

TB9100 base station

Release Notes



Base station version 01.14
TN-1000-SR
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Note: For the addresses and phone numbers of the above regional offices refer to the Tait-World website.

This technical note contains information to accompany the 1.14 release of the TB9100 base station.

1 What's New in This Release

Performance improvements

The TB9100 Base Station version 1.14 includes a number of RF improvements, including:

- Increased digital P25 sensitivity in dual mode (when using 25 kHz analog channel spacing).
- Increased selectivity in digital P25 mode.
- Shorter PL (CTCSS) detection time.
- Increased quality of digital P25 transmissions.
- Increased reliability of P25 supplementary service messages.
- Digital P25 receiver improvements that increase range and coverage.

Customer service software security features

The CSS now has three classes of user: guest, maintainer, and administrator.

- Controlling or configuring a base station requires the maintainer access code.
- Changing a base station password or a CSS access code requires the Administrator access code.

Encryption Support

This release supports end-to-end encryption between subscriber unit radios. The repeated voice quality is indistinguishable from non-encrypted voice. If the control panel speaker is turned on, it plays noise throughout the transmission. You cannot tell whether voice or silence is being transmitted. The analog line produces a brief period of noise, then is silent. Call statistics include encrypted calls.

Development is under way to provide support for encryption and decryption at the base station analog line interface or at an analog gateway. This feature will require an additional software license.

Feature License for 'Transmit Enable'

The base station has some additional software feature enabling. This will allow Tait to offer receive-only base station functionality.

2 Compatibility

The following table specifies all compatible configurations of the TB9100 base station and the related software. A configuration is compatible if an unchanged base station, the CSS, and the calibration software have compatible versions. If changes are made to the hardware or firmware of a base station, you need to check whether the hardware and firmware versions of the individual modules are compatible.

- Each row in the table identifies a compatible base station configuration.
- Each cell within a row contains the hardware, firmware, or software version number 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 hardware, firmware, or CSS version.
- Any other combination is **not** compatible and not supported.

Base Stn	Calib s/w	CSS	Data-base	Module Hardware					Module Firmware			
				Digital Board	Network Board	PMU	PA	Control Panel	Digital Board	N/W board	PMU	PA
1.14	2.05	1.12	2.10	00.03	00.00	00.01	00.01	TBA2040	1.07	1.06	2.06	2.05
01.02	2.03	01.01	02.08	00.03	00.00	00.01	00.01	TBA2040	01.02 ^a	01.02 ^a	02.03	02.03

a. Downgrading firmware to this version should not be done using the CSS. Contact Tait for more information.

3 Upgrading the Customer Service Software

A PC can have multiple versions of the CSS installed. Simply install the new version alongside any existing versions of the CSS. You can only run one instance of the CSS at a time.

4 Upgrading Base Station Firmware

Upgrading the firmware of an existing 1.02 base station cannot be done by the CSS alone. You will need to download firmware files using the TFTP protocol. Follow the instructions in TN-977.

Note You need to obtain a ‘Transmit enable’ feature license code from Tait. Your upgraded base station will not transmit properly until you do this.

5 Issues Fixed

The following known issues and limitations, listed in the release notes for version 01.02, have been fixed in this release.

Tait Reference	Headline
TIMS00041884	Alarms: QoS jitter alarm may not clear
TIMS00041906	Base station: Limited support for shared receiver frequency voting
TIMS00044651	Calibration: Difficulties adjusting the switching range
TIMS00042627	Calibration software: Limited support for TB9100 and TB8100 Calibration software installed on the same computer
TIMS00042592	Configuration: Cloning overwrites base station name
TIMS00045903	CSS: Memory consumption when running diagnostic tests
TIMS00042939	Firmware download reliability
TIMS00042015	Monitoring: Display of speech transport options is incorrect
TIMS00040893	Monitoring: Screens stop updating
TIMS00039021	PMU: Occasional auxiliary output problem
TIMS00041793	Receiver: Adjacent channel rejection marginally below target
TIMS00025757	Receiver: Dual mode sensitivity enhancements intended

6 Known Issues and Limitations

Analog line: MDC 1200 product-specific variations

Tait reference:
TIMS00043248

Contact Tait Electronics Ltd. for details of compatibility information with your MDC 1200 console.

Analog line: Multi-console re-voting is not supported

Tait reference:
TIMS00041866

If two consoles are on the same channel group and console A wins the vote over console B, the base stations in the channel group may go silent until the end of the over.

