Order number: MPC942P
Rev 1, 02/2001

Low Voltage 1:18 Clock Distribution Chip

MPC942P

LOW VOLTAGE 1:18 CLOCK DISTRIBUTION CHIP

FA SUFFIX
32-LEAD TQFP PACKAGE
CASE 873A-03

The MPC942 is a 1:18 low voltage clock distribution chip with 2.5V or 3.3V LVCMOS output capabilities. The device is offered in two versions; the MPC942C has an LVCMOS input clock while the MPC942P has a LVPECL input clock. The 18 outputs are 2.5V or 3.3V LVCMOS compatible and feature the drive strength to drive 50Ω series or parallel terminated transmission lines. With output-to-output skews of 200ps, the MPC942 is ideal as a clock distribution chip for the most demanding of synchronous systems. The 2.5V outputs also make the device ideal for supplying clocks for a high performance Pentium II™ microprocessor based design.

- LVPECL Clock Input
- 2.5V LVCMOS Outputs for Pentium II Microprocessor Support
- 200ps Maximum Targeted Output-to-Output Skew
- Maximum Output Frequency of 250MHz @ 3.3 V_{CC}
- 32-Lead LQFP Packaging
- Single 3.3V or 2.5V Supply

With a low output impedance (≈12Ω), in both the HIGH and LOW logic states, the output buffers of the MPC942 are ideal for driving series terminated transmission lines. With an output impedance of 12Ω the MPC942 can drive two series terminated transmission lines from each output. This capability gives the MPC942 an effective fanout of 1:36. The MPC942 provides enough copies of low skew clocks for most high performance synchronous systems.

The differential LVPECL inputs of the MPC942P allow the device to interface directly with a LVPECL fanout buffer like the MC100EP111 to build very wide clock fanout trees or to couple to a high frequency clock source. The OE pins will place the outputs into a high impedance state. The OE pin has an internal pullup resistor.

The MPC942 is a single supply device. The V_{CC} power pins require either 2.5V or 3.3V. The 32-lead LQFP package was chosen to optimize performance, board space and cost of the device. The 32-lead LQFP has a 7x7mm body size with a conservative 0.8mm pin spacing.

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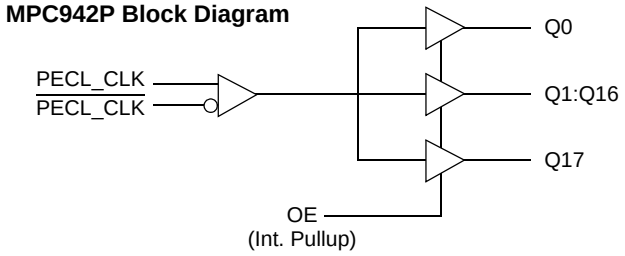
LOGIC DIAGRAM

MPC942P Block Diagram



FUNCTION TABLE

OE	Output
0	HIGH IMPEDANCE
1	OUTPUTS ENABLED

Pinout: 32-Lead (Top View)

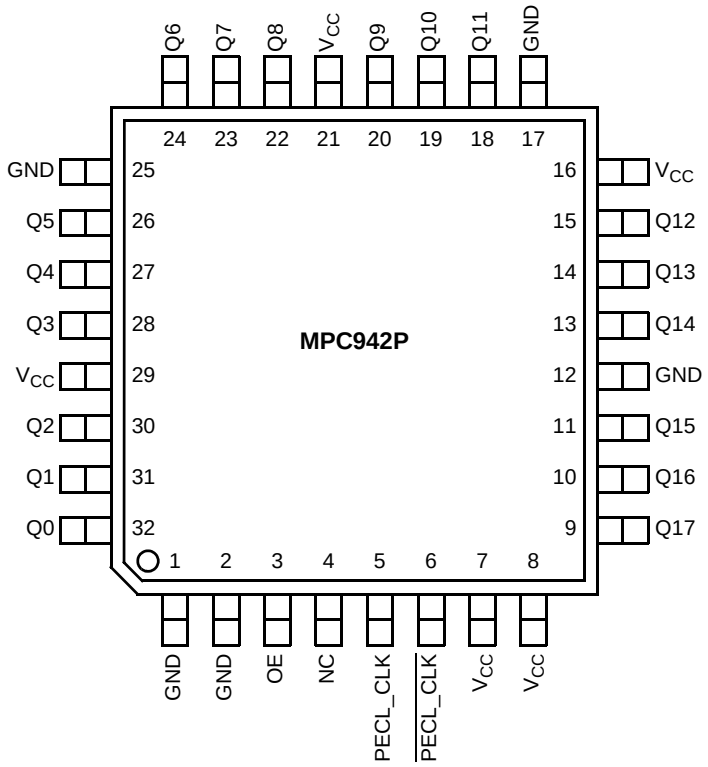


Table 1. Absolute Maximum Ratings[1]

