When constructing an electronic circuit, it is often best to build it in stages, testing each as you proceed. The following pages provide typical voltages that you might expect as you build the ELM327 Example Application circuit, first with no integrated circuits installed, and then with all in place. Hopefully, it will help you to locate wiring issues before they cause problems.

Testing the ELM327 IC

Although we do not advise it, we often get emails from people that are trying to test their ELM327 before installing it into the final circuit. This exposes the chip to conditions that may not be good for it, as people often report open-circuited inputs, incorrect supply levels, etc. CMOS integrated circuits should never have an input left open-circuited – it should always be connected to either 0V or 5V, or else erratic behaviour and possibly damage to the IC might occur.

If you insist on taking the IC from its protective tube and installing it into a test circuit, use the circuit shown in Figure 1. If the IC is able to initialize itself internally and start functioning, you will see the four LEDs light in sequence, followed by the one on pin 26 lighting one more time.

Constructing Figure 9 from the Data Sheet

Most people build the Example Application circuit that we show in the data sheet (Figure 9), so we will discuss it here, with one change. We have used the discrete RS232 interface shown in Figure 11, instead of the FTDI module. When you do begin to build your circuit, we advise using sockets for the MCP2551 and ELM327 ICs, and building the circuit in two stages. First, wire everything to these sockets, but do not install the ICs. Complete the rest of the circuit, power it with a small 9V 'radio' battery, and then measure the voltages in your circuit. Compare your voltages to those shown in red on Figure 2. If there are any significant discrepancies, find out why before proceeding. Note that a 9V battery is chosen as it will not be able to supply very large currents, so if there are serious problems, there will be little or no damage.

Once you are satisfied that your circuit will not damage the integrated circuits, install them in their sockets, and apply a source of about 12V to the circuit. You should then see voltages similar to those of Figure 3. Once satisfied that the voltages are correct, you can begin testing with the software of your choice. Do not connect to the vehicle when first testing the software, as you are only testing the communications with your PC at that point.

Once the software is able to communicate with the interface, test each protocol in sequence, with no vehicle connected. Use the SP command to select individual protocols, and then send 0100. If all goes well, you should only see 'NO DATA's or 'UNABLE TO CONNECT' and no messages that indicate a problem with the vehicle such as 'BUS BUSY' or 'FB ERROR'. If you do see either of these latter two messages, then there is a problem with your wiring – correct it before connecting to a vehicle.

When you've finished the above, and all appears to be working well, you may connect to a real vehicle and begin testing the complete 'package'. Hopefully all will work well for many years.

