SPKR-IP-CS
IP Talkback Speaker
For TalkMaster/SIP Environments

Reference Manual

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Overview

The Digital Acoustics **SPKR-IP-CS** is an IP (Internet Protocol) 2' x 2' lay-in tile replacement two-way speaker designed to work with Digital Acoustic's TalkMaster and/or the SIP Protocol. Singlewire's InformaCast software is also supported as a chargeable option that requires special Firmware.
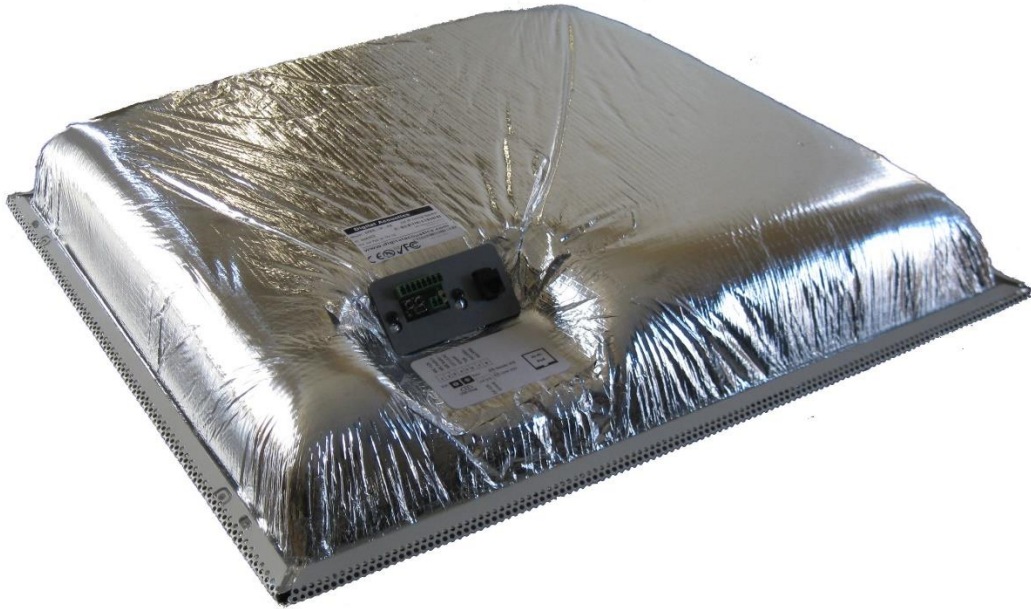
The **SPKR-IP-CS** can be deployed in environments that require two-way audio as well as paging only environments. It provides:

- High quality audio output up to 8 watts

- Highly scalable and seamless expansion

- Simple installation 2'x2' drop in tile replacement

- DHCP compliant or static IP Address assignment

- Supports PoE (802.3af) or external power (12VDC @ 1.2Amps)

- Internal microphone for talkback operation

- Able to drive a 2nd analog 8 Ohm speaker to provide more even coverage in large rooms (4 watts max per speaker)

- Supports connection of an external microphone that overrides the internal microphone so the microphone is located where it is needed most

- Supports connection of an external Call button

- Visible Staus LED in speaker grill

- Field upgradeable firmware

Specifications

Item	Specifications
Network Protocols	DHCP, HTTP, TCP, UDP/RTP, ICMP, IGMP Multicast, SIP
Network Interface	10/100 Ethernet (Auto detection, Auto MDIX)
Command protocols	TalkMaster FOCUS, SIP or Singlewire Informacast*
Audio Rate	64kbs
Audio Resolution	G.711 uLaw or 8-bit PCM
Audio Sample Rate	8K (Voice band), 22K (Background Music)
Audio Frequency	90-4kHz (Voice band), 90-11khz (Background Music)
Internal Amplifier	8 watts @ 8 Ohms
Humidity	10~90%
Power	PoE (802.3af). Requires 15.4 watts from PSE. Optional external power 12VDC at 1.2 Amps
Size	23.75" (600mm) x 23.75" (600mm) x 3.875" (98mm)

