



Supra Universal Manual

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Preparation

Unpack the Supra Universal and inspect the contents for damaged or missing products. If any problems arise, please contact Touch-Plate at 260.426.1565 for assistance.

Precautions

The Supra Universal hardware is designed to be in environments that have a temperature range of 0-60°C (non-condensing atmosphere). Installing in an environment outside of these parameters will shorten the life span of the hardware.

Touch-Plate recommends the use of 18 to 22 AWG wire for low voltage wiring of Contact Closure products, 18 AWG wire for all 24v power connections, and 16 AWG wire for Smart Control Stations. All 120VAC wiring must use wire as specified by National Electric Code for load size and wire length.

Compatible Hardware

The Supra Universal is a BACnet firing card that can be a part of a networked, intelligent system with a BACnet controller.

Warranty

Touch-Plate warrants this product against defects in materials or workmanship, under normal use, for a period of ONE (1) year from date of shipment. If a defect arises and a valid claim is received within the Warranty Period, Touch-Plate will repair or replace the product at no charge.

This warranty does not apply to:

- a. Damage to unit(s) caused by accident, acts of God, inappropriate installation, faulty installation, or any negligent use;
- b. Unit(s) which have been subject to being taken apart or otherwise modified;
- c. Unit not used in accordance with instructions;
- d. The finish on any portion of the product, such as surface and/or weathering, as this is considered normal wear and tear;
- e. Non-Touch-Plate hardware installed by the user;
- f. Damage caused by Non-Touch-Plate products;
- g. Damage caused by operating the product outside the permitted or intended uses described by Touch-Plate;
- h. -or- Specific plans or specific application requirements, unless the plans and specifications have been forwarded to Touch-Plate and they were approved and accepted in writing.

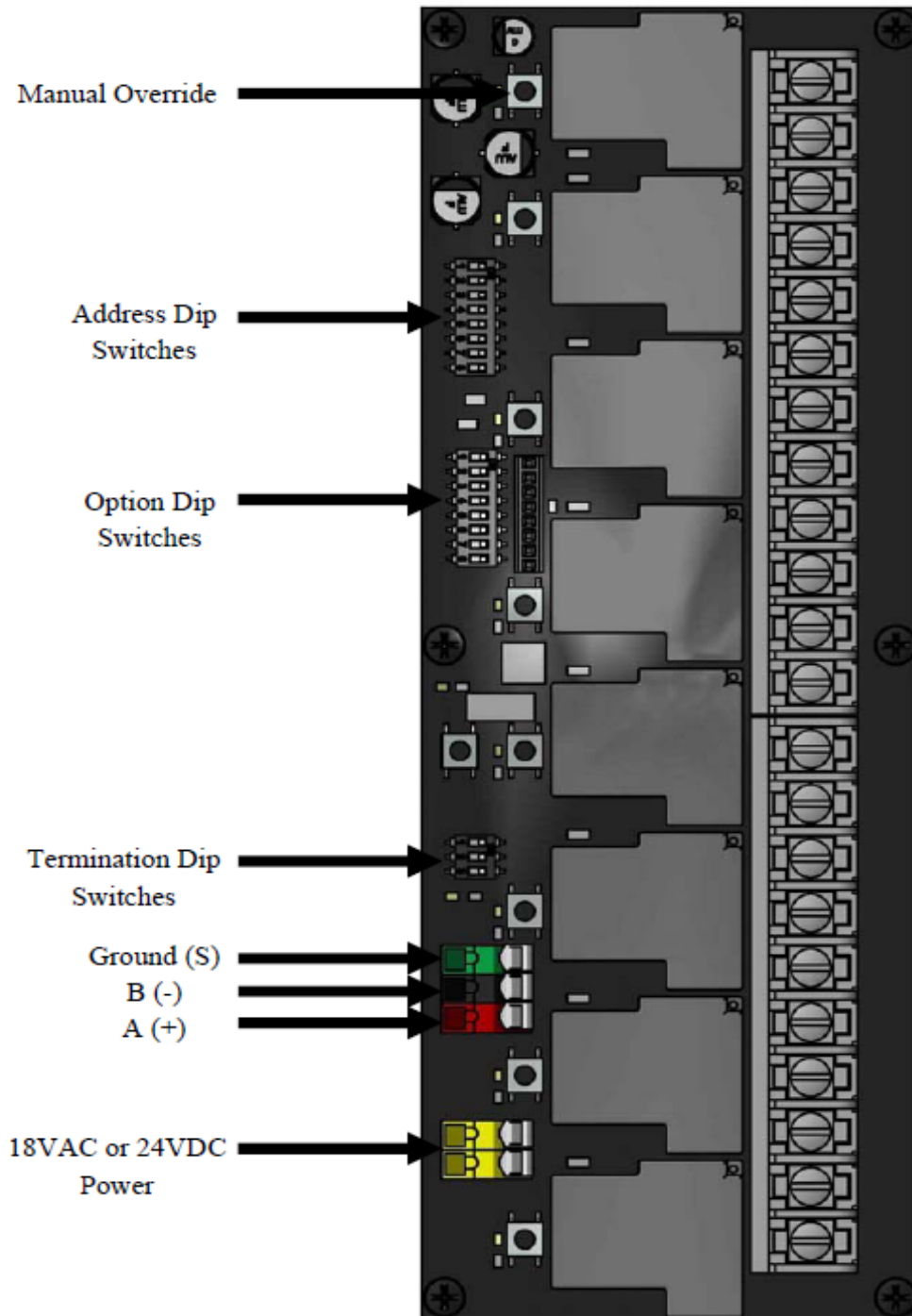
EXCEPT AS PROVIDED IN THIS WARRANTY, TOUCH-PLATE IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, INCLUDING BUT NOT LIMITED TO, INSTALLATION OR REPLACEMENT LABOR COSTS.



