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NEAR FIELD COMMUNICATION

BREAKAWAY JACK

DATAPORT CONNECTORS

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Which audio jack?

Making the right choice for your headset

INFLIGHT PERIPHERALS
IFPL

3rd Revision

IFPL is an established world leader in the design and production of reliable and efficient audio jacks, USB ports and Ethernet ports. Visit IFPL's website, www.ifpl.com, to find out more about our products.

Introduction

IFPL has compiled this guide to enable you to understand what audio jacks are all about. It explains in simple terms the relationships between the jack, the headset and how it all interfaces with the passenger. Ultimately we are all aiming to provide our customers with the best and most reliable service that enhances their flight experience. Selection of a good, quality audio system is of paramount importance.

This information should help you work out what priorities you have for your IFE system. For example, you may find the 'fit and forget' idea of a long-life jack more desirable than the short changeover time of the 'rapid-fit' jack.

IFPL provides a variety of jacks that have special features suited to individual IFE systems. If we don't already make it, we can design from new or modify existing modules. For the technically minded, many more details are available on our website, www.ifpl.com.

Contents

KEY TO HEADSETS AND JACKS

INCAM Low Cost NC Headsets

Powered NC Headsets

1 Using This Guide

The guide explains what an audio jack is and how headsets work. It takes you through each type of audio jack and headset, explaining what each does and what systems you would use them for. There is a summary of headset plugs and audio jack models, with pictures to enable you to recognise the different types.

At the back you will find a handy chart, which allows you to pick a headset and view which audio jack/s would be compatible.

The guide is intended to be simple and to take some of the mystery out of audio jacks; it does not provide details of every variation available. These are usually bespoke designs for individual customers.

2 What is an audio jack?

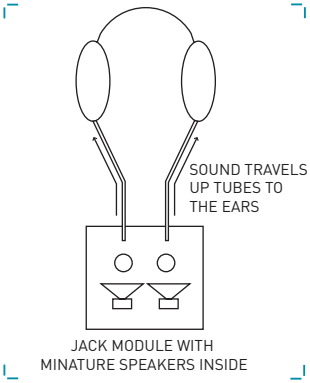
An Audio jack is the 'socket' or 'jack' in the seat, into which you plug a headset. It is often configured in a small cube-shaped module with a simple cable harness to connect into the seat box.

Sometimes the jack is built into the passenger control unit (PCU) or even the seat-back video display.

3 Headset Types

Pneumatic

Original headsets were pneumatic, which meant they carried audio to the earpieces via a 'stethoscope' tube. Audio was provided via a 'transducer' in the seat, which would contain miniature loudspeakers. Most airlines now use electronic headsets.

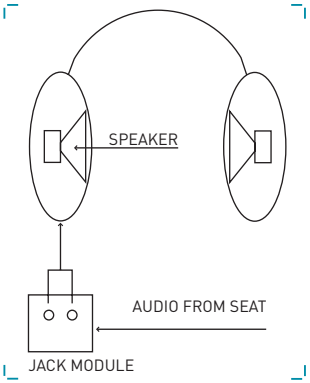


Electronic

(Non-Noise cancelling)

Most people are familiar with regular electronic headsets. These are the types we use with our Walkman or MP3 player. They carry audio to the headset electronically. The headset is normally fitted with either a single or two-pin plug.

[Arinc A1, B1, A2, B2]

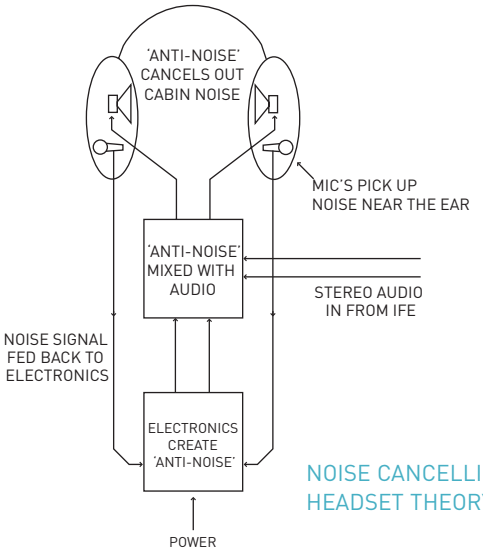


Noise Cancelling Headsets

Noise cancelling headsets are becoming hugely popular, and more and more airlines are choosing them as a way to make the flight more enjoyable for their passengers.

Noise cancelling headsets work by picking up the noise inside the cabin. Electronic circuits then convert the noise signal into "Anti-noise" and feed this back into the headset to cancel out the cabin noise.

Due to the nature of noise in the cabin, no headset can truly cancel out all the noise, and as such, these headsets should really be called Noise Reduction Headsets. The measure of a good noise cancelling headset is the level of noise reduction it can achieve whilst still offering good user comfort.

