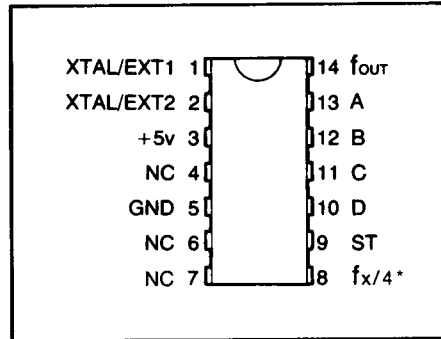


## Baud Rate Generator Programmable Divider

### FEATURES

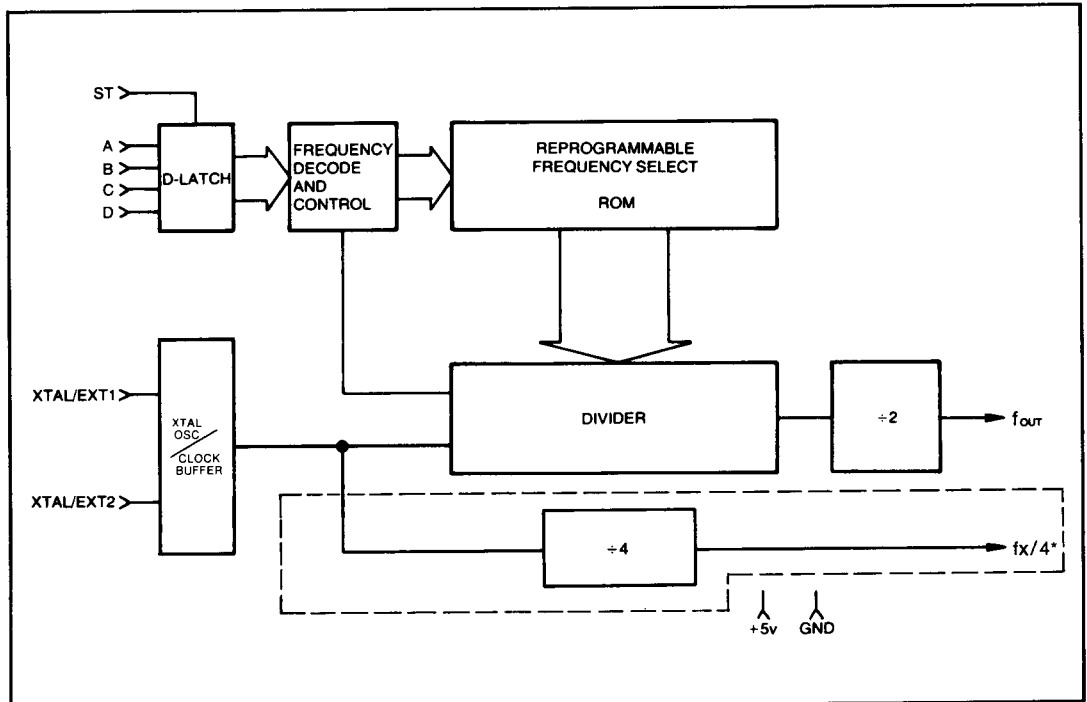
- On chip crystal oscillator or external frequency input
- Single +5v power supply
- Choice of 16 output frequencies
- 16 asynchronous/synchronous baud rates
- Direct UART/USRT/ASTRO/USYNRT compatibility
- High frequency reference output\*
- Re-programmable ROM via CLASP® technology allows generation of other frequencies
- TTL, MOS compatibility
- Compatible with COM 5026/COM 5046

### PIN CONFIGURATION



SECTION IV

### BLOCK DIAGRAM



\*COM 8146/T only

## General Description

The Standard Microsystem's COM 8126/COM 8146 is an enhanced version of the COM 5026/COM 5046 Baud Rate Generator. It is fabricated using SMC's patented COPLAMOS® and CLASP® technologies and employs depletion mode loads, allowing operation from a single +5v supply.

