

## SELECTABLE 4 DECADE CMOS DIVIDER

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### FEATURES:

- Selectable Divide by 10 or 100 or 1,000 or 10,000
- Clock Input Shaping Network Accepts Fast or Slow Edge Inputs
- Active Oscillator Network for External Crystal
- Square Wave Output
- Output TTL Compatible at +4.5 Volt Operation
- High Noise Immunity
- Reset
- All Inputs Protected
- +4.5V to +15V Operation (VDD-VSS)
- Low Power Dissipation
- RDD104 (DIP); RDD104-S (SOIC) - See Figure 1

### PIN ASSIGNMENT - TOP VIEW

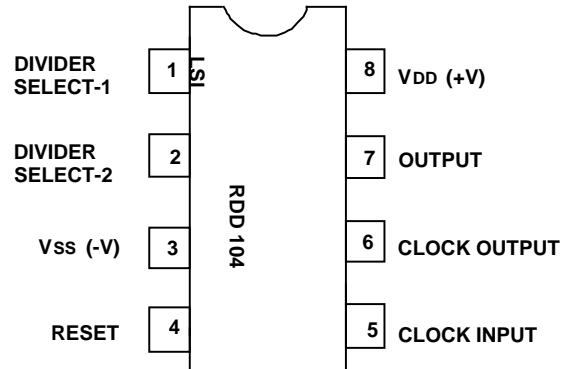


FIGURE 1

### DESCRIPTION OF OPERATION:

The RDD104 is a monolithic CMOS four decade divider circuit that advances on each negative transition of the input clock pulse. When the reset input is high the circuit is cleared to zero. The clock input is applied to a three stage inverting amplifier network whose output is brought out so that an external crystal network can be used to form an oscillator circuit. If the clock output is not used, the amplifier acts as an input buffer. Two select inputs are provided which enables the circuit to divide by 10, 100, 1,000 or 10,000.

### MAXIMUM RATINGS:

PARAMETER	SYMBOL	VALUE	UNIT
Storage Temperature	TSTG	-65 to +150	°C
Operating Temperature	TA	-40 to +85	°C
DC Supply Voltage	(VDD - VSS)	+18	V
Voltage at any input	VIN	VSS - 0.5 to VDD + 0.5	V

### DC ELECTRICAL CHARACTERISTICS:

(All voltages referenced to VSS)

	VDD	-40°C	+25°C	+85°C	UNIT	
Quiescent Device Current	4.5V	10	10	300	uA Max	
	10V	20	20	600	uA Max	
Output Voltage, Low Level	4.5V	0.01	0.01	0.05	V Min	
	10V	0.01	0.01	0.05	V Min	
	High Level	4.5V	4.49	4.49	4.45	V Max
		10V	9.99	9.99	9.95	V Max
Input Noise Immunity (Low and High)	4.5V	1.3	1.3	1.3	V Min	
	10V	3.0	3.0	3.0	V Min	
Output Drive Current: N-Channel Sink Current (VOUT = VSS + 0.4V)	4.5V	2.3	1.9	1.6	mA Min	
	10V	5.0	4.0	3.5	mA Min	
P-Channel Source Current (VOUT = VDD - 1V)	4.5V	1.1	0.95	0.8	mA Min	
	10V	2.5	2.1	1.8	mA Min	
Input Capacitance (any input)			5.0		pF Max	

The Output Division is selected according to the following truth table:

DIVIDER SELECT INPUTS:		OUTPUT DIVISION
SELECT 2	SELECT 1	
0	0	10,000
0	1	1,000
1	0	100
1	1	10

The information included herein is believed to be accurate and reliable. However, LSI Computer Systems, Inc. assumes no responsibilities for inaccuracies, nor for any infringements of patent rights of others which may result from its use.

### DYNAMIC ELECTRICAL CHARACTERISTICS:

( $C_L = 50\text{pF}$ , Input Rise and Fall Times = 20ns except for Clock, unless otherwise specified.)

	V <sub>DD</sub>	MIN	MAX	UNIT
Clock Input Frequency	4.5V	0	1.5	MHz
	10V	0	4.0	MHz
	15V	0	6.0	MHz
Clock Input Rise & Fall Times	4.5 to 15V	-	No Limit	
Clock Input Rise & Fall Time, $C_L = 15\text{pF}$	4.5V	-	140	ns
	10V	-	70	ns
Clock Output Propagation Delay, $C_L = 15\text{pF}$	4.5V	-	300	ns
	10V	-	150	ns
Output Rise & Fall Times	4.5V	-	400	ns
	10V	-	200	ns
Propagation Delay to Output	4.5V	-	1500	ns
	10V	-	750	ns
Reset Pulse Width	4.5V	800	-	ns
	10V	400	-	ns
Reset Removal Time	4.5V	-	500	ns
	10V	-	250	ns
Reset Propagation Delay to Output	4.5V	-	1400	ns
	10V	-	700	ns
Select Input Setup Time	4.5V	-	800	ns
	10V	-	400	ns

