



# **NV9680**

GV ORBIT / GV CONVERGENT CONTROL PANEL

## **User's Guide**

13-03082-300 AA

2020-11-24

[www.grassvalley.com](http://www.grassvalley.com)

## FCC Compliance

In order to comply with FCC/CFR47: Part 15 regulations, it is necessary to use high-quality, triple-screened Media or Monitor cable assemblies with integrated ferrite suppression at both ends.

## Patent Information

This product may be protected by one or more patents.

For further information, please visit: [www.grassvalley.com/patents/](http://www.grassvalley.com/patents/)

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## Important Safety Information

This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions appear throughout the manual where they apply. Please read and follow this important information, especially those instructions related to the risk of electric shock or injury to persons.

### Symbols and Their Meanings



Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



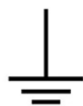
Indicates that the user, operator or service technician should refer to the product manuals for important operating, maintenance, or service instructions.



This is a prompt to note the fuse rating when replacing fuses. The fuse referenced in the text must be replaced with one having the ratings indicated.



Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.



Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.



Indicates that static sensitive components are present, which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.



Indicates that the equipment has more than one power supply cord, and that all power supply cords must be disconnected before servicing to avoid electric shock.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Canadian Standard Association (CSA) regulations and recommendations for USA/Canada.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA/Canada.



The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Intertek Testing Services regulations and recommendations for USA/Canada.



The presence of this symbol in or on Grass Valley product means that it complies with all applicable European Union (CE) directives.



The presence of this symbol in or on Grass Valley product means that it complies with safety of laser product applicable standards.

## Warnings



A warning indicates a possible hazard to personnel, which may cause injury or death. Observe the following general warnings when using or working on this equipment:

- Appropriately listed/certified mains supply power cords must be used for the connection of the equipment to the rated mains voltage.
- This product relies on the building's installation for short-circuit (over-current) protection. Ensure that a fuse or circuit breaker for the rated mains voltage is used on the phase conductors.
- Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only.
- Do not operate the equipment in wet or damp conditions.
- This equipment is grounded through the grounding conductor of the power cords. To avoid electrical shock, plug the power cords into a properly wired receptacle before connecting the equipment inputs or outputs.
- Route power cords and other cables so they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.
- High leakage current may be present. Earth connection of product is essential before connecting power.
- Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.
- To avoid fire hazard, use only the fuse type and rating specified in the service instructions for this product, or on the equipment.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Use proper lift points. Do not use door latches to lift or move equipment.
- Avoid mechanical hazards. Allow all rotating devices to come to a stop before servicing.
- Have qualified service personnel perform safety checks after any service.

## Cautions



A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

- This equipment is meant to be installed in a restricted access location.
- When installing this equipment, do not attach the power cord to building surfaces.
- Products that have no on/off switch, and use an external power supply must be installed in proximity to a main power outlet that is easily accessible.
- Use the correct voltage setting. If this product lacks auto-ranging power supplies, before applying power ensure that each power supply is set to match the power source.
- Provide proper ventilation. To prevent product overheating, provide equipment ventilation in accordance with the installation instructions.
- Do not operate with suspected equipment failure. If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.
- To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.
- This unit may have more than one power supply cord. Disconnect all power supply cords before servicing to avoid electric shock.
- Follow static precautions at all times when handling this equipment. Servicing should be done in a static-free environment.
- To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

## Electrostatic Discharge (ESD) Protection



Electrostatic discharge occurs when electronic components are improperly handled and can result in intermittent failure or complete damage adversely affecting an electrical circuit. When you remove and replace any card from a frame always follow ESD-prevention procedures:

- Ensure that the frame is electrically connected to earth ground through the power cord or any other means if available.
- Wear an ESD wrist strap ensuring that it makes good skin contact. Connect the grounding clip to an *unpainted surface* of the chassis frame to safely ground unwanted ESD voltages. If no wrist strap is available, ground yourself by touching the *unpainted* metal part of the chassis.
- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.
- When temporarily storing a card make sure it is placed in an ESD bag.
- Cards in an earth grounded metal frame or casing do not require any special ESD protection.

## Battery Handling



This product may include a backup battery. There is a danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Before disposing of your Grass Valley equipment, please review the *Disposal and Recycling Information* at:

[http://www.grassvalley.com/assets/media/5692/Take-Back\\_Instructions.pdf](http://www.grassvalley.com/assets/media/5692/Take-Back_Instructions.pdf)

## Cautions for LCD and TFT Displays



Excessive usage may harm your vision. Rest for 10 minutes for every 30 minutes of usage.

If the LCD or TFT glass is broken, handle glass fragments with care when disposing of them. If any fluid leaks out of a damaged glass cell, be careful not to get the liquid crystal fluid in your mouth or skin. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all times.

## Mesures de sécurité et avis importants

La présente section fournit des consignes de sécurité importantes pour les opérateurs et le personnel de service. Des avertissements ou mises en garde spécifiques figurent dans le manuel, dans les sections où ils s'appliquent. Prenez le temps de bien lire les consignes et assurez-vous de les respecter, en particulier celles qui sont destinées à prévenir les décharges électriques ou les blessures.

## Signification des symboles utilisés



Signale la présence d'une tension élevée et dangereuse dans le boîtier de l'équipement ; cette tension peut être suffisante pour constituer un risque de décharge électrique.



Avertit l'utilisateur, l'opérateur ou le technicien de maintenance que des instructions importantes relatives à l'utilisation et à l'entretien se trouvent dans la documentation accompagnant l'équipement.



Invite l'utilisateur, l'opérateur ou le technicien de maintenance à prendre note du calibre du fusible lors du remplacement de ce dernier. Le fusible auquel il est fait référence dans le texte doit être remplacé par un fusible du même calibre.



Identifie une borne de mise à la terre de protection. Il faut relier cette borne à la terre avant d'effectuer toute autre connexion à l'équipement.



Identifie une borne de mise à la terre externe qui peut être connectée en tant que borne de mise à la terre supplémentaire.



Signale la présence de composants sensibles à l'électricité statique et qui sont susceptibles d'être endommagés par une décharge électrostatique. Utilisez des procédures, des équipements et des surfaces antistatiques durant les interventions d'entretien.



Le symbole ci-contre signifie que l'appareil comporte plus d'un cordon d'alimentation et qu'il faut débrancher tous les cordons d'alimentation avant toute opération d'entretien, afin de prévenir les chocs électriques.



La marque UL certifie que l'appareil visé a été testé par Underwriters Laboratory (UL) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



La marque C-CSA-US certifie que l'appareil visé a été testé par l'Association canadienne de normalisation (CSA) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



La marque C-UL-US certifie que l'appareil visé a été testé par Underwriters Laboratory (UL) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



La marque ETL Listed d'Intertek pour le marché Nord-Américain certifie que l'appareil visé a été testé par Intertek et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.



Le marquage CE indique que l'appareil visé est conforme aux exigences essentielles des directives applicables de l'Union européenne en matière de sécurité électrique, de compatibilité électromagnétique et de conformité environnementale.



