TB7100 base station

Release Notes

TAIT radio
communications

This technical note contains information to accompany the May 2006 release of the TB7100 base station. This release comprises the following software versions:

■ TB7100 Tx and Rx sub–assembly firmware version 2.12.00.00

■ TB7100 programming application version 1.12.00.0000

■ TB7100 calibration application version 1.09.00.0001

1 What's in This Release

This release of the TB7100 resolves the issue "TIMS00055413 High power radios incorrectly entering High VSWR foldback". It was found that some UHF high power radios were incorrectly entering the high VSWR state. This issue was deemed important enough to re-release the sub-assembly firmware to correct it.

As this release has been distributed immediately after V2.11(TN–1164–SR) and V2.10 (TN–1158–SR), we have retained and slightly updated the entire contents of TN–1164–SR and TN–1158–SR in this release note.

On the Product CD you will also find extensive product documentation, including:

■ Installation and Operation Manual (MBB–00001–03)

■ Specifications Manual (MBB–00002–03)

■ Installation Guide (MBB–00003–03)

■ Technical Notes

High power radios incorrectly entering High VSWR foldback

Reference: TIMS00055413 High power radios incorrectly entering High VSWR foldback

High power H7 radios can enter VSWR foldback incorrectly due to an arithmetic overflow conversion in the firmware. This applies to the value calculated for the reverse power voltage threshold.

This issue has been fixed in firmware V2.12.00.00

Enhanced power control software for B and G band mid-power radios

Reference: TIMS00034484 Enhanced power control software for B and G band mid–power radios.

In order to avoid excessive heating in B and G band mid–power sub-assemblies under certain VSWR conditions, extra power control calibration parameters have been introduced.

In firmware prior to v2.10 a single PA bias value was used across the whole band. Firmware from v2.10 and later now uses 5 separate bias values spread across the band. In B band radios, these 5 values are now graded across the band to avoid excessive heating in the VHF mid-power PA. All other bands use the same bias value for all five bias points.

When upgrading firmware older than v2.10, the following MUST be performed:

1. The CAL & Radio databases must FIRST be read and saved using the old firmware.

2. After the firmware upgrade, radios not in B or G band can simply be re-programmed with the CAL database and Radio database. The CAL App will store the old bias value into all five locations across the radio band.

3. In order to correctly CAL B or G Band radios, the radio need to run through the driver bias calibration procedure in the CAL App using the test setup required by the CAL App. This will then store the correctly graded bias values into the associatead B or G Band radio.

Failure to perform this re-calibration on B-band radios will not realise the added protection mechanism introduced by the 5 new calibration points.

Improvements to the product CD

Reference: TIMS00053934 Product CD naming and version numbers

The TB7100 Product CD has been updated to include:

■ A version number that represents the release version of the particular software release on the associated CD. Each time content on the product CD changes, the CD version will be incremented so all parties can clearly refer and ensure discussions involve the same version of the CD.

■ All TB7100 firmware files are now automatically installed onto the hard drive in a sub-directory ('Firmware Files') from the selected application installation location. The default location will be "C:\Program Files\Tait Applications\TB7000\TB7100XPA\Firmware Files".

CWID tone frequency upper limit increased.

Reference: TIMS00052607 CWID tone frequency

The CWID tone frequency has been increased so it now support 400 Hz to 2500 Hz tone range. This setting can be found on the configuration tab "Networks > Basic Settings form > CWID tab".

All frequency bands now supported by the one version

Previously there were two TB7100 release notes. TN-1128-SR supported all bands except D1. TN-1135-SR supported only the D1 band. These release notes support all of the following bands: B1, D1, G2 (China only), H5, H6, and H7.

The C0 and K5 bands have not been released. Please contact the TB7100 Product Manager at Tait Electronics Limited for further information (refer to "Tait Contact Information" on page 14).

A4 band released

The A4 band has been released. Compliances have been obtained for: Europe, New Zealand, Australia, Unites States of America, and Singapore (pending).

