METASYS®

Multiplex Binary

Order No. 636-027

Introduction

Description

The Multiplex Binary (XBN) is a module that interfaces points to the system and resides in the Network Control Unit (NCU) or Network Expansion Unit (NEU). It monitors up to 32 binary inputs (voltage, dry contact, or pulse), then reports changes in their states to the NCU for processing. LEDs on the module face display the status for each corresponding input.

PHOTO

Figure 1: Multiplex Binary

Purpose

The XBN interfaces a high concentration of binary input points to the NCU or NEU. The inputs may be any combination of these points: dry contact, up to 10 Hz frequency, and up to 120 VAC or VDC.

When residing in or remote to an NCU, the XBN serves to increase the point capacity of the NCU.

If the points are clustered at a distant location, the XBN additionally provides an economical way to connect them to the NCU—over the N2 Bus—without having to hardwire each contact separately to the NCU.

Application

Typically, the XBN monitors the status of 2-position devices such as fans, pumps, or security panels. Voltage input from a starter or pilot device can also indicate that the equipment has changed state.

In addition, the XBN can detect pulses from flow meters, electric utility meters, or other pulse output devices whose frequency is 10 Hz or less. The pulses are collected in the XBN's accumulator, then transmitted to the Network Control Module where they are converted into readable analog values.

The diagram below illustrates a configuration using two XBNs: the first XBN oversees HVAC-related fans and pumps near a building entrance. The data is transmitted over an N2 Bus to the NCU in the main equipment room. The second XBN is installed directly in the NCU, monitoring a variety of binary inputs in the equipment room itself.

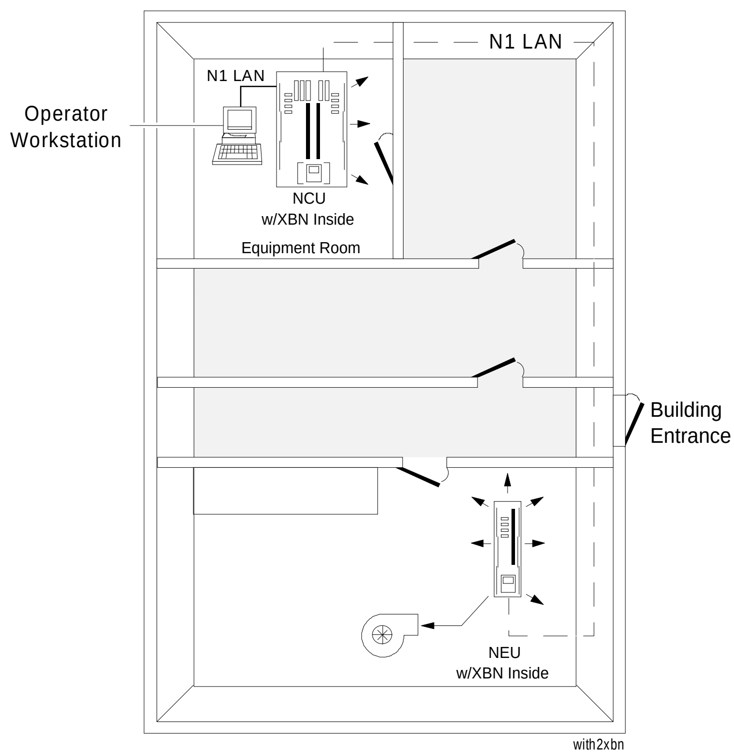


Figure 2: Typical Application with Two XBNs

Capabilities

Table 1: Capabilities

Capability	Description	Purpose
Modular Packaging	XBN electronics are integrated with system circuitry (eliminating the need for separate boxes for wires, transducers, etc.) and are housed in durable cases. Modules plug in and lock into position.	Simple to install and service; casing prevents physical and ESD damage in addition to shielding electronics from induced noise.
32 Binary Inputs	DC, AC, Dry Contact, and Pulse	Interfaces a high concentration of binary devices; flexibility to retrofit existing devices.
LED Indicators	32 Binary Inputs (software-configured: light ON = either closed contact/voltage absent), N2 Transmit, N2 Receive, Power, and Error (sanity circuit reset, check sum, RAM test result)	Determine module status by visual inspection.
Enhanced Input Circuitry	Each input is balanced differentially, with a high input impedance (significantly reducing amperage) and high level of isolation from noise and transients. Inputs withstand 120 VAC RMS of normal mode voltage.	The XBN withstands high levels of noise, especially common mode noise. Enables mixed input and output lines through a conduit, when allowed by local electrical codes.
Point Status Change Reports	The XBN latches and holds any valid data changed from an input point; further data changes are ignored until the first-detected change has been reported to, and acknowledged from, the NCM.	Report COS for alarm analysis or program triggering, and to notify operator(s).
Disable COS Reporting	Suppresses COS, reporting capabilities on a per input basis. While COS reporting is disabled, the NCM can still request point status without re-enabling the COS report functions.	Prevent constant COS reports from specified points (e.g. fluttering airflow switch).
Debounce Filter	Programs the XBN to ignore transient or intermittent changes by requiring consecutive identical input data before determining the current state.	Helps prevent false alarms or erroneous counts in accumulator points.
Accumulator (Pulse Applications)	For each status input, detects and totals transitions for pulses of less than or equal to 10 Hz (each pulse yields two transitions). When requested by the NCM, the Accumulator releases the number of valid signal transitions (up to 65,535 before rolling over).	Permit monitoring of devices that transmit frequency signals.

Specifications

Table 2: Specifications

Product	**Description**
Code Name	Multiplex Binary (NU-XBN101-0)
Microprocessor	Intel 80C51
Memory	8K by 8-bit Static RAM 8K by 8-bit E^2PROM
Binary Inputs	32 (contact, voltage present/absent, and low frequency pulses)
Maximum Input Voltage	120 VDC or 120 VAC RMS 50/60 Hz
Maximum Pulse Input Frequency	10 Hz or less (at 10 Hz, 12 mS < positive pulse width < 52 mS; and Debounce Filter set to 2)
Input Types	DC-Low Thresh: 3 V, Hi Thresh: 8 V AC - Low Thresh: 2V, Hi Thresh: 18 V Dry Contact - Low Thresh: 100 K ohms, Hi Thresh: 800K ohms Pulse—(0-10 Hz)
Minimum Output Load	10 mA at 5 VDC
Source Power	Power is from PWR in the NCU/NEU
Operating Temperature	32° to 122°F (0° to 50°C)
Storage Temperature	-40° to 158°F (-40° to 70°C)
Operating Humidity	10% to 90% RH
Storage Humidity	5% to 95% RH
Dimensions and Weight	14 in. H x 1.5 in. W x 6 in. D (355 x 36 x 152mm); 2 lbs 11 oz (1.13 kg)
Agency Compliance	FCC Part 15, Subpart J, Class A UL916 CSA C22.2 No. 205
Agency Listing	UL Listed and CSA Certified as part of the Metasys® Network

Engineering

Theory of Operation

The figure below illustrates the XBN's general components and their functions.

Field input ① is routed either through an IUN function module or directly into the base frame, depending on the XBN's slot position.

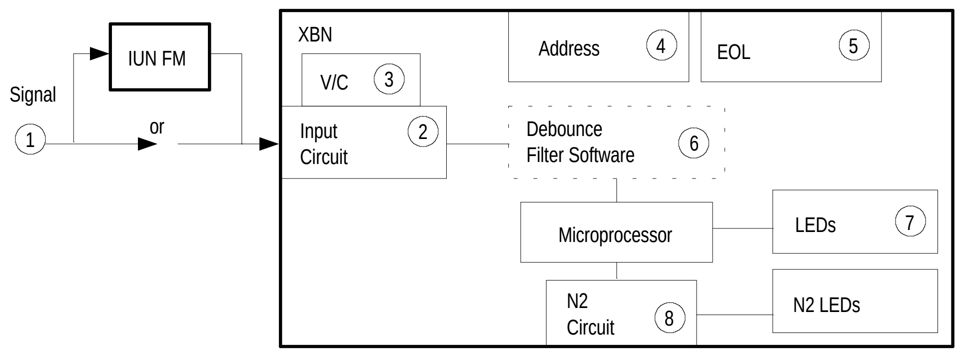


Figure 3: XBN Block Diagram

Thirty-two identical binary input circuits ② monitor input signals (dry contact, DC voltage, AC voltage, or frequencies of 10 Hz or less) changing from logical status 0 (voltage absent, contact open) to 1 (voltage present, contact closed) under these conditions:

Table 3: Input Signals

Sensed Input	Logical 0	Logical 1
Contact	$\geq$ 800K ohms	$\leq$ 100K ohms
VDC	$\leq$ 3 VDC	$\geq$ 8 VDC to limit of 120
VAC	$\leq$ 2 VAC	$\geq$ 18 VAC to limit of 120
Frequency		$\leq$ 10 Hz 12 mS $\leq$ Pos. Pulse $\leq$ 52 mS at 10 Hz Debounce count set to 2 Point defined as accumulator

The user sets a switch for each input ③ to select which type of signal the input senses: voltage or contact.

