Multimedia Product Installation Manual

Introduction

NVT Multimedia Series Transceivers supply a campus wide signal transmission solution that allows baseband (composite) video to be transmitted over unshielded twisted-pair telephone wire for distances up to 3,000 feet (900m) without a repeater. Some models also transmit line-level audio. These products do not transmit modulated or cable TV type signals. The wide bandwidth video signals employed are not compatible with "dial-up" telephone service.

With NVT's ***patented crosstalk immunity,*** video signals may reside in the same wire-bundle with other potentially interfering signals, such as ringing telephones, data communication signals, or other video signals. One- or two-way video signals may reside in existing in-house wiring. Level/Category 2 (voice grade), 3 (data), 4 and 5 (high speed data) wire are supported. Distances up to 4000ft (1,3km) are achieved by repeating the signal along the way. NVT video signals are sent without the need to digitize or compress (and without the signal degradation associated with these techniques), and are designed for use with unshielded twisted pair telephone wire.

NVT also manufactures a line of UTP-based CCTV transmission products, supporting distances up to one mile (1,5km).

This installation should be made by a qualified service person and should conform to all local codes.

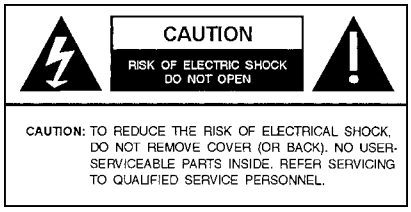
Wiring Notes

Wire — The Dos

1. Do use point-to-point Unshielded Twisted Pair wire, gauge 24 or thicker, stranded or solid, Category 2, 3, 4, or 5.
2. The video signal may co-exist in the same wire bundle as other video, telephone, data, control signals, or low-voltage power. It is also OK to run the NVT signal in or near electromagnetic fields (in accordance with National Electrical Code).
3. Measure the wire distance. Use only transceivers that are designed for that distance.
4. Do make sure the pair of wires carrying the video signal is sent as a twisted ***pair*** (e.g. the blue-white / white blue wires twisted together as a pair), not a "split-pair" (e.g. blue-white conductor, part of one pair / orange-white conductor, part of another pair).

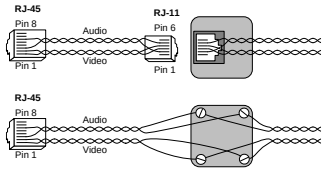
Wire — The Don'ts

1. Do not use shielded twisted pair wire. It will severely degrade the distance performance. Multi-pair wire with an overall shield is OK. Short runs may be used with some signal degradation (for example elevator traveler cables).
2. Don't use un-twisted wire. It will reduce the NVT product's inherent interference immunity.
3. Do not allow your installation to have "bridge-taps," loading coils, talk-battery, or MOV type protectors. Bridge-taps are where the signal carrying twisted pair is shorted to another wire or set of wires (such as an extension phone at home). Bridge-taps cause reflections as the signal propagates, resulting in "ghosts" in the video image, and are to be avoided.
4. For RJ45 connections, it is recommended that pre-wired patch-cords be used. If you must crimp RJ45 plugs onto wire, be alert to the following common failures:
   - Plugs designed for stranded wire used for solid wire.
   - Plugs designed for round wire jacket used with flat wire.
   - Conductors not fully seated when crimped.
   - Plugs installed with a low-cost crimping tool.
   - Conductors going to wrong pins, miswired.
5. If the phone company is providing copper between buildings, make sure it's "dry copper" i.e. it should have none of the following: dial-tone, 48 volts, loading coils, bridge-taps, switching, or long paths back to the phone company's central office and back.
6. Due to near-end crosstalk, don't send a transmit and a receive signal in the same wire bundle. Exceptions: Less than 1000 feet (300m), or Category 5 cable, up to 2000 feet (600 m) are OK.
7. Don't send "Up-the-Coax" Pan/Tilt/Zoom signals through active (amplified) NVT transceivers.
8. ⚠ For safety, never put NVT signals in the same conduit as high-voltage wiring.
9. ⚠ WARNING — to reduce a risk of fire or electric shock, do not expose this product to rain or moisture.



