theobroma
SYSTEMS

RK3399-Q7 Design Notes
Baseboard Design for the RK3399-Q7

Contents

1 Design Notes

This documents highlights a few important details when designing with the RK3399-Q7 module.

1.1 Ethernet Center Taps

The RK3399-Q7 module uses the Micrel KSZ9031RXN Gigabit Ethernet PHY.

As described in section 12.0 of the KSZ9031RXN datasheet, the PHY uses voltage mode transmit drivers that require separate center taps for each differential pair.
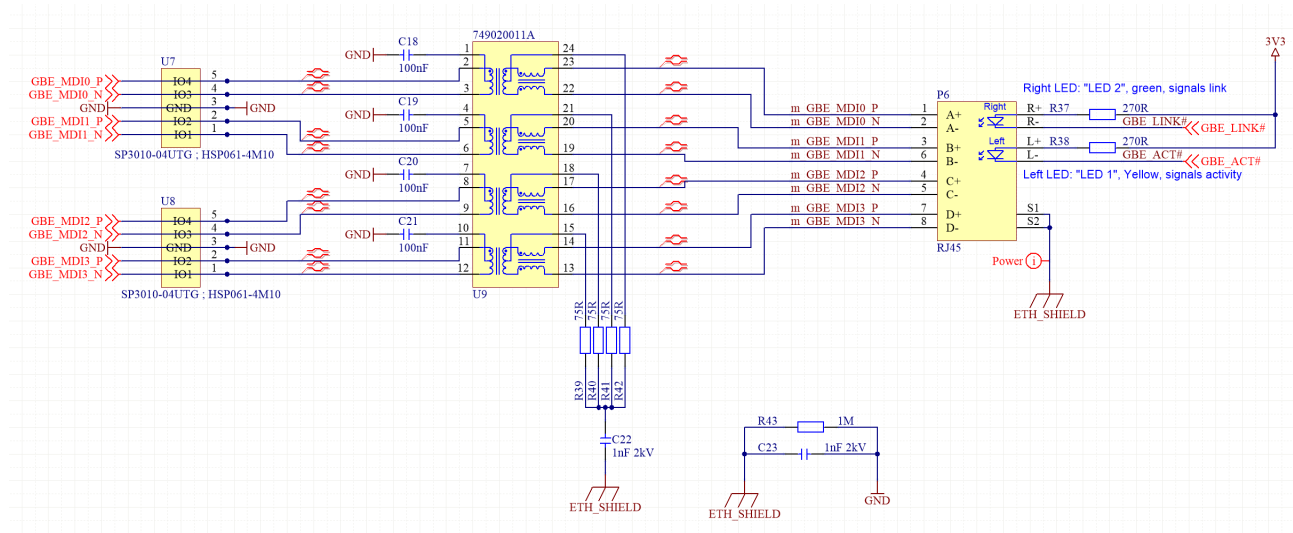
The suggested schematic is shown below.

Fig. 1.1: Suggested ethernet transformer schematics

1.2 Ethernet with 100Mbit Transformer

Using an 100Mbit-transformer can cause slow link detect behavoir when conncted to a Gigabit port. The reason is that the PHYs on both ends will agree on Gigabit speed, while the actual transmission line is missing the two extra differential pairs that are required.

In U-Boot, you may get error like the one shown below:

```
dhcp
ethernet@fe300000 Waiting for PHY auto negotiation to complete......... TIMEOUT !
Could not initialize PHY ethernet@fe300000
```

It is recommended to either place a Gigabit-capable transformer on the baseboard or to explicitely disable Gigabit in software.

In U-Boot, you can limit the speed to 100Mbit by running:

```
setenv disable_giga 1
```