NVT PHYBRIDGE

Complete Installation Guide

Model NV-EC1701U

EoC Ethernet over Coax Transceiver
with PoE, PoE+, or High Power PoE

SAFETY WARNINGS AND PRECAUTIONS

Access to the interior of this unit shall be made only by a qualified technician.
To ensure adequate cooling of the equipment, a 2-inch unobstructed space must be provided around all sides of the unit.
To prevent the risk of shock or fire hazard, replace fuse with same type and rating.

Der Zugang ins Innere des Gerätes ist nur einem fachlich qualifizierten Techniker gestattet.
Um die Kühlung des Gerätes nicht zu beeinträchtigen, ist es notwendig, an allen Seiten des Gerätes ca 5 cm Raum zu lassen.
Zur Vermeidung der Stromschlag-und Feuergefahr beim Auswechseln Sicherungen des gleichen Typs und der gleichen Nennleistung einsetzen.

Seul un spécialiste doit avoir accès l'appareil.
Afin de ne pas nuire au processus de refroidissement, il est nécessaire de laisser un espace d'environ 5 cm de chaque côté de l'appareil.
Afin d'éviter tout risque d'incendie ou d'électrocution, remplacez les fusibles par des fusibles de même type et de même ampérage.

El acceso al interior de esta unidad deberá ser realizado únicamente por un técnico cualificado.
Para asegurar un enfriamiento adecuado del equipo, se debe proporcionar un espacio sin obstrucciones de 2 pulgadas alrededor de todos los lados de la unidad.
Para evitar el riesgo de choque o peligro de incendio, reemplace el fusible con el mismo tipo y clasificación.

L'accesso all'interno di questa unità `deve essere effettuata solo da un tecnico qualificato.
Per garantire un adeguato raffreddamento dell'apparecchiatura, uno spazio libero da 2 pollici deve essere fornita intorno a tutti i lati dell'unità.
Per evitare che la prevenzione del rischio di scossa o di pericolo di incendio, sostituire il fusibile con lo stesso tipo e valore.

Достъп до вътрешността на този уред трябва да се извършва само от квалифициран техник.
За да се осигури подходящо охлаждане на оборудването, трябва да се осигури 2-инчово свободно пространство около всички страни на устройството.
За да предотвратите опасност от удар или пожар, сменете предпазителя със същия тип и квалификация.

Juurdepääs interjööri selle üksuse tehakse ainult kvalifitseeritud tehnik.
Jahutuse tagamiseks seadme, 2-tolline vaba ruum peab olema ümber kõik küljed üksus.
Selleks, et vältida riski ning tulekahjuoht, vaheta kaitse sama tüüpi ja hinnang.

Η πρόσβαση στο εσωτερικό της μονάδας πρέπει να γίνεται μόνο από εξειδικευμένο τεχνικό.
Για να εξασφαλιστεί η κατάλληλη ψύξη του εξοπλισμού, πρέπει να υπάρχει ένας ελεύθερος χώρος 2 ιντσών γύρω από όλες τις πλευρές της μονάδας.
Για να αποφύγετε τον κίνδυνο κρούσης ή πυρκαγιάς, αντικαταστήστε την ασφάλεια με τον ίδιο τύπο και την ίδια βαθμολογία.

Piekļuve interjera šīs vienības veic tikai kvalificēts tehniķis.
Lai nodrošinātu pietiekamu dzesēšanu iekārtu, 2 collu aizsegts telpu jānodrošina ap visām pusēm vienības.
Lai novērstu risku, ka trieciena vai ugunsgrēka briesmas, nomainīt drošinātāju ar tāda paša veida un reitingu.

Prieiga prie šio įrenginio viduje, turi būti atlikti tik kvalifikuotas specialistas.
Siekiant užtikrinti tinkamą aušinimą įranga, 2 colių užgriozdinti erdvę turi būti pateikta apie visus įrenginio pusių.
Siekiant užkirsti kelią šoko ar gaisro pavojus riziką, pakeiskite saugiklį su tos pačios rūšies ir įvertinimas.

A készülék belsejét csak szakképzett szakember végezheti.
A berendezés megfelelő hűtésének biztosítása érdekében egy 2 hüvelykes, akadálytalan helyet kell biztosítani a készülék minden oldalán.
Az ütésveszély vagy a tűzveszély elkerülése érdekében cserélje ki az azonos típusú és minősített biztosítékot.

Toegang tot het interieur van dit toestel wordt alleen door een gekwalificeerde technicus uitgevoerd.
Om een adequate afkoeling van de apparatuur te garanderen, moet een 2-inch vrijstaande ruimte rondom alle kanten van het apparaat worden aangebracht.
Om het risico op schokken of brandgevaar te voorkomen, vervang de zekering met hetzelfde type en de waarde.

Tilgang til det indre av denne enheten skal kun utføres av en kvalifisert tekniker.
For å sikre tilstrekkelig kjøling av utstyret, må det være 2 tommers uhindret plass rundt alle sider av enheten.
For å unngå fare for støt eller brannfare, bytt sikring med samme type og karakter.

Dostęp do wnętrza tego urządzenia wykonuje tylko wykwalifikowany technik.
W celu zapewnienia odpowiedniego chłodzenia urządzenia, wokół wszystkich stron urządzenia musi być umieszczona 2-calowa przestrzeń bez przeszkód.
Aby uniknąć ryzyka porażenia prądem lub pożaru, wymień bezpiecznik na ten sam typ i poziom.

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SAFETY WARNINGS AND PRECAUTIONS

O acesso ao interior desta unidade deve ser efectuado apenas por um técnico qualificado.
Para assegurar o resfriamento adequado do equipamento, um espaço sem obstruções de 2 polegadas deve ser fornecido em torno de todos os lados da unidade.
Para evitar o risco de choque ou incêndio, substitua o fusível pelo mesmo tipo e classificação.

