



User manual

of

MD-1562 Digital Cordless Module

For ooma Inc. (FCC ID: XFT-TELOMD15)

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Contents

1. Introduction	3
1.1 Product overview _ Features summary	3
2. Digital Cordless Module (MD-1562) description	4
2.1 Chipset platform	4
2.2 Numbering system	4
2.3 Typical application	5
3. Functionality	7
4. Technical specifications	8
4.1 Absolute operation ratings	8
4.2 Baseband specification	9
4.3 Radio part (RF) specification	10
5. Connection diagram	11
6. Software implementation	13
6.1 Examples flow for implementation of API for initial start	13
6.2 Application note (UART for Command signalling)	15
7. Safety information	17

1. Introduction

This document provides an overview of the functionalities supported by the Digital Cordless Module (MD-1562) with Vega-1 based DECT processor.

1.1 Product overview _ Features summary

The table below provided a brief summary of the key features supported by the MD-1562_CLxx series.

Features	Platform	MD-1562	Remark
Application (DECT/DECT 6.0)	Base		
Physical dimension (mm)	5*33*50		
Pin count	32 pins		
Wideband audio codec	G.722		
Audio channel (for Base)	4		
Key features supported: - GAP Compliant - Audio streaming - Remote access for Interactive data application - API command set supported for GUI control - Remote software upgradeable	Yes		

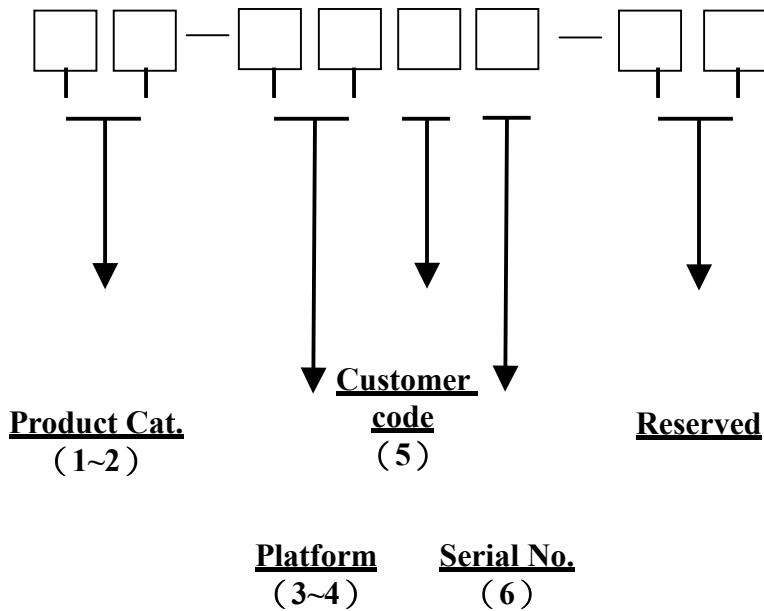
2. Digital Cordless Module (MD-1562) description

2.1 Chipset platform

The MD-1562 DECT module is based on a highly integrated chipset for DECT and DECT VoIP application.

2.2 Numbering system

The customer model number system below provides basic information of model number assignment for customer to place the order; a label shows the model number would be labeled on each module delivered!



Code 5: "1" is reserved for Baycom's standard platform

Example: MD-1562

2.3 Typical application

2.3.1 For base :

The cordless base using the MD-1562 contains a base band section & a RF section. The antenna(s) will be located outside the module PCB area. To compose a base, the module will need the additionally hardware interface to support line interface 、 power supply 、 handset charger interface...

2.3.2 For data application :

The MD-1562 for data application can be executed as a MD-1562 base, combined with one co-processor, which then by the control of the module able to send data back and forth using the up to 32 Kbits/s air interface.

It is possible to establish a data link from up to five handsets to one base and routing the data via the UART interface. However, the UART interface has a limited transmission speed up to 115.2Kb/s baud rate. If more data connections are active at the same time and exceeding the capacity of the serial bus, the bandwidth of the bus is shared equally between the data connections.

