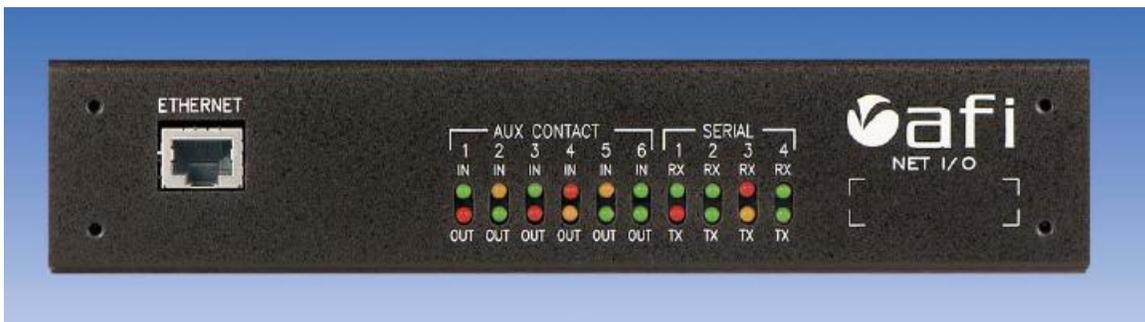afi

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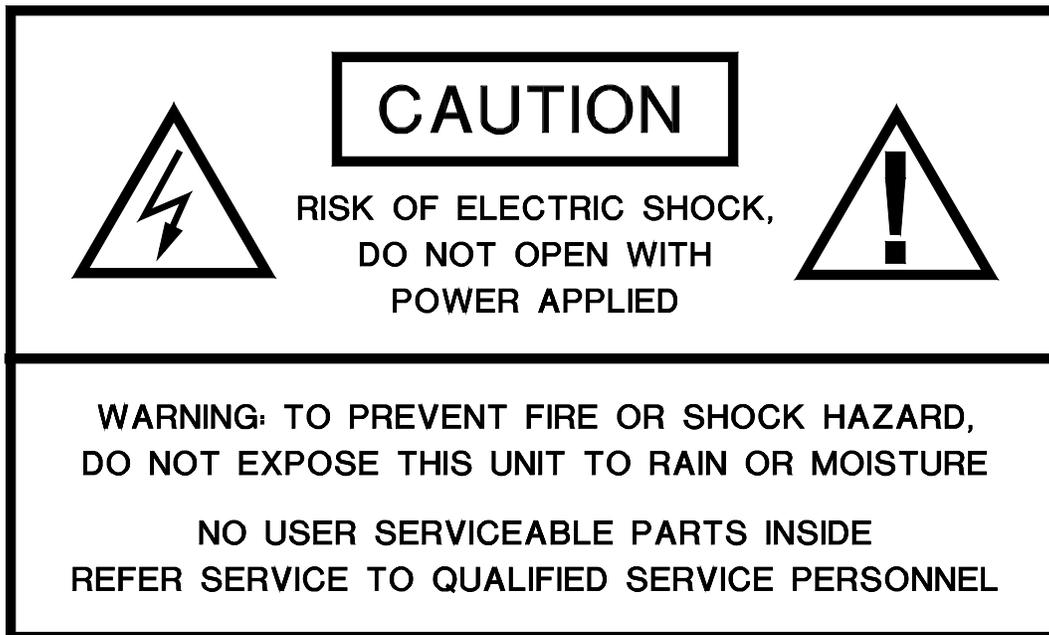

Net I/O N-664 User's Manual

Revision 8/6/2013

1

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┌─────────────────────────────────────────────────┐
│              ┌─────────────────────┐            │
│    /!\       │      CAUTION        │      /!\    │
│              └─────────────────────┘            │
│              RISK OF ELECTRIC SHOCK,            │
│                 DO NOT OPEN WITH                │
│                  POWER APPLIED                  │
├─────────────────────────────────────────────────┤
│     WARNING: TO PREVENT FIRE OR SHOCK HAZARD,   │
│    DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE  │
│                                                 │
│          NO USER SERVICEABLE PARTS INSIDE       │
│      REFER SERVICE TO QUALIFIED SERVICE PERSONNEL│
└─────────────────────────────────────────────────┘
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Introduction

Overview
Package Checklist
Product Features
Product Specifications

Overview

Thank you purchasing your American Fibertek N-664 Net I/O. Please take a few minutes to read these installation instructions in order to obtain the maximum performance from this product.

The AFI V'NES (Video Network Enterprise Solution) N-664 device allows serial data and contact closure signals to be made accessible on and linked over a network, with N-664 devices acting as transparent bridges to link together customer equipment. This permits contact closure signals – such as door opening sensors, alarm buttons, or motion detectors – to be linked to remote alarm annunciation, or serial data sources such as key pads or card registers to send data to a remote monitoring system.   N-664 devices can be linked together over a standard Ethernet connection, making it possible to use a pre-existing LAN or the Internet for device communication.

Package Checklist

> Net I/O
> Installation guide
> Power cord

Product Features

> Serial connectivity over network
> Auto-detect 10/100 Ethernet connection
> 4 port RS232, 485 2W (Half Duplex) or 4W (Full Duplex)
> Contact output (Form C, 1500KV isolated)
> Alarm input (configurable as NO/NC)
> Alarm transmission over network with verification and retry

Product Specifications

> **LAN**

> | | |
> |---|---|
> | Ethernet | 10/100 Mbps, RJ45 |
> | Protection | 1500KV magnetic isolation |

> **Serial**

> | | | |
> |---|---|---|
> | Serial interface | RS232/RS485 | |
> | Duplex | Full or half duplex | |
> | Number of ports | 4 | |
> | Signals | RS2332: | TXD/RXD, CTS/RTS |
> | | RS485: | RX+/-, TX+/- |
> | Baud rate | 0 to 57600 bps | |

Contact closures

Contact type	Form C
Number of contact outputs	6
Current rating	2A
Voltage rating	42VDC
	29VAC RMS

Battery backup

Real-time clock	10 years
User settings	Indefinite

Power requirements

Connector type	Grounded IEC C14 socket
Power input voltage	100 – 240VAC
Power input frequency	50 – 60Hz
Power required	5W maximum

