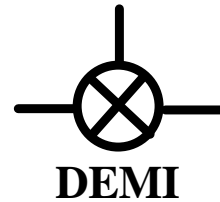


# Design Note



From: DEMI Production Dept.

DN#: 013

Date: August 15, 2002

Re: Frequency offset of DEM 2400-144RX, AO-40 receive converter.

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**PREFACE:** The three most important functions of a high performance receive converter are Gain, Noise figure, and Frequency stability. In optimizing these three criteria, a slight de-tuning or offset of the oscillator frequency may be required. In any crystal oscillator circuit, a “sweet spot” exists where it has the least amount of noise, is the most reliable in start-up over a operating temperature range, and is the most stable in frequency drift. This may result in the receiver converters best performance occurring with an offset oscillator frequency adjusted into the receive converter

**IMPLEMENTATION:** After the installation and initial start-up of any receive converter, a frequency correlation is necessary. This is quite simple with the middle beacon frequency on AO-40. After the receive converter has been powered up for 15 minutes, using what ever means you have to correctly aim your antenna system at AO-40, find the middle beacon. AMSAT list it as 2401.323. This frequency may vary according to the Doppler shift and the tolerance of AO-40. The beacon frequency can be found on a 2 meter IF transceiver if using a DEM2400-144RX by tuning to 145.323 +/- the Doppler shift and adjusting for the specified frequency offset of the receive converter. This offset is listed on the front page of the receive converter's operating manual. The offset will be listed as a + kHz. or a -kHz. This number should be added to the 2 meter IF frequency for the correct frequency of operation. This offset after being verified, may be added into your Doppler shift program if used as part of your tracking program. This offset may change over time as the crystal ages in the receive converter. It can be updated as required and kept as part of your operational record.

**COMMON PROBLEMS ENCOUNTERED:** + or - offsets are sometimes confusing. The offset listed on the operation manual are added or subtracted to the standard 2M IF frequency. The standard design of the receive converter is 2401.000 MHz. = 145.000 MHz. If your converter has a +50kHz. Offset, you will need to add 50 kHz. to the IF frequency . In the case of the middle beacon frequency of 2401.323, 2401.323 = 145.373. If your converter has a -50kHz. offset, then 2401.323 = 145.273.

**FOR BEST OPERATION:** The receive converter should be powered on at all times. This will control the frequency drift at start-up and provide a stable offset frequency anytime. The heating of the converter will also prevent moisture from building up on the internal circuitry and protect it from damage.

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