# MB 2400

## Portable Codec-mixer

**User's manual**


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# Table of contents

# Section 1 Overview

## 1.1 About this manual

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The exclamation icon within a triangle that appears in this manual is intended to alert the user to the presence of important instructions on the operation and maintenance (servicing) of the equipment.

The pencil icon that appears in this manual is to alert the user to the presence of notes, suggestions and examples about the operation.

## 1.2 What's in the box?

Inside the box you will find the following:

- *1 Solidyne MB2400 console*
- *1 Ethernet crossover network cable. Length 1 meter, for programming.*
- *1 standard Ethernet cable to conect the LAN. Length 2 meters.*
- *1 Charger (110/220V 50/60 Hz).*
- *This user's manual.*
- *Warranty form.*
- *In option: a bag for transport the console.*

**Please check the items when receive it to verify that all components are okay.**

## 1.3 Main features

MB2400 connectivity features are many; be described later in this manual. Here is a summary of the modes of transmission and signal types that the console can handle.

### 1.3.1 Connectivity

***Bluetooth***

The MB-2400 supports audio transmission and reception using a cell phone linked to the console via Bluetooth. When the console transmits streaming; by landline or mobile phone connected by "hands free" cable, Bluetooth link can establish a second telephone call that can be sent to the air (Channel 6 sends Bluetooth to program).

Bluetooth wireless technology allows to connect compatible devices without cables. A Bluetooth connection does not require that the devices be in line of sight, but the devices should be within 10 meters from each other (3 meters maximum recommended for safe operation). Connection can be subject to interference from obstructions such as walls or other electronic devices.

***ETHERNET***

Transmission of MPEG streaming via Internet.

***GPRS / EDGE / UMTS (3g)*** *(optional modem)*

Transmission of MPEG streaming via Internet using the cellullar network with a GPRS, EDGE or 3G Ethernet modem. This modem is an optional feature, consult your dealer.

***LAND LINES***

Transmit / receive audio using standard line lines. The console includes a DTMF dialler, so it operates like a standard telephone connected to a conventional telephone line.

***MOVILE PHONE***

Transmit/receive audio over the phone connected to the console via wired "hands free". Both (wireless Bluetooth and wired hands free) are supported by the MB2400 for transmission and reception.

***OUTPUT TO RF LINK or RECORDING***

The MB-2400 has balanced mono and unbalanced stereo outputs (PGM), for connection to microwave links, or direct recording on location.

### 1.3.2 INPUTS

Codec-mixer MB2400 manages 6 channel simultaneously, and the return from Studios. The inputs are:

- 5 microphone inputs (channels 1 to 5), balanced.
- 3 line inputs, balanced mono (mic channels 3, 4 and 5 supports line levels, changing automatically its gain when you connects a TRS plug).
- 1 stereo unbalanced line input (channel 6).

- 1 Bluetooth device. Return of Bluetooth cell phone can listen on headphones or routed to the main program, since Bluetooth audio is available on channel 6 (when this line input is unplugged).
- 1 Studio input. Used to listen in headphones the on-air transmission (from a external tuner connected to this input). When an external tuner is no present, this channel connects to the hybrid return of land line, or secondary cell phone (wired).

### *1.3.3 Stereo Monitoring*

The monitoring stage is a separate mixer that allows you to hear the locally generated audio and the return from the studios, witch incomes via cell phone, land line, or from an external tuner that takes the on-air transmission. The operator can choose mono or stereo monitoring.

### *1.3.4 Power supply*

The power source comes from an internal nickel metal hydride (Ni/MH) battery, which allows up to 20 hours of continuous use, depending on the mode of work (see below).

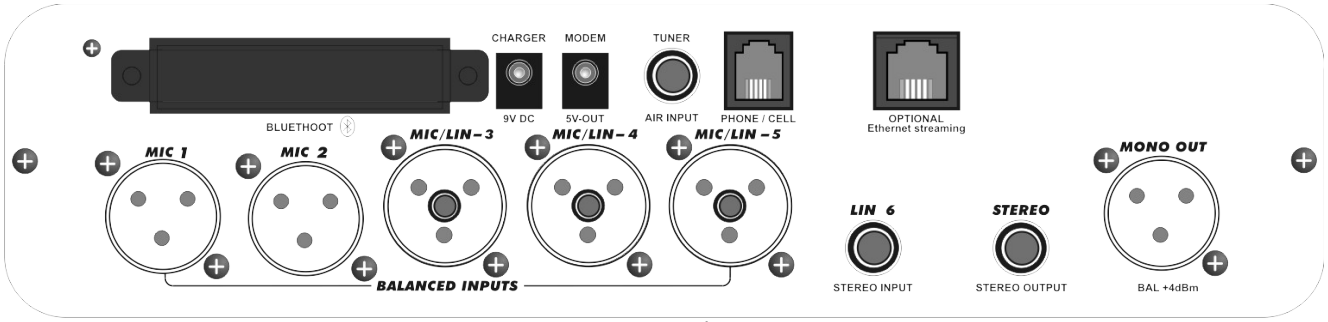
The console can be used plugged to the external charger, witch recharge the battery. The charger can be connected to 115/220 V, 50/60 Hz, with automatic switching.

### *1.3.5 48V phantom power*

Optionally, the console can have "phantom" power source of 48 volts, available in all microphone inputs. If you purchase this module after the purchase of the console, see "2.2.1 - Mounting the phantom module".

## *1.4 Recommendations for use*

- If the console is going to be used at the shoulder, use the original bag for transportation provided by Solidyne. This bag is optional and sold separately.
- **Check the battery level** before go out with the console. Always keep the charger handy.
- Do not connect the console to a charger that is not supplied from the factory.
- Do not forget to turn off the unit when not used.
- Do not leave switched on Bluetooth and/or streaming functions if not used. This reduces the length of the battery.




rear panel

## 2.1 Power supply

### 2.1.1 Charger

The console has a built-in rechargeable Ni-Mh battery which provides up to 20 hours of continuous use *.

The battery is recharged using the power supply that came with the console that provides 12 VDC, 1.5A. When you connect the external source, the battery begins to recharge and the VU meter lights, indicating that the unit is recharging. Considering a total discharge of the battery, the load is obtained in one night (12 hours). When the load is reduced, it is possible to recharge the battery before fully discharge connecting the unit to the charger for a few hours, so that the load reach its highest level.

To check the battery level, press the BATT TEST button at the frontal panel.

CONNECT THE CONSOLE ONLY TO THE CHARGER PROVIDED BY SOLIDYNE. Do not use chargers from other manufacturers or external battery.

** estimated value by considering a Bluetooth transmission, 3 dynamic microphones and two headphones. Using digital streaming is reduced to 8 hours.*

### 2.1.2 5 VDC output

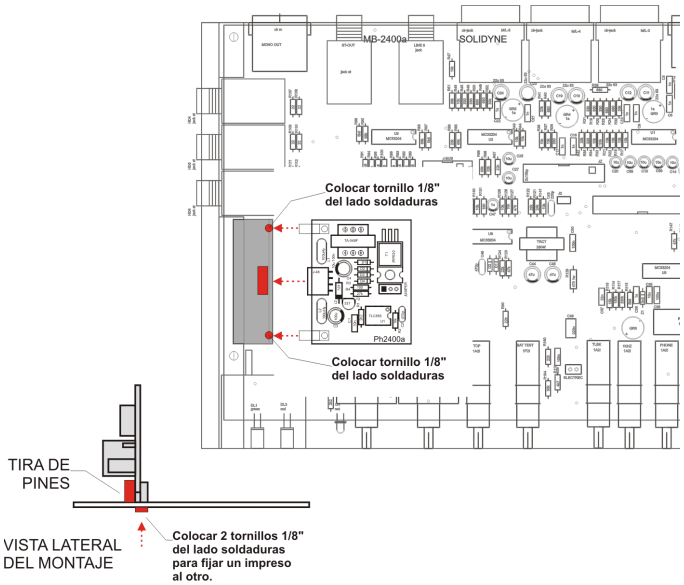
The console has an option for a second battery that provides 5VCC output to feed an external modem, for Internet access via cellular network.

## 2.2 Microphone inputs

All microphone inputs (MIC-1; MIC-2; MIC-3; MIC-4 & MIC-5) are electronically balanced, using XLR connectors. If the console has the *Pahntom Power* module (optional); all inputs gives 48 volts to use condenser microphones.

### 2.2.1 Mounting the Phantom module

If you purchased the module 48V Phantom after buying the console, follow these instructions for assembling in MB2400.




- Remove the lateral screws and lift the top cover.
- Remove bottom cover by removing the four side screws. It is necessary to fix the Phantom module to the main board with screws.
- Plug the module as is indicates the figure above.
- Fix the module with the screws.

## 2.3 Line level inputs

Inputs 3, 4 and 5 supports balanced TRS ¼" with line level. When you connects a TRS plug, input gain changes automatically.

Example of use: reception base of wireless microphone.

In addition, MB-2400 has an **unbalanced stereo input** , using TRS ¼" jack (channel 6).

Note that **3, 4, and 5 inputs are balanced mono,** using TRS jack. Do not connect a stereo signal, since left and right channels will be mixed with inverted phase.

### *2.3.1 Input connections*

| Mic's (XLR 1 to 5) | | Line (TRS 3 to 5) | | Stereo Line (TRS) | |
|---|---|---|---|---|---|
| 1 | GND | Tip | Signal (+) | Tip | left |
| 2 | Balanced (+) | Ring | Signal (-) | Ring | Right |
| 3 | Balanced (-) | Sleeve | GND | Sleeve | GND |

## *2.4 Tuner input*

The signal injected to this input (¼" mono jack) is sent only to the headphone mix through the fader STUDIO. When you connects this input, disconnects the hybrid return from studios ( RJ11 connector connected to land line or the wiring cell phone).

This input is used to monitor air emission from an **external tuner** with line-out (you can use the headphone output of a portable radio).

Is used, for example, when transmitting digital audio via Ethernet. Digital communication is unidirectional. The console sends data to a Internet server and the radio transmission is monitored, if possible, directly from the air by connecting an external tuner. Outside the coverage area, monitoring is made via cell phone .

We note that if transmitting streaming audio, monitoring should be limited to a brief listen to check the signal, as the delay of the signal bother to the speaking journalist. The monitoring must be done listening the direct audio of MB-2400 using the channel "Console".

