# NetVu N2SE/16/0T/P
# Network System Extender

# Installation Manual

## Version History

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# Important Safeguards

## Read Instructions

All the safety and operating instructions should be read before the unit is operated.

## Quality

NetVu Limited's manufacturing arm has ISO 9001 certification and all products are manufactured and tested in accordance with a comprehensive quality system.

## Warranty

NetVu product comes with a one-year warranty. NetVu is sold under a return-to-base upon any failure agreement. Any returned product must be returned in the original packaging in accordance with NetVu Limited's return process, under which all returns are first approved, a materials returns reference number issued, and then the equipment can be returned to NetVu Limited's service facility with the returns number clearly displayed.

## Restrictions on Use (Intended User)

The equipment is intended for use in non-domestic premises by suitably trained and qualified persons of at least 16 years of age. It should be protected from extremes of heat, cold, humidity, ultraviolet, infrared and all forms of ionising radiation. It should be used in a well-ventilated area and if used in a hostile environment, protected from the ingress of dust and liquids by a suitable ventilated enclosure. With the exception of *NetVu cameras*, all NetVu equipment is for indoor use only.

| | |
|---|---|
| Minimum Operating Temperature: | -10°C (14°F) |
| Maximum Operating Temperature: | 60°C (140°F) NetVu Cameras<br>40°C (104°F) NetVu Network Extender and Controller. |
| Operating Humidity: | 20% to 90% Relative Humidity (Non-condensing) |
| Minimum Lighting: | 20lux |
| Maximum Lighting: | 150,000lux |

## Input Voltage

| | |
|---|---|
| NetVu IP cameras: | 12-24VDC/24VAC or PoE (Power over Ethernet) Class 2 or 3. |
| NetVu Secure Network Extender: | 48VDC |
| NetVu Secure Network Controller: | 48VDC |
| SD Advanced Hybrid DVR: | Internal Power supply from 230VAC mains |
| Modbus Module: | 10VDC to 30VDC |

## Energy Consumption

| | |
|---|---|
| NetVu IP cameras: | 2W to 30W, depending on which model. |
| NetVu Secure Network Extender: | 30W PoE. 250W 48VDC external power supply. |
| NetVu Secure Network Controller: | 30W PoE. 250W 48VDC external power supply. |
| SD Advanced Hybrid DVR: | 250W |
| Modbus Module: | 2W |

## Noise

NetVu equipment are solid state devices and should not emit any audible noise under normal operating conditions.

## RF Interference warning

This is an FCC class A product. In a domestic environment this product may cause radio frequency interference, in which case the user may be required to take adequate measures.

### Canadian EMC statement

This product is compliant with Class A ICES-003

Note: This Class A product meets the requirements of the Canadian Interference causing equipment regulations.
Cet appareil numerique de la Classe A, respect toutes les exigencies du reglement sur le materiel brouilleur du Canada.

### Regulatory Notes and FCC and DOC Information

(USA and Canadian Models Only).

Warning: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause detrimental interference to radio communications. Operation of this equipment in a residential area is likely to cause detrimental interference, in which case the user will be required to correct the interference at their own expense. If necessary, the user should consult their dealer or an experienced radio or television technician for corrective action. The user may find the following booklet prepared by the Federal Communications Commission helpful: “How to Identify and Resolve Radio-TV Interference Problems”.
This booklet is available from the US Government Printing Office, Washington, DC20402, Stock Number 004-000-00345-4. This reminder is provided to call the CCTV system installer’s attention to Art. 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

## Limitations of Liability

NetVu must be installed and configured in accordance with NetVu Limited's instructions. NetVu Ltd. cannot be held liable for any incidental or consequential damages resulting from loss of property or damages due to misuse of NetVu Ltd. products.

*Errors and omissions excepted* (E&OE). NetVu Limited assumes no responsibility for errors or omissions within this document.

NetVu Ltd. reserve the right to make product improvements at any time.

If in any doubt whatsoever, please contact NetVu Limited to confirm that your understanding is correct.

## Intended Use

NetVu Closed IPTV® is intended to be deployed as a video surveillance system.

This equipment MUST NOT be modified in any way, shape or form except by a trained NetVu Ltd. Engineer or agent with express permission from NetVu Ltd.