Connections and Controls

The following controls, connectors and LEDs for the SPKR-IP-CS are located on the faceplate on top of the speaker
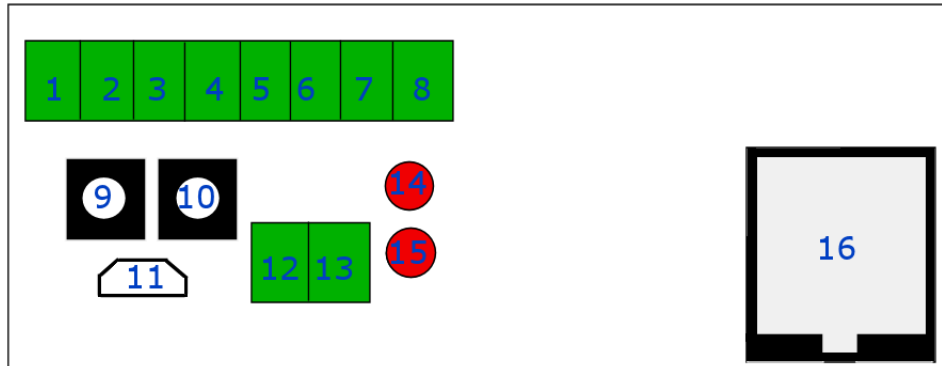
IP Speaker Fascia Plate

Connector	Description	Notes
1	MIC +12V	External Line Level Microphone. Update configuration with **Input Source** set to **Line-In** to override the internal microphone. Supports powered 2-wire or 3-wire Line Level Mic. Use **MIC Audio+** and **MIC Audio–** for 2-wire line level microphones
2	MIC Audio+	
3	MIC Audio-	
4	LED	3.3v current limited to power an external Lighted Call button or LED
5	GND	Ground for LED and TALK
6	TALK	Connect to external button/switch to signal an Incoming Call or dial a SIP extension
7	Aux Speaker+	Connect an auxiliary analog 8 Ohm Speaker. Both speakers will produce a max of 4 watts
8	Aux Speaker-	
9	Vol - button	Seven volume steps available. Can also be controlled via software
10	Vol + button	
11	Mini USB Connector	Used for diagnostics. Refer to Troubleshooting section
12	External Power +12	Optional external power connector. Requires 12VDC at 15 watts. Overrides PoE power
13	External Power Ground	
14	READY LED	On Solid = Connected and ready to play Flashing 4x /second = Not connected Flashing 20x/second = Replied to TalkMaster "FIND ALL"
15	LINK LED	On Solid = Network is connected Off = No network detected
16	RJ-45 10/100 Ethernet	PoE capable (require 15.4 Watts from Power Source Equipment)

The SPKR-IP-CS also includes an internal microphone and a green READY LED visible in the speaker grill.

Connecting to an Ethernet Network

Plug a Cat5 or Cat6 network cable from 10/100 compatible switch into the **RJ-45** connector (Connector 16). PoE (802.3af) is supported and requires 15.4 Watts from the Power Source Equipment. The **RJ-45** connector supports auto "MDIX" and can also be plugged directly into a PC for configuration or diagnostic purposes.

Connecting Power

If the SPKR-IP-CS is not powered via Power over Ethernet (PoE - 802.3af compatible), then connect an external power supply that supplies 12VDC @ 1.2 amps (Connectors 12/13).

Connecting an External Microphone

The SPKR-IP-CS includes an internal omni-directional Microphone. For environments where the ceilings are over 10' or the microphone needs to be placed closer to the audio source, an external line level powered microphone can be connected and installed on a wall or in the ceiling. Both 2-wire and 3-wire Line Level powered microphones are supported.

In the TalkMaster FOCUS Administrator Console, on the **IP Endpoints → General → Options 1** tab, change the **Input Source** to **Line In** to override the onboard microphone.

To connect a 3-wire Line Level powered microphones such as the ETS SM1, use a two-conductor wire with shield (such as Belden 8451 010500 or 9451 010U1000):
- Connect the Mic's +12V to the SPKR-IP-CS's Connector 1 (MIC +12V)
- Connect the Mic's Audio Signal to the SPKR-IP-CS's Connector 2 (MIC Audio+)
- Connect the Mic's ground (shield) to the SPKR-IP-CS's Connector 3 (MIC Audio-)

To connect a 2-wire Line Level powered microphones such as the IMS IVIKIT, use a two-conductor wire with shield (such as Belden 8451 010500 or 9451 010U1000):
- Connect the Mic's +12v/Audio Signal to the SPKR-IP-CS's Connector 2 (MIC Audio+)
- Connect the Mic's Ground to the SPKR-IP-CS's Connector 3 (MIC Audio-)
- Connect the Mic's ground (shield) to the SPKR-IP-CS's Connector 3 (MIC Audio-). This will serve as a drain wire

Connecting a Call button

An external "call" button can be connected to the SPKR-IP-CS to enable it to place a call to TalkMaster or to a SIP extension. If a lighted call button (integrated LED) is used, the SPKR-IP-CS can also supply 3.3v to power it.

