Agilent
Microwave Sweep Oscillator and Network Analyzer Instrument Security

Application Note
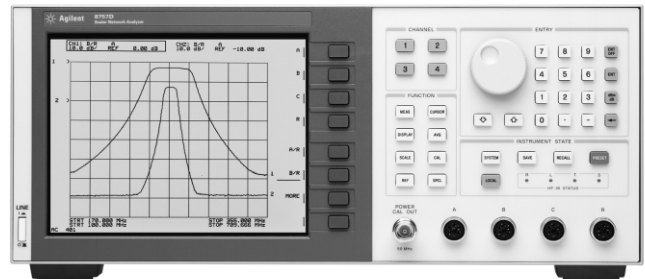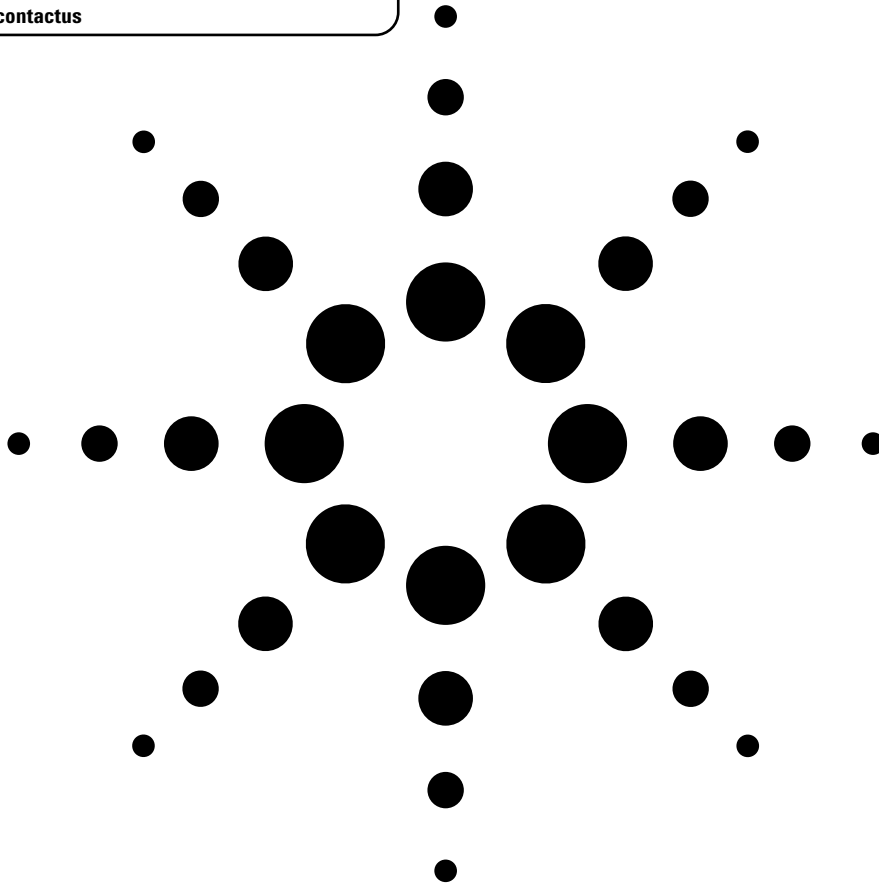
Agilent Technologies

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Introduction

This paper documents the security features of Agilent Technologies' microwave network analyzers and sweep oscillators, each of which has some capability to conceal or clear sensitive information, such as frequency, power, memory, etc. The contractor shall establish adequate in-use controls that will prevent unauthorized disclosure of classified information.

The 8350B and 8756A do not require DIS approval before classified use – all other equipment identified in the document does. However, the 8350B and 8756A do require a section in the facility SPP describing the usage of the equipment.

Note: The features described here have been reviewed and approved by the United States Defense Investigative Service (DIS). Please refer all inquiries regarding DIS regulations to:

> Defense Investigative Service
> Attention: V0430
> 1900 Half Street S.W.
> Washington, D.C. 20324-1700

Security Features

Concealing information

The parameters that are classified will not be the same in all instances. Although frequency is generally the most sensitive parameter for microwave testing, it may be necessary to secure all information.

Frequency information can either be blanked, zeroed or multiplied /offset on the front panel display. Some instruments blank or zero just the frequency information while others blank the entire display. And some are capable of multiplying and/or offsetting the displayed frequency. Whether or not this is retained in the save/recall registers is dependent on the particular instrument. Similarly, whether or not the display can be re-enabled once it is secured is also dependent on the particular instrument.

Note: Disassociation, coding and/or masking of classified information are permitted only if authorized or directed by the contracting agency.

