

3 LeCroy 7200A Restoration



If you are not a service technician or designer, do not attempt to repair or restore one of these units. If you do decide to do any repair work make sure you work with static mats, keep the unit un-plugged and discharge the picture tube (not using your body as the conductor!!). The CRT can contain lethal voltage/current levels even after the unit has been off and unplugged.

The 7200A I have was purchased from IOMEGA. This unit was sold to me "working" on Ebay. The picture used to advertise the 7200A showed the unit powered up. Soon after unpacking the unit I found that it would not power reliably. When it did power up it only ran for a short time then would lock up. The colors on the video looked poor also. At this stage I had rebuilt two of the 7200s and decided it was best to just take the 7200A apart and start from the ground up like I had done with the other two units. I purchased the 7200A with the intent on keeping it along with one of my 7200s.

3.1 System Checkout

Once apart I noticed that a tantalum capacitor used on the 5 Volt supply had broken off the motherboard. The 7200A was shipped from LeCroy with an Intel 386 or 486 processor. My unit had a 486DX33. I repaired the board and re-tested the unit with a Diamond video card running some LINUX diagnostic software. I found that the board was still unstable. After changing the CPU, cache, main memory and testing the power supply I called LeCroy. I was told that they had tried to find boards a few years back and that they turned up nothing. The 7200A can not use just any PC motherboard. It support the Symphony chipset only and only certain versions of the silicon. After exhausting all of my resources I turned up two boards that ended up working.

3.2 Main Motherboard

This is the motherboard that was supplied with the scope. Notice the new cap in the upper right corner of the board.



Also notice the AMIBIOS is used.

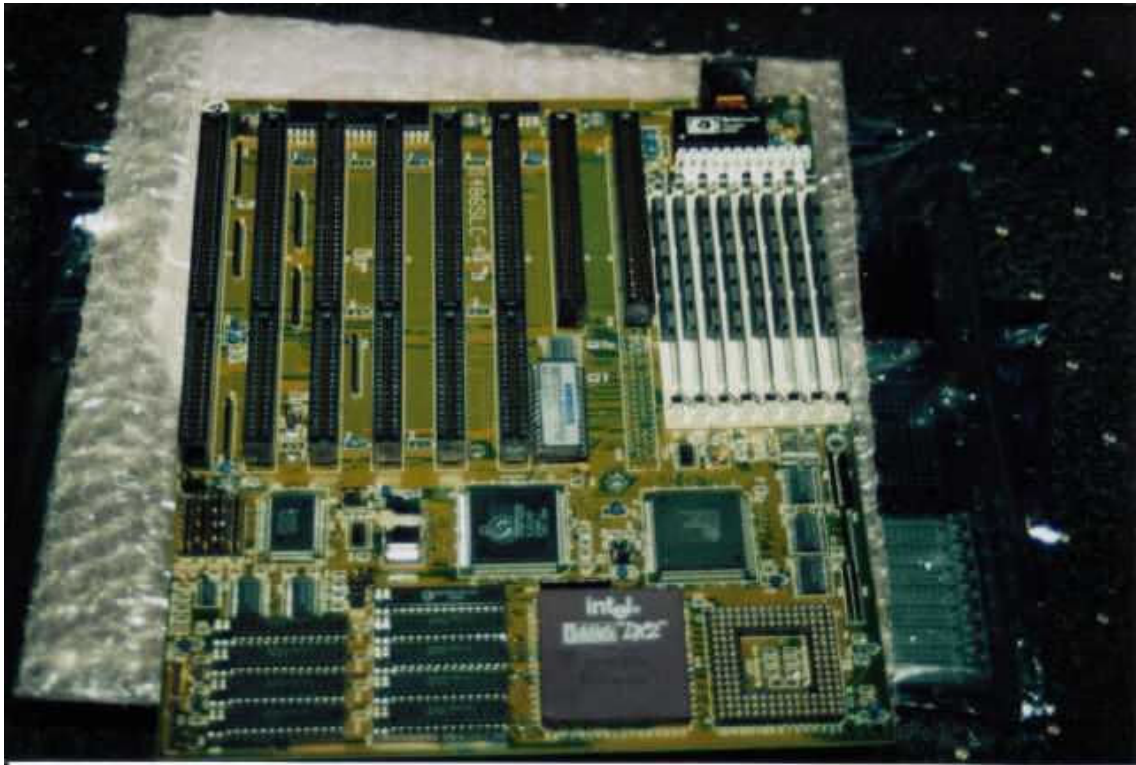
When running the diagnostics you will see a selection for the motherboard type. The following boards are listed:

486334005433

YUNG334280633

DECO334280386

I found this board down in Texas. I picked it up for \$10.00 plus shipping on Ebay.



Notice that the board is much newer. This board has revision 6 silicon for the 82C461 and revision 1 for the 82C362. I did some basic testing with the board and it seemed to be fine. I have been unable to locate the documentation for the board and the jumpers are not marked on the silk screen. So I put this one in the spare box after finding the second board.

Note: I latter switched back to this card and noticed that my video flicker problem has gone away!! This card is a JOINDATA Systems, G486SLC-4. I ended up using 8M of RAM, 64K cache and an Intel 486DX2-66. With this configuration the unit seems very stable.