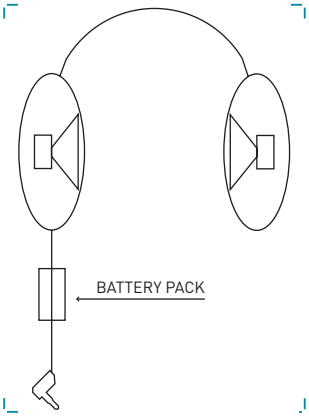


NOISE CANCELLING HEADSET THEORY

Noise Cancelling Headset Types

WITH BATTERY

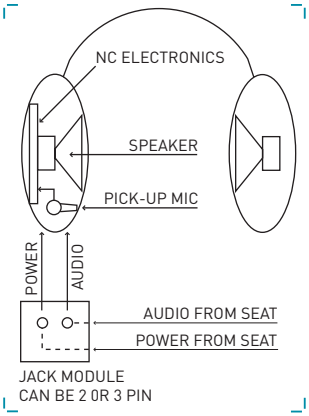
This type is powered by a battery and is the type you can buy from a store and use as a personal carry on item. Normally all of the noise cancelling electronics are inside the ear cups. Because of the need for batteries very few airlines use these. The headsets usually have single pin plugs.



POWERED NOISE CANCELLING HEADSETS

This type of headset is the most commonly used by airlines. The electronics are contained inside the ear cups, but instead of being battery powered, the headset draws its power from the seat box via the power jack module in the seat. To achieve this, the headset plug has an extra pin to make the power connection. These headsets usually have two or three pin plugs.

[Arinc C1, C2]



"LOW COST" NOISE CANCELLING HEADSETS (INCAM)

Low cost noise cancelling headsets operate in the same way as other Noise Cancelling headsets, except that the costly electronics have been removed from the headset and placed out of harms way in the seat.

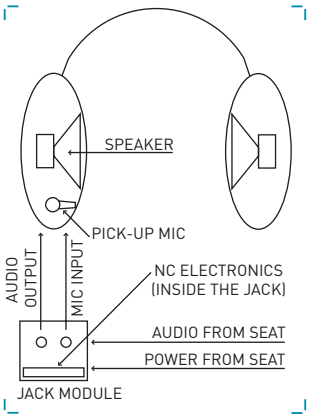
IFPL helped develop this system, and our proprietary INCAM solution combines the noise cancelling electronics within the jack module.

[See section 5]

The benefits of this type of headset are low cost and high reliability. Because the headsets no longer need the electronics inside them, the unit cost can come down significantly and because the electronics are now housed inside the jack in the seat, the overall reliability goes up. It's a win-win all round and many airlines have been able to place noise cancelling headsets throughout the whole cabin.

Although the headsets are much simpler, you still need the microphones in the ear cup to pick up the noise. They are usually fitted with two or three pin plugs.

[ARINC D1, D2, MODIFIED C2]



4 Headset Plug Types
A summary

Airline IFE headsets seem to come with a myriad of plugs on the end. Most headset suppliers will provide a plug to suit each airline's preference. In an effort to standardise the available types, the plug layouts are defined in the ARINC 628 pt 2 standard and have been given a reference letter and number combination.

Detailed information

Plugs for airline entertainment headsets are categorized into four different types, each with a variety of features. Each plug configuration is made up of a combination of 3.5mm and 2.5mm diameter connector pins.

Type A headsets have 300 ohms impedance per side and **Type B** headsets have a nominal 40 ohms impedance. **Type A** and **Type B** headset plugs are physically identical - The impedance of the headset is the only difference. **Type A** and **Type B** headsets are used typically with airline entertainment systems without active noise cancellation electronics, and the plugs are either single or dual pin.

Type C headsets that incorporate active noise cancellation electronics within the headset use dual pin or triple pin plugs.

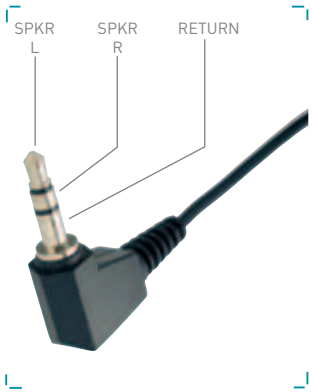
Type D (INCAM) headsets are similar to **Type C** headsets except that the active noise cancellation electronics is installed remotely within the jack module. **Type D** headsets use dual or triple pin plugs. [note that **Type D** plugs are electrically different to **Type C** plugs]

Headset Type	ARINC Designation	Impedance	Plug Style
Non-Noise Cancelling	A1	300	Single Pin, 3.5mm,Right angle
	A2	300	Dual Pin, 3.5mm,Right Angle
	B1	40	Single Pin, 3.5mm,Right angle
	B2	40	Dual Pin, 3.5mm, Right Angle
Powered Noise Cancelling	C1	300	Dual Pin, 3.5mm, Right angle
	C2	300	Triple Pin, Right angle [2.5mm+2x3.5mm]
Low Cost Noise Cancelling	D1	40-300	Dual Pin, Right angle [2.5mm+3.5mm]
	D2	40-300	Dual Pin, Right angle [2x3.5mm]
	D3	40-300	Triple Pin, Right angle [2.5mm+2x3.5mm]

IFPL make a jack to suit every type of headset plug.