For other regions or more information, please contact Technical Support (refer to "Tait Contact Information" on page 14).

CTCSS decoder performance improvements

Firmware v2.11 incorporates a modified CTCSS algorithm to resolve the following CTCSS issues:

- Mute 'pops open' with incorrect or no CTCSS. Raised as Focus 20439 and as a variation in Focus 194954.

- Valid CTCSS slow to decode. The time to decode CTCSS and pass audio to the speaker was originally approx. 300 ms, testing has verified this time to be approx. 190 ms. The product specification as stated in the TB7100 specifications manual is <220 ms. Raised as Focus 18819.

- 'High deviation level' of CTCSS required to decode. Previously, a received CTCSS deviation greater that 150 Hz was required to operate the decoder. V2.11 has been tested to decode valid CTCSS deviations greater than 80 Hz. Raised as Focus 19602.

- CTCSS would attempt to decode when adjacent tones are used. Previously, the CTCSS decode bandwidth was ±2 Hz, this has been tightened to ±1.5 Hz. Raised as Focus 19454.

These issues are common to the TM8100. For further information refer to TN-1031-SR.

Economy mode

Reference: TIMS00050463 Add economy mode

The TB7100 now offers a level of power saving. Economy Mode has been enabled by default on the Economy Mode configuration screen but will not be activated until you either:

- Select Start in Economy Mode on the Start-up form so that the radio enters Economy Mode when the radio starts up.
- Program a function key to Economy on the Key Settings form.
- Program an input line to Economy on the Programmable I/O form.

Refer to the online help of the programming application for more information on Economy Mode and how to use it.

Refer to the TB7100 specifications manual for more information on power consumption in Economy Mode.

Extended tail timer

Reference: TIMS00050505 Extend Tail Timer on TB7100 to 5 seconds.

Previously the tail timer (also referred to as "PTT Deactivation Delay", or "Soft Off") on the TB7100 could only be set to a maximum of 200 ms. This release now supports a configurable tail timer that can have a maximum value of 5 seconds. To configure this parameter go to PTT > Advanced PTT > PTT Deactivation Delay and enter a value between 0 (default) and 5000 in steps of 1 millisecond, to suit your needs.

2400 baud FFSK now supported

Reference: TIMS00041719 TM8000 2400bps FFSK modem

The TB7100 firmware now supports a 2400 baud FFSK setting. The TB7100 has not updated its compliance approvals to include this modulation format. Before this setting is enabled, users should clarify that the appropriate compliance approvals have been obtained for the conditions it will be used in.

TB7100 alarm outputs

The TB7100 now supports several alarm functions. The alarm processing can also be programmed to operate a digital I/O line on the rear of the TB7100. Alarms now supported are:

- Radio stunned (Not a recommended TB7100 setting)
- Synth Out of Lock
- High temperature
- Very high temperature
- High reverse power

To enable the alarms go to Programmable I/O form > Digital tab. Select a DIO pin as 'output' direction and the Action as 'Alarm status'. The desired alarm functionality can then be allocated to that pin.

Note	These alarm settings are used to protect the radio from damage. Their settings and operation cannot be configured in any way.

2   Compatibility

It is important that you read and understand the following general principles of compatibility:

■ You should always use the same firmware in both TB7100 radio sub-assemblies.

■ Although the TB7100 is based on the TM8100, you should **never** install TB7100 firmware into a TM8100, or install TM8100 firmware into a TB7100. Only install firmware into the equipment for which the associated firmware has been approved.

■ The TB7100 PC applications will not allow you to read or program a TM8100 radio, and the TM8100 PC applications will not read a TB7100 radio.

■ You should never use TM8100 radio assemblies in a TB7100 channel. Physical interferences with the TB7100 metalwork and various component sub-populations and value differences will inhibit features and performance. Component differences for some countries will also invalidate compliance approvals.

The following table specifies all compatible configurations of the TB7100 base station. A compatible configuration is a combination of radio sub-assembly hardware, radio sub-assembly firmware, programming application, and calibration application, where each part of the whole is compatible with all the other parts.