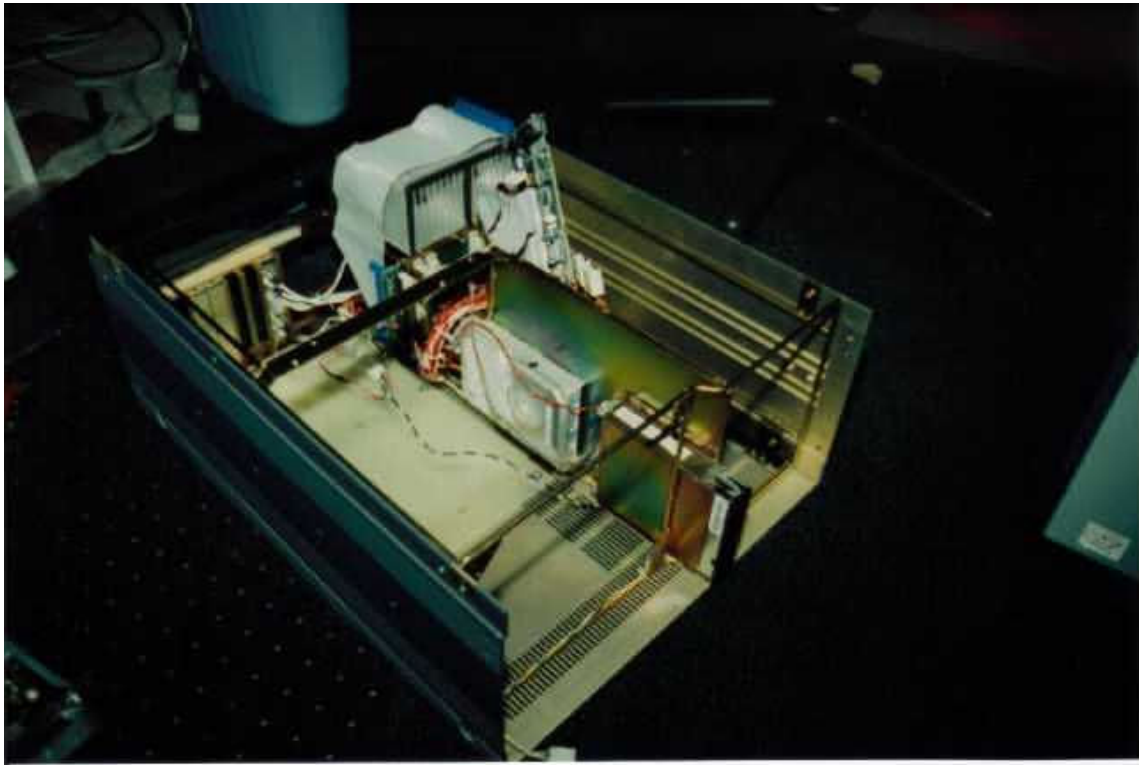
- [JOINDATA G486SLC](#)

I later turned up this board. It was a gift from a good friend of mine. This card had the documentation and had the same version of silicon as the original board.



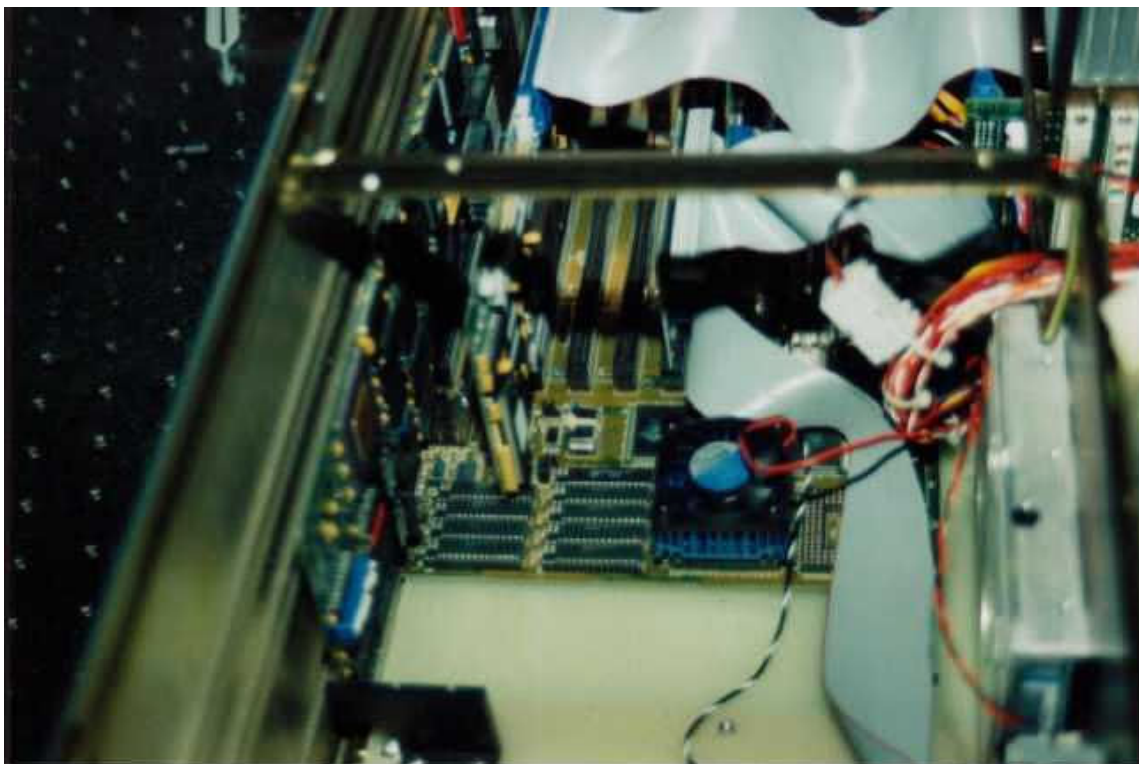
After running several hours of tests on the board I decided it was fit for service. I did some testing with the Intel DX-66 and the DX-100. I also tried a Cyrix M1 120MHz part for fun. This scope will outrun the 7200 by a long shot!!! This motherboard did not have the power supply on board and required an adapter socket for the M1. I ended up staying with the DX2-66 with a 33MHz bus.

The following shows the empty frame. Not much to look at. The 7200A does use a standard IDE drive. My system came with a Quantum ProDrive LPS, 210AT model RR21A011. This is a 977 cylinder, 5 head, 17 sector/track, 41MB drive. This is double size of the drive used in the 7200. I ended up replacing this (did not want to risk the age and travel) with a Maxtor 1.2GB drive. It was the smallest I could turn up!! While I had no problems using the larger drive, it did take a very long time to format. I think about 2 hours or so!!



3.3 Texas M.B. with Cyrix 120MHz!!

Testing with the board from Texas running the Cyrix 120MHz and 32M of RAM. Considering the scopes originally had a 386, this board is a screamer. If I locate the books for this board it will go back in at some point to help with the math. I never saw any problems running the Cyrix processor, but I only had the board installed for a few days.



3.4 Cards

The 7200A uses a PC motherboard. All of the cards are based upon the ISA bus. The 7200A supports GPIB, RS-232, Centronics, SCSI and Ethernet (maybe). All of these cards were purchased non-custom. I had no trouble locating spares.