Accesul la interiorul acestui aparat trebuie efectuat numai de către un tehnician calificat.
Pentru a asigura o răcire adecvată a echipamentului, trebuie prevăzut un spațiu liber de 2 inci pe toate laturile unității.
Pentru a preveni riscul de șoc sau de pericol de incendiu, înlocuiți siguranța cu același tip și clasificare.

Dostop do notranjosti te enote se izvede le strokovnjak.
Da bi zagotovili ustrezno hlajenje opreme, mora 2-palčni neoviran prostor, je treba zagotoviti okoli vse strani enote.
Da bi preprečili nevarnost udara ali nevarnosti požara, zamenjajte varovalko iste vrste in jakosti.

Přístup k vnitřku tohoto přístroje musí provádět pouze kvalifikovaný technik.
Aby bylo zajištěno přiměřené chlazení zařízení, musí být kolem všech stran jednotky zajištěn volný prostor o průměru 2 palce.
Abyste předešli nebezpečí úrazu nebo požáru, vyměňte pojistku stejného typu a typu.

Prístup do interiéru tohto prístroja môže vykonať iba kvalifikovaný technik.
Aby bolo zabezpečené dostatočné chladenie zariadenia, musí byť okolo všetkých strán jednotky k dispozícii 2-palcový neobmedzený priestor.
Aby ste zabránili nebezpečenstvu výbuchu alebo požiaru, vymeňte poistku rovnakého typu a typu.

Tämän laitteen sisätilojen saa suorittaa ainoastaan pätevä teknikko.
Laitteen riittävän jäähdytyksen varmistamiseksi on järjestettävä 2 tuuman esteettömät tilat laitteen kaikkien puolien ympärille.
Vaihda sulake saman tyyppisellä ja luokalla, jotta iskun tai tulipalon vaara ei onnistu.

Tillgång till det inre av denna enhet ska endast utföras av en kvalificerad tekniker.
För att säkerställa tillräcklig kylning av utrustningen måste ett 2-tums fritt utrymme tillhandahållas runt alla sidor av enheten.
För att undvika risk för chock eller brandfara, byt ut säkring med samma typ och betyg.

Aðgangur að innanverðu þessa eininga skal aðeins gerð af viðurkenndum tæknimanni.
Til að tryggja fullnægjandi kælingu búnaðarins verður að vera með 2 tommu óhindrað pláss fyrir alla hliðum tækisins.
Til að koma í veg fyrir hættu á losti eða eldhættu skal skipta um öryggi með sömu tegund og einkunn.

Aċċess għall-intern ta 'din l-unità għandha ssir biss minn tekniku kkwalifikat.
Biex jiġi żgurat tkessiħ adegwat tat-tagħmir, 2-pulzier spazju mhux mfixkel għandhom ikunu provduti madwar naħat kollha tal-unità.
Biex ikun evitat ir-riskju ta 'xokk jew perikolu ta' nar, jissostitwixxu fjus bil istess tip u ratifika.

Adgang til det indre af denne enhed skal kun foretages af en kvalificeret tekniker.
For at sikre tilstrækkelig afkøling af udstyret skal der være en 2-tommers uhindret plads på alle sider af enheden.
For at undgå risiko for stød eller brandfare udskiftes sikringen med samme type og rating.

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Model NV-EC1701U

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PRODUCT OVERVIEW

- Transmit 10/100 BaseT Full Duplex Ethernet up to 1,000ft (305m)* over 4-pair cat5; 750ft (228m) over 18/2 (or similar 2-wire cable); 500ft (150m) over Shielded Twisted-Pair
- Powers PoE entry stations (or other PoE, PoE+, or High Power devices), up to 60 watts*
- 55VDC is distributed over 2-wire cable to all connected IP devices
- One NVT Eo2TM transceiver at the network-end can support multiple remote Eo2TM transceivers and connected devices
- Up to four Eo2TM transceivers can be rack mounted on an NV-RMEC16U-90 Eo2TM Rack Mount Tray Kit, connecting up to 16 entry stations or contact closures
- Easy configuration, no PC required
- Transparently supports all networking protocols (UDP, TCP/IP, HTTP, Multicast etc.)
- Advanced 128-bit AES encrypted transmission and PoE+ power technology
- Built-in transient protection; Industrial temperature range
- Available in 1-4 device Eo2TM System Kits
- Limited lifetime warranty

The NVT Phybridge Model NV-EC1701U Eo2TM Ethernet over 2-Wire Transceiver is a compact media converter that allows 10/100 BaseT Ethernet and PoE power to be transmitted using UTP, STP,18/2, or similar cable. These devices are often used in legacy installations where existing wire is re-used as part of an upgrade to IP devices. 55VDC class 2 power is delivered to one transceiver, which distributes it to up to four remote transceivers, and their PoE or PoE+ devices.

These transceivers are extremely simple to use, with no PC configuration required. Status LEDs indicate power and link connectivity/activity for RJ45 and 2-wire ports. The NV-EC1701U is backed by NVTP's award winning customer support and limited lifetime warranty.

*Distance and number of devices supported may be lower due to attenuation/voltage-drop on the wire. See Wire Distance charts on page 9.

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CONFIGURATION INSTRUCTIONS

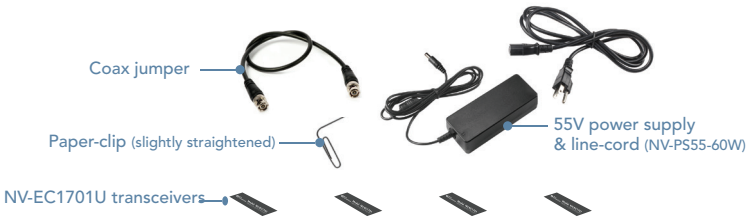
NV-EC1701U Eo2™ transceivers transmit high bandwidth encrypted Ethernet signals over conventional 2-wire cables. To provide utmost signal integrity and security, the NV-EC1701U transceivers must be configured to communicate exclusively with other transceivers within their Network Group. This group typically consists of one NV-EC1701U located at the control room (usually connected to an ethernet switch or router), and up to four remote NV-EC1701U transceivers (usually connected to IP cameras or other remote IP devices).