■ Each row in the table identifies a compatible base station configuration.

■ Each cell within a row contains the version number of the radio sub-assembly hardware, radio sub-assembly firmware, programming application, and calibration application that is compatible with the other versions in the row. If a cell contains more than one version number, more than one version is compatible.

■ Table footnotes indicate any restrictions imposed on a particular combination by the version of hardware, firmware, programming application, or calibration application.

■ Any other combination is not compatible and not supported.

Radio Sub-assembly Hardware	Radio Sub-assembly Firmware	Programming Application	Calibration Application
01.02	02.12.00.00	1.12.00.0000	1.09.00.0001
01.02	02.11.00.00	1.12.00.0000	1.09.00.0001
01.02	02.10.00.07	1.12.00.0000 1.10.00.0001	1.09.00.0001
01.02	02.08.00.00[a]	1.12.00.0000 1.10.00.0001 1.08.00.0000[b] 1.06.00.0000[c] 1.04.00.0001	1.09.00.0001 1.05.0000[b] 1.03.0003[c]

a. When upgrading B or G band mid-power sub-assemblies with versions older than V02.10.00.00, always perform a bias re-calibration. Refer to TN-1178, TIMS00034484 for more details.

b. Only use on A4 and D1.

c. All bands except A4 and D1.

3 Upgrading or Downgrading Firmware

To upgrade or downgrade the firmware of any base station module, carry out the procedures described in "Downloading new radio firmware" in the online help of the programming application.

Note We recommend you should always use the latest version of the programming application.

Note It is important when ever performing a firmware upgrade or downgrade to always perform the actions below. This ensures a working copy of the current configuration and calibration is saved in case an error occurs.

Note When upgrading firmware older than v2.10, the following MUST be performed:

1. The CAL & Radio data bases must FIRST be read and saved using the old firmware.

2. After the firmware upgrade, radios not in B or G band can simply be re-programmed with the CAL database and Radio database. The CAL App will store the old bias value into all five locations across the radio band.

3. In order to correctly CAL the B or G Band radio, the radio needs to run through the driver bias calibration procedure in the CAL App using the test setup required by the CAL App. This will then store the correctly graded bias values into the associated B or G band radio.

Refer to TN-1178, TIMS00034484 for more details

Before you change any firmware:

1.   Using the latest programming application, read and save the module's programming database.

2.   Using the latest calibration application, read and save the module's calibration database.

After you have successfully changed the firmware:

■   Re-program and re-calibrate the module using the files saved above.

4   Issues Fixed

The following is the full list of known issues or limitations from previous versions that have been fixed in this release.

Tait Reference	Headline
TIMS00055413	High power radios incorrectly entering High VSWR foldback
TIMS00034484	Enhanced power control software for B or G band mid-power radios
TIMS00055164	ATE fails VCO and VCXO calibration tests
TIMS00052607	CWID tone frequency
TIMS00053934	Product CD naming and version numbers
TIMS00025109	THSD Lead Out Delay is hardcoded as 0 ms
TIMS00027247 Focus 15108	Enhancement for BCD line
TIMS00029882	Lead in delay definition on all modems - inc THSD
TIMS00041719	TM8000 2400bps FFSK modem
TIMS00042566	Software control in power control loop
TIMS00042709 Focus 19545	One output assigned to more than one pin?
TIMS00043708	Firmware upgrade failure recovery method
TIMS00046596	No fan operation with PTT and THSD transmissions
TIMS00047129	Possible power-up failure after firmware download
TIMS00050516	TB7100 Alarms - Request as an enhancement
TIMS00050822	CWID Only sent once if TB7100 continuously keyed
TIMS00052192	Add alarms item (TB7100)

Tait Reference	Headline
TIMS00052314	Add extra lines for BCD/BIN input to allow selection of 100 channels
TIMS00052649	Calibration Application: Power control form sliders not saving values
TIMS00054793	TB7100 locks up in THSD mode when digital IO lines changed
TIMS00053483	Add G2 band

If clarification on any of these issues is required please contact Technical Support (refer to "Tait Contact Information" on page 14).

