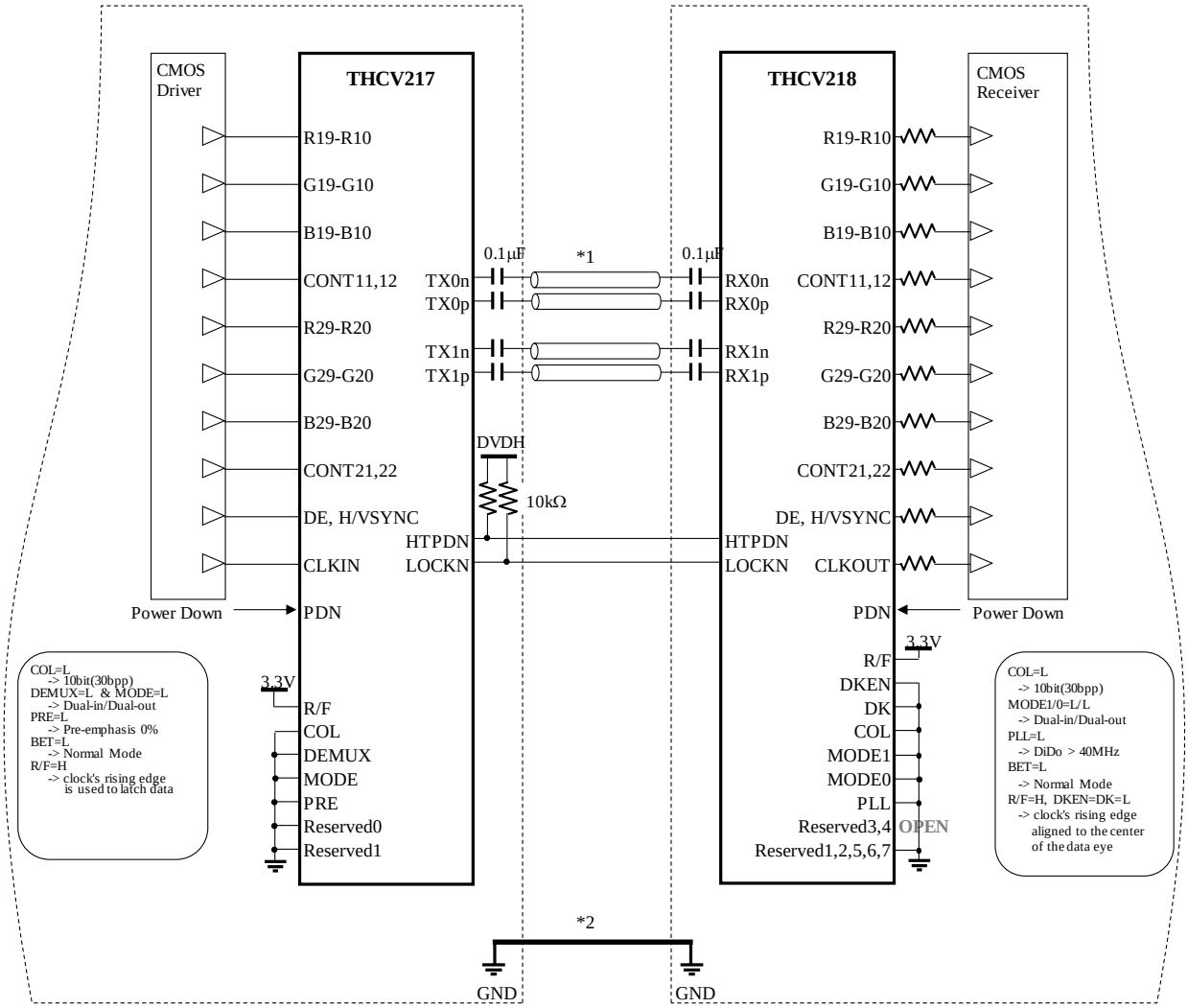
THCV217/THCV218 Application Note

System Diagram and PCB Design Guideline

Contents