For the base with MD-1562, it is possible to send data from one handset to another. It is possible to send Low Speed (6.4Kbits/s) data between two handsets in an intercom through the base unit.

3. Functionality

The following tables list all the functionalities which the MD-1562 can support :

Functionality	Support	Remark
Standard Base audio control feature : Call handling		
Incoming/outgoing call	Yes	Both DTMF and Pulse dial
Intercom	Yes	Between handsets via the base
Conference call	Yes	Between 2 handsets and external line
Call forwarding	Yes	Transfer call between handsets
Call back	Yes	If no reply on call forward
Page call	Yes	Base to pages all handsets (Handset locator)
Caller ID		
Call waiting at external line during intercom	Yes	Indication of incoming call during conversation.
Call waiting at external line during another external call.	Yes	Indication of incoming call during conversation. Requires the support from operator and the base application.
Caller ID reception	Yes	Supports ETSI (FSK & DTMF) CLIP
Message waiting reception/Voice mail	Yes	
Protocol		
Registration	Yes	Auto registration in Base
Handsets per base station	Yes	5~9 handsets subject to the selection of the platform
Data call	Yes	32 Kbits/s on the air-interface (one slot)
Dual slot diversity	Yes	32 Kbits/s voice
Broadcast from base to handset	Yes	

4. Technical specifications

4.1 Absolute operation ratings

Description	Conditions	Min	Max	Units
Supply Voltage for Baseband V _{sup1}	FP mode	3.0	3.6	V
Supply Voltage for RF V _{sup2}	FP mode	2.7	3.6	V
Supply Voltage for RF VPA	FP mode	1.8	3.8	V
Max total current into VDDIOs			90	mA
Max current into I/O pins			4	mA
Max voltage on digital input pins		GND-0.3	VDDIO+0.3	V
Storage temperature		-30	+80	°C
ESD voltage according to human body model			4K	V

4.2 Baseband specification

No	Item	Baseband	Specification		Comment
1	X'tal	Oscillator	13.824 MHz +/- 20ppm		
2	Serial Interface	UART	Compatible with 16450/16550 standard (1,200~921,600 Kbits/s)		Recommended
3	SPI Interface	SPI	Interface for external processor or PC		Optional
4	EEPROM	Module	From 8Kbit to 64 Kbit external EEPROM		TBC
5	Analog front end/Audio	BS_Application	Interface for line I/F,CLIP, Ring detection		Optional with platform selection
6	Analog front end/Audio	HS_Application	Interface for Microphone, Earpiece, Headset		
7	PCM Interface		GPIO 6/7/8/9		
8a	Power Consumption (stand by mode)	BS_Application DECT	Tyep: 55 mA	Max: 60 mA	Average
8b	Power Consumption (talk mode)	BS_Application DECT	Type: 75 mA	Max: 100 mA	Average