Work-around: If necessary, use only one console in the channel group at a time.

Base station: Frequency stability

Tait reference:
TIMS00047212

The TB9100 base station has better frequency stability for frequencies that are a multiple of the channel step. If you need to program the base station with frequencies that are not a multiple of the channel step, check the frequency accuracy after programming. In the unlikely event that the accuracy is found to be out of specification, use the calibration software to carry out FCL Auto Tuning and FCL Calibration.

The channel step varies, depending on the channel spacing and the frequency band.

Band	Channel Spacing (kHz)	Channel Step (kHz)
UHF	12.5	6.25
	20	5
	25	6.25
VHF	12.5	3.125
	20	2.5
	25	3.125

Base station: TB9100 is always a repeater

Tait reference:
TIMS00045642

The TB9100 always repeats and repeats the received RF signal. Some applications may move these functions outside of the base station, so that the base station always transmits the signal from the line (line-controlled base). Tait intends to support this in a future release.

Base station: Limited digital inputs and outputs

Tait reference:
TIMS00038599,
TIMS00034777,
TIMS00040119,
TIMS00042205

The TB9100 currently supports digital inputs 0-3.

A future firmware upgrade will add a digital output and another digital input.

Base station: CWID transmissions override calls

Tait reference:
TIMS00045562

If the base station is configured for automatic CWID and a call is in progress when a CWID is due for transmission, the call will be interrupted.

Work-around: A future release will allow automatic CWID transmissions to be held off until the Tx tail.

Base Station: External frequency reference problems

Tait reference:
TIMS00044470

A number of problems have been observed with the external frequency reference, for example when the external frequency reference is removed or lost.

Work-around: Use the base station's internal frequency reference. There is no need to connect an external frequency reference for conventional UHF and VHF operation on the currently supported frequency bands. The internal reference source is more than sufficiently accurate for these purposes.

Calibration: Correct tuning hole is not obvious

Tait reference:
TIMS00045304

The reciter cover has a number of holes for tuning and calibrating the reciter circuitry. Because of differences in the circuitry, you need to use different holes for reciters of different frequency bands. Trying to use the wrong hole can damage the sensitive reciter circuitry.

Work-around: Always refer to the manual or calibration software online Help to see which hole to use for each tuning or calibration operation, depending on the frequency band of the reciter.

Calibration: Cannot open serial port

Tait reference:
TIMS00046082

In previous versions of the calibration software, attempting to install both TB8100 and TB9100 calibration software on the same machine would result in the error message 'Cannot open serial port.' This issue is resolved with the latest calibration software: TB8100 Calibration Kit version 2.05 and TB9100 Calibration Software version 2.05.

If you see this error with the latest software versions, it is most likely to be caused by a latent problem from the older versions of software. Different combinations of old and new software may or may not co-exist on the same computer.

	TB8100 Version 2.04 or earlier	TB8100 Version 2.05 or later
TB9100 Version 2.03 or earlier	Will not work	Will not work
TB9100 Version 2.05 or later	Will not work	Will work

Because the problem has been fixed in TB8100 and TB9100 calibration software version 2.05, subsequent versions will not have the same issues that previous ones have had.

Work-around: The simplest solution is to uninstall all of your old TB8100/TB9100 calibration software, and install the newest versions of each.

Configuration: Receiver analog muting enhancements intended

Tait reference:
TIMS00030377

Tait intends to improve the performance of the analog mute. These improvements will affect both the SINAD and RSSI mute and will change the amount of hysteresis seen when bench testing the base station receiver.

Work-around: Do not rely on the exact number of dB of hysteresis for SINAD mute.

CSS: Password request on first connection

TIMS00046232

When you first connect the CSS to a new base station, you are asked to supply a password. This alerts you to the existence of security checks that the base station applies to any connection request. However, in this case, there is no password to supply. Base stations ex factory have a null password. On subsequent connection attempts you are not asked for a password, unless another CSS has changed the password.

Work-around: Do not enter anything; simply click OK. Once connected, you can give the base station a password.

CSS: Internet Explorer version 5.50 is required

Tait reference:
TIMS00043255

The CSS requires version 5.5 of the Internet Explorer subsystem of Microsoft Windows. Other Tait documents specify that the CSS will run on Windows 2000 SP4 – which includes I.E. ver. 5.0.

You must upgrade Internet Explorer to 5.5 or later before the CSS can be installed.

