TB9100 base station
and analog gateway

Release Notes

This technical note contains information to accompany the version 2.15 release of the TB9100 base station and analog gateway.

1   What's New in This Release

The TB9100 Base Station version 2.15 and its equivalent analog gateway incorporate the following improvements:

Antenna relay support

The base station can now control an antenna relay, for use with a single antenna in simplex applications. Pin 1 on the DIG connector can be configured as an antenna relay driver. This builds in timing delays to ensure that the PA does not transmit until the relay has switched over. If the receive and transmit frequencies are the same, it also shifts the transmit frequency while receiving, to minimize any reduction in receiver sensitivity.

K-Band (800 MHz) base stations now available

TB9100 base stations are now available for K-band frequencies (Tx: 762–776 and 850–869 MHz, Rx: 792–824 MHz). Operation at these frequencies requires an external reference frequency (provided, for example, by the Tait T801-02). It should have an accuracy of 50 parts per billion or better.

RF repeat improvements

RF repeat is now available with a duplex channel group. RF repeat enable/ disable and channel group simplex/duplex have been made separately configurable. This means that the channel group can provide audio from a SU to the dispatcher during a dispatcher conversation, and it can repeat the vote-winning SU when the dispatcher is not talking.

System interface improvements

The pins on the DIG connector now support a variety of functions. Pin 1 can be configured as a digital output, a digital input, or as an antenna relay driver. Pin 9 can be configured as a digital output or as an RSSI indicator. This means that you can have up to five digital inputs and one digital output, or four digital inputs and two digital outputs.

AES encryption support

The analog line is now able to encrypt and decrypt calls that use AES encryption. An AES encryption feature license is required.

Hardware checking

The CSS now helps you to avoid the situation where your base station is non–functional because of a version mis–match. Before a firmware download, the CSS looks at the base station hardware and firmware kernel versions, and alerts you if there is a problem.

2 Compatibility

The following table specifies all compatible configurations of the TB9100 base station and the related software. A configuration is compatible if a 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	Network Board			Digital Board		PMU		PA	
				F/w	Kernel	H/w	F/w	H/w	F/w	H/w	F/w	H/w
2.15	3.00	2.15	2.24	2.15	2.10	00.01[a]	2.15	00.05[b] 00.04 00.03	2.08	00.01	2.09	00.01
2.04	2.09	2.04	2.18	2.04		00.01[a] 00.00	2.03	00.04 00.03	2.08	00.01	2.09	00.01
1.23	2.07	1.23	2.11	1.23		00.01[a] 00.00	1.23	00.04 00.03	2.08	00.01	2.07	00.01
1.16	2.05	1.16	2.10	1.07		00.00	1.09	00.03	2.07	00.01	2.07	00.01
1.15	2.05	1.15	2.10	1.07		00.00	1.09	00.03	2.06	00.01	2.05	00.01
1.14	2.05	1.12	2.10	1.06		00.00	1.07	00.03	2.06	00.01	2.05	00.01
01.02	2.03	01.01	02.08	01.02[c]		00.00	01.02[c]	00.03	02.03	00.01	02.03	00.01

a. This network board version has a larger (8 MB) flash memory.

b. The digital board version 0.05 has a different exciter synthesizer circuit. Base station firmware v 2.1x can use the old or the new circuit.

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

3 Upgrading to Version 2.15

Before upgrading to Version 2.15, you need to check that the network board has 8 MB flash memory. Select Monitor > Module Details > Reciter, and look under Versions. If the network board hardware version is 0.01, proceed. If it is 0.0, contact Tait.

Upgrading base station firmware to version 2.15 cannot be done by the CSS alone. You will need to download firmware files using the TFTP protocol. It is essential to give new configuration items suitable values if your system uses networking or encryption.

Follow these steps:

1. Install the version 2.15 CSS software from the product CD. You can install it alongside any existing versions of the CSS.

Important   Make sure that you have saved a copy of the current base station configuration before upgrading the firmware. If the firmware download doesn't complete successfully and must be repeated, you will need to restore the configuration from the backup copy.

2. Follow the instructions in TN-977b. See also "Safe practices for firmware download from the CSS" below.

3. Update the settings of new configuration parameters as described in "Configuration Database Changes" below.

4. When step 3 is completed, save the new configuration data to a file, so that you have a backup.

Safe practices for firmware download from the CSS

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.

■ Always make sure that you have saved a copy of the base station configuration data before beginning a firmware download.

■ 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.

5 Configuration Database Changes

Version 2.15 has changed and additional configuration items. The following gives assistance to those upgrading from earlier versions. Generally, you need to check whether the default settings of these items are suitable for your system. The online Help and User's Manual have more detailed information about each item.

RF repeat

This configuration item now belongs to channels in the channel table, rather than to the calling profile. The old RF repeat setting in the calling profile will not be used. The default setting for the new item is enabled. If your system disabled RF repeat, you need to set the new item to disabled.

