Nemesis CNS

Control Network Switcher

USER GUIDE

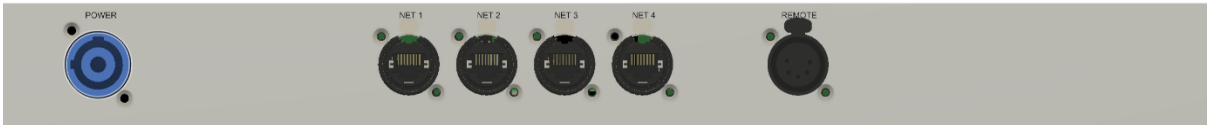
Overview

The CNS is a 4-port managed gigabit network switch, featuring 2 VLAN patches which can be easily recalled by front panel buttons, remote control or OSC commands.

Front Panel

NET 1 - 4 – Indicate network activity on each network port
PSU 1-2 – Indicate the current status of each dual redundant PSU.
NET – Indicate the current status of the network connection.
ERR – Indicate an error status due to PSU failure or network not connected.

Rear Panel Connections



NET 1 - 4 – etherCON RJ45 for network connection
REMOTE – 5 Pin Female XLR for remote control. See Pin Outs section for details.
PSU – 110-230V AC powerCON input

Network Settings

Default IP settings

IP Address	192.168.1.253
Subnet Mask	255.255.255.0
Gateway	192.168.1.1
DNS Main	192.168.1.1
DNS Backup	192.168.1.1
Network Device Name	NEMESIS-CNS
OSC Listen Port	53500

In order to change settings navigate to the device's IP address (default: 192.168.1.253) on the network using a web browser or use its network name (default: NEMESIS-CNS) and navigate to the "Network page"

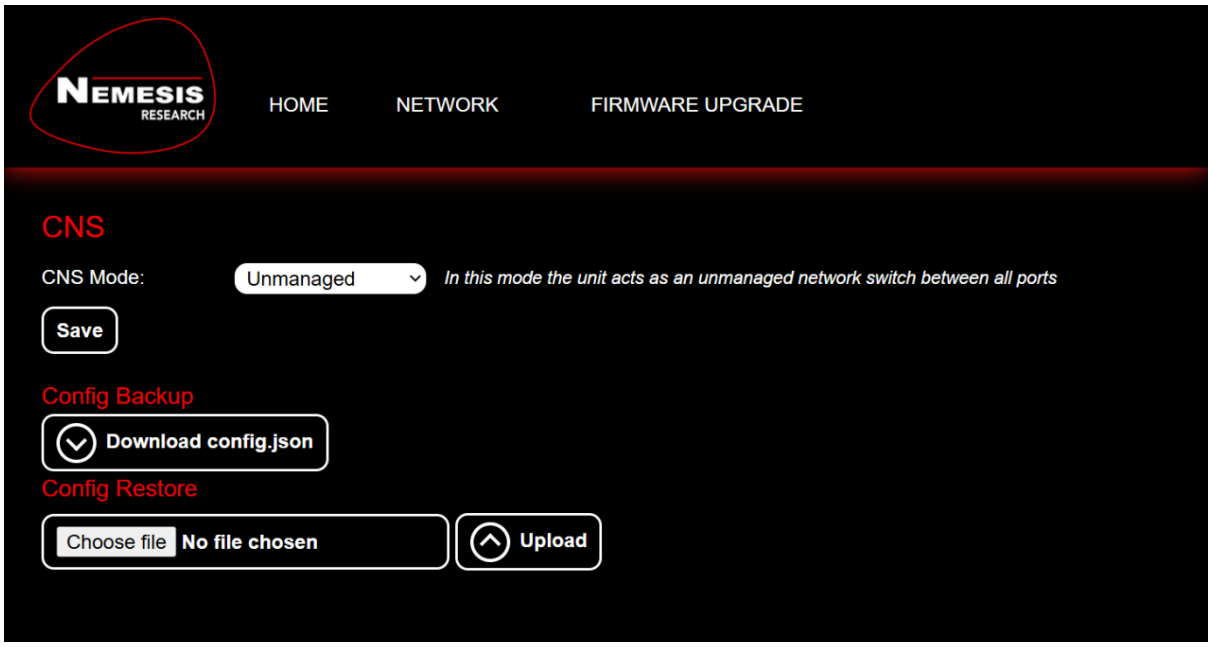
In order for changes to take effect press save and then restart (Please note if you have changed IP address or device name the page may not refresh, and you will need to open a new tab in your browser with the new user settings).