Le symbole ci-contre sur un appareil Grass Valley ou à l'intérieur de l'appareil indique qu'il est conforme aux normes applicables en matière de sécurité laser.

## Avertissements



Les avertissements signalent des conditions ou des pratiques susceptibles d'occasionner des blessures graves, voire fatales. Veuillez vous familiariser avec les avertissements d'ordre général ci-dessous :

- Un cordon d'alimentation dûment homologué doit être utilisé pour connecter l'appareil à une tension de secteur de 120 V CA ou 240 V CA.
- La protection de ce produit contre les courts-circuits (surintensités) dépend de l'installation électrique du bâtiment. Assurez-vous qu'un fusible ou un disjoncteur pour 120 V CA ou 240 V CA est utilisé sur les conducteurs de phase.

- Dans le présent manuel, toutes les instructions qui nécessitent d'ouvrir le couvercle de l'équipement sont destinées exclusivement au personnel technique qualifié.
- N'utilisez pas cet appareil dans un environnement humide.
- Cet équipement est mis à la terre par le conducteur de mise à la terre des cordons d'alimentation. Pour éviter les chocs électriques, branchez les cordons d'alimentation sur une prise correctement câblée avant de brancher les entrées et sorties de l'équipement.
- Acheminez les cordons d'alimentation et autres câbles de façon à ce qu'ils ne risquent pas d'être endommagés. Supportez correctement les enroulements de câbles afin de ne pas endommager les connecteurs.
- Coupez l'alimentation avant de nettoyer l'équipement. Ne pas utiliser de nettoyeurs liquides ou en aérosol. Utilisez uniquement un chiffon humide.
- Des tensions dangereuses peuvent exister en plusieurs points dans cet équipement. Pour éviter toute blessure, ne touchez pas aux connexions ou aux composants exposés lorsque l'appareil est sous tension.
- Avant de procéder à toute opération d'entretien ou de dépannage, enlevez tous vos bijoux (notamment vos bagues, votre montre et autres objets métalliques).
- Pour éviter tout risque d'incendie, utilisez uniquement les fusibles du type et du calibre indiqués sur l'équipement ou dans la documentation qui l'accompagne.
- Ne pas utiliser cet appareil dans une atmosphère explosive.
- Présence possible de courants de fuite. Un raccordement à la masse est indispensable avant la mise sous tension.
- Après tout travail d'entretien ou de réparation, faites effectuer des contrôles de sécurité par le personnel technique qualifié.

## Mises en garde



Les mises en garde signalent des conditions ou des pratiques susceptibles d'endommager l'équipement. Veuillez vous familiariser avec les mises en garde ci-dessous :

- L'appareil est conçu pour être installé dans un endroit à accès restreint.
- Au moment d'installer l'équipement, ne fixez pas les cordons d'alimentation aux surfaces intérieures de l'édifice.
- Les produits qui n'ont pas d'interrupteur marche-arrêt et qui disposent d'une source d'alimentation externe doivent être installés à proximité d'une prise de courant facile d'accès.
- Si l'équipement n'est pas pourvu d'un modules d'alimentation auto-adaptables, vérifiez la configuration de chacun des modules d'alimentation avant de les mettre sous tension.
- Assurez une ventilation adéquate. Pour éviter toute surchauffe du produit, assurez une ventilation de l'équipement conformément aux instructions d'installation.
- N'utilisez pas l'équipement si vous suspectez un dysfonctionnement du produit. Faites-le inspecter par un technicien qualifié.
- Pour réduire le risque de choc électrique, n'effectuez pas de réparations autres que celles qui sont décrites dans le présent manuel, sauf si vous êtes qualifié pour le faire.



Confiez les réparations à un technicien qualifié. La maintenance doit se réaliser dans un milieu libre d'électricité statique.

- L'appareil peut comporter plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher tous les cordons d'alimentation avant toute opération d'entretien.
- Veillez à toujours prendre les mesures de protection antistatique appropriées quand vous manipulez l'équipement.
- Pour réduire le risque de choc électrique, branchez chaque cordon d'alimentation dans des circuits de dérivation distincts utilisant des zones de service distinctes.

## Protection contre les décharges électrostatiques (DES)



Une décharge électrostatique peut se produire lorsque des composants électroniques ne sont pas manipulés de manière adéquate, ce qui peut entraîner des défaillances intermittentes ou endommager irrémédiablement un circuit électrique. Au moment de remplacer une carte dans un châssis, prenez toujours les mesures de protection antistatique appropriées :

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.
- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.
- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.
- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.
- Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

## Manipulation de la pile



Ce produit peut inclure une pile de sauvegarde. Il y a un risque d'explosion si la pile est remplacée de manière incorrecte. Remplacez la pile uniquement par un modèle identique ou équivalent recommandé par le fabricant. Disposez des piles usagées conformément aux instructions du fabricant. Avant de vous séparer de votre équipement Grass Valley, veuillez consulter les *informations de mise au rebut et de recyclage* à :

[http://www.grassvalley.com/assets/media/5692/Take-Back\\_Instructions.pdf](http://www.grassvalley.com/assets/media/5692/Take-Back_Instructions.pdf)

## Précautions pour les écrans LCD et TFT



Regarder l'écran pendant une trop longue période de temps peut nuire à votre vision. Prenez une pause de 10 minutes, après 30 minutes d'utilisation.

Si l'écran LCD ou TFT est brisé, manipulez les fragments de verre avec précaution au moment de vous en débarrasser. veillez à ce que le cristal liquide n'entre pas en contact avec la peau ou la bouche. En cas de contact avec la peau ou les vêtements, laver immédiatement à l'eau savonneuse. Ne jamais ingérer le liquide. La toxicité est extrêmement faible, mais la prudence demeure de mise en tout temps.

## Environmental Information

European (CE) WEEE directive.



This symbol on the product(s) means that at the end of life disposal it should not be mixed with general waste.

Visit [www.grassvalley.com](http://www.grassvalley.com) for recycling information.

Grass Valley believes this environmental information to be correct but cannot guarantee its completeness or accuracy since it is based on data received from sources outside our company. All specifications are subject to change without notice.

If you have questions about Grass Valley environmental and social involvement (WEEE, RoHS, REACH, etc.), please contact us at [environment@grassvalley.com](mailto:environment@grassvalley.com).

## Lithium Batteries

### Battery Warning

**CAUTION**

This equipment contains a lithium battery.  
**There is a danger of explosion if this is replaced incorrectly.**  
Replace only with the same or equivalent type.  
Dispose of used batteries according to the manufacturer's instructions.  
Batteries **shall only** be replaced by trained service technicians.

Your Grass Valley equipment usually comes with at least one button battery located on the main printed circuit board. The batteries are used for backup and should not need to be replaced during the lifetime of the equipment.

### Battery Disposal

Before disposing of your Grass Valley equipment, please remove the battery as follows:

- 1 Make sure the AC adapter / power Cord is unplugged from the power outlet.
- 2 Remove the protective cover from your equipment.
- 3 Gently remove the battery from its holder using a blunt instrument for leverage such as a screwdriver if necessary. In some cases the battery will need to be desoldered from the PCB.
- 4 Dispose of the battery and equipment according to your local environmental laws and guidelines.