## Hazards

Electric Shock. NetVu units are low voltage equipment. However, they are supplied with power supplies which if misused or incorrectly installed could present an electric shock hazard. NetVu equipment must only be used with the power supply provided and the power supply must be installed in accordance with local regulations by suitably qualified persons.

Manual handling. NetVu equipment is robustly constructed and can be heavier than it looks. Suitable precautions MUST be taken when handling them to prevent personal injury. They must only be installed in accordance with local regulations by suitably trained and qualified persons.

## Safe disposal When Expired

### Compliance with the UK Waste Electric and Electronic Equipment (WEEE) Regulations

NetVu Ltd is classed as a producer with respect to WEEE for 'users other than private households' under the Waste Electrical Equipment Regulations 2013. Regulation 12 places an obligation on NetVu Ltd to finance the costs of treatment, recovery and environmentally sound disposal of waste electric and electronic equipment (WEEE) from customers where that WEEE:

I. Is composed of equipment sold to our customers before 13th August 2005 and that is being replaced by products from NetVu Ltd of the same type or that perform the same function.

II. Is composed of NetVu Ltd equipment purchased by our customers after 13th August 2005.

Where NetVu Ltd is responsible for WEEE under scenarios (I) or (II) above, it is the responsibility of the customer to deliver the WEEE in question to NetVu Limited's chosen recycling facility, after which point we will accept any further treatment or recycling costs.

To arrange a collection of WEEE, please contact NetVu Ltd to allow us to ensure that the correct procedure can be applied.

Include contact information and any other details you consider relevant.

For the avoidance of doubt:

When customers wish to dispose of WEEE that is of equipment purchased before 13th August 2005, but is not being replaced by equipment of the same type or that performs the same function, then **the customer retains responsibility** for disposal under The Environmental Protection (Duty of Care) Regulations 1991.

When customers wish to dispose of WEEE that is of equipment purchased after 13th August 2005, then the original producer of the equipment retains responsibility for financing the costs of the collection, treatment, recovery and environmentally sound disposal, subject to the proviso that the responsibility has not been passed on to the customer through any contractual terms of the original purchase contract.

See https://netvu.org.uk/downloads/WEEE-B2B-Take-Back.pdf

## Safety Notes

With the exception of *NetVu cameras*, all NetVu equipment is for indoor use only.

NetVu equipment is robustly constructed and can be heavier than it looks. Suitable precautions MUST be taken when handling them to prevent personal injury. They must only be installed in accordance with local regulations by suitably trained and qualified persons.

## CE Notice (EUROPEAN UNION)

This section contains the EU regulatory declarations for the camera unit.

This product is marked with the CE symbol and indicates compliance with all applicable Directives. A "Declaration of Conformity" is held at NetVu Limited, №1 Thellow Heath Park, Northwich Road, Northwich, Cheshire WA9 6JB.

Marking by the symbol CE indicates compliance of this NetVu Ltd. product to the Electromagnetic Compatibility Directive 2014/30/EU, and the Low Voltage Directive 2014/35/EU of the European Union. Such marking is indicative that this system meets the following technical standards:

BS EN 55032:2015 Electromagnetic compatibility of multimedia equipment. Emission Requirements.

BS EN 50130-4:2011+A1:2014 Alarm systems. Electromagnetic compatibility. Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems.

## Transport and Storage

NetVu products are securely packed, using appropriate materials which are recyclable where reasonably practicable. However, the products contain delicate electronic equipment and should be handled with due care and attention.

Ensure that all cartons or boxes are the right way up before opening them at the indicated point.

Keep the original packaging for the duration of the warranty period, in case any item should need to be returned.

When no longer required the packaging should be reused, recycled, or disposed of in accordance

with local waste disposal arrangements and regulations.

These products must only be stored indoors, with their environment being maintained within the limits outlined below.

| | |
|---|---|
| Minimum Storage Temperature | -10°C (14°F) |
| Maximum Storage Temperature | 60°C (140°F) |
| Storage Humidity | 20% to 90% Relative Humidity (Non-condensing) |

# Installation

## Before you start check the contents of the box

The box should contain the following items:

N2SE/16/0T/P Network System Extender

Installation Accessories:

- Mains Power Adaptor
- Mains Power lead

# Design Guide

## Principle of Operation

The system is set-up and configured using the Web-pages on board each device, while the device is in configuration mode. All devices should be in secure mode during the normal operations of a NetVu Closed IPTV® system.