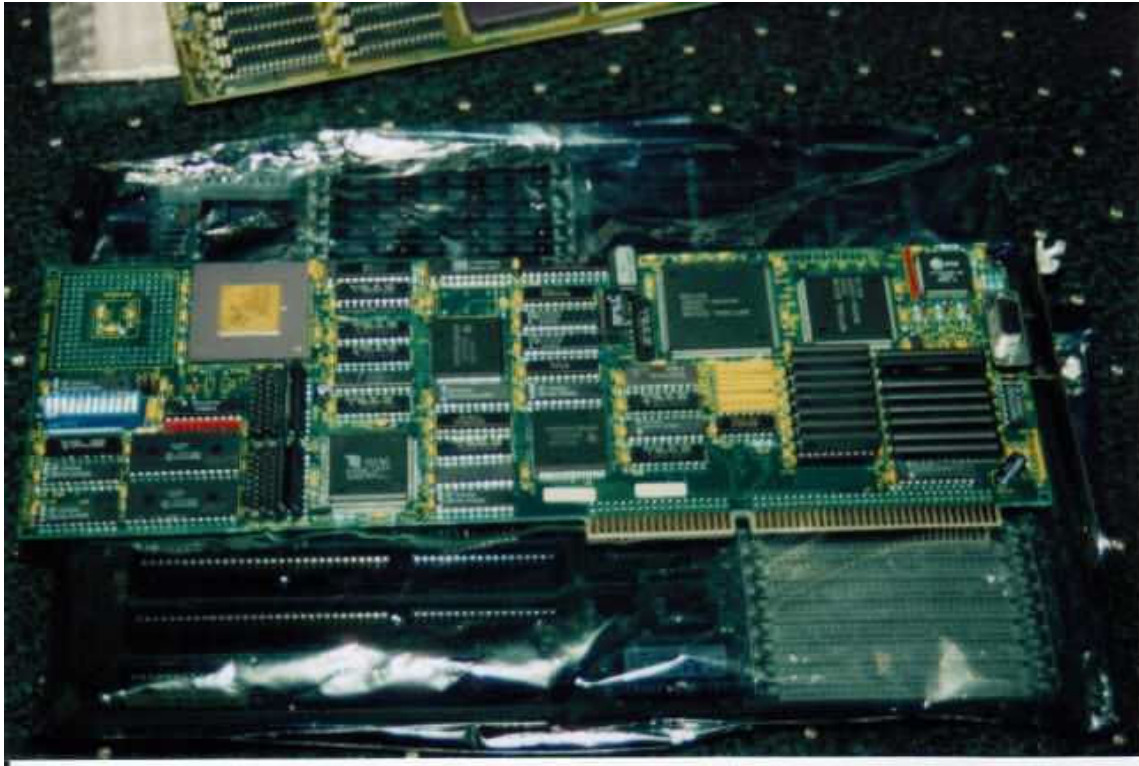
This is the GPIB card available from National Instruments.



Set as follows:

A3-OFF DRQ3
A4-OFF DACK3
A5-OFF
A6-ON
A7-OFF
A8-ON
A9-OFF
7210-OFF
PCII-OFF
IRQ5

The video card is a way high end GSWPM01. The card uses a TSENG LABS and TMS34020GBL-32 for the video processing. ~~It's too bad but the software appears to not have been written to synchronize the video to the write pulse. So, at least with my scope, the video has a flicker every time the screen changes. This is my only complaint about the 7200A and I still stew over it!!~~ It turns out that this must be one of the problems with an incompatible motherboard. More testing revealed that running the unit with the Texas motherboard seems to clear up this problem. I am now using this card in place of the other card I had shown and am not having any problems.



The video card should be set as follows:

SW1-OFF
SW2-OFF
SW3-OFF
SW4-ON
SW5-ON
SW6-ON
SW7-ON
SW8-OFF
SW9-OFF
SW10-ON
SW11-ON
SW12-OFF

The interface to the plug-in is all custom.

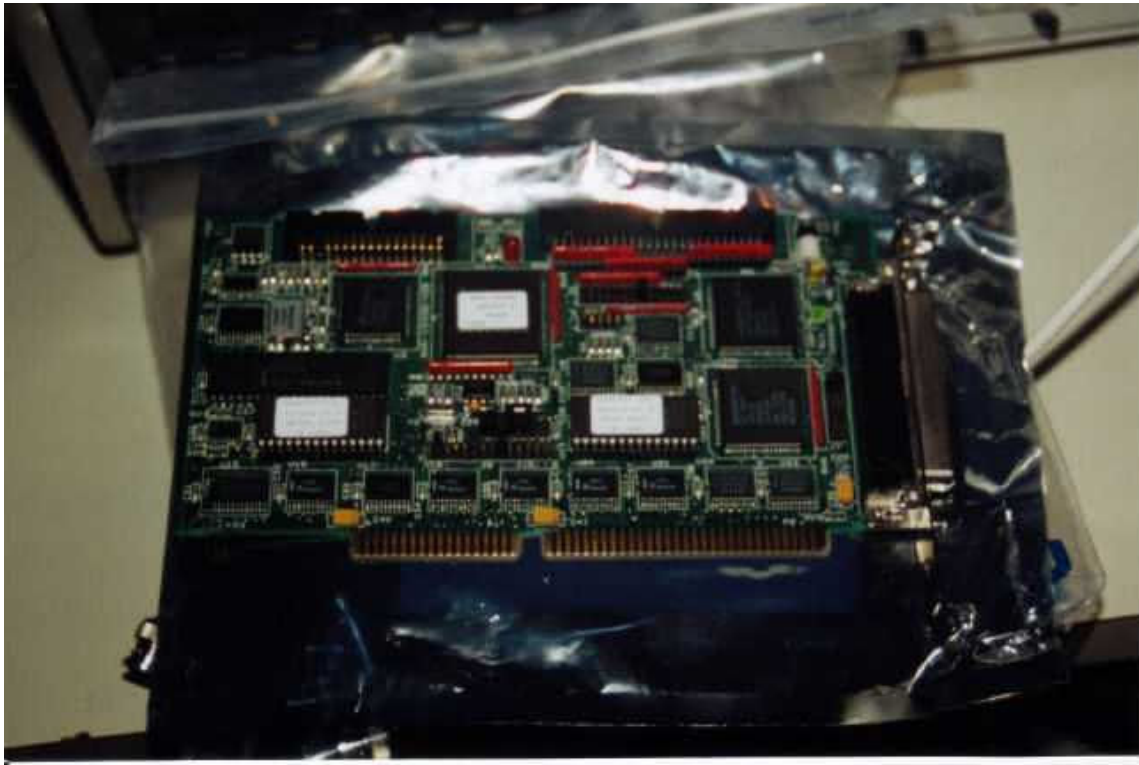


3.5 SCSI

The 7200A supports SCSI. Not for the internal disk drive, but as a means to get data out of the scope and into an outside computer. To use this feature you must have a 7242B with the F2 option or the 7234-F2. How I managed to turn these up is beyond me.

I have now written some software for the 7200/A and found right off the limit of the GPIB and RS-232. It's just too slow to bring down large amounts of data. The SCSI is the way to go here.

