TRANSISTOR DAMAGE ON BITX40 and UBITX

----------BITX40 Q13 OVER DISSIPATION WITH HIGHER BOARD VOLTAGE----------
CREDIT TO JERRY GAFFKE:
Correction:
The 150mW max dissipation figure is for a dual mmbt3904 in a SOT-363 package:
http://www.onsemi.com/pub/Collateral/MBT3904DW1T1-D.PDF

For a single transistor MMBT3904 in the SOT-23, max dissipation is 350mW at 25C ambient:
http://www.onsemi.com/pub/Collateral/PZT3904-D.pdf

When I run the numbers now, I see a quiescent dissipation at q13 of 284mW,
which is under 350mW but not by much.

HFSigs ships with the surface mount version of the 2n3904, which is the mmbt3904.
Maxdissipationof 150mW at 25C ambient. At 12v to the Bitx40, the quiescent current is dissipating 225mW in q13, and goes up from there if you feed it over 12v. A leaded to92 part like the 2n3904 can dissipate 625mW at 25C ambient, so is a much better choice. The 2n2222 should work fine too

If you search for dissipation q13 in this forum, I've got a dozen posts warning against over 12v into the Bitx40.

Replacing R141 with a 1/2W 10 ohm resistor of some sort would also be a good idea.

I'd recommend using an LM2940CT-12 to limit the voltage that the main Bitx40 board sees from your 14v power supply. If your power supply drops much below 13v, the main Bitx40 will eventually see less than 12v due to the drop across the LM2940CT-12, but the main board should still work fine if that's a couple volts low. The LM7812 could be used, but has a higher dropout voltage and does not protect against a reversed power supply. The LM2904CT-12 will limit current to something less than an arc welder, though you could add a 0.5A fuse there.

The supply to the IRF510 should be a direct connection to your power supply through a 3A fuse.
So long as you have a big enough heat sink on the IRF510, it would be quite happy at 24v.
Reverse power protection is not required since the intrinsic source-to-drain diode of the IRF510 will conduct and blow the fuse. (You did include the fuse, right?)