Alarm conditions are stored within the NetVu camera's log. These can be accessed and reports generated using NetVu's *Enterprise Observer* software.

A NetVu Closed IPTV® system is best controlled using NetVu's *Enterprise Observer* software. See the *Enterprise Observer* manual for further details.

## Appropriate Applications for NetVu Closed IPTV®

NetVu Closed IPTV® can be deployed as an effective surveillance system in almost all environments. Consequently, any decision not to utilise NetVu Closed IPTV® is usually as a result of the lower cost of conventional technology being able to provide an adequate solution and not because of any technical shortfall with NetVu systems. However, cheaper, more conventional systems simply cannot offer an equivalent level of protection and security for an IP surveillance system.

## Situations to avoid when using NetVu Closed IPTV®

- Below is a list of the types of areas where care needs to be exercised in deciding where to monitor:
- Lighting conditions likely to cause camera flare or saturation of the camera sensor.
- Where the camera is required to view through things such as mesh fences, blinds, railings, frosted glass and other items likely to obscure or cause deterioration of the image.
- Lighting levels which are lower than the camera is capable of dealing with.

## Environmental Considerations

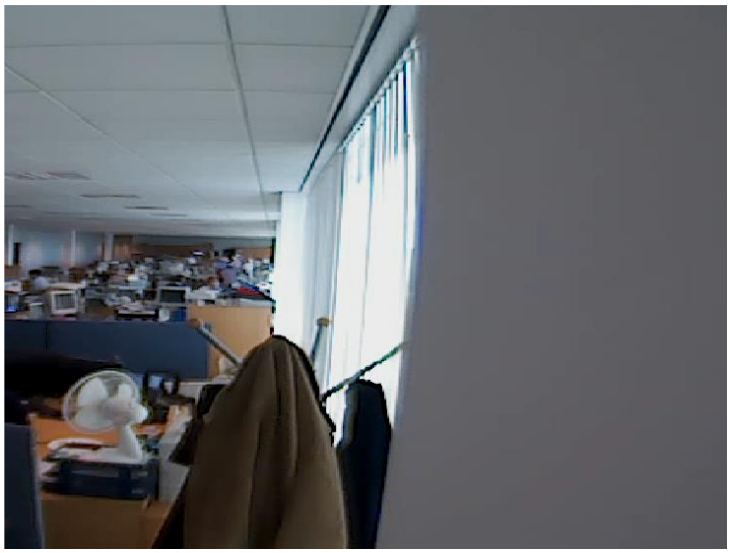
Typically, a minimum of 20 lux of visible light is required, or Infra-Red (IR) lighting when the field of view would otherwise be in darkness. Most SmartVu cameras are equipped with their own IR illumination system.

## Camera Positioning

Cameras should be mounted on as firm a structure as possible. If large amounts of camera vibration are present, then the video image will suffer degradation in quality from "camera shake".

## Ensuring maximum useable view

When positioning cameras ensure that items or fixings mounted or positioned nearby do not unnecessarily come into the cameras view. For example, if mounted beside an air conditioning unit the camera may need to be bought forward so as to not see the side of that unit "up close".



e.g. – in the view to the left, the camera has been positioned beside a pillar which effectively makes that area of the view useless.

## Background of Image when using cameras externally

The camera should be positioned to give as sterile a view as possible.

## Cabling Requirements

Cameras should be cabled in the normal way using CAT5 (or above) suitable for the lengths of run involved.