Mechanical

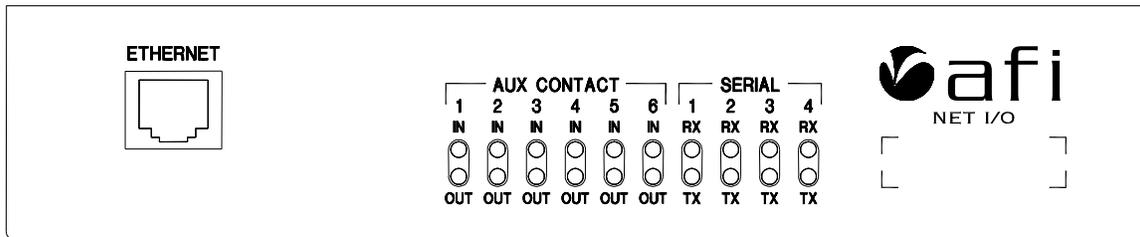|	
Dimensions	8.5" x 1.75" x 4.25"
	216mm x 44.5mm x 108mm
Weight	1 lb, 6 oz (0.62 kg)
Mounting	Surface or rack mount

Environmental

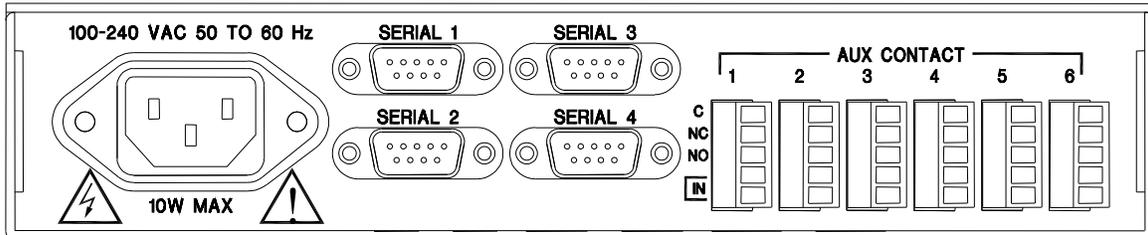|	
Storage temperature	-20C to +85C (-4F to 185F)
Operating temperature	0C to 70C (32F to 158F)
Operating humidity range	10 - 95%RH

2
Getting Started

Panel Layout
Connecting the Hardware
LED indicators
Real-time clock

Panel Layout

N-664 Front

N-664 Rear

Connecting the Hardware

Connecting power

Use the supplied AC line cord to connect the N-664 to a 100-240VAC power line by plugging one end of the cord into the polarized 3 pin socket on the rear of the N-664, and the other end into an available 3 pin grounded power outlet. A few seconds after connecting power you should see the front panel LEDS light green, then red, in sequence from left to right. The N-664 should now be ready for use.

Connecting to the network

Connect one end of an Ethernet cable to the N-664's Ethernet port and the other end of a cable to the Ethernet network.

Connecting a serial device

The N-664 has four DB-9 serial ports which can be configured in software for several different communications modes.   The method used to connect to the serial port will vary depending on the hardware mode selected.

Connecting RS232

To connect the N-664 to a RS232 serial device, connect a serial cable from one of the serial ports on the rear of the RS232 to the serial device.

Connecting RS485 four-wire

To connect to a serial port in RS485 4-wire mode, you will need a DB9 connector wired as indicated. Four connections will need to be made for the two data transmit lines and the two data receive lines. Do not make any other connections to any other pins on the DB9 connector.
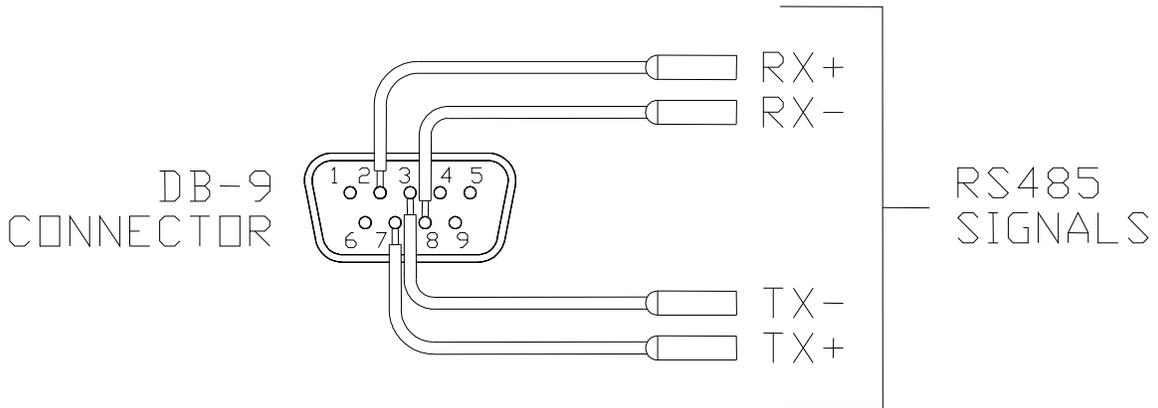
Connecting RS485 two-wire

To connect to a serial port in RS485 4-wire mode, you will need a DB9 connector wired as indicated. Two pairs of pins on the DB9 will need to be bridged together. Two connections will then need to be made to the bridged pins for the two bidirectional data lines. Do not make any other connections to any other pins on the DB9 connector.
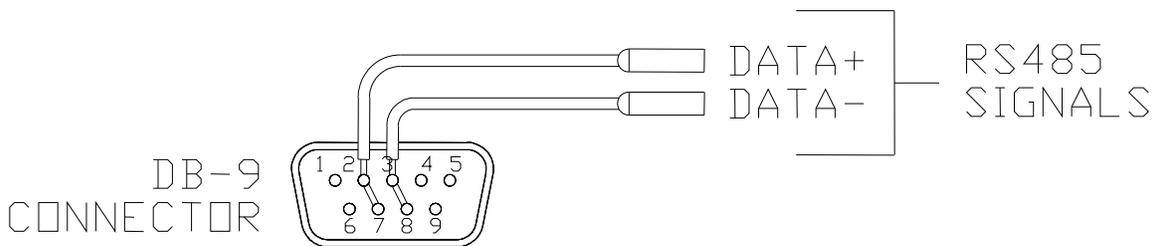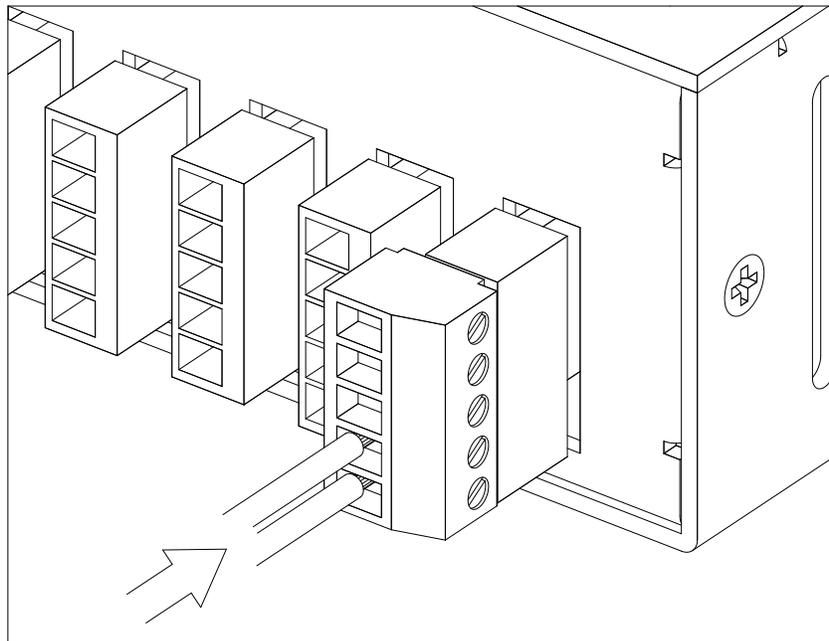
Connecting contacts

