



DIAL-101A

*GSM Gateway Voice Interface for
analog trunk interface of PBX (FXS)*



TECHNICAL – INSTALLATION MANUAL

DIAL-101A System Manual - Version HW 1.00 FW 4.05

Made in Italy by TEMA TELECOMUNICAZIONI S.r.l.

Recommendations

1. Use only original spare parts and consumables supplied by Tema Telecomunicazioni Srl for this equipment. The company shall not be held responsible for any damage caused by the use of materials that they have not supplied.
2. The device has been carefully manufactured and tested. In any case, the product is not recommended for use in situations in which incorrect operating may result in damage to persons and/or property.
3. We recommend that you carefully read all this manual before starting to use the device.
4. Do not expose the device to sunlight and protect it from sources of heat, dust, humidity and chemical agents.
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Revision	Date	Revision Reason	Prepared	Checked/Approved
5	11/05/2010	Update	DP,GBC	FL



DICHIARAZIONE DI CONFORMITÀ CE

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La sottoscritta società : **TEMA TELECOMUNICAZIONI SRL**
con sede in : Via C. Girardengo, 1/4 - 20161 MILANO

dichiara che il prodotto: **Interfaccia GSM Gateway voce – GSM Gateway**

Codici: **DIAL-101 nelle versioni A, B, C, T, con modulo relé E08**

è stato costruito in conformità alle seguenti normative:

SICUREZZA EN 60950

EMC EN 55022
EN 55024
EN 61000-6-1
EN 61000-6-3

RADIO ETSI EN 301 511 V.9.0.2 Radio Spectrum - Global System for Mobile Communications GSM900/1800
ETSI EN 300 607-1 Digital Cellular telecommunications system
ETSI EN 301 419-1, ETSI 300 342 Radio equipment and systems
EN 301 489-1 V1.6.1, EN 301 489-7 V1.3.1

TERMINALE DI TELECOMUNICAZIONE TBR 21 (1998) – Terminal Equipment (TE); Attachment requirements for pan-European approval for connection to the analogue Public Switched Telephone Networks (PSTNs) of TE (excluding TE supporting the voice telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signalling.

Inoltre il prodotto sopra menzionato soddisfa i requisiti essenziali delle seguenti direttive:

- Direttiva LVD 73/23/EEC (Low Voltage Directive)
- Direttiva EMC 89/336/EEC – 92/31/ECC
- Direttiva 99/05/EC per apparati di Radio e Telecomunicazioni

MILANO, 14 Marzo 2005

TEMA TELECOMUNICAZIONI SRL
Felice Lamanna
Amministratore

A handwritten signature in black ink, appearing to read 'Felice Lamanna', written over a light blue horizontal line.

I. IMPORTANT INFORMATION REGARDING THE RECOVERY AND RECYCLING OF THIS ELECTRONIC DEVICE

The crossed-out wheeled bin symbol below indicates that this electronic equipment is intended to be disposed in a separate collection and not in an unsorted municipal waste, in order to provide for the treatment of WEEE (Waste Electrical and Electronic Equipment) using best available recovery and recycling techniques.

Specific treatment for WEEE is indispensable in order to avoid the dispersion of pollutants and other hazardous substances into the waste stream, while recycling leads to reduction of disposal of waste and the negative impacts on environment and human health. That is, priority is given to reuse of WEEE in its components, subassemblies and consumables.

As the final holder, the user has an important role in contributing to reuse, recycling and other forms of recovery of WEEE and is responsible to return this waste in the collection facilities set up by EC Member States and to fulfill other duties in compliance with Directive 2002/96/EC and local laws.



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1. INTRODUCTION OF GATEWAY DIAL-101A

DIAL-101A is a device that redirects voice telephone calls over the GSM network allowing a significant reduction in the cost of calls to mobile telephones by, for example, negotiating corporate contracts. The unit is equipped with an FXS port (LINE connector) for connection to an analog trunk interface of the PBX or, alternatively, to a standard DTMF telephone. When DIAL-101A is connected to an analog trunk interface of the telephone exchange, it allows routing calls to cellular telephones via a built-in GSM module: the greatest savings are achieved by performing this task.

If the PBX has an LCR (Least Cost Routing) function, the ARS (Automatic Route Select) table can be configured so that DIAL-101A can be used as the default gateway for calls originating from the exchange extensions and directed towards one or more area codes.

If the PBX has no LCR function, a dial code for the DIAL-101A connection can be prefixed to the telephone number normally called, so as to use DIAL-101A as an outbound gateway.

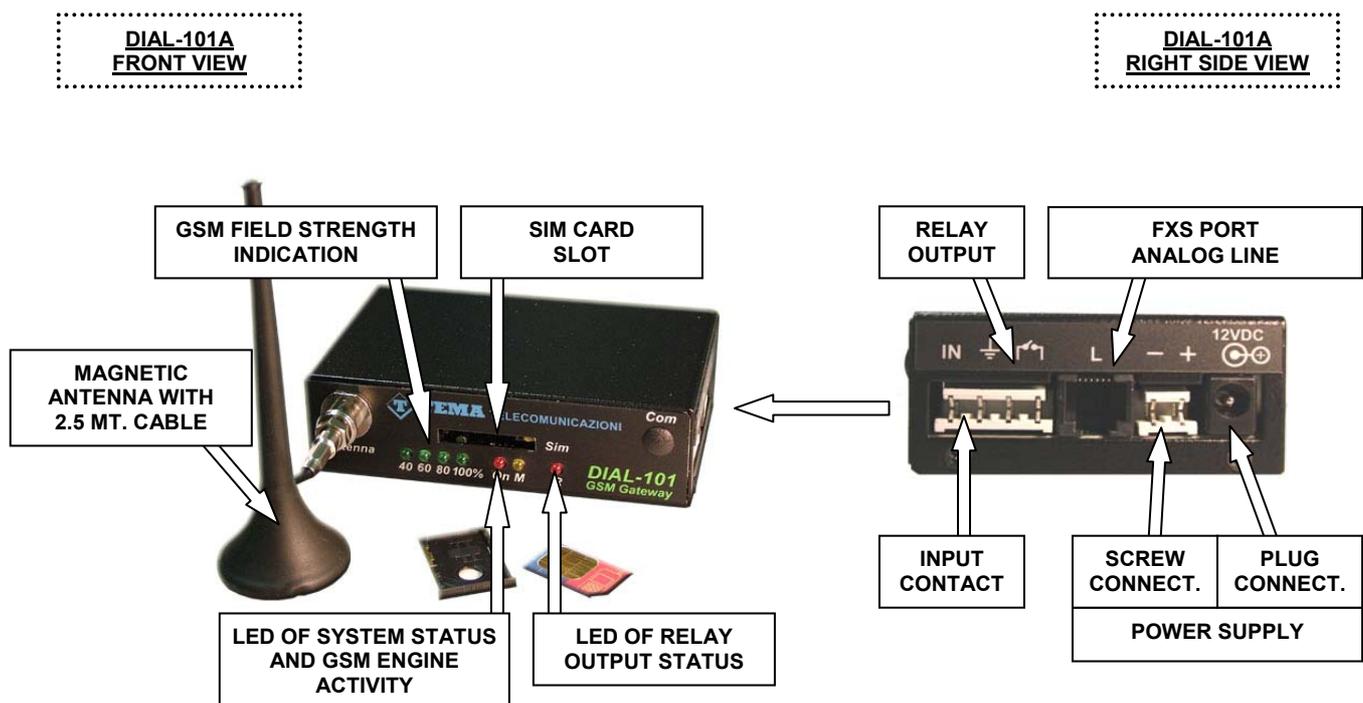
Depending on the size and traffic volumes, a company may install one or several DIAL-101A units so as to save the most on calls to cellular phones.

