

# PCB Layout Guide

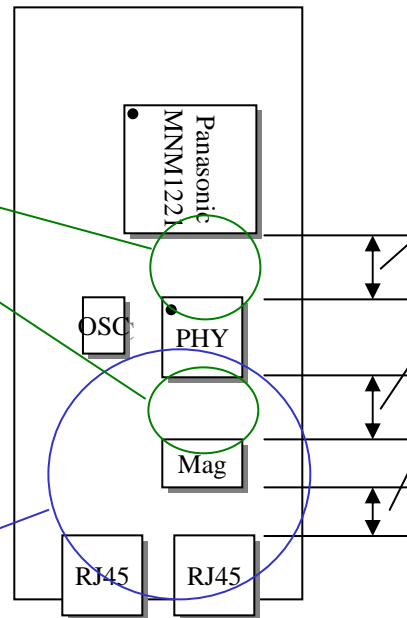
Motor Business Unit  
Home Appliances Company  
Panasonic Corporation

[After reading the application note of PHY chip, see this guide.](#)

# Basic Layout

Place closely in order to make signal traces be as short as possible.

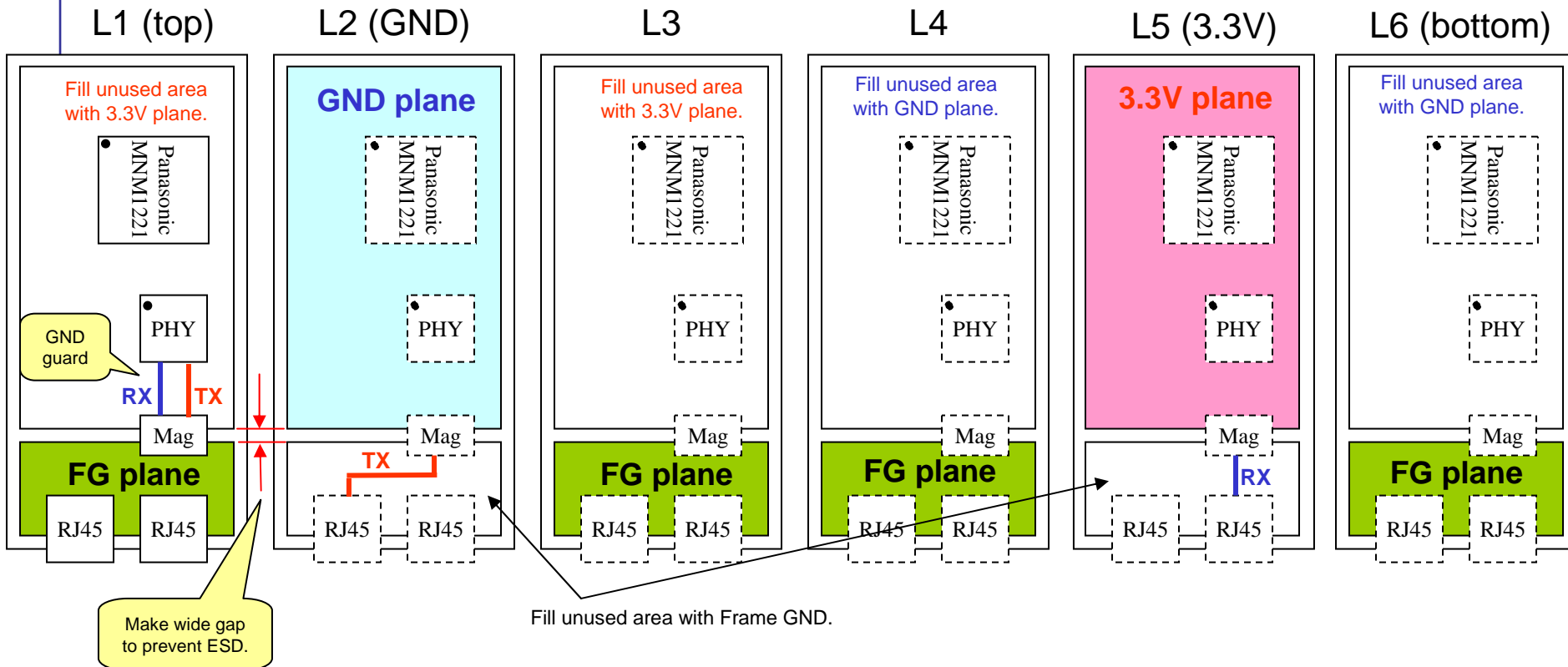
In this area, trace signal lines on L1 (top) as much as possible.



Pay special attention to routing traces in this area, because of weak and sensitive analog signals.

Note: The above figure is an example that PHY is BCM5221(Broadcom).