The standard COM 8126/COM 8146 is specifically dedicated to generating the full spectrum of 16 asynchronous/synchronous data communication frequencies for 16X UART/USRT devices. A large number of the frequencies available are also useful for 1X and 32X ASTRO/USYNRT devices.

The COM 8126/COM 8146 features an internal crystal oscillator which may be used to provide the master reference frequency. Alternatively, an external reference may be supplied by applying complementary TTL level signals to pins 1 and 2. Parts suitable for use only with an external TTL reference are marked COM 8126T/COM 8146T. TTL outputs used to drive the COM 8126/COM 8146 or COM 8126T/COM 8146T XTAL/EXT inputs should not be used to drive other TTL inputs, as noise immunity may be compromised due to excessive loading.

The output of the oscillator/buffer is applied to the divider for generation of the output frequency. The divider is capable of dividing by any integer from 6 to  $2^{19} + 1$ , inclusive. If the divisor is even, the output will be square; otherwise the output will be high longer than it is low by one  $f_x$  clock period.

The reference frequency ( $f_x$ ) is used to provide a high frequency output at  $f_x/4$  on the COM 8146/T.

The divisor ROM contains 16 divisors, each 19 bits wide, and is fabricated using SMC's unique CLASP® technology. This process permits reduction of turnaround time for ROM patterns. The four divisor select bits are held in an externally strobed data latch. The strobe input is level sensitive: while the strobe is high, data is passed directly through to the ROM. Initiation of a new frequency is affected within 3.5 $\mu$ s of a change in any of the four divisor select bits (strobe activity is not required). This feature may be disabled through a CLASP® programming option causing new frequency initiation to be delayed until the end of the current  $f_{out}$  half-cycle. The divisor select inputs have pull-up resistors; the strobe input does not.

### Description of Pin Functions

Pin No.	Symbol	Name	Function
1	XTAL/EXT1	Crystal or External Input 1	This input is either one pin of the crystal package or one polarity of the external input.
2	XTAL/EXT2	Crystal or External Input 2	This input is either the other pin of the crystal package or the other polarity of the external input.
3	V <sub>CC</sub>	Power Supply	+5 volt supply
4,6,7	NC	No Connection	
5	GND	Ground	Ground
8	$f_x/4$ *	$f_x/4$	$\frac{1}{4}$ crystal/clock frequency reference output.
9	ST	Strobe	A high level strobe loads the input data (A, B, C, D) into the input divisor select register. This input may be strobed or hard-wired to a high level.
10-13	D,C,B,A	Divisor Select Data Bits	The logic level on these inputs as shown in Table 1, selects the output frequency.
14	$f_{out}$	Output Frequency	This output runs at a frequency selected by the divisor select data bits.

\*COM 8146/T only

# ELECTRICAL CHARACTERISTICS COM8046, COM8046T, COM8116, COM8116T, COM8126, COM8126T, COM8136, COM8136T, COM8146, COM8146T