## Equipment Location

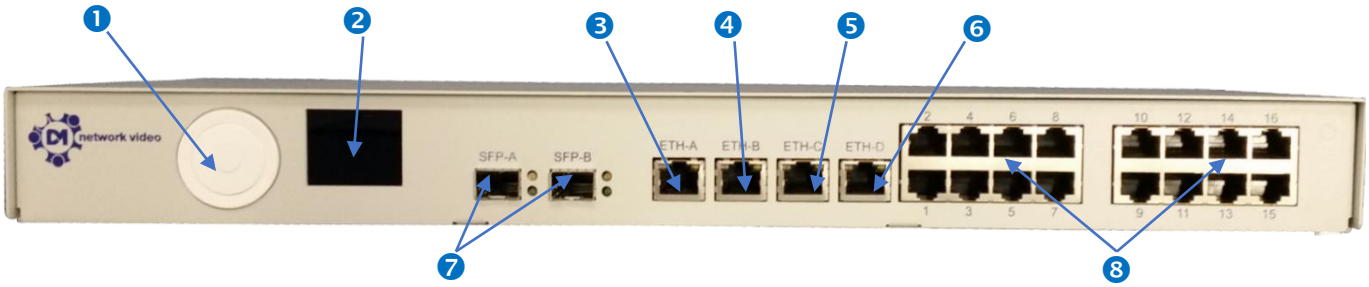
NetVu cameras should be mounted to solid structures and in accordance with the "Camera Mounting" section of this manual. All switch(es), Modbus devices and the NetVu NVR, DVR or Network Extenders and Network Controller processing units should be located in a clean, dry and temperature stable environment. If the unit needs to be located in a dirty or otherwise hostile environment, it should first be housed in a suitable filter ventilated enclosure. *Secure network Extenders, Controllers* and the *NetVu NVR or DVR* are supplied with external power supplies rated at 230Vac or 115Vac as appropriate. Where a mains connection is to be used, it should be connected by means of an unswitched fused spur.

NetVu Ltd. do not supply UPS or battery backup equipment. However, it is strongly recommended that provision for such be made and a suitable means of ensuring continued operation of the NetVu Closed IPTV® system in event of a power failure. This must cover all required aspects of the system and not just the NetVu cameras, lighting and storage devices must also be supported. NetVu Ltd. will provide data on power consumption requirements on request.

# Connections

## Network System Extender Connections

1. 24VDC power input connector.
2. 12VDC power input connector.
3. Connector for *Alarm* and *Fault* Dry / Volts-free contact outputs.
4. Communications Port.




1. Menu Control (up, down, left right, select).
2. OLED Status display.
3. Ethernet A connector (default set for connection with the Annunciator Module or “input” from an upstream Network Extender).
4. Ethernet B connector (default set for “output” from a downstream Network Extender).
5. Ethernet C connector (default set for connection to the client’s Network).
6. Ethernet D connector (default set for connection to the client’s Network).
7. Gigabit fibre optic ports for connection to interconnecting switches and DVRs.
8. Eight or sixteen 10/100 Ethernet connectors for Closed IPTV® cameras, with PoE capability.

*Illustration of the rotary switches on the underside of the unit.*

### Typical Extender usage and Port Configuration

The Closed IP Extender has 16 points for protected 'endpoints'. These are the SmartVu cameras and any locally reporting Modbus devices.

There is always a Closed IP Trunk input (ETH-A), connected to the Closed IP Master device either directly or from a Cascade trunk port (ETH-B) of another Extender or Controller.

In addition, there are two 'Corporate Network Ports' (ETH-C and ETH-D) which would be taken to the client's Router or Network switch. If additional PC viewing stations and any other devices are required, these ports can be connected to any external switch.

Port ETH-B is available as a Cascade Trunk port for access to the secure Closed IP segregated LAN.

Ports SPF-A and SPF-B are available for SPF fibreoptic connections to be made to DVRs and any interconnecting switches within the Secure Network.

### Connecting to the Network

Use a CAT5 or higher cable to connect the unit to the network.

**The maximum cable length for CAT5 cables is 90m. Failure to adhere to maximum cable lengths will result in intermittent failures of the system.**

## Configuration

The Closed IPTV® system provides for a fully automated discovery and initial configuration of IP addresses and firewall for connected devices.

This avoids the need to apply individual IP addresses and credentials to each camera, operating within a secure Virtual Local Area Network (VLAN), "The NetVu Secure Network", without the need for any manual configuration.

The Closed IP structure allows camera channels to be allocated deterministically based on the Extender device number and the individual camera port.

