

## 1.1GHz Dual Modulus Prescaler

The MC12022A can be used with CMOS synthesizers requiring positive edges to trigger internal counters such as Motorola's MC145XXX series in a PLL to provide tuning signals up to 1.1GHz in programmable frequency steps.

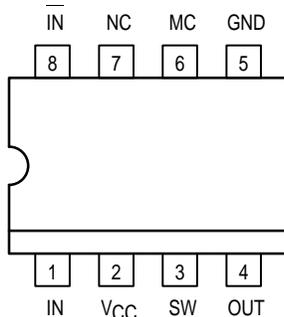
The MC12022B can be used with CMOS synthesizers requiring negative edges to trigger internal counters.

A Divide Ratio Control (SW) permits selection of a 64/65 or 128/129 divide ratio as desired.

The Modulus Control (MC) selects the proper divide number after SW has been biased to select the desired divide ratio.

- 1.1 GHz Toggle Frequency
- Supply Voltage of 4.5 to 5.5V
- Low-Power 7.5mA Typical
- Operating Temperature Range of -40 to +85°C
- Short Setup Time ( $t_{set}$ ) 16ns Maximum @ 1.1GHz
- Modulus Control Input Level Is Compatible With Standard CMOS and TTL. Maximum Input Voltage Should Be Limited to 6.5Vdc

**Pinout: 8-Lead Plastic (Top View)**



### FUNCTIONAL TABLE

SW	MC	Divide Ratio
H	H	64
H	L	65
L	H	128
L	L	129

Note: SW: H =  $V_{CC}$ , L = Open

MC: H = 2.0 V to  $V_{CC}$ , L = GND to 0.8 V

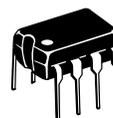
### MAXIMUM RATINGS

Symbol	Characteristic	Range	Unit
$V_{CC}$	Power Supply Voltage, Pin 2	-0.5 to + 7.0	Vdc
$T_A$	Operating Temperature Range	-40 to + 85	°C
$T_{stg}$	Storage Temperature Range	-65 to + 150	°C
MC	Modulus Control Input, Pin 6	-0.5 to + 6.5	Vdc

**MC12022A**  
**MC12022B**

### MECL PLL COMPONENTS

**÷64/65, ÷128/129**  
**DUAL MODULUS**  
**PRESCALER**



**P SUFFIX**  
8-LEAD PLASTIC PACKAGE  
CASE 626-05



**D SUFFIX**  
8-LEAD PLASTIC SOIC PACKAGE  
CASE 751-05



**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 4.5$  to  $5.5V$ ;  $T_A = -40^{\circ}C$  to  $+85^{\circ}C$ )

Symbol	Characteristic	Min	Typ	Max	Unit
$f_t$	Toggle Frequency (Sine Wave Input)	0.1	1.6	1.1	GHz
$I_{CC}$	Supply Current Output Unloaded (Pin 2)		7.5	10	mA
$V_{IH1}$	Modulus Control Input High (MC)	2.0		$V_{CC}$	V
$V_{IL1}$	Modulus Control Input Low (MC)			0.8	V
$V_{IH2}$	Divide Ratio Control Input High (SW)	$V_{CC}$	$V_{CC}$	$V_{CC}$	Vdc
$V_{IL2}$	Divide Ratio Control Input Low (SW)	Open	Open	Open	—
$V_{out}$	Output Voltage Swing ( $C_L = 12pF$ ; $R_L = 2.2k\Omega$ )	1.0	1.6		$V_{p-p}$
$t_{set}$	Modulus Setup Time MC to Out		11	16	ns
$V_{in}$	Input Voltage Sensitivity 250–1100 MHz 100–250 MHz	100 400		1500 1500	mVpp
$I_O$	Output Current ( $C_L = 12pF$ ; $R_L = 2.2k\Omega$ )		1.5	4.0	mA

