

**MNMM54C161-X REV 1A0**

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**BINARY COUNTER WITH ASYNCHRONOUS CLEAR**
**General Description**

These (synchronous presettable up) counters are monolithic complementary MOS (CMOS) integrated circuits constructed with N- and P-channel enhancement mode transistors. They feature an internal carry lookahead for fast counting schemes and for cascading packages without additional gating.

A low level at the load input disables counting and causes the outputs to agree with the data input after the next positive clock edge. The clear function for the C161 is asynchronous and a low level at the clear inputs sets all four outputs low regardless of the state of the clock.

Counting is enabled when both count enable inputs are high. Input T is fed forward to also enable the carry out. The carry output is a positive pulse with a duration approximately equal to the positive portion of QA and can be used to enable successive cascaded stages. Logic transitions at the enable P or T inputs can occur when the clock is high or low.

**Industry Part Number**

MM54C161

**NS Part Numbers**

 MM54C161J/883  
 MM54C161W/883

**Prime Die**

MM54C161

**Processing**

MIL-STD-883, Method 5004

**Quality Conformance Inspection**

MIL-STD-883, Method 5005

Subgrp	Description	Temp ( °C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55

**Features**

- High noise margin 1V guaranteed
- High noise immunity 0.45 Vcc (typ.)
- Tenth power TTL compatible Drives 2 LPTTL loads
- Wide supply voltage range 3V to 15V
- Internal look-ahead for fast counting schemes
- Carry output for N-bit cascading
- Load control line
- Synchronously programmable

**(Absolute Maximum Ratings)**

(Note 1)

Voltage at Any Pin	-0.3V to Vcc +0.3V
Operating Temperature Range	-55 C to +125 C
Storage Temperature Range	-65 C to +150 C
Maximum Vcc Voltage	18V
Power Dissipation (Pd)	
Dual-In-Line	700mW
Small Outline	500mW
Operating Vcc Range	3V to 15V
Lead Temperature (Soldering, 10 seconds)	260 C

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

## Electrical Characteristics

### DC PARAMETERS: CMOS TO CMOS:

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vih	Logical "1" Input Voltage	Vcc = 5V	1		3.5		V	1, 2, 3
		Vcc = 10V	1		8		V	1, 2, 3
Vil	Logical "0" Input Voltage	Vcc = 5V	1			1.5	V	1, 2, 3
		Vcc = 10V	1			2	V	1, 2, 3
Voh	Logical "1" Output Voltage	Vcc = 5V, Iout = -10uA, Vih = 3.5V, Vil = 1.5V			4.5		V	1, 2, 3
		Vcc = 10V, Iout = -10uA, Vih = 8V, Vil = 2V			9		V	1, 2, 3
Vol	Logical "0" Output Voltage	Vcc = 5V, Iout = 10uA, Vih = 3.5V, Vil = 1.5V				0.5	V	1, 2, 3
		Vcc = 10V, Iout = 10uA, Vih = 8V, Vil = 2V				1	V	1, 2, 3
Iih	Logical "1" Input Current	Vcc = 15V, Vin = 15V				0.15	uA	1, 3
						1	uA	2
Iil	Logical "0" Input Current	Vcc = 15V, Vin = 0V				-0.15	uA	1, 3
						-1	uA	2
Icc	Quiescent Device Current	Vcc = 15V				10	uA	1, 3
						300	uA	2

### DC PARAMETERS: CMOS TO LPTTL:

Vih	Logical "1" Input Voltage	Vcc = 4.5V	1		3		V	1, 2, 3
Vil	Logical "0" Input Voltage	Vcc = 4.5V	1			0.8	V	1, 2
			1			0.5	V	3
Voh	Logical "1" Output Voltage	Vcc = 4.5V, Iout = -360uA, Vih = 3V, Vil = 0.8V			2.4		V	1, 2, 3
Vol	Logical "0" Output Voltage	Vcc = 4.5V, Iout = 360uA, Vih = 3V, Vil = 0.8V				0.4	V	1, 2, 3

## Electrical Characteristics

### DC PARAMETERS: OUTPUT DRIVE:

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
I <sub>source</sub>	Output Source Current	V <sub>cc</sub> = 5V, V <sub>out</sub> = 0, V <sub>in</sub> = 0			-1.75		mA	1
		V <sub>cc</sub> = 10V, V <sub>out</sub> = 0, V <sub>in</sub> = 0			-8		mA	1
I <sub>sink</sub>	Output Sink Current	V <sub>cc</sub> = 5V, V <sub>out</sub> = 5V, V <sub>in</sub> = 5V			1.75		mA	1
		V <sub>cc</sub> = 10V, V <sub>out</sub> = 10V, V <sub>in</sub> = 10V			8		mA	1

### AC PARAMETERS: PROPAGATION DELAY TIME:

(The following conditions apply to all the following parameters, unless otherwise specified.)  
 AC: C<sub>l</sub> = 50pF, R<sub>l</sub> = 200K Ohms or equivalent impedance provided by diode load.

t <sub>PHL</sub>	Clock to Q	V <sub>cc</sub> = 5V				400	nS	9
t <sub>PLH</sub>	Clock to Q	V <sub>cc</sub> = 5V				400	nS	9
t <sub>PHL</sub>	Clock to Carry	V <sub>cc</sub> = 5V				450	nS	9
t <sub>PLH</sub>	Clock to Carry	V <sub>cc</sub> = 5V				450	nS	9
t <sub>PHL</sub>	Enable T to Carry	V <sub>cc</sub> = 5V				290	nS	9
t <sub>PLH</sub>	Enable T to Carry	V <sub>cc</sub> = 5V				290	nS	9
t <sub>PHL</sub>	Clear to Q	V <sub>cc</sub> = 5V				300	nS	9
t <sub>W</sub>	Minimum Clock Pulse Width	V <sub>cc</sub> = 5V	1			170	nS	9

Note 1: Parameter tested go-no-go only.