For incoming calls, i.e. for calls to the SIM number of the built-in GSM module, DIAL-101A redials the calls downstream the PBX.

Moreover, DIAL-101A can perform additional functions as the Alarm Contact Dialer or the Relay Remote Control: following the activation of its input contact, DIAL-101A calls a preset telephone number such as to notify emergency response personnel, while its built-in relay can be remote-controlled in order to turn low-power devices on and off in a pulsed or steady manner.

The installation of DIAL-101A is extremely simple and requires no particular skills. In fact, after inserting the SIM card, connect the unit to a PBX analog trunk interface and plug in the antenna and power supply cable: DIAL-101A is now ready to use. Moreover, the unit is provided with a set of LED to ease recognition of the system's and the GSM link's status and activity.

DIAL-101A parameters can be programmed using DTMF tones. This password-protected function is available locally via the system-dialed line, via remote calls from the GSM network and even via an SMS message.



2. CHARACTERISTICS OF DIAL-101A

DIAL-101A main features are:

- Built-in dual-band (900/1800 MHz) GSM module
- High audio quality
- Plug & Play installation
- Programming via DTMF tones
- Programming via SMS
- Regulation of the voice communication volume
- 2-wire line interface with RJ-11 jacks
- Visual indicators
 - LED bar indicating the antenna field signal level
 - LED indicator of the system operating status
 - LED indicator of the integral GSM module operating status
 - LED indicator of the outbound relay contact status
- Compact size

Services for outbound calls (converted from the wired line network to GSM)

If suitably programmed and as well as the routing function offered by the downstream PBX, DIAL-101A allows making direct calls to cellular telephones using the GSM network, which is more cost-effective than calling from a wired line. Moreover:

- Call by call conversation timeout with time recharge option
- Table for inhibiting outbound calls to unwanted numbers
- Possibility of concealing SIM identity of the GSM module to the called number
- Accepts DTMF tone and pulse dialing (to support older PBXs)
- Access to the module for local programming via DTMF

Services for inbound calls (converted from GSM to wired line)

If suitably programmed and connected to the PBX, DIAL-101A receives calls from the GSM network and reroutes them to the PBX (or telephone) in wired line analog mode. Moreover:

- Possibility of rejecting all incoming calls
- Table for inhibiting unwanted callers (rejecting incoming calls)
- Sending the caller-ID (CLI) to the downstream device
- Differentiated ring based on recognition of the calling number from a table
- No timeout on incoming calls
- Access to the remote programming via DTMF
- Remote programming via SMS

Additional functions

- **Alarm Contact Dialer:** following the activation of an external contact, DIAL-101A calls a preset telephone number such as to notify emergency response personnel.
- **Relay Remote Control:** the built-in relay can be remote-controlled in order to turn low-power devices on and off in a pulsed or steady manner.
- Advanced programming via SMS, with response/acknowledgement SMS, alarm via SMS and/or call

3. PARTS COMPRISING THE SYSTEM (PACKING LIST)

DIAL-101A system consists of the following parts:

- A DIAL-101A device
- An external power supply with 12V_{DC} – 1A output
- An external antenna with 2.5 meter cable
- A PLUG/PLUG RJ-11 twin-wire telephone cord
- A 2-pin screw connector
- A 4-pin screw connector
- One pair of anchor bolts and screws for wall mounting.
- A technical manual (this manual)

4. TECHNICAL SPECIFICATIONS

GSM Section

GSM Module	Built-in, dual-band (900/1800 MHz)
Type of GSM network	GSM Phase II
SIM card	Plug-in, 3V, small
Transmission power	Max. 2W / 900MHz - 1W / 1800MHz
Receiver sensitivity	> -100 dBm
Antenna/Frequency	50Ω impedance, FME connector, 900/1800MHz
Length of antenna cable	2.5 meters

Telephone FXS interface section

RJ-11 telephone connection	For connecting an analog trunk interface of the PBX directly to an analog telephone set. Even without connecting to an analog line, the RJ-11 can be used, for example, to activate other systems remotely through the built-in relay (when called by GSM).
AC impedance with engagement	600Ω
Analog line voltage in stand-by	48 V _{DC}
Analog line current with engagement	25mA max.
Max. line loop resistance	800Ω
Call signal generator (ring)	65 V _{RMS} , 25Hz on high impedance, 40 V _{RMS} , 25Hz on 3 REN (400Ω)
Dial tone	425Hz
Analog FXS line dialing	DTMF + DECADIC (PULSE)

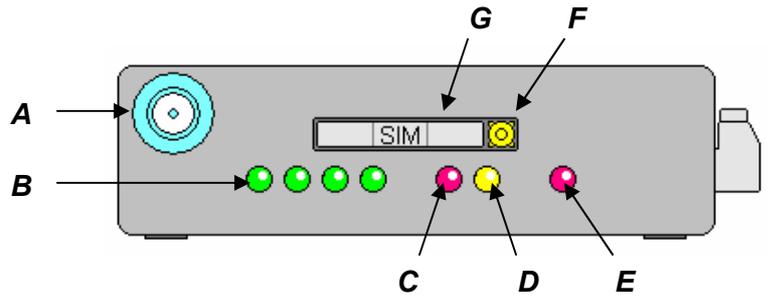
General

Power supply	Power supply adapter provided Input 220 V _{AC} , 50Hz - Output 12 V _{DC} , 1A
Operating temperature	0 °C to 45 °C
Relative humidity	95% non-condensing
Dimensions	L103 x H30 x D64 mm
Weight	About 300 gr.
Integral relay maximum capacity	50 V _{AC} – 200mA. WARNING: do not connect at 220V; this would cause irreversible damage to the device.
Activation of built-in relay	In positive logic, the normally open contact closes, in negative logic, the normally closed contact opens.
Acquisition of external contact	In positive logic when normally open contact closes, in negative logic when normally closed contact opens.