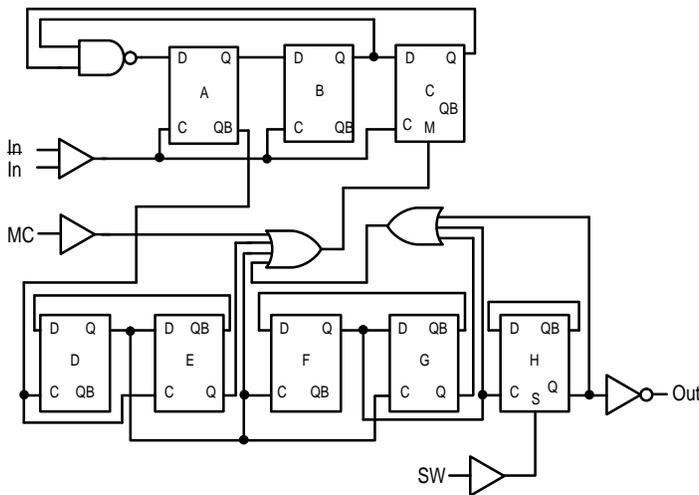
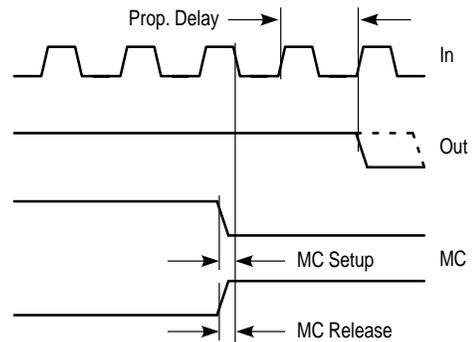
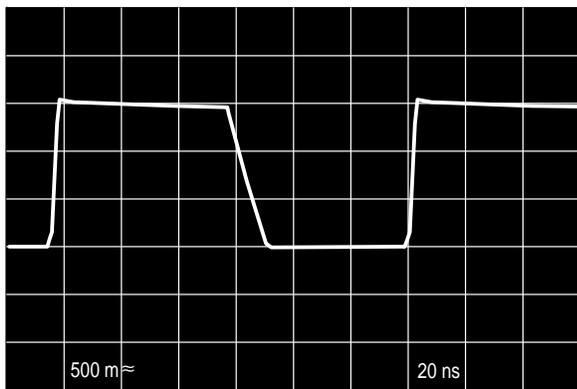


Figure 1. Logic Diagram (MC12022A)

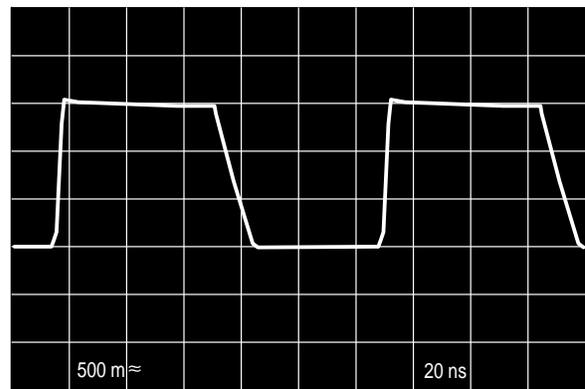


Modulus setup time MC to out is the MC setup or MC release plus the prop delay.

Figure 2. Modulus Setup Time



( $\pm 64$ , 500MHz Input Frequency,  $V_{CC} = 5.0V$ ,  $T_A = 25^{\circ}C$ , Output Loaded)



( $\pm 128$ , 1.1GHz Input Frequency,  $V_{CC} = 5.0V$ ,  $T_A = 25^{\circ}C$ , Output Loaded)

