Getting Started with the ATA5745/ATA5746 Evaluation Kit

1. Introduction

ATA5745/ATA5746 is a transparent receiver which can be applied to process the data for two different applications, tire pressure monitoring systems (TPMS) and remote keyless entry (RKE). The two systems can have a different data rate as well as modulation type. To handle different applications, ATA5745/ATA5746 can be switched very quickly between ASK and FSK modulation types, and, of course, between four different baud rate ranges. The ATA5745/ATA5746 Evaluation Kit was designed for evaluation purposes of the receiver.

The receiver can be evaluated without a microcontroller since there are eight switches implemented for setting the receiver. The board is assembled for an operating voltage of 3V. For operation with a 5V power supply, the on-board external circuitry of the receiver's power supply has to be changed (please refer to the datasheet for more information on this issue). The RF input is matched to 50Ω. This simplifies the verification of the input stage with standard RF instruments.

Figure 1-1 on page 2 is a photo of an assembled board, Figure 1-2 on page 2 shows the layout of the the top layer, and Figure 1-3 on page 3 shows the allocation of the test pins (J*x*, where *x* is an index) on the board. For each test pin there is a ground pin available in order to simplify measurement with an oscilloscope's probe. When measuring the clock signal, the load capacitance of the probe has to be taken to account. Table 1-1 on page 3 shows the information important for measurement purposes. The bill of materials for the board is listed in Table 1-4 on page 4.

ATA5745/ ATA5746 Evaluation Kit

Application Note

4943A–AUTO–07/06

Figure 1-1. Evaluation Board of the ATA5745/ATA5746

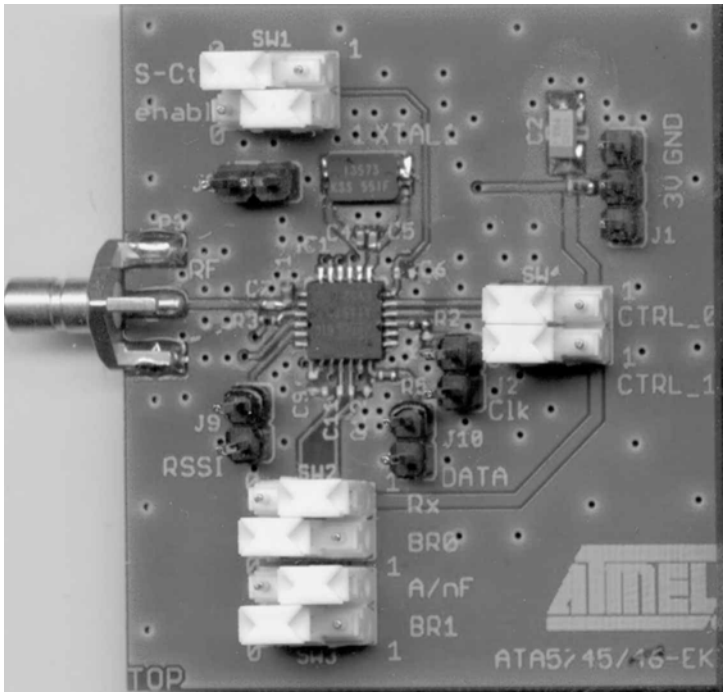


Figure 1-2. Top Layer Layout of the ATA5745/ATA5746

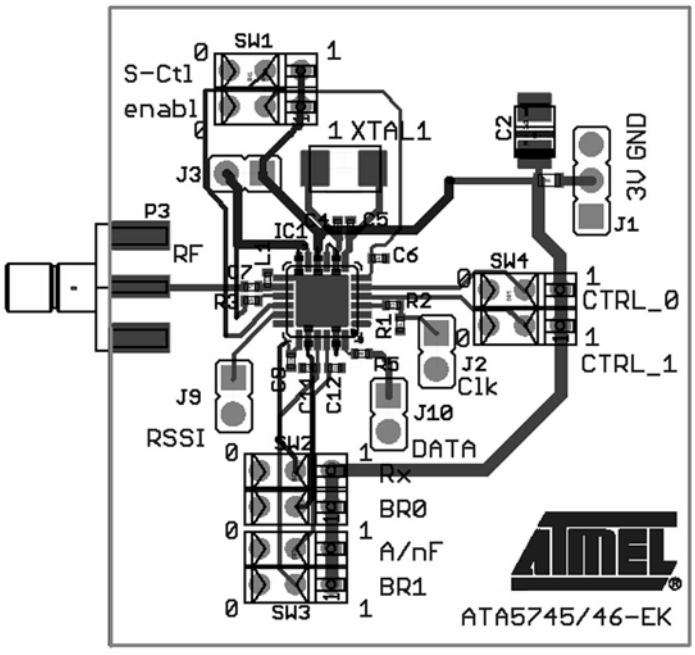
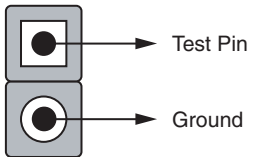


Table 1-1. Mapping of the Board Components and Designators to the Pins of ATA5745/ATA5746

Board Components	Designator and Description	The Corresponding Pin of the ATA5745/ATA5746
SW1	S-Ctl, enabl	SENSE_CTRL, ENABLE
SW2	Rx, BR0	RX, BR0
SW3	A/nF, BR1	ASK_NFSK, BR1
SW4	CTRL_0, CTRL_1	CLK_OUT_CTRL_0, CLK_OUT_CTRL_1
J1	Power supply of the board, V_S = 3V	
J2	Test pin to measure the clock signal. Connected to pin CLK_OUT over a 0Ω resistor (R2) (see Figure 1-3)	CLK_OUT
J3	The connector between VS3 and VS5	VS5V, VS3V_AVCC
J9	Test pin to measure the RSSI signal (see Figure 1-3)	RSSI
J10	Test pin to measure the demodulated data. Connected to pin DATA_OUT over a 0Ω resistor (R5) (see Figure 1-3)	DATA_OUT

Note: The switches are double switches. One switch component (SWx) consists of two switches.