5. DESCRIPTION OF THE DEVICE

5.1. Front view

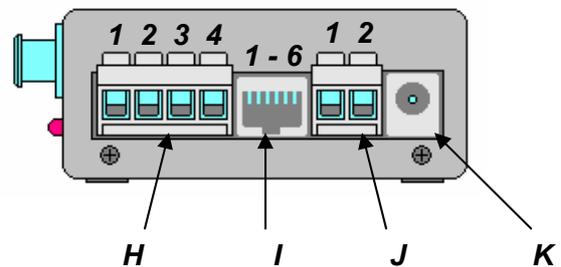
DIAL-101A front panel is provided with:



- A = Antenna connector (FME)
- B = Antenna signal field level LED bar
- C = System status LED (On)
- D = GSM module status LED (M)
- E = Relay contact status LED (R)
- F = SIM card release button
- G = SIM card slot

5.2. Right side view

DIAL-101A side panel is provided with:



H = 4-pin screw connector for connection to the input contact to read and the relay output.

- pin 1**, External contact input
- pin 2**, External contact input (connected to negative pole of power supply)
- pin 3**, Integral relay contact output
- pin 4**, Integral relay contact output

I = RJ-11 connector for a PBX trunk line interface or an analog telephone.

- pin 1, 2, 5, 6** NC not connected
- pin 3, 4**, connection to analog telephone or PBX outside line

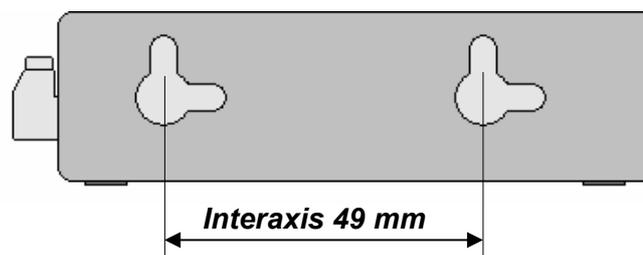
J = 2-pin screw connector for connection with the same power as "K"

- pin 1**, Negative power (Warning: this output is not fuse-protected)
- pin 2**, Positive power (Warning: this output is not fuse-protected)

K = System power connector, central positive.

5.3. Rear view

The rear panel has two slots to allow hanging the system onto the wall, either horizontally or vertically. Use the two anchor bolts provided (the slots are for 5-mm expansion anchors). Drill holes for the two anchor bolts 49 mm apart.



6. INSTALLATION AND DIAGNOSTICS

DIAL-101A has a GSM module that requires a SIM card from the selected telephone operator to work. The procedure for registering the SIM card on the wireless network when the device is turned on is automatic and identical to that of a normal GSM telephone. It is also possible to determine if the registering may be in roaming, therefore with a different operator other than the owner of the SIM Card, or not (field 225, default roaming enabled).

6.1. Installation of the DIAL-101A unit

In addition to resting on table, a desktop or shelf, the DIAL-101A unit can be wall-mounted, either horizontally or vertically, using the appropriate slots located on its rear panel.

To do that proceed as follows:

- Attach the DIAL-101A to the wall in the required position.
- Manually screw the antenna connector to the front panel (do not use a wrench).
- Connect a PBX analog trunk (or a normal analog telephone device) port to the LINE connector.
- Insert the SIM card.

To insert the SIM card into DIAL-101A, use a small screwdriver or pen point to press the center of the yellow button on the front slot with the SIM holder. Remove the holder and insert the SIM with the gold contacts facing upwards. Note that there is only one correct way to place the SIM in the holder. Now, carefully align the holder in the slot and insert it until it stops in its operating position.

Note

To avoid damaging the DIAL-101A or the SIM card, make sure the unit is disconnected from its power supply before inserting or removing the SIM card.

Important Tips for Proper Operation

We recommend disabling the PIN code request, voice mail, all call diversions (such as when busy, absent or not available) and call notifications on the SIM card before inserting the SIM in the DIAL-101A, using a normal GSM device with keypad.

- Connect the power supply cord.

The built-in GSM module will then start registration with the GSM network, a phase indicated by the red "On" LED.

Position the antenna at the point of best reception, monitoring performance on the signal level bar with the 4 green LEDs. Signal level should be close to 100% to ensure good system operation.

6.2. Operational and Diagnostic Indicators

When DIAL-101A is connected and powered, the LEDs signal the status of the system in a simple, effective manner.

6.2.1. Operational Indicators

Make sure that the antenna signal-level LED bar indicates good signal strength.

Under these conditions, when you lift the micro-telephone connected downstream or engage the PBX line, you will hear the typical analog-line dial tone.

In the case of a SIM blocked by a PIN code request, or not inserted, failed or not yet registered with the GSM network or other cases that prevent normal operation, you will hear a tone indicating unavailability.

6.2.2. Diagnostics

On power-up, the red LED "On" flashes quickly.

After registration, also the red "On" LED will flash slowly while the level of the antenna signal is indicated by the lighting of the green LEDs. This is the condition of the unit in stand-by mode (no calls in progress).

The engagement of the telephone line, and hence the activity status of the module, is signaled by the red "On" LED that remains lit for the entire duration of the conversation.

When programming the unit remotely or by a downstream telephone, this status is indicated by the fast flashing of the "On" LED, indicating the normal operation of the GSM unit.

The yellow LED "M" has diagnostic purposes, and the way it blinks depends on the GSM engine onboard.

Since the signal status is constantly updated, upon switching on the system, check that the LED bar shows maximum signal, indicating that the antenna has been put in an appropriate place.

Otherwise, it will be necessary to find a better position for the antenna so that it can provide a stronger and more stable signal. There is no rule for positioning the antenna since an appropriate position depends on the intensity of the operator's field in the area and other factors related to the shielding of the radio waves by walls/buildings. The lighting of all four green LEDs indicates that signal strength is 100%.

The status of the red "R" LED depends, on the contrary, on the program entered for the management of the built-in relay. The unit is supplied by the manufacturer with the LED in off position (contact in stand-by mode).

Abnormal conditions, or temporary inactivity periods are signaled by the fast flashing of the red "On" LED with the four green LEDs off. In this latter case, the antenna signal status is not displayed.

The gateway is ready to be used when connected to the analog line and when the registration to GSM network has been made. Make an incoming and an outgoing call to check communications in both ways.

During normal use, it is possible that the user may experience the echo effect on the conversation. This effect happens seldom and in a not systematic way, depending on the condition of the GSM link that carries the communication. However, should echo happen continuously, refer to appendix A2 in order to follow the echo cancellation instructions. The parameters to be set are available from the firmware version 2.04 on.

7. SERVICES

7.1. Outbound Call Gateway

In its basic function, outbound calls can be made through the integral GSM module, from the telephone or the PBX wired line port connected to DIAL-101A, thus transforming a wired network call into a GSM call.

If the PBX is provided with advanced routing functionality (LCR - Least Cost Routing) it is possible to configure the relevant table (ARS - Automatic Route Select table) in a way that DIAL-101A is chosen as the default output line for calls directed to one or more mobile GSM numbers, depending on their prefixes.

If the PBX is not provided with LCR, it is still possible to select DIAL-101A when a GSM mobile number is dialed by setting the selection code of the trunk interface the Gateway is connected to, and dialing this code before the GSM number to call. Refer to your PBX documentation for further info.