## *2.5 Program output*

The MB-2400 has two program outputs:

1. One monoaural program output, (PGM MONO), balanced with XLR. The audio at this output is processed to maintain constant the audio level through the link.
2. One stereo program output (PGM STEREO) unbalanced, with jack TRS ¼". The signal at this output is not processed, to maintain intact the digital quality of the transmission.

This outputs send the program mix, that is to say, the sum of signals of the 6 input channels (MIC-1 to MIC-5, and Line/Bluetooth).

The stereo signal is formed by fixed positions of the microphone channels, which are assigned to left, right and center as indicated on the front of the console. The input LINE 6 is stereo. More in "3.1.2 - Program controls and headphone"

Audio signal at the mono output is processed by a dynamic range compressor that controls the peaks of the signal, avoiding different levels on the air. The stereo output is not compressed to preserve the natural sound broadcasting music.

**Example of use:** These outputs can be connected to a portable recorder for high quality recordings, or sent to the studies using a high quality radio link (eg digital microwave link).

## *2.6 Ethernet connection*

The RJ-45 allows to connect the console to Internet; or to a GSM MODEM to Internet access using the GSM cellular network. In this way the MB-2400 transmits audio streaming to a streaming server or directly to the studios of the radio station.

## *2.7 Telephone lines*

**RJ-11:** Connects the console to transmit using land-line or wired cell phone via hands free (requires an special adapter cable)

**Bluetooth:** Links the console to a mobile phone via Bluetooth. Cell phone can be up to 3 meters away.

## *2.8 Headphone outputs*

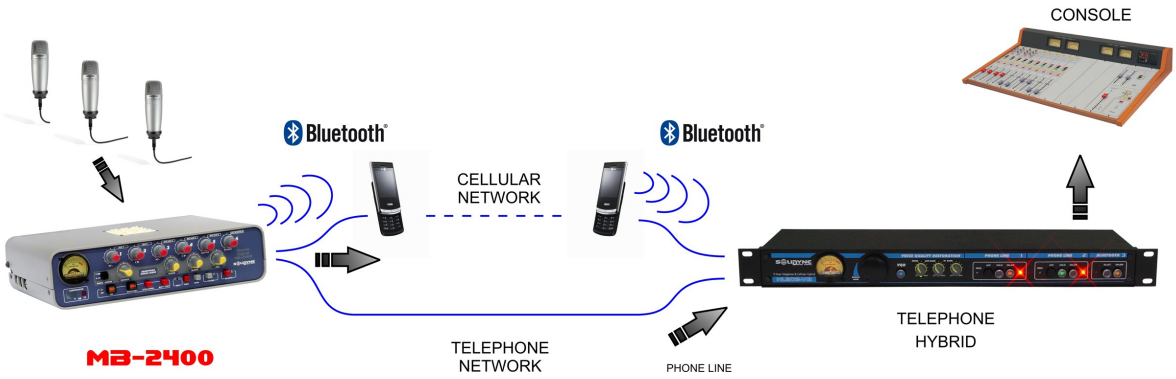
There are 6 headphone outputs with female TRS connectors (¼"). The signal sent to these outputs is a dedicated mix independent of program. It has an internal amplifier. The headphones can work in mono or stereo.

Headphone bus combines the program signal, land line return (RJ11 connector), Bluetooth return and streaming return (not yet implemented).

The signal present at the TUNER input is sent to the STUDIO fader when TUNER input is used, replacing the RJ-11 return (landline or cell phone wired).

# 3.1 Using land lines

## 3.1.1 General connection diagram to transmit audio using standard telephone lines




## 3.1.2 Connecting to a land line

The console connects to the telephone line through connector LINE, RJ11 type. Through the phone line the console sent mixed program to the studios and received a return of the studio, adding to headphone mix.

When MB-2400 transmits using land lines, you can use the Bluetooth link to make a second call and send it to the air.

MB-2400 has a DTMF keypad to dial with land lines. To dial up:

1. *Take the line pressing the button "PHONE".*
2. *Open the knob "STUDIO" to listen the dial tone in headphones.*
3. *Dial the phone number.*
4. *To talk, you can use the built-in microphone (Talkback), or a microphone connected to the console (recommended). Both are sent to studios via land line.*

## 3.1.3 Connecting to a cell phone

### 3.1.3.1 Bluetooth link

MB-2400 supports connection of a mobile phone via Bluetooth to link to studios or to put directly on the air a calling (only when using streaming or land line).

Any phone with Bluetooth can be linked to the MB2400, eliminating dependence on the headset cable, which differs in each cell. Also allows the cell to be located up to 10 meters away from the console. The Bluetooth wireless connection allows for better audio quality as the digital signal remains from the cell to the MB2400.

The incoming audio is sent via Bluetooth to the **program** mix (Channel 6) and the **headphones** mix (Blueth)

### *Linking the cell phone with the console*

By linking cell phones to the console creates a link between two devices, and allows the phone to remember the unique ID of the console (ID). Do you need to make this only the first time that use the phone. Once the console and the phone are linked, the console automatically connects to these phone when you enables Bluetooth on both devices.

Procedure:

1. **MB-2400:** Enables *discovery mode*. With Bluetooth switched off (LED off) press and hold the button BLUET (5 seconds) until the LED flashes alternating between green and red, indicating *discovery mode.* Being in this mode MB2400 can be found by the cell phone.

To enable Bluetooth, press and hold the button BLUET by 2 seconds. Release the button just when LED lights. Led will flash in green slowly, indicating Bluetooth enabled. If you hold BLUET button more that 2 seconds (5 sec approx) Bluetooth changes to "discovery" mode (toggling green and red).

2. **At the cell phone,** search for Bluetooth devices. This procedure varies by brand and model cell, see the instruction manual of phone.

3. When the phone finds the MB-2400's

Bluetooth device, shows the code “BTH-008” on screen. When the phone asks for the password, enter 0000 (default). See your phone's manual for details.

4. MB2400's ID is now stored at the cell phone's memory. You don't need to repeat this procedure for this phone. In the front panel of the console, the light will change to green flashing slow, indicating that Bluetooth is active.

In some cell phones, it is necessary to "connect" the new device found to active it. In others, the new device is activated after being detected.

If there were other systems operating in the Bluetooth studios, we commend turning off Bluetooth on the MB-2400, to repeat the search with the cell and write-down the existing devices. Then turn on Bluetooth in the MB-2400 and repeat the search. The displayed (BTH-008) will MB-2400.

### *Re-connections*

To reconnect the cell before linked, activate the MB2400's Bluetooth pressing by 2 seconds the button, and enables Bluetooth at the cell phone (if necessary, some cell phones disables Bluetooth device when turn it off). To make or receive a call, the audio is sent to the console. See “3.1.1 - Bluetooth Link” to know how to use Bluetooth.

### *Adjusting the volume*

At the cell phone, Bluetooth volume must be adjusted at maximum level in order to obtain a good reception and to sure the best signal to noise ratio.

**This adjusting must be done with a real calling using Bluetooth.**

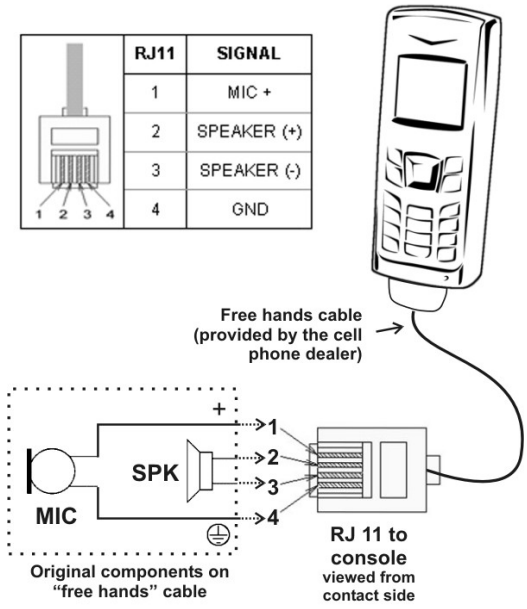
Usually, the volume of the phone's speaker is independent of the volume of Bluetooth device. If you change the phone's level without make a Bluetooth calling, you will only be changing the volume for the phone's speaker, not the Bluetooth level. To change the Bluetooth level, make a call using the console (or a hands free headset) and set the Bluetooth level to the maximum. This setting is stored at the cell phone's memory. **If you use another cell phone with the console, you needs to set the Bluetooth level again**.

To **turn off MB-2400's** Bluetooth, press and hold the Bluetooth button until LED turn off.

### *3.1.3.2 Wired cellular: hands free adapter*

The RJ-11 (LINE) supports direct connection of a second cell phone, using the "hands free" connector. This cell phone is used to link to the Studios. You probably do not need this second connection, as it is for very special applications.

The connection varies by brand and model of phone. You must purchase the hands free headset for your cell phone and consult your phone's documentation to make the connection as diagram below.




What cell phone transmits through this connector are the audio signals from cell phones. The console sends PGM signal to the cell, which transmits to the radio. The radio sends back to the telephone, which enters through the cell phone to the console and sent to the headphone mix (Studio). Usually, the microphone and speaker phone are disconnected while using the audio connector for hands-free.

## *3.1.3 Receiving at the Studios*

At the Studios, communication is established using a standard telephone hybrid. To achieve good results it is recommended to use professional quality equipment. Solidyne provides high quality telephone hybrid, both rack-mount units (Series HL-202 HL- and Bluetooth 203VQ) and built-in systems into the on-air consoles.

In addition, hybrids may include Voice Quality Restoration (VQR®), a technology developed by Solidyne which allows the reconstruction of the low and high frequency components losses in the telephone communication; and eliminate background noise. The operator adjusts the degree of restoration. This technology expands the performance of MB-2400, allowing high quality transmission on location using conventional phone lines (land or cellular). We recommend listening to the VQR® demos clips at www.solidynePRO.com

## 3.2 Transmission over Internet

### 3.2.1 Overview

MB2400 includes a module for transmitting digital audio over the Internet, with TCP/IP and others.

In the Internet broadcast, the console connects directly to a local network (LAN) with Internet access, or directly to an ADSL modem, or a GPRS modem type to access the Internet using the cellular network. MB-2400 sends to Internet an audio streaming.

At the station studios, any computer with an audio player software can download the audio sent from the MB2400.

#### 3.2.1.1 What is streaming?

New terms appear in this manual. One is *streaming*. This term derives from the word "stream", e.g. stream of water in a river or at sea. The concept of streaming is used to signal a "stream of data" flowing through a cable or a network like the Internet. These data are in our case a digitized audio signal.

These data can be sent in different ways (or protocols) for a computer network. To manage through the Internet using **TCP/IP** (Transfer Control Protocol / Internet Protocol).

