VMG02 operational description

The VMG02 is a medical gateway, which communicates with the medical center (voice and data) via the telephone line and communicates with Medic4All peripheral devices via RF protocol.

The VMG02 dimensions: 18cm x 14.5cm x 5cm.

The VMG02 power source: 120 VAC/ 9 VDC Power Adapter, mfr MW comp, Model PSU15A-2.

The VMG02 block diagram and RF transceiver block diagram are shown in Figures 1 and 2, respectively.

The VMG02 transceiver is based on chipset Chipcon CC1020.

The transceiver uses one channel.
Antenna type – whip antenna

The antenna cannot be de-attached or changed by the user.

RF communication frequency:	915 MHz.
Output transmission power:	-1 dBm (EIRP)
Baud rate:	9.6 Kbps
Modulation type:	FSK
Bandwidth:	50 kHz

The VMG02 field strength is less than 50 mV/m at 3 meters and meets the requirements of paragraph (a) of section 15.249.

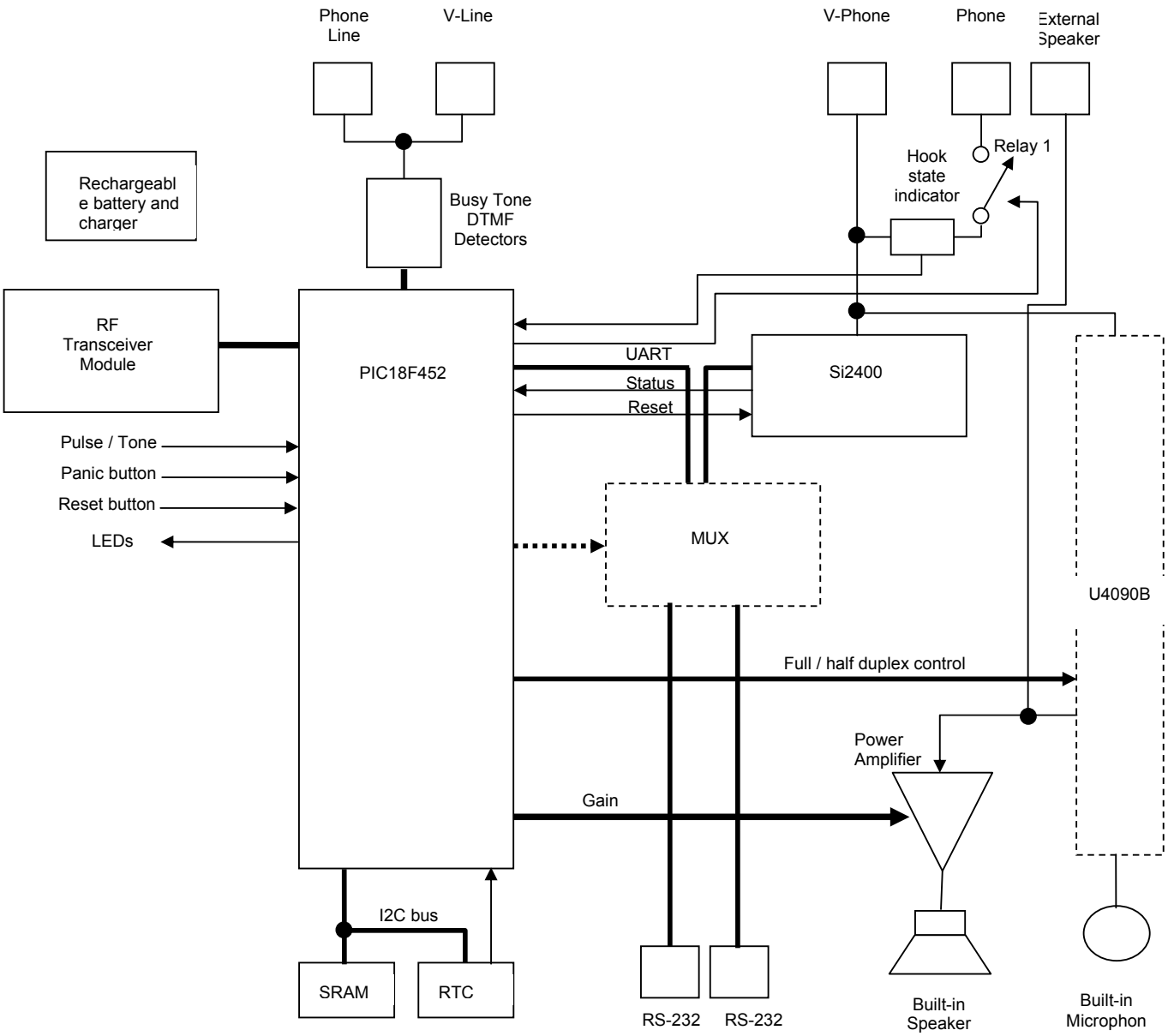

Figure 1. VMG02 block diagram

The Si2400 is a low-speed data modem with the following features:

- 300-2400 baud
- DTMF generation and detection
- Call progress tone detection
- Relay driver
- Audio (speech) input and output
- Intrusion detection during on-hook and off hook
- Caller ID detection
- On-hook monitoring of DTMF tones, call progress tones and hook state
- Compliance with international standards including CTR21 (for Europe) and FCC part 68 (for the USA)

Due to the limitation of I/O ports in the PIC18, some of the I/O ports will be connected through the Si2400.