- If the V/C switch is incorrectly set to voltage, no contact changes-of-state can be sensed by the circuit.
- If the V/C switch is incorrectly set to contact, voltage differentials greater than -12 (e.g., -10) produce a logical 1; voltages less than -12

(e.g., -14) produce a logical 0. For large AC voltages, this may not have consequences, but low voltage levels will result in errors.

Address switches ④ provide a means to identify the module along the N2 Bus. An End-of-Line (EOL) switch ⑤ must also be positioned correctly for the N2.

Each input is protected to withstand all types of short circuits (input to input, across an input, input to other potentials) without damage, although operation would be temporarily unreliable. Input circuitry also protects against transient overvoltages of up to 1000 volts peak, with current tolerance to ESD static spikes protected to 6000 volts.

Input changes are filtered in software by a debounce filter ⑥ downloaded into memory.

LEDs ⑦ indicate the state of the respective input as received by the microprocessor after debounce filtering. The state of the input representing LED On is software programmable (either contact closed/voltage present or contact open/voltage absent).

The microprocessor outputs signals to the N2 communications circuitry ⑧ on the NCU/NEU backplane. Additional LEDs indicate N2 transmit and receive signals, as well as power and sanity circuit/firmware errors.

Design Considerations

The XBN monitors up to 32 binary inputs. As a module that fits into specific slots on the NCU/NEU base frame, its environmental requirements are identical to those of the NCU/NEU and may be referenced in that technical bulletin. Power is supplied by an associated, and separately ordered, Power Supply Module.

Mounting

The figure below illustrates in which slots the module may be installed (into any base frame's slot except the number 3 slot of a 5-slot base frame).

Darkened slots indicate Point Multiplex Module location options.

When placed in slots normally occupied by DCMs, Point Multiplex Modules require IUN FMs (also darkened).

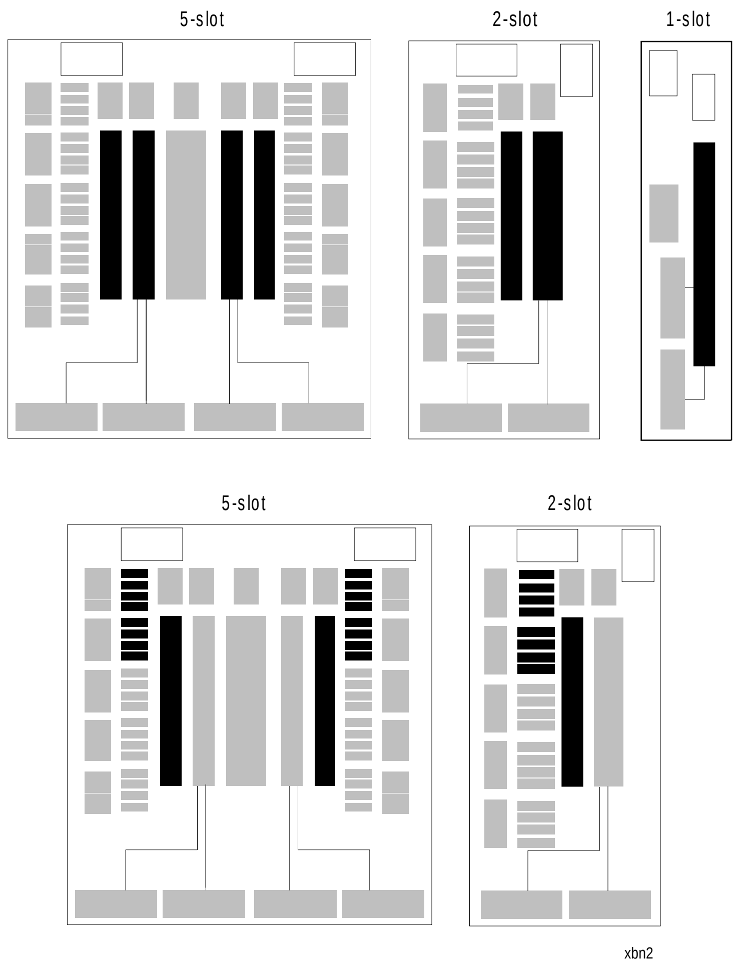


Figure 4: Mounting Options for the XBN

When installing an XBN into a slot normally occupied by a DCM (Slots 1 and 5 of a 5-slot, Slot 1 of a 2-slot), an IUN Function Module is necessary to transmit signals from the first 16 terminal blocks of the NCU/NEU to the XBN. Each IUN transmits two independent signals, requiring a total of eight IUNs. Inputs 17-32 (see Figure 19 for input locations) terminate on the bottom 16 terminal blocks and do not require

IUNs to transmit signals to the XBN. The presence of the IUN FM does not change or expand the range of signals processed by the XBN.

All configurations of the XBN in relation to other modules in the NCU/NEU panel are compatible, provided that the modules are properly located and the points correctly defined in the software.

Form C Inputs

Wiring both states of a Form C input requires two binary input terminals, as illustrated in Figure 5.

Note: Form C inputs *must* connect to adjacent screw terminal blocks, starting at an odd-numbered block (i.e., 1 and 2, 27 and 28; *not* 2 and 3, etc.).

Using all Form C inputs would reduce the point monitoring capacity from 32 to 16.

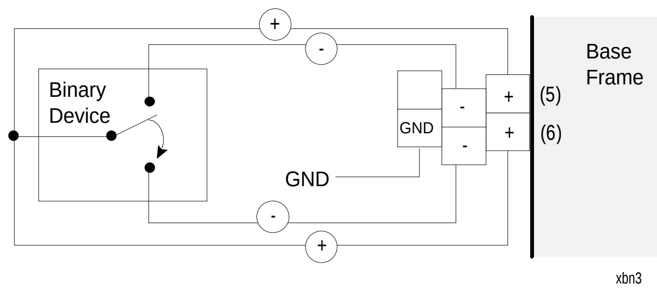


Figure 5: One Form C Input Terminating in Two Binary Inputs

Binary Inputs In Noisy Environments

To suppress nuisance signals from a noisy binary input, change the Debounce Filter to a value higher than the default of 2 (24 milliseconds); e.g., to 3, which yields 36 milliseconds.

An exception to this is when the input is a 0 to 10 Hz pulse input. In this case, the Debounce filter must be 24 milliseconds or less, and shields or other methods must be used to reduce the susceptibility of the lines to induced noise. See *Debounce Filter* under the *Binary Input Object Technical Bulletin*.

XBN Switches

Set the following switches on the XBN. Although the switches may be set either before or after installing the module, the N2 address switch must be set before turning power On (to register the physical address switch in memory). A change in the N2 address switches requires cycling power to the XBN.

N2 Address Switch

The N2 Address Switch sets the node address of the XBN. The switch contains eight binary settings, resulting in an address range of 0-255. Set the switches corresponding to the module's software-defined address.

End-of-Line Switch for N2 Bus

Two devices within each N2 Network must be designated as End-of-Line (EOL). For details regarding what constitutes EOL, refer to the *N2 Communications Bus Technical Bulletin*. Set the XBN module as one EOL device by sliding its switch up to "In."

Voltage/Contact Switch

The XBN has four contact/voltage blocks containing eight switches. The switches are numbered 1-32 with each switch defining a corresponding field input as either a contact input or voltage input (frequency inputs are characterized by their source as either contact or voltage). Set each switch according to the type of signal the addressed point should receive. The switch set to "V" reads voltage; set to "C" reads contact.

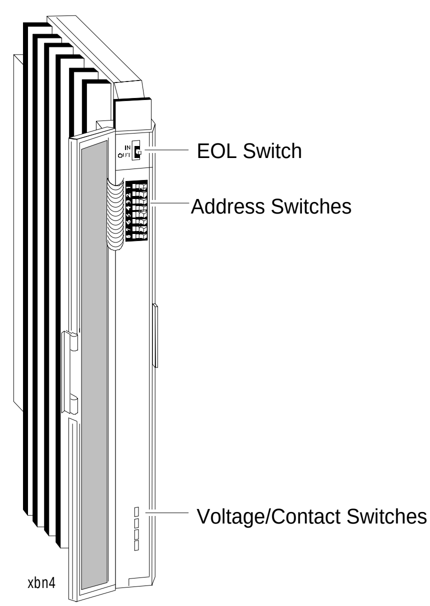


Figure 6: Location of XBN Switches

Wiring Details

Since the XBN and its associated power supply are both in modular form, the act of installing the module onto a base frame also makes all of the wiring connections for it. Only the field and communication wires need to be terminated.

