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INTRODUCTION

This document provides an overview of transformers suitable for use with IDT T1/E1/J1 LIUs and SuperJET transceivers. It consists of 2 parts. Each specifies the transformer requirements for a group of products:

PART 1: Transformer Requirements for Product Group 1;

PART 2: Transformer Requirements for Product Group 2.

Please refer to Table 1 for the product group description.

Table 1: Two Groups Detailed Description

Device	Type	Description	Transformer Selection Group
IDT82V2041E	LIU	T1 / J1 / E1 Single Short Haul	PART 2
IDT82V2042E	LIU	T1 / J1 / E1 Dual Short Haul	PART 2
IDT82V2044	LIU	T1 / E1 Quad Short Haul	PART 1
IDT82V2044E	LIU	T1 / J1 / E1 Quad Short Haul	PART 2
IDT82V2048	LIU	T1 / E1 Octal Short Haul	PART 1
IDT82V2048E	LIU	T1 / J1 / E1 Octal Short Haul	PART 2
IDT82V2048L	AFE	T1 / E1 Octal Analog Front End	PART 1
IDT82V2051E	LIU	E1 Single Short Haul	PART 2
IDT82V2052E	LIU	E1 Dual Short Haul	PART 2
IDT82V2054	LIU	E1 Quad Short Haul	PART 1
IDT82V2058	LIU	E1 Octal Short Haul	PART 1
IDT82V2081	LIU	T1 / J1 / E1 Single Short /Long Haul	PART 2
IDT82V2082	LIU	T1 / J1 / E1 Dual Short /Long Haul	PART 2
IDT82V2084	LIU	T1 / J1 / E1 Quad Short /Long Haul	PART 2
IDT82V2088	LIU	T1 / J1 / E1 Octal Short /Long Haul	PART 2
IDT82P2828	High Density LIU	T1 / J1 / E1 28 (+1) Short Haul	PART 2 (for Differential mode) PART 1 (for Single Ended mode)
IDT82P2821	High Density LIU	T1 / J1 / E1 21 (+1) Short Haul	PART 2 (for Differential mode) PART 1 (for Single Ended mode)
IDT82P2521	High Density LIU	E1 21 (+1) Short Haul	PART 2 (for Differential mode) PART 1 (for Single Ended mode)
IDT82P2816	High Density LIU	T1 / J1 / E1 16 (+1) Short Haul	PART 2 (for Differential mode) PART 1 (for Single Ended mode)
IDT82P2808	High Density LIU	T1 / J1 / E1 8 (+1) Short Haul	PART 2 (for Differential mode) PART 1 (for Single Ended mode)
IDT82P2281	Transceiver	T1 / J1 / E1 Single Short /Long Haul	PART 2
IDT82P2282	Transceiver	T1 / J1 / E1 Dual Short /Long Haul	PART 2
IDT82P2284	Transceiver	T1 / J1 / E1 Quad Short /Long Haul	PART 2
IDT82P2288	Transceiver	T1 / J1 / E1 Octal Short /Long Haul	PART 2

PART 1: TRANSFORMER REQUIREMENTS FOR PRODUCT GROUP 1

1.1 LINE INTERFACE

1.1.1 LINE INTERFACE FOR LIUS

In this part, 'LIU' refers to IDT82V2044, IDT82V2048, IDT82V2048L, IDT82V2054 and IDT82V2058.

The transmit and receive interface TTIP/TRING and RTIP/RRING connections of the LIU provide a matched interface to the cable. Figure 1 shows the appropriate external components to connect with the cable for one transmit /receive channel.

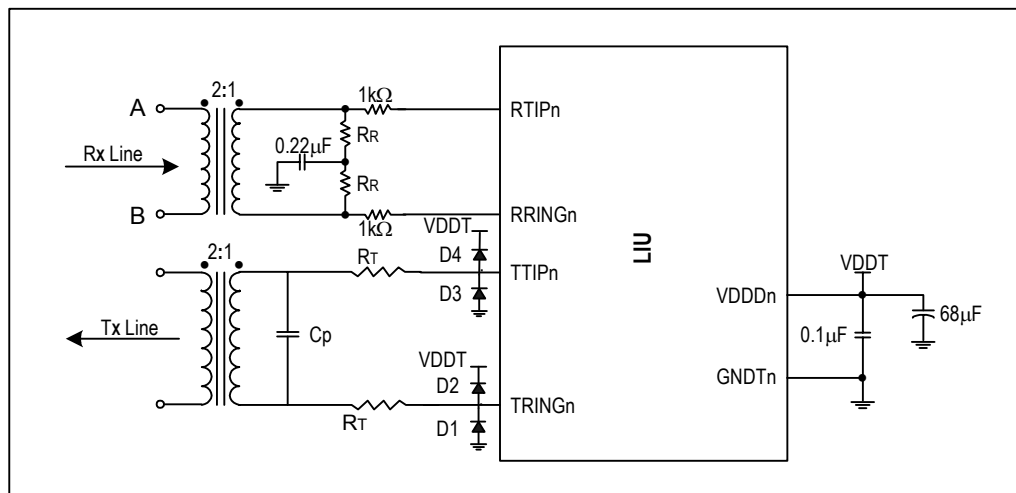


Figure 1. Appropriate External Components (LIU)

1.1.2 LINE INTERFACE FOR HIGH DENSITY LIU (SINGLE ENDED MODE)

In this part, 'High Density LIU' refers to IDT82P2828, IDT82P2821, IDT82P2521, IDT82P2816 and IDT82P2808 operated in Single Ended mode. For Differential mode, please refer to 2.1.2 Line Interface for High Density LIU (Differential Mode) on page 12.

The transmit and receive interface TTIP/TRING and RTIP/RRING connections of the High Density LIU provide a matched interface to the cable. Figure 3 shows the appropriate external components to connect with the cable for one transmit channel. In this case, only Internal Impedance Matching is supported. Refer to Table 2 for impedance matching for transmitter of High Density LIU. Figure 4 shows the appropriate external components to connect with the cable for one receive channel. In this case, only External Impedance Matching is supported. Refer to Table 3 for impedance matching for receiver of High Density LIU.