Application Diagrams

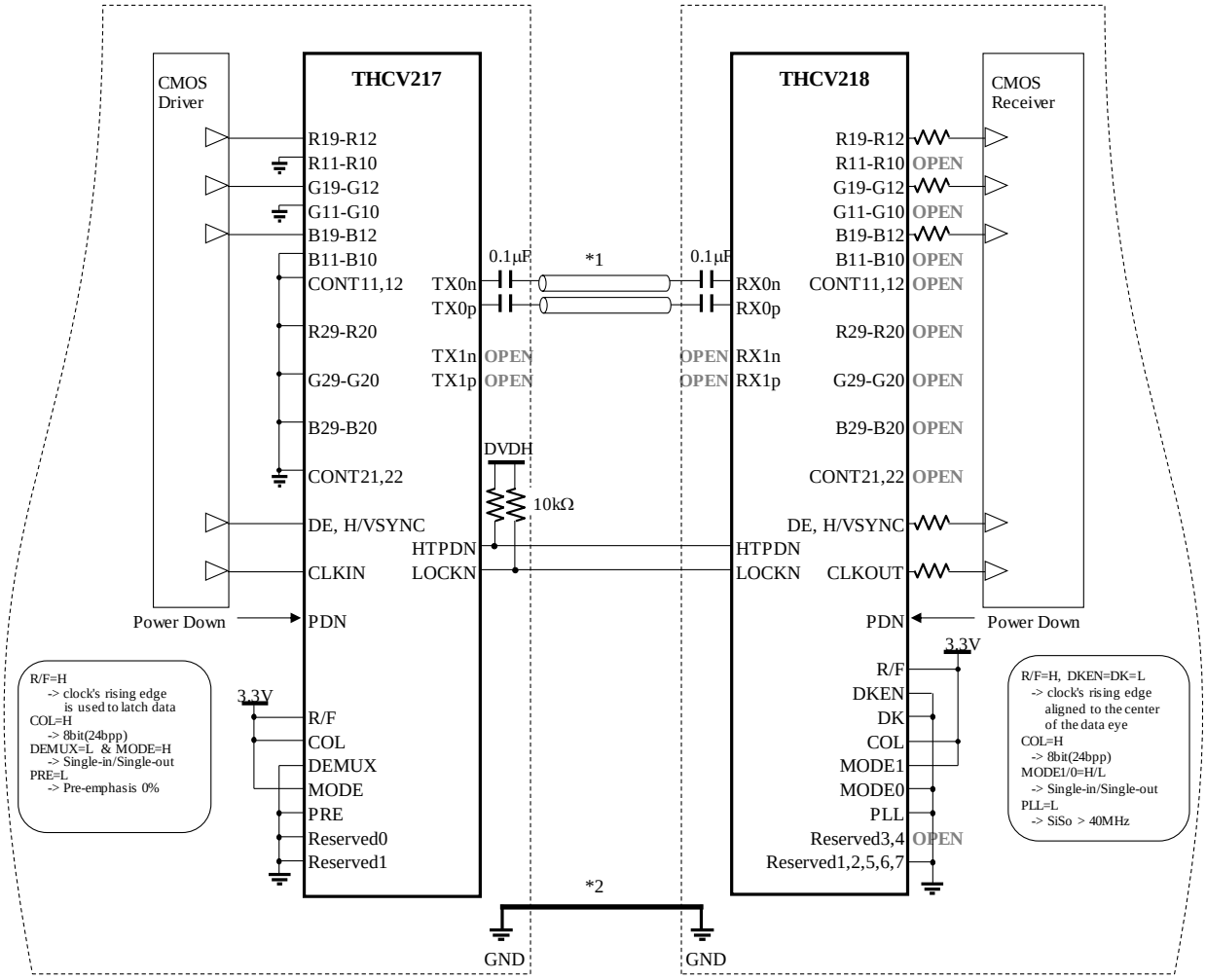
Dual-in/Dual-out, 10bit (30bit per pixel) without Pre-emphasis



