

ICPAGING

Application User Manual

ICPAGING intercom and paging system

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1 Introduction

1.1 About “ICPAGING”

ICPAGING is a fully functional solution for building intercom and paging systems over IP-based networks. With ICPAGING, BARIX devices can be easily configured and become part of the paging system in few minutes.

Being designed with a master/client architecture, the ICPAGING application can be configured to run either as a master (called ICMaster), or as client (called ICClient). The communication between the master and the client components of the paging system is implemented using the Barix IP protocol (BARP).

The ICMaster station can control the ICClient's mode of operation, send broadcast paging messages to any or all of them, and activate their relays to drive different peripherals. Multiple masters can coexist and be configured within a system.

Also the in the package contained ICgraph software (Java based PC software) can be used as ICMaster system/station.

The ICClient stations are typically used as door intercom stations or paging stations with background music playback. They can also be configured to initiate an intercom connection with up to two master stations.

1.2 Features

System:

- master / slave architecture
- BARP compatible: integrates seamlessly with other BARP applications like MP3_RTP_Streamer, ICGRAPH, BARP paging client
- priority based audio messaging
- easy WEB based configuration
- multiple master configuration – “call all masters” and “call failover” scenarios

ICMASTER

- full or halfduplex mode of operation
- handsfree mode for sending paging messages and half-duplex communication
- up to 112 available keys (with two 48 keys extensions)
- configurable audio messages priority
- intercom (client call master)
- caller ID display
- configurable ringtones per client
- till 8 configurable single or group target buttons
- paging up to 128 devices
- 1 dynamic group
- configurable unattended mode timeout
- configurable call reject mode (for

multimaster environment)

- recordable unattended mode message
- recordable custom message
- control of local and clients volume
- client background music (BGM) channel control
- 10/100 Mbit Ethernet connection supports automatic network configuration (BOOTP, DHCP, IPzator, and as well as manual static IP configuration

ICCLIENT

- full or half duplex mode of operation
- single or multimaster mode
- playing paging messages
- intercom to master
- supports the HAI Volume Source Control unit and IR remote control
- background music (BGM) playback and control
- background music playback in mp3 format
- AIPHONE door panels support
- 10/100 Mbit Ethernet connection supports automatic network configuration (BOOTP, DHCP, IPzator, and as well as manual static IP configuration

ICGraph PC software

- full or half duplex for Intercom mode

- single or multimaster mode
- playing paging messages
- remote switching of client relay

1.3 Supported hardware

The ICPAGING solution is designed to run on the following Barix devices:

- PS16 Paging Station – while it is possible to use the PS16 as a client, with its 112 available keys (16 available, others on separate 48 keys extension(s), and two line LCD display is the perfect device to be run as an ICMaster station.
- Annunicom 200 – can be used as a master or as a client. Provides mono BGM, intercom, door relay control and paging endpoint functionality. When used as a client, the available two wire interface allows the device to use the AIPHONE door stations in half-duplex mode.
- Annunicom 100 – can be used as a master or as a client. Provides mono BGM, intercom, door relay control and paging endpoint functionality.
- Exstreamer 100, 105 – used as client. Provides **stereo** BGM and paging endpoint functionality.
- Exstreamer P5 – used as client. Provides **mono** BGM and paging endpoint functionality combined with 5W amplified speaker output and Volume Source

Control (VSC) port.

- Exstreamer 110,120 - used as client. Provides **stereo** BGM, door relay control and paging endpoint functionality. In addition, it has 2 lines LCD display and an IR port for remote control¹.
- Exstreamer 200,205 - used as client. Provides **stereo** BGM and paging endpoint functionality. In addition, it has 2x25 W amplified speaker output and an IR port for remote control.
- Annunicom PS1 – this device can be used as a client or as a two buttons master, allowing to answer incoming intercom call requests and to page a predefined group of targets (Group key 1 Address Map from the web configuration page).
- Annunicom 60 – used as a client.

NOTE: other Barix devices not in this list may or “may not” work correctly with ICPAGING application.

NOTE: when Annunicom PS1 is used as a master, all features using the USB stick are disabled (i.e. customized station ringtones, unattended mode, recording unattended and custom messages).

¹ The built in IR receiver of Exstreamer 110/200 is not accessible from BCL. ABCL applications (like ICPAGING) can use the BARIX external IR dongle, or the IR receiver of the Volume Source Control unit.

1.4 Additional documents

Technical specifications for the supported devices can be found in the corresponding product sheet which can be downloaded from our site www.barix.com.

The ICPAGING System has been developed in BCL and is distributed with its source code enabling users to further customize it if they wish to. For detailed technical information about the programming language please download the “Barix Control Language (BCL) Programmers Manual” from our website.

1.5 ICPAGING ABCL Firmware

Barix provides the ICPAGING solution as a prebuilt ABCL package containing the ICMaster and ICClient applications. The ICMaster and ICClient are guaranteed to work only when they are from the same ABCL ICPAGING package. Using ICMaster and ICClient from ICPAGING packages with different versions may not work correctly, since new functionality are continually being developed.

1.6 About this manual

1.6.1 Links to chapters

References to chapters (e.g. [X Chapter name](#)) are red and underlined and serve as direct links

when viewed in Adobe Acrobat Viewer. Click on the link to jump to the referenced chapter, click on the left arrow icon to jump back to where you came from.

1.6.2 Bookmarks pane in Adobe Acrobat

The complete “Table of Contents” is available in Adobe Acrobat Viewer. Click on the “Bookmarks” pane tab on the left side of Adobe Acrobat Viewer to open it. Click on any bookmark to directly jump to the corresponding part of the manual.

1.6.3 Chapter overview

This manual is divided into the following chapters:

- [Chapter Running ICMaster](#) describing the functionality provided by the ICMaster, the key mapping and the usage of the web configuration UI
- [Chapter Running ICClient](#) giving an overview of ICClient usage and configuration
- [Chapter Running ICgraph](#) mentioning what is ICgraph and how to use the ICgraph master.
- [Chapter Implementing example paging system](#) explaining how to create a simple intercom and paging system using BARIX ICPAGING solution

- **Chapter Additional information** explaining how to rescue a device via the serial port, how to use the ICPAGING in multimaster environment, and providing a quick reference to BARP address bitmap handling and BIN/DEC/HEX conversion.
- **Chapter Dictionary** giving a short explanation of some of the most important terms used in this manual.

2 Running ICMaster

2.1 Booting up PS16 ICMaster

Power up the PS16. If the SonicIP is enabled, you will hear the IP which the PS16 got from your DHCP server. After that the device will start detecting the USB stick. The following message will be shown on the PS16 LCD while the check is being performed:

Checking USB sanity

When the check was successful, the ICMaster idle message will be displayed:

```
IcMaster, FDX  
1.02 04.07.2012,16 keys
```

In case of broken or missing USB stick, the application will display an error message, and will exit:

Bad USB stick fs

In this case, please power off the PS16, remove the two screws from the bottom, open the cover, and replace the USB stick with a new one, formatted with FAT32 file system. Also, have in mind the following important notes:

NOTE 1: If you plan to use the ICMaster on Annunicom 100/200, please plug in a formatted USB stick, otherwise the application will not start.

NOTE 2: Depending on your configuration,

the following files may be present on your USB stick:

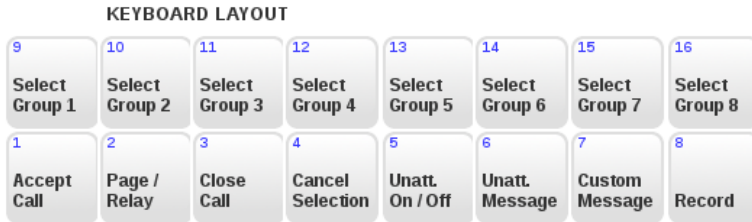
- UNATTSND – this is the recorded unattended mode message;
- CUSTMSG – this is the recorded custom message;
- TEST.USB – an empty temporary file created during USB stick check;
- xxx.MP3 – station ID specific ring tone files, where xxx is the station ID (for example 002.mp3 is the ring tone for station ID=2).

None of them is required for the application to boot, but it is advised to backup these files (without the TEST.USB as it will be deleted and recreated during boot) and copy them to the new USB stick to keep the same configuration.

2.2 PS16 Keyboard Layout

The PS16 Paging main unit has 16 functional buttons, a flexible microphone, speaker, and 2 line LCD. Optional extensions with 48 keys can be attached on the right side of the PS16 main unit. Key layout for PS16, as well as for every master device, is shown in the web UI home page, as in Illustration 1:

Illustration 1: ICMaster keyboard layout



If a PS16 extension is connected, key 17(bottom left corner) to key 64 (top right) are assigned respectively to targets 17 to 64.

The key functions are the following:

Key 1: accept an incoming call / hang-up current call. If the master is in a call, and another client is ringing, pressing this key will hang-up the current call. Pressing it once again will answer to the incoming call.

