# Vintage Mashups

Mashing New to Old, Old to Old, Old to New. 8 Bits and Beyond.

IBM PCjr Tandy 1000 Graphics Mod
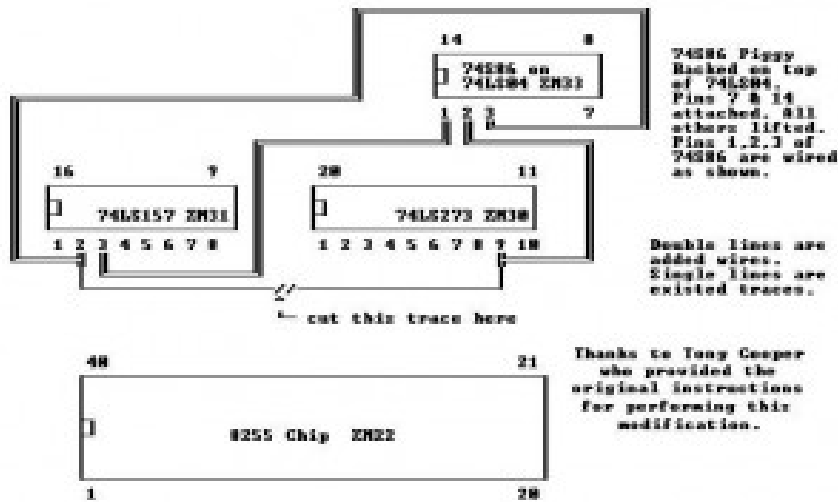
By [hexsane](#)

Friday, December 2, 2011

I have a bunch of computers that I use for various projects including playing games and am running out of space or constantly swapping computers in and out of [storage](#). Many IBM compatible games run in Tandy 16 color mode but do not support the IBM PCjr and are displayed in CGA 4 color mode. This modification allows the IBM PCjr to run many of those programs in Tandy 1000 16 color graphics mode which I hope will save me from adding yet another computer to the mix.
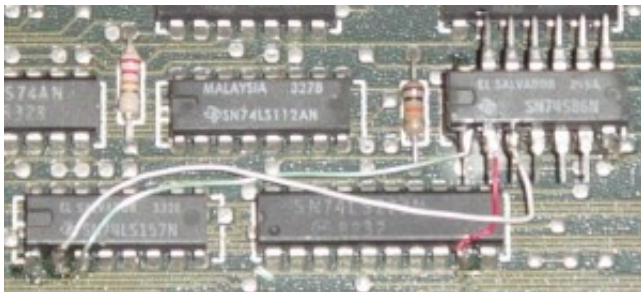
Tandy 1000 Graphics Mode Mod for IBM PCjr

I was able to find information about this modification in the forum at: [Mike's IBM PCjr Page](#)

I found the text file for doing this mod in a large download of IBM PCjr programs. With some digging you can find that file on Mike's page. If you're interested only in this modification then you can get the original file [HERE](#)

```
                        14              8
                    ┌──────────────┐
                    │  74S86 on    │        74S86 Piggy
                    │ 74L904 ZM33  │        Backed on top
                    └──────────────┘        of 74LS04.
                     1 2 3        7          Pins 7 & 14
                                             attached. All
                                             others lifted.
   16        7      20              11       Pins 1,2,3 of
 ┌──────────────┐  ┌────────────────────┐   74S86 are wired
 │ 74LS157 ZM31 │  │   74LS273 ZM30     │   as shown.
 └──────────────┘  └────────────────────┘
  1 2 3 4 5 6 7 8   1 2 3 4 5 6 7 8 9 10

                                             Double lines are
                                             added wires.
                                             Single lines are
                                             existed traces.
        ← cut this trace here

   40                          21            Thanks to Tony Cooper
 ┌───────────────────────────────┐           who provided the
 │                               │           original instructions
 │         8255 Chip  ZM22       │           for performing this
 │                               │           modification.
 └───────────────────────────────┘
   1                           20
```

PCjr to Tandy 1000 Graphics Modification [Schematic](#)

Parts / tools needed:
—Sharp [cutting tool](#) (x-acto)
—Soldering iron
—Solder
—74s86 High Speed Quad Exclusive OR Gate (a 74F86 may also work here)
—30 gauge [wire wrap](#) wire (this is my preference, 28 gauge solid core wire would also work).
—[Multimeter](#) (optional)

Use anti static precautions while [working](#) with electronics. Ground yourself [and tools](#) to prevent static discharge and potential damage to your PCjr.