Cabling to the NCU/NEU

The XBN withstands high levels of transient-voltage noise, which makes it possible to simply use individual, small gauge (14-28 AWG) wire and still yield excellent results. Apply the following guidelines when wiring through conduits or wire channels to the XBN:

1. Installations can typically use individual wires (stranded or solid), depending on local codes.
2. If an installation is expected to be in an extremely noisy environment (e.g., TV/radio stations or radar installations), a twisted pair cable provides greater noise immunity, leading to higher reliability. Shielding reduces noise even more, but it is not considered a necessity. This is true for all types of connections: voltage input or contact input.
3. Output wires may run with input wires (provided electrical codes are met) within the same conduit or wire channel.
4. The wire/cable insulation must meet code requirements.

Connecting the N2 Communications Line

For details about connecting the XBN to the N2 Bus, refer to the *N2 Communications Bus Technical Bulletin* in this manual.

Field Wiring

On the base frame, the field connections are provided in the form of screw terminal blocks. Each terminal location can handle a maximum size of one 14 AWG or two 18 AWG wires (to daisy chain), or a minimum size of 28 AWG wire.

Each field connection may require three screw terminals, two for signal and one for an optional shield.

Contact Inputs

The contact inputs can be wired without concern for polarity, although consistency in wiring (+) and (-) lines is recommended for both service and safety purposes.

If the (-) line is daisy chained as a single common (Figure 7), consistency between (-) and (+) wires *must* be maintained. Also, 18 AWG (maximum) wire must be used where the two (-) wires insert under a single terminal.

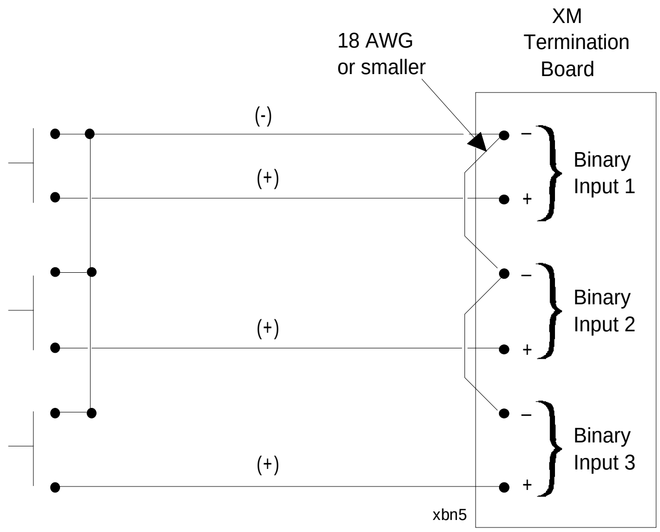


Figure 7: Wiring Contacts Using a Single Common (Daisy Chained)

Use the paired-wire technique (Figure 8), and not the daisy chained scheme, when connecting to various, widely spaced devices, since a single, widely spaced common may create a loop (antenna) effect and induce significant transient noise onto the system.

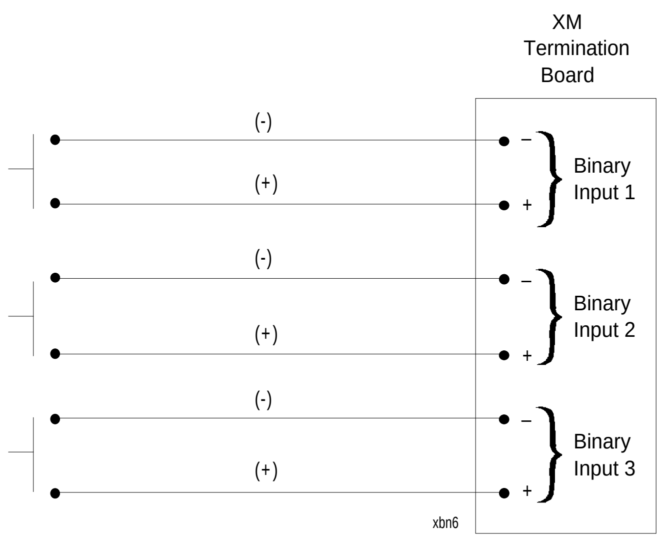


Figure 8: Wiring Contacts Using Paired Wires

Voltage Inputs, Line Voltage AC

Line-voltage AC inputs (>30 VAC RMS) can also be wired without concern for polarity; again, consistency is recommended for both service and safety purposes (Figure 9):

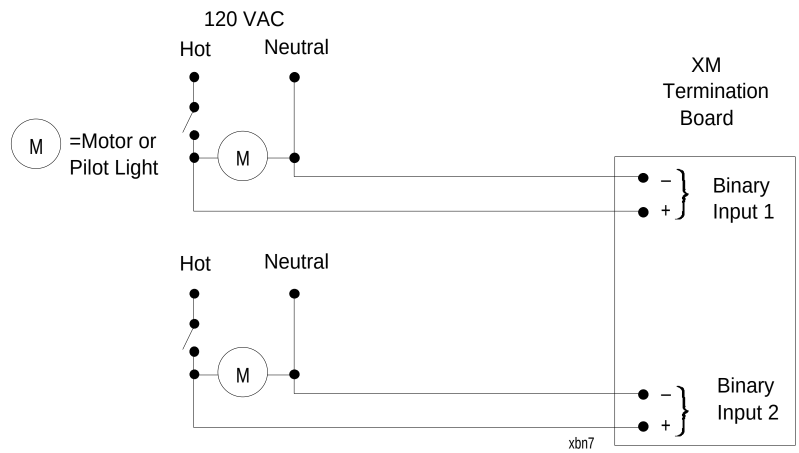


Figure 9: Wiring Line-Voltage AC Using Paired Wires

Voltage Inputs, DC and Low-Voltage AC

Terminate all DC and low AC (<30 VAC RMS) voltages in the manner illustrated in Figure 10. Wire the:

- positive voltage to the most internal (+) terminal
- negative voltage to the middle (-) terminal
- shields, if used, to the ground terminal

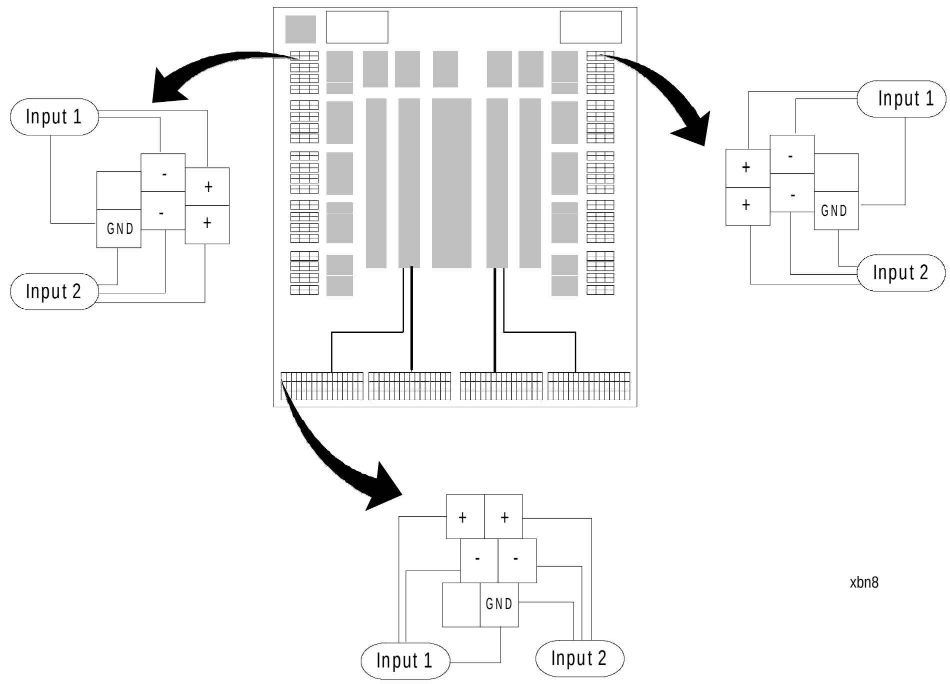


Figure 10: XBN Input Terminal Designations for VDC and Low AC

Field Wiring Applications

Six kinds of applications that input to the XBN are described on the following pages. Three common applications connect to the XBN without alteration to the circuit:

- devices wired across a load
- devices wired across non-grounded (dry) contacts
- devices in contact mode with open inputs and one side grounded

Three other applications require a small modification before connecting to the function module because unloaded XBN voltage inputs are sensitive to noise, especially when one of the input lines is earth grounded. This noise results in faulty readings.