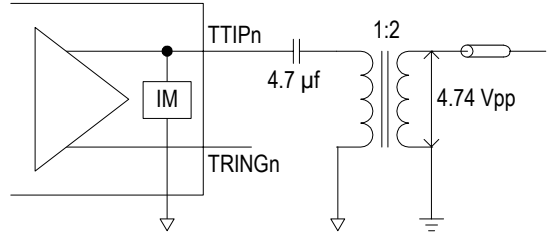


Figure 2. Transmit Single Ended Line Interface with Coaxial Cable (High Density LIU)

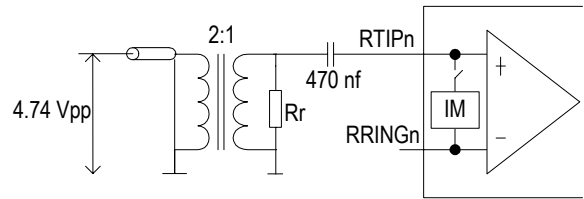


Figure 3. Receive Single Ended Line Interface with Coaxial Cable (High Density LIU)

Table 2: Impedance Matching for Transmitter of High Density LIU (Single Ended Mode)

Cable Condition	Internal Impedance Matching
	T_TERM[2:0]
T1 100 Ω twisted pair	000
J1 110 Ω twisted pair	001
E1 120 Ω twisted pair	010
E1 75 Ω coaxial	011

Table 3: Impedance Matching for Receiver of High Density LIU (Single Ended Mode)

Cable Condition	External Impedance Matching	
	R_TERM[2:0] ¹	Rr
T1 100 Ω twisted pair	1XX	100 Ω
J1 110 Ω twisted pair		110 Ω
E1 120 Ω twisted pair		120 Ω
E1 75 Ω coaxial		75 Ω

Note:
1. When RIM is low, the setting of the R_TERM[2:0] bits is ignored.

1.2 TRANSFORMER ELECTRICAL PARAMETERS

Table - 4 lists the most important transformer electrical parameters for product group 1.

Table 4: Important Transformer Electrical Parameters for Product Group 1

Parameter	Limit Values			Unit
	Min.	Typ.	Max.	
Tx (chip side : line side) Turns ratio		1: 2		
Rx (chip side : line side) Turns ratio		1: 2		
Open circuit inductance ¹		1.2		mH
Leakage inductance ²			600	nH
Inter-winding capacitance ³			35	pF
DCR			0.8	Ω
Note:				
1. Open circuit inductance: The equivalent circuit parameter that is measured during a transformer open circuit test. It is a parallel inductance across the ideal transformer primary winding.				
2. Leakage inductance: The self-inductance of a coil due to the flux. It generates while not completely linked to other windings. It is an inductance in series with the ideal transformer winding.				
3. Inter-winding capacitance: The equivalent circuit parameter used to model the effective capacitance between the primary and secondary coils of the transformer.				
4. The temperature range can be selected in accordance with the target application and the operating environment.				

1.3 AVAILABLE TRANSFORMERS

Table 5 provides an overview of currently available transformers for the product group 1. For special requests, such as different pinouts, please contact the transformer vendors directly. A reference contact list of transformer vendors can be found in the Appendix.

Table 5: Currently Available Transformers for Product Group 1

Vendor	Part Number	Package Type *	Common-Mode Choke Containing	Number of Ports	Commercial or Industrial	Isolation Voltage
Bel Fuse	S553-6500-55	40-pin SOIC	No	4 Rx 4Tx	C	1500
	S553-6500-C4	32-pin SOIC	No	4 Rx 4Tx	I	1500
	S553-6500-D4	40-pin SOIC	No	4 Rx 4Tx	I	1500
	S553-6500-D5	40-pin SOIC	No	4 Rx 4Tx	I	1500
	S553-6500-F6	40-pin SOIC	Yes	4 Rx 4Tx	I	1500
	0553-0013-HC	6-pin PTH	No	1 Rx	C	1500
	0553-0013-HC	6-pin PTH	No	1 Tx	C	1500
Delta	THJ06B14	6-pin PTH	No	1 Rx	C	1500
	THJ06B14	6-pin PTH	No	1 Tx	C	1500
	THJ06B16	6-pin PTH	No	1 Rx	C	1500
	THJ06B16	6-pin PTH	No	1 Tx	C	1500
	TX10A01	10-pin PTH	No	1 Rx	C	3000
	TX10A01	10-pin PTH	No	1 Tx	C	3000
	TX10A70	10-pin PTH	No	1 Rx	C	3000
	TX10A70	10-pin PTH	No	1 Tx	C	3000
	TX10A71	10-pin PTH	No	1 Rx	C	3000
	TX10A71	10-pin PTH	No	1 Tx	C	3000
	THX14M01	14-pin PTH	No	1 Rx 1Tx	C	1500
Halo	TG08-1205N1	16-pin SMD	No	1 Port	C	1500
	TG05-1205NM5	20-pin SMD	No	2 Ports	C	1500
Hanrun	HR604064	40-pin SOIC	No	4 Rx 4Tx	C	1500
	HR604073	40-pin SOIC	No	4 Rx 4Tx	C	1500
	HR601601	16-pin SOIC	No	1 Rx 1Tx	C	1500
	HR610610	6-pin PTH	No	1 Tx	C	1500
	HR610610	6-pin PTH	No	1 Rx	C	1500
	HR611456	4-pin PTH	No	1 Tx	C	1500
	HR611456	4-pin PTH	No	1 Rx	C	1500
	HR611003	10-pin PTH	No	1 Tx	C	3000
	HR611003	10-pin PTH	No	1 Rx	C	3000
Midcom	50946R	40-pin SOIC	No	4 Rx 4Tx	C	1500
	50648R	16-pin SOIC	No	1 Rx 1 Tx	C	1500
	50648R	16-pin SOIC	No	1 Rx 1 Tx	C	1500

