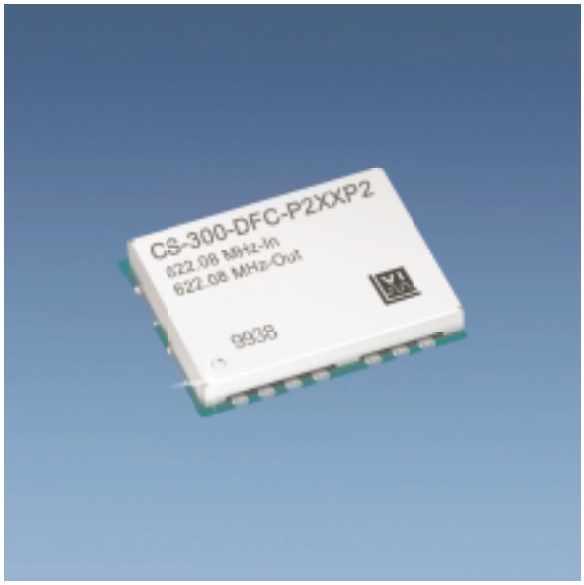
VECTRON INTERNATIONAL
A DOVER COMPANY

Product Data Sheet

CS-300

Clock Smoother

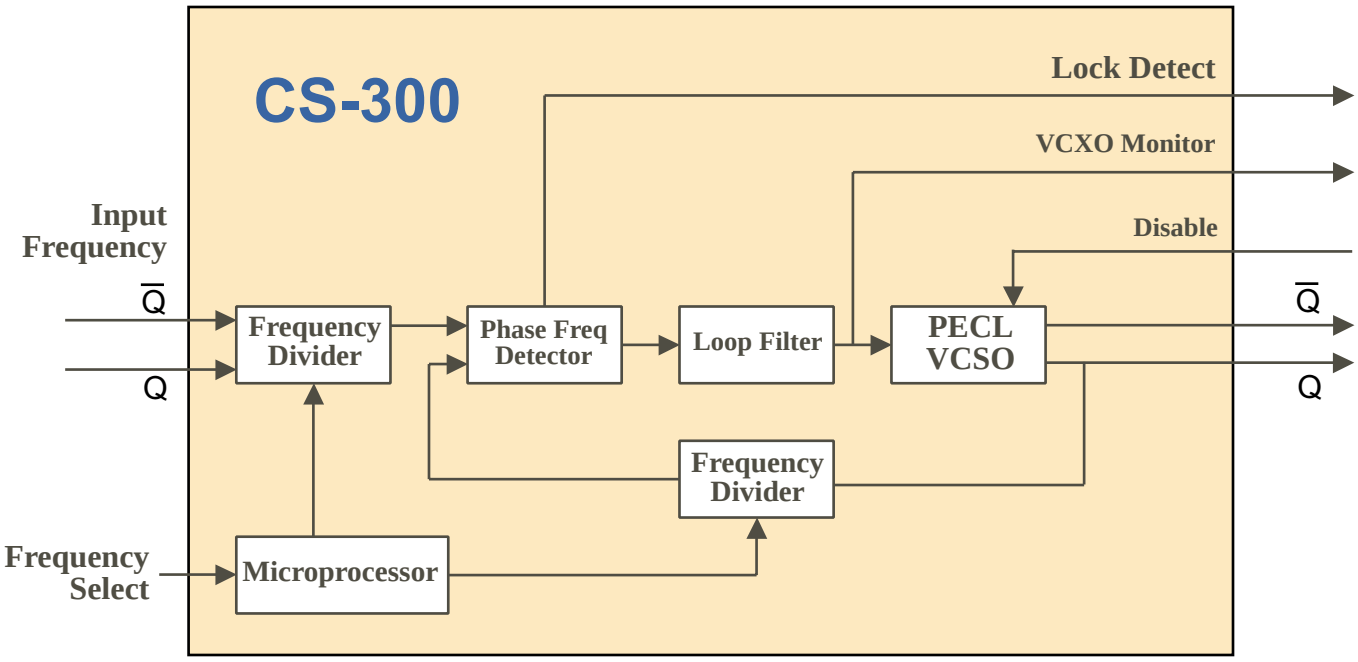


Features

- Output frequencies up to 800 MHz
- Ultra Low Jitter PECL Output
- Locks to Input Frequency (i.e. 622.08 MHz)
- 3.3 Vdc or 5.0 Vdc supply
- Lock / Loss of Signal Alarm
- 1" x 0.8" x 0.25", Surface Mount (FR4 base)