- unpowered triac or SCR contact
- high powered (>1 amp) non-wiping contact
- neon lamp applications

Wiring methods for each of the six applications are shown on the following pages.

Binary Input Wired Across the Load

A binary input wired across the load (Figure 11) is a typical wiring configuration and requires no alteration to the circuit. Set the XBN mode switch to voltage. Examples of these loads include:

- fan motors
- pumps
- lights
- compressors

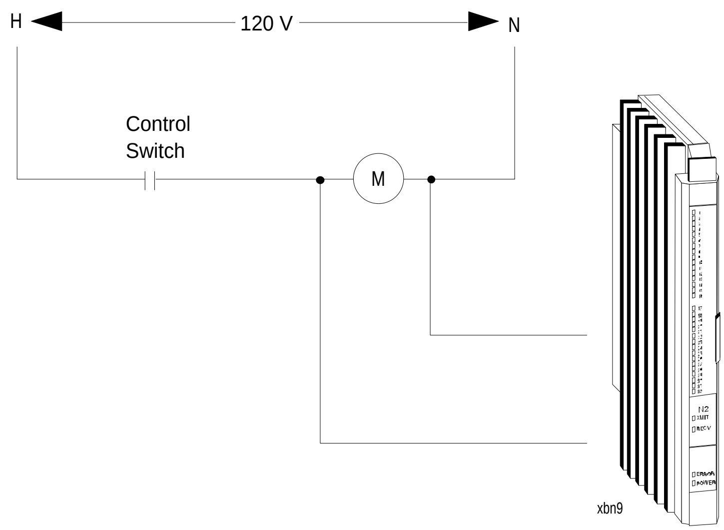


Figure 11: Wiring Across the Load

For applications normally wired across the load, make sure you don't wire across the control switch (Figure 12).

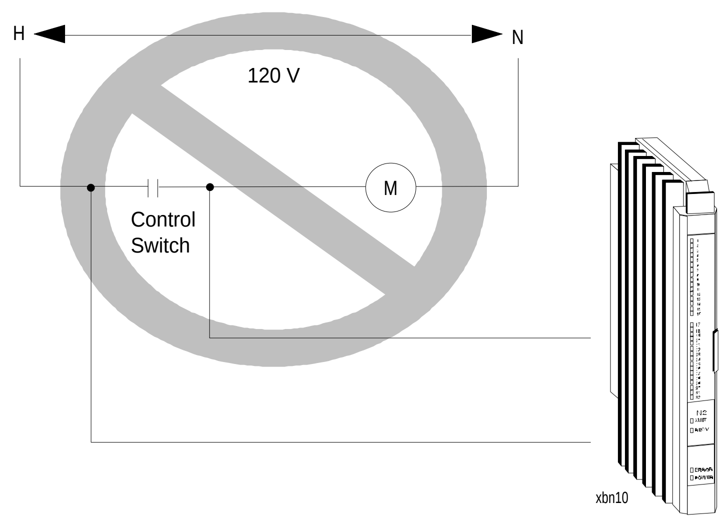


Figure 12: Incorrect Wiring Method (Across Control Switch)

Binary Input Wired Across the Dry Auxiliary Contacts

A binary input wired across the dry auxiliary contacts (Figure 13) is a second typical wiring configuration. It also requires no alteration to the circuit. Set the XBN mode switch to contact. Examples of these loads include:

- starters for motors or pumps
- retrofits where control contacts are already in place
- high-voltage devices controlled by auxiliary contacts

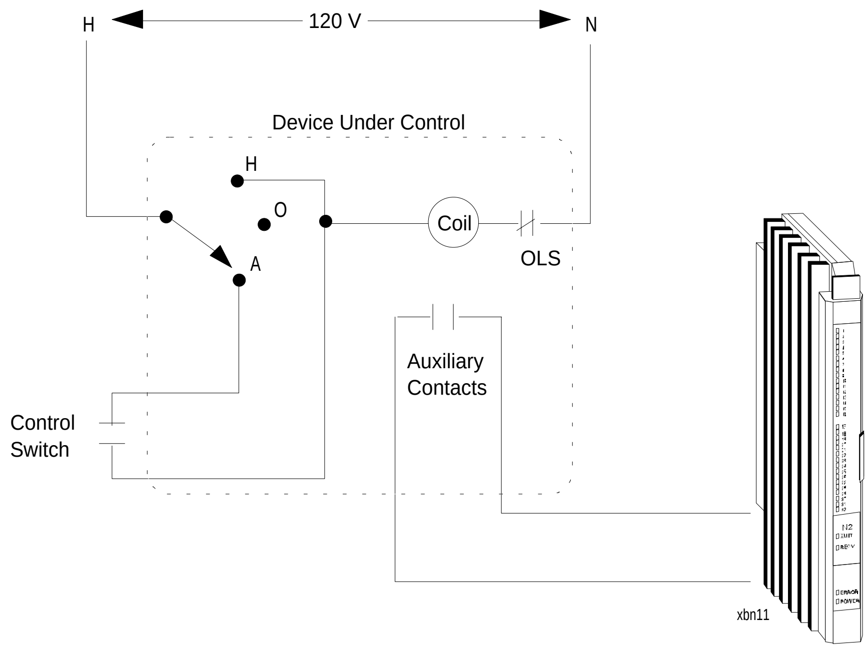


Figure 13: Wiring Across Dry Contacts

Open Inputs with One Side Grounded

If an open input device is wired to ground on one side of the circuit (Figure 14), set the XBN switch to contact mode to provide accurate readings.

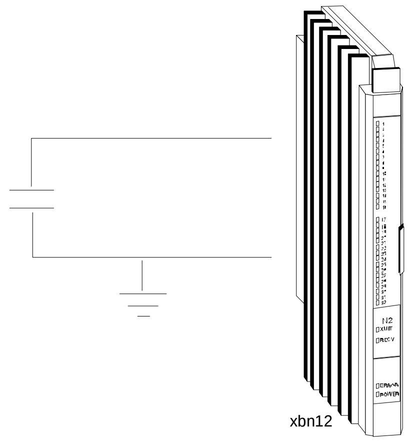


Figure 14: With Open Binary Inputs and One Side Grounded, Set XBN Switch to Contact Mode

Unpowered Triac or SCR

If the XBN input is coming from a transmitter device with a triac or SCR output, an AC source must power the output. If the transmitter does not supply the AC power to the output, you must add the power externally. Connect the AC voltage through a limiting resistor, as shown in Figure 15. The following equation calculates the resistor to be used:

$$\text{Resistor} = \frac{\text{Voltage}_{\text{Supply}} - 1.6}{\text{Current}_{\text{Holding}}}$$

The holding current is listed in the triac or SCR rating.

Determine the wattage of the added resistor by either of these two equations (power is doubled in the equations to accommodate safety standards):

$$P = 2I^2R \quad \text{or} \quad P = \frac{2E^2}{R}$$

where I is the load current, E is the source voltage (e.g., 120 VAC), and R is the resistor.

Set the XBN switch to Voltage mode.

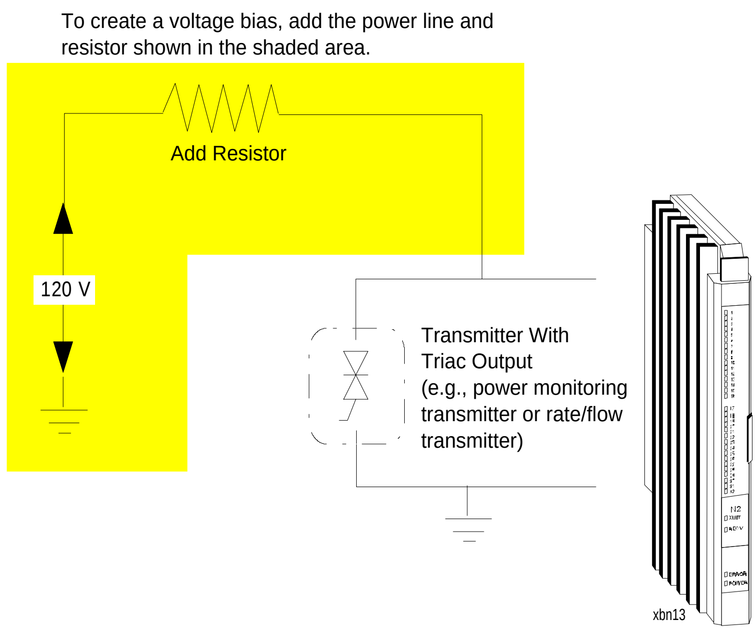


Figure 15: Adding a Voltage Bias Circuit to an Unpowered Triac or SCR Device

High Powered (>1 Amp) Non-Wiping Contact

An example of this kind of device is the KZ-4000 Series relay. Since corrosion may form on the contacts, use of a voltage bias circuit will overcome resistance caused by the corrosion. Add the voltage bias circuit to the device in the manner illustrated above, using a 100K ohm, one-half watt resistor. Set the XBN switch to Voltage mode.

