



# SP8712B

2400MHz ÷ 4

The SP8712B is an asynchronous emitter coupled logic counter which provides ECL 10K compatible outputs and can drive 100 ohm lines. It operates from a -6.8V supply or split supplies of +5V and -1.8V. Otherwise it is similar to the SP8610 and SP8611.

### FEATURES

- ECL Compatible Output
- AC Coupled Input (Internal Bias)
- Typical Operating Frequency 2.5GHz

### QUICK REFERENCE DATA

- Supply Voltage: -6.8V
- Power Consumption: 630mW typ.
- Output Voltage Swing 800mV typ.

### ABSOLUTE MAXIMUM RATINGS

Supply voltage (V <sub>CC</sub> - V <sub>EE</sub> )	8V
Output current	15mA
Storage temperature range	-55°C to +150°C
Max. junction temperature	+175°C
Max. clock I/P voltage	2.5V p-p

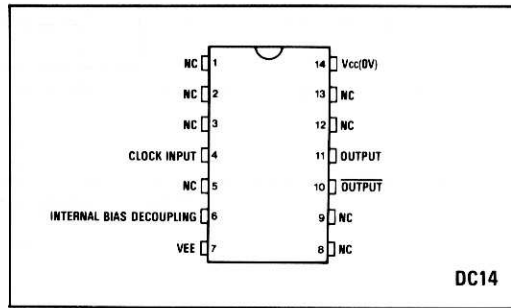


Fig.1 Pin connections - top view

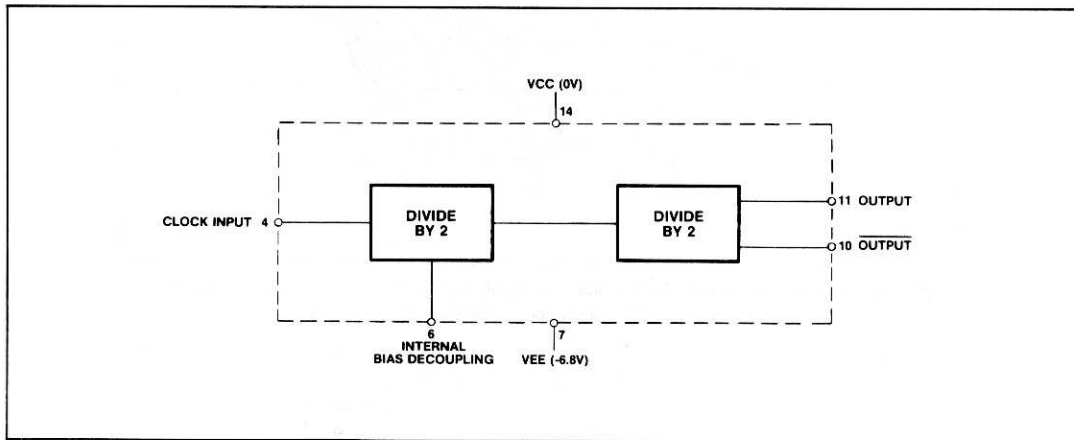


Fig.2 Block diagram

**ELECTRICAL CHARACTERISTICS**

**Test conditions (unless otherwise stated):**

Supply voltage:  $V_{CC} = 0V$ ,  $V_{EE} = -6.8V \pm 0.35V$

Temperature:  $T_{amb} = 0^{\circ}C$  to  $+70^{\circ}C$

Characteristic	Symbol	Value		Units	Conditions	Notes
		Min.	Max.			
Maximum frequency sinewave input	$f_{max}$	2.4		GHz	Input = 600mV pk-pk	Note 4
Minimum frequency sinewave input	$f_{min}$		500	MHz	Input = 400mV pk-pk	Note 5
Power supply current	$I_{EE}$		110	mA	Outputs unloaded $V_{EE} = -7.15V$	Note 5
Output low voltage	$V_{OL}$	-0.93	-0.7	V	Outputs loaded with 620Ω to $V_{EE} = -6.8V$ (25° C)	
Output high voltage	$V_{OH}$	-1.9	-1.6	V	Outputs loaded with 620Ω to $V_{EE} = -6.8V$ (25° C)	
Minimum output swing	$V_{OUT}$	0.7		V	Outputs loaded with 620Ω to $V_{EE} = -6.8V$	Note 5

**NOTES**

1. Unless otherwise stated the electrical characteristics are guaranteed over specified supply, frequency and temperature range.
2. The temperature coefficients of  $V_{OH} = +1.2mV/^{\circ}C$  and  $V_{OL} = +0.24mV/^{\circ}C$  but these are not tested.
3. The test configuration for dynamic testing is shown in Fig.5.
4. Tested at  $+70^{\circ}C$  only.
5. Tested at  $25^{\circ}C$  only.