5 Known Issues or Limitations

THSD dropping characters on narrow-band channel

Reference: TIMS00038994 and TIMS00039264

It has been found that THSD can drop approximately 2% of its characters on a narrow-band channel (wide-band channels are not affected). For this reason, if 100% reliable communication is required, it is recommended that the end-user application include error detection, correction and/or retries in their application protocol. This effect is most noticeable on A4 band radios.

Calibration Application does not override the audio settings set by programming application

Reference: TIMS00044146

Settings configured by the programming application may impact the calibration application operation. For example, if the programming application sets the RX tap point to R7 and the type to "Splice", the mute cannot be set as the audio is not passed through to the test set.

Technicans should consider this if experiencing problems using the calibration application and re-program the radio with a default configuration for calibration purposes using the programming application when appropriate.

Calibration Application: Instruction sequencing could be improved

Reference: TIMS00045505

When you are performing a re-calibration on the TB7100, it is important that after each step you advance both the 'instruction' prompt and the 'calibration controls' prompt. If both are not individually advanced by the end user, they can get out of sequence, resulting in instructions and tasks not relating to each other.

Reading and Programming in repeater mode causes Tx to key up

Reference: TIMS00046552

When the TB7100 is configured as a repeater and the receiver module is read or programmed, then each time a reset occurs (at start and end of process) it causes the transmitter to key up for half a second. Care should be exercised especially with a duplexer configuration, that this brief transmission does not cause any equipment damage.

When "Pr" is displayed after a firmware upgrade

Reference: TIMS00046722

It is good practice to save the electronic configuration and calibration data of any product you use before you start a firmware upgrade. Tait also recommends you save this data prior to a firmware upgrade. After you upgrade a TB7100 module, it is possible that you will be requested to re-load the configuration file. This will depend on the firmware updates implemented. A "Pr" on the TB7100 LCD display indicates the configuration file must be re-loaded. For this reason, always read and save the Tx / Rx configuration file to your computer's hard disk before a firmware upgrade.

Digital I/O LNK information messages

Reference: TIMS00047955

If the configuration of AUX_GPI2 (Emergency Mode) and AUX_GPI3 (Power Sense) is changed, the information messages referring to LNK settings can be ignored. The TB7100 module assemblies already have the associated LNK removed as standard. However, if the functionality associated with the LNK is indeed required, the LNK will need to be re-installed.

Loss of more than 10% of characters in THSD

Reference: TIMS00047978 and TIMS00048244

During the testing of v2.08.00.00 of the TM8100/TB7100 firmware, it was observed that if the radios terminal rate is set to 9600 on a wide-band channel using THSD wide-band modem without FEC, then at least 10% of the received characters are lost when received on a trigger-base receiver. Transmission to another non-trigger-base mobile does not result in the data loss.

The following configuration can result in the loss of up to 10% of user data:

■ the THSD setting of the radio terminal rate is 9600

■ the channel bandwidth is wide band

■ the THSD wide-band modem is used without FEC.

This fault is unique to this configuration.

This can be resolved by taking any one of the following actions:

- Change the terminal baud rate.
- Turn off the wide-band modem.
- Use FEC.
- Use narrow band (also refer to TIMS 38994).

TB7100 PC applications that do not install or un-install

Reference: TIMS00048227

It is possible that the TB7100 Programming and Calibration applications will not install on a computer, with error messages indicating other Tait applications must be removed first. Tait has been updating its software platforms over the past year to allow multiple applications to exist together. If this message occurs, it indicates you have an old version of software on your machine that does not support multiple Tait applications on the one machine. You will need to un-install the old software version causing the problem, obtain a newer version, and re-install it if required. Once this is completed, you will be able to install the TB7100 application.

