

Secure Digital Card Sockets

SD card pinout

Secure Digital cards have 9 pins; however, the pins are in a rather odd order:

9 1 2 3 4 5 6 7 8

Note two things: pin 9 precedes pin 1, and pins 7 and 8 are closer together than the others.

Figure 1 shows the pads on the PC board where the connections to the SD card are brought out of the socket. Note that pin 3 *should* be at the location marked by the black box.

Quite a number of manufacturers use plastic pins for socket positioning on the board. Hence the footprint for the ECB dual SD board has holes in what seem to be the most standard of positions. Some card sockets have two pins near the solder connections, and some have two pins near the insertion side. At least there is some agreement on the diameter of the plastic pins and their positioning.

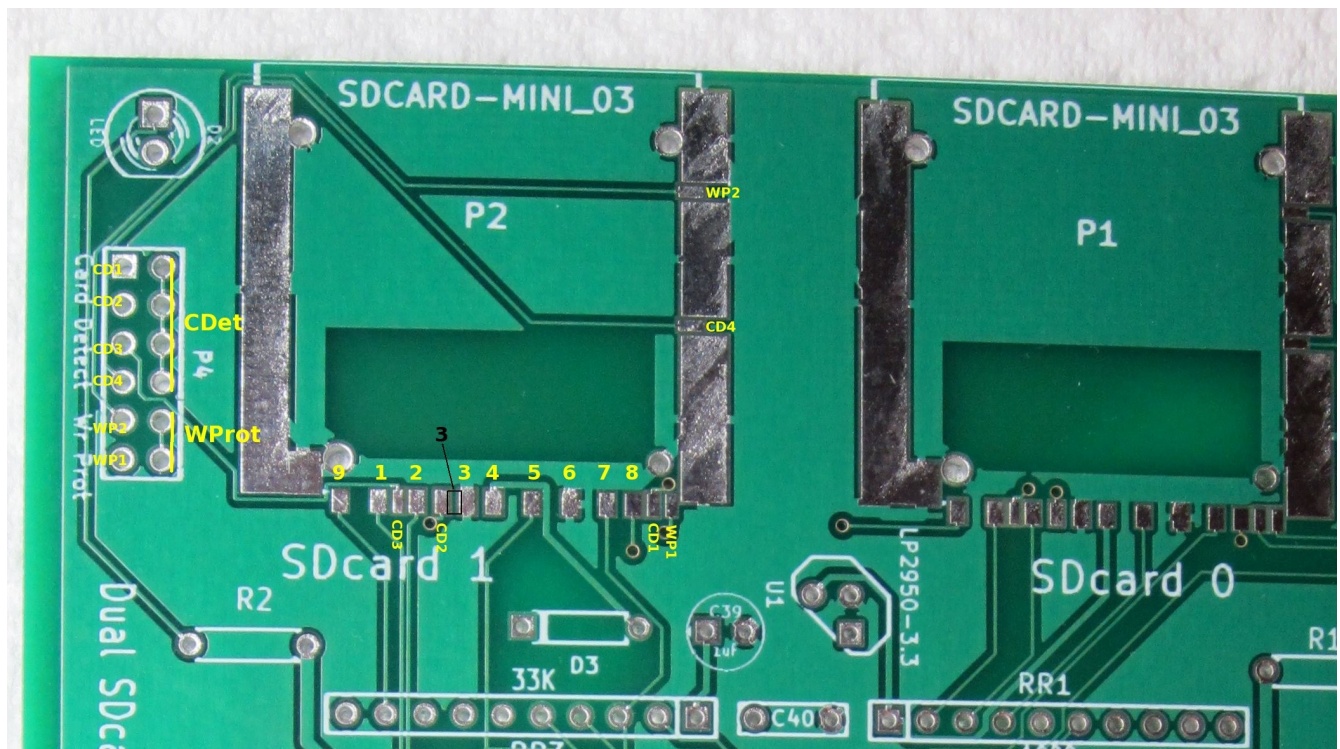


Figure 1. SD socket footprint with pins labeled.

