BPC3000

BLOCK POWER CONTROLER
REFERENCE MANUAL
VERSION 1.1

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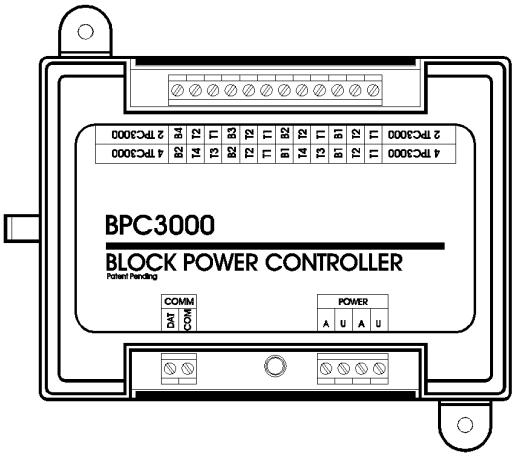
INTRODUCTION

The BPC3000 Block Power Controller is designed to be used with and is completely compatible with the Lionel Trainmaster Command Control system. It is designed to enhance either command or conventionally operated layouts by allowing the routing of power from the TPC3000 / Power Masters to any block of track. Any block can be changed between up to 4 different TPC3000s. Each loop can be changed between convention of command without reprogramming the TPC3000/ Power Master.

The main feature of the BPC3000 is to have the ability to connect more than one TPC3000 to any block of track. In conventional mode, this allows several blocks to be connected to the same TPC3000 giving you continuous control of your train without having to set each TPC. When operating in command / conventional mode each block of track can be switched between command and conventional with a simple press of a button. This flexibility allows you to easily mix Lionel and MTH engines on the same track.

This manual is designed to take you through the basic operation and wiring details of the BPC3000. Please take the time to read this information before attempting to connect it to your layout.



SPECIFICATIONS

Physical

Size 3.7” x 2.7” x 1.2”

Mounting with two #4 pan head sheet metal screws

Four double pole relays paired with a common connection

Electrical Ratings

Input Voltage 9 Volts to 20 Volts AC

Input Supply Current 50 ma

COMM input signal +/- 12 Volts

Maximum Output Voltage 24 Volts AC or DC

Maximum Output Current 15 Amps AC or DC

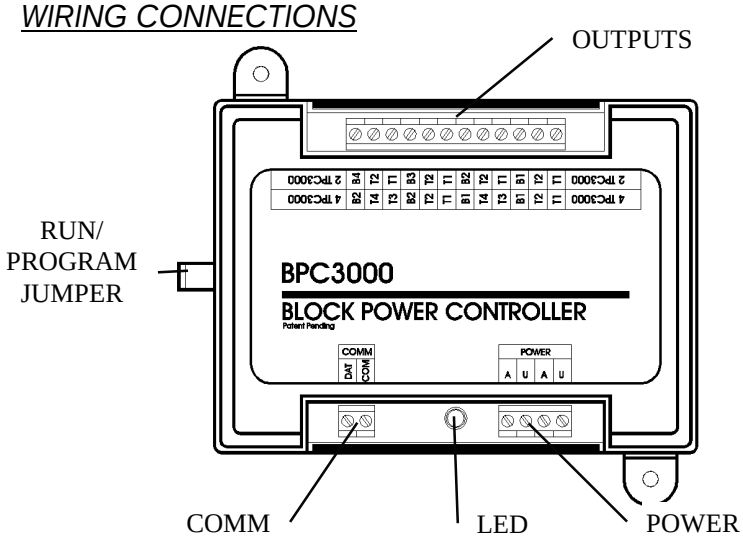
GENERAL INFORMATION

TERMS

Following are specific terms, words, letters and how they are used in the manual:

- DAT: The RED wire connected to the COMM connector
- COMM: Communication or Common on the output terminal
- COM: The GREEN wire connected to the COMM connector
- POWER A: Lionel terminology for power connection to accessory transformer
- POWER U: Lionel terminology for neutral or common connection to accessory transformer
- T(1,2,3,4) : TPC3000/Power Master input power connection
- B(1,2,3,4): Block power output connection
- LED: Indicator to let you know the controller is working
- TERMINAL: Connector strip where you connect the wires
- DAISY CHAIN: Linking multiple controllers together to add additional switch and accessory operations

WIRING CONNECTIONS



Power

The Power connections on the BPC3000 are located in the lower right hand corner and are marked as POWER. This is the power to run the module.