The N-664 has six ports for contact inputs (alarms) and contact outputs (aux). Each port is a five pin header with a supplied plug with screw terminals. Customer connections to the contact ports are made by securing stripped wire ends into the screw terminals.

Note: All connections to the screw terminals should be made with the terminal plug removed from the unit, and with power disconnected from any customer equipment being connected to the terminals.

Connecting an alarm input

Each contact block has two terminals which are used as an alarm/contact input. Viewing the rear of the N-664, these two terminals are the lower two of each 5 pin terminal block. These terminals are intended to be connected to customer equipment which will make or break a connection between the two terminals, such as a door open switch or motion detector contact output. It can be designated through the configuration web page if an alarm condition will correspond to the connection being made or the connection being broken.

To connect an alarm source such as a door switch or motion detector to the N-664, use two wires, 16-28 AWG in size. Strip about ¼" of the insulation from the end of the wires before inserting them into the terminal blocks. Tighten the terminal screws to secure the wires in the terminal block.


Alarm Input Connection

Note: the electrical connection to the alarm inputs are to be connected only to isolated contact closure devices, and must not be directly connected to any external power or ground source. Directly connecting either terminal of the alarm input to any voltage source or external ground may damage the N-664.

Connecting an aux output

Each contact block has three terminals which are used for the aux contact out function. Viewing the rear of the N-664, these three terminals are the upper three of each 5 pin terminal block. Each contact output is a form C contact closure. The topmost terminal (labeled 'C') is the Common terminal on the form C. The second terminal (labeled 'NC') is the Normally Closed contact, and the third (labeled 'NO') is the Normally Open contact.

To connect an external device to an aux contact out on the N-664, use two wires, 16-28 AWG in size. Strip about ¼" of the insulation from the end of the wires before inserting them into the terminal blocks. Tighten the terminal screws to secure the wires in the terminal block.

Normally Open Aux Contact Out   **Normally Closed Aux Contact Out**
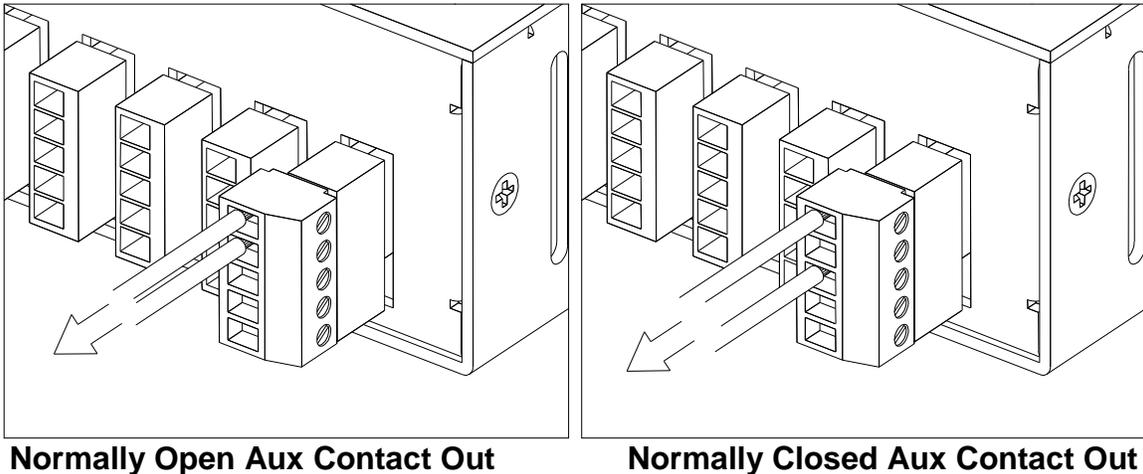
When an output is not active, the Common terminal will be electrically connected inside the N-664 to the Normally Closed terminal. When the output becomes active, the connection between the Common terminal and the Normally Closed terminal will be broken, and a connection will then be made inside the N-664 between the C terminal and the Normally Open terminal.

The Aux Output terminals are electrically isolated from the N-664 and from each other, and can be safely connected to external power sources or grounds.

LED indicators: power up sequencing

Within 5 seconds of the AC power cable being connected, the N-664 will perform a test of its front panel indicator LEDs. It will light each LED in sequence, starting with the leftmost LED and proceeding from left to right. The LEDS will first light green, then red, then turn off. Once the sequence has finished the LEDs will resume their normal function and the unit will be ready for use.

LED indicators: normal functions

The front panel of the N-664 has several LED indicators. These indicators are grouped into 6 pairs for indicating the status of the aux/alarm contact ports, and four pairs for indicating the status of the serial ports. The action of individual LEDS is as follows:

AUX CONTACT IN

The upper LED in each AUX CONTACT pair indicates the status of the Alarm In connection for that contact port. This LED will illuminate red when that Alarm In is active. Active can indicate either that the contact is open, or that the contact is closed, depending on the setting in the "Alarm Setup" management page chosen for that alarm input.

AUX CONTACT OUT

The lower LED in each AUX CONTACT pair indicates the status of the Aux Out connection for that contact port. This LED will illuminate red when that Aux Contact Out connection is active. Active indicates that the C terminal on the port is now connected to the NO terminal and disconnected from the NC terminal.

SERIAL RX

The upper LED in each SERIAL pair indicates the presence of data incoming on that hardware port. When data is being received from attached customer equipment and transmitted over an active network link, that RX led will flash green.

SERIAL TX

The lower LED in each SERIAL pair indicates the presence of data outgoing on that hardware port. When data from an active network connection is being sent out on that port, the TX led will flash red.

Real-time clock

The N-664's real-time clock and calendar (RTC) uses a lithium battery to retain time and date settings while the unit is not powered. It is strongly recommended that you not attempt to replace this battery without technical assistance from AFI.