SD card sockets also provide two additional signals: WP (for Write Protect) and CD (for

Card Detect). These are nothing more than SPST switches within the card socket. When a card is inserted, the CD pin is shorted to ground. Hence, if there is a pull-up resistor attached to the CD pad, a TTL input is generated that may be passed to the board programming interface. Similarly with the WP pin. It is a SPST switch within the socket that is open if no card is inserted, or if a card is inserted with the Lock switch in the Locked position. It is shorted to ground if a card is inserted with the Lock switch in the Unlocked, or Writeable, position.

However, there is no standard position for the placement of the WP and CD pins coming out of a Secure Digital card socket. The footprint for the SD sockets on the ECB dual SD card board tries to account for the WP and CD pinouts of several socket manufacturers. To this end, there are 4 positions for the CD connection and there are 2 positions for the WP connection. Not all cards are accounted for with this pad configuration.

Pads WP1 and CD1 are two of the most common places for WP and CD to be brought out from a socket. Note that these pads are very small and very close together.

CD2 may seem rather odd, but by shifting pad 3 closer to pad 4, a pad of the same size as the SD connections may be inserted between pads 2 and 3. This is a shortcut for CD, since pad 3 is a ground pin, and a simple shorting scheme with the fingers that contact the SD card can produce Card Detect, for pad CD2.

CD3 is somewhat of an oddity. It seems to have been inspired by the manufacturers that use CD2, but it is a very skinny pad inserted between pads 2 and 3. The good point is that neither pad 1 nor pad 2 is displaced for this type of socket.

CD4 is a real oddity. I think only one or two manufacturers bring out the CD switch to the side of the socket.

There seems to be fair standardization on bringing out the WP signal at position WP1. However, be cautioned that there is at least one manufacturer which brings out CD at this point.

WP2, at the side of the card, is also somewhat of an oddity. The location at the side of the card is only used by one or two manufacturers.

Jumper blocks P3 and P4

To accommodate the wide variety of card pinouts for CD and WP, jumper blocks P3 and P4 are provided. Since cards are soldered to the board, the custom jumpers installed in P3 and P4 may be soldered in place. No pins need be soldered into these areas.

What is necessary is to connect one of CD1, CD2, CD3, or CD4 to CDet. The four CDet holes are connected together, and one connection needs to be made to bring the position of the CD switch in the socket into the board circuitry. Similarly with WP1 or WP2. One of these needs to be jumpered to WProt to bring the WP switch position in the socket into the board circuitry.

The FCI socket (Figure 2.)

This is a fairly straightforward soldering job, with one gotcha. The CD2 position is used for Card Detect, the pin displacement of SD pin 3 is standard, so the alignment is quite good. However, WP is displaced from the usual position of pin WP1. Great care must be exercised in making the WP pin to WP1 pad connection. Bending WP will affect the internal operation of the SPST switch, so my recommendation is to put a large solder blob on WP1 and use a solder bridge to connect to the WP tab on the socket.