Diagnostics: Caution needed with transmission test

Tait reference:
TIMS00038765

The transmission test does not default to the currently configured frequency and power. If you start a transmission test without setting these parameters, you might transmit at full power on someone else's frequency.

Work-around: Always check the transmitted frequency and power before running the test.

Diagnostics: Changing C4FM test pattern may give garbled result

Tait reference:
TIMS00046453

If, while running the C4FM Transmission Test, you change the test pattern to 'P25 Conformance 1011 Hz,' the base station can transmit a garbled test pattern.

Work-around: Stop the test, select the P25 Conformance 1011 Hz test pattern, and then re-start the test.

Firmware download: Safe practices

Tait reference:
TIMS00038985

The process of loading firmware from the CSS to the base station is very reliable. The base station and CSS perform many checks during the process, and the likelihood of corrupt firmware on the base station is very low. Still, remote communications can occasionally go wrong, and checks sometimes fail. Here are some practical steps to take to ensure the best likelihood of success.

- Although the download process will save, and restore the base station configuration data, you should always make sure that you have saved a copy of the base station configuration data.
- Until you gain confidence in the overall process, upgrade firmware locally at the base station, rather than remotely via a communications link.
- All communication links have occasional transmission errors. If a download fails before the activation process begins, then resetting the base station will clear all loaded files, and allow you to try again. The activation process does not begin until the files have been successfully transferred to the base station.
- Even if the CSS reports that something failed, do not panic. Restart the base station (if necessary) and use the download screen to see what is on the base station. You can try the download again, and if necessary use the 'Force download' option to force the files to be transferred again.

Firmware download: 'Fail' message on DC power supply

Tait reference:
TIMS00033419,
TIMS00042738

On base stations with a DC power supply, the CSS will report that the activation process has failed.

Work-around:

1. Save the base station configuration file before beginning.
2. Carry out the download / activate. The CSS will report that the activation has failed. Actually the activation has succeeded.
3. Manually reset the base station.
4. Program the saved configuration data into the base station.

Firmware download: Cancel doesn't stop the download

Tait reference:
TIMS00046592

If you try to cancel a firmware download, the CSS continues to download the files to the base station. The firmware download comprises a number of firmware files, and pressing cancel only aborts the current file.

Work-around: Continue pressing cancel until the CSS stops transferring files.

Logging: Call attempts are logged as calls when in Standby mode

Tait reference:
TIMS00045125

If the base station is in Standby mode, any calls arriving at the RF or line interfaces are recorded as actual calls, even though the calls are not actually transmitted.

Work-around: Minimize the time that the base station is in Standby mode.

Logging: Trace log display hard to understand

Tait reference:
TIMS00044108

The Trace log contains Tait-internal messages that are intended for use by designers. Maintainers may find that reading the log is slow, and the results hard to interpret.

Work-around: View the System log instead of the Trace log. If a problem is particularly difficult to diagnose, Tait staff may ask you to look at the Trace log or save it to file and send it to Tait.

Network: VoIP availability

Tait reference:
TIMS00043594
TIMS00044142,
TIMS00036859,
TIMS00033691

Multi-site Voice-over IP (VoIP) is functional in this release, but is not generally available. Please contact Tait to find out whether the VoIP facility can be used in your network.

Network: Gateway address may need configuring

Tait reference:
TIMS00044306

At present, the base station uses Proxy ARP (RFC 1027) to find out which host on the LAN will forward packets destined for the network. The routers recommended by Tait support this protocol. Some networks may use different routers, or not use a local router at all. In these circumstances, it is necessary to set a gateway address in the base station. Tait's intention is to make the gateway address configurable in the CSS in a future release.

Work-around: If the network does not support the use of the Proxy ARP protocol, contact Tait for advice or assistance in setting up the gateway address.

Network: Setting QoS

Tait reference:
TIMS00036859,
TIMS00033691

Tait has specific supported configurations for QoS. Any deviation from the Tait-specified configuration may degrade system performance.

Network: QoS alarms don't trigger actions

Tait reference:
TIMS00044142

Although it is possible to program Task Manager with actions that respond to the QoS jitter and QoS lost packets alarms, Task Manager does not currently respond to those inputs.

Work-around: You can find out that the alarms are occurring by looking in the system log. At present, it is not possible to program the base station to respond in real time to these events.

