

Technical Note TN-968-SR

TM8100 Mobile Radio Firmware v2.04 Upgrade Instructions

TECHNICAL NOTE

1 March 2005

Applicability

This Technical Note details the changes in the latest Firmware and PC Application and instructions on upgrading existing TM8100 radio Firmware to v02.04.00.07. Simply referred to as v2.04.

1. Firmware Changes

The following changes have been made in Firmware v2.04 and PC Application version 2.80.

| lssues | Resolved the issue found in the previous Firmware where setting 0.000Hz as a Receive frequency would cause the radio to error on Transmit. Raised as Focus 19396. The PC Application would crash when using languages other than English and Alt-A or Alt-R were used to add a channel. Raised as Focus 19230. |
|--------|---|
| | Emergency audio source is now correctly associated. The emergency audio source path (e.g. Aux Mic.) setting was being overridden by the 'current' microphone (e.g. Fist Mic.) selection on transition to Emergency Transmit mode. Raised as TIMS 40548. |
| | The following GPIO lines are now checked at start-up for their current state. This is in addition to the functions added in Firmware v2.03. See TN-946-SR. SEND NETWORK PRESET CALL (14) SEND CHANNEL PRESET CALL This ensures these functions respond to third-party operations or inputs. Previously external inputs would need to perform a change to be recognised. Raised as Focus 19360. Backlighting With Activity now responds to all PTT presses including those made by External inputs such as the Remote PTT Kit. Resolved an issue where a radio that had Rx_AUDIO set to Tap Out to R4, then attempted to enter THSD transparent mode, would crash. Raised as TIMS 40936. |

First ProductionFrom radio serial number (TBA) all TM8100 radios builtSerial Numbershave Firmware v2.04.

Upgrading radios to v2.04

To upgrade existing TM8100 Firmware to v2.04:

- Upgrade the Calibration and PC Application versions to the latest versions. These are:
 - PC Application v2.80
 - Calibration Application v2.71
- Read and save the radio's personality (.m8p)
- Read and save the radio's calibration (.m8c)

In the <u>PC application</u>:

- 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_04_00_07.s2

NOTE: Firmware files since v2.00 have also included the FPGA image file, and this will be downloaded automatically during this upgrade process.

> The following pop-up dialog box will appear:

| MT | B100_SDAC_EXE | × |
|-----|---------------------------------------|---|
| Ple | ase power cycle the radio to continue | |
| | Cancel | |
| | | |

To continue the Firmware upgrade:

- > **<u>Remove</u>** the DC supply to the radio
- ➢ Wait 5 seconds
- ➢ Re-connect the DC supply
- Power-up the radio with the control head on/off button (if it has not already powered-up)
- The pop-up box will then disappear and the upgrade process will continue.

Once the 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.

NOTE: Failure to follow the DC removal process above will produce an "Error 59 – Protocol – unlock/erase flash block error" noted in the Download Application's Status bar leaving the radio Firmware un-changed.

2. Enhancements

- This Firmware release includes the implementation of up to 100 ID's. To allow easier access to all of these channels or groups the scroll rate has been adapted to suit. If either scroll channel change key is held for longer than 4 seconds the scroll repeat rate changes from 2 channels/sec. to 20 channels/sec.
- The TM8100 will now directly enter transmit mode (if allowed) and any PTT input is active at start-up. Raised as Focus 28715.
 - The TM8110 cannot display the Firmware version so the radio will directly enter transmit
 - The TM8115 will enter transmit after the Firmware version has scrolled on the display¹. The Firmware will be displayed as '02. 04. 00.'
 - The TM8105 will enter transmit after the Firmware version has scrolled (even though it does not have a display).
- Previously the TM8100 provided 9 possible CCDI volume steps. This has been increased to 25 steps. The CCDI commands are: f04020074 set volume level Off (= 0) f0402256D set volume to maximum level (=25)
- Encryption Status has been added to the output functions available on the Programmable I/O page. This produces an output indication that encryption has been activated either by the user pressing a programmed function key, or has selected an encrypted channel. The line will deactivate when the user turns off encryption, or an unencrypted channel is selected.

