ADAT Multicore Extender
ADX-32 / ADX-64
User's Manual

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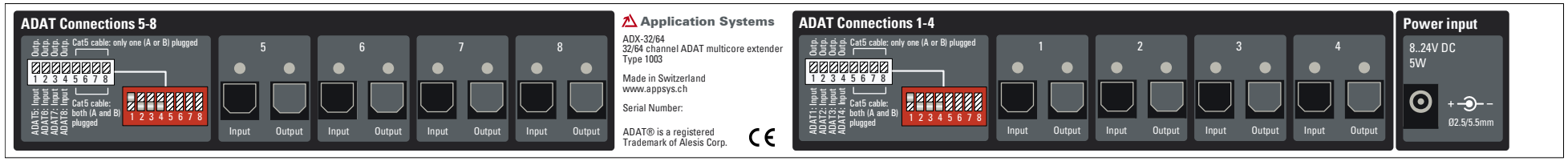
1. Device connections

1.1. Front panel

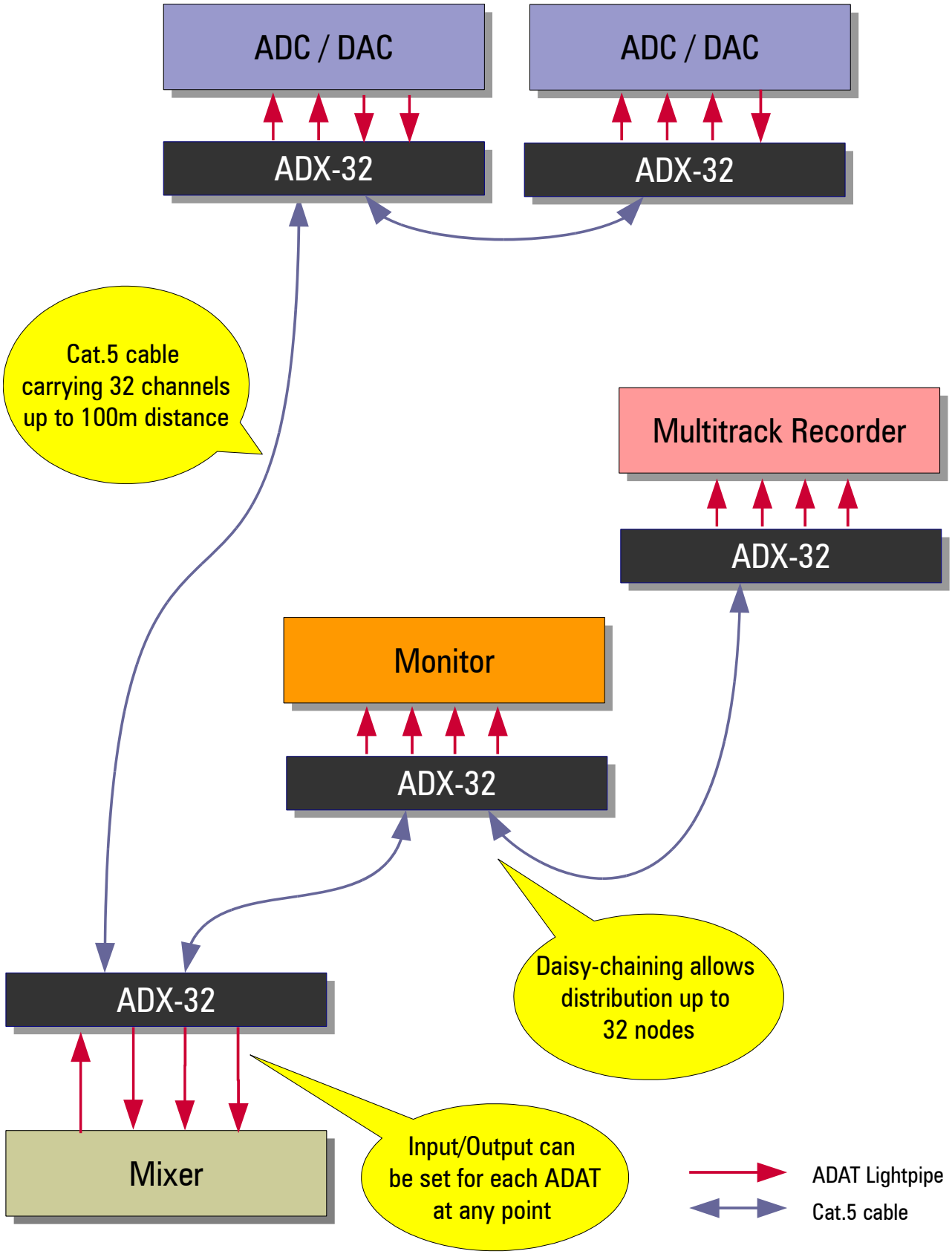
Connectors „Cat5 Connection 2“ are only available with the 64-channel version (ADX-64).

