GSM HYBRID

MANUAL

v.2.2

Please always download the latest software from our WIKI page

http://www.mambanet.org/wiki/dokuwiki/doku.php?id=supgsmhybrid:start

Contents

Dear Client,

Thank you for choosing the D&R GSM Hybrid.

This time you are not faced with a huge manual because it is simply not necessary because of the natural recognition of all functions on the user interface. All functions are self-explanatory and you will certainly appreciate the ergonomics of this design.

We are confident that you will be using the GSM Hybrid for many years to come, and wish you a lot of success with your operation.

With kind regards,

D&R Team

BACKGROUND

D&R's newest Telephone Hybrid is a half rack GSM version in the range of Telephone Hybrids. Its concept originates from many demands for a wireless version of our well known and used wired hybrids. The GSM-Hybrid is a design that makes use of the latest analogue and digital techniques available.
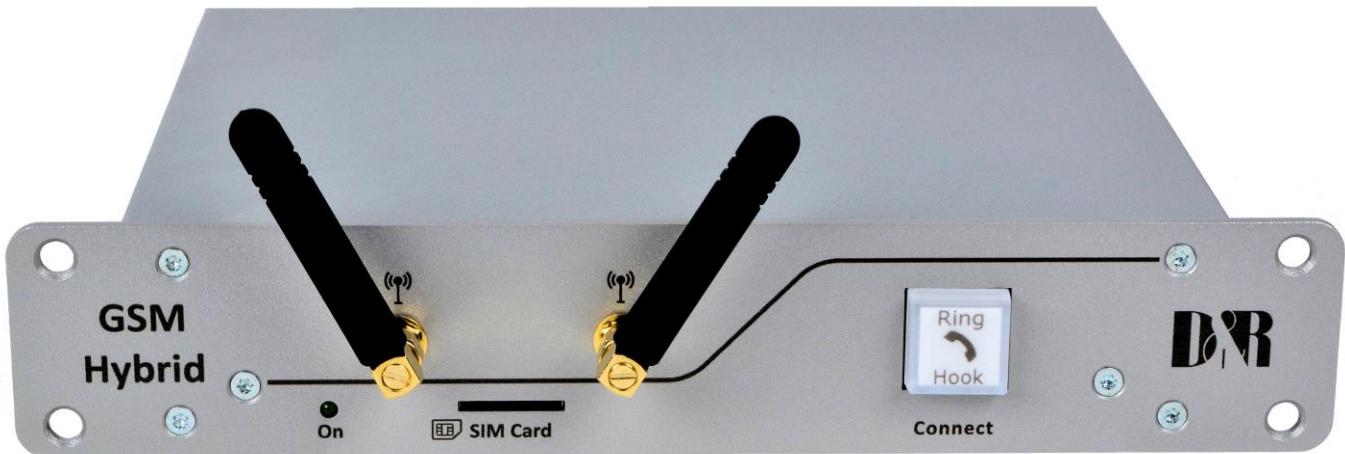
1.1   What is a telephone hybrid?

Telephone hybrids provide the interface between professional audio equipment and the public telephone network. They provide protection for your equipment and the public telephone lines, allowing for varying line signals and line and GSM conditions. Automatically canceling out the unwanted signal they also facilitate two-way communication down a single telephone connection.

With the D&R GSM Hybrid you can add a simple and effective wireless interface that your reporters can call. With features like HD voice, Echo canceling, digital EQ and application control over USB on your PC it is a nice tool to expand the communication possibilities of your studio with your reporter.

The GSM Hybrid has its own number reporters directly can dial, the call can be taken on the mixing console due to built in GPIO's. The electronics are housed in a sturdy metal 9.5" rack mount case with antenna's on the front side for optimum receiver conditions. An external 12 volt power supply adapter is part of the delivery. Software features are in and output metering and level control, phone dialing, number recognition and GSM signal strength indication

2   GENERAL DESCRIPTION

A large ring button enables you to pick up the line from the unit itself or from your mixer when it is connected via its GPI to the telephone Hybrid. When a call comes in it lights up green in the rhythm of the ring. When the line is picked up by pushing the button it turns into red. When it is off the connection is lost. Both levels of receive and send can be adjusted to suit your requirements in the mixer.

FEATURES	SOFTWARE
• **HD-Voice (AMR-WB/G722.2)** • **Balanced Audio in/Out** • **Echo cancelling** • **PC control application via USB**	• **Input and output level meters (ppm)** • **Input and output gain adjust** • **Phone dialing** • **Number recognition** • **GSM signal strength indicator (RSSI)**

2.1   Front panel
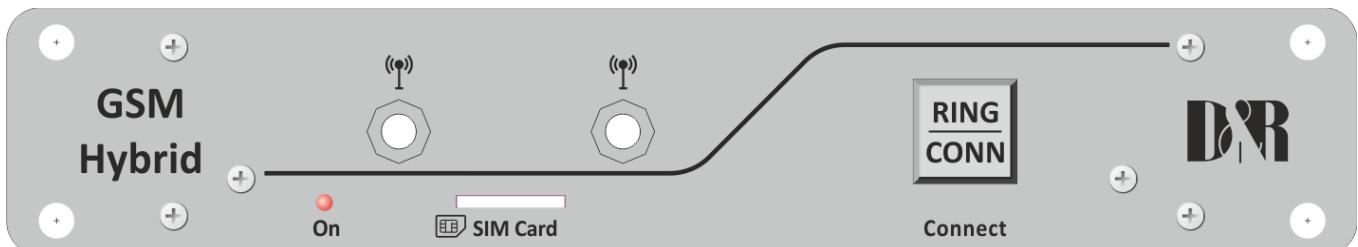
Antenna	Both antenna's assure you of an uninterrupted connection with the nearest GSM tower.
SIM Card	In this slot you insert a standard sim card available from your favorite provider as seen on the left. Copper contact area down sided. Cut off corner top left.
CONNECT BUTTON: (RING)	Connect switch to connect and disconnect calls from the GSM network. It can be remotely driven by connecting a switch to the GPI Jack on the back panel.

2.2   Rear panel
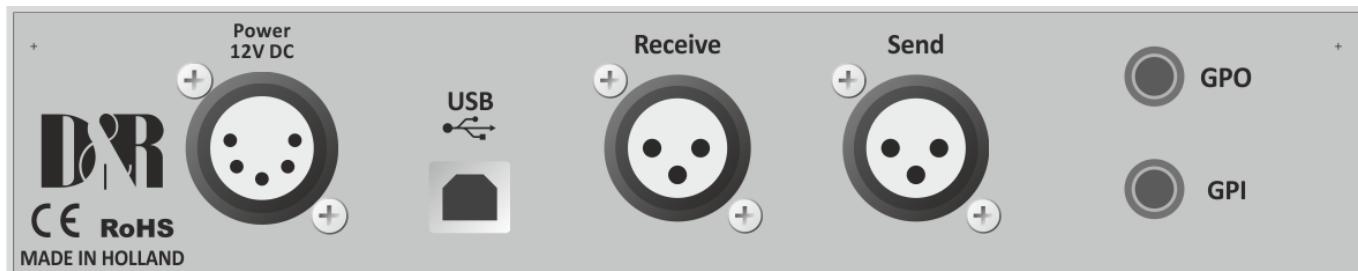
Power	The unit is powered by an External 12 volt 1A adapter.
USB	This USB connector is connected to the PC to be able to perform call operations and configuring the device.

RECEIVE	This male XLR connector outputs the received signal from the caller and needs to be connected to a line input of a mixing console.
SEND	This female XLR connector receives the audio coming from a mixing console (Mix/Minus, clean feed (N-1) or Aux) and is send to the caller.
GPO	Jack connector for remote control of a phone signaling device such as D&R's Calllite
GPI	Remote control of the Connect switch (Rink/Hook) on the frontpanel.

2.3   Inputs and Outputs

2.3.1   RECEIVE (from caller)

XLR MALE	TYPE	CONNECTION
Pin 1	Screen	Audio ground
Pin 2	Phase	Audio + (output)
Pin 3	Non-phase	Audio – (output)

2.3.2   SEND (to caller)

XLR MALE	TYPE	CONNECTION
Pin 1	Screen	Audio ground
Pin 2	Phase	Audio + (output)
Pin 3	Non-phase	Audio – (output)

2.3.3   GPIO

The GPO is a potential free contact between tip and ring. Max. 60VDC/40VAC 500mA.

GPO	FUNCTION	CONNECTION
Tip	No	Potential free contact A
Ring	No	Potential free contact B
Sleeve	No	Not connected

To activate the GPI input connect the tip and ring together via a potential free contact / external switch.

GPI	FUNCTION	CONNECTION
Tip	Pull down	47 ohm to ground
Ring	Pull up	+5 volt via 10kohm
Sleeve	No	Not connected

3   SOFTWARE

GSM Hybrid Control is an application required to configure and control the GSM Hybrid. Input and output levels can be configured in the Settings menu. Making a call can be done with the dialpad window.