By lifting the unit micro-telephone or engaging the PBX trunk line, the DIAL-101A provides the dial tone of a normal analog line. Therefore, the telephone number to call should be dialed within a configurable dialing time (field 221, default 30 sec).

DIAL-101A has to collect all the digits of the number to call before making the call through its built-in GSM module (as with a normal GSM telephone) and it uses a configurable timeout (field 220, default 4 sec) to do this. So, after the last digit is entered, the call to the GSM network is generated after 4 seconds.

It is possible to speed-up the call by simply pressing the # (pound) key at the end of the number to be called, to let DIAL-101A know that it can send the GSM call immediately.

It is also possible to determine that the call will be generated after DIAL-101A has collected a predetermined number of digits (field 271, default disabled). This feature has the advantage of not having to enter additional digits to the dialed number and not having to wait for the time-out selection; when this function is enabled, keep in mind that you can not make calls to numbers that have a longer number of digits set in the 271 field.

After sending the GSM call, DIAL-101A connects the voice to allow the caller to hear the progress of the call (ringing, busy, etc.). When the called person answers, a timer (field 235) controls the maximum allowable call duration. If a timeout has been programmed, one minute before it expires, a tone warns the user that the call is about to be terminated. The caller may reset the timer for an additional amount of time (field 245) to prevent the call from being terminated. So, when you hear the warning (one tone every 5 seconds), you can press the communication timer reset code (field 240, default “*1”).

The SIM identity in the built-in GSM module can be concealed by simply programming the appropriate field (field 260).

Note: regardless of the system programming, the GSM network allow users to forward/hide the user identity CLI by way of universal special codes foregoing the GSM number. These codes are:

CLI FORCED FORWARDING	*31#	+	GSM NUMBER
CLI FORCED HIDING	#31#	+	GSM NUMBER

7.1.1. Inhibited number Table

Some numbers, area codes or parts of numbers stored in a table (fields 250-259) can be inhibited so that DIAL-101A will not make calls to these numbers. For example, by entering “06” all calls to the Rome wired line network will be inhibited, while by entering “02615441”, calls to that complete number will be inhibited. Entering “144” blocks calls to service centers. This function is useful for blocking calls to the wired network (not cost-effective from GSM) or unwanted calls, if the downstream PBX doesn't have an ARS function or when only one telephone is connected to DIAL-101A.

7.1.2. Decadic (pulse) dialing detection

Solely to adapt to old PBXs that don't have DTMF dialing, and only when expressly enabled (field 272), DIAL-101A also accepts decadic (pulse) dialing.

7.1.3. Access to the module for Local Programming via DTMF

Parameters can be programmed by engaging DIAL-101A's line with a downstream telephone or by using the PBX's trunk interface. For changing the parameters set, refer to the relevant section.

7.2. Inbound Call Gateway

In basic operating mode, when DIAL-101A receives a call to the built-in GSM module, it regenerates the ring by sending the call current over the analog line; if a caller-ID has been received, DIAL-101A resends it in Bell202 or CCITT V.23 mode, 1200-baud FSK modulation, to the downstream telephone or PBX. Communication is established when the call is answered. There is no timeout on inbound calls.

By programming the appropriate field (field 215), it is possible to ignore all incoming calls (the built-in GSM module rejects them). This function is useful for keeping the system available only for outbound calls.

Note: This configuration has the disadvantage of preventing programming by remote calls.

7.2.1. Differentiated rings

DIAL-101A sends a differentiated ring to the downstream telephone (field 210). It is possible to set an outside line ring (1-sec. ring – 4-sec. pause), a fast ring (1-sec. ring – 2-sec. pause) or an outside line/fast ring based on the CLI of the calling number in the table (fields 505-554): if the number is recognized, it will be a fast “caller recognized” ring, otherwise it will be a trunk line ring indicating an “unknown caller.” This function is especially useful when DIAL-101A is connected to a normal telephone instead of a PBX.

7.2.2. Inhibited number Table for inbound calls

Similarly to outbound calls, an incoming call table (fields 280-289) can be created to inhibit certain callers or area codes. When DIAL-101A receives an inhibited call, it automatically rejects it.

7.2.3. Access to the module for remote programming via GSM

Call DIAL-101A at the number of its SIM card, wait for someone to answer the line downstream and, within the first 30 seconds of conversation, key ### (3 pound signs) + one of the Passwords enabling the selected function (Alarm Management, Relay Management or Parameter Programming).

If there is no downstream operator to answer, it is possible to set DIAL-101A to automatically answer a GSM call by setting the appropriate parameter (field 270).

7.2.4. Access to the module for remote programming via SMS

Send an appropriately formatted SMS (see chap. 8.4) to the SIM number of the built-in GSM module. Wait for DIAL-101A to send back a confirmation SMS, indicating that programming has been performed.

7.3. Alarm Contact Dialer via GSM network

This function allows activation of a cyclical telephone call to a telephone number following the triggering of the alarm contact to warn the assigned personnel to handle it; it also allows sending previously programmed cyclical SMS messages. It is likewise possible to report that the alarm contact has been enabled by only sending an SMS. After receiving the notice, the employee can interrupt additional attempts with the appropriate password. If the alarm contact reactivates (by reopening and reclosing) it will trigger a new series of notices for that alarm. However, if the contact remains closed after the first alarm, at the end of the attempts, or after the assigned personnel have acknowledged the message by entering the appropriate password, no other notices are sent. See appendix A1 to learn how to detect an incoming alarm on the external contact.

- The incoming alarm detection circuit is constantly checked.
- If a contact is closed for longer than 200 milliseconds, the GSM module is used as soon as available to warn the alarm handler (by dialing the number associated with the alarm, set in field 565, and/or sending the SMS message in field 601 to the number set in field 585).
- The system waits 90 seconds for the person called to identify himself by entering the alarm function PASSWORD (field 202, default 3333).
- If the time elapses without receiving the password, the system hangs up, waits for the interval between attempts (field 570) to pass, decreases the number of attempts remaining (field 575) and, finally, recalls.
- Once the attempts are over, **it stops reporting the alarms** unless a new alarm is triggered.
- If the person called qualifies himself with the correct password, the system exits from alarm status.
- In the event that the notification comes only via SMS, it is possible to stop sending the message before all the attempts are made by calling the DIAL-101A SIM number, entering the alarm function password and manually silencing it by pressing DTMF 0 (zero). See the following section for more details.

7.4. Alarm status check and silencing

The function allows checking the status of alarms. This is useful for different circumstances:

- the called person did not understand or wants to confirm that the system has reported an alarm
- the call was not answered by the operator in charge of handling the alarms
- the operator's phone was switched off or out of GSM service field, and it is required to make sure no alarm occurred

To check the status, call the system's SIM card and then:

- When the system answers, press ### (3 pound signs) + the alarm function PASSWORD (field 202, default 3333).
- After the long confirmation tone, DIAL-101A emits only **one brief tone every 5 seconds** to indicate that the alarm is disabled. Alternatively, it emits **three brief tones every 5 seconds** to signal that the alarm is enabled.
- After listening to the alarm to check if it has been enabled, you can silence it by pressing DTMF 0 (zero). DIAL-101A then emits the alarm disabled tone. Hang up at the end.