1.2. Rear panel



Connectors „ADAT Connections 5-8“ are only available with the 64-channel version (ADX-64).

2. Typical setup



3. Introduction

3.1. Overview

With the ADX-32 you can transmit 4 ADAT Lightpipe connections (32 audio channels) over a single Cat.5 network cable, up to 100 meters in distance.

The 64 channel version **ADX-64** can transmit 8 ADAT Lightpipe connections (64 audio channels) over two Cat.5 network cables – it consists basically of two ADX-32 in one case.

The system is designed to provide maximum flexibility: Transmit direction is selectable for each of the four ADAT connections separately, giving you the option to transmit 32/0, 24/8, 16/16, 8/24, or 0/32 Tx/Rx channels. With ADX-64, you can select the direction for each of the eight ADAT-connections, e.g. to build a 48/16 multicore system.

Multiple extenders can be daisy-chained together to transmit audio signals to multiple locations. Thus, complex configurations (e.g. audio distribution to multiple rooms or additional monitoring stations) are easy and cost-effective to set up.
Each ADAT connection follows the „transmit once, receive multiple scheme".

All ADAT connections operate completely independent of each other. This means it is possible to transmit different data formats, sample rates, resolutions and even ADAT and SPDIF signals together over one Cat.5 cable.

3.2. Benefits

- Much lower costs compared with MADI or analog transmissions (cabling!)
- Lossless real-time transmission, virtually no latency or delays (in the nanosecond range)
- Scalable: available in 32 or 64 channel versions,
  the 32 channel version can be upgraded to 64 channels with an additional module
- Heavily reduced cabling, one thin Cat.5 replaces 32 analog cables
- Local loopback function: each ADAT input is forwarded to the output on the same device. This gives you the ability to connect additional monitors, or use it as wordclock source.
- Compatible with all data formats using TOSLINK connector technology:
  ADAT Lightpipe, SPDIF, AC-3, DTS etc.
- Quality product „Made in Switzerland"

4. Installation notes

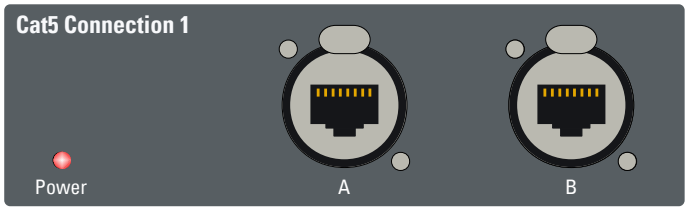
CAUTION: Use the Cat.5 cable ONLY between ADAT Multicore Extenders!

NEVER connect ADAT-Multicore Extender with ethernet networking equipment (PC, Switch, DSL modem whatsoever)!

ADAT Multicore Extenders and/or the networking equiment may be DAMAGED!