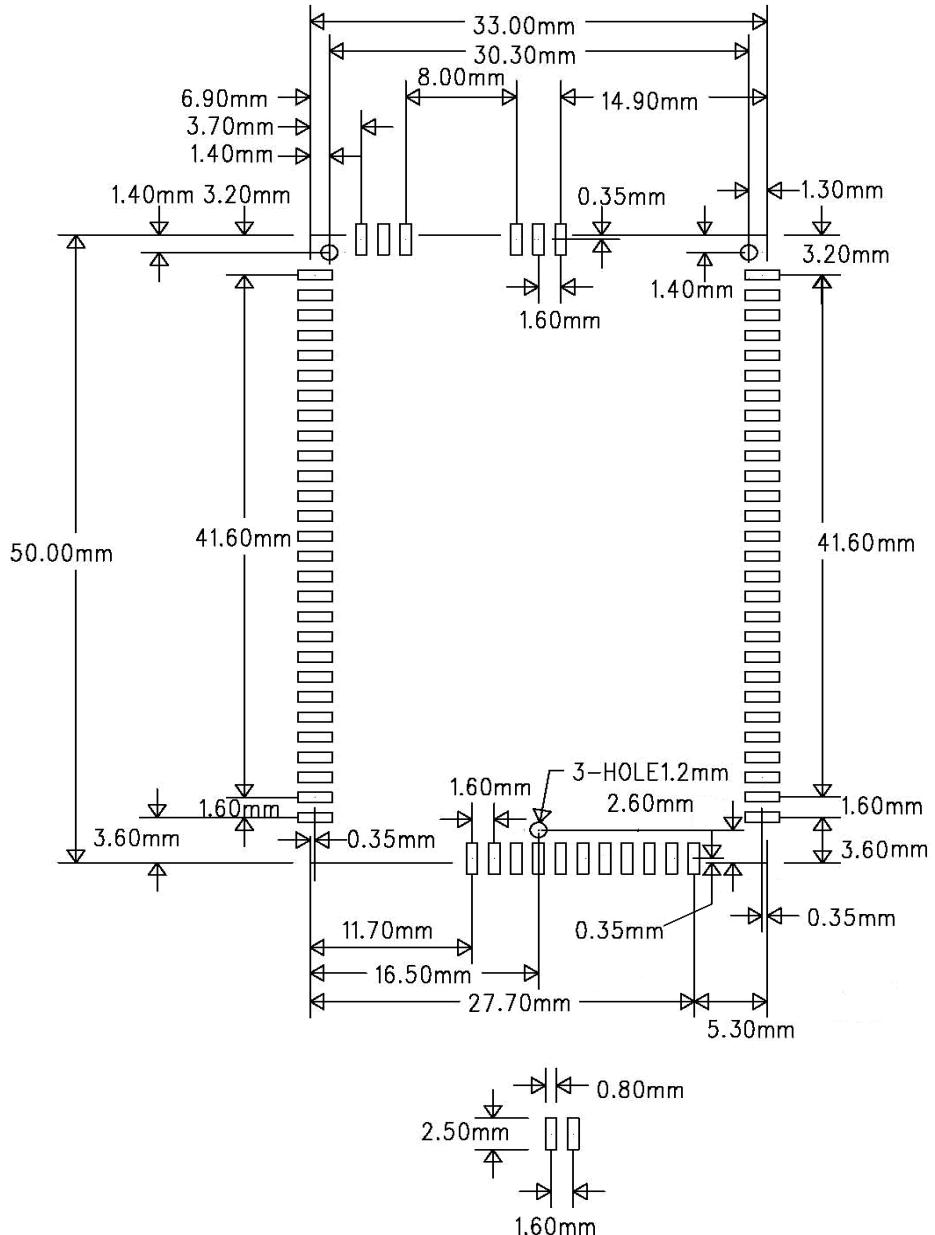
4.3 Radio part (RF) specification

No	Item	Radio Part	Specification	Comment
1	Receive Sensitivity	DECT	Minimum: -89dBm Typically: -91dBm Maximum: -93dBm	@ BER = 0.001
2	Receive IIP	DECT	-21dBm to -19dBm	
3	Transmit Power (NTP)	DECT	Minimum: 20dBm Typically: 23dBm Maximum: 25.5dBm	Approx. 200mW
4	TDMA(time division multiple access)	DECT	12 time slot pr. carrier	
5	Signaling Bit-rate	DECT	1,152 Kbits/sec	
6	Modulation	DECT	GFSK	Bandwidth 20dB < 1,728MHz
7	Antenna Diversity supported	DECT	Control signals are available from the module	Antenna switch has to be added externally