Applications

- Clock Smoothing
- SONET / SDH / ATM / DWDM / SFI-5
- FEC (Forward Error Correction)
- 622.08 MHz to 622.08 MHz



CS-300 Clock Smoother

Description

Vectron's CS-300 is a SAW based Clock Smoother and Frequency Translator which is used to "clean up" noisy input frequencies. This series can accept any input frequency from 10 MHz to 700 MHz and then "cleans up" up the signal to provide an ultra low jitter output signal. The output jitter of this unit is well below the requirements of OC-192.

The CS-300 also has the ability to translate either one or two different input frequencies between 10 MHz and 700 MHz to one common output frequency, such as input frequencies of 622.08 MHz and 666.5143 MHz translated to an output frequency of 622.08 MHz. This unit is of particular interest to those working with FEC applications or needing to switch between 10G and OC-192.

The "Input Frequency Tracking Capability" is the total amount of frequency deviation on the input signal that the CS-300 is guaranteed to track. As an example, a typical input clock would be 622.08 MHz ± 20 ppm. The CS-300 is guaranteed to track at least ±40 ppm of error over temperature/ aging/ power supply and is more than twice what most applications require.

Performance Characteristics

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage,	**C** = 5 Vdc **D** = 3.3 Vdc	Vcc Vcc	4.75 3.135	5.00 3.30	5.25 3.465	Vdc Vdc
Supply Current	5 Vdc 3.3 Vdc	Icc Icc		135 115	200 200	mA mA
Input Signal,	**F** = Comp PECL	CLKIN	10 MHz	PECL	700 MHz	---
Output	**F** = Comp PECL	---	155.52 MHz	PECL	800 MHz	---
V_{OL} @ +25ºC		V_{OL}	V_{cc}-1.95		V_{cc}-1.63	V
V_{OH} @ +25ºC		V_{OH}	V_{cc}-0.98		V_{cc}-0.75	V
Rise / Fall Time (20% to 80% @ 622.08 MHz)		t_R/t_F		250	400	ps
Output Symmetry		Sym	45	49/51	55	%
Jitter Generation, rms (12kHz to 20MHz)				0.23	1.0	ps
Jitter Generation, rms (cycle to cycle method)				3		ps
Jitter Transfer, GR-253-CORE section 5.6.2.1.2					0.1	dB
Input Frequency Tracking Capability (Can translate a Stratum 1,2,3,3E,4 or SONET Min source)		APR	+/-40			ppm
Operating Temperature		Temp Range **C** = 0ºC to +70ºC Temp Range **F** = -40ºC to +85ºC				
Size		See page 3 for outline Drawings and Dimensions				