Home

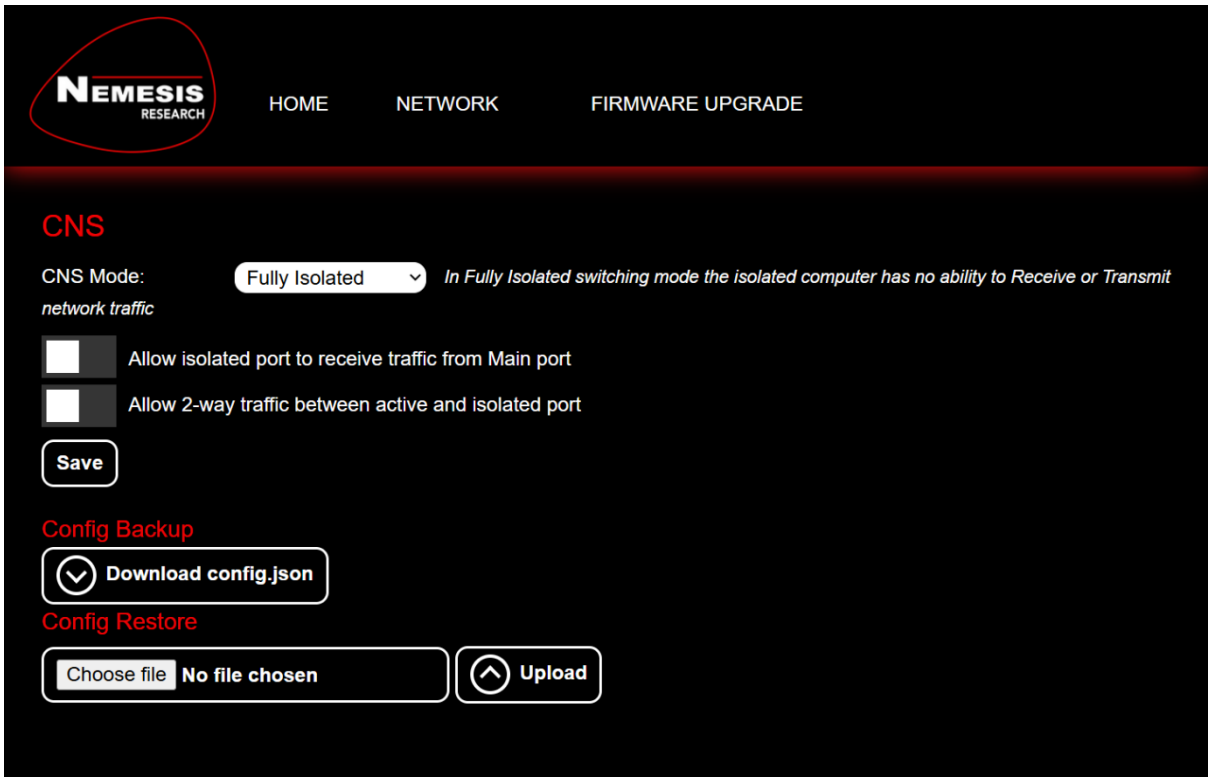
The CNS can be operated in one of 4 modes. These have been designed around running dual redundant show-controlled computers connected to NET-1 and NET-2 and the rest of the show network connected to NET-3 and NET-4.

Mode	Patch A (Green)	Patch B (Yellow)
Unmanaged	NET 1-4 are all connected	NET 1-4 are all connected
Fully Isolated	NET 1, 3,4 connected, NET 2 isolated	NET 2, 3,4 connected, NET 1 isolated
Semi Isolated	Data into NET 1 sent to NET 3,4 Data into NET 3,4 sent to NET 1,2 NET 2 semi-isolated	Data into NET 2 sent to NET 3,4 Data into NET 3,4 sent to NET 1,2 NET 1 semi-isolated
Vlan Patch Mode	Port connectivity control via VLAN routing table	Port connectivity control via VLAN routing table

