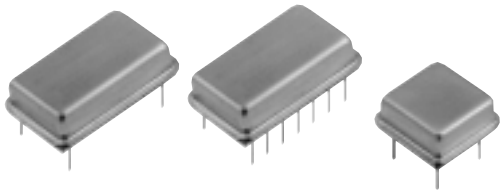
CRYSTAL OSCILLATORS
HCMOS 5V

FULL SIZE D.I.L.
M package
M5500, M5515, M5516
M5622, M5623

HALF SIZE D.I.L.
H package
H5622, H5623



Thru-Hole
HIGH RELIABILITY
1 Hz to 125 MHz

MF Electronics oscillators are not compliant with MIL-PRF-55310

FEATURES
- Hermetically sealed half size or full size DIL package
- Crystal angle controlled to ±1 minute for excellent temperature stability
- 168 hour Class B burn-in and extensive environmental testing for best performance in rugged field environments
- Start-up time less than 10 ms
- Serialized test data available

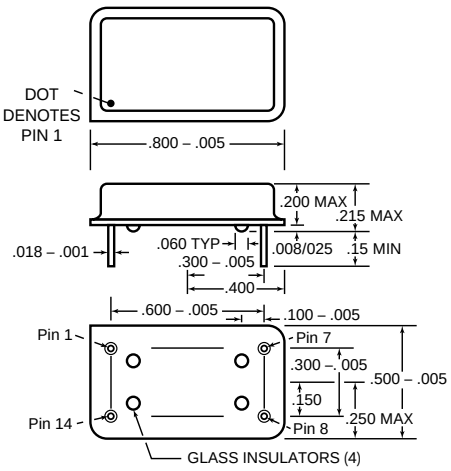
TYPICAL APPLICATIONS
- Thru-hole PCB projects requiring high reliability HCMOS clock waveforms

Description

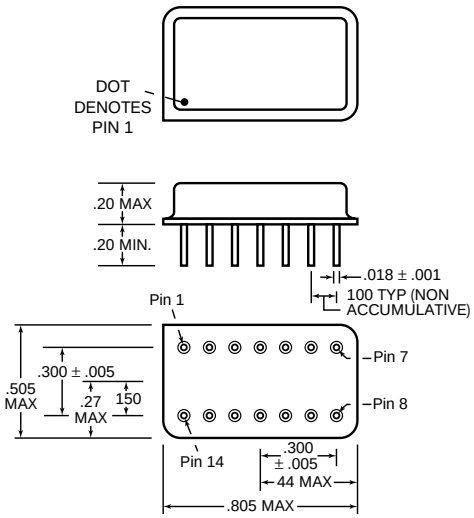
These high reliability oscillators provide HCMOS clock waveforms for applications subjected to the most stringent environmental conditions. The full size models can be provided in packages with 4 pins, or 14 pins for extra holdability.

Full Size		Half Size		Operating Temperature	Frequency Stability
Model	Package	Model	Package		
M5500, M5515	M-2			-55 to +125°C	±75 ppm
M5515	M-2			0 to 70°C	±50 ppm
M5622	M	H5622	H	-55 to +85°C	±50 ppm
M5623	M	H5623	H	-55 to +125°C	±75 ppm

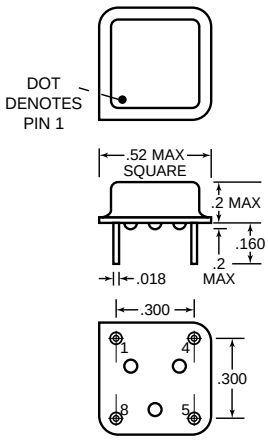
The M5500 is a 14-pin device with case ground on Pin 1, while the M5515 and M5516 have case ground on Pin 7.



"M" Package
Used for M5622 & M5623



"M-2" Package
Used for M5500, M5515 & M5516



"H" Package

MF ELECTRONICS

International Sales: +1.914-712-2200 • USA Sales: +1.800.331.1236 • Fax: 914.712.2290 • www.mfelectronics.com • email:sales@mfelectronics.com

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HCMOS 5V
Thru-Hole
HIGH RELIABILITYS
FIXED FREQUENCY, 1 Hz to 125 MHz

