



User Manual

GR64 Developer Kit V2

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Part 1 — GR64DK overview

1 About this manual

This manual describes how to use the Wavecom Inc. GR64 Developer's Kit (GR64DK), Version 2 to develop applications for Wavecom Inc. modules. Wavecom Inc. modules have an embedded controller process. You can write scripts that use these processes to control the module. These scripts can be downloaded onto the module which can then monitor system events by means of its I/O pins, UART, USB, I2C bus, or other interfaces.

1.1 How this manual is organized





Part 1 provides a broad overview of the GR64DK development platform, its base board, and the supported carrier boards. It also includes a list of abbreviations used in the manual. This section also lists the contents of the GR64DK and provides information on how to set up and use the GR64DK.

Part 2 describes each component that is available on the base board and provides mechanical information.

Part 3 describes the GR64DK carrier boards including the circuitry and interfaces that they contain.

1.2 Notices that are used in this manual

This manual contains the following notices to highlight key information:

- | | |
|--|---|
| 
NOTE | Draws attention to pertinent, useful, or interesting information. |
| 
TIP | Provides advice, suggestions, guidance, or recommendations which augment the formal text. |
| 
CAUTION | Provides information that should be heeded. Cautionary notes bring attention to the need for understanding, care, or watchfulness in relation to the information provided. |
| 
WARNING | Provides information that must be heeded. Warnings provide precautionary measures, risks, hazards, or safety information that directly affects equipment function, warranty, or personnel safety. |

1.3 Wavecom Inc. publications

The following publications are available in Portable Document Format (PDF) on the GR64DK CD-Rom and the Wavecom Inc. Support Web site:

<http://www.wavecom.com/modules/movie/scenes/support/>

- **AT Commands Manual**
The AT Commands Manual describes the AT commands that can be used with a wireless modem. The manual separates the commands into logical groups. Each section that describes a command contains the command, a description of its functionality, and an example of how to use it.
- **Integrator's Manual**
The *GS64 GSM/GPRS Modem Integrators Manual* provides information about Wavecom Inc. modules. It provides design guidelines on how to commercialize an application for a module from a regulatory point of view.
- **M2mpower Application Guide**
The M2mpower Application Guide provides the information you need to create an application using the M2mpower support environment. This manual is supplied as part of the M2mpower package.

1.4 Wavecom Inc. service and support

For more information about where to purchase Wavecom Inc. modules, or for recommendations about accessories and components, go to the Wavecom Inc. Web site:

<http://www.wavecom.com>

1.5 Abbreviations


The following abbreviations are used in this manual:

Abbreviation	Explanation
AMR	Adaptive Multi Rate
ATMS	Audio to Mobile Station
AFMS	Audio from Mobile Station
BB	Base Board
CBM	Cell Broadcast Message
CB	Carrier Board
CBS	Cell Broadcast Service




Abbreviation	Explanation
CSD	Circuit Switched Data
DCE	Data Circuit Terminating Equipment
DK	Developer's Kit
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
EA	Embedded Application
EFR	Enhanced Full Rate
EMC	Electro-Magnetic Compatibility
ETSI	European Telecommunication Standards Institute
FR	Full Rate
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile Communication
HR	Half Rate
HSCSD	High Speed Circuit Switched Data
IDE	Integrated Development Environment
IP	Internet Protocol
ITU-T	International Telecommunication Union - Telecommunications Standardization Sector
M2mpower	Wavecom Inc.'s powerful support environment
ME	Mobile Equipment
MMC	Multimedia Card
MMCX	Micro Miniature Coax
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
PCM	Pulse Code Modulation
PCM	Pulse Code Modulation
PDU	Protocol Data Unit
RF	Radio Frequency

Abbreviation	Explanation
RFU	Reserved for Future Use
RLP	Radio Link Protocol
RTC	Real Time Clock
SDP	Service Discovery Protocol
SIM	Subscriber Identity Module
SMS	Short Message Service
TCP	Transport Control Protocol
GR64DK	GR64 Developers Kit
UDP	User Datagram Protocol
USB	Universal Serial Bus
UART	Universal Asynchronous Receiver-Transmitter
WM	Wireless Module

2 Guidelines for safe and efficient use

Please read this information before using your developer's kit. 

2.1 Recommendations

- Always treat your product with care and keep it in a clean and dust-free place.
- Do not expose your product to liquid or moisture or humidity.
- Do not expose your product to extreme high or low temperatures. 
- Do not expose your product to open flames or lit tobacco products. 
- Do not drop, throw or try to bend your product.
- Do not paint your product.
- Do not use your product near medical equipment without requesting permission.
- Do not use your product when in, or around aircraft, or areas posted "turn off two-way radio".
- Do not use your product in an area where a potentially explosive atmosphere exists.
- Do not place your product or install wireless equipment in the area above your car's air bag.
- Do not attempt to disassemble your product. Only Wavecom Inc. authorized personnel should perform service. 

2.2 Antenna

Only use an antenna that has been specifically designed by Wavecom Inc. for your Wavecom Inc. module. Use of unauthorised or modified antennas could damage your module and may violate regulations, causing loss of performance and SAR levels above the recommended limits (see below).

2.3 Efficient Use

Do not cover the antenna when in use, as this affects call quality and may cause the Wavecom Inc. module to operate at a higher power level than needed, thus shortening talk and standby times.

2.4 Radio Frequency (RF) Exposure and SAR

Your module is a low-power radio transmitter and receiver (transceiver). When it is turned on, it emits low levels of radio frequency energy (also known as radio waves or radio frequency fields).

Governments around the world have adopted comprehensive international safety guidelines, developed by scientific organizations, e.g. ICNIRP (International Commission on Non-Ionizing Radiation Protection) and IEEE (The Institute of Electrical and Electronics Engineers Inc.), through periodic and thorough evaluation of scientific studies. These guidelines establish permitted levels of radio wave exposure for the general population. The levels include a safety margin designed to assure the safety of all persons, regardless of age and health, and to account for any variations in measurements.

Specific Absorption Rate (SAR) is the unit of measurement for the amount of radio frequency energy absorbed by the body when using a transceiver. The SAR value is determined at the highest certified power level in laboratory conditions, but the actual SAR level of the transceiver while operating can be well below this value. This is because the transceiver is designed to use the minimum power required to reach the network.

Variations in SAR below the radio frequency exposure guidelines do not mean that there are variations in safety. While there may be differences in SAR levels among mobile phones, all Wavecom Inc. modules are designed to meet radio frequency exposure guidelines.

2.5 Personal Medical Devices

Wavecom Inc. modules may affect the operation of cardiac pacemakers and other implanted equipment. If a minimum distance of 15 cm (6 inches) is kept between the Wavecom Inc. modules and the pacemaker, the risk of interference is limited. If you have any reason to suspect that interference is taking place, immediately turn off your Wavecom Inc. module. Contact your cardiologist for more information.

For other medical devices, please consult the manufacturer of the device.

2.6 Children

DO NOT ALLOW CHILDREN TO PLAY WITH YOUR WAVECOM INC. MODULE OR ITS ANTENNA. THEY COULD HURT THEMSELVES OR OTHERS, OR COULD ACCIDENTALLY DAMAGE THE MODULE OR ANTENNA. MODULE OR ITS ANTENNA MAY CONTAIN SMALL PARTS THAT COULD BE DETACHED AND CREATE A CHOKING HAZARD.

2.7 Disposal of old electrical & electronic equipment

This symbol on the product or on its packaging indicates that this product shall not be treated as household waste. Instead, it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or your Wavecom Inc. sales representative.

3 Introducing the Wavecom Inc. GR64 Developer’s Kit

The Wavecom Inc. GR64DK is a set of hardware and software tools that are used to create and test applications for Wavecom Inc. wireless modems.

3.1 Major components of the GR64DK

The main hardware of the GR64DK is the base board, which contains the common interfaces, such as power supply, audio, RS-232, USB, and SIM interfaces. The interfaces on the base board provide the necessary connections that allow you to access and configure Wavecom Inc. wireless modems.



[Make sure to check the contents of your GR64DK. If any of the listed items are missing, contact your supplier immediately.](#)

The following table lists the hardware components that are included with your Wavecom Inc. GR64DK V2:

Description	Part Number	Qty
Antenna	KRE1011345	1
Antenna	KRE1011346	1
CD	LZY2131645	1
Power Cord (US, UK, Europe)	2 RPM13107	3
Power Supply	BML1611020	1
RS232 Serial Cable	RPM 113 7291	1
GR64DK base Board	DPY1011483	1

Description	Part Number	Qty

3.2 Additional requirements

To successfully use the GR64DK, the following additional items are needed:

- A carrier board
There are two types of carrier boards that are supported by GR64DK V2. Each carrier board contains type-specific circuitry and interfaces, such as the system connector, antenna, charger, GPIO, Keyboard, SPI, and ADC. As a result, carrier boards must be used with the corresponding family of Wavecom Inc. modules. Contact your supplier to order the appropriate carrier board for your development purposes.
- A personal computer (PC) or unit capable of communicating with the GR64DK through one of the serial communication ports or USB port depending on which wireless modem device (WMD) is used.
- An unused serial port on the PC that is used to connect a serial cable to the base board.
- A second serial port on the PC may also be required for additional functionality.
- A terminal program such as HyperTerminal, Kermit, or Procomm.
- A Wavecom Inc. wireless module (wireless modem device).
- A SIM card with a network subscription.