To enable a user to identify the channel they are on is encrypted (or not); set the I/O lines as per the suggestion below.

| Pin | Direction | Label | Action | Active | Debounce |
|-----------|-----------|--------|-------------------|--------|----------|
| AUX_GPIO4 | Output | PIN_10 | Encryption Status | Low | None |
| AUX_GPIO6 | Input | PIN_9 | Toggle F1 Key LED | Low | 10 |

A link-short between Pins 9 and 10 of the Aux DB-15 plug will light the 'F1' LED whenever an encrypted channel is active. Be aware if the channel is then a member of a scan group it will 'beep' whenever the scan passes that channel.

¹ From an off state, depress PTT, then power-up the radio.

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Encryption on a Per-Channel Basis

Encryption (Voice Inversion) can now be enabled on a per-channel basis. To enable this operation, disable the <u>Global Encryption</u> tickbox on the UI Preferences page, and the <u>Channel Encrypted</u> tickbox(s) will be ungreyed on each Channel's <u>Detailed</u> tab. Raised as Focus 18371.

Encryption on a Global basis is default, and the radio will allow encryption (for all channels) to be controlled by a function key if also programmed. This was the previous implementation.

Encryption on a per-channel basis will enable Encryption on only those channels as they are selected, including when being Scanned. The user will no longer be able to disable Encryption for any channel in this mode.

| TM8100 Programming File Edit Radio Tools H | | | |
|---|--|--|--|
| | ~~ ∕ №? 🦻 Radio 🙀 🎉 🧱 | | |
| Radio Model | TM8100 | | |
| Specifications Receiver Monitoring Data Selcall Selcall dentity Freed Format Bursts Freed Format Bursts Torne Settings DTMF UTWo-Tone Basic Settings Freatures Phone Patch Phone Patch Phone Settup Channels Scan Groups Key Settings DUP Freemees Channels Ch | UI Preferences Audible Indicators Preferences Initial Indicator Level High Backlight Mode Initial Indicator Level High Backlight Duration 5 Confidence Tones ✓ Silent Mode Computer Control Quiet Mode Emergency Activated List Operation Wrap Around Function Activated Audio Setup Minimum Volume Level Emergency Mic Control Head Mic Gain Public Address Volume Level Public Address Volume Level | | |
| Last action: (2.60.00) Last action: (2.60.00) Lest action: (2. | | | |
| Specifications Receiver Monitoring Data Selcall | TM8100 Channels Summary Detailed Signalling Preset Signalling Decode | | |
| Selcal Identity Selcal Identity Free Format Bursts Free Format Bursts Tore Settings Control Status DTMF DTMF Signalling Two-Tone Two-Tone Options Networks Basic Settings Freduces Phone Patch | Channel Details Rx Frequency 400.000000 Tx Inhibit None Image: Channel Point | | |
| Indie Fashing The Fight Signaling Emergency Akets Channel Setup Cannels Scan Groups Key Settings UI Preferences Start-up PTT PTT | Perdedict 425 Companding Squelch Country Send/Decode SIBT on Channel Channel Channels ChannelID: 1 Image: Send Channel Chan | | |

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Deferred Calling

If <u>Deferred Calling</u> is enabled, unsuccessful Selcall or DTMF sequence transmissions will automatically retry after a random period between 500ms and 5seconds. It will continue doing this until:

- The transmission succeeds or
- The nominated <u>Deferred Calling Time</u> expires or
- There is a user input action (including any key-press).

Raised as Focus 18459.

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| Radio Model | TM8100 | |
| | | |
| Specifications | Basic Settings | |
| Receiver Monitoring Data | | |
| | Basic Network Settings Subaudible Signalling Receiver Monitoring Single In Band Tone | |
| Selcal Identity | Basic Network Settings | |
| Fixed Format Bursts | | |
| - Free Format Bursts | Network ID 1 Tx Timer Duration 60 | |
| - Tone Settings | , TX Timer Duration jou | |
| Control Status | Signalling Type None | |
| - DTMF | Tx Lockout Duration 0 | |
| - DTMF Signalling | | |
| Two-Tone | Signelling ID None | |
| 🖳 🗆 Two-Tone Options | | |
| Networks | Selective Call Mute | |
| — 🗆 Basic Settings | | |
| — 🗆 Features | Squeich Detect Type Noise Level | |
| - D Phone Patch | innut mic Fill outside a call | |
| — □ PTT Signalling | Avritice side Tones | |
| Emergency Alerts | | |
| - Channel Setup | Deferred Calling 🔽 Inhibit EPTT2 Outside a Call | |
| | | |
| Scan Groups | Deferred Calling Time 20 | |
| Key Settings | | |
| UI Preferences | | |
| □ Start-up | Networks | |
| D PTT | Network ID: 1 🔹 < > 🖶 Add 🗙 Delete | |
| Programmable I/0 | | |
| | | |
| Database Version: 0086 | Last action: Reset to defaults TM8100 | 11. |