Clearing information

An instrument must be cleared before it is left unattended (at the end of the day, for example) so that no critical information can be extracted from it. To do this, the present instrument state must be overwritten with a preset (or pre-determined) instrument state. The non-volatile memory must also be cleared by overwriting it with a preset state. Some instruments write a preset state into each of the registers. Some write alternating 1's and 0's into the memory. Others require a procedure of reloading the instrument's original operating system to clear the classified information from the memory.

The memory allocation of each instrument is known. A portion of the memory is reserved for the program data that is required to operate the instrument. Another portion of the memory is reserved for the storage of user-configured data (present instrument state, save/recall register states, etc.). This fact allows us to "clear" the memory by selectively writing over those locations that contain classified information. This process can be verified by attempting to extract information (other than the preset state) after the instrument's memory has been cleared.

Disk storage

Many of the instruments described here have the capability of storing information to disk via either an internal and/or external disk drive.

Note: If disk storage is required, approval by DIS is required before the equipment can be used to process classified data.

8350B Sweep Oscillator

This procedure documents operation of the 8350B sweep oscillator mainframe with an 83500 series RF plug-in only.

Table 1. 8350B memory allocation

Memory	Function
40 kBytes ROM	2 kBytes non-volatile RAM (battery-backed).
2 kBytes non-volatile RAM (battery-backed)	Stores data generated or processed during program execution (present front panel state, data stored in save/recall registers, data used for control of the 8350B, HP-IB addresses, etc.).

Note: Some security features can only be implemented with specific 8350B mainframe firmware revisions (the plug-in firmware revision is not important in this case). [SHIFT] [4] [9] displays the mainframe firmware revision number in the 8350B's FREQUENCY/TIME display. The appropriate 8350B firmware revisions are noted below.

Frequency display blanking
(Rev 6 or greater)

[SHIFT] [0] [1] blanks the frequency display. Frequency display blanking status is not retained in the save/recall registers. [SHIFT] [0] [2] re-enables the frequency display. [INSTR PRESET] re-enables the frequency display and writes over the present state with the instrument's preset state.

Frequency display multiplication and offset
(Rev 3 or greater)

[SHIFT] [START] [multiplier] [kHz/ms] (where the multiplier is an integer between 1 and 99) multiplies the frequency display. [SHIFT] [STOP] [offset] [kHz/ms] (where the offset is a number between 0 and 999) offsets the frequency display. Negative offsets may be used as long as the displayed start frequency is greater than the lowest frequency that the plug-in is capable of providing. The frequency display multipliers and/or offsets are not retained in the save/recall registers. [INSTR PRESET] re-enables the frequency display and writes over the present state with the instrument's preset state. [SHIFT] [ALT n] locks the frequency display multiplier (firmware revision 6 or greater) so that it will be retained even when an instrument preset is performed. Once the multiplier is locked it can only be unlocked with a [SHIFT] [INSTR PRESET].

Clear save/recall registers
(Rev 6 or greater)

[SHIFT] [0] [3] clears all nine save/recall registers by writing the instrument's preset state over the existing state into each save/recall register. The present state is overwritten with the instrument's preset state.

Deleting the battery

The battery can be easily removed from the 8350B by unclamping the battery pack from the holder. This causes the save/recall registers, current instrument state and HP-IB address to be cleared when the power is turned off. When the power is turned on, the save/recall registers come up in the instrument's preset state.

Special Option H12

This special option deletes the instrument's battery and makes some firmware changes to achieve instrument security. When the frequency display is blanked, [INSTR PRESET], [SHIFT] [0] [2], or recalling a save/recall register will not re-enable the frequency display. The only way to re-enable the display is to cycle the power, whereby the present information will be overwritten with the instrument's preset state. Information in the save/recall registers will be overwritten with the instrument's preset state when the power is cycled.

There is a kit available to retrofit special Option H12 into existing 8350B mainframes. This kit may be obtained as special Option K12.

Clear instrument

Clear the save/recall registers, and preset and cycle the power to clear the instrument.

8340B and 8341B
Synthesized Sweepers

Table 2. 8340B/8341B memory allocation

Memory	Function
64 kBytes UVEPROM	Stores main processor firmware and protected calibration data.
16 kBytes EEPROM	
16 kBytes non-volatile RAM (battery-backed)	Stores working calibration and user-configured data.

Display blanking

[SHIFT] [CONT] blanks the display. Display blanking is not retained re-enables the in the save/recall registers. Toggling [SHIFT] [CONT] re-enables the display. [INSTR PRESET] re-enables the display and writes over the present state with the instrument's preset state.

