A32 with Internal 10 MHz. Clock

The performance of the A32 synthesizer depends on the accuracy of the 10 MHz clock or standard it is connected to. For the best possible performance, we recommend using a GPS derived source. This not only guarantees the best possible performance but will ensure that you are on the same frequency as others using a GPS derived system. The next best option is an external 10 MHz. source that is temperature stable separate from the transverter it is being used with. The transverter temperature will vary depending on the ambient temperature and the amount of power dissipated as heat in the transverter. Hence, the low power transverters will be more temperature stable than the high power versions. The last option is to utilize an "on board" 10 MHz clock installed on the A32 synthesizer. This document will address the use and performance of what DEMI will install if a internal 10 MHz clock is desired.

The latest production A32 units have been designed to accommodate a surface mount TCXO produced by FOX, model 801BE. It was chosen for its performance over other designs. This model does have temperature compensation but it will not out perform and external source. The 801BE does have an internal trimmer control but we found it difficult to adjust so we have installed an "on board" frequency trimmer. This trimmer is adjusted at room temperature (25-28 °C) for the correct frequency depending on the model of transverter and operating frequency chosen. This trimmer can be re-adjusted at anytime to compensate for your type of operation or oscillator aging.

The data provided below will demonstrate what to expect as the internal air temperature of the transverter changes. The data is a compilation of worst-case frequency change of different units tested in the lab at the specified temperature ranges. We believe this is a good representation of what someone could expect when using an A32 with an internal FOX 801 10 MHz clock. Because of the nature of the 10 MHz clock (being crystal derived), the frequency change over temperature depends on the characteristics of the crystal used in the circuit. This is why we specify it as "Change in frequency or Delta" and not actual frequency change in a positive or negative direction. The delta can be in either positive or negative direction from "0" offset or "0" could be the center of the range. Just understand that at any temperature range, the data is the maximum frequency change that was observed.

Next item to understand is that data is a measurement of the A32 frequency change. (The base LO Multiplier frequency) This means that if you have a 10 GHz transverter, the base A32 frequency of 1136 MHz, is multiplied 9 times. So, the delta specified needs to be multiplied by 9. For 5760 by 5, 3456 by 3 and 2304 by 2.

Last item is to not underestimate the operating temperature of the transverter. A high power 5 or 10 GHz. transverter if left unattended in the sun in the transmit mode can exceed an internal temperature of 60 °C! In a laboratory environment, 50-55 °C can be achieved with a ½ hour of continuous transmit time. Now, the data.

Operating Temperature	Delta Frequency Change in Hz.
-10 to +50 °C	375
+20 to +40 °C	200
+30 to +55 °C	110

A32 Internal 10 MHz. Clock Assembly

If you have purchased the A-32 as part of a kit, the 10 MHz clock is not installed. If you requested the internal 10 MHz clock, it is provided as an additional kit with these simple instructions. The internal option kit is comprised of 1- FOX801 series 10 MHz TCXO (TCXO1 on the A-32 board) 1- 1K ohm pot (R3) and 2- 1K 0805 chip resistors (R14, R15). These components can placed in any order on the A-32 board. After assembly, the A-32 will function with just DC voltage applied. The R3 pot is a frequency trim adjustment. This should be adjusted after 10 minutes of operation. It is difficult to get the required frequency resolution by measuring the 10 MHz signal. It is better to measure the output frequency of the A-32 and best to measure the final multiplied frequency in your microwave oscillator chain. There are test points on all DEMI transverters where the final mixer injection frequency and level can be measured.

If in the future you decide to change over to an external 10 MHz source, a simple trace cut (Just above R29 on the board) will disable the internal clock. If you decide to use both such as an internal clock for portable and an external clock for home use, a simple jumper or a switch can be installed between the vias from where the trace was cut. These vias can be connected on either side of the board.