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**WARNING**

- Be careful not to short-circuit the battery by adhering to the appropriate safe handling practices.
  - Do not dispose of batteries in a fire as they may explode.
  - Batteries may explode if damaged or overheated.
  - Do not dismantle, open or shred batteries.
  - In the event of a battery leak, do not allow battery liquid to come in contact with skin or eyes.
  - Seek medical help immediately in case of ingestion, inhalation, skin or eye contact, or suspected exposure to the contents of an opened battery.
-

## Laser Safety - Fiber Output SFP and QSFP Modules Warning

### LASER SAFETY



The average optical output power does not exceed 0 dBm (1mW) under normal operating conditions. Unused optical outputs should be covered to prevent direct exposure to the laser beam.

Even though the power of these lasers is low, the beam should be treated with caution and common sense because it is intense and concentrated. Laser radiation can cause irreversible and permanent damage of eyesight. Please read the following guidelines carefully:

- Make sure that a fiber is connected to the board's fiber outputs before power is applied. If a fiber cable (e.g. patchcord) is already connected to an output, make sure that the cable's other end is connected, too, before powering up the board.
- **Do not** look in the end of a fiber to see if light is coming out. The laser wavelengths being used are totally invisible to the human eye and can cause permanent damage. Always use optical instrumentation, such as an optical power meter, to verify light output.

### Mains Supply Voltage

Before connecting the equipment, observe the safety warnings section and ensure that the local mains supply is within the rating stated on the power supply.

## Safety and EMC Standards

This equipment complies with the following standards:

### Safety Standards



## **Information Technology Equipment - Safety Part 1**

### **EN60950-1: 2006**

Safety of Information Technology Equipment Including Electrical Business Equipment.

### **UL1419 (4<sup>th</sup> Edition)**

Standard for Safety – Professional Video and Audio equipment (UL file number E193966)

## **EMC Standards**

This unit conforms to the following standards:

### **EN55032:2015 (Class A)**

Electromagnetic Compatibility of multimedia equipment - Emission requirements

### **EN61000-3-2:2014 (Class A)**

Electromagnetic Compatibility - Limits for harmonic current emissions

### **EN61000-3-3:2013**

Electromagnetic Compatibility - Limits of voltage changes, voltage fluctuations and flicker

### **EN55103-2:2009 (Environment E2)**

Electromagnetic Compatibility, Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2. Immunity

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**WARNING**

This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

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### **FCC / CFR 47:Part 15 (Class A)**

Federal Communications Commission Rules Part 15, Subpart B

Caution to the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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**Note:** 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 harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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## EMC Performance of Cables and Connectors

Grass Valley products are designed to meet or exceed the requirements of the appropriate European EMC standards. In order to achieve this performance in real installations it is essential to use cables and connectors with good EMC characteristics.

All signal connections (including remote control connections) shall be made with screened cables terminated in connectors having a metal shell. The cable screen shall have a large-area contact with the metal shell.

### SIGNAL/DATA PORTS

For unconnected signal/data ports on the unit, fit shielding covers. For example, fit EMI blanking covers to SFP+ type ports; and fit 75  $\Omega$  RF terminators to BNC type ports.

### COAXIAL CABLES

Coaxial cables connections (particularly serial digital video connections) shall be made with high-quality double-screened coaxial cables such as Belden 8281 or BBC type PSF1/2M, Belden 1694A (for 3Gbps), and Belden 4794A (for 12Gbps).

### D-TYPE CONNECTORS

D-type connectors shall have metal shells making good RF contact with the cable screen. Connectors having "dimples" which improve the contact between the plug and socket shells, are recommended.

# toc

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# 1

## Preface

Chapter 1 is an introduction to the NV9680 User's Guide.

### Summary

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## Chapter Structure

The following chapters provide detailed information regarding the NV9680 Control Panel:

- Chapter 1, [Preface](#), (this chapter) outlines ways to use this guide.
- Chapter 2, [Introduction](#), provides a functional description of the NV9680.
- Chapter 3, [Installation](#), provides installation, connection, and initialization instructions.
- Chapter 4, [Operation](#), provides operating instructions.  
This chapter is for operators, primarily.
- Chapter 5, [GPIO](#), describes the tally (a.k.a. GPIO) interface and tells you how to configure it.
- Chapter 6, [Technical Details](#), provides electrical, mechanical, and environmental specifications, product drawings, and default settings.
- Chapter 7, [Misc. Topics](#), presents a glossary and miscellaneous instructions and information.
- An [index](#) and a [glossary](#) are also provided for your reference.

## The PDF Document

This guide is provided in PDF format, allowing you to use Acrobat's "bookmarks" to navigate to any desired location. You can also easily print a hardcopy. Please note:

- Use the Table of Contents or the bookmarks page to jump to any desired section.
- Many hyperlinks are provided within the chapters.
- Use the Index to jump to specific topics within a chapter. Each page number in the index is a hyperlink.
- Use Acrobat's 'Go to Previous View' and 'Go to Next View' buttons to retrace your complete navigational path.

- Use the 'First Page', 'Previous Page', and 'Next Page', and 'Last Page' buttons to go to the first, previous, next, or last page within a PDF file.

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**Note:**

To display the navigation buttons, right-click the Tool Bar area, and check 'Navigation'.

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- Use Acrobat's extensive search capabilities, such as the 'Find' tool and 'Search' tool to perform comprehensive searches as required.

## Terms, Conventions and Abbreviations

The following conventions are used throughout this guide:

- The symbol ▲ denotes either an example or a special message.
- Entries enclosed in single quotation marks or Capital Letters denote physical control panel buttons, configuration buttons, or menu items.

Click 'Apply' to ...

Press the SRC 12 button ...

The following terms and abbreviations are used throughout this guide:

- The term "control panel" refers to the NV9680 control panel and to NV96xx control panels, in general.
- "High tally" means that a button is brightly illuminated.
- "Low tally" means that a button is illuminated at low intensity. Most buttons assume a low tally state until selected.
- "SE" is an abbreviation for NV9000-SE Utilities.

## Related Documentation

This document does not address the panel configuration. Refer to *Panel Configurator Tasks* and *GPIO Configurator Tasks* in the *GV Orbit Control User Guide* or *GV Convergent User's Manual*. See [Related Documentation](#), on page 2.

Use the following related documentation to configure NV9680 and to better understand the available features. You can obtain the latest product documentation from the Documentation Library section of Grass Valley's website ([www.grassvalley.com/docs/gvorbit](http://www.grassvalley.com/docs/gvorbit)).

