UWIN TECHNOLOGIES CO., LTD.

DECT Module UM-9802 Datasheet

V2.1

UWIN TECHNOLOGIES CO., LTD.

Contents

Revision history

V1.0 September 18, 2009

V2.1 July 7, 2010, Hardware relayout

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1. Introduction

The UM9802 module is based on the ETSI DECT specification and is compliant with ETSI ETS 300 444 (GAP). Typically, it is used as a DECT base, allowing maximum of 7 handsets to register. Four concurrent voice connections are supported, so it may be used for PBX, IPPBX, and IADs. When loaded with the handset (Portable Terminal) software, it can also be used as a handset.

This DECT Module have UART、PCM、SPI interface. We can provide total solution and custom-made UART command programming.

UM9802 also supports data calls of CAT-iq. So it may be used as cordless data modem for local area point to multipoint cordless data communications.
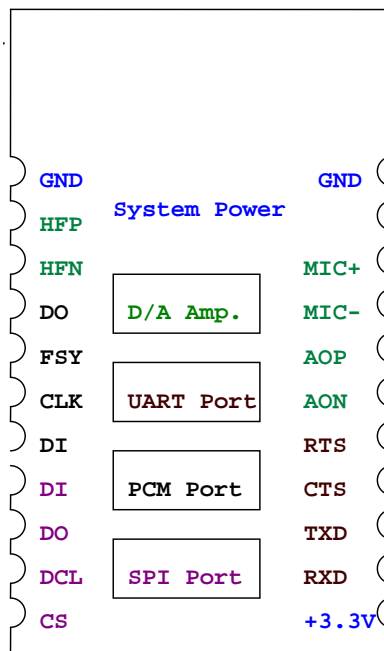
2. Features

1. Wide-band Voice channel(Cat-iq 2.0)，freq. Band: 200 ~ 6800 Hz
2. Full duplex communication
3. Caller ID display

3. DECT Module Application

1. DECT Phone
2. VoIP + DECT Phone
3. Baby Monitor

4. DECT Module function block
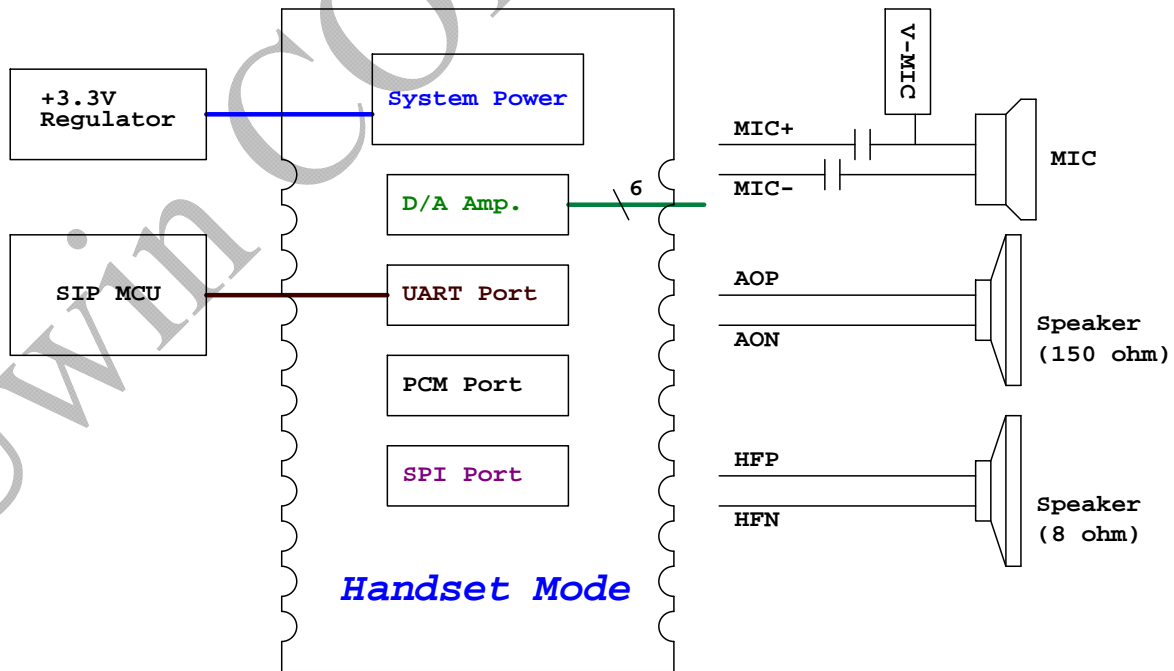
GND		GND
HFP	System Power	
HFN		MIC+
DO	D/A Amp.	MIC-
FSY		AOP
CLK	UART Port	AON
DI		RTS
DI	PCM Port	CTS
DO		TXD
DCL	SPI Port	RXD
CS		+3.3V