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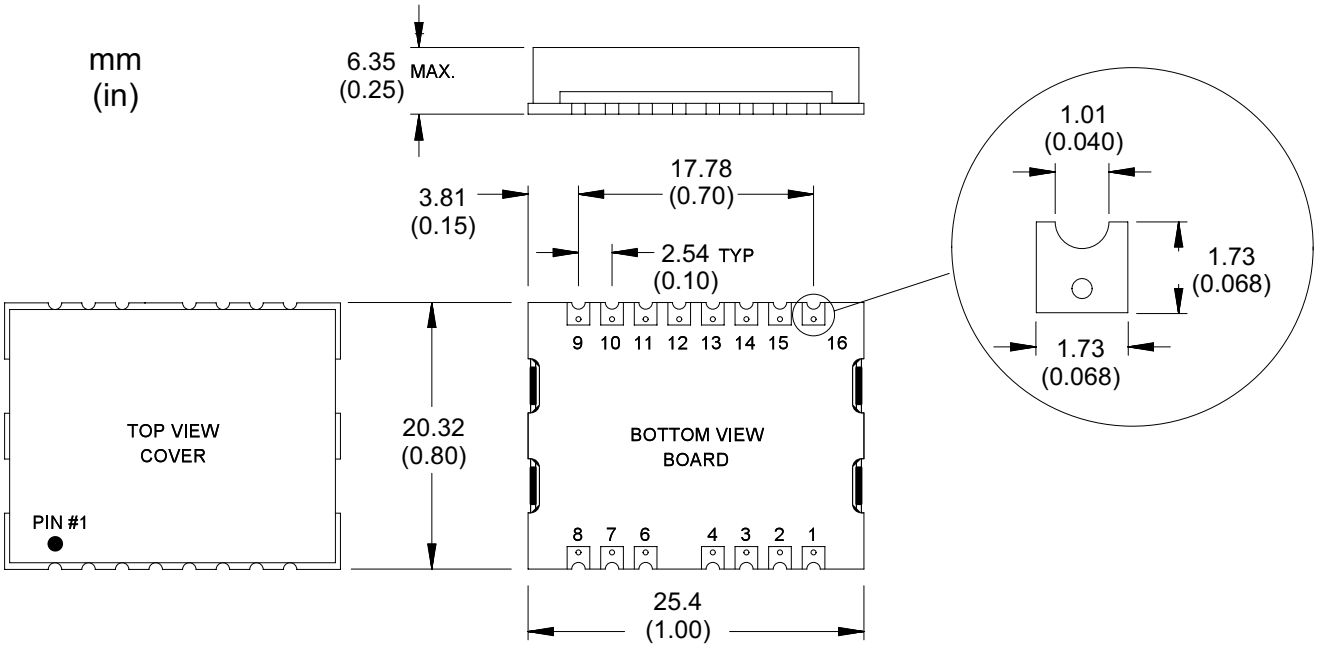
Outline Drawing



Pin	Symbol	Function
1	CLKIN Q	Input Frequency (Q)
2	CLKIN $\overline{Q}$	Complementary Input Frequency ($\overline{Q}$)
3	LD (Output)	Lock Detect Logic "1" indicates a locked condition. Logic "0" indicates an out of lock condition.
4	Monitor (Output)	PLL/ VCXO control voltage Under locked conditions, should be >0.3V and <3.0V for the 3.3 volt option or >0.5V and <4.5V for the 5 volt option. Input frequency may be out of range if voltage exceeds these limits.
5	----	Missing
6	NC	No Connection
7	GND	Ground
8	Disable (Input)	Floating = Output enabled Logic "0" = Output disabled
9	OUT	Output (Q)
10	COUT	Complementary Output ($\overline{Q}$)
11	NC	No Connection
12	Freq. Select	“0” = Primiary Frequncey “1” = Secondary Frequency (Do not Exceed Vdd)
13	NC	No Connection
14	NC	No Connection
15	GND	Ground
16	V_{cc}	5 Vdc or 3.3 Vdc