5. Connection diagram

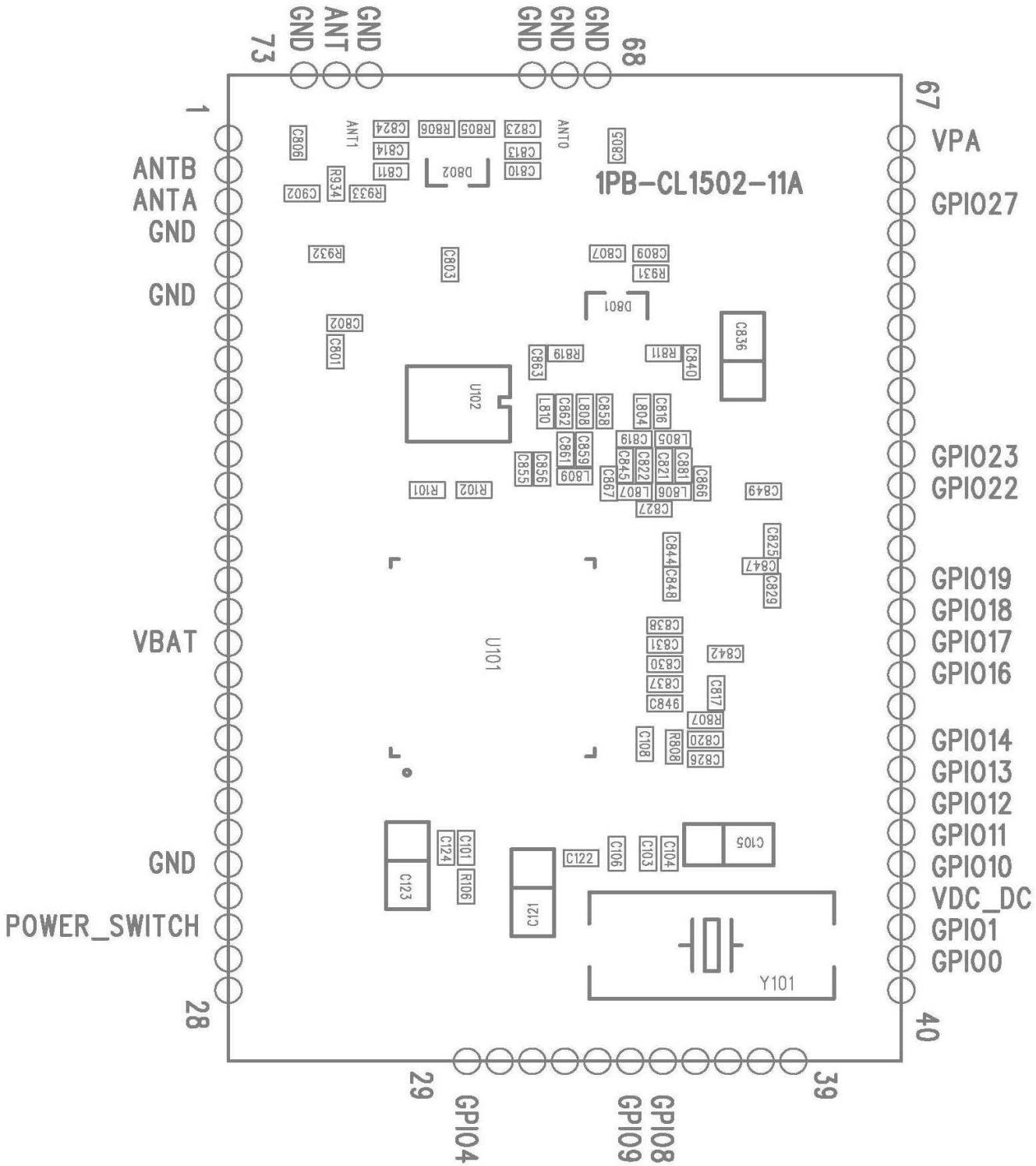
5.1 Dimension

Package Outline Dimensions



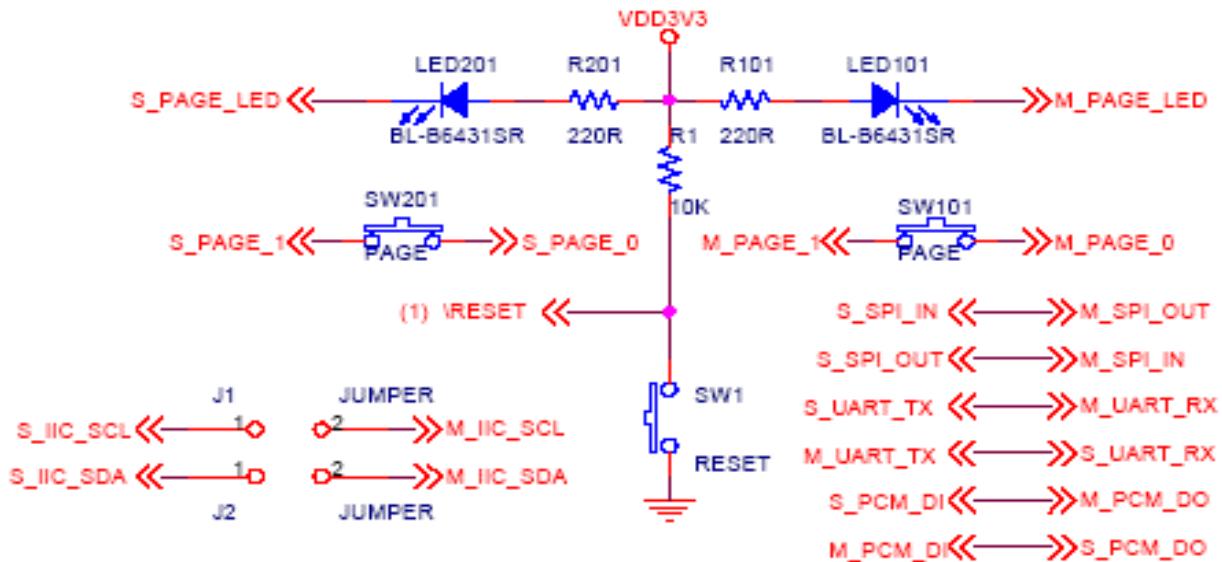
Recommended P.C.B Layout (TOP VIEW)

5.2 Pin assignment



6. Application

6.1 Examples for implementation with hardware peripheral on mother board



For module application with SPI:

- “S_SPI_IN” is “DI_SPI”, to be connected to the “SPI Data Out” on Host uP
- “S_SPI_OUT” is “DO_SPI”, to be connected to the “SPI Data In” on Host uP
- Opposed pin out connection for Transmit vs. Receive is required