Table 5: Currently Available Transformers for Product Group 1 (Continued)

Vendor	Part Number	Package Type *	Common-Mode Choke Containing	Number of Ports	Commercial or Industrial	Isolation Voltage
Premier Magnetics	PM-8108	40-pin SOIC	No	4 Rx 4Tx	C	1500
	PM-8109	40-pin SOIC	No	4 Rx 4Tx	C	1500
	PM-8116	40-pin SOIC	No	4 Rx 4Tx	C	1500
	PM-8117	40-pin SOIC	No	4 Rx 4Tx	C	1500
	PM-8216	40-pin SOIC	No	4 Rx 4Tx	I	1500
	PM-8406	24-pin SOIC	Yes	2 Rx 2Tx	I	1500
	PM-8407	24-pin SOIC	Yes	2 Rx 2Tx	I	1500
	PM-T1045	16-pin SMD	No	1 Rx 1Tx	I	3000
	PM-T1055	16-pin SMD	No	1 Rx 1Tx	I	3000
	PM-IS26	16-pin SMD	No	1 Rx 1Tx	C	2000
	TSD-982	16-pin SMD	No	1 Rx 1Tx	I	1500
	PM-IS28	16-pin SMD	No	1 Rx 1Tx	I	2000
	PM-IS80	12-pin SMD	No	1 Rx 1Tx	C	1500
	PM-T108	12-pin PTH	No	1 Rx 1Tx	C	1500
	PM-T108E	12-pin PTH	No	1 Rx 1Tx	I	1500
	PM-T114	6-pin PTH	No	1 Rx	C	1500
	PM-T114	6-pin PTH	No	1 Tx	C	1500
	PM-T114E	6-pin PTH	No	1 Tx	I	1500
	PM-T114E	6-pin PTH	No	1 Rx	I	1500
	PM-T115	6-pin PTH	No	1 Rx	C	1500
	PM-T115	6-pin PTH	No	1 Tx	C	1500
	PM-T115E	6-pin PTH	No	1 Tx	I	1500
	PM-T115E	6-pin PTH	No	1 Rx	I	1500
	PM-T107E	6-pin PTH	No	1 Tx	I	1500
	PM-T107E	6-pin PTH	No	1 Rx	I	1500
	PM-T115E	6-pin PTH	No	1 Tx	I	1500
	PM-IS33	6-pin PTH	No	1 Rx	C	3000
	PM-IS33	6-pin PTH	No	1 Tx	C	3000

Table 5: Currently Available Transformers for Product Group 1 (Continued)

Vendor	Part Number	Package Type *	Common-Mode Choke Containing	Number of Ports	Commercial or Industrial	Isolation Voltage
Pulse	T1124	40-pin SOIC	No	4Rx 4Tx	C	1500
	T1114	40-pin SOIC	No	4Rx 4Tx	I	1500
	TX1262	40-pin SOIC	No	4Rx 4Tx	I	1500
	TX1341	32-pin SOIC	No	4Rx 4Tx	I	1500
	TX1196	24-pin SOIC	Yes	2Rx 2Tx	I	1500
	TX1326	24-pin SOIC	No	2Rx 2Tx	I	1500
	T1207	12-pin SMD	No	1Rx 1Tx	I	1500
	TX1188	16-pin SMD	No	1Rx 1Tx	I	1500
	PE-64953	14-pin PTH	No	1Rx 1Tx	C	1500
	PE-65833	10-pin PTH	No	1Rx	C	3000
	PE-65833	10-pin PTH	No	1Tx	C	3000
	PE-65835	10-pin PTH	No	1Rx	I	3000
	PE-65835	10-pin PTH	No	1Tx	I	3000
	PE-65771	6-pin PTH	No	1Rx	I	1500
	PE-65771	6-pin PTH	No	1Tx	I	1500
	PE-65351	6-pin PTH	No	1Rx	C	1500
	PE-65351	6-pin PTH	No	1Tx	C	1500
	PE-64943	6-pin PTH	No	1Rx	C	1500
	PE-64943	6-pin PTH	No	1Tx	C	1500
	PE-65415	6-pin PTH	No	1Rx	C	1500
	PE-65415	6-pin PTH	No	1Tx	C	1500
UMEC	UT23861	16-pin SOIC	No	1 Rx 1Tx	C	1500
	UT23022	16-pin SOIC	No	1 Rx 1Tx	I	1500
	UT23023	40-pin SOIC	No	4 Rx 4Tx	C	1500
	UT23058	40-pin SOIC	No	4 Rx 4Tx	I	1500
	UT23034	40-pin SOIC	No	4 Rx 4Tx	C	1500
	UT23051	40-pin SOIC	No	4 Rx 4Tx	C	1500
	UT23415	6-pin PTH	No	1 Rx	I	1500
	UT23415	6-pin PTH	No	1 Tx	C	1500
	UT23040	40-pin SOIC	No	4 Rx 4Tx	C	1500
	UT23057	40-pin SOIC	No	4 Rx 4Tx	I	1500
	UT23833	10-pin PTH	No	1 Rx	C	3000
	UT23833	10-pin PTH	No	1 Tx	C	3000
	UT23951	14-pin PTH	No	1 Rx 1Tx	C	1500
	Vitec	40Z4338	40-pin SOIC	No	4 Rx 4Tx	C
46Z215		16-pin SOIC	No	1 Rx 1Tx	C	1500
28Z651		12-pin SMD	No	1 Rx 1Tx	C	1500
24Z4651		14-pin PTH	No	1 Rx 1Tx	C	1500
16Z5950		6-pin PTH	No	1 Rx	C	1500
16Z5950		6-pin PTH	No	1 Tx	C	1500
16Z5946		6-pin PTH	No	1 Rx	C	1500
16Z5946		6-pin PTH	No	1 Tx	C	1500
18Z4885		10-pin PTH	No	1 Rx	C	3000
18Z4885		10-pin PTH	No	1 Tx	C	3000