Neon Lamps

In neon lamp applications, the circuit appears open when the lamp is off. That grounds the binary input at one side and leaves a long wire on the other, acting as an antenna and making the circuit sensitive to noise. Any of the following modifications will keep a load across the input:

- Add a pilot relay. (Set the XBN switch to contact mode.)
- Connect across the lamp's built-in resistor, if it is accessible (Figure 16). (Set the XBN switch to Voltage mode.)
- Sense across an added series resistor, one tenth the size of the built-in resistor (Figure 17). Use this method when the built-in resistor is difficult to access. (Set XBN switch to Voltage mode.)

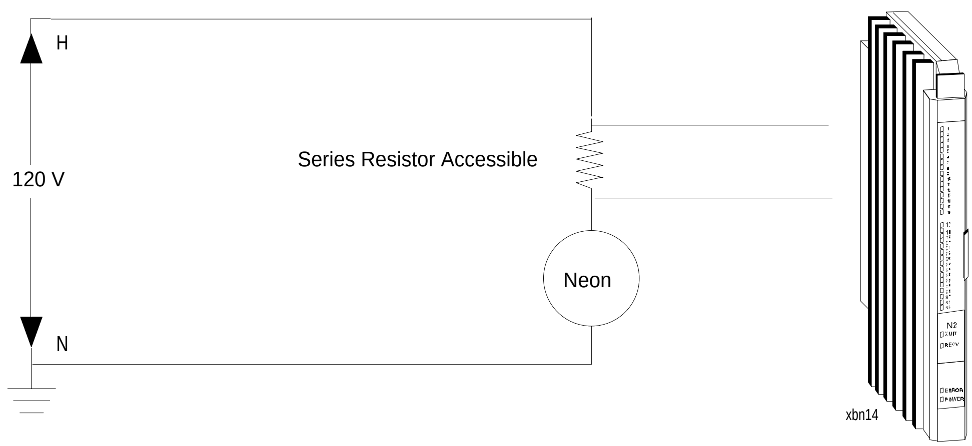


Figure 16: Connecting Across the Resistor for Neon Lamp Applications

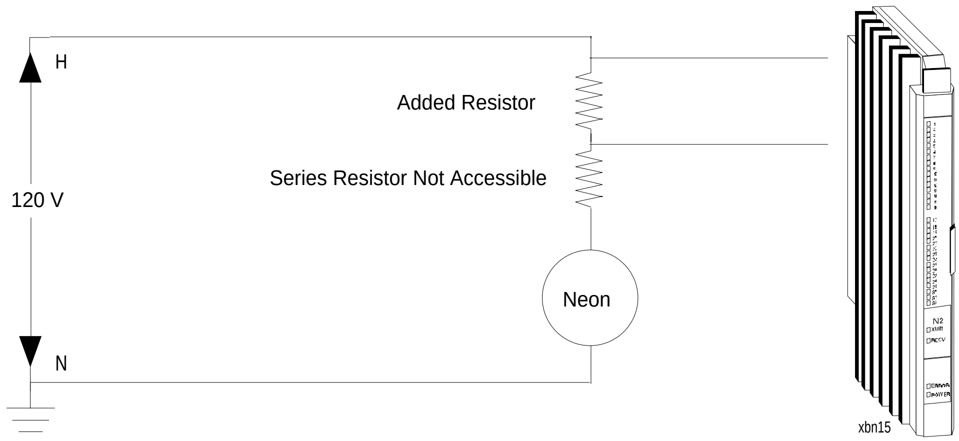


Figure 17: Sensing Across the Added Series Resistor for Neon Lamp Applications

Do not connect a neon lamp device as shown in Figure 18, which still leaves the circuit open when the lamp is off and allows for noise to collect on the “antenna” of the ungrounded side.

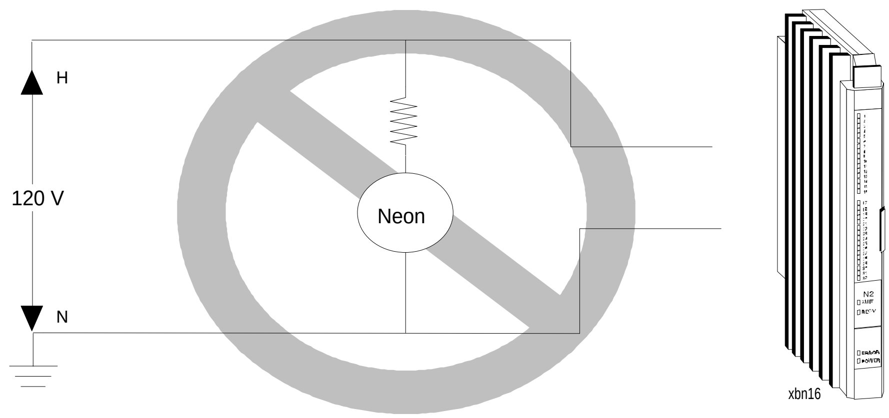


Figure 18: Incorrect Wiring for Neon Lamp Application

Terminal Blocks and Bays

Field devices are wired to terminal blocks in different configurations, depending on which slot the XBN modules are installed. Figure 19 identifies the terminal block and bay numbering for each of the base frame sizes.

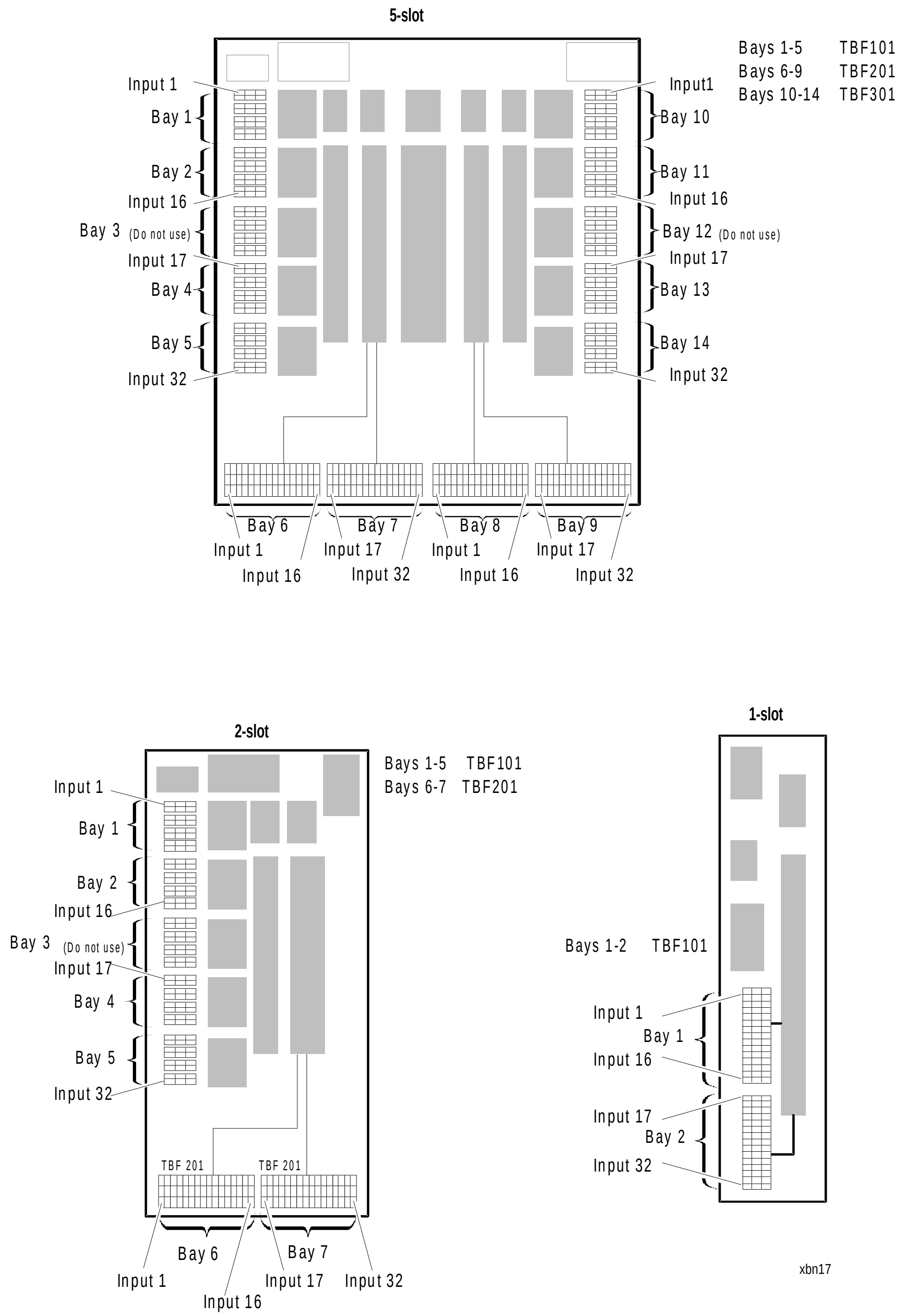
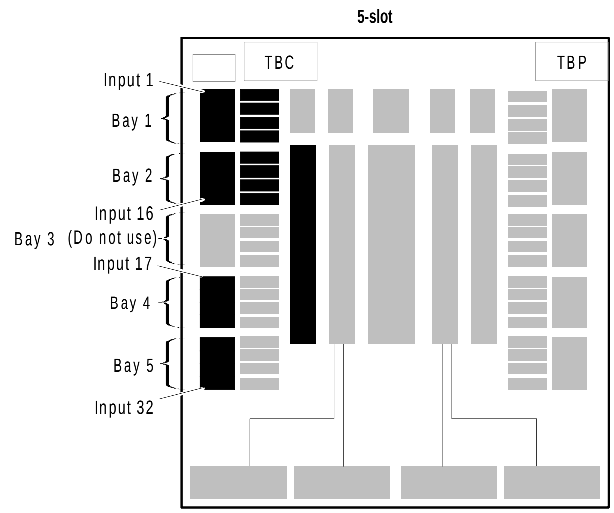
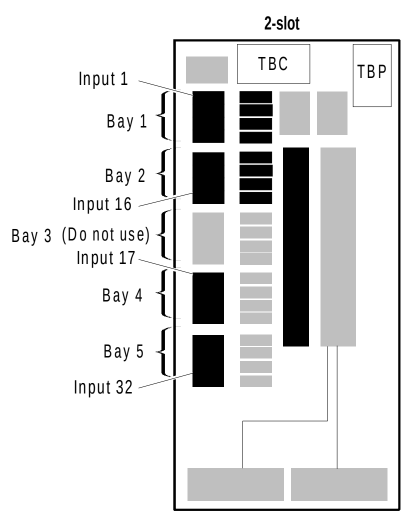