### Addressing the Network System Extender

The addressing is performed by selecting an Extender ID on a rotary switch on the base of the Extender (see illustration above). This allows for up to 15 ID's with each Extender supporting 16 channels. The rotary switch is numbered from zero to 'F' as hexadecimal. The switch number selected is the Extender ID number, minus one (i.e. selecting switch number 0 sets the Extender identity to 1, switch position1 sets the Extender ID to 2, switch position 2 sets the Extender ID to 3 and so on). The last switch position, 'F', sets the Extender ID to '16'.

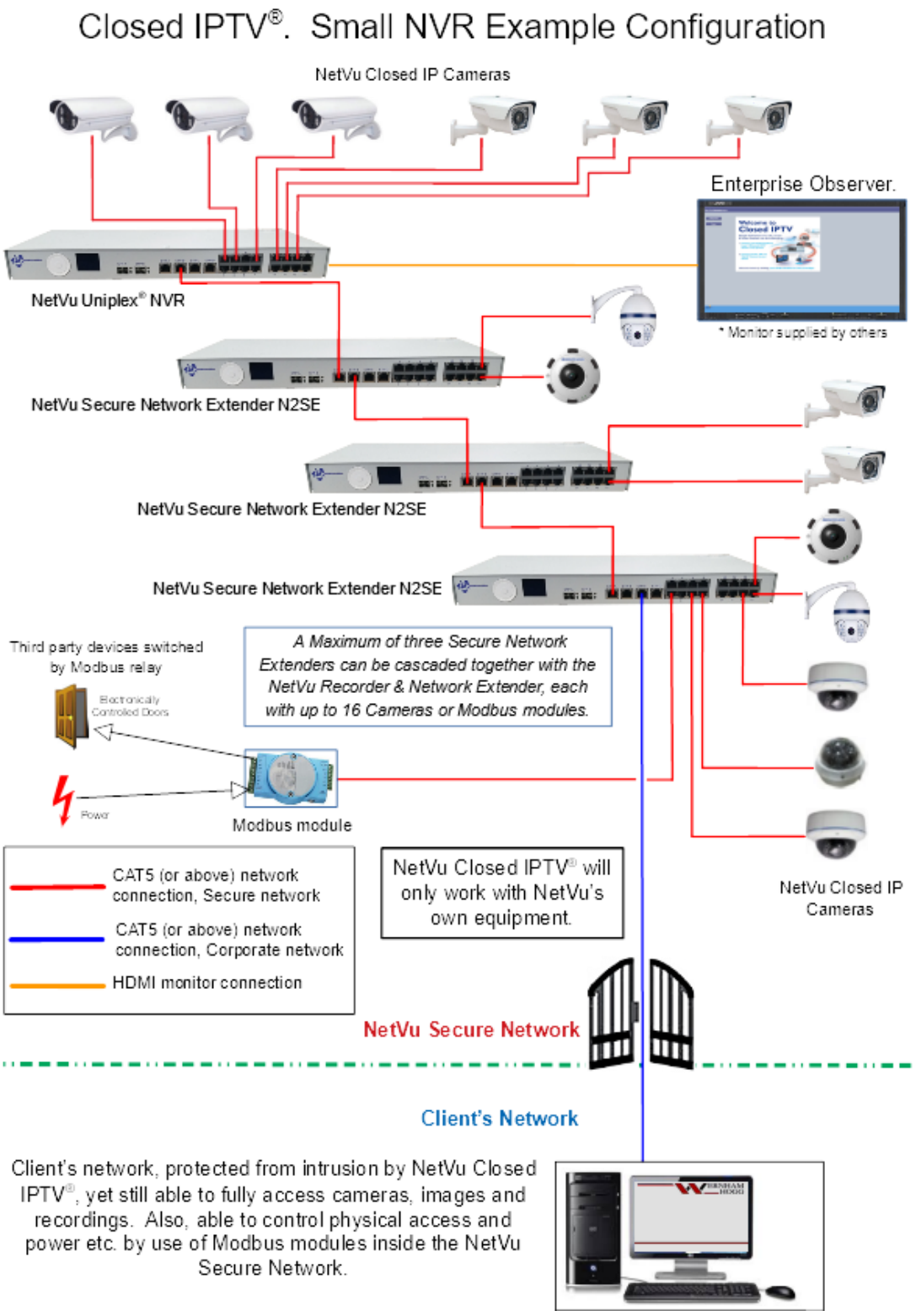
**Each Extender should have a unique setting for rotary switch in comparison with other switches in the same system. Failure to adhere to this rule will result in failure of the system to detect all the cameras**

The system is controlled by a 'Closed IP Master' device which undertakes the discovery and automatic configuration elements of the system. The Master device provides a single IP address access point, acting as a secure proxy to accessing individual cameras. This also provides the alarm reporting central hub and a local 'Annunciator Display' to indicate system status.