Frequency display multiplication and offset

[SHIFT] [START] multiplier Hz/AUTO (where the multiplier is an integer between 1 and 99) multiplies the frequency display. [SHIFT] [STOP] [offset] [Hz/AUTO] (where the offset is a number between 0 and 999) offsets the frequency display. The frequency display multipliers and/or offsets are not retained in the save/recall registers. [INSTR PRESET] re-enables the frequency display and writes over the present state with the instrument's preset state. [SHIFT] [ALT] locks the frequency display multiplier so that it will be retained even when an instrument preset is performed. Once the multiplier is locked it can only be unlocked with a [SHIFT] [PRESET].

Clear save/recall registers
(8340B/8341B)

[SHIFT] [MHz/sec] [1] [8] [Hz/AUTO] [SHIFT] [kHz/msec] [0] [Hz/AUTO] clears all nine save/recall registers by writing all 1's and then all 0's into the memory. The instrument's preset state is then written into each of the save/recall registers. The present instrument state is overwritten with the instrument's preset state.

Clear instrument

Clear the save/recall registers, and preset and cycle the power to clear the instrument.

8360 Series
Synthesized Sweepers

The tables below describe how instrument memory is allocated. Refer to the table that applies to your instrument. Table 3 applies only to Agilent 8360A models with serial prefixes less than 3104A and that have the original factory-installed CPU board. Table 4 applies to all other Agilent 8360 models and serial prefixes.

If you have an Agilent 8360A with a serial prefix less than 3104A, you can check cal constant 507 to determine whether or not the CPU board has been replaced. If the cal constant is 0, the CPU board has not been replaced and you should refer to Table 3. If the cal constant is 1, the CPU board is a replacement and you should refer to Table 4. To view cal constant 507, press SERVICE, [more 1/3], [Adjust Menu]. If prompted for a password, use the number keys to enter "8360" and press ENTER, [Adjust Menu]. Continue by pressing [Calib Menu], [Select Cal], "507" ENTER.

Table 3. 8360 (serial prefix < 3104A) memory allocation

Memory	Function
500 kBytes UVEPROM	Stores program data executed by the microprocessor and default calibration data that cannot be overwritten in the instrument. No user data is stored in this memory.
32 kBytes EEPROM	Stores calibration data, which can be overwritten in the instrument. This includes information required for the instrument to operate within specifications and installed hardware. No user data is stored in this memory.
260 kBytes non-volatile RAM (battery-backed)	Stores working calibration and user-configured data.

Table 4. 8360 (serial prefix ≥ 3104A) memory allocation

Memory	Function
1 MBytes UVEPROM	Stores program data executed by the microprocessor and default calibration data that cannot be overwritten in the instrument. No user data is stored in this memory.
64 kBytes EEPROM	Stores calibration data, which can be overwritten in the instrument. This includes information required for the instrument to operate within specifications and installed hardware. No user data is stored in this memory.
768 kBytes total RAM 512 kBytes non-volatile RAM 256 kBytes volatile RAM	Stores working calibration and user-configured data.

The system security menu is accessed by pressing SYSTEM [MENU] [MORE] [SECURITY MENU].

Display blanking

SYSTEM [MENU] [MORE] [SECURITY MENU] [BLANK DISPLAY] turns off the top four lines of the synthesizer's display. Once this security feature has been activated it can only be turned off by presetting the synthesizer.

Frequency display blanking

SYSTEM [MENU] [MORE] [SECURITY MENU] [ZERO FREQ] displays zeros for all accessible frequency information. Once this feature has been activated it can only be turned off by presetting the synthesizer.

Frequency display multiplication and offset

FREQUENCY [MENU] [FREQ MULT] [multiplier] [Hz/sec/ENTER] sets the frequency multiplier value, and applies it to all frequency parameters. The integer value of the frequency multiplier can range from +36 to -36. The factory preset value is 1. Asterisks appear next to all frequency values multiplied.

FREQUENCY [MENU] [FREQ OFFSET] [offset] [Hz/sec/ENTER] sets the frequency offset value and applies it to all pertinent frequency parameters. The frequency offset can range from +110 to -110 GHz. The factory preset value is 0. Asterisks appear next to all frequency values offset.

Save lockout

SYSTEM [MENU] [MORE] [SECURITY MENU] [SAVE LOCK] prohibits the saving of the present instrument state into a save/recall register. The save lockout may be toggled on and off at any time.

Clear memory

SYSTEM [MENU] [MORE] [SECURITY MENU] [CLEAR MEMORY] writes all 1's and then all 0's over all instrument state information, save/recall registers, and frequency lists a selectable number of times then returns the synthesizer to the factory preset state of operation.