The NV-EC1701U now comes in auto join mode for easy and quick deployments. The joining process is now only required when deploying more than 1 group of NV-EC1701 units. When deploying more than 1 group (max 4 end points and 1 head end) you are required to factory default the groups after the first group. You must first factory default the units in the next group so they can be joined together into a group. Follow the un-joining method listed below and once factory defaulted you can then move to Step 3 to join the newly factory defaulted units together.

Step One: Gather Materials

- NV-EC1701U transceivers
- 55V power supply & line-cord (NV-PS55-60W)
- Hook-up wire or BNC cable (not supplied)
- Small paper-clip, partially straightened:
- Device labels
- IP Network Documentation Log

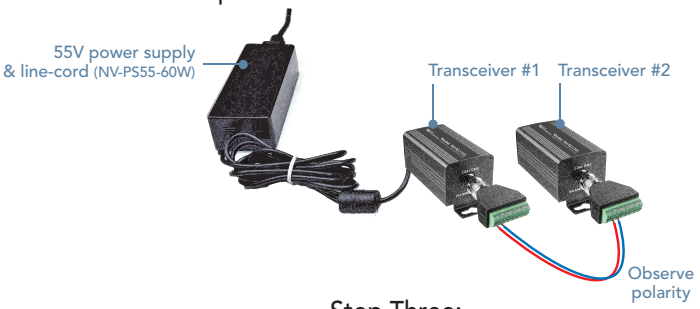
Step One: Gather Materials



Step Two: Connect Hardware

- Remove and discard the "Configure Before Use" labels.
- Connect two NV-EC1701U transceivers using hook-up wire or a BNC cable.
  Observe polarity. Units will not power-up if the polarity is reversed.
  Do not connect anything to the RJ45 connector.
- Connect a 55V power supply to transceiver #1; Apply power.
- Verify that the blue POWER LED on each transceiver illuminates.
- Before proceeding to next step, wait for any green BNC LED that came on during start up to go off, approximately 10 seconds.

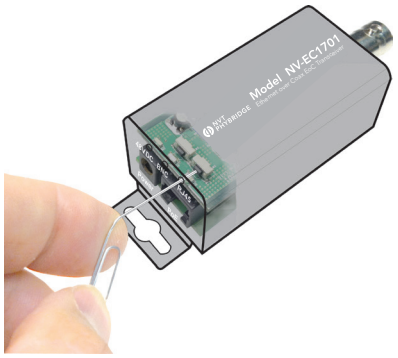
Step Two: Connect Hardware



Step Three: Joining

- On transceiver #1, using the straightened paper-clip to access the small push-button located behind and slightly above the RJ45 LED.
  Firmly press and release this button.
  The blue Power LED will begin blinking.
- Then firmly press and release the same push-button on transceiver #2.
  The blue Power LED will begin blinking.
- Both transceivers have now entered **Join Mode.**
  They will find each other and establish encrypted communication.
  In about 10 seconds, the blue Power LEDs on both transceivers will return to a steady on condition, 'and the green BNC LEDs will illuminate indicating a successful join.

Step Three:
Transparent view of push-button location



Step Four: Adding Transceivers (if required)

- Disconnect transceiver #2 and replace it with a new un-joined transceiver (#3, or #4, or #5).
- Repeat steps two and three to add additional transceivers to the same Network Group.

Step Five: Documentation

- Label the configured transceivers with a unique Network Group ID of your choice.
  This will help you identify them after they have been deployed.
- Record this Network Group information in your IP Network Documentation Log.
  This log may include essential documentation which will help you identify all system devices during and after deployment:

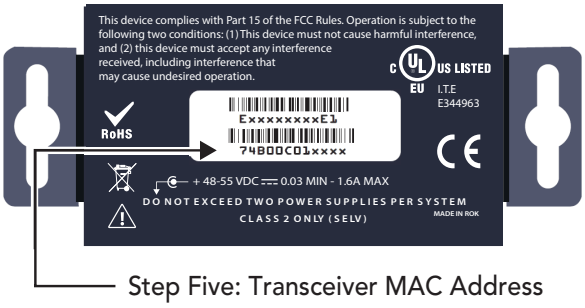
  - **Camera Number**
  - **Camera Position/Location**
  - **Camera Make & Model**
  - **Camera MAC & IP Address**
  - **Camera Login & Password**
  - **Camera-end NVT Phybridge Transceiver MAC Address**
  - **NVT Phybridge Transceiver Network Group Name**
  - **Control Room NVT Phybridge Transceiver MAC Address**
  - **Control Room Router Port Number**

Un-Joining a Transceiver

If you need to move a transceiver from one Network Group to another, it must first un-learn its previous Network Group and be returned to an un-joined state. Do this by performing these steps:

- Disconnect the transceiver from the old network.
- Connect a 55 VDC power supply to a transceiver.
- Wait until its green BNC LED is lit.
- Using the straightened paper-clip to access the small push-button located behind and slightly above the RJ45.
  Press and hold this button for 10-12 seconds until all of the LEDs flash.
- Release the paperclip.
- Observe that the green BNC LED goes on for ten seconds and then goes off.

Un-joining is now complete. If you are not sure that un-joining has been successful, remove and then re-apply power, and repeat.



Step Five: Transceiver MAC Address

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INSTALLATION INSTRUCTIONS

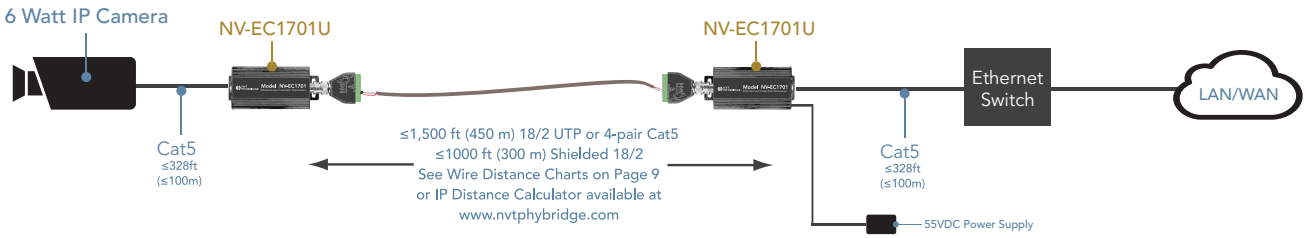

Figure 1 - Typical Installation

Most installations that use the NV-EC1701U transceiver involve the replacement of old analog equipment with new IP devices, while reusing the installed wire.