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5. RF Specification

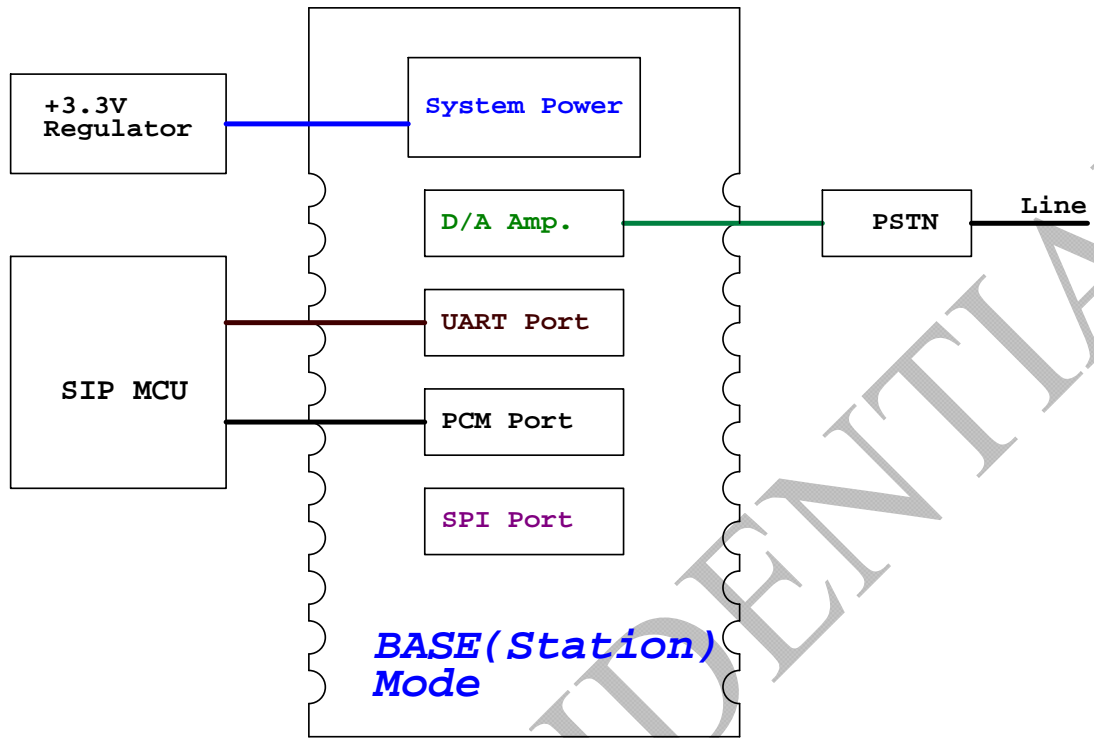| No	Item	Specification	Comment
1	Receive Sensitivity	Minimum: -86dBm Typically: -89dBm to -90dBm Maximum: -90dBm	@ BER = 0.001
2	Transmit Power(NTP)	Minimum: 20dBm Typically: 22dBm to 23dBm Maximum: 23dBm	Approx. 200mW
3	TDMA (time division multiple access)	12 time slot pr. carrier	
4	Signaling Bit-rate	1152 Kbit/sec	
5	Modulation	GFSK	Bandwidth 1.728MHz

6. Application Circuit

The UM-9802 can be used for various applications. Typical applications are the standard IP phone base. The base can be configured as a stand-alone base with standard base features. Additionally the UM-9802 can be used for small data transfer applications. The following sections describe the two typical applications.