Table 5: Currently Available Transformers for Product Group 1 (Continued)

Vendor	Part Number	Package Type *	Common-Mode Choke Containing	Number of Ports	Commercial or Industrial	Isolation Voltage
YCL	PI126819	12-pin SMD	No	1 Rx 1Tx	C	1500
	PI163001	16-pin SOIC	No	1 Rx 1Tx	C	1500
	PI403802	40-pin SOIC	No	4 Rx 4Tx	C	1500
	PI403803	40-pin SOIC	No	4 Rx 4Tx	C	1500
	PI403811	40-pin SOIC	No	4 Rx 4Tx	C	1500
	PI403840	40-pin SOIC	No	4 Rx 4Tx	C	1500
	S6PT-351	6-pin PTH	No	1 Rx	C	1500
	S6PT-351	6-pin PTH	No	1 Tx	C	1500
	S6PT-943	6-pin PTH	No	1 Rx	C	1500
	S6PT-943	6-pin PTH	No	1 Tx	C	1500

Note:

* PTH: Pin Through Hole;

SMD: Surface Mount 2.54 mm pitch;

SOIC: Surface Mount 1.27 mm pitch.

PART 2: TRANSFORMER REQUIREMENTS FOR PRODUCT GROUP 2

2.1 LINE INTERFACE

2.1.1 LINE INTERFACE FOR LIUS

In this part, 'LIU' refers to IDT82V2041E, IDT82V2042E, IDT82V2044E, IDT82V2048E, IDT82V2051E, IDT82V2052E, IDT82V2081, IDT82V2082, IDT82V2084 and IDT82V2088. These products enable designers to adopt a re-usable approach to line-card design by utilizing a single board that is configurable through software and may be easily re-scaled to suit different T1, E1 or J1 port densities and loop lengths.

The IDT82V2081, IDT82V2082, IDT82V2084 and IDT82V2088 offer the ability to terminate both long haul and short haul T1, E1 or J1 connections; the IDT82V2041E, IDT82V2042E, IDT82V2044E, IDT82V2048E offer the ability to terminate only short haul T1, E1 or J1 connections; while the IDT82V2051E and IDT82V2052E offer the ability to terminate only short haul E1 connections.

The transmit and receive interface TTIP/TRING and RTIP/RRING connections provide a matched interface to the cable. Figure 4 shows the appropriate external components to connect with the cable for one transmit/receive channel. Table 6 to Table 10 show the impedance matching for transmitter & receiver of LIU.

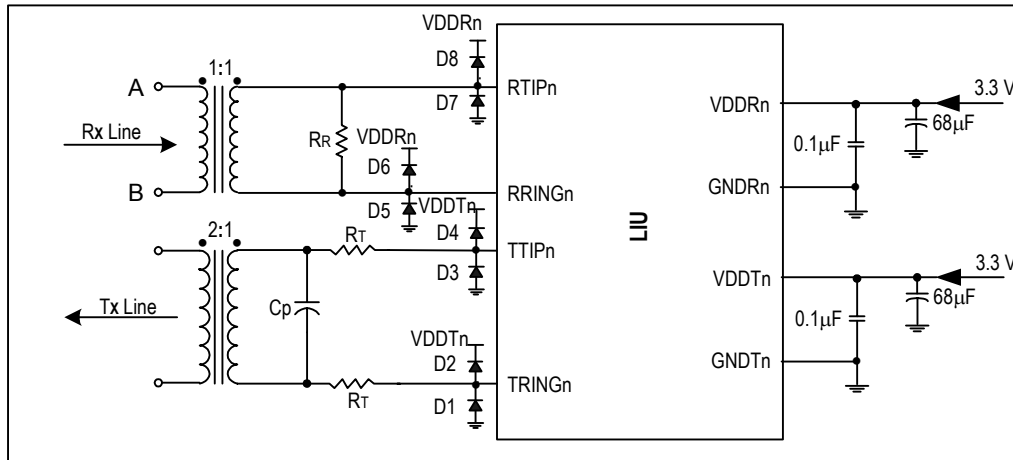


Figure 4. Appropriate External Components (LIU)

Table 6: Impedance Matching for Transmitter of IDT82V2081, IDT82V2082, IDT82V2084 & IDT82V2088

Cable Configuration	Internal Termination			External Termination		
	T_TERM[2:0]	PULS[3:0]	R _T	T_TERM[2:0]	PULS[3:0]	R _T
E1 / 75 Ω	0 0 0	0 0 0 0	0 Ω	1 X X	0 0 0 1	9.4 Ω
E1 / 120 Ω	0 0 1	0 0 0 1				
T1 / 0 ~ 133 ft	0 1 0	0 0 1 0		-	-	-
T1 / 133 ~ 266 ft		0 0 1 1				
T1 / 266 ~ 399 ft		0 1 0 0				
T1 / 399 ~ 533 ft		0 1 0 1				
T1 / 533 ~ 655 ft		0 1 1 0				
J1 / 0 ~ 655 ft	0 1 1	0 1 1 1				
0 dB LBO	0 1 0	1 0 0 0				
-7.5 dB LBO		1 0 0 1				
-15.0 dB LBO		1 0 1 0				
-22.5 dB LBO		1 0 1 1				

Table 7: Impedance Matching for Transmitter of IDT82V2041E, IDT82V2042E, IDT82V2044E & IDT82V2048E

Cable Configuration	Internal Termination			External Termination		
	T_TERM[2:0]	PULS[3:0]	R _T	T_TERM[2:0]	PULS[3:0]	R _T
E1 / 75 Ω	0 0 0	0 0 0 0	0 Ω	1 X X	0 0 0 1	9.4 Ω
E1 / 120 Ω	0 0 1	0 0 0 1				
T1 / 0 ~ 133 ft	0 1 0	0 0 1 0		-	-	-
T1 / 133 ~ 266 ft		0 0 1 1				
T1 / 266 ~ 399 ft		0 1 0 0				
T1 / 399 ~ 533 ft		0 1 0 1				
T1 / 533 ~ 655 ft		0 1 1 0				
J1 / 0 ~ 655 ft	0 1 1	0 1 1 1				

