

# Display driver module

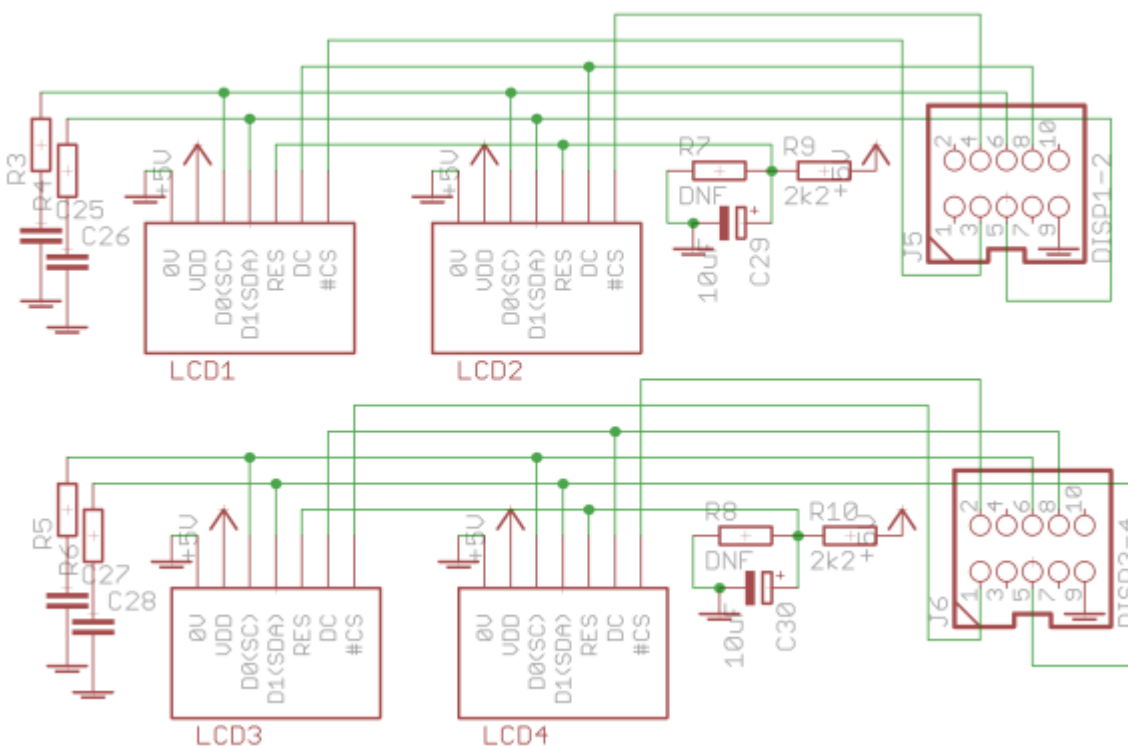
32 SPI-driven displays

## Schematic

The concept is to buffer the time-critical clock signal. A wire connected directly to the MCU is loaded by the long distance (resistance in the connectors and wires) and could be susceptible to noise. Using a 541 buffer and shunt resistors controls this impedance. The serial data and data/command (DC) signals are also buffered to avoid time propagation errors.

The second purpose is to use a chain of shift registers to provide chip select (CS) signals. It is functionally equivalent to a DOUT module, but the header is directly compatible with GPIO on the Core.

The pinout for the display connectors is as follows:



(Power is connected to pin 10.)

## BOM v1.0

| Type | Part | Value | Device       |
|------|------|-------|--------------|
| Caps | C1   | 100n  | C025-025×050 |
|      | C2   | 100n  | C025-025×050 |
|      | C3   | 100n  | C025-025×050 |
|      | C4   | 100n  | C025-025×050 |