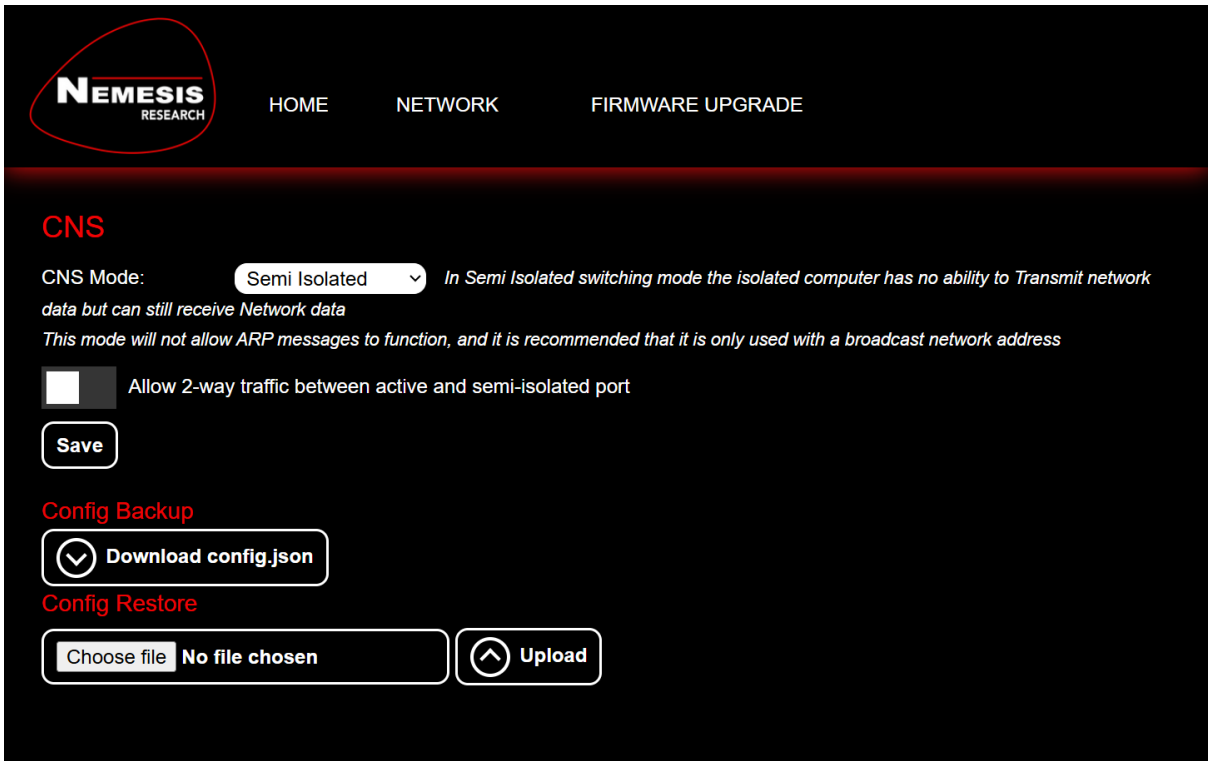
Unmanaged



Fully Isolated

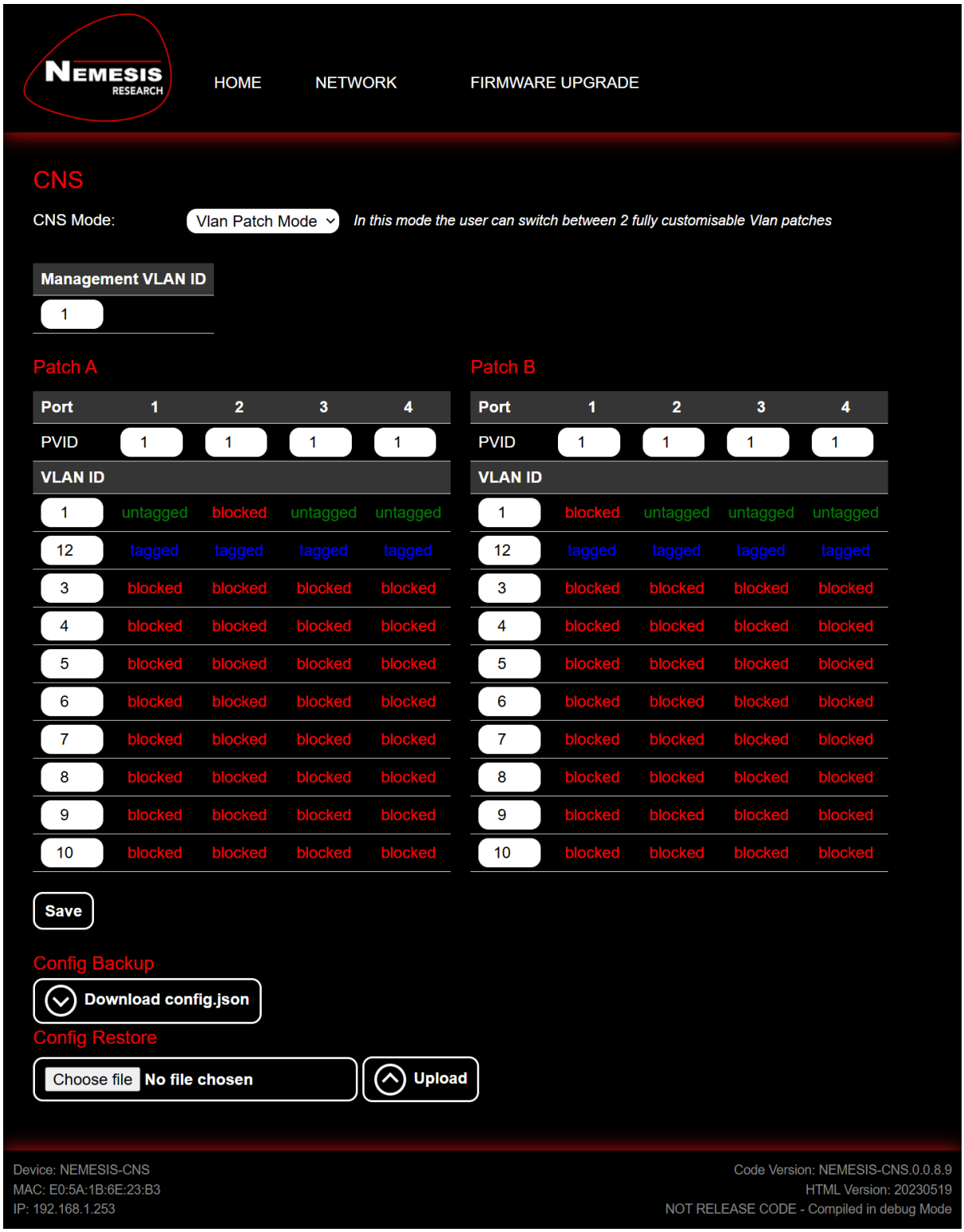


