Alyseum
More than technology

Global MIDI Network - Application Note

1 Goal of this manual

Thank you for using ***Alyseum*** products.

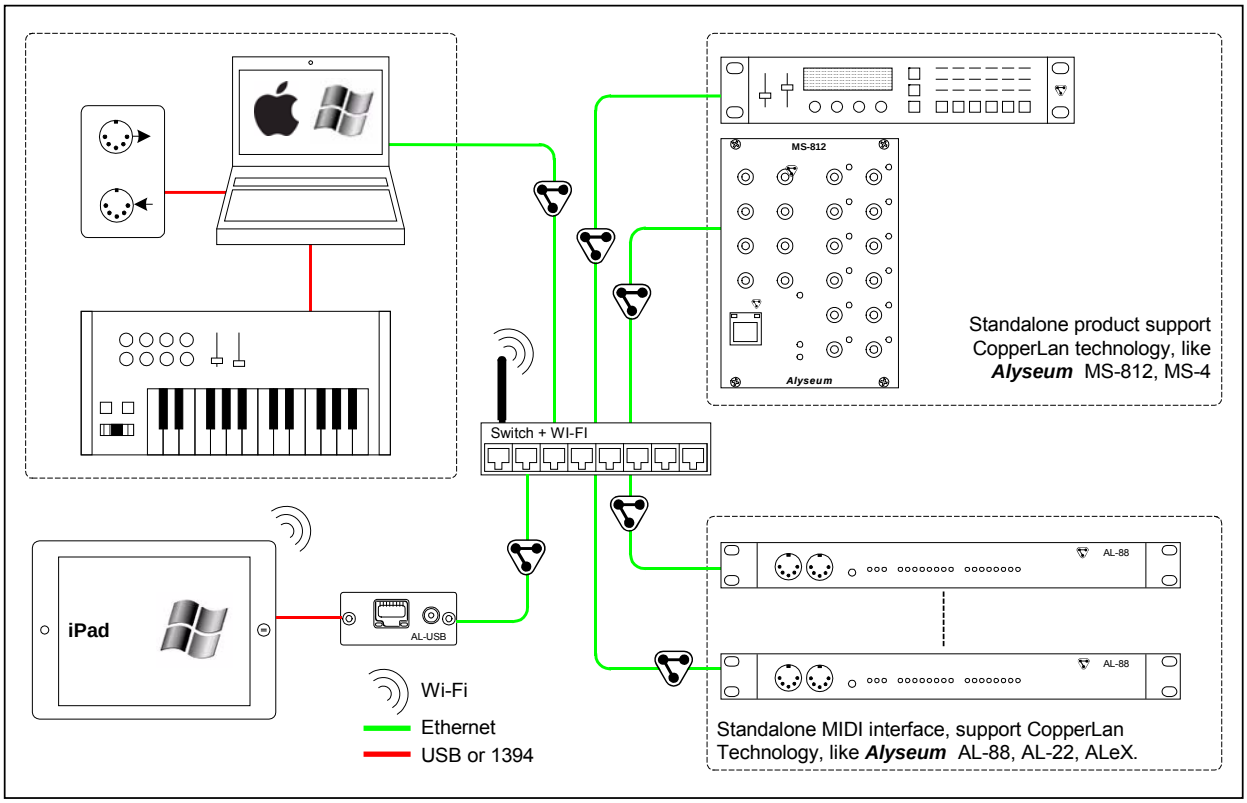
The goal of this Application Note is to demystify the transport of MIDI flows in a Global MIDI Network, which is offering limitless flexibility, performance and user-friendliness.

2 Table of contents

3 Connectivity

3.1 Wired and wireless connections

This drawing depicts the Global connectivity between various MIDI equipment and applications that freely exchange data in the Global MIDI Network environment.

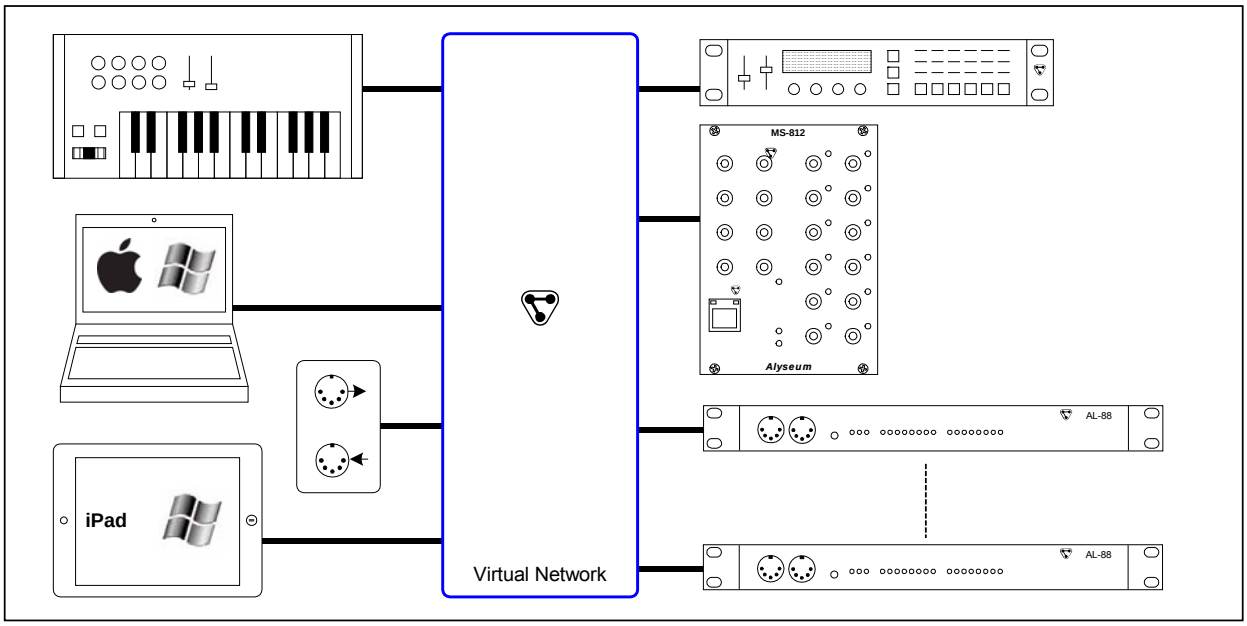


3.2 Virtual connections

The following drawing gives a virtual perception of the connected equipment.

Two key aspects are standing out:

1. Everything can talk to anything
2. The physical connection type is irrelevant and is totally hidden to the user



4 Examples

The following examples do not necessarily represent an existing setup. They are chosen to demonstrate the power and flexibility of the Global MIDI Network .

The CopperLan Manager configuration software

Managing connections for the entirety of a setup is done via the CopperLan Manager software. This software and the explanations for its use are available cost-free on the www.copperlan.org web site.

Within a setup, there is no preferred computer to install the CopperLan Manager. On the other hand, nothing prevents you from installing it on several computers.

This way you could manage your connections from multiple places. Note that all editing sessions will be kept synchronized automatically by the CopperLan system.

To ease the understanding of the drawings, Sources and Destinations are represented by a DIN connector.

