STS1TX device errata

Applicability

This document applies to the part numbers of STS1TX devices and the device variants as stated in this page.

It gives a summary and a description of the device errata, with respect to the device datasheet.

Deviation of the real device behavior from the intended device behavior is considered to be a device limitation. Deviation of the description in the reference manual or the datasheet from the intended device behavior is considered to be a documentation erratum. The term *"errata"* applies both to limitations and documentation errata.

Table 1. Device summary

Reference	Part numbers
STS1TX	STS1TXQTR

Table 2. Device variants

Reference	Silicon revision codes	
	Device marking	REV_ID
STS1TX	SPTX	0x0130

1 Summary of device errata

The following table gives a quick reference to the STS1TX device limitations and their status:

A = limitation present, workaround available

N = limitation present, no workaround available

P = limitation present, partial workaround available

"-" = limitation absent

Applicability of a workaround may depend on specific conditions of target application. Adoption of a workaround may cause restrictions to target application. Workaround for a limitation is deemed partial if it only reduces the rate of occurrence and/or consequences of the limitation, or if it is fully effective for only a subset of instances on the device or in only a subset of operating modes, of the function concerned.

Table 3. Summary of device limitations

Function	Section	Limitation	Status
			SPTX
-	2.1	Automatic VCO calibration	A
	2.2	Extracurrent consumption after power-on	A
	2.3	Unwanted VCO calibration issue	A

2 Description of device errata

The following sections describe the errata of the applicable devices and provide workarounds if available.

2.1 Automatic VCO calibration

Description

In sporadic cases, the VCO calibrator sets an inaccurate calibration word, which can cause communication failures.

Workaround

To mitigate this issue, use manual calibration and store the calibration word in the microcontroller for each center frequency that the application intends to use. This manual calibration procedure must be repeated periodically to compensate for temperature variations.

The steps are as follows:

1. Set T split time:
   - Set the T split time to the longest value (3.47 ns) to facilitate calibrator operation.
   - Write 1 in SEL_TSPLIT, register SYNTH_CONFIG[0] (register address 0x9F).
   - It is recommended to set this register during radio initialization.
2. Enable reference divider (if applicable):
   - If the reference clock is 48 MHz, 50 MHz, or 52 MHz and the reference divider is not enabled, it must be enabled.
   - Write 1 in the REFDIV bitfield, register SYNTH_CONFIG (register address 0x9E), and set the center frequency using the reference divider.
3. Increase VCO current:
   - Write 0x25 in the register, VCO_CONFIG (register address 0xA1).
4. Enable automatic calibration:
   - Write 1 in VCO_CALIBRATION, register PROTOCOL[2] (register address 0x50).
5. Transmitter calibration (only if the device is used as a transmitter):
   - Send a LOCKTX command and wait for the STS1TX to go into the LOCK state.
   - Read the VCO calibration word from VCO_CALIBR_DATA, register RCO_VCO_CALIBR_OUT[0] (register address 0xE5).
   - Write the value read into the VCO_CALIBR_TX, register RCO_VCO_CALIBR_IN[1] (register address 0x6E); optionally, this value can be saved in the microcontroller NVM.
   - Send a READY command and wait for STS1TX to go into the READY state.
6. Disable automatic calibration:
   - Write 0 in VCO_CALIBRATION, register PROTOCOL[2] (register address 0x50).
7. Restore reference divider state (if step 2 was executed):
   - Write 0 in the REFDIV bitfield, register SYNTH_CONFIG (register address 0x9E).
   - Again, set the center frequency.

Note: It is recommended to repeat this sequence if the ambient temperature changes significantly.

2.2 Extracurrent consumption after power-on

Description

In some samples, when a supply voltage below 2.6 V is applied to STS1TX from a no power condition, an extracurrent is added to the typical current consumption. Table 4 shows the current consumption in Shutdown state based on the supply voltage.

Table 4. **Current consumption in Shutdown state**

V_{BAT} (V)	IBAT (µA)
2.4	~150
2.2	~110
2.0	~74
1.8	~22

Workaround

To avoid this extracurrent, after the supply voltage below 2.6 V is provided to STS1TX, STS1TX must exit from the Shutdown state and the following operations must be performed:

1. Write 0xCA in the register PM_TEST, register address 0xB2.
2. Write 0x04 in the register TEST_SELECT, register address 0xA8.
3. Write 0x00 in the register TEST_SELECT, register address 0xA8.

Note: A small delay of a few microseconds is needed between steps 2 and 3. This delay is automatically handled by the second SPI operation, considering an SPI clock of max 10 MHz.

By following this sequence, the extracurrent is eliminated. The workaround must be repeated only when a supply voltage below 2.6 V is applied to STS1TX from a no power condition. A reset operation made by the SRES command or by driving the SDN pin to put STS1TX in Shutdown does not cause the issue again.

2.3 Unwanted VCO calibration issue

Description

While performing a transmission with the calibration disabled (VCO_CALIBRATION bit set to 0 in register PROTOCOL[2]), a calibration procedure may be started anyway. As a result, the first bit of the transmission for about 50 µs may be affected by VCO instability during the unwanted calibration.

Workaround

To avoid such bit corruption, the transmission can be delayed to wait for the completion of the possible unwanted calibration. To delay the transmission by 60 µs, write 0x22 in the register 0xBC during the radio configuration.

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Revision history

Table 5. **Document revision history**

Date	Version	Changes
05-Feb-2025	1	Initial release.

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