Supra Universal Overview

The Supra Universal is a powerful and versatile controller with the capability to control relays in a BACnet integrated system. The Supra Universal will be referenced throughout as: SPR-UB.

The Supra Universal has the following options:



Initial MS/TP Network Setup (BACnet System)

Use the Initial MS/TP Network Setup to correctly setup your system. The following steps refer to standard BACnet properties. Utilize the operator work station to access each device and to set the following parameters. If step by step instructions are needed, consult the operator work station manual.

Utilize the following steps to correctly setup the Supra Universal.

- Use consecutive numbers starting at one when assigning MS/TP addresses to the panels.
- Set the property 'MAX MASTERS' within each device object to the actual number of devices on the MS/TP network. This needs to be done for every device on the network.
- Set the property 'MAX INFO FRAMES' to 1. This is the factory default. If necessary, this number might need to be set on other manufacturers' devices to keep the token passing running as fast as possible.
- Set the 'APPLICATION DATA' unit size to 206. This is the factory default. If necessary, this number might need to be set on other manufacturers' devices to avoid overrunning the receiver buffers.
- Use the 'CHANGE OF VALUE (COV)' subscriptions instead of polling objects. This will reduce network traffic. Relays (BOs) support COV subscriptions.
If COVs are not supported, monitoring of switch inputs can be done by using the Input Change Buffer AV1001 object to reduce the amount of polling done on the network.
- Set the Baud Rate to the highest rate that your devices will support. The factory default is 38400. Set the corresponding Baud Rate on the Supra Premier.



Supra Universal BACnet Overview (Priority Level 16)

The SPR-UB comes from the factory set as Priority Level 16 and cannot be changed. When the SPR-UB processes an input to control an output, all outputs are controlled at Priority Level 16. If the operator workstation writes to the BO object (relays) at a higher priority, switch presses and releases will be ignored until the operator workstation relinquishes control of that BO. If the operator workstation issues commands at Level 16, the input and the operator workstation will both be able to control the output.

Supra Universal BACnet System Overview

The SPR-UB can run at the fastest time possible when the MS/TP network is optimized for speed. To ensure that there is not increased latency and/or delay in loads turning on after a command is issued, use the following to allow for the fastest response time possible.

