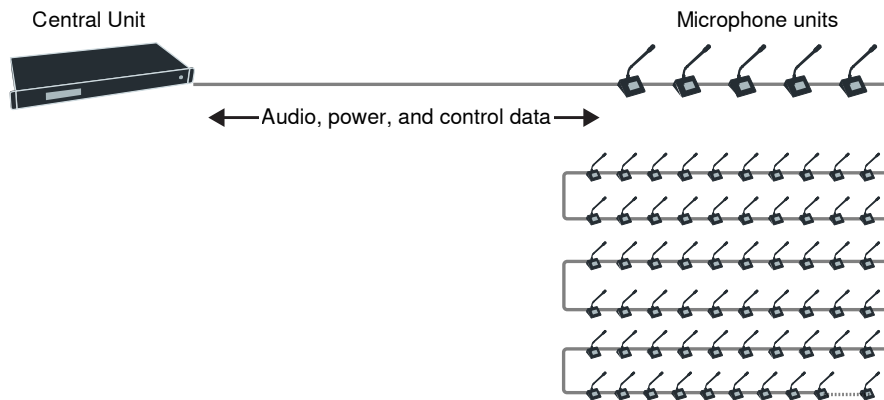


Introduction

The Shure DIS conferencing system operates on an isolated network of microphone units, interpretation stations, and additional conference accessories. Referred to as DCS-LAN (DCS 6000 local area network), the network transports audio, power, and control data to the components over the same cable: **shielded Cat5e** (or higher).

Important: Shielded Cat5e cables are critical to system operation. If you are not using the Shure EC-6001 pre-tested cables, make sure they meet the cable requirements detailed in this guide.



Dedicated Network for DIS Components

The DCS-LAN uses shielded Cat5e cable to transport the signal for up to thousands of microphone units and additional components.

Importance of Correct Cables in Audio Networks

Cable integrity is even more critical in a digital audio network than in a standard data network. While browsing the internet, network issues might cause a short delay in the page response or prompt the user to reload the page. In contrast, the audio network has no acceptable delay window: the audio must be delivered in realtime for transparency.

Shure DIS conferencing equipment achieves signal integrity by using shielded Cat5e, Cat6, or Cat7 cables. The shield carries the DCS-LAN signal, and must be continuous from end-to-end in the chain.



Shielded connectors

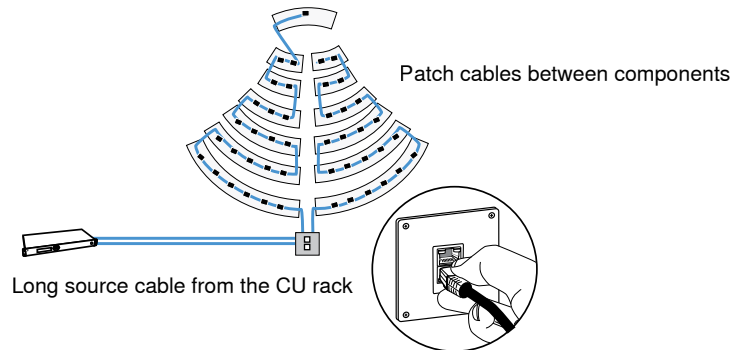
Foiled shield

Shielded Cat5e

The shield is critical for operation

Planning

There are two sections of the DCS-LAN network: the patch cables between the components and the longer source cable from the equipment closet.



Terminate the source cable to a patch panel in the event space. Components connect using short jumper cables.

Source Cable from the CU Rack

The source (feed) cable connects the CU rack in an equipment closet to the components in the event space. Often this cable is long and built into the infrastructure of the building, either in the walls, ceiling or floor. A short jumper cable connects the CU to the rack patch panel.

Always terminate the source cable to a shielded female connectors in the patch panels. This cable can be custom-made to fit the infrastructure, but must meet cable requirements detailed in this guide.

- CU rack to event space (between patch panels)
- Female-to-female cable
- Follow instructions for making a custom source cable

Patch Cables Between Components

Use short patch cables between components and from the patch panel. Shure offers pre-tested cables in various lengths from 0.5 m to 100 m for these connections.

- Between components, and from the patch panel
- Male-to-male cable
- Use Shure EC 6001 pretested cables for most reliable setup

Pre-Tested Shure Cables

Shure offers individually-tested cables for Shure conferencing and discussion equipment. The EC 6001 are high-quality, shielded Cat5e cables available various lengths from 0.5 m to 100 m. Made with male-to-male shielded connectors.

Male-to-Male Patch Cables

0.5 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-0.5
1 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-01
2 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-02
3 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-03
5 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-05
10 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-10
20 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-20
30 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-30
50 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-50
100 m black shielded Cat5e U/FTP cable (shielded RJ45)	EC 6001-100

EC 6001 Cable Specification

Standard	TIA/EIA-568-B CAT5e
Category	Cat5e
Rating	350 MHz
Shielding	F/UTP
Connector	Shielded RJ45
Gauge	24 AWG
Fire Rating	CMG Rated (General Purpose)
Delay Skew	<25 nsec/100 m, maximum
Return Loss	18.9 dB at 100 MHz, minimum

Cable Requirements and Specifications

If you are not using Shure-tested cables to connect DIS components, the cables must meet the following specifications:

Cat5e Cable Requirements

Type	Cat5e twisted pair (or higher)
Shielding	F/UTP or U/FTP
Connector	Shielded RJ45
Weight	AWG 24

Making your Own Cables

An installer can make the cable that connects the CU rack to a patch panel in the event space. The CU is typically stored in the IT booth or tech closet apart from the main area. A short jumper cable connects the CU to the rack patch panel.

