



# THCV215/216-4LANE Evaluation Kits

SerDes transmitter and receiver evaluation board

## 1. General Discription

THCV215/216-4LANE Evaluation Kits are designed to evaluate THCV215 and THCV216 for transmission of video data. Each has two THCV215's or THCV216's.

This kits can transmit video data of "Full-HD / 120 Hz / 30 bit" and "HD / 240 Hz / 30 bit".

The supply voltage range are "3.0V to 3.6V" or "5.0V to 12.0V".

## 2. Block Diagram

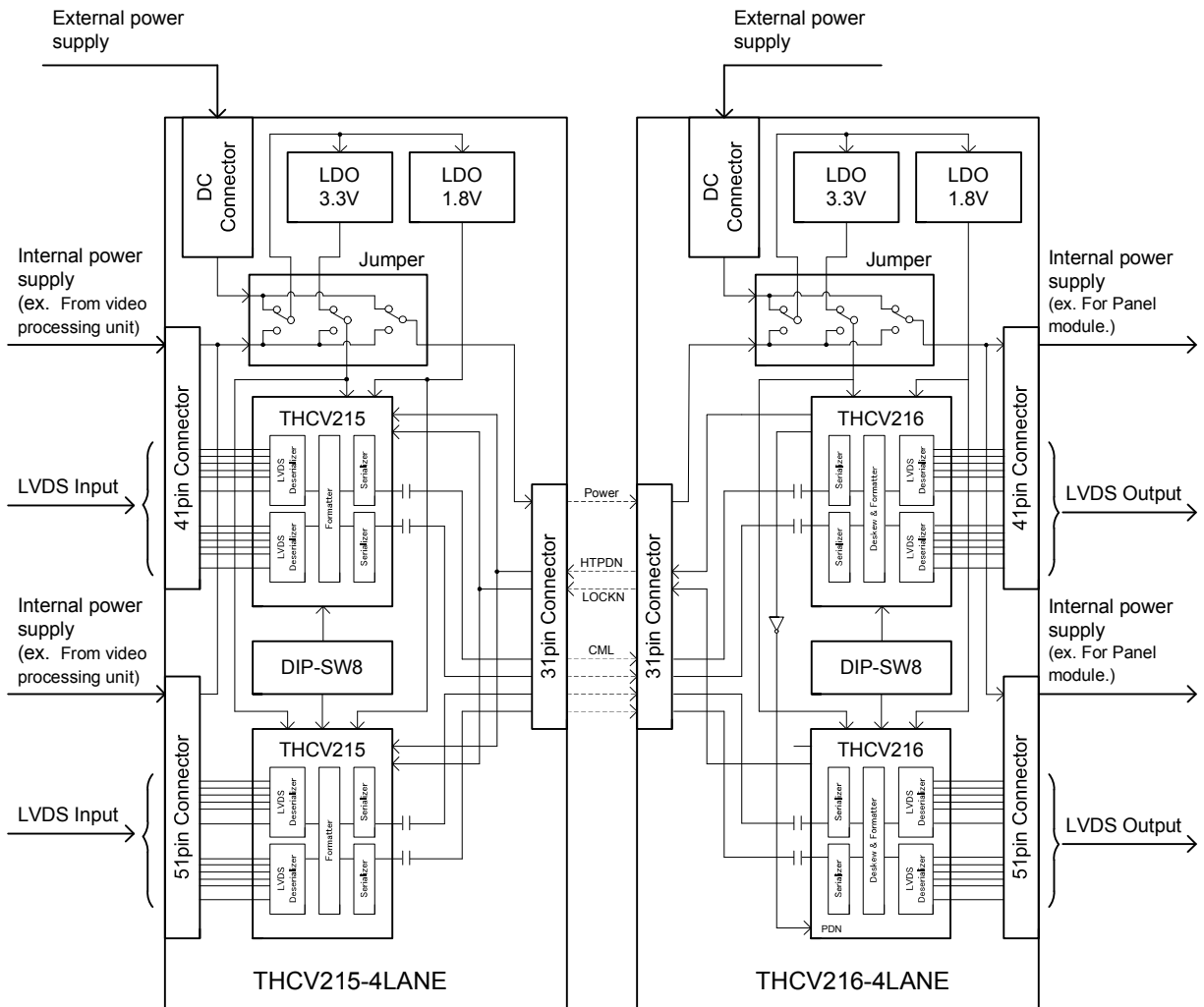


Figure 2-1. Block Diagram



# THCV215/216-4LANE Evaluation Kits

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## 3. Connector

This chapter shows the connector to connect the THCV215 and THCV216.

Table 3-1. Pin assignments of LVDS connector ( 41 pin )

THCV215_CN101		Descriptions	THCV216_CN102	
Pin No.	Symbol		Symbol	Pin No.
1	Vcc	Supply voltage from video processing unit, And for Panel module (Internal Supply)	Vcc	41
2				40
3				39
4				38
5				37
6	NC	Non Connected	NC	36
7	GND	Ground	GND	35
8				34
9				33
10	TLA0-	LVDS data input/output	RLA0-	32
11	TLA0+		RLA0+	31
12	TLB0-		RLB0-	30
13	TLB0+		RLB0+	29
14	TLC0-		RLC0-	28
15	TLC0+	RLC0+	27	
16	GND	Ground	GND	26
17	TLCLK0-	LVDS clock input/output	RLCLK0-	25
18	TLCLK0+		RLCLK0+	24
19	GND	Ground	GND	23
20	TLD0-	LVDS data input/output	RLD0-	22
21	TLD0+		RLD0+	21
22	TLE0-		RLE0-	20
23	TLE0+	RLE0+	19	
24	GND	Ground	GND	18
25	TLA1-	LVDS data input/output	RLA1-	17
26	TLA1+		RLA1+	16
27	TLB1-		RLB1-	15
28	TLB1+		RLB1+	14
29	TLC1-		RLC1-	13
30	TLC1+	RLC1+	12	
31	GND	Ground	GND	11
32	TLCLK1-	LVDS clock input/output	RLCLK1-	10
33	TLCLK1+		RLCLK1+	9
34	GND	Ground	GND	8
35	TLD1-	LVDS data input/output	RLD1-	7
36	TLD1+		RLD1+	6
37	TLE1-		RLE1-	5
38	TLE1+	RLE1+	4	
39	GND	Ground	GND	3
40	NC	Non Connected	NC	2
41				1

Table 3-2. Pin assignments of LVDS connector ( 51 pin )