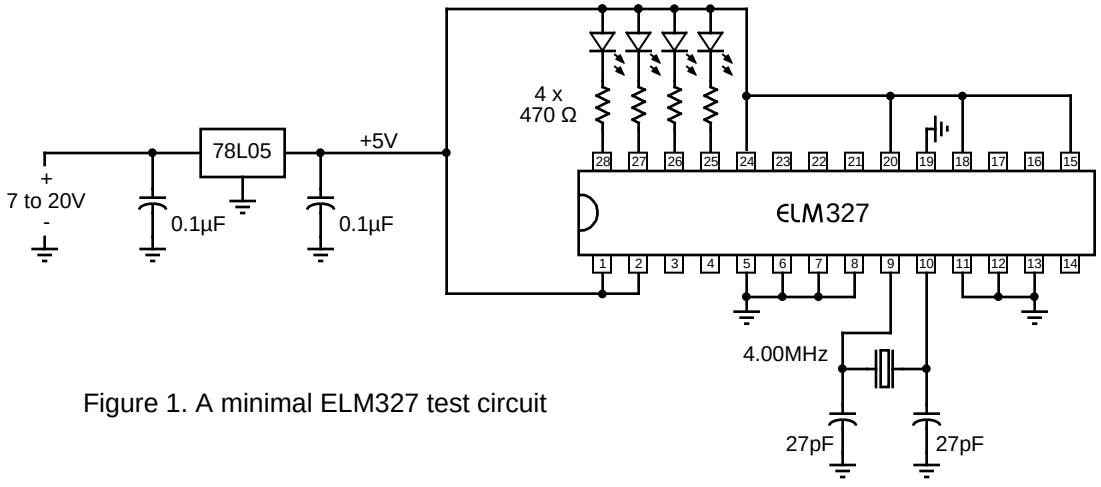
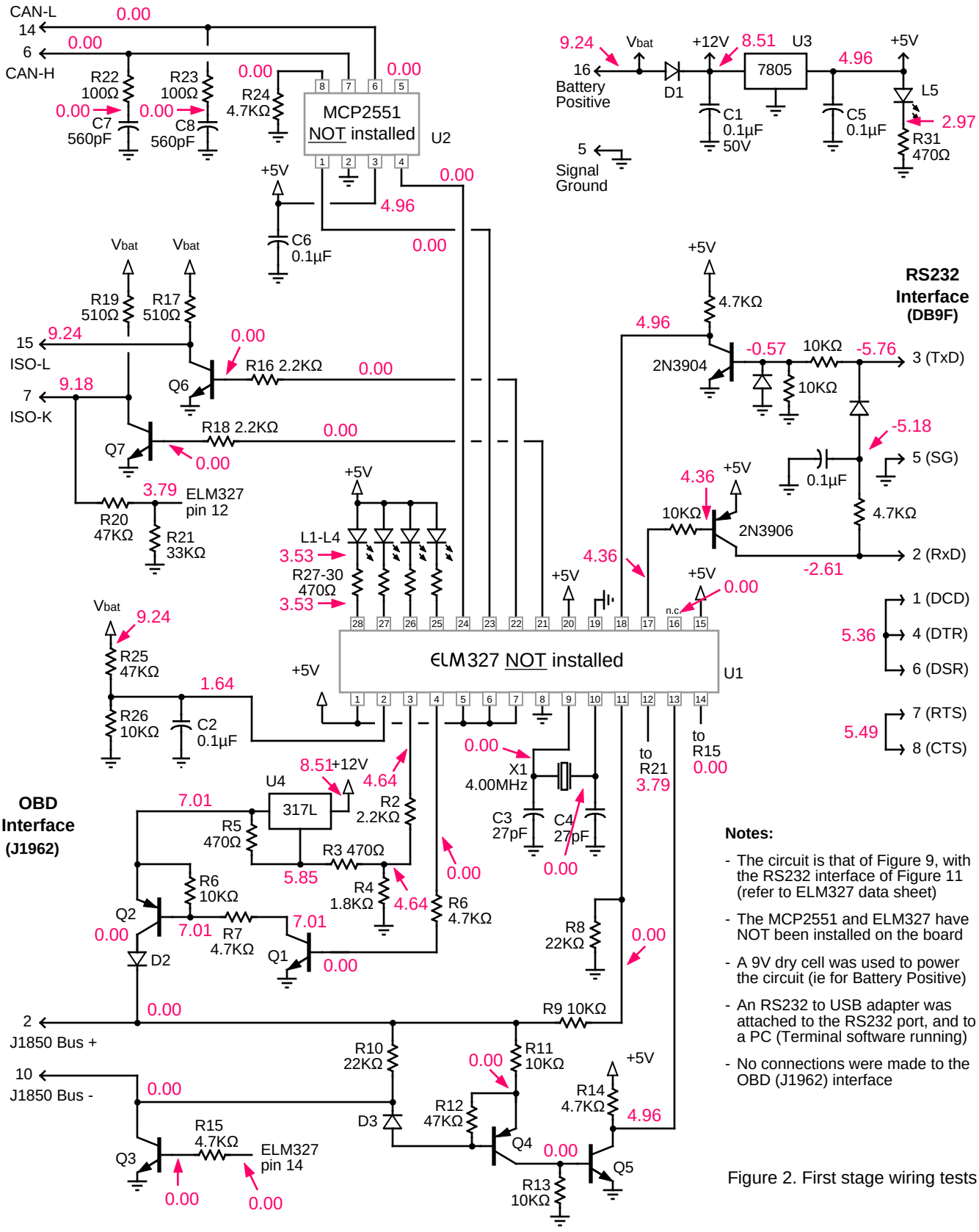