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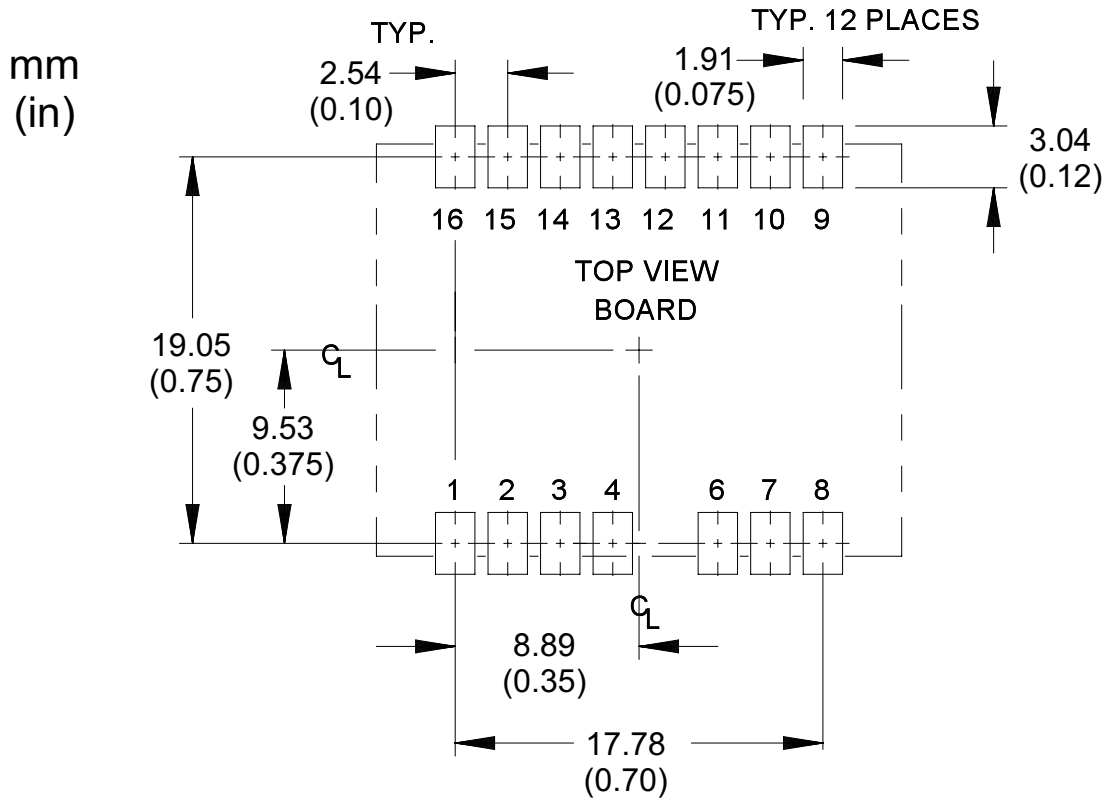
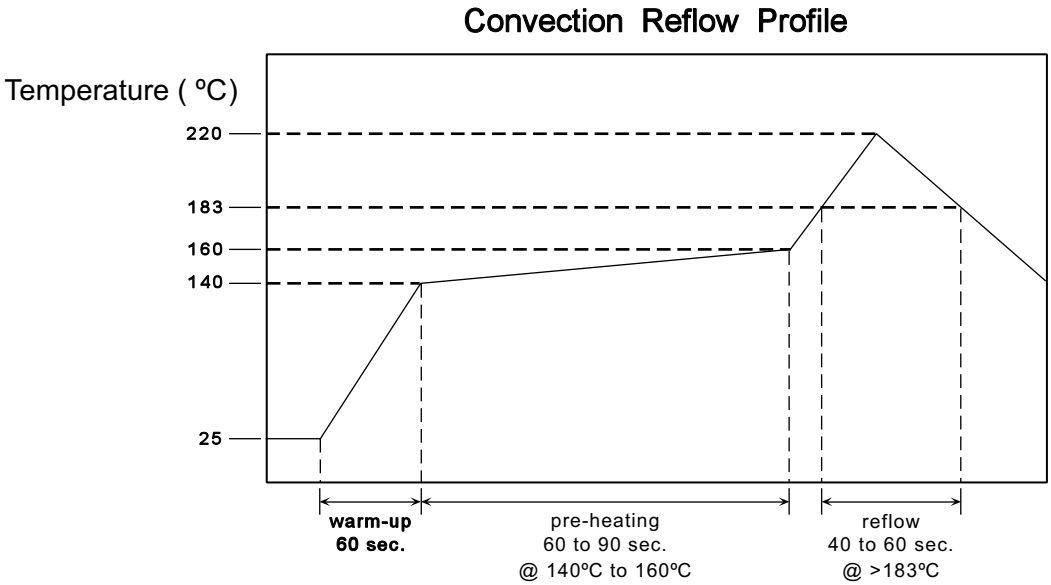
Recommended Pad Layout



Recommended Reflow Profile



NOTE: The CS-300 should not be subjected to a wash process that will immerse it in solvents. NO CLEAN is the recommended procedure. The CS-300 has been designed for pick and place reflow soldering. The suggested reflow profile is shown above. The CS-300 may be reflowed once, and should not be reflowed in the inverted position.