THCV215_CN102		Descriptions	THCV216_CN103	
Pin No.	Symbol		Symbol	Pin No.
1	Vcc	Supply voltage from video processing unit, And for Panel module (Internal Supply)	Vcc	51
2				50
3				49
4				48
5				47
6	NC	Non Connected	NC	46
7	GND	Ground	GND	45
8				44
9				43
10	TLA2-	LVDS data input/output	RLA2-	42
11	TLA2+		RLA2+	41
12	TLB2-		RLB2-	40
13	TLB2+		RLB2+	39
14	TLC2-		RLC2-	38
15	TLC2+	RLC2+	37	
16	GND	Ground	GND	36
17	TLCLK2-	LVDS clock input/output	RLCLK2-	35
18	TLCLK2+		RLCLK2+	34
19	GND	Ground	GND	33
20	TLD2-	LVDS data input/output	RLD2-	32
21	TLD2+		RLD2+	31
22	TLE2-		RLE2-	30
23	TLE2+	RLE2+	29	
24	GND	Ground	GND	28
25	TLA3-	LVDS data input/output	RLA3-	27
26	TLA3+		RLA3+	26
27	TLB3-		RLB3-	25
28	TLB3+		RLB3+	24
29	TLC3-		RLC3-	23
30	TLC3+	RLC3+	22	
31	GND	Ground	GND	21
32	TLCLK3-	LVDS clock input/output	RLCLK3-	20
33	TLCLK3+		RLCLK3+	19
34	GND	Ground	GND	18
35	TLD3-	LVDS data input/output	RLD3-	17
36	TLD3+		RLD3+	16
37	TLE3-		RLE3-	15
38	TLE3+	RLE3+	14	
39	GND	Ground	GND	13
40	NC	Non Connected	NC	12
41				11
42				10
43				9
44				8
45				7
46				6
47				5
48				4
49				3
50				2
51	1			



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## 3. Connector and Cable ( Continued )

Table 3-3. Pin assignments of CML connector ( 31 pin )

THCV215_CN102		Descriptions	THCV216_CN101	
Pin No.	Symbol		Symbol	Pin No.
31	Vcc	Supply voltage from THC215 to THC216	Vcc	1
30				2
29				3
28				4
27				5
26				6
25				7
24	GND	Ground	GND	8
23				9
22				10
21				11
20	HTPDN	Hot plug detect	HTPDN	12
19	LOCKN	Lock detect	LOCKN	13
18	GND	Ground	GND	14
17	Tx0n	V-by-One® HS Channel 0 (CML)	Rx0n	15
16	Tx0p		Rx0p	16
15	GND	Ground	GND	17
14	GND		GND	18
13	Tx1n	V-by-One® HS Channel 1 (CML)	Rx1n	19
12	Tx1p		Rx1p	20
11	GND	Ground	GND	21
10	GND		GND	22
9	Tx2n	V-by-One® HS Channel 2 (CML)	Rx2n	23
8	Tx2p		Rx2p	24
7	GND	Ground	GND	25
6	GND		GND	26
5	Tx3n	V-by-One® HS Channel 3 (CML)	Rx3n	27
4	Tx3p		Rx3p	28
3	GND	Ground	GND	29
2	NC	Non Connected	NC	30
1				31



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## 4. Power supply setting

This chapter shows the power supply setting with the jumper.

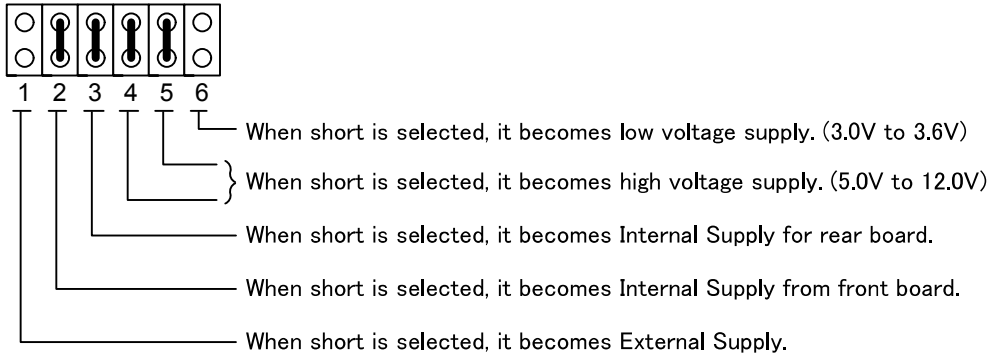


Figure 4. power supply setting with the jumper

Example4-1 : Internal Supply 5.0 V to 12.0V ( Default Setting )

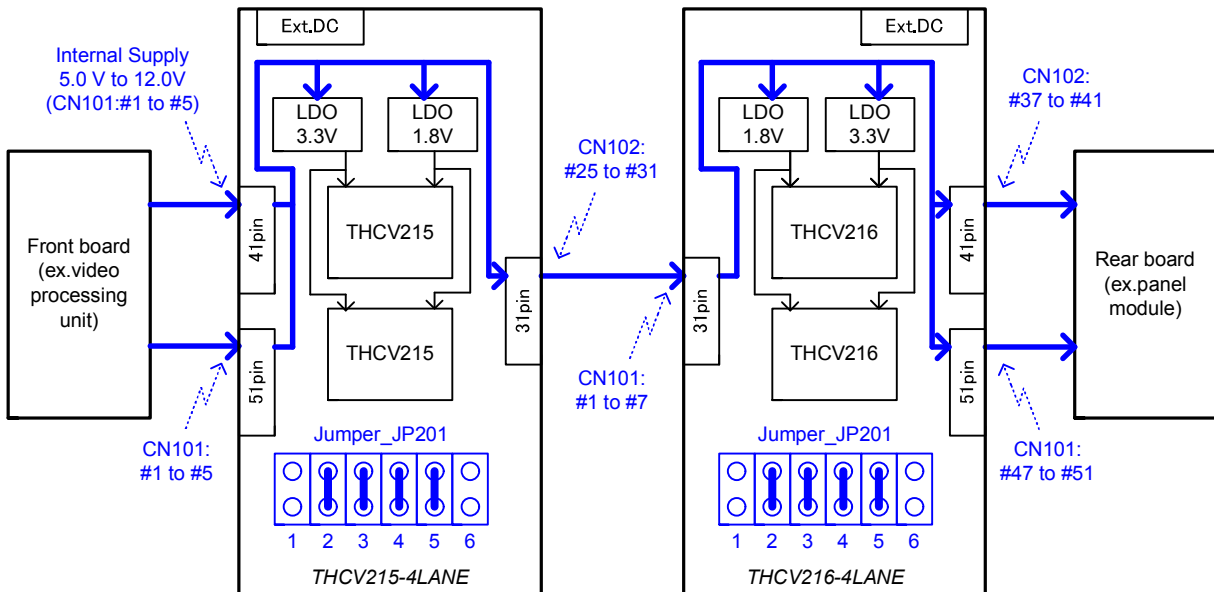


Figure 4-1. Internal Supply 5.0V to 12.0V



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## 4. Power supply setting ( Continued )