Mode

The channel group has a new mode setting: Simplex or Duplex. The default setting is Duplex. If your system enabled RF repeat, you need to set Mode to Simplex to have the same operation as before.

Port

The channel group now has a Port configuration item. This is the port that the base station uses for channel group communications. The default port number is 27258. You should not normally need to change this setting.

MDC1200 Address Mapping

The MDC1200 address table lets you define how PTT ID information (unit address, group address) information is presented to dispatch consoles using the MDC1200 protocol. The analog line interface now performs a number conversion internally, to ensure that addresses will be displayed consistently in the (P25) SU programming software, and at the dispatch console, for example

	P25 Start Address	P25 End Address	MDC1200 Start Address	MDC1200 End Address
Officers' radios	1	99	0001	0099
Vehicle radios	201	299	0201	0299
Talkgroups	901	920	0901	0920

As a consequence of this number conversion, the addresses that the analog line presents to the console will be different. Upgraded base stations or analog gateways with an old configuration file that uses the previous default mappings will report number conversion errors every over. You need to manually enter new mappings (see the picture of the default mappings in the CSS manual and copy them from it). Any console aliases will also need reprogramming.

Digital I/O configuration

Previously pin 1 could only function as digital input 4 and pin 9 could only function as a digital output. Now each pin can be configured to perform one of several functions. To continue to use the pins with their previous function requires no action. If you want to use them for a new function, you must change the default function (Configure > Base Station > System Interface).

6   Issues Fixed

The following known issues and limitations, listed in the release notes for version 2.04, have been fixed in this release.

Headline	Tait Reference
Configuration: Setting up line-controlled base stations is counter-intuitive	TIMS00052337
Receiver: DPL decoder delay can lose speech	TIMS00045587
Receiver: Problems with DPL	TIMS00045587 TIMS00050668 TIMS00050769 TIMS00050708 TIMS00050816
Task Manager: No response to digital input 4	TIMS00050273
Transmitter—Digital P25: New preamble not used	TIMS00053119
Transmitter—Digital P25: Optimizing modulation fidelity	TIMS00051882
Voting: Monitoring does not show vote winner for control panel or analog line	TIMS00052136

Several other issues have been removed from the list. Their content has been integrated into the CSS help and user's guide. Often they were more guidance and advice about possible problems rather than limitations of the product.

7 Known Issues and Limitations

Alarms: Some reciter alarms do nothing

The CSS displays a number of reciter and system alarms. Some of these do not operate when they might be expected to. The alarms are:

- BER high
- Network board configuration invalid
- Network user traffic
- Network board comms failure (this alarm is not displayed, but is an input into Task Manager)

These faults are either meaningless, or occur seldom in practice.

Analog line: Cannot stop tone remote from keying the transmitter

Tait reference: TIMS00053125

The CSS Analog Line General screen allows the system designer to specify whether the base station should transmit (channel seize) on an 'E' wire input from the line interface, or tone remote (low level guard tone), or both.

If the analog line receives low level guard tone, it seizes the channel, even if tone remote operation has not been enabled on the Analog Line General screen.

Work-around. If the dispatcher does not press PTT, the transmitter will not be keyed.

Analog Line: Emergency Alert is only sent to dispatcher if line is a member of the destination talk group

Tait reference: TIMS00054116

The calling profile defines (among other things) how the analog line will unmute on P25 transmissions. If you set the calling profile to "selective squelch", the base station will only unmute if the address in the received P25 matches the group or individual addresses specified in the calling profile. The emergency TSBK (normally sent to a group address) will behave the same way.

If you set the calling profile to "normal squelch," the base station will ignore the P25 addressing (for a voice call) and unmute on any signal. However the emergency TSBK is still processed as if selective squelch was in effect – possibly leading to the base station unmuting on speech, but not passing on the emergency TSBK.

Work-around: Set up calling profiles as if the analog line was using selective squelch. In other words, include all the groups the dispatcher wants to listen to in the group membership assigned to the calling profile.

Analog Line: M-wire output can miss line signaling

Tait reference:
TIMS00055108

The TB9100 sends MDC1200 signalling, and audible warning tones to the line interface. The timing of the M–wire output may not be synchronized with the tones on the interface. If the dispatch system relies on the M–wire to indicate the presence of the tones, they may not be successfully received. The functions most likely affected are PTT ID information, and encryption warning tones (clear and mismatch tones).

Work-around: Many consoles can use a voice–operated switch (vox). If you experience this problem, turn the vox function on in your dispatcher.

Base station: CSS cannot connect (rare)

Tait reference:
TIMS00050412

On very rare occasions, the base station does not allow the CSS to connect to it. If you ping the base station IP address, the base station responds – it just does not accept a connection request from the CSS. The problem is that the CSS communication process on the base station gets into a state that will not accept CSS requests.