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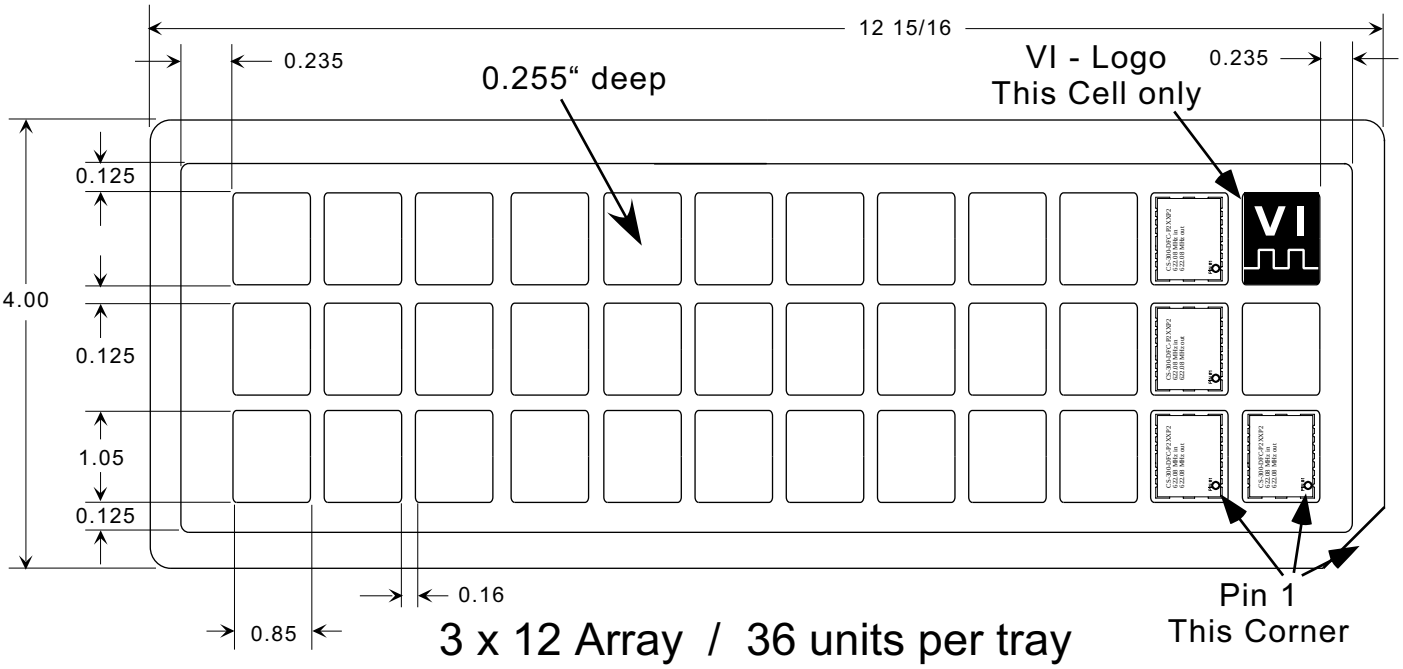
Standard Shipping Method

The Standard ship method for volume production of the CS-300 series is in a matrix tray. These trays are 100% recyclable. The trays also offer the added feature that they can be continuously feed into a pick-n-place machine eliminating the down time required with tape-n-reel.



Handling Precautions

Although protection circuitry has been designed into this device, proper precautions should be taken to avoid exposure to electrostatic discharge (ESD) during handling and mounting. VI employs a human-body model (HBM) and a charged-device model (CDM) for ESD-susceptibility testing and protection design evaluation. ESD voltage thresholds are dependent on the circuit parameters used to define the mode.

Although no industry-wide standard has been adopted for the CDM, a standard HBM (resistance = 1500 ohms, capacitance = 100pf) is widely used and therefore can be used for comparison purposes. The HBM ESD threshold presented here was obtained by using these circuit parameters.

ESD Threshold Voltage		
Model	Threshold	Unit
Human-Body (HBM)	500	V min
Charged-Device	500	V min

