

## **Replacing and retrofitting the floppy drive in LeCroy 93XX Series Oscilloscopes**

**Problem background:** Older 93XX DSO's used Citizen VIDA-40 1/3<sup>rd</sup> height floppy drives that are now pure unobtainium. These and the newer Citizen W1DE drives are prone to failure mostly due to dry rotted rubber belts which are also unavailable.

**Solution:** Replace the floppy drive with the newer readily available TEAC FD-05H series drives that have a direct drive (no belts) spindle motor. These drives are very robust and can be had for about \$10.00 USD or less on Ebay.

**Conversion Issues:** If the drive in your scope is the W1DE series that connects to the adapter PCB at the rear of the drive with a white cable you have a fairly easy job to replace the drive.

You will have to find someone that has a milling machine and mill 1mm off of the bottom edge of the drive bezel even with the bottom of the LED lens.

You will have to take great care when this is done to this to make sure that the bezel and the drive is not damaged. Take very small cuts. The depth of the cut should be nearly to the die cast housing of the drive.

When the job has been completed use a can of computer duster to remove any plastic dust and do not let the machinist use compressed air as the force can damage the drive head mechanism scrapping the drive.

You will probably have to loosen the bracket and adjust the drive to make sure that the floppy loads/unloads easily.

If you have the old VIDA-40 drive type where the multicolor ribbon cable plugs right into the drive you have a little more work as you will need a PCB to do the conversion from the 2 X 13 26 pin IDC Female to the 26 pin FFC/FPC connector on the drive.

First of all build the PCB. There are Gerber files that the group moderator created that can be used to make a PCB. You will need to order the FPC/FFC connector and the 2 X 13 male header as well. You will also need a 26 pin FPC/FFC cable that is 1mm pitch and 12 inches long. Note that a shorter one is in the parts list. The short one is used if you have the ability to cut a slot in each side of the steel bracket use to mount the floppy. I do not recommend that you do this as the method below is much easier! I will lay out the parts required at the end of this document.

You also need insulating tape to insulate the connections on the bottom of the board as the inside of the top cover has a conductive Nickel loaded paint (for EMC) on it and if you mount the board directly to the lid you will short out the connections. Kapton® tape works great for this but a few layers of Scotch® brand magic transparent tape will do the trick.

You will also need 1/16" (1.57mm) thick or slightly thicker double-sided adhesive foam tape for mounting the board. It is possible to get this in wide widths. The more that the bottom of the PCB is covered the better the adhesion will be.

The board will mount to the right of the drive in the area towards the far read of the top cover as shown. Press the board into place and check to make sure that it is anchored.

Test fit the 12 inch FPC cable folding it as shown and anchor it into place by placing a piece of double sided foam tape on the top of the Floppy mounting bracket as shown. Leave some slack in the end that plugs into the FFC/FPC connector on the conversion PCB. The excess cable feeds under the mounted floppy as shown.

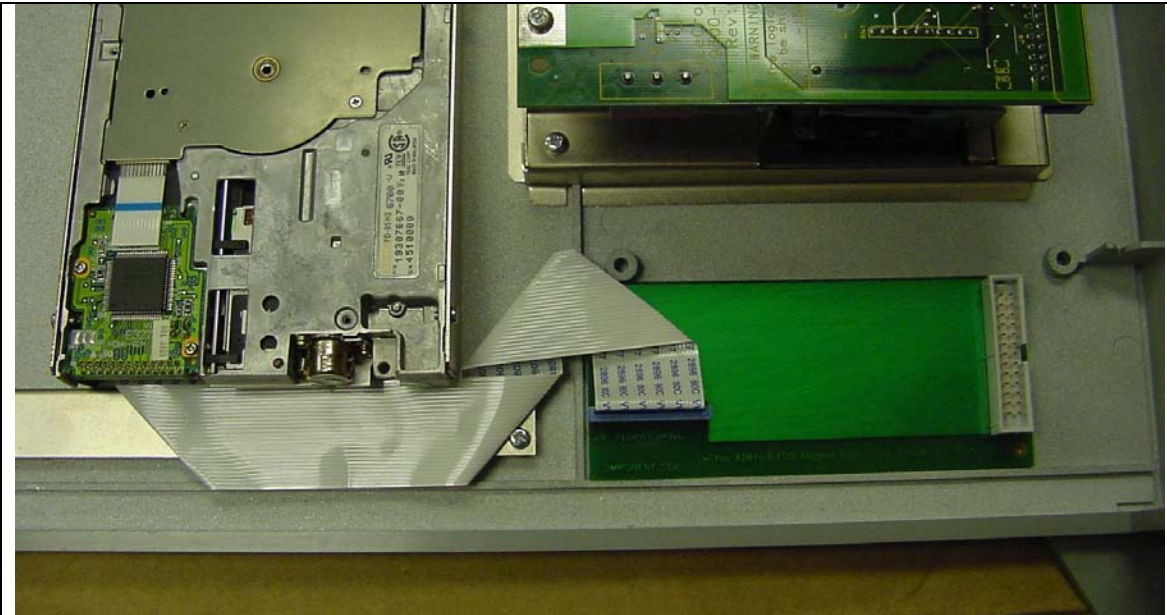
After test fitting the drive making sure that when mounted you can insert as remove the floppy disc easily (the floppy disc inserts with the spindle drive side down) mount the floppy into place.