Part Number	Document Title
13-03082-300	NV9680 User's Guide (this document)
GVB-1-0491F-EN-DS	GV Convergent Datasheet
13-00952-010	GV Convergent Release Notes
13-00952-040	GV Convergent Quick Tour of Admin Tasks
13-00952-030	GV Convergent User's Manual
GVB-2-0860A-EN-DS	GV Orbit Datasheet
13-03082-020	GV Orbit Welcome

Part Number	Document Title
13-03082-010	GV Orbit Release Notes
13-03082-090	GV Orbit Admin Guide
13-03082-160	GV Orbit User Guide
13-03082-170	GV Orbit Client User Guide



# 2 Introduction

Chapter 2 provides a basic functional description of the NV9680.

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## Summary

The NV9680<sup>1</sup> is a hierarchical control panel featuring 80 LCD function buttons (illuminated in various colors and having 1 to 3 lines of text).

This panel is organized as shown in figures 2-1 and 2-2:



Fig. 2-1: NV9680 Front View

At the rear, in addition to power, serial, and network connectors, is a 25-pin GPIO (for example, tally) connector that supports 4 optically isolated relay outputs and 8 optically isolated inputs:



Fig. 2-2: NV9680 Rear

The NV9680 is a compact unit, being 2RU and having an overall depth of 3.2”.

1. An equivalent NV9680V — a GUI that is called a “virtual panel” — is available. It emulates the NV9680.

## Panel Organization

### Function Buttons

The NV9680 has an array of 80 LCD buttons. Each button has 1, 2, or 3 lines of text, with 8 characters per line. When there are one or two lines of text, the characters are large; when there are 3 lines of text, the characters are smaller. (One or all of the lines of text might be blank). The buttons can display one of seven colors dynamically: nominally red, green, blue, purple, amber, yellow, or grey. We say a button is “dark” when its LCD is turned off.

During configuration in GV-Orbit or GV Convergent, you can assign any of the 7 colors to a button.

Each LCD button has *four* levels of brightness: off, low, medium, and high, and supports *three* operational levels: high tally, low tally, and off. High tally can be either medium or high brightness and low tally can be either low or medium brightness. High tally is always constrained to be brighter than low tally. We say a button is “dark” when its LCD is turned off. See [LCD Buttons](#), page 25, for a color chart.

Although you can see a list of the pages in the tree during configuration, the structure of the tree is not evident on the panel itself. The panel operator must commit the tree structure to memory to be able to use the panel. It is up to the person configuring the panel to design a usable tree structure.

Some buttons functions are assigned by the system depending on the context. For example, if a button page is to represent all sources in a category, and that list changes, the button subtree adjusts in size dynamically. The panel software adds a “forward” button and a “back” button if there are more sources than buttons. Pressing the ‘Forward’ button takes you to the next page of sources. Pressing the ‘Back’ button takes you to the previous page of sources.

Some button states depend on context. Many buttons remain unlit when their functions are disabled. For example, ‘Page Up’ and ‘Page Down’ buttons remain unlit until there is an opportunity to scroll up or down, respectively.

The LCD buttons display a menu if the operator presses a menu button. When the operator make a menu selection, the panel displays viewable data on the LCD buttons. In some cases, the operator can enter data (such as panel ID or LCD brightness) using buttons that allow data entry.

### Tally Interface

At the rear of the panel is a DB25 connector that provides 8 tally inputs and 4 tally outputs. (The outputs are solid state relay outputs.) Both inputs and outputs are optically isolated.

During configuration, you can construct expressions of Boolean logic that switch the outputs on or off. The terms of the logic expressions are states of the source and destination devices, and so on, controlled by the GV-Orbit or GV Convergent control system.

During configuration, you can define GV-Orbit / GV Convergent behavior that will follow the tally inputs.

What you connect to the tally interface is up to you. Grass Valley provides an optional breakout cable (WC0053) for the tally connector.

See chapter 5, [GPIO](#), on page 17, for more details.

## Other NV9680 Functions

The NV9680 can be configured to perform the following additional functions:

- Previous source, free source, “quick” source, and immediate source/destination selection.
- Return to a pre-defined (or default) state.
- Hold breakaway levels.
- System salvos.
- Lock/protect/release for destinations.
- Forced release of locked or protected devices.
- Device selection using indexes or suffixes.

The NV9680 provides the following additional features:

- The NV9680 supports multiple-level breakaways. This lets you route multiple sources to the same destination *on different levels*.
- Level mapping.
- Button page “templates”—global navigation templates and suffix templates—for easier configuration.





# 3 Installation

Chapter 3 provides installation and connection instructions.

## Summary

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<i>Installation</i> .....	9
<i>Networking Connection</i> .....	10
<i>Initialization</i> .....	10
<i>Testing</i> .....	11

## Package Contents

If you have ordered one or more NV9680 control panels from Grass Valley, inspect the shipping container for damage. If you find any container damage, unpack and inspect the contents. If the contents are damaged, notify the carrier immediately.

As you unpack the shipping container, look for the packing slip and compare it against the contents to verify that you received everything as ordered. If anything is missing (or if you find equipment damage unrelated to shipping), please contact technical support. See [Grass Valley Technical Support](#), on page 33.

Depending on your order, the NV9680 items that can ship include:

- One or more NV9680 control panels.
- One or two power supplies for each NV9680, with straps that secure the AC power cords to the power supplies.
- Optional WC0053 breakout cable.

The package does not contain network cables, serial cables, or mounting screws.

You do not need to take any special precautions regarding ESD.

## Installation

Follow these steps to install a NV9680 control panel:

- 1 Mount, and secure, the panel in the rack.

The NV9680 is designed to mount in a 19" rack. Rack-mounting is not a requirement.

Place the panel in position in your rack. Attach the panel to the rack frame, using screws appropriate for your rack. The panel's mounting slots are spaced 3.00" (76.2mm) vertically and allow approximately 1/8" (3 mm) of movement horizontally.

- 2 We assume that you have an Ethernet switch connected to the GV-Orbit Server's MANAGEMENT network. Connect an Ethernet cable from that switch to the RJ-45 port at the rear of the NV9680.

- 3 Connect one or both power supplies. First connect the 4-pin connector to PS1 or PS2 on the rear of the router. The connectors are keyed and snap into place. There is only one way they fit. Do not force them. Then connect the power supply to AC power.



A second power connection is for redundancy only (protection against failure) and is not a requirement for operation.

Refer to [Power Specifications](#) on page 19 for details on the PS0001 power supply. See also [Power Cord Retention](#) on page 26.

- 4 Connect tally (GPIO) input devices and output devices at the DB25 GPI connector. You can use the optional WC0053 breakout cable to make these connections. See chapter 5, [GPIO](#), on page 17 for detail regarding the tally interface.

## Networking Connection

You may use the Panel IP Configuration Utility to set the NV9680 to set a static IP address or the panel, by default, negotiates its IP address from the network's DHCP server.

## Initialization

Before your GV-Orbit Server can communicate with an NV9680, you must give it a panel ID. Follow these steps for each NV9680 you are installing:

- 1 Power up the NV9680. Do not connect its Ethernet cable. (disconnect it if it is connected.)

