Updating Firmware on LeCroy 9300 Series DSO's

JUST LIKE IN SCHOOL READ THE ENTIRE DOCUMENT BEFORE DOING ANYTHING!

Standard Disclaimer: Updating firmware involves some risk since a power failure in the middle of an update can corrupt the firmware download. Also note that OPTION GALS ARE NOW AVAILABLE SEE THE FILES SECTION FOR ORDERING INFORMATION (September 2012)

It is a good idea to put the scope on A UPS if you think that you may have an issue with power to the instrument or with the computer you are using for the update. *All risks involving firmware updates are the responsibility of the user and the files supplied are supplied as is with no warranty of any kind expressed or implied.* These files have been validated and are the latest release of the 93XX (Version 8.22) firmware. If your scope hardware is fully functional and follow these directions you should have no problems installing these updates. Since the target firmware is 68K processor based there are no virus risks associated with the firmware files.

SOME BACKGROUND INFORMATION

All of the firmware update methods require that you download the appropriate firmware files from the LeCroy_Users_Group file section.

Note that the firmware is specific to a model family so make sure that you download the files for your particular oscilloscope.

Additionally, with regards to the 93XX series, you need to make sure that your scope has the CPU3 option (using the *SHOW STATUS* button, Chose *SYSTEM* and look for CPU3). You also need to verify that your CPU card has Flash memory. If you have a EPROM CPU3 See the files section for an update binary.

You can confirm that your 93XX scope has flash by opening the scope and confirm that there are no EPROMS on the CPU card or check the maintenance menu as described later in this document for the presence of the Flash Update option. Note that under normal circumstances you will not have to open the scope to update the firmware. There is one exception to this rule, which will be covered in the last section of this document.

Note that units like the 9314(A/L/M) and similar 68020 processor (CPU2) scopes do not have or support Flash update as they have firmware in UV erasable EPROMS on the CPU card. The latest firmware for these scopes is 7.22.

To update these scopes you must obtain new blank EPROMS and have access to an EPROM programmer. Binary images for all of the CPU2 EPROMS can also be found in the file section. There is also a document that will tell you what files are to be burned into what EPROMS and where they go on the PCB.

The screen capture below shows the status screen of a typical 9354AL. Note that your scope may or may not have all of the options shown. This unit was recently updated to version 8.22 firmware using the files from the file section.

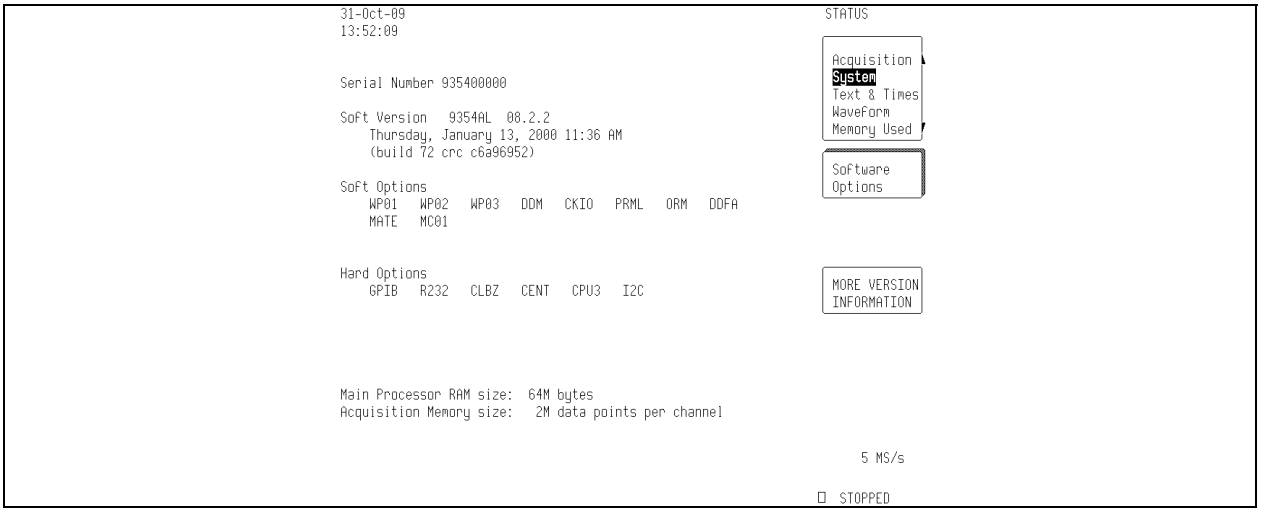
Note that updating the firmware will not enable any software options that were not enabled previously, but some menu selections may have added selections. Options are enabled using an Option GAL installed on the CPU2 or 3 board or a key code entered from the front panel of the instrument.