- Place 10 or fewer panels on each MS/TP network. There can be up to 127 panels on a single MS/TP network, but latency will increase.
- Do not combine lighting with other types of devices, such as HVAC, security, access control, fire and safety, on the same MS/TP network. When possible, isolate the lighting system onto its own MS/TP network.



Setting the BACnet MS/TP Address (MAC)

The Address Dip Switches are used to set the BACnet MS/TP Address.

Normally, these Dip Switches come from the factory pre-programmed to Address #1.

Use the setting diagram to change the Address if needed. Note that for the address changes to take effect, a power cycle needs to occur.

Address	1	2	3	4	5	6	7	8	9
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
17	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
18	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
19	ON	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
20	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF

Valid Addresses are 1-256

Valid addresses are from 1 to 256. Addresses are set using the nine Address Dip Switches, which each have a value noted in the chart below.

Address Dip Switch	1	2	3	4	5	6	7	8	9
Value	1	2	4	8	16	32	64	128	256

The values of all switches in the ON position are added together and the total is equal to the address. See the examples below:

MS/TP Address 1: Turn on switch 1 only, and leave all other Address switches off.

MS/TP Address 13: Turn on switches 1, 3 and 4. The value of those switches are $1 + 4 + 8 = 13$.



Setting the BACnet MS/TP Baud Rate & Relay Count

The BACnet MS/TP Baud Rate is set using the Option DIP Switches.

Typically the baud rate setting for the communication with the BACnet MS/TP network is preset to 76800.

Use the setting diagram to change the baud rate if needed. You will need to power cycle the unit after making changes for them to take effect.

Consult the system integrator or workstation system manual to determine the correct baud rate for communication between the Supra Universal and the MS/TP network.

Option	A	B	C	D	E	F	G	H
Baud Rate 9600	-	OFF	OFF	-	-	-	-	-
Baud Rate 19200	-	ON	OFF	-	-	-	-	-
Baud Rate 38400	-	OFF	ON	-	-	-	-	-
Baud Rate 76800	-	ON	ON	-	-	-	-	-
Relays numbered top to bottom	-	-	-	-	-	-	-	ON
Relays numbered bottom to top	-	-	-	-	-	-	-	OFF

Setting the RS485 Terminations

The RS485 terminations is used to set the RS485 Terminations.

Termination	Description
1	Non - Inverting Input Pull Up; 510 Ohms
2	Inverting Input Pull Up; 510 Ohms
3	Line to Line Termination; 120 Ohms



Choosing Objects

These explanations will help to learn what objects are available and what each object does. Use your operator work station to do object discovery.

OBJECT EXPLANATION					
Table No.	Object	Object Type	Value	Object ID	Used For
BO1	Relays	Binary Output	1 = On 0 = Off	BO1 - BO8	Relay control and status
AV1	Device Options	Analog Value	1 = Infinite COVs 0 = COVs Expire	AV100	To resubscribe to COVs with no expiration of the subscription
AV2	Relay Override Status	Analog Value	0 = No Manual Override 1 - 8 = Overridden Relay #	AV1002	To remotely monitor relay manual overrides
AV3	Device Instance	Analog Value	0 - 4, 194, 3034	AV1003	To read or change the Device ID or Device Instance
DO1	Device Object	Device Object	0 - 4, 194, 303	DEV68000	Describing properties of the device to the BACnet network

Change of Value Events (COVs)

These events only apply to Binary Outputs (BOs).

A change in state will generate a COV. The following chart shows the three events that can cause a COV.

EVENTS THAT CAUSE A COV		
Events That Generate a COV	COVs Generated by that Event	Properties Affected by that COV
A relay is commanded using the Present_Value	The state of the relay is changed.	Present_Value property reflects the state of the relay
Someone manually overrides the relay at the physical location of the relay	The state of the relay is changed. The relay was manually overridden.	Present_Value property reflects the state of the relay. The Override flag of the property Status_Flag is set to true.
When a relay is commanded via BACnet	The relay failed.	The Fault flag of the Status_Flag property is set to true.