⚠To prevent damage, disconnect all analog equipment before installing the IP equipment. The NV-EC1701U uses the wire to deliver 55VDC.

Transceiver Configuration
NV-EC1701U transceivers must be configured to communicate exclusively with other transceivers within their Network Group. The configuration process is described on page 3.

Connecting the Camera End
Install the new IP device. Mount the NV-EC1701U nearby or within 328 feet (100 meters). Connect an RJ45 cable between the network connector (PoE) of the IP device and the RJ45 jack on the NV-EC1701U.

Connect the screw-terminal adaptor to the BNC jack on the NV- EC1701U and connect one wire conductor to a terminal marked “+”. Connect the other wire conductor to a terminal marked “-”. **Observe polarity so that it will match that of the control-room end.**

For most installations, the IP device’s power will be low enough, and the wire distance short enough, so that the IP device and its NV-EC1701U can receive power through the wire. In most cases, a power supply will not be needed at this end. For additional details, see pages 6 & 7.

Set the NV-EC1701 PoE toggle switch (located near the BNC connector) to ON if the connected IP device requires PoE to be delivered by the NV-EC1701 and to OFF if PoE should not be delivered by NV-EC1701. This setting relates to power delivery at the Ethernet RJ45 connection.

Connecting the Control-room End
Install a second NV-EC1701U at the control-room end of the wire.

Connect the screw-terminal adaptor to the BNC jack on the NV-EC1701U and connect one wire conductor to a terminal marked “+”. Connect the other wire conductor to a terminal marked “-”. Be sure to match the polarity of the remote-end NV-EC1701U.

If rack-mounting is desired, use the NV-RMEC16U-90 tray, which supports up to four NV-EC1701U transceivers.

Connect a class 2 (SELV) 55VDC power supply to the power jack on the NV-EC1701U. This will provide power to the entire system, including the cameras. The Blue “Power” LEDs will illuminate on both transceivers.

If the LEDs do not light, check the wire polarity. If the blue LEDs blink, then the power supply is cycling on and off due to an overload condition. Check for wire faults or excessive loading.

Connect an RJ45 patch-cord between the RJ45 jack on the NV-EC1701U and your ethernet switch.

The Green LEDs will illuminate when a network link is established, and will blink when data traffic is present.

MULTIPLE CAMERAS

The NV-EC1701U transceivers communicate with each other using a bus-architecture. This means that multiple remote NV-EC1701Us may be connected together to an NV-EC1701U at the control-room. The cables are connected together using the screw-terminal adaptor. Extra screw terminals are provided to allow easy connection. Star, daisychain, or any combination of topologies, including mixing of UTP and coax media may be used.

Unlike coax-based signal distribution, the high frequency signals that are transmitted can be susceptible to very small amounts of crosstalk from other NV-EC1701U network groups. For this reason, do not transmit signals from different network groups within adjacent wire pairs.

PoE CONSIDERATIONS

The NV-EC1701U transceiver supports full PoE, PoE+, and High Power cameras, as well as non-powered legacy devices.

Unlike conventional PoE, voltage-drop and load current must be confirmed by the installer. See “High Power Extended Distance Considerations” on page 6 and use the IP Distance Calculator at www.nvtphybridge.com.

NVT Phybridge’s Class 2 current limiting ensures safety of the installation during fault conditions, while delivering higher power (up to 90 watts) with more efficient allocation amongst loads. **Up to two power supplies may be used within a network group.**

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IP CAMERA & NVR CONSIDERATIONS

