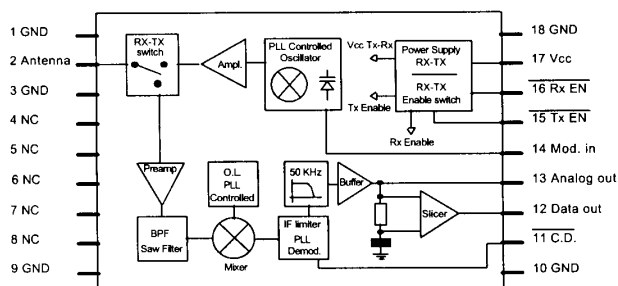




ATRT100-434 100Kbps Transceiver Module

The ATRT100 features a miniaturized CMOS/TTL compatible half duplex transceiver available in versions operating on 433.92MHz, 868.85MHz and 914.5MHz.

Pin-Out and Block Diagram



Pin Spacing: 2.54mm (0.1")
Pin diameter: 05mm

Connections

Pin Number	Designation	Description
1,3	RF GND	RF circuit ground
2	Antenna	50Ω impedance antenna connection
9,10,18	GND	Connects to GND. Internally connected and connected to the module's shielding can
11	CD	Carrier Detect -Active low . With the receiver enabled, a low level on CD indicates that the receiver is detecting the RF carrier. The CD line activates with an RF signal of -10dBm applied to the antenna pin. High impedance output available only for loads under CMOS logic.
12	RXD	Receiver data output. Permissible load impedance: over $1\text{K}\Omega$ but less than 100pf
13	AF	Filtered and buffered output representing the analog output of the FM detector. Permissible load impedance: over $2\text{K}\Omega$ but less than 100pf
14	TXD	Input to the transmitter. Accepts serial data in TTL logic (0-5V) with a $10\text{K}\Omega$ load impedance.
15	TX enable	Active low (voltage level 0V) enables the transmitter circuit. Pull-up line to Vcc with $100\text{K}\Omega$ resistor, 1mA required current.
16	RX enable	Active low (voltage level 0V) enables the receiver circuit. Pull-up line to Vcc with $100\text{K}\Omega$ resistor, 1mA required current.
17	Vcc	Connection to the positive supply terminal. ($+5\text{V}\pm 10\%$)

Technical Specifications

Parameter	Min	Typical	Max	Unit	Note
Supply Voltage	4.5	5	5.5	Vdc	
Current Consumption (TX ON)	22	26	32	mA	
Current Consumption (RX ON)		10	12	mA	
Current Consumption (TX/RX OFF)			100	nA	
RX Section					
Receive Frequency		433.92		MHz	
RF sensitivity, 1ppm BER		-100	-102	dBm	1
IF Passband		150		KHz	
Interference Rejection at 20MHz		-100		dBm	Fig.1
RF spurious emissions into antenna		absent			2
Output square wave	2.5		50	KHz	4
Output logic level: low		0.1		V	4
Output logic level: high		4		V	4
Carrier Detect threshold		-100		dBm	1
TX Section					
Transmit Frequency		433.92		MHz	
Modulation passband	2.5	50	55	KHz	
FM Deviation		±25		KHz	
Output power		10		dBm	
Antenna Impedance		50		Ω	
Switch-on time			1	ms	3
Operating Temperature	-10		+55	°C	Fig.2
Dimensions	33 x 23 x 8 mm				

Note 1: Values obtained from a test system at -100dBm, ±25KHz FM deviation, as per fig.3 with a 40KHz modulating frequency

Note 2: The RF emission test has been obtained from a spectrum analyzer connected directly to the antenna pin 2.

Note 3: Switch-on time is considered the time required for the device to acquire the stated characteristics, from the moment power is applied.

Note 4: Values obtained with a 10KΩ load applied

TX/RX Enabling

Pin 15 TX Enable	Pin 16 RX Enable	Function
1	1	Module disabled
1	0	Receiver enabled
0	1	Transmitter enabled
0	0	Invalid condition –do not use

Module Usage

To take advantage of the performances detailed in the technical specifications, the ATRT100 transceiver must be mounted on a printed circuit board with attention to the following:

5V dc supply:

1. The transceiver must be supplied with a low voltage source with short circuit and revers polarity protection.
2. Maximum voltage variations should not exceed $\pm 0.5V$.
3. Decouple the transmitter with a 0.1uF capacitor close to the transmitter.

