

Hands-On Workshop: Developing with NXP's Automotive Smart RF Remote Control Interface (RCI)

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October 2018 | AMF-AUT-T3354



SECURE CONNECTIONS
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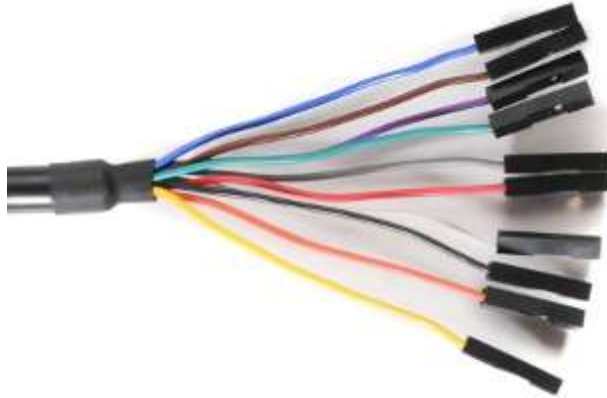
Agenda

- Connecting the Lizard Demo Board
- Task 1 (Receiver Basic Mode)
- Task 2 (Receiver Advanced Mode)
- Task 3 (Receiver Advanced Mode Polling 1 Ch)
- Task 4 (Receiver Advanced Mode Polling 2 Ch)
- Connecting the MantraCS Demo Board
- Task 5 (Transmitter Basic Mode)

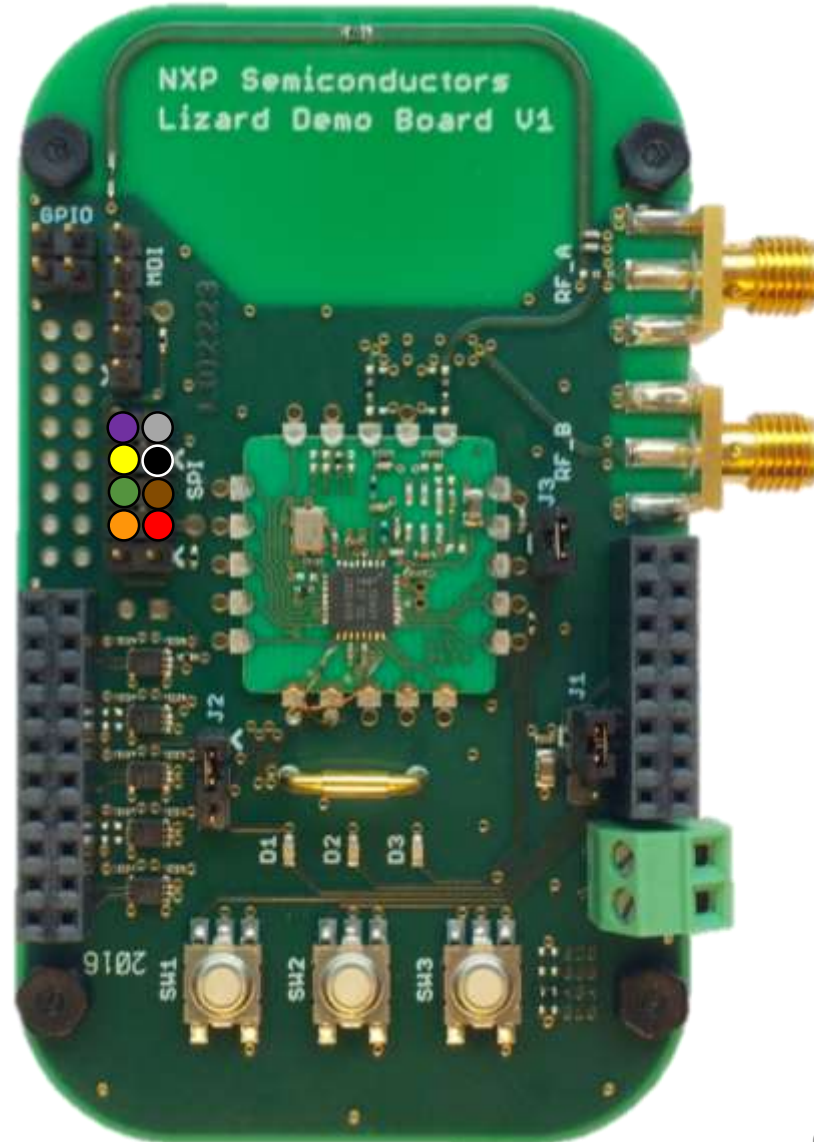
Connecting the Lizard Demo Board



Connecting the Lizard Demo Board



Black → GND → GND
Yellow → SDI → SDI
Green → SDIO → SDO
Orange → SCK → SCK
Brown → CS_N → CS
Purple → RDY_N → RDY
Gray → INT_N → INT
Red → VDD



Task 1



Task 1

- Start the CDK and open the receiver configuration area for Lizard
- Use the **basic** mode to create a receive configuration with following parameters:

Setting	Value
Center Frequency	434 MHz
Data Rate	15 kBits/s
Encoding	MAN (1 bit = 2 chips!)
Modulation	FSK
Frequency Deviation	15 kHz
RX Filter Bandwidth	72 kHz
Frame Length	64 bits
Run-In Pattern	0101010101 (in chips)
FSYNC	111010110011 (in bits)

Start the Reception!
Are you able to receive the frame?