Two connections are required between the BPC3000 and the transformer:

- The first connection to the BPC3000 is the **POWER A** terminal. It is connected to the **accessory A terminal or power** side of the transformer.

- The second connection is the **POWER U** terminal. It is connected to the **U terminal or common side** of the accessory transformer.

It is recommended that you use an accessory transformer with the output of 12 Volts AC. This will allow the BPC3000 to function regardless of whether the track voltage is ON.

Additional terminals are supplied to easily daisy chain the accessory power to other ALC3000 family members. To do this simply repeat the connection of both the A and U terminals to the other ALC3000 family member. It is recommended to color code both the A and U wires and maintain this color coding throughout the layout.

COMM

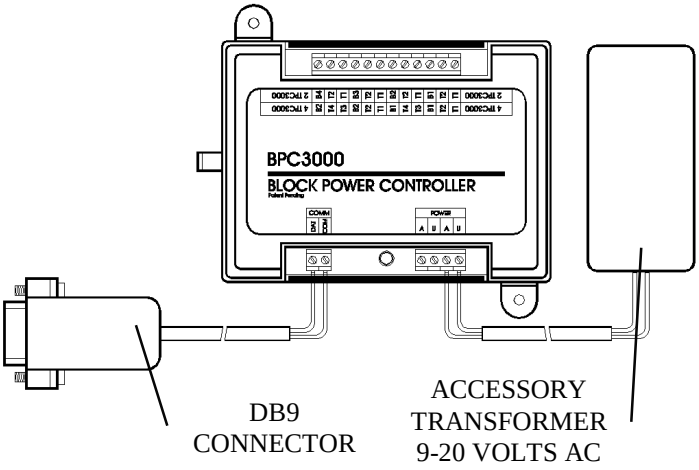
The COMM connections on the BPC3000 are located in the lower left hand corner and are marked as connector terminal COMM. These connections supply the communication or COMM to each ALC3000 family member. It tells the ALC3000 family controller what you want to do.

Two connections are needed between the BPC3000 and the Lionel Command Base. To make these connections, you will need a stranded cable with a DB9 connector on one end. The interface cable plugs into the Lionel Command Base connector marked **computer**. IC Controls can provide ready to use cables for connecting together the entire ALC3000 Family. You may purchase these cables by ordering part #ICC3001-6 or -20 depending on length.

- The first connection is the DAT (DATA) connection. This would be the **red** wire of the IC controls ICC3001 cable.

- The second connection is the COM (Common wire of the communication port) connection. This would be the **green** wire of the IC controls ICC3001 cable.

Making your own cable is explained in detail under CONNECTING THE CABLE FROM THE BPC3000 CONTROLLER TO THE COMMAND BASE. The completed connections to the BPC3000 are shown below.



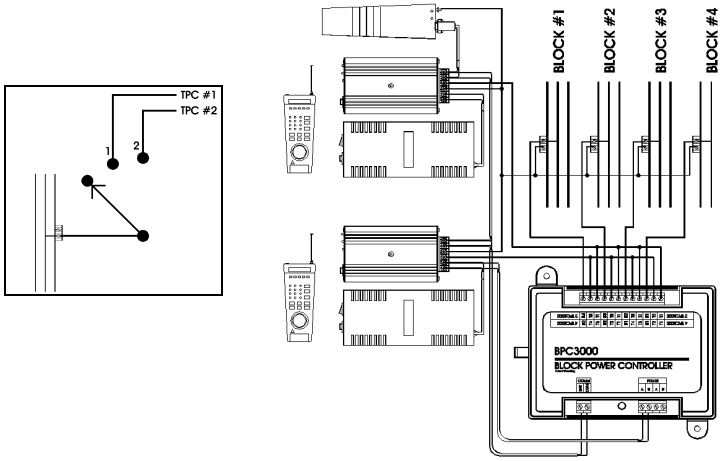
TPC/PM POWER INPUT BLOCK POWER OUTPUTS

The TPC/PM input and block power outputs on the BPC3000 are located on the topside of the BPC3000. These connections power the input power to the blocks of track located on the layout. At least two connections are required per block a B (1,2,3,4) block connection and a T (1,2,3,4) connection. This allows the BPC3000 to route input from the T's (TPC side) to the B's (Block side). The controller may be connected to any block that is 24 Volts or less requiring 15 Amps or less.