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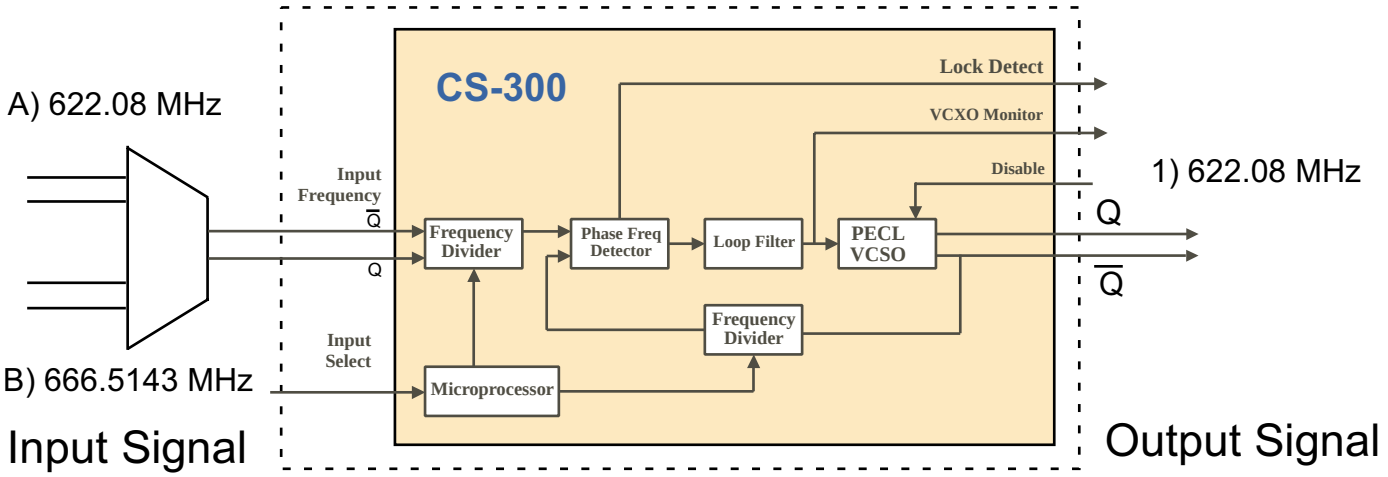
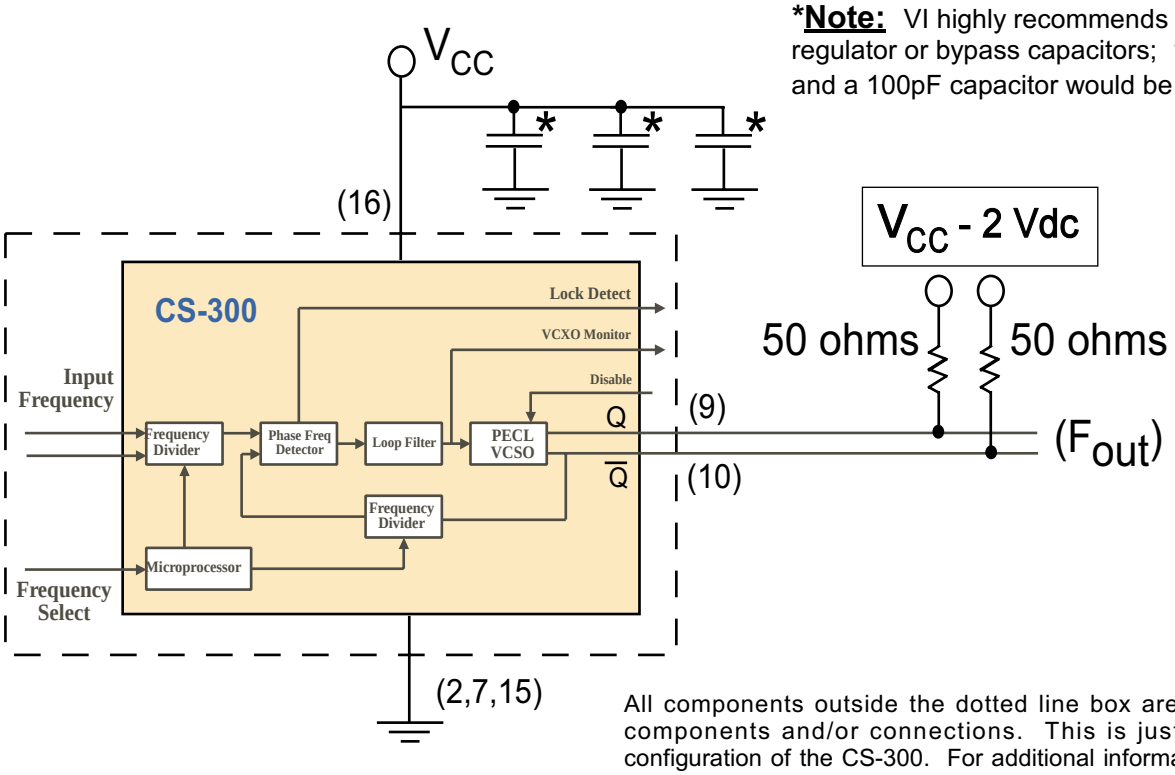
Typical Application



