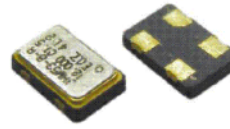


- Provides up to 12dB reduction in system EMI
- 'Drop-in' replacement for standard clocks
- Choice of modulation rate and spread
- Miniature package: 3.2 mm x 2.5 mm x 1.0mm



In electrical systems the principal cause of electro-magnetic interference (EMI) is the system clock oscillator. Traditional methods of 'patching-up' systems with too high a level of EMI is to use ferrite beads, filters, ground planes, metal shielding and similar costly methods, However, the most efficient and economic method to reduce EMI is to reduce it at source: replace the system clock oscillator with a low EMI clock oscillator.

Compared with conventional clock oscillators, Spread Spectrum (Dithered) Oscillators can reduce EMI by as much as 12dB. The part is a 'drop-in' replacement for a standard clock oscillator hence there is no requirement to re-design existing PCBs.

**DESCRIPTION**

EQHM32 series low EMI oscillators can reduce system EMI by 12dB. The oscillators are a 'drop-in' replacement for standard oscillators. EMI reduction is achieved by the use of Spread Spectrum Technology whereby the mode energy is spread over a wider bandwidth. The modulation carrier frequency, operating in the kHz region, makes the process transparent to the oscillator frequency. There is a choice of modulation rates and spread to suit application requirements.

**SPREAD SPECTRUM TECHNOLOGY**

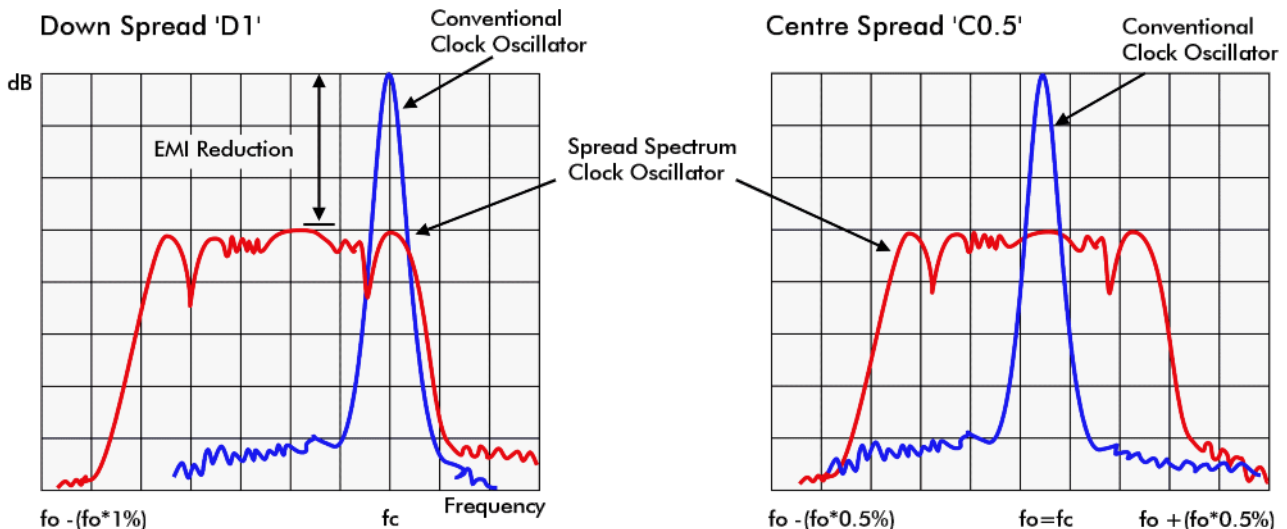
Unlike a conventional clock oscillator, in a Spread Spectrum Clock Oscillator the mode energy is spread over a wider bandwidth. This is achieved by the frequency modulation technique. The controlled modulation process may be applied to the 'down' side of the nominal frequency (known as **DOWN SPREAD**), or spread equally either side of nominal (**CENTRE SPREAD**). Down Spread is preferred if over-clocking would cause a problem to the system.

