CRYSTAL OSCILLATORS
ECL and PECL

FULL SIZE D.I.L
M package
M1400, M1436, M1444, M1445, M1500, M1536, M1544, M1545, M2400, M2436, M2444, M2445, M2500, M2536, M2544, M2545

Thru-Hole / Gull Wing
Commercial: 0° to 70°C
10 MHz to 125 MHz
1400 and 2400 – 10K ECL, -5.2V
1500 and 2500 – 10K PECL, +5V

These models which use 10K ECL logic are not recommended for new designs. Suggested models are M1600s and M1700s which use 10KH ECL logic, or low jitter models shown on M2910 data sheet which are available thru 410MHz.

FEATURES
- Single or dual complementary outputs
- Start up time less than 5 ms
- Stability options from ±100 ppm to ±25 ppm
- Guaranteed start-up with ramping DC Supply
- Specified for extended temperature to 85°C, to allow for additional heat rise in confined space
- Terminating resistor may be internal – consult factory

Description

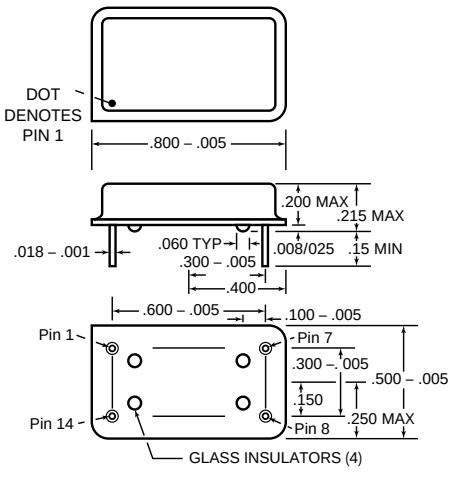
MF Electronics' high speed clock oscillators for digital and communications applications are based on 5V ECL logic and are available in full size (M) and half size (H) thru-hole packages. Designed in ECL 10K logic, the oscillators deliver 10 MHz to 125 MHz output.

All models are available in complementary output, and a choice of either negative (ECL) or positive (PECL) operating voltage. These models are intended for designs which interface with 10K logic. For superior performance, see our models using 10KH or ECLPS.

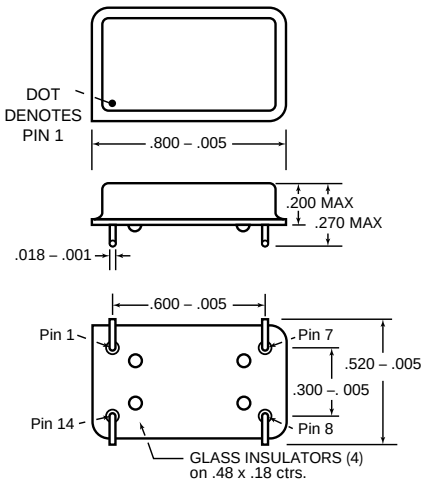
ECL OSCILLATORS		
10K Logic 10 MHz thru 125 MHz		
-5 Volt Power on Pin 14		
Single Output	**Complementary Output**	**Frequency Stability**
M1400	M2400	±100 ppm
M1436*	M2436*	±100 ppm
M1444	M2444	±25 ppm
M1445	M2445	±50 ppm

PECL OSCILLATORS		
10K Logic 10 MHz thru 125 MHz		
+5 Volt Power on Pin 14		
Single Output	**Complementary Output**	**Frequency Stability**
M1500	M2500	±100 ppm
M1536*	M2536*	±100 ppm
M1544	M2544	±25 ppm
M1545	M2545	±50 ppm

*Guaranteed Superior Symmetry 45/55



"M" Package



"M" Package with Gull Wing

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

FIXED OSCILLATORS
ECL and PECL, 10 MHz to 125 MHz
Thru-Hole / Gull Wing
Commercial: 0º to 70ºC
10 MHz to 125 MHz
1400 and 2400 – 10K ECL, -5.2V
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FULL SIZE D.I.L
M package
M1400, M1436,
M1444, M1445,
M1500, M1536,
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M2400, M2436,
M2444, M2445,
M2500, M2536,
M2544, M2545

ELECTRICAL SPECIFICATIONS

Frequency Range 10 MHz 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				
Negative Input Units	–4.75	–5.2	–5.45	volts
Positive Input Units	4.75	5.0	5.25	volts
Input Current		45	60	mA
Output Levels,				
Negative Input Units				
"0" Level				
25°C	–1.85		–1.65	volts
70°C	–1.825		–1.65	volts
"1" Level				
25°C	–0.96		–0.81	volts
70°C	–0.89		–0.70	volts
Positive Input Units				
"0" Level				
25°C	(Vc–1.85)		(Vc–1.65)	volts
70°C	(Vc–1.825)		(Vc–1.65)	volts
"1" Level				
25°C	(Vc–0.96)		(Vc–0.81	volts
70°C	(Vc–0.89)		(Vc–0.7)	volts
Rise and Fall Times				
(20 to 80%)		2.0	3.0	ns
Symmetry				
All units, except '36 Models		45/55	40/60	percent
M1436, M1536, M2436, M2536		48/52	45/55	percent
Aging				
First year		3-5		ppm
After first year		1		ppm/yr

