

Newer rebuilds of the tester like a version from Fish8840 use a 128x64 pixel graphical display. This version use a modified circuit for the switch on logic. The figure 2.14 shows a part of the modified circuit.

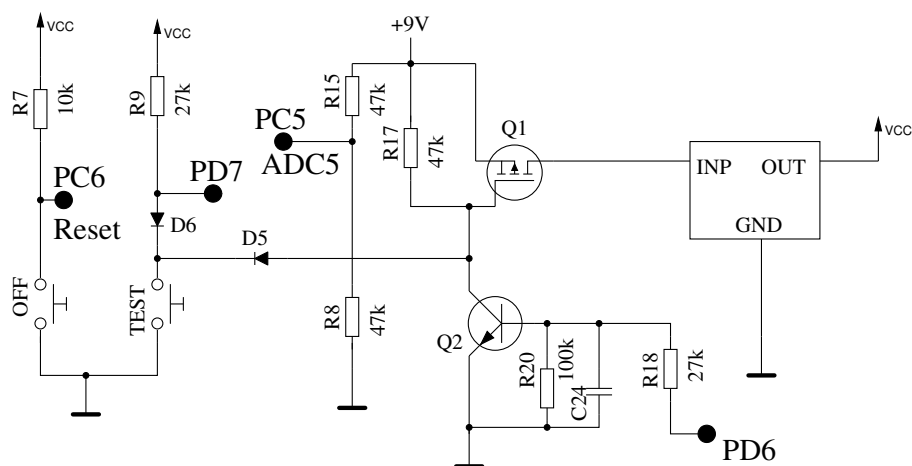


Figure 2.14. Part of the circuit from the Fish8840 version

How you can see at the values of resistor R8 and R15, a 2:1 scaling factor for the battery voltage measurement is used instead of the original scaling factor. In addition R15 is direct connected to the battery, what results to a power consumption in the switch off state. The R15 should better be connected to the drain of Q1 or the input of the voltage regulator to prevent this unneeded battery power consumption. A suitable change of the printed board is shown in picture 2.15. A circuit path is cut between R17 and D5 and a new conductive path is inserted between Q1 and R15 with a enameled copper wire.

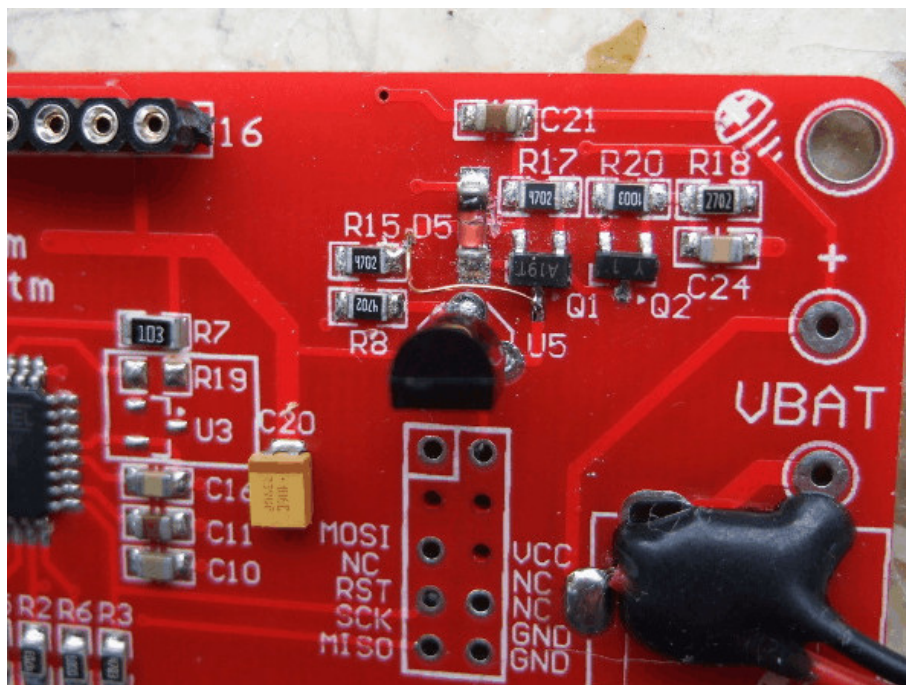


Figure 2.15. Picture of the changed Fish8840 printed board

The scaling factor of the battery voltage must be specified in any case in the Makefile before any attempt can be done to replace the original software (BAT\_NUMERATOR=66 for example).