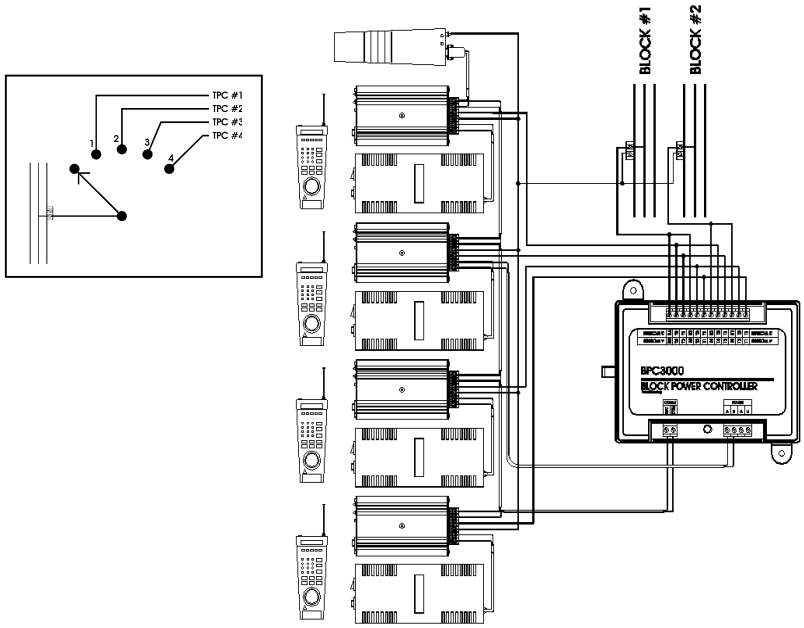
Two types of output connections are possible. Which type you need is based on how many operators you wish to have running each block of track. The BPC3000 can be configured for two operators controlling 4 blocks of track or four operators controlling two blocks of track. You may have more than two operators and still use the BPC3000 as two TPC to four block controller. For example when using three TPC's to control the layout have one control the entire layout and spilt the duties of the other two. One will control the yard and the other controls the sidings.

Functional Description

Think of the BPC3000 as an electronic rotary switch controlled from the handheld remote. It has two possible configurations, the first has three positions: OFF, TPC1 and TPC2. See diagram below. It can route power from two transformers to one block of track. In this configuration 4 of these rotary switches are in a BPC3000. This is called two TPC's to four Blocks of track.

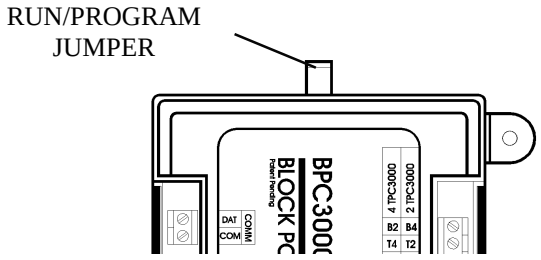


The second configuration for the BPC3000 has five positions: OFF, TPC1, TPC2, TPC3 and TPC4. It can route power from 4 different transformers to one block of track. In this configuration 2 of these rotary switches are in a BPC3000. This is called Four TPCs to two Blocks of track.



Run/Program Jumper

The Run/Program jumper is located on the left side of the BPC3000. The jumper is a small black connector that is easily removed and replaced. It controls whether the BPC3000 should perform a command or **SET** it's accessory number. The jumper should only be removed when you are setting it's number.



To set the number of a set of blocks as accessories:

- Remove the **jumper** from the BPC3000
- Select the **ACC button** followed by the accessory number, **1-99**
- Press the **SET** button on the hand held to set the number

The LED will Long Blink steady for one (1) second if the command is accepted. After the address has been set. **Make sure to replace the jumper for normal operation.**

Use of LED light

The LED light located at the bottom center of the BPC3000, indicates the proper operation of the controller. There are three different types of flashes, the quick flash, short blink, and long blink to indicate the different functions of the controller.

Quick Flash This flash is a 10th of a second in duration. (It flashes so fast you can hardly see it, like if you were to say one thousand and one, you would only be able to say one thou). A quick flash indicates the BPC3000 is receiving information from the command base. It's indicating that the information it's getting is **NOT** for this accessory controller. An example of what would cause the Quick Flash would be during the operation of controlling the speed to a locomotive on the track. Information is being sent to the locomotive and not to the controller.

