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T1/E1/J1	3
<i>Renesas</i>	3

T1/E1/J1

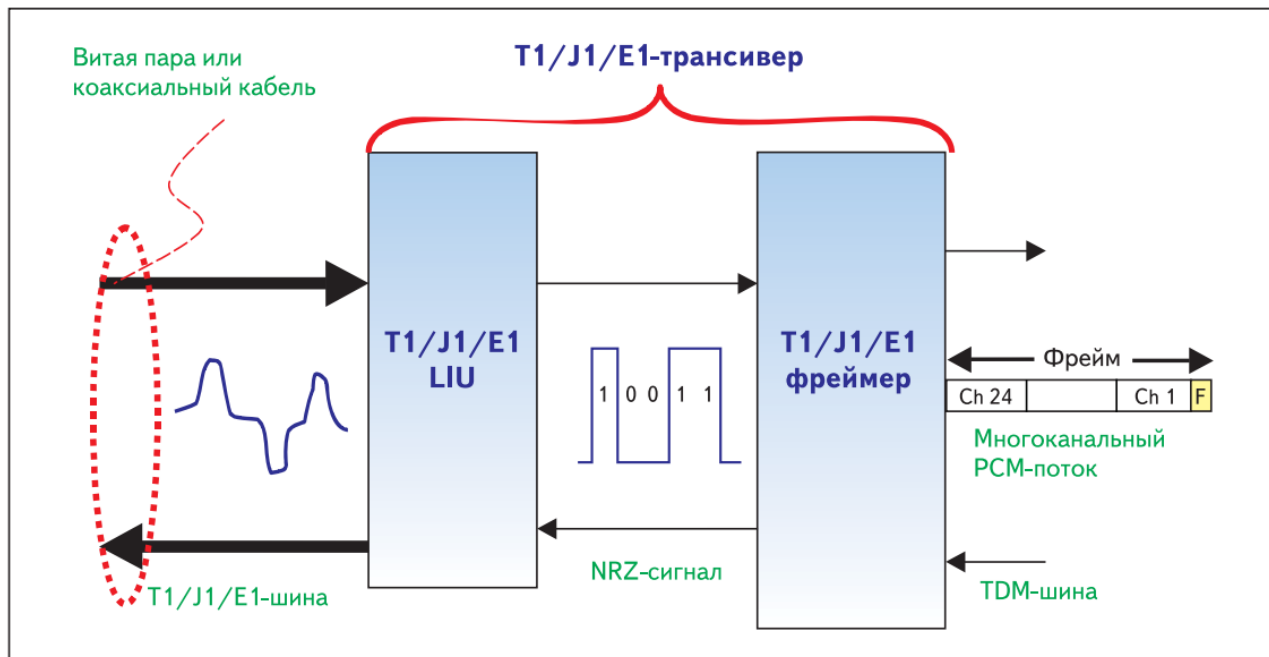


Рис. 1. Физический интерфейс с линией T1/J1/E1

Renesas

Transformer Selection Guide AN377

Device	Type	Description	Transformer Selection Group
IDT82V2041E	LIU	T1/E1/J1 Single Short Haul	PART 2
IDT82V2042E	LIU	T1/E1/J1 Dual Short Haul	PART 2
IDT82V2044	LIU	T1/E1 Quad Short Haul	PART 1
IDT82V2044E	LIU	T1/E1/J1 Quad Short Haul	PART 2
IDT82V2048	LIU	T1/E1 Octal Short Haul	PART 1
IDT82V2048E	LIU	T1/E1/J1 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/E1/J1 Single Short/Long Haul	PART 2
IDT82V2082	LIU	T1/E1/J1 Dual Short/Long Haul	PART 2
IDT82V2084	LIU	T1/E1/J1 Quad Short/Long Haul	PART 2
IDT82V2088	LIU	T1/E1/J1 Octal Short/Long Haul	PART 2
IDT82P2828	High Density LIU	T1/E1/J1 28 (+1) Short Haul	PART 2 (for Differential mode) PART 1 (for Single Ended mode)
IDT82P2821	High Density LIU	T1/E1/J1 21(+1) Short Haul	PART 2 (for Differential mode) PART 1 (for Single Ended mode)

Device	Type	Description	Transformer Selection Group
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/E1/J1 16(+1) Short Haul	PART 2 (for Differential mode) PART 1 (for Single Ended mode)
IDT82P2808	High Density LIU	T1/E1/J1 8 (+1) Short Haul	PART 2 (for Differential mode) PART 1 (for Single Ended mode)
IDT82P2281	Transceiver	T1/E1/J1 Single Short/Long Haul	PART 2
IDT82P2282	Transceiver	T1/E1/J1 Dual Short/Long Haul	PART 2
IDT82P2284	Transceiver	T1/E1/J1 Quad Short/Long Haul	PART 2
IDT82P2288	Transceiver	T1/E1/J1 Octal Short/Long Haul	PART 2