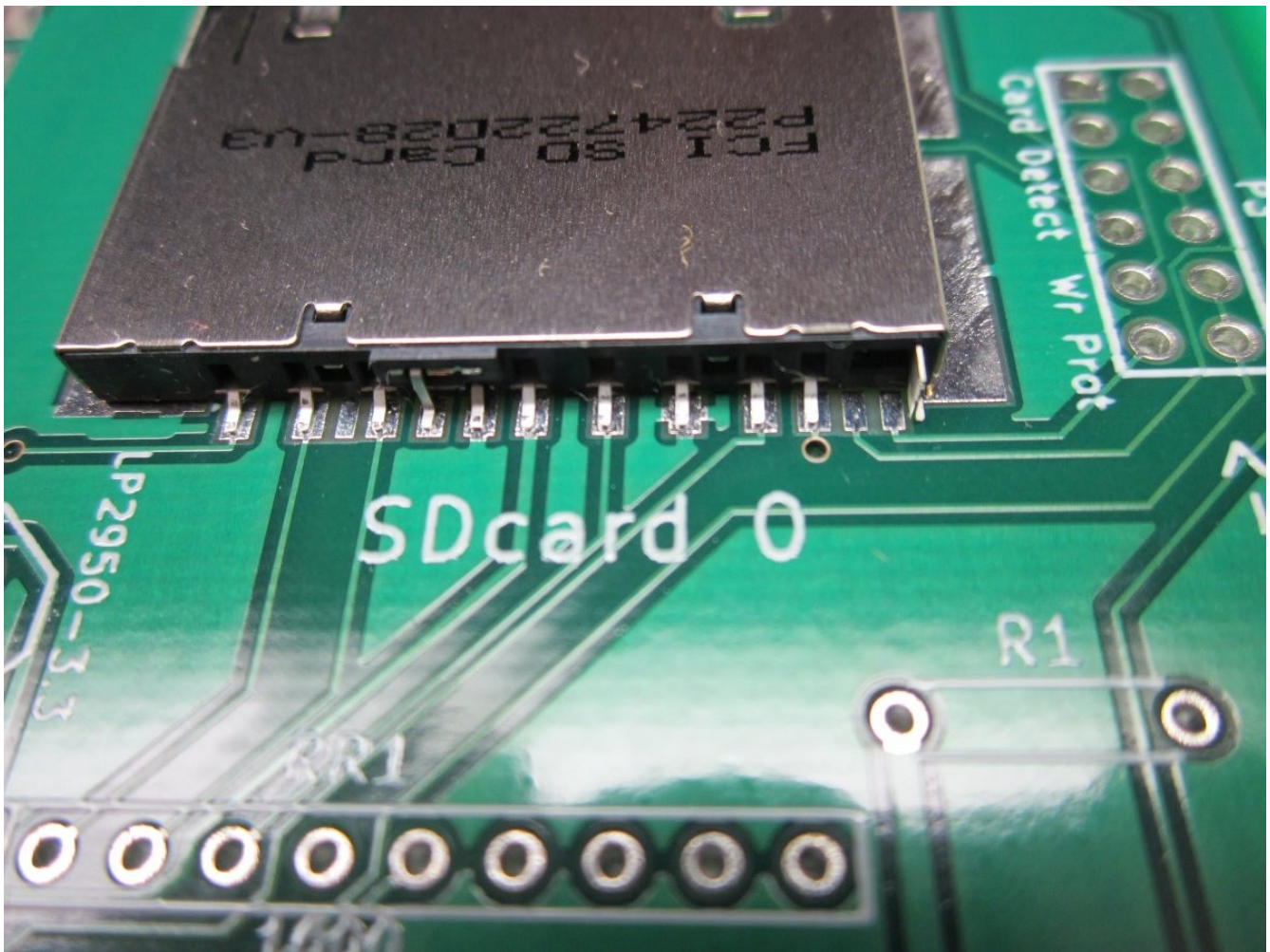


Figure 2. Connections for the FCI socket.

Figure 2b. shows jumpers properly installed in P4 for the FCI socket installed in SD card footprint P2. The FCI card uses CD2 and WP1.



Figure 2b. Soldered jumpers for the FCI card.

The TE Connectivity socket (Figure 3.)

This is one of the most standard of sockets. All of the SD card pins (9, 1-8) are in the proper positions, and the CD and WP switch positions are on the very narrow pins CD1 and WP1. However, the board footprint has displaced pin 3 away from its truly proper position. In soldering pin 3, it is quite okay to bridge pad CD2 and pad 3. This creates no problems, since CD2 is not used by this card. So a solder bridge between those two pads that connects to pin 3 from the socket will be okay. Signal CD2, connected to pad CD2, will not be connected on the jumper block P3 or P4.

