5. CORPORATION

KNIGHTS CRYSTALS AND OSCILLATORS

FREQUENCY CONTROL DIVISION 400 Reimann Ave., Sandwich, IL 60548 • 815/786-8411 • FAX 815-786-9743

Military Hybrid Clock Oscillators

CCXO SERIES Leadless chip carrier package

TTL logic output Low Profile

Excellent Environmental Performance

1.0 to 60.0 MHz* Electrically similar to

MXO-55 as follows: "A" MODELS are electrically similar to MXO55GA Models

"B" MODELS are electrically similar to MXO55GB Models from 307.2 KHZ to <2.4576 MHZ * < CCXO-150 1.0 to 25 MHz



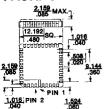


FIG. 17 CCXO-140

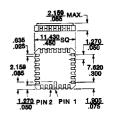


FIG. 18 CCXO-150

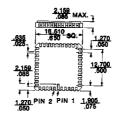
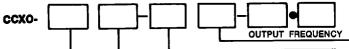


FIG. 19 CCXO-250

ORDERING INFORMATION



PACKAGE STYLE	CODE
40-pin, .040" spaced	140
28-pin, .050" spaced	150
44-pin, .050" spaced	250

FREQUENCY AND MODEL	CODE
12 to 45 MHz Basic oscillator	A
1 to <12 MHz Oscillator with dividers	В

FRQUENCY TOL. (NOTE 2)	CODE
士.1% (1000 ppm)	1
±.01% (100 ppm)	2
±.005% (50 ppm)	3
±.05% (500 ppm)	4

	<u></u>
OPERATING TEMPERATURE RANGE	CODE
0°C to +70°C	C
-40°C to +85°C	
-55°C to +105°C	Р
-55°C to +125°C	М

STANDARD PIN ASSIGNMENT

CCXO- 148 PINS	CCXO- 150 PINS	CCXO- 250 PINS	FUNCTION FOR FREQUENCY 1-45 MHz
1	2	1	NC
4	4	6	+5 VDC
5	15		NC
10	8	12	+5 VDC
15	12	18	NC
25	18	28	NC
31	22	34	GND
35			NC
37	26	40	GND
39	28	42	Output
40	1	44	NC

- NOTES:

 1. NC Indicates internal connection. No external electrical connection allowed.
- allowed.

 2. Tolerance includes 25°C accuracy, changes in operating temperature, supply voltage, load, environmental conditions and aging.

 3. Multiple +5 VDC and GND pins are internally connected and
- 4. Non-standard pin assignments may be possible. Consult factory with
- requirements.

 5. Screening similar to MIL-O-55310, Class B available by adding -MLB to end of P/N.
- Unspecified pins may have external electrical connections.

Engineering Data For Hybrid Oscillators

TYPICAL CHARACTERISTICS

- STORAGE TEMPERATURE: -65°C to +150°C.
- TEMPERATURE CYCLE: 25 cycles, -55°C to +125°C, per method 1010 of MIL-STD-883.

 CONSTANT ACCELERATION: 5000 G, Y1 direction, per method
- 2001 of MIL-STD-883
- MECHANICAL SHOCK: 1500 G, 0.5 mS, 3 shocks per direction, per method 2002 of MIL-STD-883.
- SINUSOIDAL VIBRATION: 0.06" D.A., 10 to 55 Hz and 20 G, 55 to 2000 Hz, 3 cycles per direction, per method 2007 of MIL-
- RANDOM VIBRATION: 20 G, 20 to 2000 Hz, per method 2026 of MIL-STD-883
- LEAD INTEGRITY: Per conditions B1 and B2 in method 2004 of MIL-STD-883
- HERMETICITY: 3 × 10° ATM-cc/sec, per conditions A1 and C in method 1014 of MIL-STD-883.
 MOISTURE RESISTANCE: 10 cycles, per method 1004 of MIL-
- STD-883 with step 7 subcycle omitted.
 CORROSION RESISTANCE: 24 hours, per condition A in method
- 1009 of MIL-STD-883. SOLDERABILITY: Per method 2003 of MIL-STD-883, or method 208 of MIL-STD-202, except 1 hour steam aging.

- QUALITY: In accordance with MIL-I-45208. RESISTANCE TO SOLDERING HEAT: Per conditions A and C in method 210 of MIL-STD-202.
- MARKING PERMANENCE: Per method 2015 of MIL-STD-883. THERMAL RESISTANCE: Per method 1012.1 of MIL-STD-883. 14 pin dip style package = 12°C/watt typical. TO-5/TO-8 style package = 8°C/watt typical.

 CCXO style package = 7°C/watt typical.

 ELECTROSTATIC DISCHARGE SENSITIVITY: Per method 3015
- of MIL-STD-883:
 - TTL output models—Class 3 ECL output models—Class 3
 - (100K ECL models Class 2) CMOS output models—Class 1
 - HCMOS Output—Class 1
- STEADY-STATE LIFE: 1000 hrs. @ 125°C per method 1005 of MIL-STD-883, disregarding frequency shift.
 FREQUENCY AGING: <10ppm shift in 30 days @ 85°C ambient.
- No External Connection Allowed on N/C Pinouts.

SPECIAL REQUIREMENTS

- **ELECTROMAGNETIC INTERFERENCE PROTECTION** The metal package construction, used extensively on CTS Knights hybrid oscillators, effectively reduces radiated EMI due to the oscillator circuitry. Further reduction can be accomplished by connecting the case to circuit ground, which is standard on MXO and CXO series oscillators. Case grounding is specified by a "G" in the part number (eg. MXO-55GA, CXO-65GA). CTS Knights has also gained considerable experience in reducing conducted EMI in specific customer applications. Contact CTS with your EMI problems or requirements, we'll offer a solution.
- CUSTOM DESIGN CAPABILITIES—CTS Knights' in-house capabilities include circuit design and artwork generation, crystal and hybrid thick film manufacturing facilities, manual and automated manufacture and test techniques, and mechanical and environmental test facilities. tal testing. This gives CTS a unique flexibility to design and manufacture to your custom hybrid oscillator specifications. Consult the innovative staff at CTS Knights with your special requirements.