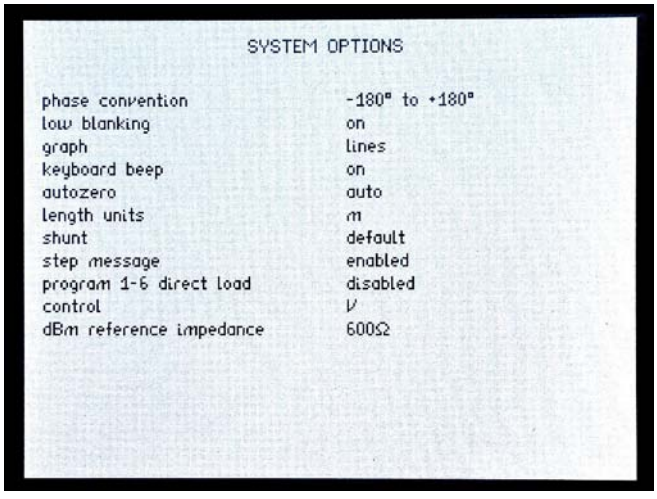


Illustration of a classic wide selectivity DFT sweep can be illustrated by using 100Hz selectivity and a narrow frequency sweep around the target signal.



dBm values shown in the SLM display are based upon a selectable 'reference impedance' option in the system option screen (SYS key).

The impedances are implemented mathematically rather than physical impedance change and the options presently implemented are 50, 75 or 600 Ohms.