Binary Outputs - Relays

Object ID: BO1 – BO8

Used for: Relay control and status

Binary Outputs are used to command a relay. The state of the relay might be different from what the present value property of this object is because the relay might have failed, been overridden, or been controlled by some other device.

On the SPR-UB each BO represents a relay. The range per SPR-UB is 1 to 8. An example would be if there are 2 SPR-UBs, this will create an object database from BO1 to BO8 per each SPR-UB. Each SPR-UB can control up to 8 relays.

If the actual device address and relay assignment need to be determined, this information will be stored in the Object_Name name property as shown in table BO1.

COV Operation: When a BO has a COV subscription, the controller will report the following properties when a COV event occurs:

- Present_Value is the value the relay was last commanded.
- Status_Flags shows the override and error flags.

Table BO1

BINARY OUTPUT OBJECT PROPERTIES FOR RELAY CONTROL	
Binary Output Property	Value
Object_Identifier	BACnet Object Identifier
Object_Type	4
Object_Name	"Relay 00# Where: # = 1 to 8 which corresponds to the BO
Present_Value	0 = Turn Off Relay, 1 = Turn On relay
Device_Type	"Lighting Contactor"
Status_Flags	Override = True when relay has been manually overridden. Fault = True when the relay has a fault condition.
Event_State	0
Reliability	0 = No fault
Out_Of_Service	0
Polarity	0 = Normal
Inactive_Text	"Off"
Active_Text	"On"
Priority_Array	BACnet Priority Array
Relinquish_Default	0 = Turn Off Relay, 1 = Turn On relay



Analog Value - Device Options

Object ID: AV100

Values: 1 = Enables the user to write 0 to the COV lifetime, which enables indefinite COV mode, in which the subscriptions will not expire.
0 = All COV subscriptions will expire according to the lifetime that was written to them when they were initially set up.

Device Options are useful for operator workstations that do not resubscribe before the current COV expires. By default, all COV values expire. If it is desired to continue to receive messages that buttons were pressed, either resubscribe before the current COV expires or enable indefinite COVs. This object affects all subscription objects within that device.

COV Lifetime: When a COV operation is performed, the COV lifetime has to be set (the time for which the subscription will continue).

COV Lifetime Value = > 0: The subscription will expire after the set time, according to the lifetime that was written to them when they were set up.

COV Lifetime Value = 0: Subscriptions do not expire. Before the COV lifetime to 0 can be set, first enable the NEX-MA to accept 0 as a COV lifetime value by writing 1 to the AV1000 object.

For further information see table AV1.

To enable indefinite COV mode:

1. Write 1 to the AV100 object.
2. Set the COV lifetime to 0 for each subscription that you want to be infinite.

Table AV1

ANALOG VALUE OBJECT PROPERTIES FOR DEVICE OPTIONS	
Analog Value Property	Value
Analog Value Property	Value
Object_Identifier	BACnet Object Identifier
Object_Type	2
Object_Name	"Device Options"
Present_Value	1 = enabling infinite COVs, else = 0 (Default)
Status_Flags	All flags are false.
Event_State	0
Out_Of_Service	0
Units	No Units = 95



Analog Value - Relay Override Status

Object ID: AV1002

Used For: Reporting a manual override of a relay at the panel

Values: 0 = No output loads have been manually overridden.

If the value is not 0, the value is the number of the last manually overridden relay.

If multiple relays were overridden on the panel, the value is the first relay in the panel or the relay with the lowest number.

It is the responsibility of the front end controller to look at all relay object status flags to determine which other relays have been overridden.

COV Operation: When a Relay Override AV has had a COV subscription, the controller will report the following properties when a COV event occurs:

- Present_Value = the last relay that was manually overridden
- Status_Flags are always false.