The application is also an indicator for SIM card status, call status and input and output level (PPM) meters.
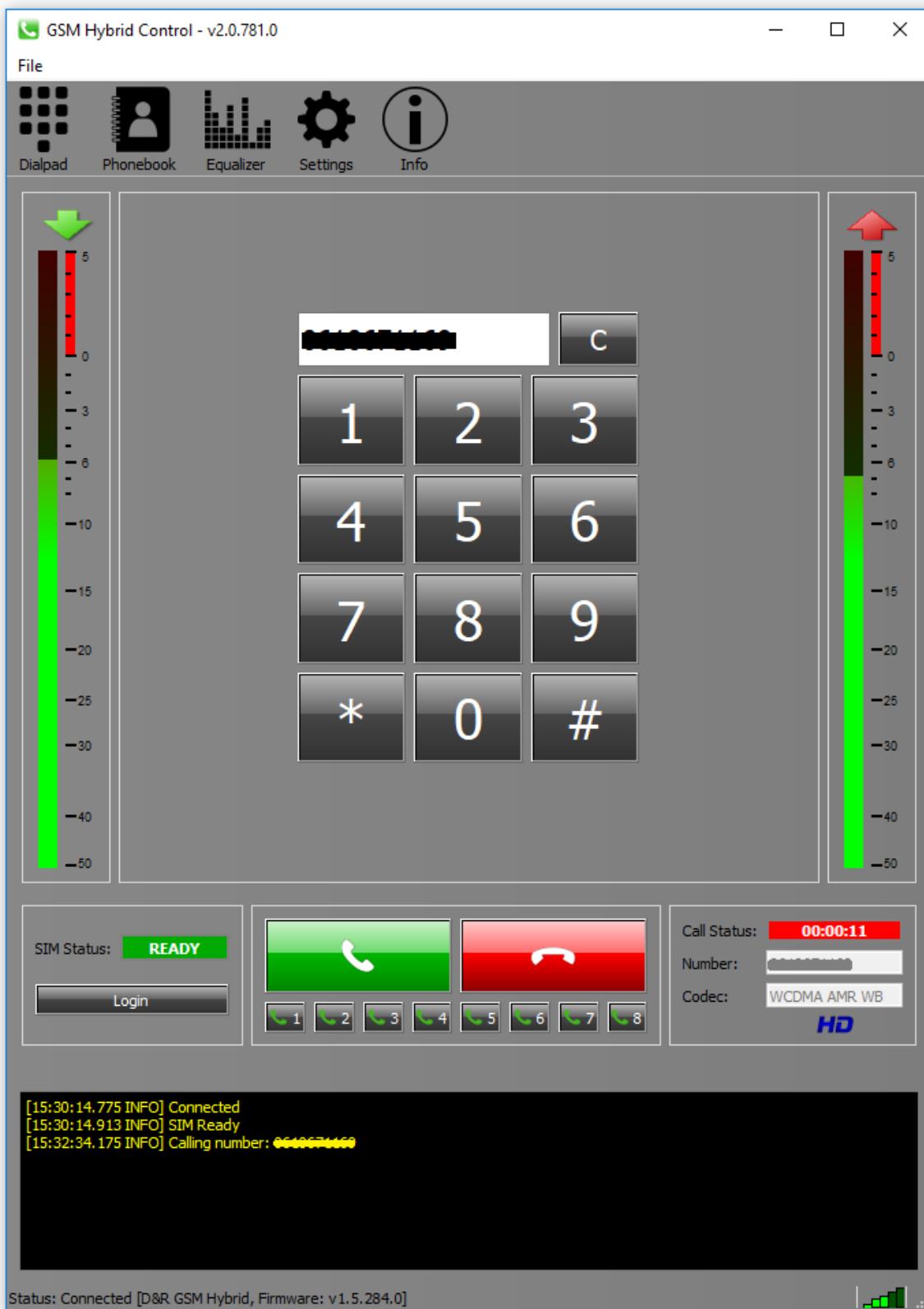
1. Download the GSM Hybrid Control software from:
   http://www.mambanet.org/wiki/dokuwiki/doku.php?id=supgsmhybrid:start