3
Initial IP configuration

Factory default IP
Reset sequence
NTP/timeserver configuration

Factory default IP

The N-664 is factory programmed with the following default IP address:

192.168.0.246

If the N-664 has not had its IP address changed by the user it will be possible to connect to it at this network address. If you do not know the IP address of the unit, you can reset the unit back to factory defaults and then connect at the default address.
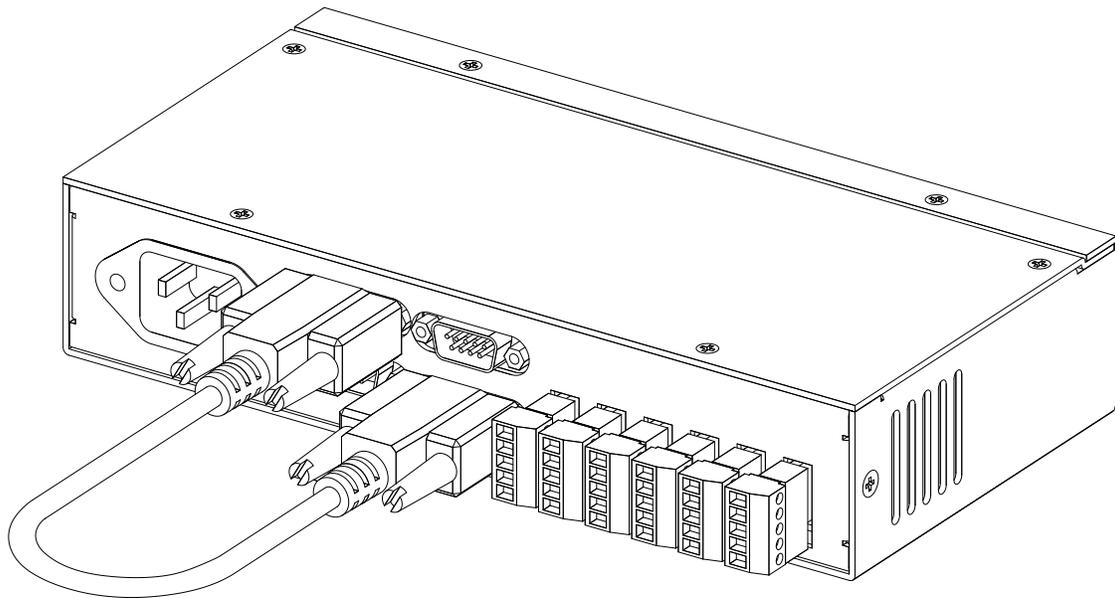
Reset sequence

If the IP address or username and password to log in are not know, it will be necessary to reset the N-664 to factory defaults in order to access the administration web interface. The reset procedure will set all unit settings to their factory defaults.

To reset the N-664 perform the following steps:

>Disconnect power from the N-664
>Disconnect any attached serial and contact connections if present
>Connect a null-modem cable from serial port 1 to serial port 4 as shown

Null Modem Cable between ports 1 and 4

>Connect power to the N-664
>Wait for the LED test sequence to complete
>Disconnect power from the N-664
>Disconnect the serial loop-back cable

The N-664 will now be reset to factory default configuration. This will reset all user-configurable settings, including network address, username and password, and all contact and serial interface settings.

NTP/timeserver configuration

The N-664 has a real time clock/calendar which keeps track of the current **Coordinated Universal Time** (UTC). This battery-backed time and date setting can be updated by regular **Network Time Protocol** (NTP) packets from a server connected to the same network as the N-664. Alternately, the N-664 can be set to actively connect to a UTC server for routine clock/calendar updates. The default setting is to accept NTP packets.

4
Operating modes

Overview
Serial Server Mode
Serial Client Mode
Alarm input forwarding
Aux outputs
Pilot interface

Overview

The N-664 permits devices which use serial or contact closure signals to communicate with each other to be connected over an Ethernet network. The N-664 acts as a virtual cable connection, permitting signals to be sent between units as if there was a direct connection between them. This allows the distance between customer equipment to be greatly increased, and reduces the number of cables needed to connect multiple pieces of customer equipment.

The N-664 makes serial ports and contact inputs and outputs accessible on a network. Other devices on the network (including other VNES devices such as the N-664 or Commander) can connect to these ports, or accept connections from them, allowing serial data or contact closure events to be transmitted between devices. The N-664 comes with a configuration web interface which can be used to link serial and contact ports on multiple N-664 devices together to provide a transparent connection between customer equipment over the network.

In addition to providing transparent serial or contact connection between customer equipment, the N-664 is also intended to work as part of a system with V'NES Pilot software. This permits features such as logging of contact events or serial data.

Configuration of serial links and contacts differ in that serial connections are intended to be point-to-point communication between two devices, while contacts can be set to trigger various actions locally or remotely as desired. Each serial port or contact input or output can be configured independently.

Each serial port can be set to act as either a Server or a Client port.

Serial Server Mode

In Server mode, the N-664 will make available a network port with a unique IP and Port number. It will then wait passively for an incoming TCP/IP connection to that port. When a TCP/IP connection is established, data sent to the N-664 through the TCP/IP connection will be transmitted out on the hardware serial port, and data received on the hardware serial port will be returned to the TCP/IP connection. This incoming TCP/IP connection could be a made by another N-664 device in Client mode, another V'NES product, or by a third-party device.

Data flow between the hardware port and the TCP/IP connection is bidirectional. The rate at which data on the RS232 port is transmitted and received can be set through the configuration web page. If the port is configured as an RS232 or 4 wire RS485 data flow may be synchronous. A port configured as 2 wire RS485 must operate asynchronously, where data reception will be inhibited while data is being transmitted out by the port.

Once a connection has been made to a port on the N-664, no other connection to that port will be accepted until the connection is broken. Once the connection is broken the N-664 will reset and re-open the port, and will wait for the connection to be re-established.

An option is available to only permit incoming TCP/IP connections from a specific source. If the user specifies an IP address for a server mode port, only connections from that port will be accepted.

Serial Client Mode

In Serial Client mode, the N-664 will actively attempt to connect to a pre-defined server device over the network. When a valid IP address and target port are set through the configuration screen, the N-664 will attempt to open a TCP/IP connection to that address. Once a connection is made, serial data received on that hardware serial port will be transmitted to the target server device, and data returned by the target server device will be returned to the hardware serial port.

Data flow between the hardware port and the TCP/IP connection is bidirectional. The rate at which data on the RS232 port is transmitted and received can be set through the configuration web page. If the port is configured as an RS232 or 4 wire RS485 data flow may be synchronous. A port configured as 2 wire RS485 must operate asynchronously, where data reception will be inhibited while data is being transmitted out by the port.