Table 8: Impedance Matching for Transmitter of IDT82V2051E & IDT82V2052E

Cable Configuration	Internal Termination			External Termination		
	T_TERM[2:0]	PULS	R _T	T_TERM[2:0]	PULS	R _T
E1 / 75 Ω	0 0 0	0	0 Ω	1XX	1	9.4 Ω
E1 / 120 Ω	0 0 1	1	0 Ω		1	

Table 9: Impedance Matching for Receiver of IDT82V2081, IDT82V2082, IDT82V2084, IDT82V2088, IDT82V2041E, IDT82V2042E, IDT82V2044E & IDT82V2048E

Cable Configuration	Internal Termination		External Termination	
	R_TERM[2:0]	R _R	R_TERM[2:0]	R _R
E1 / 75 Ω	0 0 0	120 Ω	1 X X	75 Ω
E1 / 120 Ω	0 0 1			120 Ω
T1	0 1 0			100 Ω
J1	0 1 1			110 Ω

Table 10: Impedance Matching for Receiver of IDT82V2051E & IDT82V2052E

Cable Configuration	Internal Termination		External Termination	
	R_TERM[2:0]	R _R	R_TERM[2:0]	R _R
E1 / 75 Ω	0 0 0	120 Ω	1XX	75 Ω
E1 / 120 Ω	0 0 1			120 Ω

2.1.2 LINE INTERFACE FOR HIGH DENSITY LIU (DIFFERENTIAL MODE)

In this part, 'High Density LIU' refers to IDT82P2828, IDT82P2821, IDT82P2521, IDT82P2816 and IDT82P2808 operated in Differential mode. For in Single Ended mode, please refer to 1.1.2 Line Interface for High Density LIU (Single Ended Mode) on page 4.

The transmit and receive interface TTIP/TRING and RTIP/RRING connections of the High Density LIU provide a matched interface to the cable. Figure 5 and Figure 6 show the appropriate external components to connect with the cable for one transmit channel. Table - 11 shows the impedance matching for transmitter of High Density LIU. Figure 7 and Figure 8 show the appropriate external components to connect with the cable for one receive channel. Table - 12 shows the impedance matching for receiver of High Density LIU.

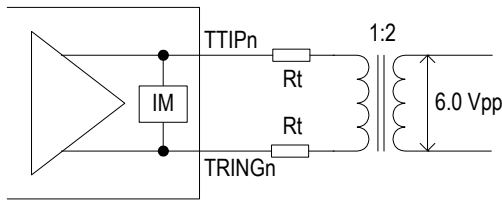


Figure 5. Transmit Differential Line Interface with Twisted Pair Cable (High Density LIU)

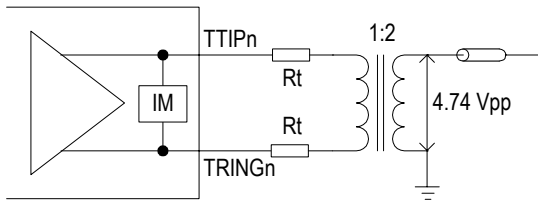


Figure 6. Transmit Differential Line Interface with Coaxial Cable (High Density LIU)

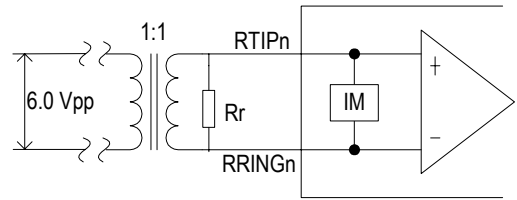


Figure-7 Receive Differential Line Interface with Twisted Pair Cable (High Density LIU)

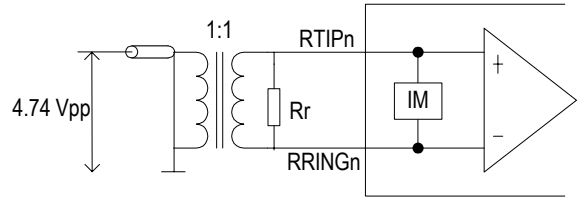


Figure 8. Receive Differential Line Interface with Coaxial Cable (High Density LIU)

Table 11: Impedance Matching for Transmitter of High Density LIU (Differential Mode)

Cable Condition	Internal Impedance Matching		External Impedance Matching	
	T_TERM[2:0]	Rt	T_TERM[2:0]	Rt
T1 100 Ω twisted pair	000	0	(not supported)	
J1 110 Ω twisted pair	001			
E1 120 Ω twisted pair	010		111	10 Ω
E1 75 Ω coaxial	011			

Table 12: Impedance Matching for Receiver of High Density LIU (Differential Mode)

Cable Condition	Partially Internal Impedance Matching (R120IN = 0) ¹		Fully Internal Impedance Matching (R120IN = 1) ¹		External Impedance Matching	
	R_TERM[2:0]	Rr	R_TERM[2:0]	Rr	R_TERM[2:0] ²	Rr
T1 100 Ω twisted pair	000	120 Ω	000	(open)	1XX	100 Ω
J1 110 Ω twisted pair	001		001			110 Ω
E1 120 Ω twisted pair	010		010			120 Ω
E1 75 Ω coaxial	011		011			75 Ω

Note:

- Partially Internal Impedance Matching and Fully Internal Impedance Matching are not supported when RIM is low.
- When RIM is low, the setting of the R_TERM[2:0] bits is ignored.

2.1.3 LINE INTERFACE FOR SUPERJET TRANSCEIVERS

The SuperJET transceivers, which integrate and expand upon the IDT LIU and framer functionality, deliver industry-leading configuration flexibility, jitter performance and signaling support across the family's octal (IDT82P2288), quad (IDT82P2284), dual (IDT82P2282) and single (IDT82P2281) densities. This family is the first of its kind to address the universal line-card market by enabling independent, per-channel programming of J1, E1 or T1 line impedance matching, frame formatting,

line code and line build out. Each device in the SuperJET family utilizes a common architecture, feature set and register map to provide an easy migration path between densities and to allow designers to reuse existing software.