Note: Key codes or Option GAL's are used to offer a secure method of enabling the software/hardware functions. (I.E. WP01, WP02, MC01, etc.). These were options that were sold as updates and features to the basic instrument. Current scopes use only the key entry method.

If you press the *Software Options* key you will see any installed options keys. It's a good idea to do a screen capture of this screen just in case you need to re-enter these codes.

Note that the CRC of the firmware is shown. The CRC is calculated when the *More Version Information* button is pressed.

After you update your scope its CRC should agree with the CRC shown below. Note also that the serial number of the scope has been changed. To change it back connect to the scope using a PC that has LeCroy ScopeExplorer installed on it and enter the command shown in the Scope Tips & Tricks document.



There may be "50 ways to leave your lover"[1] but there are only 3 methods available to update the firmware in your 93XX LeCroy Oscilloscope:

1. The 93XX Floppy Disk (the easiest way) NOTE: IF YOU SCOPE PRESENTLY HAS FIRMWARE LOWER THAN VERSION 7.3.0 ***DO NOT*** USE THE FLOPPY METHOD AS IT WILL LEAVE THE SCOPE INOPERABLE, REQUIRING THE SRAM CARD METHOD!

2. An external Laptop/PC connected via GPIB using a genuine National Instruments GPIB controller Using "LeCroy ScopeExplorer". Note that ScopeExplorer does support control by RS-232 but NOT for firmware updates due to the binary file transfer required.

3. A 2MB SRAM (93XX a 1M may work 2M for all others) Card using the front PCMCIA Card Slot.

We will discuss these in order.

FIRMWARE UPDATE USING THE OSCILLOCOPES INTERNAL FLOPPY DISK DRIVE

YOUR INSTRUMENT MUST PRESENTLY HAVE >= 7.3.0 FIRMWARE!!!!

Download the firmware files from the group file section update.

Note two files are required and you will need two formatted floppy disks. For compatibility format the disks using the format routine in the scope and then use a PC to create the two floppies. On each floppy create a folder (sub-directory) called Lecroy_p.

Label the first floppy “Boot” and copy the 93XX822.bin file to the Lecroy_p folder.

Label the second floppy “Install” and copy the 93XX822.fla file to the Lecroy_p folder.

Insert the “Boot” disk into the scope floppy drive and cycle the power to the scope.

After the scope boots press the ***Utilities*** key then choose ***Special Modes, Firmware Update.*** Select trigger mode STOP.

Remove the Boot disk from the drive and Insert the Install Disk (the one with the fla file).

Change the ***Update From*** control to ***Floppy*** and press ***Update Flash***.

Remove the Install Disk and cycle power to the scope.

Press ***Show Status***, chose ***System*** The scope should show version 8.22 and the firmware date and CRC and should agree with the screen capture above.

FIRMWARE UPDATE USING LECROY SCOPE EXPLORER

Download the firmware files from the group file section update. You will only need the 93XX822.fla file form the zip to update using ScopeExplorer.

Download, install and verify that you can communicate with the scope using ***ScopeExplorer***. A version is in the files section of the group.

You must use GPIB as RS-232 is not supported for firmware updates. ScopeExplorer will automatically find GPIB connected scopes.

