

ADA 102



CODER/DECODER TCP/IP studio-to-transmitter link

OWNER'S MANUAL / MANUAL DE USO

Table of contents

Overview.....	4	analogical connections.....	8
1.1 About this manual.....	4	1.4.2.2 Full digital connections.....	9
1.2 What's in the box?.....	4	1.4.2.3 Audio processor locates at transmission plant.....	9
1.3 Features.....	4	1.4.3 Using an RF digital link.....	9
Section 1 Hardware and connections.....	5	Section 2 software settings.....	11
1.1 General connection diagram.....	5	2.1 Setting up the ADA102 link.....	11
1.2 Rear panel.....	5	2.1.1 Set ADA102 encoder.....	11
1.2.1 Power supply.....	5	2.1.2 Set ADA102 at the transmitter plant / receiving	
1.2.2 Audio inputs and outputs.....	5	studio (decoder).....	12
Balanced input/output connections:.....	5	2.2 Advanced settings.....	13
Unbalanced connections:.....	5	2.2.1 Setting temporary IP address using ARP	
1.2.3 LAN port.....	6	command.....	13
1.2.4 USB port.....	6	2.2.3 Remote control.....	14
1.2.5 Serial port.....	6	2.2.4 Serial port.....	14
1.2.6 Remote control.....	6	2.2.5 About audio settings.....	15
1.2.7 MPX output (optional ADA102mpx).....	6	Encoding & Frequency.....	15
1.2.8 Reset.....	6	2.2.6 Calculating the bit rate.....	15
1.3 Frontal panel.....	7	2.2.7 Emergency pendrive.....	15
1.3.1 Level indicators.....	7	2.3 Alternative link modes.....	16
1.3.1.1 VU mode Tx/Rx.....	7	2.3.1 Half-duplex link with unknown IP at the	
1.3.2 SATUS LED's.....	7	transmitter plant.....	16
1.3.3 Headphones output.....	7	2.3.2 Full-duplex link with unknown IP at the Studios	
1.3.4 Input Gain.....	7		16
1.3.5 Output Gain.....	7	2.3.3 Link with repeaters.....	17
1.4 STL connection diagram.....	8	Section 3 Technical specifications.....	19
1.4.1 Connection diagrams for streaming transport....	8	Digital Streaming Input / Output.....	19
1.4.2 Set the audio levels.....	8	Other features.....	20
1.4.2.1 Audio processor locates at the studios with		MPX output (modelo ADA102mpx).....	20

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 ADA102 Encoder / Decoder (rack module).-
- 1 AC power cord.-
- 1 crossed LAN cable
- Printed user manual (this manual).-
- Warranty certificate.-

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

1.3 Features

The encoder/decoder **Solidyne ADA102** is a stand alone *streaming* generator, designed to work as Studio to Transmitter Link (STL). Encoder works with stereo audio signals turning it into an MP3 or PCM audio streaming, under different modes (see specifications).

The coded output is an RJ45 connector compatible with Ethernet TCP/IP networks. ADA102 has analogical audio inputs (balanced) and digital AES-3 or S/PDIF.

At the other end, an ADA102 set as DECODER convert the incoming stream (from Internet or microwave link 802.11.x) into analogue audio signal or a digital stereo AES-3 (S/PDIF compatible), sent to transmitter.

Model ADA102mpx decoder incorporates a third type of output: Baseband MPX for direct connection to a broadcasting FM transmitter.

The unit has **four relay remotely managed**. At the encoder, four inputs manages four switches on the decoder, and vice versa.

The **USB port** lets you connect a pendrive when the

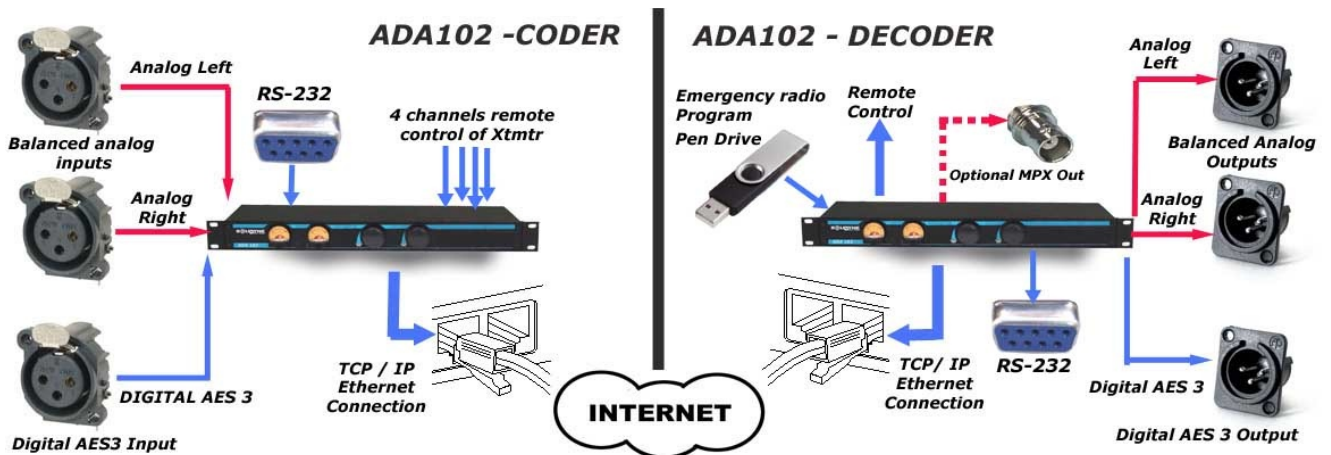
ADA102 works as a decoder. If the incoming streaming drops, the ADA102 Decoder will start to play audio files from USB device until the connection restored.

The **serial port** support "gateway". From studios, using a computer connected to the ADA102 encoder, you can command a remote device directly connected to the ADA102 decoder at the transmitter plant, as if the device was connected directly to the computer on Studio.