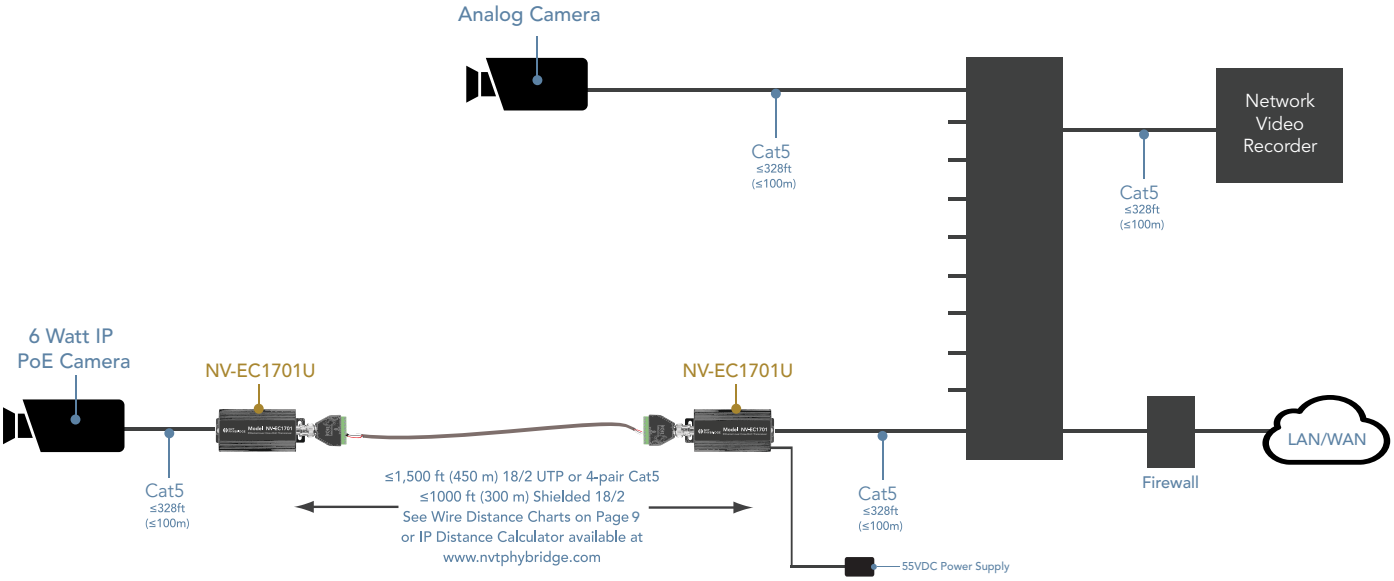

Figure 2 - IP Camera & NVR Installation

TRANSCEIVER-TO-TRANSCEIVER

The NV-EC1701U transceivers provide transparent end-to-end 10-baseT or 100-BaseT connectivity with auto detection and autocrossover. This means that IP cameras or other devices may be installed at one end, and their data is transparently delivered to the other end. Please read configuration instructions on page 3 before installing.

Wire distances up to 1,500ft (450m) are supported, although local power may be required for extended distances. See page 9.

The NV-EC1701U supports TCP/IP, UDP, HTTP, Multi-cast, and other standard protocols. This allows for the transmission of other network traffic besides streaming video.

NETWORK ARCHITECTURE

For IP-based CCTV applications, there are some network configuartions that are robust, and others that are not recommended. **In general, it is best to deploy a separate LAN exclusively for video traffic.**

Although it is possible to place IP cameras onto the end-user's "Enterprise LAN", there are several disadvantages in doing so. These include:

Traffic Management Considerations
When sharing the resources of a LAN, the nature of the traffic must be well understood for it to operate efficiently. For most end-users, the business use of their LAN is constantly changing, critical for their day-to-day operations, and not managed by the same group that manages their security. IP video can often consume large amounts of bandwidth, which may or may not be compatible with existing IT traffic.

Security Considerations
Most surveillance systems are installed specifically to protect against breaches in security. A shared LAN provides potential opportunities for unauthorized access to security assets. Sniffing IP addresses can result in the unintended disclosure of IP cameras or network vulnerabilities. Spoofing IP addresses could result in the disruption of recording.

If you must pass IP camera video through "public" LANs, ensure that video is recorded prior to leaving the secure LAN. Then encrypt it by using a Virtual Private Network (VPN) so that neither the video, nor its addressing is readable on the LAN. Many low-cost routers support VPNs.

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HIGH POWER EXTENDED DISTANCE CONSIDERATIONS

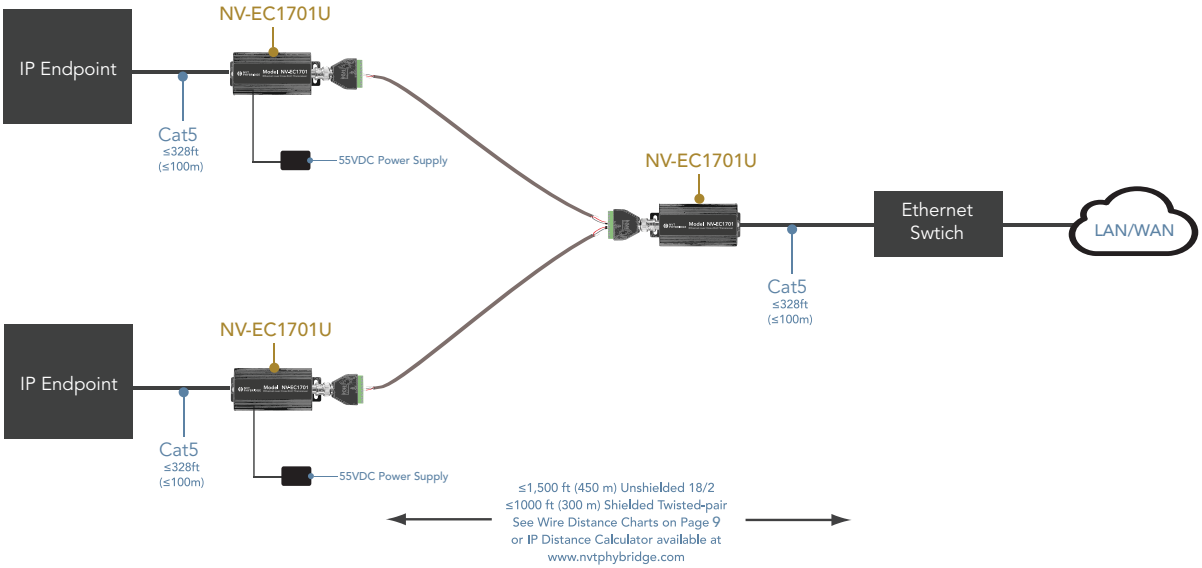

Figure 3 - Alternate Power Supply Location

The NV-EC1701U has a power inlet connector that receives 55 volts from an external Class 2 SELV desk-style power supply. Power is distributed to:

1) The transceiver's internal electronics;

2) the RJ45, provided the connected camera or other device provides the appropriate 27K ohm PoE 'discovery signature'. 55V power is provided on pins 1&2 and 5&4, while 3&6 and 7&8 are at 0 V. The use of all four wire-pairs ensures maximum distance, even for high-power loads, such as P/T/Z cameras; and

3) the coax cable, where it is used by the control-room NV-EC1701U.