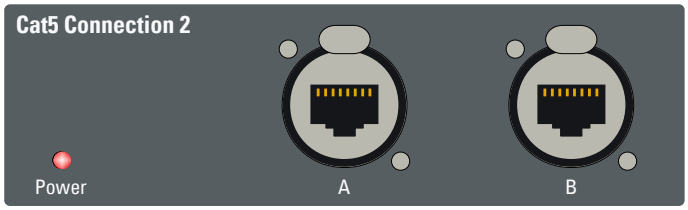
5. Front panel connections

5.1. Cat5 Connection 1 / Jacks „A“ and „B“



Transmits **ADAT connections 1-4 over Cat5 cabling.** Jacks „A“ and „B“ are electrically equal (paralleled). Depending on the number of jacks used, the termination setting has to be altered (see 7.2. Termination (DIP switches 5-8)).

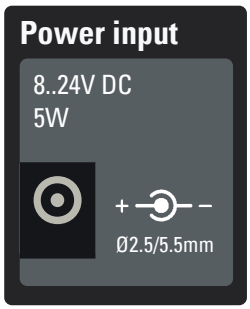
5.2. Cat5 Connection 2 / Jacks „A“ and „B“(ADX-64 only)



Transmits **ADAT connections 5-8 over a second Cat5 cable.**
The mode of operation is identical to connections 1-4.

6. Rear panel connections

6.1. Power Input

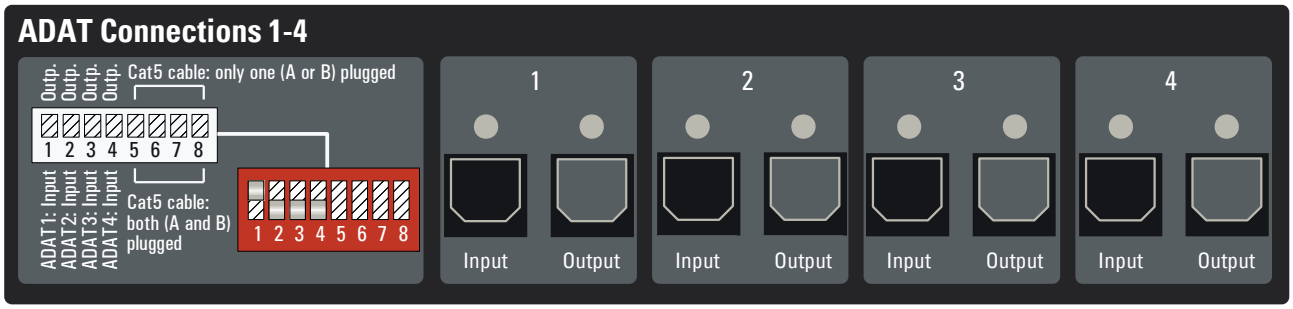


Power supply of the device.
Use only a DC adaptor with the indicated voltage, power, polarity and matching connector.

On wrong polarity, an internal resetteable fuse is tripped. Disconnect the power supply and wait 10 minutes before connecting again.

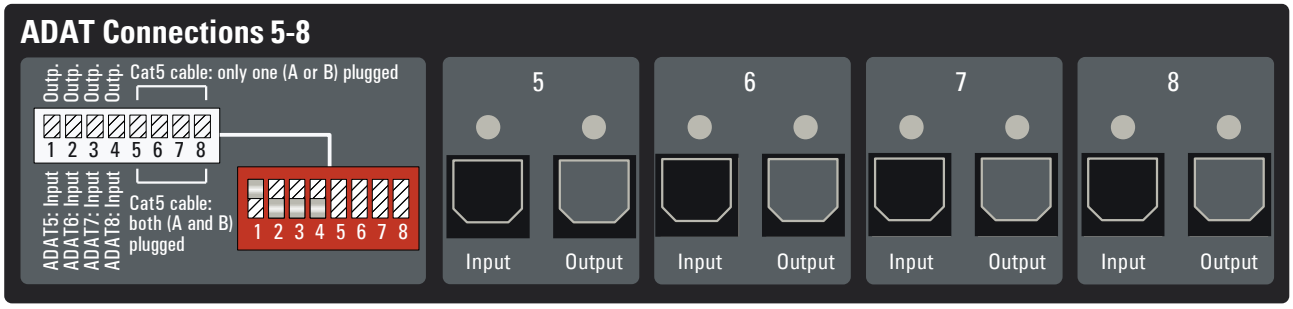
The second module in the 64 channel version is internally supplied with power, therefore it is no need for an additional DC adaptor.