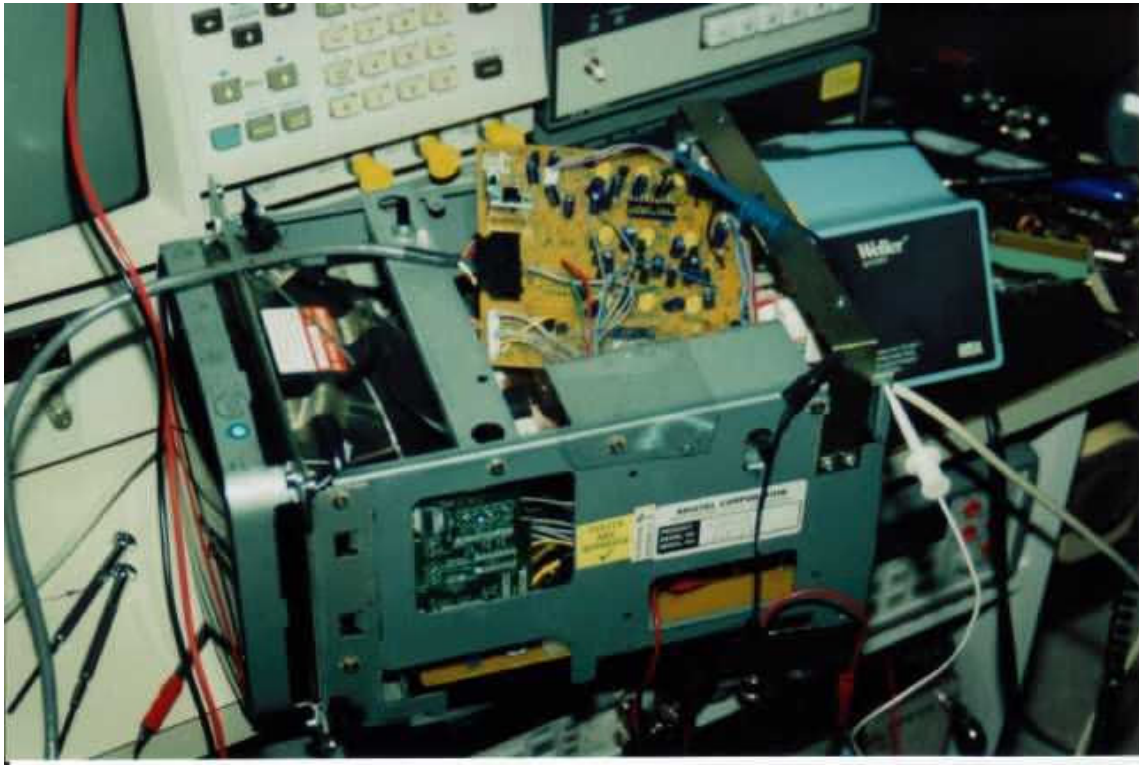
Note that you can use the cards that have floppy drive support. Just disable it.



One thing I noticed in the manual is that it wants the card in the scope to have an ID of 7. I tried to change this and the scope did ID the card with the new address. I have not done any testing yet to see if it is possible to use the card set like this.

3.6 Video CRT

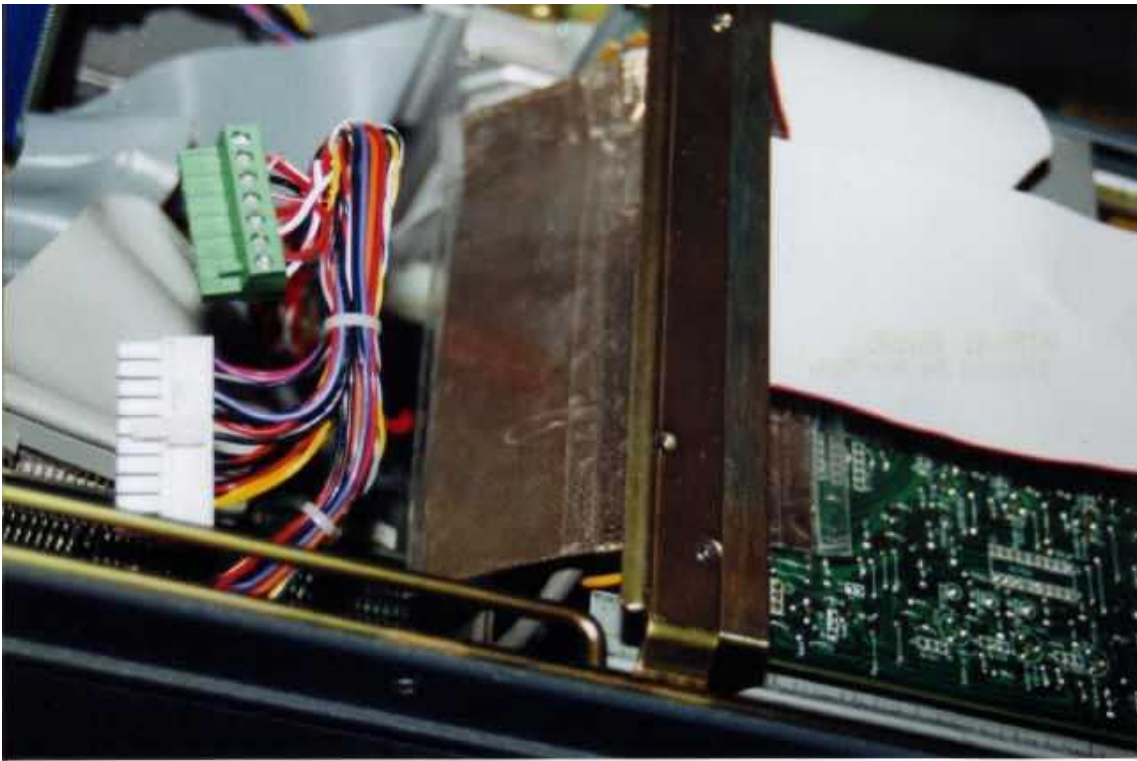
Next it was time to play with the CRT. The colors looked poor at best and the picture was dim. I hooked the CRT, which uses the standard VGA interface, to a PC. I found a blown gun driver and the video interface chip was bad causing the dim picture. I replaced these parts and realigned the whole unit. I contacted LeCroy and found that two CRTs were used. The early ones had a high failure rate and the others would need to have the intensity tweaked one a year. My unit is the newer and has a Sony Trinitron picture tube. Once aligned the picture was beautiful. I ended up having to do some minor adjustments once the unit was hooked back up to the LeCroy.