Semi Isolated



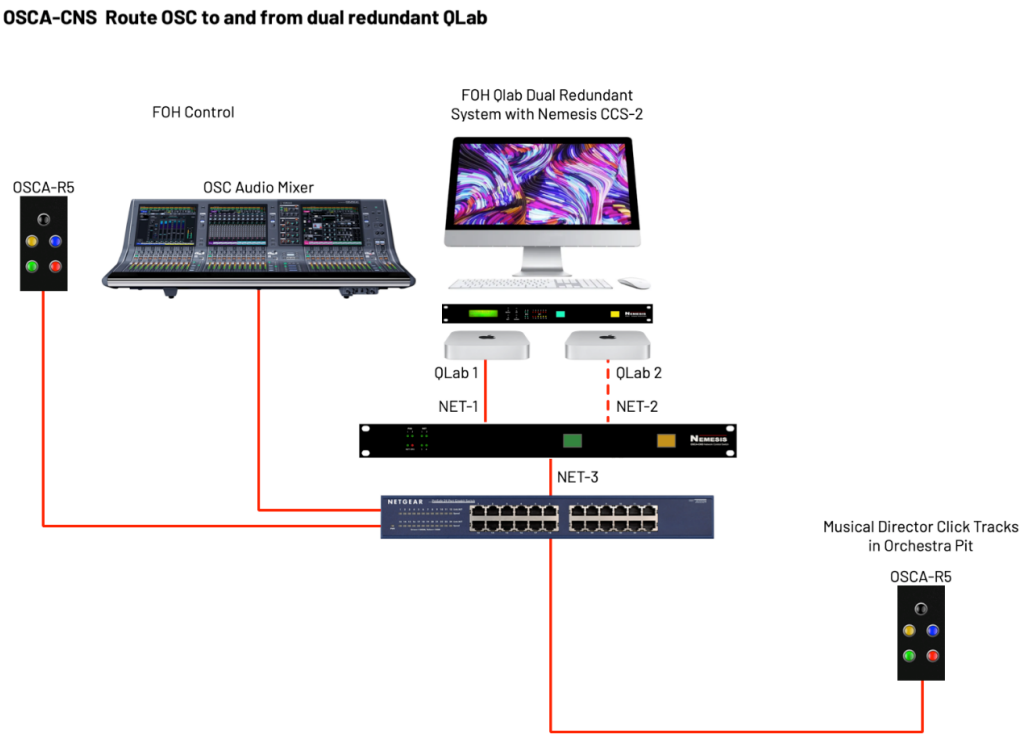
See glossary for further information on ARP