This is purely symbolic, actually, Sources and Destinations can be:

- Virtual, 100% compatible with any MIDI software running on MAC OS-X and Windows.
- Hardware, via all equipment that handles usual MIDI DIN, connected to AL-22, AL-22 PoE, AL-88 et AleX from ***Alyseum*** and connected to the Global MIDI Network.
- Hardware, via all equipment that handles usual MIDI, connected to the Global MIDI Network via USB, Firewire, Ethernet, etc.
- Hardware, by all equipment based on CopperLan, which are implicitly MIDI compatible

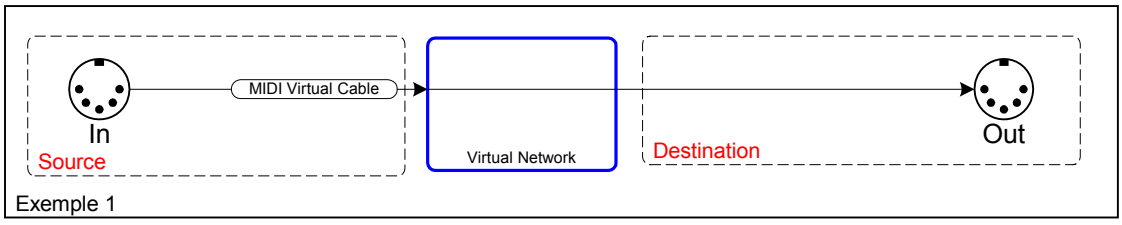
4.1 Examples 1, 2 & 3: Simple use, as with MIDI cables

4.1.1 Example 1: Virtual cable

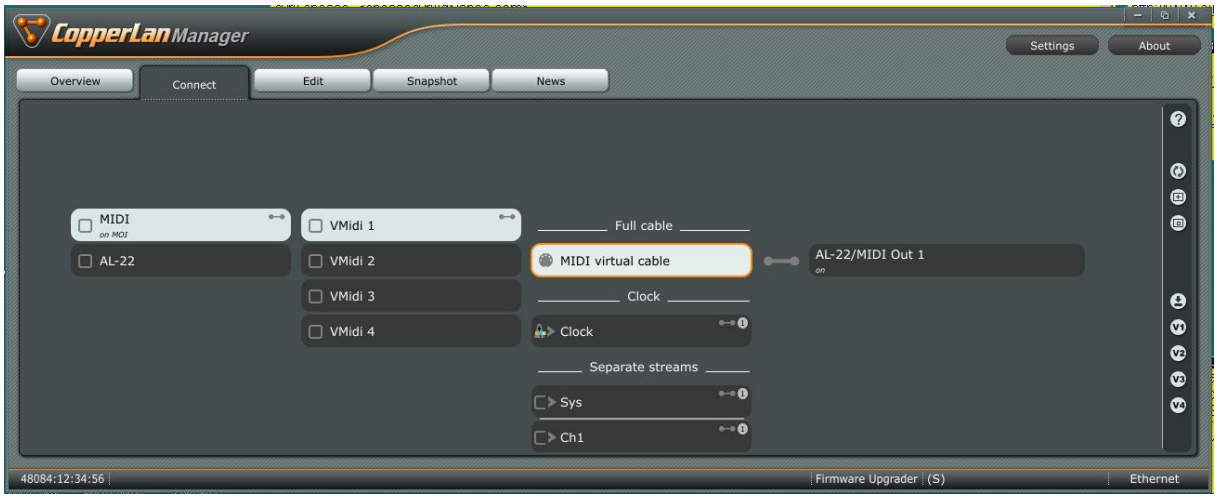
How to bring a MIDI source to a MIDI destination?

If the goal is to realize the equivalent of a MIDI cabling with all the data it carries, the procedure is straightforward: You use the Virtual Cable function to establish a link between any given source and destination.

In the Global MIDI Network, there is no limit to the number of simultaneous connections allowed.



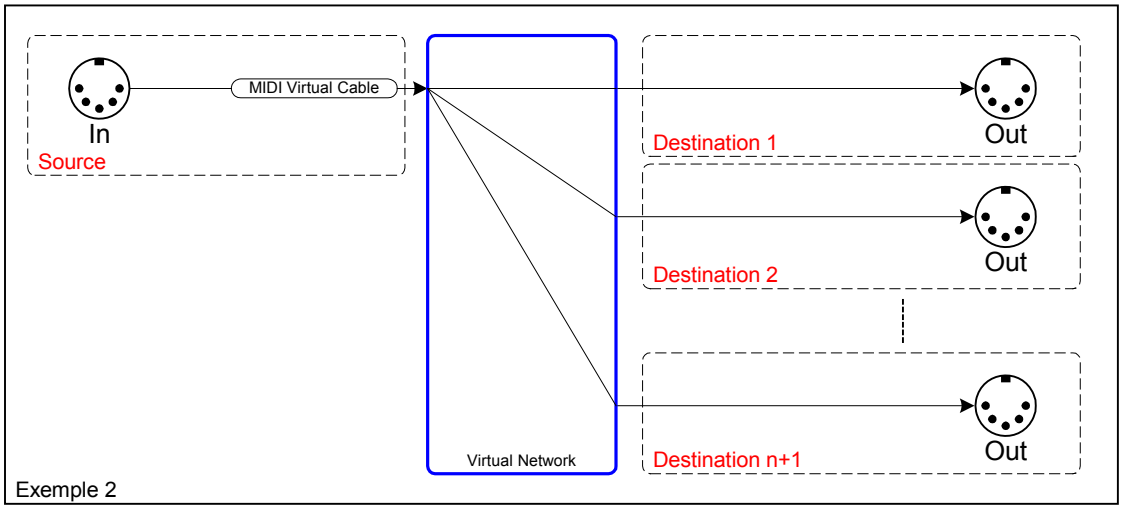
Exemple 1



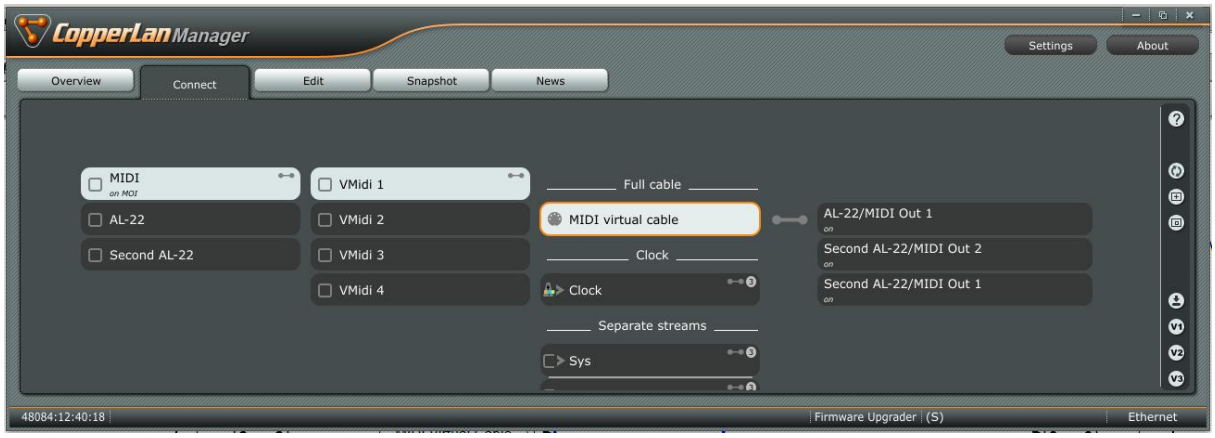
4.1.2 Example 2: Thru-Box

A Thru-Box is a hardware device that allows replicating the electrical MIDI flow from one cable to a set of connectors, from where it will be brought to multiple destinations.