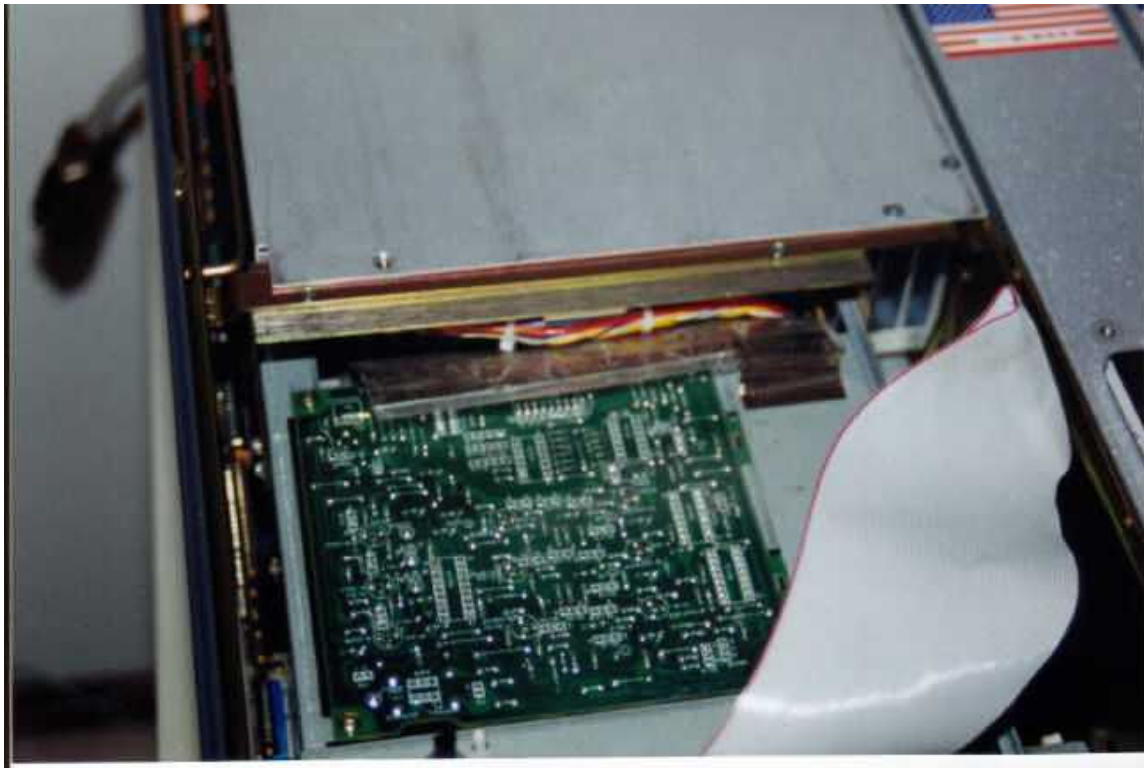
The CRT is now ready to be installed into the mainframe. I did some basic power up tests and found a very high frequency noise in the picture that was not there during my calibration. Taking out the spectrum analyzer I found the switching power supply, which is positioned directly behind the CRT was putting out enough EMI to interfere with the video. I also saw the 66MHz coming from the motherboard and a lot of low frequency noise when the plug-in would acquire data. To help reduce the noise I made a small shield for the CRT. This, a few beads and some copper tape and the noise was gone. The picture is now very clean except during video writes.



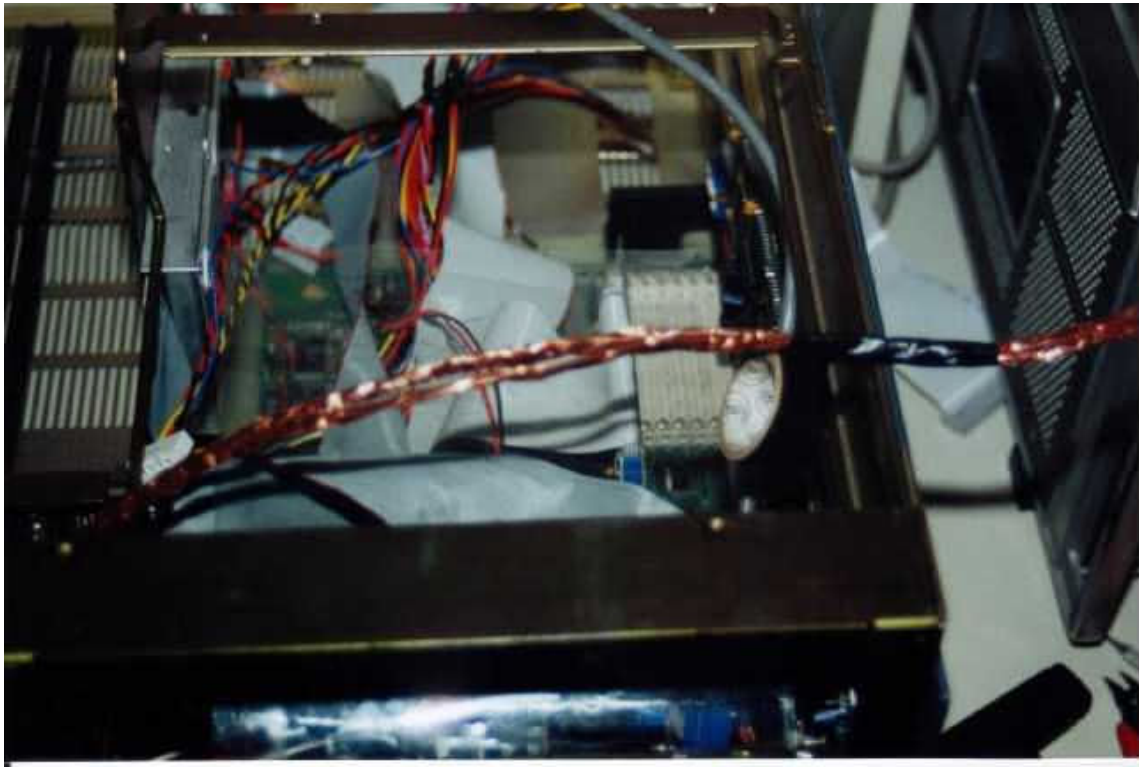
Mylar film and good old 3M tape. Notice where the power supply harness is going to be once the supply is pushed into place!