*1 indicates microstrip lines or cables with their differential characteristic impedance being 100Ω

*2 Connect GNDs of both Tx and Rx PCB

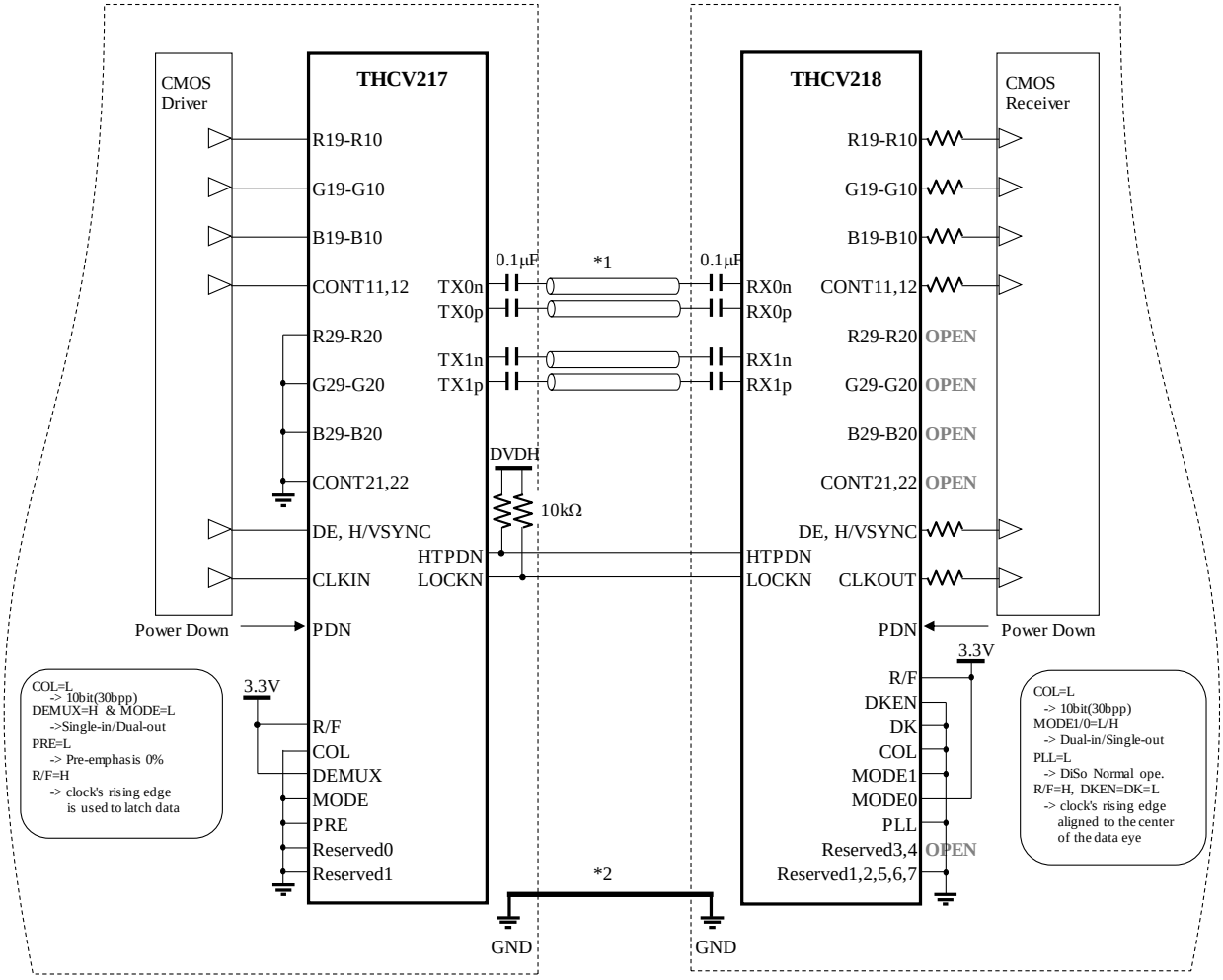
Single-in/Single-out, 8bit (24bit per pixel) without Pre-emphasis