\* Tested as specified in table of Electrical Characteristics

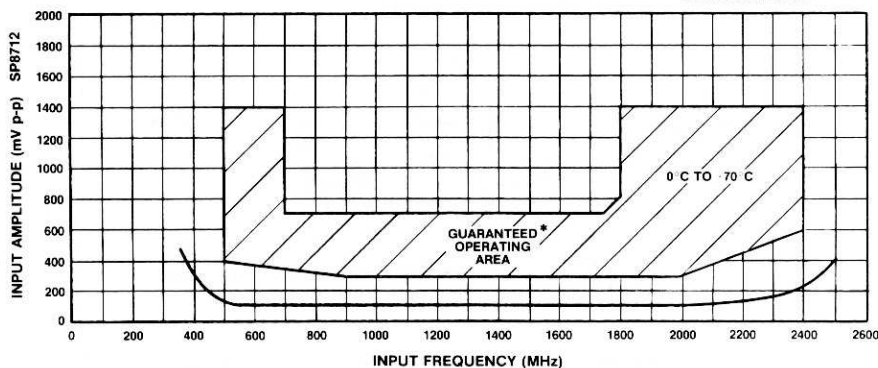


Fig.3 Typical input characteristics SP8712

**OPERATING NOTES**

1. The clock input (pin 4) should be capacitively coupled to the signal source. The input signal path is completed by connecting a capacitor from the internal bias decoupling pin (6) to ground.
2. If no signal is present the device will self-oscillate. If this is undesirable it may be prevented by connecting a 10k resistor from the input to  $V_{EE}$  (i.e. pin 4 to pin 7). This reduces sensitivity by approximately 100mV.
3. The input can be operated at very low frequencies but slew rate must be better than  $200V/\mu s$ .
4. The input impedance of the SP8712 is a function of frequency. See Fig.4.
5. The emitter follower outputs require external load resistors. These should not be less than 330 ohms, and a value of 620 ohms is recommended. Interfacing to ECL III/10K is shown in Fig.7.
6. These devices may be used with split supply lines by means of the circuit of Fig.6. Some improvement in the upper frequency of operation may be obtained under these conditions, but suitable circuit layout must be employed to achieve this improvement.
7. To obtain the best performance from these devices, good RF construction techniques must be employed: the use of leadless chip capacitors is recommended.

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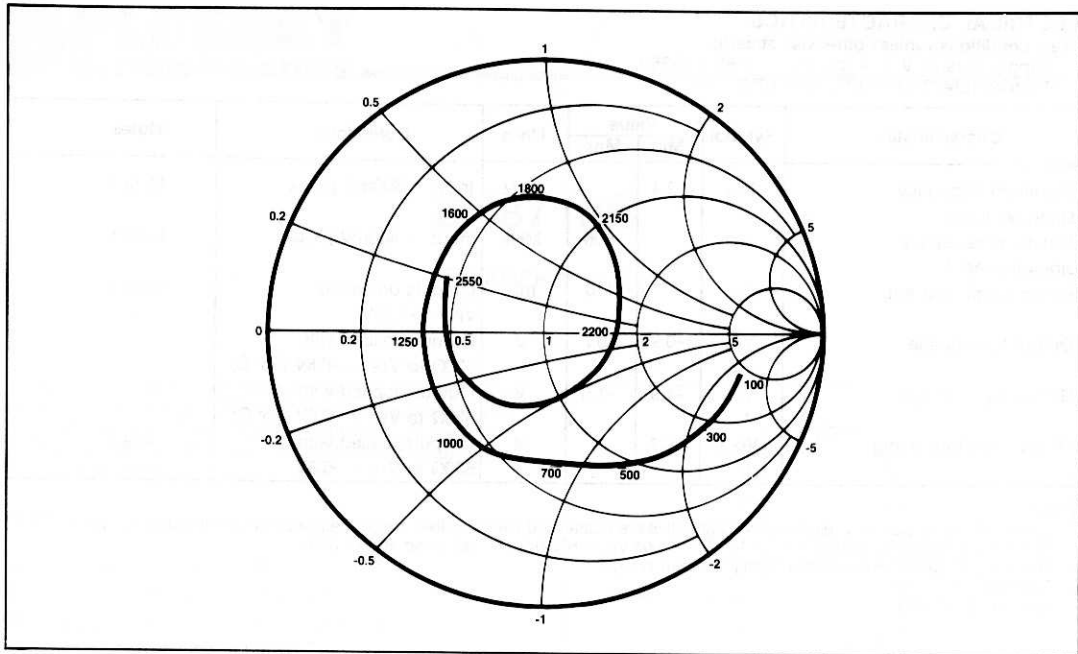


Fig.4 Typical input impedance. Test conditions: supply voltage -6.8V, ambient temperature 25° C. Frequencies in MHz, impedances normalised to 50 ohms.