Figure 9 shows the appropriate external components to connect with the cable for one transmit/receive channel of SuperJET transceivers. Table 13 and Table 14 show the impedance matching value for the transmitter and receiver of the SuperJET transceivers.

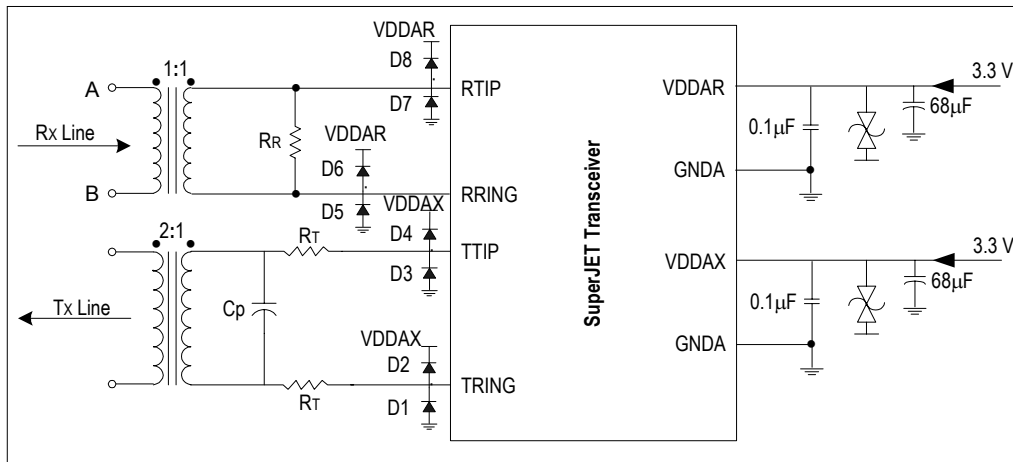


Figure 9. Appropriate External Components (SuperJET Transceiver)

Table 13: Impedance Matching Value for Transmitter of SuperJET Transceiver

Cable Configuration	Internal Termination		External Termination	
	T_TERM[2:0]	R _T	T_TERM[2:0]	R _T
E1 / 75 Ω	0 0 0	0 Ω	1 X X	9.4 Ω
E1 / 120 Ω	0 0 1		(not support)	
T1 / 100 Ω	0 1 0			
J1 / 110 Ω	0 1 1			

Table 14: Impedance Matching Value for Receiver of SuperJET Transceiver

Cable Configuration	Internal Termination		External Termination	
	R_TERM[2:0]	R _R	R_TERM[2:0]	R _R
E1 / 75 Ω	0 0 0	120 Ω	1 X X	75 Ω
E1 / 120 Ω	0 0 1			120 Ω
T1 / 100 Ω	0 1 0			100 Ω
J1 / 110 Ω	0 1 1			110 Ω

2.2 TRANSFORMER ELECTRICAL PARAMETERS

Table 15 lists the most important transformer electrical parameters for product group 2.

Table 15: Important Transformers Electrical Parameters for Product Group 2

Parameter	Limit Values			Unit
	Min.	Typ.	Max.	
Tx (chip side : line side) Turns ratio		1: 2		
Rx (chip side : line side) Turns ratio		1: 1		
Open circuit inductance ¹		1.2		mH
Leakage inductance ²			600	nH
Inter-winding capacitance ³			35	pF
DCR			0.8	Ω
Note:				
1. Open circuit inductance: The equivalent circuit parameter that is measured during a transformer open circuit test. It is a parallel inductance across the ideal transformer primary winding.				
2. Leakage inductance: The self-inductance of a coil due to the flux. It generates while not completely linked to other windings. It is an inductance in series with the ideal transformer winding.				
3. Inter-winding capacitance: The equivalent circuit parameter used to model the effective capacitance between the primary and secondary coils of the transformer.				
4. The temperature range can be selected in accordance with the target application and the operating environment.				

2.3 AVAILABLE TRANSFORMERS

Table 16 provides an overview of currently available transformers for product group 2. For special requests, such as different pinouts, please contact the transformer vendors directly. A reference contact list of transformer vendors can be found in the Appendix.

Table 16: Currently Available Transformers for Product Group 2

Vendor	Part Number	Package Type *	Common-Mode Choke Containing	Number of Ports	Commercial or Industrial	Isolation Voltage
Bel Fuse	S553-6500-B8	40-pin SOIC	No	4 Rx 4Tx	I	1500
	S553-6500-B9	40-pin SOIC	No	4 Rx 4Tx	I	1500
	S553-6500-C8	40-pin SOIC	No	4 Rx 4Tx	I	1500
	S553-6500-E6	16-pin SOIC	No	1 Rx 1Tx	I	1500
	S553-6500-62	16-pin SOIC	No	1 Rx 1Tx	I	3000
	0553-0013-AC	6-pin PTH	No	1 Rx	C	1500
	0553-0013-BC	6-pin PTH	No	1 Rx	C	1500
	0553-0013-HC	6-pin PTH	No	1 Tx	C	1500
Delta	THJ06B20	6-pin PTH	No	1 Rx	C	1500
	THJ06B14	6-pin PTH	No	1 Tx	C	1500
	THJ06C01	6-pin PTH	No	1 Rx	C	1500
	THJ06K70	6-pin PTH	No	1 Rx	C	1500
	THJ06B16	6-pin PTH	No	1 Tx	C	1500
	TX10B71	10-pin PTH	No	1 Rx	C	3000
	TX10A01	10-pin PTH	No	1 Tx	C	3000
	TX10B70	10-pin PTH	No	1 Rx	C	3000
	TX10A70	10-pin PTH	No	1 Tx	C	3000
	THX14R70	14-pin PTH	No	1 Rx 1Tx	C	1500