2. Double click on the installer file (**GSM Hybrid Control Vx.x.x.x – Setup.exe**) and click **Next.**

3. Select the destination location where GSM Hybrid Control should be installed and press **Next**.
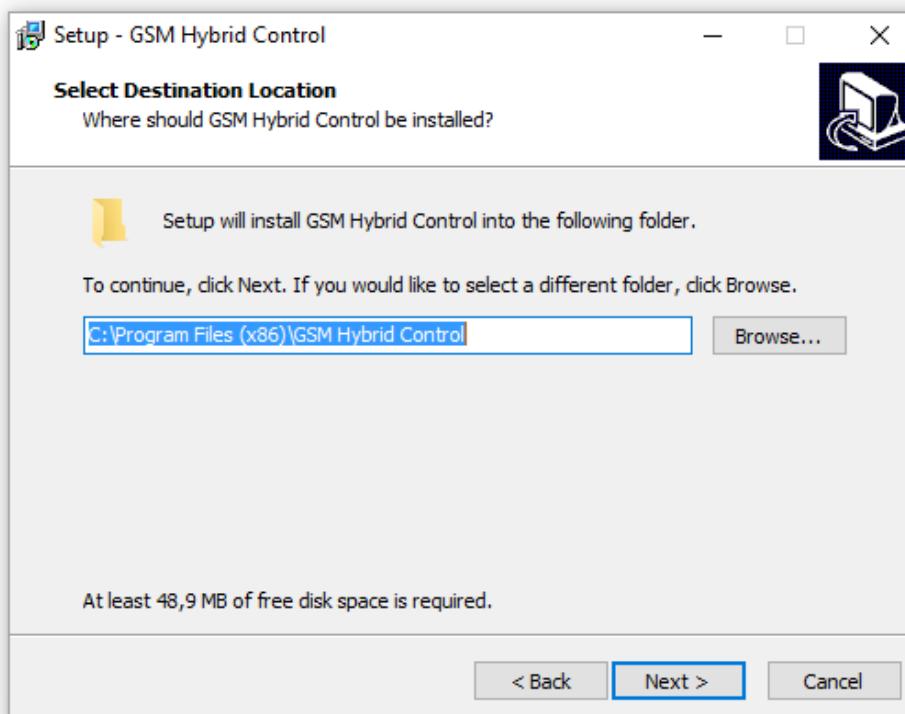
4. Select a start menu folder for the program's shortcut and click **Next.**
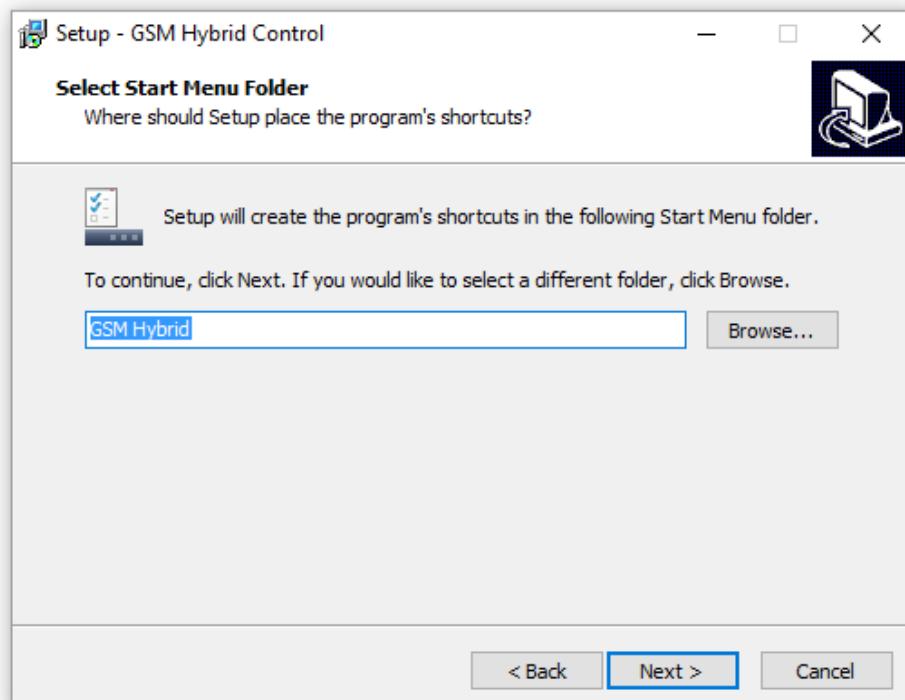
5. Select if a desktop icon should be placed on your desktop and press **Next.**
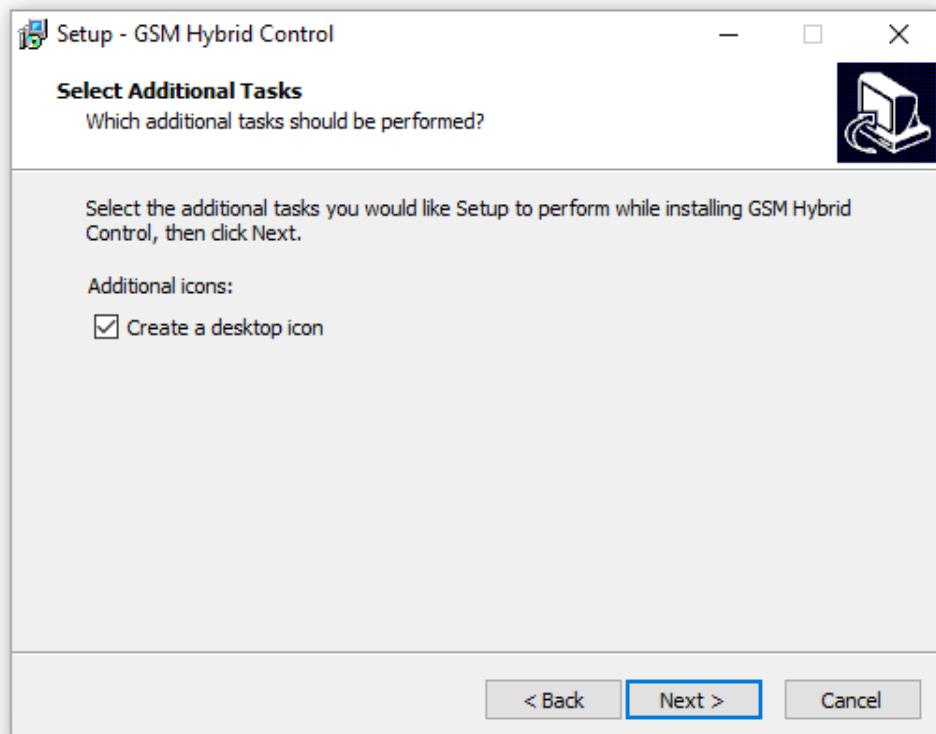
6. Press *Install* to start with the installation.
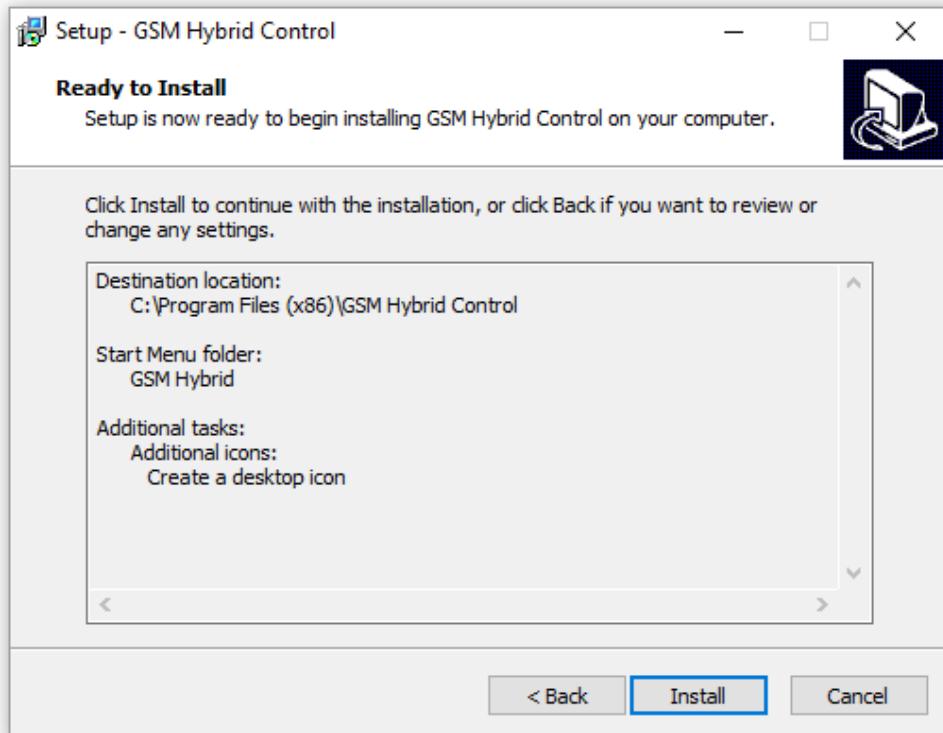
7. Wait while the setup installs all the required files on your computer.
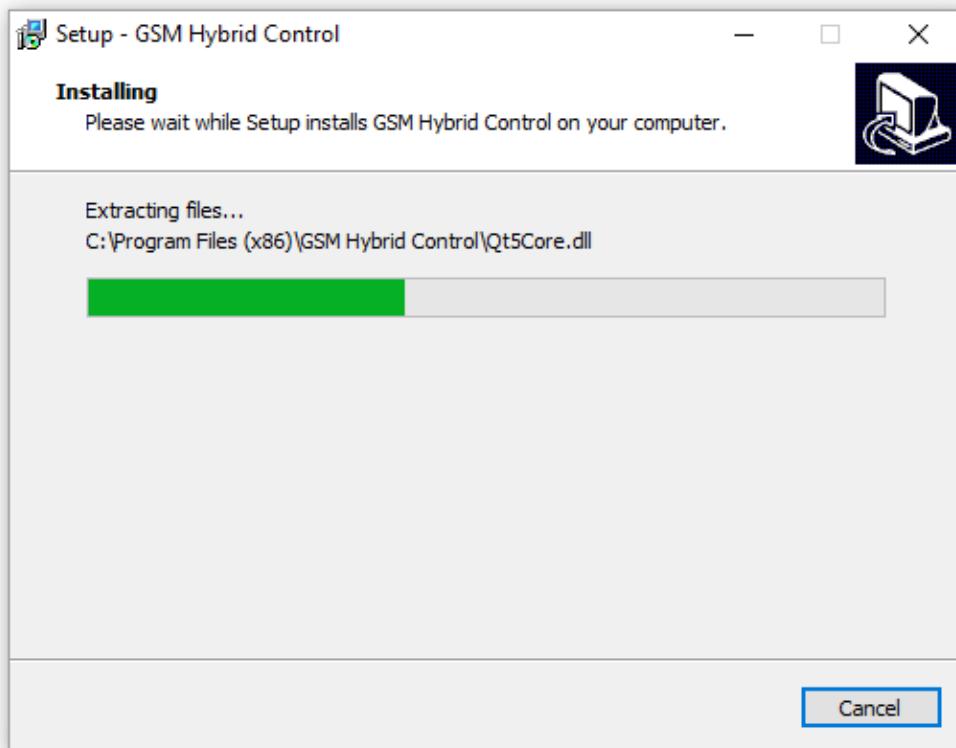
8. Click **Finish** to exit the setup procedure.
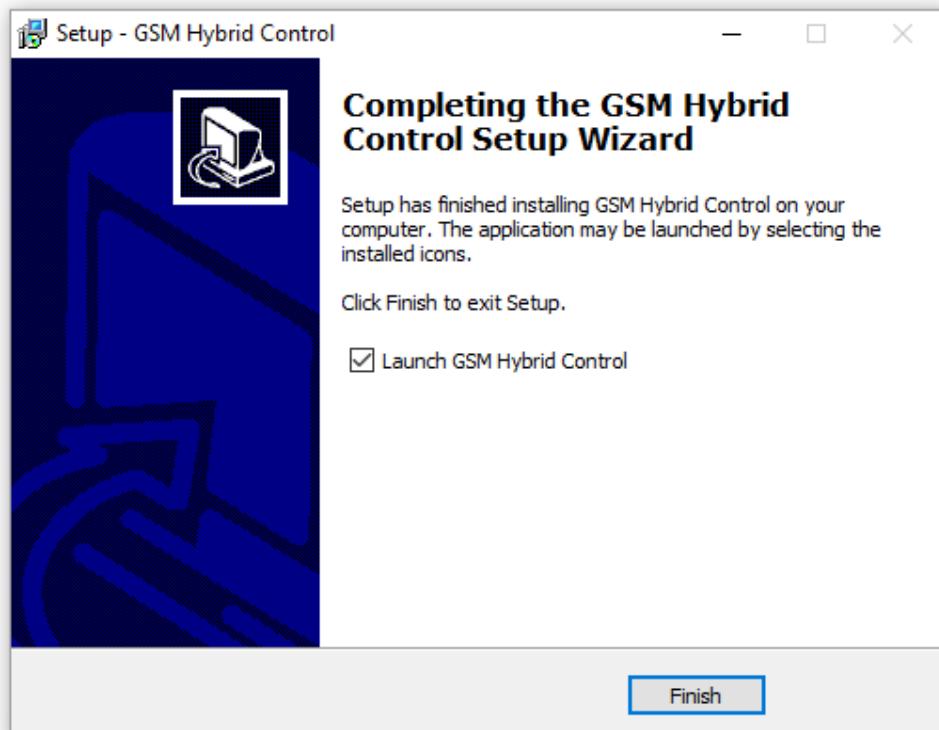
3.2   Overview

In this chapter an overview the components or also called features of the GSM Hybrid Control software will be described in more detail. Before you can use any of the features the application offers, you must connect (USB) to the GSM Hybrid device by clicking on **File -> Connect** in the top bar. The statusbar in the bottom left of the window indicates the status of the connection and the firmware revision of the currently connected GSM Hybrid.