You will at minimum have to remove the [floppy drive](#) and controller to get to the area to do the modification. I opted to remove everything but left the motherboard in place. If you have an upgrade board like the jrHotshot II you will also need to carefully remove it and make sure once you've completed the modification that you don't have pins sticking up from the 74S86 that could cause problems later on.

With the PCjr rotated so the front is pointing away from you:
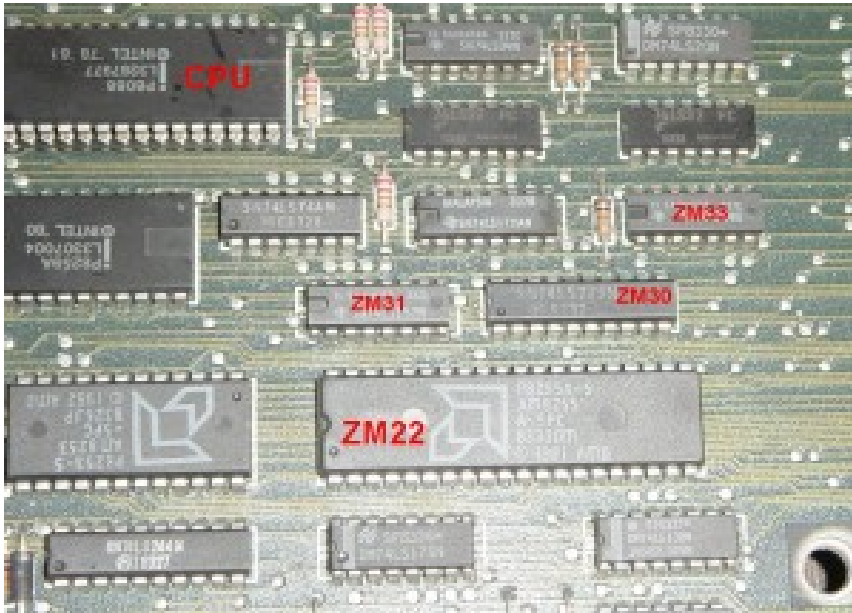
Locations of the PCjr chips noted in the schematic.

First thing you will need to do is cut the trace between pin 2 of 74LS157 (ZM31) and pin 9 of 74LS273 (ZM30) as illustrated in red in the image below. I used a hobby knife to do this. I think the placement and angle for the cut is perfect. If you go to far you are less likely to damage other traces.
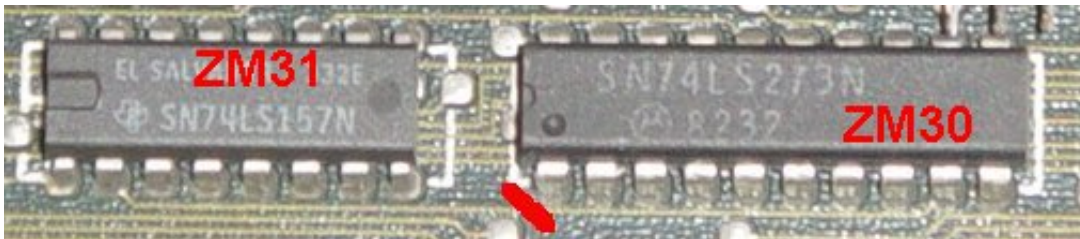

Red indicates location and angle of cut.

The 74S86 needs to be piggybacked on top of the 74LS04 (ZM33). Bend pins 1 through 6 and 8 through 13 up so they are parallel to the 74S86 body. Leave pins 7 and 14 in the down position. These will provide power and ground to the 74S86 when soldered to the same pins of the 74LS04.