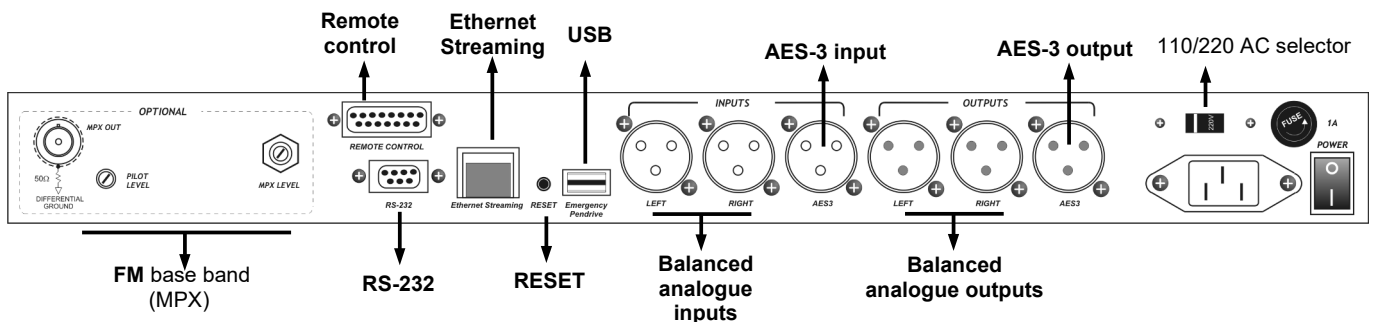
Main features

- Can be set as Encoder or Decoder by settings, using the WEB Control Panel.
- Generates **MP3 streams** at adjustable bit rates (VBR) from analogue or digital (AES-3) sources. Compressed audio is not supported for full-duplex transmissions.
- Generates **G.711** (aLaw/uLaw) streams at 8 or 48 KHz sample rate from an analogue source.
- Generates **PCM** (16 bit) streams from 8 up to 48KHz sample rate from an analogue source.
- Supports **Full-duplex** for PCM and G.711.
- 10/100 Mbit Ethernet connection supports automatic network configuration (BOOTP, DHCP, AutoIP and IPzator) as well as manual static IP configuration.
- Features **SonicIP®** announcing the IP address on power up over the audio outputs.
- Control and configuration using a standard web browser.
- Remote monitoring using SNMP.
- Remote controllable using HTTP, TCP and UDP.
- 4 inputs to manage 4 switches at the remote device.
- Serial port gateway.
- In half-duplex the unit automatically recognizes the audio format of incoming streaming.
- Balanced analogue inputs / outputs.
- Base band MPX output for FM (optional).
- **USB Pen Drive for emergency audio.** If the streaming is lost due to network failure, the decoder plays from USB device until streaming restores.

1.1 General connection diagram



1.2 Rear panel



AES3 INPUTS / OUTPUTS is available only on models produced prior to 2018.

1.2.1 Power supply



Always **CHECK** the correct position of the **VOLTAGE SELECTOR** (200/240V o 100/130V, according to the country)

AC wires do not have to be mixed with audio wires, especially with analogical ones. Remember that all audio installation must have a trustworthy grounding. We recommend accomplishing with the standards - Article 810 of the National Electricity Code (NEC); ANSI/NFPA N° 70-1984 in USA; IRAM 2379 and 2281-3 in Argentina. This standard provides information and guidelines for a consistent grounding.

1.2.2 Audio inputs and outputs

Analog inputs and outputs are electronically balanced. The inputs are "bridging" type, with impedance greater than 10 KOhms. The connectors used, as is standard, are female XLR-3 for the inputs and male for the outputs. **Take care with the phase.**

- Use one pair shielded audio cables of good quality, preferably with double shielding. The maximum length recommended is 30 mts, although in special cases it's possible to achieve 100 mts. accepting a little loss at HF.
- The connection of this cables are made as is standard. See the following table:

Balanced input/output connections:

- 1 = GND
- 2 = balanced positive phase (+)
- 3 = balanced negative phase (-)

Unbalanced connections:

- Inputs: Signal = 2; GND = join 1 y 3
- Outputs: Signal to pin 2; leave pin-3 unconnected. GND = pin 1

AES-3 input and output cables connect as following:

XLR	Signal
1	GND
2	AES3 (1)
3	AES3 (2)

AES3 standard connection

S/PDIF device can connect to AES-3 input/output of ADA102 using an S/PDIF to AES-3 adapter.



No software setting is needed to enable AES-3. Decoded audio are always sent to Analog and AES-3 outputs.

1.2.3 LAN port

Standard Ethernet RJ45 10/100 to connect the unit to a switch/router to send or receive audio streaming.

1.2.4 USB port

Lets plug in a flash memory storage (Pen Drive) when the unit works as a decoder, so that in case of loss of streaming, the decoder switches to the Pen Drive to continue with the audio playback. USB 1.1 compatible devices are supported, with the following limitations:

- Only mass storage devices are supported.
- HUB's are not supported (some flash drives have an internal HUB)
- **4GB** is the maximum capacity. If the flash disk is larger, create a 4 GB partition. Only the first partition is supported.
- First partition must be **FAT16** format.

If your computer does not recognize the pen drive, the following procedure can help you find the reason:

- Open an Internet browser, enter the ADA102 IP address followed by /status (i.e.: 102.168.0.110/status).
- Scroll down until "USB device info"
- Check if "Filesystem type" is "FAT16". If it's "FAT32", reformat the USB memory as FAT16.

The USB must contain a playlist file named **"playlist.m3u"** which determines the order in which MP3 files are played.



When the USB is plugged, ADA102 will reboot to detect the device, so audio output will be muted by few seconds.

1.2.5 Serial port

The serial port is used to command, from the studios, a device located in the transmitter plant as if it were directly connected to serial port of the computer at the Studio. For this ADA102 generates a *gateway* for transporting serial data transparently through the network (see "2.3 - Advanced Settings"). The connection requires a standard RS232 cables.

1.2.6 Remote control

Each unit has four inputs and four outputs for remote control. Each input can controls a switch off the remote unit.

Inputs are type "dry inputs". To enable an input (input "on") send it to a GND pin of DB-15.

The output switches 1 and 2 are "open collector" type (used for example to command external control circuit). Switches 3 and 4 are mechanical relays that can manage up to 1 A @ 24 VDC.

DB-15 pin out:

PIN	Signal	PIN	Signal
1	Input 1	5	Switch 1 (open collector)
2	Input 2	6	Switch 2 (open collector)
3	Input 3	7 y 14	Switch 3 Relay, normal open
4	Input 4	8 y 15	Switch 4 Relay, normal open
9 a 13	GND		

1.2.7 MPX output (optional ADA102mpx)

The model ADA102mpx includes a stereo coder that generates the FM baseband signal. This output is connected to an FM transmitter. The MPX cable is a RG-59 (coaxial 75 ohms), like the used for CATV. The output connector is BNC. The maximum length recommended for this cable is 25 m. Take care with the grounding; although this rarely is cause of problems because all Solidyne processors have MPX differential outputs, that is to say, with the ground isolated from the cabinet, to avoid ground loops. If some residual humming appears when the system is on the air; power off ADA102. If the humming disappears, check the input connections at the decoder. If, however, the humming continues (and only disappears unplugging the MPX cable), this indicates some important problem with the grounding.

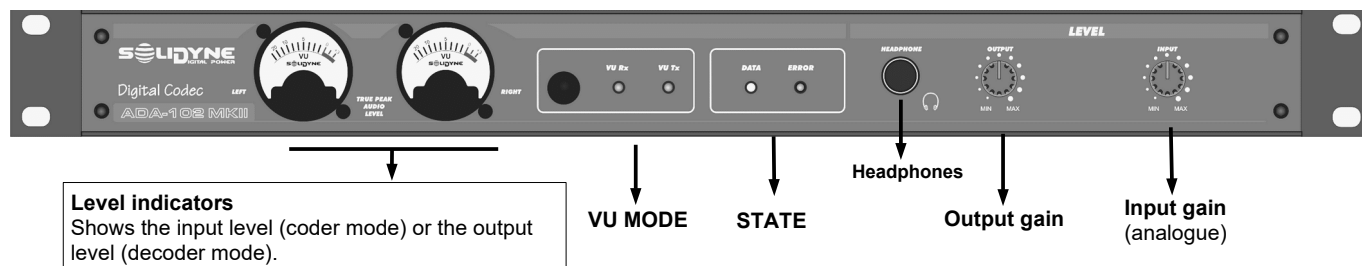
When enters to the transmitter through the MPX input, make sure that the internal pre-emphasis network IS DISCONNECTED (that is to say, flat response from 20 Hz to 100 KHz). Contrary, when use an external stereo coder, make sure that the generator INCLUDES the pre-emphasis curve. This is due that ADA102 audio output DOES NOT INCLUDE pre-emphasis (only the MPX output has pre-emphasis).

1.2.8 Reset

Pressing this button restarts the unit. Press and hold for 10 seconds to reload the factory defaults.

If you start your computer holding down the button for 5 seconds, ADA102 starts in "firmware update" mode.

1.3 Frontal panel



1.3.1 Level indicators

ADA102 has two needle-type VU meters that shows the real peak value of audio signal.

1.3.1.1 VU mode Tx/Rx

This button changes the signal that the VU shows.

Tx shows the level of the analogue input. Adjusting the input level you are adjusting the transmission level. This is the usual work mode in the Studios.

Rx shows the output level of analogue output and streaming. This is the usual work mode in the Transmitter Plant.



Level indicators do not work with AES-3 signals.

1.3.2 SATUS LED's

During the initial boot up sequence the 2 status indicator LEDs can indicate the following anomalies:

No Application loaded (only bootloader) or started with hold reset button during power up: The green LED is on and the red LED blinks.

Application starts (boot-up sequence):

First the red goes on and the green LED blinks once. Then during the startup the green and red LEDs blink.

During DHCP the red LED blinks with a continuous cycle . The green LED blinks five times and then pause four times.

If an error is detected the red led remains on and the device resets itself after the green LED has indicated the error as follows:

ERROR	Green LED blinks
Corrupt application or IP address conflict	five times
The Network hardware could not be initialized or a Corrupt MAC address	three times

In normal conditions:

Green LED	Red LED	State
OFF	BLINKING	Application is detecting USB devices or announcing the assigned IP address using SonicIP technology.
ON	OFF	The application is operational.
ON	ON	Reset Button is being pressed, the unit will reboot after releasing the button.

1.3.3 Headphones output

Gives the output signal with headphones level, to monitoring. The level changes with the output level control.

1.3.4 Input Gain

Manages the input gain of the analog inputs. Adjust this level to reach 0 VU with signal peaks. To see the input level the VU meter must be in Tx mode.

1.3.5 Output Gain

Manages the analog output level. At 0 VU the output level is +4 dBm. To see the output level the VU meter must be settled as Rx from rear panel.

1.4 STL connection diagram

1.4.1 Connection diagrams for streaming transport

The figures above shows two examples of streaming link in FM stations.

In diagram (a) the audio processor is located at the studios, and carries the processed audio to a ADA102mpx connected directly to transmitter. In this way the processor works with the audio signal directly from the console, and ADA102 carries the processed audio. This is the recommended

configuration for FM.

The diagram (b) shows a chain of 100% digital audio, using inputs and outputs AES-3. In this case, the processor appears in transmission plant, which is processing the audio decoding of MPEG streaming. The output of MPX audio processor is connected directly to the transmitter.

In **AM stations**, the audio processor must be close to the transmitter to maintain a DC coupling that allows the asymmetric modulation.

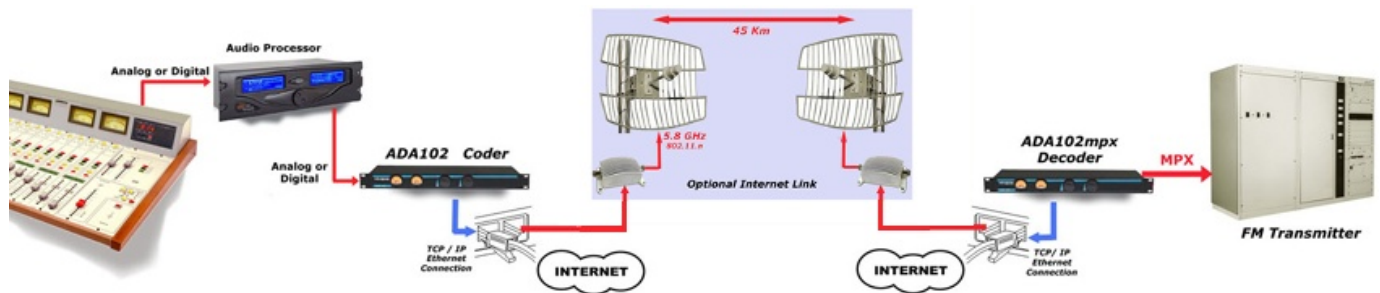


Figure (a) – STL with audio processor at the Studios

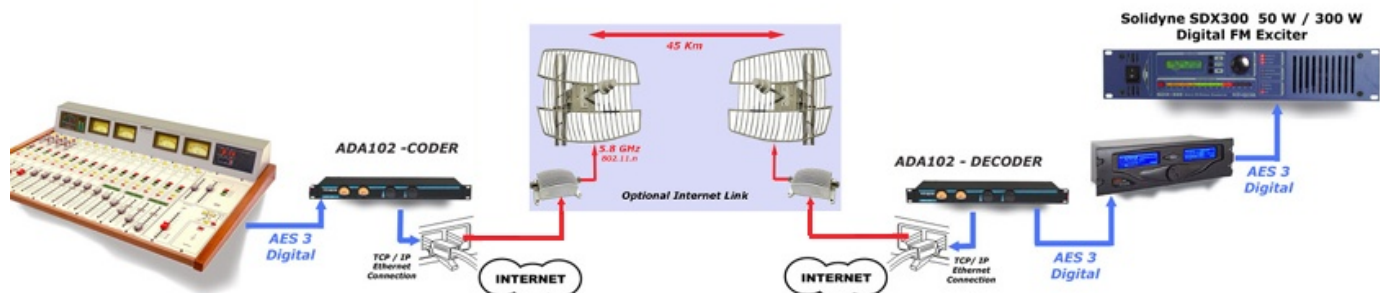


Fig.(b) – STL using an digital audio chain. For AM stations, the audio processor must be next to the transmitter

1.4.2 Set the audio levels

1.4.2.1 Audio processor locates at the studios with analogical connections

When the audio processor is at the Studio, connected by analog input – case (a) mentioned above – the input level of ADA102 CODER is a critical issue.

- Choose a high density musical program.
- Play on-air the music and check the audio processor to verify that the AGC compression be 10 dB or higher.
- Adjust carefully the ADA102 input gain to obtain a 0 VU deviation with the peaks. **Needle must never overpass the 0 VU indication.**

At the other end, **ADA102mpx** receives the

streaming. The incoming streaming is decoded and sent to MPX stage. To adjust the 100 % of modulation proceed:

- ADA102mpx has two presets at the rear panel: MPX level and 19 kHz Pilot Tone level.
- Playing the same high-density song used to adjust the CODER, adjust the MPX level preset to obtain 100% of modulation at the transmitter. Read this value at the exciter VUmeter
- If you have a modulation meter available (Solidyne VA16, Belar, Innovonics, etc.) we recommends to use the measurements of this instrument instead of the exciter value.
- If you have a modulation meter available, adjust the pilot tone depth to 8% / 10%

using the correspondent preset of ADA102mpx. If you don't have a modulation meter, do not change this preset.



Do not push the screwdriver. The preset can be broken.

The level knob at the ADA102mpx front panel do not changes the MPX level. Only take effect on the level of balanced outputs, so it must be adjusted only to obtain a visualization at the VU-meters, which will indicate that *input streaming is present*.

The internal input gain (software) do not be changed. It must be -1 dB (default value).

1.4.2.2 Full digital connections

Whenever the audio processor is located, in a full digital audio chain – *case (b) mentioned above* – the controls on frontal panel do not take effect over the signal. The adjustment is made from web control panel. The level of the digital audio is not changed by the encoding–decoding process.

- You must set the output level of the decoder output (wich excites the stereo coder input) according to the output level (dBfs) of the audio processor. Default output level is -1 dB (for use with analog signals).

This level is adjusted from web control pannel, in the section *Basic Settings* → *Configuration* → *Audio (Output Audio Level)*.

AUDIO

Format

Sample Rate

Quality

Input Source

Input Gain dB

Output Audio Level dB

Next, a table with reference Output Audio Level values.

Procesador output (dBfs)	Decoder Output
- 3 dBfs	- 6 dB *
- 6 dBfs	- 3 dB
- 9 dBfs	0 dBfs

* Value for Solidyne digital processors



The knob level at the front panel only takes effect over analog inputs, and the VU meters do not operate with digital signal.

- To adjust the modulation depth, proceed like the previous case (MPX preset).

1.4.2.3 Audio processor locates at transmission plant

When ADA102 links the Studios to Transmission Plant, where ADA102 DECODER connects to the audio processor; the audio level managed by ADA102 link **is not critical**, since the processor at the end of chain controls the level sent to the transmitter.

- In ADA102 CODER, adjust the input gain to reach 0 VU with signal peaks. If you are connecting the AES-3 input, the level adjustment is no needed (neither possible).
- In ADA102 DECODER, adjust the output level knob to reach 0 VU with signal peaks. If you are connecting the AES-3 output, the level adjustment is no needed (neither possible).
- Now follow the Audio Processor user's manual in order to adjust the modulation.

1.4.3 Using an RF digital link

The use of a ADA102 CODER in studios connected to broadband Internet, allows to cover any distance from studios to transmitter plant. This solution can be used to STL links and for radio networks, so one coder from studios can send a signal to several slaves throughout the country.

Another solution to transport the audio streaming maintaining the great sound quality at low cost: a **microwave link** for 5.8 GHz (or 2,4 GHz in some countries) using the standard 802.11.x. This **band is free** in all countries and does not require any special authorization. It is able to cover 45 Km and should not have major obstacles between the two sides.

For details, please contact us (info@solidynepro.com).

2.1 Setting up the ADA102 link

ADA102 can work as a coder, as decoder and as full-duplex link. Next step by step guide describes how to set two units for a STL link, a unidirectional link (half-duplex) between main Studios and the Transmitter Plant (but the same procedure is also valid for link the main studio to another studio or any remote location).

Into the main studio the ADA102 works as ENCODER (audio PUSH) encoding and sending an audio streaming to a remote location. At the remote location another ADA102 receives and decode the audio streaming (audio PULL).

Network requirements for both locations:

1. Must have DHCP enabled.
2. Requires a **STATIC PUBLIC / WAN IP address** (This needs to be setup by your service provider).

2.1.1 Set ADA102 encoder

1. Connect the power, LAN and AUDIO inputs to the unit.
1. Plug in headphones in front and ensure volume is turned up
2. Turn on the unit. At this stage, you need to have the headphones on and have a pen and paper handy.
3. The IP address of the unit will be called out over the headphones – write it down



If you don't hear the IP address, or the announced IP is out of range, hold down RESET button at rear of the unit for 10+ seconds – release when the red error light starts to flash. Wait for the default factory settings redo.

4. Now, go to a computer on the same network and open up the internet software you use – Chrome, etc.
5. Type in the IP address that you just wrote down and hit ENTER
6. You should now have access to the unit's dashboard (control)
7. If for some reason you are asked to login and you have not set a password etc., RESET the unit (and return to step 3)
8. Open up a new tab and type in "MY IP", and press enter. Write this IP address down and send to the remote location technician. This is the static IP you should've been given by your service provider. This is your PUBLIC / WAN IP address and will be needed by the

ADA102 decoder at remote location (AUDIO PULL).

9. Now, go back to the unit control page and click LOCATION tab. LOCATION value must be STUDIO ENCODER (factory default). If not, set it and click APPLY.
10. Click CONFIGURATION tab. Under Basic Setting, stream method select PUSH (RTP).

BASIC SETTINGS

OUTGOING STREAM

Stream Method	URL	Port
Push(RTP)	192.168.0.30	4050

11. For the URL, you now need the STATIC IP address of the PULL unit. As discussed above to obtain the IP address for your unit, the PULL unit (the receiving location) needs to do the same and send you that info. You will now be sending (PUSHING) the audio to that specific IP address.
12. Click APPLY.
13. Now select Network in the left area. Enter the unit's IP address (the one read out to you on the headphones). Add in the Gateway IP address as well. If you do not know this, browse to the network settings on the computer and take a look at the properties. You will find that info under DHCP servers and could look like this: 192.168.1.1 or similar.
14. Add a name under DHCP HOST NAME, if blank. Max 15 characters
15. Click APPLY
16. Under Streaming on the left you will notice it has been populated with the IP of the PULL unit info, as well as port 3030
17. Select Audio on the left. Here you set the audio format as needed, probably PCM 16bit stereo MSB
18. Click APPLY
19. That is it for the encoder (PUSH) install. Once both the unit have been setup, the link will be created and displayed on the HOME tab
20. NOTE: If at any time you get an error 400, just refresh the screen.

2.1.2 Set ADA102 at the transmitter plant / receiving studio (decoder)

1. Connect the Power, LAN and AUDIO outputs to the unit
2. Plug in headphones in front and ensure volume is turned up
3. Turn on the unit. At this stage, you need to have the headphones on and have a pen and paper handy.
4. The IP address of the unit will be called out over the headphones – write it down



If you don't hear the IP address, or the announced IP is out of range, hold down RESET button at rear of the unit for 10+ seconds – release when the red error light starts to flash. Wait for the default factory settings redo.

5. Now, go to a computer on the same network and open up the internet software you use – Chrome, etc.
6. Type in the IP address that you just wrote down and hit ENTER
7. You should now have access to the unit's dashboard (control)
8. If for some reason you are asked to login and you have not set a password etc., reset the unit.
9. Open up a new tab and type in "MY IP", and press enter. Write this IP address down and send to the ADA102 encoder (PUSH) unit technician. This is the static IP you should've been given by your service provider. This is your PUBLIC / WAN IP address and will be needed by the encoder (AUDIO PUSH UNIT).
10. Now, go back to the unit control page and click LOCATION tab and select TRANSMITTER DECODER
11. Click APPLY
12. Click CONFIGURATION tab. Under Basic Setting, stream method select PULL (BRTP).
13. For the URL, you now need the STATIC IP address of the PUSH unit. As discussed above to obtain the IP address for your unit, the encoder unit needs to do the same and send you that info. You will now be receiving (PULLING) the audio from that specific IP ADDRESS.
14. 14. Click APPLY

OUTGOING STREAM

Output Trigger Level
Output Inactivity Timeout msec
Keep-alive Period msec

INCOMING STREAM

Stream Method URL Port
RTP delay

15. Now select Network in the left area. Enter the unit's IP address (the one read out to you on the headphones). Add in the Gateway IP address as well. If you do not know this, browse to the network settings on the computer and take a look at the properties. You will find that info under DHCP servers and could look like this: 192.168.1.1 or similar.
16. Add a name under DHCP HOST NAME, if blank. Max 15 characters
17. Click APPLY
18. Under Streaming on the left you will notice it has been populated with the IP of the PUSH unit info, as well as port 3030
19. The RTP is expressed in milliseconds. Default value is 600. This is the buffering and helps if there is a drop-out in the audio (see "2.2.5 - About audio options").
20. Click APPLY if changes have been made
21. Select Audio on the left. Here you can set levels etc.
22. Click APPLY if changes have been made
23. That is it for the PULL install. Once both the unit have been setup, the link will be created and displayed on the HOME tab
24. NOTE: If at any time you get an error 400, just refresh the screen.

2.2 Advanced settings

2.2.1 Setting temporary IP address using ARP command

This procedure is used to temporarily set the IP address for first time browser access to the ADA102, in the case where you have no LAN and want to access from a Notebook.

After this procedure the temporary IP will be active only as long as the ADA102 stays powered. After a restart the procedure has to be repeated unless you have configured it with a static IP address.

Step 1

Use either a "crossover" network cable between the ADA102 and the PC or use two network cables to connect the ADA102 and the PC to a network switch and power the ADA102.

Make sure that you have a valid IP address configured on your PC (e.g. 192.168.0.2).

Step 2

Open a command window. Windows: click on "Start", click on "Run..", in the "Open" field type `cmd`, click on "OK".

OSX / Linux: Open a terminal window

Step 3

Please proceed to step 4 if you used a "crossover" network cable in the preparation step above.

To ensure that we use a free IP address (not already used by another device in the network) we have to use the Ping command. In this example we assume the PC to have the IP address "192.168.0.2" and want to check if "192.168.0.6" is free.

To do so type `ping 192.168.0.6` and hit the "Enter" key.

If you get a reply (IP already used) then try to ping another IP until you find one that is not used. If the request times out (no reply) then the "pinged" IP is free and we can continue with the next step.

Step 4

Look for the Solidyne ADA102 MAC address printed on a label placed on the rear panel (12 hex digits, separated by a hyphen every 2 digits). Type into the windows command window:

```
arp -s 192.168.0.6 00-08-E1-00-B1-77
```

and hit the "Enter" key (replace the digits according to your devices MAC address). On a OSX or Linux system type into the terminal:

```
arp -s 192.168.0.6 00:08:E1:00:B1:77
```

Step 5

Now we have to make the ADA102 listen to the IP address "192.168.0.6" using the Telnet command.

To do so type into the command window:

```
telnet 192.168.0.6 1
```

 and hit the "Enter" key

(the number "one" must be there for this command to work correctly !!!). The ADA102 will refuse the connection on port 1 immediately but will be available for web access on the IP address used as long as the device stays powered.

Step 6

To check if the ADA102 is responding you can use the ping command again. To do so type:

```
ping 192.168.0.6
```

 and hit the "Enter" key.

If you do get a reply the IP address 192.168.0.6 can be used to access the ADA102 using a web browser. If you do get "request timed out" then please repeat step 6 carefully (you most likely mistyped the telnet command) or repeat the entire procedure.

2.2.2 Static IP

You can define a static IP. The advantage is that a known IP allows you to access to the web panel, in case that you requires change settings; without the necessity of listen the audio to know the IP (voice IP announced on start up).

By default the IP address is set to 0.0.0.0 (Dynamic IP disabled). To change it, go to "Configuration → Network".

Use SonicIP: If set to "yes", the device will announce its IP address over the audio output. Default: "yes".

IP Address: Enter the IP address of the device, e.g.: "0.0.0.0" for automatic discovery (DHCP/Bootp, IPzator, AutoIP) "192.168.0.12" for an internal LAN. Default: "0.0.0.0"

Netmask: Enter the 4 values of the desired Static IP e.g.: "0.0.0.0" for a default Netmask depending on the used IP Address. "255.255.255.0" for a C class network Default: "255.255.255.0".

Gateway IP Address: Enter the IP address of the Gateway e.g.: "0.0.0.0" for no Gateway "192.168.0.1" for a Gateway in a LAN.



The Gateway has to be set only when connecting to other devices over the WAN (through a router). Default: "0.0.0.0"

Primary DNS: Enter the primary DNS IP address so the device can connect to URLs (e.g. www.radio.com).

Example: "195.186.0.1" Default: "0.0.0.0".

Alternative DNS: Enter the alternative DNS IP address in case the primary DNS is not reachable.

Example: "195.186.4.111" Default: "0.0.0.0"

Syslog Address: Destination address for syslog messages sent by the BCL program via the SYSLOG command. Set this to your syslog logging machine, if your syslog messages are recorded centrally.

If set to 0.0.0.0, syslog messages are broadcast. Default: "0.0.0.0"

DHCP Host Name: Name of the device sent in DHCP request. If left empty, a name based on the device's MAC address is generated automatically. Enter up to 15 Characters.

Web server port: Defines the port where the webserver of the Solidyne device can be reached. If set to "0" the default HTTP port (80) is used.

2.2.3 Remote control

ADA102 has four electronic switches managed by the remote Solidyne device. Four inputs at the CODER manages four switches in the DECODER, and vice versa. In addition, switches can be controlled by other events.

In the control WEB panel, go to option "Configuration" of main menu. Section "I/O and Control" allows to define the behavior of electronic switches. Available options are:

"ON while remote Input X ON": Relay will be ON while the button with proper Input number is pressed on remote device.

"ON while connection ON": Relay will be ON while connection is defined by keep-alive.

"ON while connection OFF": Relay will be ON while disconnection is defined by keep-alive (Alarm: partner missing!).

"ON while IN audio ON": Relay will be ON while audio input is above "Input Trigger Level" (with "Inactivity Timeout" delay).

"ON while IN audio OFF": Relay will be ON while audio input is below "Input Trigger Level" (with "Inactivity Timeout" delay)

"PULSE ON with IN audio change": Relay will be pulse ON if audio input changes its state via "Input Trigger Level" (with "Inactivity Timeout" delay).

"ON while incoming stream ON" Relay will be ON while incoming audio buffer is full.

"ON while incoming stream OFF": Relay will be ON while incoming audio buffer is empty.

"always OFF": Relay will be OFF always. Default setting is "always OFF".

I/O AND CONTROL

Front Panel LEDs	Input State
Relay 1 Mode	ON while connection ON
Relay 2 Mode	always OFF
Relay 3 Mode	always OFF
Relay 4 Mode	always OFF
SNMP Destination IP(s)	
SMTP Server IP/DNS	
Local e-mail (FROM:)	
Destination e-mail(s) (TO:)	

By default, relay N°1 is ON while the connection is alive. Relays 2, 3 and 4 remain OFF.

SNMP Destinations IP(s)

For alarm sending, set the desired list (colon separated) of SNMP trap receivers.

SMTP Server IP/DNS

For alarm sending, set the IP address or DNS name of the SMTP server.

Local e-mail (FROM:)

FROM mail address, for SMTP alarm service.

Destination e-mail(s) (TO:)

TO mail address, for SMTP alarm service. Multiple e-mail addresses have to be separated by colon.

2.2.4 Serial port

The ADA102 serial port allows control from a PC in the Studios a remote device located in the transmitter plant as if it were connected directly to the serial port of the computer at the Studios.

- At the Studios, the computer connects to ADA102's serial port, using null-modem cable (crossed RS232).
- At the Transmitter Plant, a device (i.e. a broadcast RDS coder) connects to the ADA102-s serial port, using a standard RS232 cable.

You must set the port to RS232 "tunneling". In the WEB control panel, hint the option "Configuration". In section "Serial" the field "UDP/TCP Port for COM1" allows to enter a port number to serial communication. You must use the same port in both CODER and DECODER devices.



The option "Serial 2" is not implemented. Leave "UDP/TCP Control Port for COM2" as zero.

2.2.5 About audio settings

Encoding & Frequency

The unit supports the following audio formats:

- *MPEG1 / MPEG2 (solo half-duplex)*
- *uLaw/aLaw*
- *PCM MSB/LSB first*

The passive receiver of a half-duplex system automatically recognizes the audio format but only for audio formats with fixed content.



AES3 / S-PDIF input uses MPEG1 and the sample rate detects automatically (32, 44.1 o 48 KHz).

Remember: The playback buffer size is a very important question. This value expresses the buffer size in miliseconds. Smaller values minimize the delay, but increase the chance of audio drops. The optimal value depends on audio format and sample rate.

MP3 baja tasa de bits	400 mS
MP3 alta tasa de bits	200 mS
PCM 44.1/48 KHz	40 mS

2.2.6 Calculating the bit rate

The final bit rate is the sum of the audio bit rate and encapsulation of audio packets make the network protocol used. For RTP the calculation is:

The Ethernet total overhead per packet is 300 bit.

The IP total overhead per packet is 160 bit.

The UDP total overhead per packet is 64 bit.

The RTP total overhead per packet is 128 bit (considering the enclosure MP3 MPA into the usable RTP overhead, that have a extra header of 32 bit).

Total overhead of bits per packet =

Ethernet Overhead + IP Overhead + UDP Overhead + RTP Overhead = 652 bit

The audio bit rate expressed in bits/s, but the overhead is expressed in bits/packet. So we have to translate the overhead (bit/packet) in overhead rate (bits/sec). For this we need to know the number of packets per second, depending on the audio format. It can be measured with a software network protocol analyzer such as the "Wireshark".

Overhead/s = Overhead/Package x Packet/s

Total Bit Rate (Kbit/s) = Audio Data Rate (Kbit/s) + Overhead/sec (Kbit/s)

(1Kbit = 1000 bits)

	(Kbit/s)			(Kbit/s)
MPEG1 48KHz quality 0, stereo	88	41.7	652	115.2
MPEG1 48KHz quality 4, stereo	144	41.7	652	171.2
MPEG1 48KHz quality 7, stereo	192	41.7	652	219.2
MPEG1 48KHz quality 4, mono	96	41.7	652	123.2
MPEG1 44.1KHz quality 0, mono	65	38.3	652	90
MPEG1 44.1KHz quality 4, mono	90	38.3	652	114.97
MPEG1 44.1KHz quality 7, mono	140	38.3	652	164.97
MPEG2 16KHz quality 0, mono	28	27.8	652	46.12
MPEG2 16KHz quality 4, mono	44	27.8	652	62.12
MPEG2 16KHz quality 7, mono	64	27.8	652	82.12