In general, Tait applications may not run, or could create problems when installing and un-installing other Tait applications, if they have version numbers lower than those listed below:

TB7100 Programming Application 1.04.00
TB7100 Calibration Application 1.03.00
TM8100 Programming Application 2.72.00.0002
TM8200 Programming Application 1.01.00
TM8000 Calibration Application 2.70.00.0019
TM9100 & TP9100 Programming Application 1.0.0.0
TM9100 & TP9100 Calibration Application 1.0.0.1

This is not just a TB7100 issue. This problem could be encountered for any new Tait software installation on a PC that has old Tait software already installed.

Software flow control

Reference: TIMS00048251

The TB7100 does not support flow control, even though both RF assemblies can be configured to use it. The architecture of the TB7100 requires that the SI microprocessor be fitted to support Software Flow control correctly. There are currently no plans to fit the SI microprocessor.

Hardware flow control (CTS) not working (Wideband THSD)

Reference: TIMS00049598

When using the hardware flow control line with wide-band THSD, the CTS line does not toggle to reflect the status of the radio's data buffer. It does operate correctly for narrow-band THSD when the SI PCB links are configured correctly.

Inconsistency in FFSK operation between FW 2.06 and 2.09

Reference: TIMS00050286, Focus 21811

If 9600-baud DTE serial port data rates are used with 1200-baud FFSK, errors in data transfers can occur when the data to transmit is greater than 100 bytes. This problem is not present in firmware 2.06 and appears in firmware 2.09. It has been found that increasing the FFSK lead-in delay to 300ms can resolve the data error. The reason for this is unknown.

CWID will only transmit once if transmission of string is longer than interval

Reference: TIMS00051100

If a CWID string is programmed into a TB7100 that will take longer than the interval time selected to transmit, the TB7100 will only send the CWID message once. For successful repeating CWID transmissions the interval period must always be set to a value that is greater than the time to transmit the CWID message.

Changing to DC in case of AC mains failure

Reference: TIMS00053079

If the base station is transmitting during an AC mains failure, an outage in the power supplied to the transmitter may cause the base station to go off the air. Re-keying the transmitter will bring it on again. To ensure seamless changeover from AC mains to an external DC supply, a resistive load should be plugged into the TB7100's AC mains supply. The load could be simply a 25W incandescent light bulb. This will ensure seamless changeover even when the base station is transmitting.

If the base station is not transmitting, AC/DC change over will be seamless without a resistive load on the mains circuit.

For AC mains to external DC changeover to occur, the AC supply must fail completely. Low mains voltage (Brown out) may not be sufficient to enable a change to external DC input.

Switching between THSD and voice affects voice deviation levels

Reference: TIMS00054573

When a TB7100 is switching between voice and THSD modes of operation using the TB7100 system connector, setting the digital I/O line to "Toggle THSD modem" will result in errors in the voice deviation levels.

When a TB7100 is used in the one mode and not switched this issue does not occur.

Not enough external channel select input lines

Reference: TIMS00054887

The TB7100 module firmware can now support up to 8 digital input lines to be used to select the active channel, however the TB7100 system connector does not support 8 lines. Only a maximum of 6 lines can be used on the TB7100 system connector. Different I/O signal types also mean pins 2, 3, 6 and 7 are routed to both Tx & Rx modules whilst others (pins 10, 12, 19 and 22) go to specific Tx or Rx modules; if the appropriate pins have been shorted together.

6 Issuing Authority

This TN was issued by: Kurt Ebrecht
Technical Publications Manager

7 Publication History

Publication Date	Author
16 May 2006	Laurie Chisholm

8 Tait Contact Information

**Corporate Head
Office
New Zealand**

Tait Electronics Limited
P.O. Box 1645
Christchurch
New Zealand

For the address and telephone number of regional offices, refer to the
TaitWorld website:
Website: http://www.taitworld.com

Technical Support

For assistance with specific technical issues, contact Technical Support:
E-mail: support@taitworld.com
Website: http://support.taitworld.com