## MAXIMUM GUARANTEED RATINGS\*

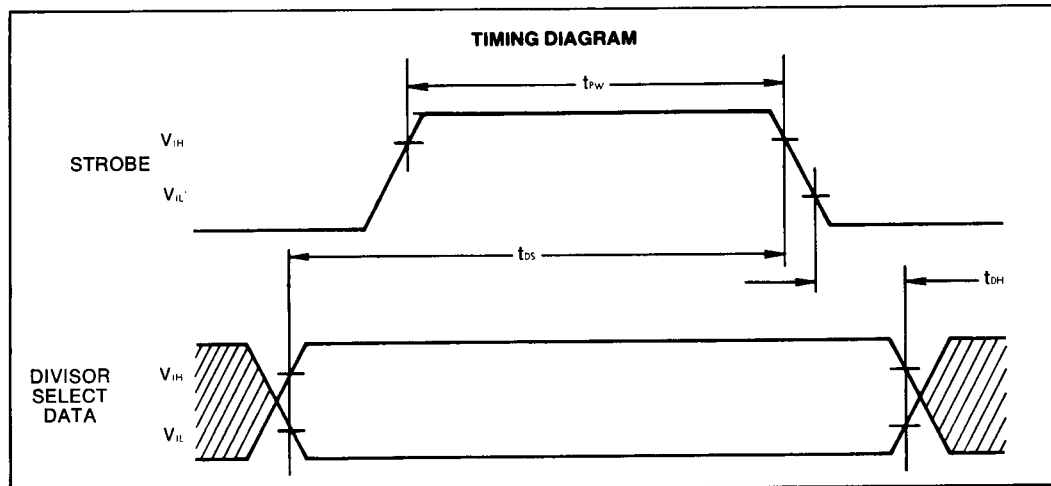
Operating Temperature Range	.....0°C to + 70°C
Storage Temperature Range	.....-55°C to +150°C
Lead Temperature (soldering, 10 sec.)	.....+325°C
Positive Voltage on any Pin, with respect to ground	.....+8.0V
Negative Voltage on any Pin, with respect to ground	.....-0.3V

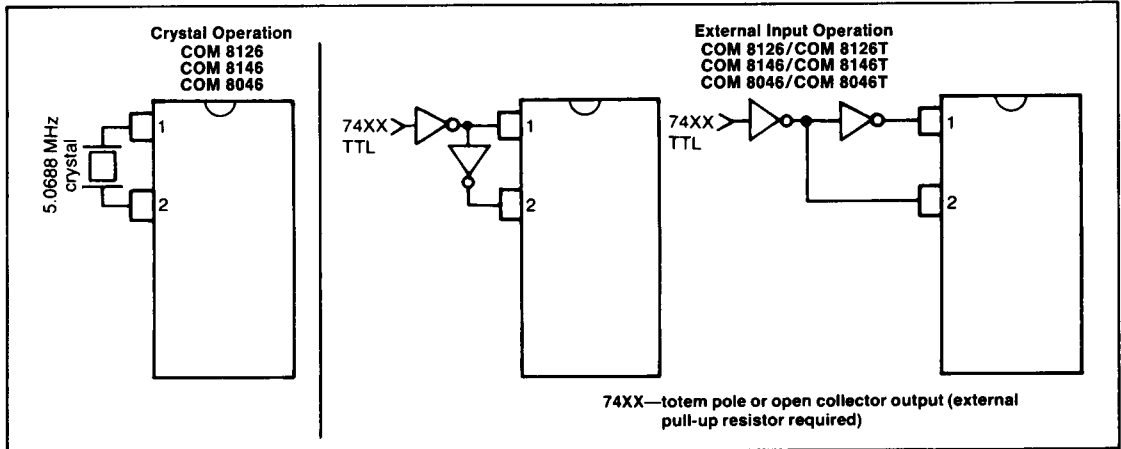
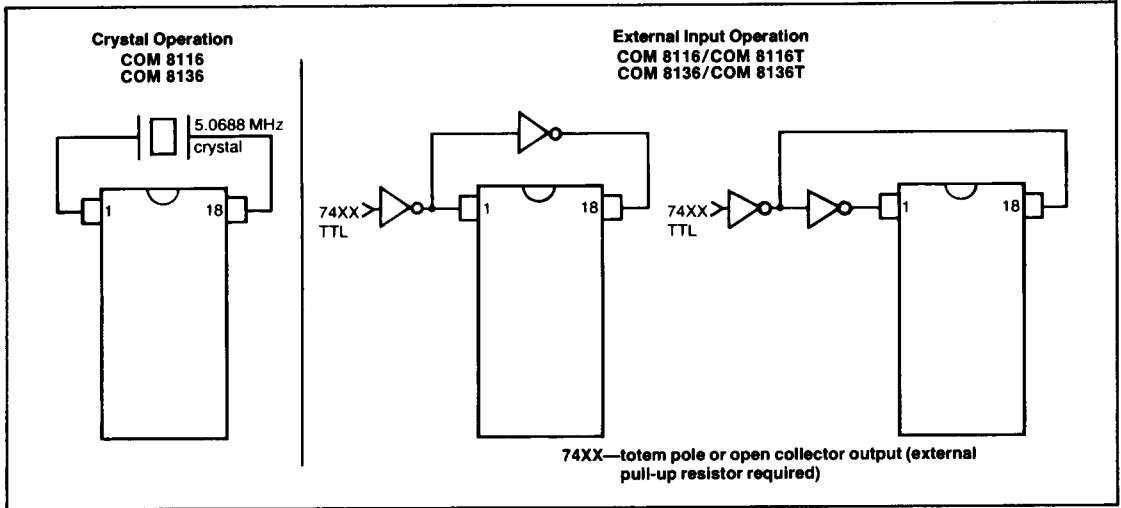
\*Stresses above those listed may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or at any other condition above those indicated in the operational sections of this specification is not implied.