If Deferred Calling functionality is not desired when Scanning the Scan Groups > ID/Membership tab has the tickbox <u>Disable Deferred Calling</u> to disable this.

| mtm8100 Programming | |
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| Radio Model 🗧 | TM8100 |
| Specifications | Scan Groups |
| Receiver Monitoring | ocurrenteps |
| 🗆 Data | ID/Membership Scan Vote Priority Scan |
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| Fixed Format Bursts Free Format Bursts | Group ID 99 Channel ID |
| Free Format Bursts Tone Settings | |
| Control Status | Group Type Scan 💌 2 |
| - DTMF | 3 |
| □ DTMF Signalling | Group Hold Time 5000 |
| Two-Tone | |
| 🗆 🗆 Two-Tone Options | Transmit Group Hold Time 8000 |
| Networks | |
| Basic Settings | Allow Scan When Off Hook 🔽 |
| Features Phone Patch | |
| Prione Patch PTT Signalling | Scan Immediately When Placed on Hook 🗖 |
| Emergency | Hidden Chennels |
| Alerts | |
| Channel Setup | Disable Deferred Calling |
| - Channels | |
| Scan Groups | <u>A</u> dd <u>D</u> elete |
| Key Settings | |
| UI Preferences | Scan Groups |
| Start-up TT | |
| Programmable I/0 | Group ID: 99 C > Add X Delete |
| Li i rogrammable 170 | |
| Database Version: 0086 | |
| , | · //////////////////////////////////// |

Start-Up ChannelChannel/Group Active on Power Up forces the radio to start-
up on a specific Channel or Group regardless of last ID used
before being powered-off (this will also occur if the radio
resets due to a brown-out with heavy vehicle cranking).
NOTE: BCD inputs have a higher priority, and these will
define the actual channel even if this option is enabled.

Once the tickbox is enabled the required channel or group can be picked from the drop-down ID list. Hidden channels will not appear.

Raised as Focus calls 18254 and 19123.

| | TM8100 Programming Application (2.80.00) Imit Edit Edit Edit Edit Edit Edit Edit Ed | | |
|---|--|---|---|
| | | | 20 |
| | Radio Model | TM8100 | |
| | Specifications Receiver Monitoring Data Selcall Monitoring Fires Format Bursts Fires Format Bursts DTMF DTMF DTMF DTMF Basic Setings Fires Format Bursts Basic Setings Fires Format Bursts Control Status DTMF DTMF DTMF Basic Setings Fires Format Basic Setings Fires Format Basic Setings Fires Format Basic Setings Channels Scan Groups Key Setings UI Preferences Stativug PTT Programmable I/0 Database Version: 0086 | Front Channel/G Security PIN Security Lock | Power On Mode Power On Stat in Low Power Mode Panel Low Power Control Low Reset on Error Disable On/Off Control Disable On/Off Control Security PIN FI FI FI FI |
| | | | R. |
| Maximum number of Channels | model is defi TM8115 – 2 10 of which 24 members TM8110 – Each group of TM8105 – | ned below: 2 digit display – 1 can be groups 1 digit display :an have up to 9 Blank head – | 100 ID's; 0 to 99 inclusive. |
| | These are Programmab | | BINARY selection from the |
| FFSK Lead-In Delay | from 1200m as the T2000 The <u>FFSK Lea</u> | s to 5100ms in-l -A75 and the Or <u>ad-In Delay</u> field, | ead-In Delay has been increased ine with existing products such ca5000. found in Data > RF Modems, Oms in 5ms steps. |
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| Tait Electronics Limited PO Box 1645, Christchurch | n, New Zealand | d | Telephone: +64–3–358–3399 Facsimile: +64–3–358–3903 |