# 6 Layers Case

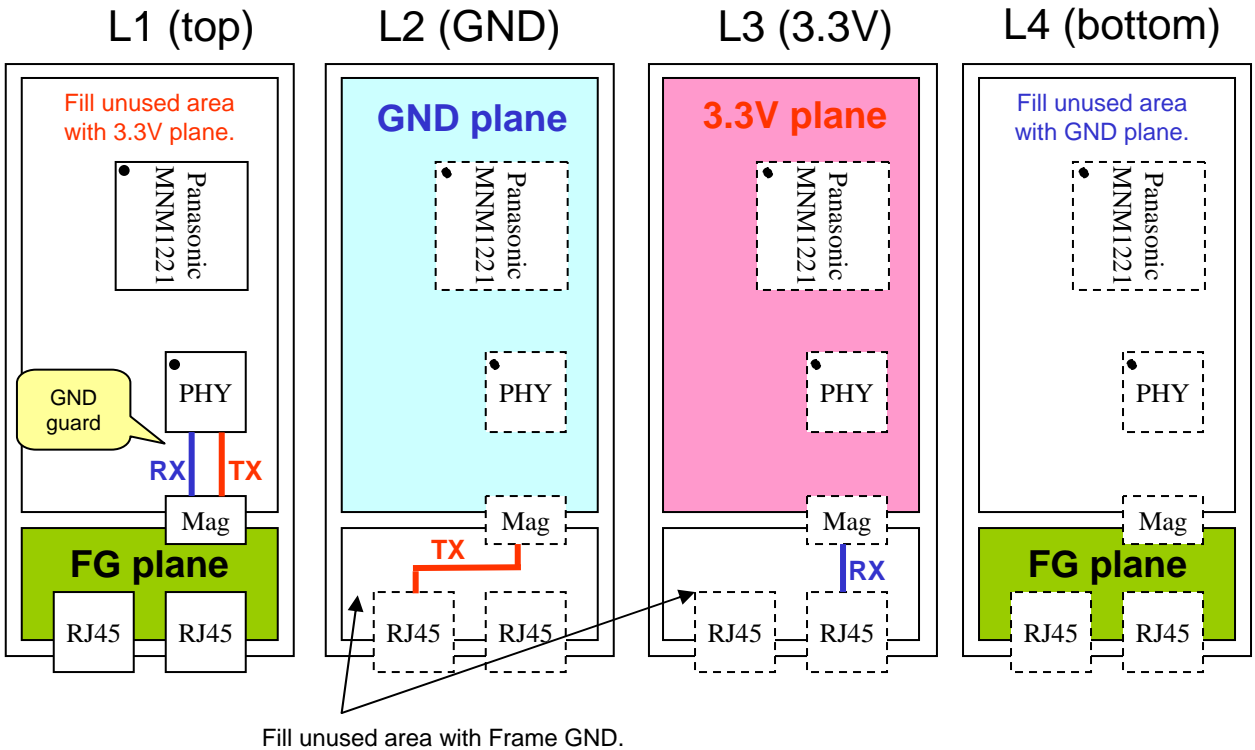


- Guard the signal traces from RJ45 to magnetic with FG plane.
- To avoid crosstalk, route the TX and RX pairs traces in different layers.
- R and C circuit traces from unused pins of RJ45 to FG should be placed in layer 1 or 6.

Mag: Magnetic (pulse transformer)  
FG: Frame (chassis) Ground

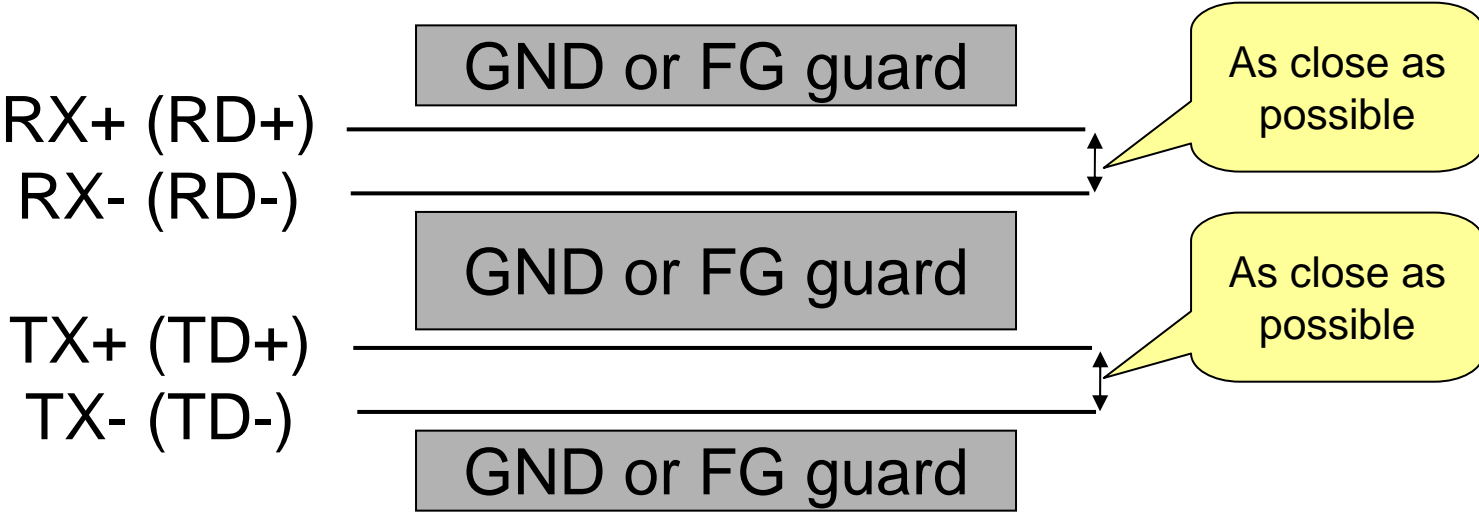
Note: The reverse arrangement of RJ45 is also allowed, i.e. leftward RX and rightward TX may be placed.