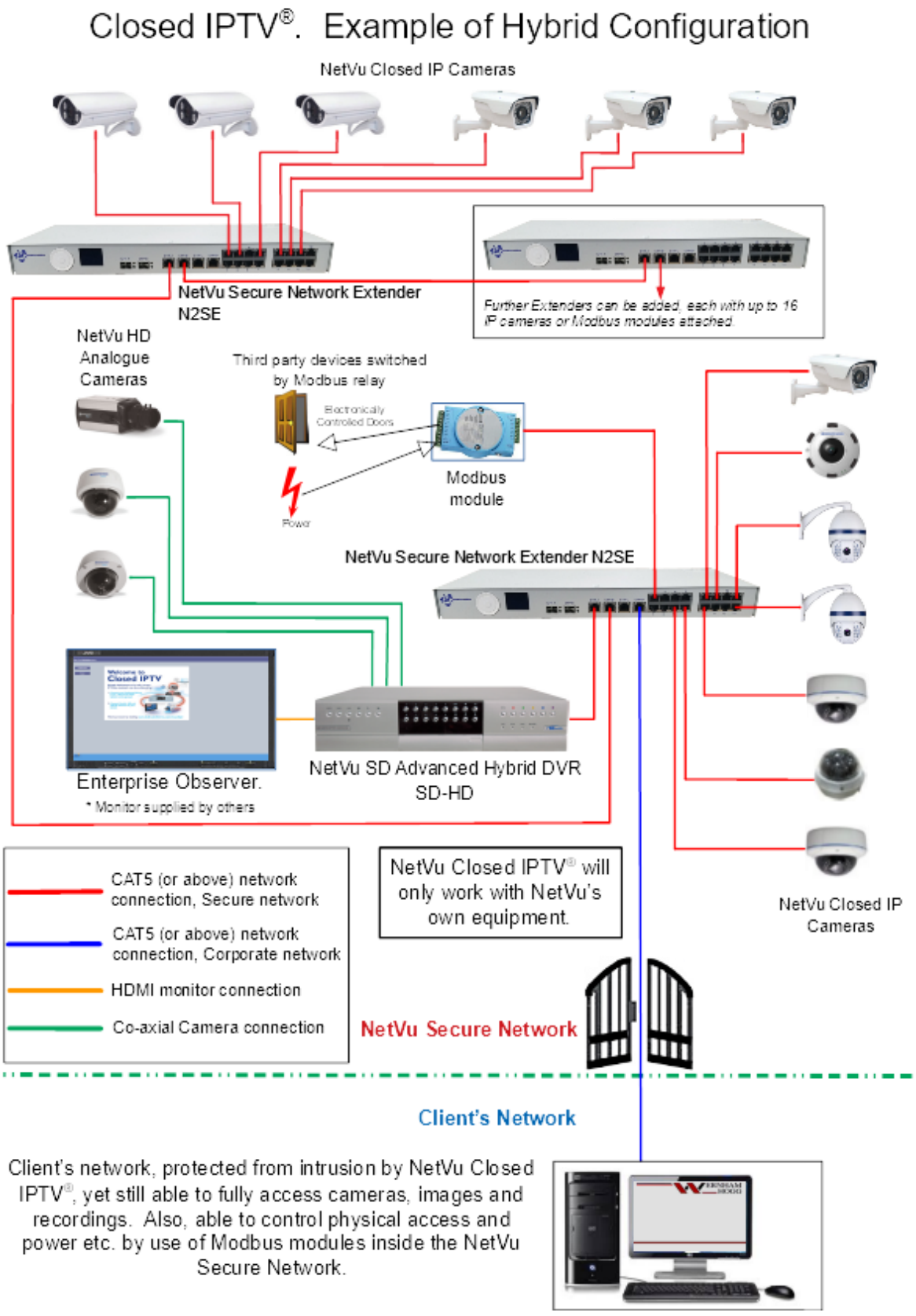
The Master device is the NetVu Uniplex® NVR for the "Small NVR" configuration, the Hybrid DVR for the "Hybrid" configuration, or the Secure Network Controller for the "Virtual NVR" configuration.