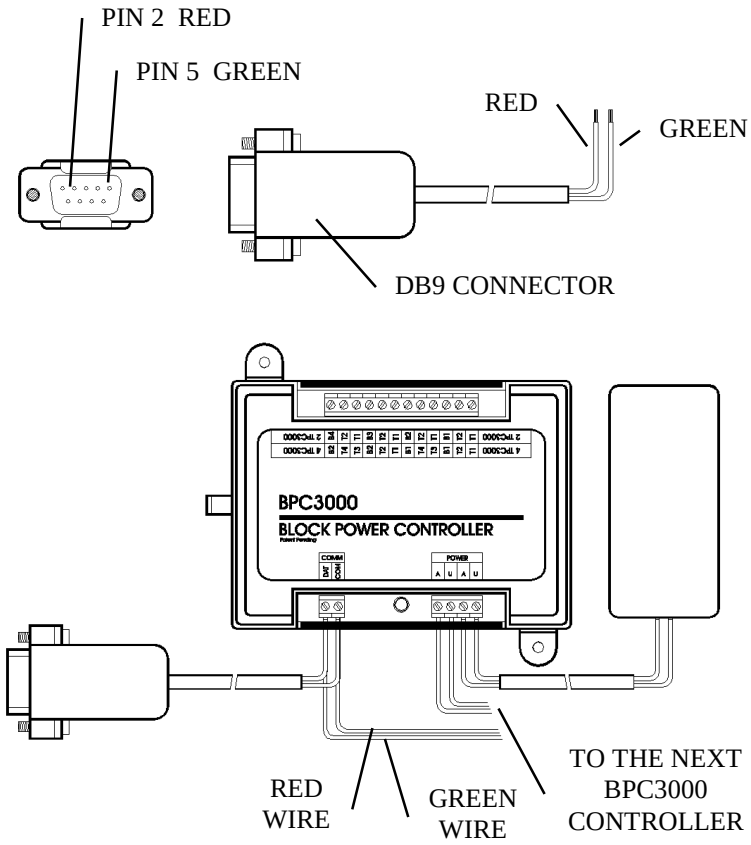
Short Blink A 1/2 second short blink indicates the BPC3000 has received a command telling it to do something. It indicates normal operation when an accessory is selected the handheld. For example, when the Short Blink would flash when you select block #5 OUT and block 5 is being control be this BPC3000.

Long Blink A one (1) second Long Blink indicates the BPC3000 has a SET command that should be stored into the BPC3000 for later use. An example of the Long Blink is when the Run/Program jumper is removed and a SET Accessory number is done. (Setting an accessory number is covered further in the manual.)

CONNECTING THE BPC3000 TO THE COMMAND BASE

The ALC3000 controller family requires a cable to be connected from the Command Base to the ALC3000 controller family. This is done by using a simple two wire cable. The cable should be made of #22 gauge stranded wire containing a RED and GREEN wire. This cable may be purchased ready made from IC Controls as #ICC3001-6' or -20'. You may choose to build your own cable. The details of how to do this are as follows. The connector required to hook to the command base is called a Male DB-9 (Radio Shack Part #276-1537). Connect the RED (DAT) wire to pin 2 of the DB9 connector. Connect the GREEN (COM) wire to pin 5 of the DB9.

Connecting the ALC3000 controller family to the Command base.



- Start by connecting the DB9 end of the cable to the

Command Base marked Computer

- Connect the RED wire to the DAT terminal of the COMM connector located on the BPC3000

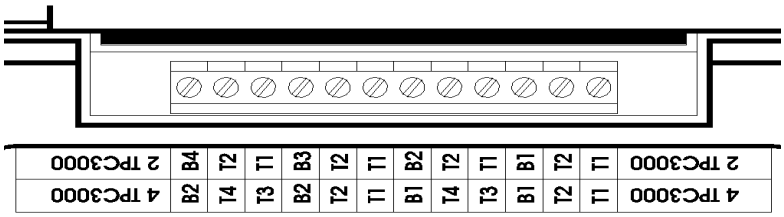
- Connect the GREEN wire to the COM of the COMM connector located on the BPC3000. Additional ALC3000 family members can be added by simply daisy chaining the RED (DAT) and GREEN (COM) wires from this BPC3000 to the next

Halt Button in Handheld

Pushing the halt button on the handheld will remove the power to the layout by shutting down the TPC3000/Power Masters. This will remove all power to the track. It does not clear the routing selections you have made. To restore power to the track after the halt key has been pressed is done by simply turning the TPC3000/Power master's back on and power is restored.

