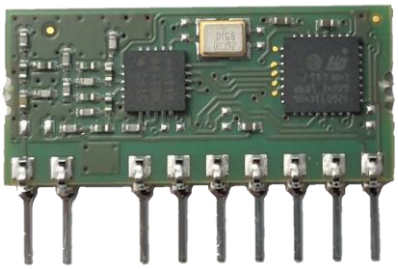
Wireless Transparent Modules

32001536F / 32001541F

DUAL MODE 900 MHz TRANSCEIVER

Command Reference



Description

This document provides the instruction how to use the Extended Mode in the Dual Mode Transceivers family.

Contents

1. Operating Modes of the Dual Mode Transceiver Family

This transceiver family can operate in two modes:

Normal Mode: whose operation is already described in the datasheet
Extended Mode: user programmable, covered in this document

2. Extended Mode Operation

For the setup of the device a serial interface is provided, by means of the same I/O lines that are used for normal operation. These lines are EN, CH_SEL, TX/RX, and must be connected to an external microcontroller.

2.1. Entering programming mode

To enable the programming mode, it is necessary to:

- set the device in power down state (**by setting pin EN = 0**), and then:
- generate a high pulse **t1** with a duration within **80 µs and 120 µs** on **EN line** (see Figure 1).

2.2. UART Setup

From that point on, the transceiver is in **UART programming mode on CH_SEL pin.**

The serial port is configured for reception only, with the following parameters:

- Baud rate: 9600 ± 300 baud
- Parity: no
- Stop bit: 1
- Data bit: 8

The time **t2** between the end of the pulse on EN line and start of data transmission on CH_SEL must be at least **4 ms** (see Figure 1).

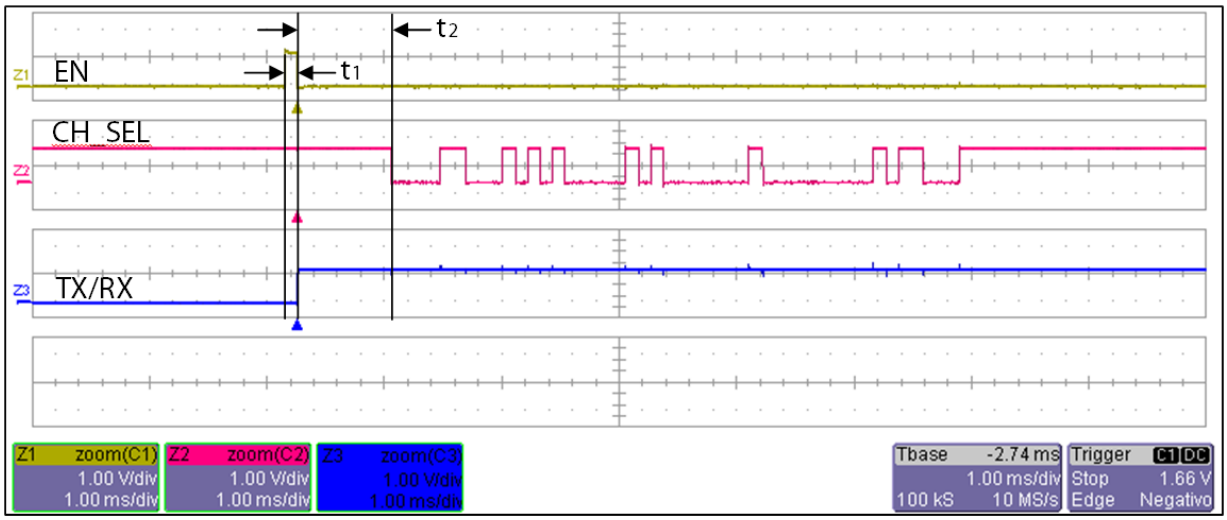


Figure 1: timings. 80µs < **t1** < 120µs; t**2** > 4ms

2.3. Feedback on the state of programming

The transceiver is capable of returning a feedback in case of successful programming (**ACK**).
To this purpose it is necessary to set the **TX / RX line** as input on the external microcontroller during the programming operation, with pull-up enabled.
The line must be set this way within the end of the pulse **t1** on EN and the beginning of the transmission of serial data (end of **t2**), and kept in pull-up for all the duration of programming phase.
The ACK occurs as a negative pulse **t3** on the TX / RX line and has a duration of **1 ms** (typical) (see Figure 2).