⚠ **For fault/safety, never use more than two power supplies within a network.**

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WIRE TYPE AND DISTANCE CP

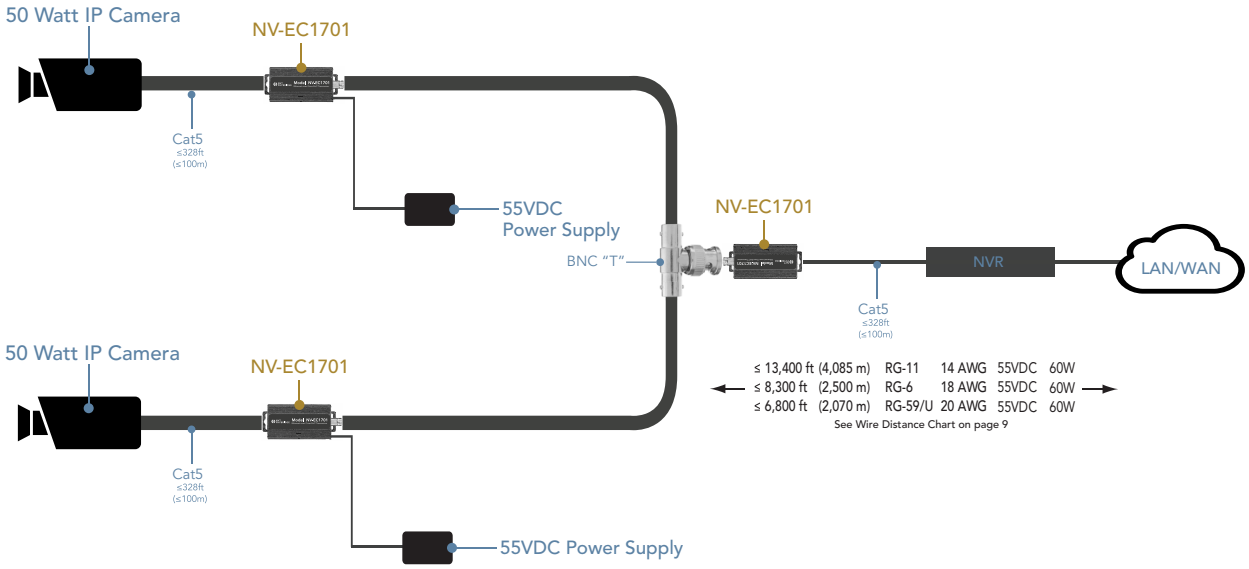

Figure 4 - Alternate Power Supply Location

The NV-EC1701 has a power inlet connector that receives 55 volts from an external Class 2 SELV desk-style power supply.

Power is distributed to:

1) the transceiver's internal electronics;

2) the RJ45, provided the connected camera or other device provides the appropriate 27K ohm PoE 'discovery signature'. +55V power is provided on pins 1&2 and 5&4, while 3&6 and 7&8 are at 0 V. The use of all four wire-pairs ensures maximum distance, even for high-power loads, such as P/T/Z cameras.

3) the coax cable, where it is used by the control-room NV-EC1701.

⚠ **For fault/safety, never use more than two 60 watt power supplies within a network, and never exceed 120 watts, total.**

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WIRE DISTANCE CHARTS

WIRE DISTANCE CAPACITY

The distance capability of wire is dependent on its ability to deliver DC power, and separately, to deliver high-frequency data signals.

The graph below shows maximum power delivery when using a 55V power supply. If you are not delivering power to your camera (or other remote device), then this graph does not apply. Figure 5 shows the maximum network data rate.

A Distance Calculator can be found at www.nvtphybridge.com.

PoE devices require a minimum of 43V to operate. With a 55V supply, we have 13V of allowable voltage drop on the wire.

The voltage will dip in proportion to the remote (camera) load. The graph below shows what distances are supported for various loads and wire types.

- The voltage will dip in proportion to the remote (camera) load. The graph below shows what distances are supported for various loads and wire types.
- Start with the Powered Device (camera) wattage at the left. Sometimes PoE devices are listed as to their PoE Class rather than wattage. If this is the case, use the colored classes instead.
- Now read over to the right until you find your kind of wire. Then look up (feet) or down (meters) to find your maximum wire distance. If your wire is not among the examples, simply measure its total resistance and find that value on the right side of the graph. The maximum supported wattage is on the left.

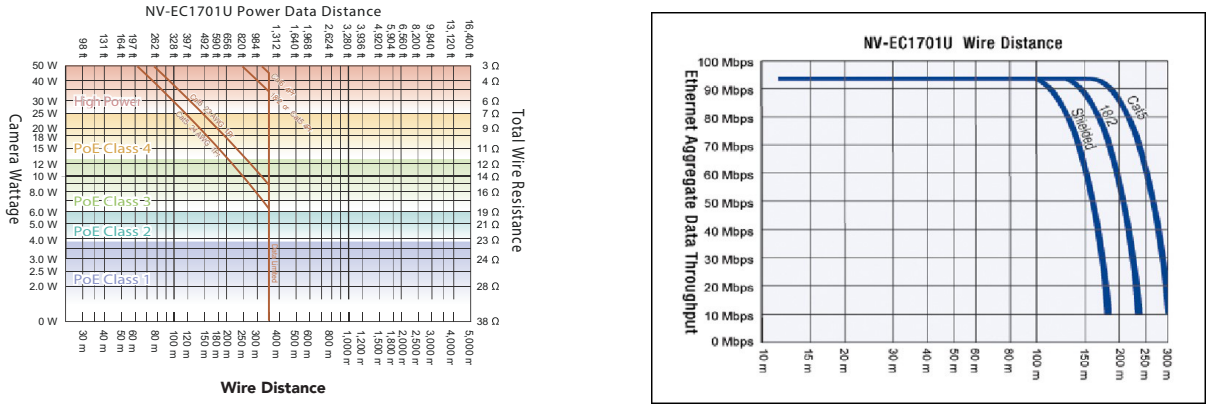

Figure 5 - Data Distance Chart

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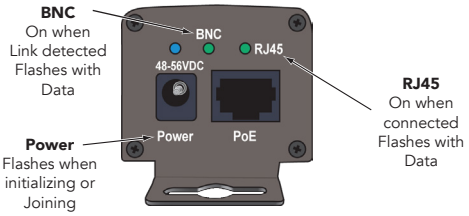
TECHNICAL SPECIFICATIONS

