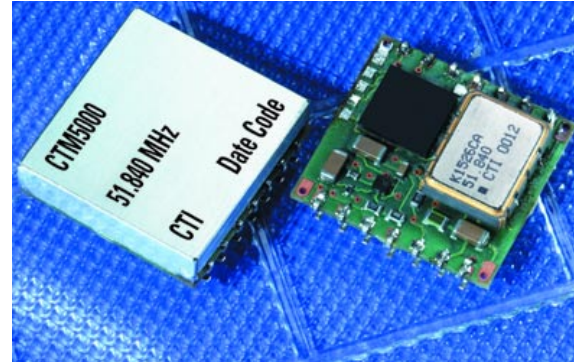


#### FEATURES:

- ♦ Phase Locked Output Frequency Control
- ♦ Low Jitter Voltage Controlled Oscillator Incorporated
- ♦ +3.3 Volt Power Supply
- ♦ LOR and LOL Alarm
- ♦ Forced Free Run Function
- ♦ Automatic Free Run upon LOR Alarm Condition
- ♦ Four Selectable Reference Inputs (8KHz, 16KHz, 32KHz or 64KHz)
- ♦ Tri-State Enable/Disable Function
- ♦ Surface Mount Package
- ♦ Output Frequencies Available to 77.760MHz



#### Applications

- ♦ Low-Jitter, Precision Clocks
- ♦ VCXO's and VCTCXO's

#### GENERAL DESCRIPTION

The CTM 5000A is manufactured in Champion's ISO 9001 Certified facility located in Franklin Park, Illinois. The CTM 5000A is a Frequency Translator that can lock to four programmed input frequencies from 8KHz to 64KHz. A variety of outputs for T1, E1, OC and STM applications are available.

Further features include alarms for Loss-Of-Reference (LOR), or Loss-Of-Lock (LOL) conditions. Upon LOR the CTM 5000A will automatically enter a "free run" state that will maintain a  $\pm 20$ ppm frequency stability. A Tri-State enable/disable function is also available for testing purposes.

The CTM 5000A is available in a Surface Mount Package that is leaded to be compatible with a variety of SMD manufacturing processes.

Champion's Engineering Staff can also modify or customize the CTM 5000A for your particular application.

#### PART NUMBERING GUIDE

**CTM5000AX** - Specify Output Frequency  
    └─ "Blank" = 40%/60% Symmetry  
    └─ "S" = 45%/55% Symmetry

**Table 1: Absolute Maximum Ratings**

| Symbol   | Parameter            | Minimum | Maximum | Units       |
|----------|----------------------|---------|---------|-------------|
| $V_{CC}$ | Power Supply Voltage | 0.0     | +5.5    | Volts       |
| $V_i$    | Input Voltage        | -0.5    | +5.5    | Volts       |
| $T_S$    | Storage Temperature  | -65     | 135     | $^{\circ}C$ |

**Table 2: Electrical Specifications**

| Parameter                     | Specification                   |
|-------------------------------|---------------------------------|
| Voltage                       | 3.3V $\pm$ 10%                  |
| Current                       | < 100 mA                        |
| Oscillator Output Frequencies | Up to 77.760MHz                 |
| Temperature Range             | 0 $^{\circ}C$ to 70 $^{\circ}C$ |
| Input Reference Frequencies   | 8KHz, 16KHz, 32KHz, 64KHz       |
| Input Jitter Tolerance        | <8 $\mu$ s (0.064UI @ 8KHz)     |
| Acquisition Time              | 0.25 sec                        |
| Capture/Pull In Range         | $\pm$ 50 ppm                    |
| Input Logic Type              | 3.3V CMOS, 5V Tolerant          |
| Output Logic Type             | CMOS                            |
| Output Duty Cycle             | 40%/60% @ 50% Level             |
| Output Rise and Fall Times    | <2 ns (20% - 80%)               |
| Output Load                   | 30 pF                           |
| Alarms                        | LOR and LOL                     |
| Freerun Accuracy              | $\pm$ 20 ppm                    |
| Jitter @ 77.760MHz            | 9ps @ 10Hz to 1MHz              |

