

TDA525X - UWLink[©] Evaluation Kit

Universal Wireless Link

TDA525X

ASK/FSK Transceiver for the ISM frequency bands of 315 MHz, 434MHz, 868 MHz and 915 MHz

User Manual

Revision 1.0, 2012-01-25

Wireless Control

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Introduction

1 Introduction

The **TDA525X Board** can either be used as stand-alone module (see respective data sheet) or together with the **UWLink-Adapter-Board** and the **UWLink Mainboard** as Interface to your Windows PC.

For that purpose the **TDA525X-Explorer** Windows Software may also be used to set the configuration registers and to read out the status registers of the **TDA525X** as well as of the **TDA525X**.



Figure 1: TDA525X-Board, -UWLink Adapter-Board, UWLink-Motherboard



2 Using the TDA525X-Board as stand-alone module

- Leave jumper X4, X11, X12, X19 and X20 open (see Figure 2)
- Select either RX-mode or TX-mode by setting the jumper of the RX/TX-multi-pin connector (X8) accordingly (see Figure 2 below or Figure 4-4 of the respective Data-Sheet).
- Select either ASK or FSK by setting the jumper of the ASK/FSK-multi-pin connector (X7) accordingly (see Figure 2 below or Figure 4-4 of the respective Data-Sheet).
- Apply a supply voltage of 3V (2.1V to 5V) to connector X3 (for polarity see Figure 3 below or Figure 4-4 of the Data-Sheet).
- Apply an antenna or RF-signal generator on the 50 Ω RF-connector (X1; see Figure 3 below or Figure 4-4 of the the Data-Sheet) if the RX-mode is selected (via RX/TX-Jumper). Use an ASK-modulated or FSK-modulated RF-signal according the mode selected by the jumper of the ASK/FSK-multi-pin connector.
- Apply an antenna or Spectrum-Analyzer to be able to measure the spectrum, for instance, on the 50 Ω RF-connector (X1; see Figure 3) if the TX-mode is selected (via RX/TX-Jumper). CAUTION: Applying a signal, from a RF-signal generator for instance, in TX-mode could possibly damage the power amplifier output of the TDA525X!
- Connect the Data Input/Output (X2; see Figure 3) to an Oscilloscope, for instance, to be able to measure the data output signal, in case of RX-mode (via RX/TX-Jumper) is selected.
- Apply a data signal, a PRBS9-sequence or just a rectangular signal on the Data Input/Output (X2; see Figure 3) if TX-mode is selected. For data signal Low- and High-level see the Data Sheet.







Figure 3: Connectors



3 Using the TDA525X UWLink Adapter-Board together with the UWLink Mainboard as interface between the TDA525X-Board and a Windows PC

Before using the UWLink Mainboard and TDA525X UWLink Adapter-Board as interface, the required software, which can be downloaded from the Infineon Web page (see link below), has to be installed.

Please follow this step-by-step approach when you start up your **TDA525X-UWLink**-Set for the first time: **Important Note:** The **TDA525X Explorer** Windows Software requires the **DAS** (Device Access Server) and the SIB-Server services running in the background. Both are automatically installed while following the steps below.

Step 1 – Installation of the TDA525X-Explorer

- Go to www.infineon.com/TDA525X and download the latest TDA525X-Explorer Installation Package (e.g. TDA525X_Explorer_E1.1.05.zip)
- Extract the ZIP-archive to a temporary directory on your PC.
- Open the sub-directory 1_DAS and execute DAS_setup.exe and follow the on-screen instructions.
- Execute **TDA525X_Explorer_E1.1.05.exe** and follow the on-screen instructions.
- Execute the NextGenLoader and start the installation of the SIB-Server by just double-clicking at the SIB Server button (see 0) and follow the on-screen instructions.



Figure 4: SIB-Server button

Step 2 – Usage of the TDA525X Explorer

- Start the TDA525X Explorer by double-clicking at the TDA525X Explorer button (see Figure 5).
- Click to **OPEN** in the **Wizard**-tab to start the communication (see Figure 6).
- Now you are ready to configure the TDA525X: Either by changing the settings in the Wizard-tab of the TDA525X Explorer (see Figure 7), or by changing the bit values of each register directly in the Registers-tab (see Figure 9). CAUTION: If you choose RX/TX and ASK/FSK "Register Controlled" (see Figure 8) it is strongly recommend to remove the jumper of the RX/TX-multi-pin connector and ASK/FSK-multi-pin connector to avoid conflicting hardware and software settings and harming of the TDA525X!