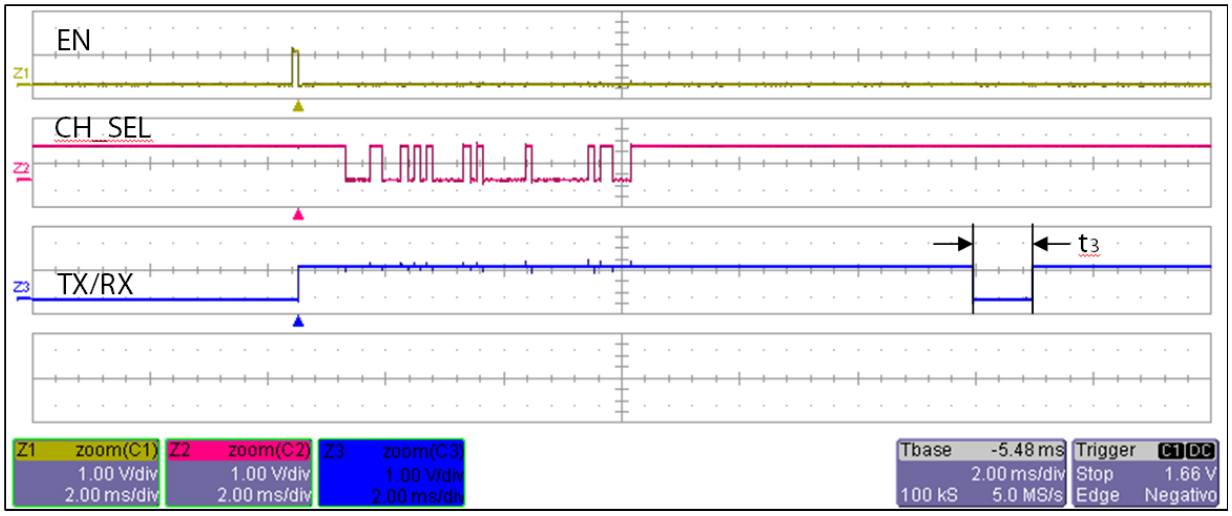


Figure 2: timings. **t3** = 1 ms typ.

If programming is not successful, the line remains in tri-state.

When programming ends, disable the pull-up on the external microcontroller pin on TX/RX line and restore the functionality of this line (input for the transceiver).

The transceiver exits the programming mode after a timeout of **100 ms**. For this reason, the time **t4** elapsed between the end of the pulse on EN and the end of a valid command sent on CH_SEL must be less than **90 ms**.

After programming a single parameter, the user can program other parameters consecutively; the 100 ms time-out is reset at the end of each ACK pulse on the TX / RX line, for each programmed parameter. To avoid errors during the writing of consecutive parameters it is mandatory that during this phase there are no pulses on EN line, and there are no other than programming data on CH_SEL line (see figure 4).

After a valid command, before starting the transmission of new data you must wait for the ACK on the TX / RX line, or if the TX / RX line is not used, a delay of at least **30 ms** is needed.

Typical time **t5** between command reception and ACK valid for the writing of *single parameters*: **20 ms** (see Figure 3).

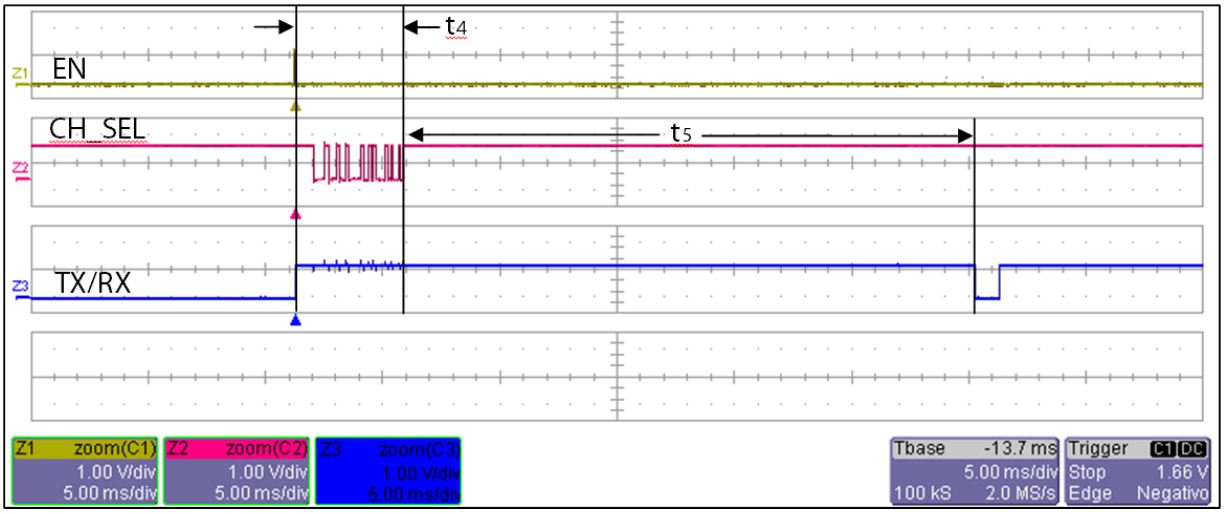


Figure 3: timings. **t4** < 90 ms; t**5** = 20 ms typ.

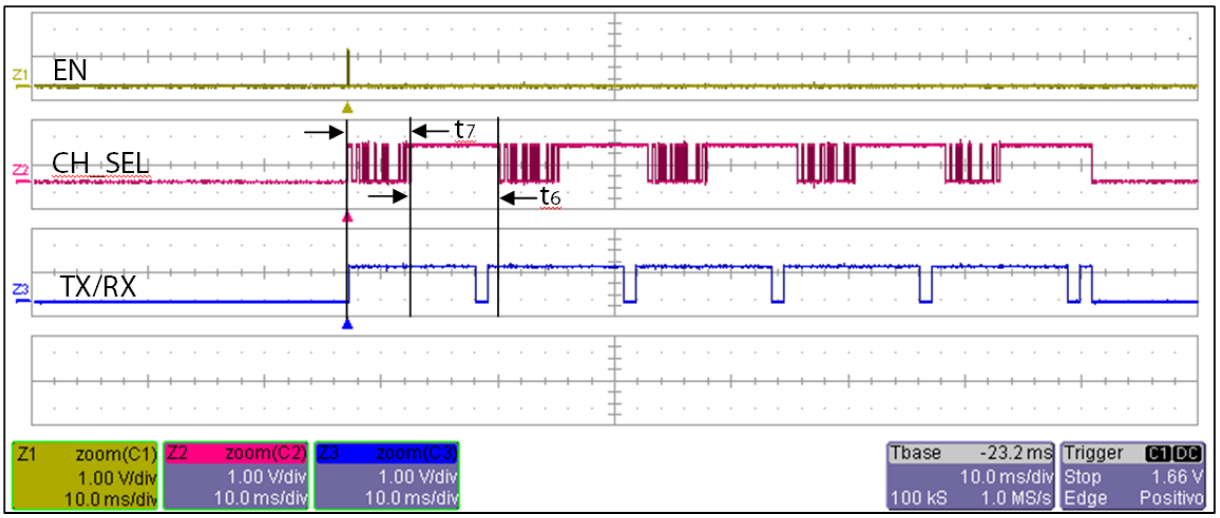


Figure 4: no other data must be present on CH_SEL line during period **t6** elapsed between a frame related to a command (**t7**) and the following.

2.4. Programming bytes sequence

- START: 0x18
- LEN: number of bytes from START to CHK
- CMD: command to be executed
- D1: first data (if any)
- CHK: checksum (0xFF – (XOR from START to CHK))

If you try to set a parameter with a value other than those permitted, the configuration will remain unchanged.

The settings are valid by the end of the time-out.

Valid parameters are stored in non-volatile memory, and are preserved even if module power is switched off.

3. Command Set

Parameter	Description	Byte CMD	Byte LEN	Value
Channel 1	Channel frequency selection byte	0x50	5	0x00: 903 MHz 0x01: 905 MHz 0x02: 907 MHz 0x03: 910 MHz 0x04: 913.7 MHz (default) 0x05: 917 MHz 0x06: 919 MHz 0x07: 921 MHz 0x08: 923 MHz 0x09: 925 MHz 0x0A: 927 MHz
Channel 2	Channel 2 frequency selection byte	0x51	5	0x00: 903 MHz 0x01: 905 MHz 0x02: 907 MHz 0x03: 910 MHz 0x04: 913.7 MHz 0x05: 917 MHz 0x06: 919 MHz (default) 0x07: 921 MHz 0x08: 923 MHz 0x09: 925 MHz 0x0A: 927 MHz
Power	RF output power selection byte	0x01	5	0x00: +10 dBm (default) 0x01: +7 dBm 0x02: +4 dBm 0x03: +1 dBm 0x04: -2 dBm 0x05: -5 dBm
Default setting	Default parameters setting	0x0A	4	
Shutdown mode	Current consumption is reduced up to 3 uA.	0x0B	4	

Example: To set the 32001536F/32001541F TX power on +4 dBm and channel 1 on 917 MHz, you must send the 100 µs pulse on the EN line and then send the following two commands on the CH_SEL line:

- Select the channel frequency 917 MHz: 0x18 0x05 0x50 0x05 0xB7
- Select the output power +4dBm: 0x18 0x05 0x01 0x02 0xE1

4. Shutdown Mode

The module has a low consumption mode that allows it to reach 3 uA of absorbed current in sleep state.

4.1. Entering shutdown mode

Example: To set the 32001536F/32001541F TRX in shutdown mode, you must send the 100 µs pulse on the EN line and then send the following command on the CH_SEL line:

- Activate the Shutdown mode: 0x18 0x04 0x0B 0xE8

Transceiver enters in shutdown mode after **100 ms** from the ACK impulse generated on TX / RX line.

4.2. Exiting shutdown mode

Transceiver exits from shutdown mode by a rising edge on the EN pin.

After that, the module switches to the different operating modes in the following time periods.

Parameter	Min.	Typ.	Max.	Unit	Notes
Time between Shutdown and valid data reception in FSK	-	40	-	ms	
Time between Shutdown and valid data transmission in FSK	-	40	-	ms	

5. Revision History

Revision	Date	Description
0.0	04.09.2025	First release