FULL SIZE D.I.L.
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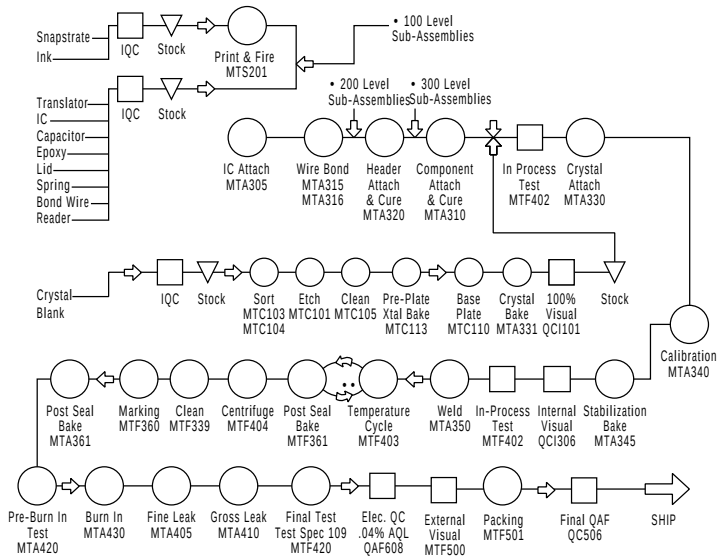
CONNECTIONS, FULL SIZE PACKAGE

Pin	M5500	M5515, M5516	M5622, M5623
1.	Case	N.C.	Case & Electrical Ground
2.	N.C.	N.C.	Pins 2 thru 6 are not present
3.	N.C.	N.C.	
4.	N.C.	N.C.	
5.	N.C.	N.C.	
6.	N.C.	N.C.	
7.	Electrical Ground	Case & Electrical Ground	Case & Electrical Ground
8.	Output	Output	Output
9.	N.C.	N.C.	Pins 9 thru 13 are not present
10.	N.C.	N.C.	
11.	N.C.	N.C.	
12.	N.C.	N.C.	
13.	N.C.	N.C.	
14.	+5V, V_{DD}	+5V, V_{DD}	+5V, V_{DD}

CONNECTIONS

	Half Size
Pin 1.	Not Used
Pin 4.	Ground and Case
Pin 5.	Output
Pin 8.	+5V, V_{DD}



NOTE: • Indicates where Sub-Contracted Assemblies and Sub-Assemblies enter the Manufacturing line.
All Sub-Contracted Assemblies and Sub-Assemblies are inspected to QCI307 and stored in stock until needed.

•• Indicates Post Seal Bake and Temperature Cycle Processes may be performed in reverse order.

ELECTRICAL SPECIFICATIONS

Frequency Range
M5500, M5515, M5516, M5622, M5623 – 1 Hz to 125 MHz
H5622, H5623 – 1 KHz to 125 MHz

Frequency Stability Includes calibration at 25°C, operating temperature, change of input voltage, change of load, shock and vibration.

	MIN	TYP	MAX	UNITS
Input Voltage	4.5	5.0	5.5	volts
Input Current				
Frequency at 1 KHz or above		30	55	mA
Frequency below 1 KHz		35	60	mA
Frequency Accuracy		See preceding Table		
Waveform Symmetry,				
Measured at 1.5V	40/60		60/40	percent
Rise and Fall Times				
Below 10 MHz				
0.8 to 2.4 volts		5	15	ns
10 MHz and above,				
0.8 to 2.4 volts		2	5	ns
"Zero" Level,				
Sinking 16 mA			0.5	volts
"One" Level				
Sourcing 400 microAmps	4.5			volts
Sourcing to 10 TTL loads	2.5			volts
Frequency Change				
from +4.5 to +5.5V		±5		ppm
Aging				
First year		3		ppm
After first year		1		ppm/yr

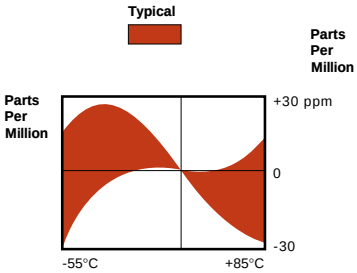
ENVIRONMENTAL SPECIFICATIONS

Temperature Cycle – Not to exceed ±5 ppm change when exposed to 2 hours maximum at each temperature from 0 to 120°C, with 25°C reference.