- Furthermore you can read the SFR Status register and SFR ADC register at the Explore-tab. See the RSSI Voltage and Vcc Measurement- and Data valid decision-fields in the Explore-tab (see Figure 10).
- The registers settings can be saved as config-file (*_spi.def) by clicking at the "Save"-button in the Register-tab on the one hand (see Figure 11). Already available config-files can be loaded by clicking at the "File-Open"-button on the other hand (see Figure 12)



Figure 5: TDA525X Explorer button

9	< > Subgroup Selection 1 Configuration	• •			
<u>ו</u> ב	General Chip Configuration:	XTAL Tuning:	Filter bandwidth:	RSSI_TH3	XTAL Config
Logging	Shave Mode Shave Mode Shave Mode Of the second	Setting for positive frequency shift of ASK-RX 9 & PF 9 & 49F 9 & 49F 9 & 50F 9 & 50F 9 & 500F 9 & 500	36 B Cutoff frequency 7 Bats Filer. 7 Bats Filer. 38 Cutoff frequency of ILO Filter. 150 KHz Dataszt thresholds. COUNT_TH1: 0 COUNT_TH2. 0 COUNT_TH2. 0 On/Off. Time f_RC: 3216 On-Time Register: 52316	ADC Input: VCC RSI RSSI threshold: 63 Clock Dvider: Chip variant: TDA5251 • Clock divider: 26.6 • Clock divider: 26.6 • Clock divider: 3.3,125 MHz 3.3,25 MHz 3.3,25 MHz	FET

Figure 6: TDA525X Explorer, Open button



TDA525X UWLink Evaluation-Kit

ſ	Wizard Registers Explore About				
	Subgroup Selection 1 Configuration	• 🔾			
	General Chip Configuration:	XTAL Tuning:	Filter bandwidth:	RSSI_TH3	XTAL Config
	Slave Mode Timer Mode Self Polling Mode RXTX and ASKFSK external controlled Register Controlled	Setting for positive frequency shift +FSK or ASK -RX: 8pF	3dB Cutoff frequency of Data Filter: 7 kHz 3dB Cutoff frequency	ADC Input: VCC	FET - Bipolar FSK Ramp (only in bipolar mode):
1	FSK - ASK	- 4pF	of I/Q Filter:	RSSI threshold:	(a) <0,2µs >32 kBit/s N
		2pF	[150 kHz 🔹	63	⊘ <4µs 32 kBit/s N
	Note: Bit must be set to Register controlled in order to control the TDA525x by the PC-software! Image: CLK off during power down Always CLK on, ever in PD	Setting for negative shift -FSK:	Datarate thresholds: COUNT_TH1: 0 COUNT_TH2: 0		⊘ <8μs 16 kBit/s N ⊘ <12μs 12 kBit/s N
	Date out if always valid always valid and the total out of	2pF 1pF 500F 250F 125F		Clock Divider: Chip variant: TDA5250	Building Blocks Power Dow Band Gap Reference RC Oscillator Window Counter ADC Rest Detector
	LNA Gain:	ASK - TX or FSK - RX:	On/Off-Time f_RC: 32000 Hz	18 - 1,00 MHz 🔻	Data Slicer Data Filter
	Low gain · · · · · · · · · · · · · · · · · · ·	🗐 8p F	T_On: 10 ms	Clock divider output:	[] Quadri Correlator ☐ Limiter
	Lowpass 1 Peak	<mark> √ 4</mark> pF	T_Off: 100 ms	Output from divider	V I/Q Filters
	Normal U-All Power operation U-All Power	2pF	On-Time Register: 65216	© 18,089 MHz	 ✓ I/Q Mixer ✓ 1st Mixer ✓ LNA
	operation U— Testmode	500/F	Off-Time Register: 62336	 32kHz Window Count Complete 	Power Amplifier PLL XTAL Oscillator
L	Drin Control		SIB Status		
			2 registers read		