SINGLE PIN – ARINC A1

Used with regular non-noise cancelling headsets.

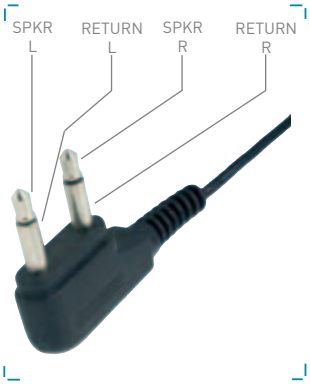


BREAK AWAY

A unique headset plug that is designed to solve the problem of broken headset pins.

DUAL PIN – ARINC A2

Used with regular non-noise cancelling headsets. This type of plug is often referred to as 'dual mono' because it uses two mono plugs. It is still actually a stereo plug.

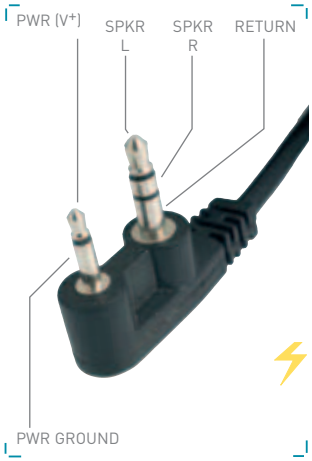


DUAL PIN – ARINC C1

Used with powered noise cancelling headsets.

The 2.5mm plug supplies 12 volts to the noise cancelling electronics inside the headset.

The 3.5mm plug supplies the Audio (Stereo)



THREE PIN – ARINC C2

Used with powered noise cancelling headsets.

The 2.5mm plug supplies 12 volts to the noise cancelling electronics inside the headset.

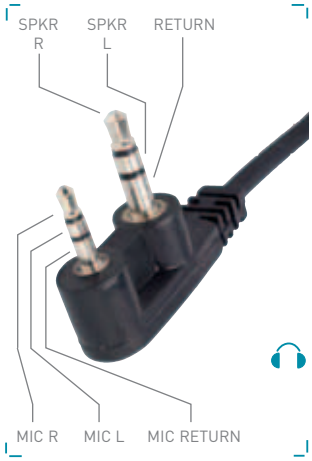
The 3.5mm plugs supply the audio (Left + Right)

DUAL PIN – ARINC D1

Used with INCAM™ low cost noise cancelling headsets.

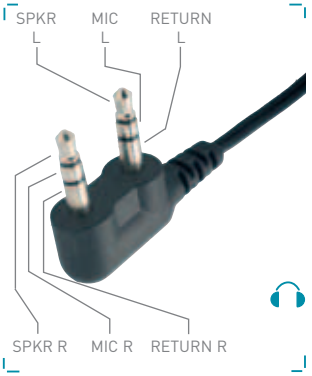
There are two types of 'D1' plug and the designations are under review by the industry standards committees.

To provide backwards compatibility with single pin (A1) headsets, there is a D1 Plug available that is 'reverse wired' i.e tip = Left. This version is commonly known as D1-2 with the "standard" (as shown) known as D1-1



DUAL PIN – ARINC D2

Used with INCAM™ low cost noise cancelling headsets



TRIPLE PIN – MODIFIED ARINC C2 [D3*]

Used with INCAM™ low cost noise cancelling headsets.

*This plug is a variation of the D2 Type with an added 2.5mm dummy Pin for extra strength.

Note that there is no ARINC standard for this type of jack and as such is termed 'modified ARINC C2'or 'D3'.

So, now you have an idea of the headsets that are available, and which style of plug you can get, now read on for information about audio jacks.

5 Audio Jack Types

There are several IFE suppliers who make audio jacks. The following are the jacks made by IFPL. They have been developed with specialist features. A range of options can be incorporated into one audio jack, such as backlighting and extra safety features.

Long Life ™

IFPL has developed two very different jack concepts to meet the varying needs and priorities of different airlines:

'Reliability and Maintainability'

Our Long Life™ jack has been tested beyond 100,000 cycles, which is far greater than anything else that is available on the market, the Long Life™ jack is effectively "Fit & Forget".