**Table 3: Input and Output Characteristics**

| Symbol   | Parameter                 | Minimum | Maximum | Units |
|----------|---------------------------|---------|---------|-------|
| $V_{IH}$ | High Level Input Voltage  | 2.0     | 5.5     | Volts |
| $V_{IL}$ | Low Level Input Voltage   | -0.5    | 0.8     | Volts |
| $T_{IO}$ | I/O to Output Valid       |         | 10      | nS    |
| $C_O$    | Output Capacitance        |         | 10      | pF    |
| $V_{HO}$ | High Level Output Voltage | 2.4     |         | Volts |
| $V_{LO}$ | Low Level Output Voltage  |         | 0.4     | Volts |
| $T_{IR}$ | Input Signal Pulse Width  | 30      |         | nS    |

**Table 4: Input Reference Selection**

| SEL A IN | SEL B IN | Reference Input |
|----------|----------|-----------------|
| 0        | 0        | 8KHz (Default)  |
| 1        | 0        | 16KHz           |
| 0        | 1        | 32KHz           |
| 1        | 1        | 64KHz           |

**Table 5: Alarm States**

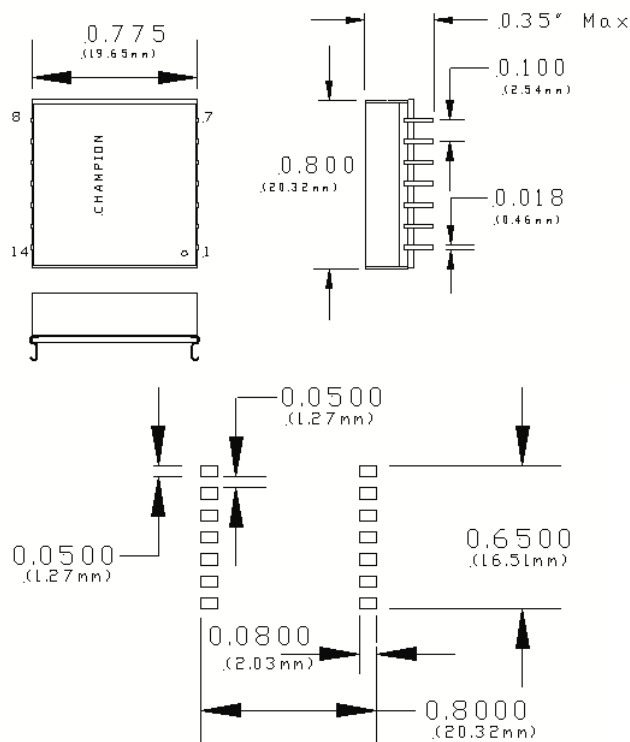
| LOL | LOR | Alarm             |
|-----|-----|-------------------|
| 0   | 0   | No Alarm          |
| 1   | -   | Loss of Lock      |
| -   | 1   | Loss of Reference |

**Table 6: Output Programming**

| Tri-State | Free Run | Effect on Output                       |
|-----------|----------|----------------------------------------|
| 0         | 0        | Locked to Reference (Default)          |
| 1         | *        | Hi-Z Output                            |
| 0         | 1        | Free Run at Nominal Internal Reference |