Note that you may have to use a small piece of thin weather stripping under the bottom front edge of the drive to insure that it fits snug against the top edge of the mounting bracket. You will most likely have to remove and discard the two front mounting screws. Don't worry; the drive will not be going anywhere! Re-check the mounting to make sure you can load and eject the floppy without any interference.

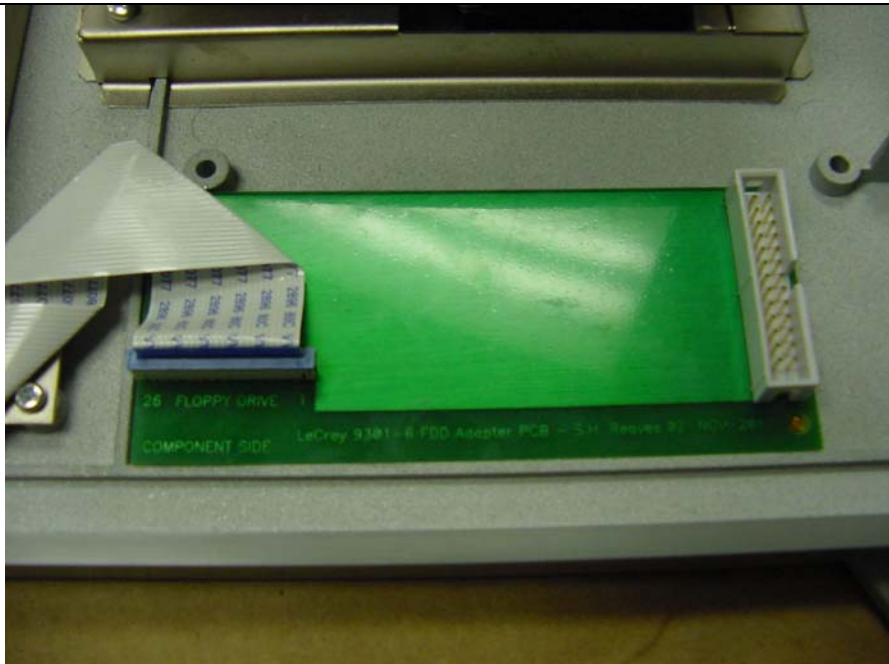
Test the drive with the Floppy Utility. You should be good to go.

Please refer to the pictures and data below.

Good Scoping!  
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**Overview of the retrofit using the TEAC FD-05HG Drive**  
**Note that the connections on the FPC/FFC cable face towards the front and Pin 1 (the brown wire from the floppy interface cable from the scope) is on the bottom right (the PCB artwork is marked with a 1 and the 26 pin male header is marked with a triangle for pin1. Note the fold in the cable.**



**Closer view of the PCB. The FPC/FFC cable stiffener faces towards the rear of the instrument. Pin 1 for the floppy disc connector cable is at the bottom right.**



**Floppy drive connection. Note the FPC/FFC Cable stiffener faces towards the rear of the drive. The cable is anchored to the steel rail of the floppy bracket.**

### **Parts List**

**PCB – See Group Files Section**

**TEAC FD-05HG Floppy Drive – Find on eBay**

**26 pin Male Shrouded Header**

**Assman AHW-26G-0202-T Digi-Key HRP26H**

**26 pin Female Vertical Mount Through Hole FFC/FPC**

**Molex 52030-2629 Digi-Key WM1187-ND**

**26 position male FFC/FPC cable with contact area on the same side of the cable. 1mm contact spacing**

**Parlex 100R26-305B Digi-Key HF26U-12-ND**

**Permanent Adhesive Foam Tape 3M from office supply store. Kapton® or Mylar® Insulating Tape**