Each serial port can only send data to a single target server address at once. If the connection to the target server is lost, the N-664 will immediately attempt to reconnect. If the reconnect attempt fails, the N-664 will retry every 60 seconds afterwards to re-establish the connection.

Alarm input forwarding

The N-664 has six contact inputs which can be connected to customer supplied contact closure devices such as motion detectors or door switches. These alarm inputs can be linked through the N-664 to trigger aux contact outputs on that device, or another N-664 device or other VNES devices elsewhere on the network.

The conditions which will be considered an alarm can be set through the configuration web page. Thus the N-664 can be used with alarms where a contact is broken (such as a wire break or emergency stop switch) or where a contact is made (such as a motion detector). The minimum duration that the contact must be made or broken before an alarm is registered can also be set by the user, so that the user can set an alarm to trigger only if an alarm condition has been present for a certain amount of time.

When an alarm is triggered, the N-664 can be set to activate aux output contacts either on that same N-664, or on other N-664 or VNES devices on the network. The user can set which output to set and whether to turn it on or off in response to the triggered alarm. The user can also set the target aux contact out to be set on or off for a specific duration in response to a local alarm condition. Alternately the user can set the target aux contact out to be set on or off indefinitely in response to a local contact, so that a local contact will cause an aux out to be set or cleared until some other trigger clears or sets that aux output.

The permitted targets of aux contact actions to be taken in response to local alarms are any N-664 devices, or any other compatible VNES device, such as a C10 Commander,

on the same network as the N-664. Up to two independent actions can be taken by an N-664 in response to a local alarm condition.

Local actions – where a local alarm condition is set to activate an aux contact output on the same local unit – will be taken immediately. Remote actions – where a local alarm condition is set to trigger an aux contact on another unit – are stored in a queue and acted on sequentially. The N-664 will for each queued action attempt to open a connection to the target device and send it a command to take the set aux output action. If it fails to connect, or fails to get a confirmation response from the target device, it will retry the action after a 5 second delay. The N-664 will attempt to take an action 15 times before abandoning it.

Aux outputs

The N-664 makes six aux contact outputs available to devices on the network. Any device on the network can connect to a port on the N-664 and with a properly formatted and authenticated message signal the N-664 to trigger one of those output ports to change state. The N-664 will verify that the indicated aux output did in fact change state and will respond to the device which sent the message to confirm. Each of the N-664's six aux outputs can be controlled independently and can accept state change commands from any number of sources.

The N-664 outputs are controlled by mechanically latching relays. Once an output has been commanded to a specific state it will retain that state until commanded otherwise, even if power to the unit is lost. The user can set through the configuration web page the behavior for the contacts to take when power applied to the unit after a power outage. Each output can be configured to switch on, switch off, or retain the previous state on power-on. Retaining the previous state is the default condition. The behavior of the contacts on power loss cannot be changed from staying latched to the previous state.

Each aux output can also be manually controlled by the user through the configuration web page. The web page will indicate the current state of each aux output and permit the user to change that state.

Pilot interface

The N-664 is intended to communicate over the network with up to four Pilot server devices. The user will provide an address and port number for each of the Pilot servers he wishes the N-664 to communicate with. The N-664 will automatically attempt to connect to Pilot servers when a valid IP address and port number have been provided.

Once connected to a Pilot server, the N-664 will send updates of the status of all alarm inputs and aux outputs to each Pilot server every 5 seconds. It will also send immediate updates every time an alarm input or aux output changes state.

5
Web Interface

Connecting to the N-664
Interface layout
Operator setup
Global settings
IP Ethernet Setup
NTP Setup
Alarm Setup
Aux Setup
Communications
Reboot Net I/O

Connecting to the N-664

Use a Windows PC or similar computer connected to an Ethernet network. Connect the N-664 to the same network. Ensure that the network is one where the IP address of the N-664 (Default address is 192.168.0.246) is legal and not already in use.

You will need to use a browser program such as Internet Explorer with cookie functionality enabled to connect to the N-664.

Type 192.168.0.246 in to the Address bar of your browser window and then press Enter. (If you have changed the IP address of the N-664, you will need to type that address in instead.) You should see a prompt for a User Name and Password to access the unit.
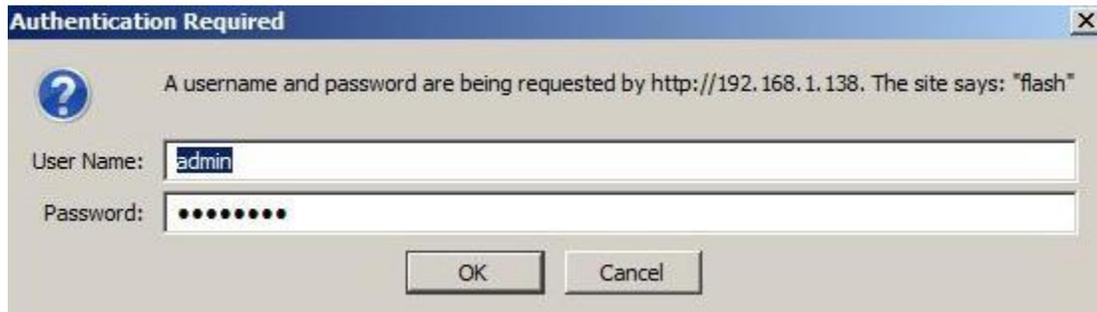
[note – need to fix this to have the right address and username/password]

The default User Name and Password are "Admin" and "Password" respectively. It is strongly recommended that you change these when you first install and set up your unit.

Interface layout

The N-664 web interface screens use a common design in which the screen is divided into three sections. Across the top of the screen is a title bar which contains the user-settable device name and device location strings, and the current time and date setting.

Down the left side of each screen is a menu used to access the configuration sub-pages. Clicking on one of the selections in that menu will bring up that configuration sub-page. The name of currently selected sub-page will be indicated in bold.

When an individual sub-page has been selected, that sub-page will display in the main part of the interface screen. The name of that sub-page will be shown in a header just below the main title bar. Controls specific to each sub-page will be shown below that, and at the bottom of the screen will be buttons labeled "Save" and "Default"

Save   Default

The Save button at the bottom of each screen will cause the specific settings on that screen to be saved to the N-664's nonvolatile configuration files, and then will return the user to the main configuration screen.

The Default button will cause all settings on that screen to be reset back to their factory defaults. It will also save the default settings to the nonvolatile configuration memory and return the user to the main configuration screen. These changes will take place immediately.