Before you connect the GR64DK hardware to a Wavecom Inc. module, it is strongly recommended that you read the Integrator's Manual.

3.3 About the GR64DK base board and its family of carrier boards

The Wavecom Inc. GR64DK, Version 2 is the third-generation developer's kit. It includes a user-friendly interface that enables you to connect to and program applications for Wavecom Inc. wireless modules.

Unlike the previous GR64DK, which required substantial configuration to connect different Wavecom Inc. modules, GR64DK V2 eliminates most of the configuration settings. With GR64DK V2, the interfaces are automatically set up when a module is mounted on the appropriate carrier board that is attached to the base board.

3.4 Introducing the carrier board

The introduction of the carrier board to the development environment makes it easier to maintain support for the different interfaces that are used by each Wavecom Inc. module. The carrier board eliminates the need for jumpers and switches, which were required in the previous GR64DK. The only jumpers and switches in the latest version of the GR64DK are those used to configure the different interfaces.

The carrier board enables the main power supply voltage to be housed on the base board. It also provides a voltage reference that you can use to set the level. The same concept is used for the logic voltage. A reference from the module is fed to the base board where the current is amplified and used by interface circuitry on both the base board and carrier board.

3.5 GR64DK in a communication system

Figure 1 illustrates the main components of the wireless communication system for the Wavecom Inc. GR64DK. The figure also illustrates the communication principles of the system and the interface between the base board, carrier board, and module.

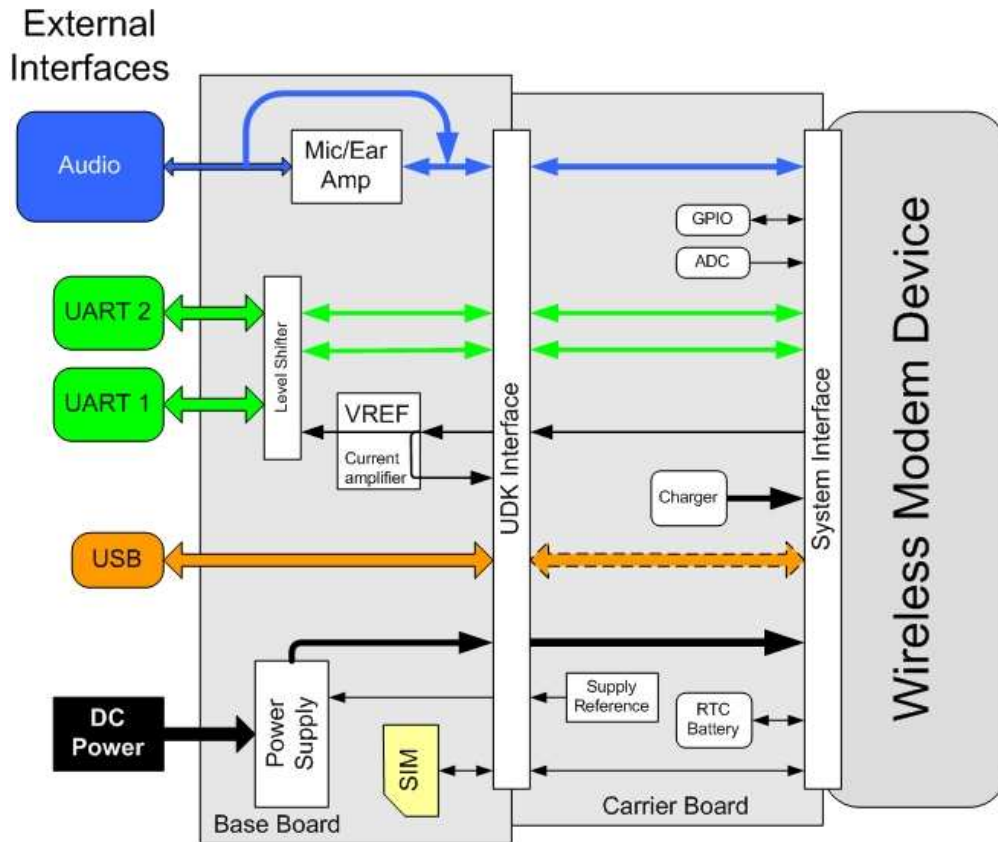


Figure 1 Interfaces in wireless communication system for the Wavecom Inc. GR64DK

3.6 Assembling the GR64DK

The base board can be used with the following Wavecom Inc. modules:

- GR64
- GS64

The carrier board that you connect to the base board will depend on the type of Wavecom Inc. module that you use. Before you assemble the GR64DK, make sure that you have the applicable module and the corresponding carrier board.



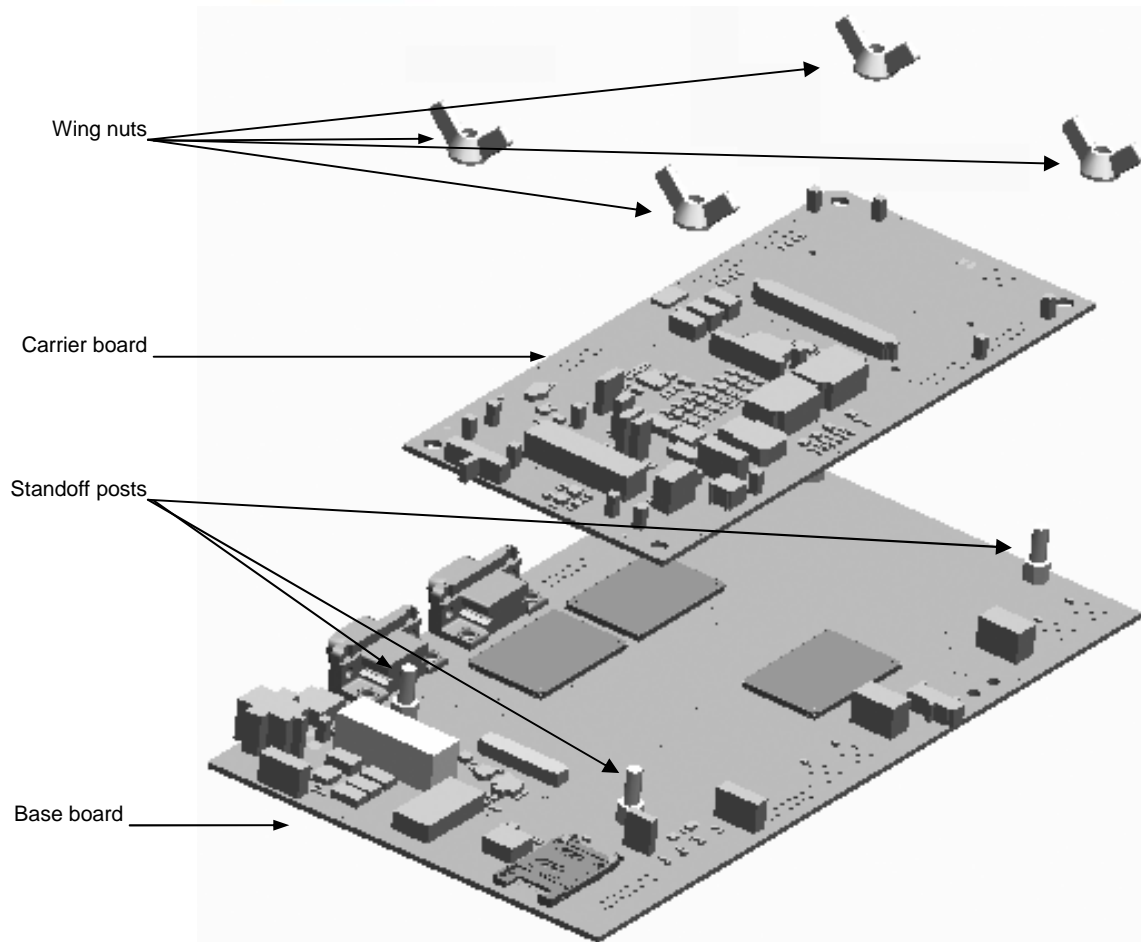
Check the contents of the GR64DK package to make sure that you have all the required components.



