

OSCILLATORS

T-50-23

OSCILLATORS  
STANDARD SPECIFICATIONS

Valpey-Fisher oscillator products include hybrid and discrete oscillators to provide a full range of performance options.

Valpey-Fisher Hybrid Clock Oscillators combine state of the art, thick film hybrid technology with precision quartz crystal resonators to achieve small size, low cost, high reliability and frequency stability in a variety of output waveforms. Package options include leaded through hole and several surface mount designs as well as molded plastic.

Valpey-Fisher Precision Oscillators provide an even more stable frequency reference. They combine high reliability quartz crystals, hermetically sealed in their own enclosures, with individual components specifically selected to optimize that specific circuit design. The following types of oscillators are offered in small, PC board mountable packages with a wide variety of outputs to your exact specifications.

Valpey-Fisher's more than 50 years of experience with piezoelectric technology makes it a front-runner in the development, design and manufacture of oscillators for both standard and custom applications. Listed here are typical specifications for Standard Valpey-Fisher Oscillators. Complete specifications for each type of oscillator are listed in the following pages. Fully customized oscillators meeting critical frequency requirements in a wide range of demanding applications are also a specialty of Valpey-Fisher. Contact our factory with your special frequency control needs.

Valpey-Fisher Series	Output
VF150	TTL
VF160	ECL
VF170	CMOS
VFHS170	HCMOS

Valpey-Fisher Series	Type
VF500	Temperature Compensated Crystal Oscillator (TCXO)
VF600	Voltage Controlled Crystal Oscillator (VCXO)
VF800	Oven Controlled Crystal Oscillator (OCXO)

Standard Specifications for Valpey-Fisher VF500, VF600 and VF800 Oscillators

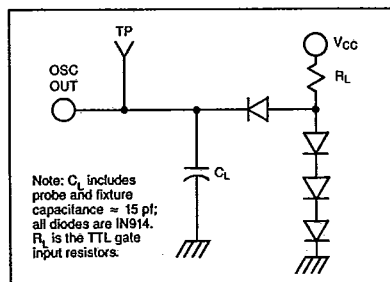
<b>Frequency range:</b> Varies by circuit technology and oscillator type. See each oscillator series specifications.
<b>Frequency adjust range:</b> ± 5.0 PPM min.
<b>Output:</b> See Standard Output Tables.
<b>Input:</b> Tolerance on input supply voltage is 2%. RF and DC returns are connected to the case.
<b>VF500 (TCXO):</b> Frequency set temperature is +25°C, ± 2°C.
<b>VF600 (VCXO):</b> Control voltage: ± 5.0 VDC, 0 VDC ref. Control voltage slope: Negative Linearity: ± 20% Input impedance: 10 kilohms min. Input modulation frequency: DC to 10KHz min.
<b>Stability</b> <b>vs. Supply Voltage:</b> VF500 (TCXO): ± 1 × 10 <sup>-7</sup> /2% VF800 (OCXO): ± 1 × 10 <sup>-8</sup> /2% <b>vs. Load:</b> VF500 (TCXO): ± 1 × 10 <sup>-7</sup> /10% VF600 (VCXO): ± 2 × 10 <sup>-7</sup> /10% VF800 (OCXO): ± 1 × 10 <sup>-8</sup> /10% <b>vs. Temperature:</b> As specified <b>vs. Time (Aging—after 30 days power on condition):</b> VF500 (TCXO): - 1 × 10 <sup>-8</sup> /yr typ VF800 (OCXO): As specified, from 5 × 10 <sup>-10</sup> /day to 1 × 10 <sup>-9</sup> /day

All Valpey-Fisher Oscillator test references are calibrated to the National Bureau of Standards. Product meeting all environmental, mechanical, and electrical requirements of MIL-0-55310, MIL-STD-883, and MIL-STD-202 can be provided.

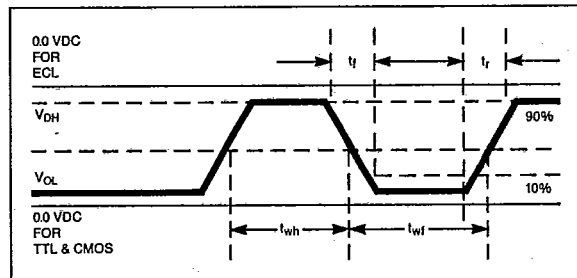
Standard Output Tables

Sine wave Output			
<b>Frequency</b>	500 kHz to 4 MHz	4 MHz to 1,000 MHz	
<b>Output level</b>	1V rms min	0 dBm min	
<b>Output load</b>	1 kilohm	50 ohms	
<b>Load VSWR</b>	1.2:1 max	1.2:1 max	
<b>Harmonics/subharmonics</b>	-20 dBc	-20 dBc	
<b>Spurious</b>	-60 dBc	-60 dBc	
Square wave Output			
	TTL	ECL	HCMOS
<b>Frequency Range (f<sub>o</sub>)</b>	10 kHz-70 MHz	50 MHz-200 MHz	10 kHz-30 MHz
<b>Logic "1"</b>	+2.4 Vdc min	-0.96 Vdc min	+3.7 Vdc min
<b>Logic "0"</b>	+0.4 Vdc max	-1.65 Vdc max	+0.2 Vdc max
<b>Symmetry (%)</b>	60/40	60/40	60/40
<b>Rise/Fall Times (T<sub>r</sub>/T<sub>f</sub>)</b>	15ns	2ns	15ns
<b>Load</b>	10 TTL gates	50 ohms to -2 Vdc	6 LS TTL