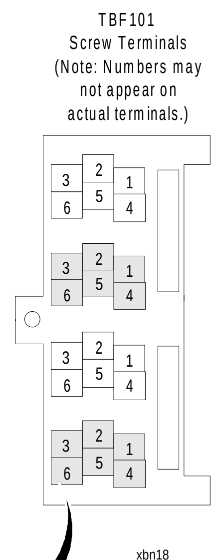
Figure 19: Base Frames with Terminal Bays Numbered

The next three illustrations diagram the different ways to wire field devices into the terminal bays.





	In Bay 1	In Bay 2	In Bay 4	In Bay 5
XBN input 1		9	17	25
XBN input 2		10	18	26
XBN input 3		11	19	27
XBN input 4		12	20	28
XBN input 5		13	21	29
XBN input 6		14	22	30
XBN input 7		15	23	31
XBN input 8		16	24	32



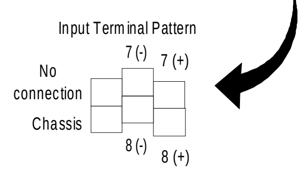


Figure 20: Terminal Wiring Pattern When XBN is in Slot 1 (2-, 5-slot Base Frame)

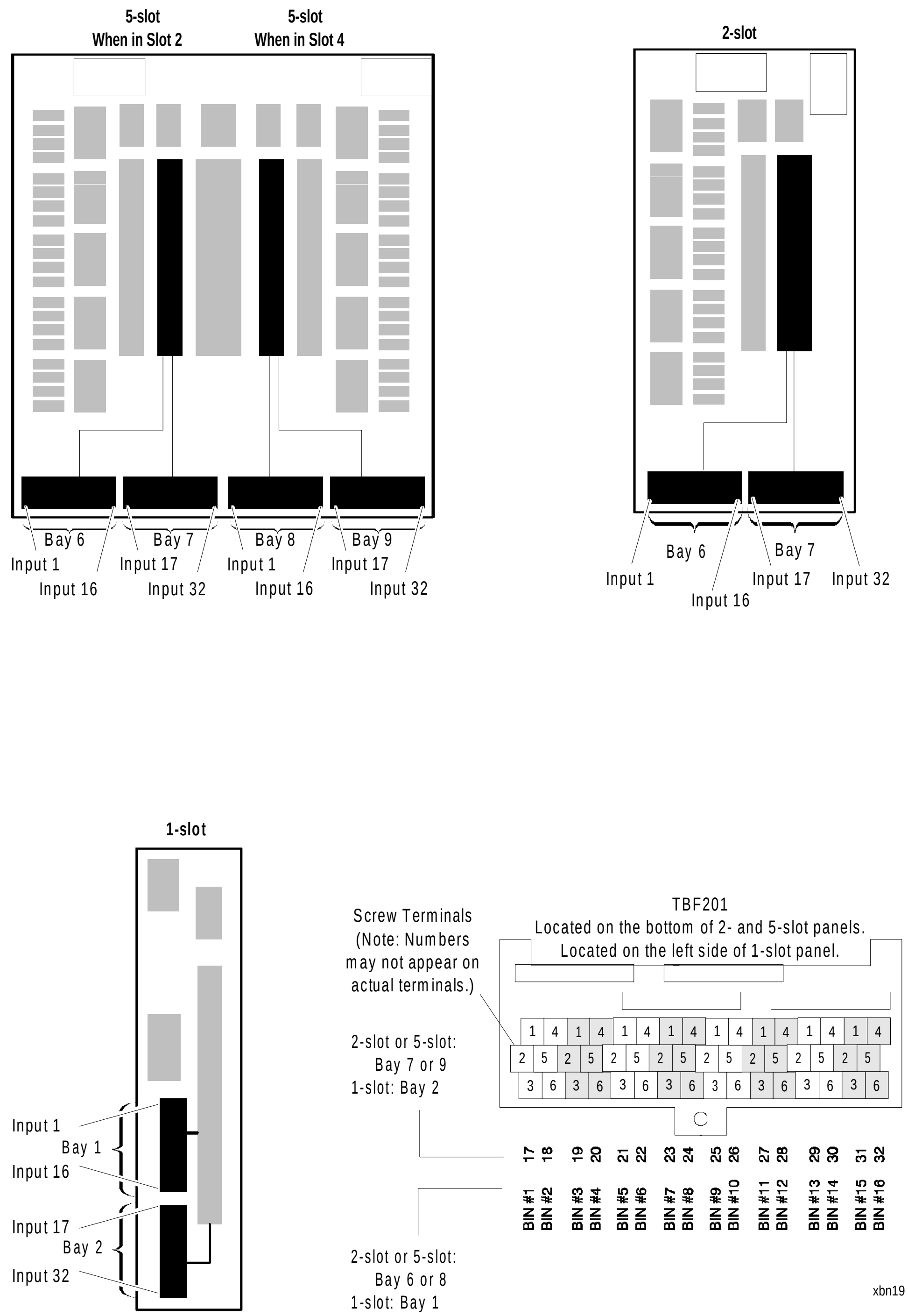


Figure 21: Terminal Wiring Pattern When XBN Is in Slots 2 and 4 (5-slot), or Slot 2 (2-slot), or in 1-slot Base Frame