My building only has RJ-11 connectors

Use one of the methods below to convert:



Locating the other end of the wire

Consider using a pair of battery operated test devices called a "toner" set (available from telecom supply houses). One unit generates a distinctive audible warble signal. The other unit has a probe and speaker. When this unit is near the correct conductor, the warble can be heard.

Measure your wire distance

*Note: All NVT quoted distance specifications **include any coax in the run.** It is recommended that the wire distance be measured to ensure that the capability of the NVT product is correct.*

Wire resistance may be measured with an ohm-meter by shorting the two conductors together at the far end, and measuring the loop-resistance out and back. Compare your readings to the following chart:

Distance feet	Distance m	Wire Gauge AWG 18	20	22	24
250	76	3 Ω	5 Ω	8 Ω	13 Ω
315	96	4 Ω	6 Ω	10 Ω	16 Ω
397	121	5 Ω	8 Ω	13 Ω	21 Ω
500	**152**	**7 Ω**	**10 Ω**	**17 Ω**	**26 Ω**
630	192	8 Ω	13 Ω	21 Ω	33 Ω
794	242	10 Ω	16 Ω	26 Ω	41 Ω
1000	**305**	**13 Ω**	**20 Ω**	**33 Ω**	**52 Ω**
1260	384	16 Ω	25 Ω	42 Ω	66 Ω
1587	484	21 Ω	32 Ω	52 Ω	83 Ω
2000	**610**	**26 Ω**	**40 Ω**	**66 Ω**	**104 Ω**

Pan / Tilt / Zoom / control signals

Video signals may co-exist in the same wire bundle with twisted-pair control signals, such as RS-422, RS-485, etc. Model numbers NV-314A and NV-418A will transmit "up the coax" P/T/Z control signals up to 1,000ft (300m). Call NVT for more details.

Power Supply Requirement

NVT transceivers require the following power:

NV-314A	no power required	
NV-418A & AR	no power required	
NV-518A & AR	12 to 16 VAC power supply included	@200mA
NV-RM15	12 to 16 VAC power supply included	@2A

⚠ The model NV-518A and NV-RM15 are intended to be powered by a safety extra low voltage (SELV) power source that delivers less than 60V DC under single fault conditions. Additionally, a limited power source with less than 5A total available current should be used, such as a pre-approved wall-mount or desktop power supply that has been evaluated by a product safety agency such as UL or TUV Rheinland, in the country of end-use.

Ground Lifting

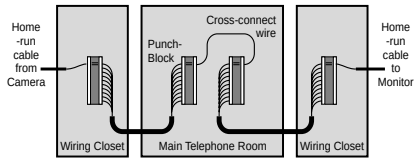
Ground loop immunity to differences in grounds are built into all NV-518A units. This eliminates annoying ground loops that may be found when connecting from building to building, or floor to floor. Ground immunity is preserved when any NV-518A unit is used with a passive device, such as the NV-314A or the NV-418A.

Transient protection & surge suppression

Transient protection is built-in to the NV-518A and NV-518AR.

Laying out your system

1. To save installation time, try to use existing wire. Assess your existing telephone cable-plant within the site or sites. Use a 'toner-set' (warbler) to locate wire paths in the wiring closets and at each end of the wire runs.



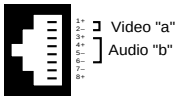
2. To get from the source location to the destination, find a spare home-run wire pair between the source and the wiring closet. Once in the wiring closet, use a short length of twisted-pair "cross-connect" wire to connect between that pair and the pair that goes to the destination.
3. If existing UTP is unavailable, new UTP can be installed more easily than coax. Unshielded 24AWG Category 3 is recommended, though Category 2 or Category 5 will also do nicely. Use telephone wire all the way to the camera / monitor.
4. Measure the distance for each run from camera to monitor. Include all wire in the run including coax.
5. Select the correct NVT transceivers for this distance.

Connecting the Camera End

Video & Audio Applications using model NV-314A

This transceiver contains two independent circuits: one video, and one audio, with a distance range of up to 1,000 ft (300m) of unshielded twisted pair wire.