Contrarily to the usual article, with ***Alyseum***, the destinations can be located into various hardware or software applications without limit to their number.



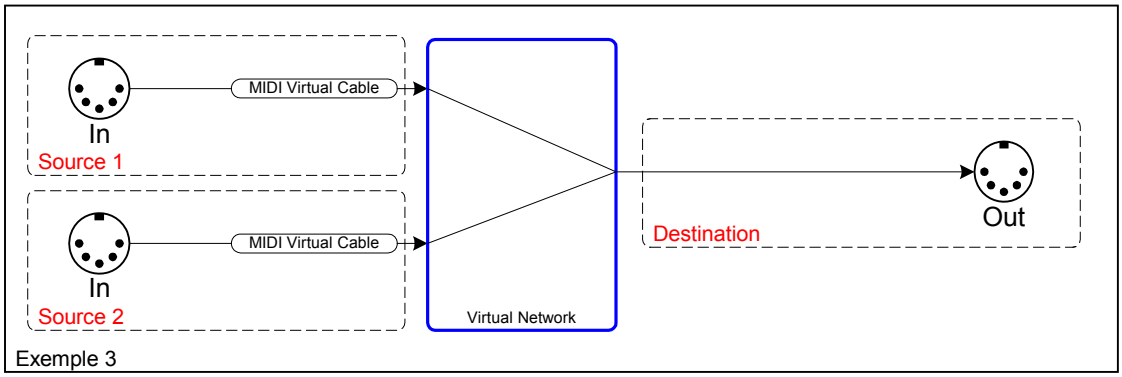
Exemple 2



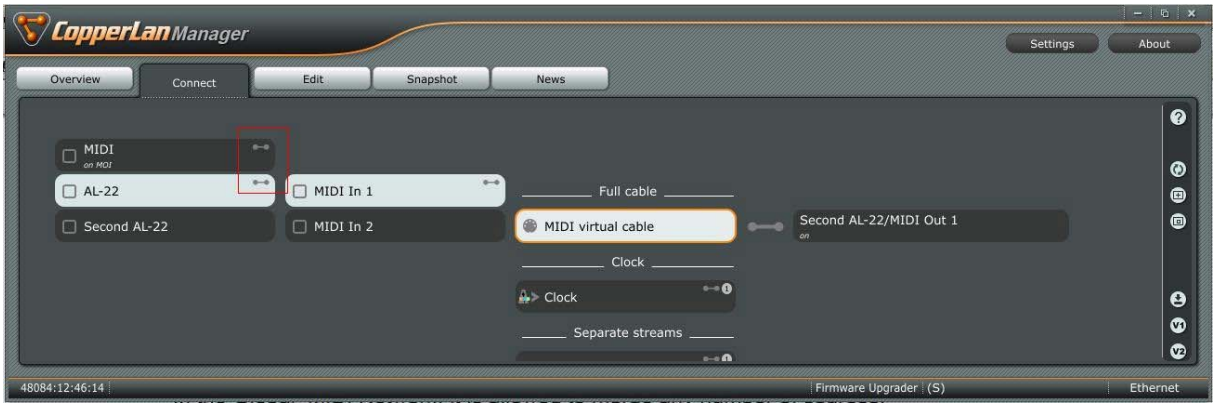
4.1.3 Example 3: Merging of two or more virtual cables

To combine the entirety of messages coming from two sources, it is only needed to direct them to the same destination. The merge function occurs automatically.

In the Global MIDI Network, it is allowed to merge any number of sources.



Exemple 3



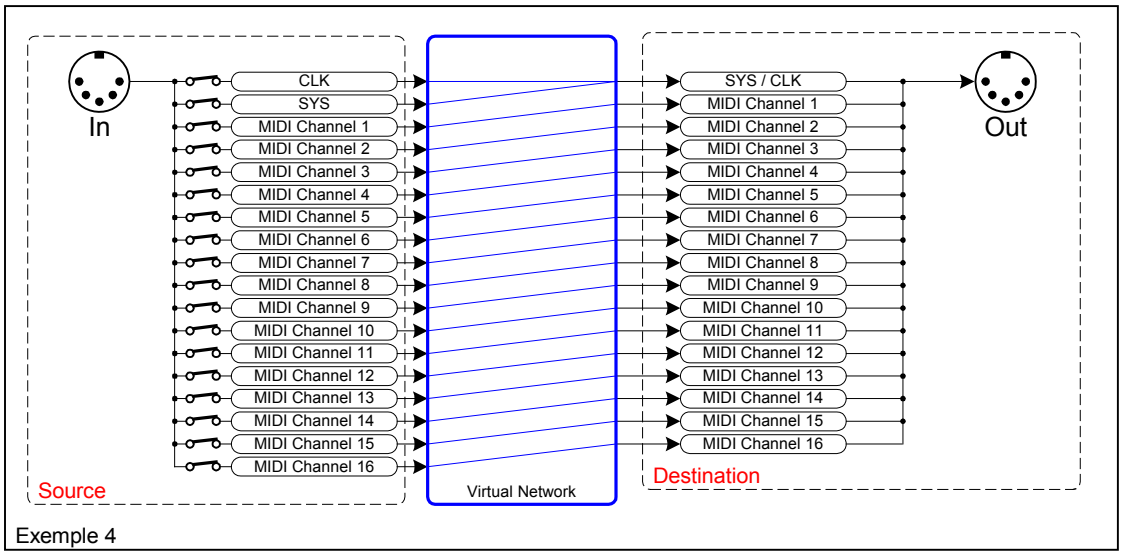
NB: It's possible to see only one connection at a time. in the red frame is indicated the connections established for each source.

4.2 Examples from 4 to 7: Advanced use – Fine control of connections

4.2.1 Example 4: Detail of an actual connection

When a connection is done by a Virtual Cable, actually, the MIDI virtual network establishes 18 separate connections: one for each of the 16 MIDI channels, one for the clock related messages (CLK), and the last for all other system messages (SYS).

This approach allows a finer control than by linking a "full cable".