Example4-2 : External Supply 5.0V to 12.0V

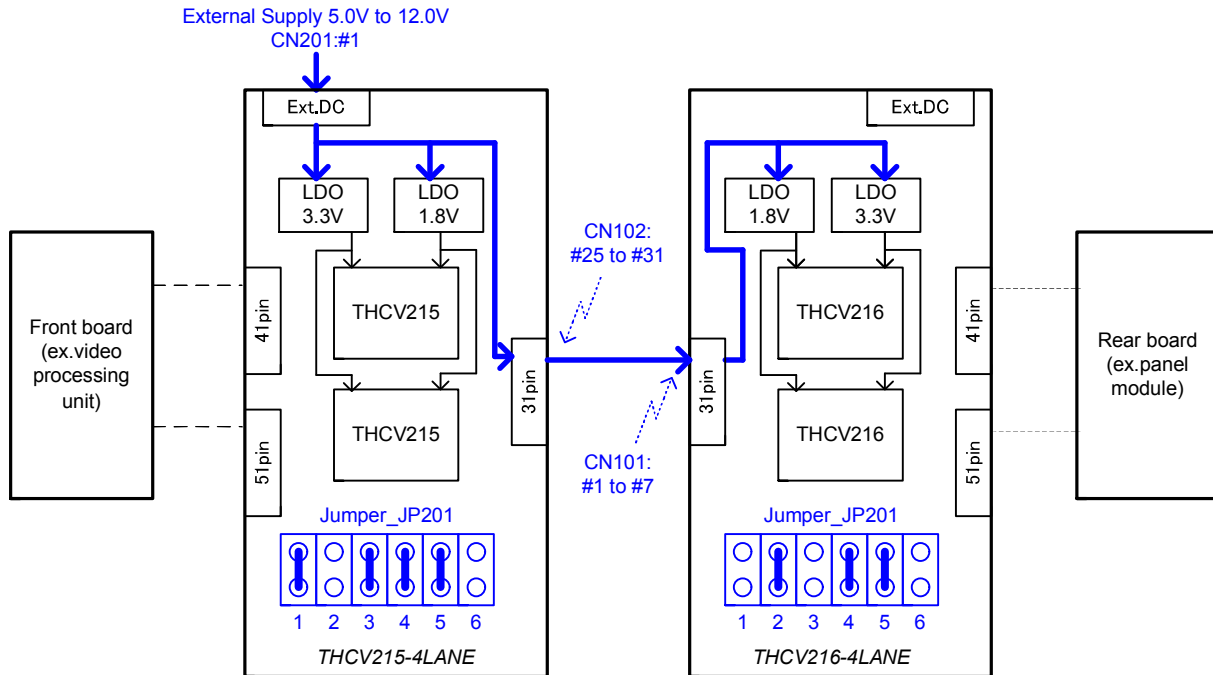


Figure 4-2. External Supply 5.0V to 12.0V

Example4-3 : External Supply 3.0V to 3.6V

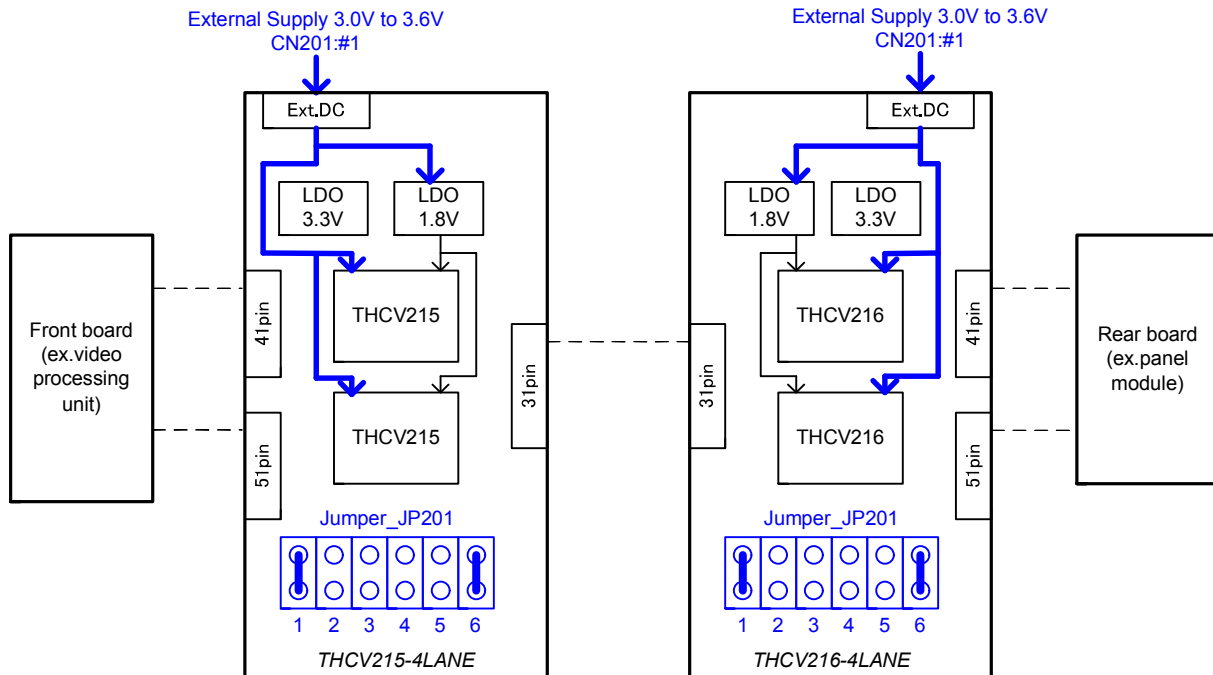


Figure 4-3. External Supply 3.0V to 3.6V



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## 5. Function setting

This chapter shows the DIP switches of the control settings.