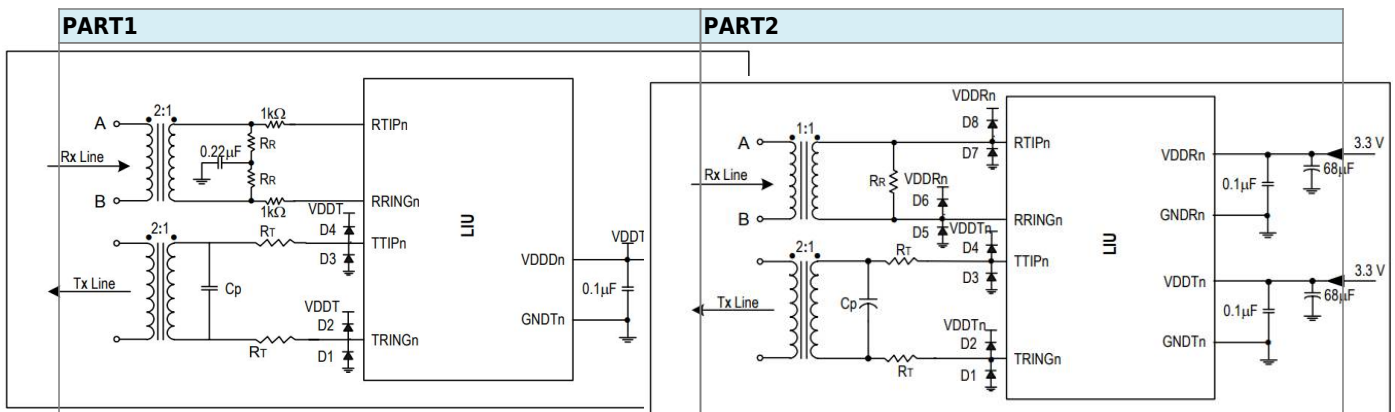


Figure 1. Appropriate External Components (LIU)

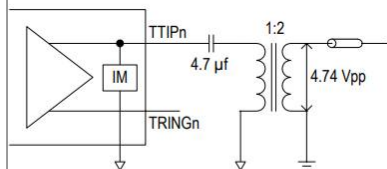


Figure 2. Transmit Single Ended Line Interface with Coaxial Cable (High Density LIU)

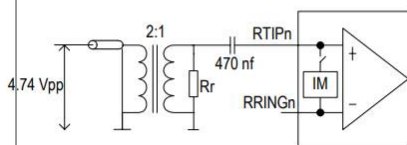


Figure 3. Receive Single Ended Line Interface with Coaxial Cable (High Density LIU)

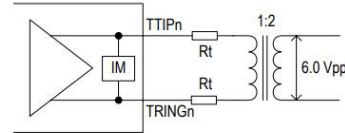


Figure 5. Transmit Differential Line Interface with Twisted Pair Cable (High Density LIU)

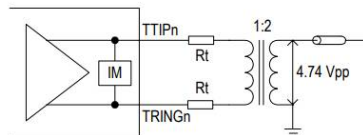


Figure 6. Transmit Differential Line Interface with Coaxial Cable (High Density LIU)

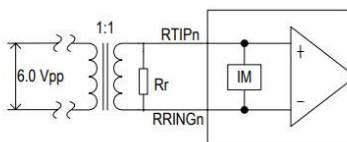


Figure 7. Receive Differential Line Interface with Twisted Pair Cable (High Density LIU)

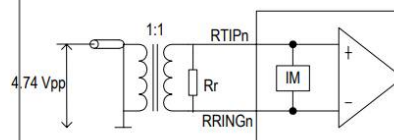


Figure 8. Receive Differential Line Interface with Coaxial Cable (High Density LIU)