When [CLEAR MEMORY] is selected, the synthesizer displays "# OF TIMES TO CLEAR MEMORY: X" in the active entry area. Enter the number of times the state information should be overwritten with all 1's and then all 0's. While the synthesizer is working to overwrite the state information, it flashes the count on the display.

Also, removing the CPU (A15) and shorting across the battery or Super Cap for 10 seconds will erase memory.

Clear instrument

Clear the memory one time and cycle the power to clear the instrument.

8756A Scalar
Network Analyzer

This procedure documents operation of the 8756A scalar network analyzer with the 8350B sweep oscillator or the 8340B/8341B synthesized sweeper.

Table 5. 8756A memory allocation

Memory	Function
64 kBytes ROM	Stores program data and data constants for the microprocessor to read.
16 kBytes non-volatile RAM (battery-backed)	Stores instrument variables.

Note: Some security features can only be implemented with specific 8756A firmware revisions. [PRESET] will display the firmware revision number on the 8756A display. The appropriate 8756A firmware revisions are noted below.

Display blanking
(Rev 2.0 or greater)

[MAIN MENU] [LABELS ON/OFF] blanks the mode labels, frequency labels, and reference line position labels. The source frequency display is also blanked when the analyzer labels are turned off and the system interface between the analyzer and source is connected. Display blanking is not retained in the save/recall registers. MAIN [MENU LABELS] [ON/OFF] re-enables the display. [PRESET] re-enables the display and writes over the present state with the instrument's preset state.

Clear save/recall registers

[PRESET] [SAVE] [1] [2] [3] [4] [5] [6] [7] [8] [9] clears all nine save/recall registers on both the 8756A and the source (when the system interface is connected) by writing the instrument's preset state into each of the save/recall registers. The 8756A save/recall registers retrieve information from the source's save/recall when the system interface is connected. The present instrument state is overwritten with the instrument's preset state.

Clear instrument

Preset the instrument and save the instrument's preset state into each save/recall register, and cycle the power to clear the instrument.

8757 Scalar
Network Analyzer

This procedure documents operation of the 8757A/C/E scalar network analyzer with the 8350B sweep oscillator, 8340B/8341B synthesized sweeper or 8360 series synthesized sweeper (8757C/E only).

Table 6. 8757A memory allocation

Memory	Function
192 kBytes ROM	Stores program data and data constants for the microprocessor to read.
4 kBytes EEPROM	Stores calibration constants of log amplifier assemblies.
16 kBytes non-volatile RAM (battery-backed)	Stores instrument variables.

Table 7. 8757C/E memory allocation

Memory	Function
256 kBytes ROM	Stores program data and data constants for the microprocessor to read.
4 kBytes EEPROM	Stores calibration constants of log amplifier assemblies.
128 kBytes non-volatile RAM (battery-backed)	Stores instrument variables. HP-IB plotter/printer buffer stores up to one plot or printout.
External disk drive (8757C only)	Stores data, instrument states, and CRT graphics.

Display blanking

[SYSTEM] [LABELS] [LABELS ON/OFF] blanks mode labels, frequency labels, reference line position labels and the title on the 8757A/C/E display. The source's frequency display is blanked when the system interface is connected. Display blanking is not retained in the save/recall registers. Toggling [SYSTEM] [LABELS] [LABELS ON/OFF] re-enables the display. [INSTR PRESET] re-enables the display and writes over the present state with the instrument's preset state.

Frequency display blanking
(8757A)

[SYSTEM] [LABELS] [FREQ LBL ON/OFF] blanks frequency display notation on the HP 8757A display. The source's frequency display is blanked when the system interface is connected. Toggling [SYSTEM] [LABELS] [FREQ LBL ON/OFF] re-enables the display. [PRESET] re-enables the display and writes over the present state with the instrument's preset state. Frequency display blanking is not retained in the save/recall registers.

Frequency display blanking
(8757C/E)

[SYSTEM] [LABELS] [FREQ LBL ON/OFF] blanks frequency display notation on the 8757C/E display. The source's frequency display is blanked when the system interface is connected. Once this mode is activated, the frequency display can only be re-enabled by pressing [PRESET]. This re-enables the display and writes over the present state with the instrument's preset state.

Frequency display blanking is retained in the save/recall registers and when storing a configuration to an external disk drive (8757C only).

Frequency display coding

The 8757A/C/E frequency display may be numerically coded when the system interface is turned off ([SYSTEM] [MORE] [SWEEP MODE] [SYS INTF OFF]) or when it is not connected to the source. [SYSTEM] [LABELS] [START LABEL] allows the user to set the start frequency display. [SYSTEM] [LABELS] [STOP LABEL] sets the stop frequency display. The coded frequency displays are retained in the save/recall registers. [INSTR PRESET] or cycling the power re-enables the normal display and writes over the present state with the instrument's preset state.