The base board and its components are sensitive to electrostatic discharge (ESD). Make sure to take the appropriate steps to protect your GR64DK components, such as wearing a grounded ESD bracelet when handling the base board and the components that attach to it.

To set up the base board, complete the following steps:

1. Place the carrier board on the base board. Make sure that the holes on the carrier board are lined up with the mounting posts that protrude from the base board.



2. Press the 80-pin connector of the carrier board into the base board pin connection.
3. Screw the wing nuts onto the plastic screws to secure the carrier board to the base board.
4. Connect one end of the serial and/or USB cable to the base board.
5. Connect the other end of the serial and/or USB cable to your PC.



Before you connect the 12-volt DC power cord to the base board, make sure that the power cord is NOT plugged in to a power outlet.

6. Connect the power cable to the base board
7. Connect the other end of the power cable to an appropriate power outlet.



CAUTION

The GR64DK provides the same electrostatic discharge (ESD) protection that is supported by the individual components. To ensure no damage occurs to the base board, carrier board, or the wireless modem, make sure to follow electronic device handling precautions when you work with the GR64DK.

8. On the base board, move the Main Power switch (S301) to the **On** position to obtain full power for the base board.
9. Ensure the Main Power LED is lit.

To disassemble the GR64DK, complete the following steps:

1. Move the main power switch (S301) to the **Off** position. The wireless modem takes a few seconds to completely shut down.
2. Disconnect the hardware as necessary.

Part 2 — Base board

4 Understanding the base board

The base board provides the mounting platform used to develop applications for Wavecom Inc. wireless modules. The base board includes RS-232 interfaces, automatic voltage levelling, audio interfaces, I/O controls, a SIM card holder, LED status indicators, USB interfaces, and an 80-pin carrier board connector. *Figure 2: Base board components*, illustrates the components that are housed on the base board.

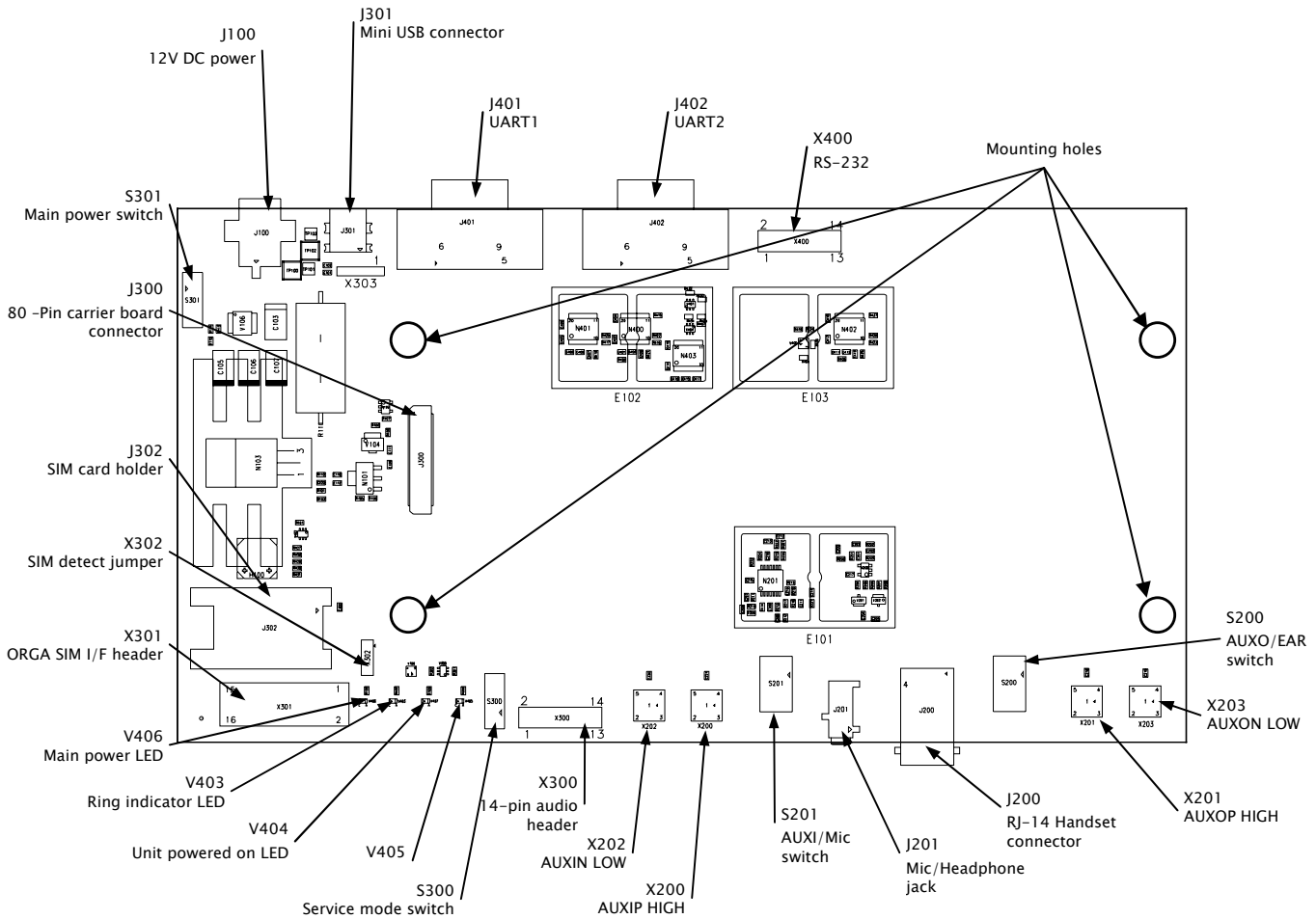


Figure 2: Base board components

4.1 Power supply

The base board is the main voltage source for the GR64DK and its components. The power that is supplied to the base board also supplies any attached carrier board and module. The base board contains a linear regulator that is capable of powering all Wavecom Inc. wireless modules.

The power supply becomes active only when a carrier board is attached and the main power switch (S301) is set to the **On** position. The voltage level is determined by the carrier board through a feedback resistor, but the voltage level is limited to 4.5V in case the feedback from the carrier board becomes high impedance. The actual voltage level output to the wireless module can be adjusted by manipulating the R_{fbh} and R_{fbl} on the carrier board.

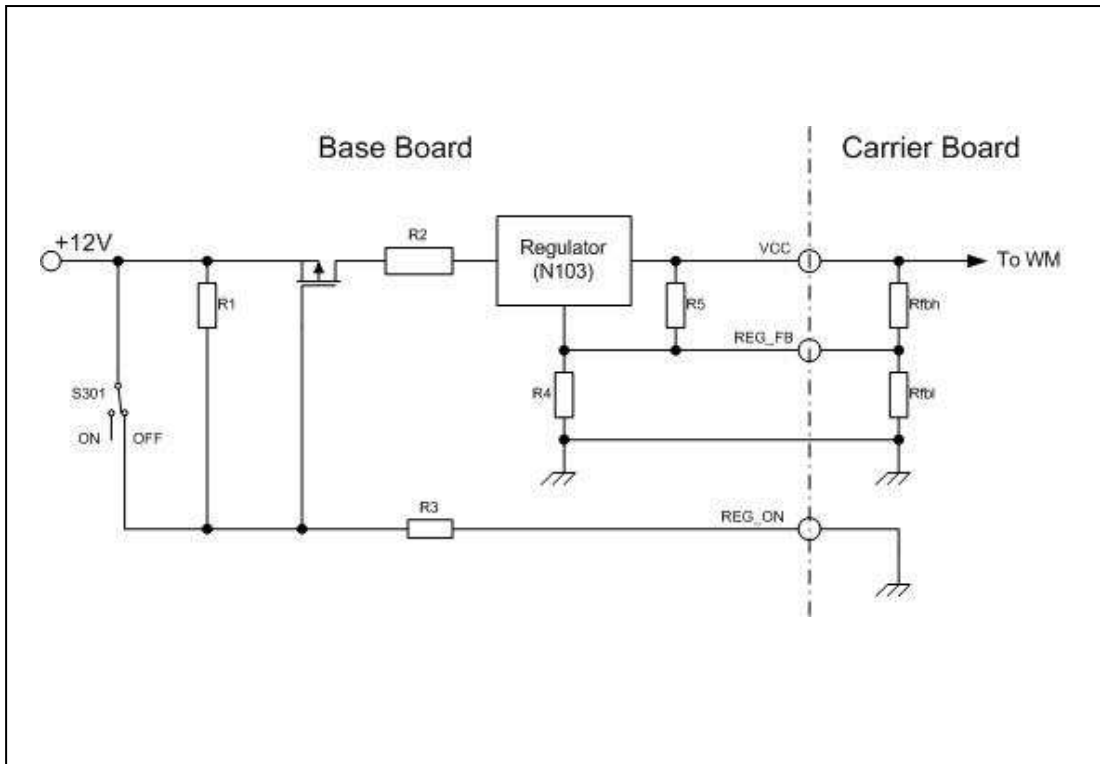


Figure 3 VCC power supply

To power on the base board, complete the following steps:



For the Power LED on the base board to function correctly, be sure to connect a carrier board before powering on the base board.