Table 5-1. DIP switches on the THCV215-4LANE Board

SW#	Symbol	Default Setting	Function															
1	SDSEL	High ( 4 lane )	Selects the Lanes. Low : Not available High : 4 lane															
2	COL1	High	Selects the color depth. <table border="1"> <thead> <tr> <th>COL1</th> <th>COL0</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>Low</td> <td>6 bit mode</td> </tr> <tr> <td>Low</td> <td>High</td> <td>8 bit mode</td> </tr> <tr> <td>High</td> <td>Low</td> <td>10 bit mode</td> </tr> <tr> <td>High</td> <td>High</td> <td>Not available</td> </tr> </tbody> </table>	COL1	COL0	Function	Low	Low	6 bit mode	Low	High	8 bit mode	High	Low	10 bit mode	High	High	Not available
COL1	COL0	Function																
Low	Low	6 bit mode																
Low	High	8 bit mode																
High	Low	10 bit mode																
High	High	Not available																
3	COL0	Low																
4	PDN	High ( Normal )	Selects the power down. Low : Power down ( CML output High Fix, other Hi-Z ) High : Normal operation															
5	DRV1	Low	Selects the drive strength. Must be set to DRV1=Low and to DRV0=High															
6	DRV0	High																
7	PRE1	Low ( 0% )	Selects the pre-emphasis level. Low : 0% High : 100%															
8	RES1	Low ( Normal )	Selects the Field BET Mode. * Low : Normal operation (default) High : Field BET Mode enable															

\* Please see the datasheet for details. ( THCV215-216\_Rev.x.xx\_E.pdf )

Table 5-2. DIP switches on the THCV216-4LANE Board

SW#	Symbol	Default Setting	Function															
1	SDSEL	High ( 2 lane )	Selects the Lanes. Low : Not available High : 4 lane															
2	COL1	High	Selects the color depth. <table border="1"> <thead> <tr> <th>COL1</th> <th>COL0</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>Low</td> <td>6 bit mode</td> </tr> <tr> <td>Low</td> <td>High</td> <td>8 bit mode</td> </tr> <tr> <td>High</td> <td>Low</td> <td>10 bit mode</td> </tr> <tr> <td>High</td> <td>High</td> <td>Not available</td> </tr> </tbody> </table>	COL1	COL0	Function	Low	Low	6 bit mode	Low	High	8 bit mode	High	Low	10 bit mode	High	High	Not available
COL1	COL0	Function																
Low	Low	6 bit mode																
Low	High	8 bit mode																
High	Low	10 bit mode																
High	High	Not available																
3	COL0	Low																
4	PDN	High ( Normal )	Selects the power down. Low : Power down High : Normal operation															
5	RES3	Low ( Normal )	Selects the Field BET Mode. * Low : Normal operation (default) High : Field BET Mode enable															
6	NC	Low	Not connected															
7	NC	Low																
8	RS	Low ( Normal )	Direction of RS pin depends on RES3. Selects the LVDS swing range when RES3=Low High : Normal swing ( 350 mV typ. ) Low : Reduced swing ( 200mV typ. ) Field BET output when RES3=High *															

\* Please see the datasheet for details. ( THCV215-216\_Rev.x.xx\_E.pdf )



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### **6. Other functional Descriptions**

This chapter shows other function.

#### 6-1. About LED on the board.

- D201 detects power on.
- D401 detects the lock.

#### 6-2. THCV215 Link Ready function ( RDY )

This is a CMOS output for indicating the link status. If link is ready RDY = High.

\*See the schematic of page 8 for details.

#### 6-3. THCV216 Field BET mode settings.

Please detach Jumper ( JP101,JP102 ) for Field BET mode.

\*See the schematic of page 9 for details.







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## 7. Schematic ( Continued )

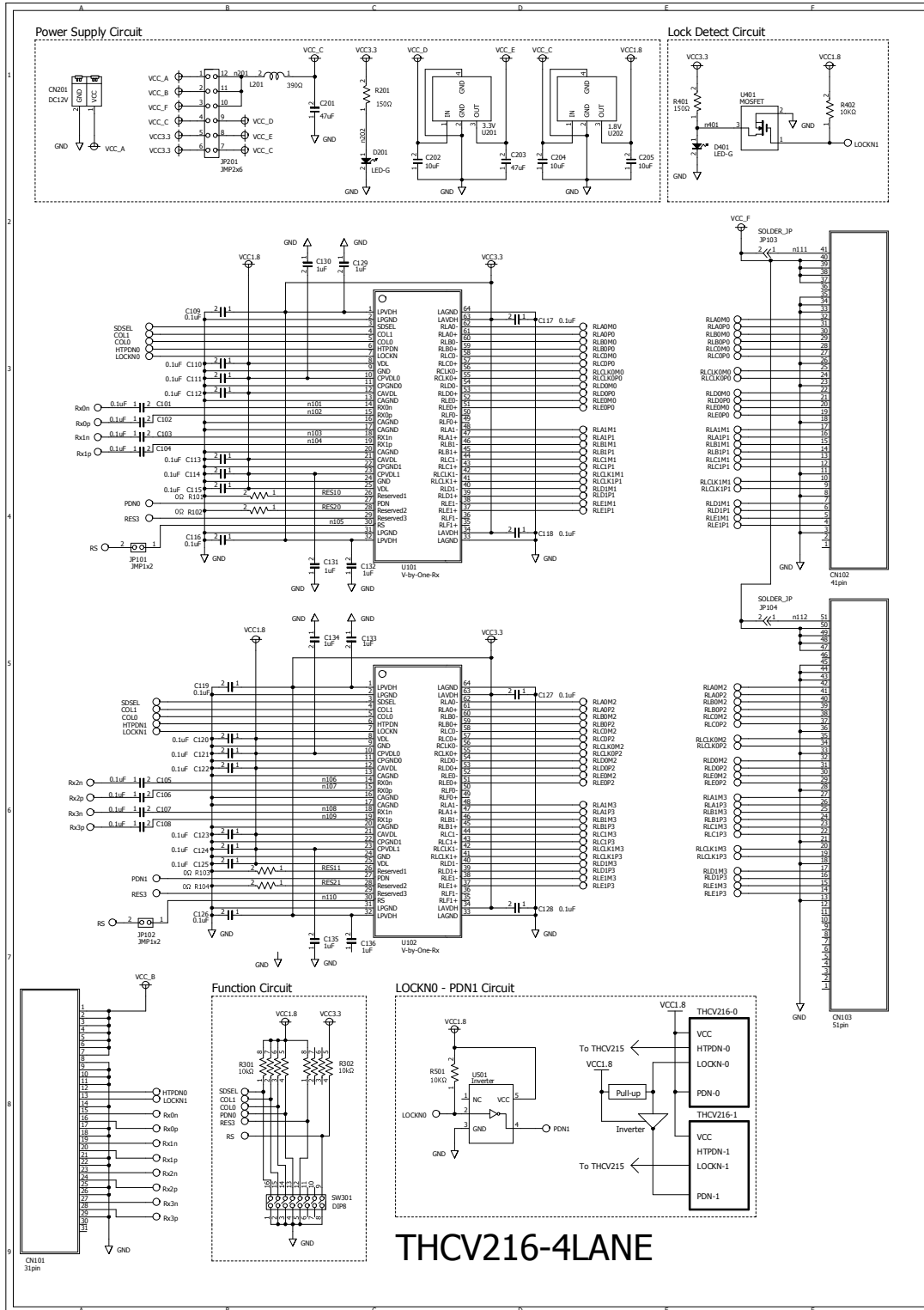


Figure 7-2. THCV216-4LANE schematic



# THCV215/216-4LANE Evaluation Kits

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## 8. Bills of Materials (BOM)