Input Select	Description of Action
0	A to 1 :Translates 622.08 MHz to 622.0800 MHz
1	B to 1 :Translates 666.5143 MHz to 622.08 MHz

All components outside the dotted line box are user supplied components and/or connections. This is just one possible configuration of the CS-300. For additional information about your specific needs please contact our Factory.

Output Load Configuration



***Note:** VI highly recommends either a linear regulator or bypass capacitors; 10 uF, 0.1 uF and a 100pF capacitor would be typical.

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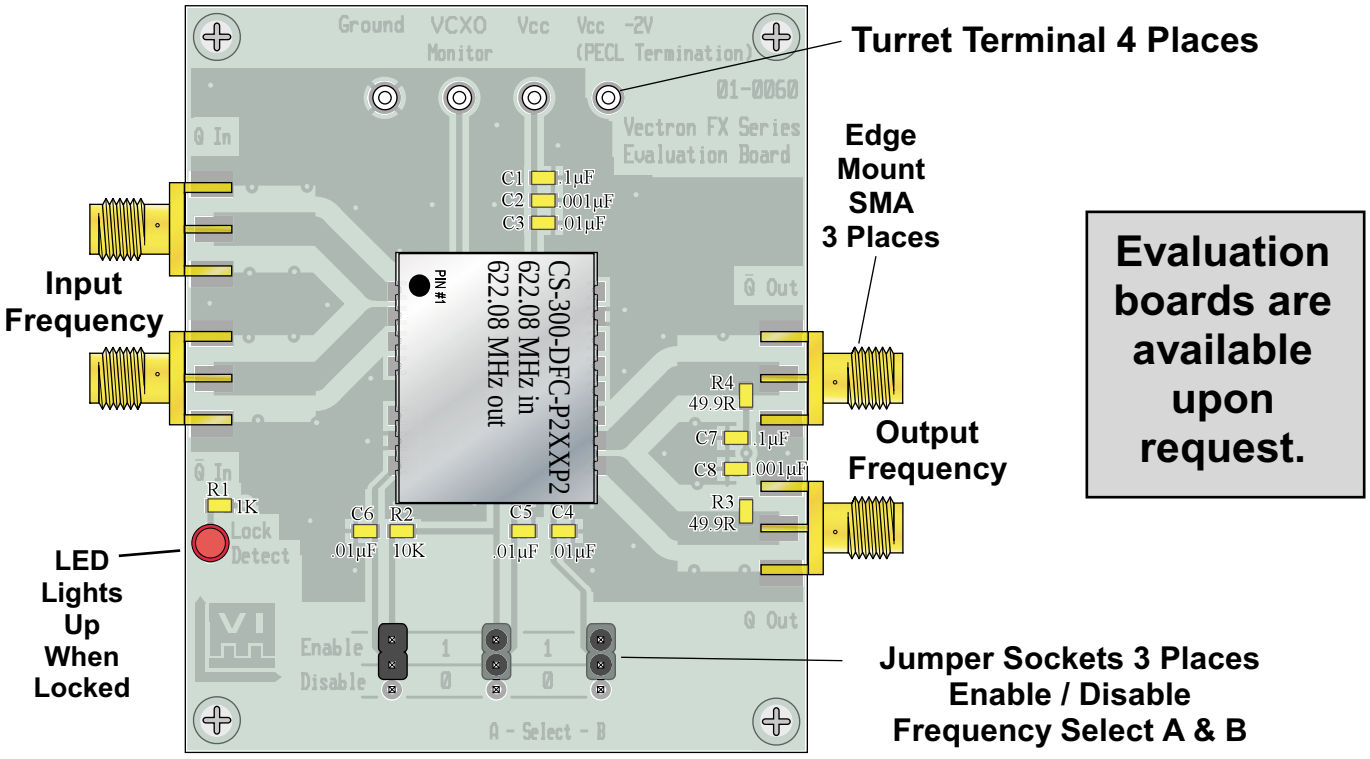
Evaluation Board



FAQ's

Q1: What are the different input frequencies available?
A: The CS-300 is able to handle any input frequency between 10 MHz and 700 MHz. (A list of standard frequencies is available on page 8.)