TCP relies on IP addresses to identify computers (hosts) from which they originated and where the packets are sent.

Ports are numbers (between 0 and 65535) which are used to identify the processes that are communicating. At each end, each process involved in the communication uses a single port for sending and receiving data.

Together, two pairs of ports and IP addresses to uniquely identify two processes in a TCP / IP.

TCP guarantees that the information is received in order. Every packet sent has a sequence number. Each of the two processes involved maintains its own sequence, starting with a random value and then increases as the number of bytes sent.

### 3.2.2 Make your first digital transmission

Locate the MB-2400 next to a PC connected to the Internet. Disconnect the network cable from PC and plug it to the MB2400 (RJ45 Ethernet connector on the rear panel). Now turn the MB-2400 and press the button to enable the streaming on MB-2400. Note that the green LED on the RJ45 connector will light immediately, indicating that the network was detected. After a time, the orange LED lights flashing, indicating that the connection was made.

Now press the button "1 kHz" to send to Internet an audio tone. You are transmitting now!

To listen to the transmission, you can go to another PC on the LAN, or any other computer anywhere in the world... Open an audio player (VLC Player; Winamp; Windows Media Player) and enter the following URL:

**http://streamnow.alsolnet.com:8080/solidynedemo**

To open an URL in the audio player proceed:

Windows Media Player: "File → Open URL address"
VLC Player: "Media → Open network stream"
Winamp: "File → Play URL"

We can now plug a microphone into the console and listen to the excellent sound quality.

The delay of the streaming is de terminated by several variables. One of them is the buffer size of the player. Refers to the on-line help of the player to know how to manage the buffer.
If you enters in a web browser the URL http://streamnow.alsolnet.com:8080/solidynedemo, probably the browser will play the streaming directly, depending on the version and components of your web browser.

Do not leave pushed the "Streaming" button when not used, as this represents an unnecessary consumption of battery.

#### 3.2.2.1 Streaming server

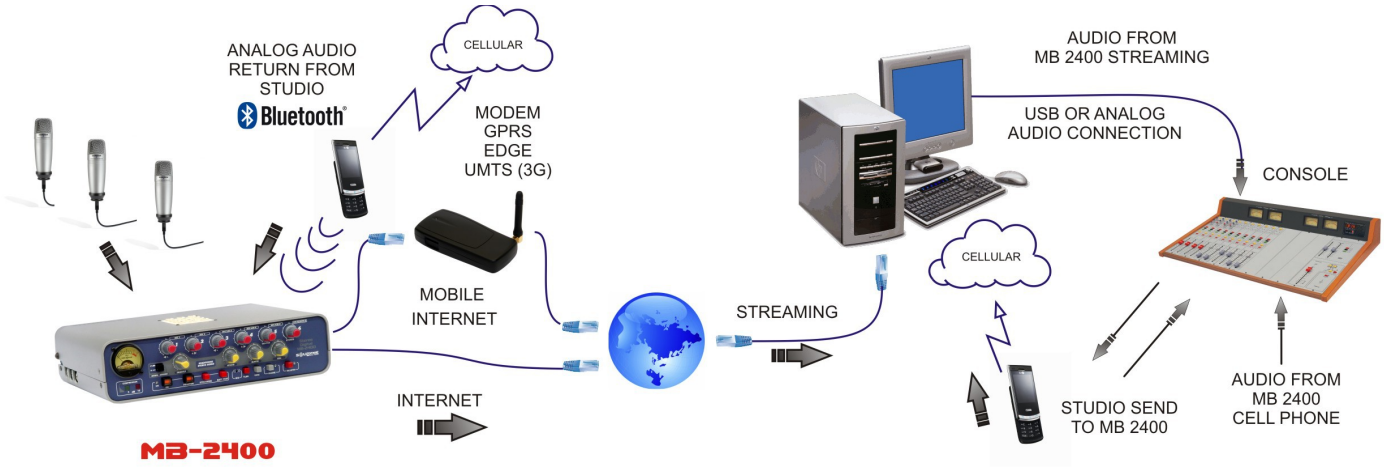
This simplicity to connect across the world is partly due to the use of a streaming server. The streaming server you have just used is a courtesy of Solidyne for testing MB2400 consoles. Therefore you can use it for testing, when you receive your MB2400, **but never use it to broadcast transmissions**, since it is public use and any other MB2400 can use it, breaking your transmission (bandwidth is limited).

Check with your Internet provider the availability of low latency Icecast streaming service.

By default, the MB2400 Mixer comes programmed to connect to the Solidyne's courtesy server. So once you have a server provider, you must set the Solidyne MB2400 to use the new server address (see Technical Appendix at the end of this manual).

If you do not want to hire a streaming server, the Solidyne MB2400 allows you to connect directly with the radio station without a server, but it modality require more network configuration (see Technical Appendix, "Section 5.1 - Direct Connection").

### *3.2.3 General connections diagram for Internet transmissions*




## 3.2.4 **Return from studios** (monitoring on location)

**The transmission of digital streaming is unidirectional.** The console transmits to studies via Internet. The study goes back to the console via a cell phone (see picture above).

Simultaneously to the Internet link, from MB-2400 provides a Bluetooth wireless communication to the studios of the radio station. From Studios the radio sends audio to the console, using an standard hybrid. The operator of the MB-2400 listen the transmission by opening the control BLUETH of headphones mixer (or Studio when RJ11 connector is used instead of Bluetooth).

#### 3.2.5.1 Streaming latency

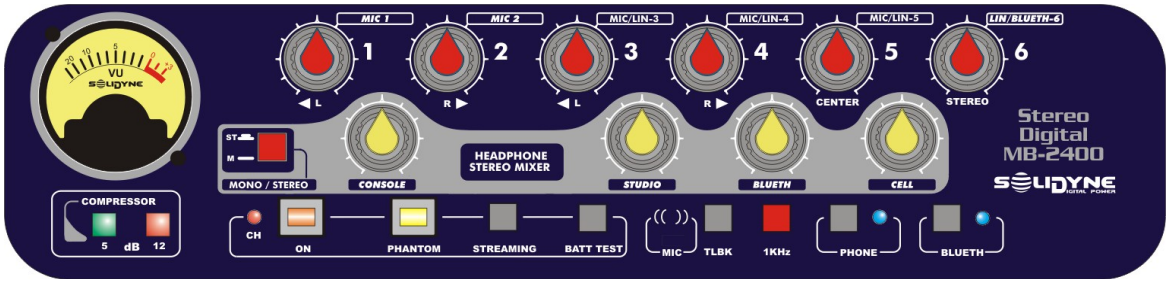
The MB-2400 transmitted almost instantaneously (just 100 thousandths of a second delay). But the path that streaming follows , including the Internet and the decoding in the PC, makes the total delay amounts 0.3 to 1.5 seconds for a direct link; and 0.5 to 2 seconds if you use a streaming server type Icecast.

This delay (aka latency) must be considered by journalists. It is irrelevant if you send a music festival, a sports match, or do interviews since the MB-2400. However, it should be considered when conducting an interview in which the journalist asking being studios, and the interviewee is at location (MB-2400). This means that the journalist should ask through a cellular connection, and wait for the latency for the response, coming from the MB-2400 via the Internet.

You can use the analogue transmission to establish a dialogue with zero latency, since the MB-2400 also transmits the audio signal by cell phone. Just switch to hybrid that the receives the phone's signal at the studies if you want to have a communication without delays. In turn, you can use in the study VQR® system to restore the voice quality of the interview (please listen the audio demos at Solidyne's web site).

The next chapter details how to manage in studios the signals generated by the MB-2400 codec-mixer.

# 4.1 Frontal panel




## 4.1.1 Power on

Pressing the "ON" to turn on the console, whether it is connected to the charger or operating with the internal battery. The button has an optical indication (window) that changes to red when it is pressed.

The "BATT TEST" displays on vu-meter the battery charge (the console must be turned on). The red zone of the scale indicates full load. At half-scale (5) the battery is still good load. If the needle doesn't reach the value "5", connect the console to charger to the battery begins to recharge.

### 4.1.1.1 Charging the battery

Connect MB-2400 to the 110/220 VAC mains using the charger supplied with the console. The plug will light the LED "CH" and VU meter, indicating the electrical power. The battery is full charged after 12 hours, there is no risk of damage if it stays connected longer.

**USE ONLY THE CHARGER PROVIDED BY SOIDYNE.**
**NEVER CONNECT the MB-2400 to a battery of a CAR.**

Remember **turn off the console when is not used.**
Power-on button indicates its state by means a mobile window. Button seems red when is pressed, and black when is released.

### 4.1.1.2 Phantom power

**The 48V phantom power module is an option, verify their existence.**

The button “Phantom” enables the *48 V phantom power* on all microphone inputs (MIC-1 to MIC-5), for connecting condenser microphones.

Remember that you can connect dynamic microphones to phantom powered inputs, since dynamics microphones decoupled internally the DC. If you don't need the phantom power, make sure that it is turned off, to avoid unnecessary use of battery.

## 4.1.2 Program and Headphones

The MB-2400 has two independent mixers: one Program Mixer, which is the signal that is sent to the air, and another mix of Headphones, which allows journalists to listen the transmission, including return from studios. Below are two stages.

### 4.1.2.1 Program Mixer

The audio signals coming from inputs MIC-1; MIC-2; MIC/LIN-3; MIC/LIN-4; MIC/LIN-5 y LIN/Blueth-6 are mixed using the channel's knobs on front panel. This mix is the program signal.

Program signal sends to the radio station throught phone line and Internet; and sends to the console PGM outputs (mono and stereo). Also is send to the headphone mixer ( knob “CONSOLE”).

Channels MIC/LIN-3; MIC/LIN-4 y MIC/LIN-5 supports microphone signals (XLR) or line signals (Jack 1/4”) . See Section 2.

**Channel 6 LIN/BLUETH** sends to program mixer the Bluetooth signal when the input **LINE 6** is unconnected. See Section 2.

**Stereo mix**

The signal in the stereo program output is generated from the fixed panning of mic channels and the stereo input signal “Line 6”.

We recommend to use microphones cardioid-type.