*1 indicates microstrip lines or cables with their differential characteristic impedance being 100Ω

*2 Connect GNDs of both Tx and Rx PCB

Single-in/Dual-out to Dual-in/Single-out, 10bit (30bit per pixel) without Pre-emphasis



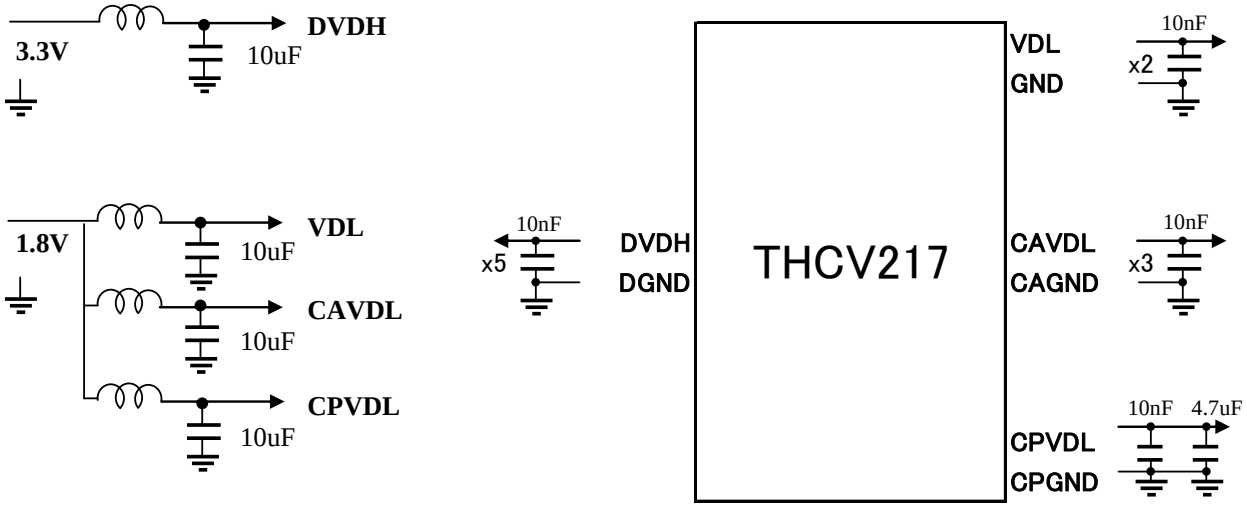
*1 indicates microstrip lines or cables with their differential characteristic impedance being 100Ω