1. Move the main power switch (S301) to the **On** position to obtain full power for the base board. The Main Power LED displays a solid red light.

To shut down the base board, complete the following steps:



NOTE

When shutting down the developer's board and/or module it is important to perform an orderly shutdown before power is removed. Do NOT simply pull the plug. .

1. Move the main power switch (S301) to the **Off** position. The wireless modem takes a few seconds to completely shut down.
2. Disconnect the hardware as necessary.

4.2 Audio

The audio circuitry on the base board includes a telephone line (RJ-14) interface, a headset jack (J201), high and low auxiliaries-in headers (X200 and X202), and high and low auxiliaries-out headers (X201 and X203).

The handset microphone can be routed directly to the differential microphone interface (MICIP, MICIN) or through a pre-amplifier, which is housed on the base board, to the auxiliary interface (AUXIP, AUXIN).

In the same manner, the handset earpiece can be routed directly from the earpiece output (EARP, EARN), or through a power amplifier from the auxiliary interface (AUXOP, AUXON).

The headset is always routed through the pre-amplifier and power amplifier to the auxiliary interface.

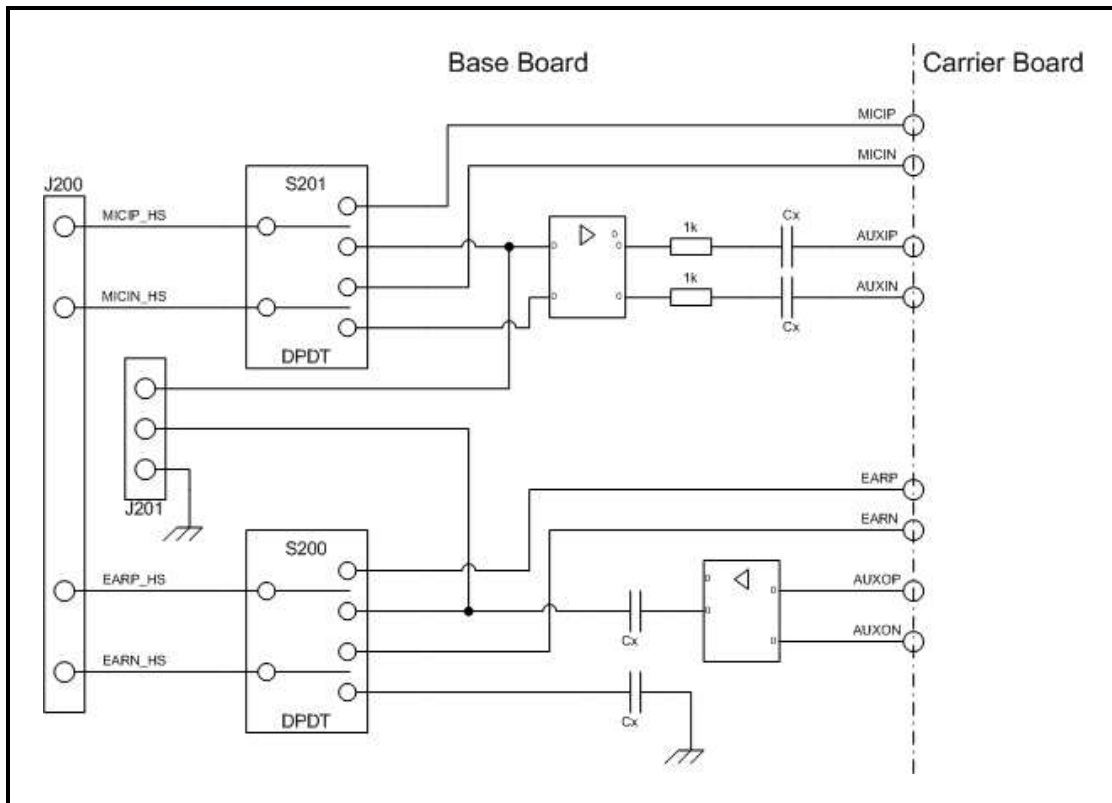


Figure 4 Audio Interface

4.2.1 Auxiliary headers

The following four auxiliary headers on the base board are used to mount external audio devices and connectors to the base board:

- Auxiliary-in negative (X202 – AUXIN LOW)
Pin 1 sends a single-ended analogue audio signal to the AUXIN pin on the wireless module.
- Auxiliary-in positive (X200 – AUXIP HIGH)
Pin 1 sends a single-ended analogue audio signal to the AUXIP pin on the wireless module
- Auxiliary-out positive (X201 – AUXOP HIGH)
Pin 1 receives a differential analogue audio output from the AUXOP pin on the wireless module and may be used to drive a speaker or an earpiece.
- Auxiliary-out negative (X203 – AUXON LOW)
Pin 1 receives a differential analogue audio output from the AUXON pin on the wireless module and may be used to drive a speaker or an earpiece.

Each auxiliary connection bypasses the amplifier on the base board and interfaces directly to the connected wireless module.

Each auxiliary audio header is a five-pin interface, as illustrated in *Figure 5*. Pin 1 on an auxiliary-in header sends the audio signal to the Wavecom Inc. wireless module. On an auxiliary-out header, pin 1 receives the signal from the Wavecom Inc. wireless module. Pins 2, 3, 4, and 5 are all grounded on the auxiliary headers.

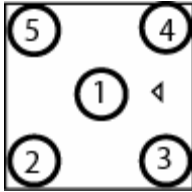


Figure 5: Auxilliary header

The following table describes the auxiliary header pins:

Header pin	Description
1	This pin connects the audio signal between the connector and the Wavecom Inc. wireless module.
2	This pin is grounded.
3	This pin is grounded.
4	This pin is grounded.
5	This pin is grounded.

4.2.2 Headset jack

The headset jack (J201) on the base board provides a standard 2.5mm headset connection that is used to access the EARP and AUXIP of the connected Wavecom Inc. wireless module. The earpiece of an attached headset interfaces directly with the auxiliary output from the Wavecom Inc. wireless module. The microphone on an attached headset interfaces with the auxiliary input to the Wavecom Inc. wireless module.

4.2.3 Handset

The handset connector (J200) on the base board provides a standard RJ-14 telephone line connection that is used to access the AUXI, MIC, AUXO, and EAR of the connected Wavecom Inc. wireless module. Use the AUXI/MIC switch (S201) and the AUXO/EAR switch (S200) to configure how the audio is routed from the RJ-14 connection to the connected Wavecom Inc. wireless module. The audio signals from the handset are routed through the amplifier on the base board.

4.2.4 14-Pin audio header

The base-board-to-carrier-board audio signals (MICIP, MICIN, EARP, EARN, AUXIP, AUXIN, AUXOP, and AUXON) are also available on a 14-pin header (X300) together with +5V supply and ground.

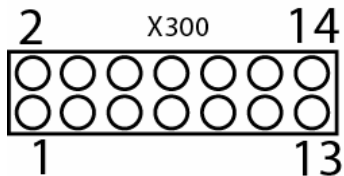


Figure 6: 14-pin audio header

The following table describes the 14-pin audio header:

Header pin	Name	Description
1	EARP	The ear output (positive) pin receives the positive differential-mode audio output from the EARP pin on the Wavecom Inc. wireless module.
2	EARN	The ear output (negative) pin receives the negative differential-mode audio output from the EARN pin on the Wavecom Inc. wireless module.
3	MICIP	The microphone input (positive) pin sends a balanced differential microphone signal to the MICP pin on the Wavecom Inc. wireless module.
4	MICIN	The microphone input (negative) pin sends a balanced differential microphone signal to the MICN pin on the Wavecom Inc. wireless module.
5	AREF	The analogue reference pin is the analog ground that is used to ground AUXIP, AUXIN, AUXOP, AUXON signals.
6	AREF	The analogue reference pin is the analog ground that is used to ground AUXIP, AUXIN, AUXOP, AUXON signals.

Header pin	Name	Description
7	AUXIP	The auxiliary input (positive) pin sends a balanced differential audio signal to the AUXIP pin on the Wavecom Inc. wireless module.
8	AUXIN	The auxiliary input (negative) pin sends a balanced differential audio signal to the AUXIN pin on the Wavecom Inc. wireless module.
9	AUXOP	The auxiliary output (positive) pin receives a balanced differential audio signal from the AUXOP pin on the Wavecom Inc. wireless module.
10	AUXON	The auxiliary output (negative) pin receives a balanced differential audio signal from the AUXON pin on the Wavecom Inc. wireless module.
11	VCC_5V	The regulated power supply voltage pin supplies a maximum of 5V to the interface that is connected to the header.
12	VCC_5V	The regulated power supply voltage pin supplies a maximum of 5V to the interface that is connected to the header.
13	GND	This pin is the digital ground.
14	GND	This pin is the digital ground.