- Connect two button connectors to the SPKR-IP-CS Connectors 5 and 6 (polarity independent)
- If the call button has an LED, connect the LED+ to the SPKR-IP-CS Connector 4 and the LED- to the SPKR-IP-CS Connector 5

Connecting a 2nd Analog Speaker

An analog speaker can be connected to the SPKR-IP-CS for more even coverage in large areas (order part number **SPKR-12**)
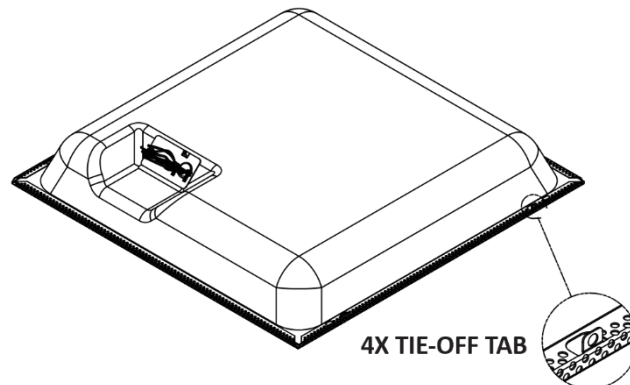
- Connect 18/2 wire (max 100') to connectors 7 – 8 on the SPKR-IP-CS
- Connect the two wires to the analog speaker leads

Mounting Instructions

The SPKR-IP-CS is a lay-in replacement tile speaker:

- Select an area in the ceiling away from HVAC vents which may obfuscate the microphone input
- Cut ceiling tile as required for 2' x 2' format
    - 2' x 2' tile – No cutting required
    - 2' x 4' tile – Cut tile in half along 2' axis
- Place assembly onto ceiling grid

Note! AHJ/local codes may require a tie-off to structure. Bend up tie-off tabs as shown below and install as directed

4X TIE-OFF TAB

Note! AHJ/local codes my require tie-down to grid. Recommended fasteners (not supplied) Erico/Caddy part ATA4i and ¼"-20 x 2" bolt or equivalent.

Audio Options

The SPKR-IP-CS can be used in the following two-way audio configurations:
- Full Duplex or Half Duplex using the internal microphone
- Full Duplex or Half Duplex using an optional external powered line level microphone

When using Full Duplex, the speaker volume and microphone sensitivity will be limited to prevent feedback, but both parties can operate "hands fee". Better results may be achieved by using an optional external microphone and moving it closer to where people will be speaking and away from the speaker. This should be deployed in environments where the ambient noise level is 75 dB or less. When configuring the unit, make sure to select **SPKR-IP-CS** from the **Audio Profile** dropdown on the **IP Endpoints → General → Options 2** tab.

When using Half Duplex, the speaker volume and microphone sensitivity are not limited since there is no feedback. The customer at the SPKR-IP-CS can press the Call button to contact an Operator on either TalkMaster or a SIP Phone. In TalkMaster, the Operator can press the Space Bar to toggle between Talking and Listening. On a Phone, the Operator can press the 0 key to toggle between Talking and Listening. In both cases the customer at the SPKR-IP-CS operates in hands-free mode. This is the recommended solution when the ambior the ceilings are over 10' high. When configuring the unit, make sure to select **Half-Duplex** from the **Audio Profile** dropdown on the **IP Endpoints → General → Options 2** tab.

SPKR-IP-CS Configuration

Use the TalkMaster FOCUS Administrator Console to configure the SPKR-IP-CS (available from the **Software/Firmware Downloads** page on www.digitalacoustics.com) The SPKR-IP-CS must be powered on and connected to the same network subnet as the PC running TalkMaster:

- Open the **IP Endpoints → Configuration** tab
- Press the **FIND ALL** button to discover the devices connected to the network
- Select the correct SPKR-IP-CS by comparing the ICOM ID on the screen with the label on the back of the unit
- If the SPKR-IP-CS will be used with TalkMaster, select **Client** from the **Type** dropdown. If it will only be used for SIP operations, select **SIP Stand-alone**
- Enter a **Location Name** to uniquely identify the unit
- Either check the **Assign IP automatically with DHCP** option or enter a static IP Address
- If the SPKR-IP-CS will be used with TalkMaster, enter the IP Address of the TalkMaster Server in the **Server IP** field. The Port should be set to 3000. Make sure the **Authorized IP Endpoint** option is checked on the PC identified in the Server IP field