1. Connect the baseband video signal from the source to the video transceiver by using a 75Ω coax cable with an RCA plug. The twisted-pair video output appears at the 8-conductor RJ45 connector, pins 1(+) and 2(–) as shown:

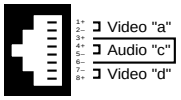


2. Using an RJ45 patch-cord, connect these conductors to your new or existing unshielded twisted-pair wiring. (Note wire colors of the patch-cord and wiring so that polarity may be observed at the receiving end.)
3. If audio is to be transmitted, it should be a line level signal (+4 dBm) with a source impedance of 600Ω or less. Do not send un-amplified microphone signals or "speaker-level" signals. Connect the audio to the RCA jack labeled "audio b".
4. Connect a second twisted-pair at the 8-conductor RJ45 connector, pins 3(+) and 6(–). If your application does not require audio, these conductors may remain unconnected.

Video & Audio applications using model NV-418A

This transceiver contains four independent circuits: two video, and two audio. The two video circuits may be used as dual transmitters, for use with two cameras, or for Y and C portions of an S-video signal. This transceiver may also be used as dual receivers, or one transmitter and one receiver for two-way applications, or for one camera and stereo audio.

1. Connect the baseband video signals from the two sources and/or destinations to the video transceiver RCA connectors marked "video a" and "video d". The twisted-pair video outputs appear at the 8-conductor RJ45 connector, pins 1(+) and 2(–) for path "a" and 8(+) and 7(–) for path "d" as shown:

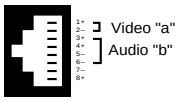


2. Using the NVT supplied RJ45 patch-cord, connect these conductors to your in-house wiring. (Note wire colors so that polarity may be observed at the receiving end.)
3. If audio is to be transmitted, it should be a line level signal (+4 dBm) with a source impedance of 600Ω or less and a load impedance of 600Ω or more. Do not send un-amplified microphone signals or "speaker-level" signals.
4. Connect the audio signals to the RCA jacks labeled "audio b" and "audio c". The twisted-pair audio signals appear at the 8-conductor RJ45 connector, pins 3(+) and 6(–) for path "b" and pins 4(+) and 5(–) for path "c". If your application does not require audio, these conductors may remain unconnected.

Connecting the Monitor End

Video & Audio applications using model NV-314A

1. Using an RJ45 patch-cord, connect the unshielded twisted-pair baseband video signal to the NV-314A's 8-conductor RJ45 connector, pins 1(+) and 2(–), observing polarity, as shown:



2. Connect a second twisted-pair at the 8-conductor RJ45 connector, pins 3(+) and 6(–). If your application does not require audio, these conductors may remain unconnected.
3. Connect a 75Ω coax cable from the RCA connector "a" to the video monitor (or other video equipment). If required, connect a second RCA cable from the connector "b" to the monitor's line-level audio input.

Video & Audio applications using model NV-418A

1. Using an RJ45 patch-cord, connect each of the wire pairs to the appropriate RJ45 connector pins as shown, recalling the wire-color to ensure correct polarity. If your application does not require all four pairs, the unneeded ones may remain unconnected.

2. Connect the baseband video signals from the NV-418A RCA jacks marked "video a" and "video d" to the two sources and/or destinations using 75Ω coax cables.
3. If audio is required, connect the audio signals to the RCA jacks labeled "audio b" and "audio c". As with the video paths within the NV-418A, each audio path may be used either to transmit or receive.

Video & Audio applications using model NV-518A

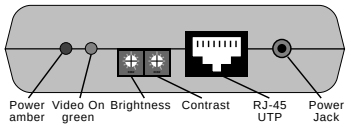
Like the NV-418A, this model contains four independent paths: two video and two audio. Video path "a" of the NV-518A contains a receive-only amplifier that compensates for cable loss up to 3,000 feet (900m).

1. The model NV-518A requires external power, supplied by a transformer (included). Plug the transformer into a suitable wall outlet and connect it to the power jack on the 518A. The Amber "Power" LED should light.
2. If your application requires one-way video without audio, use path "a" only. Connect the single wire-pair to the 8-conductor connector using an RJ45 patch-cord. Connect pins 1(+) and 2(–) as shown below, recalling the wire-color to ensure correct polarity.