4.3 UART

There are two UARTs available on the base board. The RS-232 levels that the base board receives from the carrier board are translated into CMOS logic by using the voltage supply level. This level ranges from 1.8V to 5.0V, depending on the Wavecom Inc. wireless module that is connected.

UART1 is the AT command port. It supports full 9-pin RS-232 flow control

UART2 is the debug port. It supports data to mobile (DTM) and data from mobile (DFM) signals.



The GSxx modules also support CTS and RTS on UART2.

The CMOS-level side of both UARTs is also available on a fourteen-pin RS-232 header. Also included on the header is the logic supply level and ground. They are placed so that CTS-RTS and DTR-DSR can easily be shorted to loop back the HW flow-control lines.

4.3.1 RS-232 header

The RS-232 header (X400) on the base board provides a fourteen-pin interface that you can use to mount your own connectors to the base board. This header provides direct access to the attached wireless module.

The following table describes the RS-232 header:

Header pin	Name	Description
1	CTS_1_M	The SIM card clock pin receives the SIMCLK signal from the Wavecom Inc. wireless module. Clocks and data from the external SIM device must be synchronized to it.
2	RTS_1_M	This pin is the ground.
3	SIMVCC	This pin receives the regulated power supply voltage that is supplied to the SIM. Only 3V and 1.8V are supported. The wireless module automatically detects the SIM type, and switches the signal voltage accordingly.
4	GND	This pin is the ground.
5	GND	This pin is the ground.
6	GND	This pin is the ground.
7	SIMDATA	The SIM card data pin is a bi-directional pin that is routed from the SIM reader contacts of the external SIM holder that is connected to the header to the SIMDAT pin on the Wavecom Inc. wireless module.
8	GND	This pin is the ground.
9		Not connected
10	GND	This pin is the ground.
11	GND	This pin is the ground.
12	GND	This pin is the ground.

Header pin	Name	Description
13	SIMVCC	This pin receives the power supply voltage that is regulated by the Wavecom Inc. wireless module. Only 3V and 1.8V are supported. The wireless module automatically detects the SIM type, and switches the signal voltage accordingly.
14	GND	This pin is the ground.
15	SIMRST	The SIM card reset pin receives a SIMRST signal from the Wavecom Inc. wireless module.
16	GND	This pin is the ground.

4.4 USB

There are no active components for USB on the base board. The USB interface is directly routed to the carrier board.

4.5 SIM Holder

The base board includes a SIM card holder that is used to simulate an external SIM card; however, no components on the base board actively use or access the SIM card holder. All SIM signals are routed directly to the carrier board.

4.5.1 ORGA



The ORGA header is used only for type approval testing.

The GR64DK provides a 16-pin ORGA SIM (X301) header; however, the base board does not include a mounted ORGA interface. When an ORGA-interface is used, the 3-pin SIM detect jumper (X302) must be set to “ORGA” by using a jumper. This sets the SIM-detect pin to low, indicating to the module that the external SIM interface is active.

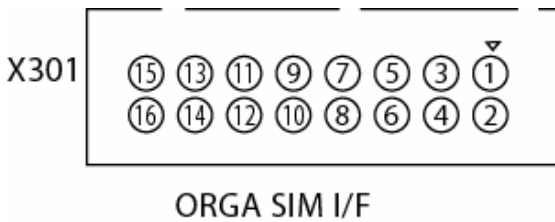


Figure 7: ORGA SIM I/F header

The following table describes the ORGA SIM I/F header:

Header pin	Name	Description
1	SIMCLK	The SIM card clock pin receives the SIMCLK signal from the Wavecom Inc. wireless module. Clocks and data from the external SIM device must be synchronized to it.
2	GND	This pin is the ground.
3	SIMVCC	This pin receives the regulated power supply voltage that is supplied to the SIM. Only 3V and 1.8V are supported. The wireless module automatically detects the SIM type, and switches the signal voltage accordingly.
4	GND	This pin is the ground.
5	GND	This pin is the ground.
6	GND	This pin is the ground.
7	SIMDATA	The SIM card data pin is a bi-directional pin that is routed from the SIM reader contacts of the external SIM holder that is connected to the header to the SIMDAT pin on the Wavecom Inc. wireless module.
8	GND	This pin is the ground.
9		Not connected
10	GND	This pin is the ground.
11	GND	This pin is the ground.
12	GND	This pin is the ground.
13	SIMVCC	This pin receives the power supply voltage that is regulated by the Wavecom Inc. wireless module. Only 3V and 1.8V are supported. The wireless module automatically detects the SIM type, and switches the signal voltage accordingly.
14	GND	This pin is the ground.
15	SIMRST	The SIM card reset pin receives a SIMRST signal from the Wavecom Inc. wireless module.
16	GND	This pin is the ground.

To mount an ORGA interface on the base board

1. Solder the ORGA interface to the ORGA SIM header holes (X301) on the base board.
2. Select the ORGA configuration by placing a 2 pin jumper on the middle pin and the ORGA pin.

4.6 Service mode

Service mode enables you to create a download connection with a Wavecom Inc. wireless module through the UART1 port on the base board. Typically, Service mode is used to flash the existing code on the Wavecom Inc. wireless module.

Each Wavecom Inc. module has been set up to enter download mode in one of the following ways:

- At power on
- When AT*EDNLD command is issued

Depending on the state of the module, one or both methods are possible. It will depend on the state of external I/O lines and the state of the software loaded onto the module.



If the data on the module is corrupted, the software must be loaded onto the module by using the Power on method. The typical way for a PC card to be corrupted is the loss of power during an upgrade of the software.

Power on method is valid only when the Service mode is active or if the software in the module has been corrupted.

To enable service mode on the base board

1. Make sure that the appropriate carrier board and Wavecom Inc. wireless module are connected to the base board.
2. Make sure the UART1 port is connected to your PC and the appropriate terminal program is running.
3. Make sure the base board is powered off.
4. On the base board, set the Service Mode switch to the **Service Mode** position.
5. On the base board, move the main power switch (S301) to the **On** position. The Main Power LED displays a solid red light.
6. On the carrier board, press and hold the On/Off button for 1 second. The Unit Powered On LED displays a solid green light and the Service LED displays a solid red light. The module also sends a protocol description byte (Z) to the terminal

when it is powered on.



NOTE

The module issues the protocol description byte when it is powered on. If the base board is not set to Service Mode when the carrier board is powered on, the module does not send the protocol description byte. After the software is updated, the base board operates as if it is in normal mode even though it is set to service mode.

4.7 Understanding the LEDs on the base board

The base board is equipped with four LEDs that indicate the status of different board settings.

- **Power**
This LED lights up red to indicate that the base board powered on. A carrier board must be attached and the main power switch (S301) set to the **On** position.
- **Ring indicator**
This LED flashes green to indicate that the attached module is ringing.
- **Unit Powered On**
This LED lights up red to indicate that the attached carrier board is powered on. A module must be attached and the carrier board power switch powered on.
- **Service**
This LED lights up green to indicate that the attached module is connected to a cellular service.

Part 3 — Carrier board

5 Understanding the carrier board

Carrier boards are mounted on the base board and fastened with the four wing nuts.

5.1 Powering a carrier board

The following table summarizes the voltages supplied by the base board for each carrier board:

Carrier board	VCC (Volts)	VDIG (Volts)
GR64/10	3.6V	2.8V
GR64/20	3.6V	1.8V–5.0V
GS64	3.6V	1.8V

To power-on a carrier board

1. Make sure that the 80-pin connector on the carrier board is connected to the pin connector on the base board.
2. Make sure the appropriate Wavecom Inc. wireless module is connected to the carrier board.
3. On the base board, move the main power switch (S301) to the **On** position to obtain full power for the base board. The Main Power LED on the base board displays a solid red light.
4. On the carrier board, press and hold the On/OFF switch. The Unit Powered On LED on the base board displays a solid green light.

To power-off a carrier board

1. On the base board, move the main power switch (S301) to the **Off** position. The Main Power LED on the base board turns off.

5.2 Using the charger

The GS64 and GR64 carrier boards can use one of the following two sources to charge a battery:

- A built-in charger that is limited to 5.0V 500mA. This charger is enabled by setting the Charger switch (S400) to its **ON** position.
- Charge via USB. The current is limited by the USB-port. Typically, the nominal current is 350mA. This charging path is active as long as the USB cable is attached.