Table AV2

ANALOG VALUE OBJECT PROPERTIES FOR RELAY OVERRIDE STATUS	
Analog Value Property	Value
Object_Identifier	BACnet Object Identifier
Object_Type	2
Object_Name	"Relay Override"
Present_Value	Last manually overridden relay.
Status_Flags	All flags are false.
Event_State	0
Out_Of_Service	0
Units	No Units = 95



Analog Value - Device Instance

Object ID: AV1003

Used For: Is a BACnet system-wide unique identifier that is pre-set by the factory to a unique ID of 68002 - 68100 when ordered in a panel with the device instance assigned on a label located on the SPR-UB.

You can use this object to read the current device instance or to change it.

If you change the device instance, the Device Object ID will change from DEV68000. If you change the device instance AV1003 to a value of 70000, then the Device Object ID will be DEV70000.

Table AV3

ANALOG VALUE OBJECT PROPERTIES FOR DEVICE INSTANCE	
Analog Value Property	Value
Object_Identifier	BACnet Object Identifier
Object_Type	2
Object_Name	"Device Options"
Present_Value	Device instance value
Status_Flags	All flags are false.
Event_State	0
Out_Of_Service	0
Units	No Units = 95
Priority_Array	BACnet Priority Array
Relinquish_Default	0



Device Object - Device Object

Object ID: DEV68000

Used For: The Device Object states the capabilities of the SPR-PB.

If you change the device instance, the Device Object ID will change from its default of DEV68000. If you change the device instance AV1003 to a value of 70000, then the Device Object ID will be DEV70000 & the Device Object Name will be BAC1012300070000.

Table DO1

DEVICE OBJECT PROPERTIES	
Device Object Properties	Value
Object_Identifier	BACnet Object Identifier (Default = DEV68000)
Object_Name	"BAC1018800068000"
Object_Type	8
System_Status	0 = Normal
Vendor_Name	"Touch-Plate Lighting Controls"
Vendor_Identifier	68
Model_Name	"SPR-UB (10188)"
Firmware_Revision	"2.49"
Application_Software_Version	"1.5b"
Protocol_Version	1
Protocol_Revision	2
Protocol_Services_Supported	SubscribeCOV, readProperty, readPropertyMultiple, writeProperty, writePropertyMultiple, deviceCommunicationControl, reinitializeDevice i-Am, who-Is
Protocol_Object_Types_Supported	Analog_Value Binary_Output Device
Object_List	List all the objects in the Object Database
Max_APDU_Length_Accepted	244
Segmentation_Supported	3 = no-segmentation
Max_Segments_Accepted	1
APDU_Timeout	3000
Number_Of_APDU_Retries	0
Device_Address_Binding	List is always empty
Database_Revision	1
Max_Master	Range is 1 to 127



Appendix I - PIC Statement

Vendor Name: Touch-Plate® Lighting Controls
 Product Name: Supra Universal Firing Card
 Product Model Number: SPR-UB
 Applications Software Version: 1.5b
 Firmware Revision: 2.49
 BACnet Protocol Revision: 4 (135-2004)

Product Description:

This unit is a general purpose firing card that is capable of monitoring up to 8 outputs. The outputs are relays.

The 8 outputs are represented as binary output objects.

The relays support subscribed Change of Value (COV) operation. Relays can be overridden at the panel for maintenance and service purpose, which also could generate a COV as well. MS/TP MAC address, baud rate, and I/O configurations may be set using DIP switches.

BACnet Standardized Device Profile (Annex L):

BACnet Application Specific Controller (B-ASC)

BACnet Interoperability Building Blocks Supported (Annex K):

DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B

Segmentation Capability:

Not supported.

Standard Object Types Supported:

STANDARD OBJECT TYPES SUPPORTED				
Object	Create	Delete	Optional Properties	Custom Properties
Binary Output	N	N	DEVICE_TYPE, RELIABILITY, INACTIVE_TEXT, ACTIVE_TEXT	---
Analog Value	N	N	---	---

Data Link Layer Options: MS/TP master, baud rate(s): 9600, 19200, 38400, 76800

Device Address Binding: Is static device binding supported? No

Networking Options: No routing or BBMD functions are supported.