   If a transmit path is needed, the second BNC jack, path "d" may be connected to a video source. Connect pins 8(+) and 7(–) as shown:

3. If a video signal is being received on path "a", the green "Active" LED will be lit.
4. Connect the baseband video signals from the NV-518A BNC connector marked "video a" to a video monitor using a 75Ω coax cable.
5. Using a small screwdriver, adjust the distance equalization controls for brightness and contrast to produce the best picture.

   Adjust both trimpot controls to minimum (counterclockwise) positions. Increase the Brightness control until the correct brightness is achieved on a monitor. (It is recommended that a CRT monitor be used and not an LCD.) Then increase the Contrast control until the detail is good.



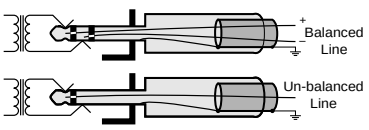
6. If audio is to be received, connect the second pair of wires to path "audio b" of the RJ45 connector, pins 3(+) and 6(–).

   Connect the 1/4" phone jack labeled "audio b" to the line input of your destination equipment. This input should have an impedance of 600Ω or greater.

   If another audio path is required, connect the third pair of wires to path "audio c" of the RJ45 connector, pins 4(+) and 5(–).

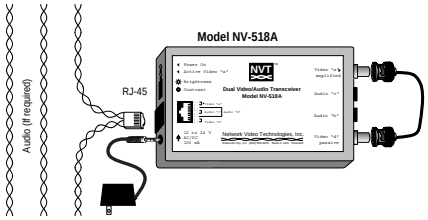
   Connect the 1/4" phone jack labeled "audio c" to your destination equipment. If your application does not require audio, these may remain unconnected.

   The 1/4" phone jacks are wired to be compatible with balanced or unbalanced audio lines. Use either of the drawings below for proper wiring:



Repeater operation

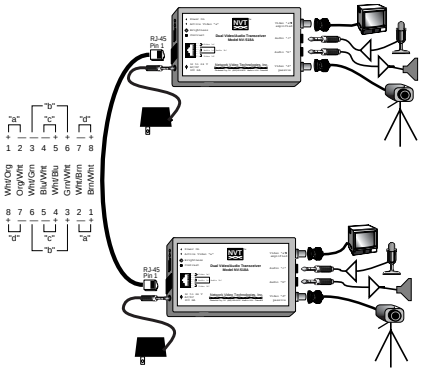
For greater distances, the Model NV-518A may be used as a repeater, as follows. NVT recommends wire lengths no greater than 2000 feet (600m) per hop.



Using the NV-518A in two-way applications

The NV-518A may be used to support two-way video and audio for distances up to 2,000ft (600m) using Cat 5 wire or 1,000ft using Cat 2 or 3 wire.

Because path “a” of the NV-518A is receive-only, path “d” of one NV-518A must be wired to path “a” of the other NV-518A. This requires a cable-flip along the way.

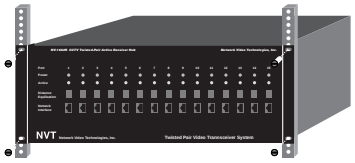


Rack Mounting

The RM-15 Rack System supports up to fifteen of the NV-418AR and/or NV-518AR transceivers. These are rackmount versions of the NV-418A and NV-518A.

Do not install the NV-RM15 in an environment where the operating ambient temperature may exceed 50 degrees C or 120 degrees F.

Do not restrict airflow around any active powered NVT product.



Troubleshooting

If you are experiencing problems, attempt to simplify your setup. Test each portion separately. For example, test the camera and monitor together without the other equipment. Then add in the NVT transceivers, back-to-back. Test each segment of a long cable-run independently. Attempt to isolate the problem.

Below are problems that may be encountered. If the suggestions below are not helpful, or the recommendations not effective, please call NVT’s customer support or your local representative. NVT customer support can be reached 8:00 AM to 5:30 PM PST at (800) 959-9870 in the US and Canada or (+1) 650.462.8100.