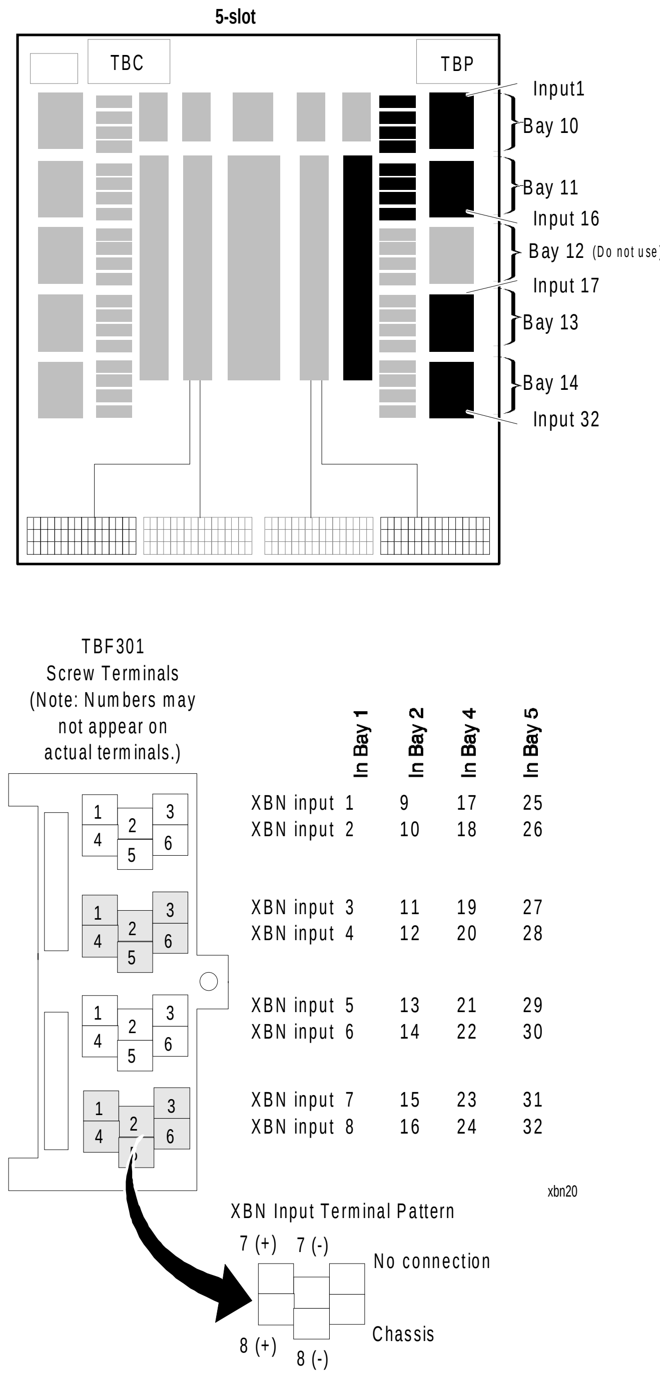


Figure 22: Terminal Wiring Pattern When XBN is Located in Slot 5 of 5-slot Base Frame

Software Setup

Define the XBN hardware object by entering data into the attribute fields on the Definition menu. Figure 23 shows the menu as seen on the Operator Workstation; following is a description of each attribute's characteristics.

If the definition window is a new selection, all the fields will be initialized to a default state.

If the definition window is brought up from an existing XBN object, then all of the fields are filled in with the data from that object.

Fields that allow the data to be modified have the field value boxed in. When a field entry is modified, the new value is immediately verified when the field is exited.

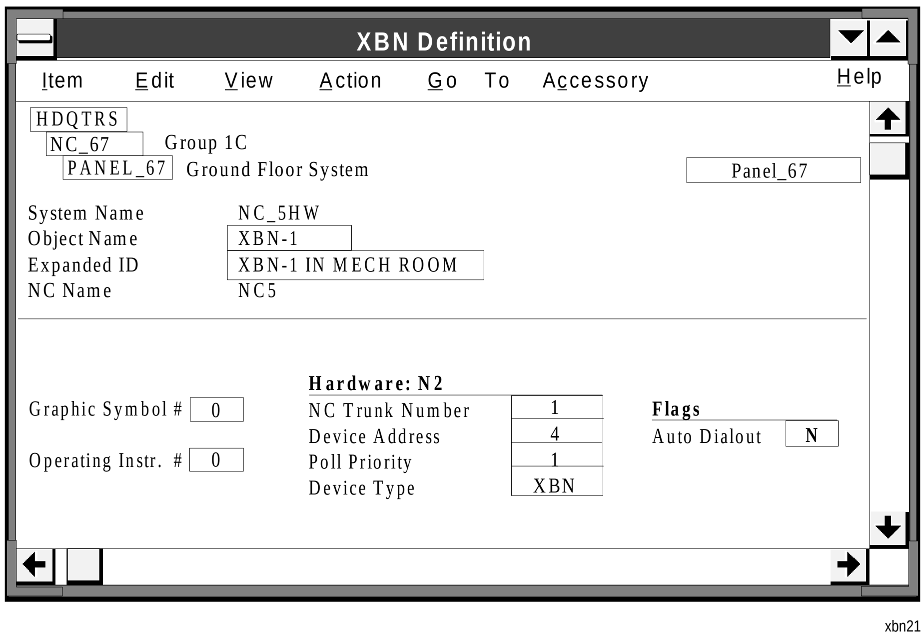


Figure 23: XBN Definition Window

XBN Hardware Object Identification

System Name

Enter any valid 1-8 character string. The system name must be of an existing system on the network. It is predefined on the Operator Workstation with the name of the system that the operator was in when selecting the definition screen.

Object Name

This field distinguishes among the points on the XBN. Enter any valid 1-8 character string. The object name must not presently exist under the system name.

Expanded ID

Enter any valid 0-24 character string.

N2 Bus Connection Identification

NC Trunk Number

A check must be made that the port selected is defined as an N2 trunk.

Device Address

(0-255) Enter the N2 address assigned to the XBN. The address must not be assigned to any other device on this N2 trunk.

Poll Priority

(0-3) Enter the priority that this device should be polled at.

Device Type

(1-3) Enter which type of Point Multiplex Module: 1 = XBN, 2 = XRM, 3 = XRL/XRE.

Code Association to Graphics and Help Screens

Graphic Symbol

If a graphic has been composed to associate with this object, enter the number of the graphic (0-32767). Zero means no graphic is associated with this object.

Operating Instr.

When "Help" is selected for this object, a notepad appears containing user-modifiable operator instructions. Enter the number (0-32767) to reference the desired notepad. Zero means no operator instructions will be associated with this object.

Flags

Auto Dialout

(Y or N) Select whether Critical 4 reports from this object will force an auto dialout if a remote Operator Workstation is on a dial-up link.

Commissioning Procedures

Overview

Commissioning an XBN begins after the module and associated Power Supply Module have been installed into the NCU/NEU, the field wires inspected, and the points defined in software. Refer to the *Engineering* section, as well as the *NCU/NEU Technical Bulletin*, for information regarding these steps.

The general commissioning tasks are to set the module switches to their appropriate positions and confirm proper operation via the LED indicators at power On. No special tools are necessary.

Switch Settings

Figure 24 illustrates the switch positions on the faceplate of the XBN module.

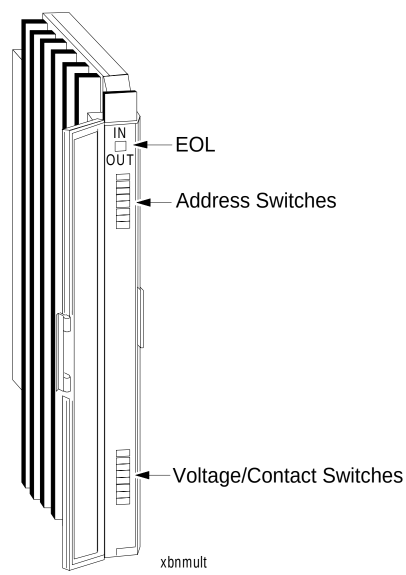


Figure 24: Switch Positions on XBN Module

N2 End-of-Line Switch

The N2 End-of-Line switch is set to “In” (up) if the module is physically the last one on the N2 line (i.e., the N2 wires enter, but do not leave again on their way to another device). Only two N2 switches are set to the “In” position among all the devices connected to any individual N2 network.

N2 Address Switch

The address switch on the XBN is used by the NCM for communications, and is set to the same number as was assigned to the XBN in software. The address is set according to the numbering on the faceplate; the numbers are in binary format and vertically arranged, with the least significant digit on top.

For example, if the module address is 119 (decimal), the binary representation is 01110111—switches 1, 2, 4, 16, 32, and 64 must all be set to the On (to the right) position (1+2+4+16+32+64 = 119), as shown in Figure 25.

Note: The XBN must be turned off before setting the address switches in order to register the physical address in memory upon power up.

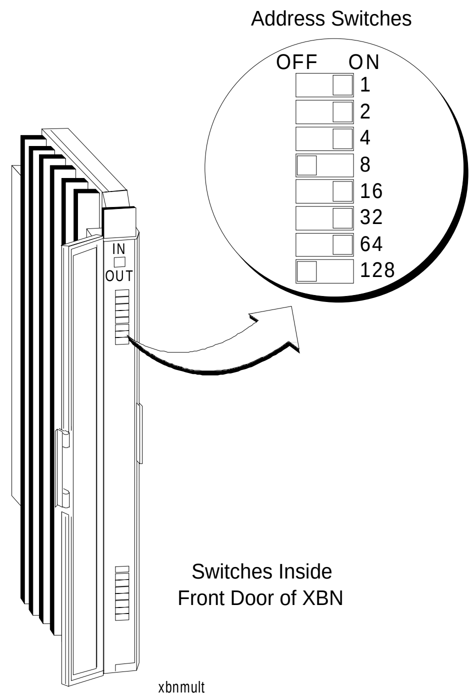


Figure 25: Example of Setting Address Switch

Voltage/Contact Switches

The XBN has 4 contact/voltage switch blocks containing 8 switches each, for a total of 32. The switches are numbered (1-32) with each switch defining a corresponding field input as either a contact input or voltage input (frequency inputs are characterized by their source as either contact or voltage). Set each switch according to the type of signal the addressed point should receive. The switch set to the left (V) reads voltage; set to the right (C) reads contacts, as shown in Figure 26.