# 4 Layers Case

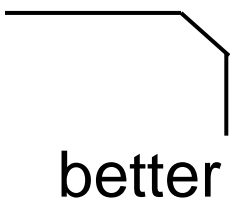


# TX+/-, RX+/- pairs

TX+/- and RX+/- pairs from RJ45 to Mag and from Mag to PHY should be traced symmetrically, identically, and closely.

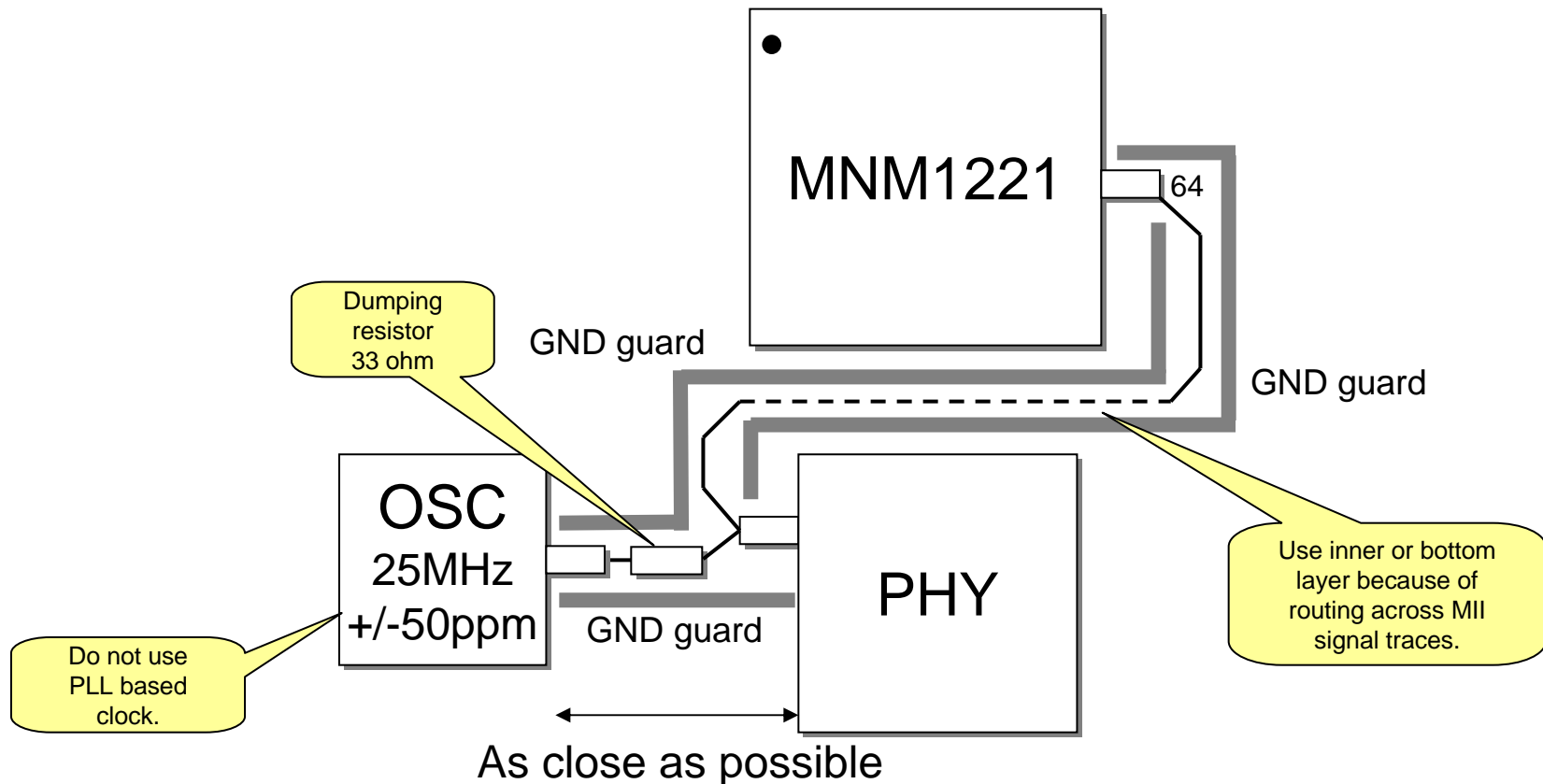


Do not turn at right angle (90degree), and turn at 45degree instead.



# Clock

Place as closely as possible between OSC and PHY.  
Shield with GND guard.



Note: Place OSC close to a clock-input pin of PHY. The above figure is an example that PHY is BCM5221(Broadcom).