

ASC3000

ACCESSORY SWITCH CONTROLER
REFERENCE MANUAL
VERSION 1.3

TABLE OF CONTENTS

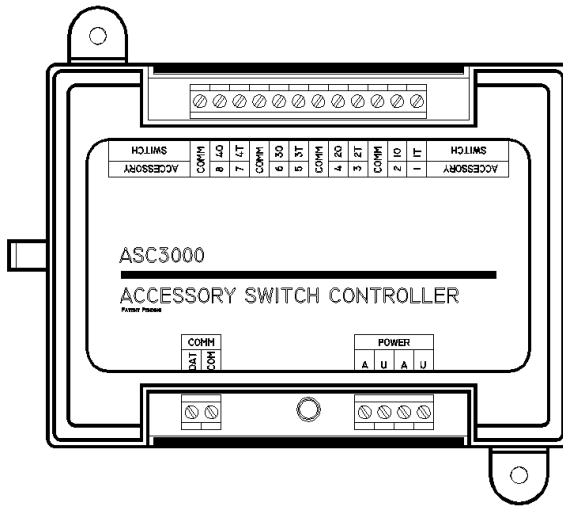
<u>INTRODUCTION</u>	<u>3</u>
<u>SPECIFICATIONS</u>	<u>3</u>
PHYSICAL	3
ELECTRICAL RATINGS	3
<u>GENERAL INFORMATION</u>	<u>3</u>
TERMS	3
<u>WIRING CONNECTIONS</u>	<u>4</u>
POWER	4
COMM	5
<u>SWITCH AND ACCESSORY OUTPUTS</u>	<u>6</u>
RUN / PROGRAM JUMPER	6
USE OF LED LIGHT	6
<u>CONNECTING THE ASC3000 TO THE COMMAND BASE</u>	<u>7</u>
USE OF HALT BUTTON IN HANDHELD	9
<u>THE ASC3000 CONTROLLING REMOTE SWITCHES</u>	<u>9</u>
GENERAL OVERVIEW	9
SETTING THE ASC3000 SWITCH ADDRESS	9
CONTROLLING A REMOTE SWITCH	10
OUTPUT CONNECTIONS	11
<u>SWITCH MACHINE WIRING EXAMPLES</u>	<u>12</u>
LIONEL REMOTE SWITCHES	12
TORTOISE SWITCH MACHINE	13
NJ TWIN COIL SWITCH MACHINE	14

<u>SETTING SWITCH OUTPUT TIME</u>	14
SELECTING MOMENTARY SWITCH OUTPUT	14
<u>ROUTES</u>	15
GENERAL INFORMATION	15
CLEARING A ROUTE	16
SETTING UP A ROUTE	17
USING A ROUTE	18
<u>THE ASC3000 CONTROLLING REMOTE ACCESSORIES</u>	18
GENERAL OVERVIEW	18
SETTING THE ASC3000 ACCESSORY ADDRESS	19
OUTPUT CONNECTIONS	20
CONTROLLING AN ACCESSORY	20
<u>WIRING EXAMPLES</u>	21
SEARCH LAMP	21
SAWMILL	24
UNCOUPLING TRACKS	24
DIESEL FUELING STATION	25
CONVENTIONAL TRACK POWER WIRING	26
<u>ADDITIONAL INFORMATION AND TECH SUPPORT</u>	28
<u>WARRANTY INFORMATION</u>	28

INTRODUCTION

The ASC3000 Switch and Accessory Controller is designed to be used with and is completely compatible with the Lionel Trainmaster Command Control system. The controller operates any switch or accessory through any

Lionel Trainmaster compatible handheld such as the Lionel CAB-1. It allows you to operate either 4 switches or 8 accessories. The ASC3000 replaces any push button or toggle switch giving you the versatility of realistic control to run your layout directly from your finger tips. This manual is designed to take you through the basic operation and wiring details of the ASC3000. 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