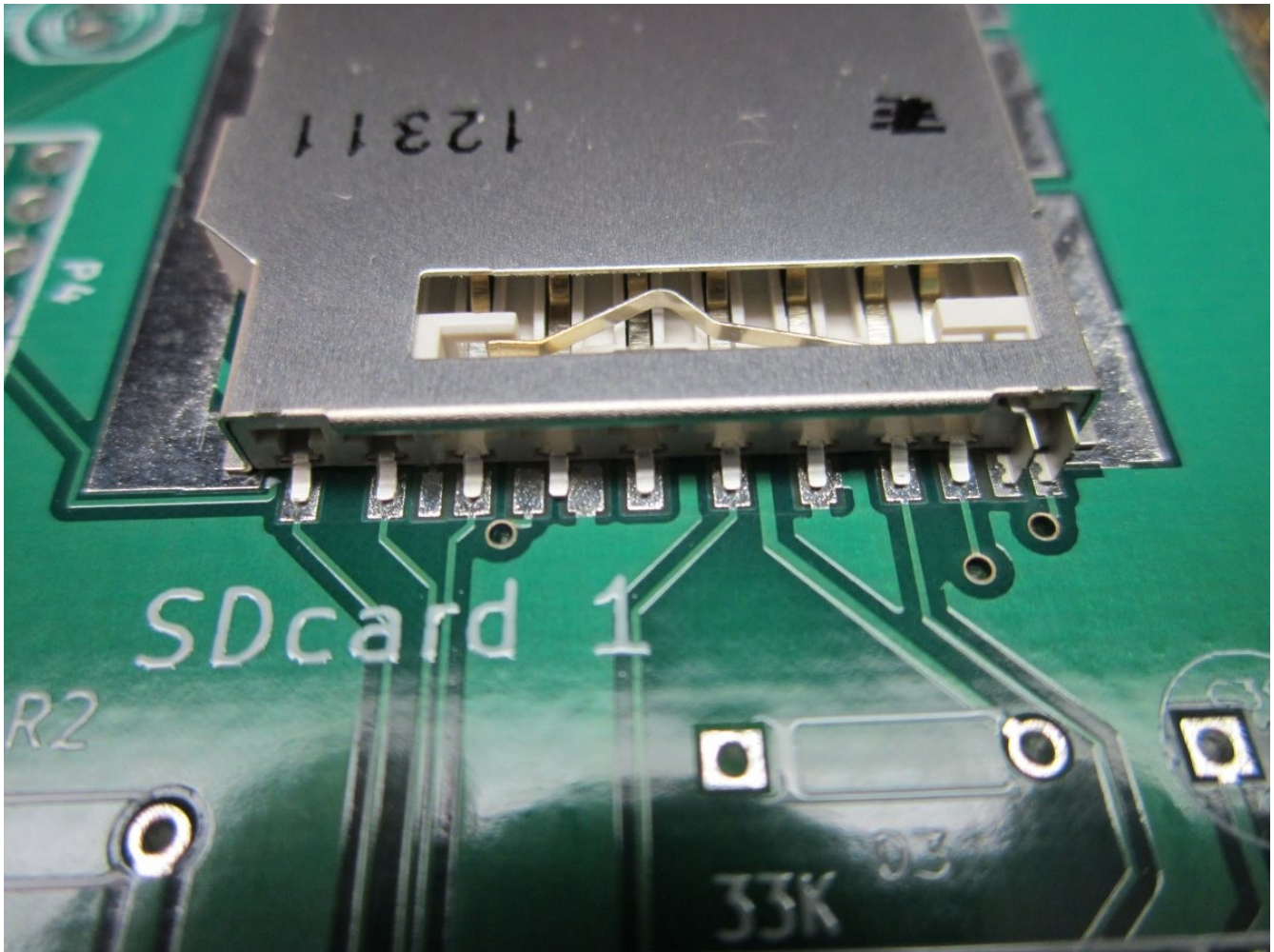


Figure 3. Connections for the TE Connectivity socket.

The XX socket (Figure 4.)

The manufacturer of this socket is unknown to me (eBay), but it seems to be similar to the Kyocera socket. However, an ohmmeter confirms that the tab above the WP1 pad is actually the CD output, since the actual WP tab is near the WP2 pad on the side of the socket. This socket is quite usable, but adjustment must be made in the P3 or P4 configuration area: WP2 is jumpered to WProt, and WP1 is jumpered to CDet. Just don't short the crossed wires, or better to use insulated wire jumpers.