*2 Connect GNDs of both Tx and Rx PCB

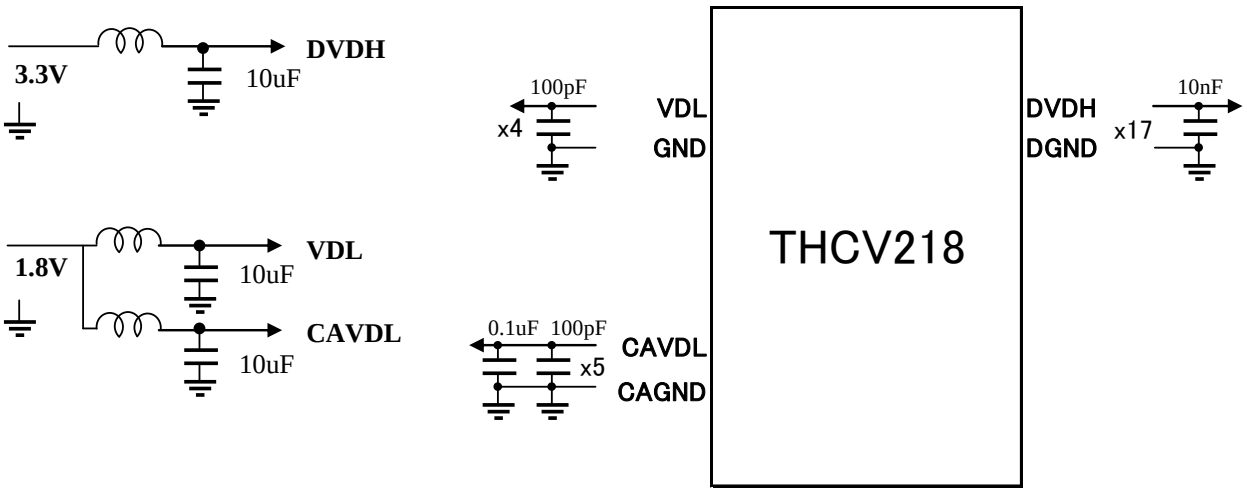
Recommendations for Power Supply

- Separate all the power domains in order to avoid unwanted noise coupling between noisy digital and sensitive analog domains.
- Use high frequency ceramic capacitors of 100pF or 10nF as bypass capacitors between power and ground pins. Place them as close to each power pin as possible. 100pF capacitors, along with 0.1uF capacitors, are recommended for 218's CAVDL.
- Adding 4.7μF capacitors to PLL's power pins, along with the smaller bypass capacitors, is recommended.
- Use the same ground plane for all ground pins.

Recommended Power Supply for THCV217



Recommended Power Supply for THCV218



Note

1)Cable Connection and Disconnection

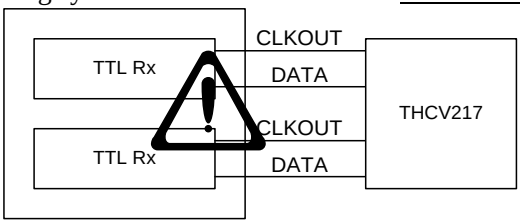
Don't connect and disconnect the LVDS and CML cable, when the power is supplied to the system.

2)GND Connection

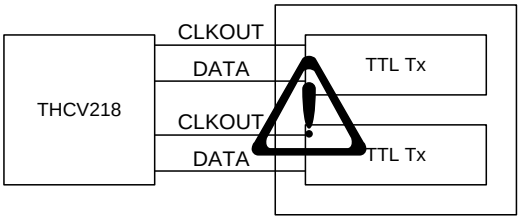
Connect the each GND of the PCB which Transmitter, Receiver and THCV217 on it. It is better for EMI reduction to place GND cable as close to LVDS and CML cable as possible.

3)Asynchronous use

Asynchronous use such as following system are not recommended. Data sheet p.18 tRS/tRH should be kept.



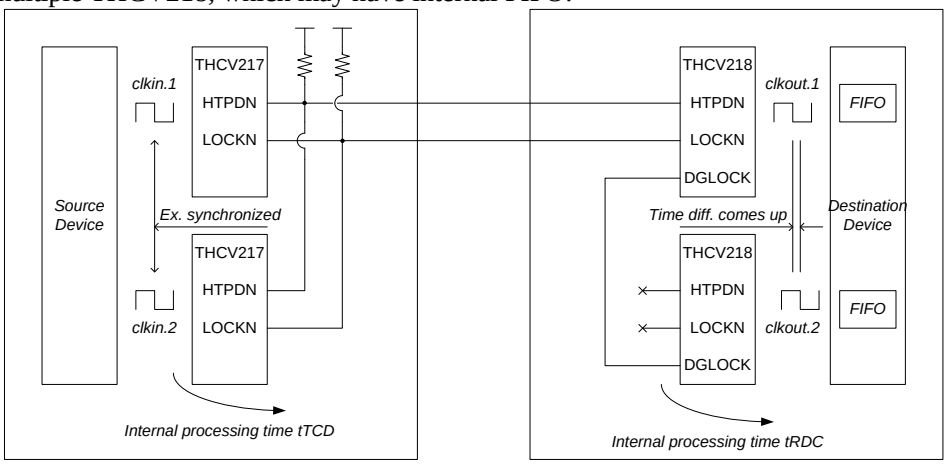
Asynchronous use such as following system are not recommended.