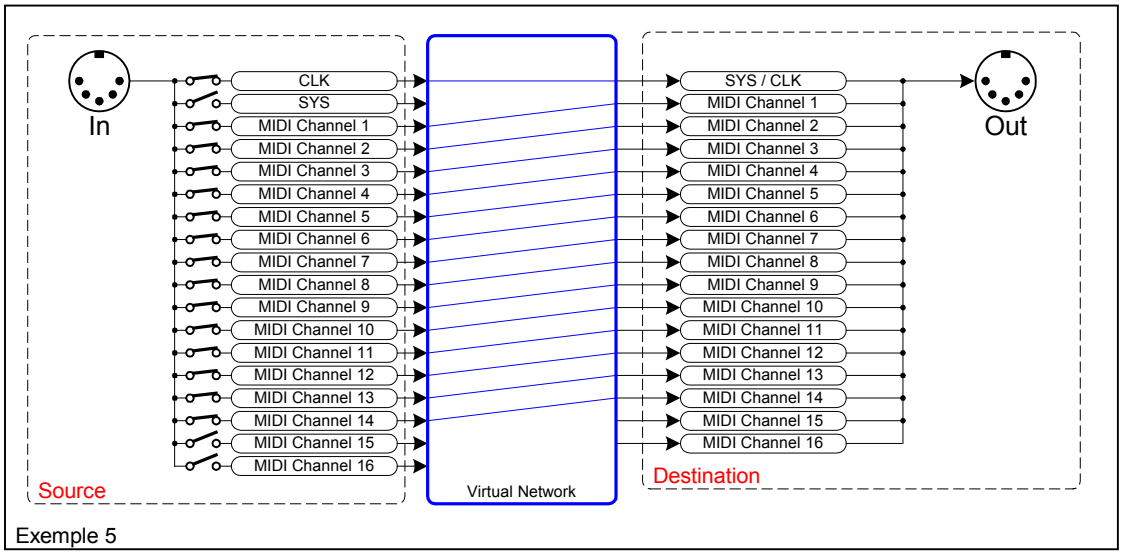
Exemple 4

4.2.2 Example 5: Filtering a part of the content

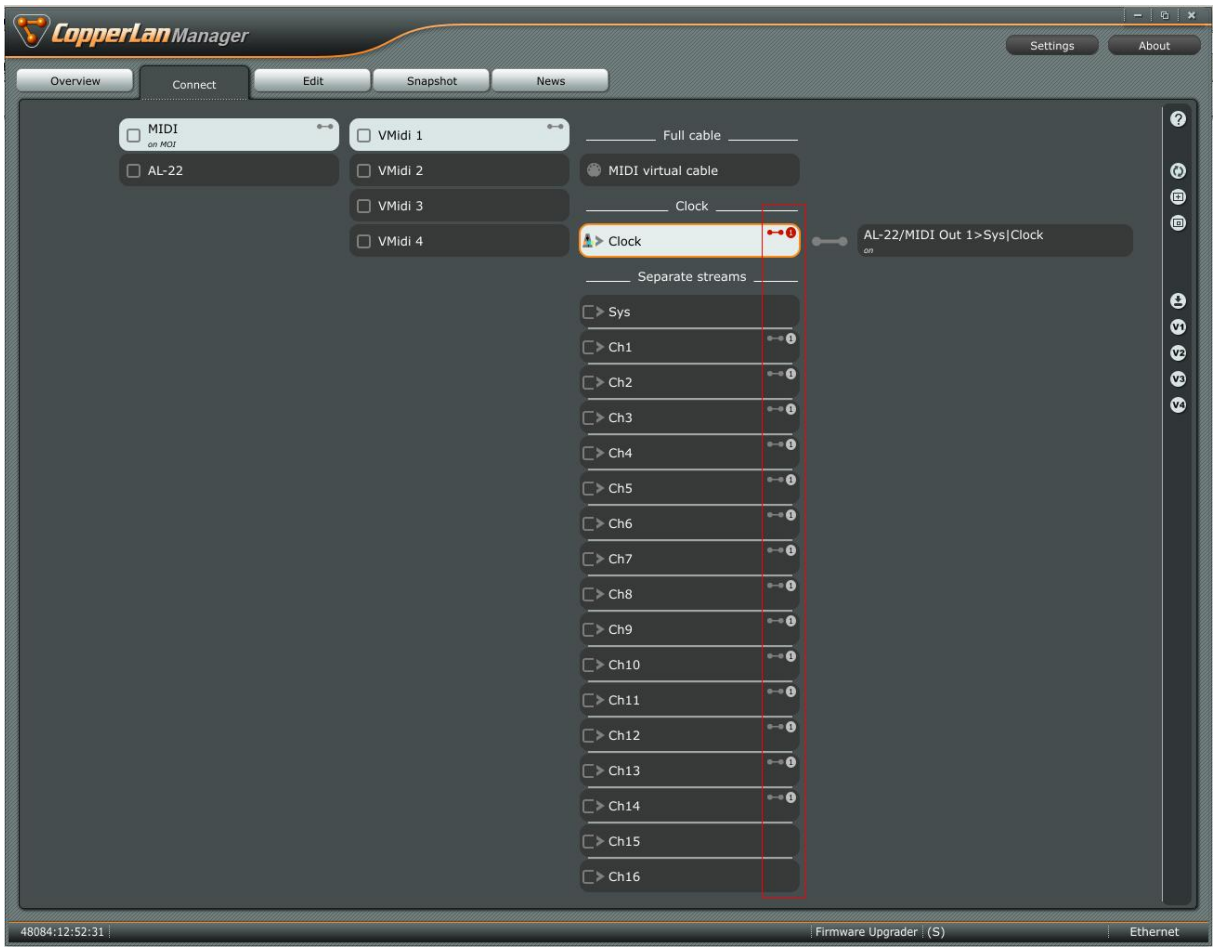
By accessing the connections in a detailed way, it is easy to filter-out what was globally connected in the first place.

In the example, after having established a virtual cable connection, we have removed the links for the SYS messages as well as channels 15 and 16.

This is equivalent to filtering these specific messages out of the global connection.



Exemple 5



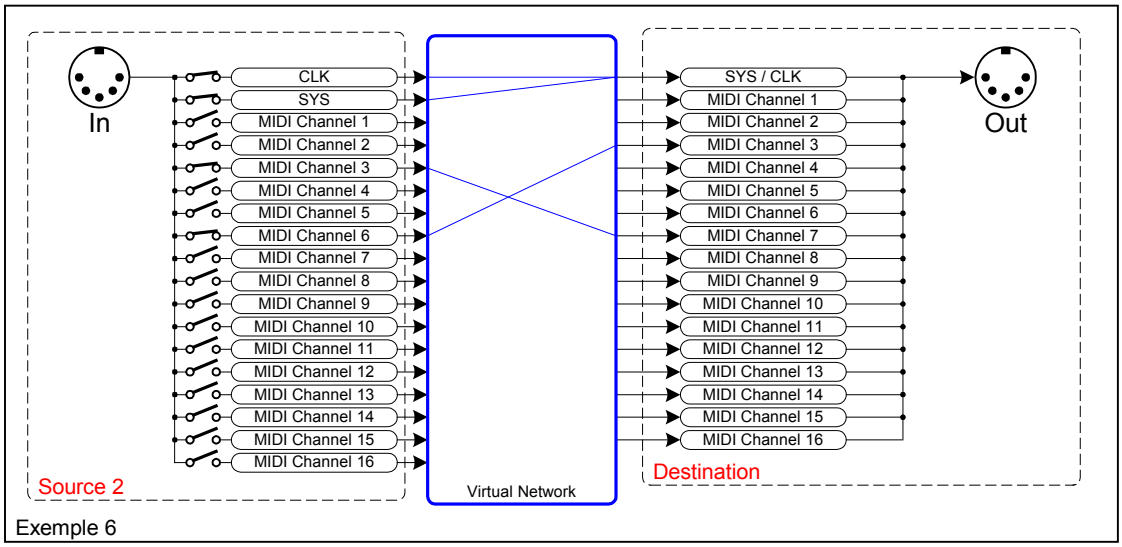
4.2.3 Example 6: MIDI channels reassignment

When connecting channels one by one, it is not mandatory to maintain the channel number relation on each side of the connection.