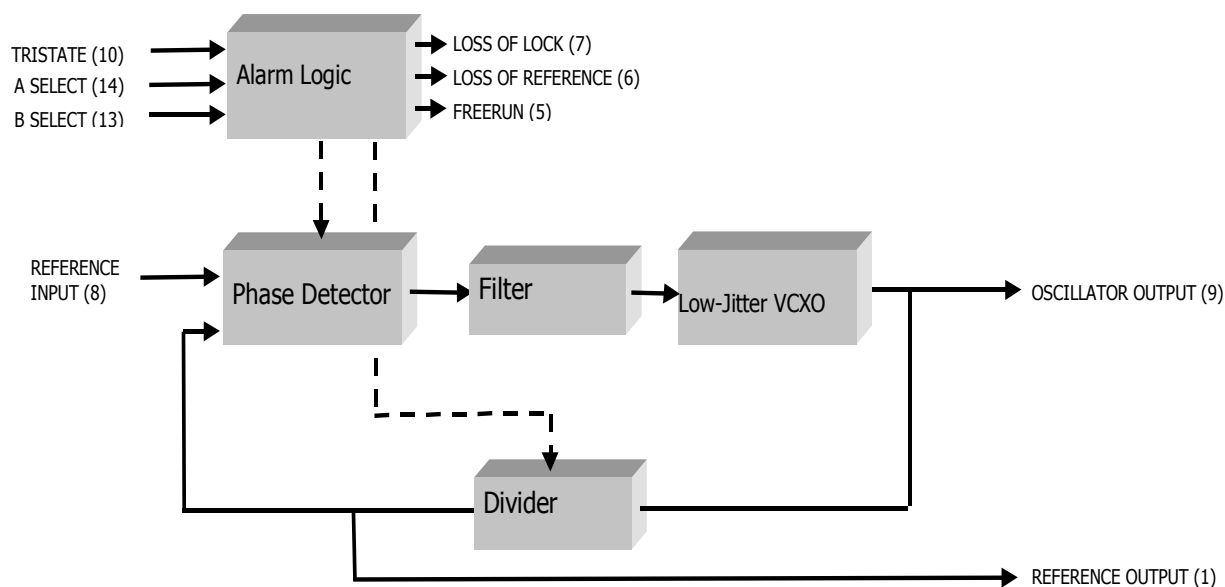
**Table 7: Reference Frequencies**

| Input Reference | Output Reference |
|-----------------|------------------|
| 8KHz            | 8KHz             |
| 16KHz           | 16KHz            |
| 32KHz           | 32KHz            |
| 64KHz           | 64KHz            |



| PIN | Function          | PIN | Function            |
|-----|-------------------|-----|---------------------|
| 1   | Reference Output  | 8   | Reference Input     |
| 2   | N/C               | 9   | Oscillator Output   |
| 3   | N/C               | 10  | Tri-State Enable    |
| 4   | Ground            | 11  | VCC                 |
| 5   | Free Run          | 12  | N/C                 |
| 6   | Loss of Reference | 13  | B Select Input Freq |
| 7   | Loss of Lock      | 14  | A Select Input Freq |

#### CTM5000A Block Diagram



#### Mechanical and Environmental Specifications

| TEST METHODS            | REFERENCE PROCEDURES                 | DESCRIPTION                                            |
|-------------------------|--------------------------------------|--------------------------------------------------------|
| Temperature Cycle       | MIL-STD-883, Mtd 1010, Cond. B       | -55°C to +125°C; Air-to-Air; 100 cycles; 10 min. dwell |
| Mechanical Shock        | MIL-STD-202, Mtd 213, Cond. D        | 500 g's                                                |
| Vibration               | MIL-STD 202, Mtd 204, Cond. B        | 10-2000 Hz; 0.06 inch; 15g; 3 planes                   |
| Humidity Steady State   | MIL-STD-202, Mtd 103                 | 40°C; 90%-95% R.H.; 56 days                            |
| Thermal Shock           | MIL-STD-883, Mtd 1011.7 Cond. A      | 100°C to 0°C; Water-to-Water; 15 cycles                |
| Electrostatic Discharge | MIL-STD-883, Mtd 3015 Class II       | 2 KV to 4 KV Threshold                                 |
| Solderability           | MIL-STD-883, Mtd 2022.2              | Solder dip; Meniscograph Criteria                      |
| Hermeticity             | MIL-STD-883, Mtd 1014.8, Cond. A1    | Mass spectro. 2 x 10 <sup>-8</sup> atmos. CC/sec He    |
| Resistance to Soldering | MIL-STD-202, Mtd 210A, Cond. C       | 260°C; 10 seconds: 1 inch/sec.                         |
| Lead Integrity          | MIL-STD-883, Mtd 2004.5, Cond. A, B1 | Lead tension & bend stress                             |
| Marking Permanence      | MIL-STD-883, Mtd 2015.8              | Resistance to solvents                                 |
| Life Test               | MIL-STD-883, Mtd 1005.6              | 125°C, powered. 1000 hours minimum                     |