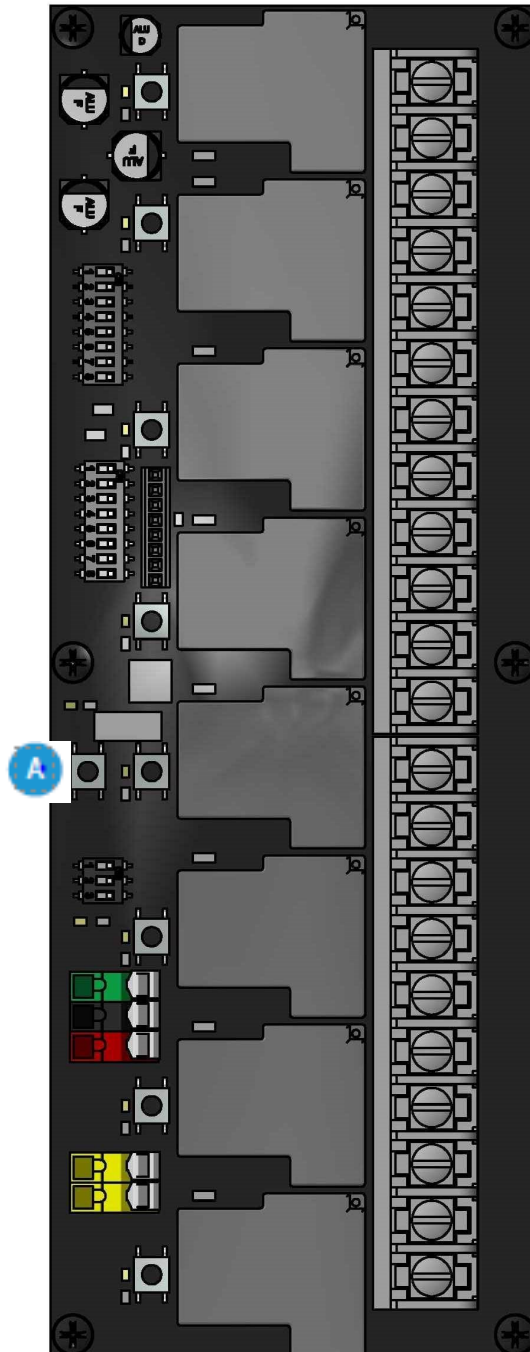
Character Sets Supported: ANSI X3.4



Appendix II - Clearing Override Flags

Use the Reset button to clear the manual override flags.

- A Press and hold the 'RESET' button. After a few seconds, the LEDs will turn off. As the 'RESET' button is held, the Heartbeat LED will turn off, then after a couple of seconds will start to blink in short flashes. This indicates that the manual overrides have been cleared. Release the 'RESET' button.



Troubleshooting Guide

If no response occurs when the system is powered up, use the following steps to identify the problem.

1. Look for the LED indicator to be blinking on the SPR-UB.
 - a. For the indicator to be blinking, power has to be correctly brought to the system.
 - b. If the LED indicator is not blinking, confirm power connections and then contact the factory for assistance.

If the communications LED does not stop flashing and/or output boards do not flash.

1. Verify that the wiring is correct.
2. Verify that all devices are connected to power.
3. Verify the baud rate on the SPR-UB.

If there are communication problems with a remote panel far away, use the following steps to solve the problem.