6.2. ADAT Connections 1-4



ADAT Lightpipe inputs and outputs 1-4. The transmission direction (transmit or receive) is set by DIP switches, see 7.1. Input/output mode (DIP switches 1-4).

6.3. ADAT Connections 5-8 (ADX-64 only)

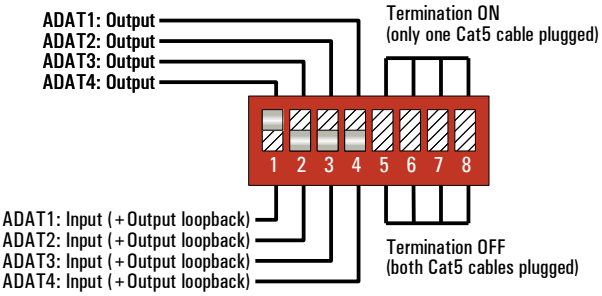


ADAT Lightpipe inputs and outputs 1-4.
The mode of operation is identical to connections 1-4.

ADAT connections 5-8 can be used as additional outputs for the connections 1-4, in order to use them as simple ADAT splitter.

7. Settings

Prior to use, the configuration must be set by means of the DIP switches on the rear panel.



ADX-64: There are two DIP switch banks on the rear panel. Each bank sets the function for the corresponding 32 channel submodule.

7.1. Input/output mode (DIP switches 1-4)

The transmission direction for the ADAT connections 1-4 are set with DIP switches 1-4:

- **Input:** ADAT connection is configured as input. The received ADAT data is sent to the Cat5 cable.

  The input signal is looped back to the corresponding output jack on the same device ("local loopback"). This gives you the possibility to connect additional monitoring, or to use the signal as wordclock source (see 9.2. Digital 24/8 multicore (sync over ADAT)).

- **Output**: ADAT connection is configured as output. ADAT data will be received from the Cat5 cable and is forwarded to the optical output.

  NOTE: For each ADAT connection, exactly one device on a bus must be set to "Input". All others have to be set to "output" (only one signal source, but many signal sinks are allowed). You can choose which of the devices acts as the sender ("Input") for each ADAT conection independently.

7.2. Termination (DIP switches 5-8)

To avoid signal reflections which degrade signal quality, each end of the Cat5 cable has to be terminated with matching resistors. These are integrated into the ADAT Multicore Extenders and can be switched on by means of DIP switches 5-8.

- On ADAT Multicore Extenders which are placed at the and of a Cat5 bus (that is, all devices having *only one* Cat5 connector "A" or "B" plugged in), termination must be *switched on*.

- On ADAT Multicore Extenders in the middle of a bus (that is, all devices where both connectors "A" and "B" are used at the same time), termination must be *switched off.*

NOTE: Switches 5,6,7,8 must all either be„ON“ or all „OFF“ stehen. Other combinations are not

allowed and cause malfunction.

8. Wordclock synchronization

8.1. General

In digital audio systems it is required that all devices (mixers, converters, effects etc.) work with a common clock (the so-called "wordclock"). This ensures that signal is processed on all channels in all devices at the same time. Without a common clock, local clocks drift apart with time, which may cause disturbances like clicks, pops and dropouts.

ADAT Multicore Extender does *not* require a wordclock signal,
but transmits the wordclock signal which is contained in the ADAT data stream.

8.2. Wordclock synchronization over ADAT

The wordclock signal is generated by a master device (mostly the mixer) and is output along with the audio data over the ADAT interface. Devices receiving the signal reconstruct the wordclock from the data stream.
When using ADAT synchronzation, there is no need for additional sync cables.