After a few seconds, the alphanumeric display will show 'No Server' at the top and show the panel's current panel ID. The 2 left-most buttons and the right-most button in the top row now read:

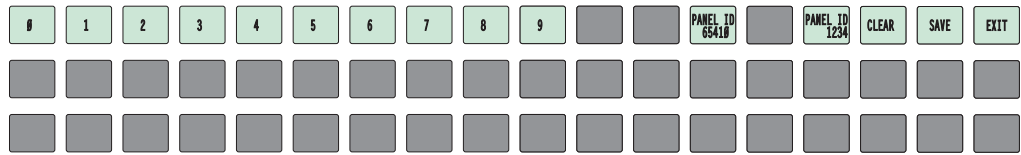


- 2 Press the 'Menu' button to enter the menu. The menu button now displays 'Exit'. At any time during this process, you can press the exit button to "back out of" the process. You might have to press it more than once.
- 3 Find and press 'Enter Panel ID' among the panel buttons on the left.



- 4 After you press 'Enter Panel ID', the panel illuminates 10 "digit" buttons at the left end of the top row of buttons. Press the digits of your intended panel ID—up to 8 digits. The

digits you enter appear on the button next to the 'Clear' button at the right. If you make an error, press the 'Clear' button to start over.



- 5 Then press the 'Save' button (on the right) to save the ID, or press the 'Clear' button to discard the ID.

The new panel ID does not appear until you exit the menu after saving.

- 6 You may use any other menu function at this time. When you are finished, press the 'Exit' button (which reappears) to leave the menu.
- 7 After you designate the panel ID, reconnect the Ethernet cable. The system controller will detect your panel in a few seconds. (**All** panel IDs must be unique.)

You can now prepare an NV9680 configuration with GV-Orbit and upload the configuration to the NV9680. You need the panel ID to create a NV9680 configuration in GV-Orbit. When you upload the configuration, the panel ID you entered in GV-Orbit designates the actual panel to which the upload will occur. The panel might be a physical panel or a virtual panel. If no actual panel has that ID, the upload cannot occur.

## Testing

As shown above in step 3 above, a panel test function is available when the NV9680 is disconnected from the system controller. The test determine the "health" of the buttons of your NV9680. See [Setup Mode](#) on page 14 for detail. Press the 'Software Versions' button to review the versions of installed software and firmware.

These are points to consider after you install your NV9680 control panel(s):

- 1 Do the buttons illuminate? When an NV9680 powers up, its two leftmost LCD buttons are supposed to turn green. Does it pass the panel test mentioned above?
- 2 When the NV9680 powers up and it is connected to the GV-Orbit Server, it should initialize completely. This takes a few seconds. GV-Orbit should load whatever configuration exists for that panel and the buttons appropriate for that configuration should light in the colors appropriate for the top-level button page of that configuration.

If you continue to see "No Server," "Acquiring IP Address," or "Locating Network" on button 2, you have a problem. Reboot everything and try again.

- ▲ The NV9680, by default, acquires its IP address through DHCP on the NV9680's IP network. You can use the Panel IP Configuration Utility to force the panel to have a static IP address.
- 3 Is the GV-Orbit Server actually running? Open GV Orbit Control. You can view the health of the panel in the *System Status* task. Refer to *System Status Task* in the *GV Orbit Control User Guide* or *GV Convergent User's Manual*. See [Related Documentation](#), on page 2.
  - 4 Does the configuration actually work? Is it useful? Can the operator perform tasks and perform other operations?

The design of an NV9680 “operator interface” is non-trivial. You might want to consider how well your operator interface works in addition to the basic question of whether it works.

# 4 Operation

Chapter 4 provides operating instructions for the NV9680 control panel.

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<i>Button Legends</i> .....	13
<i>Setup Mode</i> .....	14

This chapter is intended specifically for the NV9680 panel **operator**.

## Summary

As an NV9680 operator, you will see and use a panel that has been configured in GV Orbit or GV Convergent. This document does not show how to configure the panel. Refer to *Panel Configurator Tasks* in the *GV Orbit Control User Guide* or *GV Convergent User's Manual* for more information about how to configure the panel's operating menus and navigation tree. See [Related Documentation](#), on page 2.

## Panel Operation

The configuration of the NV9680 panel is made in GV Orbit or GV Convergent. You will have to work with the person who has designed the panel's layout and has created the panel's configuration to learn how to use the panel as intended.

## Button Legends

There are many different button function types and the legend that appears on any button varies with the function type and depends on the configurer's intentions.

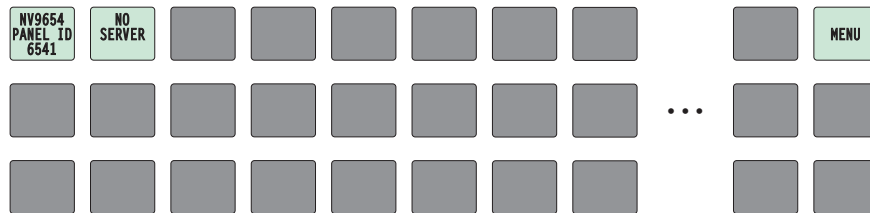
Buttons are also color-coded. The colors are specified in the NV9680 configuration. In most cases, buttons that are high-tally (bright) are active or selected. Buttons that are low-tally (muted) are inactive or unselected. Buttons that are dark either have no function or are momentarily disabled. As an example, a 'Take' button is disabled until you have a destination and a source selected. Then, the 'Take' button goes high tally (red, by default).

By default, category buttons show the category mnemonic and source buttons show the source device mnemonic. By default, destination buttons show the destination device mnemonic and salvo buttons show the salvo mnemonic.

## Setup Mode

Setup mode occurs when the NV9680 is disconnected from its network and is freshly powered up. In setup mode, you can set or change the panel ID, determine software versions, and perform a test of the panel's buttons. It is in setup mode that you must initially set the panel ID.

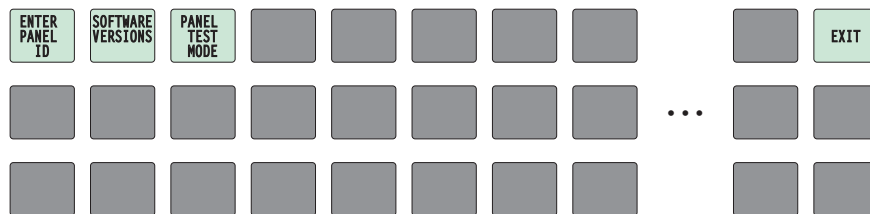
The panel powers up with 3 buttons illuminated in green:



▲ It can take up to 30 seconds for the menu buttons to appear.

In this illustration, the panel ID was already set to 6412. The "Acquire IP Address" is a status message during initialization. Until you connect the panel to its network, the status message will remain the same.

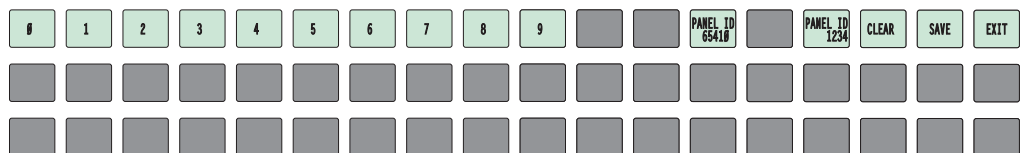
Press the 'Menu' button at the far right to access the setup menu:



There are 3 setup menu choices. The 'Exit' button at the far right allows you to leave the menu.