Operator setup
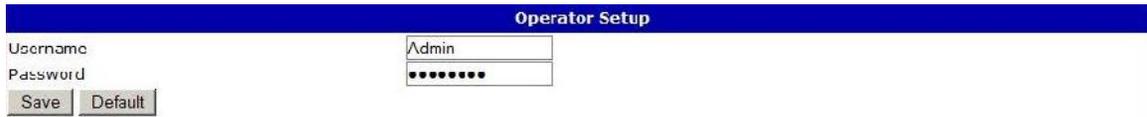
Operator Setup	
Username	Admin
Password	••••••••
Save Default	

The Operator Setup screen permits the user to set the Username and Password used to log in to the operator web page. A username and password combination are required. It is recommended that you change these from the default settings.

Setting	Default Value	Range
Username	"Admin"	15 characters
Password	"Password"	15 characters

Changes to this page take place immediately. If you change the username or password and save changes, you will then have to enter the new username and password to continue using the web interface.

Global settings

The Global Settings screen permit the user to change the Device Name and Device Location strings associated with the N-664. These strings are shown at the header at the top of every configuration web page. They are also provided in the configuration data sent to any Pilot server which the N-664 communicates with to identify the N-664.

The Global Settings screen also permits the user to change which authentication will be used for the API. The user may select for the fixed internal username and password to be used, or for the user-supplied username and password to be used.

Setting	Default Value	Range
Device Name	"NetIO N-664"	39 characters
Device Location	"Afi"	39 characters
API Authentication	Internal Authentication	Internal Authentication User Authentication

Changes to these settings take effect immediately.

Changes to the API Authentication will take effect at the next unit startup. Note that when tunneling contacts between units, both units must have the same API Authentication setting and the same Username and Password set.

IP Ethernet Setup

The IP Ethernet Setup page permits the user to set the network address and network access settings of the N-664. It also permits the user to designate up to four Pilot servers for the N-664 to connect and sent configuration data and status updates to.

Setting	Default Value	Range
IP Address	"192.168.0.246"	15 characters
Subnet Mask	"255.255.255.0"	15 characters
Default Gateway	"192.168.10.1"	15 characters
DNS	"0.0.0.0"	15 characters
MAC address	Unique for each unit	6 bytes hexadecimal

These three IP configuration strings must be provided in dotted-quad format and have a maximum length of 15 characters. Note that changes to these settings take place immediately, so if you change the unit's IP address in this screen and then save the settings you will have to enter the new IP address in the browser address bar to reconnect to the unit. Changes to the network settings will also cause any active Pilot or serial port network connections to disconnect. Those connections will then attempt to reconnect with the new network settings.

The DNS is an optional field. If a valid DNS address is provided, it will be used to look up the address of the mail server provided by the user.

Setting	Default Value	Range
Pilot Server	1 - 4	Fixed
IP	"0.0.0.0"	15 characters
Port	8800	8000 - 32767

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Settings for four Pilot servers are provided. Default settings for each are "0.0.0.0" and port "8800". An N-664 will not attempt to connect to a Pilot server whose address is still "0.0.0.0", but will begin attempting to connect as soon as a valid address is entered and saved.

For each of the four target servers, an indication of "CONNECTED" or "NOT CONNECTED" is provided to show if the N-664 has successfully connected to that server.

Email Settings:

Setting	Default Value	Range
To address		80 characters
SMTP Mail server		64 characters
Login name		64 characters
Password		16 characters
Retries	3 tries every 15 minutes	0-999, 0-999

In order to send email notifications the N-664 needs to connect to an SMTP mail server. The server may be an IP Address or mail server URL. In the case of a URL, at least one DNS server must be specified on the IP Ethernet set up page.

A 'Mail status' indication is provided to indicate the status of any attempt to send an Email message.

NTP Setup

NTP Setup	
NTP	AcceptNTP Broadcast ▼
Enter NTP Server Address	0.0.0.0
Update Time Every	12 Hours 00 Mins
Save Default	

The NTP Setup screen is used to control how the real-time clock/calendar of the N-664 is updated. The user can select one of three update modes: No updates, NTP broadcast updates, or polling a NTP server.

If "None" is selected for the NTP update mode, the N-664 will never update its real-time clock/calendar. If the time was set accurately before updating was disabled and a working battery is installed it should retain a fairly accurate time and date for some time. There will be some drift from true time and date over time, so this mode is not recommended.

If "Accept NTP Broadcast" is selected, the N-664 will update its time and date settings every time it received a NTP broadcast packet on the network. This is the default setting.

If "Poll NTP Server" is selected, the N-664 will periodically connect to a NTP server to update its RTC setting. No server is specified by default, so if the user wishes to use this function they will have to specify a server address. The time between updates can be set. The default setting for update rate is to update once every 12 hours.

Setting	Default Value	Range
Mode	Accept NTP Broadcast	None Accept NTP Broadcast Poll NTP Server
Server Address	"0.0.0.0"	15 characters
Hours	12	0 - 32767
Minutes	0	0 - 59

Alarm Setup

The Alarm Setup screen is used to configure the N-664's six alarm inputs, and the actions to be taken when any of these input is triggered. Each of the hardware alarm contact inputs can have its trigger conditions and actions independently configured.

Alarm settings

Setting	Default Value	Range
Name	"alarm-N"	15 characters
Input Type	Normally Open	Normally Open Normally Closed
Duration	1 second	Static 1,5,15,30,or 45 seconds 1 or 5 minutes

Each alarm input has an associated user-settable text label. The alarm name label is supplied along with the number when reporting the status of an alarm input to a Pilot server. This label may be up to 15 characters long.

The Input Type setting selects if the normal (non-alarm) state is if the contact input is closed or if the contact input is open. In Normally Open mode an alarm will be registered when the two contact input terminals are shorted to each other. In Normally Closed mode an alarm will be registered when the two contact inputs are not shorted to each other. The default mode is Normally Open.

The duration setting sets a minimum time for which the alarm condition must be maintained before an alarm is triggered. Setting the duration to "Static" will cause the N-664 to trigger an alarm the moment it detects an alarm condition. If a longer duration is selected the N-664 will not trigger an alarm until the input has been maintained continuously for that duration.

Alarm actions

Each alarm input can have set up to two actions to be taken on that alarm's triggering. These actions consist of setting aux contact outputs on that same N-664, or on other N-664 devices or other VNES devices on the network, or of sending an email message.

Setting	Default Value	Range
Email	Off	Check box on/off
Action address	"0.0.0.0"	15 characters
Action aux	1-6	1-99
Action state	On	On Off
Action duration	5 seconds	Follow 1,5,15,30,or 45 seconds 1 or 5 minutes Indefinitely

Each alarm input can be configured to send an email message when the associated alarm input changes state. Multiple alarm inputs which occur within 5 seconds will be combined and sent as separate lines in a single email. Each event line in the email contains a time stamp indicating when that event occurred, and the entire email will also include information on the name and location of the N-664 which sent the email.