Table 16: Currently Available Transformers for Product Group 2 (Continued)

Vendor	Part Number	Package Type *	Common-Mode Choke Containing	Number of Ports	Commercial or Industrial	Isolation Voltage
Halo	TG05-1505NU	32-pin SMD	No	8 Channels	I	1500
	TG83-1505NU	32-pin SMD	No	4 Ports	I	1500
	TG83-S005NU	32-pin SMD	No	4 Ports	C	1500
	TG83-S006NU	32-pin SMD	No	4 Ports	I	1500
	TG74-1205N1	16-pin SMD	No	1 Port	C	1500
	TG83-1205NM5	20-pin SMD	No	2 Ports	C	1500
	TG74-1505NZ	24-pin SMD	No	2 Ports	I	1500
	TG75-1505NZ	24-pin SMD	Yes	2 Ports	I	1500
	TG83-1505NX	40-pin SMD	No	4 Ports	I	1500
	TG89-1505NX	40-pin SMD	Yes	4 Ports	I	1500
	TG01-1505NV6	32-pin SMD	No	12 Channel Rx	I	1500
	TG76-1505NV6	48-pin SMD	Yes	12 Channel Rx	I	1500
	TG05-1505NV6	48-pin SMD	No	12 Channel Tx	I	1500
	TG95-1505NV6	48-pin SMD	Yes	12 Channel Tx	I	1500
	MDT2-IDT001-UNV (Intra-Building No Internal Res.)	22-pin PTH	Yes	2 Ports	I	1500
	MDT2-IDT383-UNV (Intra-Building)	22-pin PTH	Yes	2 Ports	I	1500
	MDT2-IDT395-UNV (Intra-Building)	22-pin PTH	Yes	2 Ports	I	1500
	MGT-IDT383-UNV (Inter-Building)	20-pin SMD	Yes	2 Ports	I	1500
MST1-IDT383-UNV (Inter-Building)	14-pin SMD SIP	Yes	1 Port	I	1500	
Hanrun	HR60406A	40-pin SOIC	No	4 Rx 4Tx	C	1500
	HR601610	16-pin SOIC	No	1 Rx 1Tx	C	1500
	HR610610	6-pin PTH	No	1 Tx	C	1500
	HR610602	4-pin PTH	No	1 Rx	C	1500
	HR611456	14-pin PTH	No	1 Rx 1Tx	C	1500
	HR611003	10-pin PTH	No	1 Tx	C	3000
Midcom	50942R	40-pin SOIC	No	4 Rx 4Tx	C	1500
	50658R	16-pin SOIC	No	1 Rx 1 Tx	C	1500
	5893R	16-pin SOIC	No	1 Rx 1 Tx	C	1500

Table 16: Currently Available Transformers for Product Group 2 (Continued)

Vendor	Part Number	Package Type *	Common-Mode Choke Containing	Number of Ports	Commercial or Industrial	Isolation Voltage
Premier Magnetics	PM-8114	40-pin SOIC	No	4 Rx 4Tx	C	1500
	PM-8214	40-pin SOIC	No	4 Rx 4Tx	I	1500
	PM-8403	24-pin SOIC	Yes	2 Rx 2Tx	I	1500
	PM-IS21	16-pin SMD	No	1 Rx 1Tx	C	2000
	PM-T110	12-pin PTH	No	1 Rx 1Tx	C	1500
	PM-IS77	16-pin SMD	No	1 Rx 1Tx	I	2000
	PM-T1031	16-pin SMD	No	1 Rx 1Tx	I	3000
	PM-T114	6-pin PTH	No	1 Tx	C	1500
	PM-T114E	6-pin PTH	No	1 Tx	I	1500
	PM-T115	6-pin PTH	No	1 Tx	C	1500
	PM-T115E	6-pin PTH	No	1 Tx	I	1500
	PM-T107E	6-pin PTH	No	1 Tx	I	1500
	PM-T115E	6-pin PTH	No	1 Tx	I	1500
	PM-IS33	6-pin PTH	No	1 Tx	C	3000
	PM-IS34	6-pin PTH	No	1 Rx	C	3000
	PM-T117	6-pin PTH	No	1 Rx	C	1500
	PM-T117E	6-pin PTH	No	1 Rx	I	1500
	PM-T119	6-pin PTH	No	1 Rx	C	1500
	PM-T119E	6-pin PTH	No	1 Rx	I	1500
	PM-T106	6-pin PTH	No	1 Rx	C	1500
	PM-T106E	6-pin PTH	No	1 Rx	I	1500
	PM-T113	6-pin PTH	No	1 Rx	C	1500
	PM-T113E	6-pin PTH	No	1 Rx	I	1500

Table 16: Currently Available Transformers for Product Group 2 (Continued)