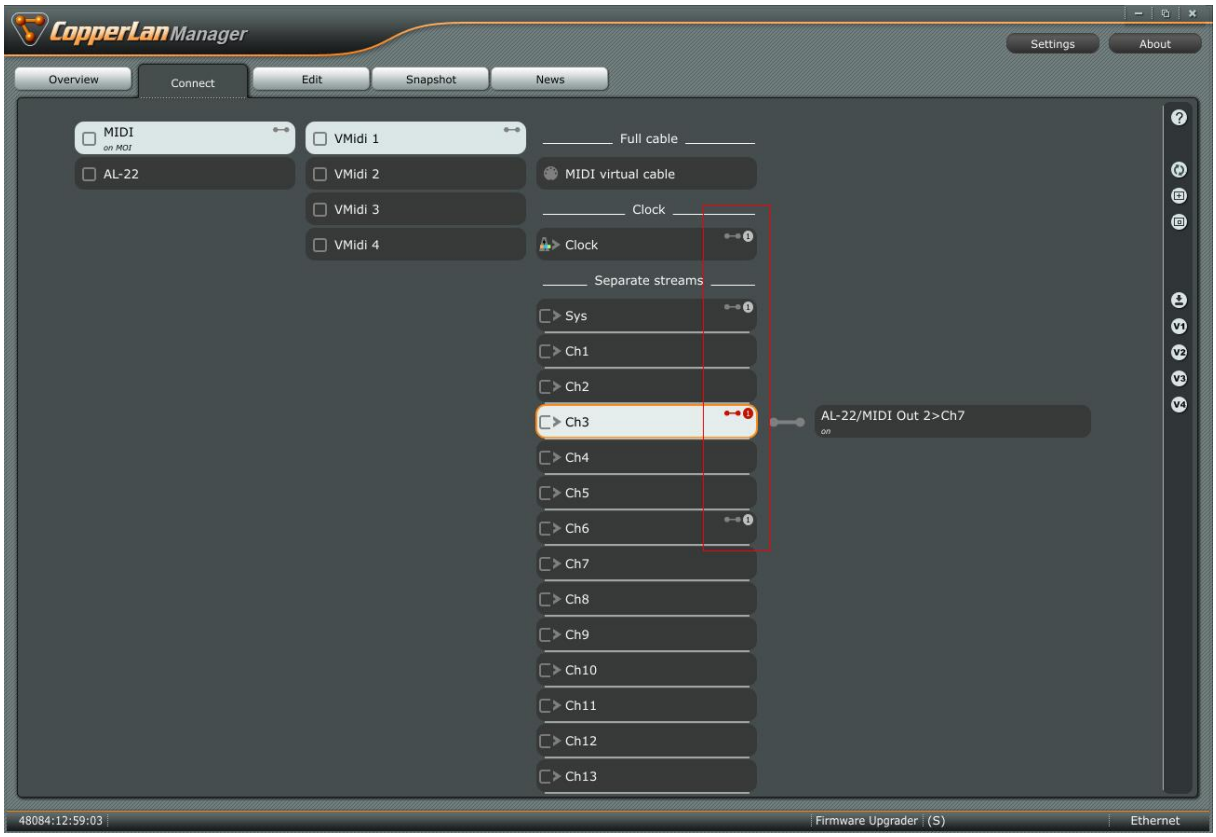
In the example, we have connected the source channel 3 to the destination channel 7. This equates to reassign all messages relating to channel 3 as messages of channel 7 identity.

The channel reassignment is implicit by the connection itself.

(The same goes for channel 6 to 3)



Exemple 6

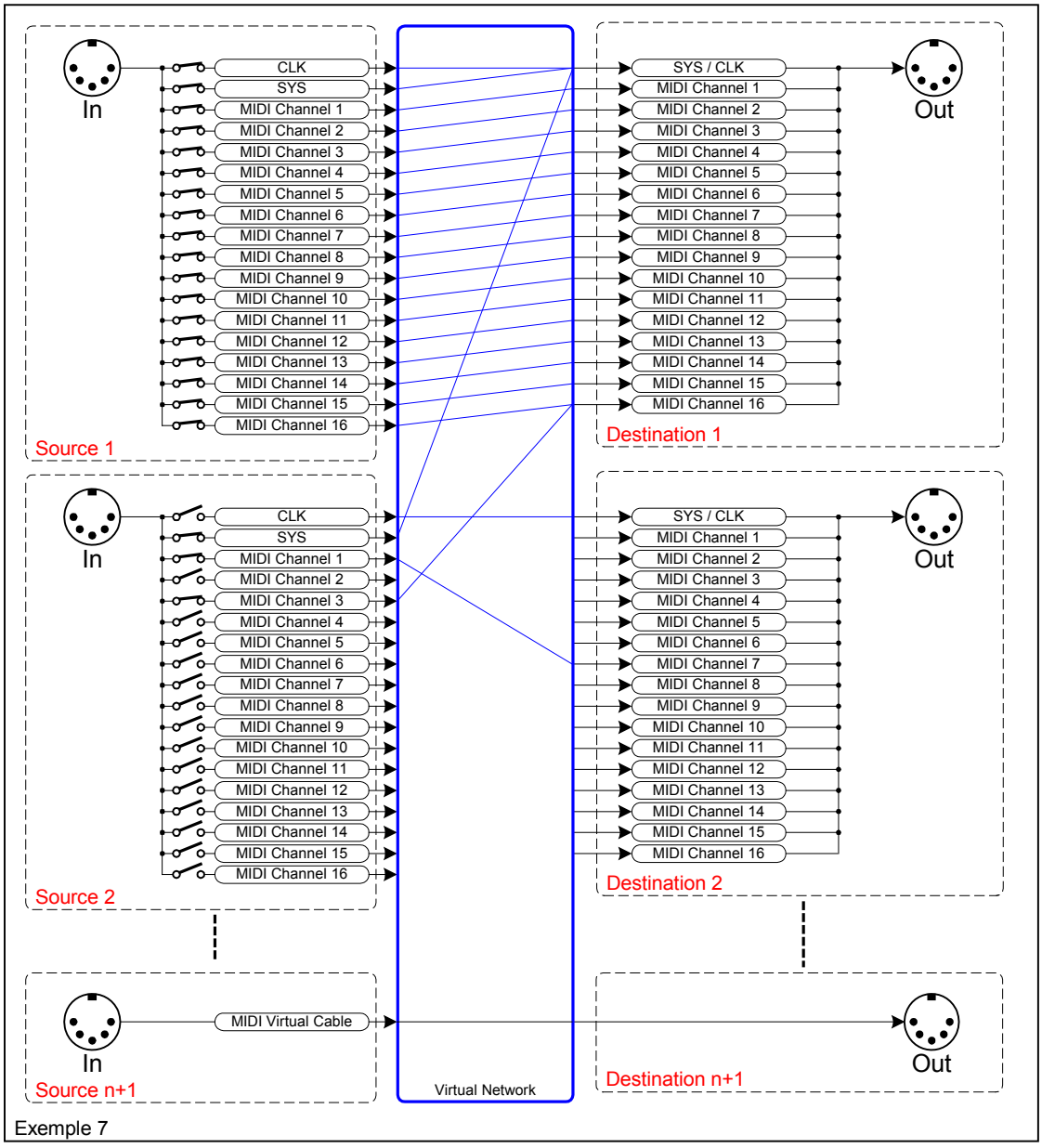


4.2.4 Example 7: Combination of functions

In this last example, we combine the various features previously seen separately:

- Merging of messages from two sources
- Filtering by partial connection (disconnection)
- Channel reassignment by dedicated connection

Unlimited possibilities !