| Type      | Part  | Value           | Device         |
|-----------|-------|-----------------|----------------|
|           | C5    | 100n            | C025-025×050   |
|           | C6    | 100n            | C025-025×050   |
|           | C7    | 100n            | C025-025×050   |
| ICs       | IC1   | 74HC541N        | 74HC541N       |
|           | IC2   | 74HC541N        | 74HC541N       |
|           | IC3   | 74HC541N        | 74HC541N       |
|           | IC4   | 74HC595N        | 74HC595N       |
|           | IC5   | 74HC595N        | 74HC595N       |
|           | IC6   | 74HC595N        | 74HC595N       |
|           | IC7   | 74HC595N        | 74HC595N       |
| Headers   | J1    | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J2    | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J3    | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J4    | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J5    | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J6    | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J7    | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J8    | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J9    | +5V             | 22-23-2031     |
|           | J10B  | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J10B1 | PINHD-2X54WALL  | PAK100/2500-10 |
|           | J15A  | PINHD-2X8THTTHT | PAK100/2500-16 |
|           | J15A1 | PINHD-2X8THTTHT | PAK100/2500-16 |
| Resistors | R1    | ~220R           | 0207/10        |
|           | R2    | ~220R           | 0207/10        |
|           | R3    | ~220R           | 0207/10        |
|           | R4    | ~220R           | 0207/10        |
|           | R5    | ~220R           | 0207/10        |
|           | R6    | ~220R           | 0207/10        |
|           | R7    | ~220R           | 0207/10        |
|           | R8    | ~220R           | 0207/10        |
|           | R9    | ~220R           | 0207/10        |
|           | R10   | ~220R           | 0207/10        |
|           | R11   | ~220R           | 0207/10        |
|           | R12   | ~220R           | 0207/10        |
|           | R13   | ~220R           | 0207/10        |
|           | R14   | ~220R           | 0207/10        |
|           | R15   | ~220R           | 0207/10        |
|           | R16   | ~220R           | 0207/10        |
|           | R17   | ~220R           | 0207/10        |
|           | R18   | ~220R           | 0207/10        |
|           | R19   | ~220R           | 0207/10        |
|           | R20   | ~220R           | 0207/10        |
|           | R21   | ~220R           | 0207/10        |
|           | R22   | ~220R           | 0207/10        |

| Type | Part | Value | Device  |
|------|------|-------|---------|
|      | R23  | ~220R | 0207/10 |
|      | R24  | ~220R | 0207/10 |
|      | R25  | ~1k   | 0207/10 |
|      | R26  | ~1k   | 0207/10 |
|      | R27  | ~1k   | 0207/10 |
|      | R28  | ~1k   | 0207/10 |
|      | R29  | ~1k   | 0207/10 |
|      | R30  | ~1k   | 0207/10 |
|      | R31  | ~1k   | 0207/10 |
|      | R32  | ~1k   | 0207/10 |
|      | R33  | ~1k   | 0207/10 |
|      | R34  | ~1k   | 0207/10 |
|      | R35  | ~1k   | 0207/10 |
|      | R36  | ~1k   | 0207/10 |
|      | R37  | ~1k   | 0207/10 |
|      | R38  | ~1k   | 0207/10 |
|      | R39  | ~1k   | 0207/10 |
|      | R40  | ~1k   | 0207/10 |
|      | R41  | ~1k   | 0207/10 |
|      | R42  | ~1k   | 0207/10 |
|      | R43  | ~1k   | 0207/10 |
|      | R44  | ~1k   | 0207/10 |
|      | R45  | ~1k   | 0207/10 |
|      | R46  | ~1k   | 0207/10 |
|      | R47  | ~1k   | 0207/10 |
|      | R48  | ~1k   | 0207/10 |
|      | R49  | ~1k   | 0207/10 |
|      | R50  | ~1k   | 0207/10 |
|      | R51  | ~1k   | 0207/10 |
|      | R52  | ~1k   | 0207/10 |
|      | R53  | ~1k   | 0207/10 |
|      | R54  | ~1k   | 0207/10 |
|      | R55  | ~1k   | 0207/10 |
|      | R56  | ~1k   | 0207/10 |

## Versions

v1.0: first release. Erratum: there is a significant error in that J15 is mirrored. The simplest way to get it working is to swap pairs of the ribbon wires as shown:



Here the header notches are aligned with the silkscreen. Only the first six wires are required.

## Assembly

All parts are THT, start with resistors and caps, IC sockets then headers.

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## Interconnection to Core

J10B connects to J10B. J15A to J15A. Note the mirrored connection on v1.0

J15A1/J10B1 chain another Display Driver. Note that the J15 connection should not be mirrored for subsequent boards.

## Dimensions

The PCB is 100\*100mm with 3.2mm diameter holes centred 3.5mm from the edges.

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## License

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