Table 8-1. BOM for THCV215-4LANE

Designator	Description	PKG	Part Number	Manufacturer
C101	0.1uF	1005	GRM155B31C104KA87	Murata
C102	0.1uF	1005	GRM155B31C104KA87	Murata
C103	0.1uF	1005	GRM155B31C104KA87	Murata
C104	0.1uF	1005	GRM155B31C104KA87	Murata
C105	0.1uF	1005	GRM155B31C104KA87	Murata
C106	0.1uF	1005	GRM155B31C104KA87	Murata
C107	0.1uF	1005	GRM155B31C104KA87	Murata
C108	0.1uF	1005	GRM155B31C104KA87	Murata
C109	0.1uF	1005	GRM155B31C104KA87	Murata
C110	0.1uF	1005	GRM155B31C104KA87	Murata
C111	0.1uF	1005	GRM155B31C104KA87	Murata
C112	0.1uF	1005	GRM155B31C104KA87	Murata
C113	0.1uF	1005	GRM155B31C104KA87	Murata
C114	0.1uF	1005	GRM155B31C104KA87	Murata
C115	0.1uF	1005	GRM155B31C104KA87	Murata
C116	0.1uF	1005	GRM155B31C104KA87	Murata
C117	0.1uF	1005	GRM155B31C104KA87	Murata
C118	0.1uF	1005	GRM155B31C104KA87	Murata
C119	0.1uF	1005	GRM155B31C104KA87	Murata
C120	0.1uF	1005	GRM155B31C104KA87	Murata
C121	0.1uF	1005	GRM155B31C104KA87	Murata
C122	0.1uF	1005	GRM155B31C104KA87	Murata
C123	0.1uF	1005	GRM155B31C104KA87	Murata
C124	0.1uF	1005	GRM155B31C104KA87	Murata
C125	0.1uF	1005	GRM155B31C104KA87	Murata
C126	0.1uF	1005	GRM155B31C104KA87	Murata
C127	1uF	1608	GRM188B31H105KA92	Murata
C128	1uF	1608	GRM188B31H105KA92	Murata
C129	1uF	1608	GRM188B31H105KA92	Murata
C130	1uF	1608	GRM188B31H105KA92	Murata
C131	1uF	1608	GRM188B31H105KA92	Murata
C132	1uF	1608	GRM188B31H105KA92	Murata
C201	47uF	3225	GRM32EB31A476ME20L	Murata
C202	10uF	2012	GRM21BB31C106KE15	Murata
C203	47uF	3225	GRM32EB31A476ME20L	Murata
C204	10uF	2012	GRM21BB31C106KE15	Murata
C205	10uF	2012	GRM21BB31C106KE15	Murata
CN101	41pin	3404	FX15SC-41S-0.5SH	HRS
CN102	51pin	3804	FX15SC-51S-0.5SH	HRS
CN103	31pin	2804	FX16-31S-0.5SH	HRS
CN201	DC12V	1105	ML-800-S1H-2P	Sato-parts
D201	LED-G	1608	SML-310MT	ROHM
D401	LED-G	1608	SML-310MT	ROHM
JP201	JMP2x6	2.54mm	2*6-PinHeaders	-
L201	390 Ω	1608	MPZ1608R391A	TDK
R101	0 Ω	1005	MCR01MZPJ000	ROHM
R102	0 Ω	1005	MCR01MZPJ000	ROHM
R103	0 Ω	1005	MCR01MZPJ000	ROHM
R104	0 Ω	1005	MCR01MZPJ000	ROHM
R105	10K Ω	1005	MCR01MZPF103	ROHM
R106	10K Ω	1005	MCR01MZPF103	ROHM
R201	150 Ω	1608	MCR03EZPFX151	ROHM
R301	10k Ω	2010	EXB-28V103JX	KOA
R302	10k Ω	2010	EXB-28V103JX	KOA
R401	150 Ω	1608	MCR03EZPFX151	ROHM
SW301	DIP8	2206	A6S-8104-H	Omuron
U101	V-by-One-Tx	TSSOP64	THCV215	THine
U102	V-by-One-Tx	TSSOP64	THCV216	THine
U201	3.3V	SC-63	uPC2933BT-AZ	NEC
U202	1.8V	SC-63	uPC2918BT-AZ	NEC
U401	MOSFET	1616	SSM3K16FS	Toshiba