Setting the BPC3000 Accessory Address

Block/Accessory Number	16	15	14	13	BPC #4
	12	11	10	9	BPC #3
	8	7	6	5	BPC # 2
	4	3	2	1	BPC # 1



The connections on the top of the BPC3000 are divided into two groups, 2 TPC3000 for 2 TPC's to 4 Blocks or 4 TPC3000 for 4 TPC's to 2 blocks. Make the connections based on the type of operation. Connect all like connections together. For example connect all T1s together then all T2s these will become the TPC A terminal connections to TPC1 and TPC2. Tie all Bs together if required these become the connection to the track. See wiring diagrams for details.

Setting the address of the BPC3000 is easy. You must first

decide which block numbers you would like to control. Block are considered accessories and are selected by using the ACC button on the handheld. There are always four accessory numbers assigned to each BPC3000. For example, if you wanted the BPC3000 to control blocks 9,10,11,12 in a 2 TPC3000 to 4 Track configuration each track block would be selected by ACC 9, 10, 11 and 12. To try this, make the necessary POWER and COMM connections. NOTE: It is not necessary at this time for the power inputs and outputs to be connected to SET the accessory number.

- Remove the **Run/Program jumper** from the side of the BPC3000 that you wish to SET
- Select **ACC** button on the handheld
- Next select **number 9** then press **SET**

The BPC3000's LED should Long Blink for one (1) second indicating that you have set the block number. If it does not, make sure the Run/Program jumper is removed and repeat until you see a long blink. After you have seen the Long Blink replace the Run/Program jumper and test the operation of the BPC3000.

To test the function:

- Select **ACC**
- Select the **number 9**
- Then press the **AUX1** button

You should hear the Relay click and the BPC3000's LED will Short Blink. If the LED only Quick Flashes, the switch number that has been SET does not match the switch number that is being thrown. **NOTE:** The factory default setting for the BPC3000 is for accessory numbers 1-4.

NOTE: Always remember to replace the Run/Program jumper after you have SET the accessory number.

SELECTING BLOCKS

The BPC300o are addressed as accessories. The power routings are changed by using of the AUX1 and AUX2 functions on the handheld remote.

2 TPC3000 to 4 Blocks of track

In the 2 TPC to 4 Block configuration each block of track is assigned to 1 accessory number. TPC #1 is selected by pressing AUX1. To turn off that same block press AUX1 again. This toggles the output to that block. To connect the same block to TPC #2 press the AUX2.

- Accessory number and AUX1 connects to TPC #1
- Accessory number and AUX2 connects to TPC #2

For example controlling block 1 with accessory 1 :

- **ACC (1)** followed by **AUX1** connects to TPC #1
- **ACC (1)** followed by **AUX2** connects to TPC #2

Block 2 would be controlled as followed

- **ACC (2)** followed by **AUX1** connects to TPC #1
- **ACC (2)** followed by **AUX2** connects to TPC #2

4 TPC3000 to 2 Blocks of track

In the 4 TPC to 2 Block configuration each block of track is assigned to 2 accessory numbers. Odd number accessory numbers connect to TPC #1 and TPC #2 and even numbers connect to TPC#3 and #4. TPC #1 is selected by using odd accessory numbers and pressing AUX1. To turn off that same block press AUX1 again. This toggles the output to that block. To connect the same block to TPC #2 use the same odd number and press the AUX2. For example if you are controlling block 1 with accessory 1 do the following:

- **ACC (1)** followed by **AUX1** connects to TPC #1
- **ACC (1)** followed by **AUX2** connects to TPC #2
- **ACC (2)** followed by **AUX1** connects to TPC #3
- **ACC (2)** followed by **AUX2** connects to TPC #4

Block 2 would be controlled as followed

- **ACC (3)** followed by **AUX1** connects to TPC #1
- **ACC (3)** followed by **AUX2** connects to TPC #2
- **ACC (4)** followed by **AUX1** connects to TPC #3
- **ACC (4)** followed by **AUX2** connects to TPC #4