6.2 Examples flow for implementation of API for initial start

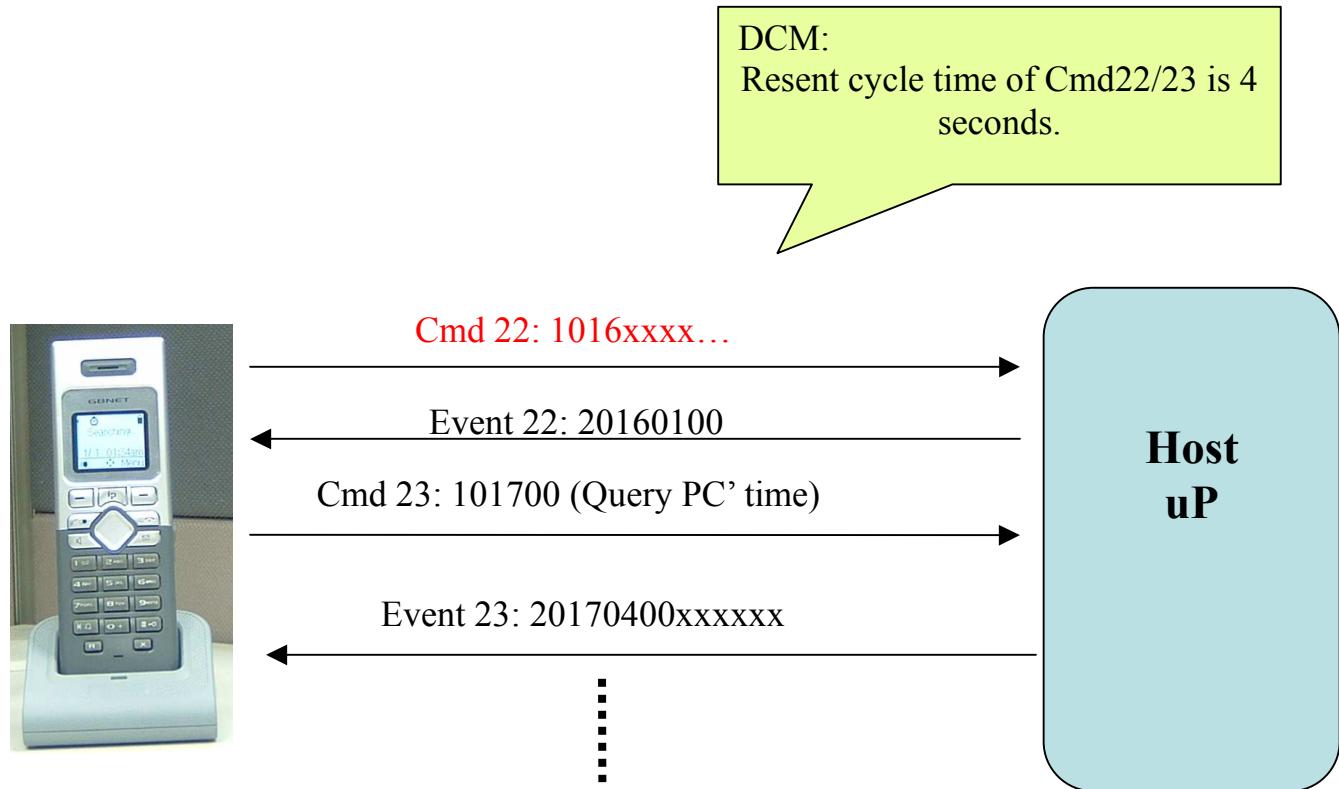


Figure 2 _ Example for implementation of API for initialization

6.3 Example for software implementation

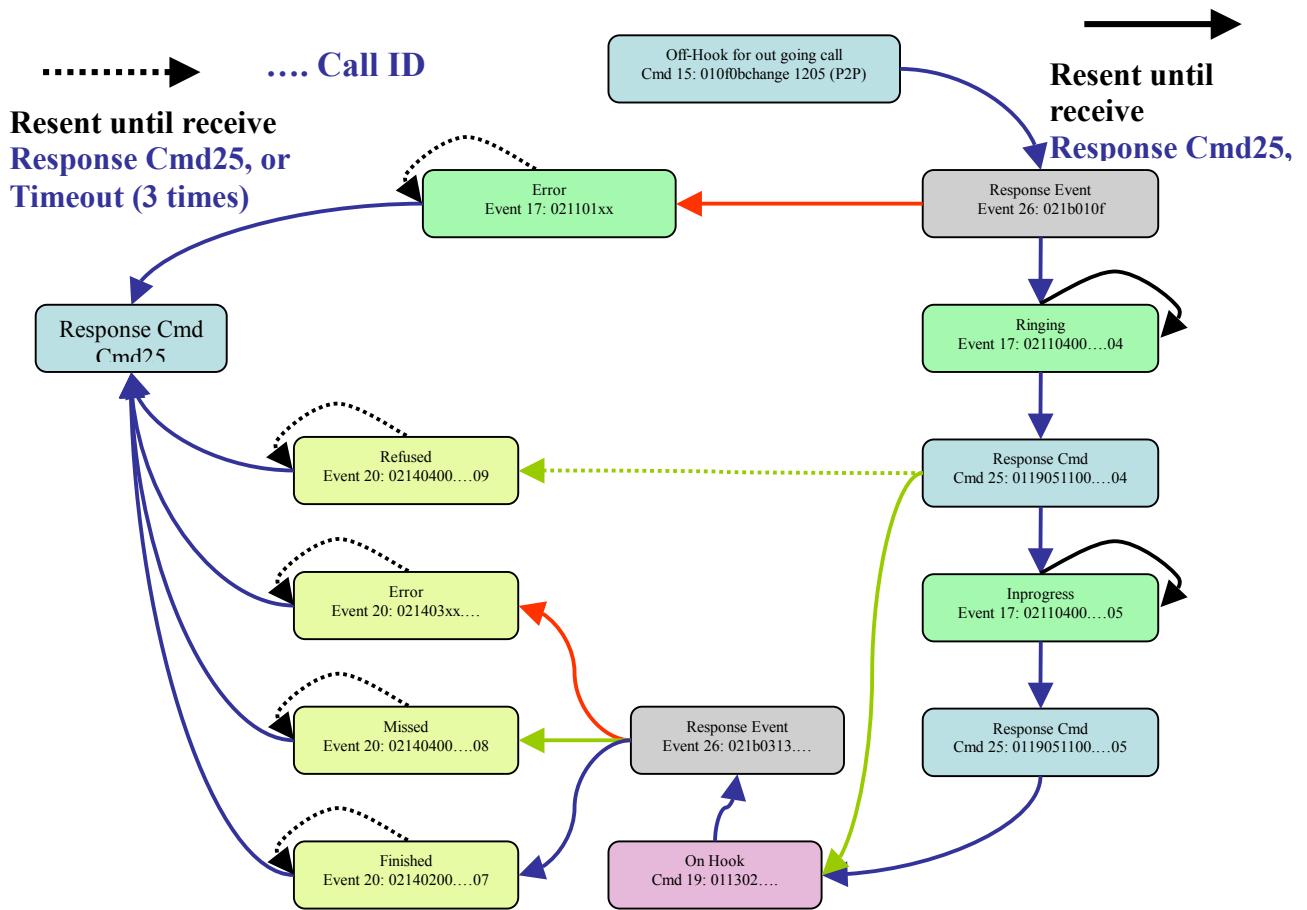


Figure 3 Example for Implementation of API – P2P Out going call

6.4 Application note (UART for Command signaling)

■ Block Function

The enhanced serial (UART) interface is basically compatible with the industry-standard 16450/16550 UARTs.

The following features are supported:

- Even, odd, fixed '1', fixed '0' or no parity generation and detection
- One or two stop bit generation
- Character size 5/6/7 or 8 bits
- 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 (for the highest baud rate restrictions on system clock settings apply)
- Automatic line error checking: stop bit failure (framing), RX overrun, parity error, break
- Received characters will be stored together with detected line errors in RX FIFO
- Transmit interrupt generated when TX FIFO (i.e. TX hold register) empty
- Receive interrupt generated on one of the following events
- Receive line status (framing error, RX overrun, parity error)
- Receive data available (receive hold register full or pre-programmed level in RX FIFO reached)

Noted: The default of UART functions are defined below:

- **No parity generation and detection**
- **One stop bit generation**
- **8 bit characters size**
- **Baud rates: 115,200 bps**

7. Safety information

The equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communication. However, there is no grantee that interference will not occur in a particular installation. If this equipment dose causes harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To comply with the FCC RF exposure compliance requirements, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter.



To OEM installer:

1. FCC ID label on the final system must be labeled with "**Contains FCC ID: XFT-TELOMD15**" or "**Contains transmitter module FCC ID: XFT-TELOMD15**".
2. In the user manual, final system integrator must be ensured that there is no instruction provided in the user manual to install or remove the transmitter module.
3. Transmitter module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. This device complies with the following radio frequency and safety standards.

The user manual of the final host system must contain the following statements:

USA-Federal Communication Commission (FCC)

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