Table 8-2. BOM for THCV216-4LANE

Designator	Description	PKG	Part Number	Manufacturer
C101	0.1uF	1005	GRM155B31C104KA87	Murata
C102	0.1uF	1005	GRM155B31C104KA87	Murata
C103	0.1uF	1005	GRM155B31C104KA87	Murata
C104	0.1uF	1005	GRM155B31C104KA87	Murata
C105	0.1uF	1005	GRM155B31C104KA87	Murata
C106	0.1uF	1005	GRM155B31C104KA87	Murata
C107	0.1uF	1005	GRM155B31C104KA87	Murata
C108	0.1uF	1005	GRM155B31C104KA87	Murata
C109	0.1uF	1005	GRM155B31C104KA87	Murata
C110	0.1uF	1005	GRM155B31C104KA87	Murata
C111	0.1uF	1005	GRM155B31C104KA87	Murata
C112	0.1uF	1005	GRM155B31C104KA87	Murata
C113	0.1uF	1005	GRM155B31C104KA87	Murata
C114	0.1uF	1005	GRM155B31C104KA87	Murata
C115	0.1uF	1005	GRM155B31C104KA87	Murata
C116	0.1uF	1005	GRM155B31C104KA87	Murata
C117	0.1uF	1005	GRM155B31C104KA87	Murata
C118	0.1uF	1005	GRM155B31C104KA87	Murata
C119	0.1uF	1005	GRM155B31C104KA87	Murata
C120	0.1uF	1005	GRM155B31C104KA87	Murata
C121	0.1uF	1005	GRM155B31C104KA87	Murata
C122	0.1uF	1005	GRM155B31C104KA87	Murata
C123	0.1uF	1005	GRM155B31C104KA87	Murata
C124	0.1uF	1005	GRM155B31C104KA87	Murata
C125	0.1uF	1005	GRM155B31C104KA87	Murata
C126	0.1uF	1005	GRM155B31C104KA87	Murata
C127	0.1uF	1005	GRM155B31C104KA87	Murata
C128	0.1uF	1005	GRM155B31C104KA87	Murata
C129	1uF	1608	GRM188B31H105KA92	Murata
C130	1uF	1608	GRM188B31H105KA92	Murata
C131	1uF	1608	GRM188B31H105KA92	Murata
C132	1uF	1608	GRM188B31H105KA92	Murata
C133	1uF	1608	GRM188B31H105KA92	Murata
C134	1uF	1608	GRM188B31H105KA92	Murata
C135	1uF	1608	GRM188B31H105KA92	Murata
C136	1uF	1608	GRM188B31H105KA92	Murata
C201	47uF	3225	GRM32EB31A476ME20L	Murata
C202	10uF	2012	GRM21BB31C106KE15	Murata
C203	47uF	3225	GRM32EB31A476ME20L	Murata
C204	10uF	2012	GRM21BB31C106KE15	Murata
C205	10uF	2012	GRM21BB31C106KE15	Murata
CN101	31pin	2804	FX16-31S-0.5SH	HRS
CN102	41pin	3404	FX15SC-41S-0.5SH	HRS
CN103	51pin	3804	FX15SC-51S-0.5SH	HRS
CN201	DC12V	1105	ML-800-S1H-2P	Sato-parts
D201	LED-G	1608	SML-310MT	ROHM
D401	LED-G	1608	SML-310MT	ROHM
JP101	JMP1x2	2.54mm	1*2-PinHeaders	-
JP102	JMP1x2	2.54mm	1*2-PinHeaders	-
JP201	JMP2x6	2.54mm	2*6-PinHeaders	-
L201	390 Ω	1608	MPZ1608R391A	TDK
R101	0 Ω	1005	MCR01MZPJ000	ROHM
R102	0 Ω	1005	MCR01MZPJ000	ROHM
R103	0 Ω	1005	MCR01MZPJ000	ROHM
R104	0 Ω	1005	MCR01MZPJ000	ROHM
R201	150 Ω	1608	MCR03EZPFX151	ROHM
R301	10k Ω	2010	EXB-28V103JX	KOA
R302	10k Ω	2010	EXB-28V103JX	KOA
R401	150 Ω	1608	MCR03EZPFX151	ROHM
R402	10K Ω	1005	MCR01MZPF103	ROHM
R501	10K Ω	1005	MCR01MZPF103	ROHM
SW301	DIP8	2206	A6S-8104-H	Omuron
U101	V-by-One-Rx	TSSOP64	THCV216	THine
U102	V-by-One-Rx	TSSOP64	THCV216	THine
U201	3.3V	SC-63	uPC2933BT-AZ	NEC
U202	1.8V	SC-63	uPC2918BT-AZ	NEC
U401	MOSFET	1616	SSM3K16FS	Toshiba
U501	Inverter	SON5	TC7SG04FU	Toshiba