SETTING THE ROUTING MODE

The BPC3000 can be set between two different modes of operation. The first is the two TPC3000s to four Blocks of track. This means that up to two TPC3000s can control each block of track. Each BPC3000 will control four Blocks of track. To set the BPC3000 to this type of operation complete the following

- Remove the **jumper** from the BPC3000
- Select the **ACC button** followed **(98)**
- Press the **SET** button on the hand held to set the number
- Replace the **jumper** from the BPC3000

The second is the four TPC3000s to two Blocks of track. This means that up to four TPC3000s can control each block of track. Each BPC3000 will control two Blocks of track. To set the BPC3000 to this type of operation complete the following

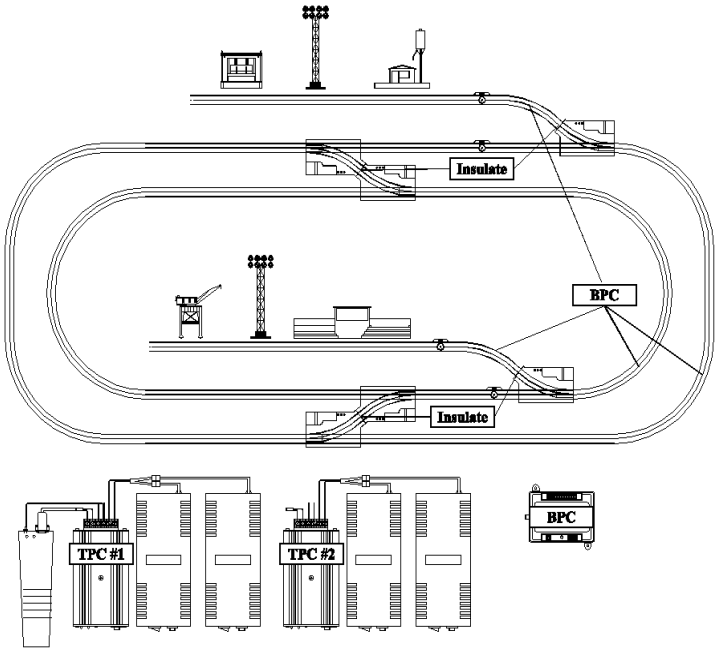
- Remove the **jumper** from the BPC3000
- Select the **ACC button** followed **(99)**
- Press the **SET** button on the hand held to set the number
- Replace the **jumper** from the BPC3000

These mode selections will not changed the accessory address of the BPC3000 and can be done at any time.

SAMPLE LAYOUT

The BPC3000 routes the power throughout the layout. To do this, the layout must be broken up into blocks. Block are isolated pieces of track. This is done by placing an insulated jointer in the center rail of the track . Now you can turn power on and off to each block. Looking at the layout below, notice the two main loops. Insulated jointers have been placed at both switch crossovers breaking the layout into two separate pieces. This will give you individual control of each loop. Further control is given by insulating the inter and outer sidings. This allows engines to be operated separate from the main line. You can do switching with the other TPC3000 or just park the engine by shutting the power off.

The BPC3000 is used to route the power from the two TPC3000s to any block of track. A TPC3000 can control as little as one block or as much as the entire layout. In the example below four blocks are controlled by one BPC3000.