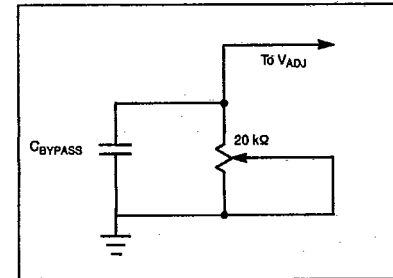
TTL Test Circuit



Standard Wave Form



Electrical Frequency Adjustment



## OSCILLATORS

VF 150 Series TTL HYBRID  
CRYSTAL CLOCK OSCILLATORS

Valpey-Fisher VF150 hybrid oscillators are compatible with TTL circuitry and offer a dependable, proven design, hermetic seal, and state of the art thick film technology. The widely used VF150 series is also available with dual and triple outputs, enable/disable and tri-state functions. The tri-state option ensures compatibility of the

VF150 series with Automatic Test Equipment (ATE).

Package choices include traditional full size or new half size plated-through-hole metal DIP designs, as well as surface mount, both full and half size, with either leads or pads for soldering.

## VF150 Series TTL Hybrid Crystal Clock Oscillators

Specifications	
FREQUENCY RANGE:	0.25 MHz to 70.0 MHz
OUTPUT:	TTL
Symmetry:	60/40 to 40/60% @ 1.4 VDC level*
Rise & Fall Times:	15 ns max. between 0.4 VDC and 2.4 VDC levels (0.25 MHz to 4 MHz) 10 ns max. between 0.4 VDC and 2.4 VDC (4.01 MHz to 20 MHz) 6 ns max. between 0.5 VDC and 2.7 VDC levels (20.01 MHz to 70 MHz)
"0" Level:	+0.4V max., sinking 16 mA min. (0.25 MHz to 20 MHz) +0.5V max., sinking 20 mA min. (20.01 MHz to 70 MHz)
"1" Level:	+2.4V min., sourcing -0.4 mA min. (0.25 MHz to 20 MHz) +2.7V min., sourcing -0.5 mA min. (20.01 MHz to 70 MHz)
Fanout:	10 TTL gates
Short Circuit Output Current:	18 mA min.
INPUT VOLTAGE:	+5 VDC, $\pm 10\%$
INPUT CURRENT (max., unloaded)	70 mA 0.25 MHz to 3.999 MHz 30 mA 4.00 MHz to 20.00 MHz 50 mA 20.01 MHz to 70.00 MHz
STORAGE TEMPERATURE:	-55°C to +125°C
PACKAGE:	See Oscillator Package Chart, pages 16, 17 and 18.
ELECTRICAL CONNECTIONS:	PIN #1 N.C.**      PIN #7 Case GND PIN #14 +5 VDC      PIN #8 Output***

Valpey-Fisher welcomes inquiries for stability tolerances and temperature ranges that may be specific to your needs.

\*The symmetry shown is standard. Tighter symmetries, such as 45/55, are available upon special request and are indicated by the letter "H" between the code for stability and the code for operating temperature. For example, an 8.0 MHz oscillator with 0.005% stability, an operating temperature range of -40°C to 85°C, and a 45/55 stability would be designated VF150BH1.

\*\*Additional outputs with various phase and frequency relationships are available.

\*\*\*Enable/disable feature available.

In addition to specifying the *frequency*, use the Valpey-Fisher part number in the chart below to designate the exact *frequency range*, *stability*, and *operating temperature* you require:

Frequency Range (MHz)	Stability (%)	Operating Temperature Range (°C)		
		0 to +70	-40 to +85	-55 to +125
0.25 to 1.124	0.0025	VF154A	VF154A-1	VF154A-2*
	0.005	VF154B	VF154B-1	VF154B-2
	0.01	VF154	VF154-1	VF154-2
	0.05	VF154C	VF154C-1	VF154C-2
	0.25	VF154D	VF154D-1	VF154D-2
1.125 to 2.249	0.0025	VF153A	VF153A-1	VF153A-2*
	0.005	VF153B	VF153B-1	VF153B-2
	0.01	VF153	VF153-1	VF153-2
	0.05	VF153C	VF153C-1	VF153C-2
	0.25	VF153D	VF153D-1	VF153D-2
2.250 to 3.999	0.0025	VF152A	VF152A-1	VF152A-2*
	0.005	VF152B	VF152B-1	VF152B-2
	0.01	VF152	VF152-1	VF152-2
	0.05	VF152C	VF152C-1	VF152C-2
	0.25	VF152D	VF152D-1	VF152D-2
4.00 to 25.00	0.0025	VF150A	VF150A-1	VF150A-2*
	0.005	VF150B	VF150B-1	VF150B-2
	0.01	VF150	VF150-1	VF150-2
	0.05	VF150C	VF150C-1	VF150C-2
	0.25	VF150D	VF150D-1	VF150D-2
25.01 to 70.00	0.0025	VF155A	VF155A-1	VF155A-2*
	0.005	VF155B	VF155B-1	VF155B-2
	0.01	VF155	VF155-1	VF155-2
	0.05	VF155C	VF155C-1	VF155C-2
	0.25	VF155D	VF155D-1	VF155D-2

\* -55°C to +105°C