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## 9. Layout

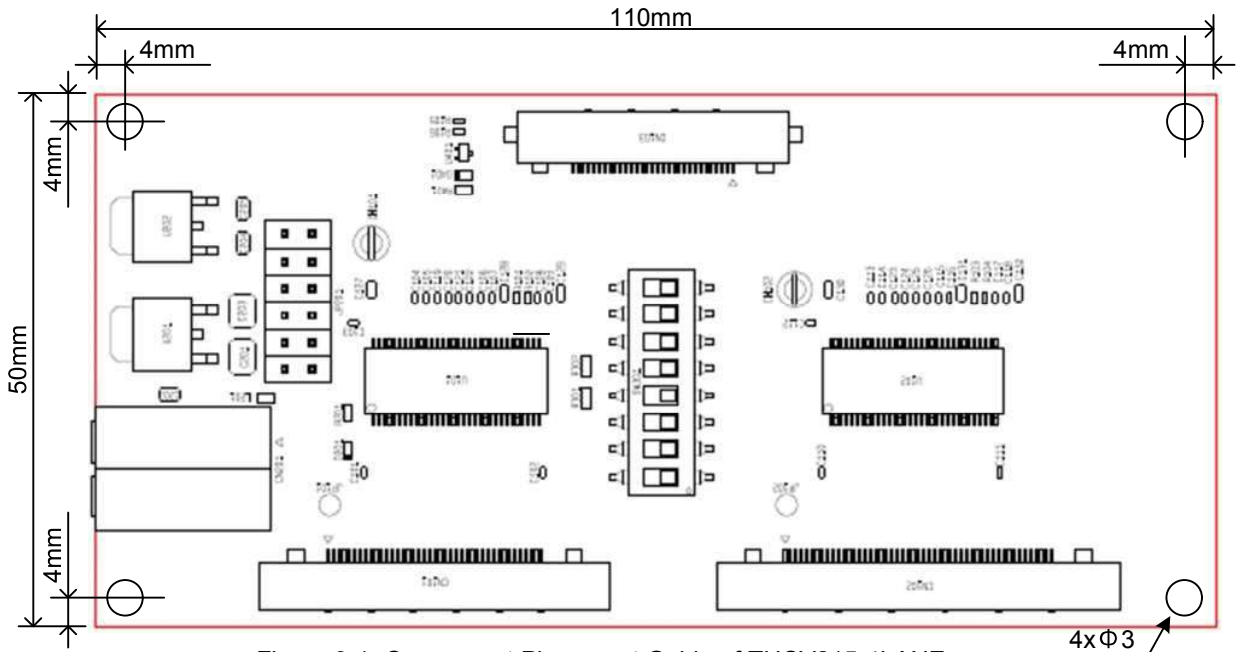


Figure 9-1. Component Placement Guide of THCV215-4LANE

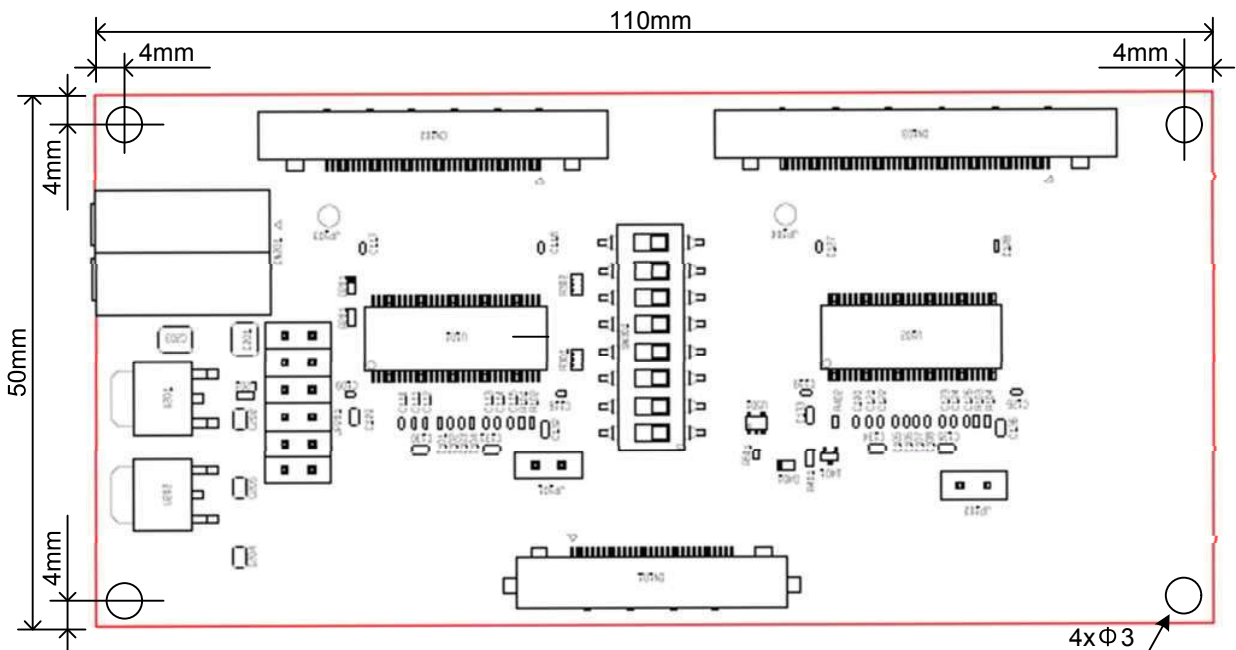


Figure 9-2. Component Placement Guide of THCV216-4LANE



# THCV215/216-4LANE Evaluation Kits

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## 9. Layout

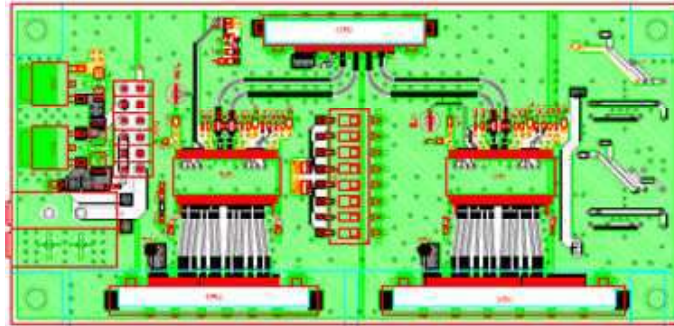


Figure 9-3. Component Side of THCV215-4LANE



Figure 9-4. Ground Plane of THCV215-4LANE



Figure 9-5. Power Plane of THCV215-4LANE

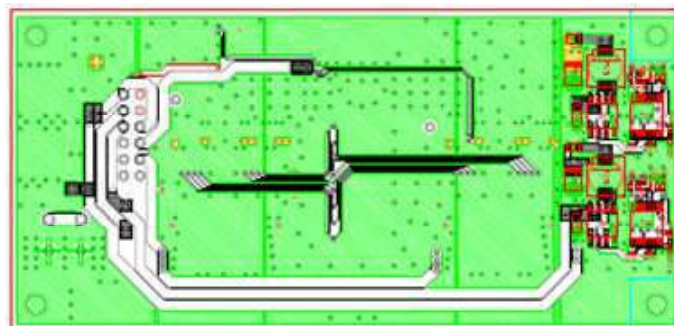


Figure 9-6. Solder Side of THCV215-4LANE





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## 9. Layout

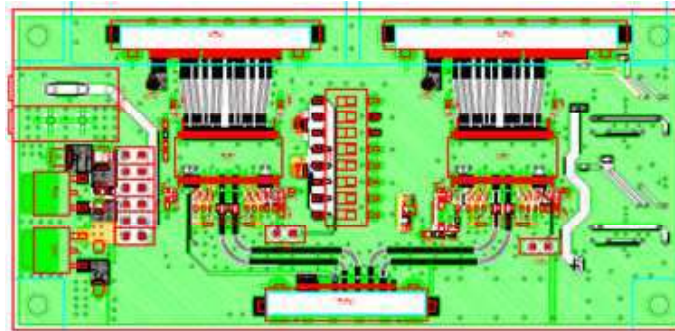


Figure 9-7. Component Side of THCv216-4LANE



Figure 9-8. Ground Plane of THCv216-4LANE

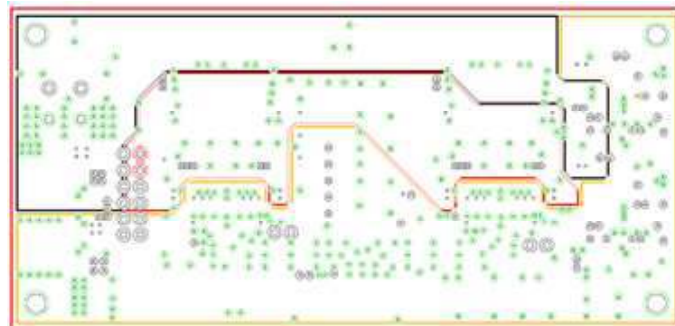


Figure 9-9. Power Plane of THCv216-4LANE

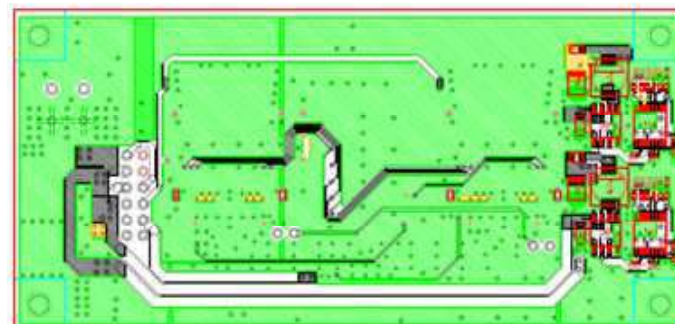


Figure 9-10. Solder Side of THCv216-4LANE



# THCV215/216-4LANE Evaluation Kits

SerDes transmitter and receiver evaluation board

## 10. Cable

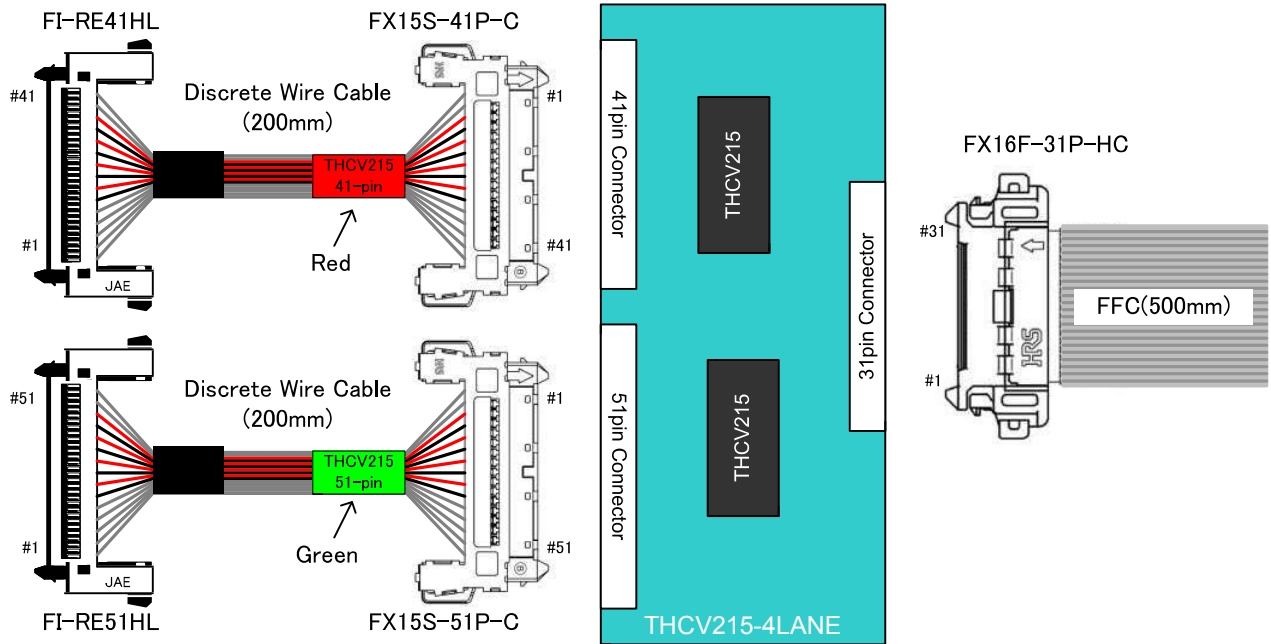


Figure 10-1. Cable of THC215-4LANE

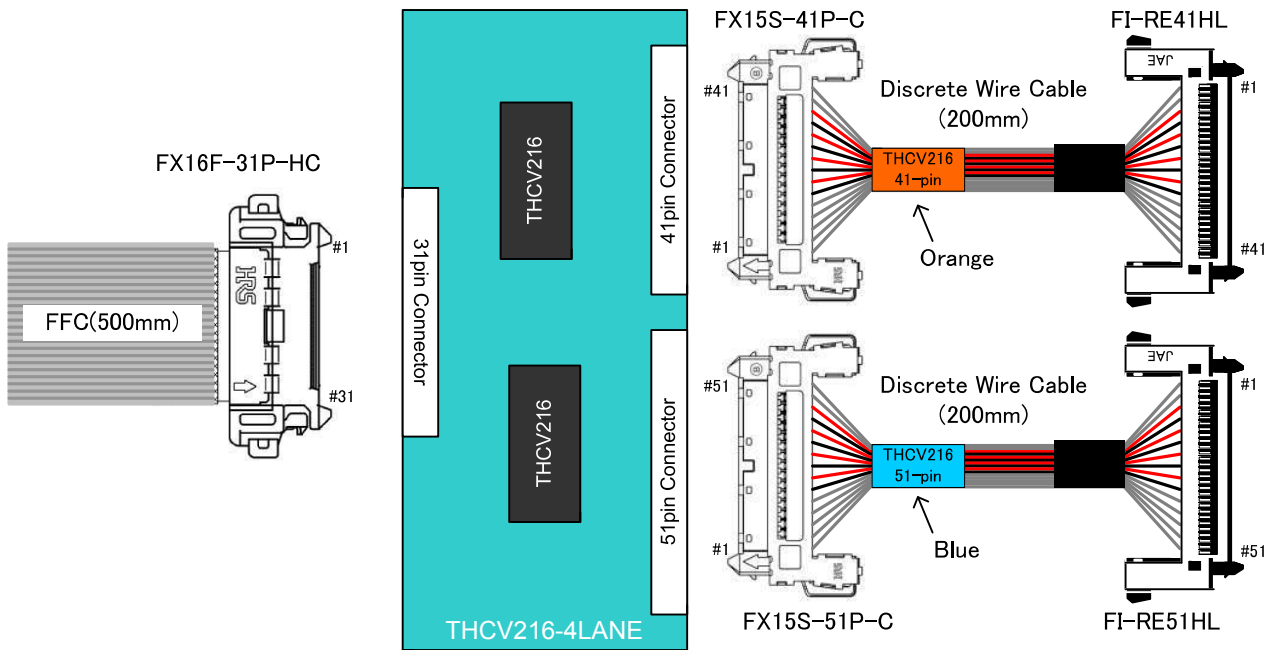


Figure 10-2. Cable of THC216-4LANE



## THCV215/216-4LANE Evaluation Kits

SerDes transmitter and receiver evaluation board

### 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. We are not responsible for possible errors and omissions in this material. Please note if errors or omissions should be found in this material, we may not be able to correct them immediately.
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5. This product is presumed to be used for general electric equipment, not for the applications which require very high reliability (including medical equipment directly concerning people's life, aerospace equipment, or nuclear control equipment). Also, when using this product for the equipment concerned with the control and safety of the transportation means, the traffic signal equipment, or various Types of safety equipment, please do it after applying appropriate measures to the product.
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 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. Please note that this product is not designed to be radiation-proof.
8. 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 Control Law.

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