IC CROSS REFERENCE: T1/E1/CEPT/ISDN-PrI FOR SINGLE & MULTI-PORT PORT ICs

IC MFR.	IC PART NO. / COMMENT	DUAL SMT (BH)		DUAL SMT (AN)		DUAL SMT XFMR/CHOKE	SINGLE THT	
		STD TEMP	EXT TEMP	STD TEMP	EXT TEMP	EXT TEMP	STANDARD TEMP	
		TX & RX	TX & RX	TX & RX	TX & RX	TX & RX	TX	RX
Cirrus Logic (Crystal)	61577 T1 & E1	PE-65861	T1090	PE-68861	PE-68841	T1207	PE-65351	PE-65351
	61304A/5A/535A/574A/75 T1	PE-65865	T1076	PE-68865	PE-68825	T1209	PE-65388	PE-65351
	61304A/5A/535A/574A/75 75 E1	PE-65866	T1092	PE-68866	PE-68826	T1212	PE-65389	PE-65351
	61304A/5A/535A/574A/75 120 E1	PE-65866	T1092	PE-68866	PE-68826	T1210	PE-65389	PE-65351
	61884 T1/E1/J1	PE-65861	TX1188	PE-68861	PE-68841	T1207	PE-65351	PE-65351
	61582, 61583	PE-65870	T1093	PE-68874	PE-68874	T1211	PE-65388	PE-65388
	61310, 61581	PE-68678	T1094	PE-68877	PE-68877	T1212	PE-65351	PE-64936
	61310, 61581 Host	T1022	T1077	T1022	—	—	PE-65351	PE-65351
	61880, 61881	PE-65865	T1076	PE-68865	PE-68825	T1209	PE-65388	PE-65351
	61584/84A IQ3	PE-65861	T1090	PE-68861	PE-68841	T1207	PE-65351	PE-65351
	61584/82/83/A IQ5	PE-65870	T1093	PE-68874	PE-68874	T1211	PE-65388	PE-65388
Exar	XRT5683A, XRT59L91	PE-65861	T1090	PE-68861	PE-68841	T1207	PE-65415	PE-65415
	XRT5894/5897/5997	PE-65861	T1090	PE-65861	PE-68841	T1207	PE-65415	PE-65415
	XRTT5793/94	PE-65866	T1092	PE-68866	PE-68826	T1220	PE-65389	PE-64934
	XRT81L2782L24, 82D20	PE-65861	T1090	PE-68861	PE-68841	T1207	PE-65415	PE-65415
	XRT83L30/4/8/314, 86L38	PE-68678	T1094	PE-68877	PE-68877	T1212	PE-65415	PE-64934
	XRT83SL30/4/8/314	PE-68678	T1094	PE-68877	PE-68877	T1212	PE-65415	PE-64934
	XRT86L30/32/34/38	PE-68678	T1094	PE-68877	PE-68877	T1212	PE-65415	PE-64934
	T5684, XRT7288, 82D20	PE-65862	T1091	PE-68862	PE-68822	T1208	PE-64937	PE-65351
IDT	82V2048, 82V2058	TX1188	TX1188	PE-68861	PE-68841	T1207	PE-65415	PE-65415
	82V2044/48/48L/54/58	TX1188	TX1188	PE-68861	PE-68841	T1207	PE-65415	PE-65415
	82V2041E/2E/4E/8E	PE-68678	T1094	PE-68877	PE-68877	T1212	PE-65415	PE-64934
	82V2081/2/4/8	PE-68678	T1094	PE-68877	PE-68877	T1212	PE-65415	PE-64934
	82P2281/2/4/8	PE-68678	T1094	PE-68877	PE-68877	T1212	PE-65415	PE-64934

Transformers for Part2

Manufacturer	P\N	Package	CM Choke	Ports	Temp Range	Isolation
Bel Fuse	S553-6500-B8	40-pin SOIC	No	4 Rx 4 Tx	I	1500
Bel Fuse	S553-6500-B9	40-pin SOIC	No	4 Rx 4 Tx	I	1500
Bel Fuse	S553-6500-C8	40-pin SOIC	No	4 Rx 4 Tx	I	1500
Bel Fuse	S553-6500-E6	16-pin SOIC	No	1 Rx 1 Tx	I	1500
Bel Fuse	S553-6500-62	16-pin SOIC	No	1 Rx 1 Tx	I	3000
Bel Fuse	0553-0013-AC	6-pin PTH	No	1 Rx	C	1500
Bel Fuse	0553-0013-BC	6-pin PTH	No	1 Rx	C	1500
Bel Fuse	0553-0013-HC	6-pin PTH	No	1 Tx	C	1500
Delta	THJ06B20	6-pin PTH	No	1 Rx	C	1500
Delta	THJ06B14	6-pin PTH	No	1 Tx	C	1500
Delta	THJ06C01	6-pin PTH	No	1 Rx	C	1500
Delta	THJ06K70	6-pin PTH	No	1 Rx	C	1500
Delta	THJ06B16	6-pin PTH	No	1 Tx	C	1500
Delta	TX10B71	10-pin PTH	No	1 Rx	C	3000
Delta	TX10A01	10-pin PTH	No	1 Tx	C	3000
Delta	TX10B70	10-pin PTH	No	1 Rx	C	3000
Delta	TX10A70	10-pin PTH	No	1 Tx	C	3000
Delta	THX14R70	14-pin PTH	No	1 Rx 1 Tx	C	1500
Halo	TG05-1505NU	32-pin SMD	No	8 Channels	I	1500
Halo	TG83-1505NU	32-pin SMD	No	4 Ports	I	1500
Halo	TG83-S005NU	32-pin SMD	No	4 Ports	C	1500
Halo	TG83-S006NU	32-pin SMD	No	4 Ports	I	1500
Halo	TG74-1205N1	16-pin SMD	No	1 Port	C	1500
Halo	TG83-1205NM5	20-pin SMD	No	2 Ports	C	1500
Halo	TG74-1505NZ	24-pin SMD	No	2 Ports	I	1500
Halo	TG75-1505NZ	24-pin SMD	Yes	2 Ports	I	1500
Halo	TG83-1505NX	40-pin SMD	No	4 Ports	I	1500
Halo	TG89-1505NX	40-pin SMD	Yes	4 Ports	I	1500