Eight single 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

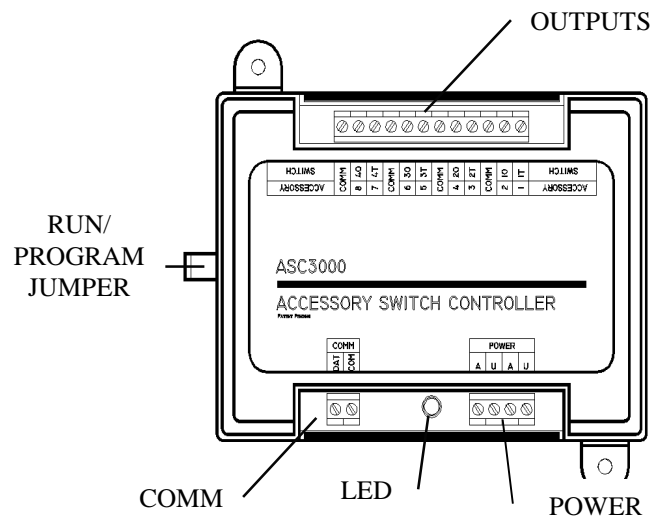
GENERAL INFORMATION

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: Common
- POWER A: Lionel terminology for power connection to accessory transformer
- POWER U: Lionel terminology for ground or common connection to accessory transformer
- T : **THROUGH** position of remote switch
- O: **OUT** position of remote switch
- 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 ASC3000 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 ASC3000 and an accessory transformer:

- The first connection to the ASC3000 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 ASC3000 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.

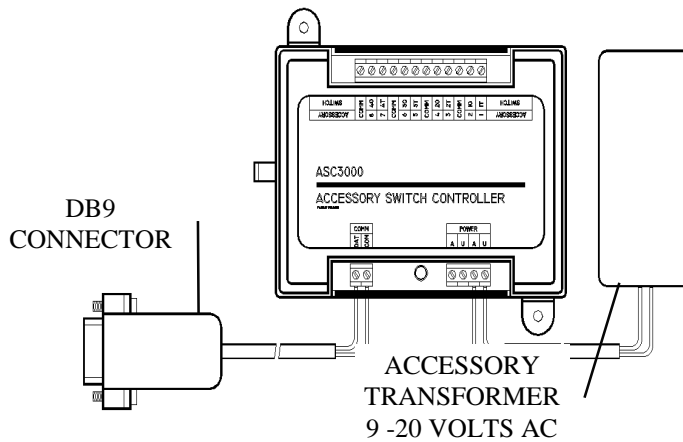
COMM

The COMM connections on the ASC3000 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 ASC3000 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 ASC3000 CONTROLLER TO THE COMMAND BASE. The completed connection to the ASC3000 are shown below.

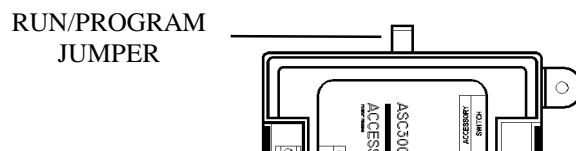


SWITCH AND ACCESSORY OUTPUTS

The switch and accessory connections on the ASC3000 are located on the top side of the ASC3000. These connections act as a switch to run either switches or accessories. At least two connections are required per switch or accessory, a COM (common) and a switch or accessory connection. The controller may be connected to any electrical device AC or DC that is 24 Volts or less requiring 15 Amps or less.

Run/Program Jumper

The Run/Program jumper is located on the left side of the ASC3000. The jumper is a small black connector that is easily removed and replaced. It controls whether the ASC3000 should perform a command or **SET** it's switch or accessory number. The jumper should only be removed when you are setting it's number.



To set the number of a switch or accessory:

- Remove the **jumper** from the ASC3000
- Select the **SW or ACC button** followed by the switch or 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 ASC3000, 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 ASC3000 is receiving information from the command base. It's indicating that the information it's getting is **NOT** for this accessory or switch 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.