In half duplex mode, this key works as a PTT key. Press and hold to answer incoming call and start talking, release to listen. If the handsfree mode is activated, then the talk mode can be voice controlled. In this case the voice activation level, and the time-out are configured via the web UI.

NOTE: closing the current call when there is a second incoming call is possible only in FDX mode. In HDX mode key 1 is used as a PTT key, so in this case only rejecting the incoming call is possible.

Key 2: page all selected clients if no call is in progress / trigger the connected client's relay (door open) for 5 seconds if a call is in progress. Please note this is a PTT (Push-To-

Talk) button when the handsfree mode is not activated. In handsfree mode, press this key once to activate the paging mode, and once again to stop it. The key LED blinks when paging is active.

Key 3: pressing this key will cancel an incoming call (either in idle mode, or when the ICMaster is in a call session with one client, and another client is calling). If the ICMaster is in a call and there is no other incoming call, pressing this key will also hang-up the current call session.

Key 4: clear current target/group selection.

Key 5: enter unattended mode, (pressing any other key exits unattended mode). Clients that try to call a master that is in unattended mode will have the 'unattended message' played to them and the call will be terminated once the message has been played.

Pressing and holding this key for 4 seconds will enter the master in "call reject mode". When the master is in this mode, and a client calls in, instead of opening a call session and sending the unattended message, it will send a special message to the client informing that it is not available. In this case the client should call the next master in its list.

NOTE: if the ICMaster does not cancel/answer the second call, the ICClient will continue ringing and hang-up automatically after a certain amount of time (configurable via the ICClient web UI).

NOTE: when the unattended mode is disabled from the web UI, pressing this key puts the

master immediately in call reject mode.

Key 6: when pressed allows to listen the unattended message locally.

Key 7: when pressed without any selection allows to listen the custom message locally. When there are targets selected, the custom message is sent to the selected destination/s.

Key 8: record custom or unattended message. Press and hold this key together with key 6 to record unattended message or with key 7 to record custom message. Recording stops when this button is released.

Key 9: select page group 1. The address bitmap assigned to this key is configured from the related ICMaster web UI address map configuration page.

Key 10: select page group 2. The address bitmap assigned to this key is configured from the related ICMaster web UI address map configuration page.

Key 11: select page group 3. The address bitmap assigned to this key is configured from the related ICMaster web UI address map configuration page.

Key 12: select page group 4. The address bitmap assigned to this key is configured from the related ICMaster web UI address map configuration page.

Key 13: select page group 5. The address bitmap assigned to this key is configured from the related ICMaster web UI address map configuration page.

Key 14: select page group 6. The address bitmap assigned to this key is configured from the related ICMaster web UI address map configuration page.

Key 15: select page group 7. The address bitmap assigned to this key is configured from the related ICMaster web UI address map configuration page.

Key 16: select page group 8. The address bitmap assigned to this key is configured from the related ICMaster web UI address map configuration page.

Keys 17-112: select client ID (17-112) .

Important note !!!

When the ICMaster is run in HDX mode, pressing key 1 when there is an active call will not close it. In HDX mode, key 1 is used as PTT (Push-To-Talk) key. When pressed, the microphone of the ICMaster is switched ON, the speaker turned OFF, while the mic of the ICClient is automatically switched OFF, and its speaker turned ON.

2.3 Running ICMaster on Annunicom 100/200/PS1

The ICMaster can be used also on the Annunicom 100/200 and PS1 devices with limited functionality. Because on these devices there are only two available keys, the key mapping is a bit different than the one

described for the PS16:

Full duplex (FDX) mode:

Key 1: answer incoming/Close current call.

Key2: if it is in a call, pressing this key will open the relay on the client for 5 seconds. When the ICMaster is in idle mode, pressing key 2 will start paging to Group 1.

Half duplex (HDX) mode:

Key 1: answer incoming call. While the call is active, it works as a PTT key – press and hold to talk, release to listen.

Key2: if it is in a call, pressing this key will open the relay on the client for 5 seconds. When the ICMaster is in idle mode, pressing key 2 will start paging to Group 1

Press and hold key 1, then press key 2: Close the current call.

In addition, as the PS1 device does not have USB port, all features that use it are disabled (customized station ring-tones, unattended mode and custom messages recording).

2.4 ICMASTER Web home page

Illustration 2: ICMASTER home page

HOME	CONFIGURATION	STATUS	DEFAULTS	UPDATE	REBOOT
------	---------------	--------	----------	--------	--------

Intercom Master Station

APPLICATION STATUS

BARP Station ID : 1001
Current Status : **IDLE**

AUDIO LEVELS

Input Level : -127 dB

Output Level : -127 dB

KEYBOARD LAYOUT

9 Select Group 1	10 Select Group 2	11 Select Group 3	12 Select Group 4	13 Select Group 5	14 Select Group 6	15 Select Group 7	16 Select Group 8
1 Accept Call	2 Page	3 Close Call	4 Unatt. On/Off	5 Record Unatt. Message	6 Rec/Play Custom Message	7 Cancel Sel.	8 Dynamic Group

The device home page is dynamically auto-refreshed every second and shows some useful run-time application details.

Under the “APPLICATION STATUS” section is visible the BARP station ID and the current application status.

Under the “AUDIO LEVELS” section input and output audio levels are displayed, in dB.

The section “KEYBOARD LAYOUT” shows the layout of the keys, as supported and used in the current hardware.

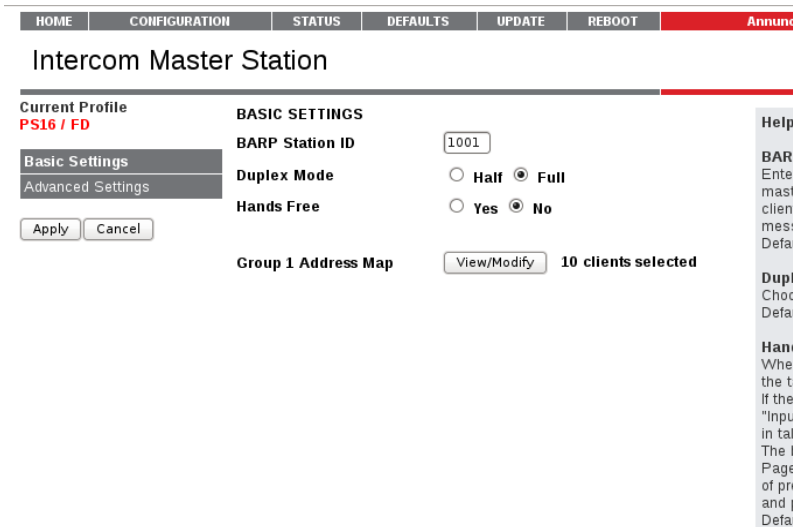
2.5 ICMaster Web configuration pages

The configuration of the ICMaster is very intuitive and easily done via the web UI. Example snapshots of the basic settings and advanced settings pages are shown on Illustration 3 and Illustration 7.

2.5.1 BASIC SETTINGS

The BASIC SETTINGS page is accessible clicking the CONFIGURATION button in the top menu, it shows the most important options to be set up for a quick configuration.

Illustration 3: ICMaster basic settings page



- **BARP Station ID**

Enter here the BARP system ID of this master station. The ID is used from the clients to identify the source of the control messages in multimaster environment.

Default is "1001".

- **Duplex Mode**

Choose the desired mode of operation.

Default setting is "Full".

- **Hands Free**

When set to yes, and HDX mode is enabled, the talk/listen mode can be voice controlled. In *Intercom* mode, if the voice level exceeds the one set in "Input Trigger Level", the master is switching in talk mode, and the client in listen mode. In *Page* mode, the Page key needs to be pressed once (instead of press and hold) to activate the paging, and pressed again to stop.

Default setting is "No".

Hands Free Keys

The function of the keys changes, depending upon the device and the configuration (Full/Half duplex):

Function	FD Key	HD Key
PS16		
Accept Call (IC)	1	1
Reject Call (IC)	3	3
Close Call (IC)	1 or 3	3
Open Relay (IC)	2	2
Start Paging	2 (blinks whilst Paging)	
Stop Paging	2	
PS1 and other 2 button Annuncicom		
Accept Call (IC)	A(1)	A(1)
Close Call (IC)	A(1)	A(1)+B(2)
Open Relay (IC)	B(2)	B(2)
Start Paging	B(2)	
Stop Paging	B(2)	

- **Group 1 Address Map**

Allows to set up the first group (1) of destination targets. Click related “View/Modify” button to setup the group. A label on the right shows the number of selected clients in this group.

Default setting is "id's 1 to 10 selected".

2.5.2 ADVANCED SETTINGS

Illustration 4: ICMaster advanced settings page

HOME	CONFIGURATION	STATUS	DEFAULTS	UPDATE	REBOOT
------	---------------	--------	----------	--------	--------

Intercom Master Station

Current Profile
PS16 / FD

- Basic Settings
- Advanced Settings**
- Network
- BARP Control
- Audio
- Incoming Call
- Paging
- I/O Control
- Security

NETWORK SETTINGS

Use SonicIP® Yes No

IP Address . . .