Notch (U shaped) indicates top with pin 1 to the left. Some chips will have a dot to indicate pin 1.

```
--|1 U 14|
```

```
--|2  7  13|--
--|3  4  12|--
--|4  S  11|--
--|5  8  10|--
--|6  6   9|--
  |7____ 8|--
```

Once you have the pins bent into position place the 74S86 on top of the 74LS04 and solder pins 7 and 14 of the 74S86 to pins 7 and 14 of the 74LS04 as illustrated in the image below:
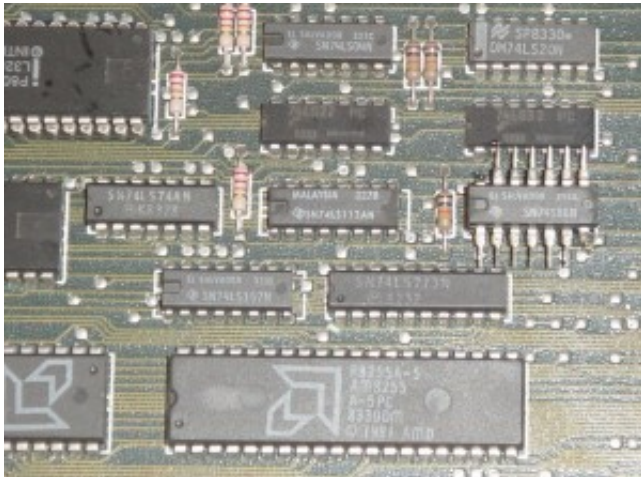
74S86 piggybacking the 74LS04 with pins bent
upward.

Once the trace is cut and the 74S86 is in position the circuit can be wired.
Solder a wire from pin 1 of the 74S86 to pin 3 of the 74LS157 (ZM31). This is the green wire in the picture below. Solder the next wire (red in the picture) from pin 2 of the 74S86 to pin 9 of the 74LS273 (ZM31). Finally solder a wire from pin 3 of the 74S86 to pin 2 of the 74LS157 (ZM30) as illustrated by the white wire below.
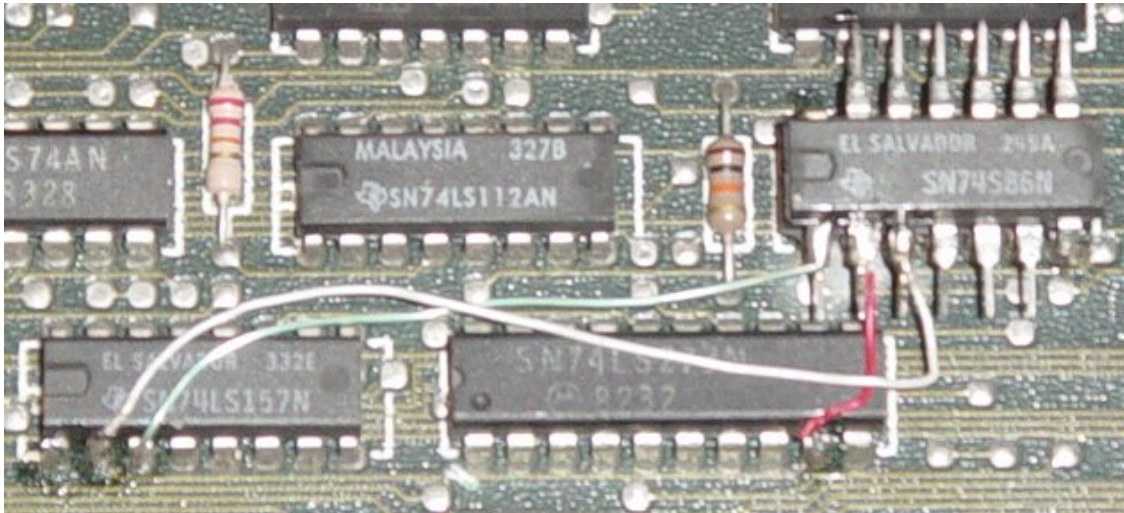
Final hardware step of the modification for enabling Tandy graphics on the IBM PCjr.

