

Preliminary remarks.

The diagrams look unfinished to the end. There is no schema. Project-C_LED.PrjPCB. Many conductors and components are not connected anywhere. Specific errors are indicated in the diagrams (in PDF) in large red print.

Power consumption

To estimate the power consumption of the "antennas", we will take the capacity of one "antenna" 10pF. The maximum signal swing is 30V, therefore, when switching the antenna, the charge is recharged $10 \text{ pF} * 30 \text{ V} = 300 \text{ pC}$. At a signal frequency of 1 MHz, recharging the antenna leads to a current consumption of $300 \text{ pC} * 1 \text{ MHz} * 2 = 600 \text{ }\mu\text{A}$. 320 channels will consume 192mA. Taking into account the DCDC converter from a 12V source, this load will consume $192\text{mA} * 30\text{V} / 12\text{V} = 480\text{mA}$. Note that this estimate is based on the antenna capacitance of 10 pF. The real consumption can be higher according to the increase in the antenna capacity.

Estimating the consumption of output buffers. Average consumption of the buffer in static ($2.5 \text{ mA} + 0.6 \text{ mA}$) / 2 = 1.5 mA. From a 12V source, 320 channels will consume $320 * 1.5 \text{ mA} / 2 = 600 \text{ mA}$

FPGA consumption, from 12V source: $200\text{mA} * 3.3\text{V} / 12\text{V} = 440\text{mA}$.

The total current from the 12V source will be approximately 1.5A, which is quite acceptable for RJ45 (see PoE).

The TPS61175PWPR has sufficient current.

MP2333H has sufficient current.

Miscellaneous notes

The Project-C_CONTROLLER.PrjPCB device does not have RJ45 connectors to connect Project-C_VOLTAGE.PrjPCB.

There is no 12V power connector. This connector should be rated for a current of about 15 A.

I recommend connecting a resistor in parallel with the MCP4562. The value of this resistor must be such that when the MCP4562 is not turned on (or burned out), the VCC_OUT voltage does not exceed the maximum allowable one (30 V).