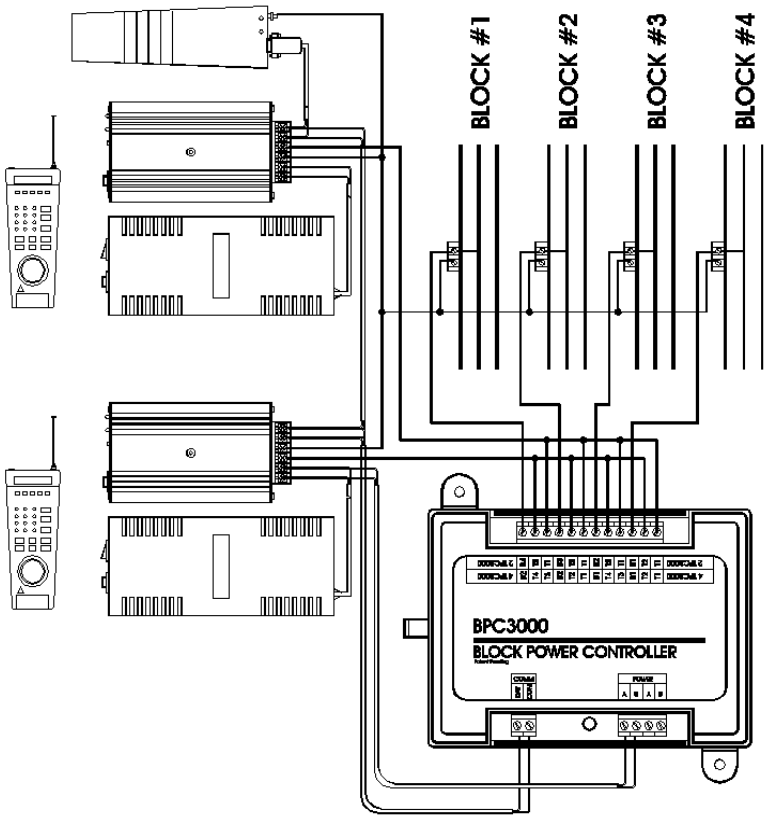


WIRING EXAMPLES

WIRING A SINGLE BPC3000

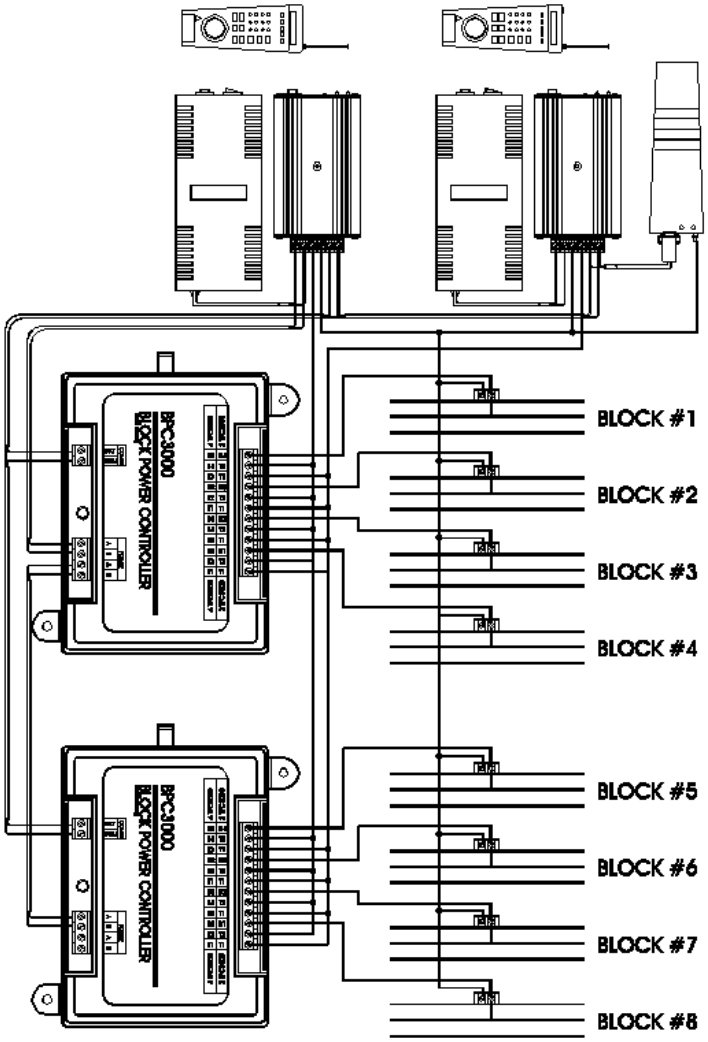
The wire example below shows the basic wiring for connecting two TPC3000 to 4 blocks of track. Notice the **COMM** cable is just loop from one unit to the next. Only one power connection is necessary and is made to transformer power input.

You can also make this connection to a separate transformer that is isolated from the track. An isolated transformer will be needed if noise from the Lionel command control signal interferes with communications. This is indicated by a steady green COMM light located on the BPC3000. If the green light of the BPC is always on, you will need to use an isolated supply. If you are currently using other ALC3000 family members with an isolated supply just loop the power from it. The BPC3000 uses very little power to operate so many of them can be connected together to one transformer.