If you have a multimeter now is a good time to test for continuity and shorts. If everything checks out then reassemble the PCjr and test it. You shouldn't notice any differences at this point and all should work and act as it did previously. If something isn't working properly power down and check the circuit again.

Once your IBM PCjr is up and running you will need to configure the video at boot time. If you are not already using it I suggest downloading jrconfig from here: Mike's IBM PCjr Page Downloads

Copy jrconfig.sys to your boot disk and edit your config.sys file to add the following:

```
DEVICE=jrconfig.sys /v32
```

This allocates the 32k video memory for 16 color graphics modes.

Reboot and test your favorite game that has Tandy 16 color graphics. Many games and programs work, some do not. I couldn't get Ultima I to come up in Tandy mode but Bards Tale III: Thief of Fate came up in 16 color mode without a problem:
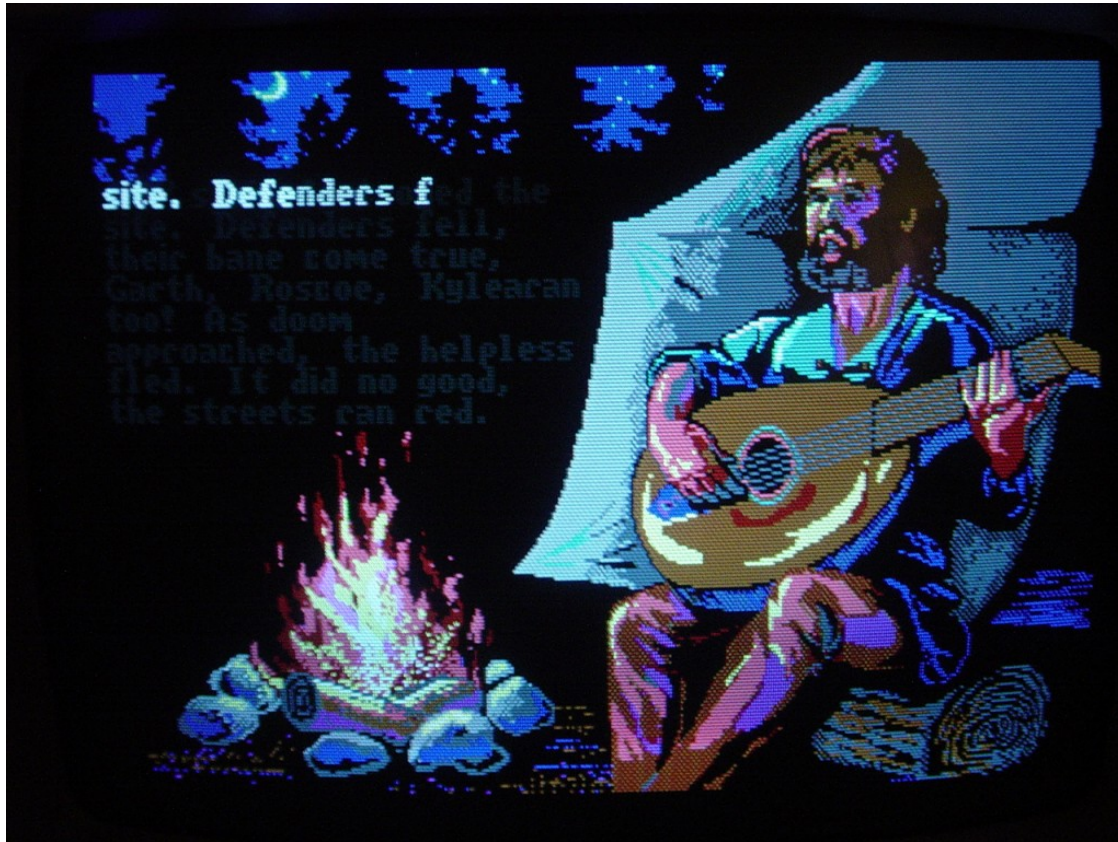
Bards Tale III: Thief of Fate Tandy 1000 16 Color Mode on IBM PCjr

Several posters in Mike's PCjr forum have posted hints about getting some programs to work by reducing the ram disk allocated by jrconfig.sys. You'll need to do some experimentation if a program you have doesn't work as expected.

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