4)Multiple device connection

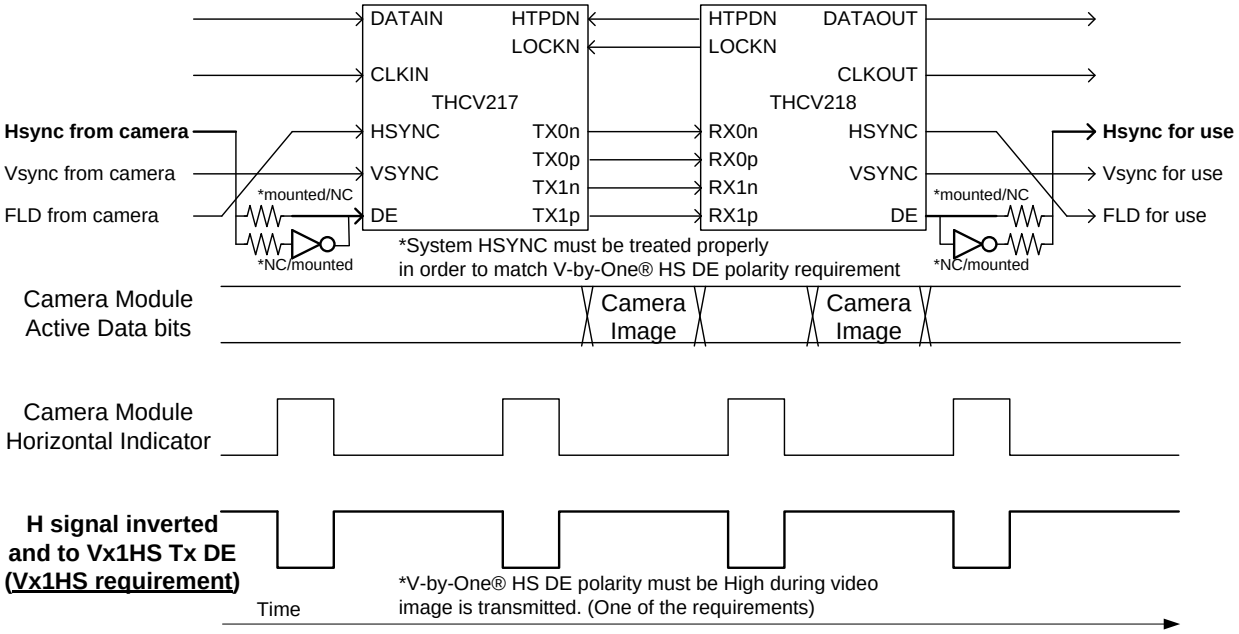
HTPDN and LOCKN signals are supposed to be connected proper for their purpose like the following figure.
HTPDN should be from just one Rx to multiple Tx because its purpose is only ignition of all Tx.
LOCKN should be connected so as to indicate that all Rx CDR become ready to receive normal operation data.
LOCKN of Tx side can be simply split to multiple Tx. THCV218 DGLOCK is appropriate for multiple Rx use.

Also possible time difference of internal processing time (Data sheet p.19 THCV217 tTCD and THCV218 tRDC) on multiple data stream must be accommodated and compensated by the following destination device connected to multiple THCV218, which may have internal FIFO.