Vendor	Part Number	Package Type *	Common-Mode Choke Containing	Number of Ports	Commercial or Industrial	Isolation Voltage
Pulse	T1068	40-pin SOIC	No	4Rx 4Tx	C	1500
	T1108	40-pin SOIC	No	4Rx 4Tx	I	1500
	TX1266	40-pin SOIC	No	4Rx 4Tx	I	1500
	TX1344	32-pin SOIC	No	4Rx 4Tx	I	1500
	TX1473	32-pin SOIC	No	4Rx 4Tx	I	1500
	TX1193	24-pin SOIC	Yes	2Rx 2Tx	I	1500
	TX1323	24-pin SOIC	No	2Rx 2Tx	I	1500
	T1031	16-pin SMD	No	1Rx 1Tx	C	3000
	T1212	12-pin SMD	No	1Rx 1Tx	I	1500
	TX1277	12-pin SMD	No	1Rx 1Tx	I	1500
	PE-68864	12-pin SMD	No	1Rx 1Tx	C	1500
	PE-68678	16-pin SMD	No	1Rx 1Tx	C	1500
	T1094	16-pin SMD	No	1Rx 1Tx	I	1500
	PE-64954	14-pin PTH	No	1Rx 1Tx	C	1500
	PE-65833	10-pin PTH	No	1Tx	C	3000
	PE-65834	10-pin PTH	No	1Rx	C	3000
	PE-65835	10-pin PTH	No	1Tx	I	3000
	PE-65771	6-pin PTH	No	1Tx	I	1500
	PE-65778	6-pin PTH	No	1Rx	I	1500
	PE-65351	6-pin PTH	No	1Tx	C	1500
	PE-65415	6-pin PTH	No	1Tx	C	1500
	PE-64934	6-pin PTH	No	1Rx	C	1500
	PE-64936	6-pin PTH	No	1Rx	C	1500
	PE-65755	6-pin PTH	No	1Rx	C	1500
	T9030	48-pin SOIC	Yes	4Rx 4Tx	I	1500
	UMEC	UT23811	16-pin SOIC	No	1 Rx 1Tx	C
UT23878		16-pin SOIC	No	1 Rx 1Tx	C	2000
UT23062		16-pin SOIC	No	1 Rx 1Tx	I	2000
UT23764		12-pin SMD	No	1 Rx 1Tx	C	1500
UT23036		40-pin SOIC	No	4 Rx 4Tx	C	1500
UT23031		40-pin SOIC	No	4 Rx 4Tx	I	1500
UT23934		6-pin PTH	No	1 Rx	C	1500
UT23936		6-pin PTH	No	1 Rx	C	1500
UT23755		6-pin PTH	No	1 Rx	C	1500
UT23644		6-pin PTH	No	1 Rx	C	1500
UT23834		10-pin PTH	No	1 Rx	C	3000
UT23415		6-pin PTH	No	1 Tx	C	1500
UT23833		10-pin PTH	No	1 Tx	C	3000
UT23954		14-pin PTH	No	1 Rx 1Tx	C	1500

Table 16: Currently Available Transformers for Product Group 2 (Continued)

Vendor	Part Number	Package Type *	Common-Mode Choke Containing	Number of Ports	Commercial or Industrial	Isolation Voltage
Vitec	24Z4654	14-pin PTH	No	1 Rx 1Tx	C	1500
	46Z214	16-pin SOIC	No	1 Rx 1Tx	C	1500
	46Z232	16-pin SOIC	No	1 Rx 1Tx	C	1500
	28Z654	12-pin SMD	No	1 Rx 1Tx	C	1500
	16Z5950	6-pin PTH	No	1 Tx	C	1500
	16Z5932	6-pin PTH	No	1 Rx	C	1500
	16Z5934	6-pin PTH	No	1 Rx	C	1500
	16Z5936	6-pin PTH	No	1 Rx	C	1500
	16Z5946	6-pin PTH	No	1 Tx	C	1500
	18Z4884	10-pin PTH	No	1 Rx	C	3000
	18Z4885	10-pin PTH	No	1 Tx	C	3000
YCL	PI403805	40-pin SOIC	No	4 Rx 4Tx	C	1500
	PI126853	12-pin SMD	No	1 Rx 1Tx	I	1500
	PI126820	12-pin SMD	No	1 Rx 1Tx	C	1500
	PI163007	16-pin SOIC	No	1 Rx 1Tx	C	1500
	PI163848	16-pin SOIC	No	1 Rx 1Tx	C	1500
	PI062858	6-pin PTH	No	1 Rx	C	1500
	S6PT-351	6-pin PTH	No	1 Tx	C	1500
	S6PT-934	6-pin PTH	No	1 Rx	C	1500
	S6PT-936	6-pin PTH	No	1 Rx	C	1500
	S6PT-943	6-pin PTH	No	1 Tx	C	1500

Note:

* PTH: Pin Through Hole;
 SMD: Surface Mount 2.54 mm pitch;
 SOIC: Surface Mount 1.27 mm pitch.

APPENDIX: VENDOR LIST

Bel Fuse Inc.

198 Van Vorst Street, Jersey City, NJ 07302
 Phone (201) 432-0463
 Fax (201) 432-9542
 Web site www.belfuse.com

Delta Electronics Inc.

252, San Ying Road, Kuei San Industrial Zone, TAOYUAN SHIEN,
 TAIWAN
 Phone 886-3-3591968
 Fax 886-3-359199
 Web site www.deltaww.com

Halo Electronics Inc.

P.O. Box 5826, Redwood City, CA 94063
 Phone (650) 568-5800
 Fax (650) 568-6161
 Web site www.haloelectronics.com

Hanrun Electronics Inc.

Xiang Feng Road, Si Sheng Gong, Xiao Lan Town, Zhong Shan
 City, Guang Dong Province
 Phone 86-0760-2121067 or 86-0760-2121679
 Fax 86-0760-2121065
 Web site www.hanrun.com

Midcom, Inc.

P.O. Box 1330, 121 Airport Drive, Watertown, SD 57201
 Phone (800) 643-2661
 Fax (605) 886-4486
 Web site www.midcom-inc.com

Premier Magnetix Inc.

23081 Barents Sea Circle, Lake Forest, CA 92630
 Phone (949) 452-0511
 Fax (949) 452-0512
 Web site www.premiermag.com

Pulse Inc.

12220 World Trade Drive, San Diego, CA 92128
 Phone (858) 674-8100
 Fax (858) 674-8262
 Web site www.pulseeng.com

UMEC (UNIVERSAL MICROELECTRONICS Inc.)

3,27TH RD., TAICHUNG INDUSTRIAL PARK, TAICHUNG,TAI-
 WAN
 Phone 886-4-23590096
 Fax 886-4-23590129
 Web site www.umec-web.net

Vitec Inc.

4027 Clipper Court, Fremont, CA 94538
 Phone (510) 353-9260
 Fax (510) 353-9836
 Web site www.viteccorp.com

YCL Electronics Inc.

95, Feng Jen Road, Feng Shan, Kaohsiung 830, Taiwan.
 Phone 886-7-7458587
 Fax 886-7-7459120
 Web site www.ycl.com.tw

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