Digital Electronics Experimentation – Assembling the 8255 PC Interface Card

Introduction: You will construct and program the 8255 PC Interface Card to digitally experiment with input/output control. This Card plugs into your PC's ISA slot just like a modem or sound card would. A 34-pin ribbon cable tethers the Card to the Terminal Expansion Board (TEB) that lies outside the computer. The TEB's header pins provide a quick means to physically connect the digital and "real" worlds.

Assembly Instructions: You will construct three circuits. The first two are the 8255 PC Interface Card and TEB and the third consists of eight LED (light emitting diodes).

- The 8255 PC Interface Card

Part Description	QTY
8255 Printer Circuit Board	1
82C55 PPI 40-pin DIP	1
74HCT138 3-to-8 decoder	1
40-pin DIP socket	1
16-pin DIP socket	1
0.1 inch 34-pin shrouded header	1
0.1 µF ceramic capacitors	3
0.1 inch shorting block	1
0.1 inch 8 row double header	1

Table 1: 8255 Card Parts List

The electronic components in Table 1 are soldered to the 8255 printed circuit board (PCB). A PCB has two sides called ***component*** (shown in Figure 1) and ***solder***. Electronic components are physically placed through the component side and soldered underneath on the PCB's solder side

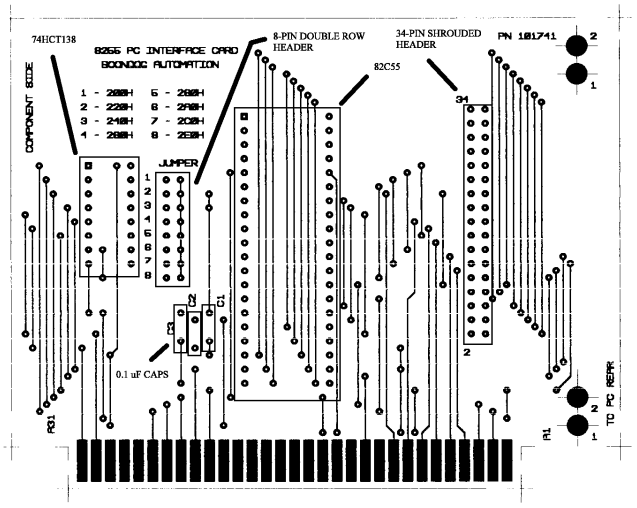

Figure 1: Component Side of the 8255 PCB

There are 9 components, namely the 40 and 16 pin sockets, 8-pin double row header, 34-pin shrouded header and three 0.1 µF capacitors) to solder. Their placement is also illustrated in Figure 1.

Step-by-Step Instructions:

1. Solder the 40-pin and 16-pin DIP sockets
2. Solder the 34-pin shrouded header. **Note that its notch should face right**, (see Figure 2)
3. The 8-position double row header is soldered next. Place the black colored shorting block on the 4th row (from top)
4. The three 0.1 µF are then soldered
5. Insert the 82C55 integrated chip, with its notch oriented up, into the 40-pin DIP socket
6. Insert the 74HC138, with its notch oriented up, into the 16-pin DIP socket

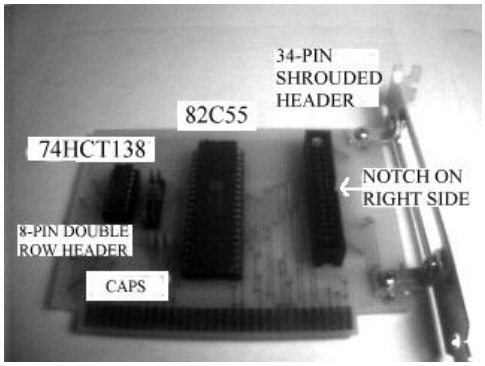

Figure 2: Photo of finished 8255 Card

- The Terminal Expansion Board

Part Description	QTY
0.1 inch 34-pin shrouded header	1
270 Ω resistor	1
Green diffused LED T13/4	1
0.1 inch 4-pin single row header	2
0.1 inch 8-pin single row header	5

Table 2: TEB Parts List

The parts in Table 2 are soldered to the Terminal Expansion Board (TEB). The TEB has a **component** and **solder** side. The parts are placed on the component side as shown in Figure 3 and soldered underneath.

Step-by-Step Instructions:

1. Solder the 34-pin shrouded header, with its **notch facing the downwards** (see Figure 3)
2. Solder the five 8-pin headers
3. Solder the two 4-pin headers
4. Insert the resistor, shorten wire leads to appropriate lengths and solder
5. Insert the green LED, **noting its orientation!** Its cathode (the flat end) faces the TEB edge (see Figure 3)

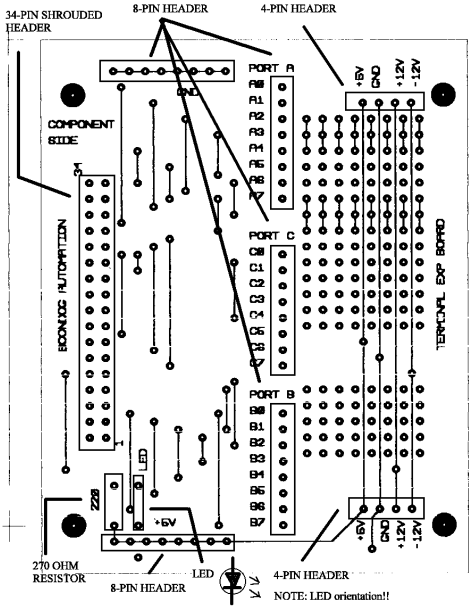

Figure 3: TEB component side and part placement

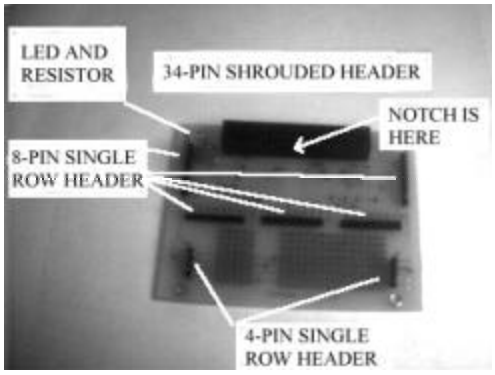

Figure 4: Final photo of TEB