

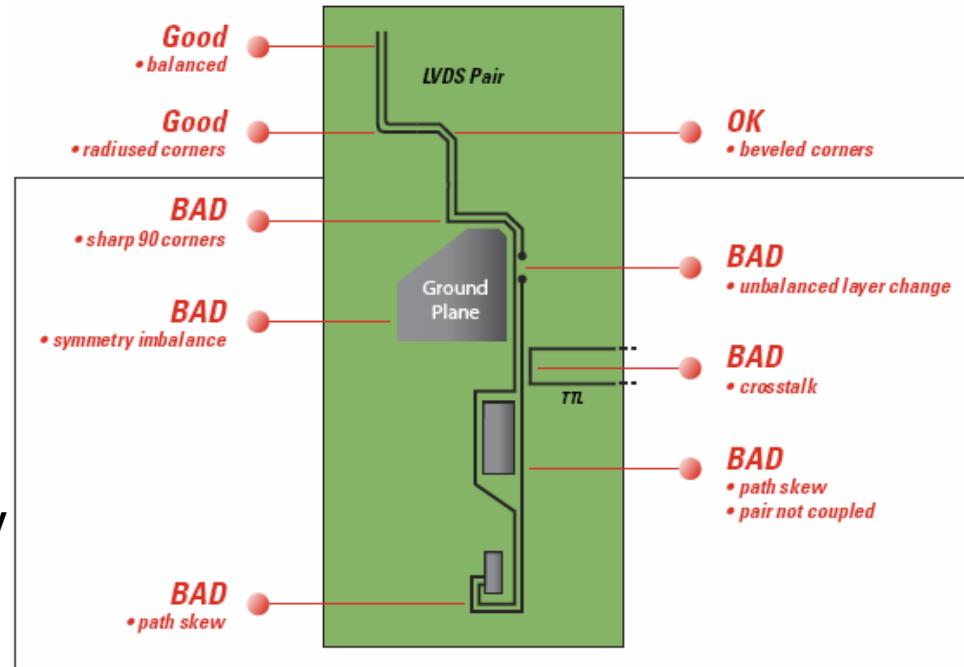
EMI Best Practices

- **PCB Design Guidelines**
 - Minimize ground loop areas
 - Route differential pairs close together
 - Use 100ohm coupled differential pairs
 - Minimize impedance discontinuities
 - Minimize skew within the pair
 - Keep stubs as short as possible
 - Minimize the number of vias
 - Solid ground and power planes
 - Sufficient decoupling capacitors on chip power supplies
 - Keep digital and analog lines separate
- **Signal Integrity**
 - Reduce crosstalk noise and jitter
 - Minimize Power/Ground bounce (noise)
 - Controlled edge rate of 2ns for single-ended signals to minimize signal reflections
 - Optimize Host to Serializer signal drive strength (low drive) to avoid over/undershoot and extremely fast edge rates; maintain only clock fast edge for low jitter

PCB Guidelines

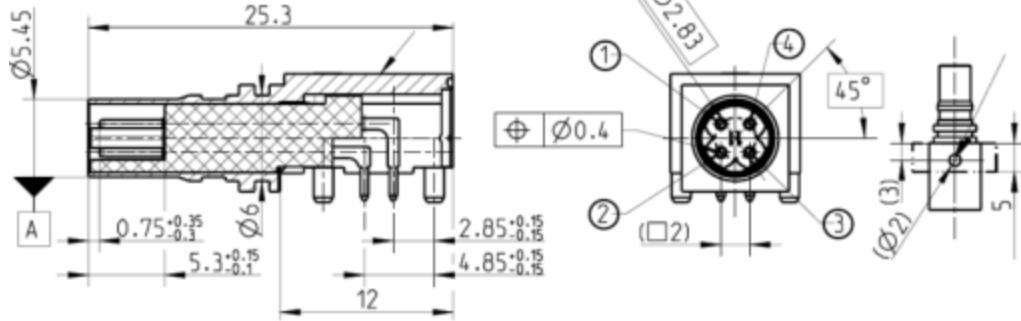
- ✓ Use at least a four-layer board with dedicated power and ground planes
- ✓ Use surface-mount components to minimize parasitics
- ✓ Separate a single-ended signal from a differential signal by at least three times the differential spacing
- ✓ Separate adjacent differential pairs by three times the intra-pair trace spacing
- ✓ If vias are required for high-speed data lines, be sure to place vias to ground next to the signal via for a constant return path for the signal
- ✓ Route all differential traces as 100Ω differential impedance transmission lines
- ✓ Route all single-ended signals as 50Ω impedance lines
- ✓ Route all power signals as wide as reasonably possible to minimize inductance

- ✓ Use connectors and cables that are designed for high-speed differential data
- ✓ Follow the typical connection diagrams found in the datasheet for power-supply filtering recommendations