The display module of the Fish8840 tester is equipped with a 3.3V voltage regulator to adapt the operating voltage of the display controller. Because the 3.3V operating voltage can be increased with the 5V signal level of the data signals from the ATmega, a adapter circuit according to the picture 2.16 is recommended. The four data signal lines are equipped with four serial 2.7k $\Omega$  resistors at a little breadboard. Longer spacer bolts must be used to mount the display with the adapter board to the printed board of the Fish8840 tester now.

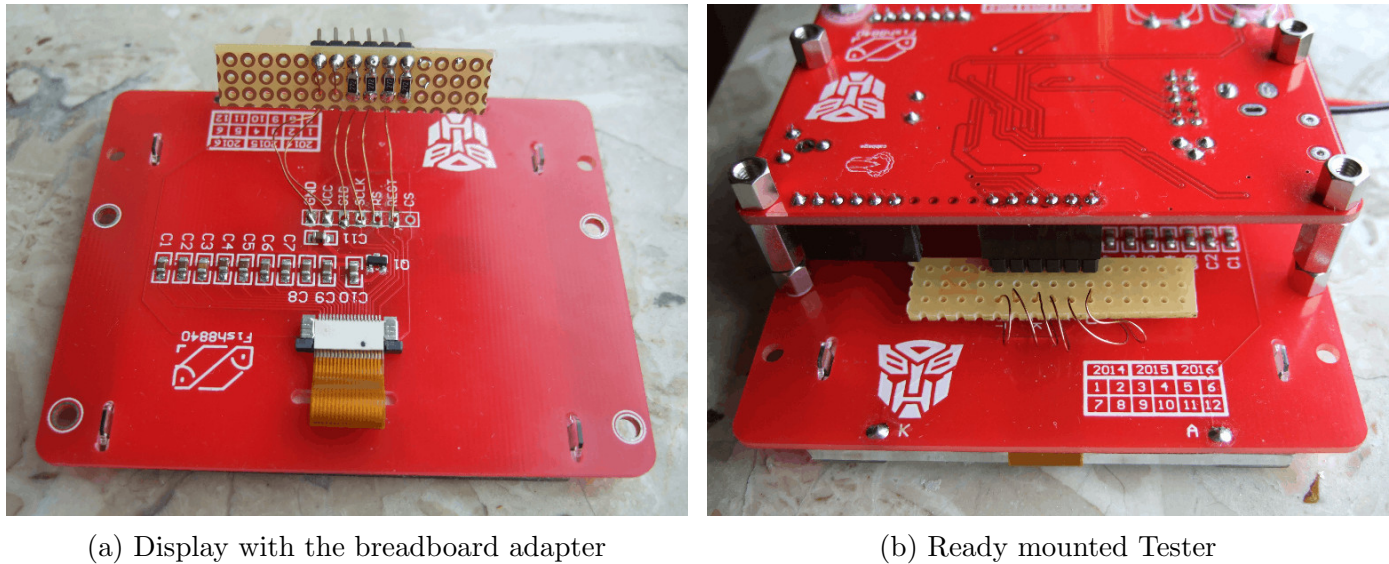


Figure 2.16. Adapter for a correctly display connection

Instead of this modification you can also use a special output mode of the 4 SPI signals of the ATmega with the Makefile option `LCD_SPI_OPEN_COL` . With this option the outputs are not switched to VCC level, but the internal "pull-up" resistors are switched on during the output of a high level. If the option `PULLUP_DISABLE` is set, additionally a external pull-up resistor for the

"Reset" signal (PD0) is required. Because the data signals are never switched to VCC directly, the 3.3V power of the LCD controller can not be elevated. My version of the Fish8840 tester has all signals for connecting a character display routed to the LCD plug connector. Therefore you can prepare the board for connection of a character display, if the female header is completed and the potentiometer for the contrast level is added. However the supply pin 15 for the background light is connected directly to the VCC level. If you install a character display, you should check, that your display module is equipped with a serial resistor for the background LED. Of course iyou have to adapt the software for different displays. Also the hardware extension are possible with the Fish8840 board.