Use the "Local Loopback" function (see 7.1. Input/output mode (DIP switches 1-4)) to have additional ADAT sources for synchronization purposes. Look at the example in 9.2. Digital 24/8 multicore (sync over ADAT).

8.3. Wordclock synchronization over separate coax cable

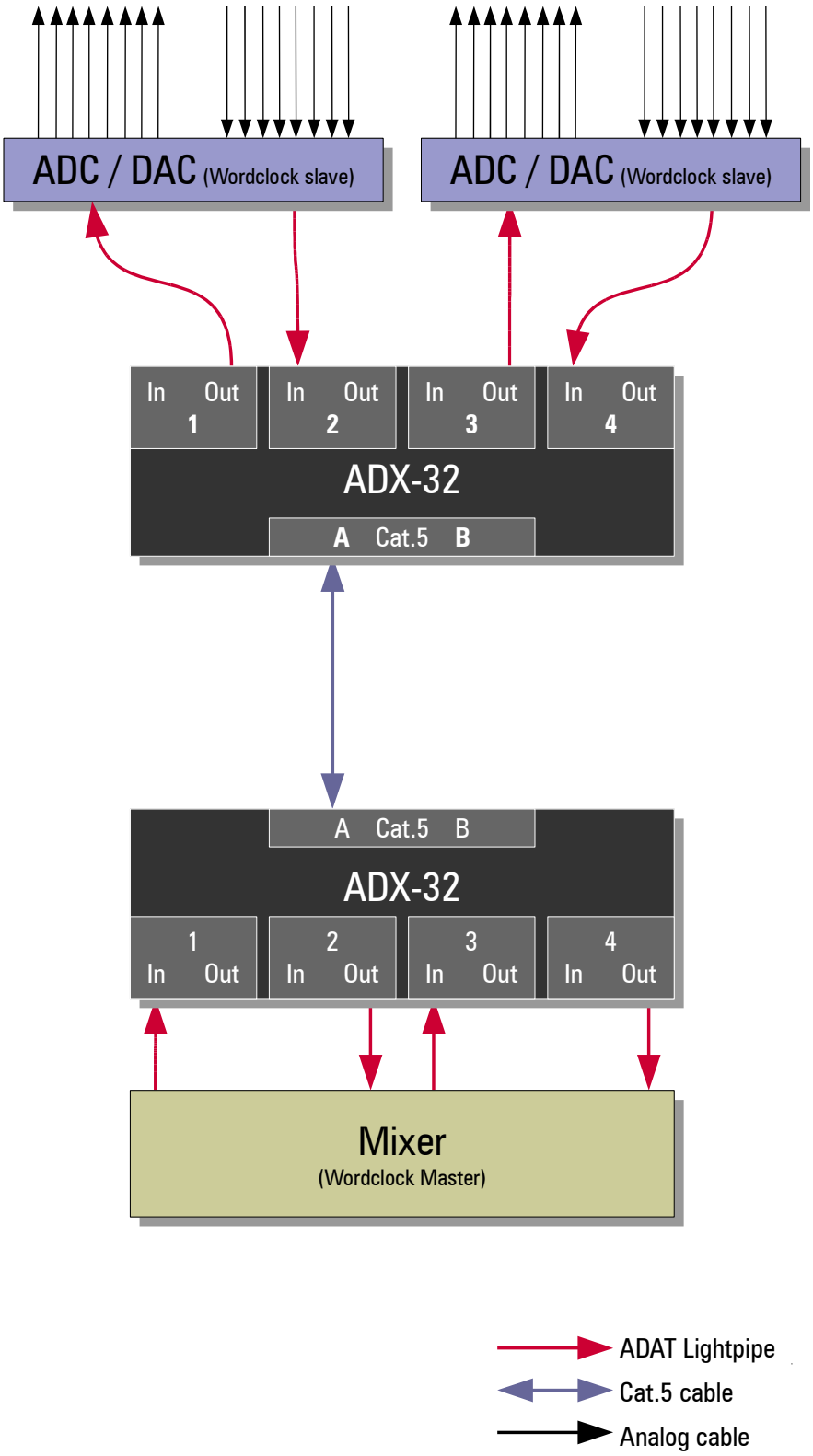
This configuration is often used in larger installations where simple ADAT sync is not sufficient.

The sync signal generated by the master (mostly the mixer) is distributed over a separate cable to all devices involved. Commonly used is 75 ohms coaxial cable with BNC plugs, with 75 ohms termination resistors at each end.

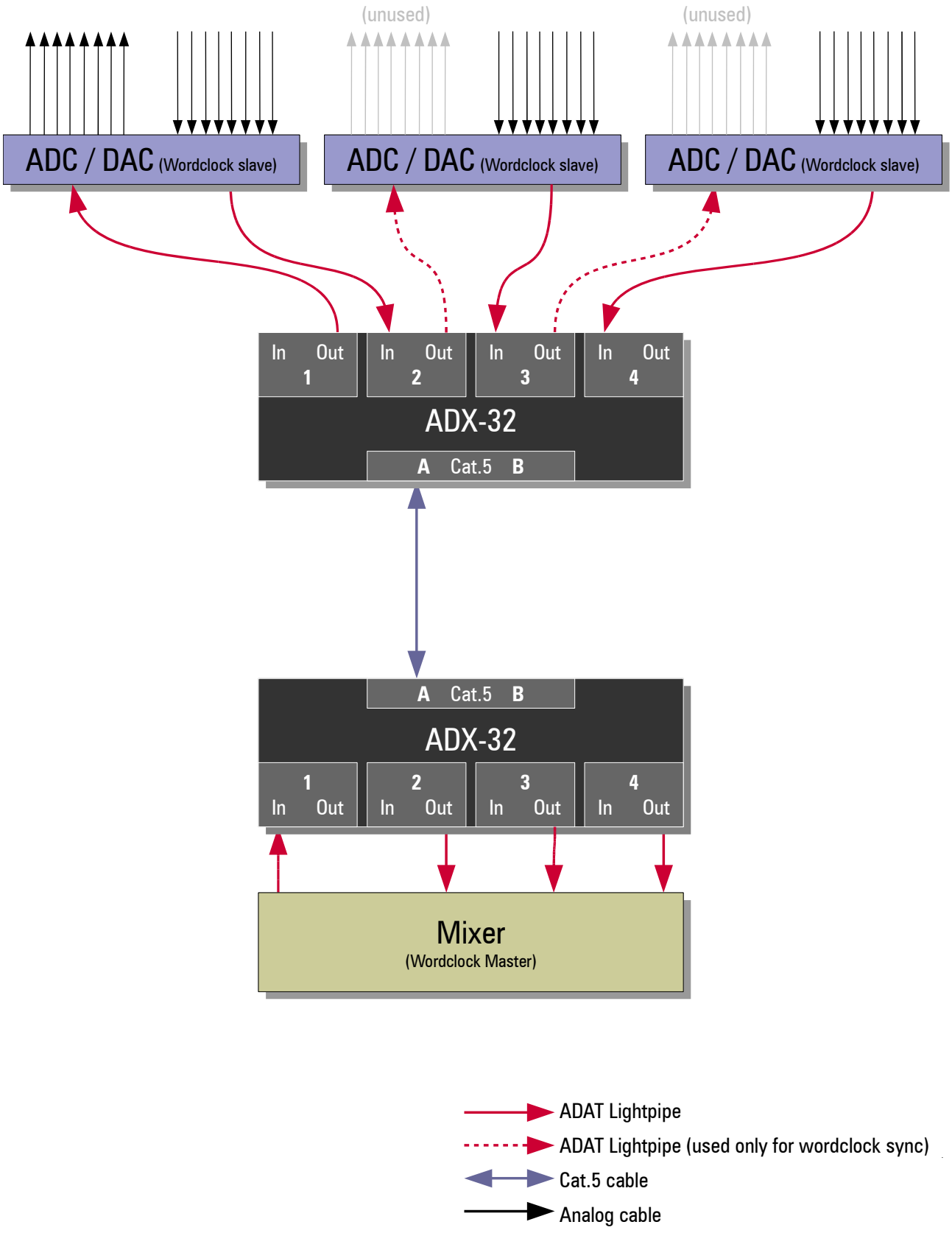
If you want to use this kind of sync distribution, you have to lay an extra coaxial cable beside the Cat5 cables (see 9.3. Digital 48/16 multicore (sync over separate coax cable)).

9. Example configurations

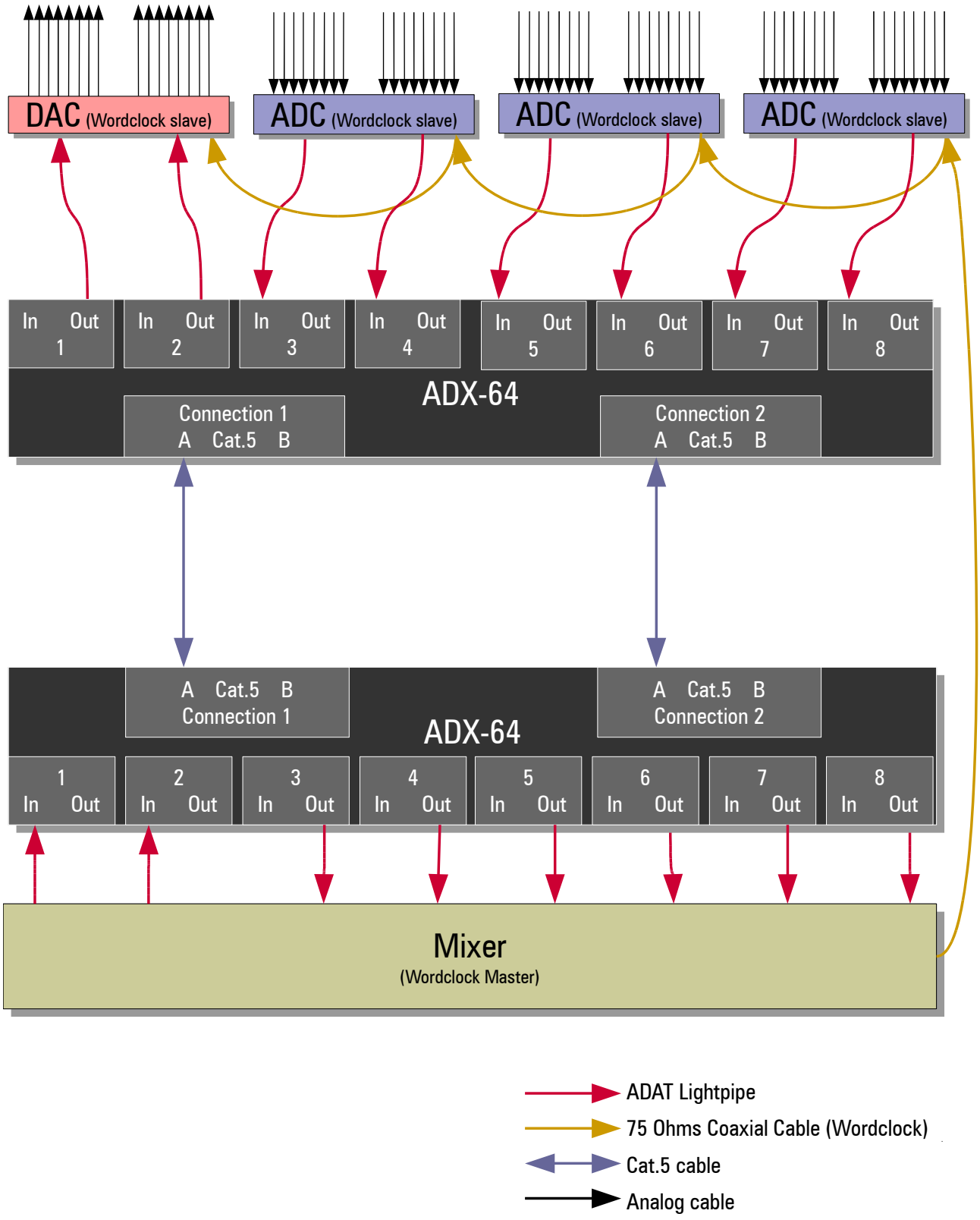
9.1. Digital 16/16 multicore



9.2. Digital 24/8 multicore (sync over ADAT)



9.3. Digital 48/16 multicore (sync over separate coax cable)



10. Specifications

<table>
<tr><td>Device Type</td><td>ADX-32/ADX-64
No. 1003</td></tr>
<tr><td>ADAT Input/Output connector type</td><td>Optical connector type F05 (TOSLINK ®)</td></tr>
<tr><td>Cat5 cable connector type</td><td>Neutrik EtherCon® ruggedized connector,
compatible with standard RJ45 plugs</td></tr>
<tr><td>Transmission media</td><td>Twisted pair network cable.(100 ohms) meeting or exceeding Cat5 specifications.

DMX cabling (110 ohms) may also be used, however, the maximum transmission distance may be reduced. A customer specific version optimized for DMX cabling, providing full transmission distance, is available on request.</td></tr>
<tr><td>Maximum transmission distance (Cat5 bus end-to-end)</td><td>100m</td></tr>
<tr><td>Maximum number of devices on a Cat5 bus</td><td>32</td></tr>
<tr><td>Supported data formats</td><td>ADAT Lightpipe®, S/PDIF®, AC3/Dolby Digital 5.1 ®, DTS® and other data formats using TOSLINK® optical connectors, up to 15.5 Mbit/s signalling rate.

All four connections work completely independent of each other. It is therefore possible to transmit different data formats, sample rates, resolutions at the same time.</td></tr>
