Design Requirements

Impedance Control

Impedance control is required. Impedance control is required in the following layers

1. 50 Ohms (+-10%) Single-Ended Microstrip
    a. L1 (F_Cu) **ref.** L2 (In1_Cu)
    b. Trace width = 0.23
2. 50 Ohms (+-10%) Single-Ended Microstrip
    a. L6 (In5_Cu) **ref.** L7 (In6_Cu) and L5 (In4_Cu)
    b. Trace width = 0.14
3. 50 Ohms (+-10%) Single-Ended Microstrip
    a. L8 (B_Cu) **ref.** L7 (In6_Cu)
    b. Trace width = 0.23
4. 90 Ohms (+-10%) Differential Microstrip (50 Ohms (+-10%) Single-Ended)
    a. L1 (F_Cu) **ref.** L2 (In1_Cu)
    b. Trace width = 0.23 mm
    c. Trace spacing = 0.26mm
    d. USB Lines
5. 100 Ohms (+-10%) Differential Microstrip (50 Ohms (+-10%) Single-Ended)
    a. L1 (F_Cu) **ref.** L2 (In1_Cu)
    b. Trace width = 0.23 mm
    c. Trace spacing = 1.0mm
    d. Ethernet lines to MagJack

Ethernet Design

Considerations in this design are listed below,

- RMII 10/100 Mbps ethernet design is used.
- Matched net lengths are required
    - RXD0, RXD1, and CRS_DV are matched with each other
    - TXD0, TXD1, and TX_EN are matched with each other
- Differential lines [TXN, TXP] and [RXN, RXP] are intra-pair length matched.
- Impedance control is required (See Section Impedance Control section)
    - 50 Ohm Single Ended microstrip
        - Trace width = 0.23mm
            - L1 (F_Cu) **ref.** L2 (In1_Cu)

        - Trace width = 0.14mm
            - L6 (In5_Cu) **ref.** L7 (In6_Cu) and L5 (In4_Cu)
    - 100 Ohm Differential microstrip
        - Trace width = 0.23 mm and Trace spacing = 1.0mm
            - L1 (F_Cu) **ref.** L2 (In1_Cu)

eMMC Memory Design

Considerations in this design are listed below,

- Laser Micro-vias from Layer 1 to Layer 6 is used as via in-pad
- The data lines are length matched – [D0-D7] to each other and to the CMD line.
- Impedance control is required
    - 50 Ohm Single Ended microstrip
        - Trace width = 0.23mm
            - L1 (F_Cu) **ref.** L2 (In1_Cu)
        - Trace width = 0.14mm
            - L6 (In5_Cu) **ref.** L7 (In6_Cu) and L5 (In4_Cu)

SD Card Design

Considerations in this design are listed below,

- The data lines are length matched – [D0-D3] to each other and to the CMD line.
- Impedance control is required
    - 50 Ohm Single Ended microstrip
        - Trace width = 0.23mm
            - L1 (F_Cu) **ref.** L2 (In1_Cu)
        - Trace width = 0.14mm
            - L6 (In5_Cu) **ref.** L7 (In6_Cu) and L5 (In4_Cu)

USB Design

Considerations in this design are listed below,

- Impedance control is required
    - 50 Ohm Single Ended microstrip
        - Trace width = 0.23mm
            - L1 (F_Cu) **ref.** L2 (In1_Cu)
        - Trace width = 0.14mm
            - L6 (In5_Cu) **ref.** L7 (In6_Cu) and L5 (In4_Cu)
    - 90 Ohm Differential microstrip

- Trace width = 0.23 mm and Trace spacing = 0.26mm
  - L1 (F_Cu) **ref.** L2 (In1_Cu)

General

1. Solder bridge is required. Some of them are bridged and some are left open. The ones that are bridged need to be bridged via solder during assembly are given below:
   a. JP401, JP402, JP403, JP406, and JP408