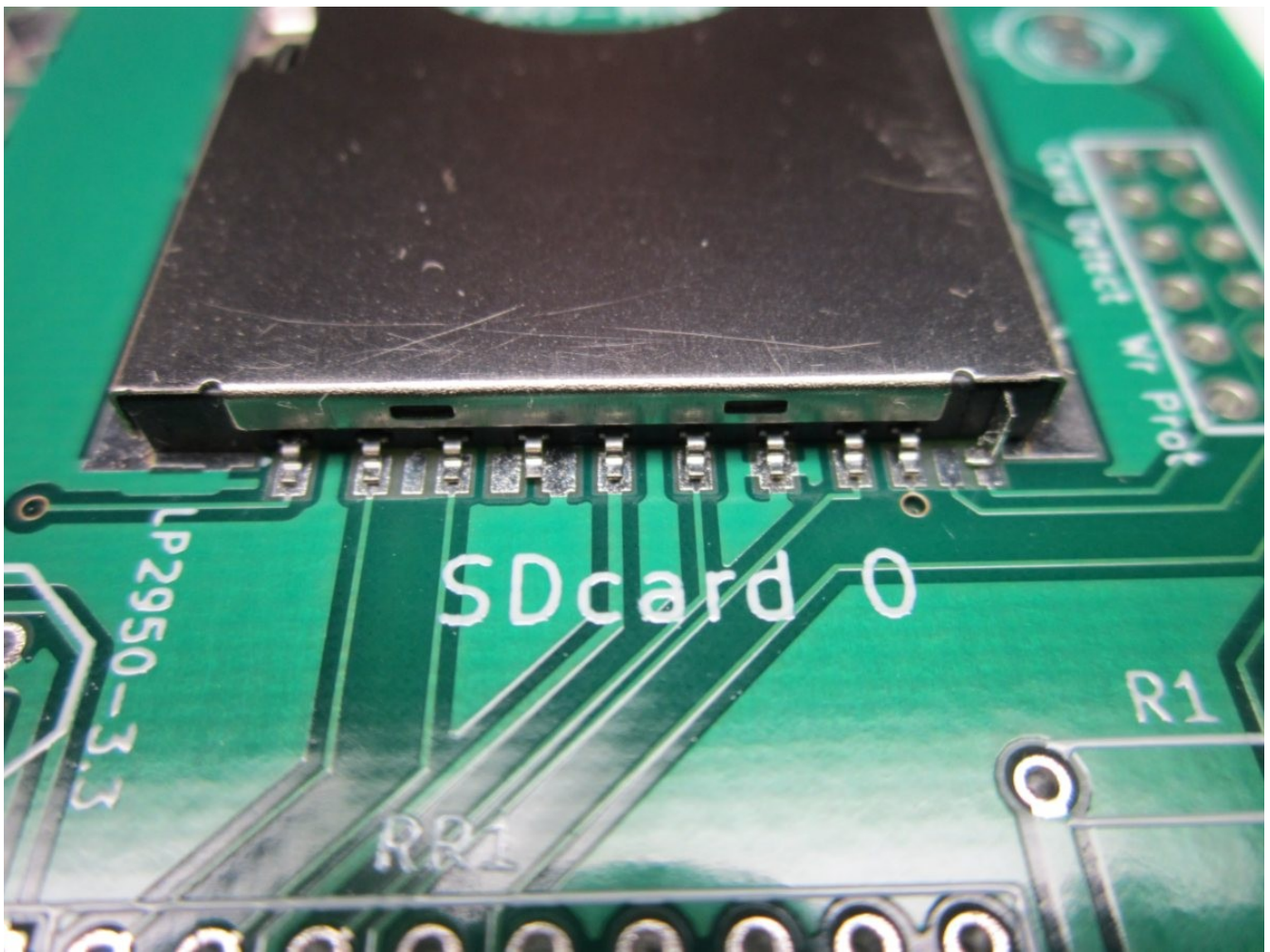


Figure 4. Connections for the XX-unknown socket.

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