NOTE

To use the built-in charger to charge the battery and use the USB communication, the V100 diode must be removed.

The built-in charge management device provides a charge for a single Li-Ion battery.

To connect a battery to the carrier board

1. Remove R100, R101, R102, and R103 from the carrier board.
2. Mount 0ohm resistors in place of the removed resistors. As an alternative, you can short R104, and R105.
3. Attach the Li-Ion battery positive pole to TP105A and its negative pole to TP105B.
4. Move the Charger switch (S400) to its **ON** position.

5.3 GS64

This section describes the components and interfaces on the GS64 carrier board.

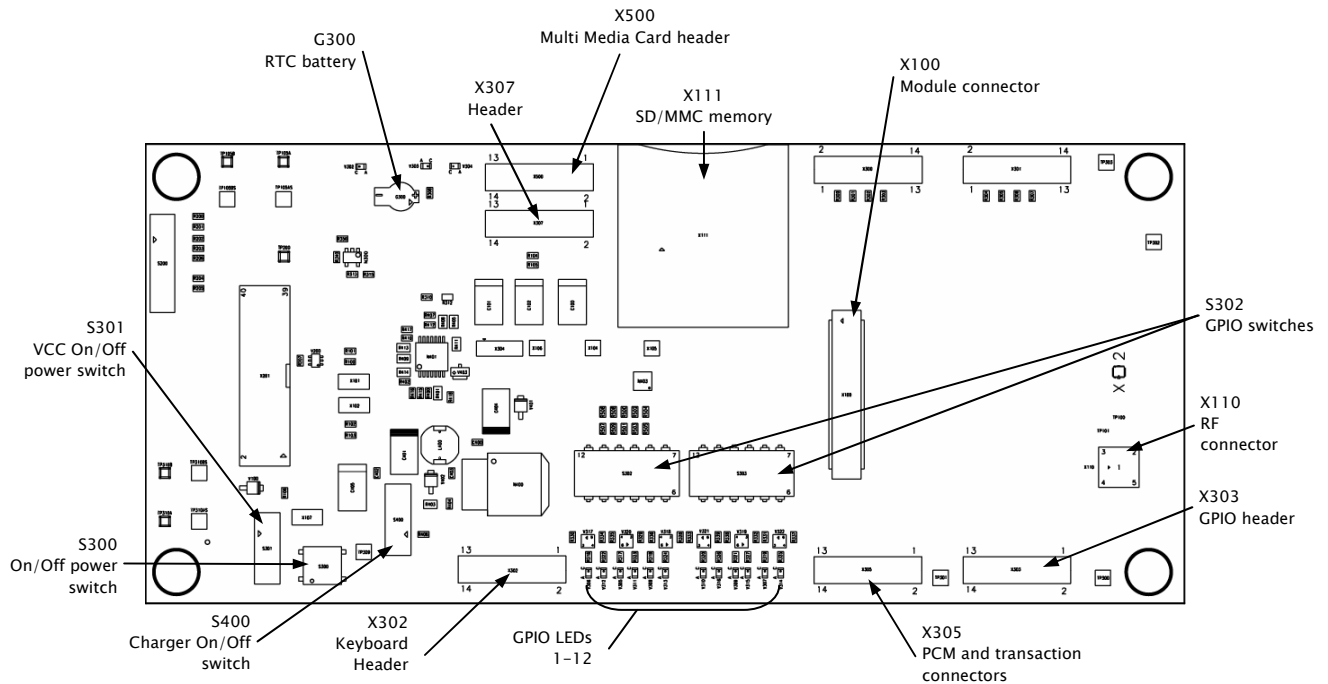


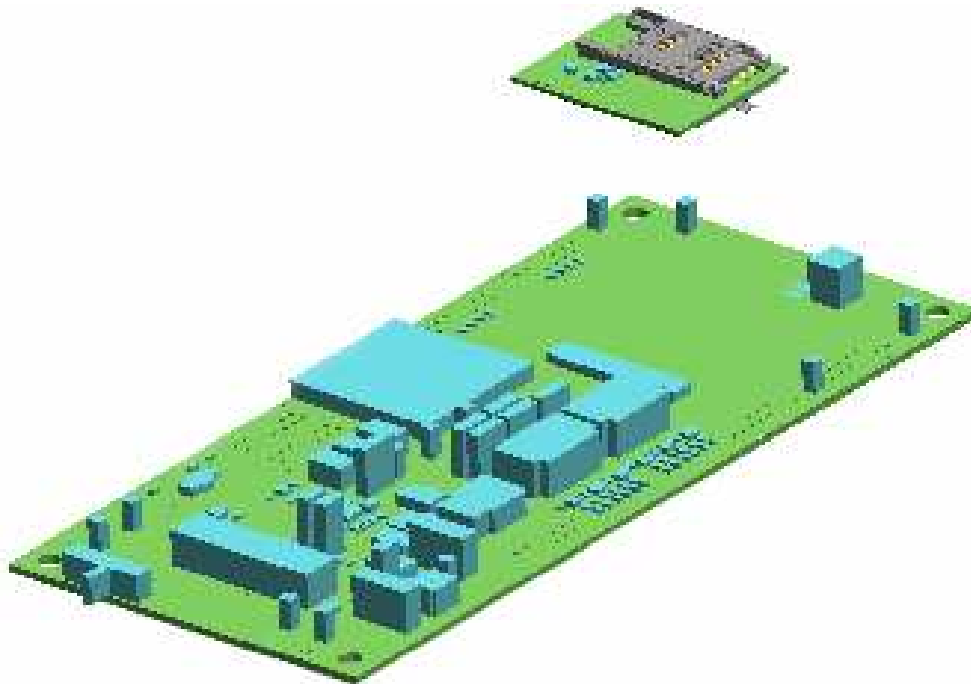
Figure 8: GS64 Carrier board components



CAUTION

The X300 and X301 headers are intended only for internal Wavecom Inc. testing and configuration. To prevent damage to the GR64DK, do not connect an interface to these headers.

5.3.1 Mounting a GS64 on the GS carrier board



5.3.2 PCM header

The GS64 provides a 14-pin PCM header that provides a digital audio interface to the Wavecom Inc. wireless module. This interface can be used to process PCM digital audio signals instead of using the headphone and headset jacks provided on the base board.

The PCM header is based on the Texas Instruments SSI standard.

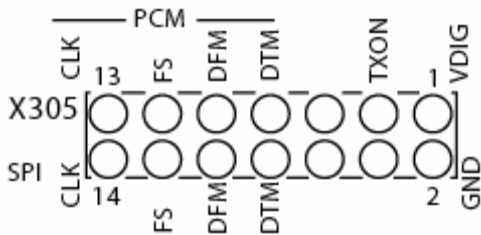


Figure 9: X305 header

The following table describes the pin for the PCM header:

Header pin	Name	Description
1	VDIG	This pin provides the DC voltage to the external component that you attach to the header. 1.8V
2	GND	This pin is the ground.
3	TX_ON	The Transmitter On pin sends a TX_ON signal (HIGH) to indicate that the module radio is actively transmitting.
4		Not connected
5		Not connected
6		Not connected
7	SSPDTM	The Data To Module pin sends data from the attached connector to the SSPDTM input on the Wavecom Inc. wireless module.
8	PCMDTM	The Data To Module pin sends data from the attached connector to the PCMDTM input on the Wavecom Inc. wireless module.
9	SSPDFM	The Data From Module pin receives data from the attached Wavecom Inc. wireless module SSPDFM output.
10	SSPDFM	The Data From Module pin receives data from the attached Wavecom Inc. wireless module PCMDFM output.
11	PCMFS	The Frame Synchronization pin receives the SSPFS signal from the Wavecom Inc. wireless module.
12	SSPFS	The Frame Synchronization pin receives the PCMFS signal from the Wavecom Inc. wireless module.
13	PCMCLK	The Clock pin receives the PCMCLK signal from the Wavecom Inc. wireless module. The digital signal processor within the wireless module is the master for all external PCM devices. Clocks and data from external devices must be synchronized to it.

Header pin	Name	Description
14	SSPCLK	The Clock pin receives the SSPCLK signal from the Wavecom Inc. wireless module. The digital signal processor within the wireless module is the master for all external PCM devices. Clocks and data from external devices must be synchronized to it.

5.3.3 Keyboard header

The keyboard header provides 9 pins that are used to send keyboard signals to the Wavecom Inc. wireless module.