The stereo panning of each channel, indicated at the front pane serigraph, is the following:

| | Left | Rigth |
|---|---|---|
| MIC 1 | x | |
| MIC 2 | | x |
| MIC 3 | x | |
| MIC 4 | | x |
| MIC 5 | x | x |
| LIN 6 (estéreo) | x | |

Table 4.1

***Examples:*** *Microphones 1 to 4 are used to take all music, being panned to the left and right. The microphone 5 must be used for the singer or an centred instrument, as the bass drum of a battery, which plays for both channels.*

*In the case of a* ***sports transmission****, you can use Mic 1 and Mic 2 for the sound of the Stadium environment, locating them with a minimum separation of 2 meters. The rapporteur will use the main MIC-5 (center).*

### *4.1.2.2 Headphone Mixer*

This stage generates the mix that is listened on headphones. There are four knobs:

**CONSOLE**

Manage the **program signal** generated by the console. It can be stereo or mono.

**STUDIO**

Lets hear the return from Studios when using a telephone line connected to RJ11 (land or wired cell phone) or the on-the-air transmission when an external tuner is connected to the TUNER input.

When you connect the TUNER input, the signal at this input is sent to the mix headphones through knob STUDIO. When this input is not used, the knob STUDIO manages the return signal from RJ11, which can be connected to a landline or a cell phone with adapter cable.

When you open STUDIO, being the RJ11 unconnected , the output signal of the console appears on the channel Studio, due to Hybrid is unbalanced. Therefore, in these cases STUDIO knob must always remain closed . This situation resolves:

- Connecting the jack TUNER. This action disconnects the hybrid monitoring.
- Connecting a land line to RJ11. Hybrid is balanced and STUDIO gives you the return from Studios and very attenuated residual local signal.
- Connecting to a cell phone to RJ11, using the cable adaptor. It cancels completely the Studio return since hybrids turn to of 4 threads.

**BLUETH**

Lets hear the return from the cell phone linked to the console via Bluetooth.

**TCP/IP**

Lets hear a pre-recorded voice that reports the **IP number** assigned to the console when it connects to an Internet network. This is useful in the absence of a hosting server or technical testing.

**MONO/STEREO**

Switch the listening mode of the headphone mixer. In the MONO position (pressed), listening to the mono mix, sum of all inputs.

In STEREO (released), you listen microphone inputs in accordance with their respective panning, ie the microphone 1 will be heard only at the left headphone speaker, microphone 2 at the right, and so on (see Table 4.1).

**WARNING:**

***Mono/Stereo*** **button also switches the signal to mono for digital stage (streaming). When the MB2400 is configured (via http) to transmit mono streaming, the** ***Mono/Stereo*** **button must be as MONO (pressed) to use all the microphones. In this mode the TalkBack microphone adds to the streaming mix, so can not be used for private communication with studios while the console is on the air.**

If button is in STEREO mode and the streaming is stereo, you will be making a stereo transmission with stereo monitoring (headphones). This mode has the advantage that the Talk-back microphone does not mix with the streaming, allowing to talk privately with Studios using the phone link while on-air broadcast audio sent over the Internet.

If you need to use the Talkback mic to talk with studios in a transmission, you can use the mono/stereo button as stereo and transmit mono streaming. But in this case, you can not use the microphones 2 and 4; and remember audio from microphones 1 and 3 will be heard only at the left headphone's speaker.

#### *4.1.2.3 Talkback*

Sends the talk-back microphone, located on the front of the console, to the mono output (MONO PGM) and telephones (RJ11 and Bluetooth). Talk-back signal in not sent to the stereo output.

When the MB2400 is on the air over streaming, Talkback is only operating as private circuit in stereo transmissions (button MONO/STEREO of headphone mixer in stereo mode). In the MONO position the talk-back microphone is sent to streaming, so it can not be used while the console is on the air (see 4.2.2.3)

### *4.1.3 Level indicators*

#### *4.1.3.1 Program VU-meter*

The console incorporates a needle VU meter that shows the signal level at the output of the compressor. This level corresponds to mono and stereo program outputs (shows the sum L+R).

The instrument is connected to an amplifier that measures the real peak of the audio signal. The needle should move along the scale, penetrating the red zone only on the peaks. The compressor is needed to control the peaks in automatically freeing the operator precise control.

The VU meter is also used to show the level of battery charge. Pressing BATT TEST, indicates the battery level. The red zone indicates that the battery is charged at 100%. (This indication only occurs if the console is turned on).

The battery charge is not reduced linearly. After a brief initial drop, the charge remains stable for many hours, then begins to decline fastly.

#### *4.1.3.2 Audio compressor*

MB-2400 have a a dynamic range compressor, automatic action, which acts on sends to the phone lines and mono program output, maintaining peak output at a constant level.

Stereo streaming signals and stereo output are not compressed, as are intended to convey a musical or sound environment in which we must respect the dynamic range. If using mono streaming, the compressor is active because it is understood that transmitting human voice.

LED indicators show the level of compression applied to the signal. Indications 5 and 12 relate to the attenuation, expressed in decibels, applied to the signal when it exceeds 0 VU. The more the signal exceeds the 0 VU, the higher the compression used, being 18 dB the maximum compression. The ideal condition of work is green LED always on and red LED lighting just with the peaks.

This compressor prevents signal peaks saturate the transmission lines, generating distortion. Using this advanced compression allows a better reconstruction of sound in the studios, using **VQR®**.

### *4.1.4 Test tone*

MB-2400 includes a test-tone generator, which is activated by pressing the button "1KHz". Send a sinusoidal tone of 1000 Hz @ 0 VU to all outputs (mono, stereo, RJ11, Bluetooth, Ethernet).

Test tone sent to streaming is 6 dB attenuated in the left channel, to identify the channels in studies.

# 4.2 Linking with the radio station

## 4.2.1 Telephonic link

Whether you use cell phones or land lines, the transmission is set calling to the studios of the radio station, or receiving the call. To generate a call from the console, proceed as follows.

### 4.2.1.1 Using a land line

1) Press the button “Phone”.
2) Open the knob “Studio” to listen the dial tone at the headphones.
3) Dial the number from MB-2400's DTMF keypad. Hang up and redial, release an press again “Phone”.
4) To talk, you can use the built-in talkback microphone, pressing the “Talkback” button; or an external microphone connected to an input.
5) Also, you can receive the calling from Studios. In this case the 'Ring LED' will lights (blue) with each ring. Calling takes by pressing PHONE.
6) Before starting the audio transmission, you can send a test-tone (by pressing "1KHz") for the operator checks the audio level.
7) To ends the transmission, press PHONE again. The phone line will be released.

### 4.2.1.2 Using a cell phone

Usually, the cell phone is connected to the console via Bluetooth wireless link (recommended) but if the mobile don't have Bluetooth, you can connect it with a cable adapter to the RJ-11. If using Bluetooth, remember to link the console with the phone before making the call (see 3.1.2 - Connecting to a cell phone).

1) To turn on Bluetooth in the MB-2400, press the button “BLUETH” and release just when LED lights.

   If the cell phone is connected to RJ11, press the button “PHONE” before dial.
2) The call is made from a cell phone connected to the console. You may also receive the call from the studios, but usually it is the reporter who communicates with the radio.
3) To listen at headphones the ring tone, open the mixer headphone knob "Blueth" if the connection is Bluetooth (if connected to the RJ-11 open the knob "Studio").
4) To talk, you can use the built-in microphone, pressing the talkback button, or a microphone connected to an input (recommended in noisy environments).

When the phone is connected via Bluetooth, depending on the cellular model used, it is possible to repeat the last call by pressing the button Blueth on the console.

It is also possible to take an incoming call directly from the console by pressing the button Blueth. Check the manual of your mobile phone

5) Before starting the transmission of audio, you can send a reference tone (by pressing "1KHz") for the operator at the station adjust the reception level.
6) **Ends a call:** The calling can be finished by pressing BLUET at the console; or directly from the cell phone.

**Do not forget to turn off Bluetooth when not used as this represents an unnecessary consumption of battery.**

## 4.2.2 Audio over Internet

As seen (3.2 - Transmission over Internet) there are two ways to operate Internet communications, whether from a broadband Ethernet connection or a GSM cellular data network. In either case you can work:

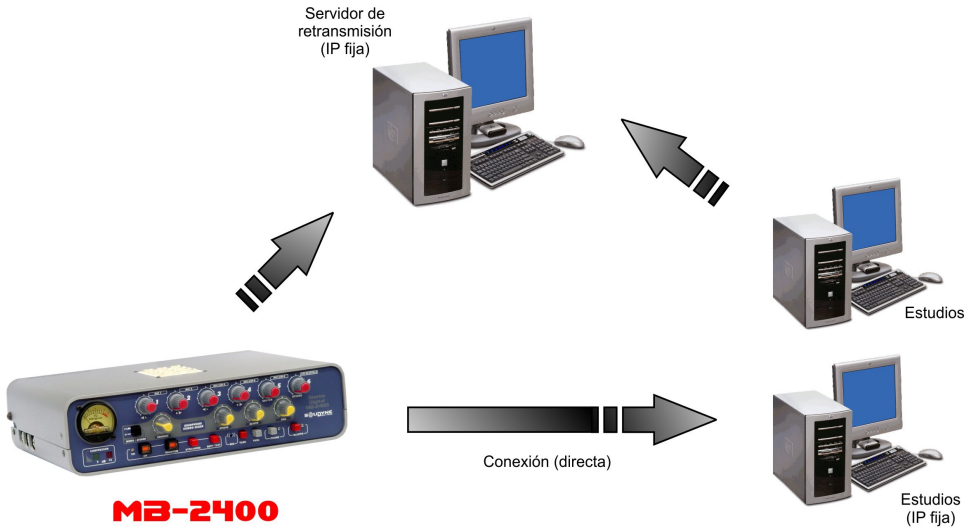
A) **Using a streaming server**: recommended for its operational simplicity. Requires a monthly subscription which is very low cost.

B) **Direct link from MB-2400 to Studios:** Least-cost method for not requiring a monthly subscription to a streaming server. But requires more knowledge of computer networks for their initial settings.

The **Method 'A'** is recommended for its easy operation, the journalist connects MB2400 to the Internet and immediately starts to transmit to studies. This method requires contracts with a hosting company, a **streaming server** for a single channel. Since the monthly cost is low.

In this way, the MB2400 always sends to the same IP address and the server sends data from a fixed URL, simplifying the reception at the Studies. Another advantage is that the transmission can be taken from several stations simultaneously. This means that the external transmission can be shared by several radios. It's a good option for freelance reporters who sell their work to several radio stations.

**Method 'B'** does not require a streaming server. But programming for their connection is more complicated and does not distribute the signal between various radio stations (see Appendix, Section 5.1 - Direct Connection").