NOTE: When powering this device from laboratory or system power supplies, it is important that the Absolute Maximum Ratings not be exceeded or device failure can result. Some power supplies exhibit voltage spikes or "glitches" on their outputs when the AC power is switched on and off. In addition, voltage transients on the AC power line may appear on the DC output. If this possibility exists it is suggested that a clamp circuit be used.

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=0°C to 70°C, V<sub>CC</sub>= +5V ± 5%, unless otherwise noted)

Parameter	Min.	Typ.	Max.	Unit	Comments
<b>D.C. CHARACTERISTICS</b>					
<b>INPUT VOLTAGE LEVELS</b>					
Low-level, V <sub>IL</sub>	2.0		0.8	V	excluding XTAL inputs
High-level, V <sub>IH</sub>				V	
<b>OUTPUT VOLTAGE LEVELS</b>					
Low-level, V <sub>OL</sub>	3.5		0.4	V	I <sub>OL</sub> = 1.6mA, for f <sub>X</sub> /4, f <sub>O</sub> /16
			0.4	V	I <sub>OL</sub> = 3.2mA, for f <sub>O</sub> , f <sub>R</sub> , f <sub>T</sub>
			0.4	V	I <sub>OL</sub> = 0.8mA, for f <sub>X</sub>
High-level, V <sub>OH</sub>				V	I <sub>OH</sub> = -100μA; for f <sub>X</sub> , I <sub>OH</sub> = -50μA
<b>INPUT CURRENT</b>					
Low-level, I <sub>IL</sub>			-0.1	mA	V <sub>IN</sub> = GND, excluding XTAL inputs
<b>INPUT CAPACITANCE</b>					
All inputs, C <sub>IN</sub>		5	10	pF	V <sub>IN</sub> = GND, excluding XTAL inputs
<b>EXT INPUT LOAD</b>					
		8	10		Series 7400 equivalent loads
<b>POWER SUPPLY CURRENT</b>					
I <sub>CC</sub>			50	mA	
<b>A.C. CHARACTERISTICS</b>					
<b>CLOCK FREQUENCY, f<sub>IN</sub></b>					
	0.01		7.0	MHz	T <sub>A</sub> = +25°C XTAL/EXT, 50% Duty Cycle ±5% COM 8046, COM 8126, COM 8146
	0.01		5.1	MHz	XTAL/EXT, 50% Duty Cycle ±5% COM 8116, COM 8136
<b>STROBE PULSE WIDTH, t<sub>PW</sub></b>					
	150		DC	ns	
<b>INPUT SET-UP TIME</b>					
t <sub>BS</sub>	200			ns	
<b>INPUT HOLD TIME</b>					
t <sub>BH</sub>	50			ns	
<b>STROBE TO NEW FREQUENCY DELAY</b>					
			3.5	μs	@ f <sub>X</sub> = 5.0 MHz





For ROM re-programming SMC has a computer program available whereby the customer need only supply the input frequency and the desired output frequencies. The ROM programming is automatically generated.