Address indicated the network IP address of the target device. This may be up to 15 characters long and must be in dotted-quad format. The default setting of "0.0.0.0" indicates no action to be taken. Set this to the IP address of this N-664 to indication an action to be taken on the local unit. Setting it to another valid IP address will cause the N-664 to attempt to connect to that target on the network and set an output on it when the alarm is triggered.

Aux is the number of the aux contact out on the target device to trigger. The valid range of this number depends on the device being contacted. The N-664 does not know what the target unit is, so it is the responsibility of the user to select a valid output number for the target device.

Action selects if the target aux output is to be set ON or OFF in response to the local alarm condition.

Duration sets how long to set the target output for. If a duration is set, the N-664 will set the target aux contact out to the selected status (ON or OFF) for the chosen duration, and them will set the target to the opposite setting. Thus, if an alarm is set to trigger a certain aux ON for 5 seconds, the N-664 will when that alarm is triggered contact the target unit, set the indicated aux to ON, wait five seconds, and then set the indicated aux to OFF.

Selecting "Follow" for the duration will cause the N-664 to make the targeted aux contact out follow the state of the alarm input. If the action selected is ON, the target will be

turned ON whenever the local alarm goes ON, and OFF when the local alarm goes OFF. Selecting an action of OFF will invert the behavior, causing the targeted aux to go OFF when the local alarm is triggered and ON when it is not.

Selecting "Indefinitely" for the duration will simply cause the N-664 to set the target aux contact ON or OFF once and leave it so set.

Buttons are provided which force an ON or OFF message to be sent to the indicated remote aux output immediately. These are used to test unit configuration and network connectivity.

IP Message Actions

Setting	Default Value	Range
IP:PORT	"0.0.0.0:23"	24 characters
Message – Alarm		80 characters
Message – Clear		80 characters

Address indicates the network IP address and port of the target device. This may be up to 24 characters long and must consist of an IP address in dotted-quad format, followed by a colon, followed by a port number in the range of 0 to 32767. The default setting of "0.0.0.0:23" indicates no action to be taken.

Message – Alarm holds a text message of up to 80 characters. When the local alarm is triggered this message will be sent to the entered IP address. A 'test' button is provided so that the user may manually test the sending of this message.

Message – Clear holds a text message of up to 80 characters. When the local alarm is cleared this message will be sent to the entered IP address. A 'test' button is provided so that the user may manually test the sending of this message.

Local Aux Actions

Setting	Default Value	Range
Local aux	1-6	1-6
Action state	On	On Off
Action duration	5 seconds	Follow 1,5,15,30,or 45 seconds 1 or 5 minutes Indefinitely

Aux is the number of the aux contact out on the local device to trigger. This number may be from 1 to 6.

Action selects if the target aux output is to be set ON or OFF in response to the local alarm condition.

Duration sets how long to set the target output for. If duration is set, the N-664 will set the target aux contact out to the selected status (ON or OFF) for the chosen duration, and then will set the target to the opposite setting. Thus, if an alarm is set to trigger a certain aux ON for 5 seconds, the N-664 will when that alarm is triggered contact the target unit, set the indicated aux to ON, wait five seconds, and then set the indicated aux to OFF.

Selecting "Follow" for the duration will cause the N-664 to make the targeted aux contact out follow the state of the alarm input. If the action selected is ON, the target will be turned ON whenever the local alarm goes ON, and OFF when the local alarm goes OFF. Selecting an action of OFF will invert the behavior, causing the targeted aux to go OFF when the local alarm is triggered and ON when it is not.

Selecting "Indefinitely" for the duration will simply cause the N-664 to set the target aux contact ON or OFF once and leave it so set.

Timing of actions on remote units

Actions to set aux contact outputs on the local unit will be acted on immediately. Actions to set aux contact outputs on other units on the network may be delayed up to a few seconds according to network conditions.

The N-664 stores actions to be taken in a queue. Each action is attempted in turn, and if an action is unable to be completed (unable to reach target address or target device did not acknowledge the command) it is pushed back on the queue and re-attempted after 5 seconds. After 15 failed attempts an action will be abandoned.

The N-664 is capable of attempting 6 remote actions simultaneously, so a long wait for a target to respond will not prevent other actions from being attempted.

When a action is taken to set a target aux out for a specific time duration, the beginning of that duration will be from when the N-664 first succeeded in contacting the target unit, not from when the alarm was triggered. Thus if a N-664 is set to set a specific aux contact out ON for 5 seconds when an alarm input is triggered, and it takes 3 seconds to initially contact the target, the N-664 will turn the target OFF 5 seconds after turning it ON and therefore 8 seconds after the alarm.

Aux Setup

The Aux Setup screen is used to configure the N-664's six aux contact outputs. Each of the six hardware contact outputs can be individually configured.

Setting	Default Value	Range
Name	"aux-N"	15 characters
Email	Off	On/Off checkbox
State on Startup	Previous	Previous Off On
Current state	N/A	On Off

Each aux output has a fixed number indicating which hardware output it corresponds to. These numbers cannot be changed. Each aux out also has a user-settable text label which may be up to 15 characters long. The aux name label is supplied along with the number when reporting the status of an aux contact output to a Pilot server.

The aux contact can be configured to send an email message when it changes state. Multiple aux changes which occur within 5 seconds will be combined and sent as separate lines in a single email. Each event line in the email contains a time stamp indicating when that event occurred, and the entire email will also include information on the name and location of the N-TAH which sent the email.

As each contact output has terminals for normally closed and normally open, there is no setting to change the action of a contact in software.

The aux contact outputs of the N-664 are mechanically latching relays which retain their state during loss of power. The default behavior of the N-664 is to retain all relays at their previous state when power is first applied to the unit. Optionally, the user can select for relays to turn OFF or ON when power is first applied.

The Aux Setup screen indicates the current state of each aux output, showing each as ON or OFF. These indications are updated every few seconds. Buttons are provided for each state so that the user may manually switch each output ON or OFF through the setup screen.

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All six aux contacts automatically accept commands from other devices on the network, such as other N-664 devices, Scout or Commander devices, or other Pilot servers. This function cannot be disabled.

Communications

The Communications screen allows the user to configure the N-664's four serial ports.

Setting	Default Value	Range
Name	"aux-N"	15 characters
Mode	RS232 Server	Disabled RS232 Server RS485-4 Wire Server RS485-2 Wire Server RS232 Client RS485-4 Wire Client RS485-2 Wire Client
Speed	57600	0-57600
IP	"0.0.0.0"	15 characters
Port	1-4	1-4
Flow Control	Hardware	Hardware None
Echo to local port	None	None 1-4

Each serial port has a fixed number indicating which hardware port it corresponds to. These numbers cannot be changed. Each serial port also has a user-settable text label identifying it for user documentation purposes. This string can be up to 15 characters long.