PMU: Fan is not checked at startup

Tait reference:
TIMS00044738

While the PA and reciter fans are checked at startup, the PMU fan is not. These checks turn the fan on briefly so that the control firmware can determine whether the fan is rotating. In the absence of such a check, the control firmware can only determine that the fan has failed once the PMU is hot enough to turn the fan on. This gives no warning before the PMU detects over-temperature and reduces its power output, which effectively disables the transmitter.

Work-around: Tait recommends that base station maintainers perform a PMU fan test from time to time.

Receiver: DPL decoder delay can lose speech

Tait reference:
TIMS00045587

In analog mode, Digital Private Line signaling (also known as DCS) allows the base station to reject channel noise — and to only repeat signals with the correct embedded code. In combination with a slow subscriber unit decoder, the delay can cause the first half-second of speech in a transmission to be lost.

Work-around: Use Private Line/CTCSS instead. This currently has a faster decode time.

Receiver: False detect of P25 digital signals

Tait Reference:
TIMS00048252

The current receiver is highly sensitive in analog and digital modes. As a consequence, the receiver occasionally detects P25 signals that are not actually present — it can unmute briefly, on no valid signal. The unmuting can last from a few milliseconds up to 180 milliseconds and is usually not audible.

Workaround: To minimize the impact of false P25 detection, Tait recommends that you program your base stations and terminals with a network access code (NAC) other than F7E or F7F. F7E and F7F are used to unmute on any NAC.

Receiver: Limited frequency offset in supplementary service messages

Tait reference:
TIMS00041098

The base station can miss supplementary service messages (such as radio inhibit and uninhibit, status query, short data message, radio check, call alert, and emergency alarms) if the sending subscriber unit is at extremes of frequency offset.

Work-around: Ensure that subscriber units are properly tuned to the correct frequency.

Receiver: Poor sensitivity after calibration

Tait reference:
TIMS00044731

If performed according to the instructions in the calibration software, adjusting the receiver front end tuning can result in poor sensitivity.

The apparent aim of adjusting the receiver frequency response (Tune Receiver Front End Wizard) is to get the red trace entirely within an upper and lower limit, over a frequency range (displayed by a box on the screen).

The problem is that the upper and lower limits are only applicable if the RSSI tuning has already been performed correctly. However, in the normal sequence, the frequency response is adjusted before the RSSI has been calibrated. The correct curve may even be outside the box.

Work-around: Adjust the filters to give a frequency response which is not only as flat as possible, but which also produces as much signal strength as possible (i.e. make the curve as high as possible, even if it is outside of the box). If the response curve is above the upper limit of the box, the wizard will complain that the frequency response is outside of limits. Press 'Cancel' to continue anyway. Once the RSSI has been properly calibrated, the frequency response curve will lie within the expected limits.

Verify the receiver sensitivity using an RF test set once you have completed the tuning.

System: Recommended subscriber unit preamble

Tait reference:
TIMS00047870

While Tait P25 equipment has a fixed preamble, other subscriber unit radios may have a configurable preamble. Tait recommends giving them a preamble of around 20 ms. The preamble helps prevent late entry to voice calls and makes supplementary services (for example, call alert and status request) more reliable.

Task Manager: Problems implementing channel scanning

Tait reference:
TIMS00045053,
TIMS00045047

One use of Task Manager is to allow the base station to scan several different frequencies, stopping if it recognizes a signal. This would allow a high degree of interoperability amongst a diverse set of terminals. Some problems in Task Manager make this difficult:

- Changing channels can put excess load on the firmware and cause it to miss its deadlines. The consequences vary depending on the situation, but could include the firmware protection mechanisms restarting the base station.
- Under heavy load, Task Manager can miss occasional input events. The consequence in a channel scanning application is that you may see timers stop counting, causing the channel scanning to stop.

Work-around: Tait recommends that you do not rely on Task Manager channel scanning in this release. To restore timer functioning, put the base station briefly into Standby mode, then back into Run mode.

Task Manager: Problem with the input 'NAC received'

Tait reference:
TIMS00043683,
TIMS00043680

There is a problem with the Task Manager processing of detected NACs. Following a transition to Run mode (e.g. on restart), Task Manager may not respond when the base station receives the NAC code.

Work-around: After going to Run mode, use a subscriber unit to transmit a NAC code other than the one which Task Manager is expecting. Task Manager will then recognize the expected NAC code.

Transmitter - Analog FM: Over-deviation limiter may constrain deviation

Tait reference:
TIMS00031363

An overload test input will cause a transmitter deviation of only 80 percent of full system deviation.

Work-around: Normal FM signals are not affected.

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