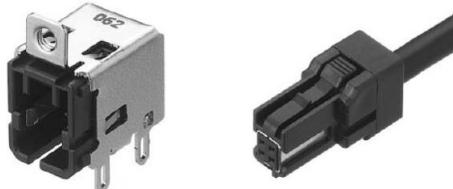


Examples of Connectors

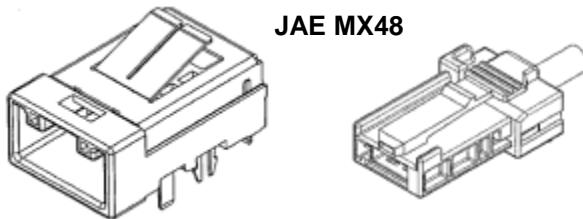
Rosenberger HSD®



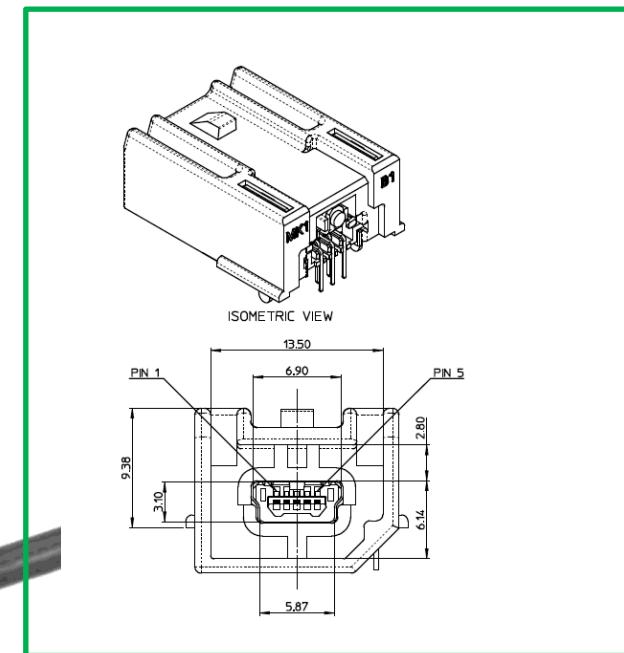
Honda TAK-A4



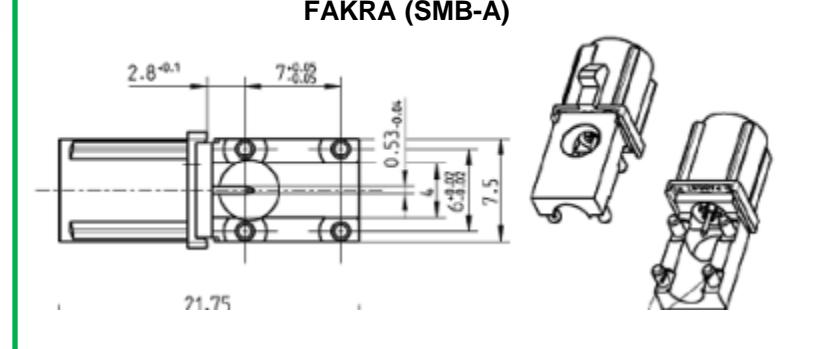
JAE MX48



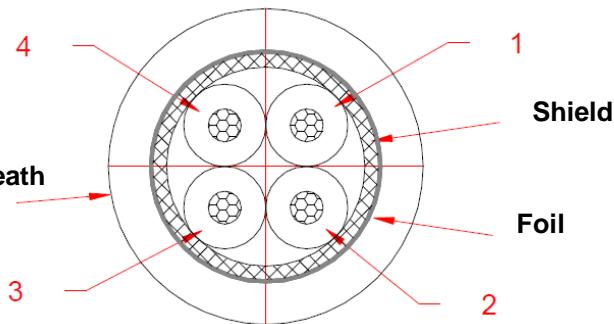
Hirose GT17



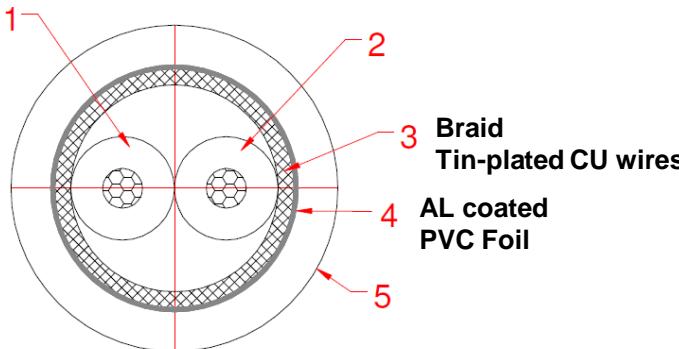
FAKRA (SMB-A)



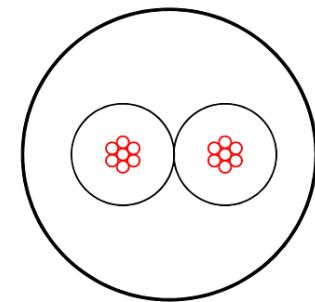
Cable Types



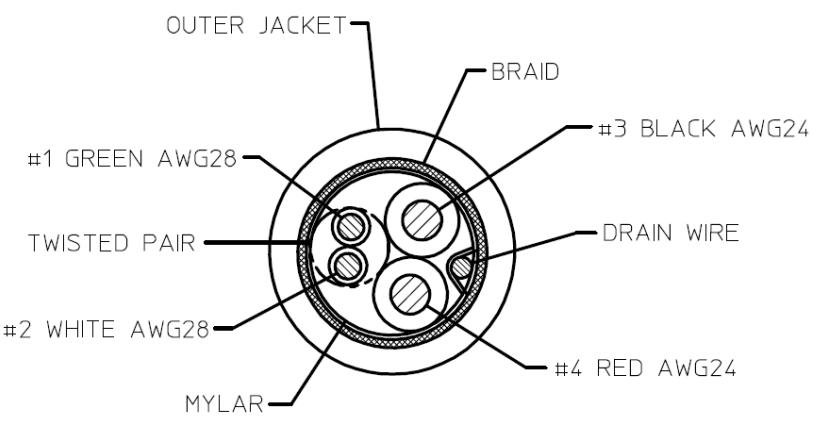
Leoni DACAR538
Star-Quad Cable



Leoni DACAR 522 STP
FL9YCBY 2x0.14
Shielded Twisted Pair



K&S FlexRay UTP
FLR09YS-YW
Unshielded Twisted Pair



Molex 4-wire Cable
Shielded Twisted Pairs

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Leoni DACAR302
Coax