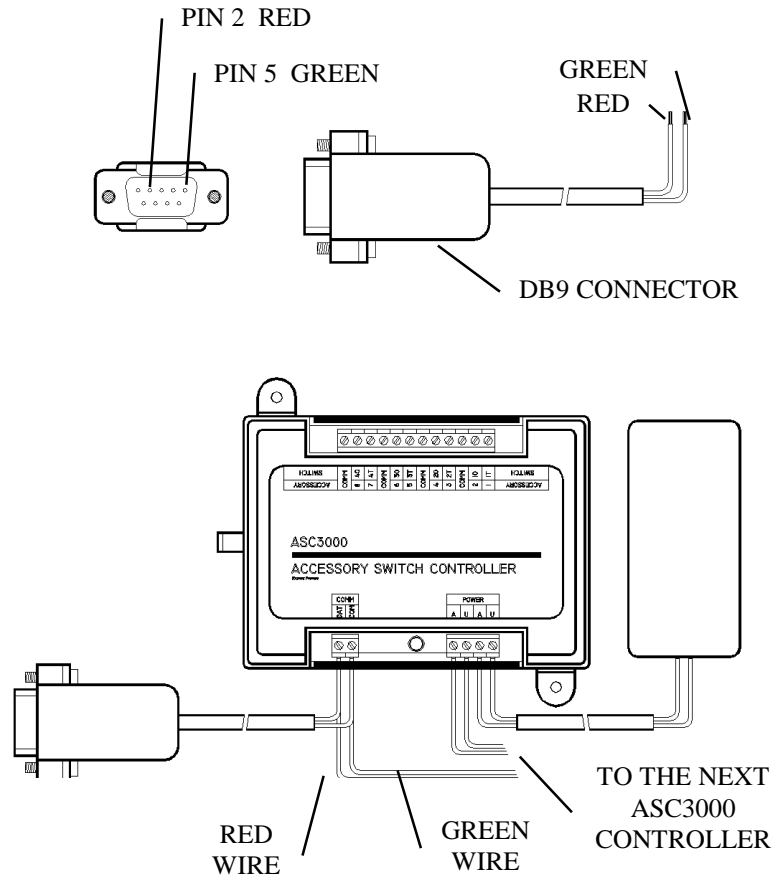
Short Blink A 1/2 second short blink indicates the ASC3000 has received a command telling it to do something. It indicates normal operation when a switch or accessory is selected the handheld. For example, when the Short Blink would flash when you throw switch #5 OUT and switch 5 is being control be this ASC3000.

Long Blink A one (1) second Long Blink indicates the ASC3000 has a SET command that should be stored into the ASC3000 for later use. An example of the Long Blink is when the Run/Program jumper is removed and a SET Switch or Accessory number is done. (Setting a switch or accessory number is covered further in the manual.) A Long Blink will also occur when a SET route command is performed. This indicates that the route information has been stored.

CONNECTING THE ASC3000 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 ASC3000
- Connect the GREEN wire to the COM of the COMM connector located on the ASC3000. Additional ALC3000 family members can be added by simply daisy chaining the RED (DAT) and GREEN (COM) wires from this ASC3000 to the next

Halt Button in Handheld

Pushing the halt button on the handheld will immediately turn off all outputs on the ASC3000. Each output can be turn back on after the halt button has been released.

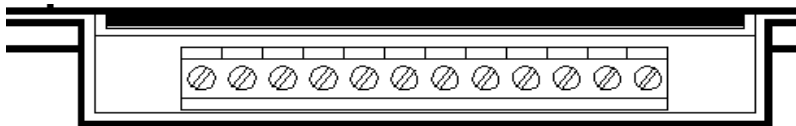
THE ASC3000 CONTROLLING REMOTE SWITCHES

General Overview

The ASC3000 can control 4 remote switches. Remote switches that form crossovers can be wired as one output and selected as one switch. Remote switch numbers on the ASC3000 are in groups of fours. The first group will contain 1-4 the next group would be 5-8 followed by 9-12 13-16..... . This grouping method is used to decided which ASC3000 controls which remote switch. Up to 25 ASC3000 switch controllers can be hooked together providing control of up to 100 remote switches.

Setting the ASC3000 Switch Address

	16	15	14	13	ASC #4
SWITCH					
NUMBER	12	11	10	9	ASC #3
	8	7	6	5	ASC #2
	4	3	2	1	ASC #1



SWITCH	COMM	40	4T	COMM	30	3T	COMM	20	2T	COMM	10	1T	SWITCH
ACCESSORY		8	7		6	5		4	3		2	1	ACCESSORY

Setting the address of the ASC3000 is easy. You must first decide which switch numbers you would like to control. Remember they are grouped together in fours. An example, if you wanted the ASC3000 to control switches 9,10,11,12. Make the necessary POWER and COMM connections.
 NOTE: It is not necessary at this time for the outputs to be

connected to SET the switch number.