7.5. Relay Remote Control

This function allows to check the status of the integral relay as well as enabling or disabling it. It is useful for making any type of signal to an outside device that can be driven by a contact. The DIAL-101A contact can be programmed for permanent activation, pulsed activation for electric locks or cyclical for light signals.

- When the system answers, press ### (3 pound signs) + the remote control function password (field 201, default 2222).
- After a long confirmation tone, DIAL-101A emits **just one brief tone** if the relay is disabled or **three brief tones**, if enabled.
- The relay status can be changed by keying DTMF 1 (one) to enable it or 0 (zero) to disable it. Following each command, the above-described tones confirm the relay status.

DIAL-101A allows sophisticated management of the built-in relay. It is possible to set the relay activation method and logic, by appropriately setting parameters 555 ("Relay activation method") and 580 ("Confirm relay input contact").

For example, it is possible to save the status of the relay in the system's non-volatile memory. This allows resetting the status of the contact after a power failure. The reactivation of the relay is deliberately delayed by 10 seconds so as not to immediately enable loads downstream from the system when the power comes back on. If this function is not used, the relay will not be enabled when the electricity comes back on. Program the operating modes to suit your own needs.

7.6. Door opening / gate opening function at zero cost

A special feature of the relay contact (field 500) allows accessing the door opening / gate opening function. This function exploits another of DIAL-101A features, i.e. detection of the caller-ID on an incoming GSM call. This allows activating the relay in pulse mode (to command the electric lock) only when certain identification numbers (which have been entered in an appropriate table of telephone numbers to be recognized – fields 505-554) call the number of the SIM in the system's GSM module. Automating the door opening function in this way has no cost for the users since DIAL-101A does not answer the call, but simply recognizes the qualified calling number and activates the relay.

It is possible to subordinate the effective activation of the relay to the status of the DIAL-101A input contact (field 500, value 2). When the contact is open, the door opening/ gate opening function is disabled; when the contact is closed, it is enabled. It is thus possible to "block" the function, such as during door closing hours, simply by connecting a switch or a timer for automatic schedule management.

Note: when the relay is used for the door opening function, its programming through a remote control is not recommended (see previous section).

8. PARAMETER PROGRAMMING

DIAL-101A is equipped with an integral non-volatile memory, whose structure can be shown in a table where programming data should be entered.

8.1. Programming Modes

A simple call to the system allows access to many of the functions offered as well as parameter programming. Anyway the system can be programmed also locally. The functions that can be enabled are the following:

- Access to system programming
- Enabling the remote control relay
- Accessing the alarm silencing function
- Resetting the system's default parameter settings

These functions require entry of the relevant password.

Note: Each access password can be typed "concealed" in the sense that the system will recognize it even if preceded by a series of deliberately wrong DTMF characters. DIAL-101A waits for a password to be entered correctly and, if this occurs, emits a long password recognition beep.

8.2. Local programming

This function allows updating DIAL-101A's data tables for configuring its operating mode.

- Connect an analog telephone directly to the LINE connector or to the trunk interface of the PBX to which DIAL-101A is connected.
- Key **###** and, after the confirmation tone, key the password for the parameters, **1111** by default.
- Wait for the confirmation tone that indicates password accepted and access to programming mode

The Gateway answers back with different tones depending on which operation has been made, in order to ease the programming. Basically these tones are:

- **1 long tone** : confirm data entering or password accepted, it is a confirming tone
- **1 short tone** : confirm field selection
- **2 short tones** : confirm value selection
- **3 short tones** : error notice or confirm of just inserted data removal

Thus, if the entered password is correct, you will hear the begin of programming confirmation tone: the field to program and the value to be set may be selected dialing the appropriate number with the phone keypad, and then # (pound key) to confirm the choice or * (asterisk key) to cancel selection.

Note: the field number entered must always be three digits. If an invalid field number were entered, the system would play the 3 short tones of error signaling.

For example, to set the "Ring type" parameter you must dial **210** and **#** to confirm the choice: the system will announce, with the short confirm field selection tone, that the field has been selected.

Then it is possible to set the value of the field, entering the appropriate digit (digit 0, in this example of parameter 210, to set the fast ringing mode): the system will confirm the value selection with the 2 short confirm value selection tones.

If the data entered are correct, press **#** to confirm the choice: the system will confirm the entry with the 2 short confirm value selection tones. If you wish to empty a field, do not enter any value and, after the single-beep press **#** to obtain the long confirmation beep.

It is possible to quit programming by simply hanging up or changing other parameters by following the procedure just described. Dial-101A waits 3 seconds from the last DTMF digit entered before confirming the entered value: that is entering a new value the user must dial within this timeslot.

In the event that you have reached the limit of the data area provided for the field in programming, this time value is canceled in order to speed up programming. For example, if the parameter is 1 digit long, Dial-101A confirms the value entered after receiving one DTMF digit. If the parameter is 3-digit long and the user enters only 2 digits, Dial-101A will confirm the entry 3 seconds after the user entered the second digit; when 3 digits are entered, the entry is confirmed immediately after receipt of the third digit to signal that the field is full and, at the same time, speed up programming. The parameters entered will be stored.

Note: during programming no call can be made.

Note: when no digit is keyed for at least 30 seconds, the unit automatically exits programming mode.

8.3. Remote programming

This function allows updating DIAL-101A data tables for configuring its operating mode. It is programmed in the same way as local programming.

- Call the SIM number of the DIAL-101A GSM module.
- If the downstream operator answers, press **###** and password **1111**, as in the case of local programming. The operator will be excluded and it is possible to proceed to programming.
- If no response is received from the operator, DIAL-101A will automatically answer the GSM call after a programmable delay and, when you hear a long tone, the DIAL-101A is ready to receive the password. This avoids having to key the three beginning pound signs.

8.4. Programming via SMS

To program in this way, just write a message by constructing the necessary elementary fields. The concept is similar to programming by telephone, i.e., you need to enter the valid programming password, indicate the field to change and the value to enter and delimit the elementary information with exclamation points.

Format of valid SMS must be as following:

1. **Programming password**
2. **Exclamation mark**
3. **Field to set followed by its value**
4. **Exclamation mark**

For faster programming, it is possible to send several fields in a single SMS message (with a maximum of 150 characters), simply repeating point 3. and 4. of the previous format for each couple field+value is required to set.

For example, send the system the following SMS: **1111!2100!**

which means sending the following information **PASSWORD (1111) + (!) + FIELD (210) + VALUE (0) +(!)**

which **instructs DIAL-101A to program the following field: 210 with value 0**

For example, send the system **1111!2100!5001!50539335123456!506393359876543!2151!**

This **instructs DIAL-101A to program the following fields:**

210	with value	0
500	with value	1
505	with value	39335123456
506	with value	393359876543
215	with value	1

Since the programming SMS message may not be received immediately (it depends exclusively on the mobile telephone operator), as soon as DIAL-101A receives the programming SMS message and correctly executes it, it will send a confirmation message to the user containing a summary of the programming message received.