Clear save/recall registers

[SYSTEM] [MORE] [CLEAR SAVE/RECALL] [CLEAR YES] clears all nine save/recall registers on both the HP 8757A/C/E and the source (when the system interface is connected) by writing the instrument's preset state into each of the save/recall registers. The 8757A/C/E save/recall registers retrieve information from the source's save/recall when the system interface is connected. The present instrument state is overwritten with the instrument's preset state.

Delete limit lines
(8757A/C)

[SPECIAL] [ENTER LIM LNS] [DELETE ALL LNS] deletes all segments from the 8757A/C' limit line memory since all limit lines are retained on instrument preset.

Special option H02

This special option deletes the instrument's battery which causes the save/recall registers and global state-settings to be cleared when the power is turned off. When the power is turned on, the instrument and the save/recall registers come up in the instrument's preset state. The source's save/recall registers are not affected when the system interface is connected.

Special option H12
(8757A)

This special option deletes the instrument's battery and makes some firmware changes to the 8757A to achieve instrument security. [PRESET], [FREQ LABELS ON], [LABELS ON] or recalling a save/recall register will not re-enable the 8757A display. When the system interface is connected to the source and the frequency display is blanked on both instruments, the only way to re-enable the display is to cycle the power, whereby the present information will be overwritten with the instrument's preset state.

There is a kit available to retrofit special option H12 into existing 8757A analyzers. This kit may be obtained as special option K12.

Clear instrument

Clear the save/recall registers and delete the limit lines, and preset and cycle the power to clear the instrument.

8752 and 8753
RF Network Analyzers

Table 8. 8753A memory allocation

Memory	Function
384 kBytes EPROM	Stores operating system for instrument control.
2 kBytes EEPROM	Stores instrument correction constants.
16 kBytes non-volatile RAM	Stores instrument states.
128 kBytes DRAM	Stores current instrument state, calibration sets, user graphics and data processing and display variables.
External disk drive	Stores data, instrument states (including calibration data), user graphics and test sequences.

Table 9. 8752A and 8753B/C memory allocation

Memory	Function
384 kBytes EPROM	Stores operating system for instrument control.
2 kBytes EEPROM	Stores instrument correction constants.
16 kBytes non-volatile RAM	Stores instrument states.
1 MBytes DRAM	Stores current instrument state, calibration sets, user graphics and data processing and display variables. HP-IB plotter/printer buffer stores one plot or printout.
External disk drive	Stores data, instrument states (including calibration data), user graphics and test sequences.

Frequency display blanking

[DISPLAY] [MORE] [FREQUENCY BLANK] blanks the frequency display notation on the 8753A. [DISPLAY] [MORE] [MORE] [FREQUENCY BLANK] blanks the frequency display notation on the 9752A and 8753B/C. Frequency display blanking is retained in the save/recall registers. [PRESET] or cycling the power will re-enable the display and write over the present state with the instrument's preset state.

Clear save/recall registers

[SAVE] [CLEAR REGISTER] [CLEAR ALL] clears all five save/recall registers by writing all 1's and then all 0's into each 16-bit word size 100 times over the non-volatile memory.

Delete limit lines

[PRESET] deletes all segments from the limit line memory.

Clear test sequence
(8752A and 8 753B/C)

[SYSTEM] [SEQUENCING MENU] [MORE] [CLEAR SEQUENCE] clears individual sequences by writing a bit pattern over the memory containing the sequence.

Clear instrument

Clear the save/recall registers and test sequences, and preset and cycle the power to clear the instrument.

8719, 8720 and 8722
Network Analyzers

Table 10. 8720A memory allocation

Memory	Function
384 kBytes EPROM	Stores operating system for instrument control.
2 kBytes EEPROM	Stores instrument correction constants.
16 kBytes non-volatile RAM	Stores instrument states.
128 kBytes DRAM	Stores current instrument state, calibration sets, user graphics and data processing and display variables.
External disk drive	Stores data, instrument states (including calibration data) and user graphics.

Table 11. 8719A and 8720B memory allocation

Memory	Function
384 kBytes EPROM	Stores operating system for instrument control.
2 kBytes EEPROM	Stores instrument correction constants.
16 kBytes non-volatile RAM	Stores instrument states.
1 MBytes DRAM	Stores current instrument state, calibration sets, user graphics and data processing and display variables.
External disk drive	Stores data, instrument states (including calibration data), and user graphics.

Table 12. 8719C, 8720C and 8722A memory allocation

Memory	Function
384 kBytes EPROM	Stores operating system for instrument control.
2 kBytes EEPROM	Stores instrument correction constants.
256 kBytes non-volatile RAM	Stores instrument states, calibration sets, display memory and power meter calibration arrays.
1 MBytes DRAM	Stores current instrument state, user graphics and data processing and display variables. HP-IB plotter/printer buffer stores one plot or printout.
External disk drive	Stores data, instrument states (including calibration data), and user graphics.

Frequency display blanking

[DISPLAY] [MORE] [FREQUENCY BLANK] blanks the frequency display notation. Frequency display blanking is retained in the save/recall registers. On the 8719A or 8720A/B, [PRESET] or cycling the power will re-enable the display and write over the present state with the instrument's preset state. On the 8719A/C, 8720C or 8722A (firmware revision 2.0 or greater), [RECALL] [RECALL FAC PRESET] will re-enable the display and write over the present state with the instrument's factory preset state.

Clear registers

[SAVE] [CLEAR REGISTER] [CLEAR ALL] clears all registers with 100 alternating 0 and 1 rewrite operations over the entire non-volatile portion of the specified register memory.

Delete limit lines

On the 8719A or 8720A/B (firmware revision less than 2.0), deletes all segments from the limit line memory. On the 8719A/C, 87120C or 8722A (firmware revision 2.0 or greater), [RECALL] [RECALL FAC PRESET] deletes all segments from the limit line memory.

Clear instrument

Clear the save/recall registers, and preset and cycle the power to clear the instrument.

8510 and 8530
Network Analyzers

This procedure documents operation of the 8510A/B/C and 8530A network analyzers with the 8350B sweep oscillator, 8340B/8341B synthesized sweeper or 8360 series synthesized sweeper (8510B/C and 8530A only)

Table 13. 8510A memory allocation

Memory	Function
26 kBytes EPROM	Stores boot-up and diagnostic programs.
256 kBytes magnetic bubble memory	Stores the main program that is downloaded into DRAM and non-volatile data such as instrument states, display memories (1-4 only), calibration sets and kits, hardware states (HP-IB addresses, etc).
26 kBytes DRAM	Stores working program and volatile data such as measured data, display memories (5-8 only), and data processing and display variables.
Internal tape drive	Stores data, calibration sets and kits, and instrument and hardware states, and user displays.

Table 14. 8510B memory allocation

Memory	Function
144 kBytes EPROM	Stores boot-up and diagnostic programs.
590 kBytes EEPROM	Stores the main program that is downloaded into DRAM and non-volatile data such as instrument states, display memories (1-4 only), calibration sets and kits, hardware states (HP-IB addresses, etc).
1 MBytes DRAM	Stores working program and volatile data such as measured data, display memories (5-8 only), and data processing and display variables.
Internal tape drive or external disk drive	Stores data, calibration sets and kits definitions, and instrument and hardware states, machine dumps, and user displays.

Table 15. 8510C and 8530A memory allocation

Memory	Function
262 kBytes EPROM	Stores boot-up and diagnostic programs.
786 kBytes EEPROM	Stores the main program that is downloaded into DRAM and non-volatile data such as instrument states, user preset, display memories (1-4 only), calibration sets and kits, hardware states (HP-IB addresses, multiple source equations, display colors, etc).
2 MBytes DRAM	Stores working program and volatile data such as measured data, display memories (5-8 only), and data processing and display variables. Two serial port plotter/printer buffers store plots and printouts.
Internal 3.5 inch disk drive or external disk drive	Stores data, calibration sets and kits, instrument and hardware states, machine dumps, and user displays.

Note: Some security features can only be implemented with specific 8510 firmware revisions. [SYSTEM] [MORE] [SERVICE FUNCTIONS] [SOFTWARE REVISION] displays the 8510 firmware revision on the display. The appropriate 8510 firmware revisions are noted below.

The CRT and frequency display blanking and preset features for the 8510A/B (firmware revision less than 6.0) are different from the 8510B (firmware revision 6.0 or greater), 8510C and 8530A. The procedures to clear the memory of the 8510A/B/C and 8530A are also different.

CRT blanking

[SYSTEM] [CRT OFF] blanks the entire display on the 8510A or 8510B (firmware revision less than 6.0). [PRESET] or recalling an instrument state that was saved with the CRT on will re-enable the CRT.

[SYSTEM] [DISPLAY FUNCTIONS] [CRT OFF] blanks the entire display on the 8510B (firmware revision 6.0 or greater), 8510C or 8530A. [RECALL] [MORE] [FACTORY PRESET] or recalling an instrument state that was saved with the CRT on will re-enable the CRT.

Frequency display blanking

On the 8510A or 8510B (firmware revision less than 6.0), [SYSTEM] [FREQUENCY OFF] sets Start, Stop, Center and Span frequency display notation to 0.000000000 GHz. The Marker frequency value is blanked. Frequency display blanking is retained in the save/recall registers. Recalling an instrument state stored without display blanking re-enables the display. [PRESET] re-enables the display and writes over the present state with the instrument's preset state.

On the 8510B (firmware revision 6.0 or greater), 8510C or 8530A [SYSTEM] [DISPLAY FUNCTIONS] [FREQUENCY OFF] sets Start, Stop, Center and Span frequency display notation to 0.000000000 GHz. The Marker frequency value is blanked. Frequency display blanking is retained in the save/recall registers. Recalling an instrument state stored without display blanking re-enables the display. [USER PRESET] will not re-enable the display if frequency display blanking is stored to instrument state #8. [RECALL] [MORE] [FACTORY PRESET] re-enables the display and writes over the present state with the instrument's factory preset state.

Clear memory
(8510A)

Initialize a blank tape cassette in the 8510A tape drive. Load the operating system by inserting the firmware tape in the tape drive and press [SYSTEM] [SERVICE FUNCTIONS] [TEST MENU] [1] [9] [=MARKER]. All cal sets, data memories, arrays and user graphics memory will be set to zero. All instrument states, cal kits and HP-IB addresses will be set to the factory preset state (refer to pages 407-410 of the 8510A keyword dictionary).

Cycle the line power. The 8510A has now been initialized. This is the state in which the instrument was originally received. Insert the initialized tape in the tape drive. To store the complete machine state, press [TAPE] [STORE] [MORE] [MACHINE DUMP] [FILE n]. This will store the initialized machine state on tape, return internal memories to an initialized state and purge all internal memories in one operation (refer to page 194 of the 8510A keyword dictionary).

To clear the 8510A memory of classified information and replace it with the initialized machine state, insert the tape into the tape drive and press [TAPE] [LOAD] [MORE] [MACHINE DUMP] [FILE n].

Clear memory
(8510B/C and 8530A)

To clear and initialize the 8510B/C or 8530A memory registers, press [SYSTEM] [MORE] [SERVICE FUNCTIONS] [TEST MENU] [2] [2] [=MARKER] [1] [=MARKER] [4] [=MARKER] [8] [5] [1] [5] [=MARKER] [2] [=MARKER] [x1]. This operation clears the non-volatile memory by writing 1's and 0's to each memory location. When the routine is finished, press [=MARKER] [1] [=MARKER] to initialize the non-volatile memory board.

Cycle the line power on the 8510B/C or 8530A. The 8510B/C or 8530A memory is completely cleared so the operating system must be re-loaded. All cal sets, data memories, arrays and user graphics memory will be set to zero. All instrument states, cal kits and HP-IB addresses will be set to the factory preset state.

To re-load the 8510B operating system, press PRIOR MENU =MARKER. Insert operating system tape #1 in the tape drive and press [1] [9] [=MARKER]. When the routine is finished, insert operating system tape #2 in the tape drive and press OK.

To re-load the 8510C or 8530A operating system, press [PRIOR MENU] [=MARKER]. Insert the operating system disk in the disk drive and press [1] [9] [=MARKER]. Select the program to load using the RPG or step keys (i.e., PG_8510C). Press [LOAD FILE].

Note: The test port power flatness correction feature of the 8510B (firmware revision 6.0 or greater), 8510C and 8530A stores a flatness correction table to the internal memory of the 8360 series synthesized source. If a power flatness correction calibration has been performed, the memory of the 8360 series source will contain frequency information that should also be cleared.

On the 8360, press SYSTEM [MENU] [MORE] [SECURITY MENU] [CLEAR MEMORY] [1] [ENTER]. This will write all 1's and then all 0's over the memory including the flatness calibration corrections.

For 8360 series sources with no front panel (dedicated 8510 system source models or stand-alone models with option 003), the 8360 front panel emulator must be used. Insert the operating system tape/disk into the 8510B/C or 8530A tape/disk drive. To access the front panel emulator on the 8510B/C or 8530A press [SYSTEM] [MORE] [SERVICE FUNCTIONS] [TEST MENU] [1] [9] [=MARKER]. Select the file for the front panel emulator program (i.e., PG_8360FPE). Press [LOAD FILE] [2] [=MARKER] [SYSTEM] [k4 (MORE)] [k2 (SECURITY MENU)] [k2 (CLEAR MEMORY)] [1] [x1]. When the procedure is finished press [=MARKER] to exit the program.