Auto Connect

Another option is to enable the AutoConnect feature available under **File -> AutoConnect**. When enabled the software will automatically connect to the GSM Hybrid on startup. Even when the connection get lost (USB cable disconnect) momentary, the software will re-connect automatically when the cable is inserted again.
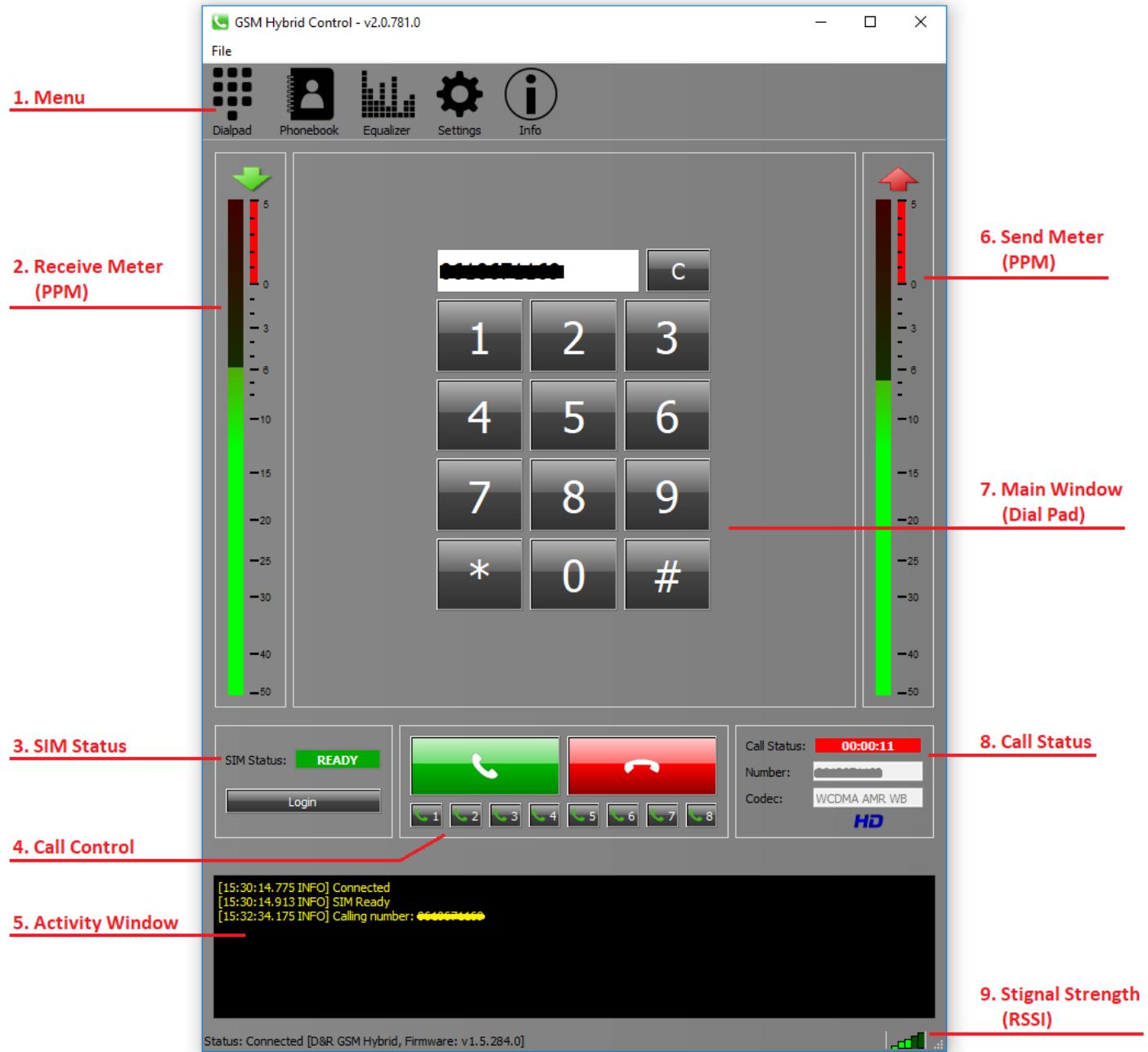
3.2.1   Menu

In the Menu toolbar you can click on one of the available menu-icons which will open up the corresponding content viewed in the main window. All these will be discussed further in this document. the *Dialpad* or the *Settings* icon in order to view their content in the *Main Window*. More icons in the Menu toolbar are added in the future to give you even more options to control.

12

The RECEIVE meter indicates the audio level received from the caller over the GSM network. The meter has a PPM (Peak Program Meter) DIN scale and a fallback of 20dB / 1.5sec. The received signal is present at the RECEIVE XLR output on the rear panel. This signal should be fed into a channel on your mixing console.

3.2.3   SIM Status

The SIM Status window indicates the status of the SIM card inserted in the slot at the frontpanel of the GSM Hybrid. In order to make a call or receive an incoming call the status should be READY (green). In all other situations the SIM Status window displays an error code (red). A more detailed description about the error code is shown in the *Activity Window* at the bottom of the application.

Login
If you connect to the GSM Hybrid by clicking on *File -> Connect* the application automatically tries to login and asks for the pincode of the inserted SIM card. Enter the pincode and press *[OK]*. Manually login is also possible by clicking the *[login]* button.
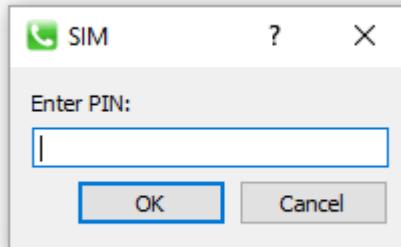
*** NOTE: SIM Card may only be removed with power disconnected!!!

3.2.4   Call Control

The Call Control contains the trival 'call' and 'end call' buttons, respectively green and red colored. Pressing the green call button dials the selected number in the dialpad window. Pressing the red button will disconnect any active call or reject an incoming call. The eight small quick call buttons are for calling a phonenumber stored under one of the memory locations 1 till 8.

3.2.5   Activity Window

The Activity window displays all activity of the GSM Hybrid. This includes events such as incoming calls, making calls, error messages, SIM status error descriptions and many more. For the user this is a very usefull overview of the past activities in time. Messages are divided into INFO (in yellow) and ERROR (in red) messages.

3.2.6   Send Meter

The SEND meter indicates the audio level send to the caller over the GSM network. The meter has a PPM (Peak Program Meter) DIN scale and a fallback of 20dB / 1.5sec. The send signal is taken from the SEND XLR input on the rear panel. Your mixing console has to create the N-1 (cleanfeed) for this SEND input.

3.2.7   Main Window

The Main window shows the contents of the selected item in the Menu toolbar. You switch at any time from one view to another by clicking the icons in the Menu toolbar, even if there is an ongoing active call.

ALERT feature
The Alert feature is implemented to let a reporter in the field 'wake-up' a DJ behind the desk to start an interview. Assumed is that a connection is already there and the DJ is doing some other work in the studio while the reporter waits for the moment to start the interview.

On that moment the reporter only has to press the **'0'** on his phone to Alert the DJ. In the mainwindow of the GSM Hybrid Control application the background starts blinking red for 2 seconds. Also the GPO output alternates with this Alert signal. Doing so, the DJ knows the reporter is ready for the interview and he can mix in the reporter to the show.

The Call Status window defines four possible states:

IDLE
In the IDLE state nothing is happening and the GSM Hybrid waits for an incoming call or a call to be made.
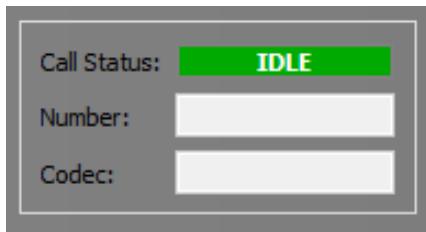

INCOMING CALL
If there is an incoming call, the call status indicates 'INCOMING' in a green/white blinking way. The number field contains the number of the caller.
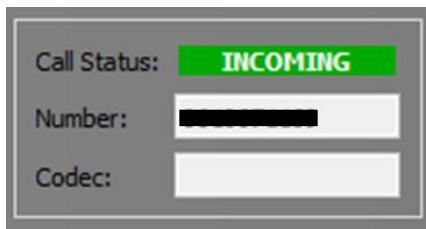

CALLING
When a number is entered in the dialpad and the green call-button is pressed, the call status change to 'CALLING' and the number field contains the number to be dialed.
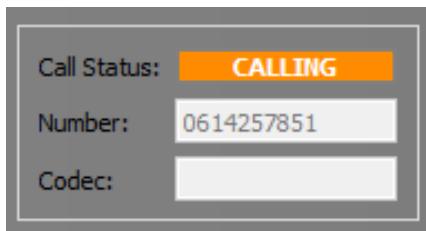
TALKING
When an active conversation / connection is established, the call status change to 'TALKING' and a timer is directly started indicating the elapsed time. The number field contains the number you are connected to. The codec field contains the used codec for the current connection. 'NB' stands for Narrow Band (300Hz – 3000Hz) and 'WB' for Wide Band (300Hz – 8000Hz), also called HD-voice. The GSM Hybrid automatically choose the best codec available.
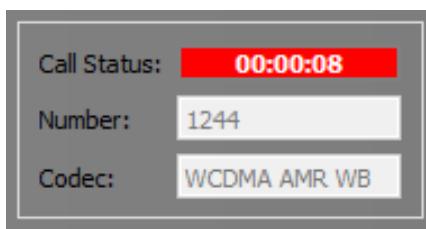

HD VOICE
The GSM Hybrid is equipped with a GSM module which can handle a HD voice connection (dependent of your provider). Both sides need to support HD Voice in order to get a HD Voice enabled connection. The '**HD**' logo turns into blue color when such a connection is established. This can also be seen in the Codec info: WB = Wide Band.