Microchip PIC18F452 micro controller has the following features:

- 32K byte FLASH memory
- 1536 byte RAM
- 16 bit architecture with 8 bit multiplier
- 10 MIPS (40 MHz)
- 10 bit A/D converter
- 3 timers
- UART
- I2C

The PIC18 is the CPU of the M4A Gateway and performs the following tasks:

- Controls the Si2400 via a UART interface
- Communicates with Chipcon RF transceiver
- Controls the speaker gain.
- Mutes the speaker output or the microphone input
- Connects to the Panic / Reset buttons
- Reads the DTMF and busy tone detectors
- Controls the relay connection to the external telephone

DTMF and busy tone detector module based on the Zarlink MT3271 chip.

U4090B – speakerphone chip.

Relay 1 is a telecom type mechanical relay that disconnects the external telephone while the system performs data transfer.

Relay 2 (optional) connects a 300 ohm load in parallel between the Tip and Ring lines in order to maintain the call in off-hook state while the Si2400 goes momentarily on-hook. This relay can be used to switch back the videoconferencing equipment from video mode to voice mode. Relay 2 is a solid-state relay. This option is not used.

The line (supply) power detector measures and reports the line power condition to the micro controller in order to detect input power loss.

The Chipcon CC1020 is a programmable RF transceiver operating at 9.6Kbps at 915MHz.

Speaker amplifier with 2-level programmable gain control

FRAM – 32K byte serial RAM with I2C interface

RTC – real time clock with I2C interface.

Rechargeable batteries and charger

Buttons: Panic (Red), Reset (Green)

DC input connector (DC connector)

External telephone interface (RJ11 connector)

Telephone line interface (RJ11 connector)

Videoconferencing telephone interface (RJ11 connector)

Videoconferencing line interface (RJ11 connector)

RCA receptacle connects to the TV audio input

Multiplexer (optional) connects the PIC18 UART interface to the Si2400 modem or to one of the two optional RS232 interfaces.

Two RS232 interfaces connected to the optional multiplexer

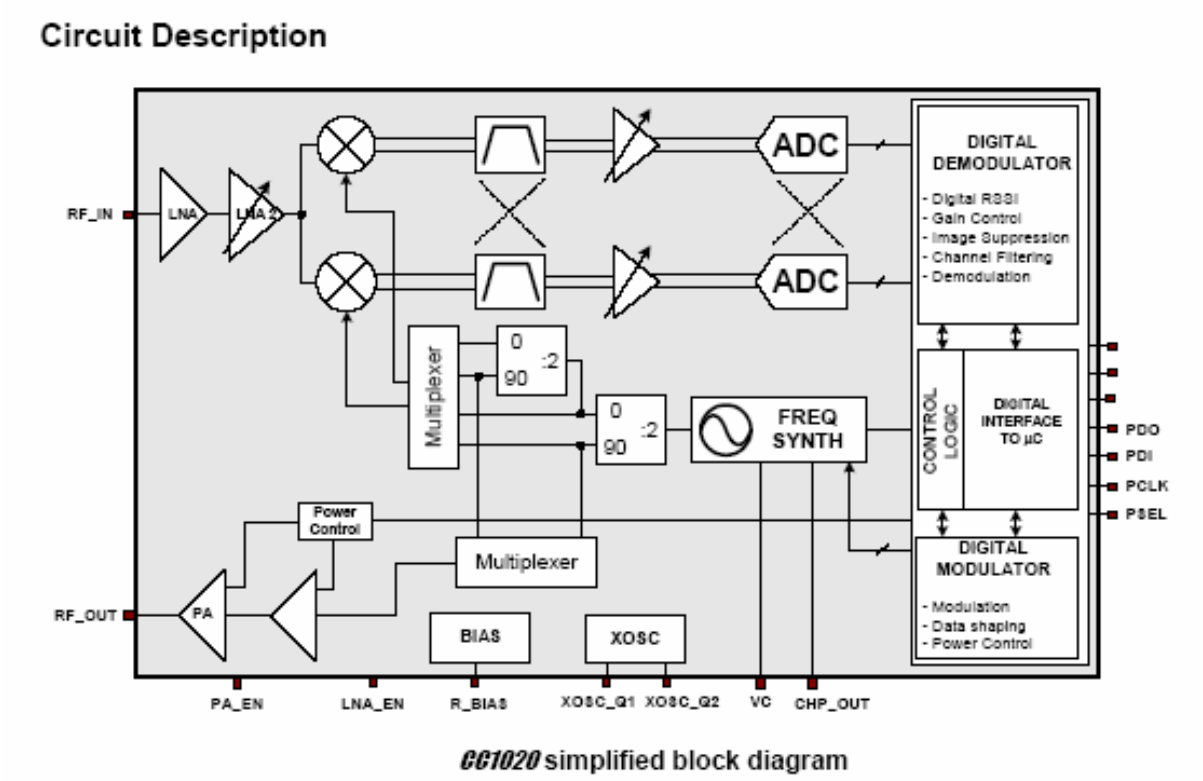

Figure 2. Tx-Rx block diagram