*This scheme is a summary of the ways that you can work when the MB-2400 starts the connection. Note that in case A, both the console and the studies start the connection to a streaming server .*

#### *4.2.2.1 Normal use with 'streaming server'*

**On location**

Connect the MB-2400 to the Internet (LAN or mobile) and turn on ('Power' and 'Streaming' buttons pressed). If you want this operation can be confirmed with the headphones, opening the knob TCP/IP. When 'Streaming' button is pressed, you hear the voice of the computer reporting the IP; indicating that the connection was successful. It is also confirmed by the flashing orange LED on the RJ-45 connector.

**At the Studios**

A PC connected to the internet with an audio player is all that you needs to download and plays the streaming from Server. You can use VLC Player (download www.videolan.org/vlc), WinAmp (www.winamp.com), Microsoft Windows Media Player or similar.

In the audio player software, you enter **the URL address of your streaming server**. IE; URL for the Solidyne courtesy server is:

http://streamnow.alsolnet.com:8080/xstream

If you can not connect, your network administrator has set a firewall to block outgoing Internet connections for the specified port (in our example is 8504). See this issue with your network administrator.

#### *4.2.2.2 Normal use in 'direct connection'*

**On location**

Connect the MB-2400 to the Internet (LAN or mobile) and turn on ('Power' and 'Streaming' buttons pressed). If you want this operation can be confirmed with the headphones, opening the knob TCP/IP. When 'Streaming' button is pressed, you hear the voice of the computer reporting the IP; indicating that the connection was successful. It is also confirmed by the flashing orange LED on the RJ-45 connector.

**At the studios**

You must use a PC connected to the Internet with free software (VLC Player). See "4.3 Managing the transmission at the Radio Station" The output of this computer is sent to the on-air console. Normally obtained latencies from 0.3 to 2 seconds.

#### *4.2.2.3 Private communication with Studios when MB-2400 transmit stereo streaming*

When console operates in stereo streaming (button Mono/Stereo of Headphone Mixer released) the MB2400 has an excellent talk-bak channel with studies which operates by a private independent channel. There are two ways to use it.

When transmitting mono streaming, the talkback MIC is mixed with the digital transmission, so it can not be used as independent channel.

**a) Land line calling**

The telephone line is connected to the RJ-11 connector on the rear panel. When someone calls the remote position, the LED will light next to the Phone button. Press the Phone button to take the telephone line. Put the headphones and open the

fader Studio (in the headphones mixer) to listen the call. Pressing this button activates the Talkback microphone inside the MB2400. Simultaneously with this microphone at the studios will be heard the MB-2400 transmission.

This communication is private, meaning that if you are working with 5 microphones connected to studios via Internet, nothing to speak for talk-back will air. Remember that this occurs only with **stereo streaming**, not mono streaming.

To make a call from MB-2400, press 'Phone' and dial using the DTMF keypad. The conditions of privacy with respect to digital streaming are the same as before explained.

**b) Cell phone calling**

To communicate with the Studios, using a phone linked by Bluetooth (see 3.2.1 - Telephone communication).

You can speak from internal mic by pressing 'Talk-back', and heard the return from studios in headphones, opening the knob 'BLUETH' at the headphone mixer. Simultaneously with talk-back microphone, at the studios will be heard the MB-2400 transmission.

This communication is private, meaning that if you are working with 5 microphones connected to studios via Internet, nothing to speak for talk-back will air. Remember that this occurs only with **stereo streaming**, not mono streaming.

To make a call from MB-2400, press 'Phone' and dial using the DTMF keypad. The conditions of privacy with respect to digital streaming are the same that was explained above.

# 4.3 Managing the transmission at the radio station

## *4.3.1 Receiving the signal*

The signal arrives to the Studios from the MB-2400 in many ways: as an audio streaming to a standard computer with Internet access; by cell phone and/or by land-line via a standard telephone hybrid.

We analyse the case of the console transmitting streaming over Internet. When streaming link is used, the signal generated by the MB2400 will receive duplicate at the studios:

- *a computer with Internet access receives the streaming;*
- *an telephonic hybrid receives analogical audio from land line or cell phone.*

This double-link provides a back up signal in case of losing any of the transmissions, but also cell phone communication is necessary because the return from studios to the console is not Internet, but via the phone. Streaming communication is one-way to save bandwidth and ensure better reliability.

To visualize the signal flow, we recommend to see the connection diagram “3.2.3 - General connections diagram for transmission over the Internet".

### *4.3.1.1 Streaming*

The streaming receives on a computer with Internet access running an MP3 player software (VLC Player, www.videolan.org/vlc; WinAmp, www.winamp.com; Microsoft Windows Media Player or equivalent).

Obviously, this computer must have a good sound card, (balanced output preferred) or better yet a direct USB connection to the console, avoiding the use of expensive sound cards (requires a console with USB inputs).

In the player software you enter the address of the streaming server or the port number, depending on the connection method used by the MB2400 to broadcast from outside (see "4.2.2 - Internet Link").

***If the MB-2400 transmit to a streaming Server:***

In the software player you must enter the broadcast URL address. This information is provided by your Server provider.

IE: if you use Winamp, go to “File → Open URL”.

Here you enter the broadcast address of the streaming server. The default Solidyne test server is: http://streamnow.alsolnet.com:8080/xstream

***If the MB-2400 transmit directly to the studios:***

In this case the streaming goes directly to the LAN router at the radio station. The router must redirect the incoming streaming to the correspondent computer (see "5.1.2 – How to configure the reception at Studios").

In the streaming player you must enter the **port** of the computer to which the streaming arrives, and the **transmission protocol** used by MB2400.

**Example:** using VLC select “File → Open network” and specify the port number (usually 5900) and indicate rtp://@ or udp://@ according to the MB2400

settings. Default protocol is RTP (real time protocol) which is slightly more efficient than UDP.

#### *4.3.1.2 Telephonic link*

Streaming link is unidirectional. The console can only send digital audio to the Studios. The return of audio from Studios to the remote console is made via telephone communication .

a) **At the location,** the reporter communicates with the station using a phone connected to the console, usually a Bluetooth cell phone.

b) **At the Studios**, the operator receives the call using a standard hybrid. Cell phones are generally used at both ends, due the low cost offered by corporate plans.

This communication occurs simultaneously and independently of the transmission of streaming over the Internet.

### *4.3.2 The audio signals*

MB2400 console simultaneously sends streaming to Internet and audio via telephone.

At the studios, on-air operator has the audio from the Internet, received by a computer, and the same signal received by a telephone hybrid. The decision of which signal is send on the air depends on the needs of the transmission.

***Streaming**:*

Pros

- Allows 'digital' audio quality (20Hz a 15KHz).
- Allows stereo transmissions.
- Interferences-free.

Contras

- **Latency.** The signal arrives delayed, due to the Internet latency. This delay depends on the connection type and characteristics of the Internet service in the area. It can be from 0.3 to 2 seconds.
- **Unidirecional**, from console to Studio.

***Telephonic signal***:

Pros

- Without delays.
- Full duplex.

Contras

- The audio quality is restricted by telephonic band – 300 a 3.400 Hz – (it can be improved with VQR® system, but not reach the audio quality of streaming transmission).
- Not support stereo transmission.
- High cost for long distances.
- Using cell phones, distortion increases and they are susceptible to interferences.

The operator always will prefer to send on-air the streaming audio, except in the following cases:

a) If there are problems receiving the streaming (eg by overloading of the Internet provider's network).

b) When the delay becomes difficult a fluid conversation between Studios and the location.

The first case rarely happens, but if streaming reception fails (audio choppy or interrupted), the on-air operator switches the air to the telephone signal, to continue the transmission from location.

The second case is a dialogue between Location and Studios. If due to the features of the Internet service are not achieved low delays in the streaming transmission, the delay can difficult the conversation, because the interviewed at the remote console MB2400 listens the question from Studios, that reached by phone in real time, but its response reaches the Studios delayed via Internet. The results on air are "pauses of silence" between the question from the Studio speaker and the answer from the remote location.

In this case, put on-air the audio from the hybrid, with no delay, instead of streaming.

**Remember:** The Codec MB2400 allows both digital stream and audio by cell phone, so that the Studios make the decision of which option will be sent to air. For example: using the streaming for sports and switching to phone link (with lower quality but without delay) for the interviews at the end of the match.

#### *4.3.2.1 Improvement of the telephonic reception*

**VQR® Hybrids**

Solidyne VQR® technology allows restoring bass and treble lost in the transmission. Using VQR® hybrids at the Studios, you can narrow the gap between the sound quality of streaming broadcasts and telephone sound (cellular or land-line). See the user's manual of your hybrid or console for details about VQR®.

**Bluetooth links**

Cell phones linked using Bluetooth have better frequency response that is linked via a cable adapter

to hands free.

Solidyne recommend using Bluetooth connections at both ends of the transmission chain (portable console and hybrid at the studios).

You can find in our website (www.solidynepro.com) audio clips and comparisons between VQR technology and Bluetooth®, recorded in real working conditions.

### *4.3.3 Send audio from Studio to MB-2400*

As noted above, the audio return from Studio to remote console when MB2400 transmitting streaming is made by a telephone call. But this return must be used only to check the transmission received at the Studios, and for private communication between the on-air operator and the MB2400. **The MB2400 operator listens the local audio generated in the console (PGM).**

This is because the streaming have *latency*; so this signal arrives delayed from Studios to MB2400 monitoring, which cause confusion to the MB2400 operator. For this reason MB2400 operator must listen the direct output of the console, not the return from Studios.

Just in case that a dialogue between the Location and Studios, the operator of MB-2400 will use the return from studies. If the latency is small (less than 0.5 seconds), does not affect the conversation, being on air the audio streaming while the MB2400 receives return via cell phone.

If the delay of the signal stream make difficult the conversation, leave the streaming and put on-air the cell phone signal. Remember that you can improve the audio quality of phone line using Solidyne ® VQR technology.

Another alternative, is the monitoring using an **external tuner** connected to the TUNER input of MB-2400. Thus you not require the telephone link, but you lose the possibility of private communication with the Studios through the console (besides the fact that this method can only be used within the coverage area of the radio).

#### *4.3.3.1 How to make a private conversation with the MB2400's journalist*

Some time ago, when the link was made by land-line phone, just a phone in parallel with the line was needed to speak with the remote operator. But when using mobile phones connected via Bluetooth, you must consider the talk-back circuits for hybrids and consoles.