The signal strenght of the GSM signal is shown in the bottom right corner with the five green bars. All the bars on indicates best signal quality. In order to determine the exact RSSI (Received Signal Strength Indicator), place the mouse cursor on the bars and the current RSSI in [dBm] will be shown.

-85 dBm
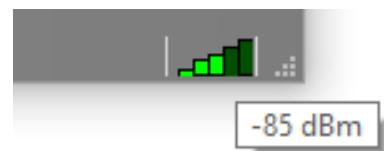
3.3 Dialpad

The Dialpad is the trivial selection when using the GSM Hybrid Control application. With this selected you can make calls by choose the number on the dialpad and press the green call button to initiate a call. The 'C' button clears the entered number in the white field.

		C
1	2	3
4	5	6
7	8	9
*	0	#
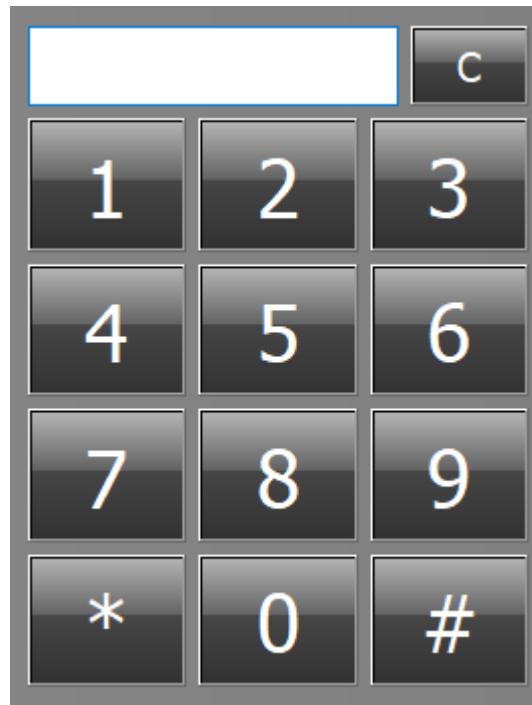
3.4   Phonebook

The phonebook stores all the contact information in a SQLite database. This database is represented as a single file which can be copied to other systems for sharing the same phonebook. The file *database.db* can be found in the following folder:

C:\Users\<user>\AppData\Local\VirtualStore\Program Files (x86)\GSM Hybrid Control
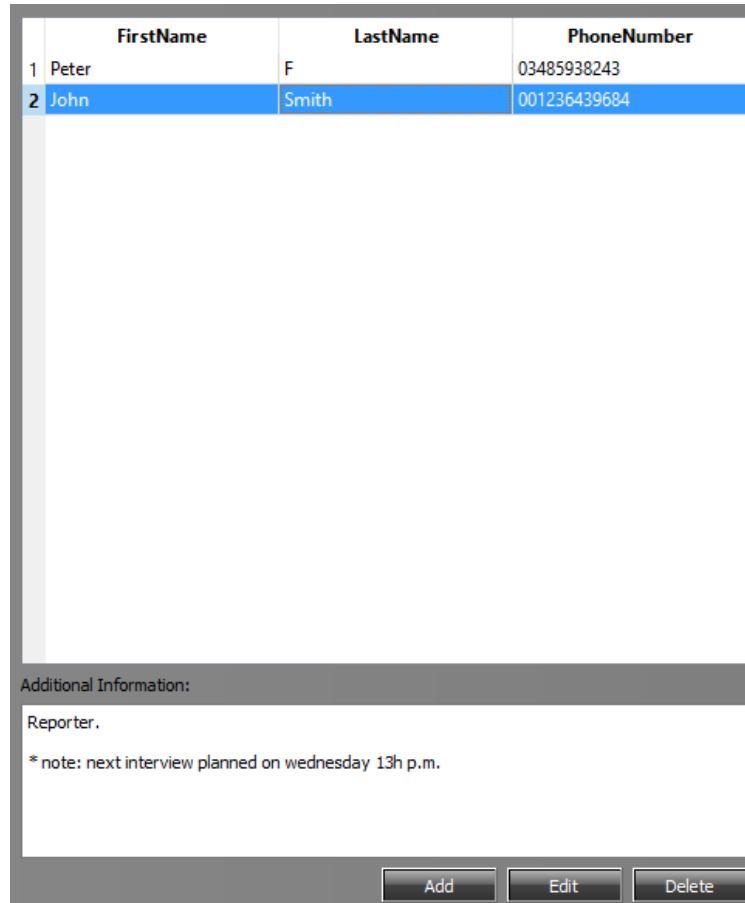
3.4.1   Add / Edit Contact

To add a contact simply click on the [ADD] button in the Phonebook view. A new window will pop up where you can enter the contact information. In the additional field some more in-depth information about the contact can be filled in.

Changes to a current contact can be done by selecting the contact and press the [EDIT] button. When done editing press [OK] to confirm the changes. If pressed [Cancel] the changes don't affect the contact.
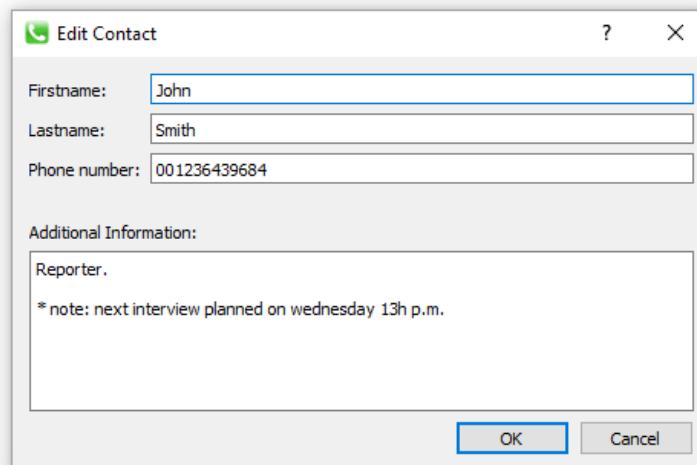
To delete a contact select the contact in the contact list and press [Delete]. A warning window will pop up and asks if you are sure to delete the currently selected contact.

In order to call a phonebook contact just select the contact you want to call and press the green call button.

3.5   Equalizer

The GSM Hybrid is equipped with a 5-band equalizer. The LOW and HIGH bands are shelfing. Each band can select between four different fixed frequencies. The gain can be adjusted from -12dB .. +12dB. The three middle bands contains an additional narrow/wide option (Q-factor). In the top screen a graphical represnentation can be seen from the settings made with the controls.
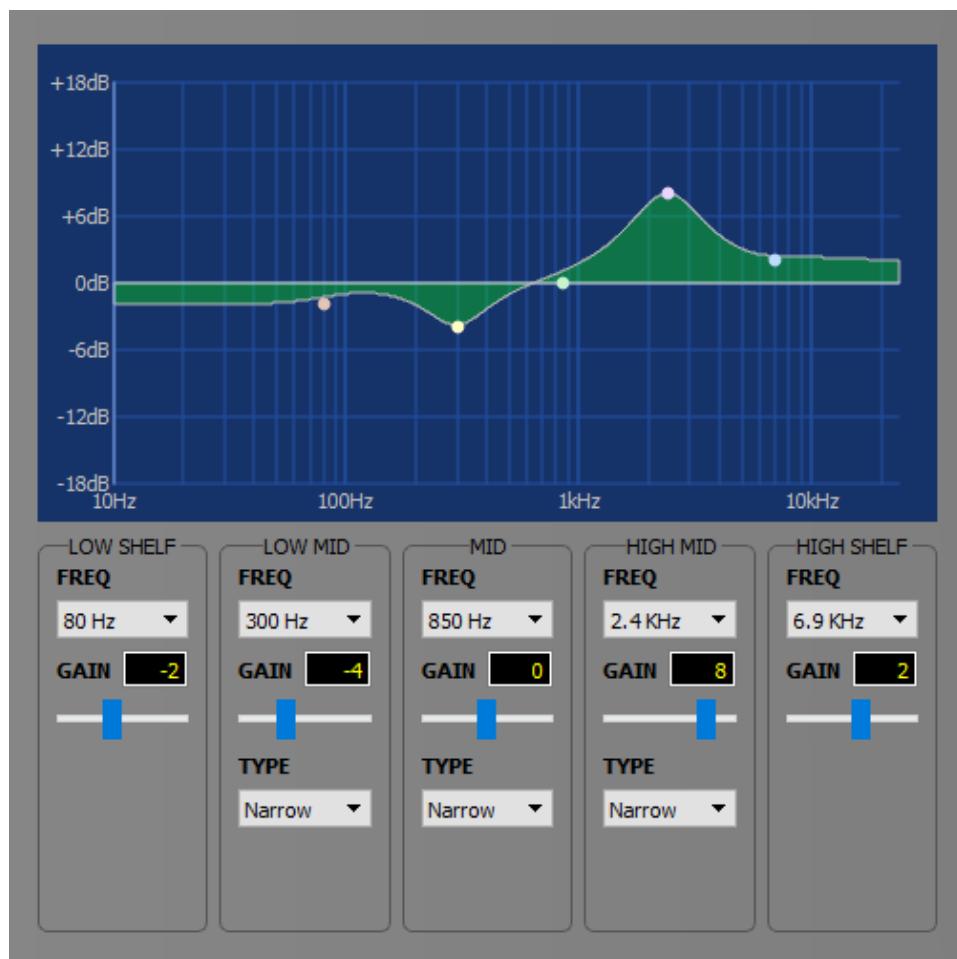
3.6   Settings

In the Settings view you can adjust several settings. Click on the tab for viewing the settings you want to adjust. Currently there are three settings tabs available:

- Audio Levels
- Dial numbers
- Auto Answer

AUDIO LEVELS:
The audio levels of the RECEIVE(output) and SEND(input) XLR connectors on the backpanel can here be adjusted. The level of the RECEIVE (from caller) output from 0..100%. The gain of the SEND (to caller) input can be adjusted from -12.. +35.25 dB.

