



Technical Support

TECHNICAL NOTE

Technical Note TN-857-SR TM8000 Mobile radio Release 3 and Upgrade Instructions

10 May 2004

Applicability

This Technical Note details the changes in Firmware and PC Application in Release 3, and instructions on upgrading existing TM8100 radios to Release 3.

1. Information

Release 3 Feature Additions

The following features have been included in release 3 Firmware version 2.00.00.03. These features also rely on Release 3 PC Application version 2.66.00.06 (or later). Release 3 Calibration Application is version 2.65.00.08.

➤ THSD – Tait High Speed Data

Over-the-air Data rates at Release 3 are up to 12000 bps on narrowband (12.5KHz) and medium (20KHz) channels and up to 12000 or 19200 bps on wideband channels (25KHz).

The 19200 bps over-the-air rate is only available if Wide Band Modem Enabled is checked on the Data > RF Modems tab **after** the Transparent Mode Enabled and THSD Modem Enabled tick-boxes are checked on the Data > General tab.

- Checked: data will be sent over-the-air at up to 19200bps on wide-band (25KHz) channels.
- Cleared: data will always be sent over-the-air at a rate of up to 12000bps, regardless of channel bandwidth.

Important: Tait High Speed Data fully conforms to the relevant European performance specifications only when operated with this check box cleared. Do not select this check box unless local regulations in the country of operation allow.

Feature Additions (cont.)

➤ **Single In Band Tone – SIBT**

Single-in band tone signalling; [Basic Settings > Single In Band Tone](#) is a means of segregating users on a channel (as with subaudible signalling), but because it is audible it can be passed through a repeater without re-generating the tone.

Single in-band tone signalling cannot be used on a Two-Tone network, or used on a channel with subaudible signalling (the tickbox remains greyed out).

Important: SIBT relies on carrier to maintain a valid signal. If the squelch mute fluctuates due to a weak signal, then the radio will remain muted for the rest of that transmission. Set the [Squelch Tail Extension Time](#) to a higher value to counteract this effect.

Note: If the [Selective Call Mute](#) check-box is selected, a valid call sequence and single in-band tone must be received to unmute the radio.

➤ **Two-Tone Signalling**

Two-tone signalling (also known as Type-99) is in-band, two-tone sequential signalling. See [Two-Tone > Two-Tone Options](#).

Two-tone signalling is used for selective calling of individual radios, groups of radios, or pagers. The radio can be set to decode individual, group and super group calls, using two different formats:

Motorola Quick Call II[®]

Com-Net Ericsson / GE.

You can decode both two-tone and subaudible signalling on a channel, and use two-tone signalling with groups. You cannot encode Selcall or DTMF sequences, and decode two-tone sequences, on the same channel.

➤ **CCR – Computer Controlled Radio**

CCR provides a means of controlling the TM8000 radio unit via a serial interface, using some form of data terminal equipment (PC, AVL equipment etc).

In CCR mode the radio no longer uses a non-volatile database. All radio parameters are uploaded and changed in real time from an external application.

The TM8000 CCR operation is a sub-mode of CCDI. Once in CCR mode the radio will accept serial CCR commands and will no longer process CCDI commands.

The external device operating over a serial communications link can control most of the radio functionality. This allows system integrators to develop their own intelligent control device.

A publication will be released soon with an in-depth description of operation.

Feature Additions (cont.)

➤ Encryption

Voice encryption is also known as voice scrambler, or more correctly as voice inversion.

To enable voice encryption enter a frequency between 2800 Hz and 3300 Hz in the UI Preferences > Audio Setup > Encryption Inversion Frequency field, then assign Encryption to a function key in the Key Settings form. The default is 2850 Hz which matches the only frequency of the T2000-A4502.

This frequency is mixed with audio to encrypt outgoing transmissions, and is also used restore audio to its original state when received.

Important: Care must be taken when setting the inversion frequency as it can impact on audio quality if set too high or low.

Points to Note

If an older personality datafile is loaded into the Release 3 PC Application it should be validated before it is written to a Release 3 radio. Failure to do this *may* produce database errors.