*In the 2300 series consoles Solidyne this issue resolved, since the hybrid signal is received directly into the console, which has a microphone for talk-back which the operator can talk with the MB2400 operator. This is true even for an external hybrid connected to a console Solidyne 2300.*

*Some hybrids include a microphone and a headphone output to private speak with the caller when the line is not on-air.*

*In consoles that do not have a communication system before, you should use a microphone connected to a channel. Obviously, this channel is sent to the hybrid but not to program. is heard by the hybrid system prior (cue) from the standard console.*

*If you works with a hybrid type Solidyne HL-203 with Bluetooth link, connected to a console that has no talk-back circuit for the hybrid, you must consider the cell phone used has the option to switch between the Bluetooth device and the phone, to transfer the calling between the hybrid and the cell phone.*

This chapter describes all the options for configuring the console MB2400. This information is aimed at technical staff, who operate the console does not require knowledge of the details of configuration.

The first section describes in summary the configuration procedure and implementation for the two modes of transmission: with streaming server and direct IP. This practice -Direct IP- requires knowledge of network configuration. We recommend working with a specialist in the field.

The second part of this appendix describes advanced configuration options for the transmission and reception.

# *5.1 Overview*

## *5.1.1 How to configure the MB2400*

The settings for both modes of work are similar. First, you must configure the console at the radio station, entering the destination IP address where the MB-2400 will transmit. To establish a direct connection to the Studios, the radio must have a fixed IP address. Otherwise, you can use an Internet streaming server to distribute the streaming (eg www.alsolnet.com).

1) Connect the MB2400 to the LAN at the Studios. You can temporarily disconnect a PC from the network and connect the Ethernet cable to the MB2400.

2) Open the knob TCP/IP to listening on headphones the announced IP address. It is something like 192.168.0.XXX. Write down this value.

3) From another PC in the network, open an Internet browser and enter the IP address (192.168.0.XXX). This will open the screen of the computer's internal MB2400.

4) Select CONFIGURATION option. In the "Streaming" define the destination address where transmitting the console. When you turn on the MB2400 over an external network, it starts to send streaming to that address.

   Using streaming server:

   a) Enter the URL address of the streaming server hosting and set the password in the Security section. By default, MB2400 uses a test-server courtesy of Solidyne. It must be used only for test the transmissions.

   Using direct IP:

   b) The IP address of the radio station network (must be a fixed IP).

5. **Set the audio quality**. Go to menu AUDIO menu. To save bandwidth, we recommend to use the human voice quality **MPEG-2 / 22KHz / Mono / Quality=0** This is the default value. As reference, we recommend listening to the audio demos on our website (www.solidynepro.com, locate MB2400 in the section “Products”).

Upon reaching destination, the reporter connects the MB2400 to Internet (to a LAN) and turn on the streaming (pressing the button Streaming) starting the audio transmission. This operation can be confirmed with the headphones opening the knob TCP/IP. If the voice is listened, it means that the connection was successful.

## *5.1.2 How to configure the reception at the Studios*

At the Studios you must use a PC connected to the Internet to receive the streaming and send it to on-air console.

When working with **streaming server**:

Simply enter the URL of the server software on the player. You will not need to configure the router to send the stream to the designated PC.

When working with **direct IP**:

At the station, the router/firewall must be configured to send the incoming stream to the designated computer.

1) Router/firewall settings can be done from an Internet browser by entering the correspondent IP address. Usually is 192.168.0.1. The firewall will ask you to identify the user name and password, a typical value are admin/admin or admin/1234, but this may change. Read the user manual for your firewall/router.

2) Once entered to the Control Panel, you must go to the section called NAT or 'Port forwarding', then add the IP address of the on-air computer (eg 192.168.0.20) and the Internet 'port'. Solidyne recommended to use port number 5900, but you can choose another port if 5900 is busy. If you use another port, you must configure the codec MB2400 not only the IP address, but what is the port used (other than 5900).

3) Install an audio player software for receiving the streaming. Solidyne suggested VLC, WinAmp or Windows Media Player as a stream players.

4) Finally, verify that the PC is connected to a stereo input of the on-air console. For good audio quality use professional soundcards with balanced outputs; or better still if your console have USB inputs.

# 5.2 Advanced information

## 5.2.1 Transmission settings

Like all devices on the Internet, there are two types of connection. The module starts the connection or the module receives a connection. The module supports both streaming connection simultaneously. Remember that a higher number of concurrent connections operating, the higher the bandwidth used.

### 5.2.1.1 IP configuration

The usual way of working is that the MB2400 starts the connection to transmit audio streaming, since it simplifies the work at location.

When the console starts the connection, you can use a streaming server or a direct link to the Studios.

On radio, connect the MB2400 to the local area network (LAN) and to turn on. On headphones you can listen the the IP address assigned by DHCP. Remember that the knob 'TCP' must be enabled closed or can not listen to the assigned IP address.

Obviously terminals must have TCP/IP installed (or can not use web browsers). It is also advisable to have a DHCP server (Configuration Protocol dynamic IP address). Usually the router to your local area network (LAN) acts as a DHCP server.

If you do not have a DHCP server, MB2400 will assign an IP address itself, but this operation requires more time (1 minute or more) to determine that no address conflict with another IP on the network.

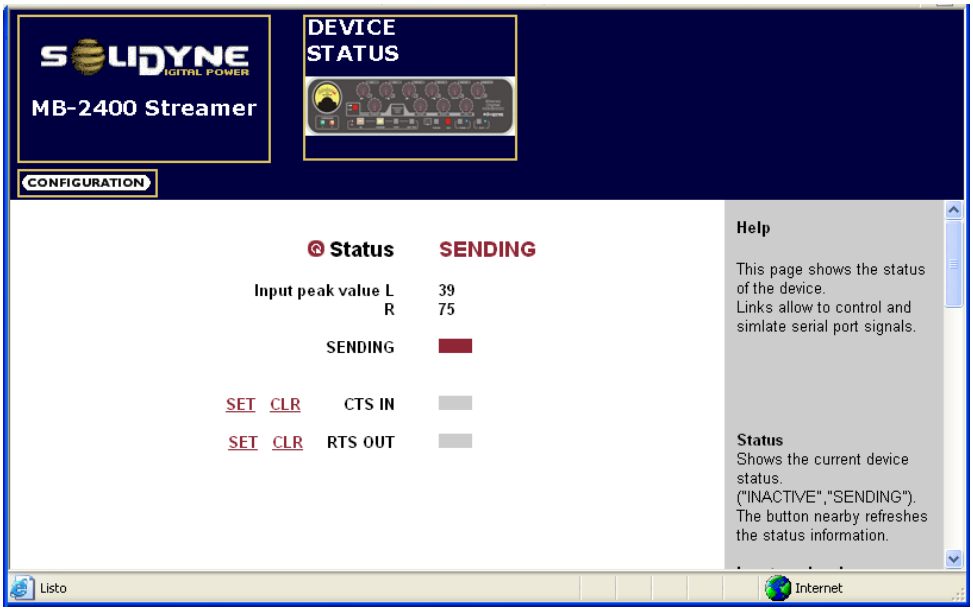
Remember that the assigned IP address, is announced at the audio output from the console (TCP knob)

An alternative way to obtain the IP address is from the DHCP server (eg. router), which displays a list of IP addresses assigned to each device (reports the IP assigned to each MAC Address). This requires that you contact the network administrator, since access is restricted to routers. To known the MAC Address of the MB2400, open the top cover and watch the number at RJ-45 circuit board (each console presents a unique and irreplaceable MAC address).

The IP assigned to the Solidyne MB2400 is temporary, and changes each time you connect the console to a different network. Ie: the IP address that is used in the Studios to access and configure the console, not necessarily is the same when the device is plugged to another network.

### 5.2.1.2 Settings panel

The configuration is done through standard web pages. Using an Internet browser (eg Firefox, Microsoft Internet Explorer or Apple Safari) enter the IP address reported. There you will see the following screen:




It presents the state of the streamer module MB-2400. The most important parameters are:

- *The audio level, updated each 3 seconds.*
- *The state (transmitting or stand by).*

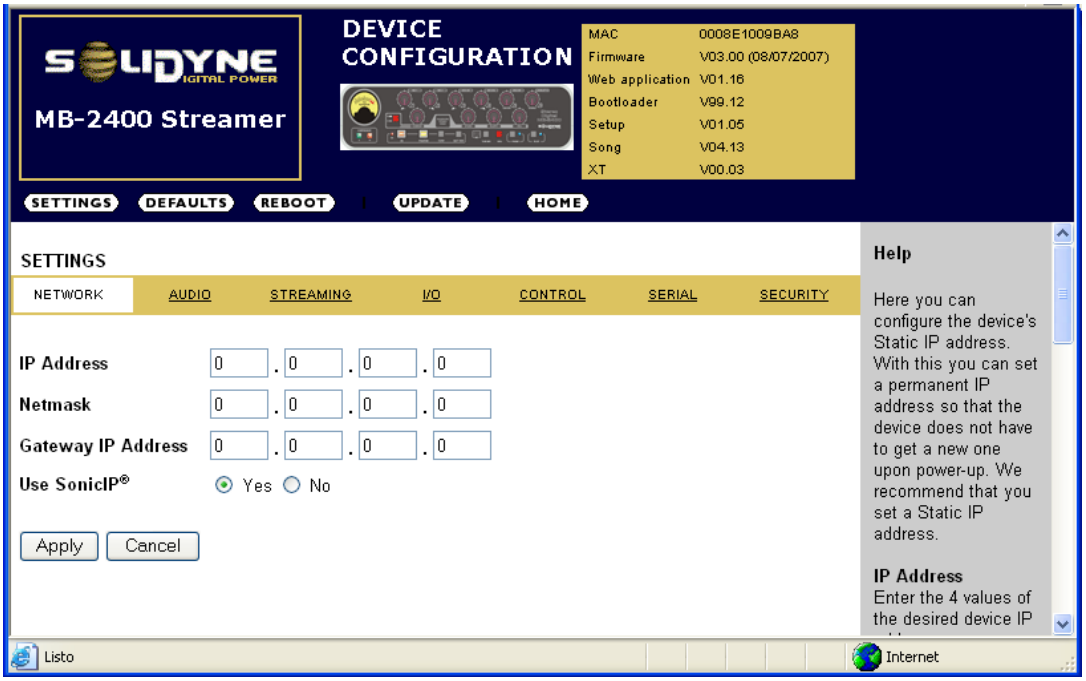
At right, a brief help is used as a 'memory aid'. Once admitted to the general screen, press the button **[Configuration]** to indicate the destination address

Here you can access to 4 options:

**[Settings] [Defaults] [Reboot] [Update]**

and to go back to main menu [Home].