For example, the SMS message confirming the previous command would be:

“1111!2100!5001!50539335123456!506393359876543!2151!”

By simply checking these values, the operator will be confident of what has been programmed. In addition, there are two special commands to be introduced in SMS programming:

“ENTER NUMBER IN THE CLI LIST” and **“DELETE NUMBER FROM THE CLI LIST”**

These are especially useful for managing the entry/removal of numbers from the CLI list without having to worry about the list position (fields 505-554) of the number to be added or removed.

To entry a new number: use operator “>” (more than)
To remove a number : use operator “<” (less than)

For example, send the system the following SMS: 1111!>39335123456!”

which **instructs DIAL-101A to program entry the new number 39 335 123456**

It is possible to add and remove several numbers in the same SMS. See the following example.

“1111!>39335123456!>393359876543!<39335112233!”

The numbers 39335123456 and 393359876543 will be added to the list and 39335112233 removed.

NOTE: field 601, which contains the text message associated with closing the alarm contact, can **ONLY AND EXCLUSIVELY** be programmed by SMS. In fact, it is impossible to enter the text in a simple and intuitive way from a telephone. To program this field, send an SMS similar to the following:

For example, send: **1111!601Notice. Contact activation detected!”**

This means to program field: 601 with value **Notice. Contact activation detected**

Note that, after the field value (601), all characters are accepted until either the maximum message capacity is reached (50 characters) or the “!” character (exclamation mark) is encountered, which cannot, therefore, be part of the message text.

8.5. Restoring the default parameters

If necessary, ALL the data entered in the device memory can be deleted so as to restore default parameters (see the tables for the default values) **by programming from a local line**. To erase the memory and reset the device with the default values proceed as follows:

- Connect an analog telephone directly to the LINE connector or to the trunk of the PBX where DIAL-101A is connected.
- Key **###** and, after the confirmation tone key ****8 ##8 **8** (asterisks and pound signs with the digit 8).
- Wait for the confirmation tone indicating that all default parameters have been restored.

Or, if you know the programming password and the SIM number of the module, send the module the following SMS:

“1111!?” where **1111** is the password and **!?** is the command to restore the default parameters.

8.6. Parameter Table

The following table summarizes the programming commands.

Note: in the “Field Number” column, the three-digits parameter code is followed by the # (pound key), to remind the users to always confirm the device that the data just entered is correct.

Note: Use the column to fill-in your settings, writing the values entered in the device you are programming.

Field Number	Parameter Name	Description	Default	Field max length (digits)	Enter Your Settings
200 #	Password for programming the parameters	This is the password to enter for accessing the programming function. It is not possible to clear this field; this password must exist. <i>Range: max 6 digits</i>	1111	6	
201 #	Password for relay management	This is the password to enter for accessing the relay management function; it must exist. <i>Range: max 6 digits</i>	2222	6	
202 #	Password for alarm management	This is the password to enter for accessing the alarm management function; it must exist. <i>Range: max 6 digits</i>	3333	6	
210 #	Ring type	Signals inbound calls. 0 = Fast Ring 1 = Phone Company 2 = depending on the CLI function table <i>Range: from 0 to 2</i>	1	1	
215 #	Accepts inbound GSM calls	Defines whether or not to accept any inbound calls. 0= calls are rejected 1= calls are accepted (a ring is generated) <i>Range: from 0 to 1</i>	1	1	
220 #	Interdigit timeout for dialing (in milliseconds)	Delay for reading digits on analog line, detect the number and redial it on GSM <i>Range: from 0 to 65535</i>	4000	5	
221 #	Delay for dialing first digit (milliseconds)	Maximum time allowed for dialing before DIAL-101A emits a not-available tone. <i>Range: from 0 to 65535</i>	30000	5	
225 #	Roaming Enable	Allow or deny the DIAL-101A roaming registration to the GSM network. 0= Roaming disabled 1= Roaming enabled <i>Range: from 0 to 1</i>	1	1	
235 #	Max. outbound conversation time before cut-off (in seconds)	Timeout for single outbound conversation. <i>Range: from 0 to 65535</i>	36000 (10h)	5	
240 #	DTMF code to recharge conversation time	Code for recharging timeout per single conversation. <i>Range: max 3 digits</i>	*1	3	
245 #	Conversation time recharge (in seconds)	Max. recharge time per single conversation. <i>Range: from 0 to 65535</i>	300 (5 min)	5	
250 #	Inhibited number 1	Enter number or area code to be inhibited (outbound calls). <i>Range: max 15 digits</i>	-	15	
251 #	Inhibited number 2	As above.	-	15	
252 #	Inhibited number 3	As above.	-	15	
253 #	Inhibited number 4	As above.	-	15	
254 #	Inhibited number 5	As above.	-	15	
255 #	Inhibited number 6	As above.	-	15	
256 #	Inhibited number 7	As above.	-	15	
257 #	Inhibited number 8	As above.	-	15	
258 #	Inhibited number 9	As above.	-	15	
259 #	Inhibited number 10	As above.	-	15	

Field Number	Parameter Name	Description	Default	Field max length (digits)	Enter Your Settings
260 #	To send SIM CLI	Send your own CLI 0 = do not send it 1 = send it <i>Range: from 0 to 1</i>	0	1	
265 #	RX voice level	GSM module reception volume <i>Range: from 0 to 9</i>	5	1	
266 #	TX voice level	GSM module transmission volume <i>Range: from 0 to 9</i>	5	1	
270 #	Time before automatic response to inbound call (in seconds)	Waiting time before automatic response in view of programming <i>Range: from 0 to 65535</i>	30	5	
271 #	Max number of dialing digits	You can determine how many digits DIAL-101A will use to generate a call without waiting for the interdigit time-out (field 220). Attention: longer numbers will be truncated. <i>Range: from 0 to 99</i>	-	2	
272 #	Enables detection of decadic (pulse) dialing	For old PBXs with decadic (pulse) dialing on outside line trunk. 0 = DTMF only 1 = DTMF + DECADIC (PULSE) <i>Range: from 0 to 1</i>	0	1	
280 #	Unwanted caller 1	Blocks unwanted users. These numbers are rejected when they call the GSM module. <i>Range: max 15 digits</i>	-	15	
281 #	Unwanted caller2	As above.	-	15	
282 #	Unwanted caller 3	As above.	-	15	
283 #	Unwanted caller 4	As above.	-	15	
284 #	Unwanted caller 5	As above.	-	15	
285 #	Unwanted caller 6	As above.	-	15	
286 #	Unwanted caller 7	As above.	-	15	
287 #	Unwanted caller 8	As above.	-	15	
288 #	Unwanted caller 9	As above.	-	15	
289 #	Unwanted caller 10	As above.	-	15	
290 #	Unused	Only used in Italy, leave default value (0).	0	1	
291 #	Ring frequency	To set the ring signal frequency value 0 = set to 25 Hz 1 = set to 50 Hz <i>Range: 0,1</i>	0	1	
500 #	Door opening mode	Sets whether to enable the door opening function 0 = function disabled 1 = function enabled (from CLI table) 2 = as for value 1 but only if input contact is enabled. <i>Range: from 0 to 2</i>	0	1	
505 #	CLI table num. 1	Telephone number table position <i>Range: max 15 digits</i>	-	15	
506 #	CLI table num. 2	As above	-	15	
507 #	CLI table num. 3	As above	-	15	
508 #	CLI table num. 4	As above	-	15	
509 #	CLI table num. 5	As above	-	15	
510 #	CLI table num. 6	As above	-	15	
511 #	CLI table num. 7	As above	-	15	
512 #	CLI table num. 8	As above	-	15	
513 #	CLI table num. 9	As above	-	15	
514 #	CLI table num. 10	As above	-	15	
515 #	CLI table num. 11	As above	-	15	
516 #	CLI table num. 12	As above	-	15	
517 #	CLI table num. 13	As above	-	15	
518 #	CLI table num. 14	As above	-	15	
519 #	CLI table num. 15	As above	-	15	
520 #	CLI table num. 16	As above	-	15	
521 #	CLI table num. 17	As above	-	15	
522 #	CLI table num. 18	As above	-	15	