Dimensions (LxWxH)	4.10 x 1.65 x 1.57" (102 x 42 x 40mm)
Weight	5.12 oz. (145 g)
RJ45 Ethernet Interface	Connectivity: RJ45 auto-crossover Wire type: CAT5 or better Distance: Up to 328ft (100m) Speed: 10/100 Base T, auto-negotiation auto MDI/MDIX cross-over Latency: 3ms Data Throughput: 85Mbps ± 10% usable bandwidth per network. Power Output: For maximum distance, 55VDC appears on all eight RJ45 pins, and are current-protected and transient-protected.
Coax Building Wiring Interface	Connectivity: UTP, STP, 18/2 or similar cable Impedance: 25 to 100 Ohm Distance: See page 9 Topology: Bus architecture supports star, daisy-chain, or any combination. One control-room NV-EC1701U may support multiple remote NV-EC1701Us Transmission Technology: IEEE 1901, 128 bit AES encryption
Power Supply	The AC/DC Power supply is external and has the following characteristics - Input: 120/240VAC, 50/69Hz - Output: +55VDC - IEC Class II, isolated only – Efficiency VI Optional NVTPhybridge Power Supplies - Model NV-PS55-60W (55VDC, 60W) - Model NV-PS55-110W (55VDC, 110W)
Power Consumption	≤ 3W
Operating Temperature	-40°F to 104°F (-40°C to +40° C)
Storage Temperature	-40°F to 185°F (-40°C to +85° C)
Humidity	20% to 85% non-condensing

Important Note:
Distance will often be shorter due to power supply capacity and wire voltage-drop. See Maximum Per-Camera Wire Distance Chart on Page 9.

WARNING: For safety, never use more than two power supplies. Never exceed 120 watts.

LED STATUS INDICATORS



Power = *Blue "Power On"*
BNC/2-wire Interface = *Green "Link"*
RJ45 Interface = *Green "Link"*

Specifications subject to change without notice.

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MODEL NUMBERS

Product		
NV-EC1701U	Single transceiver only, no power supply	

NV-EC1701U Accessories		
NV-PS55-60W	55VDC power supply, 60 watts with IEC line cord	
NV-PS55-110W	55VDC power supply, 110 watts with IEC line cord	
NV-BNCA	BNC Screw terminal adaptor	
NV-BNCT	BNC “T” adaptor	
NV-EC4BNC	1:4 BNC splitter adaptor	
NV-RJ45A	RJ45 Screw terminal adaptor	
NV-PC4PR	RJ45 Patch Cord, 4-pair 3’ (1m) Grey	
NV-DPSC4	Detachable Power Supply Cord Splitter 1:4 2ft	
NV-RMEC16U	Rack mounting chassis, 19” x 1U Holds up to 4 NV-EC1701U transceivers plus 60W or 110W power supplies. Includes NV-DPSC4 Power Cord Splitter (Transceivers and power supplies not included)	

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TRANSCEIVER KITS

NV-EC1701U Transceiver Kits	
Single 60 Watt Eo2 Transmission System NV-EC1701U-KIT1: • 2: NV-EC1701U Transceivers • 1: NV-PS55-60W Power Supply with IEC line cord • 2: NV-PC4PR patch-cord Single 110 Watt Eo2 Transmission System NV-EC1701U-K1H: • 2: NV-EC1701U Transceivers • 1: NV-PS55-110W Power Supply with IEC line cord • 2: NV-PC4PR patch-cord	
Dual 60 Watt Eo2 Transmission System NV-EC1701U-KIT2: • 3: NV-EC1701U Transceivers • 1: NV-PS55-60W Power Supply with IEC line cord • 3: NV-PC4PR patch-cord Dual 110 Watt Eo2 Transmission System NV-EC1701U-K2H: • 3: NV-EC1701U Transceivers • 1: NV-PS55-110W Power Supply with IEC line cord • 3: NV-PC4PR patch-cord	
Triple 60 Watt Eo2 Transmission System NV-EC1701U-KIT3: • 4: NV-EC1701U Transceivers • 1: NV-PS55-60W Power Supply with IEC line cord • 4: NV-PC4PR patch-cord Dual 110 Watt Eo2 Transmission System NV-EC1701U-K2H: • 4: NV-EC1701U Transceivers • 1: NV-PS55-110W Power Supply with IEC line cord • 4: NV-PC4PR patch-cord	
Quadruple 60 Watt Eo2 Transmission System NV-EC1701U-KIT4: • 5: NV-EC1701U Transceivers • 1: NV-PS55-60W Power Supply with IEC line cord • 5: NV-PC4PR patch-cord Quadruple 110 Watt Eo2 Transmission System NV-EC1701U-K4H: • 5: NV-EC1701U Transceivers • 1: NV-PS55-110W Power Supply with IEC line cord • 5: NV-PC4PR patch-cord	