<tr><td>Converter latency (ADAT->Cat5, Cat5->ADAT)</td><td>Each <50ns</td></tr>
<tr><td>Pinout Cat5 cable
Jacks A+B are paralleled</td><td>
<table>
<tr><th>Pin</th><th>Signal</th></tr>
<tr><td>1</td><td>ADAT1+ (ADAT 5+*)</td></tr>
<tr><td>2</td><td>ADAT1- (ADAT 5-*)</td></tr>
<tr><td>3</td><td>ADAT2+ (ADAT 6+*)</td></tr>
<tr><td>4</td><td>ADAT2- (ADAT 6-*)</td></tr>
<tr><td>5</td><td>ADAT3+ (ADAT 7+*)</td></tr>
<tr><td>6</td><td>ADAT3- (ADAT 7-*)</td></tr>
<tr><td>7</td><td>ADAT4+ (ADAT 8+*)</td></tr>
<tr><td>8</td><td>ADAT4- (ADAT 8-*)</td></tr>
</table>
* ADX-64: Connections 5-8
</td></tr>
<tr><td>Power supply</td><td>8..24V DC 5W, Polarity: +  –
Plug type: ID 2.5mm, OD 5.5mm</td></tr>
<tr><td>Mechanical dimensions</td><td>19“ rack case 1U
Depth: 60mm</td></tr>
</table>

11. Warranty

We offer a full warranty within two (2) years from the date of purchase. Within the warranty period , we repair or exchange your device free of charge in case of a defect (*)

If you experience any problems, please contact us first. We try hard to solve your problem as soon as possible - even after the warranty period.

(*) Not covered by the warranty are any damages resulting out of improper use, willful damage, normal wearout (especially of the connectors) or connection with incompatible devices like ethernet equipment or third-party power supplies.

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