If the SPKR-IP-CS is to be used with the TalkMaster Software:
- On the **IP Endpoints → Options 1** tab
- Check the **Use UDP/RTP** option. If a NAT'd firewall is between TalkMaster Server and the unit, assign a **Fixed RTP Port** and add port forwarding rule to the Firewall
- For full duplex operation, check the **Supports Full-Duplex Audio** option

If the optional external line level microphone is being used, the following option must be changed:
- On the **IP Endpoints → Options 1** tab, change the **Input Source** from **Microphone** to **Line In**. This will disable the internal microphone and enable the external microphone

On the **Options 2** tab, configure the audio profile:
- If Full Duplex operation has been configured, select the **SPKR-IP-CS** Audio, otherwise select the **Half Duplex** profile

If the SPKR-IP-CS will be used in SIP mode:
- Open the **IP Endpoints → eSIP → Options 1** tab
- If the SPKR-IP-CS should dial a number when the Call button is pressed, select **Dial SIP Extension on PTT**. Otherwise, select **SIP Extension Only**
- Enter the IP Address or DNS of the Primary SIP Registrar and Primary SIP Server (usually the same) as well as the Port (default is 5060)
- Enter the SPKR-IP-CS's **Local Port** (defaults to 5060) and **RTP Port** (defaults to 46000)
- Enter the **SIP Extension** that was created in the PBX
- Enter the **SIP Password** that was created in the PBX
- Enter the **SIP Authentication** (usually the same as the SIP Extension or the User ID that is linked with the Extension)
- For Full Duplex SIP operation, check the **SIP Full Duplex** option and verify that the **SPKR-IP-CS** audio profile has been selected on the **Options 2** tab
- If the option **Dial SIP Extension on PTT** has been selected, enter the extension or phone number to be dialed in the **Out Dial Extension**

When all changes have been made, press the **Save** button at the bottom of the screen.

Volume Setting

The SPKR-IP-CS has seven volume steps. If the SPKR-IP-CS has been configured for TalkMaster, use the Operator Console to adjust the volume level. If it has been configured for SIP, then the volume can be adjusted when a call is placed to it.

In TalkMaster Operator Console, make sure the SPKR-IP-CS shows as a connected device in the **Intercoms** tab. Select menu option **Help → Help on using TalkMaster** and then search for **IP Endpoint Volume Control** for current instructions on displaying and setting the volume.

If the SPKR-IP-CS has been configured for SIP operations, the volume can be set during a SIP call by pressing the following keys:

- #00 – Set volume down one level
- #01 – Set to Volume Level 1
- #02 – Set to Volume Level 2
- #03 – Set to Volume Level 3
- #04 – Set to Volume Level 4
- #05 – Set to Volume Level 5
- #06 – Set to Volume Level 6
- #07 – Set to Volume Level 7
- #08 – Set volume up one level

If the PBX that is being used has already used the key combinations above, then TalkMaster must be used to set the volume.

Physical Dimensions

The SPKR-IP-CS dimensions are as follows:
23.75 in (600 mm) x 23.75 in (600 mm) x 3.88 (100mm)