ENVIRONMENTAL SPECIFICATIONS

Temperature

Operating	0º to 70°C, case temperature
Storage	-55º to +125°C

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

MECHANICAL SPECIFICATIONS

Gross Leak – Each unit checked in 125°C fluorocarbon

Fine Leak – Mass spectrometer leak rate less than 2 X 10^{-8} atmos, cc/sec of helium

Pins – Kovar, nickel plated with 60/40 solder coat.

Bend Test – Will withstand two bends of 90° from reference

Header – Steel, with nickel plate

Case – Stainless steel, type 304

Marking – Permanent black epoxy ink or laser marked

Resistance to Solvents – MIL STD 202, Method 215

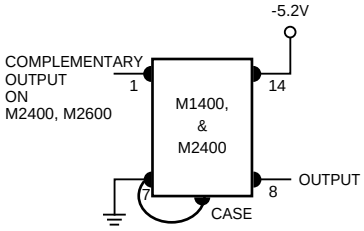

Fig. 1

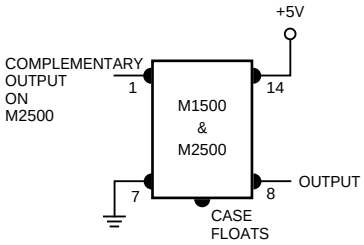

Fig. 2

Note: Outputs must be properly terminated

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ECL and PECL, 10 MHz to 125 MHz
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M2400, M2436,
M2444, M2445,
M2500, M2536,
M2544, M2545

CONNECTIONS

PINS	M1400, M2400 Models	M1500, M2500 Models
1.	Not used in Single Output or Used for Complementary Output (same termination as Pin 8.)	
7.	Electrical Ground and Case	Electrical Ground
8.	Output requires termination of 270 ohms to Pin 14. or 50 ohms to –2V	Output requires termination of 270 ohms to Pin 7. or 50 ohms to +3V
14.	–5.2 volts	+5 Volts
CASE	Tied to Pin 7.	Floating

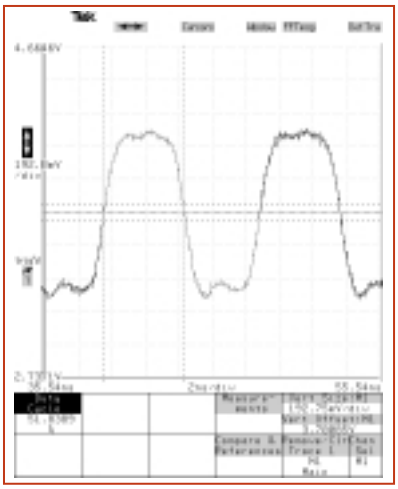
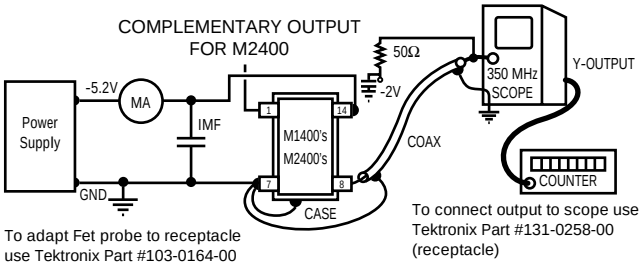
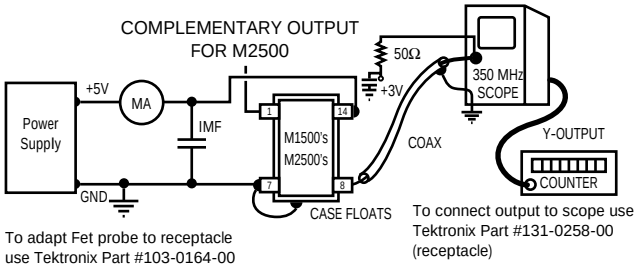


Fig. 3 M2545-107M, 10K logic



TEST CIRCUIT FOR M1400's
M2400's HAVE ADDITIONAL OUTPUT ON PIN 1.



TEST CIRCUIT FOR M1500's
M2500's HAVE ADDITIONAL OUTPUT ON PIN 1.

HOW TO ORDER

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

M 1500-66.666M

- "M" is full size DIL
- "1500" is model type
- "66.666 M" frequency in MHz
- Leave blank for straight leads Add "G" for gullwing

SS#	Rev.
M1400	A

Unless customer-specific terms and conditions are signed by an officer of MF Electronics, the sale of this and all MF Electronics products are subject to terms and conditions set forth at www.mfelectronics.com/terms