Work-around: It is possible to use telnet to remotely reset the state of the base station's CSS communication process. Contact your Tait technical support representative for details.

Base station: Control panel speaker only gives receiver audio

Tait reference:
TIMS00054032

The control panel speaker has three modes of operation:

- Monitor the voter output
- Monitor the receiver
- Off

Under particular receiver settings, the speaker only monitors the receiver audio, and not the voter output. This does not allow the maintainer to have a conversation with people at other base stations in the channel group.

Work-around. Use an SU, or choose another mode of operation (such as P25).

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 reference spurious alarms

Tait reference:
TIMS00055739

The TB9100 allows the selection of 10 MHz or 12.8 MHz external reference. Using the CSS, you must configure the correct reference to be used. If you select the wrong reference, the base station gives spurious alarm indications including Reciter Power up failure and Synthesiser out of lock – as well as the correct alarm: External reference Invalid. The base station can also become unresponsive to the CSS, making it difficult to set the correct reference frequency.

Work-around: You should be able to read the configuration, correct it, and program it to the base station. If you are local to the base station, it may be easiest to disconnect the reference – the error handling is more stable when the external reference is absent.

CSS: Cannot set the location for configuration files

Tait reference:
TIMS00054953

The CSS has a File Folders dialog which defines some of the file locations that the CSS will use. The file location for configuration files is currently ignored. If you ask to save or open a configuration file, the CSS presents you with the folder in which you most recently saved or opened a file.

Work-around: None. You should find that the 'most recently used' location works well most of the time.

CSS: Cryptic warning when another maintainer is connected

Tait reference:
TIMS00055765

If you try to connect the CSS to a base station when another maintainer is already connected, it displays the following warning message:

"Failed to connect. Invalid response from host – the number of bytes received for the level 2 data does not match the number we expect."

Work-around: When you see the message above, understand that you cannot connect to the base station because another CSS is already connected.

CSS: Programming configuration may fail

Tait reference:
TIMS00054619

After a long time connected to the base station, the CSS may fail to program configuration tags, or to read monitoring tags.

Work-around: Disconnect the CSS from the base station and reconnect.

CSS: Incorrect tone remote mapping display

Tait reference:
TIMS00052604

The Tone Remote Mapping form display can become incorrect if you clear the Hide Task Manager actions check box, sort one or more columns in the table, and select the Hide Task Manager actions check box.

Work-around: Leave the form and then return to it. The display is now correct.

CSS: Limited operating system support

Tait reference:
TIMS00051024

The current CSS will work correctly with the English version of the Windows XP Professional or Windows 2000 (SP4 or later) operating systems. However, there is a known problem with the German Windows XP. Problems could also be encountered if the CSS is installed on Windows versions for other languages.

Work-around: Install the CSS on PCs with the English version of Windows XP Professional or Windows 2000.

Diagnostics: 800 MHz base stations may display the wrong lock range

Tait reference:
TIMS00054591

The Synthesizers form (Diagnose > RF Interface > Synthesizers) displays the lock ranges of the receiver and exciter. The 800 MHz base station has two exciter synthesisers, each covering a different band. The form shows the range of the synthesizer that was most recently calibrated. This may not be the synthesizer used by the current channel.

Diagnostics: Auxiliary supply test always 'good'

Tait reference:
TIMS00050649

The auxiliary supply diagnostics test is always reported as good. The Toggle Output button has no effect on the actual auxiliary supply output or on the display of its state in the PMU Control Tests form.

Diagnostics: Problems with Log C4FM test

Tait reference:
TIMS00046453
TIMS00049209

The Log C4FM test allows you to record raw C4FM data from the RF. You can compare it with the original data that was sent and verify the performance of the RF channel and base station receiver. This facility is currently not reliable. The base station may lock up, or may produce garbled output.

Work-around: You may still use the diagnostic. It is usually obvious whether it is working properly. Only run the test when you are local to the base station, so that you can reset it if needed.

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: Call information in channel group duplex mode

Tait reference:
TIMS00055276

In duplex channel group operation, the CSS call statistics screen (Monitor > Data Logging > Call Statistics) only records statistics for inbound (SU to dispatcher) voice calls. Also, a call from an SU results in a double entry in the call log, if RF repeat is enabled.

Task Manager: 'Transmit CWID now'

Tait reference:
TIMS00055710

The TB9100 can transmit a CWID (Continuous Wave Identification) signal at regular intervals (automatic mode), and when asked by Task Manager (the 'Transmit CWID now' action). This action only transmits CWID if automatic mode is enabled in configuration.

Work-around: Enable automatic mode in the configuration and then use Task Manager to disable sending the CWID at regular intervals, by using the 'Lock automatic CWID' action. Task Manager can then transmit CWID when it needs to.

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.

Publication Information

Tait Contact Information