- Remove the **Run/Program jumper** from the side of the ASC3000 that you wish to SET
- Select **SW** button on the handheld
- Next select **number 9** then press **SET**

The ASC3000's LED should Long Blink for one (1) second indicating that you have set the switch 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 ASC3000.

To test the function:

- Select **SW**
- Select the **number 9**
- Then press the **THROUGH** button

You should hear the Relay click and the ASC3000'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 ASC3000 is for switch numbers 1-4.

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

Controlling a Remote Switch

Setting up to control switches by a simple push of a button is simple. Once the switch number has been SET you may now operate the switches located throughout your layout from the remote controller. To do this:

- **Press the SW** on the handheld
- Select the **switch number**
- Finally choose either **THROUGH** or **OUT** on the handheld depending on the path you want your trains to travel

An example, to throw main line switch 5 **OUT** to diverge from the main line. Begin by selecting **SW** on the handheld followed by number 5 then press **OUT**. Switch 5

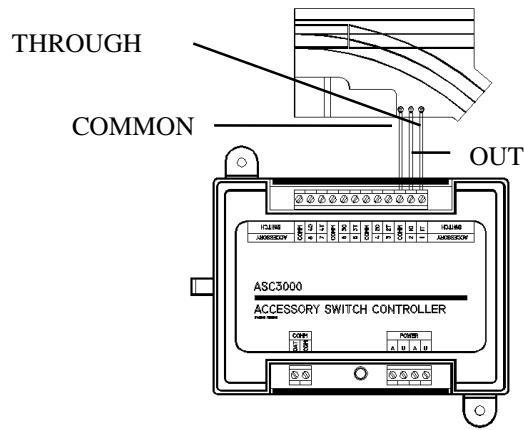
will now activate a move to the **OUT** position. The switch movement will remain powered for a 1/2 second after the release of the **THROUGH** or **OUT** buttons. To operate a slow motion Tortoise switch machine simply hold the **THROUGH** or **OUT** buttons until the switch is completely thrown, approximately 2-3 seconds.

Output Connections

The ASC3000 does not supply power to the remote switches it simply closes the switch to make them work. This is done in the same way the remote hand lever closes to move the remote switch **THROUGH** or **OUT**. Each output is made up of two switches the **THROUGH** and **OUT** and have a common point between them. This common point is connected to the common point of the switch.

Each switch output of the ASC3000 is connected to each side of the switch. When the proper switch is selected and the **THROUGH** or **OUT** button is pushed and the remote switch moves through or out. The ASC3000 switches are marked in groups of four. Looking at the top left of the ASC3000, the first group is the group containing the forth set. This set contains a COMM (common point), 4O (Switch group 4 **OUT**), and 4T (Switch group 4 **THROUGH**). The next group is 3, made up of the same connections COMM, 3O, and 3T and so on.

To wire a Lionel remote switch into SW1 look at the diagram below to wire the next switch simply move over to the next group of three.



- **Locate the common point on the switch** (refer to wiring examples for details) **connect it to COMM** connection
- **Connect the terminal** that makes the switch go through to the **xT terminal of the ASC3000**
- Connect the last **connection** to switch terminal that makes the switch go out to the **xO terminal**

Test the switch by:

- Selecting the **SW** button
- The **Switch number**
- Now the **THROUGH** button

The switch should have changed to straight or through. To make sure it works both ways, press the **OUT** button, the switch should change to **OUT** or diverging. If the switch only goes one way, the common point to the switch is wrong. Recheck your wiring and try it again.

SWITCH MACHINE WIRING EXAMPLES

Lionel Remote Switches

There are many types of Lionel switches and the location of the connections are different for each of them. This list will help you locate the connection of each switch:

- LTI O gauge switches #3010 and #3011 the COMM is

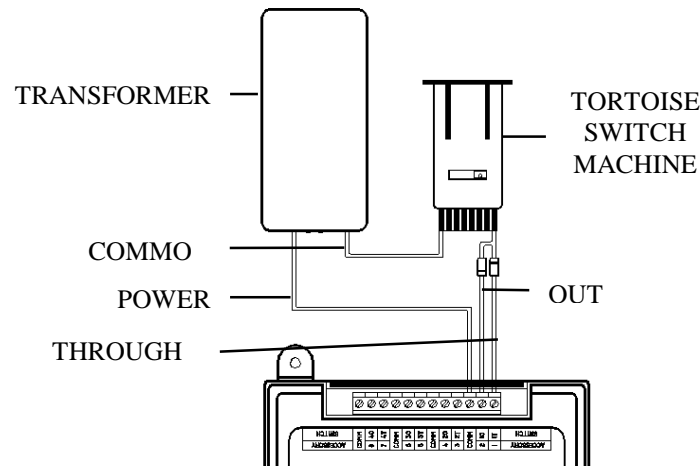
terminal 2

- Postwar O22 and MPC O gauge switches #5132 and 5133 the COMM is the center terminal
- Super O switches that have two post together and one on the side, the side post is the COMM terminal
- O27 and O42 gauge switches #1122, #1122e, #5121 and 5122 the COMM terminal is closest to the switch motor

Tortoise Switch Machine

Slow motion switch machines like the Tortoise Switch machine can be operated by the ASC3000. Lionel accessories are AC powered and Tortoise Switch machines are DC. If a Lionel accessory transformer is used, two diodes (1N4001 Radio Shack #276-1101) must be added to control the direction of the motor in the switch machine.

NOTE: There is a direction or polarity to each diode. This is indicated by the band around it.



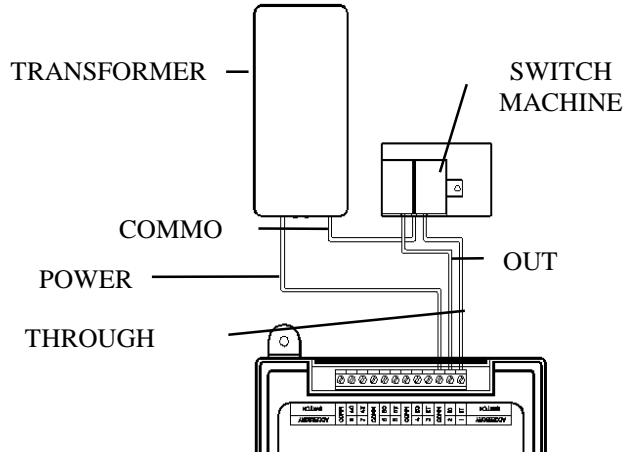
To test the switch for operation: select the switch and hold the **THROUGH** and **OUT** key until the switch is completely moved to the desired position. This normally takes 2-3 seconds. If the switch machine through and out commands are backwards, reverse the xT and xO connections at the ASC3000.

The accessory voltage supplied to the tortoise may be different from the voltage supplied to the ASC3000. This will give you the ability to slow down the movement of the switch by lowering the voltage to it.

NJ Twin Coil Switch Machines

Twin coil switch machines like the NJ International can be driven directly from the ASC3000, this is not even a problem with pairing the two together to operate a crossover). No additional circuitry is required to do this. Just connect both machines to one ASC3000 output.

To wire a twin coil machine, you first need to locate the COMM or common connection of switch machine. On a NJ International the COMM is the center terminal. The two outside terminals are the xT (through) and xO (out) connections. The through and out connection are based on how the machine is mounted on your layout. If the switch machine through and out commands are backwards, reverse the xT and xO connections at the ASC3000.



Setting Switch Output Time

Selecting momentary switch output

The ASC3000 has two different types of output operation. The first is momentary. This momentary output is designed for use with all coil type switch machines i.e. Lionel, Atlas or NJ twin coil types. The output when

activated will remain on for one half of a second or as long as the button on the handheld is pressed.

The second type of output operation is constant on. Each time a switch or route is selected it remains on until a change of direction activated or by pressing the emergency stop button on the handheld. The constant output is designed for use with tortoise switch machine or signal controlled lighting. DO NOT use this type of operation with coil switch machines it may cause damage to the switch.

To set the switch controller to momentary operation

- Remove the **jumper** from the ASC3000
- Select the **SW** followed by the number, **98**
- Press the **SET** button on the hand held to set the address

To set the switch controller to constant operation

- Remove the **jumper** from the ASC3000
- Select the **SW** followed by the number, **99**
- Press the **SET** button on the hand held to set the address

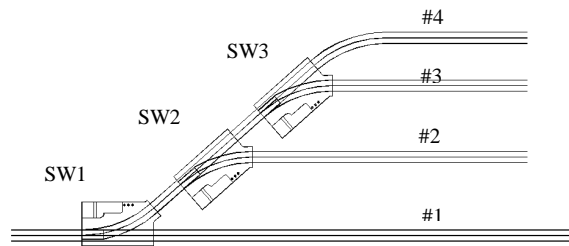
The LED will Long Blink steady for one (1) second if the command is accepted. After the address has been set. This sequence can be done either before or after the initial address is set. **Make sure to replace the jumper for normal operation.**

ROUTES

General information

Routes are used to allow multiple switches to be thrown with a single push of a button. A good example of the use of a route would be to select a yard track. Let us suppose you want to send a train into yard track #4. This would require you to throw switches 1, 2 and 3. This could be done by using the **SW** function of the handheld and selecting each switch or it can be combined to become a route that would be used by the **RTE** function. We will make it route 4 and be selected by pressing the

RTE followed by the **4**. This would throw all the switches to there proper direction with a single **RTE** command. Each yard track could be selected by a different **RTE** command simplifying the operation of the yard.



Clearing a Route

Clearing a route removes all the switches that are connected to that route. Old routes should be cleared before defining a new one. To remove a switch from an existing route you must clear the old route list from the ASC3000. This is done by:

- Selecting the **RTE** button
- Press the number that is to be cleared **0-9**

NOTE: This **must be done twice** to insure the CAB-1 handheld is clear on the operation.

- After the **RTE** button followed by the route number **0-9** has been pressed two times
- Press the **SET** button on the handheld. The route is now cleared.

The LED will **Long Blink** indicating the route is clear.

For example, to clear route 4 to a new route:

- Press the **RTE** button followed by the number **4**
- Repeat this sequence **RTE** followed by **4**
- Then press the **SET** button

Route 4 is cleared and is now ready to be set to a new route. All switches that were in route 4 are cleared from route 4.

Setting up a Route

To add a switch to a route:

- Select the **RTE** key
- Select route number **0-9**
- **Repeat** by pressing the RTE followed by the same route number
- Enter the switch number **1-99**
- Then select the **THROUGH** or **OUT** button depending on the desired setting of the switch
- Finally press the **SET** key

Setting up a route requires you to define which switches are in the route and whether they have a **THROUGH** or **OUT** setting. Using our yard track example and setting up route number 4 we see that Switch **one (1)** is **OUT**, Switch **2** is **THROUGH** and Switch **3** is **THROUGH**. To set up this route from beginning to end start by clearing the route then add each switch to that route. The handheld entry would be like this:

- Begin by selecting **RTE, 4, RTE, 4, SET**, (clear route 4) Long Blink
- **RTE, 4, RTE, 4, 1, OUT, SET**(add switch 1 out to route 4) Long Blink
- **RTE, 4, RTE, 4, 2, THROUGH, SET**(add switch 2 through to route 4) Long Blink
- **RTE, 4, RTE, 4, 3, THROUGH, SET**(add switch 3 through to route 4) Long Blink

Routes may sound complicated at first but they greatly enhance the operation of the railroad. Remember start by making a list of switches and their direction. Clear the route then enter each switch one by one.

Using a route

Using a route is done by:

- Selecting the **RTE** button
- Selecting the **route number 0-9** of the route you wish to operate

If it does not activate the first time just press the **RTE** and route number again. For example to select route number 4 (yard track 4) select the **RTE** button followed by the number **4**.

THE ASC3000 CONTROLLING REMOTE ACCESSORIES

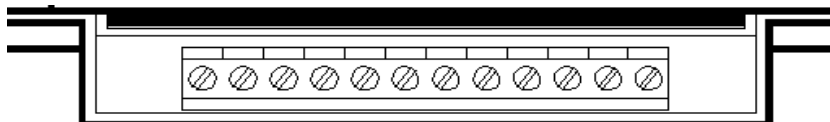
General Overview

The ASC3000 can control 8 accessories at a time. Accessory numbers are in groups of eight. This grouping is used to decide which ASC3000 controls which accessory. Up to 13 accessory controllers can be hooked together providing control of up to 100 accessories.

