

How Amateur Radio Operators Can Emulate an HF ALE Radio

David R. Wortendyke, N0WGC
U.S. Department of Commerce
NTIA/ITS.N1
325 Broadway
Boulder, Colorado 80303

Automatic Link Establishment (ALE) techniques became popular for Government HF radios four years ago with the adoption of Federal Standard 1045, and a Government effort to test all candidate HF ALE radios for interoperability and performance before major procurement actions could occur. Testing ALE radios in 1990 was a cumbersome process. As a spin-off the Institute for Telecommunication Sciences (ITS) in Boulder, Colorado investigated new techniques to simplify the method of testing. Last year ITS produced an audio compact disc (CD) with over 50 tracks of computer generated ALE modem tones. These ALE tones exercise almost all of the primary functions and addressing combinations required by the HF ALE Radio Federal Standard. All that is required to simulate an ALE radio is the CD, a CD player, and an HF transceiver with a microphone VOX input. As part of the development effort to produce the ALE modem tones, a computer program was written which makes PC "wave" files, or the digital audio (DA) files for the CD. The wave files may be played using a good quality PC sound card. This software uses ASCII text protocol files to produce the sound files, and the complete software package is now available free of charge on the Internet as of July 1, 1994. This paper describes the software use, and some of the future potential, for emulating an ALE radio using only typical amateur equipment.

Additional information via e-mail: ale-cd@its.blrdoc.gov.