Note the Current Consumption!
(Button: „Show Current Consumption“)

Task 2



Task 2

- Change from basic to advanced mode without changing the previously made configuration
- Can you find the settings from the basic mode (Configurations of index 0)?
- Apply the following tolerances in the “Baseband” tab:

Setting	Value
Data Rate Tolerance	5 %
FSK Deviation Tolerance	5 %
Max CFO	12 kHz

- Press the magic “Set To Default Values” button in the “Timeout Optimization” field (BB)

Start Continuous Reception!
Are you still able to receive the frame?

Task 3



Task 3

- Keep the settings of task 2
- Change Pattern 2 (WUP) to 1111 and press the magic “Adjust Signal Monitor” button (Both in the “WUP/FRAME” tab)
- Go to the “Polling” tab and enter the following settings:

Polling slot	Slot type	RX configuration	Duration
Index 0	Reception	Your configuration (Index 0)	800 μ s
Index 1	Repeat	Repeat => Don't care	13380 μ s

Start Polling!

Are you still able to receive the frame?

Note the Current Consumption!

Task 4



Task 4

- Note your center frequency

Group	Center frequency	Group	Center frequency
1	433.04 MHz	9	434.12 MHz
2	433.16 MHz	10	434.24 MHz
3	433.28 MHz	11	434.36 MHz
4	433.4 MHz	12	434.48 MHz
5	433.52 MHz	13	434.6 MHz
6	433.64 MHz	14	434.72 MHz
7	433.76 MHz	15	434.84 MHz
8	433.88 MHz		

Task 4

- Use the configurations of **index 1** to create an additional RX configuration

Setting	Value	Setting	Value
Local Frequency	Center Frequency - DF	Data Rate Tolerance	5 %
Digital Frequency (DF)	200 kHz	FSK Deviation Tolerance	5 %
Data Rate	20 kBits/s	Max CFO	12 kHz
Encoding	MAN (1 bit = 2 chips!)	Data, WUP, FSYNC inversion	OFF
Modulation	FSK	Wake Up (Pattern 2)	1111 (Bits)
Frequency Deviation	20 kHz	FSYNC	111010110011 (in bits)
RX Filter Bandwidth	120 kHz	Frame Length	80 bits
Run-In Pattern	0101010101 (in chips)		

- Press the buttons: “Set To Default Values” (BB) and select BB index 1 and “Adjust Signal Monitor” (WUP/FRAME)
- Link all configurations of index 1 to the WUP/SEARCH configuration of index 1
- Use the WUP/SEARCH conf. of index 1 in the reception configuration of index 1

Task 4

- Go to the “Polling” tab and enter the following settings:

Polling slot	Slot type	RX configuration	Duration
Index 0	Reception	First configuration (Index 0)	800 μ s
Index 1	Reception	Second configuration (Index 1)	600 μ s
Index 2	Repeat	Repeat => Don't care	10000 μ s

Start Polling!

Are you still able to receive the frame?

Note the Current Consumption!

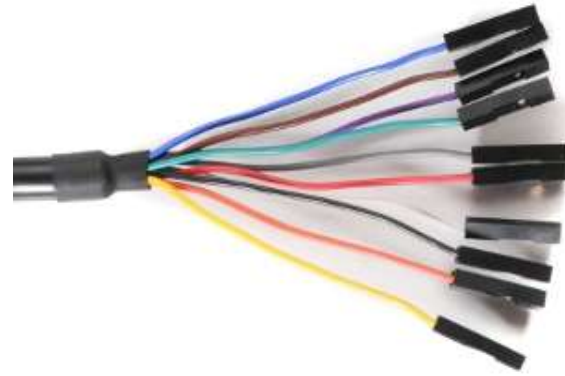
Is it still as low as before?

- **Don't close the CDK:** In the next task you will receive your own transmitted frame

Connecting the MantraCS



Connecting the MantraCS



- Black** → GND → GND
- Yellow** → SDI → SDI (P16)
- Green** → SDIO → SDIO (P13)
- Orange** → SCK → P15
- Brown** → CS_N → CS (P12)
- Purple** → RDY_N → P11
- Gray** → INT_N → P23
- Red** → VDD → VSPI



Task 5



Task 5

- Start a new CDK instance and open the TX configuration area for MantraCS
- Use the **basic** mode to create a transmit configuration with following parameters:

Setting	Value
Center Frequency	The one assigned to you
Data Rate	20 kBits/s
Encoding	MAN (1 bit = 2 chips!)
Modulation	FSK
Frequency Deviation	20 kHz
Output Power	0 dBm
WUP	0xFF; Repeat = 30
FSYNC	111010110011 (in bits)
Data	80 bits of your choice

Transmit Once!
Can you receive the frame with the other CDK instance?

Task 6



Task 6

- Change from basic to advanced mode for Mantra CS
- Select Advanced Tx in upper right
- Select Local Frequency index 3 and Tx Baseband tab 0 indicated in Transmission index 0. You should see your parameters that were configured in basic mode.
- Select Tx Frame Creation Tab
- Click on Frame Index 0, DMA Index 0, 1 and 2. You should see the data you set up and configurations in the Properties pane.
- Under Packet Settings pane, set packet delay to 1000ms and Packet Count to 10.

Transmit Loop!

Can you receive the 10 frames with the other CDK instance?



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