Clear instrument

Clear the memory and cycle the power to clear the instrument.

Keystroke Summary

Frequency/display blanking keystrokes

Table 16. Frequency/display blanking keystrokes

Instrument	Frequency blanking	Display blanking
8350B (≥ rev 6.0)	Press [SHIFT] [0] [1].	
8340B or 8341B		Press [SHIFT] [CONT].
8360A	Press **SYSTEM** [MENU] [MORE] [SECURITY MENU] [ZERO FREQ.].	Press **SYSTEM** [MENU] [SECURITY MENU] [BLANK DISP].
8756A (≥ rev 2.0)		Press [MAIN MENU] [LABELS ON/OFF].
8757A/C/E	Press [SYSTEM] [LABELS] [FREQ LBL OFF].	Press [SYSTEM] [LABELS] [LABELS ON/OFF].
8753A	Press [DISPLAY] [MORE] [FREQUENCY BLANK].	
8752A or 8753B/C	Press [DISPLAY] [MORE] [MORE] [FREQUENCY BLANK].	
8719A/C, 8720A/B/C or 8722A	Press [DISPLAY] [MORE] [FREQUENCY BLANK].	
8510A or 8510B (≥ rev 6.0)	Press [SYSTEM] [FREQUENCY OFF].	Press [SYSTEM] [CRT OFF].
8510B (≥ rev 6.0) **or 8510C**	Press [SYSTEM] [DISPLAY FUNCTIONS] [FREQUENCY OFF].	Press [SYSTEM] [DISPLAY FUNCTIONS] [CRT OFF].

Clear instrument keystrokes

Table 17. Clear instrument keystrokes

Instrument	Clear
8350B (≥ rev 6.0)	Press [SHIFT] [0] [3] [INSTR PRESET] and cycle power.
8340B or 8341B	Press [SHIFT] [MHz/sec] [1] [8] [Hz/AUTO] [SHIFT] [kHz/msec] [0] [Hz/AUTO] [INSTR PRESET and cycle power.
8360A	Press **SYSTEM** [MENU] [MORE] [SECURITY MENU] [CLEAR MEMORY] [1] [Hz/sec/ENTER] and cycle power.
8756A	Press [PRESET] [SAVE] [1] [2] [3] [4] [5] [6] [7] [8] [9] and cycle power.
8757A/C/E	Press [SYSTEM] [MORE] [CLEAR SAVE/RECALL] [CLEAR YES] [SPECIAL] [ENTER LIM LNS] [DELETE ALL LNS] [PRESET] and cycle power.
8753A	Press [SAVE] [CLEAR REGISTER] [CLEAR ALL] [PRESET] and cycle power.
8752A or 8753B/C	Press [SAVE] [CLEAR REGISTER] [CLEAR ALL] [SYSTEM] [SEQUENCING] [MENU] [MORE] [CLEAR SEQUENCE] [PRESET] and cycle power.
8719A/C, 8720A/B/C or 8722A	Press [SAVE] [CLEAR REGISTER] [CLEAR ALL] [PRESET] and cycle power.
8510A	**I**nsert operating system tape. Press [SYSTEM] [SERVICE FUNCTIONS] [TEST MENU] [1] [9] [=MARKER]. Cycle power. Insert blank tape. Press [TAPE] [STORE] [MORE] [MACHINE DUMP] [FILE n]. Press [TAPE] [LOAD] [MORE] [MACHINE DUMP] [FILE n].
8510B (< rev 6.0)	Press [SYSTEM] [MORE] [SERVICE FUNCTIONS] [TEST MENU] [2] [2] [=MARKER] [1] [=MARKER] [4] [=MARKER] [8] [5] [1] [5] [=MARKER] [2] [=MARKER]. Press [=MARKER] [1] [=MARKER]. Cycle power. Press [PRIOR MENU] [=MARKER]. Insert operating system tape #1 and press [1] [9] [=MARKER]. Insert operating system tape #2 and press [OK].
8510B (≥ rev 6.0), **8510C or 8530A**	Press [SYSTEM] [MORE] [SERVICE FUNCTIONS] [TEST MENU] [2] [2] [=MARKER] [1] [=MARKER] [4] [=MARKER] [8] [5] [1] [5] [=MARKER] [2] [=MARKER] [1]. Press [=MARKER] [1] [=MARKER]. Cycle power. Press [PRIOR MENU] [=MARKER]. Insert operating system tape/disk and press [1] [9] [=MARKER]. Select the program to load and press [LOAD FILE]. If a power flatness correction has been performed the memory of the Agilent 8360 series source must be cleared separately.

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