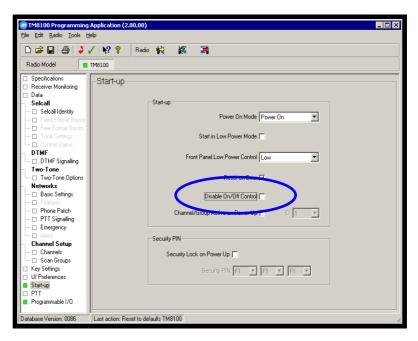
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Disable On/Off Control

The addition of the function <u>Disable On/Off Control</u> allows third-party systems (e.g.: Mobile Data Terminal) to control the TM8100 front panel on/off switch, removing the ability from the user.

This tick-box option only un-greys when the input AUX_GPI3 for Power Sense (Ignition) has been set. This I/O line then becomes the *only* way of controlling how the TM8100 is powered on or off. Raised as Focus 18044.

NOTE: It is recommended the Power Sense (Ignition) input line be operated as Active High. The line may also need a $3K3\Omega$ 'bleed' resistor to ground if that input DC supply does not fall below 0.7V when inactive. Failure to fall to this level will mean the TM8100 remains 'on'.



Dual Busy StatusThe TM8100 can now provide two <u>BUSY STATUS</u> outputsOutputsSimultaneously.These can be assigned to any
Programmable I/O outputs and each can also be configured
differently. Raised as Focus 17349.

Setting Scan inIfpre-v2.04mFirmwareredTh

If the Firmware being used is older then v2.04 the radio **must** have a scan group with two members. This is required even if scan is not utilised by the user. The scan members are allowed to be duplications of the same ID if only one channel is programmed, for instance.

Scan Groups in the TM8115 (TM8110)

Scan Groups (up to 10 can be enabled) are added using the Add/Delete buttons at the bottom of the <u>Scan Groups</u> > <u>ID/Membership</u> tab. By default no Scan Groups are enabled, leaving all 100 (10) ID's free for Channel use.

As no Scan groups are enabled if none have been added, then this provides a solution to the request in Focus 16413.

| m TM8100 Programming | Application (2.80.00) |
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| <u>File E</u> dit <u>R</u> adio <u>T</u> ools <u>H</u> e | elp |
| | / 💦 💡 Radio 🙀 🌠 🕌 |
| | |
| Radio Model 🗧 | TM8100 |
| Specifications | CScan Groups |
| Receiver Monitoring | Scandroups |
| 🗆 Data | ID/Membership Scan Vote Priority Scan |
| Selcall | |
| - 🗆 Selcall Identity | Group ID Group Membership |
| 🖬 Fixed Format Bursts | Group ID 99 Channel ID |
| 🗖 Free Format Bursts | |
| 🗖 Tone Settings | Group Type Scan 👻 2 |
| Control Status | |
| DTMF | Group Hold Time 5000 |
| Two-Tone | |
| Two-Tone Options | Transmit Group Hold Time 8000 |
| Networks | |
| Basic Settings | Allow Scan When Off Hook 🔽 |
| Features | |
| Phone Patch | Scan Immediately When Placed on Hook |
| PTT Signalling | |
| Emergency | Hidden Channels |
| Alerts | |
| Channel Setup | Disable Deferred Calling |
| E Channels | |
| 🔤 Scan Groups | <u>A</u> dd <u>D</u> elete |
| □ Key Settings | |
| UI Preferences | Scan Groups |
| Start-up | |
| Programmable I/0 | Group ID: 99 🔹 < > 📥 Add 🗙 Delete |
| | |
| Database Version: 0086 | |
| | |

NOTE: Scan Groups (if enabled) use an ID each. Groups can include up to 24 (9) members leaving up to 90 (9) ID's for channel use.

Only <u>one</u> group can be assigned and selected by the function keys.

Scan Group(s) can now be accessed from the Up/Down scroll keys; Groups are still identified by the amber LED indication when selected.

The table below shows what actions occur when the TM8100 exits Groups.

| Exiting | Group Active but no | Group Active and on | Group Active after a |
|---|---------------------------------------|----------------------------|---------------------------------------|
| Groups | Captured Channels | a Captured Channel | Captured Channel |
| Scroll Keys | Next ID up or down | Next ID up or down | Next ID up or down |
| exit to: | from Group ID | from Group ID | from Group ID |
| Group assigned Function key exits to: | The ID active before entering Scan | That captured channel | The ID active before entering Scan |

The <u>Abbreviated Label</u> on Scan Groups > Scan > Scan Group Display Indicator now appears as:

- TM8115 "SC"
- TM8110 "o" (looks like the bottom half of an eight).

3. PC Application Changes

Invalid Confirmation Delay

Programmable I/O

IOP Pins as they appear

Options Extender Bd:

IOP GPIO1 = Pin 15

 $IOP_GPIO2 = Pin 14$

 $IOP_GPIO3 = Pin 13$

IOP GPIO4 = Pin 10

IOP GPIO5 = Pin 9

 $IOP_GPIO6 = Pin 5$

 $IOP_GPIO7 = Pin 4$

TMAA01-05

the

DB-15(HD)

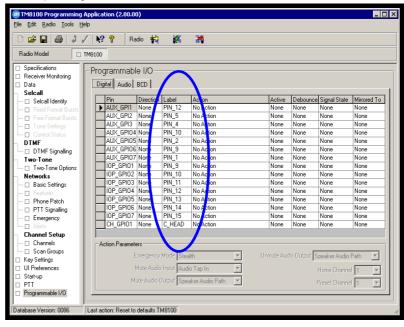
on

default labels

Invalid Confirmation Delay can now be adjusted between the values of 10 and 1000ms. The default is 20ms. Some older radios appear to have 0ms, which is invalid. Please ensure these are updated to at least 10ms. This value defines how long the signalling on the carrier has disappeared before the receiver closes the mute. Raised as Focus 17446.

| m TM8100 Programming | Application (2.80.00) |
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| Radio Model | TM8100 |
| Specifications Receiver Monitoring | Basic Settings |
| 🗆 Data | Basic Network Settings Subaudible Signalling Receiver Monitoring Single In Band Tone |
| Selcall Selcal Identity Fixed Format Bursts Free Format Bursts Tone Settings | Subaudible Signalling Settings Validate When Selective Call Received Invalid Confirmation Delay 20 |
| DTMF | Generate When Selective Cell Transmitted Rx CTCSSVe80 Eller Enabled for CTCCSHCS |
| - Two-Tone Options | CTCSS Settings |
| Networks Basic Settings Features Phone Patch | Reverse Tone Burst Duration 130 Invert Tx DCS Reverse Tone Burst Phase Shift 180 Invert Rx DCS Invert Rx DCS |
| PTT Signalling Emergency Alerts | Lead-Out Delay 0 Stop Tone Duration 180 |
| Channel Setup Channels Scan Groups Key Settings | LeadOut Delay 0 |
| UI Preferences Start-up PTT Programmable I/O | Networks Network ID: 1 |
| Database Version: 0086 | Min: 10 Max: 1000 Unit: milliseconds /// |

These define the specific Pin on the respective connectors allowing easier interfacing. The AUX port is the rear DB-15, IOP is the 18-way MicroMatch on the main board and CH_GPIO1 is Pin 8 of the display heads' Microphone RJ-45 socket. These can still be re-labelled to any description as before but will revert to 'None' if the label is subsequently deleted. Raised as Focus 17495.



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4. Calibration Application Changes

| Calibration App Changes | There are no changes to the TM8000 Calibration Application at this time. The current Calibration Application is v2.71.00.09. | | |
|----------------------------|---|--|--|
| | NOTE : If a TM8100 requires re-calibration it is important to temporarily remove programmed settings - through the PC Application > Programmable I/O - for any audio Tap-In's or Tap-out's. Depending on configuration these may inhibit the radio's audio path and consequently fail calibration testing. | | |

| Compliance Issues | None. |
|----------------------|----------|
| CSO Instruction | Please i |

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

5. Issuing Authority

Name and PositionGraham Brenchleyof Issuing OfficerTechnical Support Engineer

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| Distribution Level | Associate. | | |
|-----------------------|------------------|--------------|-----|
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