Video Troubleshooting

Faint or blurry picture; little or no color

Possible causes and solutions:

1. Verify that wire is unshielded twisted-pair cable. Multi-pair cable with an overall shield is OK.
2. Longer wire distance than expected. Be sure to include any coax cable that’s part of this distance. Verify end-to-end connectivity with an ohm meter. Measure the distance by disconnecting the transceivers, shorting the far end, reading the loop’s resistance at the near end. See other side for ohm vs. distance ratings. If necessary, replace transceivers with models specified for longer distances.
3. Incorrect distance equalization adjustments on the NV-518A.
4. Poor connection at a punch-block, RJ45 plug, splice, or coax cable. Re-check using the method described in 2) above, or use a wire test set.
5. Short between conductors of the twisted-pair. Use an ohm meter to locate the short.
6. Do not use transient protection devices employing metal-oxide varistors (MOVs). Use carbon blocks, gas-discharge tubes, or NVT transceivers with built-in protection.
7. Check the camera. Are the focus and iris set correctly? Verify with portable monitor.

Extremely faint picture

Only faint shadows of the original picture are visible. One of the twisted-pair conductors is open or the wires are shorted together. Check with ohm meter for continuity.

Over-saturated colors, high-contrast grainy picture, too bright, torn picture

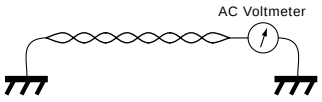
Cable run is shorter than the minimum distance specification. Use shorter distance transceivers. Adjust the distance equalization as necessary. Verify that the monitor has a 75Ω termination, not in “loop-through”.

Won’t sync, wide white jagged areas

Looks like a scrambled Cable TV signal. Check polarity.

Won’t sync, torn picture

1. Make sure that you are using unshielded twisted pair wire.
2. Check distance equalization settings.
3. For installations with passive (non-amplified) transceivers at both ends, check for ground loops. This may be done with an AC Voltmeter, as shown below:



If the voltage is greater than 1/2 volt, use an amplified receiver, such as the NV-518A.

Alternately, remove the ground at one end (usually at the camera end). Be sure that floating the camera conforms to local and National Electrical Codes.

4. Check for crosstalk from a second video path. Disconnect all other video sources. If the problem goes away, check for a split-pair.

Faint stripes gliding up or down the screen

These are caused by crosstalk from a second video path, or with ground-loops in installations employing passive models at both ends.

1. To identify, disconnect all other video signals temporarily. If the interference goes away, check the wire to make sure the signal is traveling through a twisted-pair. Is two-way video being sent more than 1000 feet over Category 2 or 3 wire? If so, the send and receive signals may need to go in separate jacketed cables, or upgrade to Category 5 wire.
2. Next check for ground loops. See last column.

No Power light

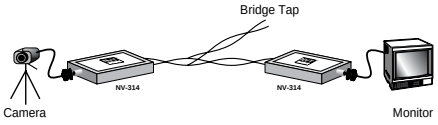
The NV-518A receiver is not getting power. Re-check the power source and connections.

No green light, no video

The NV-518A receiver is not detecting a video signal. There is an open connection. An AC voltmeter can be used to locate the fault. With the camera pointed at a bright, unchanging field, measure the voltage between the conductors of the twisted-pair at various points along the path. The voltage is typically between 0.5 and 2.0 Volts AC.

Ghosts

Faint shadows of the original signal shifted to the right. This is caused by an impedance mismatch along the wire. Verify that the monitor is terminating with 75Ω (not in “loop-through”). Check that all wire is unshielded twisted-pair. The high-frequency wire impedance should be 100Ω. Check for bridge-taps (see below) either by inspecting wiring closet connections, or, if available, using a “Time-Domain Reflectometer” (T.D.R.), sometimes called a “cable tester”.



Audio Troubleshooting

No audio

A pair of walkman headphones or telephone butt-set is useful in tracing audio signals. First verify that audio arrives at the NVT device. Re-check pinouts and patch-cords. Listen for a signal at various points along the wire.

Very weak audio

This could be due to one open conductor, or a short between conductors. Re-check continuity, paying special attention to connectors and patch-cords.

Distorted audio

Check the signal amplitude. The line (pre-amp) level signal should not be greater than 1.2 V AC (+4 dBm). Check for over-driven signals.