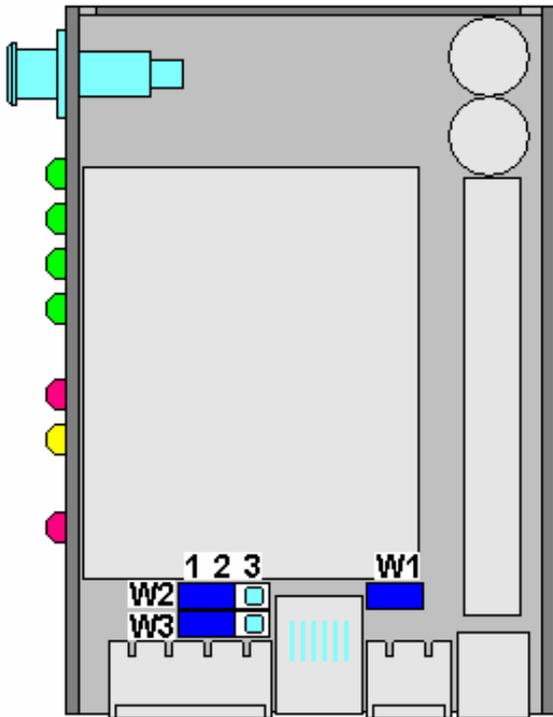
Field Number	Parameter Name	Description	Default	Field max length (digits)	Enter Your Settings
523 #	CLI table num. 19	As above	-	15	
524 #	CLI table num. 20	As above	-	15	
525 #	CLI table num. 21	As above	-	15	
526 #	CLI table num. 22	As above	-	15	
527 #	CLI table num. 23	As above	-	15	
528 #	CLI table num. 24	As above	-	15	
529 #	CLI table num. 25	As above	-	15	
530 #	CLI table num. 26	As above	-	15	
531 #	CLI table num. 27	As above	-	15	
532 #	CLI table num. 28	As above	-	15	
533 #	CLI table num. 29	As above	-	15	
534 #	CLI table num. 30	As above	-	15	
535 #	CLI table num. 31	As above	-	15	
536 #	CLI table num. 32	As above	-	15	
537 #	CLI table num. 33	As above	-	15	
538 #	CLI table num. 34	As above	-	15	
539 #	CLI table num. 35	As above	-	15	
540 #	CLI table num. 36	As above	-	15	
541 #	CLI table num. 37	As above	-	15	
542 #	CLI table num. 38	As above	-	15	
543 #	CLI table num. 39	As above	-	15	
544 #	CLI table num. 40	As above	-	15	
545 #	CLI table num. 41	As above	-	15	
546 #	CLI table num. 42	As above	-	15	
547 #	CLI table num. 43	As above	-	15	
548 #	CLI table num. 44	As above	-	15	
549 #	CLI table num. 45	As above	-	15	
550 #	CLI table num. 46	As above	-	15	
551 #	CLI table num. 47	As above	-	15	
552 #	CLI table num. 48	As above	-	15	
553 #	CLI table num. 49	As above	-	15	
554 #	CLI table num. 50	As above	-	15	
555 #	Relay activation method	When relay is enabled : 0 = steadily enabled with memory 1 = steadily enabled without memory 2 = 2-second pulse 3 = cycle 1 sec/1 sec with memory 4 = cycle 1 sec/1 sec without memory 5 = cycle 2 sec/1 min with memory 6 = cycle 2 sec/1 min without memory <i>Range: from 0 to 6</i>	1	1	
560 #	Alarm detection logic (contact)	External contact detection 0 = positive logic, detects contact closure 1 = negative contact, detects contact opening See Appendix A2 <i>Range: from 0 to 1</i>	0	1	
565 #	Alarm notice telephone number	Number to contact when an alarm is detected. <i>Range: max 15 digits</i>	-	15	
570 #	Time between alarm notice attempts (seconds)	Time between two attempts to call preset number for alarm function management. <i>Range: from 0 to 65535</i>	300	5	
575 #	Number of notice attempts	Total number of attempts to notify preset number. <i>Range: from 0 to 99</i>	10	2	
580 #	Confirm relay input contact	For indicating the condition of the alarm contact (followed by its status) or reporting the alarm status of the device. 0 = no, contact free for other functions 1 = closed with alarm enabled (logical positive) 2 = open with alarm enabled (logical negative) 3 = relay follows status of input contact (to confirm input reading) <i>Range: from 0 to 3</i>	0	1	

Field Number	Parameter Name	Description	Default	Field max length (digits)	Enter Your Settings
585 #	Telephone number for alarm via SMS notification	Number to send SMS notification of an alarm condition. <i>Range: max 15 digits</i>	-	15	
601 #	SMS text	Text of the SMS message to send for reporting an alarm. This field can only be programmed by SMS <i>Range: max 50 letters/numbers</i>	-	50	

APPENDICES

A1 - ARRANGEMENT OF INTERNAL JUMPERS TO SET INPUT SIGNAL DETECTION

The figure shows the internal parts highlighting the jumper position.



Jumper W1

Jumper W1, inserted on the two contacts (short-circuited contacts) means allowing the detection of the closing of a voltage-free external alarm contact on terminals 1-2 of the screw connector (identified as H). In practice the voltage for “reading” the contact is provided by DIAL-101A itself. The contact must withstand a 24 V_{AC-DC}, see figure A.