Netmask . . .

Gateway IP Address . . .

Primary DNS . . .

Alternative DNS . . .

Syslog Address . . .

DHCP Host Name

Web Server Port

Default Ethernet Port ▾

SNMP System Name

SNMP System Location

SNMP System Contact

The **ADVANCED SETTINGS** page is accessible by clicking the “Advanced Settings” button in the left menu, it contains and allows to configure all the application options, organized in specific subsections. The advanced settings page shows all the configurable options.

2.5.2.1 Network

- Use SonicIP

If set to "yes", the device will announce its IP address over the audio output when the device

boots up.

Default setting is: "yes"

- IP Address

Enter the 4 values of the desired device IP address e.g.: "0.0.0.0" for automatic discovery (DHCP/Bootp, IPzator, AutoIP), or a specific IP for an internal LAN.

Default value: "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

- Gateway IP Address

Enter the 4 values of the desired Gateway IP address e.g.: "0.0.0.0" for no Gateway, or the IP of the gateway in your LAN

Note: 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

In this field you can give the desired primary and alternative DNS IP address to be able to connect to URLs (e.g. www.radio.com).
Example: "195.186.1.111"

Default: "0.0.0.0"

- Alternative DNS

In this field you can type the desired 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 broadcasted.

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 device can be reached. If set to "0" the default HTTP port (80) is used.

- **Default Ethernet Port**

On devices with dual-ethernet connection this parameter selects the default port to be used. In most cases selecting ETH1 is suitable, however some devices (e.g. the PS16) provide Power-over-Ethernet (PoE) functionality on ETH2.

If you change this parameter do not forget to connect the ethernet cable to the proper port on the rear of the device.

NOTE: on devices with a single ethernet port select always ETH1. Selecting ETH2 makes the device inaccessible!

Default: "ETH1".

- **SNMP System Name**

SNMP MIB entry for system name (system.sysName.0).

Default : empty.

- **SNMP System Location**

SNMP MIB entry for system location (system.sysLocation.0).

Default : empty.

- **SNMP System Name**

SNMP MIB entry for system contact (system.sysContact.0)

This parameter can be queried using any SNMP browser but can not be updated.

Default : empty.

2.5.2.2 BARP Control

- **BARP Station ID**

Enter here the BARP system ID of this master station. The ID is used from the clients to identify the source of the control messages in multimaster environment.

Default is "1001".

- **Paging Priority**

Enter here the priority of the audio messages sent by this master station. This setting is useful in multimaster environment when a client receives audio messages from many masters simultaneously. In this case the client will play the stream with the highest priority.

The priority must be in the range [1-254]. Priority "0" (the highest) is reserved for emergency priority port, priority "255" (the lowest) is reserved for BGM.

Default setting is "127".

- **BARP Broadcast Address**

By default the ICCLIENT uses a broadcast IP to listen/send on the BARP ports. Modify the BARP IP address to use multicast if communication across different networks is desired, or if your LAN policy is not allowing broadcast.

Default setting is "0.0.0.0" (*broadcast*).

- **BARP Audio Port**

Enter the BARP port number to which the master will send audio for paging and established calls. In the multicast port and address are configured, this port will be used only for incoming calls. Paging will be done using the multicast group.

Default is "5555".

- **BARP Control Port**

Enter the BARP port number to which the master will send control messages.

Default is "5556".

- **BARP Status Port**

Enter the destination port number where the master will listen for BARP status messages.

Default is "5557".

2.5.2.3 Audio

- **Audio Format**

Choose between different encoding types and sampling frequencies ("μ-law" or "A-law" at 8 or 24 kHz).

Default setting is "μ-law 8 kHz".

IMPORTANT: If you change the encoding don't forget to provide/record correct unattended/custom audio message files! Also, make sure to use the same encoding on ALL devices of the ICPAGING system.

- **Acoustic Echo Cancellation**

Choose between "On" and "Off".

Default setting is "Off".

Note: this options is visible/available only for hardware that supports AEC.

- **Input Source**

Choose the desired input source.

Default setting is "Mic".

- Duplex Mode

Choose the desired mode of operation.

Default setting is "Full".

- Hands Free

When set to yes, and Half-Duplex mode is enabled, the talk/listen mode can be voice controlled while the ICMaster is in **active** call. If the voice level exceeds the one set in "Input Trigger Level", the master is switched in talk mode, and the client in listen mode. The behavior for paging is also changed: the Page key needs to be pressed once (instead of press and hold) to activate Paging mode, and pressed again to stop.

Please see BASIC SETTINGS for keys to be used in Hands-Free mode.

Default setting is "No".

- Input Trigger Level

Triggering input audio level if "Hands Free" mode is selected. Accepted range: 0-32767.

Default setting is "1000".

- Inactivity timeout

Sending of the audio stream in "Hands Free" mode stops after this number of milliseconds of no input audio signal.

Default setting is "1000".

- Microphone Gain

Microphone gain dB, increase if your

microphone is too faint, decrease if it's too loud or overdriven.

Default: "21 dB".

- **A/D Amplifier Gain**

A/D converter preamplification in dB. Increase if the audio signal too faint, decrease if it's too loud or overdriven. Default: "0 dB".

- **Default Volume**

Choose between "0%" and "100%" in 5% steps.

Default: "50%".

2.5.2.4 Incoming Call

- **Call Master by**

Configures the way the master is being called. If set to "ID" then the call is ignored if the destination ID in the call request is not the same as the one of the master. When set to "IP Address", the master reacts on unicast, or broadcasted call requests. The destination ID check is ignored in this case.

Default is "IP address".

- **Unattended Mode**

Enables or disables the unattended mode. When enabled, the "Unattended Timer" becomes visible, and can be configured. Disabling the unattended mode is recommended when using the master in a multimaster environment because if any of the masters is in unattended mode, it may always

pickup the incoming call thus preventing the other masters to get the call. When disabled, pressing the unattended mode key enters the master in a "Call reject" mode

Default is "Enabled".

- **Unattended Timer**

Configures the number of seconds after the device switch to "unattended mode" during a call. Minimum value allowed is 3, maximum is 60.

Default is "20".

2.5.2.5 Paging

- **Group Address Map**

Allows to set up the related group of destination targets. Click related "View/Modify" button to setup the group. A label on the right shows the number of selected clients in this group.

Note: only available groups supported from the current keyboard layout are displayed.

Default setting is: starting from group 1, 10 clients selected for every group, for group 1 id's 1 to 10 are selected, group 2 id's 11 to 20 selected ... group 8 id's 71 to 80 selected.

- **Audio Multicast Socket**

Configures the multicast group socket, as IP:PORT, for paging. As IP, it has to be within the range 224.0.0.0 - 239.255.255.255. If set to "0.0.0.0", then the default broadcast address is used. Port is ignored if the IP is set to

"0.0.0.0" .

Default is *"0.0.0.0:12345"* - use broadcast.

2.5.2.6 I/O Control

- Relay 1 Control

Configures the relay behavior. The relay can be either off (*"always off"*), on while an incoming call is pending (*"relay while ringing"*) or on while a call is in process (*"relay while talking"*).

Default is *"always off"*.

- LED Status

Configures the device front panel led behavior for the devices that have a led panel.

Default is *"Input State"*.

2.5.2.7 Security

- Reset Function

Enable or disable the "Reset" function on the Reset button and on the WEB UI. In order to restart the device press the Reset button once.

Default: "enabled".

- Factory Defaults

Enable or disable the "Factory Defaults" function on the Reset button. In order to revert all settings to factory defaults keep the Reset button pressed until the red LED starts blinking (approx. 10 seconds).

Default: "enabled"

- **Update Function**

Enable or disable the WEB Update function of the device. If the Update function is disabled, the only way to update the firmware is to use the serial rescue.

Default: "enabled"

- **Set Password**

This is visible as long as no password is set.

Enter a password (up to 25 characters) and hit the "Apply" button. After the restart you should close the browser window and open a new browser window. You will be asked to supply user name and password. The user name can be omitted but the password has to be supplied in order to see the web configuration.

- **Old Password / New Password**

These fields are visible as long as a password is set.

To allow free access (clearing the password) enter the old password and leave the field "New Password" empty. Enter the old password in the password field above the "Apply" button as well and then hit the "Apply" button.

After the restart you will not be asked for user name and password anymore.

To change the password enter the old password and enter the new password in the field "New Password". Enter the old password in the password field above the "Apply" button as well and then hit the "Apply" button.

After the restart you will be asked for user name and password. The user name can be omitted but the new password has to be supplied in order to see the web configuration.

3 Running ICCLIENT

3.1 About ICCLIENT

The ICCLIENT application has to be run on all client endpoints from the ICPAGING system. The ICCLIENT can play BGM and paging messages, initiate a call session to two preconfigured ICMaster stations, and send periodically its current status. Being the slave component from the master/slave architecture, the ICCLIENT does not have the possibility to control other devices from the ICPAGING system.

3.2 Available keys

The ICCLIENT application uses the Input 0 (key 1) and Input 1 (key 2) that are available on the connector of the supported BARIX devices. The mapping of the keys is the following:

Key 1: Call ICMaster station 1. The id or IP of the ICMaster station is configured via the ICCLIENT web configuration page.

Key 2: Call ICMaster station 2. The id or IP of the ICMaster station is configured via the ICCLIENT web configuration page.

If the ICCLIENT is configured to operate with the AIPHONE door panels, then the hardware inputs are ignored, and the key 1 press is emulated by the firmware. The IP of the ICMaster station 1 is only used in this case.

Note: The ICCLIENT can use the HAI Volume Source Control unit together with the BARIX IR Remote Control. However, if the ICCLIENT is run on BARIX device with its own LCD display (ex. BARIX Exstreamer 110) then the VSC LCD cannot be used and stays blank.

3.3 ICCLIENT Web home page

The device home page is dynamically auto-refreshed every second and shows some useful runtime application details.

Illustration 5: ICCLIENT home page

The screenshot shows the ICCLIENT web interface. At the top, there is a navigation bar with six tabs: HOME, CONFIGURATION, STATUS, DEFAULTS, UPDATE, and REBOOT. Below the navigation bar, the page title is "Intercom Client Station". The main content area is divided into two sections. The first section, titled "APPLICATION STATUS", displays "BARP Station ID : 1" and "Current Status : IDLE". The second section, titled "AUDIO LEVELS", displays "Input Level : -127 dB" and "Output Level : -127 dB", each with a corresponding progress bar.

Under the “APPLICATION STATUS” section is visible the station ID and the current application status.

Under the “AUDIO LEVELS” section input and output audio levels are displayed, in dB.

3.4 ICCLIENT Web configuration page

As in ICMASTER, the ICCLIENT application can be configured in a fast fashion. Clicking CONFIGURATION top menu button, a BASIC SETTINGS page will be displayed. All the application options are then available clicking the ADVANCED SETTINGS left-menu button.

3.4.1 BASIC SETTINGS

The BASIC SETTINGS page is accessible clicking the CONFIGURATION button in the top menu, it shows the most important options to be set up for a quick configuration.

Illustration 6: ICCLIENT Application "basic settings" Web Page

HOME	CONFIGURATION	STATUS	DEFAULTS	UPDATE	REBOOT	
<h2>Intercom Client Station</h2>						
Basic Settings		BASIC SETTINGS				
Advanced Settings		BARP Station ID	<input type="text" value="1"/>			
<input type="button" value="Apply"/> <input type="button" value="Cancel"/>		Duplex Mode	<input type="radio"/> Half <input checked="" type="radio"/> Full			
		Use AI_Phone	<input checked="" type="radio"/> No <input type="radio"/> Yes			

- **BARP Station ID**

The system ID of this client station. The ID is used to identify the unit at the master station.

Default setting is "1".

- **Duplex Mode**

Choose the desired mode of operation. If "Half" is selected, the communication is controlled from the ICMaster.

Default setting is "Full".

- **Use AI_Phone**

This setting is for Annunicom 200 hardware only, which provides support for AI PHONE two

wire interface. Set to "Yes" if AI_Phone is used as a door station. In this case "Half" operating mode is recommended.

Default setting is "No".

3.4.2 ADVANCED SETTINGS

The ADVANCED SETTINGS page is accessible clicking the "Advanced Settings" button in the left-side menu.

Illustration 7: ICCLIENT Application "advanced settings" Web Page

HOME	CONFIGURATION	STATUS	DEFAULTS	UPDATE	REBOOT
Intercom Client Station					
Basic Settings	BARP CONTROL				
Advanced Settings	BARP Station ID	<input type="text" value="1"/>			
Network	BARP Broadcast Address	<input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/> . <input type="text" value="0"/>			
BARP Control	BARP Audio Port	<input type="text" value="5555"/>			
Audio	BARP Control Port	<input type="text" value="5556"/>			
Outgoing Call	BARP Status Port	<input type="text" value="5557"/>			
Background Music	Notification Port	<input checked="" type="radio"/> No <input type="radio"/> Yes			
Serial					
I/O Control					
Security					
<input type="button" value="Apply"/> <input type="button" value="Cancel"/>					

3.4.2.1 Network

This section is the same as in ICMaster. See ICMaster [2.5.2.1 Network](#) section.

3.4.2.2 BARP Control

- **BARP Station ID**

The system ID of this client station. The ID is used to identify the unit at the master station.

Default setting is "1".

- **BARP Broadcast Address**

By default the ICCLIENT uses broadcast to listen/send on the BARP ports. Modify the BARP IP address to use multicast if communication across different networks is desired, or if your LAN policy is not allowing broadcast.

Default setting is "0.0.0.0".

- **BARP Audio Port**

Enter the BARP port number where the ICCLIENT will listen for incoming audio.

Default setting is "5555".

- **BARP Control Port**

Enter the BARP port number where the ICCLIENT will listen for BARP control messages.

Default setting is "5556".

- **BARP Status Port**

Enter the destination port number to which the ICCLIENT will broadcast BARP status messages.

Default setting is "5557".

- **Notification Port**

Enable here the usage of the notification port which the client may listen for any incoming audio. No BARP messages are checked for this port, so any audio arriving at this port will be played immediately. This can be used as a "Broadcast to all" feature.

Default setting is *"No"*.

3.4.2.3 Audio

- **Audio Format**

Choose between different encoding types and sampling frequencies (" μ -law" or "A-law" at 8 or 24 kHz).

Default setting is " μ -law 8 kHz".

IMPORTANT: make sure to use the same encoding on ALL devices of the ICPAGING system.

- **Acoustic Echo Cancellation**

Choose between *"On"* and *"Off"*.

Default setting is *"Off"*.

Note: this options is visible/available only for hardware that supports AEC.

- **Input Source**

Choose the desired input source.

Default setting is "Mic".

- **Duplex Mode**

Choose the desired mode of operation. If "Half"

is selected, the communication is controlled from the ICMaster.

Default setting is "Full".

- Use AI_Phone

This setting is for Annunicom 200 hardware only, which provides support for AI PHONE two wire interface. Set to "Yes" if AI_Phone is used as a door station. In this case "Half" operating mode is recommended.

Default setting is "No".

- Microphone Gain

Microphone gain dB, increase if your microphone signal is too faint, decrease if it's too loud or overdriven.

Default: "21 dB".

- A/D Amplifier Gain

A/D converter preamplification in dB. Use this setting to achieve the right balance to your connected equipment. Increase if the audio signal too faint, decrease if it's too loud or overdriven.

Default: "0 dB".

- Default Paging Volume

The setting is the default volume used for paging and intercom audio. Choose between "0%" and "100%" in 5% steps.

Default: "50%".

- Minimal Paging Volume

The setting is used as a minimal volume limit, in case the volume is set from the paging source. Choose between "0%" and "100%" in 5% steps.

Default: "10%".

- **Maximal Paging Volume**

The setting is used as a maximal volume limit, in case the volume is set from the paging source.

Note: a control volume of 0 (remote muting) is anyway accepted.

Choose between "0%" and "100%" in 5% steps.

Default: "90%".

- **Default BGM Volume**

The setting is used as the default BGM volume at device start-up. Choose between "0%" and "100%" in 5% steps.

Default: "50%".

- **Minimal BGM Volume**

The setting is active if HW Volume Source Control is used. Choose between "0%" and "100%" in 5% steps.

Default: "10%".

- **Maximal BGM Volume**

The setting is active if HW Volume Source Control is used. Choose between "0%" and "100%" in 5% steps.

Default: "90%".

- **Notification Volume**

Sets the default notification volume. In case a notification message is received and the paging volume is lower than notification volume, notification volume is used.

Default: "90%".

3.4.2.4 Outgoing Call

- **Call Masters by**

Configures the way the master stations are called. If set to "IP address", the masters are called by unicasting the call request command to the master IP. If set to "ID" then the masters are called by broadcasting the call request command with the destination ID=master ID. Select the needed option so see the corresponding configuration fields.

Default: "IP address".

- **Master Station ID**

When "Call Master by BARP ID" is set, enter the system ID of the related (1 to 4) master station.

The first master station is called after pressing the Button 1 (activating the first digital input).

Default setting is "for master stations 1 to 4, respectively 1001,1002,1003,1004".

- **Master Station IP**

When "Call Master by IP Address" is set, enter the IP address of the related (1 to 4) master station. If set to zero, uses broadcast to find a

master station on the local network.

The first master station is called after pressing the Button 1 (activating the first digital input).

Default setting is "0.0.0.0".

- **Call next Master**

If set to "Yes" the client is forced to call the next master in the list if the one that it is currently calling is not responding (for example because of network problems or power failure of the master). The call to the next master is activated after the expiry if the auto hang-up timeout. In this case the call ring timer is restarted when the client starts calling the next master.

Default: "No".

- **Auto Hang Up**

Configures the number of seconds after which the client will stop ringing if the master is not responding. Minimum value allowed is 3, maximum is 60. Make sure this value is greater than the unattended mode timeout set for the ICMaster, otherwise the ICClient will not get the unattended message from the ICMaster.

Default: "20".

3.4.2.5 Background Music

Background Music multiple-channel service (BGM) works listening for one or more UDP audio streams on a range of ports. Stream audio format expected must be as RTP MPEG.

To enable the BGM service almost a starting port and a total number of channels must be supplied.

Once the service is enabled, channels can be switched using the Barix VSC accessory connected to the device serial port.

In addition, once the service is enabled, for devices supporting an HW line input, a local line in channel (channel 0) is available and selectable.

Example of BGM service configuration

This example shows how to setup the BGM service to listen to multiple broadcast streams, for a desired scenario as in the table below:

Channel	Desc.
0	Local Line Input
1	Audio Stream 1
2	Audio Stream 2
3	Audio Stream 3

BGM Broadcast Address : set to 0.0.0.0

BGM First Broadcast Port : set to 11001 (default)

BGM Available Channels : set to 3

BGM Start Channel : set to 1 (allows Audio Stream 1 to be played at startup)

- **BGM Broadcast Address**

Enter the broadcast/multicast address of the background music streaming server. If set to "0.0.0.0" then broadcast is used.

Default setting is "0.0.0.0".

- **BGM First Broadcast Port**

Enter the broadcast/multicast port of the first channel background music streaming server. The BGM streaming could be provided by multiple streamers, but they have to be configured to use consecutive port numbers. If set to "0", the BGM functionality is disabled.

Default setting is "11001".

- **BGM Available Channels**

Enter the number of the available background music channels. If set to "0" then BGM will be disabled. If greater than "0", a local channel 0 will be available for local line input.

Default setting is "0".

- **BGM Start Channel**

Enter the background music channel to start playing after a reboot. If it more than the available channels, then the last one will be used.

Default setting is "0".

3.4.2.6 Serial

- **Serial Port**

Selects the way the device serial port will be used. Select "VSC Panel" here to use Barix VSC accessory with this application.

Default: Intercom Client Software.

3.4.2.7 I/O Control

- Relay 1 Control

Set here the default relay behaviour. Available values are:

"always off" - the relay is off in all states (idle,BGM playback,paging and intercom);

"on while in a call" - the relay is normally off, but when the client is in intercom state, the relay automatically switches on;

"always on, off while in a call" -this is the inverted version of "On while in a call" setting. The relay is normally switched on, and off when the client is in a intercom state.

"on while in PA mode" - the relay is normally off, but when the client is receiving paging message, the relay automatically switches on.

"on while receiving audio stream" - the relay is normally off, but when the client is receiving audio stream (either in intercom, or PA mode), the relay automatically switches on;

Note: Please have in mind that the BARP relay control command is ignored when the relay is not in "always off" mode in order not to override the preconfigured relay behaviour.

Default: "always off".

- LED Status

Configures the device front panel led behavior for the devices that have a led panel.

Default is *"Input State"*.

3.4.2.8 Security

This section is the same as in ICMASTER. See ICMASTER [2.5.2.7 Security](#) section.

4 Running ICgraph

4.1 About ICgraph

ICgraph is a Java-based PC software. It requires a Java Runtime Environment (JRE) installed on the PC to run properly. Such JRE is available for almost all operating systems (see www.java.com). ICgraph is a free Barix software when used together with Barix hardware products. This software is freely configurable over the ICgraph.cfg file. It allows to control ICPaging devices and communicate to it.

The ICPAGING firmware package contains two different ICgraph configurations, one for half-duplex and one for full-duplex. These configurations can be modified from you if needed.

For more information about ICgraph check the ICgraph manual available on www.BARIX.com .

4.2 How to run ICgraph

The ICPAGING software package contains a sub folder “ICgraph Master”, there are two different ICgraph configurations stored – one for full-duplex and one for half-duplex.

Before you can start ICgraph, make sure the Java JRE is installed (see www.java.com) on your PC.

If Java is installed, then decide which mode

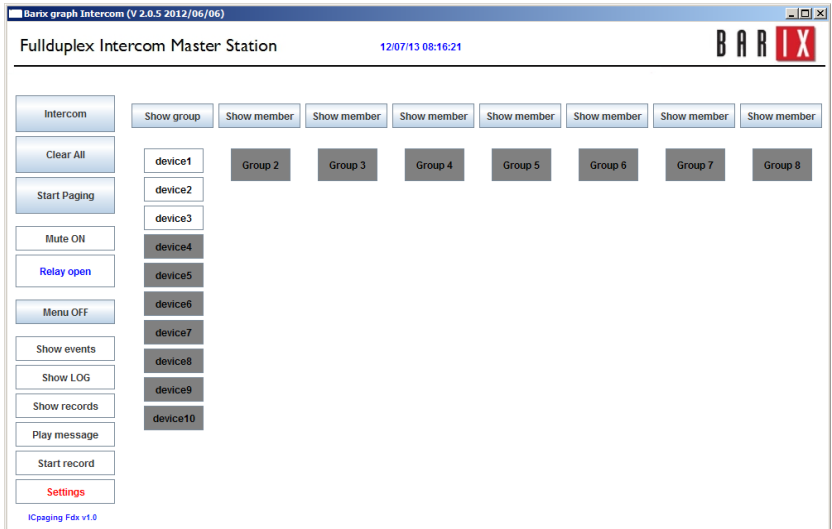
(full-duplex or half-duplex) you will use for Intercom communication with the clients and select the according sub directory and start the ICgraph.jar file from this directory.

ICgraph can be used as single master or together with other Masters, but in multimaster mode the behaviour is a little bit different than using the ICMaster devices.

4.3 Usage of ICgraph

The ICgraph configuration shows per default 8 groups or 80 client (configured with Ids from 1 – 80) and some more function buttons. You can change the view and display group buttons and/or point buttons.

Illustration 8: ICgraph application (Full-duplex)



When ICPaging devices in the network are properly configured then they will be discovered after maximum 30 seconds from ICgraph and the according point button will change the color from dark grey to white. The white point buttons can be used for other actions on ICgraph. If a device is not more reachable in the network (e.g. turned off or not connected) then the point button will change the color of this point button from white to dark grey within 60 seconds.

Buttons on ICgraph window:

Show group / Show member

toggles view between point and group

Intercom

allows bi-directional communication with a single point, point must request/ring before !

Clear All

resets active communication and/or point buttons to normal state. Must be used to finish every communication from and with ICgraph.

Start Paging / Stop Paging

allows to make paging/announcements to selected points and/or groups. For use this function one, many or all points/groups should be selected before clicking the “Start Paging” button.

Mute ON/ Mute OFF

mutes/unmutes the ICgraph PC microphone

Relay open

allows switching of the remote relay for 3 seconds on selected device. Works only during Intercom mode.

Menu OFF / Menu ON

displays or hides menu/buttons below this button

Show events / Hide events

displays or hides event window, the event window is a helpful tool which shows all current point activities

Show LOG / Hide LOG

displays or hides LOG window, this window displays all ICgraph activities, even the background activities

Show records / Hide records

displays or hides Record window, this window shows all recording you made with ICgraph or from the sub folder "RECORDS". From here window select recordings or self-made audio files can be sent to the selected devices.

Play message / Stop message

allows to stream a pre-recorded file to the selected points. The default message can be replaced in the ICgraph configuration/folder . Note, the audio must be recorded in 16-bit mono WAV format and must have the same audio frequency than ICgraph and the devices have.

Start record / Stop record

this button allows to record running communication on ICgraph. Recorded files will be displayed in Record window. Recorded pagings to multiple points can be used to send later as pre-recorded files to selected devices. Note this function requires the installation of the MP3 libraries, for more info see ICgraph manual.

Settings

this button opens on Windows PCs the Internet Explorer, if a white point button was selected before then the Internet Explorer opens with the home page of the selected device.

4.3.1 Intercom functionality with ICgraph

In the Full-duplex and in the Half-duplex configurations everything is the same except the Intercom functionality.

To use the Intercom functionality the device must ring before to request the two-way communication. When ICgraph receives a Ring request from a device the according point button will change his color and blink magenta. At this state select the point and click the Intercom button to get a two-way communication.

In the Full-duplex mode / ICgraph configuration both sites can communicate with each other. To finish the communication press the “Clear All” button.

In the Half-duplex mode / ICgraph configuration the Intercom button will after activation change to “Intercom Talk” (yellow) in this mode you can talk to the ringed/selected device. To listen to the device click on the “Intercom Talk” button. The button name will change not to “Intercom Listen” (green).

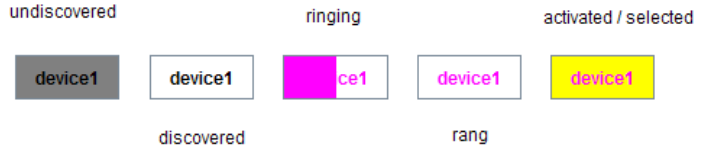
Illustration 9: ICgraph half-duplex Intercom buttons



Clicking on the “Intercom Listen” button will change again to “Intercom Talk” button. To finish the communication press the “Clear All” button.

Note, for Intercom only one ringing device should be selected at the same time, no Groups and not multiple devices! If the device is not ringing anymore, then the point button will stay in magenta (none blinking). In this mode only a one-way communication (to the device) for max. 10 seconds is possible when using the Intercom button.

Illustration 10: ICgraph Point button states



5 Implementing example paging system

5.1 Necessary components

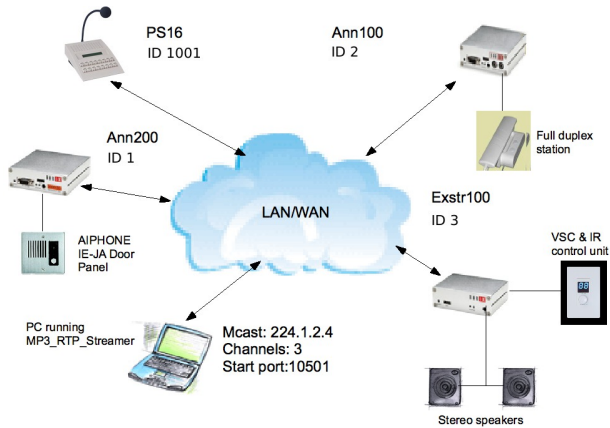
For better understanding the usage of ICPAGING solution proposed by BARIX we will try to implement a small paging system, supporting all the advertised features. For the system shown below, the following components are needed:

- BARIX Annunicom 200
- BARIX Annunicom 100
- AIPHONE door panel
- PS16 Paging station
- One PS16 48-keys extension (optional)
- BARIX Exstreamer 100
- A pair of powered stereo speakers
- A telephone style door station
- A PC for streaming music
- BARIX MP3_RTP_Streamer application

5.2 System layout

Let's implement an example system for the needs of a small shop. The proposed layout is shown on the figure below:

Illustration 11: Example intercom and paging system



We will need one Master station for sending messages, and controlling the background music, that will be located at the security room, one station for delivering high quality music in the shop area, one door station at the stock delivery entry, and one telephone at the cash desk.

The music delivery is done by a PC running the BARIX MP3 RTP Streamer, but could be also done with a BARIX Instreamer device. The BGM playback can be controlled by the ICMaster, or locally using the HAI Volume Source Control unit.

For the door station BARIX Annunicom 200 is being used as it provides the suitable two wire interface for connecting the AIPHONE panel. As this device is half duplex, the whole system needs to be configured in half duplex mode.

5.3 Configuring the master station

5.3.1 Initial setup

Get the latest version of the ICPAGING ABCL software from [BARIX download](#) page. Unzip the file.

Connect the ICMaster station to the LAN, and power it on. Note down the IP address announced by the Sonic IP, and point the browser to that address. The application page of the PS16 will be displayed.

Click on the Update tab of the current installed firmware, then click on the “Please click here to start the update” to go to the update page.

You will see the update page. Click on “Browse”, then navigate to the update_rescue/compound.bin in the directory where you have unzipped the abcl_icpaging_v0xxxxxx.zip file. Select it, then click on the “Upload” button to continue.

Resource

Advanced Update

Illustration 12: Device upload web page

Reboot the device when the update is finished, and open the web UI at the announced IP address. Once the device reboot click on DEFAULTS top menu button and apply defaults. The device will reboot again with default settings.

Note: default ICPAGING running application is ICMaster when “compound.bin” is loaded and defaults settings are applied. The package supplied 2 additional binaries, “update_rescue/compound_master.bin” and “update_rescue/compound_client.bin”, they respectively contain ICMaster or ICClient as the default running application.

5.3.2 General settings

Now it is time to configure our master station. Once PS16 is rebooted, open the Settings page

and eventually set up the network settings. Network setup is not mandatory if a DHCP server/router exists in the network, anyway, for example, a fixed IP address instead of default assigned DHCP address can make the device access easier in future reconfiguration operations.

5.3.3 ICMaster settings

Now it is time to configure the ICMaster specific settings. Click on the “Advanced Settings” tab, and set the following items :

- **Basic Settings or Audio section, Duplex Mode**
Choose "Half".
- **Paging section, Group 1 Address Map**
Click on the “View/Modify” button to open the address map configuration dialog, click “Clear All”, then select id 1 only and click apply. After device reboot click “Close”.
- **Paging section, Group 2 Address Map**
Click on the “View/Modify” button to open the address map configuration dialog, click “Clear All”, then select id 2 only and click apply. After device reboot click “Close”.
- **Paging section, Group 3 Address Map**
Click on the “View/Modify” button to open the address map configuration dialog, click “Clear All”, then select id 3 only and click apply. After device reboot click “Close”.
- **Group 4 Address Map**

Click on the “View/Modify” button to open the address map configuration dialog:

We will dedicate this group to select all, then we need to check clients ID=1, 2 and 3). So click “Clear All”, select 1, 2, and 3, then click “**Apply**” at the bottom of the Group configuration page. The device will reboot, click “Close” to exit address map configuration page.

NB! Do the group key assignment after you have applied all other ICMaster settings. Otherwise the changes will be lost, and only the group mask will be saved.

After reboot, click CONFIGURATION and Advanced Settings button, and check if the number of the selected clients for the groups is correct. It should look like this:

Illustration 13: Group buttons address bitmap summary

PAGING		
Group 1 Address Map	<input type="button" value="View/Modify"/>	1 clients selected
Group 2 Address Map	<input type="button" value="View/Modify"/>	1 clients selected
Group 3 Address Map	<input type="button" value="View/Modify"/>	1 clients selected
Group 4 Address Map	<input type="button" value="View/Modify"/>	3 clients selected

For more detailed explanation on the address bitmap configuration values see sections [Understanding BARP address bitmaps](#).

- Paging section, Audio Multicast Socket

Configure 224.1.2.3, leave the default port as "12345".

Leave all other settings to their default values, and click “Apply”. With this the ICMaster station configuration is finished.

5.4 Configuring the door station

5.4.1 Initial setup

Do the initial setup as described in the ICMaster [General settings](#) section. After uploading the SW, if the default running application is ICMaster click REBOOT menu button and under the “Reboot as” drop down list select “Intercom Client” and click “Reboot”.

5.4.2 General settings

Now it is time to configure our door station. As has been done for the master station, once Annunicom 200 is rebooted, open CONFIGURATION and then “Advanced Settings” page and setup the desired options into the Network Settings section.

5.4.3 Door station settings

- BARP Control section, BARP Station ID

Check the client ID to be "1".

- Audio section, Duplex Mode
Choose "Half".
- Audio section, Use AI_Phone
Set to "Yes"
- Background Music section, BGM First Broadcast Port
Playing music on AI_Phone is not possible because of the two line interface that it is using, so set it to "0" (no BGM).

Click the "Apply" button to save the settings, and reboot the device.

5.5 Configuring the cash desk station

5.5.1 Initial setup

Do the initial setup as described in the [ICMASTER General settings](#) section. After uploading the SW, if the default running application is ICMaster click REBOOT menu button and under the "Reboot as" drop down list select "Intercom Client" and click "Reboot".

5.5.2 General settings

Now it is time to configure our door station. As has been done for the master station, once Annunicom 100 is rebooted, open CONFIGURATION and then "Advanced

Settings” page and setup the desired options int the Network Settings section.

5.5.3 Cash desk settings

- BARP Control section, BARP Station ID

Set the client ID "2".

Click the “Apply” button to save the settings, and reboot the device.

5.6 Configuring the stereo music player

5.6.1 Initial setup

Do the initial setup as described in the [ICMASTER General settings](#) section. After uploading the SW, if the default running application is ICMaster click REBOOT menu button and under the “Reboot as” drop down list select “Intercom Client” and click “Reboot”.

5.6.2 General settings

Now it is time to configure our door station. As has been done for the master station, once Exstreamer 100 is rebooted, open CONFIGURATION and then “Advanced Settings” page and setup the desired options int the Network Settings section.

In addition, also set the serial port to be used

for the VSC.

- I/O Control section, Serial Port
Select "VSC Panel."

5.6.3 BGM player settings

- BARP Control section, Station ID
Set the client ID "3".
- Background Music section, BGM Broadcast Address
Set to use multicast address 224.1.2.4.
- Background Music section, BGM First Broadcast Port
Set to "10501".
- Background Music section, Available BGM Channels
Set to "3".
- Background Music section, BGM Start Channel
Set to "1".

5.6.4 Connecting the Volume Source Control (VSC) unit

Unpack the VSC unit from the supplied box. Turn it upside down. Take a small flat tip screwdriver and set the arrow of the yellow switch to point to "1".

Take a LAN cable with the necessary length, and plug it in the VSC RJ-45 socket.

Connect the other end of the LAN cable to the [DSUB9-RJ45](#)² adapter. Plug the adapter in the RS-232 port at the back panel of the Exstreamer 100 screwing it for more reliable connection.

Reboot the Exstreamer 100 to recognise the newly connected VSC unit.

Now the VSC unit should be functional. After reboot, the default BGM channel should be displayed (for.ex. "1"). Rotating the knob left/right decreases/increases the volume. Pressing the knob switches to "channel" mode, the rotation changes the channel being played. If channel "0" is selected, then "Lo" (meaning local line input channel) is displayed.

5.7 Configuring the PC for BGM distribution

5.7.1 Hardware requirements

For music distribution we need a computer that can run the BARIX MP3_RTP_Streamer application which creates several streams from MP3 library. Any recent Windows/Linux/iMac computer running Java VM should work.

5.7.2 Configuring the MP3_RTP_Streamer

Download the MP3_RTP_Streamer from the BARIX web site. Unzip it in a separate

² This DSUB9-RJ45 adapter is sold separately. Please contact BARIX for more information.

directory, and run the MP3_RTP_Streamer.jar. The application window should look like this:

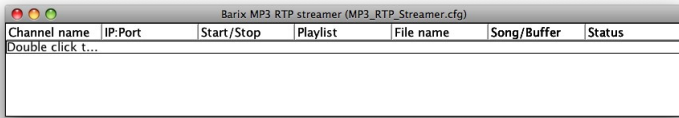
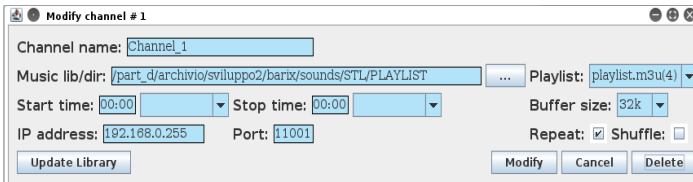


Illustration 14: MP3_RTP_Streamer main window (unconfigured)

We're going to configure it to play the 3 BGM channels, plus the “local” channel. The three BGM channels will stream from ports 10501, 10502, 10503, while the local channel expect audio input from local line in, for devices that supports the “line” HW input. Double click at the MP3_RTP streamer window to open the channel add dialog:

Illustration 15: MP3_RTP_Streamer configuration dialog



Put the channel name first, ex. “Channel 1” for channel “1”

Set the IP to the multicast group 224.1.2.4, and the port to 10501

Click “Music lib/dir” and navigate to the

directory where your mp3 files and playlists reside.

Click “Playlist” and select the playlist for this channel. The playlists can be created with iTunes, WinAmp, or any other mp3 capable player.

Click on “Create” and repeat all these steps to add channels 2 and 3, using ports 10502 and 10503.

Now the MP3_RTP_streamer is configured, and should be streaming music on address 224.1.2.4 and ports 10501-10503

5.8 Testing the Paging system

5.8.1 Recording a custom message

The ICMaster allows the user to pre-record an announcement to be sent when desired to the selected targets.

Make sure there are no clients selected (by pressing the “Cancel Sel” key (key 7)). Keep pressed the custom message key (key 6, LCD display will show a warning “Nothing Selected”), then press key 5 and release it to start recording (key 6 can be released from now). “Recording custom message” will be displayed on the PS16 LCD. Press again key 5 a second time to stop recording and save the message to the USB stick.

5.8.2 Rejecting a call

Press the call button on the Door, or cash desk station. Wait for the ICMaster to display the message with the caller ID, and play the ring tone, then press key 3 to reject the call. The client should play the busy tone.

5.8.3 Answer a call

Press again the call button on the client. When the call indication is received on the master, press key 1, and keep it pressed for a while. As it is a PTT key, the ICClient is switched to listen mode when pressed, and to talk mode when released.

Release the key to listen to the client, and push it again to talk. Press key 2 to toggle the relay on the client, or key 3 to hang up the call

5.8.4 Paging

Select the desired clients to be paged by pressing the corresponding target (group) buttons, then press and hold the page key (key 2) to send the message. Release it when finished.

5.8.5 Paging the custom message

With a group selection active, press the custom message key once. The prerecorded message will be sent to the selected IDs, and once the message has been sent the ICMaster will

return to idle mode. The LED will blink while sending, and the BGM playback should be restored after the message is sent.

6 Additional information

6.1 Updating a device using the RS-232 serial port

Sometimes when the device is not accessible via the LAN, or the image in the flash memory is corrupted for some reason, then a serial rescue may be needed to reset the device to the factory defaults³.

So, here are the steps that need to be executed to do the serial rescue:

- Disconnect the device from the power supply
- Connect the COM port of the device to the COM port of your computer via a null modem serial cable
- Open a terminal in the `update_rescue` directory in your unzipped copy of the ABCP ICPAGING firmware. If using Linux or Mac, switch to `update_rescue/linux` directory
- Start the rescue process by executing `serialX`, where X is the number (1-4) of the serial port on the computer
- If running on Linux /Mac execute the `seriald.sh` script, giving the device name of your COM port as a parameter. For ex.:

```
seriald /dev/tty.UC-232AC
```

- Power on the device, and wait for the update to finish. The device will reboot automatically.

NOTE: All other settings except the network

³ Rescuing the PS16 using the serial port is more complex, and requires some engineering work. Please contact BARIX Support to get more information.

settings will be lost !

6.2 Restoring Factory Defaults of PS16

This new feature has been added as a software replacement for the missing reset button in PS16 stations.

In some cases (forgot web UI password, loading corrupted FW image, etc.) the access to the web UI of the ICMaster may be lost. In such a situation the one of the possible recovery solutions on the BARIX devices is to press and hold the reset button while powered on ⁴. The device will revert to factory defaults, and reboot.

However, since PS16 stations do not have HW reset button, this procedure is not applicable. In this case follow the procedure below to revert to factory defaults:

- Press and hold key 1 (lower left) at startup. A message will appear on the display asking you to confirm;
- To confirm press key 16 (upper right) within 3 seconds, without releasing key 1, otherwise the unit will continue booting normally;
- After confirming and releasing all keys, the factory defaults are restored and the unit reboots. Listen to the SonicIP and note down the IP address.

⁴ Another recovery solution is to do a serial rescue using the serial port (see section Updating a device using the RS-232 serial port).

- Open the web page at the announced IP address, and change the application from “ICCLIENT” to “ICMASTER”. Click “Apply to reboot.

After reboot, reconfigure the ICMaster as it was before.

6.3 Configuring ICPAGING in multimaster environment

In some cases, multiple masters may be needed in the paging system. For example, a door station may need to ring to the reception at the entrance during normal working hours, and to the security room at night.

For this purpose, ICPAGING supports several multimaster scenarios:

6.3.1 Call Failover scenario:

In this case maximum 4 masters can be called by the client. If one of the first two masters in the client IP/ID list are called, and it is in "call reject mode" then the client starts calling the other three masters in a chain. However, if the first master does not reply (or any other master called in the chain) then the client will timeout, and may not connect to any master. To prevent this happen, the "Call next Master" on the client must be enabled.

6.3.2 Call all masters scenario

For that mode the masters must be addressed by IP. This is done by setting the ICCLIENT Call Masters by and the ICMaster Call Master by configuration options to "IP Address".

Then it is enough to set one of the first two master IP addresses in the ICCLIENT list to IP address 0.0.0.0. In this case, when the call button associated with that IP address is pressed, then the call request is broadcasted to all masters, and one of them may pickup. The masters track the current state of the calling client status message, and if it changes to something other than 3 (connecting) then they stop ringing. The masters also stop ringing if more than 5 seconds have elapsed after the last call request command, sent from the client.

6.3.3 Call all + failover scenario:

Configured as call all masters scenario. However, if there is one master in a call reject mode, the client will get the reject and start calling the other masters in the list by sending unicast call requests. The masters that got the broadcasted call request shall stop ringing.

6.4 Understanding BARP address bitmaps

According to BARP protocol, the address bitmap is 128 bytes, allowing to address client IDs 1-1024 (starting from "1", client ID=0 is not valid). In the ICMaster application, because of the limited memory space in the EEPROM only

the first 16 bytes can be stored, thus allowing to group select only the first 128 client IDs.

Each byte addresses 8 clients (for ex. byte 0 addresses clients IDs 1-8, byte 1 addresses client IDs 9-16, etc.) Setting a bit within a byte enables the corresponding client, clearing the bit-disables it.

However, the client IDs within a byte are stored in reversed order, i.e. the smallest ID is stored in the MSB, the biggest at the LSB. The composed address map is then transmitted with the smallest byte numbers first, as shown on the picture below:

		Byte0								Byte 127							
		Client Ids 1-8 (bits 7-0)								Client Ids 1017-1024 (bits 7-0)							
Bits		7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Client ID		1	2	3	4	5	6	7	8	1017	1018	1019	1020	1021	1022	1023	1024
Enable/Disable		1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0
Hex		A				A				0				0			

Illustration 16: Address bitmap encoding

To find out in which byte is the client ID we would like to select, we use the integer division operation:

$$IDbyte = (Client\ ID - 1) / 8$$

Let's see what it means in terms of our example. Let's find in which byte is our client ID 21:

$$IDbyte = (21 - 1) / 8 = 2$$

The result is the biggest number, which multiplied by 8 does not exceed (ID-1). The other result from this operation is called *remainder*, and is in fact the number that completes to ID-1:

$$ID-1 = result*8 + remainder$$

Now, to find which bit within this byte, we take the remainder (which for ID=21 is 4) from the integer division, and subtract it from 7. In other words:

$$IDbit = 7 - 4 = 3$$

which means that we have to set bit3 from byte2:

	Byte0							Byte1							Byte2									
	Client Ids 1-8							Client Ids 9-16							Client Ids 17-24									
Bits	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Enable/Disable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
Hex	0							0							8									

Repeating these calculations for client ID=17, we find that bit7 of byte2 has to be set. Looking at the BIN / DEC / HEX conversion table, we see that 1000 is 0x8 in HEX format, which explains the 0x88 value we see for group 1 in the Group buttons address bitmap summary.

6.5 BIN / DEC / HEX conversion

Hexadecimal digits have values from **0..15**, represented as **0..9** and as **A** (for 10) to **F** (for 15).

The following table can serve as a conversion chart:

Bin /DEC / Hex Table

Decimal	Binary	Hexadecimal
0	0000	0
1	0001	1

Decimal	Binary	Hexadecimal
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

To convert a binary value in a hexadecimal representation, the upper and lower four bits are treated separately, resulting in a two-digit hexadecimal number.

7 Troubleshooting

Below just a brief table to help solving the main known issues.

1 ISSUE	Description	Possible cause and remedy action
1	Device boot but web UI home page frames shows ERROR 400.	ICPAGING has been uploaded over an existing different ABCL fw based application. Click “DEFAULTS” on the top menu and apply defaults.
2	Device not visible in the LAN network.	An IP assignment server is missing in the LAN, or there could be a LAN cable issue. Check device LAN cable connections, eventually set firmware defaults through keeping pressed the device front panel reset button for more than 10 seconds, then listen to SonicIP. If the above don't solve the issue try the serial rescue process (see par. 6.1).
3	Audio is missing.	Volume level is set to 0, mic or speakers wiring is defective. Check the volume level, (client Audio >Default Paging Volume, master Audio > Default Volume fields), to be greater than 0. Check also mic and speakers to be well connected to the device.
4	Audio corrupted.	Client device has an audio format set different from the master. Check “Audio Format” field, under CONFIGURATION > Advanced Settings > Audio section. All devices in the system MUST have the same audio format set.
5	Annunicom 100/200 master device not working.	USB key is not connected to the device. Insert a USB key.
6	ICCLIENT locked in “PAGING” state.	Master could have been rebooted while paging. Once master is up, re-page locked devices and close the paging session.

7	Device not responding in the serial update process.	Another PC task can be holding the serial port. <hr/> Check for other PC programs/tasks using the same serial port and terminate them. Restart the update procedure.
---	---	--

8 Dictionary

8.1.1 DHCP

Short for Dynamic Host Configuration Protocol, a protocol used to assign an IP address to a device connected to a Network.

8.1.2 FDX

Short for Full Duplex. A full-duplex system allows communication between two parties to be done in both directions simultaneously. See [this](#) Wikipedia article for more information.

8.1.3 HDX

Short for Half Duplex. In a half-duplex system simultaneous communication in both directions is not possible, i.e. if one of the parties is sending, the other have to wait it to finish before replying. See [this](#) Wikipedia article for more information.

8.1.4 IP

Short for Internet Protocol, the IP is an address of a computer or other network device on a network using IP or TCP/IP. Every device on an IP-based network requires an IP address to identify its location or address on the network. Example: **192.168.2.10**

8.1.5 IPzator

Barix IPzator™ technology is designed for the purpose that the Barix device can create its own IP address according to the network structure in case it can't receive one from your network. If DHCP, AUTOIP or BOOTP fail, IPzator will create an IP address within the subnet and test it (starting with **x.x.x.168** and if occupied incrementing by one). If the address works and is not being used by another device on the network, it will give the address to the Barix device.

8.1.6 MAC address

Abbreviation for Medium Access Control, a MAC is a unique address number formatted in hexadecimal format and given to each computer and/or network device on a computer network. Because a MAC address is a unique address a computer network will not have the same MAC address assigned to more than one computer or network device.
Example: **A1:B2:C3:D4:E5:F6**

8.1.7 Netmask

A number used to identify a sub network so that an IP address can be shared on a LAN (Local Area Network).
A mask is used to determine what subnet an IP address belongs to. An IP address has two components, the network address and the host address. For example, consider the IP address **150.215.017.009**. Assuming this is part of a

Class B network, the first two numbers (150.2.) represent the Class B network address, and the second two numbers (.017.009) identify a particular host on this network. The Netmask would then be 255.255.0.0 .

8.1.8 Static IP

A Static IP is a fixed IP address that you assign manually to a device on the network. It remains valid until you disable it.

8.1.9 VSC

[Volume Source Control](#) unit. This is a universal wall mountable control accessory for the Barix audio products range. It provides two digit LED display, control knob, and a IR port.

8.1.10 IP Addressing

An IP address is a 32 bit value, divided into four octets of eight bits each. The standard representation is four decimal numbers (in the range of 0..255), divided by dots.

- Example: **192.2.1.123**

This is called decimal-dot notation. The IP address is divided in two parts: a network and a host part. To support different needs, five "network classes" have been defined. Depending on the network class, the last one,

two or last three bytes define the host, while the remaining part defines the network. In the following text, 'x' stands for the host part of the IP address.

8.1.11 Class A network

- IP address **1.x.x.x** to **127.x.x.x**

Only 127 different networks of this class exist. These have a very large number of potential connected devices (up to 16'777'216)

- Example: **10.0.0.1** (network **10**, host **0.0.1**)

8.1.12 Class B network

- IP address **128.0.x.x** to **191.255.x.x**

These networks are used for large company networks. Every network can consist of up to 65534 devices.

- Example: **172.1.3.2** (network **172.1**, host **3.2**)

8.1.13 Class C network

- IP address **192.0.0.x** to **223.255.255.x**

Class C networks are most common and for smaller companies. These networks can consist of a maximum number of 254 hosts.

- Example: **192.7.1.9** (network **192.7.1**, host **9**)

8.1.14 Class D network

The remaining addresses **224.x.x.x - 239.x.x.x** are defined as "Class D" and are used as multicast addresses.

8.1.15 Class E network

No addresses are allowed with the four highest order bits set to "1" (**240.x.x.x - 254.x.x.x**). These addresses, called "class E", are reserved.

8.1.16 Network Address

The host address with all host bits set to "0" is used to address the network as a whole (for example in routing entries).

- Example: **192.168.0.0**

Network addresses can not be used as a host address!

8.1.17 Broadcast Address

The address with the host part bits all set to "1" is the broadcast address, meaning "for every host".

- Example: **192.168.0.255**

Broadcast addresses can not be used as a host address!

8.1.18 IP Netmask

The Netmask is used to divide the IP address differently from the standard defined by the classes A,B and C.

Entering a Netmask, it is possible to define how many bits from the IP address are to be taken as the network part and how many bits are to be taken as the host part.

Standard IP network Netmask:

Class	Network bits	Host bits	Netmask
A	8	24	255.0.0.0
B	16	16	255.255.0.0
C	24	8	255.255.255.0

Netmask examples:

Netmask	Host bits
255.255.255.252	2
255.255.255.248	3
255.255.255.240	4
255.255.255.224	5
255.255.255.192	6
255.255.255.128	7
255.255.255.0	8
255.255.254.0	9
255.255.252.0	10
255.255.248.0	11
.	.
.	.
255.128.0.0	23
255.0.0.0	24

8.1.19 Private IP Networks and the Internet

If your network is not connected to the Internet and there are no plans to make such a connection you may use any IP address you wish.

However if you are not connected to the Internet and have plans to connect to the Internet or you are connected to the Internet and want to operate your Barix Barionet on an intranet you should use one of the sub-networks below for your network. These network numbers have been reserved for such networks. If you have any questions about IP assignment ask your Network Administrator.

Private IP networks by class:

Class	Network
A	10.x.x.x
B	172.16.x.x
C	192.168.0.x

8.1.20 Network RFC's

For more information regarding IP addressing see the following documents. They can be found on the Internet:

RFC	Description
950	Internet Standard Subnetting Procedure
1700	Assigned Numbers
1117	Internet Numbers
1597	Address Allocation for Private Internets

9 Legal Information

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Barix AG
Seefeldstrasse 303
8008 Zürich
SWITZERLAND



T +41 43 433 22 11
F +41 44 274 28 49
www.barix.com
sales@barix.com
support@barix.com