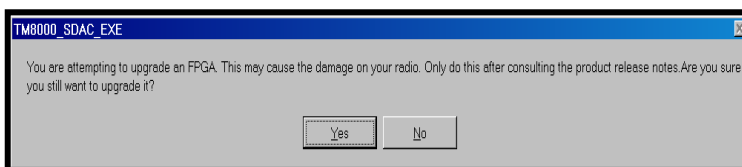
To validate, click on each tickbox in the lefthand menu. The datafile can then be written to the radio.

Reading from a Release 3 Firmware radio or generating from new does not require this operation.

The process of upgrading the Firmware in a TM8000 will produce an advisory warning (see screenshot below) that the FPGA - Field Programmable Gate Array – will also be updated in this process.

If the user has got to this point in error this pop-up allows an exit without change.

If the upgrade process is not done as per the instructions on the following page, then the radio can be left in a non-operational state, however if the operation is legitimate then click Yes to continue.



First Production Serial Numbers

From early May 2004 the production line upgraded existing Release 2 radio Firmware (v01.01.08.03) in stock to Release 3 Firmware (v02.00.00.03). All radios shipped after May 6th 2004 have Release 3 Firmware.

Upgrading radios to Release 3

From radio serial number **19009872** all radios built have Release 3 Firmware.

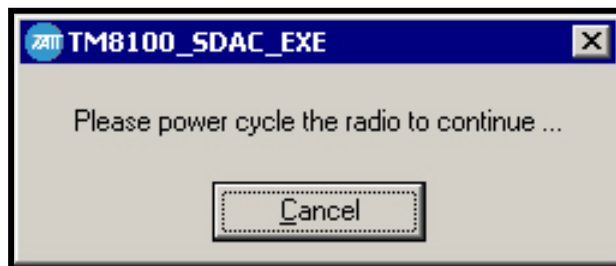
Do NOT upgrade Demo / Field Trial (DMABxx) radios with serial numbers prior to **19001450** to Release 3, this will render the radio inoperable.

To upgrade production TM8100 Firmware to Release 3:

- Upgrade the Calibration and PC Application versions to Release 3 or later. These are:
 - PC Application v2.66.00.06
 - Calibration Application v2.65.00.08
- Read and save the radio's personality (data file)
- Read and save the radio's calibration

In the PC application:

- Click on Tools > Download... > **Download**
- The radio will display "UP" and the Download Application will look for the saved location of the Firmware QMA1Fstd_02_00_00_03_EP1C6.S2
NOTE: The Release 3 (or later) Firmware version also *includes* the FPGA version and this will be downloaded automatically to the radio after Firmware completion
- The following pop-up dialog box will appear:



To continue, **remove** the DC supply to the radio and wait 5 seconds before re-applying the DC supply. The download will continue automatically.

Once Firmware and FPGA download is complete the radio will return to "PR" mode

- Reprogram the saved personality back to the radio
- Reprogram the saved calibration back to the radio

The radio will now reset to normal operation

Click on Tools > Download... > **Report Configuration** to confirm the Firmware has updated in the radio.

2. Firmware Changes

Release 3 Firmware changes

The Release 3 Firmware is the first version that supports use of the single digit 10-channel TM8110 control head TMAC50-0T.

As there is only one display digit there are differences in representing different operational functions on the TM8110 and TM8115.

These are listed below with TM8115 display in brackets:

- Calibration mode (CL) shows "C" instead.
- If the Abbreviated label option is used in the Scan Group Display Indicator (SC) shows "0" (zero) instead.¹
- Reading or writing personality data (Pr) shows "P" instead.
- With any Hardware errors (Ex) where x is number 1 or 2 shows "E" only.
- Out-Of-Lock indicator (OL) shows as "L" instead.
- Locked radio (--) is one dash only "-".
- PIN entry required (--) is one dash only "-".
- Operating in CCR mode (Computer Controlled Radio) (CC) shows "r" instead.

NOTE: Upgrading the Firmware version (UP) and the error code (E3) are functions of the bootcode and as such do not respond to the head being a TM8110. Therefore they are represented as "P" and "3" respectively.