The details for this can be found in the help menu within ScopeExplorer.

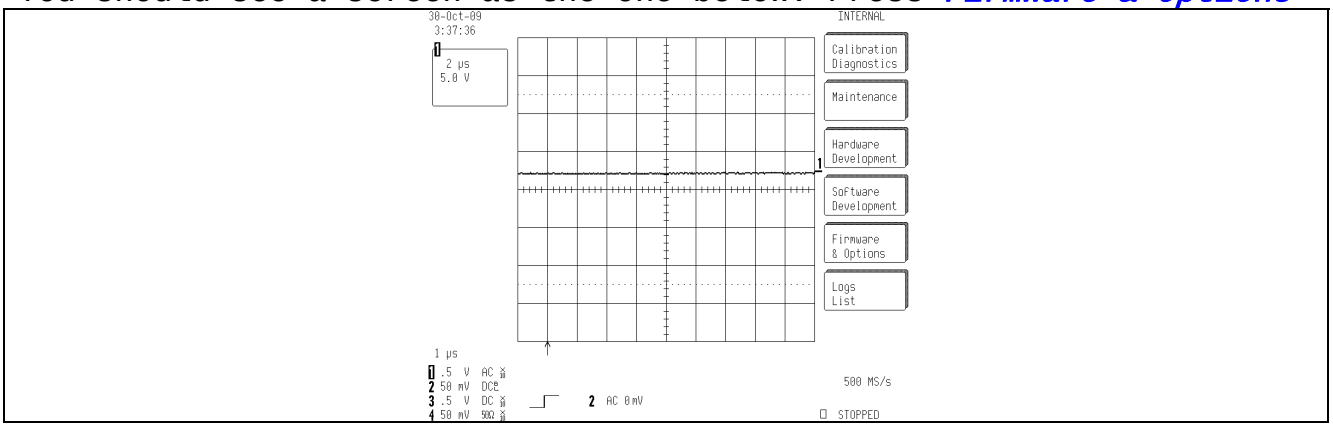
You will also find a step-by-step procedure showing how to update the firmware so I won’t duplicate that effort here.

93XX USING A 1MB (2MB recommended) SRAM CARD

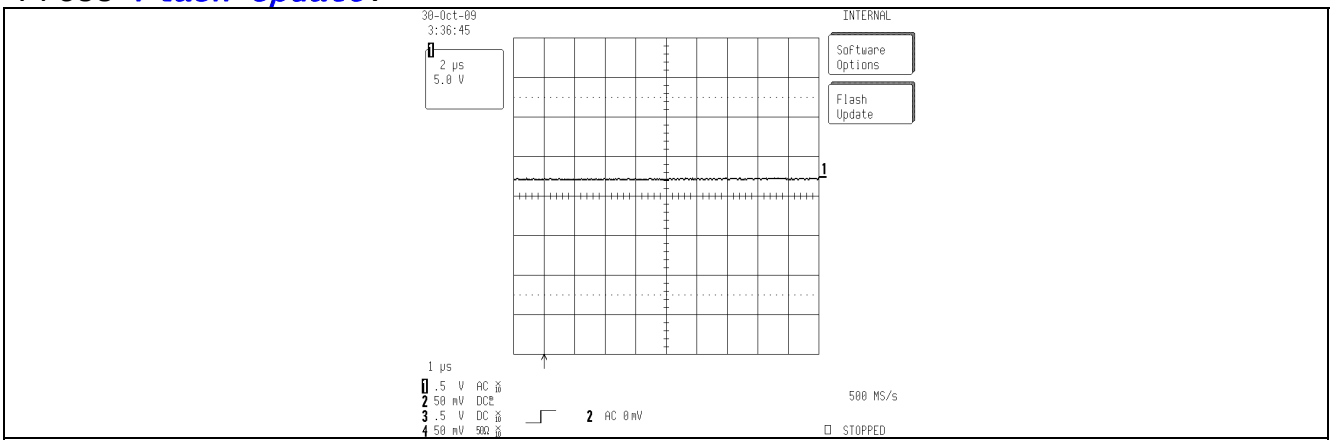
To use the SRAM method you will need access to a working scope that has an updated version of the firmware. Power up the firmware source scope and insert the 1MB (or greater) SRAM card into the front card slot. Note that you do not have to have the MC01 (memory card) option to do firmware updates. ***See notes on SRAM cards on page 5 and at the end of this section.***

