

# Re: Tektronix 2235 Scope High Voltage Problem

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**From:** Scibuff (*bobd426\_at\_yahoo.com*)

**Date:** 09/28/04

Date: 28 Sep 2004 14:45:29 -0700

and7@bigfoot.com (TekMan) wrote in message  
news:<6a624601.0409272301.4b796d15@posting.google.com>...  
> Jim Yanik <jyanik@abuse.gov> wrote in message  
news:<Xns9571D407F42C1jyanikkuanet@204.117.192.21>...  
>> and7@bigfoot.com (TekMan) wrote in  
>> news:6a624601.0409262333.1bb8b871@posting.google.com:  
>>  
>>> Jim Yanik <jyanik@abuse.gov> wrote in message  
>>> news:<Xns957089733DC52jyanikkuanet@204.117.192.21>...  
>>>> bobd426@yahoo.com (Scibuff) wrote in  
>>>> news:6fa04d1c.0409251726.6f1d16c@posting.google.com:  
>>>>  
>>>>> It looks like my faithful 2235 has bit ths dust! When powered on,  
>>>>> the power LED only pulses on/off about every second and the CRT has  
>>>>> no light. Using the Service manual, I got as far as restoring the  
>>>>> power LED operation by disconnecting the lead from T948-p23 to  
>>>>> U975, which I assume is the HV multiplier, but have no details on  
>>>>> it. The 2 5.1K resistors off U975-p4 are good and disconnecting  
>>>>> C975 and C976 one at a time does not allow the Power LED to come on  
>>>>> steady.  
>>>>>  
>>>>> Help please!  
>>>>>  
>>>>>  
>>>>>  
>>>>> The HV multiplier has a red lead that goes to the front of the CRT.  
>>>>> The multipliers do fail occasionally.  
>>>>> You will NOT be able to order one from TEK,they consider this model  
>>>>> obsolete.A parts scope will be your only source,I believe.  
>>>>>  
>>>>> The HV mult develops the -2960 cathode V from the pin that feeds the  
>>>>> 5.1K resistors,the anode V comes from the pin that the red HV lead to  
>>>>> the CRT is connected to.  
>>>>>  
>>>>>  
>>>>> Are your low voltages proper when you disconnect the HV mult.?  
>>>>>  
>>>>> The HV multiplier is a x6 type. Do as Jim proposed and try to get a

> > > *parts scope.*  
> > >  
> > > *It is possible to build the the HV multiplier from discrete parts*  
> > > *(diodes, caps, etc), but is really a tedious task and requires HV*  
> > > *experinece. I did it a couple of times, but would recommend this only*  
> > > *to someone with a lot of repair experience. The HV is nasty, so*  
> > > *careful soldering and isolation technique is a must.*  
> >  
> > *And you have to build it to fit into the available space and not arc to*  
> > *something else.*  
> > >  
> > > *you're better of with a commercial build multiplier from a parts*  
> > > *scope.*  
> > >  
> > > *hth,*  
> > > *Andreas*  
> > >  
> >  
> > *I believe the multiplier is a X-FOUR,not six. My 2215 schematic shows X4.*  
> > *I also believe he could adapt a HV mult from a 1700 series TEK waveform*  
> > *monitor,they're about the same size,but don't have the internal cathode*  
> > *supply diode,no big deal. 152-0900-00,and probably still available from*  
> > *TEK.*  
>  
> *Special case was not necessary to prevent arcing. "Rounded" solder*  
> *blobs are much more important to prevent HV arcing due to corona*  
> *effects etc.*  
> *Insulation: A couple of spray paint named Plastik70 (a special brand*  
> *forHV, a german suppiier manufactured this. Don't know if it is still*  
> *for sale).*  
>  
> *Multiplier: It's a sextupler ( x6 ) in the 2235, but a quadrupler ( x4*  
> *) in the 2215 - trust me :)*  
>  
>  
> *hth,*  
> *Andreas*

As requested yesterday, here is the results of further tests after the top input wire to the X6 (says so on the schematic) U975 voltage multiplier is disconnected:

The other voltages are within parameters, e.g. +100, +30, +8.6, -8.8, +5.2 volts are all OK. Even the calibrator is working and the Uncal lamps come on when knobs are turned.

I reconnected the top input to X6 after disconnecting one end of 5.1K R976 (to isolate the circuit after that) and the power lamp will no longer come on. It sounds like the HV oscillator is trying to come on, as I hear it raising in pitch, then it fails. This repeats about every second. Also I know that at least some HV was generated, as when I

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went to reconnect R976, I got "bit" by it!

With an ohmmeter, I also verified all the resistors and diodes in the X6/pin 4 circuit that supplies voltage (how much is this – not in my manual) to the cathode, control and focus grids, etc. They are OK.

It is looking more and more like the X6 has bit the dust. And no parts machines are on eBay now.:( Maybe that is what mine will become, as it was operating great until this HV problem happened.

BobD