If the jumper is removed (open contacts), the system is ready for detecting a maximum voltage of 24 V_{AC-DC}, to be supplied by an external device between terminals 1 and 2 of connector “H”, instead of detecting a closing/opening contact, see figure B. Remove the jumper only if absolutely necessary and assisted by qualified technical personnel since the system is live. Besides detecting the options (parameters) in positive or negative logic, the system can also detect contact opening/closing or whether the system is live or not.

By programming field 560 it is possible to invert the logic of acquisition of the normally open/closed contact or the normal voltage status (present/absent).

Jumpers W2 and W3

Jumpers W2 and W3 should always be left in position 1-2 as when the system was supplied by the manufacturer. They are provided for additional future functions.

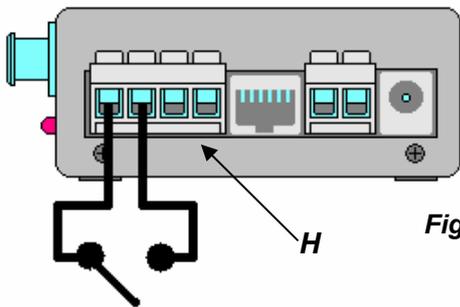


Figure A

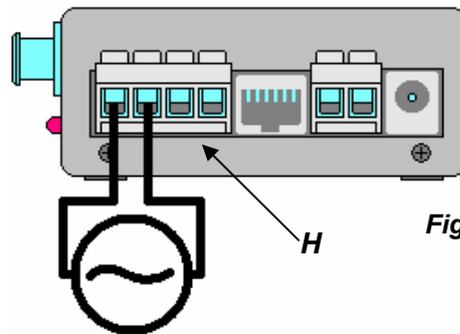


Figure B

Warning: pin 2 of the “H” connector is connected to the **negative** pole of power supply: please keep in mind that anything connected to this pin will be referred to that negative.

Following tables summarize the possible input signal detection combinations:

Jumper W1	Field “560” detection logic	External contact status	ALARM status
Inserted	0	Open	OFF
Inserted	0	Closed	ON
Inserted	1	Open	ON
Inserted	1	Closed	OFF

Jumper W1	Field “560” detection logic	External voltage status	ALARM status
Removed	0	Present	OFF
Removed	0	Absent	ON
Removed	1	Present	ON
Removed	1	Absent	OFF

A2 - ECHO CANCELLATION

The parameters to be set are available from the firmware version 2.04 on; please modify only in case the effect experienced during normal use is continuous and systematic, as echo may randomly happen depending on GSM link conditions.

The parameters below are very sensitive, that is modify only with the help and under supervision of TEMA technical staff.

Parameters below affect DIAL-101A gateways with "WISMO" GSM engine built-in only; for the others models, the only parameter that can be modified is the one enabling or disabling of the echo cancellation, while the other parameters regarding the customization of the algorithm will not have effect.

Note: for information regarding how to set DIAL-101A operative parameters, refer to section of parameters programming.

Note: after setting at least one parameter, switch off and on the gateway in order to let the changes have effect.

Field Number	Parameter Name	Description	Default	Field max length (digits)	Enter Your Settings
020 #	Enable/Disable the echo cancellation algorithm	<p>This parameter allows to enable or disable the algorithm for echo cancellation.</p> <p>0 = echo suppressor disabled 1 = echo suppressor enabled</p> <p>Note: if the built-in GSM engine is "WISMO" it may possibly be necessary to set the other parameters also, otherwise this is the only parameter whose modification will have effect.</p> <p><i>Range: 0,1</i></p>	0	1	
021 #	Algorithm type	<p>If echo cancellation is enabled, it is possible to choose between algorithms to use.</p> <p>1=set suppressor algorithm 1 3=set suppressor algorithm 3</p> <p><i>Range: 1,3</i></p>	3	1	
022 #	Parameter 1	<p>If algorithm 1 is chosen, this parameter indicates the echo attenuation level.</p> <p>0= 15 dB attenuation 1= 14 dB attenuation 15= 1 dB attenuation</p> <p><i>Range: from 0 to 15.</i></p> <p>If algorithm 3 is chosen, this parameter indicates the attenuation strength.</p> <p>0= minimal attenuation 63= maximum attenuation</p> <p><i>Range: from 0 to 63.</i></p>	63	5	

Field Number	Parameter Name	Description	Default	Field max length (digits)	Enter Your Settings
023 #	Parameter 2	<p>If algorithm 1 is chosen, this parameter indicates what step to use for the echo attenuation increase.</p> <p>0=steps 1 dB each 1=steps 2 dB each 2=steps 3 dB each 3=steps 4 dB each</p> <p><i>Range: from 0 to 3.</i></p> <p>If algorithm 3 is chosen, this parameter indicates the noise attenuation threshold.</p> <p>0 = maximum noise attenuation 32767 = no noise attenuation</p> <p><i>Range: from 0 to 32767.</i></p>	8000	5	
024 #	Parameter 3	<p>If algorithm 1 is chosen, indicates the threshold level between minimum and maximum energy.</p> <p><i>Range: from 0 to 31.</i></p> <p>If algorithm 3 is chosen, indicates the number of taps of the adaptive filter.</p> <p>64 = short distance echo 256= long distance echo</p> <p><i>Range: from 64 to 256.</i></p>	256	5	
025#	Parameter 4	<p>If algorithm 1 is chosen, indicates the threshold level of the maximum power.</p> <p><i>Range: from 0 to 31.</i></p> <p>If algorithm 3 is chosen, the parameter is not used.</p>	7	5	

A3 - TECHNICAL GLOSSARY

ARS	Automatic Route Selection: the PBX routes calls to output interface depending on digits dialed and the caller's privileges, if any. This way it is possible to route calls through the most cost-effective Operator
CALL BACK	Automatic recall service. A user requests this service through a free call to the system. The system recognizes the caller from the CLI.
CLI	Calling Line Identification, identifies the caller (the number of the calling user).
DECADIC	Pulse dialing system used on dial telephones or electromechanical PBXs.
DTMF	Dual Tone Multi Frequency, the dialing system used in modern telephony. Also called tone dialing as opposed to decadic or pulse dialing.
FXO	Foreign eXchange Office interface. Uses the services of a POTS interface. For example, a telephone device connected to an analog line.
FXS	Foreign eXchange Subscriber. Provides the services of a POTS interface. For example, an analog plug inside a PBX or an outside analog telephone line.
GATEWAY	Understood as a gate/port, a common access point, that allows communications between two systems using different technology handling the adaptation/transformation of signals from both.
GSM	Global System for Mobile communications (or Groupe Speciale Mobile). A mobile telephone network technology.
LED	Light Emitting Diode.
NC, NO	Normally Closed, Normally Open, refer to the status of a relay contact that normally remains closed or open under stand-by, or rest, conditions.
PBX	Private Branch Exchange.
POTS- PSTN	Plain Old Telephone Service, the very widespread analog telephone system, also called Public Switched Telephone Network.
SIM	Subscriber Identity Module, the card that identifies a GSM subscriber.
SMS	Short Message System, for sending messages over the mobile network.

REMARKS: