## *Overview*

### Block Diagram/Description

The IP-Audio Option provides both audio and control connectivity to an ICM-32 over a standard TCP/IP network. The option consists of an ICM-32 with the IP-Audio Option, and a Barix Annuncicom 1000 or 100 unit loaded with SAS IP-Audio Option Firmware and connected to either a RIO or 32KD on the other end. Both units can be networked via LAN, across a dedicated WAN, or even the public Internet.
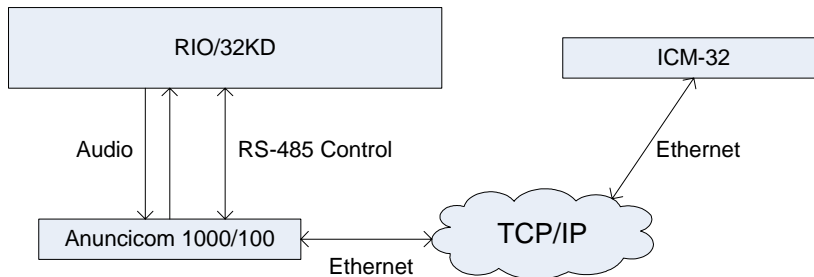


figure 1 - Block Diagram of ICM-32 connectivity with IP Audio Option.

To connect the Annuncicom to a 32KD or RIO, you will need to have the following SAS I/O resources available:
- Mono analog input channel
- Mono analog output channel
- Dedicated RS-485 control port on RIO or DRC, with one Annuncicom per port.

## *Network Configuration on a LAN or WAN*

Information that you will need from your network administrator before you begin:
- Static IP Address, netmask, and gateway settings for 32KD/RIO side Annuncicom
- Static IP Address, netmask and gateway settings for ICM-32

NOTE: It is possible to use DHCP to obtain IP the network settings automatically, however you will have to ensure that your network administrator has configured your DHCP server to always grant the same IP address for the ICM-32 and Annuncicom.

ICM-32 IP Audio Option Setup

## ICM-32 Network Setup

Connect the ICM32 to the LAN using rear Ethernet connector J7.

### ICM-32 Basic Setup
- On the ICM-32, press and hold the 'Dialup' knob for 5 seconds to go to the setup screens.
- Moving the knob to the left or right will navigate through the various setup screens.
- Pressing the setup button again exits setup and applies the settings.
- On the Initial 'Setup' screen, set the Stereo Mode to "Mono".
- The initial 'Setup' screen also displays hardware and firmware version information for support and upgrade purposes.
- The setup parameters are stored locally by the intercom station and are retained on power-down/power-up.



figure 2 – Initial setup screen

### ICM-32 Network Settings
- Use the dialup knob to select the Network Settings screen.
- Set the "Control" option to "TCP/IP"
- Set "TCP/IP Settings" option to Manual
- NOTE: You can set TCP/IP Settings to "Automatic/DHCP" only if your network administrator has configured a static DHCP assignment for you.
- A summary of the IP Address, netmask, and gateway settings are displayed. If you have configured the ICM-32 to use DHCP, these will show the DHCP-obtained settings.
- The network settings are applied when you exit setup, and can take anywhere from 10 to 20 seconds to take effect.



figure 3 – Network Settings screen

### ICM-32 IP Address, Netmask, and Gateway Settings
- Use the dialup knob to select the IP Address, netmask, and gateway screens
- Enter the IP Address, Netmask, and Gateway settings for the ICM-32 using the talk/listen buttons below each field.

ICM-32 IP Audio Option Setup


figure 4 – IP Address setting screen.

**ICM-32 Network Audio Settings**
- Use the dialup knob to select the Network Audio screen.
- In the "Destination IP" field, enter the IP Address of the Barix Annuncicom unit connected to the RIO/32KD.
- Enter the UDP port number to use for sending audio to the Barix Annuncicom, and the UDP port number to use for receiving audio. Note that these settings have to match the corresponding settings on the Annuncicom unit. The default value is 3030.
- Press the dialup knob to exit setup and apply the settings.


figure 5 – Network Audio setup screen.

## Annuncicom 1000/100 Network Setup

Connect the Annuncicom to your LAN, and the Annuncicom audio in/out and RS-485 to the 32KD or RIO. Refer to the Barix Annuncicom documentation and 32KD connector block documentation for wiring of audio and RS-485 connections.

**Determine Annuncicom IP Address**
- Connect the Annuncicom to the LAN.
- The Annuncicom is configured from the factory to use DHCP and will automatically obtain an IP address on power-up.
- To find out the Annuncicom's IP address, monitor the audio output of the Annuncicom when it is powered on. It will announce its DHCP-obtained IP address on the audio outputs on power-up.

**Annuncicom Network Settings**
- Open a web browser on a computer that is also on the LAN, and type in the Annuncicom's IP address in the address bar to get to the Annuncicom web configuration page.

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ICM-32 IP Audio Option Setup

- On the 'SAS Device Setup' page that is displayed, enter the IP Address, netmask, and gateway that your network administrator has given you for the Annuncicom, and hit the 'Apply' button.
- The IP address change should take effect after a few seconds.
- To change back to DHCP, follow steps above, and set IP address to 0.0.0.0
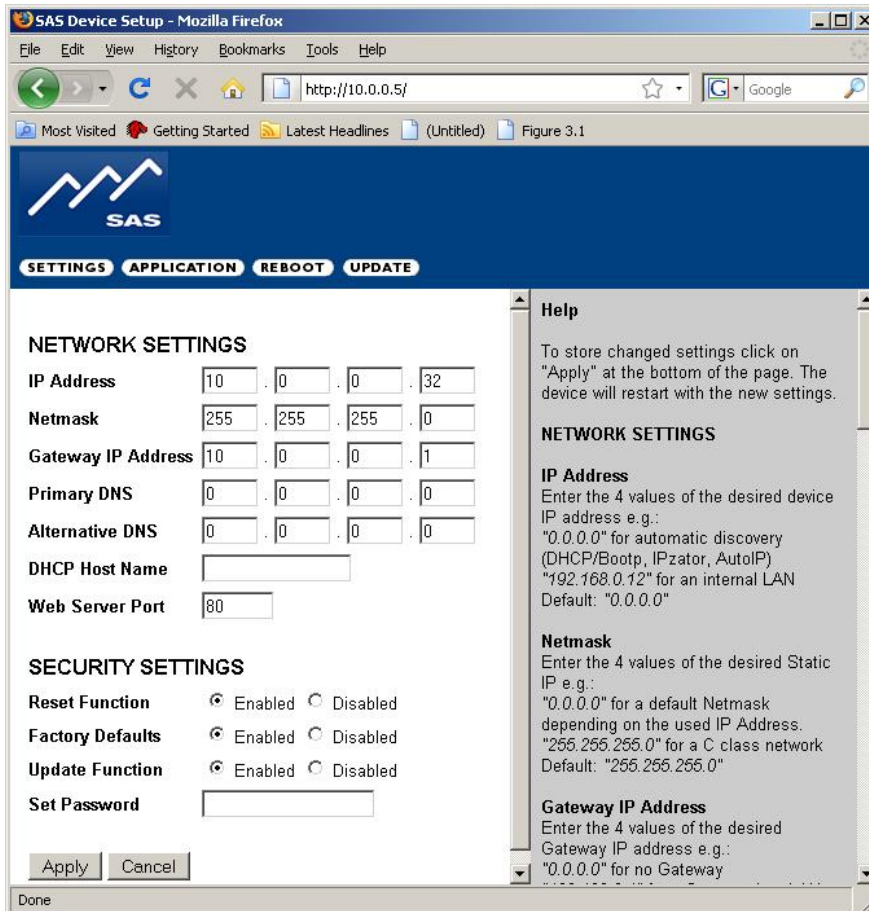


figure 6 - Changing ICM32 IP address to static 10.0.0.32

**Annuncicom Network Audio**
- Open a web browser on a computer that is also on the LAN, and type in the Annuncicom's IP address in the address bar.
- Click on the "Application" link in the upper blue bar.
- Under "Destination IP", enter the ICM-32's IP address.
- Make sure the destination and receive port settings match the corresponding settings on the ICM-32.

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ICM-32 IP Audio Option Setup

- On the Annuncicom, make sure the "A/D Amplifier Input Gain" is set to "-3dB", and the "Output Volume" is set to "100%".
- Hit the "Apply" button, and the changes will take effect in a few seconds.
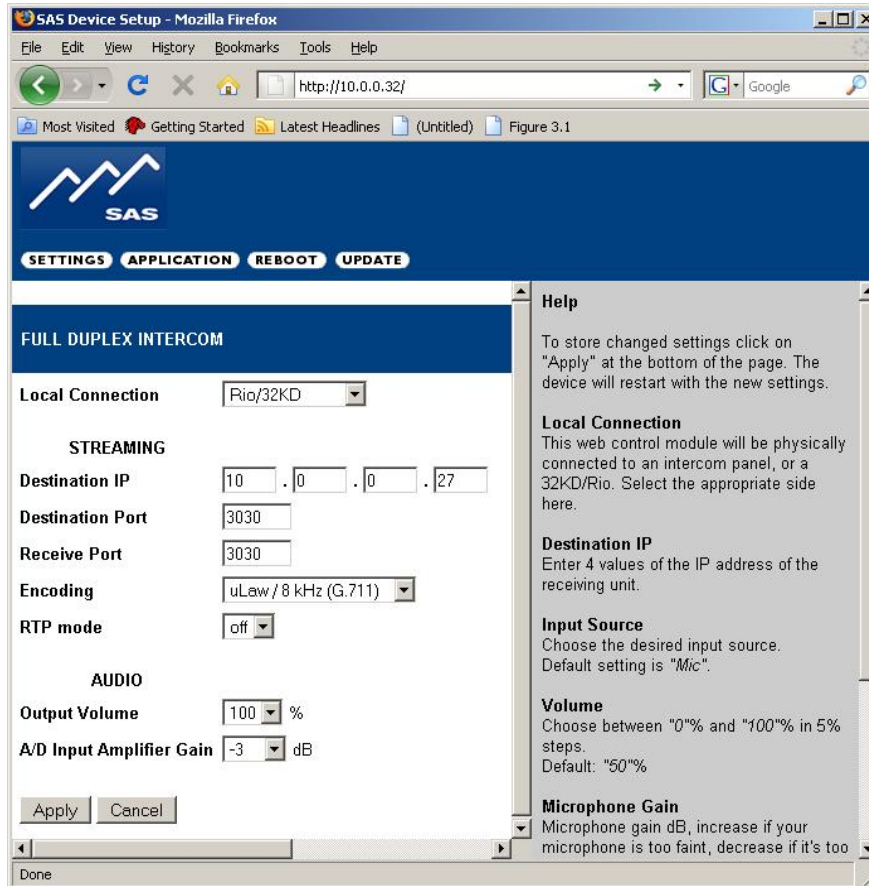


figure 7 - Annuncicom Network Audio settings

## 32KD/RIO Configuration

### 32KD Port Configuration
- Run the Windows RCS application
- Select the Switcher/Status Configuration folder, click the 'Configure' button and go to the Control Module Config tab.
  - o For a RIO/KRL, click on the 'Config' button of the KRL
  - o For a DRC, click on the 'Config' button of the DRC
  - o For a standalone RIO, click on the 'Configure' button

ICM-32 IP Audio Option Setup

- Under 'Edit Port', click on the Port number that corresponds to the RS-485 port connected to the ICM-32 to bring up the Module Configuration dialog.
  - o Set the 'Port State' to 'Active'
  - o Set the 'Port Type' to 'Enhanced Intercom Panel'
  - o Set the 'Speaker' and 'Mic' to be the system input and output audio channels that are connected to the Annuncicom
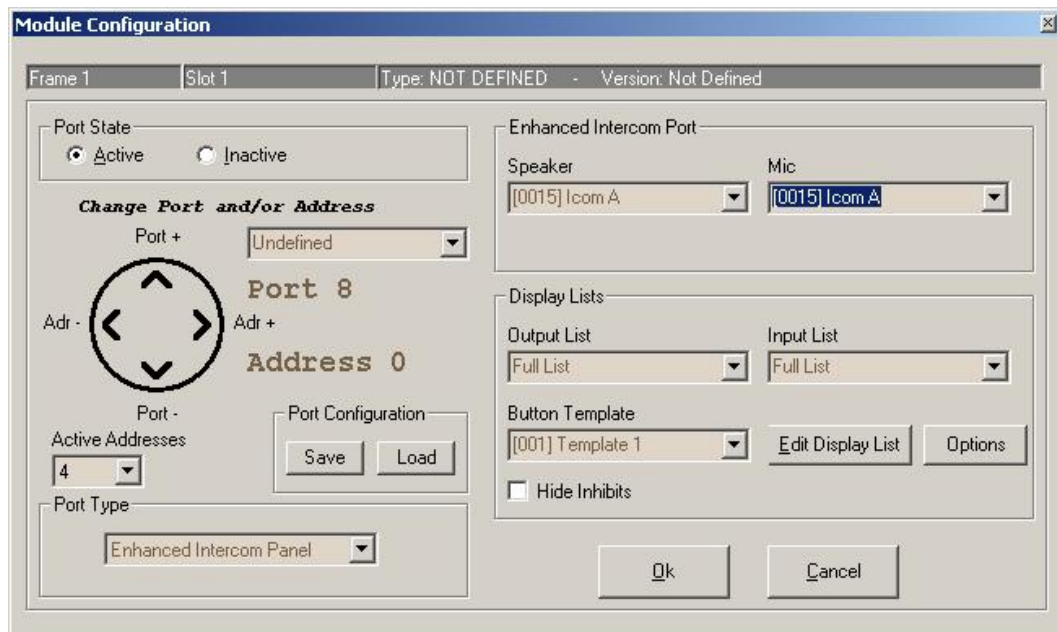
figure 8 – Module Configuration Dialog

- Click on the 'Options' button.
- On the "Intercom Muting Options" dialog, enter a value of 3 for the "Comm Time", and hit "OK". The "Comm Time" setting sets the polling rate of the panel to be slower than a port that is connected directly via RS-485.

ICM-32 IP Audio Option Setup



figure 9 – Options dialog with Comm Time delay

- Click 'Send' on the Module Configuration dialog for the intercom setup to take effect.
- Click 'Close' on the Module Configuration dialog to exit.
- Refer to the "ICM-32 Setup – Getting Started" document for details on how to use the RCS configuration software for general ICM-32 setup and configuration.

## 32KD Audio Levels

**Set Output Gain for Annuncicom**
- Run the Windows RCS Application
- Select the "Crosspoint Maps" folder, and find the Intercom's output channel in the output list. This would be the 32KD output channel that is connected to the input of the Annuncicom.
- Right click on the output channel, and select "DSP Output Gain".
- Set the DSP output gain to –17dB
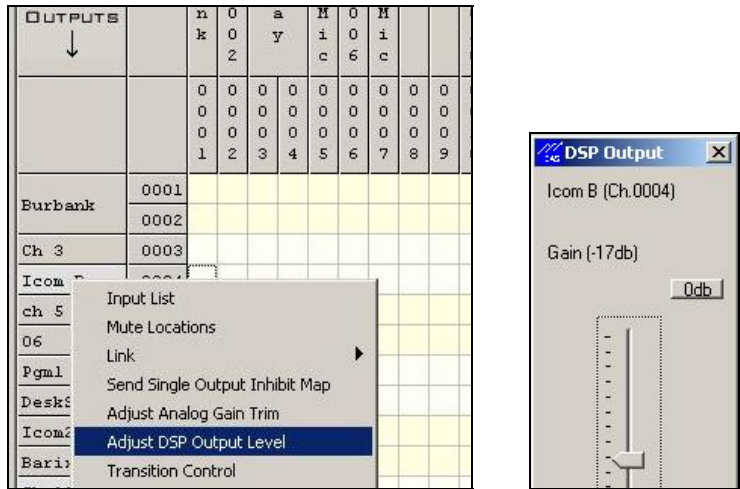
figure 10 – DSP Output Level Adjustment

**Set Input Gain for Annuncicom**
- Run the Windows RCS Application
- Select the "Crosspoint Maps" folder, and find the Intercom's input channel in the output list. This would be the 32KD input channel that is connected to the output of the Annuncicom.
- Right click on the output channel, and select "Adjust Trim Gain".
- Set the Input Trim Gain to +14dB
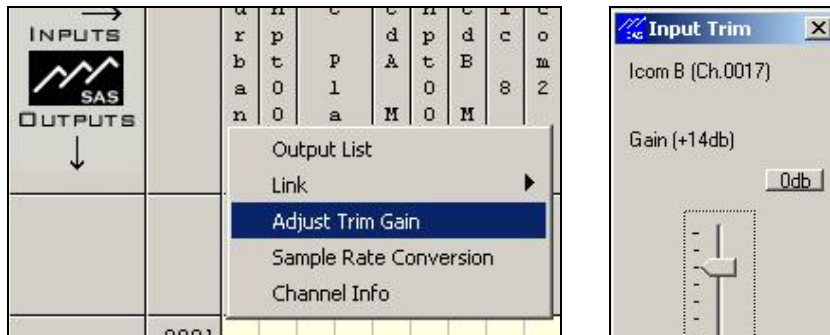

figure 11 – Input Trim Gain

## Appendix A - Network Audio Options

- To configure the IP Audio Options on the ICM32 or Annuncicom, open a web browser window and enter the IP address of the ICM32 or Annuncicom.
- Click on the "Application" button in the upper blue banner.

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ICM-32 IP Audio Option Setup

- The IP Audio Option supports several different codecs. The default codec is G.711 uLaw 8KHz, but you can select different higher-quality audio formats if you have sufficient network bandwidth.
- The "RTP Mode" setting adds RTP header information to the network audio packets. The recommended setting is "Off".
- NOTE: Both the ICM-32 and Annuncicom have to have the same codec settings, and same setting for RTP mode.
- A few codec settings and their associated bitrates are given in figure 8 below. Note that the actual network bitrates will be slightly higher based on packet overhead.

| Codec | Samplerate | Mode | Bitrate |
|---|---|---|---|
| G.711 (aLaw or uLaw) | 8kHz | Mono | 64 Kbps |
| G.711 (aLaw or uLaw) | 24kHz | Mono | 192 Kbps |

Figure 8. Codec settings

- NOTE: The codec selection page also includes audio gain adjustment levels. Make sure that the audio settings are as follows:
  - Annuncicom:
    - "A/D Amplifier Input Gain" is set to "-3dB"
    - "Output Volume" is set to "100%
  - ICM-32:
    - "A/D Amplifier Input Gain" is set to "0dB"
    - "Output Volume" is set to "100%

## Appendix B - Port Forwarding

- If the ICM-32 or Annuncicom is behind a firewall with network address translation (NAT), you will need to configure the other side to use the public IP address of the firewall as the "Destination IP address" under the Network Audio settings.
- You will also need to configure your firewall to forward UDP port 3030 and UDP port 10861 to the ICM32 or Annuncicom's LAN address.
- You can find out your public IP address from a computer that is on the same LAN as the end that is behind the firewall. From a web browser, go to www.whatismyip.com. It will display your public IP address.

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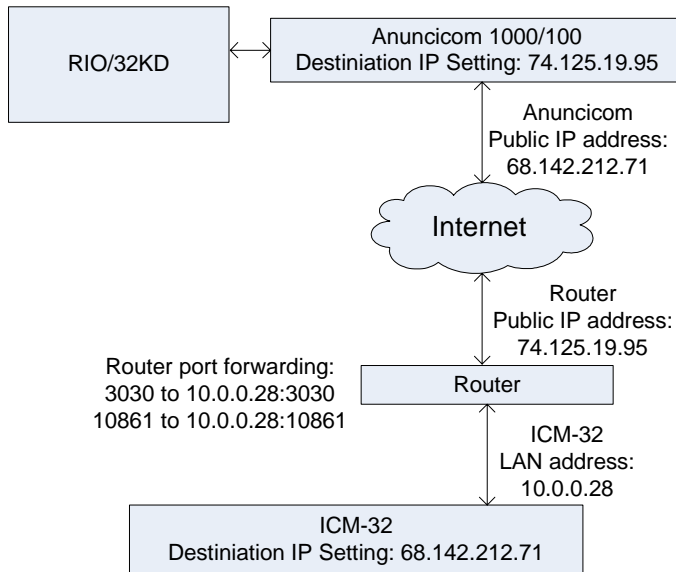                                91504-3224 USA

ICM-32 IP Audio Option Setup



```
┌──────────┐      ┌──────────────────────────────┐
│          │ <──> │     Anuncicom 1000/100       │
│ RIO/32KD │      │ Destiniation IP Setting:     │
│          │      │        74.125.19.95          │
└──────────┘      └──────────────────────────────┘
                          Anuncicom
                          Public IP address:
                          68.142.212.71

                          Internet

                          Router
                          Public IP address:
                          74.125.19.95
  Router port forwarding:
  3030 to 10.0.0.28:3030      Router
  10861 to 10.0.0.28:10861
                          ICM-32
                          LAN address:
                          10.0.0.28

              ┌──────────────────────────────┐
              │           ICM-32             │
              │ Destiniation IP Setting:     │
              │       68.142.212.71          │
              └──────────────────────────────┘
```

figure 9 – Example of port forwarding & setup for ICM-32 behind a firewall.

## Appendix C – How to Reset the Annuncicom IP address if it is set to a static IP on a different Subnet

- If the Annuncicom has a fixed IP address that doesn't match your subnet (ex: it announces a fixed IP address in the 192.168.0.X range, and your network uses 10.0.0.X addresses), you can still connect to its web interface from a PC to change it.
- On the PC, go to start->run, type "cmd", and in the command prompt window type the following:

    route add <Annuncicom IP addr> mask 255.255.255.255 <your PC's IP addr>

- You can then enter the Annuncicom's IP address in your web browser and get to the configuration page, and enter a correct IP address, gateway and subnet mask.