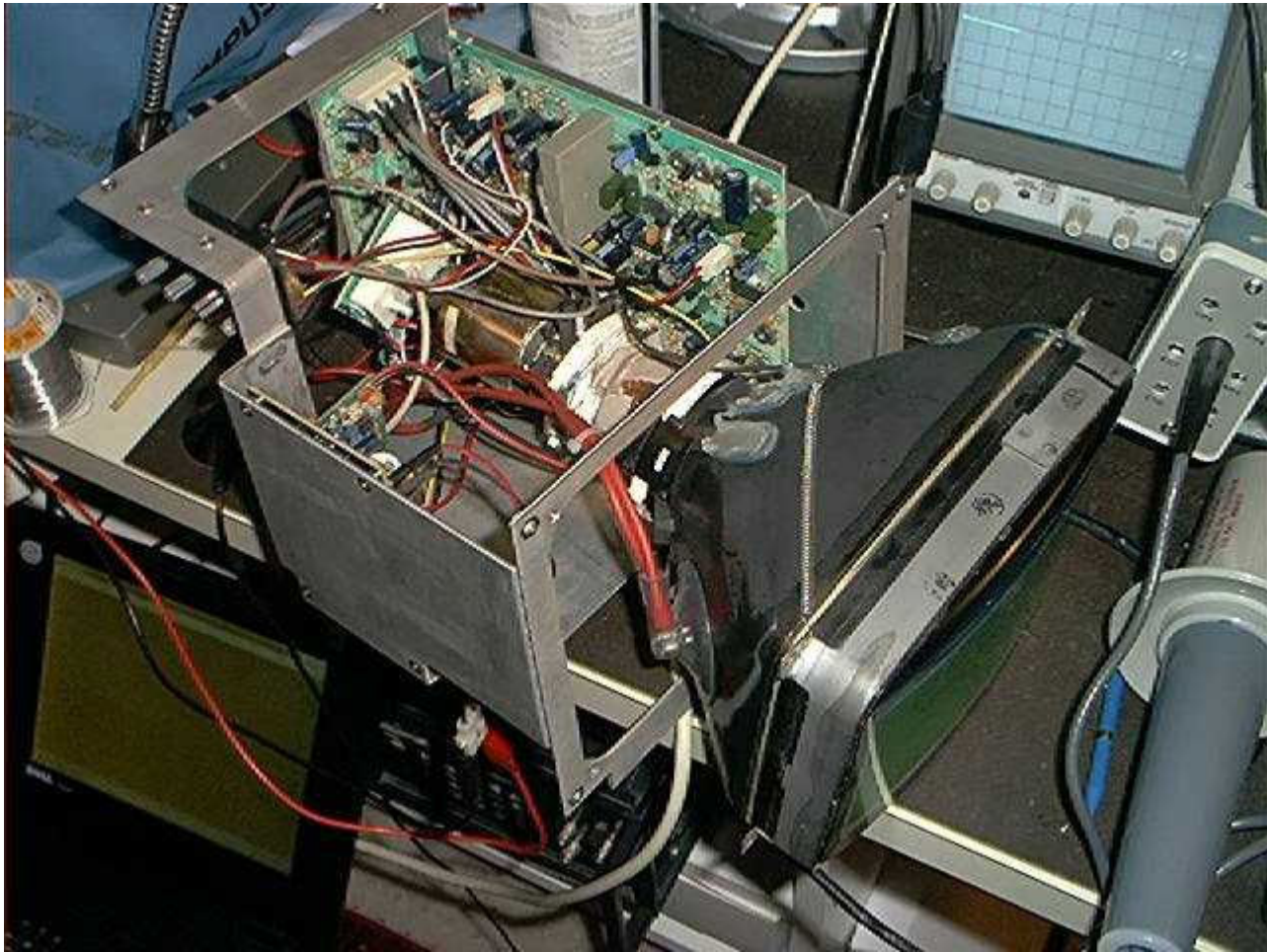
It may not look nice, but it works good.



The two auxiliary power feeds for the plug-ins also created some large spike during acquisition.