Audio crosstalk

Check that each audio path is a twisted-pair. Verify that the audio signal is at Line Level (not Microphone Level). No “split pairs”. Using an Ohm meter, verify that there are no shorts between one conductor of the audio path and any other conductor. Sometimes adjacent conductors in low-cost modular RJ- connectors will short together.

Technical Specifications

NV-314A, NV-418A

Video:

Attenuation:
Transceiver alone, DC to 5MHz

NV-314A, NV-418A	0.5	dB	typ
NV-418AR	1.5	dB	max

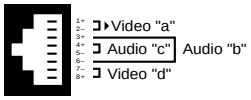
Common-mode rejection:

15 KHz to 5 MHz	60	dB	typ

Connectors:

User Interface:
Models NV-314A & NV-418A

Video & Audio	RCA jack(s)
Twisted-pair	RJ45 non-keyed jack (NV-314A wired for a & b only)



Power:

300 & 400 Series	No external power required

Mechanical:

Model NV-314A & NV-418A

Dimensions	3.75 x 2.50 x 0.875 inches (95.2 x 63.5 x 10.1 mm)	
Weight	314A	4oz (113g)
	418A	4.7oz (133g)
Material	Grey ABS	
Mounting	3M Dual-Lock™ adhesive strips	

Environmental:

Temperature	
300 & 400 Series	-20 to 75°C
Humidity	0 to 95% non-condensing

Transient Immunity

NV-314A, & NV-418A	20 KV, 200pF

NV-518A Video/ Audio transceiver

Video:

Common-mode rejection:

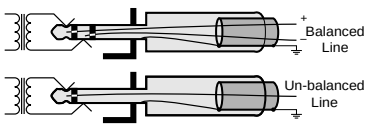
15 KHz to 5 MHz	60	dB	typ

Distance equalization:
Adjustable trim for sharpness and contrast

Connectors:

User Interface:

Video out, Video in	Female BNC jacks
Audio out, Audio in	1/4" phone jacks Tip = "+"; Ring = "–" Sleeve = no connection



Twisted-pair: RJ45 non-keyed jack

Power NV-518A	Power supply included Primary 120 VAC, 30mA or 240 VAC 20mA Secondary 12 to 16 VAC, 50/60 Hz, @ 200mA Power plug as shown:

Mechanical:

Dimensions	5.75 x 3.60 x 1.15 inches (146 x 91.4 x 24.2 mm)
Material	ABS, gray
Mounting	3M Dual-Lock™ adhesive strips

NV-RM15 Rack Systems

Supports up to 15 518AR or 418AR rackmount video transceivers.

Power supply included	Primary 120VAC 250mA or 240VAC 125mA Secondary 12 to 16 VAC 2A RJ-11 connector

Mechanical:

Dimensions	19 x 5.25 x 17.5 inches (482 x 133 x 200 mm)
Material	Aluminum

Environmental:

Temperature	0 to 50°C
Humidity	0 to 95% non-condensing

All Video/Audio transceivers

Audio:

Attenuation	20 Hz to 20 KHz	1.5	dB max
Signal (line level)		+4	dBm max
Impedance		600	ohms

Recommended wire type

Specifications using the following:

Distribution wire	One 24 AWG unshielded twisted-pair for each video and each audio signal
Category	Type 2, 3, 4, or 5
Impedance	100 ohms ±15%
Loop resistance	52 ohms per 1000 feet; 24 AWG
Differential Capacitance	20 pF per foot

Camera / monitor video interface:

Shielded coax cable Impedance: 75 ohms

Environmental:

Temperature	0 to 50 °C
Humidity	0 to 95% non-condensing
ESD Susceptibility	20 KV, 200pF

Agency

These NVT products are listed and/or conform to the following certifications:

UL Listed to UL2044 for the United States.
cUL Listed to CAN/CSA22.2 No. 1 for Canada.
CE Mark under EMC and low voltage Directives for the European Union.

Common Questions

Is one unit a transmitter or receiver?

The 300 & 400 series transceivers can be used as either transmitter or a receiver. The model NV-518A contains both, however it amplifies in the receive path only.

Is a DEDICATED pair required?