Manufacturer	P\N	Package	CM Choke	Ports	Temp Range	Isolation
Halo	TG01-1505NV6	32-pin SMD	No	12 Rx	I	1500
Halo	TG76-1505NV6	48-pin SMD	Yes	12 Rx	I	1500
Halo	TG05-1505NV6	48-pin SMD	No	12 Tx	I	1500
Halo	TG95-1505NV6	48-pin SMD	Yes	12 Tx	I	1500
Halo	MDT2-IDT001-UNV (Intra-Building No Internal Res.)	22-pin PTH	Yes	2 Ports	I	1500
Halo	MDT2-IDT383-UNV (Intra-Building)	22-pin PTH	Yes	2 Ports	I	1500
Halo	MDT2-IDT395-UNV (Intra-Building)	22-pin PTH	Yes	2 Ports	I	1500
Halo	MGT-IDT383-UNV (Inter-Building)	20-pin SMD	Yes	2 Ports	I	1500
Halo	MST1-IDT383-UNV (Inter-Building)	14-pin SMD SIP	Yes	1 Port	I	1500
Hanrun	HR60406A	40-pin SOIC	No	4 Rx 4 Tx	C	1500
Hanrun	HR601610	16-pin SOIC	No	1 Rx 1 Tx	C	1500
Hanrun	HR610610	6-pin PTH	No	1 Tx	C	1500
Hanrun	HR610602	4-pin PTH	No	1 Rx	C	1500
Hanrun	HR611456	14-pin PTH	No	1 Rx 1 Tx	C	1500
Hanrun	HR611003	10-pin PTH	No	1 Tx	C	3000
Midcom	50942R	40-pin SOIC	No	4 Rx 4 Tx	C	1500
Midcom	50658R	16-pin SOIC	No	1 Rx 1 Tx	C	1500
Midcom	5893R	16-pin SOIC	No	1 Rx 1 Tx	C	1500
Premiere Magnetics	PM-8114	40-pin SOIC	No	4 Rx 4 Tx	C	1500
Premiere Magnetics	PM-8214	40-pin SOIC	No	4 Rx 4 Tx	I	1500
Premiere Magnetics	PM-8403	24-pin SOIC	Yes	2 Rx 2 Tx	I	1500
Premiere Magnetics	PM-IS21	16-pin SMD	No	1 Rx 1 Tx	C	2000
Premiere Magnetics	PM-T110	12-pin PTH	No	1 Rx 1 Tx	C	1500
Premiere Magnetics	PM-IS77	16-pin SMD	No	1 Rx 1 Tx	I	2000
Premiere Magnetics	PM-T1031	16-pin SMD	No	1 Rx 1 Tx	I	3000
Premiere Magnetics	PM-T114	6-pin PTH	No	1 Tx	C	1500
Premiere Magnetics	PM-T114E	6-pin PTH	No	1 Tx	I	1500
Premiere Magnetics	PM-T115	6-pin PTH	No	1 Tx	C	1500
Premiere Magnetics	PM-T115E	6-pin PTH	No	1 Tx	I	1500

