
TECHNICAL NOTE TN-1129

Differences between TB8100 and T800 when used with an External Frequency Reference

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Applicability

TB8100 when used with an external reference.

1. Introduction

There has been some confusion in the way the TB8100 is locked to an external frequency reference compared to the T800. This technical note explains the differences between them.

2. T800 used with external frequency reference

In the T800, low frequency modulation was achieved using a dual point modulation scheme. That is, the audio was split into two paths, one feeding the VCO in the synthesiser and the other feeding an integrator, which drove a phase modulator in the reference path. This scheme provided an audio frequency response down to about 60Hz, and was adequate to pass CTCSS tones. This system was truly phase locked, and thus had zero drift with respect to any external reference applied. It was thus suitable for Quasi-Synchronous systems. It was NOT suitable for DCS tones, or for paging. A special ancillary board with a frequency control loop was needed for these applications but the T800 could NOT be used in a QS system with this board operational as the frequency locking accuracy was inadequate.

3. TB8100 used with external frequency reference

The TB8100 employs a frequency control loop (FCL) which is implemented in a DSP. The modulation frequency response goes as low as 10Hz on the unbalanced input, and as low as 0.8Hz if bypass mode is selected.

Note: With bypass mode enabled, the limiter is bypassed, so it is up to the user to prevent excessive deviation, which may cause possible interference to other users.

The frequency locking accuracy with an external reference is specified at less than 1Hz at V/UHF, and less than 2Hz at 800 MHz. Although the system is not absolutely phase locked as the T800 is, this accuracy is more than adequate for simulcast systems using analogue FM. For paging, even the 0.8 Hz high pass filter is bypassed, extending the modulation frequency response down to DC. In this mode, however, the carrier frequency accuracy, even with an external reference, is never guaranteed beyond the 0.5 ppm specified for operation without an external reference. This is due to offsets introduced at the analogue input and in the CODECs, that cannot be removed. For paging this is not a problem, as these offsets are largely removed when the application PCB is set up.

CSO Instruction

Please pass this technical note to customers using the TB8100 for Quasi-Synchronous systems or systems using an external reference.

4. Issuing Authority

Name and Position of Issuing Officer

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