RECEIVE:
- This is the signal we receive from the caller and is feed to the XLR male output connector.
- Output volume can be adjusted from 0 – 100%.

SEND:
- This is the signal we send to the caller and is provided at the XLR female input connector.
- Input gain can be adjusted from -12dB…+35,25dB.
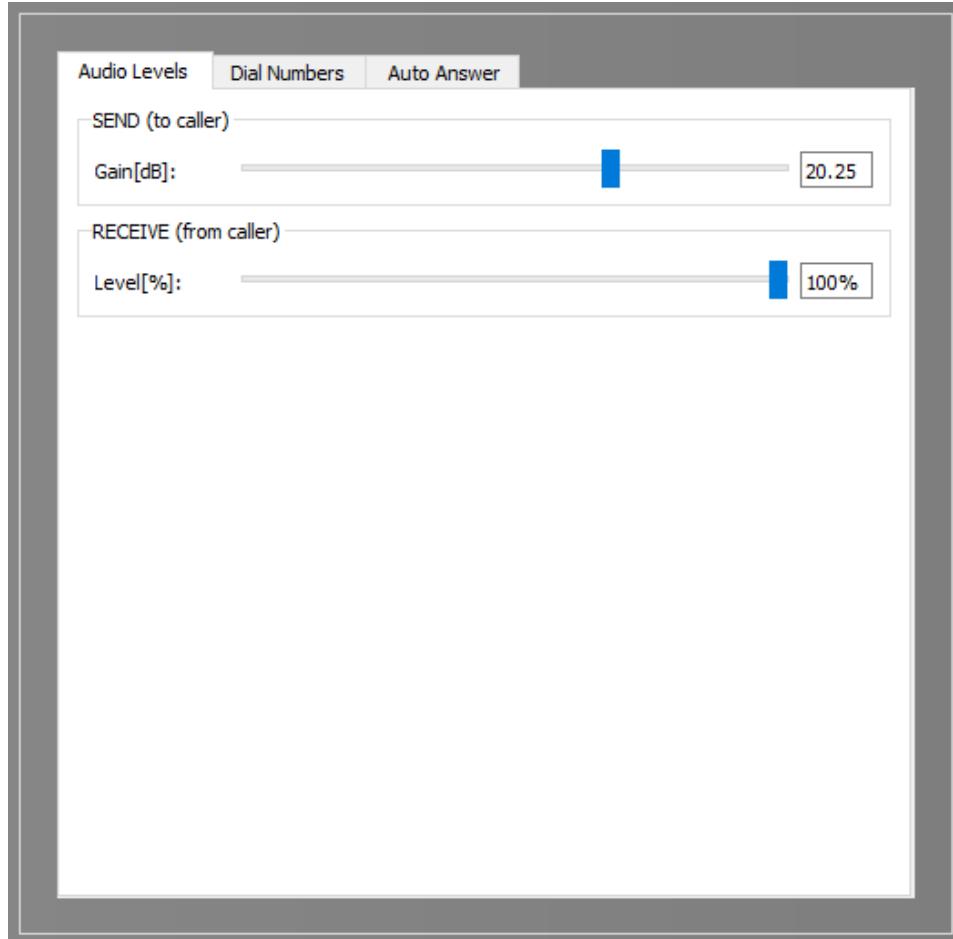
DIAL NUMBERS

In the dial numbers section you can configure 8 numbers which can be dialed by clicking on the corresponding quick-dial buttons right below the large Call and Disconnect buttons.
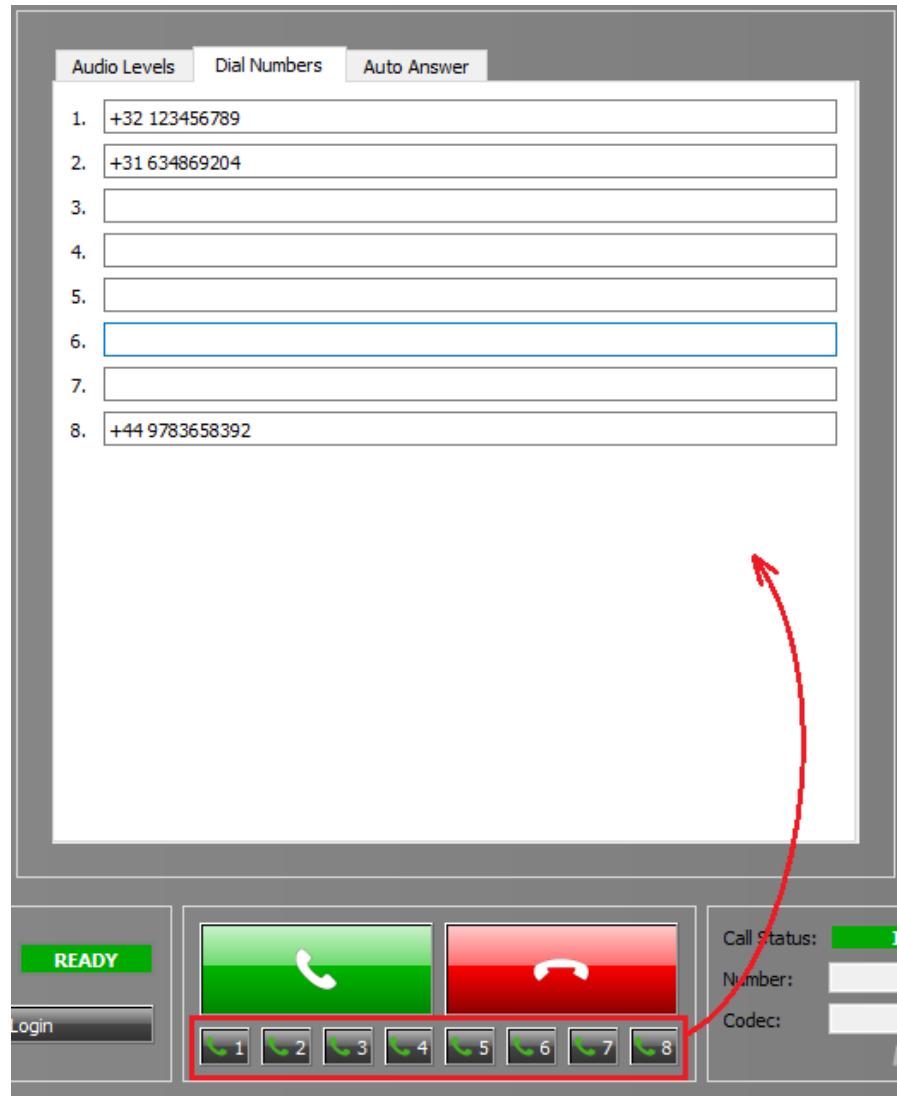
AUTO ANSWER

When enabled, the GSM Hybrid will pick up the line after one time the ring signal is received.
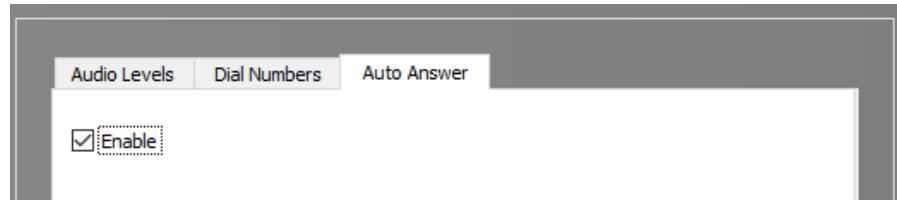
3.7 Info