THREE WAY HANDSHAKE USED BY ALE RADIOS TO ESTABLISH A LINK

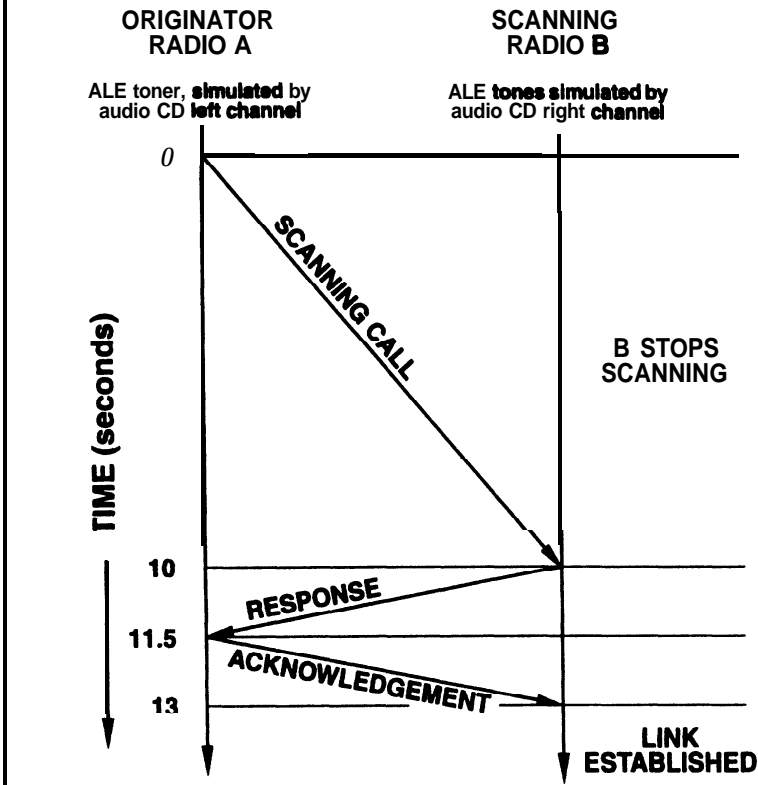


Figure 1

EQUIPMENT SETUP for ONE WAY RADIO TESTING with PRERECORDED ALE TONES

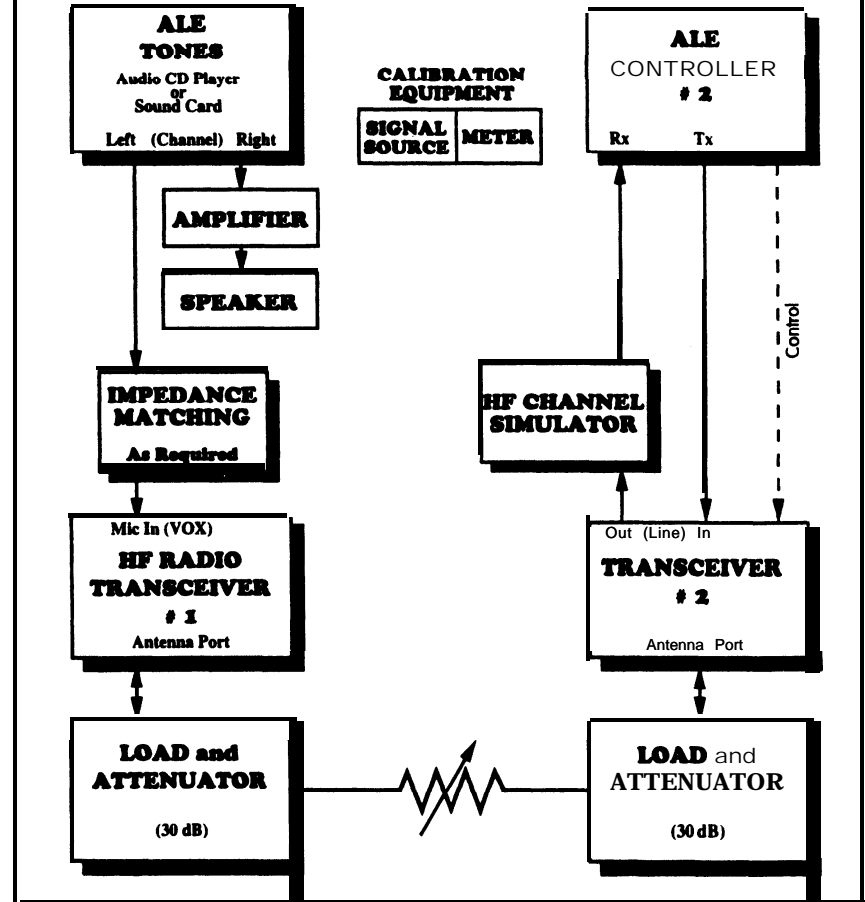


Figure 2

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Generation of ALE Tones for Interoperability Testing of FED-STD-104 Radios

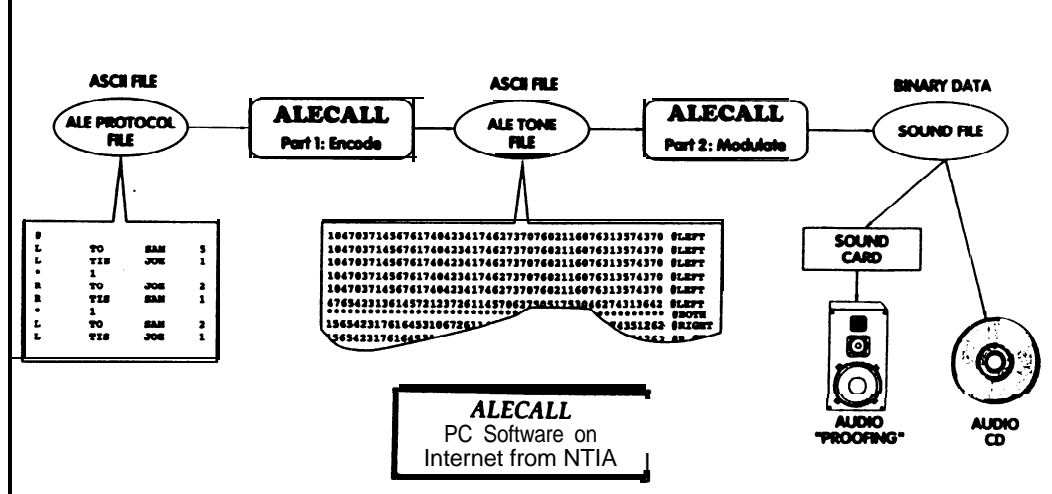


Figure 3

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Two Step Process for Interoperability Testing with an Audio CD

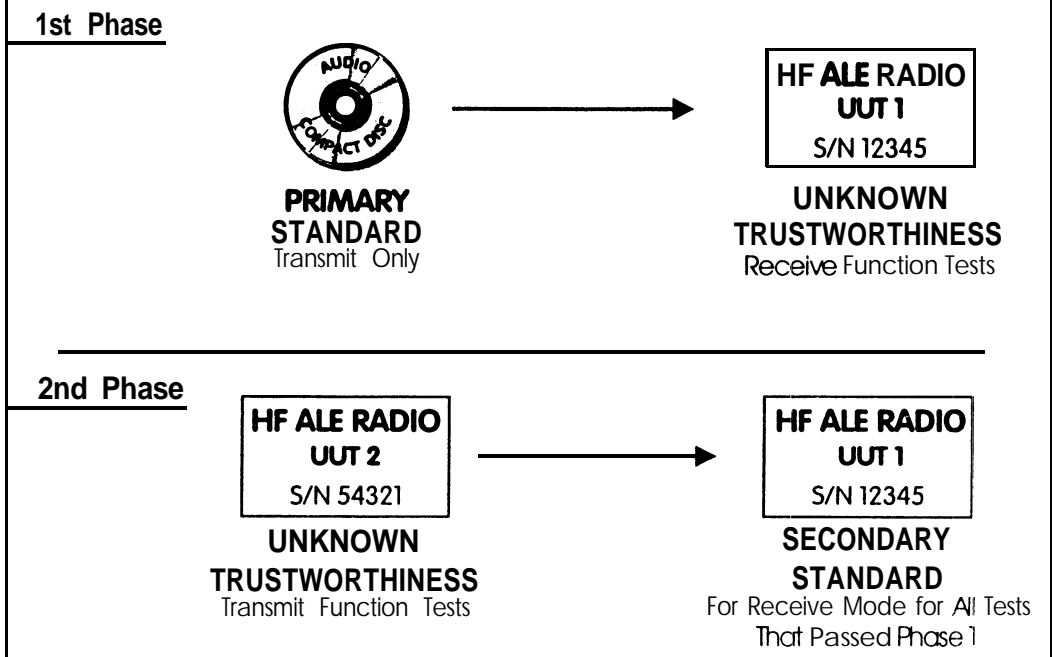


Figure 4