6.1 Handset Mode

6.2 BASE(Station) Mode

BASE(Station) Mode

Blocks: +3.3V Regulator, System Power, D/A Amp., PSTN, Line, SIP MCU, UART Port, PCM Port, SPI Port

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7. DECT Module Functionality Description

7.1 MCU Interface

The UM-9802 supports both a standard UART interface and a SPI interface for the interface to the MCU(Micro Controller Unit --- external μP in a UM-9802 application). Seen from the MCU both the UART and SPI interfaces consist of a driver part and a command interface part. Both interfaces support a re-transmission protocol, which ensures that no communication is lost during operation. The UM-9802 supports either the UART or the SPI interface, but not both.

7.2 SPI

The UM-9802 always runs as a slave in a SPI configuration. The UM-9802 SPI slave configuration makes it possible for the MCU to run the SPI as a software simulation. The UM-9802 SPI uses an 8-bit wording and the SPI_CLK signal can run up to a 5.182 MHz clock. In SPI mode the data is clocked on SDI read in negative edge, SPI_DO write in positive edge of the SPI_CLK. Please refer to next figure. Even though the SPI clock can be set to 5.182MHz as max, it is not possible to transfer continuous data on the SPI at this rate. The actual rate is limited by the processing speed of UM-9802 and the MCU. If overflow occurs, the transmission errors will be detected, forcing the retransmissions.


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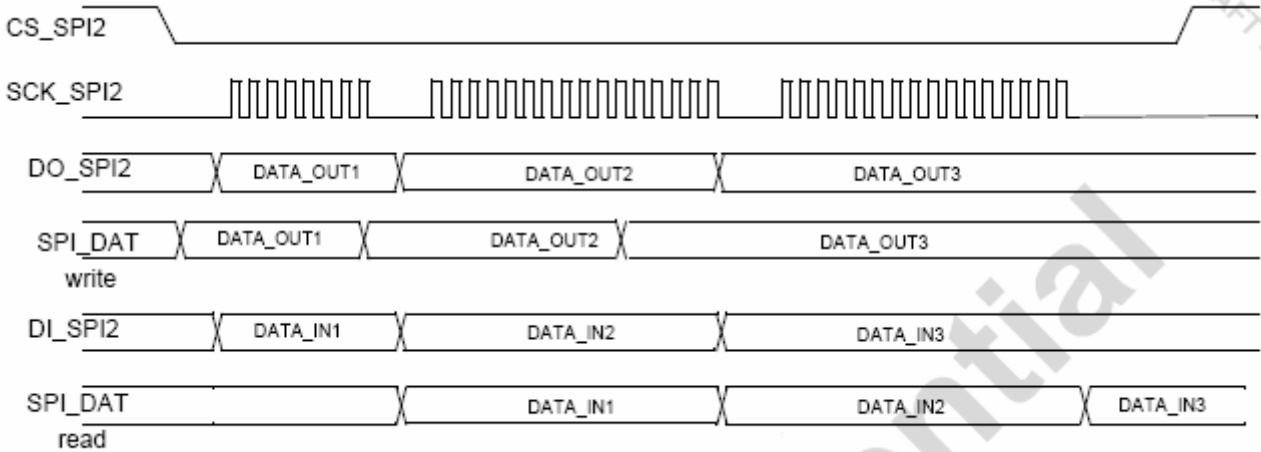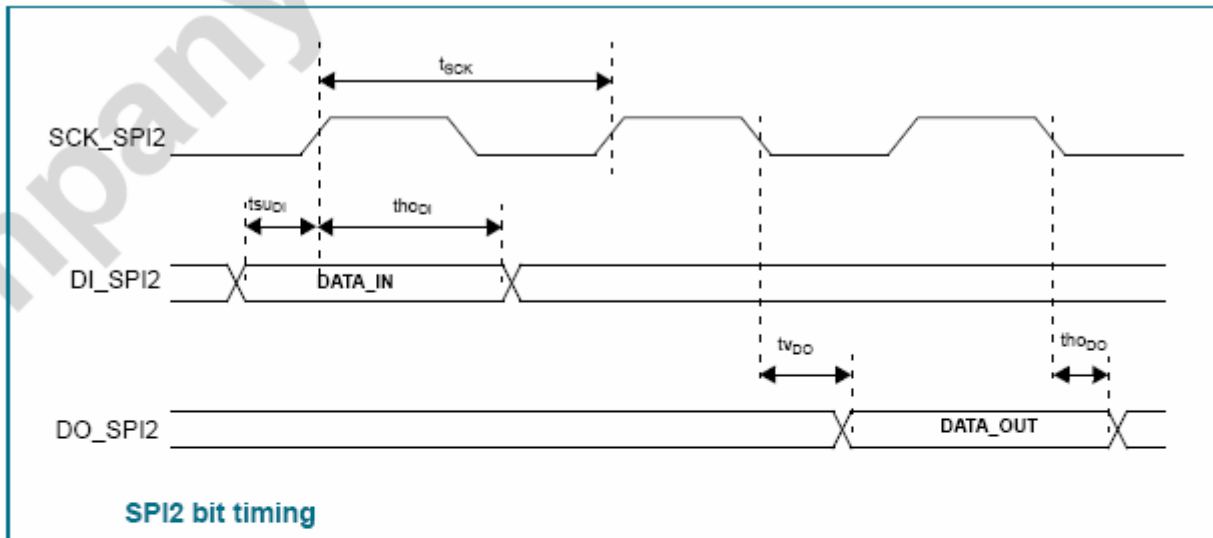
SPI2 bit timing