Tie-Off x4
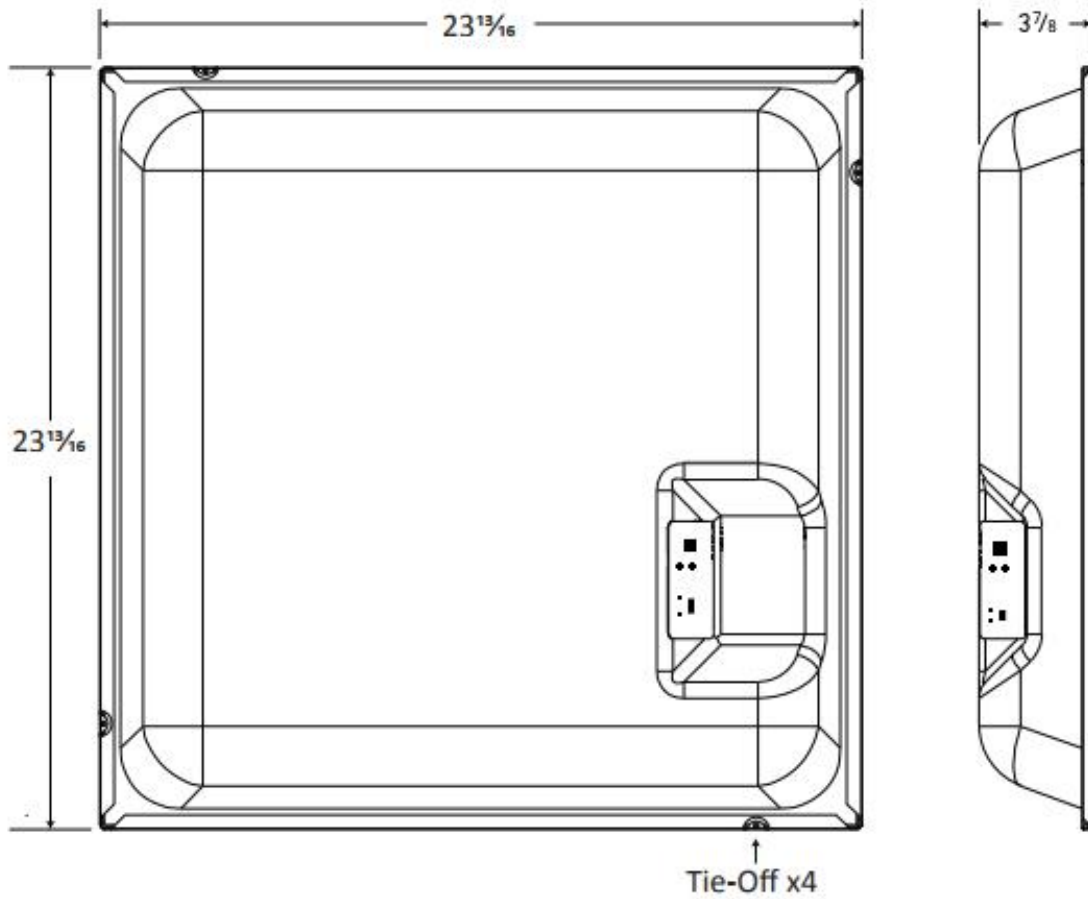
Environmental

The SPKR-IP-CS is designed to operate indoors.

Troubleshooting

Once configured, the SPKR-IP-CS ceiling speaker should operate trouble free.

Reset to Factory Defaults

The IP Address information and all other options can be reset to factory defaults by the following procedure:
- Unplug the PoE network cable or external power supply
- Press and hold the "Vol +" and "Vol -" buttons
- Plug in the PoE cable or external power supply
- Wait till the unit plays a multi-tone beep (about 8-10 seconds)
- Release the "Vol +" and "Vol -" buttons
- A multi tone beep will be heard and the unit will reboot with the default factory settings (DHCP will be enabled)

Low Volume

Make sure that the correct Audio Profile has been selected. Refer to the Audio Options section for additional information.

Viewing tech support info via the USB port

If requested by Digital Acoustics Support, a USB cable can be attached to the SPKR-IP-CS to capture additional information.
- Attach a USB cable to the Mini USB connector (connector 11)
- Attach the other end of the USB cable to a PC running Windows®
- Open the Windows Device Manager to determine the virtual Serial port that has been assigned to the unit (the unit will enumerate as **GPS Data Logger**)
- Open a terminal emulation program such as Tera Term and set the serial port properties to 115kbs, 8,N,1, no flow control and ANSI Terminal
- Press the **Enter** key
- If nothing appears on the screen, unplug/replug the USB cable and then press the **Enter** key
- Provide the requested info to Digital Acoustics Tech support

Contacting Technical Support

Information online at www.digitalacoustics.com

Email support

esupport@digitalacoustics.com

Regulatory Notices

Federal Communication Commission Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to **Part 15** of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

In compliance with FCC regulations, the following information is provided on the device or devices covered in this document.
- Product Name: IP7 Series
- Model number: SS20, Sx8, STx
- Company name: Digital Acoustics LLC
                              2340 S River Road,STE 406
                              Des Plaines, IL 60018
                              877-724-3387

IC Notice (Canada Only)

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme **NMB-003** du Canada.

NOTE: Industry Canada regulations provide that changes or modifications not expressly approved by Digital Acoustics, LLC could void your authority to operate this equipment

CE Notice

Marking by the symbol CE indicates compliance of this equipment to the EMC (Electromagnetic Compatibility) directive of the European Community. Such marking is indicative that this equipment meets or exceeds at least an **EN 55022:2006 Class A** device

VCCI Compliance

Class A

AS/NZS CISPR22:2006 Compliance

Class A

CNS 13438 Compliance

Class A

www.digitalacoustics.com