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MULTICAST PACKET SUPPORT

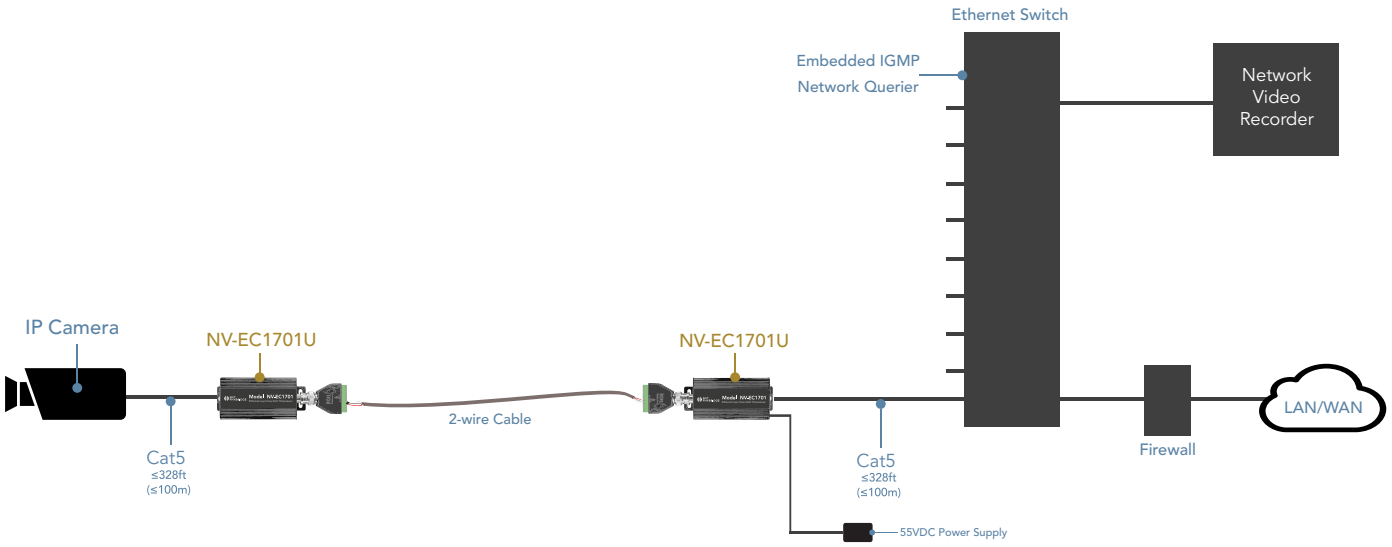

Figure 6 - Multicast Network

On rare occasions, a customer will experience a problem where a camera sending unicast packets performs flawlessly, but the NV-EC1701Us fail to deliver multicast streams.

To understand this, we need to delve a little deeper into how multicast networking works. To do this, we will first explore unicast packet transmission.

With unicast packets, there is a source (the camera) and a destination (the NVR). Packets are generated by the source and directed to a single destination. The first time a packet is sent, the switch has never heard of the destination address. So it sends a broadcast transmission to ALL destinations. The correct recipient acknowledges the packet. The switch snoops in on that response and memorizes which port is associated with that transmission. Subsequent transmissions are directed ONLY to the recipient's port, thereby reducing bandwidth on other parts of the network.

With multicast packets, the same bandwidth considerations apply. Switches and routers do not routinely deliver multicast traffic to all destinations. Instead they rely on a special control protocol to identify and report which multicast traffic should go where.

That protocol is called Internet Group Management Protocol (IGMP). IGMP is a shared "querier" control resource that is implemented on a host, such as a switch or router, within the network. Virtually all routers and most switches are equipped with an IGMP querier.

That host is responsible for sending IGMP queries to multicast devices, requesting the generation of an IGMP Report. That report is monitored by switches and routers within the network. That monitoring is called IGMP Snooping. These switches and routers keep a state table and use it to determine to which ports to deliver each multicast stream.

In practice, a multicast source (camera) sends its data not to the destination, but to a fictitious "Group IP Address." Destination devices (the NVR), in response to an IGMP querier request, send a request to the IGMP host asking to be included as a destination for that group.

Switches and routers allow these multicast packets through so they can be received by those interested devices (NVR) and block them from being delivered elsewhere. **It would be inappropriate for the switch to send a multicast stream everywhere, as it would clog the network.**

The NV-EC1701Us are not point-to-point devices. They join together to function as a switch. Like a switch, they listen for IGMP reports and block unknown multicast packets. This is particularly important in a multi-camera environment, as we do not want the stream from one camera being delivered to all other cameras. That could generate too much traffic.

On rare occasions an installation will be created without the required IGMP querier. If the switches are not equipped with IGMP snooping then they just deliver all multicast traffic everywhere. If the NV-EC1701Us do not receive IGMP reports, then they will BLOCK UNKNOWN MULTICAST PACKETS, and the video will not pass through.

An investigation can be performed as necessary using a Packet Sniffer, such as WireShark.

The bottom line is that an IGMP querier is required for a properly configured multicast network. Contact NVT for further information.

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TROUBLESHOOTING

Confirm that the NVTP transceivers have been configured to communicate with each other, per instructions on page 3.

If you are experiencing problems, attempt to simplify your setup. Test each cable segment separately. For example, test the IP camera directly at the ethernet switch without other equipment. Then add in the NVTP transceivers, back-to-back. Test each segment of a long cable- run independently. Attempt to isolate the problem.

Most IP camera installation problems involve configuring the IP camera and the recorder to recognize each other. If in doubt, connect the camera directly to the Ethernet switch, bypassing the transceivers.
Consult the IP camera and/or recorder installation manuals for configuration instructions, or contact the camera or recorder manufacturer.

NETWORK DIAGNOSTIC TOOLS

NVT Phybridge has developed a Console Utility that can be downloaded from www.nvtphybridge.com. Once installed on any Windows PC, the application scours the network for NVTP devices, and reports each of their MAC addresses, as well as the MAC addresses of any other NVTP devices within its joined group.

Additional network tools, such as Packet Sniffers or Traffic generators are available from other sources such as LAN Shark, LANTraffic, etc.

CUSTOMER SUPPORT

NVT Phybridge customer support is available for consultation from 6:00AM - 7:00PM EST Monday through Friday. In addition, emergency after hours callback support is available.

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Email UK European Headquarters: eusales@nvtphybridge.com
Web Home Page: www.nvtphybridge.com

PRODUCT RETURNS

Please call before returning units to NVT Phybridge. Returned materials must have a “Returned Materials Authorization” (RMA) number from NVT Phybrigde marked on the outside of the shipping carton.

PRODUCT DESCRIPTION

The NVT Phybridge Model NV-EC1701U Ethernet over 2-wire Transceiver is a compact media converter that allows 10/100 BaseT Ethernet and PoE, PoE+, or high-power PoE to be transmitted using 2-wire cable. These devices are typically used in legacy installations where existing cable is redeployed as part of an upgrade to IP cameras. 48-55VDC class 2 power is delivered to one transceiver, which distributes it to multiple remote transceivers, and their PoE cameras (or other IP devices).

These transceivers are extremely simple to use, with no IP or MAC address configuration required. Status LEDs indicate power and link connectivity/activity for RJ45 and BNC ports.

COMPLIANCE AND AGENCY APPROVALS

All the compliance information is available on our website www.nvtphybridge.com.

WARRANTY

The NV-EC1701U is backed by NVT Phybridge’s award winning customer support and limited lifetime warranty.