**APPLICATIONS**

- Printers, Multiple Function Printers (MPCs)
- Digital Copiers; PDAs
- Networking: LAN/WAN; Routers
- Storage Systems (CD-ROM, VCD, DVD, HDD)
- Scanners; Modems; Projectors
- Embedded Systems
- Musical Instruments
- Automotive: GPS car navigation systems
- LCD PC Monitors; LSD TVs
- ADSL; PCMCIA
- Still Digital Cameras (SDCs)

**MODULATION TYPES - EXAMPLES**

Output amplitude (dB) vs. frequency span (MHz)



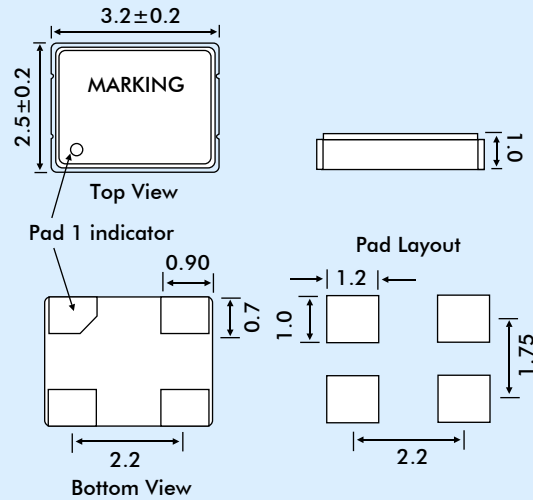
### SPECIFICATION

Model No:	EQHM32 (Group 'C')
Frequency Range:	16MHz to 40MHz
Spread Types:	See table below
EMI Reduction*:	3dB to 12dB (typ.) For main mode
Modulation Carrier Frequency:	20.9kHz min, 52.4kHz max. Frequency dependent Call for details
Output Logic:	CMOS
Input Voltage:	Vdd = +1.8VDC ±10% Vdd = +2.5VDC ±10% Vdd = +3.3VDC ±10%
Frequency Stability***	
Commercial (0~70°C):	±25ppm (Spec. code = 'A') ±50ppm (Spec. code = 'B') ±100ppm (Spec. code = 'C')
Industrial (-40~+85°C):	±25ppm (Spec. code = 'D') ±50ppm (Spec. code = 'E') ±100ppm (Spec. code = 'F')
Output Voltage HIGH '1':	90%Vdd
Output Voltage LOW '0':	10%Vdd
Rise/fall Times:	10ns max. (1.8VDC) 7ns max. (2.5VDC) 7ns max. (3.3VDC)
Load:	15pF
Start-up Time:	1ms typical, 5ms max.
Storage Temperature:	-55° to +125°C
Current Consumption:	
1.8VDC	4mA (max.)
2.5VDC	5mA (max.)
3.3VDC	6mA (max.)
Duty Cycle:	50%±10% (CL=15pF, 50%Vdd)
Static Discharge Voltage:	>2000V (per MIL STD 833)
Ageing:	±5ppm /year max at Ta=25°C
Packaging:	EIA 16mm tape and reel, 1k per.
Pad 1 Option:	Output Enable/Disable. Output is high impedance when taken low Output enable time 5ms max. Output disable time 100ns max.

#### Notes:

- \* EMI reduction is applied to the entire frequency spectrum
- \*\* dBc: with respect to no modulation. Frequency and total % spread dependant.
- \*\*\* Frequency Stability parameter excludes modulation.

### OUTLINE & DIMENSIONS



#### Pad Connections

- 1 Enable/Disable
- 2 Ground
- 3 Output
- 4 Supply Voltage

### ENVIRONMENTAL SPECIFICATION

RoHS Compliance:	RoHS compliant and Pb (lead) free
Storage Temperature Range:	-55° to +125°C
Humidity:	85% RH, 85°C for 48 hours
Hermetic Seal:	Leak Rate 2x10 <sup>-8</sup> ATM-cm <sup>3</sup> /s max.
Solderability:	MIL-STD-2002F method 208E
Reflow:	260° for 10 seconds
Vibration:	MIL-STD-202F method 204, 35g 50Hz to 2000Hz
Shock:	MIL-STD-202F method 213B, test condition: E, 1000g ½ sine wave

### AVAILABILITY OF SPREAD TYPES AND MODULATION RATES

SPREAD TYPES and % MODULATION	
<b>DOWN SPREAD</b>	
<b>D0.5</b>	-0.50%
<b>D1.5</b>	-1.5%
<b>D2.0</b>	-2%
<b>CENTRE SPREAD</b>	
<b>C0.25</b>	±0.25%
<b>C0.75</b>	±0.75%
<b>C1.0</b>	±1.0%

### PART NUMBER CONFIGURATION