Yes, one point-to-point unshielded twisted-pair for each signal. This high bandwidth signal will not pass through dial-up lines, T1-lines, loading coils, or PBX switches. Multipoint distribution can be achieved by using a distribution amplifier at the source and separate NVT transceivers for each path.

Can UN-twisted wire be used?

Some customers have successfully used un-twisted wire. NVT does not recommend it due to its interference susceptibility.

Can SHIELDED twisted-pair be used?

Some customers have successfully used shielded wire up to a few hundred feet. Its high-frequency roll-off will severely degrade the distance performance. Multi-pair wire can have an overall shield without degradation.

Can I send low-voltage power over twisted-pair?

Yes. Amplified NVT transceivers, cameras, or other equipment may be remotely powered via other pairs in the same wire bundle. Be sure to account for the resistive voltage-drop of your wire, possibly using more than one pair.

Although NVT signals are immune to interference caused by low-voltage power and/or electromagnetic fields, many telecom and datacom signals are not. Be sure not to send low-voltage power in the same bundle/conduit as these other sensitive signals. **For safety, NVT signals should never be sent in the same conduit as high voltage power.**

What about punch-blocks?

Video has been sent through twelve sets of the old-style "66-blocks" without problems. Just be sure there are no bridge-taps.

Do NVT units support transient suppression?

NVT transceivers are highly immune to transients. The model NV-518A Series model has built-in transient protection. For inter-building runs, other NVT models must have carbon-block or gas discharge tube protection.

What is the supported bandwidth?

DC to 5 Megahertz, clear channel.

Are NVT signals compatible with any CODEC, camera, or multiplexer?

Yes, NVT transceivers are compatible with any device that handles baseband (composite) video.

Will NVT transceivers support PAL, SECAM, RGB or S-video signals?

Yes. RGB and S-video require separate paths for each component signal.

Do NVT transceivers support broadband RF/VHF/ UHF?

No. Use demodulators and modulators to convert to baseband composite video.

Is stereo supported?

Yes, since our audio paths are bi-directional, both paths of the NV-418A or NV-518A may be used to send stereo audio in one direction.

Limited Lifetime Warranty

NVT warrants that the multimedia product conforms to NVT's applicable published specifications and is free of defects and workmanship, **for the life of the product.**

There shall be no other warranties, express, statutory or otherwise, including any implied warranty of merchantability of fitness or any other obligation on the part of NVT with respect to any of the products.

In the event that any product is damaged or altered or modified without the express written consent of NVT, any warranty for those products will cease and NVT will have no further liability as it pertains to those products. NVT assumes no responsibility for damages or penalties incurred resulting from the use of this product in a manner or location other than for which it is intended.

NVT's liability under any warranties shall be discharged by replacing or repairing any part or parts which do not conform to the applicable warranty under normal and proper use. NVT's liability with respect to any product shall not exceed a refund of the price received by NVT for that product, and in no event shall NVT have any liability for any incidental, consequential, special, or indirect damages.

Some states do not allow the exclusion or limitation of special, incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Customer Support

NVT customer support is available for consultation from 8:00 AM to 5:30 PM PST Monday through Friday.

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Please call before returning units to NVT. Returned materials must be shipped pre-paid, and have a "Returned Materials Authorization" (RMA) number from NVT marked on the outside of the shipping carton.

Product Selection Chart

Distance	Transmit	Receive	External Power	Surge Supression	Ground Lifting	Rack Mountable
Video and Audio						
0 to 1000ft*† (0 to 300m)	NV-314A	NV-314A	No	No	No	No
0 to 3000ft (0 to 900m)	NV-314A	NV-518A	12-24VAC or DC at recv, Transformer Included	No	Incl.	518AR in NV-RM 15
Video and Audio Two-Way						
0 to 1000ft* (0 to 300m)	NV-418A	NV-418A	No	No	No	418AR in NV-RM 15
0 to 2000ft (0 to 600m)	NV-518A	NV-518A	12 to 24 VAC/DC, Transformer Included	YES	Incl.	518AR in NV-RM 15

* Supports "up-the-coax" pan/tilt/zoom control signals. Distance measurements based on 24AWG Category 3 UTP wire.

Network Video Technologies, Inc.

Quality video over ordinary telephone wire...®