Exemple 7

5 In pratice

Hereafter are shown a few practical examples.
Note that these only deal with the MIDI connections within the Global MIDI Network .

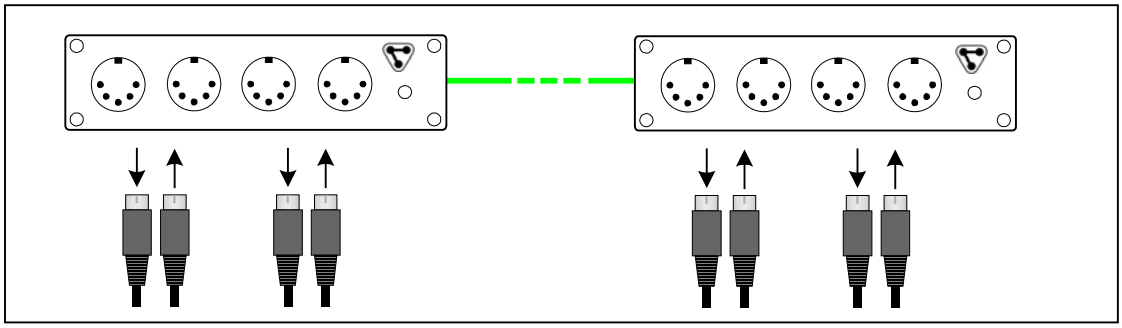
5.1 Pipeline

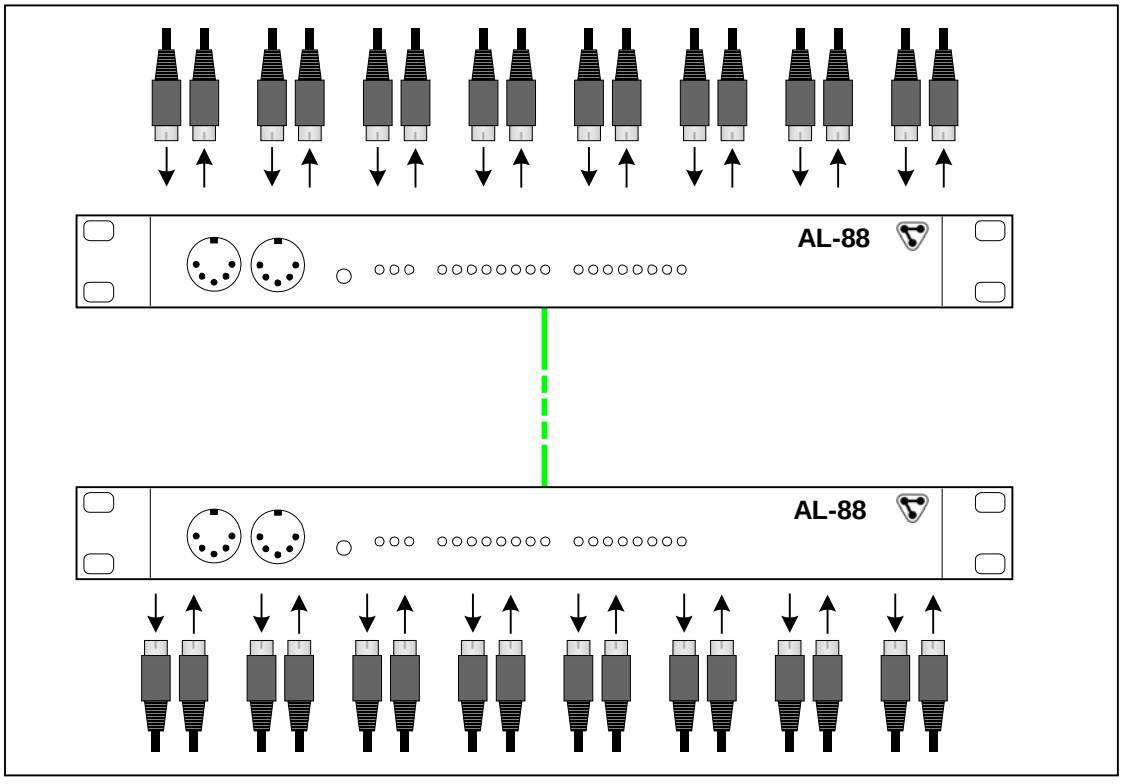
This allows you to carry the equivalent of 2 or 8 pairs of bidirectional MIDI cables over long distance.
The Ethernet cable can be of the normal or crossed type indifferently.
Uses :

- Backstage (live).
- Broadcast.

Benefits :

- Lower cost compared to dedicated MIDI extension boxes.
- Possibility to realize various filtering, merging and remapping on the way.
- Easy installation and maintenance
- Free choice of actual cable length
- Sharing with an existing Ethernet cabling (no interference)
- Save money and time.





