The ECL Translator Guide

ECL • TTL • PECL • LVECL • LVPECL • CMOS • LVTTL

How To Make Them Talk To Each Other

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APPLICATION NOTE

Are You Designing with Different I/O Levels?

This document guides you to the appropriate interface.

For interfacing between ECL devices and the TTL / CMOS world discrete interfaces could be used. But the switching points are usually not controlled and may vary with temperature, device variation, or supply voltage. This results in duty cycle variation. To avoid this signal quality uncertainty translating devices with controlled switching levels and specified propagation delays and skews are available.

Translation between ECL signals off different power supplies might be done by capacitive coupling. But this is only possible for clock signals or RZ coded signals. For this reason special translators are available.

If you are looking for interfaces between LVDS and ECL, please see the application note AN1568/D “Interfacing Between LVDS and ECL”.

You will find the right device for your application in the translator matrix on page 3. The tables give you additional information on the bit–width and the databook location.

Translators from TTL–World to ECL–World

TTL to ECL Translators (Dual Supply +5 V, −5 V)

Width	Device	Function	Databook
1	MC10/100ELT24	TTL to Differential ECL	DL140
4	MC10124	Quad TTL to MECL	DL122
4	MC10H124	Quad TTL to MECL with TTL Strobe	DL122
4	MC10H424	Quad TTL to PECL with ECL Strobe	DL122
6	MC10/100H604	Registered Hex TTL/ECL	DL122
9	MC10/100H600	9 Bit TTL/ECL	DL122
9	MC10/100H602	9 Bit Latch TTL/ECL	DL122

TTL/ECL Transceiver (Dual Supply +5 V, −5 V)

Width	Device	Function	Databook
4	MC10/100H680	4 Bit Differential ECL Bus/TTL Bus Transceiver with Latches	DL122
6	MC10/100H681	Hex Differential ECL/TTL Transceiver with Latches	DL122

TTL to PECL (Single Supply +5 V)

Width	Device	Function	Databook
1	MC10/100ELT20	TTL to Differential PECL	DL140
2	MC10/100ELT22	Dual TTL to Differential PECL	DL140
4	MC10H351	Quad TTL/NMOS to PECL	DL122
6	MC10/100H606	Registered Hex TTL/PECL	DL122

LVTTL to LVPECL (Single Supply +3.3 V)

Width	Device	Function	Databook
2	MC100LVELT22	Dual LVPECL to LVTTL	WWW
1	MC10EPT20	LVPECL to LVTTL	BR1513
2	MC100EPT22	Dual LVPECL to LVTTL	BR1513

Translators from ECL–World to TTL–World

ECL to TTL (Dual Supply +5 V, −5 V)

Width	Device	Function	Databook
1	MC10/100ELT25	Differential ECL to TTL	DL140
4	MC10125	Quad MECL to TTL	DL122
4	MC10H125	Quad MECL to TTL	DL122
4	MC10/100H660	4 Bit ECL TTL Load Reducing DRAM Driver	DL122
6	MC10/100H605	Registered Hex ECL/TTL	DL122
9	MC10/100H601	9 Bit ECL/TTL	DL122
9	MC10/100H603	9 Bit Latch ECL/TTL	DL122

PECL to TTL (Single Supply +5 V)

Width	Device	Function	Databook
1	MC10/100ELT21	Differential PECL to TTL	DL140
2	MC100ELT23	Dual Differential PECL to TTL	DL140
4	MC10H350	Differential PECL to TTL	DL122
6	MC10/100H607	Registered Hex PECL/TTL	DL122

LVPECL to LVTTL (Single Supply +3.3 V)

Width	Device	Function	Databook
1	MC100EPT21	Differential LVPECL to LVTTL	BR1513
2	MC100EPT23	Dual Differential LVPECL to LVTTL	BR1513
2	MC100LVELT23	Dual Differential LVPECL to LVTTL	WWW
2	MC100EPT26	1:2 Differential LVPECL to TTL	BR1513