Figure 3. Typical Output Waveforms

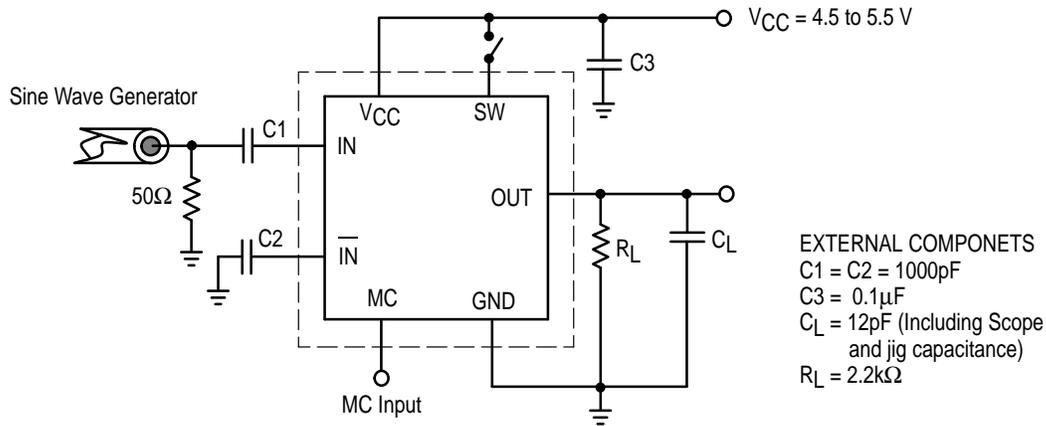


Figure 4. AC Test Circuit

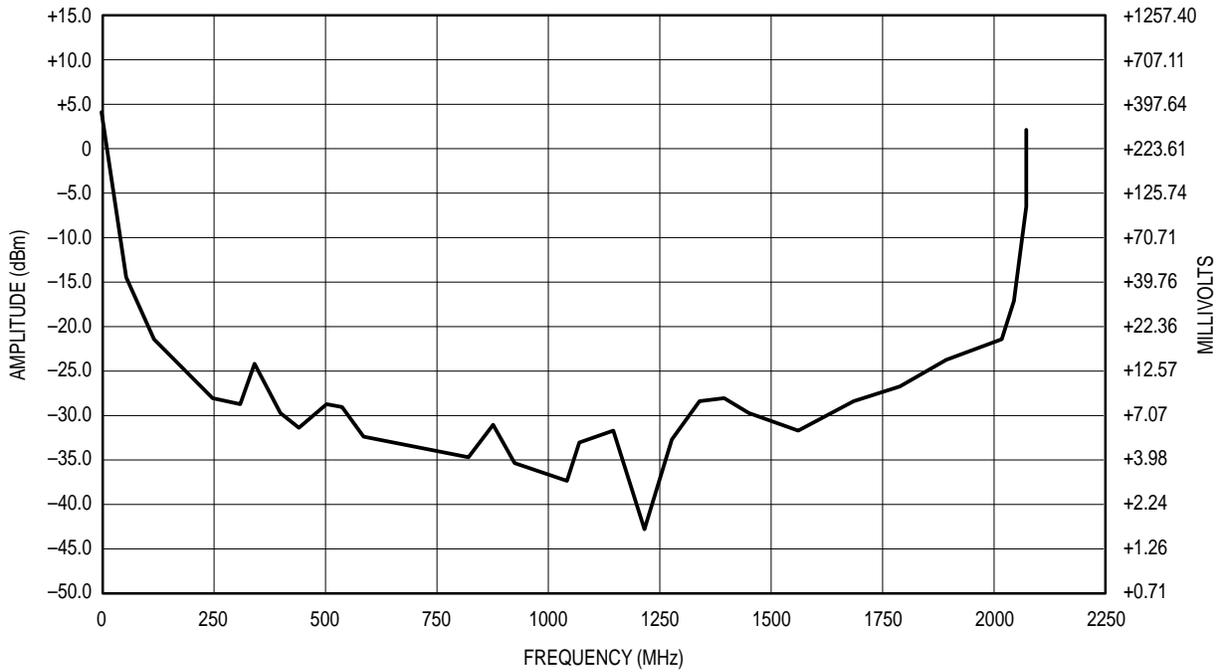


Figure 5. Input Signal Amplitude versus Input Frequency  
 Divide Ratio = 8; VCC = 5.0V; TA = 25°C