Reference Curves

Fig. 1 Frequency-Selectivity curve

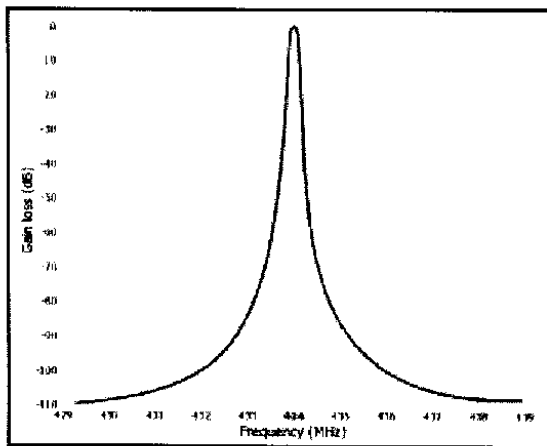
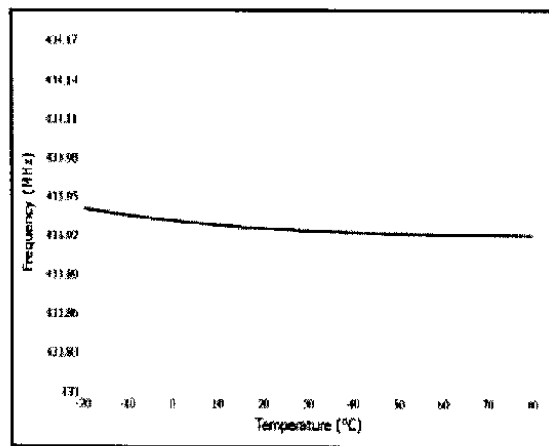


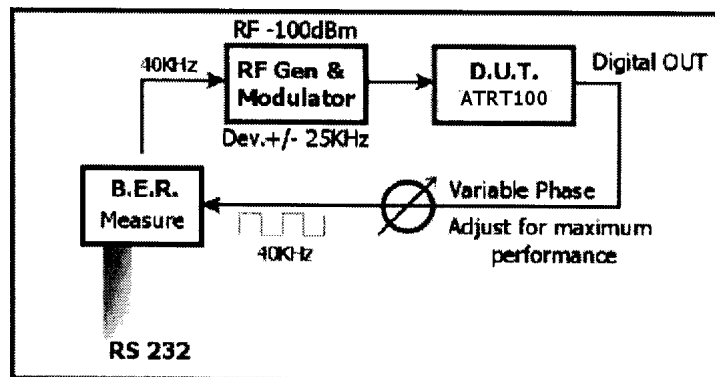
Fig.2 Temperature-Frequency curve



This curve has been obtained from the test system as in Fig.3

The technical specifications were derived from the test setup in figure 3 below.

Fig. 3

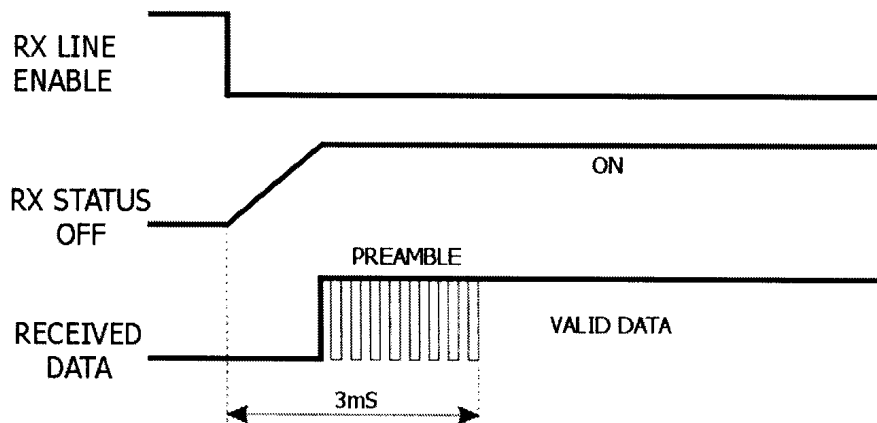


Considerations over the TX/RX serial data

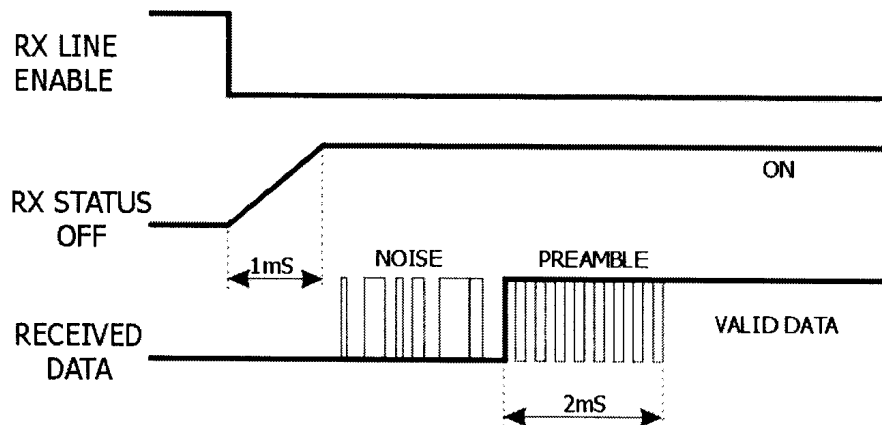
Pulse amplitude time: the circuit design characteristics (passband in base band and AC couplings) determine the maximum and minimum length of the time between two consecutive level transitions on the serial data. For the correct operation of the ATRT100, this time must be between $10\mu\text{s}$ and $200\mu\text{s}$. Settling time of The Data Slicer requires a settling time, therefore, before actual data is sent, a preamble of 2ms square wave (55) is transmitted in order to ensure data from the RXD line is reliable.