Manufacturer	P\N	Package	CM Choke	Ports	Temp Range	Isolation
Premiere Magnetics	PM-T107E	6-pin PTH	No	1 Tx	I	1500
Premiere Magnetics	PM-T115E	6-pin PTH	No	1 Tx	I	1500
Premiere Magnetics	PM-IS33	6-pin PTH	No	1 Tx	C	3000
Premiere Magnetics	PM-IS34	6-pin PTH	No	1 Rx	C	3000
Premiere Magnetics	PM-T117	6-pin PTH	No	1 Rx	C	1500
Premiere Magnetics	PM-T117E	6-pin PTH	No	1 Rx	I	1500
Premiere Magnetics	PM-T119	6-pin PTH	No	1 Rx	C	1500
Premiere Magnetics	PM-T119E	6-pin PTH	No	1 Rx	I	1500
Premiere Magnetics	PM-T106	6-pin PTH	No	1 Rx	C	1500
Premiere Magnetics	PM-T106E	6-pin PTH	No	1 Rx	I	1500
Premiere Magnetics	PM-T113	6-pin PTH	No	1 Rx	C	1500
Premiere Magnetics	PM-T113E	6-pin PTH	No	1 Rx	I	1500
Pulse	T1068	40-pin SOIC	No	4 Rx 4 Tx	C	1500
Pulse	T1108	40-pin SOIC	No	4 Rx 4 Tx	I	1500
Pulse	TX1266	40-pin SOIC	No	4 Rx 4 Tx	I	1500
Pulse	TX1344	32-pin SOIC	No	4 Rx 4 Tx	I	1500
Pulse	TX1473	32-pin SOIC	No	4 Rx 4 Tx	I	1500
Pulse	TX1193	24-pin SOIC	Yes	2 Rx 2 Tx	I	1500
Pulse	TX1323	24-pin SOIC	No	2 Rx 2 Tx	I	1500
Pulse	T1031	16-pin SMD	No	1 Rx 1 Tx	C	3000
Pulse	T1212	12-pin SMD	No	1 Rx 1 Tx	I	1500
Pulse	TX1277	12-pin SMD	No	1 Rx 1 Tx	I	1500
Pulse	PE-68864	12-pin SMD	No	1 Rx 1 Tx	C	1500
Pulse	PE-68678	16-pin SMD	No	1 Rx 1 Tx	C	1500
Pulse	T1094	16-pin SMD	No	1 Rx 1 Tx	I	1500
Pulse	PE-64954	14-pin PTH	No	1 Rx 1 Tx	C	1500
Pulse	PE-65833	10-pin PTH	No	1 Tx	C	3000
Pulse	PE-65834	10-pin PTH	No	1 Rx	C	3000
Pulse	PE-65835	10-pin PTH	No	1 Tx	I	3000
Pulse	PE-65771	6-pin PTH	No	1 Tx	I	1500
Pulse	PE-65778	6-pin PTH	No	1 Rx	I	1500
Pulse	PE-65351	6-pin PTH	No	1 Tx	C	1500
Pulse	PE-65415	6-pin PTH	No	1 Tx	C	1500

Manufacturer	P\N	Package	CM Choke	Ports	Temp Range	Isolation
Pulse	PE-64934	6-pin PTH	No	1 Rx	C	1500
Pulse	PE-64936	6-pin PTH	No	1 Rx	C	1500
Pulse	PE-65755	6-pin PTH	No	1 Rx	C	1500
Pulse	T9030	48-pin SOIC	Yes	4 Rx 4 Tx	I	1500
UMEC	UT23811	16-pin SOIC	No	1 Rx 1 Tx	C	2000
UMEC	UT23878	16-pin SOIC	No	1 Rx 1 Tx	C	2000
UMEC	UT23062	16-pin SOIC	No	1 Rx 1 Tx	I	2000
UMEC	UT23764	12-pin SMD	No	1 Rx 1 Tx	C	1500
UMEC	UT23036	40-pin SOIC	No	4 Rx 4 Tx	C	1500
UMEC	UT23031	40-pin SOIC	No	4 Rx 4 Tx	I	1500
UMEC	UT23934	6-pin PTH	No	1 Rx	C	1500
UMEC	UT23936	6-pin PTH	No	1 Rx	C	1500
UMEC	UT23755	6-pin PTH	No	1 Rx	C	1500
UMEC	UT23644	6-pin PTH	No	1 Rx	C	1500
UMEC	UT23834	10-pin PTH	No	1 Rx	C	3000
UMEC	UT23415	6-pin PTH	No	1 Tx	C	1500
UMEC	UT23833	10-pin PTH	No	1 Tx	C	3000
UMEC	UT23954	14-pin PTH	No	1 Rx 1 Tx	C	1500
Vitec	24Z4654	14-pin PTH	No	1 Rx 1 Tx	C	1500
Vitec	46Z214	16-pin SOIC	No	1 Rx 1 Tx	C	1500
Vitec	46Z232	16-pin SOIC	No	1 Rx 1 Tx	C	1500
Vitec	28Z654	12-pin SMD	No	1 Rx 1 Tx	C	1500
Vitec	16Z5950	6-pin PTH	No	1 Tx	C	1500
Vitec	16Z5932	6-pin PTH	No	1 Rx	C	1500
Vitec	16Z5934	6-pin PTH	No	1 Rx	C	1500
Vitec	16Z5936	6-pin PTH	No	1 Rx	C	1500
Vitec	16Z5946	6-pin PTH	No	1 Tx	C	1500
Vitec	18Z4884	10-pin PTH	No	1 Rx	C	3000
Vitec	18Z4885	10-pin PTH	No	1 Tx	C	3000
YCL	PI403805	40-pin SOIC	No	4 Rx 4 Tx	C	1500
YCL	PI126853	12-pin SMD	No	1 Rx 1 Tx	I	1500
YCL	PI126820	12-pin SMD	No	1 Rx 1 Tx	C	1500
YCL	PI163007	16-pin SOIC	No	1 Rx 1 Tx	C	1500
YCL	PI163848	16-pin SOIC	No	1 Rx 1 Tx	C	1500
YCL	PI062858	6-pin PTH	No	1 Rx	C	1500
YCL	S6PT-351	6-pin PTH	No	1 Tx	C	1500
YCL	S6PT-934	6-pin PTH	No	1 Rx	C	1500
YCL	S6PT-936	6-pin PTH	No	1 Rx	C	1500
YCL	S6PT-943	6-pin PTH	No	1 Tx	C	1500