# Example System Configuration Diagrams

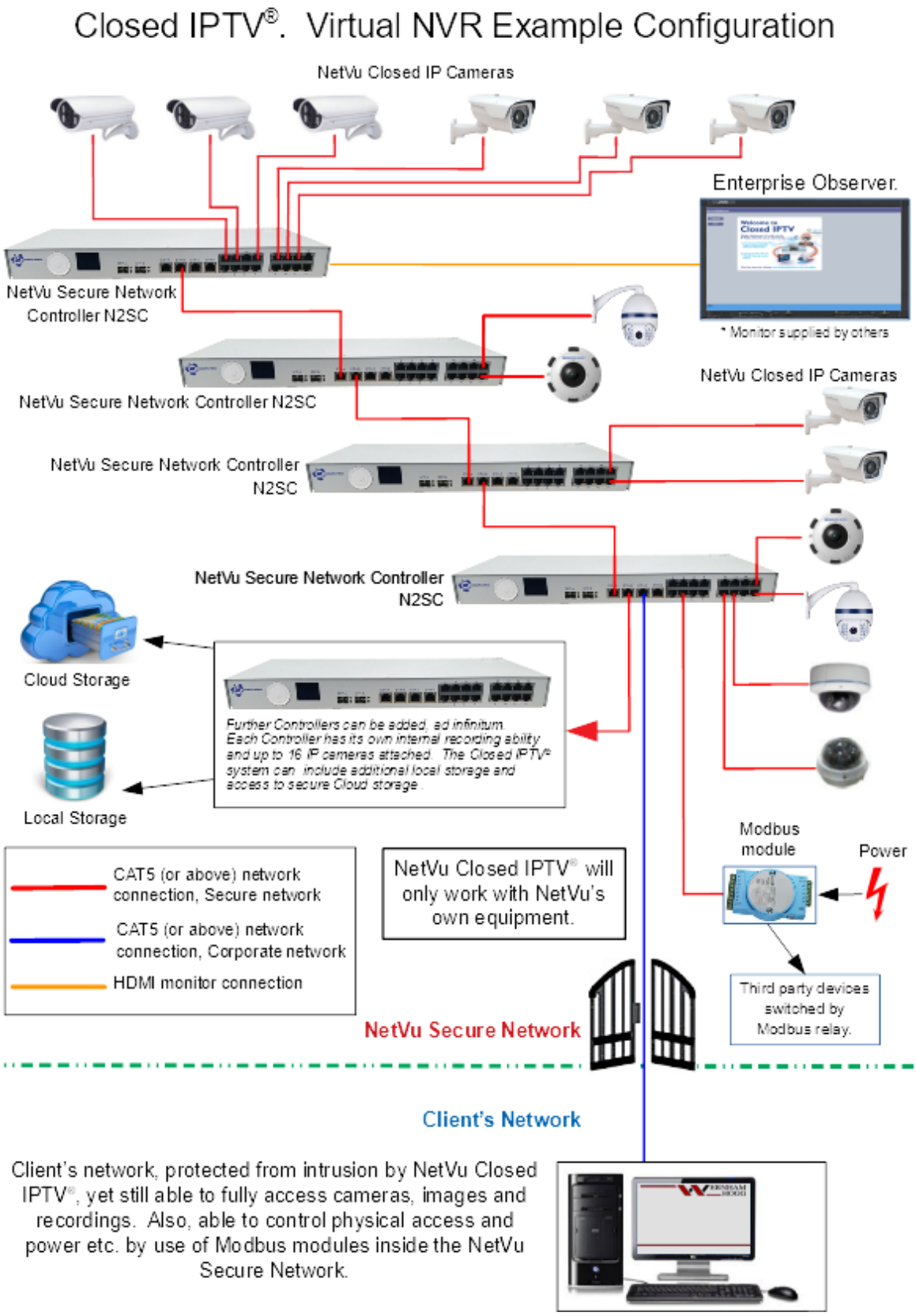
## Small NVR Example Configuration



## Hybrid Analogue/IP System Example Configuration



## Virtual NVR System Example Configuration



# Glossary

| | |
|---|---|
| AGC | Automatic Gain Control |
| ALPR | Automatic License Plate Recognition (US) |
| AMS | Archive and Management System |
| ANPR | Automatic Number Plate Recognition (UK and Europe) |
| AoE | ATA over Ethernet |
| ARC | Alarm Receiving Centre |
| ATA | Advanced Technology Attachment |
| BMS | Building Management System |
| BNC | Bayonet Neill–Concelman (connector used for coaxial cable). |
| CCTV | Closed-Circuit Television |
| CIF | Common Intermediate Format |
| CIP | Closed Internet Protocol |
| CIPTNET | Closed Internet Protocol Telnet |
| CMOS | Complementary Metal-Oxide-Semiconductor |
| CRT | Cathode Ray Tube |
| CSV | Comma Separated Values |
| DHCP | Dynamic Host Configuration Protocol |
| DNS | Domain Name Server |
| DoS | Denial of Service |
| DVR | Digital Video Recorder |
| EDP | Electronic Data Processing |
| EOL | End of Line |
| FACP | Fire Alarm Control Panel |
| FoV | Field of View |
| FQDN | Fully Qualified Domain Name |
| FSV | Fail-Safe Video |
| FTP | File Transfer Protocol |
| GMT | Greenwich Mean Time |
| GUI | Graphical User Interface |
| ICR | In-Camera Recording (Edge Recording) |
| ID | Identity |
| IDE | Integrated Development Environment |
| IP | Internet Protocol |
| IR | Infrared |
| IRE | A unit used in the measurement of composite video signals |
| LAN | Local Area Network |
| LLDP | Link Layer Discovery Protocol |
| MAC | Media Access Control |
| MDNS | Multicast Domain Name System |
| MIME | Multipurpose Internet Mail Extensions |
| MTU | Maximum Transmission Unit |