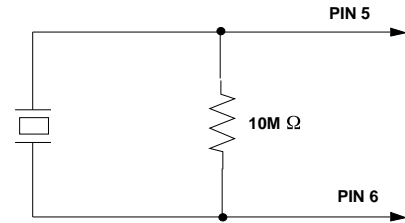


FIGURE 2.  
MINIMUM PARTS OSCILLATOR CIRCUIT

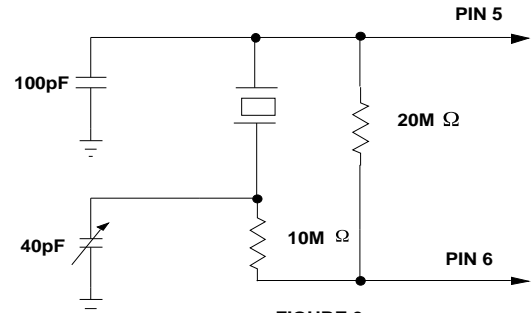


FIGURE 3.  
TYPICAL OSCILLATOR CIRCUIT WITH TRIM - 1 MHz AND BELOW

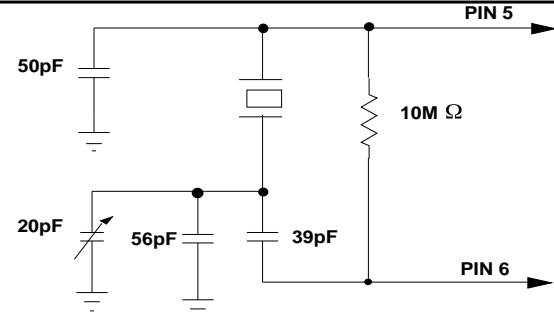


FIGURE 4.  
TYPICAL OSCILLATOR CIRCUIT WITH TRIM - ABOVE 1 MHz

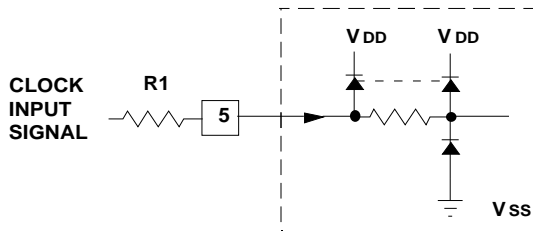


FIGURE 5. TYPICAL INPUT

If input signals are less than  $V_{SS}$  or greater than  $V_{DD}$ , a series input resistor, R1, should be used to limit the maximum input current to 2 milliamperes.

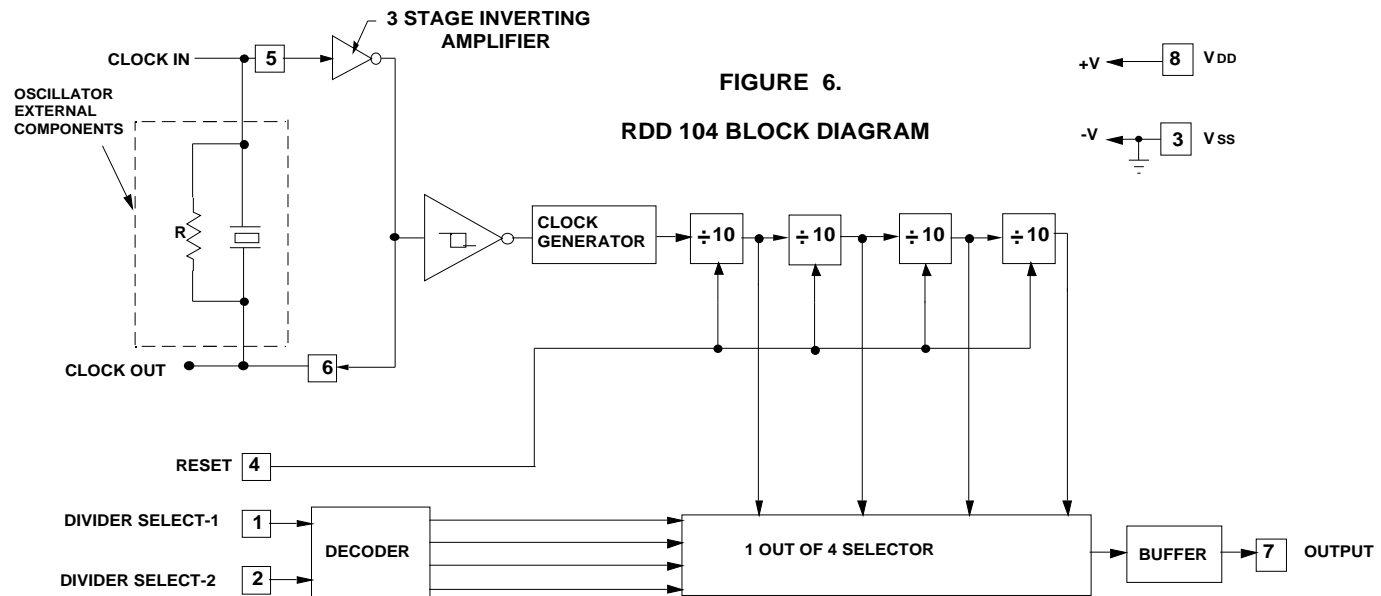


FIGURE 6.

RDD 104 BLOCK DIAGRAM