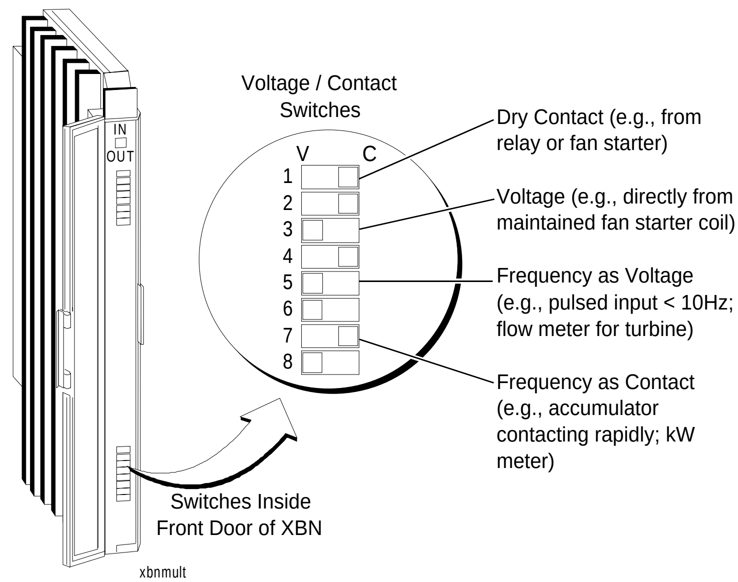


Figure 26: Example of V/C Settings for Switches 1-8

Power Up

LEDs

The LED indicators (Figure 27) supply evidence of the module's condition, and help determine that the module is functioning properly.

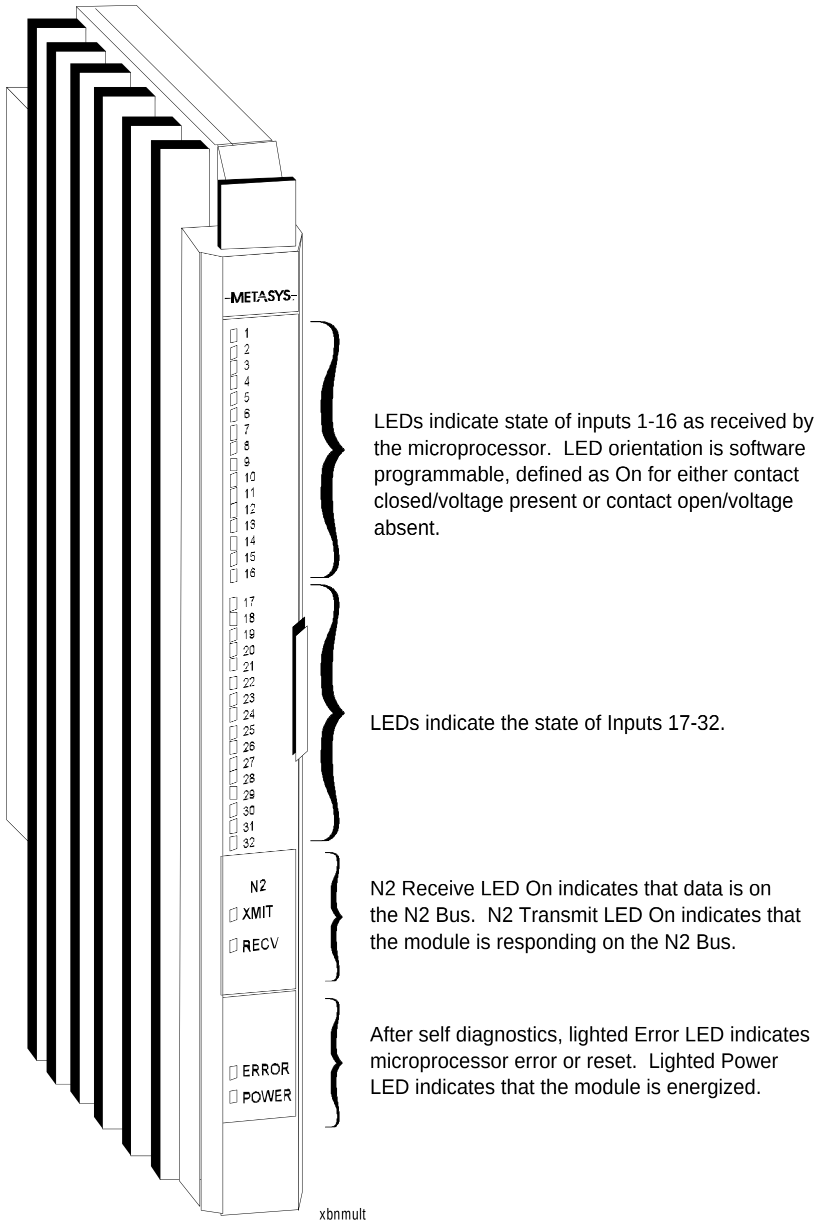


Figure 27: Identification of LED Indicators on XBN

Troubleshooting Procedures

Self-Diagnostics

Turn On the Power Supply Module to initialize the XBN. At the beginning of the XBN's initialization, the ERROR LED and all point LEDs turn On for approximately three seconds.

1. First, the On condition of the LEDs tests whether or not all the LEDs are functioning.
2. Then the Static RAM (SRAM) self-diagnosis is implemented. If the SRAM test fails, an alternating odd/even pattern on the LEDs blinks in 1/2 second intervals. Power must be cycled and the XBN reinitialized. If the SRAM test continues to fail, replace the module.
3. All self-diagnostics are conducted within the three seconds, and if successful, the LEDs turn Off (except the POWER LED).
   a. If the ERROR LED stays lit, the XBN is defective and must be returned to the factory.
   b. If the POWER LED turns Off (and the Power Supply Module LEDs remain On), a power failure is occurring either in the connections between the Power Supply Module and XBN, or inside the XBN. If possible, test the connections by installing a known functioning XBN module into the slot.
      - If the functioning XBN verifies the connections, replace the faulty XBN module.
      - If a functioning XBN fails in the slot, a problem may reside in the power supply or NCU/NEU base frame. Refer to the technical bulletins for those units.

Field Checks

Perform the following steps to field check the XBN. Steps 4 and 5 must be checked with the presence of functioning N2 communications, as checked in Step 3.

1. Ensure that the POWER LED lights and remains lit to indicate that the supply voltage is good.
2. Verify that the ERROR LED never lights (with the exception at power On). If this LED constantly flashes, or remains illuminated, or if all the LEDs constantly flash, a severe hardware failure is indicated. Cycle power; if the error continues, replace the module.
3. Next, verify that the device is being polled. This is evident if the XMIT (transmit) LED lights, which indicates that the XBN is *replying* to a poll.

If the transmit LED never lights, check if the green RECV (receive) LED lights.

- If the RECV LED does not light, the XBN is not receiving data from the N2 Bus and therefore is not connected properly to the N2 Bus. Refer to the *N2 Communications Bus Technical Bulletin* in this manual.
- If the RECV LED does light without the XMIT LED ever responding, perhaps no messages are being addressed to the XBN. Ensure that the system is configured to poll the XBN by cross checking the address in the Hardware Definition window with the address physically set by the N2 address switches. If the address is changed, cycle power to the XBN after resetting the N2 address switches.

4. Ensure that the input LEDs on the XBN coincide with the "present state" indication at the NCM. This requires a comparison of the point's status as seen on the Object Focus window with the actual condition of the LED. Note that the LED orientation is used defined in software, such that the LED light On may indicate either contact closed/voltage present or contact open/voltage absent.
5. Force each binary input to change state, then check: a) the "present state" condition on the Object Focus window or the Network Terminal and b) the LED light to verify that the change was detected accordingly.

   Note: Steps 4 and 5 require that the point data base has been downloaded to the XBN. If no point data base download has ever been made, the LED lights will not indicate the point status.

If the XBN fails the Field Checks, replace the module. There are no test points or removable parts on the XBN. The only field repair is to replace the module.

Ordering Information

Table 4: Ordering Information

Description	Product Code Number
Expansion Module, 32 Binary Inputs	NU-XBN101-0
Expansion Module, 32 Binary Inputs (repair)	NU-XBN101-700
Power Supply Module	NU-PWR101-0

Notes

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