Figure 7: TDA525X Explorer, Wizard tab

Wizard Registers Explore About				
< > Subgroup Selection 1 Configuration	- •			
General Chip Configuration:	XTAL Tuning:	Fiter bandwidth:	RSSI_TH3	XTAL Config
Silve Mode Silve Mode Silve Mode Silve AskiFSK external controlled Register Controlled FXUTX and ASKiFSK external controlled FXUTA and ASKiFSK external controlled	Setting for positive frequency shift +FSK or ASK-RX: 8pF 4pF 2pF 1pF	3dB Cutoff frequency of Data Filter: 7 kHz ▼ 3dB Cutoff frequency of I/Q Filter: 150 kHz ▼	ADC Input: VCC	FET
Note in must be set to Hegister control and an arror of the control the 1D Accurs of the I Control and C Areff during power down RX Data Invention Ways CLK on, ever in PD V hable Receiver	Setting for negative shift -FSK:	Datarate thresholds: COUNT_TH1: 0 COUNT_TH2: 0		O <12µs 12 kBit/s N
Data out if always Low TX Honor TX Hono	2pF 1pF 500F 250F 125F		Clock Divider: Chip variant: TDA5250	Building Blocks Power Down
LNA Gain: Low gain — 🗍 High gain	ASK - TX or FSK - RX: 8pF	On/Off-Time f_RC: 32000 Hz T_On: 10 ms	18 - 1,00 MHz Clock divider output:	 ✓ Data Slicer ✓ Data Filter ✓ Quadri Correlator ✓ Limiter
Lowpass — Peak Detector Normal — All Power down Normal — Testmode	 ✓ 4pF 2pF 1pF ✓ 500/F 250/F 	T_Off: 100 ms On-Time Register: 65216 Off-Time Register: 62336	Output from divider 18.089 MHz 32kHz Window Count Complete	 ✓ I/Q Filters ✓ I/Q Mixer ✓ 1st Mixer ✓ LNA ✓ Power Amplifier ✓ PLL ✓ XTAL Oscillator
Chip Control		SIB Status		

Figure 8: RX/TX and ASK/FSK external controlled or register controlled



TDA525X UWLink Evaluation-Kit

Register Addeese Value 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 SFR_CONFG 0.00 0.04F3 0	Wizard	Registers Explore	About																
SFR_CONFG 0.00 0.04F5 0		Register	Address	Value	15 1	4 13	12	11 10	9	8	7	6	5	4	3 2		0	Register Map / S	PI File Control
SFR_SK 0x01 0x000 0x000 <td< td=""><td></td><td>SFR_CONFIG</td><td>0x00</td><td>0x04F9</td><td></td><td></td><td></td><td></td><td></td><td></td><td>V</td><td>V</td><td>7</td><td>7</td><td>/</td><td></td><td></td><td>Salact file</td><td></td></td<>		SFR_CONFIG	0x00	0x04F9							V	V	7	7	/			Salact file	
SFR_XTAL_TUNING 0.02 0.0012 0 <td></td> <td>SFR_FSK</td> <td>0x01</td> <td>0x0A0C</td> <td></td> <td></td> <td></td> <td>v 🗉</td> <td>V</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>/</td> <td></td> <td></td> <td></td> <td>C</td>		SFR_FSK	0x01	0x0A0C				v 🗉	V						/				C
SFR_LPF 0.03 0.18 0 <		SFR_XTAL_TUNING	0x02	0x0012										v			1	Load Defaults	Save All
SFR_ON_TIME 0.04 0.4FEC0 0.01<		SFR_LPF	0x03	0x18										v	/		1 🖻	<please a="" enter="" setti<="" td=""><td>ng description></td></please>	ng description>
SFR_OFF_IME 0.63 0.6 0.6 0.0		SFR_ON_TIME	0x04	0xFEC0		7	V	v v	1			V				1	1 🗖		
SFR_COUNT_TH1 0.06 0.0000 0		SFR_OFF_TIME	0x05	0xF380	V V		V	•	7	V									
SFR_COUNT_TH2 0x07 0x000 0		SFR_COUNT_TH1	0x06	0x0000															
SFR_RSS_TH3 0.08 0.6F 0		SFR_COUNT_TH2	0x07	0x0000		1												Note: Manual chan	ges in the register
SFR_CLK_DIV 0x00 0x08 0		SFR_RSSI_TH3	0x08	0xFF		1	[]				V	V	v	v	/			input validation !	cipie, but not subje
SFR_XTAL_CONFIG 0.001		SFR_CLK_DIV	0x0D	0x08											v	1		I herefore an incor generated !!!	isistent setting mig
SFR_BLOCK_PD 0x6F 0x6FFF 0x 0		SFR_XTAL_CONFIG	0x0E	0x01														-	
SFR_STATUS 0.60 0.01		SFR BLOCK PD	0x0F	DxFFFF	V V		V	v v	7	V	V	7	V	7	7				
SFR_ADC 0.81 0.81 Find register enter register name		SFR_STATUS	0x80	0x01			[]				[T]	[T]							
Rid register enter register name		SER ADC	0x81	0x81															
																		Find register enter register name.	