Long Life™ jacks from IFPL use extremely high quality terminals housed within a robust glass reinforced plastic body to give maximum reliability. An open back on the jack provides a self-cleaning feature to reduce the chances of blockage due to debris or broken plug tips.

INCAM ™

(Integrated Noise Cancelling Audio Module)

INCAM™ has taken the costly and complex electronics out of the headset and placed them in the jack module. This greatly reduces the cost of the headset and increases the reliability and maintainability of the audio system. Airlines are finding this a cost-effective way of providing noise cancelling audio throughout the aircraft.

The INCAM ™ jack is used with the low cost Noise-Cancelling Headset (see page 9) INCAM ™ is available in both Long Life ™ and Rapid Fit ™.

Rapid-Fit ™

The Rapid Fit™ concept attacks the problem from another direction, that of maintainability. However tough and robust we make our jacks, your passengers will still find a way of breaking them. Knowing this, IFPL has invented the Rapid Fit™ Jack.

The actual jack part is housed within a low cost removable cassette that can be replaced quickly and easily without taking the main unit out of the seat. The Rapid Fit™ jack takes about 30 seconds to fix whereas a regular jack normally takes anywhere up to 10 minutes. That means huge savings on maintenance costs.

All in all, you save on the replacement costs of the unit and you save on the time it takes to fix a jack.

IFPL Breakaway

This module solves the problem of broken headset pins. Using all the features that has made the Long Life™ jack so popular the Breakaway Jack adds an even better 90˚breakaway feature. It has new design features such as the addition of a cuff, which, when coupled with a shorter pin on the headset (no more expensive than regular pins) allows a 90 degree pull out. Compatible with single pin ARINC A1.

Dual Purpose

Accepts Single Pin and Dual Pin headset plugs. Available in Rapid Fit or Long Life formats.

The 1248 is a variant of the Rapid Fit family and the 1129 is a variant of the Long Life family. Both permit the use of ARINC A2 & A1 headsets. Either socket will accept the A1 headset.

6 Audio Jack Summary

The Long Life range (100,000 Insertions)

→ SINGLE PIN
MODEL 1010

A1

→ SINGLE PIN (MINIATURE)
MODEL 1048

A1

→ DUAL PIN (DUAL PURPOSE)
MODEL 1129
Single pin and two pin headsets

A1 A2

→ TRIPLE PIN
POWERED NC
MODEL 1159

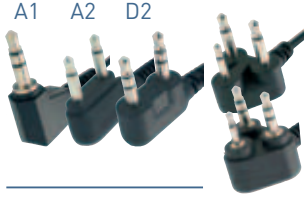
A1 A2 C2

→ LONG LIFE ™ DUAL PIN
INCAM ™ LOW COST NC
MODEL 1152

A1 A2 D2

→ LONG LIFE ™ TRIPLE PIN
INCAM ™ LOW COST NC
MODEL 1155

A1 A2 D2 C2 & C2 MOD



→ THE BREAKAWAY
SINGLE PIN
MODEL 1190

A1

The Rapid Fit range

30 Second Time To Repair

SINGLE PIN
MODEL 1052

A1

DUAL PIN
MODEL 1056

A2

DUAL PIN POWER JACK
MODEL 1064

Powered NC Headsets

A1 C1

RAPID FIT INCAM
MODEL 1067-400

Low Cost Noise Cancellation

A2 D2

RAPID FIT INCAM
MODEL 1067-300

Low Cost Noise Cancellation

D1 (D1-1)

RAPID FIT INCAM
MODEL 1067-600

Low Cost Noise Cancellation

(Reverse Wired)

A1 D1-2

DUAL PIN (DUAL PURPOSE)
MODEL 1248

Single pin and two pin headsets

A1 A2

See page 12 for explanation

7 Glossary

ARINC (628) Avionics specification used for headsets.

AUDIO JACKS Sometimes referred to as 'jacks', 'sockets', RJU & RJM.

CARTRIDGE / CASSETTE Removable part of Rapid Fit jack which can be changed whilst leaving the module in the seat.

CONNECTOR Generic term for the male and female parts of jack and plug.

INCAM Integrated Noise Cancelling Module. IFPL's low cost noise cancelling solution (see page 9)

JACK Female or receptacle part of connectors, also called socket.

NCH Noise Cancellation Headset.

PIN Male part of connectors, also called plug or connector. Audio jacks are frequently referred to as being one, two or three pin/ plug types. This refers to how many holes it has to receive pins from the headset.

PCU Passenger Control Unit.

PLUG Male part of connectors, also called pin. Headsets are often referred to as having a 'two pin plug'.

POWER JACKS A jack with an extra pin to provide power to headsets that have built in NC electronics.

RJU/RJM Remote Jack Unit / Module.

Notes

8 Compatibility Chart