SPI2 bit timing values

Symbol	Parameter		Time
t_{SCK}	SCK_SPI2 period	[1]	41.6 ns (min)
tv_{DO}	DO_SPI2 valid time with respect to the falling edge of SCK_SPI2		20.8 ns (max)
tho_{DO}	DO_SPI2 hold time with respect to the falling edge of SCK_SPI2		0 ns (min).
tsu_{DI}	DI_SPI2 setup time with respect to the rising edge of SCK_SPI2		20.8 ns (max)
tho_{DI}	DI_SPI2 hold time with respect to the rising edge of SCK_SPI2		0 ns (min).

[1] The values refer to the highest allowed frequency setting with SCK_SPI2 at 24 MHz.

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7.3 UART Interface

The UM-9802 UART is a full duplex UART with frame type: 1 start bit, 8 data bits (LSB first), 1 stop bit and no parity. It is possible to configure the baud rate to four different speeds: 9600, 19200, 57600, 1152001bps by EEPROM configuration. The UM-9802 UART is by default set to the baud rate: 9600 bps.

The UART hardware interface uses 3 wires. Please refer to next figure.
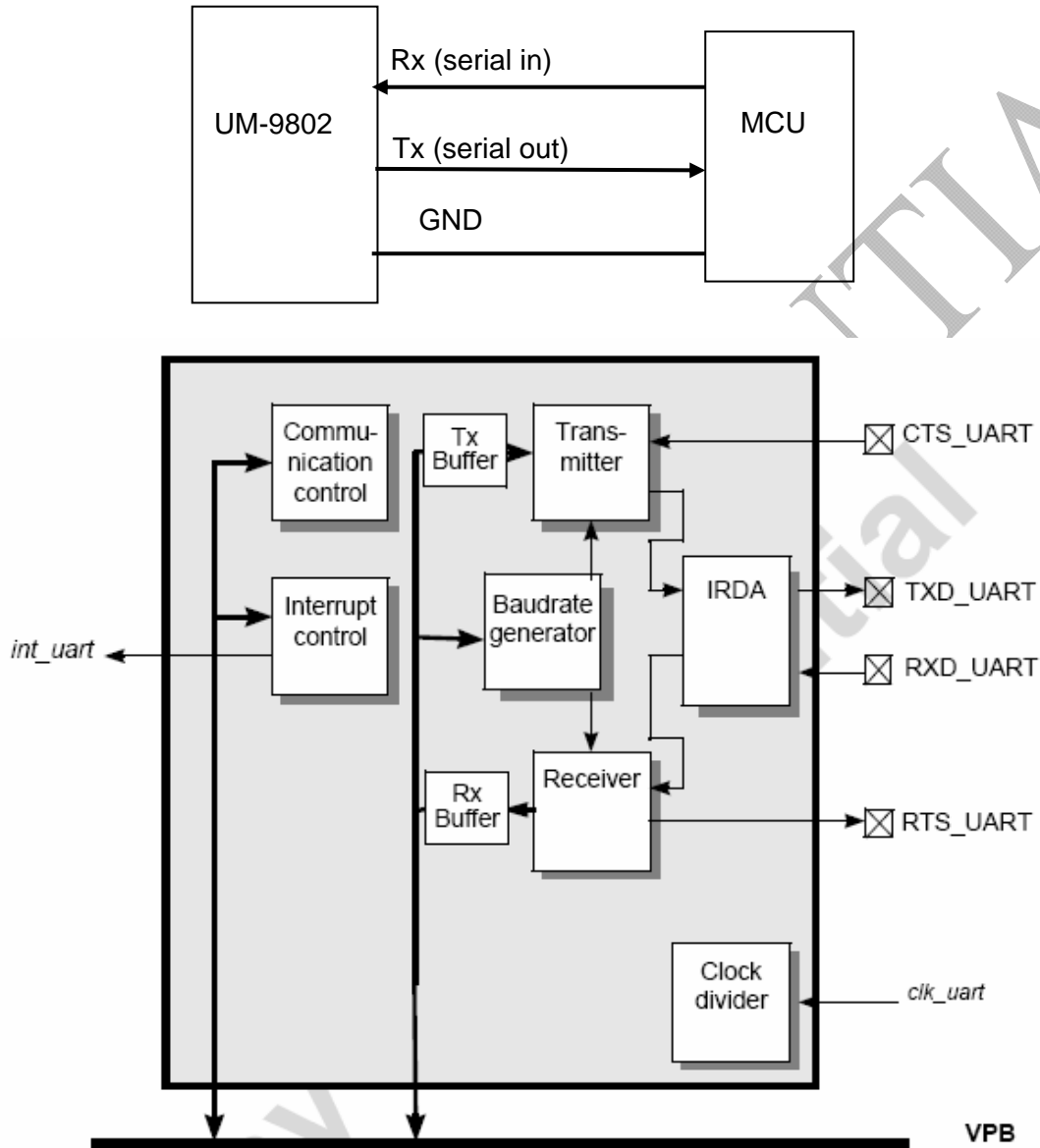
The UART supports the following features:

1. Even, odd, fixed 1, fixed 0 or no parity generation and detection

2. One or two stop bit generation

3. Character size 5/6/7 or 8-bit

4. Programmable standard baud rates, e.g. 4.8, 9.6, 19.2, 38.4, 57.6 and 115.2, 230.4, 460.8 and 921.6 kbps

5. Automatic line error checking: stop bit failure (framing), RX overrun, parity error, break

6. loop-back mode

7.4 PCM

The PCM port may work in master mode (i.e. bus timing is provided by module) or slave mode (Module is synchronized to the timing received from the bus).

The key features of the module are listed below:

- linear, log a-law and u-law data formats
- host processor access to PCM data bus for signal processing
- bit rates supported: Master / Slave operation

PCM / IOM port detailed external timing diagram for single clocked data (PCM mode)
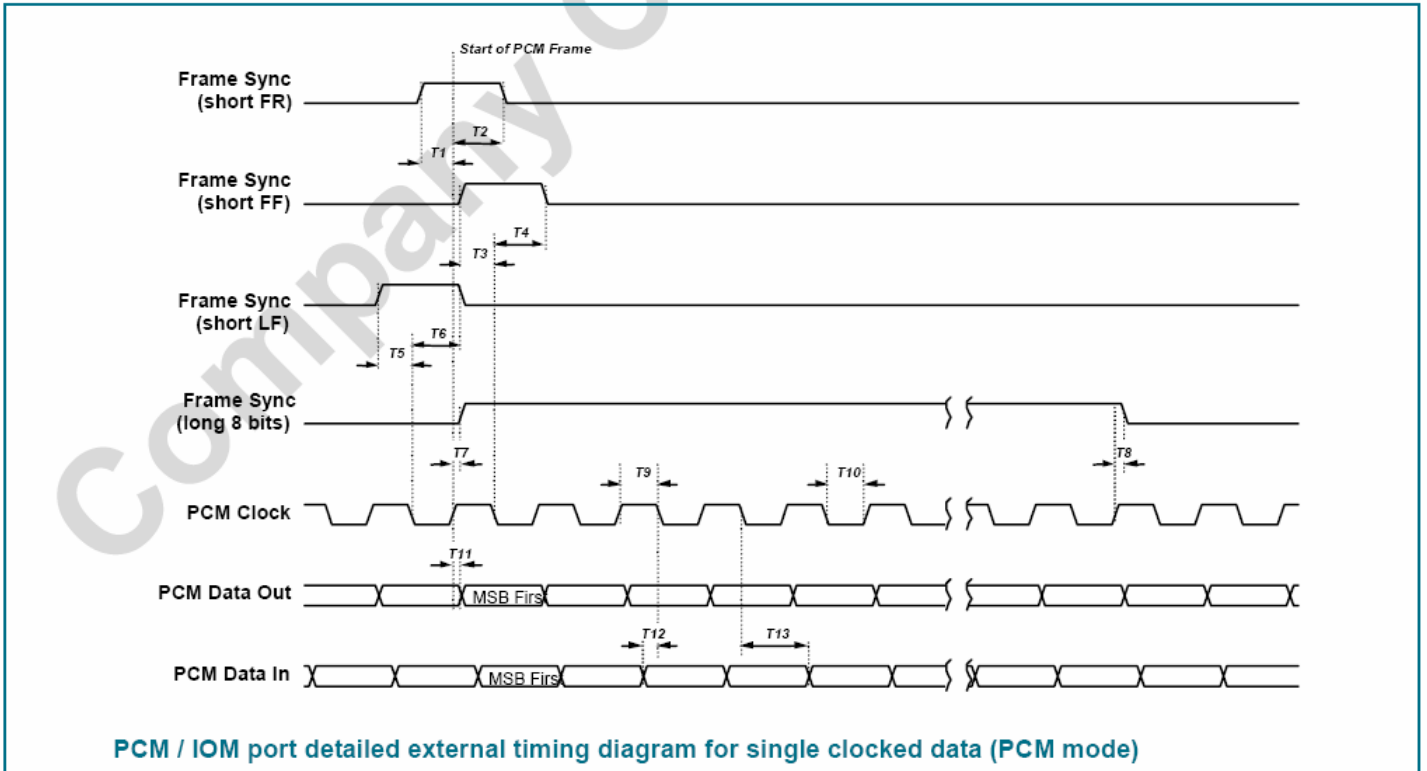
PCM port timing (single clock per bit), master mode

Symbol	Description	Min	Typ	Max	Unit
T7	Frame Sync (long) to Clock rising edge delay	-20		20	ns
T8	Frame Sync (long) to Clock falling edge delay	-20		20	ns
T9	IOM clock high time				ns
T10	IOM clock low time				ns
T11	IOM data out valid delay	50		90	ns
		15		55	ns
T12	IOM data in set-up time	30	0		ns
T13	IOM data in hold time	45	0		ns

7.5 Protocol

The protocol handles the RF interface. For UM-9802 the DECT TDMA is used. The protocol features encryption within DECT.

The UM-9802 DECT protocol supports the DECT GAP standard. DECT TBR22 GAP type approval is possible. To pass a GAP type approval a disable of PP authentication and encryption during conversation is needed for some TBR22 test cases (DLC test cases).

7.6 Registration

The handset and the base must be paired using a procedure called registration. Without registration the handset will be out of lock, and will not be able to establish a link to a base and then not be able to make a call. The registration is using the unique product identities and secures the handsets and bases not to cross communicate. To avoid cross communication it is very important that the handsets and bases all uses a unique numbering scheme.

It is possible to register up to 7 handsets in a UM-9802 DECT base. Only 4 handsets can be active at the same time in UM-9802. Handsets numbers will be available for the MCU.

The handsets can be de-registered from a base again either via the base MCU or the handset MCU using the command interface. Also it is possible to deregister a handset from an extra registered handset.

Manual Registration

A registration of UM9802 Handset-Mode to a base is done by first enabling the registration mode in the base (by key press on the base or by UART/SPI command from the base MCU).

Then the actual registration is started by sending the registration command request from the handset MCU to the UM9802 holding the Authentication code (default 0000) and the Subscription No.

The UM-9802 will then search for the "registration enabled" base and when found, the registration is completed and a confirm message is returned to the handset MCU.