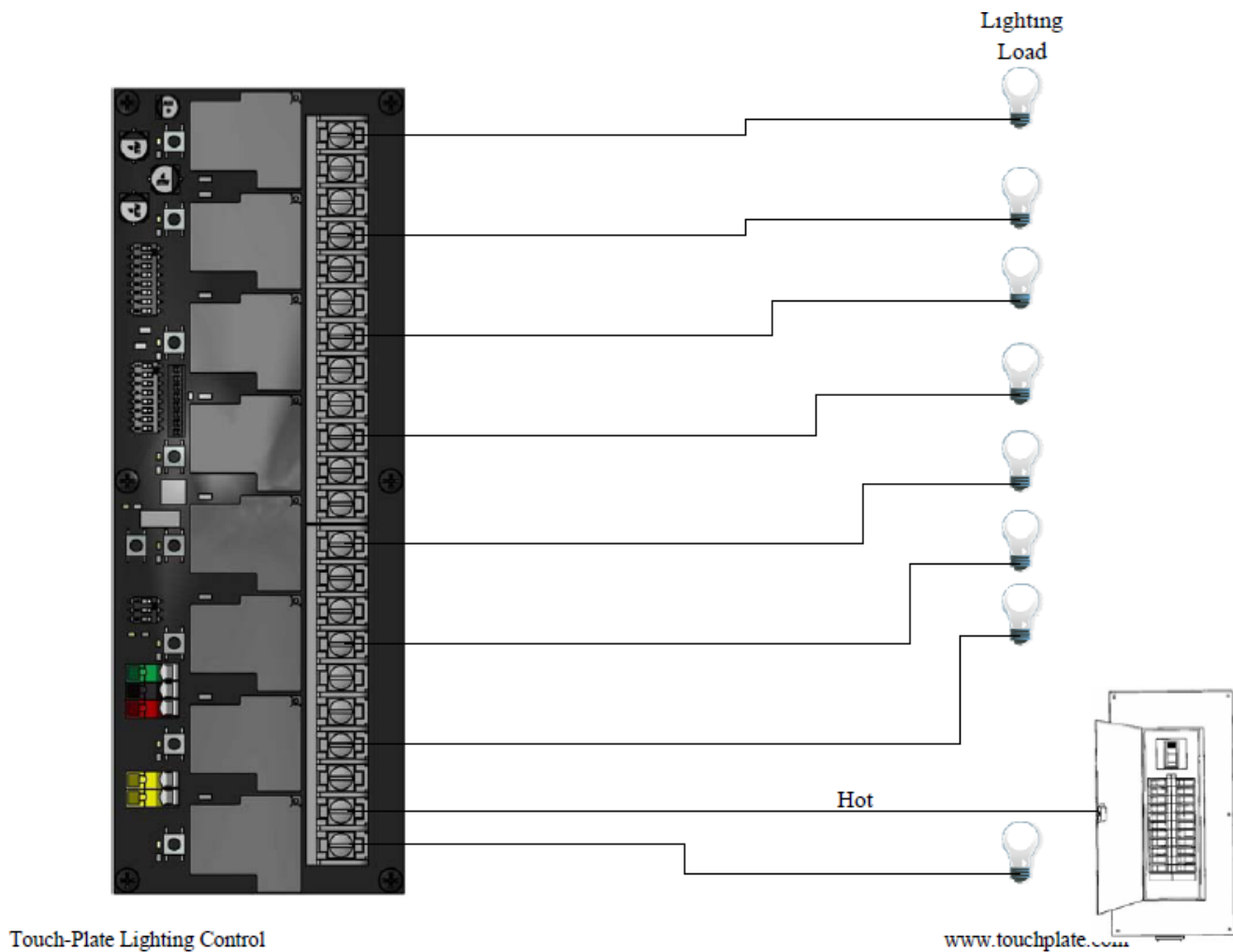
1. Verify that the baud rate is correctly set.
2. If this doesn't solve the problem, slow down the baud rate to improve communication.
 - a. All devices have to run at the same baud rate. If the baud rate is changed on one of the SPR-UBs, all devices on the system have to have their baud rates changed.



Frequently Asked Questions

1. What is the Device ID?
 - a. The Device ID is a value that ranges from 0 to 4194302 to uniquely identify a BACnet device on a network. Touch-Plate sets the Device ID between 68000 to 68999. This is based on Touch-Plate's BACnet ID of 68.
 - b. Although this is not a required practice, it will help create a unique ID when other manufacturers use this method. This value can be changed to any of the valid values.

2. What if there is no response from the main controller?
 - a. Verify that the MS/TP cable is correctly connected.
 - b. Verify that there are not conflicts with the MS/TP MAC addresses. Each device on a MS/TP network must have unique MS/TP MAC address.





Touch-Plate Supra Universal System
Manual Revision: 2.0a