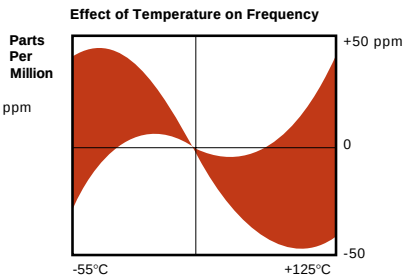
Shock – 1000 Gs, 0.35 ms, 1/2 sine wave, 3 shocks in each plane

Vibration – 10-2000 Hz of .06" d.a. or 20 Gs, whichever is less

Humidity – Resistant to 85° R.H. at 85°C



M5622, H5622



M5500, M5516, M5623 & H5623

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HCMOS 5V
Thru-Hole
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MECHANICAL DESCRIPTION

Case – Stainless Steel

Marking – MF part number, date code, serial number and description
Marking will withstand MIL-STD 202, Method 215

Optional Marking – Customer part number if required

Leads – Kovar, nickel plated, gold flash

Shock – MIL-STD 202, Method 213A, Test Condition 1

Vibration: – MIL-STD 202, Method 204B, Test Condition B

Each unit undergoes the following:

1. Stabilization Bake	MIL-STD-883 Method 1008, Cond. B
2. Temperature Cycling	MIL-STD-883 Method 1010, Cond. B
3. Centrifuge	MIL-STD-883 Method 2001, Cond. A
4. Fine Leak	MIL-STD-883 Method 1014, Cond. A1
5. Gross Leak	MIL-STD-883 Method 1014, Cond. C
6. Temperature Stability	Within ±75 ppm from –55 to +125°C (M5500, M5516, M5623, H5623)
	Within ±50 ppm from –55 to +85°C (M5622 and H5622)

7. Electrical Test at 25°C, as follows:

TABLE 1

A. Frequency	H. Duty Cycle (FL)
B. Current	I. Frequency at 5.5V
C. Rise Time (NL)	J. Frequency at 4.5V
D. Fall Time (NL)	K. Overvoltage (6.5 volts for 30 seconds)
E. Rise Time (FL)	L. "Zero" logic level
F. Fall Time (FL)	M. "One" logic level
G. Duty Cycle (NL)	

Test data on each unit is available for additional cost

HOW TO ORDER

For Part Number, put package type before model number, and add frequency in MHz, for example:

M 5516 - 32M

"M" is full size DIL
"H" is half size DIL

"5516" is model type

"32 M" frequency in MHz

TABLE 2 — RELIABILITY TEST PROCEDURE AND CONDITIONS FOR QUARTZ CRYSTAL OSCILLATORS

I. Group A

Electrical Characteristics at 0, 25, 70 and 125°C
- Frequency @ 4.5, 5.0 and 5.5 volts (for 5 volts units)
- Symmetry (Duty Cycle)
- Input current
- Zero/One levels
- Rise/Fall times

Physical Dimensions
- Length/width
- Height
- Glass seal (Visual)
- Package finish (Corrosion, discoloration, etc.)
- Marking placement/legibility

II. Group B

1000 hrs aging at or above 70°C, 5.0V VDC, with proper load

III. Group C – All units have passed Group A testing

A. Subgroup 1 – 8 pcs.

Standard	Condition	Description	End point measurement
MIL-STD-883	METHOD 2002 COND. B	Mechanical shock 1500 g's, 5ms 5 drops, 6 axis	Frequency Output waveform
MIL-STD-883	METHOD 2007 COND. A	Vibration, var. freq. 20 g's, .06" disp., 20-20,000-20 Hz	Frequency Output waveform
MIL-STD-883	METHOD 2003	Solderability	Visual 95% coverage

B. Subgroup 2 - 4 pcs (One-half of Subgroup 1)

MIL-STD-883	METHOD 1011 COND. B	Thermal Shock Liq. to liq. –55 to 125°C, 15 cycles	Frequency Output waveform
MIL-STD-202	METHOD 105 COND. B.	Altitude, 3.44 inch Hg, 12 hrs	Frequency Output waveform
MIL-STD-883	METHOD 1004	Moisture resist. with 5V applied 25-65°C, 90 to 100% RH, 10 cycles	Frequency Output waveform
MIL-STD-202	METHOD 210 COND. A.	Resistance to Solder Heat Immersion @350°C 3.5 sec	Frequency Output waveform

C. Subgroup 3 - 4 pcs. (One half of Subgroup 1)

Standard	Condition	Description	End point measurement
	Storage Temp. No. Oper.	24 hrs. @ –55°C 24 hrs. @ 125°C	Frequency Output waveform
MIL-STD-883	METHOD 1009 COND. A	Salt Atmosphere 24 hrs. @ 35°C .5-3.0% Solution	Frequency Output waveform Visual
MIL-STD-883	METHOD 1014 COND. B	Fine Leak	Qs <5 x 10^{-8}
MIL-STD-883	METHOD 1014 COND. C	Gross Leak	Visual in 125°C Detector fluid

SS#	Rev.
M5500	B

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