Vlan Patch Mode

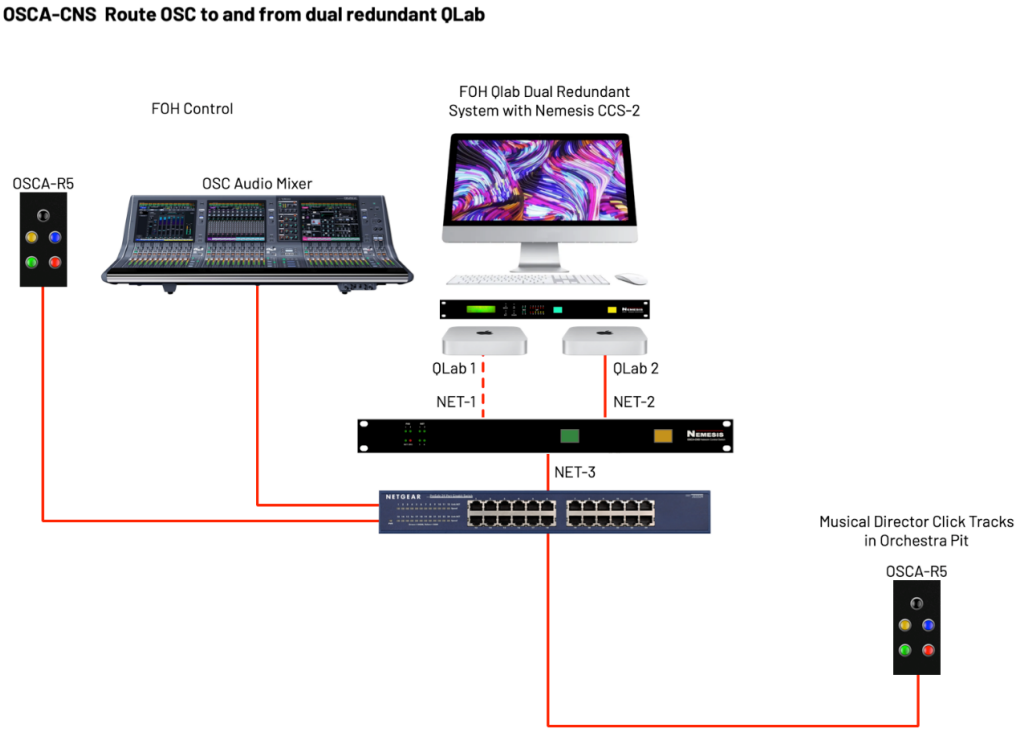


Example

In Patch A OSC devices communicate with QLab 1



In Patch B, OSC devices communicate with QLab 2.



Firmware Update

If connected to the internet you can use the Firmware update page to install the latest firmware from the Nemesis server.

OSC methods (incoming OSC)

CNS will react to incoming OSC messages on the port specified.

/patch/[A,B]
e.g. /patch/A
Recall patch A

/saveconfig
e.g. /saveconfig
This will save the current config to the internal config file.
Please note saves can take a second or two and Nemesis-CNS will not respond to patch changes made during a save or load operation.

/loadconfig
e.g. /loadconfig
This will load the internal config file, and can be used to revert temporary changes made by sending in /redirect messages
Please note saves can take a second or two and Nemesis-CNS will not respond to patch changes made during a save or load operation.

Additional Information

Power
Nemesis CNS can be powered by 90 – 260 VAC 50 – 60 Hz 12W.

Factory Reset
Press and hold for 3s the yellow button at power on to reset the network settings to default.
Please then power cycle the unit for the changes to take effect.

Glossary

Network messages are typically sent to an IP address, which identifies a device on a network. However, to deliver the message over a local network, the message is ultimately addressed to a MAC (Media Access Control) address, which uniquely identifies a network interface card (NIC) on that local network.

ARP (Address Resolution Protocol) is used to find out the MAC address of a device when you know its IP address. Normally, if you want to send a message to a specific IP on your local network, your computer uses ARP to ask, "Who has this IP?" and gets back the MAC address so it can send the message.

But when you're sending a message to a **broadcast IP address** like 255.255.255.255 or something like 192.168.1.255, you don't need ARP. That's because the MAC address for broadcast is already known—it's always FF:FF:FF:FF:FF:FF. This MAC address means "send to everyone."