In the Info menu-item you can see the information of the GSM Hybrid itself, and the information about the onboard GSM Module. The hardwareID of the GSM Hybrid is a unique id for the device and can be used in future for registering your device.

```
GSM Hybrid
    Serial:             16081203V1
    Firmware revision:  1.5.284.0
    Hardware ID:        355833343031110E001000-1E9746-00

Internal GSM Module
    Manufacturer:       Quectel
    Model:              UC20
    Firmware revision:  UC20EQBR03A13E1G_BETA0418
    IMEI:               861075021931977
```
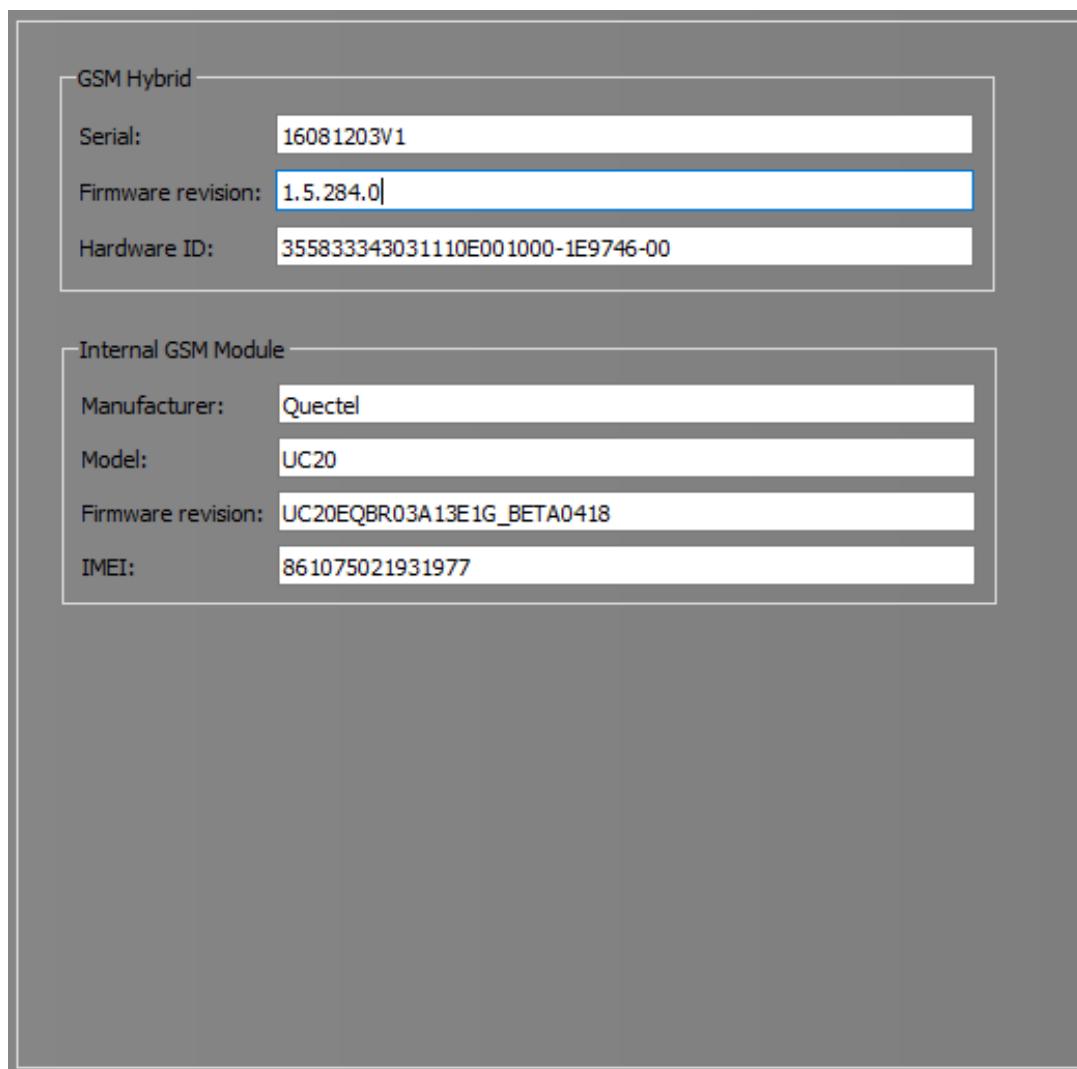
In the Call History menu-item an overview is given the incoming, outgoing and missed calls. Every call is logged into the database which is also used for the phonebook. The records in the Call History table are automatically synchronised with the Phonebook. If the phonenumber is known (from phonebook) the fullname of the person will be shown instead of the phonenumber. If a phonenumber is not known, you can double click on the phonenumber to add it to the phonebook.

The icon in front of the number indicates the call type. This can be incoming, outgoing or missed call. In case of a missed call the phonenumer/name is displayed in red. If a call is from the same type and phonenumber as the last one, the record in the call history form will be incremented with a number behind the phonenumber. This prevents you are getting 5 records in the call history, when someone calls 5x times.

In the second column the timestamp of the call is given. If the call is from 'today' then only the time is displayed. If the call is from 'this week' the time and the day of the week is displayed, like: "**Wednesday 10:23**". If the call is from longer than a week ago it will display full date and time as: "**25.07.2019 10:30**". The last column represents the duration of the call.

In order to clear the list you can press the [CLEAR] button at the bottom.

1. CALL HISTORY MENU BUTTON
2. TIMESTAMP OF CALL
3. DURATION OF CALL
4. MISSED CALL
5. OUTGOING CALL
6. INCOMING CALL
7. ADD NUMBER TO PHONEBOOK (DOUBLE CLICK)
8. CLEAR CALL HISTORY LOG
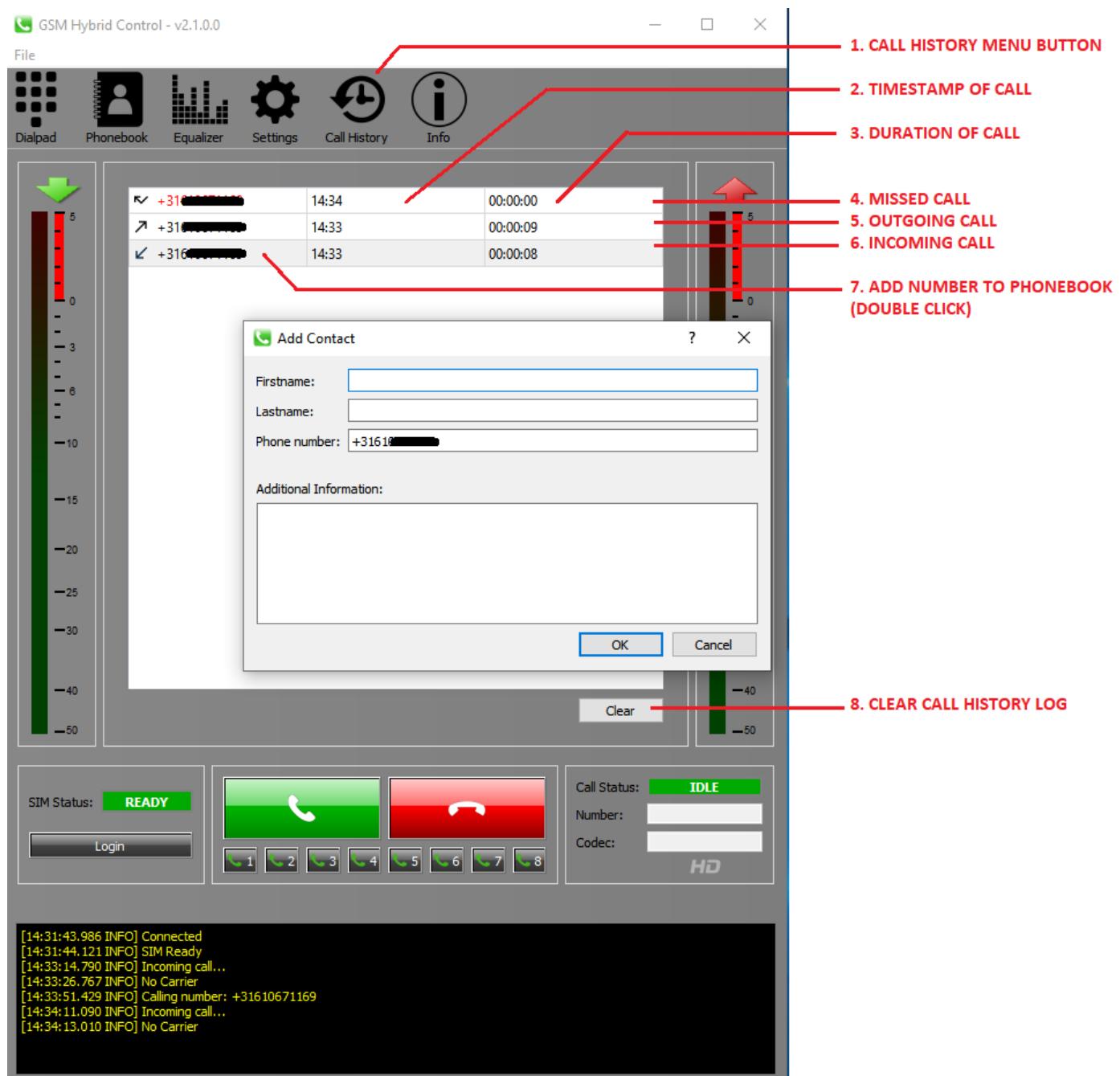
3.9   Save settings internal

When you want to use the GSM Hybrid in the field without the use of the GSM Hybrid Control software , this is possible since the all the settings can be stored into the device itself. When you are done configuring the device, you close the software application and you will be prompted with the following message:
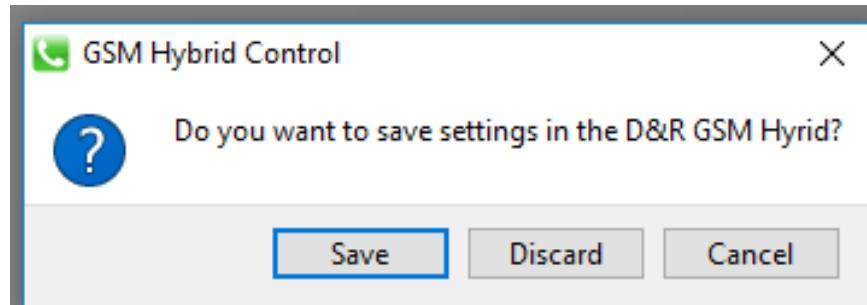
Please click on Save to store all the settings to the GSM Hybrid.

