

SEA INC OF DELAWARE
PRELIMINARY MAINTENANCE MANUAL
EXCERPTS CONCERNING TUNEUP

**MF/HF SSB GMDSS RADIOTELEPHONE/DSC
CONTROLLER**

MODEL SEA 245

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2 OPERATION

2.1 WARM UP CAUTION

Do not attempt to transmit until the radiotelephone is warmed up for at least 1 minute. Transmitting before the 1-minute warm-up period has elapsed can cause violation of FCC regulations.

3 MODE AND FREQUENCY CONTROL

3.1 GENERAL

In the SEA 245, the frequency of operation is determined through a combination of coarse and fine tuning mechanisms. The coarse tuning system consists of the PLL circuitry associated with the first Local Oscillator VCO. The effective loop frequency of the PLL is 4 kHz and the first LO is preset to the nearest incremental frequency needed to convert the desired operating frequency to 45 MHz. The required divide-by-N number for a given operating frequency is calculated by the control microprocessor and then loaded into the main loop PLL chip through the microprocessor SPI bus. The fine tuning system is incorporated into the DSP algorithm, which operates as the receiver "back end" and the transmitter "front end". The PLL that controls the second conversion oscillator is also loaded through the microprocessor SPI bus.

Such data as filter band, VCO band, synthesizer loads, carrier status and DSP algorithm are calculated and stored in appropriate registers by the controller computer, once the desired channel is entered by the operator.

3.1.1 TRANSMITTER MODE SELECTION

The primary mode of operation of the SEA 245 is in the J3E (SSB with fully suppressed carrier) mode.

Two auxiliary VOICE modes are also provided:

R3E: SSB with pilot carrier re-inserted 16 dB below PEP.

H3E: SSB with pilot carrier re-inserted 6 dB below PEP.

J3E is the basic SSB operating mode and is used for virtually all VOICE communications. H3E (AME) is used to provide a degree of compatibility between old style AM and SSB systems. Present practice limits this mode to 2182.0 kHz ONLY. R3E is primarily used to provide a pilot carrier on public correspondence channels. Present practice ignores this mode.

J2B: TELEX operation with both internally and externally generated (AFSK) tones. Uses J3E mode with narrower bandpass filter. Note that the internal DSC system uses the same standard 1700 Hz subcarrier frequency as is used in the SEA 3000 SEATOR equipment.

3.1.2 RECEIVE MODE SELECTION

The SEA 245 supports J3E, R3E and H3E modes as a standard SSB (J3E) receiver. The passband filter and AGC characteristics are tailored for SSB VOICE operation.

In the TELEX (J2B) receive mode, the passband filter is shifted to narrowband (500

Hz) and the BFO offset is set to the International Standard of 1700 Hz. AGC is fast attack, fast release.

In the CW (A1A) receive mode, the receiver passband filter is shifted to narrowband (500 Hz) and the BFO offset is set to 1000 Hz. AGC is fast attack, fast release.

In the AM (A3E) receive mode, the receiver passband is shifted to maximum bandwidth (4 kHz) and the received signal carrier is offset 1 kHz from the passband center. The DSP based envelope detector provides "true" AM demodulation with an effective bandwidth of 3000 Hz for audio recovery. This mode is useful primarily in the reception of time signals from WWV, shortwave broadcast signal etc. AGC is fast attack, fast release.

3.2 CAUTION! FREQUENCY TOLERANCE

Under FCC Rules, the frequency tolerance for the Marine Service is ± 10 Hz. In order to achieve this accuracy a frequency counter with long term accuracy of ± 1 Hz should be used.

All work affecting the transmitter performance must be done by, or under the supervision of, a person holding at least a General Radiotelephone FCC license.

3.3 SETTING THE TRANSMITTER FREQUENCIES

3.3.1 THE MASTER CLOCK OSCILLATOR

1. Select the highest desired transmitter frequency (Such as 25083.0 kHz). With the transmitter output connected to an appropriate dummy load and a few watts of re-inserted carrier being generated, connect a high accuracy frequency counter (See Paragraph 3.3) to the RF dummy load and adjust trimmer capacitor C56 on the transceiver Main Board (ASY-0245-01) for the correct carrier frequency. The trimmer capacitor is located next to the Master Clock crystal oven on the Main Board Assembly.

3.3.2 ENABLING CARRIER REINSERTION

Using DIRECT FREQUENCY ENTRY mode (See PP 2.5.28 above), enter the desired test frequency. E.g.: 25083.0 kHz. Select R3E from the MODE menu.