- Panel ID Entry.

Press the Panel ID Entry button to set the panel ID. A numeric button array appears:

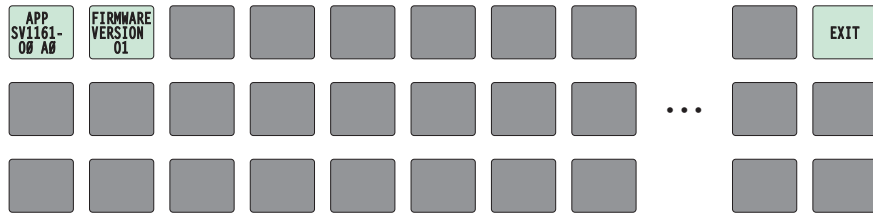


Use the numeric button array as a keypad to enter a panel ID. What you enter appears on the 'Panel ID' button at the top left.

To make the ID permanent, press 'Save'; to cancel your entry, press 'Cancel'. In either case, you will be returned to the setup menu.

- Software Versions.

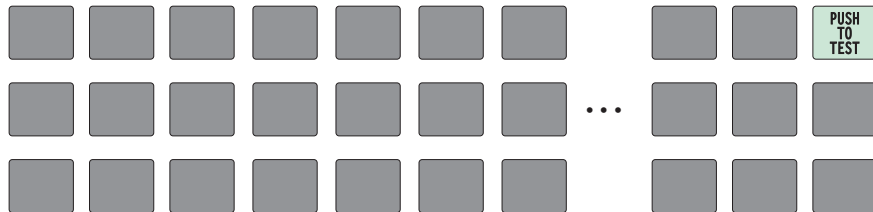
In the setup menu, press the 'Software Versions' button. Three buttons appear:



The 2 buttons at the top left display the software version numbers. Use the 'Exit' button on the right to return to the setup menu.

- Panel Test Mode.

In the setup menu, press the 'Panel Test Mode' button. One button appears:



Press the 'Push to Test' button repeatedly to execute the test.

Each time you press the button, the panel illuminates all its LCD buttons in a single color, changing the color each time you press the button. Keep pressing the button until all 7 colors (high and low tally) have been displayed.

The panel test shows you (1) whether all the buttons are working and how well and (2) whether the software and firmware are working.

When you are finished using the setup menu, press 'Exit' one or more times to return the panel to its normal pre-connected state.

When you connect the panel to its network, the panel leaves its setup state and begins to initialize in its normal operational state. After a short time, the panel will have initialized to its configured state and will display its default button page.





# 5 GPIO

Chapter 5 provides information about the tally (GPIO) interface.

## Summary

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## GPIO Summary

The NV9680 has 4 relays that can switch on or off your external devices, based on (1) NV9680 input transitions and (2) events configured in the GV-Orbit or GV Convergent. Its 8 inputs can be switched on or off by your external devices. When an input transitions on or off, the NV9680 can respond with one of 4 actions, such as executing a salvo. It is GV-Orbit that actually executes the salvo. See *GPIO Configurator Tasks* in the *GV Orbit Control User Guide* or *GV Convergent User's Manual*. See [Related Documentation](#), on page 2.

## The Interface

The tally interface includes 8 optically isolated inputs and 4 solid-state relay outputs (also optically isolated). Tally devices you connect to inputs can trigger events—through the NV9680—in GV-Orbit. The router control system can trigger events that—through the relays in the NV9680—switch your tally devices.

The DB25 connector, labeled “GPI Interface” at the rear of the NV9680 presents the tally signals. There are 8 input signals and 4 pairs of output signals.

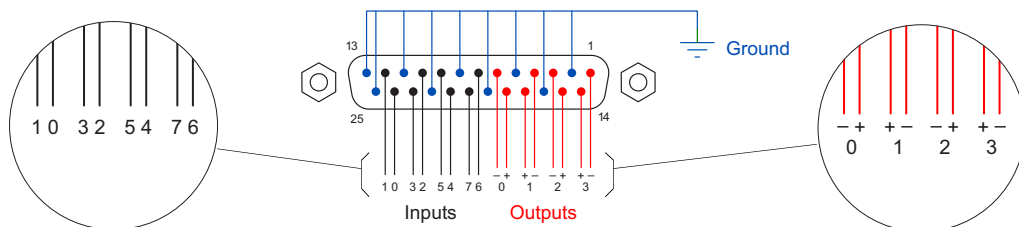


Fig. 5-1: GPI Interface

## Input

The tally inputs expect contact closure to ground, through the ground pins on the connector, to trigger a GPI input event.

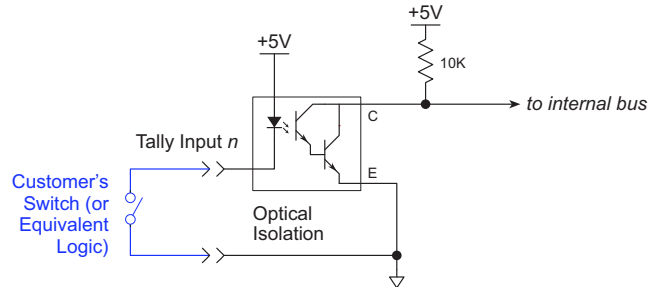


Fig. 5-2: GPI Input

When the input transitions off or transitions on, the NV9680 notifies the GV-Orbit Server, which carries out the task defined for the input (if a task has been configured).

During contact closure, a current of 1.2 mA flows. A maximum of 48VDC can be applied to the tally input for less than 5 seconds without failure. No voltage above 5VDC should be continuously applied.

## Output

A tally output is a solid state relay (no audible click) with a maximum resistance of 10Ω and current capability of 150mA. It can withstand 200VAC.

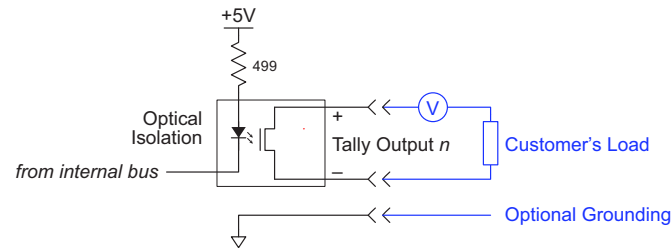


Fig. 5-3: GPI Output

When a condition (defined for the relay) occurs, GV-Orbit Server notifies the NV9680 which then opens or closes the relay. The relay switches the connected circuit on or off. This does not power the circuit. You must provide a power source for the circuit.

# 6 Technical Details

Chapter 6 provides electrical and mechanical specifications for the NV9680.

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## Power Specifications

Power specifications for the NV9680 control panels.

Specification	Detail
DC power	External power supply: 12VDC $\pm$ 10%, 5A.
Power consumption	12.72 W
Regulatory	UL listed and CE compliant.