**Crystal Specifications**

User must specify termination (pin, wire, other)  
 Prefer: HC-18/U or HC-25/U  
 Frequency — 5.0688 MHz, AT cut  
 Temperature range 0°C to 70°C  
 Series resistance < 50 Ω  
 Series Resonant  
 Overall tolerance ± .01%  
 or as required

**Crystal manufacturers** (Partial List)

**Northern Engineering Laboratories**

357 Beloit Street  
 Burlington, Wisconsin 53105  
 (414) 763-3591

**Bulova Frequency Control Products**

61-20 Woodside Avenue  
 Woodside, New York 11377  
 (212) 335-6000

**CTS Knights Inc.**

101 East Church Street  
 Sandwich, Illinois 60548  
 (815) 786-8411

**Crystek Crystals Corporation**

1000 Crystal Drive  
 Fort Myers, Florida 33901  
 (813) 936-2109

# COM 8046

# COM 8046T

**Table 2**  
REFERENCE FREQUENCY = 5.068800MHz

Divisor Select EDCBA	Desired Baud Rate	Clock Factor	Desired Frequency (KHz)	Divisor	Actual Baud Rate	Actual Frequency (KHz)	Deviation
00000	50.00	32X	1.60000	3168	50.00	1.600000	0.0000%
00001	75.00	32X	2.40000	2112	75.00	2.400000	0.0000%
00010	110.00	32X	3.52000	1440	110.00	3.520000	0.0000%
00011	134.50	32X	4.30400	1177	134.58	4.306542	0.0591%
00100	150.00	32X	4.80000	1056	150.00	4.800000	0.0000%
00101	200.00	32X	6.40000	792	200.00	6.400000	0.0000%
00110	300.00	32X	9.60000	528	300.00	9.600000	0.0000%
00111	600.00	32X	19.20000	264	600.00	19.200000	0.0000%
01000	1200.00	32X	38.40000	132	1200.00	38.400000	0.0000%
01001	1800.00	32X	57.60000	88	1800.00	57.600000	0.0000%
01010	2400.00	32X	76.80000	66	2400.00	76.800000	0.0000%
01011	3600.00	32X	115.20000	44	3600.00	115.200000	0.0000%
01100	4800.00	32X	153.60000	33	4800.00	153.600000	0.0000%
01101	7200.00	32X	230.40000	22	7200.00	230.400000	0.0000%
01110	9600.00	32X	307.20000	16	9900.00	316.800000	3.1250%
01111	19200.00	32X	614.40000	8	19800.00	633.600000	3.1250%
10000	50.00	16X	0.80000	6336	50.00	0.800000	0.0000%
10001	75.00	16X	1.20000	4224	75.00	1.200000	0.0000%
10010	110.00	16X	1.76000	2880	110.00	1.760000	0.0000%
10011	134.50	16X	2.15200	2355	134.52	2.152357	0.0166%
10100	150.00	16X	2.40000	2112	150.00	2.400000	0.0000%
10101	300.00	16X	4.80000	1056	300.00	4.800000	0.0000%
10110	600.00	16X	9.60000	528	600.00	9.600000	0.0000%
10111	1200.00	16X	19.20000	264	1200.00	19.200000	0.0000%
11000	1800.00	16X	28.80000	176	1800.00	28.800000	0.0000%
11001	2000.00	16X	32.00000	158	2005.06	32.081013	0.2532%
11010	2400.00	16X	38.40000	132	2400.00	38.400000	0.0000%
11011	3600.00	16X	57.60000	88	3600.00	57.600000	0.0000%
11100	4800.00	16X	76.80000	66	4800.00	76.800000	0.0000%
11101	7200.00	16X	115.20000	44	7200.00	115.200000	0.0000%
11110	9600.00	16X	153.60000	33	9600.00	153.600000	0.0000%
11111	19200.00	16X	307.20000	16	19800.00	316.800000	3.1250%