4 GETTING STARTED

4.1 Hardware Setup

1. Connect the GSM Hybrid to your PC with the delivered USB cable.

2. Connect the SEND (balanced audio input XLR female) to a (preferable) balanced mixer output of around +4dBu. This output has to be the mix of all signals except the signal coming from the hybrid itself to avoid feedback. An Aux. output will do or in broadcast mixers a clean-feed is the best.

3. Connect the RECEIVE (balanced audio output XLR male) to a line input of the mixing console. Note that this signal is NOT to be send to the output where the Hybrid's input is connected to. So in case of use of an Aux send this local channel Aux send needs to be turned off. In case of use of a clean-feed buss, this input channel needs to be disconnected from the cleanfeed buss.

4. ***OPTIONAL: Position RECEIVE and SEND controls of the mixer in their mid position.

5. Connect the 12VDC supplied adapter to the power input connector. The On led on the front should be blinking for around 8 seconds, indicating the unit is starting up. If the On led becomes steady green the unit is ready for normal operation.

1. Make sure you have properly setup all hardware connections

2. Power the GSM Hybrid with the delivered power supply (12VDC) and wait for the ON led to become stable green.

3. Start the GSM Hybrid Control Software (double click the icon on your desktop).

4. Connect to the GSM Hybrid (Click on **File -> Connect** at the top bar)

5. Click the DialPad icon on the Menu and enter the phone number you want to call.

6. Press the green call button to make the call.

4.3   *Receiving calls*

1. Make sure you have properly setup all hardware connections

2. Power the GSM Hybrid with the deliverd power supply (12VDC) and wait for the ON led to become stable green.

3. Start the GSM Hybrid Control Software (double click the icon on your desktop).

4. Connect to the GSM Hybrid (Click on **File -> Connect** at the top bar)

5. Answer the incoming call by clicking on 'Accept'
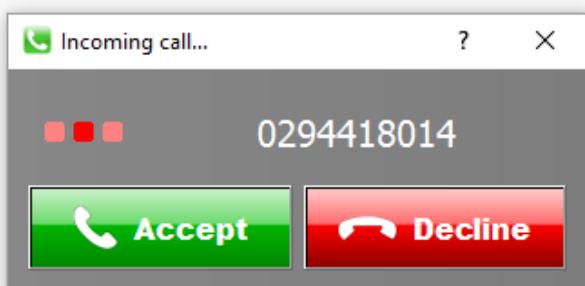
5   GSM Firmware update

Note: A firmware update is not done with the GSM Hybrid software!

You must have a USB cable connected between de GSM Hybrid and your PC to process below mentioned download.

Please download the firmware update tool and update from our download page:
http://www.mambanet.org/wiki/dokuwiki/doku.php?id=supgsmhybrid:start

Disconnect the power.
Hold down the Connect button.
Connect the power.
Release Connect button after 5 seconds.
It now boots into bootloader mode.
Start Firmware update tool.
Select GSM Hybrid and load the downloaded firmware,
Press UPDATE and it will run the update.

When the Atlibdfu error occures follow this video:
https://youtu.be/oWNRIsJQvCk
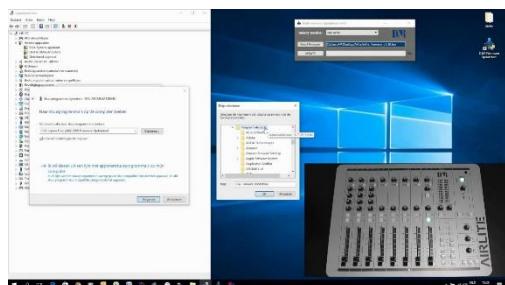
D&R firmware update tool message AtLibUsbDfu.dll not found
for Airlite, Airence, Airlab, GSM Hybrid
youtu.be
In this video we will show you what you need to do when you get
the message AtLibUsbDfu.dll not found at the D&R firmware
update tool when you want to update...

6 SPECIFICATIONS

6.1 Audio Input (SEND)

SEND	
Impedance	20k Ohm, electronically balanced
Common mode rejection	>40dB
Maximum input level	+22dBu
Nominal input level	+6 dBu
Frequency response	50Hz – 7kHz
Connectors	XLR type 3 pin female

6.2 Audio Output (RECEIVE)

RECEIVE	
Impedance	< 50 Ohm, electronically balanced
Common mode rejection	>40dB
Maximum output level	+21.5dBu
Nominal output level	+6 dBu
Bandwidth to telephone line	50Hz – 7kHz, -3dB ref 1 kHz
Connectors	XLR type 3 pin male

6.3 General

GENERAL	
Distortion	Less than 0.1% (0dBu out)
Power supply	100-240 volt AC / 50/60Hz to 12Volt 1Amp
Power consumption	10VA Maximum
Dimensions	1 HE front panel: 241mm x 44mm (1HE)
USB	USB 1.1
GPO	Opto Fet 60V/550mA, Pmax=500mW
GPI	Pulldown to GND.
GSM bands	900/1800MHz@GSM
Antenna	SMA connector

7   DIMENSIONS

Left-Right   : 240 mm
Front-Back   : 175 mm
Height   : 44   mm
Front panel thickness   : 3   mm
Weight   : 2 kg net excl. packing

We wish you many creative years of productivity using this quality product from:

Company   : D&R Electronica b.v.
Address   : Rijnkade 15B
Zip Code   : 1382 GS
City   : WEESP
Country   : The Netherlands
Phone   : 0031 (0)294-418 014
Fax   : 0031 (0)294-416 987
Website   : http://www.d-r.nl
E-mail   : mail@d-r.nl

8   SUMMARY

We hope this manual has given you sufficient information to use this new GSM Hybrid in your studio.
If you require more info please contact your local dealer or send us an email at mail@d-r.nl and we will answer your email within 24 hours during weekdays.

In case you have bought this product from a previous owner, check out the dealer in your area on our website www.d-r.nl in case you need assistance.

9   ELECTROMAGNETIC COMPATIBILITY

This unit conforms to the Product Specifications noted on the Declaration of Conformity. Operation is subject to the following two conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation. Operation of this unit within significant electromagnetic fields should be avoided. Use only shielded interconnecting cables.

10   DECLARATION OF CONFORMITY

Manufacturer   : D&R Electronica B.V.
                                              : Rijnkade 15B,
                                              : 1382 GS Weesp,
                                              : The Netherlands

declares that this product

Product   : GSM HYBRID
Model   : n.a.
Installed options   : none

passed the following product specifications:

Safety   : IEC 60065 (7th ed. 2001)

EMC   : EN 55013 (2001+A1)
                                              : EN 55020 (1998)

Supplementary Information:

The product passed the specifications of the following regulations;

                                              : Low voltage 72 / 23 / EEC
                                              : EMC-Directive 89 / 336 / EEC. as amended by Directive 93/68/EEC

(*) The product is tested in a normal user environment.

Duco de Rijk

md

D&R Electronica B.V..
Rijnkade 15 B
1382 GS WEESP
The Netherlands

11 PRODUCT SAFETY

This product is manufactured with the highest standards and is double checked in our quality control department for reliability in the "HIGH VOLTAGE" section.

12 CAUTION

Never remove any panels, or open this equipment. No user serviceable parts inside. Equipment power supply must be grounded at all times. Only use this product as described in the user manual or brochure. Do not operate this equipment in high humidity or expose it to water or other liquids. Check the AC power supply cable to assure secure contact. Have your equipment checked yearly by a qualified dealer service center. Hazardous electrical shock can be avoided by carefully following the above rules.

Ground all equipment using the ground pin in the AC power supply cable. Never remove this pin. Ground loops should be eliminated only by use of isolation transformers for all inputs and outputs. Replace any blown fuse with the same type and rating only after equipment has been disconnected from AC power. If problem persists, return equipment to qualified service technician.

Always earth all your equipment by the grounding pin in your mains plug. Hum loops should be only cured by proper wiring and isolation input/output transformers. Replace fuses always with the same type and rating after the equipment has been turned off and unplugged. If the fuse blows again you have an equipment failure, do not use it again and return it to your dealer for repair.

Always keep the above information in mind when using electrically powered equipment.