Audio Format (STL)	Audio Data Rate (Kbit/s)	Packet/sec (Wireshark)	Overhead (bit) ¹	Total Bit Rate (Mbit/s) ²
ALaw 8 KHz, mono	64	50	620	0.09
PCM MSB 16 bit 8 KHz mono	128	50	620	0.16
PCM MSB 16 bit 11.025 KHz mono	176.4	50	620	0.2
PCM MSB 16 bit 12 KHz mono	192	50	620	0.22
PCM MSB 16 bit 16 KHz mono	256	50	620	0.29
PCM MSB 16 bit 22.050 KHz mono	352.8	50	620	0.38
PCM MSB 16 bit 24 KHz mono	384	50	620	0.41
PCM MSB 16 bit 32 KHz mono	512	50	620	0.54
PCM MSB 16 bit 44.1 KHz mono	705.6	70	620	0.75
PCM MSB 16 bit 48 KHz mono	768	75	620	0.81
PCM MSB 16 bit 8 KHz stereo	256	50	620	0.29
PCM MSB 16 bit 11.025 KHz stereo	352.8	50	620	0.38
PCM MSB 16 bit 12 KHz stereo	384	50	620	0.41
PCM MSB 16 bit 16 KHz stereo	512	50	620	0.54
PCM MSB 16 bit 22.050 KHz stereo	705.6	70	620	0.75
PCM MSB 16 bit 24 KHz stereo	768	75	620	0.81
PCM MSB 16 bit 32 KHz stereo	1024	100	620	1.08
PCM MSB 16 bit 44.1 KHz stereo	1411.2	137	620	1.5
PCM MSB 16 bit 48 KHz stereo	1536	150	620	1.63

2.2.7 Emergency pendrive

If the incoming streaming drops, ADA102 can play audio files from a pendrive plugged on USB port. When the audio stream is reestablished the system will fold back to incoming streaming.

ADA102 only support .mp3 files. The USB drive must

Audio Format	Audio Data Rate	Packet/sec (Wireshark)	Overhead (bit)	Total Bit Rate
--------------	-----------------	------------------------	----------------	----------------

contain the audio files placed directly in the root folder, and a playlist file named **playlist.m3u**, which determines the order in which the files will be played.

This playlist can be created using a simple text editor (eg Windows Notepad) and then changing the extension from .txt to .m3u. Example:

```
# sample playlist begin
audio1.mp3
audio2.mp3
audio3.mp3
audio4.mp3
# sample playlist end
```

As files are in the root folder, it is not necessary to enter the path. Lines preceded by pound (#) are comments.

Playlist can also be created using an audio player. Usually create an .m3u only requires to save the list of songs loaded on the player, as .m3u. playlist file.

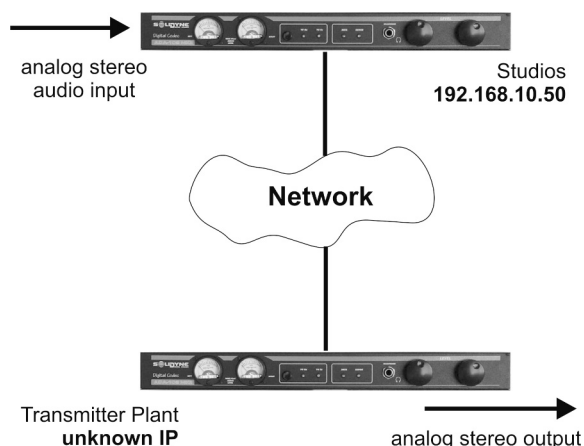


Supported USB memory drives are detailed in “1.2.4 – USB port”

2.3 Alternative link modes

2.3.1 Half-duplex link with unknown IP at the transmitter plant

In this case requires a half-duplex link between Studios and Transmitter Plant. Studios have static IP but the Transmitter IP is unknown. The decoder (Transmitter Plant) will start the connection to the studios.



ADA102 at the Studios:

BASIC SETTINGS

OUTGOING STREAM

Stream Method	URL	Port
Pull(BRTP)	0.0.0.0	3030

In the coder, go to “Configuration → Basic settings” and set the streaming method as “Pull (BRTP)”, the URL as “0.0.0.0” and enter the listening Port for BRTP. Hit “Apply” to confirm the values.

ADA102 at the Transmitter Plant

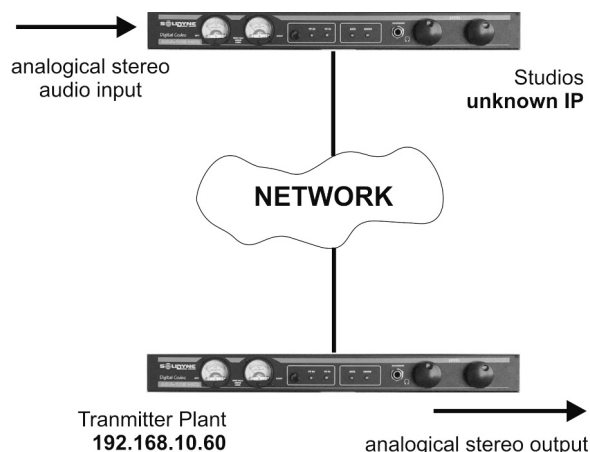
At the Transmitter Plant, go to “Configuration → Basic settings” and set “Stream Method” as “Pull(BRTP)”. In field URL enter the IP address or URL of the CODER in Studios. “Destination Port” must be the same assigned in the CODER. Hit “Apply” to confirm.

BASIC SETTINGS

INCOMING STREAM

Stream Method	URL	Port
Pull(BRTP)	192.168.0.202	3030

2.3.2 Full-duplex link with unknown IP at the Studios



This case is a full-duplex Studio to Transmitter link, but only the Transmitter Plant IP is known. The coder at the Studios starts the communication to that IP address.

ADA102 at the Studios:

In option “Location” set the device as “Studio Encoder/Decoder”. Go to “Configuration → Basic settings” and enter the IP address or URL for send and receive.

Set the outgoing stream method as “Push(RTP)”. In URL enter the IP of decoder (the external IP address that router redirects to ADA102 decoder at the Transmitter Plant). The Port number is the the “Local Port” value assigned to the decoder in the Transmitter Plant.

Set the incoming stream as “Pull(BRTP)” since the IP address of coder is unknown. In the field URL enter the IP of the transmitter plant (decoder) and the same port number assigned to decoder.

OUTGOING STREAM

Stream Method	URL	Port
Push(RTP)	192.168.0.202	3031

INCOMING STREAM

Stream Method	URL	Port
Pull(BRTP)	192.168.0.202	3030

In a full-duplex link, both units must work with the same audio format. **MPEG are NOT SUPPORTED for full-duplex mode.**

ADA102 at the Transmitter Plant

At the Transmitter Plant ADA102 receives the streaming from Studios.

