Technical Support
TECHNICAL NOTE

TECHNICAL NOTE TN-1031-SR

TM8100 CTCSS solutions in Firmware v2.09

25 July 2005

Applicability

This Software Release Note applies to the TM8100 Mobile radios using v2.09 Firmware.
This Technical Note compliments TN-1038-SR.

1. Introduction

Over the last 6 months a number of issues have been raised by TM8100 users with respect to its CTCSS operation.

(a) Mute 'pops open' with incorrect or no CTCSS. Raised as Focus 20439 and as a variation in Focus 19454.

(b) Valid CTCSS slow to decode. Raised as Focus 18819.

(c) 'High deviation level' of CTCSS required to decode. Raised as Focus 19602.

(d) TM8100 CTCSS would attempt to decode when *adjacent* tones were used. Raised as Focus 19454.

2. Implemented Changes

Firmware v2.09 incorporates a modified algorithm to solve these CTCSS issues.

(a) This issue was raised because a TM8100 radio on a channel controlled by CTCSS would occasionally 'pop' noise/audio from the speaker. This would be especially prevalent if there was some on-channel RF signal about mute threshold that did not have the correct (or any) CTCSS. E.g.: localised noise.

(b) Firmware versions prior to v2.09 had been tested to verify complaints the TM8100 was too slow to open the receive audio path on a valid signal and first words in sentences were being missed.
Time to decode CTCSS and pass audio to the speaker was originally ~300ms, testing has verified v2.09 has shortened this timeframe to ~190ms. This is regardless of the CTCSS frequency being used.

A T2020 with the same setup profile was measured at ~230ms @ 67.0 Hz and ~100ms @ 250.3 Hz.

NOTE: If the decode speed of a TM8100 needs to be even quicker the AUX_GPIO input option "Force Audio PA On" can be enabled. This will further decrease the time to get receive audio to the speaker by ~50ms.

(c) Earlier firmware versions would decode on-channel valid CTCSS so long as the CTCSS deviation received was greater than 150Hz. The T2020, for instance, will decode valid CTCSS at greater than 80Hz deviation.
Normally the encoded deviation from a repeater is at least 10% of Full System Deviation which is >250Hz for a Narrowband channel (± 2.5KHz) so the TM8100 is well within specification.
Some users operate CTCSS *through* their carrier-only repeater where the output is not regenerated and instead relies on the transmitting mobile radio's CTCSS deviation level being adequate after the repeater receiver's normal audio pass-band has 'rolled-off' the sub-audible tones to still be decoded at the other mobile's receiver.
Firmware v2.09 has been tested to decode valid CTCSS deviation greater than 80Hz.

(d) This is a slight variation of issue (a), where the TM8100 was noted to decode CTCSS frequencies up to ±2 Hz of centre. The Orca5000 and T2000 have a narrower decode window of ±1 Hz.
Firmware v2.09 has a compromise and allows a CTCSS decode window of ±1.5 Hz, alleviating adjacent tone 'popping' but not dropping out if the incoming CTCSS tone strays from it's correct frequency.

Compliance Issues

None.

CSO Instruction

Inform all sales and service staff of the released information.
This Technical Note compliments TN-1038-SR.

3. Issuing Authority

Name and Position of Issuing Officer

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Confidentiality

Distribution Level

Associate.

Document History

Original Release	25 July 2005	GCB