¹ If a Scan or Vote group is required the maximum number of channels drops to 9 (1 to 9 inclusive) and the ID '0' is used as the Group Indicator. Only ID's 0-9 can be used to initiate Scan from a Function button.

Check Packet Length Tickbox

Sets whether or not the data packet length is checked when data is received in FFSK transparent mode.

Found in Data > RF Modems > FFSK Modem. This is basically an unprotected mode FFSK modem, as it does not check length or CRC. This field is only available if the Transparent Mode Enabled check box is ticked

- Selected: the radio will check packet lengths as data is received. Invalid data will not be sent to the computer equipment.
- Cleared: packet lengths will not be checked. Data throughput will be slightly faster but erroneous data may be sent through to the computer equipment. If this check box is cleared, some other form of third-party data-length checking should be used.

Note: To remain compatible with other products, TM8100 radios will always transmit the packet length over-the air, regardless of this setting.

Resolved Issues

- If a radio personality was read or a datafile loaded, the PC Application did not recognise that the Data hardware flow lines RTS and CTS were set and changed them to NONE. Raised as Focus 14449.
- All AUX_GPI(x) inputs on the Programmable I/O > Digital tab now have a default de-bounce of 10 milliseconds. Raised as Focus 14776.
- Resolved an issue where the Vote group would halt after PTT action if the Stop Scan on PTT Release on the Scan page was enabled. When Group Type is set to Vote this tickbox is now automatically disabled.
- Changes to the *TaitComms.exe* application have solved the Read and Write issues noted with slow PC's (less than 200MHz processors) and earlier radio Firmware and also crashing if the com-port was already in use. Raised as Focus 13652.
- The dropdown frequencies available for each tone field in Tone Settings > Custom Selcall has been modified to be listed in Numerical order. Raised as Focus 12774.
- The PC Application will now automatically append the serial number of the radio just read when a saving that personality to file. Raised as 8000fieldtrial 417. In keeping with other radio models the pop-up Radio Interrogation box now lists "F/W version" rather than "S/W version" when displaying the radio Firmware.
- The options for Start-Up > Power On Mode are now only Power On and Previous State. If an existing datafile has the setting Power Off it will automatically change to Previous State.
- Solved an occasional issue where the character '%' in the filename caused the PC Application to crash when attempting to Load or Save.
- To date the Repeater Access Burst on the Free Format Burst page has been defined as the 'B' burst. The label has now been changed to Repeater to better represent its functionality.
- The Repeater field will now also allow the group tone 'G' to be programmed as a Free Format Burst tone. Added a validation to check that a Group (Scan or Vote) can not be enabled if there's only 1 member.

Calibration Application Changes

Resolved the issue of the Calibration Application default corrupting databases.

The Calibration Application defaults to band H5 at start-up. If a radio (for example a B1) calibration database was read from a radio and saved to file then the Calibration App restarted and the file written to the radio it would programme the radio as a H5 and consequently cause Out-Of-Lock errors. If the Application was not shut-down the issue would not occur. Raised as Focus 14884.

The Red (Reject) and Green (Accept) Icons on the toolbar have been fixed. These icons would not 'un-grey' when changes were made and therefore changes could not be Accepted or Rejected before writing data to the radio. This issue did not stop the new updated data from being validated and written to the radio. Raised as Focus 14602.

Moved the Read, Interrogate and Write toolbar Icons apart from each other. This decreases the likelihood of clicking the wrong icon during a critical calibration operation.

Compliance

Tait High Speed Data fully conforms to the relevant European performance specifications only when operated with this check box cleared. Do not select this check box unless local regulations in the country of operation allow.

CSO Instruction

Please inform all technical staff and accredited dealers of the updates in PC Application, Calibration Application and radio Firmware available for the TM8100 mobile radio.

3. Issuing Authority

Name and Position of Issuing Officer Confidentiality

Graham Brenchley
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Document History

Original Release	10 May 2004	GCB
Added first serial number	14 May 2004	GCB