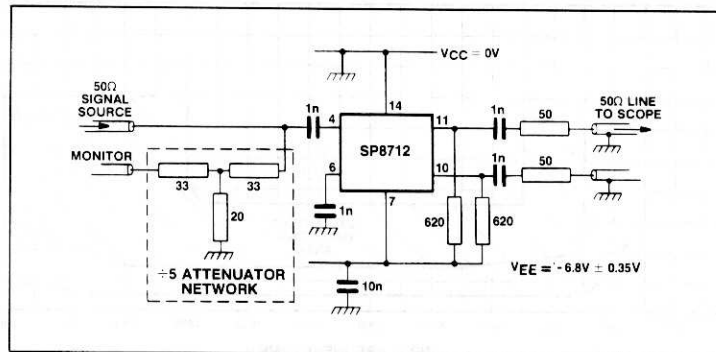


Fig.5 Toggle frequency test circuit

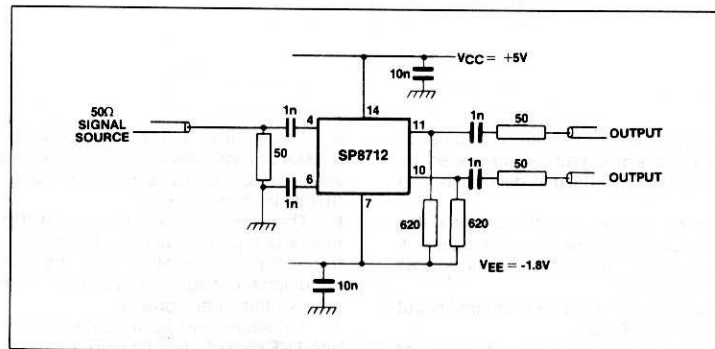


Fig.6 Operation on split supply voltages

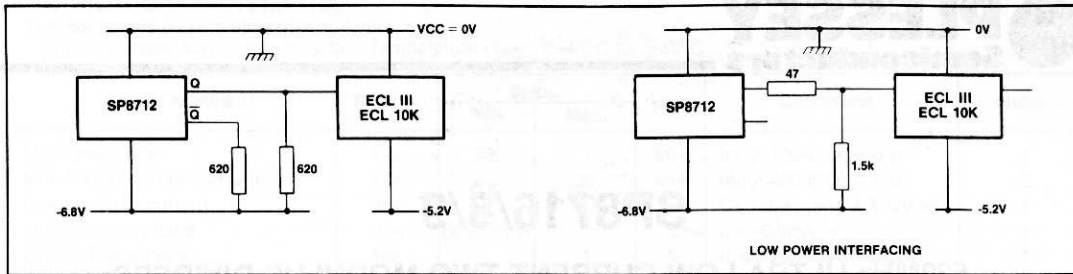


Fig.7 Interfacing SP8712 series to ECL 10K and ECL III

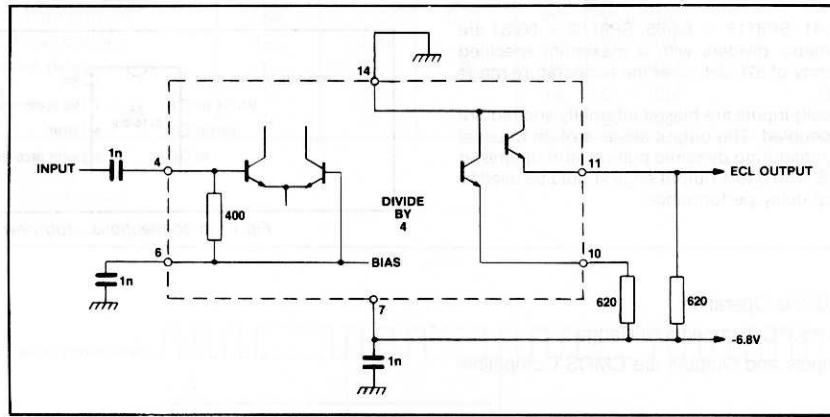


Fig.8 Typical application showing interfacing