WIRING SEVERAL BPC3000's

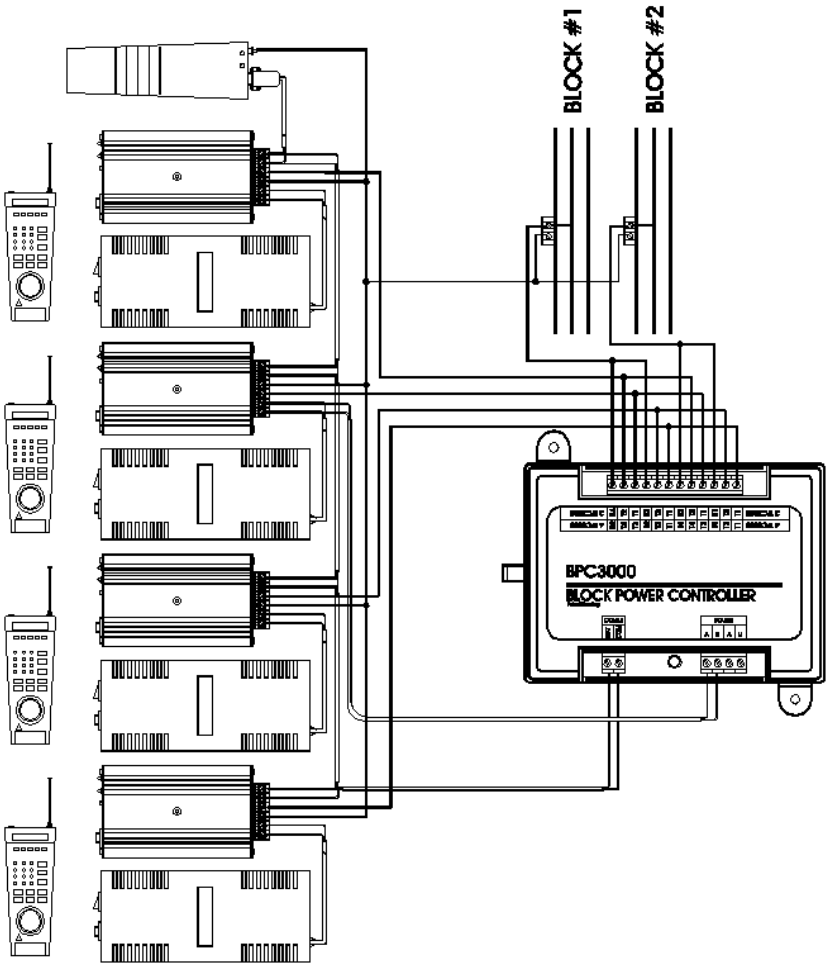
To wire several BPC3000's together simply loop or daisy chain the power and COMM connections. Each must be given a separate address. In the example below, BPC3000 #1 controlling blocks 1,2,3 and 4 is set to accessory #1 and BPC3000 #2 controlling blocks 5,6,7 and 8 is set to accessory #5. Only the first address of each BPC3000 needs to be set all other block numbers are set automatically. To add additional BPC3000 or any other ALC3000 family members just continue this process giving each one a unique address.



WIRING 4TPCs TO 2 BLOCKS

The wiring of four TPC3000 to two blocks of track is shown below. Use the connections marked 4 TPC3000 on the BPC3000. Connect all connection marked with the same numbers together. Example, hook all T1s together and connect it to TPC #1. Then connect all the T2s together and connect it to TPC #2 and so on.

If additional BPC's are used just daisy chain them together as



described in WIRING SEVERAL BPC3000's section, page 15.

Additional Information and Tech Support

IC Control is continually trying to make it's products the best in the market place. Your input on our products is very important to us. It allows us to shape our products to your needs. If you have any comments or questions on any of our products please feel free to contact us. We can be reached at:

IC Controls
P.O. Box 296
New Boston, MI 48164
ATT: Marketing Dept.

Warranty Information

IC Controls stands behind their products with a one year parts and labor warranty. If the product fails to operate because of manufacture defect, IC Controls will repair or replace it at their discretion free of charge for a period of one year from the date of purchase. To return defective product please include the following:

- Defective unit
- Dated sales receipt
- Reason for return
- A check for $5.00 to cover postage and handling

Send the above information to:

IC Controls
P.O. Box 296
New Boston, MI 48164
ATT: Returns Dept.

Please allow 2 to 3 weeks for processing.

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