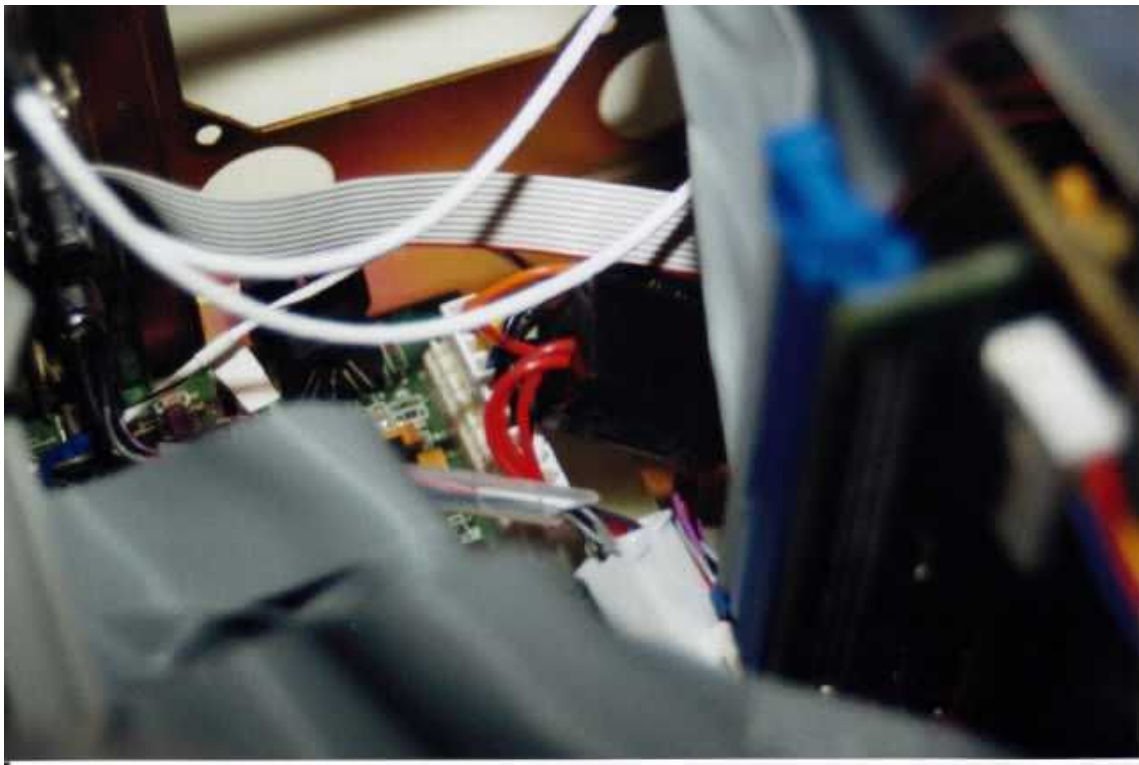
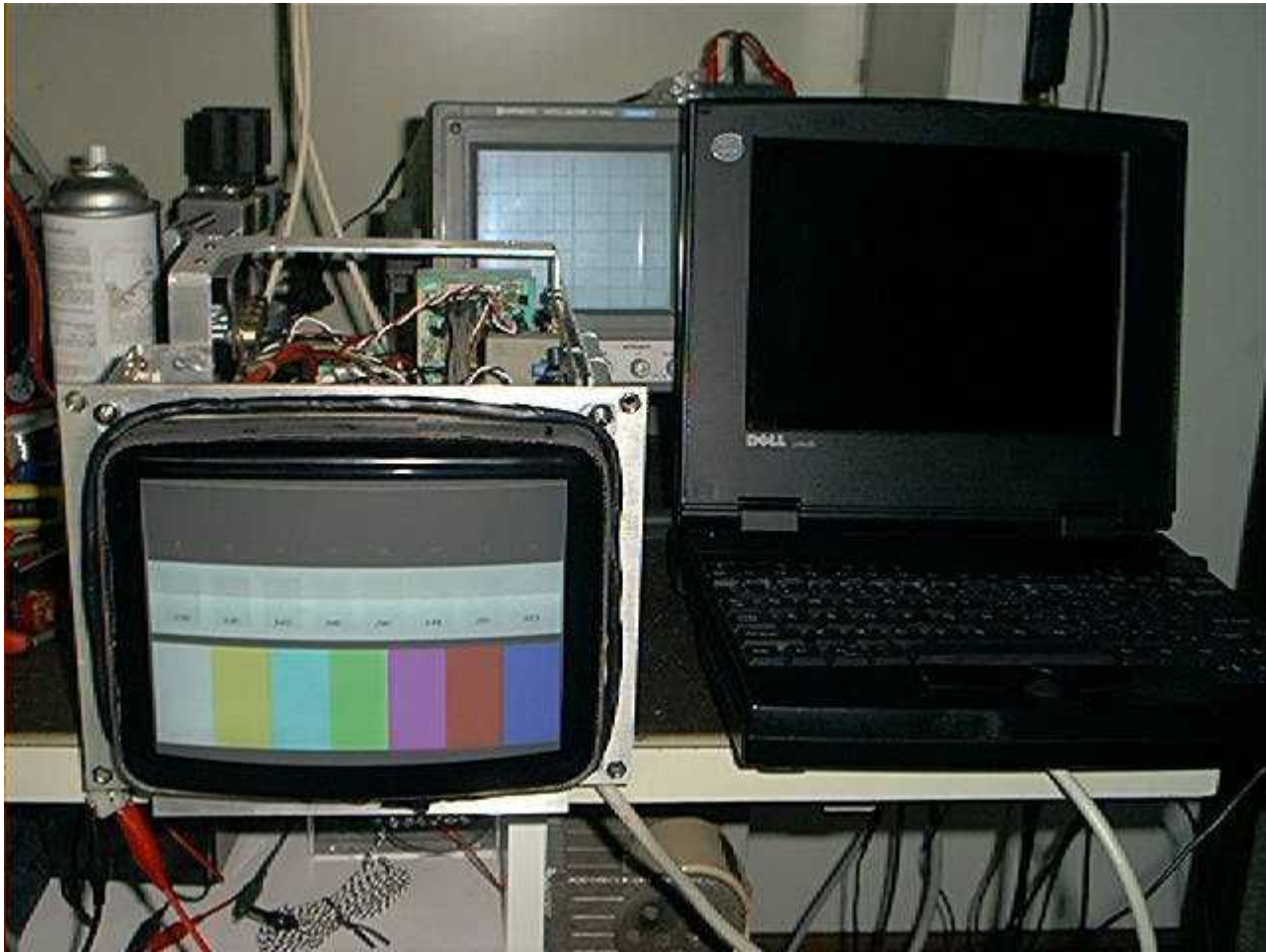


This is the other version of the monitor I have seen. I got this unit for a spare and it too needed repairs.





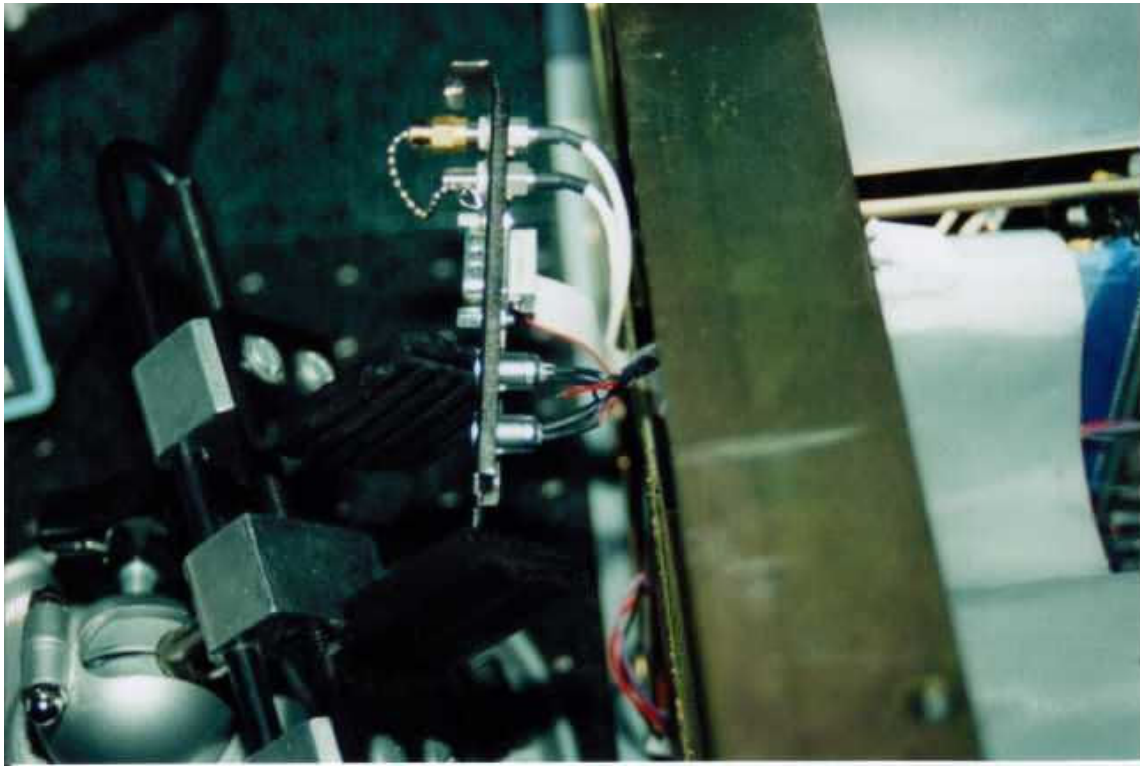
Once setup, this unit performed about as good as my original unit. It does run from 12V instead of 24 and requires 3.6 Amps to run.