Bit ON/Bit OFF relation: the Data Slicer is optimized for a 50:50 duty cycle, calculated over a period of 2 ms. It will continue to operate, however, even with duty cycles of up to 30:70 or 70:30 but with less tolerance to interference.

Minimum RX reaction time

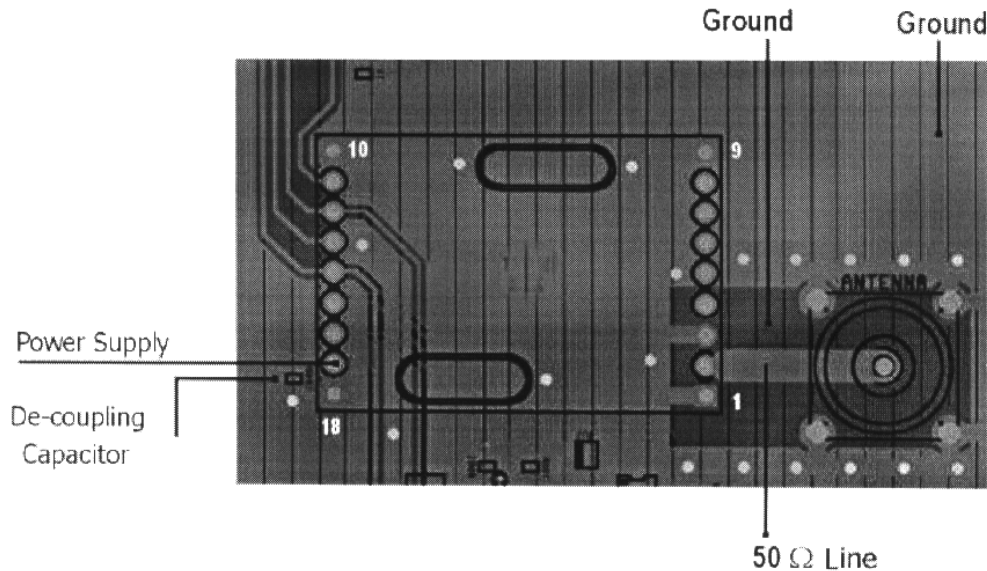


Reception Timing



Ground:

1. Ground plane must ideally surround the solder area of the module. The layout must be double sided, with vias (about 15mm apart) linking the ground planes of the two sides .
2. Ground plane must be properly dimensioned, particularly in the antenna connection area. If a radiating whip antenna is used, it should be radiating at least 5cm away from the ground plane.



50 Ohm Line (connection between antenna and pin 2):

1. Should be as short as possible.
2. 1,8 mm wide trace for 1 mm thick FR4 printed circuits boards and 2,9 mm wide trace for 1,6 mm thick FR4 printed circuits boards.
On the same side, it must be kept 2 mm away from the ground plane
3. A ground plane area must be present on the opposite side .

Antenna connection:

1. Antenna may be connected directly to the antenna connector or pad.
2. The antenna may be mounted off-board via a 50Ω coaxial cable. The braid should be connected soldered to the ground plane in close proximity to the RF GND pin.

Antenna:

A whip antenna, 16,5 mm long and approximately 1 mm dia., of brass or copper wire, must be connected to the RF input of the transceiver. The antenna body must be kept as straight as possible and it must be free from other components or metal parts (5cm minimum suggested clearance distance.) The antenna may be oriented either vertically or horizontally, provided the connection point between antenna and receiver input, is surrounded by a good ground plane.

N.B: As an alternatives to the whip antenna above, ABACOM offers a range of suitable manufactured antenna.

Other components:

1. Keep the receiver separate from all other components of the circuit (more than 5mm).
2. Keep microprocessors and clock circuits as far away from the ATRT100 as possible
3. Do not fit components around the 50 Ohm line. Keep at least 5mm distance.
4. If the Antenna Connection is directly used for a radiating whip connection, keep at least a 5 cm radius free area. In case of coaxial cable connection 5 mm radius will suffice.

Data Encoder and Decoder IC's

ABACOM offer a suitable data encoder and decoder interface IC's such as the DPC-64 which perform the required data formatting for transmitting and receiving serial data at 9600bps. Further details are available from our sales department or visit www.abacom-tech.com

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