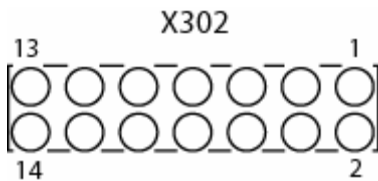


Figure 10: Keyboard header

The following table describes the keyboard header pins:

Header pin	Name	Description
1	VDIG	This pin provides the DC voltage to the keyboard that you attach to the header. 1.8V
2	VDIG	This pin provides the DC voltage to the keyboard that you attach to the header. 1.8V
3	KEYROW1	The keyboard row 1 pin is routed to the KEYROW1 pin on the Wavecom Inc. wireless module.
4	KEYROW2	The keyboard row 2 pin is routed to the KEYROW2 pin on the Wavecom Inc. wireless module.
5	KEYROW3	The keyboard row 3 pin is routed to the KEYROW3 pin on the Wavecom Inc. wireless module.
6	KEYROW4	The keyboard row 4 pin is routed to the KEYROW4 pin on the Wavecom Inc. wireless module.
7	KEYROW5	The keyboard row 5 pin is routed to the KEYROW5 pin on the Wavecom Inc. wireless module.
8	KEYCOL1	The keyboard column 1 pin is routed to the KEYCOL1 pin on the Wavecom Inc. wireless module.

Header pin	Name	Description
9	KEYCOL2	The keyboard column 2 pin is routed to the KEYCOL2 pin on the Wavecom Inc. wireless module.
10	KEYCOL3	The keyboard column 3 pin is routed to the KEYCOL3 pin on the Wavecom Inc. wireless module.
11	KEYCOL4	The keyboard column 4 pin is routed to the KEYCOL4 pin on the Wavecom Inc. wireless module.
12		Not connected
13	GND	This pin is the ground.
14	GND	This pin is the ground.

5.3.4 General purpose input/output header

The GS64 provides a 14-pin GPIO header that provides an interface that can be used to input or output signals to the Wavecom Inc. wireless module. To use these GPIO pins, the module must first be programmed appropriately. For information about how to program your module to use a GPIO, see the *GR64 & GS64 GSM/GPRS Modem Integrators Manual*.

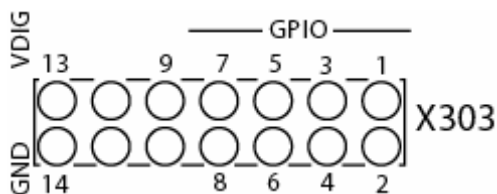


Figure 11: GPIO header

The following table describes the GPIO pins:

Header pin	Name	Description
1	GPIO1	This pin is routed to the GPIO1 pin on the Wavecom Inc. wireless module.
2	GPIO2	This pin is routed to the GPIO2 pin on the Wavecom Inc. wireless module.
3	GPIO3	This pin is routed to the GPIO3 pin on the Wavecom Inc. wireless module.
4	GPIO4	This pin is routed to the GPIO4 pin on the Wavecom Inc. wireless module.
5	GPIO5	This pin is routed to the GPIO5 pin on the Wavecom Inc. wireless module.

Header pin	Name	Description
6	GPIO6	This pin is routed to the GPIO6 pin on the Wavecom Inc. wireless module.
7	GPIO7	This pin is routed to the GPIO7 pin on the Wavecom Inc. wireless module.
8	GPIO8	This pin is routed to the GPIO8 pin on the Wavecom Inc. wireless module.
9	GPIO9	This pin is routed to the GPIO9 pin on the Wavecom Inc. wireless module.
10		Not connected
11		Not connected
12		Not connected
13	VDIG	This pin provides the DC voltage to the external component that you attach to the header. 1.8V
14	GND	This pin is the ground.

5.3.5 Multimedia Card header (X500)

The MMC header provides a 14-pin header that provides an interface to input or output signals from a connected SD/MMC to the Wavecom Inc. wireless module.

The SD/MMC header is 1.8V. To interface to an SD/MMC device that is based on 3V technology it is necessary to level shift these signals for compatibility purposes.

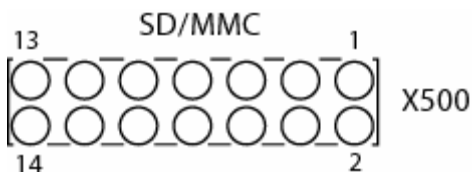


Figure 12: MMC header (X500)

The following table describes the pins on SD/MMC header:

Header pin	Name	Description
1	MMCDAT3	This pin is routed to the MMCDAT3 pin on the Wavecom Inc. wireless module.
2	MMCDAT_EN	This pin is routed to the MMCDAT_EN pin on the Wavecom Inc. wireless module.
3	MMCDAT2	This pin is routed to the MMCDAT2 pin on the Wavecom Inc. wireless module.

Header pin	Name	Description
4	MMCDAT_EN0	This pin is routed to the MMCDAT_EN0 pin on the Wavecom Inc. wireless module.
5	MMCDAT1	This pin is routed to the MMCDAT1 pin on the Wavecom Inc. wireless module.
6	MMCCMD_EN	This pin is routed to the MMCCMD_EN pin on the Wavecom Inc. wireless module.
7	MMCDAT0	This pin is routed to the MMCDAT0 pin on the Wavecom Inc. wireless module.
8	MMCCMD	This pin is routed to the MMCCMD pin on the Wavecom Inc. wireless module.
9		Not connected
10	MMCCLK	The MMC clock pin receives the MMCCLK signal from the Wavecom Inc. wireless module. Clocks and data from external devices must be synchronized to it.
11	VDIG	This pin provides the DC voltage to the external component that you attach to the header. 1.8V
12	GND	This pin is the ground.
13	VBATT	This pin provides battery voltage to the external component that you attach to the header. 1.8V
14	GND	This pin is the ground.

5.3.6 Analogue-to-Digital (X307)

The 14-pin Analogue-to-Digital header provides an interface to output analogue signals from the Wavecom Inc. wireless module to a connected device.

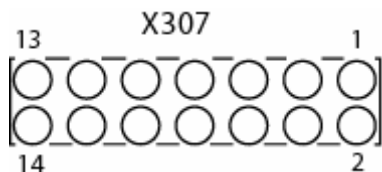


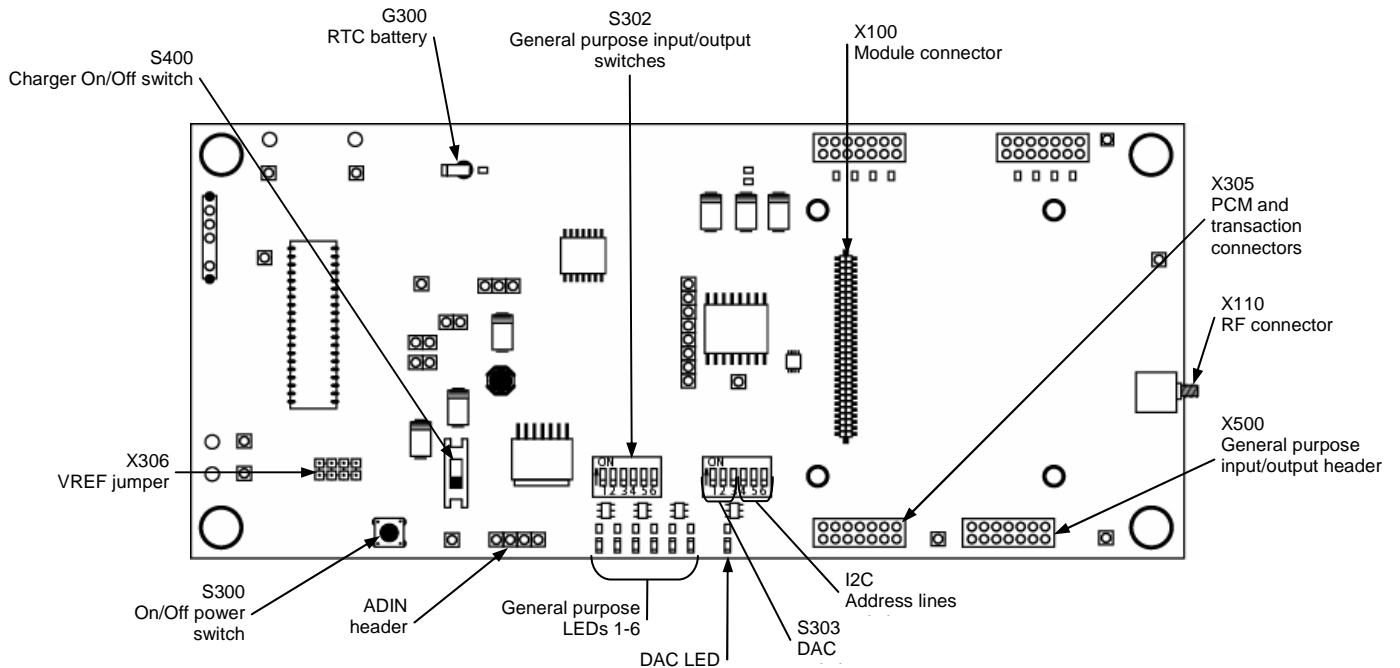
Figure 13: Analogue-to-Digital header (X307)