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply Voltage	–0.3	3.6	V
V_I	Input Voltage	–0.3	V_{CC} + 0.3	V
I_{IN}	Input Current		±20	mA
T_{Stor}	Storage Temperature Range	–40	125	°C

1. Absolute maximum continuous ratings are those values beyond which damage to the device may occur. Exposure to these conditions or conditions beyond those indicated may adversely affect device reliability. Functional operation under absolute-maximum-rated conditions is not implied.

Table 2. DC Characteristics (T_A = 0° to 70°C, V_{CC} = 2.5V ±5%)

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
V_{IH}	Input HIGH Voltage	2.0		V_{CC}	V	
V_{IL}	Input LOW Voltage			0.8	V	
V_{PP}	Input Swing PECL_CLK	0.6		1.0	V	
V_X	Input Crosspoint PECL_CLK	V_{CC}–1.0		V_{CC}–0.6	V	
V_{OH}	Output HIGH Voltage	2.0			V	I_{OH} = –16 mA
V_{OL}	Output LOW Voltage			0.5	V	I_{OL} = 16 mA
I_{IN}	Input Current			±200	μA	
C_{IN}	Input Capacitance		4.0		pF	
C_{PD}	Power Dissipation Capacitance		14		pF	Per Output
Z_{OUT}	Output Impedance		12		Ω	
I_{CC}	Maximum Quiescent Supply Current		0.5	5.0	mA	

Table 3. AC Characteristics (T_A = 0° to 70°C, V_{CC} = 2.5V ±5%)

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
F_{max}	Maximum Frequency			200	MHz	
t_{PLH}	Propagation Delay	1.8		4.0	ns	
t_{PHL}	Propagation Delay	2.0		4.3	ns	
$t_{sk(o)}$	Output-to-Output Skew			200	ps	
$t_{sk(pr)}$	Part-to-Part Skew			2.2	ns	Note 2
$t_{sk(pr)}$	Part-to-Part Skew			1.3	ps	Note 1
t_r, t_f	Output Rise/Fall Time	0.1		1.0	ns	

1. For a specific temperature and voltage, includes output skew.
2. Across temperature and voltage ranges, includes output skew.

Table 4. DC Characteristics (T_A = 0° to 70°C, V_{CC} = 3.3V ±5%)

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
V_{IH}	Input HIGH Voltage	2.4		V_{CC}	V	
V_{IL}	Input LOW Voltage			0.8	V	
V_{PP}	Input Swing PECL.CLK	0.6		1.0	V	
V_X	Input Crosspoint PECL_CLK	V_{CC}–1.0		V_{CC}–0.6	V	
V_{OH}	Output HIGH Voltage	2.4			V	I_{OH} = –20 mA
V_{OL}	Output LOW Voltage			0.6	V	I_{OL} = 20 mA
I_{IN}	Input Current			±200	μA	
C_{IN}	Input Capacitance		4.0		pF	
C_{PD}	Power Dissipation Capacitance		14		pF	Per Output
Z_{OUT}	Output Impedance		12		Ω	
I_{CC}	Maximum Quiescent Supply Current		0.5	5.0	mA	

Table 5. AC Characteristics (T_A = 0° to 70°C, V_{CC} = 3.3V ±5%)

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
F_{max}	Maximum Frequency			250	MHz	
t_{PLH}	Propagation Delay	1.5		3.2	ns	
t_{PHL}	Propagation Delay	1.5		3.6	ns	
$t_{sk(o)}$	Output-to-Output Skew			200	ps	
$t_{sk(pr)}$	Part-to-Part Skew			1.7	ns	Note 2
$t_{sk(pr)}$	Part-to-Part Skew			1.0	ps	Note 1
t_r, t_f	Output Rise/Fall Time	0.1		1.0	ns	

1. For a specific temperature and voltage, includes output skew.
2. Across temperature and voltage ranges, includes output skew.