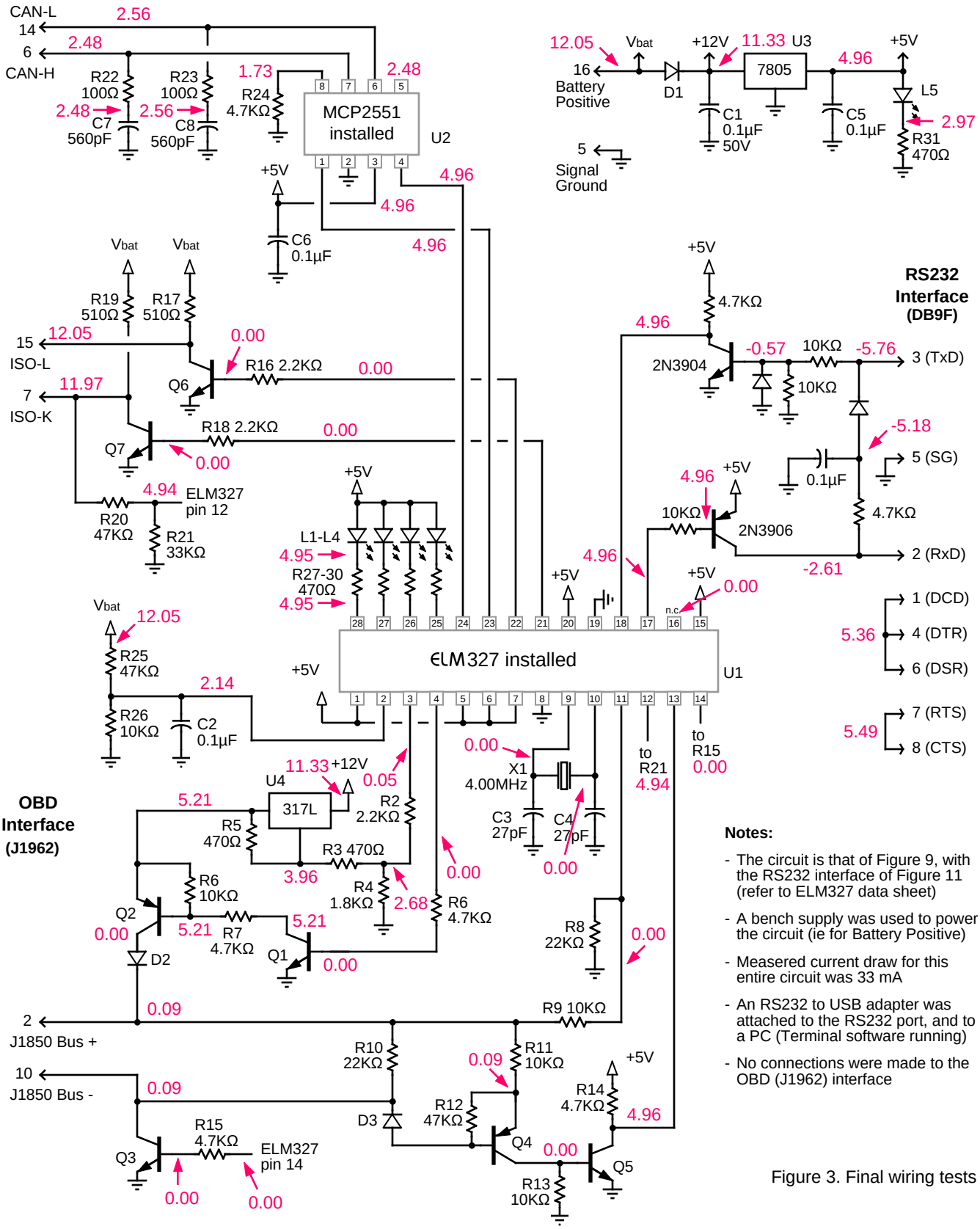
Figure 1. A minimal ELM327 test circuit



Notes:

- The circuit is that of Figure 9, with the RS232 interface of Figure 11 (refer to ELM327 data sheet)
- The MCP2551 and ELM327 have NOT been installed on the board
- A 9V dry cell was used to power the circuit (ie for Battery Positive)
- An RS232 to USB adapter was attached to the RS232 port, and to a PC (Terminal software running)
- No connections were made to the OBD (J1962) interface

Figure 2. First stage wiring tests



Notes:

- The circuit is that of Figure 9, with the RS232 interface of Figure 11 (refer to ELM327 data sheet)
- A bench supply was used to power the circuit (ie for Battery Positive)
- Measered current draw for this entire circuit was 33 mA
- An RS232 to USB adapter was attached to the RS232 port, and to a PC (Terminal software running)
- No connections were made to the OBD (J1962) interface

Figure 3. Final wiring tests