LIU Frontend

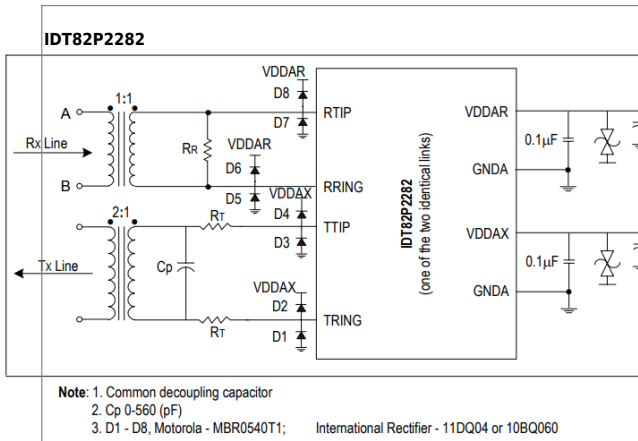


Figure 6-4. LIU Front-End

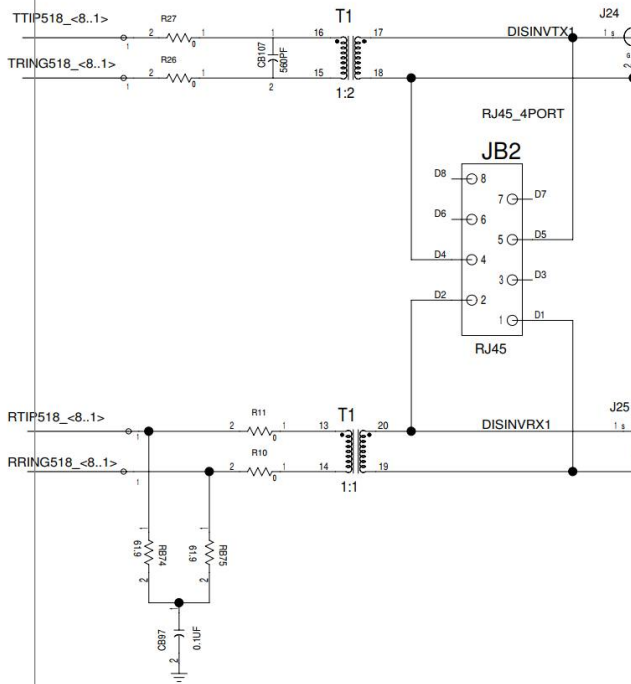
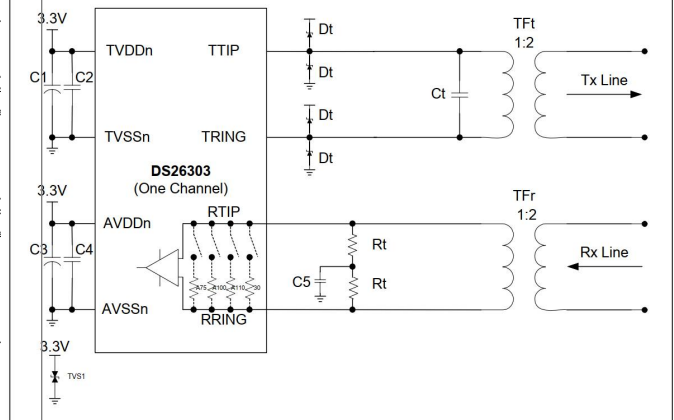


FIGURE 14. SIMPLIFIED DIAGRAM FOR T1 IN THE EXTERNAL TERMINATION MODE (RXTSEL = 0)