Figure 1-3. Allocation of the Row Connectors (Test Pins) for Measurement Assembly



The following steps need to be followed to start working with the evaluation board:

1. Activate the 3V power supply.
2. Set switches *enabl* and *Rx* to “1” in order to start the receiver in receiving mode.
3. Set switches *BR0* and *BR1* according to Table 1-2 for the desired data rate to be processed by the receiver.

Table 1-2. The Receiver’s Bit Rate Depends on the Combination of *BR0* and *BR1*

BR1	BR0	BR_Range	Recommended Bit Rate (Manchester)
0	0	BR_Range0	1 kBit/s to 2.5 kBits/s
0	1	BR_Range1	2 kBits/s to 5 kBits/s
1	0	BR_Range2	4 kBits/s to 10 kBits/s
1	1	BR_Range3	8 kBits/s to 10 kBits/s (ASK) 8 kBits/s to 20 kBits/s (FSK)

4. Set switch *A/nF* as desired to set the modulation type of the receiver: “1” for ASK, or “0” for an FSK-modulated signal.
5. Set switch *S-Ctl* as desired for the sensitivity reduction's functionality. Set *S-Ctl* to LOW for normal sensitivity or HIGH for the sensitivity reduction functionality. The resistor on pin SENSE (R3) determines the value of the reduction. For more information, refer to the datasheet.
6. Set *CTRL_0* and *CTRL_1* as shown in Table 1-3 for the frequency of the clock signal to be measured on test pin J2.

Table 1-3. The Functionality of the Pin CLOCK_OUT Depending on the Logic Combination of the Pins CTRL_0 and CTRL_1

CTRL_1	CTRL_0	Function
0	0	Pin CLK_OUT is switched off
0	1	$f_{CLK\_OUT} = f_{XTO} / 3$
1	0	$f_{CLK\_OUT} = f_{XTO} / 6$
1	1	$f_{CLK\_OUT} = f_{XTO} / 12$

Note: f_{XTO} at 433 MHz = 13.57375 MHz, f_{XTO} at 315 MHz = 13.1433 MHz

Table 1-4. Bill of Materials of the ATA5745/ATA5746

Components	Pcs	315 MHz	433 MHz	Value	Tolerance	Material/Series	Housing	Manufacturer/ Distributor
IC1	1	x		ATA5746			QFN24	Atmel®
			x	ATA5745				
R2, R3, R5	4	x	x	0Ω			0402	Murata®
C2	1	x	x	4.7 µF				
C4, C5	2	x	x	18 pF			0402	
C51, C52, C53	3	x	x	10 nF			0402	
C7	1	x	x	2.2 pF		X7R	0402	
C54	1	x	x	15 nF		X7R	0402	
L1	1	x		68 nH	Q = 20	0402CS	0402	Coilcraft®
			x	36 nH	Q = 15	0402CS	0402	Coilcraft
XTAL1	1	x		13.1433 MHz			CX-53G	Kyocera® Kinseki
			x	13.57375 MHz				
SW1,SW2, SW3, SW4	4	x	x			JSK9-1G2-G0		ITW/PANCON - Heilind Electronics
J2, J3, J9, J10	4	x	x	Row connector		800-10-012-10-001	2 pins/ 0.1 in. pitch	CAB
J1	1	x	x	Row connector		800-10-012-10-001	3 pins/ 0.1 in. pitch	CAB
P3				SMB connector		Radiall®		Radiall
R1, C6, C9, C11, C12, C55, FB1	n.m.							

Atmel Corporation

2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 487-2600

Regional Headquarters

Europe
Atmel Sarl
Route des Arsenaux 41
Case Postale 80
CH-1705 Fribourg
Switzerland
Tel: (41) 26-426-5555
Fax: (41) 26-426-5500

Asia
Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimshatsui
East Kowloon
Hong Kong
Tel: (852) 2721-9778
Fax: (852) 2722-1369

Japan
9F, Tonetsu Shinkawa Bldg.
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
Tel: (81) 3-3523-3551
Fax: (81) 3-3523-7581

Atmel Operations

Memory
2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

Microcontrollers
2325 Orchard Parkway
San Jose, CA 95131, USA
Tel: 1(408) 441-0311
Fax: 1(408) 436-4314

La Chantrerie
BP 70602
44306 Nantes Cedex 3, France
Tel: (33) 2-40-18-18-18
Fax: (33) 2-40-18-19-60

ASIC/ASSP/Smart Cards
Zone Industrielle
13106 Rousset Cedex, France
Tel: (33) 4-42-53-60-00
Fax: (33) 4-42-53-60-01

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Scottish Enterprise Technology Park
Maxwell Building
East Kilbride G75 0QR, Scotland
Tel: (44) 1355-803-000
Fax: (44) 1355-242-743

RF/Automotive
Theresienstrasse 2
Postfach 3535
74025 Heilbronn, Germany
Tel: (49) 71-31-67-0
Fax: (49) 71-31-67-2340

1150 East Cheyenne Mtn. Blvd.
Colorado Springs, CO 80906, USA
Tel: 1(719) 576-3300
Fax: 1(719) 540-1759

Biometrics/Imaging/Hi-Rel MPU/
High-Speed Converters/RF Datacom
Avenue de Rochepleine
BP 123
38521 Saint-Egreve Cedex, France
Tel: (33) 4-76-58-30-00
Fax: (33) 4-76-58-34-80

Literature Requests
www.atmel.com/literature