Set “Outgoing stream” as “Pull(BRTP)” since is the coder from studios who starts the connection. IP address is zero and the Port number must be the used in the section “Incoming stream” in Studios.

Set “Incoming stream” as “Push(RTP)” with IP address zero, since the coder starts the connection to the decoder.

OUTGOING STREAM

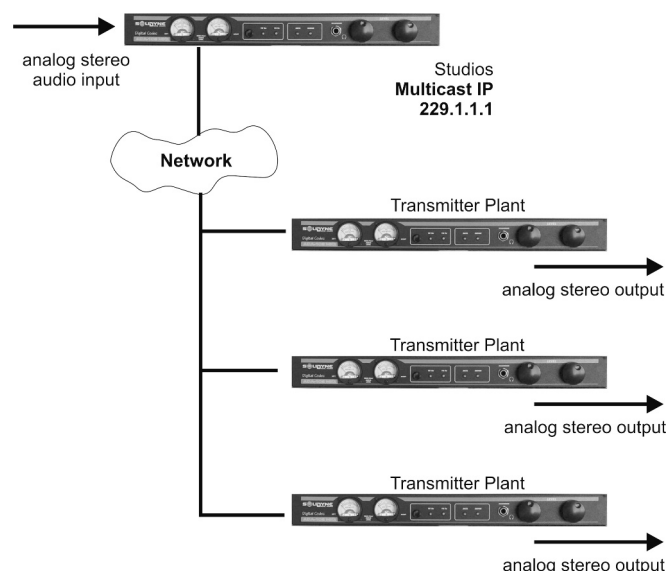
Stream Method	URL	Port
Pull(BRTP)	0.0.0.0	3031

INCOMING STREAM

Stream Method	URL	Port
Push(RTP)	0.0.0.0	3030

2.3.3 Link with repeaters

In this mode the coder send streaming to several devices simultaneously. This configuration is common when you have a static IP to the “multicast” group and requires a half-duplex link. In both Studio and in Plant, ADA102 is set as “Multicast” (Configuration → Basic settings → Stream Method).



Multicast is a protocol designed for maximum efficiency of the networks when required simultaneous transmission from one point to multiple destinations. Both the transmitter and receiver use the same IP address, which should be in a special range of IP addresses for a multicast. This range includes addresses from 224.0.0.0 to 239.255.255.255.

To implement this scheme, see your network administrator, because you need to configure the multicast routers.

ADA102 at the Studios

In this case ADA102 coder transmit to a multicast IP address. Coder works in mode “Multicast” (Configuration → Stream Method).

ADA102 at the Transmitter Plant

The decoder also works as “Multicast”. In the field URL you must define the same multicast IP used in the coder.

Coder / Decoder Mode	ADA102 is able to work as Coder or Decoder by software configuration. Full-duplex supported for non compressed audio streaming.
Analog Input / Output	Stereo balanced In / Outs -10 to + 15 dBu input level, regulated by front panel level control Max output level + 20 dBm over 600 ohms (at FSD level) 0 VU at meter: + 4 dBu out
Digital IN / Out	AES 3 professional balanced digital stereo IN / Out Z=110 Ohms. Full compatible S/PDIF
Frequency Response	Analog: 30 - 15.000 Hz +/- 0,5 dB @ 192 kbps Digital AES-3: 20 - 15.000 Hz +/- 0,1 dB @ 192 kbps
Distortion	Less than 0,01 % THD distortion, Analog or Digital @ 192 kbps Typical AES-3: 0,005 % @ 192 kbps Total Encoder+Decoder
Noise	Dynamic Range > 70 dBA @ 192 kbps as encoder Dynamic Range > 80 dBA @ 192 kbps as decoder Dynamic range AES 3: > 90 dBA @ 192, Total Encoder + Decoder
Headroom	Safety level from 0 VU meter to Full Digital Scale: 15 dB
VUmeter Level	Measures true peak level with a peak-hold system
Channel Separation	Better than 70 dB @ 1 kHz, Analog Better than 90 dB @ 1 kHz, Digital AES 3
Power supply	220-240V / 110 - 127 V 50 / 60 Hz, 15 VA

Digital Streaming Input / Output

Streaming connection	Standard RJ45 Ethernet connection TCP/IP
Standards supported	• MP3 Layer 1 (32, 44.1 and 48 kHz) • MP3 Layer 2 (16, 22.05 and 24 kHz) • G.711 (μLaw / A-Law 8 and 24 kHz sampling rate) • 16bit PCM uncompressed (from 8 KHz to 48 KHz) MONO Streaming: MPEG1/2 Layer 3, VBR (Fs:48KHz): 72 76 80 88 96 112 144 160kbps STEREO Streaming: MPEG1/2 Layer 3, VBR (Fs:48KHz): 88 96 104 120 144 160 176 192kbps
Protocols	IP standard based protocols; TCP/IP, UDP, HTTP, ICMP, SNMP Supports BootP, DHCP and Auto IP. Supports RTP for low latency audio streaming.
Latency (time delay)	ADA102 has a latency of only 20 mS (uncompressed audio) on LAN
Variable Bit Rate (VBR) Encoding	The encoder uses Variable Bitrate Encoding (VBR) to realize optimal compression of the audio data. The setting of a fixed bitrate is replaced with setting a quality level that preserves audio quality in critical sections and enhances compression otherwise.

Other features

Port RS232	Bidirectional serial port RS232 used for Audio Processor control from studios, RDS signal control or Transmitter remote control. Supports all speeds up to 96 Kbits/s
4 channels remote control lines	Used for switch on-off transmitter, change to Day-Night power, change antenna array, etc. Four On-Off lines, 2 relay outputs (120 V - 1 A) and 2 open collector outputs (up to 24 V / 0,25 A). In/Outs using D-15 female connector
USB Emergency audio	In case of Internet streaming interruption, ADA102 starts to reproduce a pre-recorded radio program. The user must record it on a Pen Drive, using MP3 format. The Emergency Radio Program could be only music or a complete program several hours long.

MPX output (modelo ADA102mpx)

MPX Output	Differential output, BNC connector, floating ground 50 ohms Allows 45 dB canceling buzz & noise due to ground loops Level: Adjusted 0,5 to 4 Vpp from rear panel preset.
Total Distortion	THD less than 0.003 % at 1 kHz.
Stereo Separation	75 dB at 400 Hz / > 70 dB; 30-15.000 Hz.
38 kHz Suppression	75 dB minimum below 100% modulation.
57, 76 and 95 kHz Suppression	75 dB minimum below 100% modulation.
Pilot Level	Adjusted 7-12 % from rear panel preset control
Pilot Stability	+/- 0.05 Hz, 0 to 50 °C.