FIGURE 13. SIMPLIFIED DIAGRAM FOR THE INTERNAL RECEIVE AND TRANSMIT TERMINATION MODE

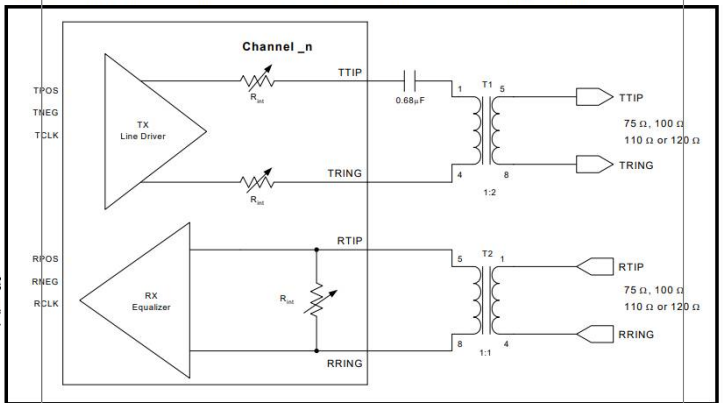
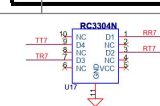
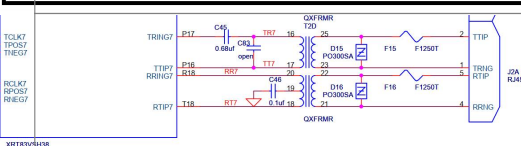
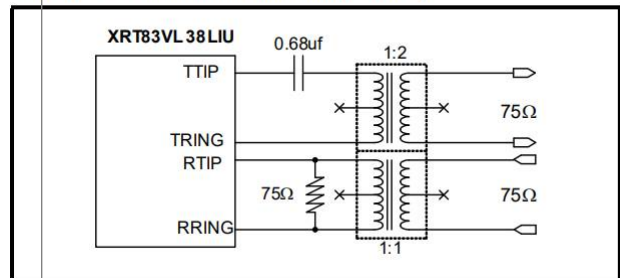
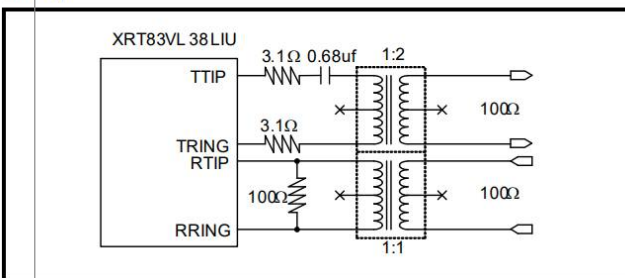
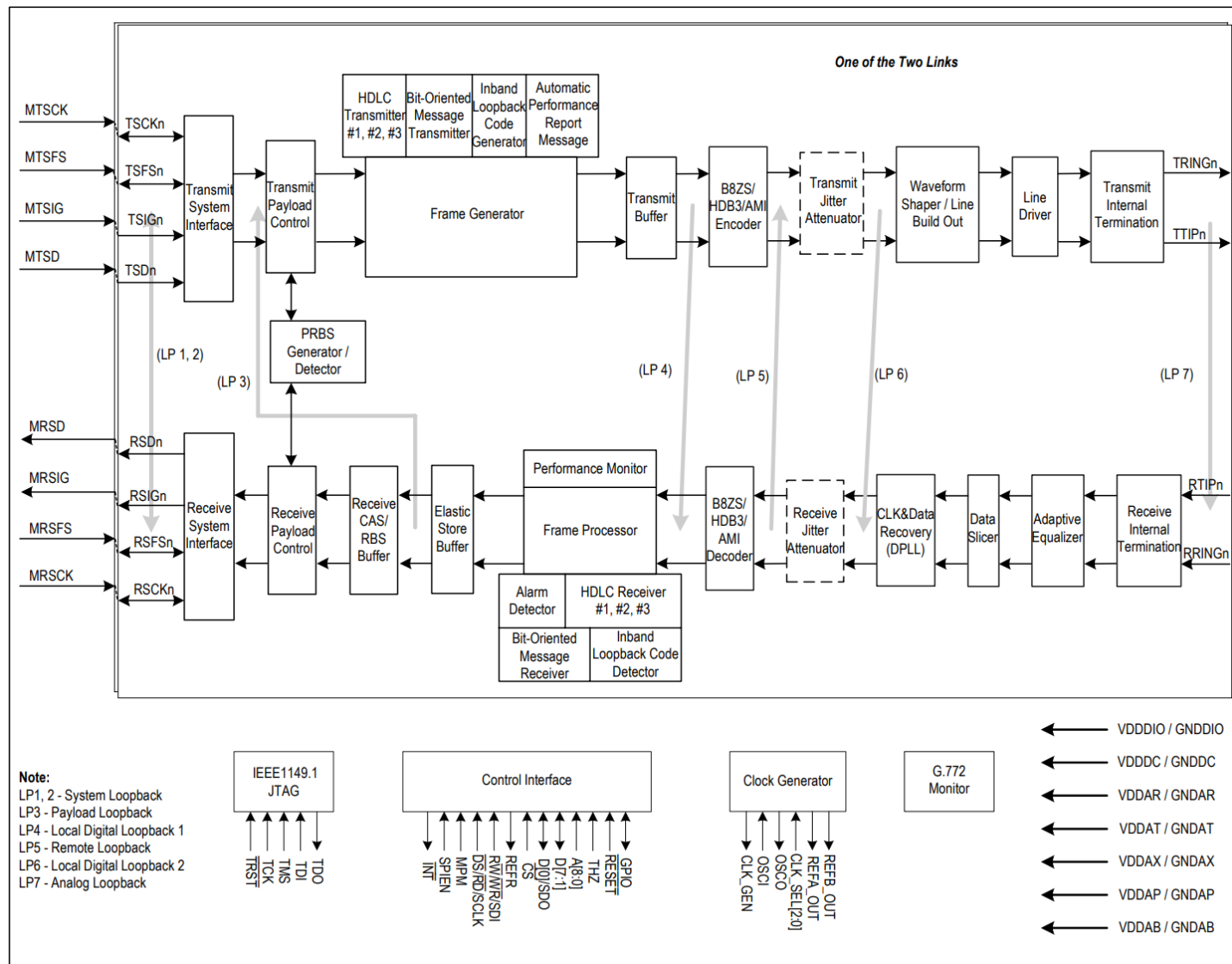