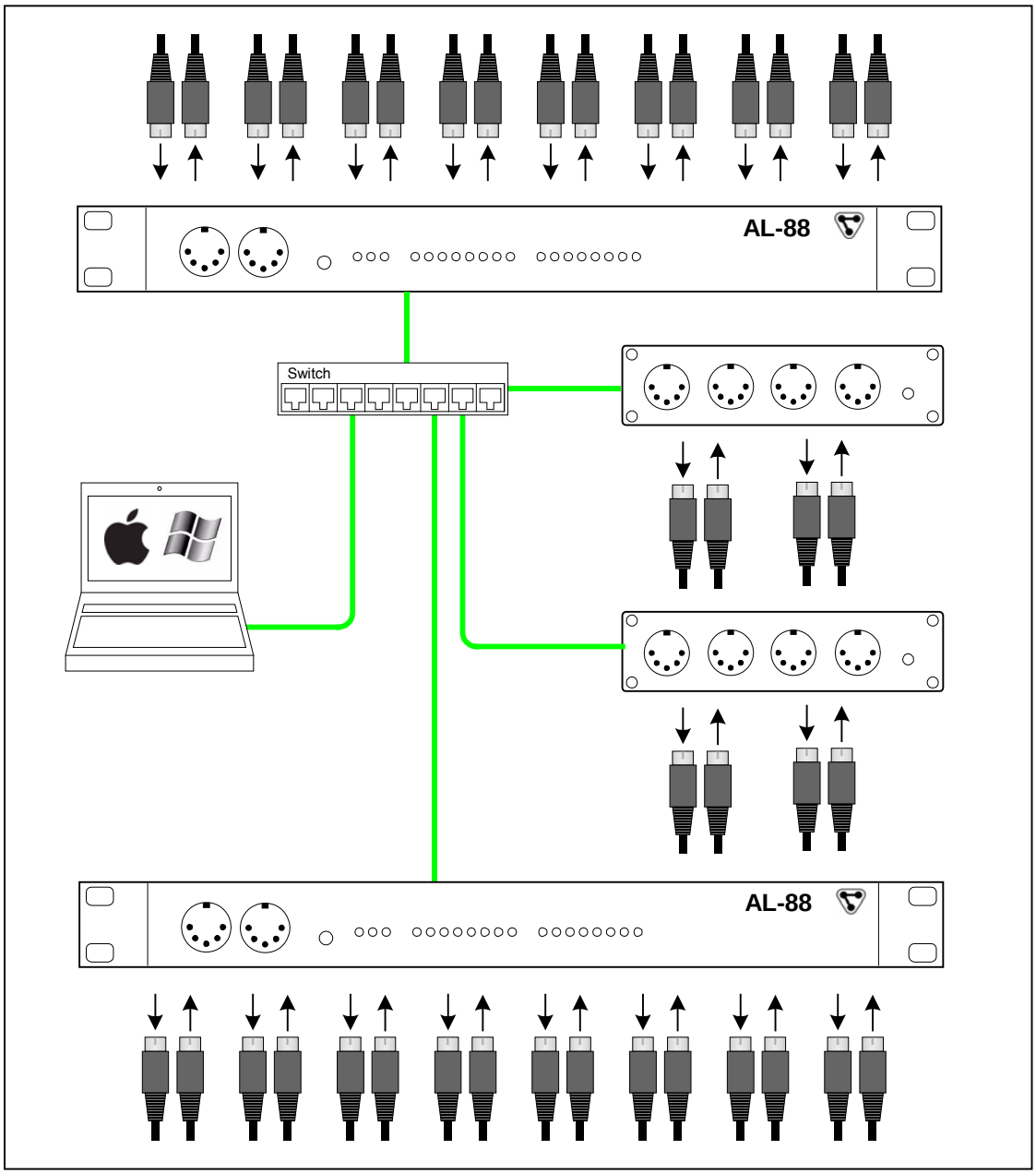
5.2 Replacing a conventional MIDI Patchbay

All the he AL products from ***Alyseum*** can substitute any conventional MIDI patchbay.
Does not require any computer on the network (except during the configuration phase).
advantages:

- Free configuration and a virtually unlimited matrix by couple 2X2 or 8X8.
- Enjoy native functions Merge, remapping and filtering, MIDI channel MIDI channel.
- Share multiple computers on the same virtual patchbay.
- Distance and free distribution among the different devices for MIDI cables to the shortest.
- One mouse click and you change instantly MIDI setup.
- Very high bandwidth, low latency and jitter.

The AL-22 and AL-22PoE are MIDI patchbay 2X2, AL-88 is a MIDI patchbay 8X8.
Simply add the AL-22 or AL-22PoE and / or AL-88 to perform a custom patchbay in multiples of 2 and / or 8.

In the exemple below, we get a patch-bay 20x20



5.3 Standalone

Another example of the versatility of the AL-22, AL-22PoE and AL-88, like a Swiss army knife.

Once set up with your computer, you can disconnect it from the network, so your AL-22, AL-88 or AL-22PoE becomes a fully autonomous device that combines the functions.

- Merge has on several MIDI inputs
- Thru Box to multiple MIDI outputs
- Remapping or filtering MIDI channels
- Filtering messages clocks (Clock)
- Filtering message system (SYS)

NB: All these functions can be combined together

Advantage:

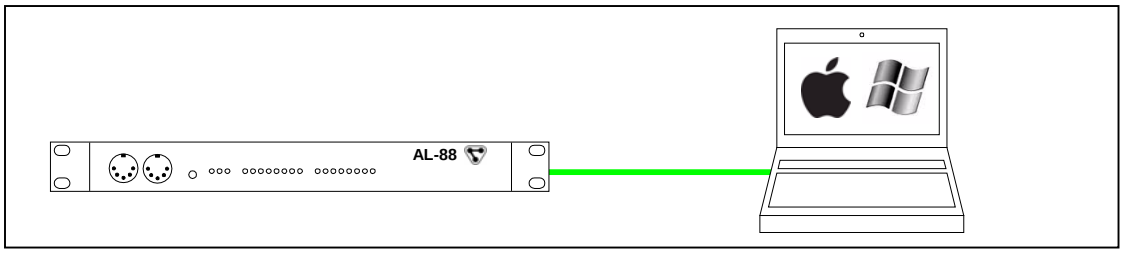
- In a single device, you perform an infinite number of combinations.
- Avoid the use of multiple devices associated with a variety of MIDI cables and power.
- Reconfigure at any time.
- Save time and money.

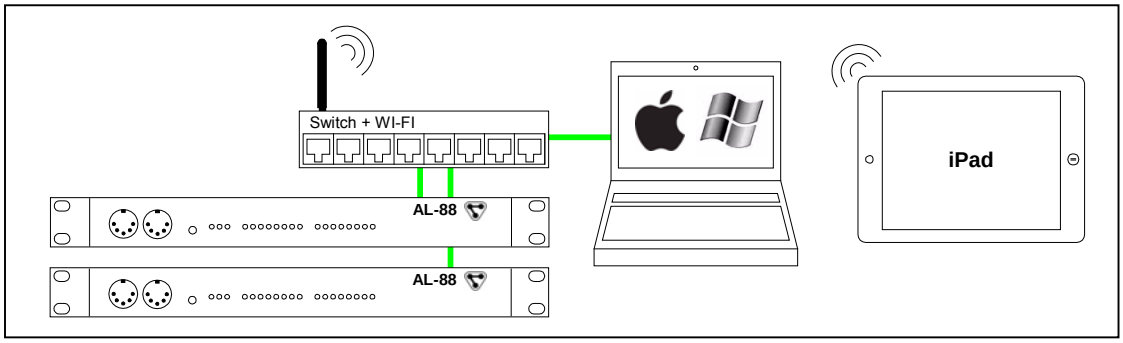
5.4 Home studio

Two examples relating to a simple and a richer home studio setup.