LVTTL to ECL/LVECL (Dual Supply +3.3 V, –3.3V to –5V)

Width	Device	Function	Databook
1	MC100EPT24	LVTTL to Differential LVECL	BR1513

ECL/LVECL to LVTTL (Dual Supply +3.3 V, –3.3V to –5V)

Width	Device	Function	Databook
1	MC100EPT25	Differential LVECL to LVTTL	BR1513

PECL–TTL and TTL–PECL (Single Supply +5 V)

Width	Device	Function	Databook
1+1	MC10/100ELT28*	TTL to Differential PECL + Differential PECL to TTL	DL140

CMOS to PECL Interfacing

	Width	Device	Function	Databook
CMOS to PECL (Single +5 V)	4	MC10H352	Quad CMOS to PECL	DL122

Different Supplied ECL

	Width	Device	Function	Databook
LVECL to PECL (−3.3 V to +5 V)	3	MC100EL90	Triple ECL to PECL	DL140
LVECL to LVPECL (−3.3 V to +3.3 V)	3	MC100LVEL90	Triple ECL to LVPECL	DL140
LVPECL to ECL (−3.3 V to MECL)	3	MC100EL91	Triple LVPECL to ECL	DL140
LVPECL to LVECL (+3.3 V to −3.3 V)	3	MC100LVEL91	Triple LVPECL to LVECL	DL140
PECL to ECL (+5 V to MECL)	3	MC100EL91	Triple PECL to LVECL	DL140
PECL to LVECL (5 V to −3.3 V)	3	MC100EL91	Triple PECL to LVPECL	DL140
PECL to LVPECL (5 V to +3.3 V)	3	MC100LVEL92	Triple PECL to LVPECL	DL140
ECL to PECL (MECL to +5 V)	3	MC100EL90	Triple ECL to LVPECL	DL140
ECL to LVPECL	3	MC100LVEL90	Triple ECL to LVPECL	DL140

Translator Table

From/To	TTL VCC = +5V	ECL VEE= –4.5/–5.2V	PECL VCC = +5V	LVTTL VCC = +3.3V	LVECL VEE = –3.3V	LVPECL VCC = +3.3V	CMOS VDD = +5V
TTL	standard connection	124 H424 H124 H600 H602 H604 H680* H681* ELT24	H351 H606 ELT20 ELT22 ELT28*	(Use +5V input tolerant devices)	EL91	EPT20, EPT22, or LVELT22 With VIH limited to VCC = 3.3V	Pull up resistor
ECL VEE = –4.5/–5.2V	125 H125 H601 H603 H605 H660 H680* H681* ELT25	standard connection	EL90	EPT25	standard connection	LVEL90	ECL/TTL Translator to HCT or ACT input
PECL VCC = +5V	H350 H607 ELT21 ELT23 ELT28*	EL91	standard connection	LVEL92 + LVELT23, EPT23, or EPT21	EL91	LVEL92	PECL/TTL Translator to HCT or ACT input
LVTTL VCC = 3.3V	Direct connection, as DC levels are identical	EPT24	(EPT20, EPT22, or LVELT22) + 5V ECL line receiver, e.g.(EL17) EL90	standard connection	EPT24	EPT20 EPT22 LVELT22	Pull up resistor
LVECL VEE = –3.3V	ELT25	Standard connection, as DC levels are identical	EL90	EPT25	standard connection	LVEL90	ECL/TTL Translator to HCT or ACT input (–5V required)
LVPECL VCC = +3.3V	ELT21 ELT23 ELT28*	EL91	ECL line receiver, e.g. EL17	EPT21 EPT23 LVELT23 EPT26	LVEL91	Direct connection	Direct connection
CMOS VDD = +5V	Direct connection	H352 + EL90	H352	VIA LCX	H352 + EL90	LCX + LVELT22, EPT20, or EPT22	

*Bidirectional

Notes

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