FIGURE 15. SIMPLIFIED DIAGRAM FOR E1 IN EXTERNAL RECEIVE TERMINATION MODE (RXTSEL = 0) AND INTERNAL TRANSMIT TERMINATION MODE (TXTEL = 1)



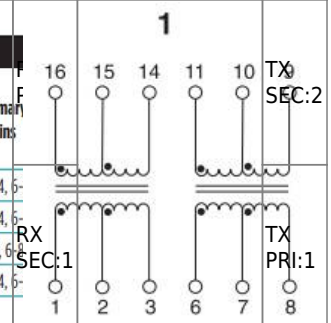
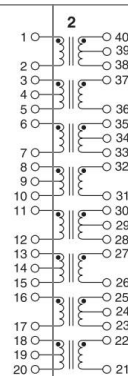


Electrical Specifications @ 25°C

RoHS Compliant Part Number ^C		Turns Ratio ^{A, B} (Pri:Sec ±2%)		OCL @ 25°C (mH MIN) ^F		L _L (μH MAX)		C _{Ww} (pFMAX)		Package/ Schematic ^E	Primary Plns	
Std Temp.	Ex Temp ^F	TX	RX	TX	RX	TX	RX	TX	RX		Transmit	R
T1063NL	—	1:1.36	1:1.36CT	1.2	1.2	.6	.6	35	35	TOU/1	1-2, 6-7, 11-12, 16-17	38-36, 33-
T1064NL	—	1:1.14	1:1.14CT	1.2	1.2	.6	.6	35	35	TOU/1	1-2, 6-7, 11-12, 16-17	38-36, 33-
T1065NL	T1105NL	1:2CT	1:2CT	1.2	1.2	.8	.8	35	35	TOU/3	4-5, 9-10, 14-15, 19-20	24-25, 29-
T1068NL	T1108NL	1:2CT	1:1CT	1.2	1.2	.6	.6	35	35	TOU/2	1-2, 6-7, 11-12, 16-17	21-22, 26-

Electrical Specifications @ 25°C

RoHS-6 Compliant Part Number		Turns Ratio ^B (Pri:Sec ±5%)	OCL (mH MIN)	C _{w/w} (pF MAX)	L _L (μH MAX)	DCR Pri (Ω MAX)	Package/ Schematic
STD Temp	EXT Temp						
PE-65861NL	T1090NL	1CT:2CT & 1CT:2CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/1
-	T1076NL	1:1.15CT & 1CT:2CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/2
PE-65870NL	-	1CT:1.15CT & 1CT:1.15CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/1
PE-65878NL	T1094NL	1CT:1CT & 1CT:2CT	1.20 & 1.20	30 & 30	.60 & .60	0.70 & 0.70	BH/1



География\Стандарт

- T1
- E1
- J1

Дальность линии

- Short Haul — короткие линии (до 200 м)
- Long Haul — длинные линии (до 1800 м)

Структурные части

- AFE - Analog Front End
- LIU - Line Interface Unit
- Framer
- Multiplexor

Форматы линейного кодирования:

- AMI
- B8ZS
- HDB3

Основные отличия стандартов T1, E1 и J1, используемых в цифровой телефонии, заключаются в скорости передачи, количестве каналов и географическом распространении.

- E1 (Европа/Азия)
 - обеспечивает 30+2 канала со скоростью 2,048 Мбит/с,
- T1 (США) и J1 (Япония)
 - предлагают 24 канала со скоростью 1,544 Мбит/с, различаясь способами формирования потока.

Основные отличия T1, E1, J1:

- География и стандарт:
 - E1 (CEPT): Европа, Азия, включая Россию.
 - T1 (ANSI): Северная Америка.
 - J1 (TTC): Япония.
- Скорость передачи:
 - E1: 2,048 Мбит/с.
 - T1/J1: 1,544 Мбит/с.
- Структура каналов (тайм-слоты):
 - E1: 32 тайм-слота (30 для голоса, 1 для синхронизации, 1 для сигнализации).
 - T1/J1: 24 тайм-слота по 64 кбит/с.
- Кодирование звука:
 - E1: А-закон (A-law).
 - T1/J1: μ -закон (μ -law).
- Линейное кодирование:
 - E1: AMI, HDB3.

- T1/J1: AMI, B8ZS.