Benefits:

- One mouse click reconfigures the entire MIDI cabling (snapshots)
- Free distance between the equipment and the computer
- Shorter physical MIDI cables
- No more dedicated patch-bays, merge or thru boxes
- Frees the computer of the MIDI flow handling of USB/Firewire interfaces





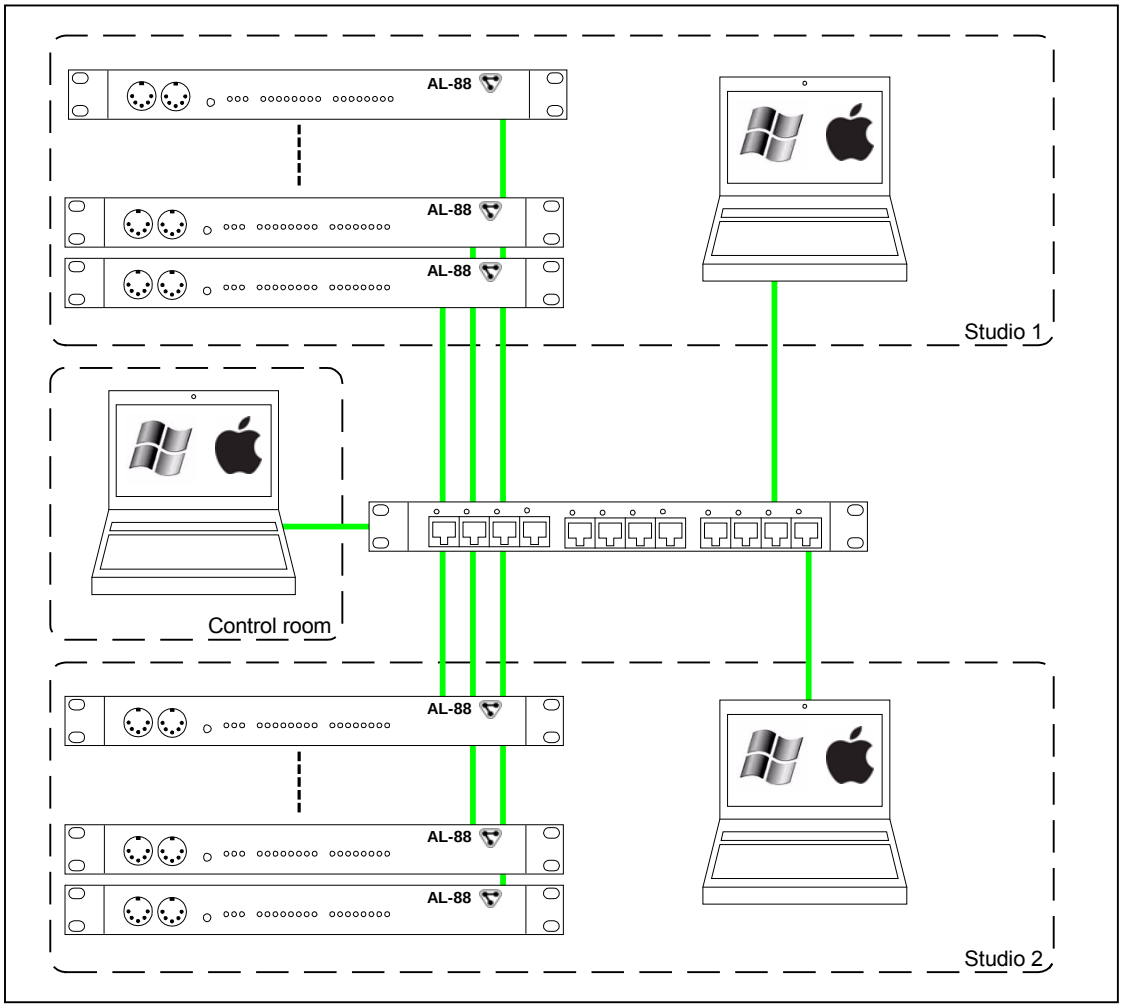
5.5 Professional Recording Studio & Broadcast use

Frequently, recording studios are forced to acquire some MIDI equipment in multiple copies to fit their recording rooms.

Alyseum is offering the very first solution allowing to easily share and dispatch the various MIDI equipment and applications.

Benefits:

- One mouse click reconfigures part or all of the entire MIDI cabling (snapshots)
- Flexible and easy sharing of MIDI resources
- Allocation of the equipment into virtual groups to avoid cluttering.
- Free distance between the equipment and the computer.
- Shorter physical MIDI cables.
- No more dedicated patch-bays, merge or thru boxes
- Synchronized control from multiple computers (MAC or PC)
- Frees the computer of the MIDI flow handling of USB/Firewire interfaces
- Unbeatable cost/performance ratio



6 About

6.1 Ethernet

Alyseum products rely on Ethernet to transport data; compared to other solutions (USB, IEEE1394 ...) Ethernet offers many advantages:

- Available on all computer platforms
- No practical limit in cable length and node connections.
- Full Duplex.
- Very high bandwidth and very low Latency.
- Free topology.
- Frees the computer of the MIDI flow handling of USB/Firewire interfaces.
- Embedded devices can work without any computer in the network
- Peer to peer capability.
- Full electrical isolation between machines, preventing audio hum due to ground loops.
- Low cost, ubiquitous, mature and reliable infrastructure.
- Easy installation/maintenance

6.1.1 Note about Wi-Fi use

Using these products via Wi-Fi is possible but not guaranteed.

Wireless transmissions are subject to perturbations that require data resending which implies unavoidable delays which are inconvenient for real-time musical purposes.

This is why Alyseum only guarantees good performance when using wired network.

6.1.2 Tips for an efficient Ethernet Network

The performance of an Ethernet network is always related to its weakest link.

- Use WI-FI only for web, Email, ... and wired network on your computer for CopperLan and audio streaming
- For large installations, use an additional network card in your computer dedicated to CopperLan and audio streaming
- For large installations, preferably use high-quality Gigabit Ethernet switches to guarantee a better data exchange
- Avoid Ethernet HUBs as these create collisions in messages that will hamper the overall network performance

6.2 CopperLan

CopperLan offers many advantages for the users:

- Connectivity guaranteed with any hardware/Software supporting CopperLan.
- No IP addresses, thanks to an address abstraction layer.
- Zero Knowledge Network
- Self configuring & Plug and Play in less 2 seconds.
- Full compatible with any IEEE protocol
- Full compatible with any Ethernet equipements

CopperLan manages MIDI in a more powerful and flexible than any other technology available.

The benefit of having its own dedicated protocol surpasses the afterthought solutions relying on TCP/UDP-IP in terms of speed and user-friendliness.

7 Miscellaneous

7.1 Glossary

Source	• MIDI flow coming from a physical MIDI port via a USB, Firewire or Ethernet of a computer, and beyond, 100% of MIDI hardware. • Virtual MIDI flow coming from 100% of MIDI software running on MAC OS-X and Windows
Destination	• MIDI flow sent to a physical MIDI port via a USB, Firewire or Ethernet of a computer, and beyond, 100% of MIDI hardware. • Virtual MIDI flow sent to 100% of MIDI software running on MAC OS-X and Windows
Merge/Merging	Fusion/Fusing in a single point of messages sent from multiple sources
Global MIDI Network	Unified matrix of hardware and software MIDI connections

7.2 Disclaimer

7.3 Revision history

Issue	Date	Comments
1.0	24 March 2011	Draft
1.1	5 April 2011	Add Disclaimer
1.2	7 June 2011	Add chapter: In practice, Corrections
1.3	15 Jully 2011	Change name products
1.5	22 May 2012	Add chapter 5.2:
1.6	28 December 2012	Change document name & add AL-22PoE model
1.7	September 2013	Add chapter 5.2 & 5.3
1.8	December 2013	Add AL-USB