The following table describes the pins on Analogue-to-Digital header:

Header pin	Name	Description
1	ADIN1	This pin receives the output for from the Wavecom Inc. wireless module for A/D Converter #1.
2	ADIN2	This pin receives the output for from the Wavecom Inc. wireless module for A/D Converter #2.
3	ADIN3	This pin receives the output for from the Wavecom Inc. wireless module for A/D Converter #3.
4	ADIN4	This pin receives the output for from the Wavecom Inc. wireless module for A/D Converter #4.
5	BUZZER	This pin receives the buzzer output from the Wavecom Inc. wireless module. Connecting the BUZZER signal to an inverting transistor-buffer followed by a piezoelectric transducer enables the wireless modem to play pre-programmed melodies or sounds.
6		
7	LED1	This pin is receives the LED control signal from the LED1 pin of the Wavecom Inc. wireless module.
8	LED2	This pin is receives the LED control signal from the LED2 pin of the Wavecom Inc. wireless module.
9	PON_H	This pin is receives the power on (high) control signal from the PON_H pin of the Wavecom Inc. wireless module.
10	P_ON	This pin is receives the power on (low) control signal from the PON_L pin of the Wavecom Inc. wireless module.
11	ALARM	This pin is receives the alarm signal from the Wavecom Inc. wireless module.
12	VRTC	This pin receives the power signal from the Wavecom Inc. wireless module for the real time clock (RTC) for the external component that is connected to the header.
13	VDIG	This pin provides the DC voltage to the external component that you attach to the header. 1.8V
14	GND	This pin is the ground.

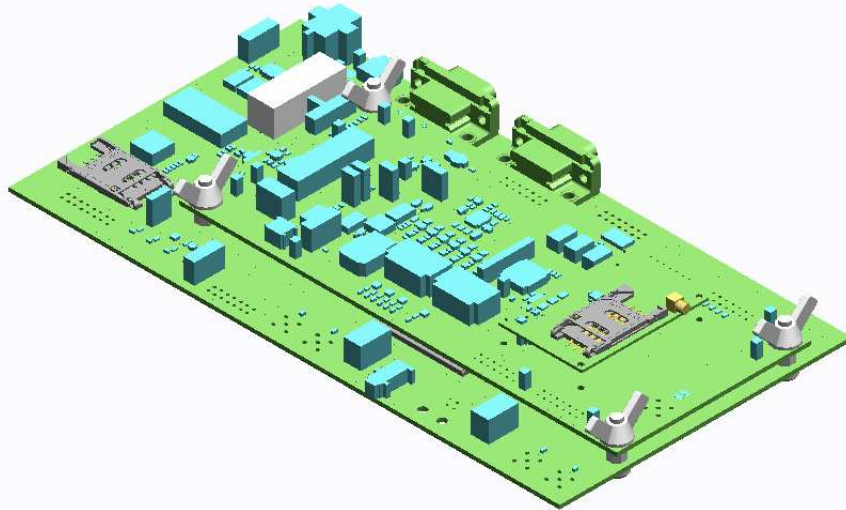
5.4 GR64

This section describes the components and interfaces on the GR64 carrier board.



Important! The X300 and X301 headers are intended only for internal Wavecom Inc. testing and configuration of the base board. To prevent damage to the GR64DK, do not connect an interface to these headers.

5.4.1 Mounting a GR64 on the GR carrier board



5.4.2 PCM header

The GR64 provides a 14-pin PCM header that provides a digital audio interface to the Wavecom Inc. wireless module. This interface can be used to process PCM digital audio signals instead of using the headphone and headset jacks provided on the base board.

The PCM header is based on the Texas Instruments SSI standard.

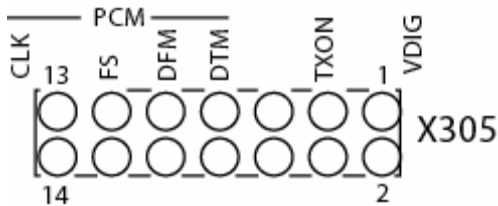


Figure 14: PCM header

The following table describes the PCM header pins:

Header pin	Name	Description
1	VDIG	This pin provides the DC voltage to the external component that you attach to the header. 1.8V
2	GND	This pin is the ground.
3	TX_ON	The Transmitter On pin sends a TX_ON signal (HIGH) to indicate that the module radio is actively transmitting.
4		Not connected.

Header pin	Name	Description
5		Not connected.
6		Not connected.
7	DTM	The Data To Module pin sends data from the attached connector to the PCMDTM input on the Wavecom Inc. wireless module.
8		Not connected.
9	DFM	The Data From Module pin receives data from the attached Wavecom Inc. wireless module PCMDFM output.
10		Not connected.
11	FS	The Frame Synchronization pin receives the PCMSYNC signal from the Wavecom Inc. wireless module.
12		Not connected.
13	CLK	The Clock pin receives the PCMCLK signal from the Wavecom Inc. wireless module. The digital signal processor within the wireless module is the master for all external PCM devices. Clocks and data from external devices must be synchronized to it.

5.4.3 GPIO header

The GR64 provides a 14-pin GPIO header that provides an interface that can be used to input or output signals to the Wavecom Inc. wireless module. To use these GPIO pins, the module must first be programmed appropriately. For information about how to program your module to use a GPIO, see the *GR64 & GS64 GSM/GPRS Modem Integrators Manual*.

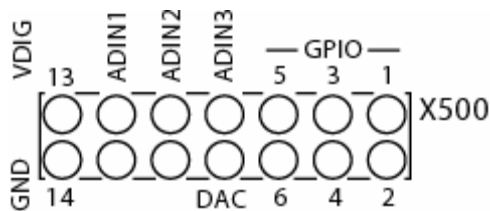


Figure 15: GPIO header

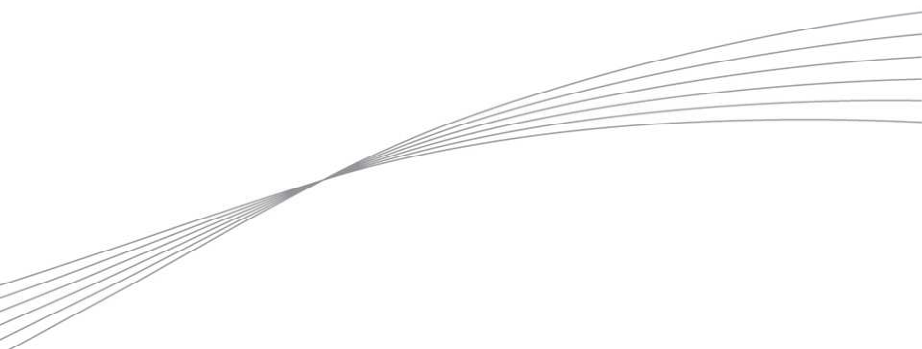
The following table describes the GPIO pins:

Header pin	Name	Description
1	GPIO1	This pin is routed to the GPIO1 pin on the Wavecom Inc. wireless module.
2	GPIO2	This pin is routed to the GPIO2 pin on the Wavecom Inc. wireless module.
3	GPIO3	This pin is routed to the GPIO3 pin on the Wavecom Inc. wireless module.
4	GPIO4	This pin is routed to the GPIO4 pin on the Wavecom Inc. wireless module.
5	GPIO5	This pin is routed to the GPIO5 pin on the Wavecom Inc. wireless module.
6	GPIO6	This pin is routed to the GPIO6 pin on the Wavecom Inc. wireless module.
7	ADIN3	The Analog-to-Digital Input 3 is routed to the ADIN3 pin on the Wavecom Inc. wireless module.
8	DAC	The Digital to Analog pin is routed to the DAC pin on the Wavecom Inc. wireless module.
9	ADIN2	The Analog-to-Digital Input 2 is routed to the ADIN2 pin on the Wavecom Inc. wireless module.
10	ADIN1	The Analog-to-Digital Input 1 is routed to the ADIN1 pin on the Wavecom Inc. wireless module.
11		Not connected
12		Not connected
13	VDIG	This pin provides the DC voltage to the external component that you attach to the header. 1.8V
14	GND	This pin is the ground.

5.4.4 Using I2C

The I2C-bus is for 2-way, 2-line communication between different ICs or modules. The two lines are a serial data line (SDA) and a serial clock line (SCL). Together, these signals enable the GR64DK to support serial transmission of 8-bit bytes of data-7-bit device addresses plus control bits-over the two-wire serial bus. The device that initiates a transaction on the I2C bus is termed the master. The master normally controls the clock signal. A device being addressed by the master is called a slave.

For details on how to use I2C interface, refer to the Philips I2C Bus Specification 2.0, documentation or the datasheet that came the device that you want to connect.



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