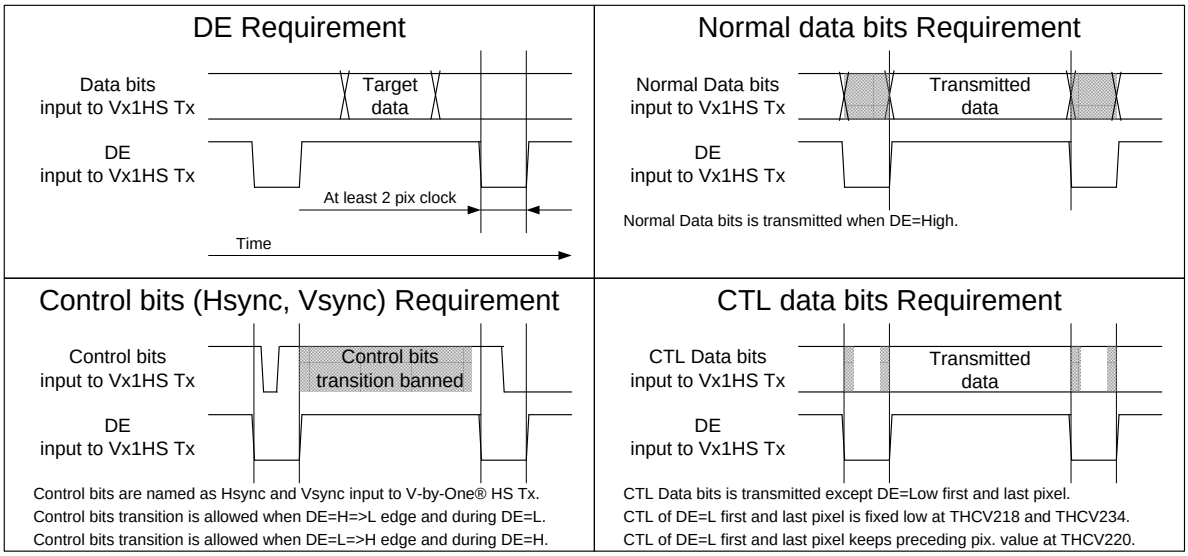


5)In case of No DE in video signal stream

V-by-One® HS transmission always requires DE, while some system has only HSync and VSync.
Sometimes Hsync should be connected to DE and other treatment is at the same time required.
DE polarity on active data transmission period must be High, which sometimes needs external inverter.



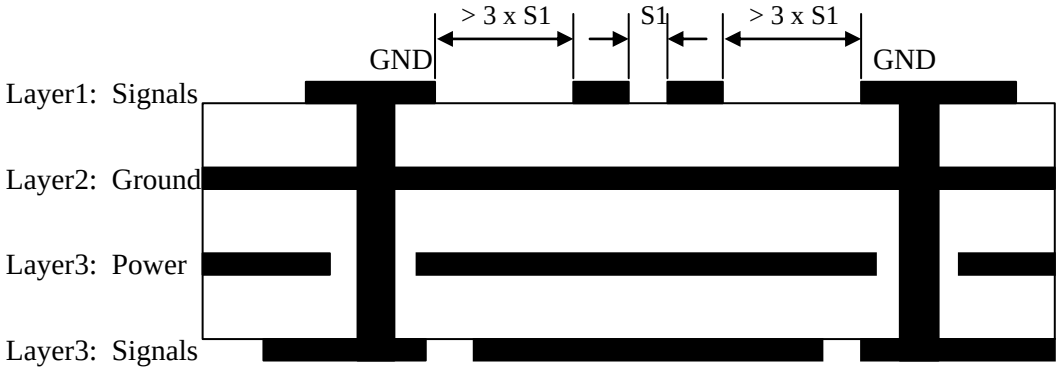
Below are consideration points if there is no DE signal on original data format.



PCB Layout Considerations

- Use at least four-layer PCBs with signals, ground, power, and signals assigned for each layer. (Refer to figure below.)
- PCB traces for high-speed signals must be single-ended micorstirp lines or coupled microstrip lines whose differential characteristic impedance is 100Ω.
- Minimize the distance between traces of a differential pair (S1) to maximize common mode rejection and coupling effect which works to reduce EMI (Electro-Magnetic Interference).
- Route differential signal traces symmetrically.
- Avoid right-angle turns or minimize the number of vias on the high speed traces because they usually cause impedance discontinuity in the transmission lines and degrade the signal integrity. Mismatch among impedances of PCB traces, connectors, or cables also causes reflection, limiting the bandwidth of the high-speed channels.