Notice the bead located at the PC's main supply feed. Every thing I did had a little effect. The over all performance is much better now.

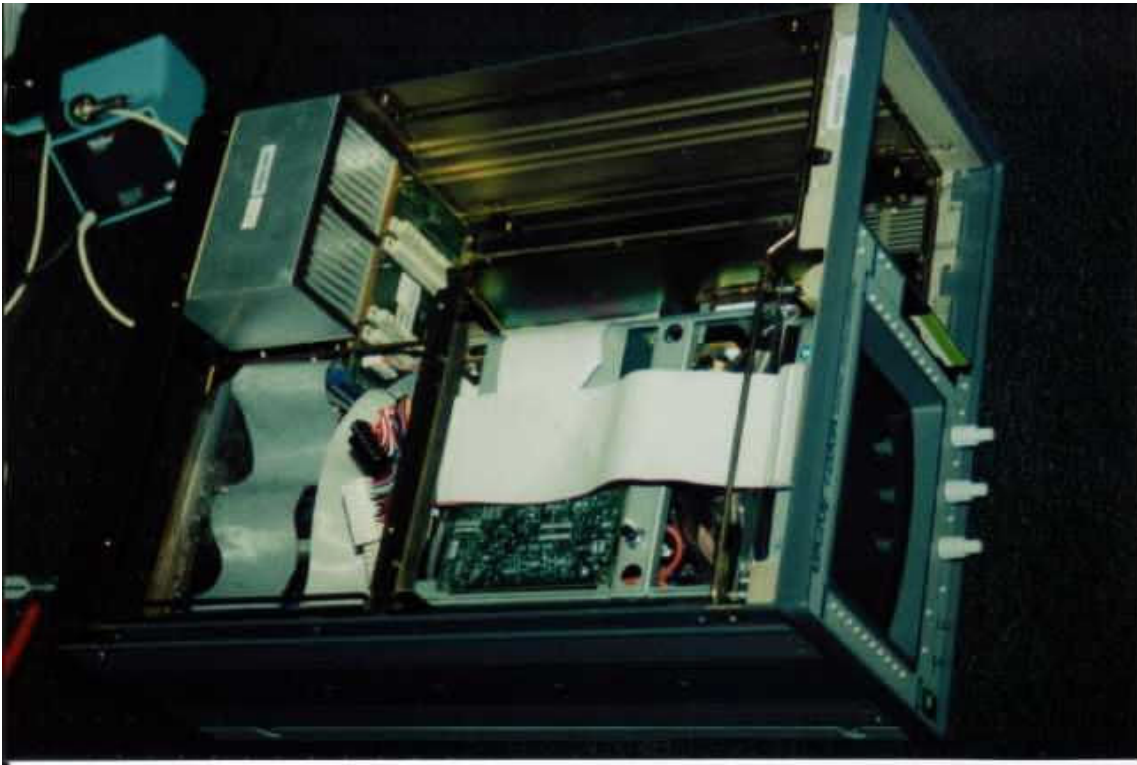
3.7 Cables

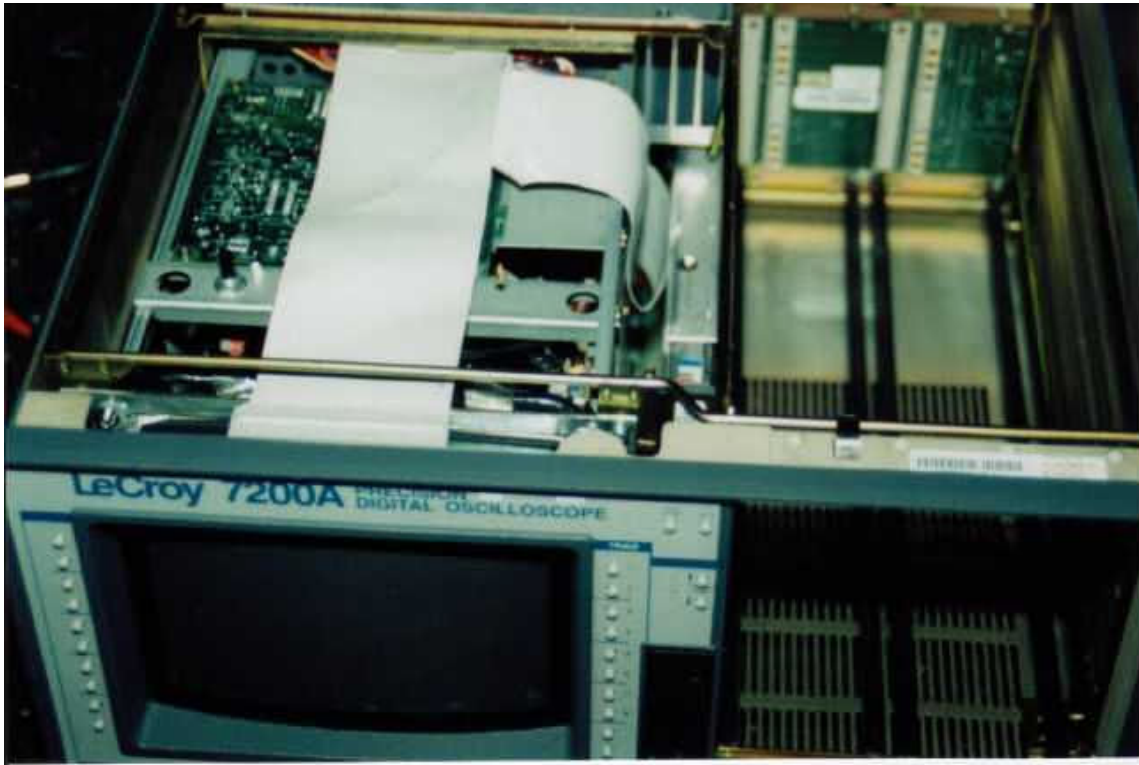
Next I checked the external peripheral interface connectors for broken wires. These wires are fragile and need to have some kind of strain relief.



3.8 Ready for Test

The mainframe is finally ready for test. So it's time to start looking into the plug-ins. I wanted to have all of the features in the 7200A and found two 7242Bs. To use the SCSI these need to have the 7242B with the F2 option or the F234-F2. LeCroy has told me that only one customer ever used this feature. Looking back it's hard to believe. The SCSI is so much faster than the GPIB or serial interface.







This is the cables to the unit. I have the RS-232 and GPIB interface hooked up here. Notice the older style SCSI connector is still not in use. I have yet to get the drivers written for LabView to support this feature.

