Hi Don,

Sorry for the delay, I wanted to make sure, to have the last state for you.

I checked the schematic you sent and I found no mistake. But, in between the were some new findings.

There is a further mod urgently recommended for the harlequin. The following effects were noted while using the RGB output - SCART especially with a small number of digital TVs or monitors:

* repeated small vertical movement of the whole picture

* periodic dark picture for a short time (because of vertical sync loss)

The reason for that behaviour seems to be that the start flank of the vertical sync signal is interfered with a horizontal sync impuls. This is avoided for the composite signal because inside the PAL coder AD724 the composite sync signal is EXNOR processed with the vertical enable signal. This processing is also needed for the sync signal used for RGB output.

Therefore the following mod is necessary:

* cut the base of transistor Q1 from the rest of the circuitry

* insert a capacitor of 10 pF at the circuitry that was cut from the base of Q1 (R22) to ground – this capacitor is necessary as substitution for the input capacitance of Q1, without it there are problems with the composite video signal from the AD724

* remove the pins 4,5,9,10 of U30 from ground

* connect pin 6 of U30 with the base of Q1

* connect pin 4 of U30 with 5V (Vcc=Pin 13/14 of U30)

* connect pin 5 of U30 with pin 8 of U30

* connect pin 9 of U30 with pin 4 of U27

* connect pin 10 of U30 with pin 3 of U29

U30 contains 4 exclusive or gates. One of them (Pins 8,9,10) is used to combine composite sync with vertical sync enable, the other one (pins 4,5,6) is used to invert the output of the first mentioned gate - this way an EXNOR is realized.

This mod was made now 4 times and in any case it solved the problems with modern TVs.

Some additional changes I would recommend:

1. expand the pin header 9V/GND/5V with 3 additional pins or add an additional 3 pin header and connect the additional 3 pins with the edge connector pins for +12V, -12V and -5V. In the past some users (as I also) added a transverter 5V to +/- 12V and a -5V regulator to supply interface 1 or beta disk interface with the needed voltages ➔ alternatively you can place a commercial transverter like that: http://pdf1.alldatasheet.com/datasheet-pdf/view/107486/ETC/SIM2-0512D-

SIL7.html and a 79L05 after the -12V for making -5V as described in the attached file (Har_Mod.jpg); these parts then could be optional soldered by the user if needed

2. increase the diameter of the pins of D13 to 1.5 mm as there are items of diodes with different diameters at the market and I had to bore all holes at the boards I made
3. check the hole diameters for the transistors Q6 to Q13; the emitter holes seem to be too big (bigger than the other two holes)
4. check the layers of the slot!!! I got all boards from the manufacturer without slot at the edge connector, so I had to cut the slots myself by hand; I was told that the slot was only drawn in a document layer but not in the contour layer; While making the prototypes a worker saw that mistake and corrected it by hand while preparing the production but he did not tell me about it; so it was oversight for the final PCBs
5. if possible cut out a 2mm deep and 3 mm wide small window/slit at the edge of the PCB centered to the ear/mic sockets. These sockets have a metallic ring at their ends that is deeper than the base of the socket; therefore I grinded a 3 mm wide and 0.8 mm deep channel to make sure the base of the sockets is lying flat at the PCB.
6. if possible try to use the same pin distance for the same kind of part, for example there are a lot of 100nF capacitors, some of them have 5.08 mm distance, some have 2.54 mm; I think R15/16/17 may also have different pin distance (don't know exactly)
7. change some resistor data: R19/20/21/34/38/43 should be 68 Ohm instead of 43/82 Ohm, to have correct level at RGB/composite output, R33 should be 33 kOhm, to correct a problem with some sound signals from some games as "Manic Miner" (the sound output at the MIC socket missed some tones
8. R37 could be marked to be optional; in most cases I did not soldered it

I hope that this was the last revision. Sorry for the amount of changes. You should do what/if you like/can do. It is a masterpiece of hardware. In between about 110 PCBs were finished from my lot of PCBs.

You can see a Rev F board modified as described above here (the last one I soldered myself):
http://www.truppel-online.de/RevF_Last/Harl_RevF_Last.html

With best regards

Ingo.