So instead of asking who owns the IP, your computer just sends the message to that broadcast MAC address, and every device on the local network receives it. No need to look up anything with ARP. However, if a device replies to your broadcast and you want to send a message back to that specific device, then your computer might use ARP to find its MAC address.

As OSC messages are sent to a specific port, even when you send to the network broadcast address, only devices listening for OSC messages on the same port as your message was sent to will receive and process that OSC message.

ARP (Address Resolution Protocol)

Definition:

ARP is a network protocol used to map an IP address to a physical MAC (Media Access Control) address on a local area network (LAN). It enables devices to locate each other on the same subnet by resolving IP addresses into hardware addresses required for data transmission.

How It Works:

When a device wants to send data to another device on the same network, it checks its ARP cache to see if it already knows the MAC address for the destination IP. If not, it broadcasts an ARP request asking, "Who has this IP?" The device with that IP replies with its MAC address, allowing the sender to complete the transmission.

Broadcast Network Address

Definition:

A broadcast network address is a special IP address used to send messages to **all devices** on a specific subnet. It allows one device to communicate with every other device on the local network simultaneously, without knowing their individual IP addresses.

How It Works:

When a device sends a packet to the broadcast address of its subnet (e.g., 192.168.1.255 for a 192.168.1.0/24 network), the packet is delivered to all hosts within that subnet. The underlying Ethernet frame uses the broadcast MAC address FF:FF:FF:FF:FF:FF, ensuring every device receives the message.

Types:

- **Limited Broadcast**: 255.255.255.255 — reaches all devices on the local network, regardless of subnet.
- **Directed Broadcast**: Subnet-specific, like 192.168.1.255 — targets all devices within a defined subnet

IP Address

Definition

An IP (Internet Protocol) address is a unique numerical identifier assigned to a device on a network. It facilitates routing and communication between devices across local networks and the internet.

Types

- **IPv4**: 32-bit format (e.g., 192.168.1.10)
- **IPv6**: 128-bit format (e.g., 2001:0db8:85a3::8a2e:0370:7334)

Characteristics

- Operates at **Layer 3 (Network Layer)** of the OSI model
- Can be **static** (manually assigned) or **dynamic** (via DHCP)
- Composed of **network** and **host** portions, defined by a subnet mask

Example

A device with IP 192.168.0.5 can communicate with another device on the same subnet, such as 192.168.0.10.

MAC Address

Definition

A MAC (Media Access Control) address is a hardware-based identifier assigned to a network interface card (NIC). It is used for communication within a local area network (LAN).

Format

- 48-bit hexadecimal address (e.g., 00:1A:2B:3C:4D:5E)

Characteristics

- Operates at **Layer 2 (Data Link Layer)** of the OSI model
- Unique to each network interface
- Required for Ethernet communication and ARP resolution

Example

When sending data to another device on the same LAN, the sender uses the recipient's MAC address to construct the Ethernet frame.

Port

Definition

A port is a logical endpoint used to identify specific processes or services on a device. It works alongside IP addresses to route data to the correct application.

Port Ranges

- **0–1023**: Well-known ports (e.g., HTTP = 80, HTTPS = 443)
- **1024–49151**: Registered ports
- **49152–65535**: Dynamic/private ports

Characteristics

- Operates at **Layer 4 (Transport Layer)** of the OSI model
- Used by protocols such as **TCP** and **UDP**
- Enables multiple services to run on the same IP address

Example

A computer may use IP 192.168.1.100 and listen on port 53000 to handle OSC messages, sending replies to port 53001.

Pin Outs

Remote:

Pin	Function
1	12V Common (500mA)
2	Switch B
3	Switch A
4	Lamp B (Relay contact to GND)
5	Lamp A (Relay contact to GND)

EU declaration of conformity (CE symbol)

This declaration applies to
Nemesis CNS XX:XX:XX:XX:XX:XX
manufactured by Nemesis Research

All products of type -10-16 are included, provided they correspond to the original technical version and have not been subject to any later design or electromechanical modifications.

We herewith declare that said products are in conformity with the provisions of the respective EC directives including all applicable amendments.

A detailed declaration is available on request and can be ordered from Nemesis Audio.

WEEE Declaration (Disposal)

Electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime.

Please dispose of this product according to the respective national regulations or contractual agreements. If there are any further questions concerning the disposal of this product please contact Nemesis Audio.

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