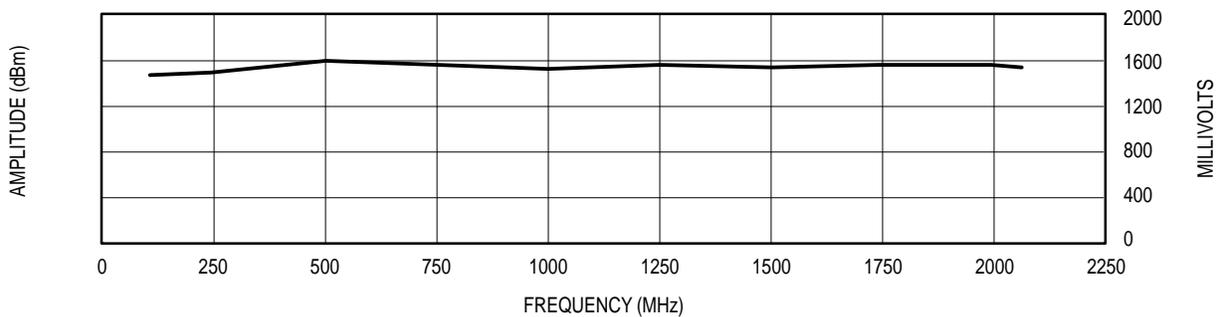


Figure 6. Output Amplitude versus Input Frequency

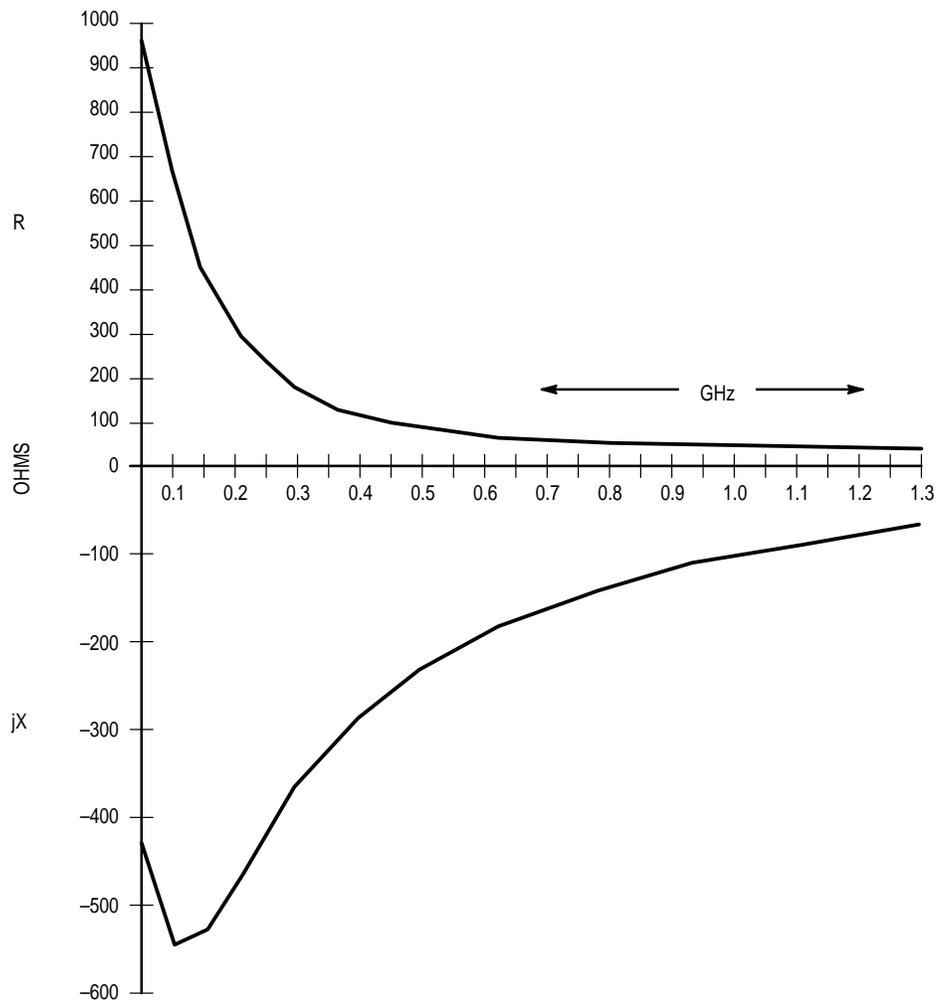


Figure 7. Typical Input Impedance versus Input Frequency

