Instrument Security Procedures

Models:

Fluke 5520A

Product Name:

Multi-Product Calibrator

Instrument Description:

High performance multi-product calibrator capable of calibrating 5-1/2 and 6-1/2 digit multimeters.

Memory Description:

The Fluke 5520A Multi-Product Calibrator contains two types of storage media. The first is a flash-based storage media and the second is random access memory (RAM).

Flash Memory:

The flash memory used in the 5520A is a physically block structured device. It contains three (3) separate blocks. The first block is a special purpose block intended to hold a small boot loader. It's used for that purpose within the 5520A. The boot loader software was designed and maintained by the Fluke Corporation and is preprogrammed into the flash device for us by the vendor. The boot loader flash memory can't be easily changed or reconfigured without special programming equipment. It's considered by Fluke to be permanent. If it were tampered with, or otherwise changed, by anyone other than qualified software engineer equipped with supporting documentation from Fluke, and external programming hardware, the calibrator would cease to function. The second block contains the application software for the 5520A. It's programmed by Fluke but is otherwise subject to the same stringent restrictions as the boot code. Additionally, a checksum is generated and compared on power-up to insure that no changes to this code have occurred. The third block is logically partitioned, by the software, into two (2) mini-blocks. The first contains the calibration constants for the instrument. The second contains all nonvolatile configuration data for the instrument.

Calibration Constants:

Calibration constants are double precision floating-point numbers. These numbers are used by the instrument during normal operations to achieve its rated output accuracy. Each calibration constant (CCO) has a default value and a limit. Most limits are within a few percent of the default value. It's impossible to set a calibration constant to a number outside of its limit. Calibration constants can't be accessed directly by a user. They can be changed during a calibration process. Theoretically, someone could run a calibration procedure and store numerically encoded data in the calibration constants. The limits on many of them would obviously complicate the process though.

Non-Volatile Configuration Data:

Non-Volatile configuration data contains user settings like IEEE address, serial port configuration, calibration dates, etc. It also contains a string of a maximum of 64 characters. The string is an IEEE 488.2 standard and is set using the <*PUD> command. It's queried using the <*PUD?> Command or from the front panel [see page 6-35 of the Operator Manual for a complete explanation of these commands].

> To read the contents of the User Report String [PUD], use the following key strokes from the front panel [see page 3-12 of the Operator Manual]:
>
> Select the SETUP key on the front panel, using the blue 'soft' keys under the Control Display, select the following:
> > UTILITY
> > FUNCTNS
> Then,
> > INSTMT
> > CONFIG
> Then,
> > SHOW USER
> > REPORT STRING
> The Control Display then shows the user report string contents.

Random Access Memory (RAM):

RAM is not directly accessible by the user and its contents are lost when the power is removed (volatile). RAM is not a likely security risk.

Memory Cleaning Instructions:

The PUD string can be cleared using the <*PUD> command in conjunction with an empty string. Then queried to insure it contained the empty string. This would not address any of the other nonvolatile constants but would remove the most likely threat.

All Configuration Data, including the User Report String, can be set to their default state using the <FORMAT> command and <SETUP>. Any configuration data that has been modified by the customer would need to be restored, including the system clock and clock format. This command also clears the PUD string. This would eliminate any risk of tampering with the Configuration Data Constants but would not address the Calibration Constants issue. The

Calibration Constants can be reset to their default settings using the <FORMAT> command and <CAL>. The instrument would need to be calibrated after this command was issued. This would address the Calibration Constant issue but would not affect the Configuration Data Constants. All data in the third physical block, the Configuration Data and the Calibration constants, can be reset to their default state by using the <FORMAT> command and <ALL> [see page 6-19 of the Operator Manual for a complete explanation of these commands]. Both the <CAL> and <ALL> parameters require the calibration switch on the rear panel of the instrument be set to the ENABLE position.

> For re-formatting non-volatile memory, use the following key strokes from the front panel [see page 3-12 of the Operator Manual]:
>
> Select the SETUP key on the front panel,
> Using the blue 'soft' keys under the Control Display, select the following:
> > UTILITY
> > FUNCTNS
> Then,
> > FORMAT
> > NV MEM
> Then,
> > ALL, or CAL, or SETUP

The instrument will need to be calibrated after this operation and any configuration data that has been modified by the customer would need to be restored, including the system clock and the clock format. This is the safest method, but is highly destructive in that it requires a total recalibration of the instrument.