PCB Cross-sectional View
for Microstrip Lines



Notices and Requests

1. The product specifications described in this material are subject to change without prior notice.

2. The circuit diagrams described in this material are examples of the application which may not always apply to the customer's design. THine Electronics, Inc. ("THine") is not responsible for possible errors and omissions in this material. Please note even if errors or omissions should be found in this material, THine may not be able to correct them immediately.

3. This material contains THine's copyright, know-how or other intellectual property rights. Copying, reverse-engineer or disclosing to third parties the contents of this material without THine's prior written permission is prohibited.

4. THINE ACCEPTS NO LIABILITY FOR ANY DAMAGE OR LOSS IN CONNECTION WITH ANY DISPUTE RELATING TO INTELLECTUAL PROPERTY RIGHTS BETWEEN THE USER AND ANY THIRD PARTY, ARISING OUT OF THIS PRODUCT, EXCEPT FOR SUCH DAMAGE OR LOSS IN CONNECTION WITH DISPUTES SUCCESSFULLY PROVED BY THE USER THAT SUCH DISPUTES ARE DUE SOLELY TO THINE. NOTE, HOWEVER, EVEN IN THE AFOREMENTIONED CASE, THINE ACCEPTS NO LIABILITY FOR SUCH DAMAGE OR LOSS IF THE DISPUTE IS CAUSED BY THE USER'S INSTRUCTION.

5. This product is not designed for applications that require extremely high-reliability/safety such as aerospace device, nuclear power control device, or medical device related to critical care, excluding when this product is specified for automotive use by THine and used it for that purpose. THine accepts no liability whatsoever for any damages, claims or losses arising out of the uses set forth above.

6. Despite our utmost efforts to improve the quality and reliability of the product, faults will occur with a certain small probability, which is inevitable to a semi-conductor product. Therefore, you are encouraged to have sufficiently fail-safe design principles such as redundant or error preventive design applied to the use of the product so as not to have our product cause any social or public damage.

7. This product may be permanently damaged and suffer from performance degradation or loss of mechanical functionality if subjected to electrostatic charge exceeding capacity of the ESD (Electrostatic Discharge) protection circuitry. Safety earth ground must be provided to anything in contact with the product, including any operator, floor, tester and soldering iron.

8. Please note that this product is not designed to be radiation-proof.

9. Testing and other quality control techniques are used to this product to the extent THine deems necessary to support warranty for performance of this product. Except where mandated by applicable law or deemed necessary by THine based on the user's request, testing of all functions and performance of the product is not necessarily performed.

10. This product must be stored according to storage method which is specified in this specifications. THine accepts no liability whatsoever for any damage or loss caused to the user due to any storage not according to above-mentioned method.

11. Customers are asked, if required, to judge by themselves if this product falls under the category of strategic goods under the Foreign Exchange and Foreign Trade Act in Japan and the Export Administration Regulations in the United States of America on export or transit of this product. This product is prohibited for the purpose of developing military modernization, including the development of weapons of mass destruction (WMD), and the purpose of violating human rights.

12. The product or peripheral parts may be damaged by a surge in voltage over the absolute maximum ratings or malfunction, if pins of the product are shorted by such as foreign substance. The damages may cause a smoking and ignition. Therefore, you are encouraged to implement safety measures by adding protection devices, such as fuses. THine accepts no liability whatsoever for any damage or loss caused to the user due to use under a condition exceeding the limiting values.

13. All patents or pending patent applications, trademarks, copyrights, layout-design exploitation rights or other intellectual property rights concerned with this product belong to THine or licensor(s) of THine. No license or right is granted to the user for any intellectual property right or other proprietary right now or in the future owned by THine or THine's licensor. The user must enter into a license agreement with THine or THine's licensor to be granted of such license or right.

THine Electronics, Inc.

http://www.thine.co.jp/