The registration procedure must be as follows:

1. First the base registration mode is enabled
2. Secondly the handset registration mode is enabled

If a reverse order is used there is a possibility for the registration to fail. The reason is the handset search for open bases method, which will set found bases not in registration mode back in the search queue.
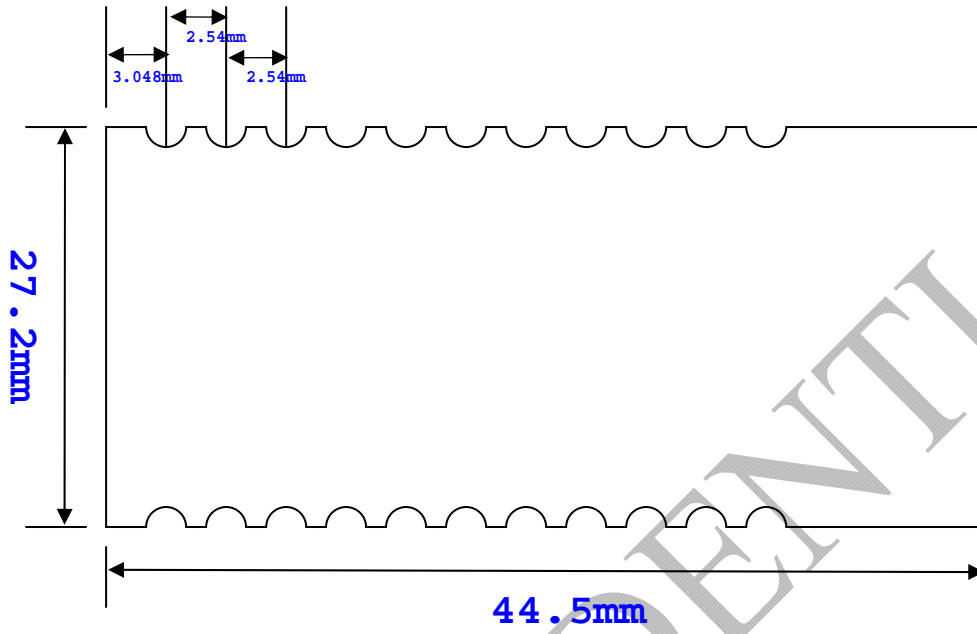
8. DECT Module Connection Diagram
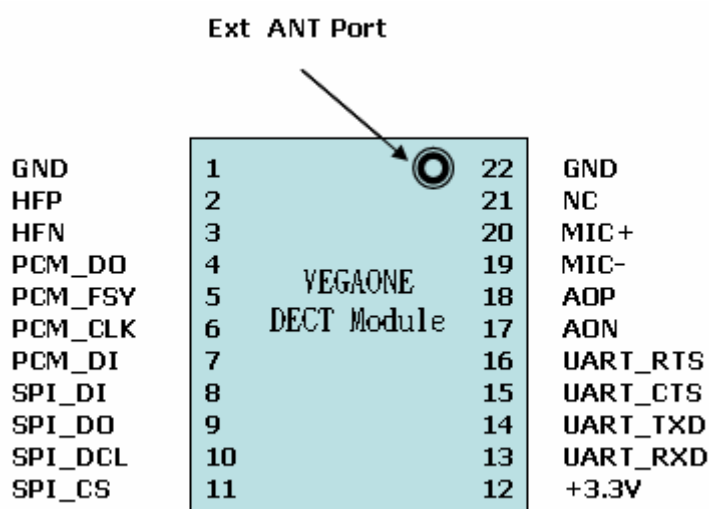
9. DECT Module Pin Description

PIN	Signal name	Application	Function
1	GND	Power GND	GND
2	HFP	O	Hand-free Speaker +
3	HFN	O	Hand-free Speaker -
4	PCM_DO	O	PCM port data output
5	PCM_FSY	I/O	PCM port Frame Sync
6	PCM_CLK	I/O	PCM port Clock 2.048MHz
7	PCM_DI	I	PCM port data input
8	SPI_DI	I	SPI port data input
9	SPI_DO	O	SPI port data output
10	SPI_DCL	I/O	SPI port Clock
11	SPI_CS	I/O	SPI port chip-select
12	+3.3V	Power VCC	+3.3V(mini: +3.0V , max: +3.6V)
13	UART_RXD	I	UART port Data input
14	UART_TXD	O	UART port Data output
15	UART_CTS	----	N/A
16	UART_RTS	----	N/A
17	AON	O	D/A Amp. Output +
18	AOP	O	D/A Amp. Output -
19	MIC-	I	D/A Amp. Input -
20	MIC+	I	D/A Amp. Input +
21	NC		
22	GND	Power GND	GND

10. Module Package Information

10.1 Connector pin Size &   PCB Size