Specifications for the PS0001 power supply.

Specification	Detail
AC power	90–264 VAC (127–300VDC), 47–447 Hz. Inrush current < 50 A at 230 VAC, cold start, at 25°C, Input current < 2.0 A rms at 115 VAC; < 1.0 A at 230 VAC.
DC power	< 60 W, 12VDC, 5 A (5.4 A peak), Regulation $\pm$ 2%. Ripple < 120 mV.
Efficiency	Efficiency > 80% at full load typical, 115 VAC.
Weight	1.06 lb (0.48 kg).
Regulatory	UL Listed and CE Compliant.

The power supply is a Grass Valley PS0001-00:

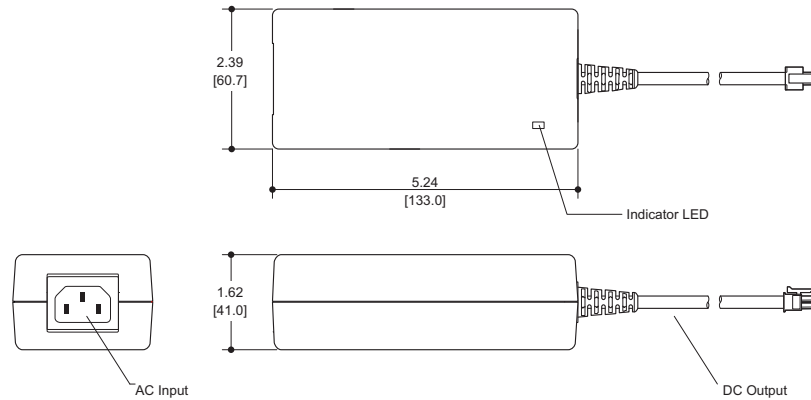


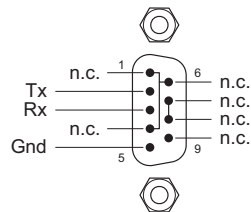
Fig. 6-1: The power output has Molex 4-pin plug. See [Power Cord Retention](#) on page 26.

## NV9680 Specifications

Specifications for the NV9680.

Specification	Detail
Dimensions	Height: 3.47 in (88.1 mm), fits EIA 2 RU (3.5 in or 88.9 mm), Width: 19.0 in (482.6 mm).
Depth	3.20 ± 0.01 in (81.3 mm), overall.
Power	12.72 W
Weight	1.892 kg (4.17 lb)
Connectors	Power: 2 connectors, Molex 4-pin, keyed. Ethernet: 1 connector, 10/100baseT, RJ-45 jack. RS-232: 1 connector, 9-pin D type, for diagnostics and upgrades. GPIO: DB25.
Tally Interface (GPIO)	Input: < 5 VDC continuous; < 48 VDC for less than 5 seconds; 1.2 mA when on. Output: < 150 mA; < 200 VAC.
Grounding terminal	None.

The RS-232 connector has this pinout:



Pins 1, 4, and 6 are tied together and pins 7 and 8 are tied together. None of those pins are connected to any circuitry.

## Environmental Specifications

Environmental specifications for the NV9680.

Specification	Detail
Operating temperature	0–40°C, ambient.
Relative humidity	0 to 90%, non-condensing.
Cooling	No fan required.

## Defaults

### DHCP

The panel is set up to respond to DHCP from the factory. It is possible to assign the panel a fixed IP address using the Panel IP Configuration Utility.

## Drawings

The drawings on the following pages identify features and provide overall and critical dimensions.