The serial mode drop-down menu allows the user to select both the hardware interface and the software behavior of each serial port. The hardware mode of each port can be selected between RS232, RS485 in 4 wire mode, and RS485 in 2 wire mode, to control the hardware behavior of the serial output pins. RS232 mode ports can be connected to customer equipment with any standard serial cable. RS485 2 wire or 4 wire ports will need to use a custom header to connect to customer equipment.

The software mode can be selected from server or client mode. "Disabled" mode can be selected to leave a port completely unused.

The hardware baud rate for each port can be selected from 0 to 57600 bps. This controls the rate at which each hardware port receives and transmits data. It does not affect the rate at which information is transmitted over the network.

IP address specifies the address of the target N-664 on which there will be a port which this serial port is to link to. This address may be up to 15 characters long and must be in dotted-quad format. An IP address is required for client mode and must contain the network IP address of the device the client will connect to. In server mode the IP address is optional. If an IP address is provided in server mode the server port will only accept incoming connections from that address.

The port number indicates which port on the target device the N-664 will attempt to connect to in client mode. Note that these numbers refer to the number of the serial port as indicated on the device and web screen, not the IP port number. This number has no function in server mode.

The flow control setting is used to control the function of the CTS/RTS pins when the port is configured in RS232 mode. With flow control set to 'Hardware' the RTS output pin on each port will only be asserted when that port is connected to a destination that can receive data, and the port will only transmit data when the CTS input pin is asserted. With flow control set to 'None', the RTS pin will be asserted all the time and the CTS input pin will be ignored.

The 'Echo to local port' function allows serial data received on one port to be automatically forwarded to another port on the same device. This is useful when attaching a network connection to monitor an existing serial communications link between two devices.

Procedure to link serial ports on two Net I/O devices together

The serial port function of the N-664 is intended to be used with two or more N-664 devices on a network, where a serial port on one N-664 is linked to a serial port on another N-664. Each port on a N-664 can be linked to a different N-664, or all four can be linked to separate ports on the same target N-664. The only restriction is that a port cannot be targeted to another port on the same unit, and client and server ports must be linked together in one-to-one pairings.

To link serial ports on two N-664 devices, you must designate one port on one device as the Slave, and one port on the other device as the Client. The Client port must be configured with the IP address of the Server, and the port number of the port on the server being connected to. The Server port may either be configured with the IP address of the Client, or set to '0.0.0.0'.

It is recommended that both ports in a client-server pair be set to the same hardware mode and the same baud rate. Setting different baud rates between the two ports is permissible, but not recommended as characters may be dropped if data is coming in to the higher speed port faster than they can be transmitted out of the lower speed port.

Baud rate and buffer size concerns

Each port has a buffer which stores data coming in from the serial port and stores it until it can be transmitted over the network. Normally this data is sent out over the TCP/IP connection as quickly as it is received. During conditions of heavy network activity or high latency the buffer may become full. When this occurs some data may be lost.

Data coming from the remote unit over the TCP/TP connection will be sent out over the local serial connection at the specified baud rate. If the remote unit is sending data at a higher rate than the local baud rate permits transmission, data may be lost.

Reboot Net I/O

The Reboot Net I/O screen allows the user to perform a hardware reset of the N-664. This will not affect the state of the stored configuration files, but will cause all N-664 systems to reset as if a power interruption had occurred. A single button, "Click here to reboot", is provided to restart the system.

The N-664 takes approximately 10 seconds to reboot and return to full function after this function is used.

When the N-664 is being reset, all the aux contact outputs will retail their current state until the reset cycle is completed, at which time they will behave as configured on the 'Aux Setup' page. Any messages from to change aux outputs from other devices on the network will be ignored while the device is rebooting. Alarm conditions on the alarm input terminals will also be ignored while the device is rebooting.
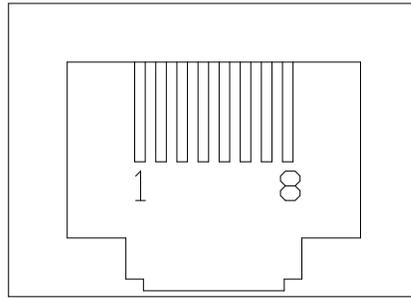
When the N-664 is rebooting, all serial data links over the network will be dropped. The unit will attempt to reestablish them once it has finished rebooting, but any data arriving on the serial ports during the reboot cycle will be lost.

A
Pinouts and connectors

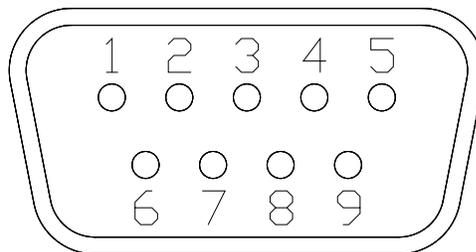**Power**
Ethernet
Serial
Aux/Alarm

Ethernet

Pins

1	TX+
2	TX-
3	RX+
4	N/C
5	N/C
6	RX-
7	N/C
8	N/C

Serial

RS232

Pins

1	Data Carrier Detect (DCD)
2	Receive Data (RD)
3	Transmit Data (TD)
4	Data Terminal Ready (DTR)
5	Ground
6	Data Set Ready (DSR)
7	Request To Send (RTS)
8	Clear To Send (CTS)
9	Not connected

RS485
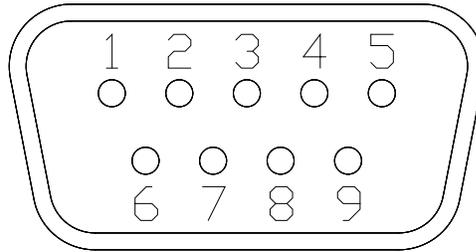
Pins

1	Not connected
2	Receive Data Positive (RX+)
3	Transmit Data Negative (TX-)
4	Not connected
5	Ground
6	Not connected
7	Transmit Data Positive (TX+)
8	Receive Data Negative (RX-)
9	Not connected

Aux/Alarm
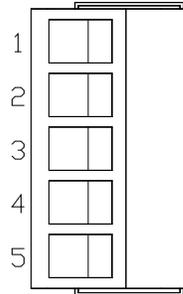
Pins

1	Aux Contact Common
2	Aux Contact Normally Closed
3	Aux Contact Normally Open
4	Alarm Contact In
5	Alarm Contact In

B
Service Information

Technical Assistance

If any questions arise concerning the installation of American Fibertek products, please allow us to assist you by calling, faxing or by E-mail.

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