| N/C | Normally Closed |
| N/O | Normally Open |
| NTSC | National Television System Committee (a colour encoding system for analogue television used in North America and Japan). |
| NVR | Network Video Recorder |
| ONVIF | Open Network Video Interface Forum |
| OSD | On Screen Display |

| | |
|---|---|
| PAL | Phase Alternation Line (a colour encoding system for analogue television). |
| PAR files | Video Partition files |
| PIR | Passive Infrared |
| PLC | Programmable Logic Controller |
| PoE | Power over Ethernet |
| PPP | Point to Point Protocol |
| PPS | Pictures Per Second |
| PSIM | Physical Security Information Management |
| PTZ | Pan-Tilt-Zoom |
| RTOS | Real-Time Operating System |
| RTU | Remote Terminal Unit |
| RVRC | Remote Video Response Centre |
| SAP | Service Access Point |
| SCADA | Supervisory, Control and Data Acquisition System |
| SIA | Security Industry Authority |
| SMB | Server Message Block |
| SNTP | Single Network Time Protocol |
| SoW | Scope of Work |
| SQL | Structured Query Language |
| TCP/IP | Transmission Control Protocol / Internet Protocol |
| TTL | Time To Live |
| TVL | Television Lines |
| UDP | User Datagram Protocol |
| UPS | Uninterruptible Power Supply |
| VSaaS | Video Surveillance as a Service |
| VESA mount | A family of standards defined by the Video Electronics Standards Association for mounting flat panel monitors, TVs, and other displays to stands or wall mounts. |
| ViSP | Visual Signal Processor |
| VLAN | Virtual Local Area Network |
| VMD | Video Motion Detector |
| VPN | Virtual Private Network |
| VSD | Visual Smoke Detection |
| UDP | User Datagram Protocol |
| UI | User Interface |
| WEEE | Waste Electrical and Electronic Equipment |
| WDT | Watchdog Timer |
| Zeroconf | Zero Conflict |