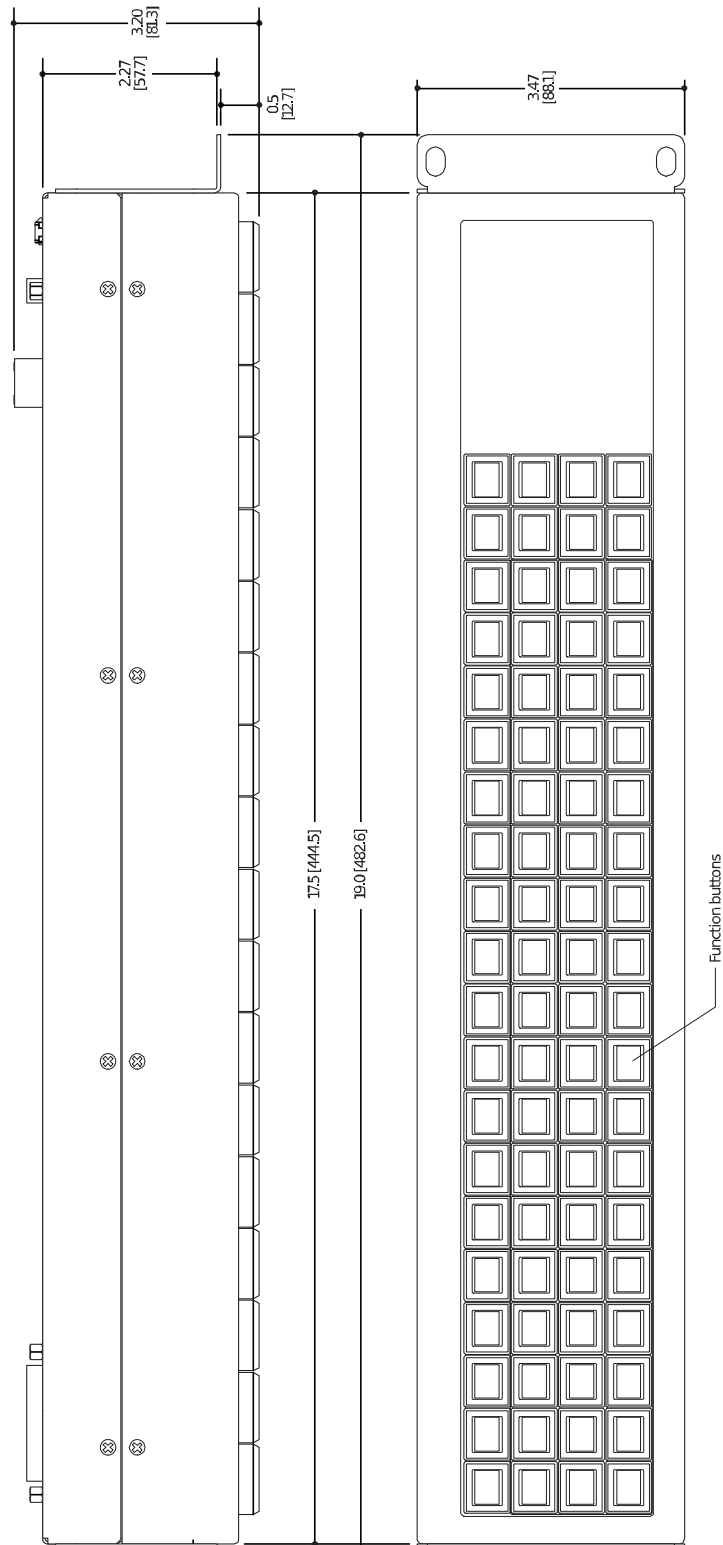


Fig. 6-2: Front and Top Views of the NV9680

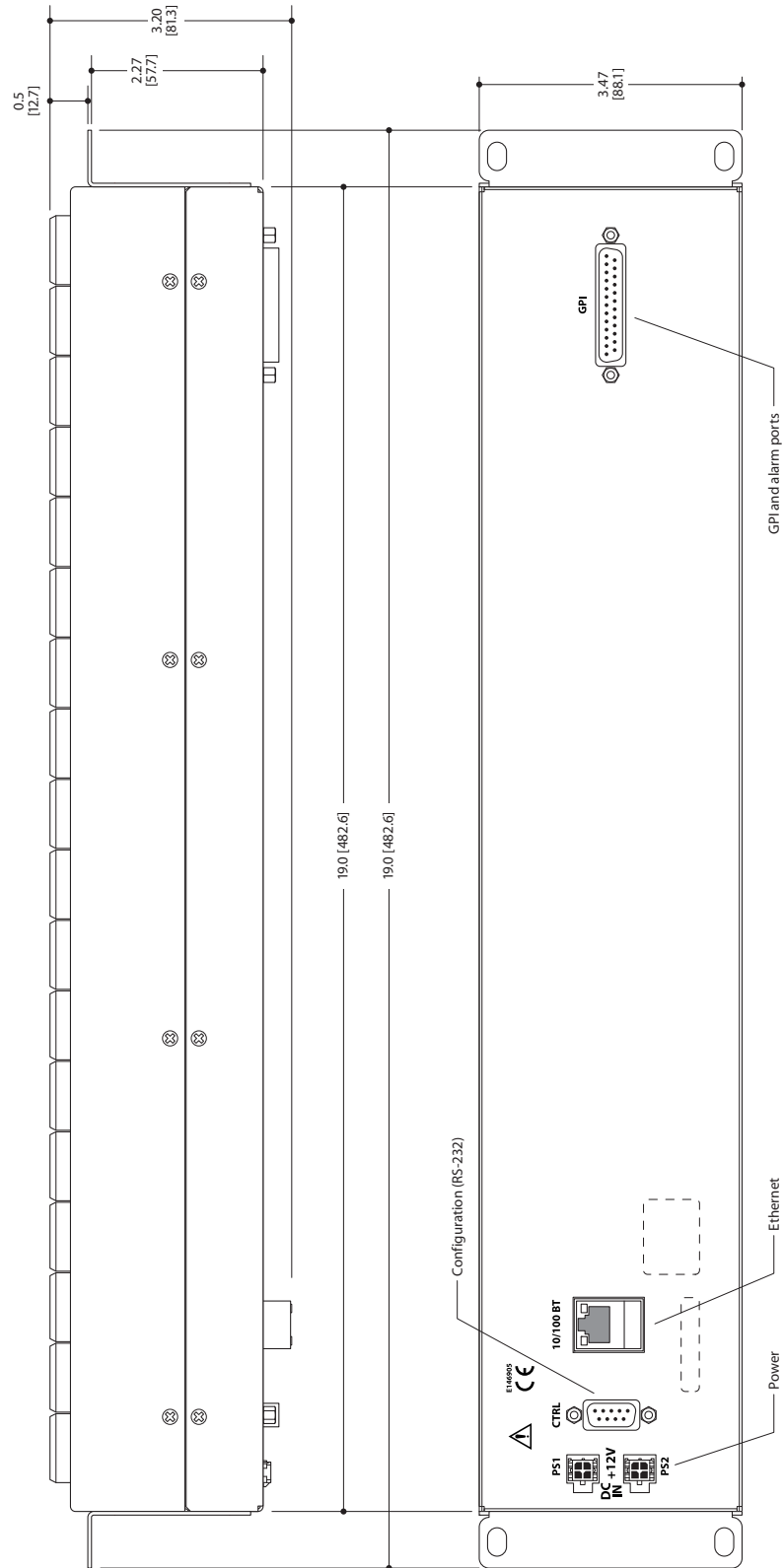


Fig. 6-3: Rear and Top Views of the NV9680





# 7

## Misc. Topics

Chapter 7 provides the following:

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### LCD Buttons

The 80 LCD buttons have 3 lines of text, 8 characters each. The text can be blank. The buttons can be of 7 colors in 4 brightness levels: high, medium, low, and off. “Off” is not quite black—you can read black text on the “off” background.

The following is an approximate representation of the 14 button colors:

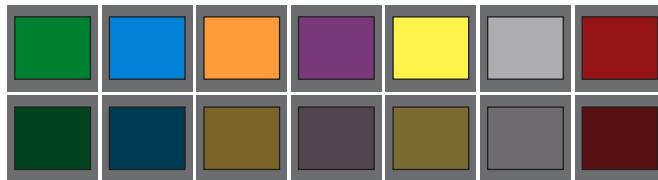


Fig. 7-1: Button Colors

The best way to view this illustration is on a computer monitor. A color printer cannot represent these colors nor can a black and white printer.

Each color is represented in Figure 7-1 as a (high-tally, low-tally) pair.

The colors of the up and down buttons are fixed. When they are off, they are white. When they are on, they are said to be “amber.” This amber is not the same as for the LCD buttons: it is pale and almost yellow.

### Firmware Upgrade

The panel’s firmware is upgraded through the RS-232 connector on the back panel. See [Figure 2-2](#) on page 5. Instructions to install new firmware are provided in the firmware package.

## Power Cord Retention

Use the supplied retention strap to keep the AC power cord firmly connected to the power supply. Follow these steps to use the strap:

- 1 Firmly insert the AC power cord into the power supply. Examine the last figure in this section to see how the strap should be applied.
- 2 Placed the Velcro retention strap, fuzzy side up, on top of the power supply with the buckle loop approximately 1 inch from the AC input side and the remaining strap around the cord end and down:



- 3 Holding the buckle in place, lift the strap up and around the cord end so the strap overlaps itself:



- 4 Holding the buckle loop in place, route the strap around the back of the supply diagonally across so that it sticks out on the left below the output cord:



- 5 Continue the strap around toward the buckle loop and through the loop. Cinch the strap tightly. While keeping tension, place the 2 inch strap end (with Velcro loops) down on the fuzzy part to complete the process:



- 6 Examine the strap though its path around the cord and power supply. Be sure that no slack exists and that it is tight the full length of the strap. If necessary, adjust and cinch it more tightly.

## Ordering Information

These are the NV9680 components:

PS0001	12V power supply, 4-pin Molex connector, with cord, and cord retention strap.
NV9680	Control panel. 80 button, 2RU.
WC0053	Optional breakout cable for the tally interface



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## **Grass Valley Technical Support**

For technical assistance, contact our international support center, at 1-800-547-8949 (US and Canada) or +1 530 478 4148.

To obtain a local phone number for the support center nearest you, please consult the Contact Us section of Grass Valley's website ([www.grassvalley.com](http://www.grassvalley.com)).

An on-line form for e-mail contact is also available from the website.

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