Remembering accessories are grouped together in eight's, accessory 1-8 will be controlled by the first ASC3000 followed by 9-16 for the second, and so on 17-24, 25-32.... To connect accessories it takes two connections just like a switch, (one to the accessory number and one to the COMM). This common connection is shared by two outputs. The first COMM to outputs 1&2 is pin 3, the second is common for outputs 3 & 4 is pin 6, etc.

Setting the ASC3000 Accessory Address

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



ACCESSORY SWITCH	COMM	8	40	7	4T	COMM	6	30	5	3T	COMM	4	20	3	2T	COMM	2	10	1	1T	ACCESSORY SWITCH
------------------	------	---	----	---	----	------	---	----	---	----	------	---	----	---	----	------	---	----	---	----	------------------

Setting the accessory number of the ASC3000, no problem. Decide which accessory number group you would like to control. Remember they are grouped together in blocks of eight. If you wanted the ASC3000 to control accessories 9-16. This would be in the second ASC3000 used as an accessory controller.

- Begin by making the necessary **POWER** and **COMM connections** to the ASC3000. It is not necessary at this point for the **outputs** to the accessory to be connected to SET the addressing numbers of the controller.
- Next remove the **Run/Program** jumper from the side of the ASC3000 that you wish to SET.
- Select the **ACC** button on the handheld followed by the number **9** then press **SET**. This tells the ASC3000 to set itself for accessory numbers 9-16.

The ASC3000's LED should Long Blink for one (1) second indicating that you have set the accessory number. If the LED does not Long Blink make sure the jumper is removed and try again. After you have seen the Long Blink replace the Run/Program jumper.

To test the operation of the ASC3000:

- Select **ACC** followed by **9** then press the **AUX1** button. You should hear the Relay click and the ASC3000's LED will come on. When you release the AUX1 Button the Relay will click again turning it off and the LED will turn off. If the LED only Quick Flashes during this check, the wiring is correct but the accessory number that has been SET does not match the accessory number that was selected.

Note: Always remember to replace the Run/Program jumper after you have programmed the address.

Output Connections

The ASC3000 does not supply power to the accessory. It functions in the same manner as your push button switch. This is the same way you run your accessories now.

Each COM terminal is common to two accessories. This common point is connected to the accessory transformer and each ASC3000 output is connected to the accessory. When an accessory is selected the output is "electronically pushed" and the accessory operates.

Controlling an Accessory

Accessories can be controlled with two different functions. The first is the function of the **AUX1** push button. This turns the accessory ON when pushed and OFF when released.

The second is the function of **AUX2**. This will turn the accessory ON the first time the button is pushed and turn it OFF when it is pushed again acting in a toggle manner.

For example, to make the watchman come out of his tower in accessory number 6.

- You select **ACC** on the handheld
- Followed by the number **6**
- Press the **AUX1** key

The watchman will come out each time the **AUX1** key is pressed:

- Another example is to turn and leave ON the light tower accessory number 3. Select the **ACC** on the handheld followed by the number **3**. Pressing the **AUX2** button once will turn the light ON. Press **AUX2** again will turn the light off.

WIRING EXAMPLES

Search Lamp

Wiring and operating search lamp as accessory number 3. To connect the search lamp accessory refer to the wiring diagram below

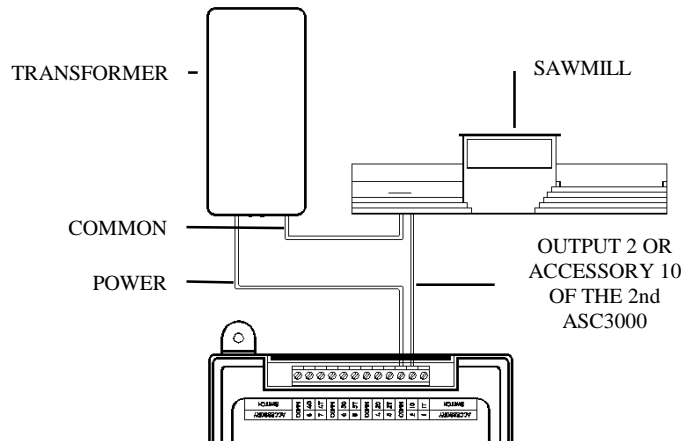


To operate the search lamp:

- Select **ACC** on the handheld
- Press **3** for the accessory number
- Press **AUX2** and the search lamp should come on and stay ON
- Press **AUX2** again to turn it OFF

Sawmill

Wiring and operating sawmill as accessory number 10. This uses a second ASC3000 supplying accessory outputs 9-16. To connect the saw mill accessory refer to the wiring diagram below:

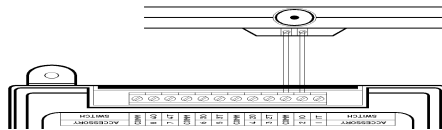


To operate the Sawmill:

- Select **ACC** on the handheld
- Press **10** for the accessory number
- Press **AUX1** and the sawmill will start and stay on as long as the **AUX1** key is pressed

Uncoupling Tracks

This example is to show how to wire a uncoupling tracks as accessory # 2. To operate the uncoupling track, select **ACC** on the hand held followed by the **# 2**. Pressing **AUX1** will activate the uncoupling track for as long as you hold the button.

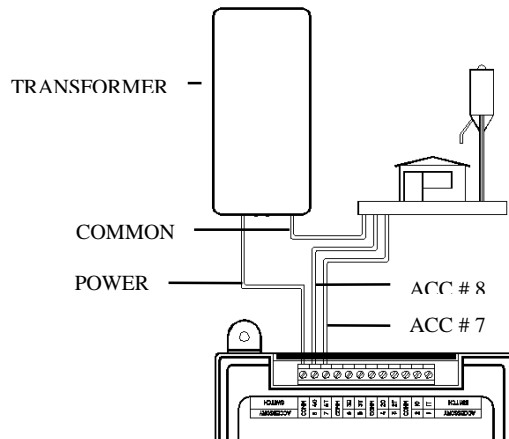


To operate the uncoupling track:

- Select **ACC** then the **#2**
- Pressing **AUX1** will activate the uncoupler for as long as you hold the button

Diesel fueling Station

The diesel fueling station requires two ASC3000 accessory outputs. The first controls the light of the station and is accessory number 7. The second operates the attendant and is accessory number 8. To connect the diesel fueling station refer to the wiring diagram below:



To operate the diesel fueling station lights:

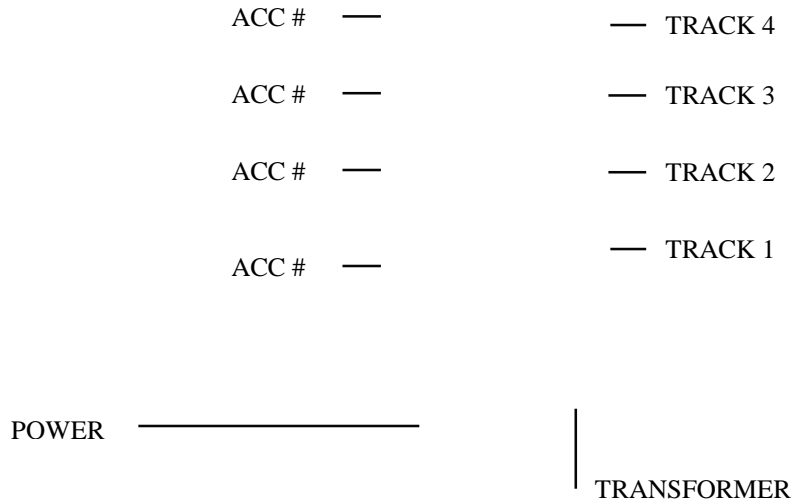
- Select **ACC** on the handheld
- Press **7** for the accessory number
- Press **AUX2** and the lights should come on and stay ON
- Press **AUX2** again to turns them OFF

To operate the attendant:

- Select **ACC** on the handheld
- Press **8** for the accessory number
- Press **AUX1** and the attendant will come out and stay out as long as **AUX1** is pressed

Conventional Track Power Wiring

This example is to show you how to wire individual blocks of track. This allows you to turn different sections of track on and off throughout the layout. Each block of track is given an accessory number. In our example accessories #1-4 are used. To select an individual block of track select **ACC** followed by the track #, then press **AUX2**. Pressing **AUX2** again turns that section off.





To operate each block of track:

- Select **ACC** followed by the track #
- Press **AUX2** will operate the track
- Pressing **AUX2** again will turn that section off

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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