Q2: How many different input frequencies can a specific CS-300 accept?
A: Each CS-300 can be programmed to accept up to 2 different input frequencies.

Q3: If there is only one set of input pins, how can your unit accept 2 different frequencies?
A: The customer is required to supply a multiplexer which would switch between the different input frequencies. The multiplexers' select pin would need to be sync'd to the select pin of the CS-300.

Q4: What is the lock time for the CS-300?
A: The exact lock time will depend on the specific input frequency. It should be noted that in all cases the lock time will be significantly less than 1 second.

Q5: What type of noise on the supply line can the CS-300 suppress?
A: The CS-300 is designed to clean up noise on the Input Clock Signal, it is not designed to clean up noisy power supplies. If excessive noise is present on the supply line it may degrade the output jitter performance. Additional external filtering may be required. Please consult with your power supply vendor on the best way to filter noise of your supply line.

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Standard Frequencies

10.000 MHz	**C4**	38.8800 MHz	**H5**	139.264 MHz	**L5**	669.1281 MHz	**R2**
12.800 MHz	**D2**	44.4343 MHz	**J2**	155.520 MHz	**M2**	669.3266 MHz	**R3**
13.000 MHz	**D3**	44.7360 MHz	**J3**	156.250 MHz	**M3**	669.6428 MHz	**R1**
15.000 MHz	**D4**	51.8400 MHz	**J4**	161.1328 MHz	**M4**	672.1627 MHz	**R5**
16.384 MHz	**D5**	61.4400 MHz	**J5**	166.6286 MHz	**M5**	690.5692 MHz	**R4**
19.440 MHz	**D6**	65.5360 MHz	**J6**	167.3316 MHz	**N2**	693.4830 MHz	**R6**
20.0000 MHz	**E2**	74.1250 MHz	**K1**	168.0407 MHz	**N3**	710.9486 MHz	**T2**
20.1416 MHz	**E3**	74.2500 MHz	**K7**	311.0400 MHz	**P1**	719.7344 MHz	**T3**
20.4800 MHz	**E4**	77.7600 MHz	**K2**	622.0800 MHz	**P2**	777.6000 MHz	**T4**
22.2171 MHz	**E5**	78.1250 MHz	**K3**	624.7048 MHz	**P6**		
26.0000 MHz	**F3**	78.6432 MHz	**K5**	625.0000 MHz	**P3**		
27.0000 MHz	**F4**	82.9440 MHz	**K6**	627.3296 MHz	**P7**		
29.4912 MHz	**F5**	112.000 MHz	**L2**	644.5313 MHz	**P4**	No Second Input Freq	**XX**
32.7680 MHz	**H3**	114.000 MHz	**L3**	666.5143 MHz	**P5**	Input Freq not listed	**SS**
37.0560 MHz	**H4**	125.000 MHz	**L4**			Output Freq not listed	**SS**

How to Order

CS - 300 - [D] [F] [C] - [P2] [XX] [P2]

Supply Voltage
C = 5 Vdc +/-5%
D = 3.3 Vdc +/-5%

Output Type
F = Comp. PECL

Temperature Range
C = 0 to +70 C
F = -40 to +85 C

Output Frequency - 1 (M2 to T4)
See Frequency Chart Above
*Consult factory about availability of non-standard output frequencies.

Secondary Input Frequency (D2 to R4)
See Frequency Chart Above
For only one input frequency place XX in this block.
*If not listed enter **SS** in this block and then list the frequency after the part number.
If a secondary frequency is chosen it must be larger than the primary frequency.

Primary Input Frequency (C4 to R4)
See Frequency Chart Above
*If not listed enter **SS** in this block and then list the frequency after the part number.

Note: The Primary Input frequency must be less than Secondary Input frequency.

*A special part number will be assigned for these cases.

Visit Our Website at www.vectron.com

For additional information please contact:

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