Figure 9: TDA525X Explorer, Register tab



Figure 10: TDA525X Explorer, Explorer tab



TDA525X UWLink Evaluation-Kit

Wizard	Registers Explore About					
	Register	Address \	alue 15 14 13 12 11 10	9876	5 5 4 3 2 1 0	Register Map / SPI File Control
	SFR_CONFIG	0x00 0x	04F9 🔲 🗂 📄 📰 📝			Select file
	SFR_FSK	0x01 0x	DAOC 🔲 🔲 📄 🔽 🗐			
	SFR_XTAL_TUNING	0x02 0x	012			Load Defaults Save All
	SFR_LPF	0x03 0x	18			<pre><please a="" description="" enter="" setting=""></please></pre>
	SFR_ON_TIME	0x04 0x	ECO VVVVVV			/
	SFR_OFF_TIME	0x05 0x	380 🗸 🗸 🗸 🗖 🗖			
	SFR_COUNT_TH1	0x06 0x				
	SFR_COUNT_TH2	0x07 0x				Note: Manual changes in the egister are allowed in principle but not subic
•	SFR_RSSI_TH3	0x08 0x	OFF			input validation !
	SFR_CLK_DIV	0x0D 0x				generated !!!
	SFR_XTAL_CONFIG	0x0E 0x				
	SFR_BLOCK_PD	0x0F 0x	FFF VVVVV			
	SFR_STATUS	0x80 0x	21			
	SFR_ADC	0x81 0x	5F		/ . / / / / /	"Save"-Butto
						Find register enter register name
					SIR Statue	

Figure 11: Save button

Wizi	ard Registers Explore About		
	Register	Address Valu	e 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 Begister Map / SPI File Control
	SFR_CONFIG	0x00 0x04	
	SFR_FSK	Ox01 Ox0A	
	SFR_XTAL_TUNING	0x02 0x00	12 Coad Defaults Save Al
	SFR_LPF	0x03 0x18	C C C C C C C C C C C C C C C C C C C
	SFR_ON_TIME	0x04 0xFE	
	SFR_OFF_TIME	0x05 0xF3	
	SFR_COUNT_TH1	0x06 0x00	
	SFR_COUNT_TH2	0x07 0x00	00 Note: Manual changes in he register
+	SFR_RSSI_TH3	0x08 0x00	FF F F F F F F F F F F F F F F F F F F
	SFR_CLK_DIV	0x0D 0x08	generated !!!
	SFR_XTAL_CONFIG	0x0E 0x01	
	SFR_BLOCK_PD	0x0F 0xFF	FF 🗸 🗸 🗸 🗸 🗸 🗸 🗸 🗸 🗸 🗸 🗸 🗸
	SFR_STATUS	0x80 0x21	
	SFR_ADC	0x81 0x5F	
			File-Open - Dutto
			SIR Status

Figure 12: File-Open button



Step 3 – Configure the TDA525X Board by the TDA525X-Explorer via the USB connector of the PC

- Connect the TDA525X Evaluation Board to the TDA525X UWLink Adapter-Board and the TDA525X UWLink Adapter-Board to the UWLink Mainboard.
- Close jumper X4, X11, X12, X19 and X20 (see Figure 2).
 CAUTION: If there is just a 1-pole pin connector instead of X4 the external power supply (typically 3V, see next instruction below) has also to be applied to this 1-pole pin connector.
- The TDA525X Evaluation Board has to be supplied by an external power supply of 3V (2.1V to 5V) via connector X3. For the polarity of X3 see also Figure 3.
- Connect the UWLink Mainboard to the USB-connector of your PC.
- Start the TDA525X Explorer by double-clicking at the TDA525X Explorer button (see Figure 5).
- Click to OPEN in the Wizard-tab to start the communication (see Error! Reference source not found.).
- It is strongly recommended to remove the jumper of the RX/TX-multi-pin connector and ASK/FSK-multi-pin connector before you select "RX/TX and ASK/FSK Register Controlled" (see 0) to avoid conflicting hardware and software settings and harming of the TDA525X! If you select "RX/TX and ASK/FSK external controlled" (see Figure 8) you have to set the jumper of the ASK/FSK- and RX/TX-multi-pin connector according the desired mode (see Figure 2).
- Apply an antenna or RF-signal generator on the 50 Ω RF-connector (X1; see Figure 3) if the RX-mode is selected. Use an ASK-modulated or FSK-modulated RF-signal according the selected mode.
- Apply an antenna or Spectrum-Analyzer to be able to measure the spectrum, for instance, on the 50 Ω RF-connector (X1; see Figure 3) if the TX-mode is selected (via RX/TX-Jumper). CAUTION: Applying a signal, from a RF-signal generator for instance, in TX-mode could possibly damage the power amplifier output of the TDA525X!
- Connect the Data Input/Output (X2; see Figure 3) to an Oscilloscope, for instance, to be able to measure the data signal, in case of RX-mode (via RX/TX-Jumper) is selected.
- Apply a data signal or just a rectangular signal on the Data Input/Output (X2; see Figure 3) if TX-mode is selected. For data signal Low- and High-level see Data Sheet.

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