Select the option **[Settings]**.



### *Settings*

Defines the parameters of the transmission. It has several sub-sections: Network, Audio, Streaming, I/O Control, Serial, Security.

Here are the relevant sections.

### *Audio*

Set the audio quality. Available options are: *PCM, uLaw, MPEG 1 (layer 3)* and *MPEG 2 (layer 3)*. Mono or stereo.

Allowing different transmission qualities (mono/stereo, 44.1/32/22 KHz, etc.) according to available bandwidth.

The most recommended are **MPEG 2 (layer 3)** at any sample rate. As more faster, better frequency response, but requires more bandwidth.

It is also possible to choose between mono and stereo transmission.

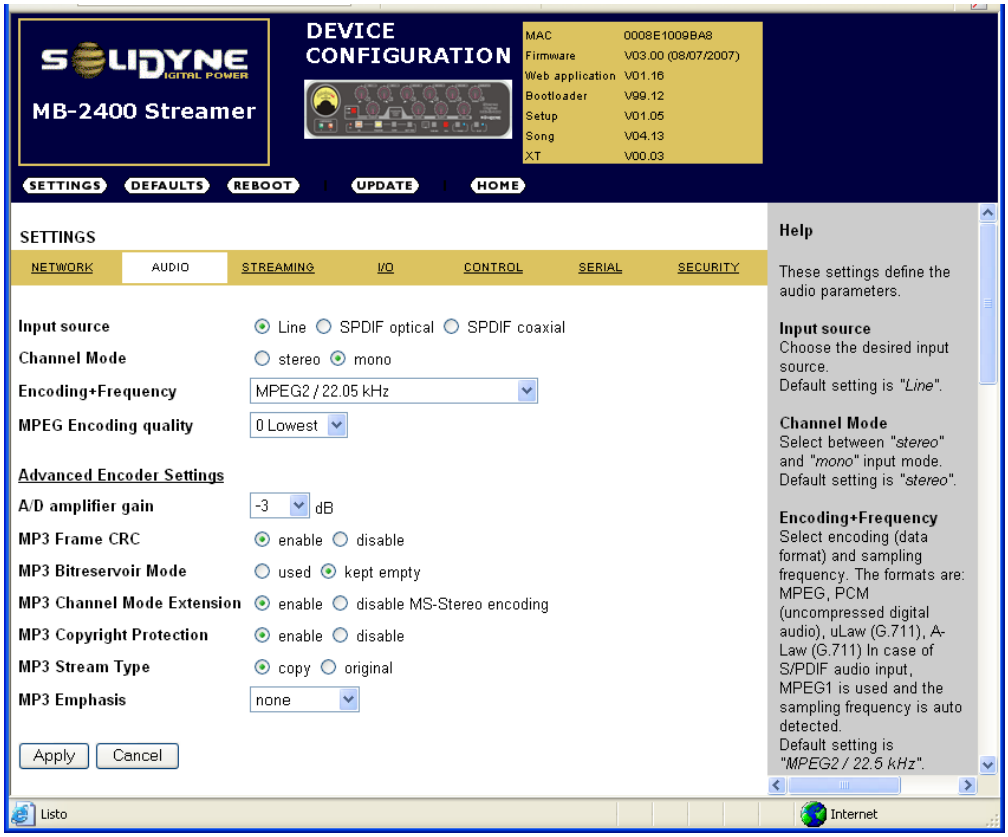
We recommend 'mono' to conventional transmissions. Stereo only applies to special broadcasts such as music or sports events of great importance where necessary to transmit more impact and realism of the environment.

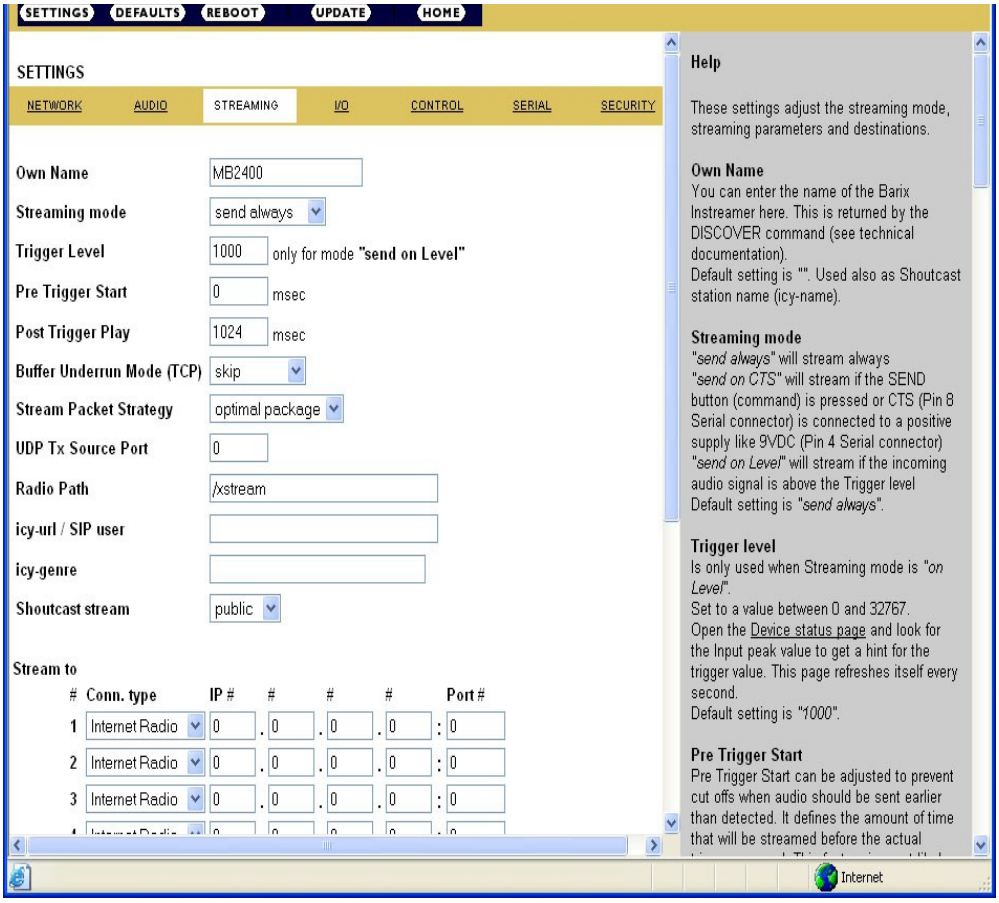
When you select MPEG, it is possible to define an extra parameter called **'quality'** that **determines the bitrate** of transmission. The encoding is of variable bit rate (VBR).

The examples listed below can be heard on our website www.solidynepro.com

**MPEG2/Mono/16KHz/Quality=0** generates a VBR between 24 kbps and 32 kbps, preferably by the rate of 24 kbps. It is appropriated for transmission of human voice.

**MPEG1 (MP3) / Stereo/32 KHz / Quality=4** generates a stream of 96 kbps, stereo.






### *Streaming*

The figure above shows the streaming setup. The only information that you must change is the destination IP address.

As we saw, the IP can be:

- *IP address of Studios*
- *IP address of streaming server.*

The streaming service provider must provide the IP address and port to which the console must transmit.

> The IP and port for the streaming server can also be obtained from the URL provided by the supplier. For example: if the address to connect to the server's is http://streamnow.alsolnet.com:8080/xstream, the IP address is the correspondent to http://streamnow.alsolnet.com and the port is 8080.

As you can see the console is capable of transmitting more than one direction simultaneously, but each connection twice the bandwidth required for transmission.

### *Security*

When using a streaming server will be necessary to specify the password to validate the access. This password is entered in this section.

### *DEFAULT VALUES*

Allows to restore the factory default values. This include to the server configuration. The console will transmit to the Solidyne's test server.

### *REBOOT*

Reboot the streaming stage. IE if you assign a fixed IP and forget it.

### *UPDATE*

This option lets you update the firmware of the device.

### *HOME*

Returns to main page.

### 5.2.2 Settings at the radio station

#### 5.2.2.1 Using an streaming server

If you are using a streaming server, you only needs to use a streaming player application (eg Winamp) and indicate the URL address of the server used (eg www.alsolnet.com/FM_mia/movil1). How the connection is initiated from MB2400 to your LAN, it is not necessary to enable anything on the router. Unless your network supervisor has changed the default settings and blocked the access to the Internet. If this were the case, contact to the network supervisor.

#### 5.2.2.2 Using direct transmission

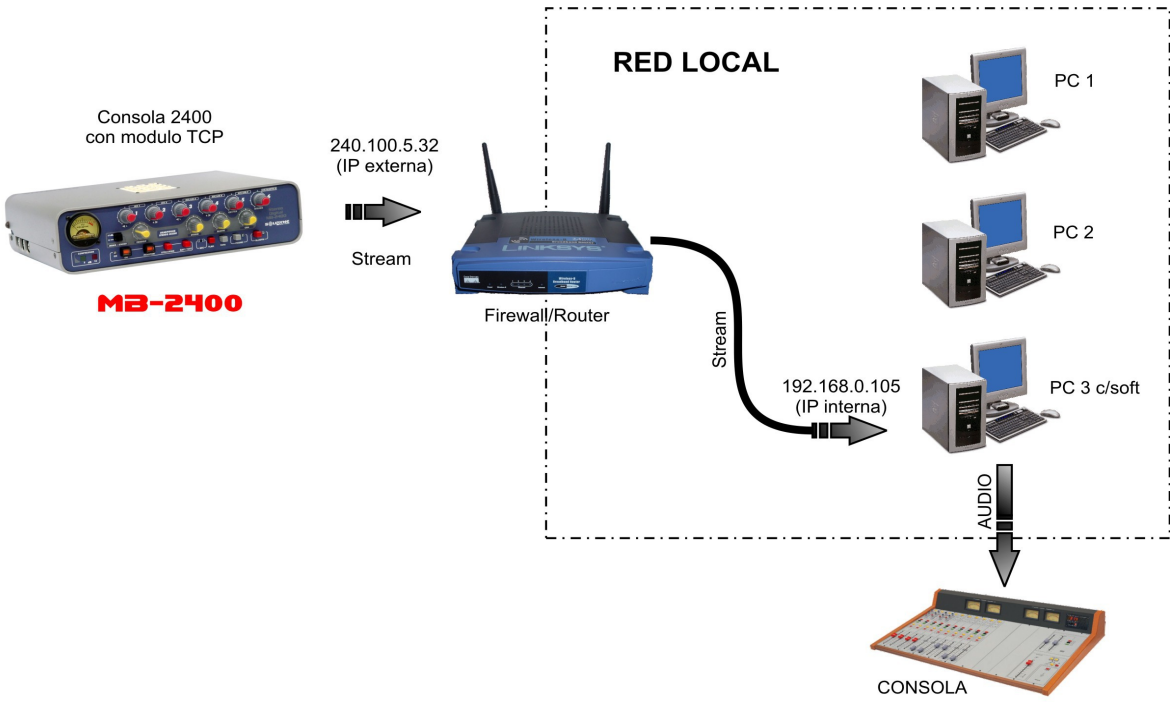
In this configuration the console transmit directly to an fixed IP address. In the studios, you must use a PC running a audio player software that accepts incoming connections, and supports the protocols UDP and RTP (eg the VLC player).

