DTI-100A DF BEARING SYNTHESIZER
USER FUNCTIONAL TEST PROCEDURE

I DESCRIPTION

This procedure provides users with the means to implement a “closed-box” functional test of the DTI-100/DTI-100A DF Bearing Synthesizer to verify essential performance characteristics. It is organized to test as many features as practical in an abbreviated test with a minimum of test equipment and accessories. The procedure requires only basic familiarity with electronic test equipment and procedures, and does not require that the unit be opened. It is suitable both as a user acceptance test procedure as well as a means of performance verification. It is particularly recommended that this procedure be implemented prior to returning a DTI-100/DTI-100A to the factory for repair, since the results will more rapidly point the factory technician to the source of trouble.

II APPLICABILITY

This procedure is applicable to all DTI-100/DTI-100A DF Bearing Synthesizers. The only difference between the DTI-100 and DTI-100A is that the DTI-100 lacks the **HI/LO BAND** indicator lamp and the **BREAK** switch. Users testing the DTI-100 should therefore disregard those steps in the procedure pertinent to these two features.

III APPLICABLE DOCUMENTS

RF Products DTI-100A DF Bearing Synthesizer Operator’s Manual (doc. # dti100a_oma_01).

IV TEST EQUIPMENT REQUIRED

A. Oscilloscope (Tektronix 465 or similar).

B. DF Bearing Processor (DFP-1010, DFP/DFR-1000(A) with computer interface option, or other compatible DF bearing processor).

C. Host computer and software (as required for DF bearing processor).

D. Power supply (as required for DF bearing processor).

E. Miscellaneous plugs, cables, and adaptors as required.

V TEST PROCEDURE

1__ Carefully inspect the unit for any signs of physical damage.

2__ Configure the DF bearing processor for an audio signal interface (see Figure 1).

3__ Connect the DTI-100/DTI-100A to the DF bearing processor via the supplied DIN interface cable.

4__ Power-up the DF bearing processor and verify that the red **+13.8 VDC** power indicator illuminates.

5__ Set the **AZIMUTH** switch to 0° and the **GAIN** control fully clockwise.

6__ Connect an oscilloscope to the **HIGH AUDIO OUT** phono jack and confirm the presence of a clean sine wave with a typical amplitude of approximately 4.25 volts peak-to-peak. The waveform should show no signs of clipping or parasitic oscillations. **Note 1:** This and the following step require that the bearing processor X and Y tone outputs similarly be clean sinusoids with amplitudes of 1.0 volt peak-to-peak. **Note 2:** Clipping often appears within the first few seconds following power-up, but should gradually diminish and then disappear once the unit has settled.

7__ Set the **AZIMUTH** switch to 90° and again confirm the presence of a clean sine wave with a typical amplitude of approximately 4.25 volts peak-to-peak.

8 __ Rotate the **AZIMUTH** switch in succession to all 10 remaining azimuths and confirm that there is no waveform peak clipping or “dead” azimuths for which there is no output.

9__ Momentarily press the **BREAK** switch and confirm that the waveform disappears (DTI-100A only - skip this step for DTI-100).

10__ Slowly rotate the **GAIN** switch fully counter-clockwise and verify that the waveform gradually diminishes in amplitude until it is no longer visible.

11__ With the **GAIN** control still fully counter-clockwise, check for the presence of a DC bias voltage. If any DC bias voltage is present, it should be less than 100 millivolts. **Note:** A positive bias voltage often appears for several seconds following power-up, but gradually diminishes to zero.

12__ Disconnect the oscilloscope from the **HIGH AUDIO OUT** phono jack and connect it instead to the **LOW AUDIO OUT** phono jack.

13__ Set the **AZIMUTH** switch to 0° and confirm the presence of a clean sine wave with a typical amplitude of approximately 175 millivolts peak-to-peak.

14__ Disconnect the oscilloscope and connect the **LOW AUDIO OUT** phono jack to the DF bearing processor audio signal interface input via an appropriate cable.

15__ Appropriately configure the DF bearing processor to display a bearing. For the DFP/DFR-1000(A), set the **CRT TRACE LENGTH** control fully clockwise for maximum gain, set the **CRT** switch to **SLOW**, and monitor bearings at the host computer using DFDATA1 (the software program supplied with the computer interface option). For the DFP-1010, start it supplied host-computer interface program DEFCON1 and select the **FM Voice** operating mode (after first setting DEFCON1 to its default setups via Main Menu Option #7 of its accompanying DEFDAT1 utility program). Once done, return to DEFDAT1 and select Main Menu Option #1 to select the scrolled bearing listing format. Confirm that a 0° bearing (+/- 1.0°) is displayed. Note the bearing magnitude indication for reference in the following steps.

16__ Rotate the DTI-100A **AZIMUTH** switch in succession through all 12 azimuths and record the displayed bearings and their associated magnitudes. Be sure to allow sufficient time for the displayed bearing to fully settle at each azimuth. Verify that all bearings are accurate to with +/- 1.0 ° (typical accuracy is to within a few tenths of a degree).

17__ Confirm that the magnitude indications at all azimuths (including 0°) are nearly the same.

18__ Set the DF bearing processor antenna band to Band 5 and verify that the DTI-100A **HI/LO BAND** indicator is extinguished (DTI-100A only - skip this step for DTI-100). **Note:** Skip this step if using a non-RF Products DF receiver/bearing processor.

19__ Set the DF bearing processor antenna band to Band 6 and verify that the DTI-100A **HI/LO BAND** indicator illuminates (DTI-100A only - skip this step for DTI-100). **Note:** Skip this step if using a non-RF Products DF receiver/bearing processor.

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