Enter the Maintenance Menu by pressing buttons 3, 4 and 5 (see the ***ScopesTips&Tricks.xls*** document in the files section)

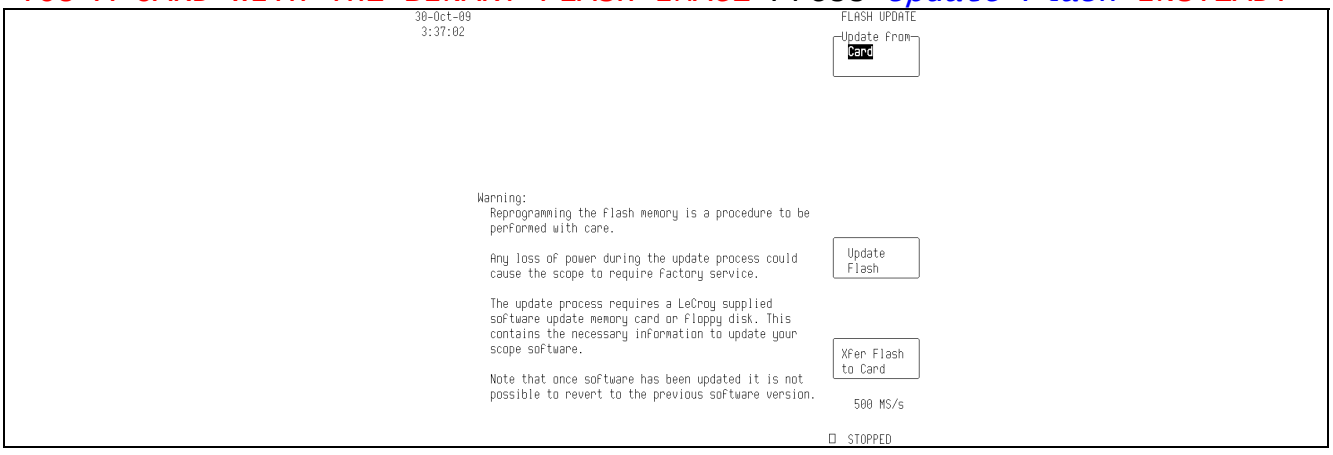
You should see a screen as the one below. Press ***Firmware & Options***



Press ***Flash Update***.



Press ***Xfer Flash to Card***. You will be asked to confirm by pressing the button again. When complete you will see a message flash at the top of the screen that says “Transfer Complete”. IF SOMEONE HAS SENT YOU A CARD WITH THE BINARY FLASH IMAGE Press ***Update Flash*** INSTEAD!



To transfer this firmware into another scope move the card to the target scope and follow the instructions as above but press the ***Update Flash*** button instead of Xfer Flash to Card. Again you will be asked to press the button twice to confirm.

NOTES ABOUT SRAM CARDS

The only card types that can be used for Flash Update are standard ***linear SRAM cards, NOT FLASH***. The cards can be up to 4MB in size. The author has used a 2 to 6MB card successfully for the 93XX (LC and WR1 needs 2MB, WR2 needs 4MB minimum). If you have the MC01 option and you have a larger card try it as a data card in the scope. If you can read/write the card with the scope functions then it should work for firmware updates. If you find cards that work please let the group members know.

These cards must also be of the type that uses a non-rechargeable battery. Flash cards of any type with or without adapters will not work! Cards made for the long obsolete Poquet PC will work as well as MELCARD SRAM cards.

Unfortunately these cards are often quite expensive as new but the author has had success finding inexpensive ones on e-bay from time to time.