Terminate the source cable to a patch panel for the most reliable operation. Then, simply connect the components using short male-terminated cables.

Shure strongly recommends only making a source cable that terminates in female connectors, most often in a patch panel or outlet box. Crimping the cable to a female connector is easier and far more reliable than attempting to terminate to a male connector.

Tip: Use Shure pre-tested EC 6001 patch cables for short connections for the microphone units from the patch panel.

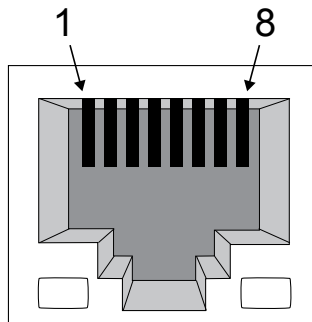
Follow these guidelines for making your own cable:

Conductor (Core) Type

CAT-5e, CAT-6 and CAT-7 cables come with either solid or stranded copper conductors (cores). Only use the solid conductor type for structured cables that terminate to a patch panel (female connector).

Connectors

Terminate the cables to shielded RJ45 female connectors.



Shielded RJ45 Female Connector

Pin numbers when looking into the connector

Pin Wiring

How to wire a CAT-5e and CAT-6 Cables using the EIA/TIA 568-B standard:

Pin	Function	Connector #1	Connector #2
1	In-going +	ORG/WHT	ORG/WHT
2	In-going -	ORG	ORG
3	+48V	GRN/WHT	GRN/WHT
4	0V	BLU	BLU
5	0V	BLU/WHT	BLU/WHT
6	+48V	GRN	GRN
7	Outgoing -	BRN/WHT	BRN/WHT
8	Outgoing +	BRN	BRN

If other color codes are used then the four pairs are connected as follows:

Pair 2: Pin 1 & 2

Pair 3: Pin 3 & 6

Pair 1: Pin 4 & 5

Pair 4: Pin 7 & 8

The phase of the pairs must be correct and the wiring spec. as stated in Cat5e (EIA 568-B) has to be followed.

Testing

Test all homemade cables before installation. Use a cable certifier, like the Fluke DSX-5000 CableAnalyzer™ for the most accurate results.

Installation Best Practices

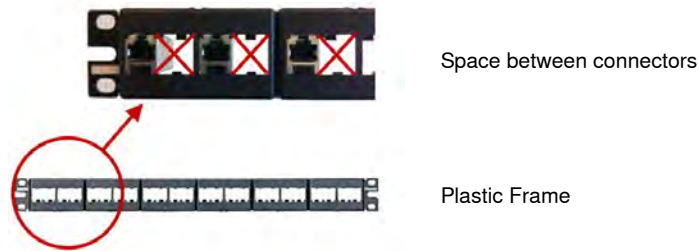
Follow these guidelines for the most reliable installation.

Continuity of Shielding

Shielding must be consistent through the DCS-LAN chain. Any cable or patch panel used for DIS components requires shielded RJ45 connectors. All DIS components feature shielded RJ45 female connectors.

Avoiding Accidental Grounding (Galvanic Isolation)

Avoid accidentally grounding the DCS-LAN signal with the chassis ground of a patch panel. The DCS-LAN uses the shield as a signal ground reference and cannot contact another ground anywhere in the connection.



Avoid Grounding in a Patch Panel

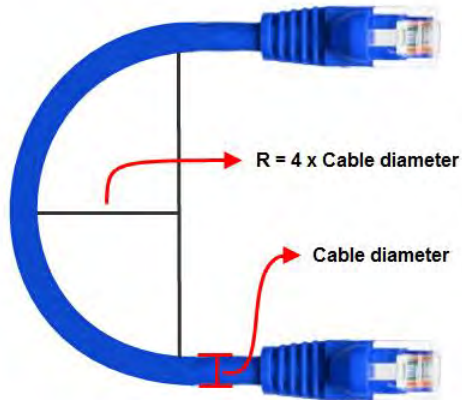
To avoid ground issues:

- **Plastic frames in patch panel:** this ensures that the female RJ45 connectors do not ground to the chassis of the patch panel.
- **Blank space between connectors:** leave a space between each female RJ45 connector in a patch panel.
- **Shielding continuity:** each component in the chain must be shielded properly.

Note: The female connectors in all DIS components units feature an air gap that isolates the chassis of the connector and the chassis of the unit preventing any galvanic (physical and thus electrical) connection.

Properly Securing Cables

As with any cable carrying a signal, use care when installing the equipment.



Bending Rule

Do not sharply bend the cable. Ethernet cables cannot bend more than four-times the diameter of the cable.



Pinching

Do not over-fasten the cable. A pinched cable may not operate correctly.

Checklist

The DIS line of conferencing and discussion systems operate reliably when installed with the right equipment. Use this checklist before an installation or when troubleshooting a system.

1. Cables meet the minimum requirements:
 - Cat5e or higher specification
 - Shielded cables - FTP or STP type
 - Shielded connectors
2. Shielding is continuous from end-to-end of the DCS-LAN.
3. Self-made cables terminate to female connectors in a patch panel.
4. Patch panel does not ground the DCS-LAN signal.
 - Plastic frame
 - Empty space between connectors
5. Cables are properly installed.
 - Do not over-bend
 - Do not crush the cable

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