When using a direct connection is required to contact the network supervisor in order to configure the router/firewall of the station to allow the incoming connections (arising in the MB2400).

Remember that the destination IP address you enter when you configure the MB2400 is the address to access to the router from exterior (fixed IP assigned by your ISP).

When streaming reach the router/firewall, packets must be redirected to the local IP address (eg 192.168.0.105) of the on-air. To identify which packages should be address use port forwarding. As the MB2400 transmit to a specified IP address and port, all packets that arrive at your radio and match the specified port will be redirected to the on-air computer.

Diagram of connection:

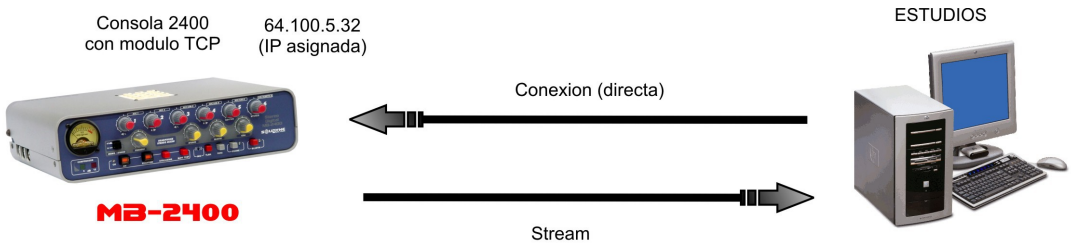



*The diagram shows the path to the streaming audio from the console to the PC host for an IP connection.*

### *5.2.2.3 Alternative method – Start a connection from Studios to MB-2400*

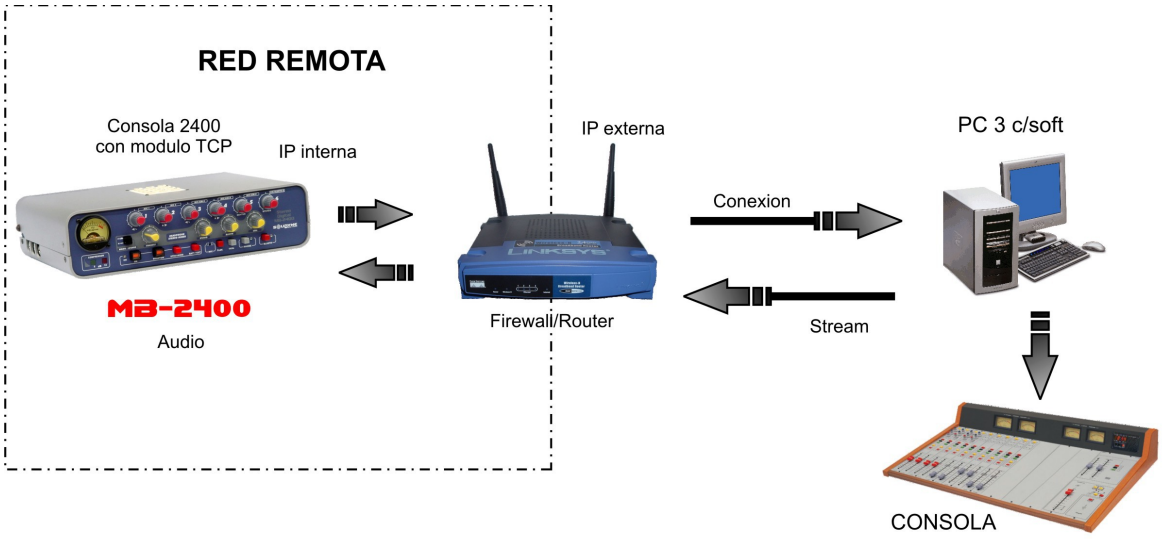
This method is rarely used, but it is documented. In this case the connection is initiated from a studio to the console. This requires knowing the IP address you get the console.

For example, when connecting to a wireless network via EDGE or 3G system equipment will obtain an IP address. Entering the IP address in the connection software is sufficient to communicate with the computer.




Remember that the assigned IP address, information from the audio output from the console.

But if the console is connected in a local area network, you will need to contact the network administrator to configure the router / firewall and map the IP connection to the local console. In addition you must tell to network administrator which is the external IP network. The address will be used effectively as a destination from studies of the connection.




Connection scheme originated in a study destination console connected to a remote local area network.

## *Stereo mixer*

| | |
|---|---|
| **Inputs** | **6 channel**, 9 inputs;<br>**5 Microphone balanced** inputs; 3 are MIC / Line<br>XLR connectors for MICs and 1/4" jacks for balanced line<br>In stereo, MIC 1 & 3 are Left; MIC 2 & 4 Rigth; MIC 5 center<br>**One Stereo line input** 1/4" unbalanced jack, 50 Kohms |
| **Phantom Power** | Optional 48 V phantom in all microphones with internal switching supply |
| **Input level** | **Balanced Microphone:** -22 to -75 dBu, MIC 1,2,3 & 4<br>MIC 5 (stereo center) ; -22 to -65 dBu<br>**Balanced Line:** -20 to + 20 dBu<br>**Stereo Line;** -10 to + 20 dBu |
| **Audio output** | **Mono** balanced audio output + 4 dBm / 600 ohms / XLR out<br>**Stereo**, unbalanced -10 dBu to 0 dBu / 10 Kohms / 1/4" jack<br>**Digital Stereo** stream, coded MP3, see below CODEC / RJ45 |
| **Hybrid Outputs** | 2 outputs with internal Hybrid.<br>One for land phone line (POT) and one for cellular phone<br>Return to Studio output level: - 2 dBu over 2 Km artificial line |
| **Bluetooth link out** | Microwave digital link, Bluetooth, to connect a second cellular phone wireless up to 15 meters. This avoids problems associated to wired connections |
| **Stereo Headset Mixer** | **6 stereo outputs for headsets;** Z= 8 to 600 ohms<br>4 channel mixer and Distribution Amplifier included. It can work stereo or mono mode. Inputs are: Stereo Mixer Out, Studio return (Hybrid,Cellular or Tuner), Bluetooth and Digital stream |
| **Frequency Response** | **MIC to mono out:** 20 - 20.000 Hz +/- 0,5 dB<br>plus -3 dB @ 20 Hz anti pop filter<br>**Stereo Line to Stereo Out:** 20-20.000 Hz +/- 0,2 dB<br>**Stereo Line to Digital** at 64 Kbits/s: 30-15.000 Hz +/- 0,5 dB |
| **THD Distortion** | **MIC to mono out:** less than 0,1 %<br>**Stereo Line to Stereo Out:** less than 0,04 %<br>**Stereo Line to Digital stream** at 64 Kbits/s: less than 0,04 % |
| **Noise** | **MIC to mono out:** Signal/noise > 60 dBA at -40 dBu MIC input<br>**Stereo Line to Stereo Out:** Dynamic range > 85 dBA<br>**Stereo Line to Digital stream** Dynamic range > 75 dBA |
| **Stereo Crosstalk** | Better than 65 dB at 1 KHz |
| **Audio Compressor** | Audio compressor for level control at the mono output and cellular phone. High audio quality stereo output is uncompressed<br>20 dB action with 2 LED indication; 5 & 15 dB<br>1 ms attack time and 200 ms recovery<br>Slope 20:1 |
| **Electronic Technology** | Advanced rail to rail amplifiers with very low power consumption , for long battery duration. Modular easily changed sub-set for Bluetooth, 48V phantom, Digital stream and potentiometers. One million operation potentiometers for full life duration. |
| **Cellular connection** | Cellular # 1wireless Bluetooth linked up to 15 meters<br>Cellular # 2 (backup unit) wired to RJ11 connector |

| | |
|---|---|
| **Additional Features** | Battery charge meter<br>Internal talkback MIC<br>Internal DTMF dialer<br>Audio generator at + 4 dBu reference level, 1.000 Hz +/- 10 % |
| **Battery charger** | The console includes a multivoltage 90 V to 240 V switching battery charger<br>During charge the console can work On Air<br>Full charge overnigth, 10 to 12 hours |
| **Battery duration** | Analogue mixer use with Bluetooth: more than 20 hours<br>Digital stereo or mono Internet streaming: 8 hours<br>Professional grade Nikel-Metal battery, 1.000 charges guaranteed |
| **Dimensions and Weight** | Dimensions: 70 mm x 200 mm (wide) and 265 mm depth<br>Weight: 1,8 Kg with battery |

## *Sección de codificación streaming*

| | |
|---|---|
| **Streaming connection** | Standard RJ45 Ethernet connection TCP/IP |
| **Standards supported** | • MP3 Layer 1 (32, 44.1 and 48 kHz)<br>• MP3 Layer 2 (16, 22.05 and 24 kHz)<br>• G.711 (µLaw / aLaw 8 and 24 kHz sampling rate)<br>• 16bit PCM uncompressed (8 and 24 kHz) |
| **Protocols** | • IP standard based protocols; TCP/IP, UDP, HTTP, ICMP, SNMP<br>• Supports BootP, DHCP and Auto IP<br>. It supports RTP for low latency |
| **Studio link** | Using a streaming host (Solidyne provides one temporal to test the MB 2400), the Journalist only needs to connect the codec to Internet to start the digital transmission |
| **Latency (time delay)** | MB2400 has a latency of only 50 mS<br>The full loop including Internet and receiver software in a direct connection is between 0,5 sec to 1,5 sec<br>Using an iceCast host streaming server this value usually raise to 1 - 2 sec |
| **Voice IP identification** | When MB2400 is connected to a LAN network for codec programming, a voice response in English can be heard at headphones in order to get the IP address of LAN |