WHAT TO DO IF THE SCOPE WON'T BOOT (93XX other similar)

If the scope won't boot or shows something strange on the screen there is a possibility that the firmware has been corrupted in some way. This procedure assumes that the basic hardware is functional but the scope won't boot to its normal operating screen or some standard feature or menu won't work correctly, etc.

In order to get past this debacle it is necessary to create a bootable SRAM card. You must have a working scope available to you to create a bootable SRAM card or have a friend that can create a bootable image for you.

I do not know of any PC based programs that can read and write non OS specific binaries to create these cards although it would be handy to have such utilities to make it easier to fix a scope that won't boot. Maybe some software expert can create such a program for the group!

In that case you could mail a SRAM card to your friend and have him go through the SRAM update procedure down to the point where the ***Xfer Flash to Card,*** button is pressed.

At this point there is a bootable image of the scope firmware on the SRAM card.

The card can now be mailed back to you with the image in place.

Once you have this image, install the SRAM card in the front panel slot and open the scope top cover. Place a jumper over two pins on the header shown below on the CPU3 (9302-1) card to force the scope to boot from the SRAM card image instead of the internal flash image.

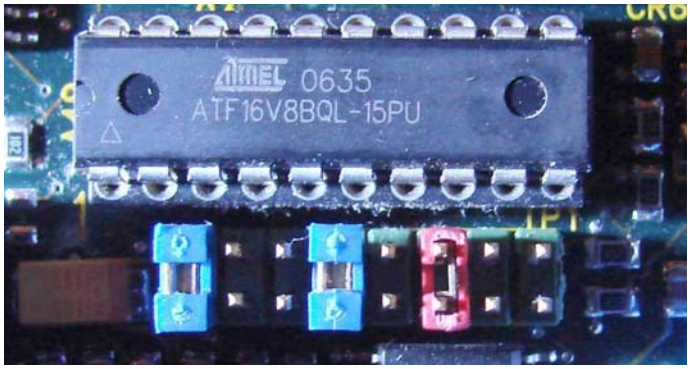
TP1 Berg Connector – BOOT from PCMCIA (MC01 SLOT)

The TP1 header on the 9302-1 Rev. B CPU3 PCB has 16 pins and is shown in the picture below. The **BLUE** jumpers are for processor memory configuration. (Note: The memory jumpers may be set differently for your scope. There is a separate document on the site that covers the memory jumper settings.) DO NOT DISTURB THE MEMORY JUMPERS!!!!

The jumper settings count from left to right, A to H. The blue jumpers are shown in the “A” and “D” position in the leftmost picture.

To set the scope to boot from the SRAM card install an additional jumper in the “F” position as shown by the RED jumper in the right most picture below.

JUMPER SETTING FOR STANDARD INTERNAL BOOT



JUMPER SETTINGS FOR SRAM CARD BOOT

Once you have the scope booted, enter the maintenance menu and follow the steps in the section entitled “Using a 2MB SRAM Card” but use the Update Flash button to copy the booted image to the internal Flash memory. Once the transfer has been completed remove the SRAM card, turn the scope power off, remove the boot jumper and turn the scope back on. The scope should now boot normally.

At this point you can either use the scope as is or update the firmware using any of the prescribed methods.

SOME NOTES ON THE SRAM CARD BINARY IMAGE

The image on the bootable SRAM card is a true binary copy of the 68030 firmware microcode. It is an address for address, bit-by-bit copy of the firmware from the source scope.

For scope boot recovery purposes the firmware does not have to be the latest version (with one exception, in order to use the floppy method for further updates it must be version 6.4 or higher).

Note that if you plug this card into a Windows based PC PCMCIA slot (**P**eople **C**an’t **M**emorize **C**omputer **I**ndustry **A**cronyms) it will appear blank.

This is normal, as modern Windows systems do not recognize SRAM cards. Some systems will, but most require special external card readers to read the data on them.

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1. “50 Ways to leave your lover”, Paul Simon 1975