

### Maximum Output Power Limitations

Each zone can supply up to 7 Amps of output current. However, the zones can not simultaneously provide this amount of current because the DC power supply is limited to 8 Amps when set for 15 volts. Thus, if one zone is continuously supply about 5 Amps, the other zone can not supply more than about 3 Amps. Exceeding this value will cause the external power supply to shutdown.

For best operation, design your layout such that any one zone requires no more than about 4Amps maximum at any one time. This can be accomplished by considering how many trains can be operating at one time within the zone. If the total current required by all the trains exceeds about 4 or 5 amps, consider adding another booster. Using this strategy insures that there is plenty of extra power to start trains, even if the zone is loaded down with 4 Amps.

At any point in time, either zone can supply up to 7 Amps - they just can't do it at the same time. If this is a requirement, you will need to add some additional boosters.

**Do not share a power supply among multiple boosters.** This is not allowed and can cause problems between ZoneMaster Boosters.

### Application Tips and Techniques

**Do not attach any external devices to the output of the ZoneMaster Booster.** For best performance and maximum safety, don't use any external devices such as shields or circuit breakers between the Booster and the layout. They can cause unpredictable results and could damage the Booster. If you think you need such devices, consider selecting one of our other ZoneMaster Booster that provide the same capability at a much lower price. Conventional block detectors, used for signaling, are OK for the ZoneMaster Boosters.

**Do not connect any cables with power applied.** Always make connections to the Booster with power turned off. Under unusual conditions, connecting the modular cable with the power turned on could result in unexpected locomotive operation.

**Do not use the ZoneMaster with the Analog Channel 0 feature.** Some system allow a locomotive without a decoder to operate. This feature is not supported by the ZoneMaster.

**Disable the analog conversion feature of your decoders.** Consult your decoder manual and set CV29 to "digital only."

**Use heavy duty wiring.** Because the ZoneMaster has a huge power capacity, your layout needs to be wired properly. Using wire that is too small, or depending only on rail joiners to connect lengths of track will result in the automatic short circuit protection not working.

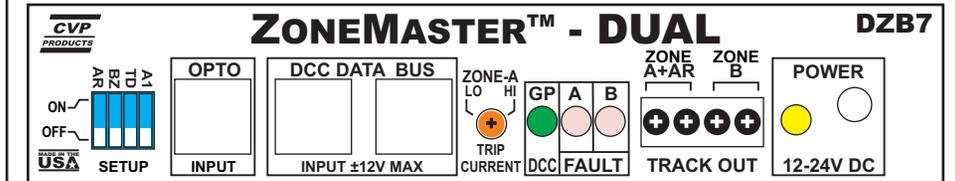
**Test your wiring and trackwork.** Go to the end of your bus wiring and place a metal object or coin across the rails. If your wiring is OK, the short circuit beeper will sound immediately. If it doesn't sound, you will need to beef up your wiring.

**Zone-A has a variable trip current control and can be used at any time.** Although this is normally used to set the auto-reverse sensitivity, it can be used when the auto-reverse is turned off.

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**AR:** Zone-A Auto-Reverse (On/Off)

**BZ:** Alarm Buzzer On/Off

**TD:** Time Delay (Long=On, Short=Off)

**A1:** Not assigned

Switch up = feature selected or "on."

**Opto Input:** For use with any high level input signal or if opto-isolated control bus is required.

**DCC Data Bus:** For use with EASYDCC system and boosters.

**AR Trip Current:** Full counter-clockwise equals lowest trip current (~1.5A) for autoreverse. Full clockwise equals highest trip current (~7A) for autoreverse. A lower setting is best.

**Zone A Track Output** - has selectable auto-reverse feature using the AR switch. Trip current for either autoreverse sensing or maximum allowed output current is set with AR-Trip Current control.

**Zone B Track Output** is independent of Zone-A. It does not have autoreverse. Short circuit or overload current trip current is set at 7 Amps and is not adjustable.

**GP:** On when DCC data present

**A-Fault or B-Fault:** On when there is a fault in the Zone such as shorted or overloaded. Also indicates when the output has been turned off.

**POWER:** On when DC power is applied.

### Caution

The DZB7 is designed for use **ONLY** with external, regulated, **DC power supplies**. It is the external power supply voltage value that sets the track voltage. The recommended default setting is 15 Volts or lower. Higher voltages can damage decoders. If you intend to operate at a higher voltage, you must first contact your decoder vendor and ask them for the maximum voltage the decoder can withstand and use that as the absolute maximum voltage setting for the external power supply.

### Caution

Never apply AC voltage to the DZB7 power input jack. Doing so will damage the DZB7 which will not be covered by the warranty.

### Caution

Short circuit and overload protection of the DZB7 requires proper wiring techniques and suitable wire. Be sure and use the recommended wire size.

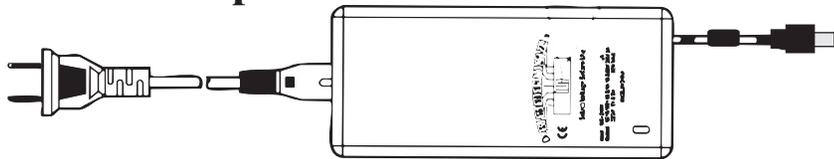
### Warning

**The DZB7 is not a toy and is not designed to be operated by children. It is a high current device, capable of supplying up to 30 Amps of surge current and 7 Amps continuously at voltages as high as 24 Volts. Read and follow all directions and installation instructions. Do not expose to moisture; do not use outdoors. Never block the rear vent holes. CVP Products shall not be responsible for any claim or loss of any nature arising directly or consequentially from the use of this unit.**

# Universal DC Power Supply - DCPS120

## AC Input 100 to 240 VAC 50/60Hz

### Output Power 120 Watts



**Input AC Voltage:** This is a universal supply suitable for all primary voltages found throughout the world. The supplied plug fits most European wall outlets. However, feel free to remove the plug and attach one that fits your wall sockets.

**Output Voltage Select:** Before using the power supply, select the desired output voltage using the slide switch. Once selected, remove the appropriate voltage selector cap and snap it in place. This is not mandatory but prevents accidental changing of the output voltage.



**Recommended Output Voltage:** Use the 15 Volt setting for HO and O railroads. For LGB, use 18V. Always use the lowest possible setting since the higher the voltage, the lower the available current.

**Available Power and Current:** The maximum power output is 120 Watts. To determine the maximum available current, divide the power rating (120W) by the selected output voltage. For example, with the 15V setting, up to 8 Amps can be supplied. However, your specific booster will have its own maximum rating which may be less than the maximum available from the power supply.

**Operating Temperature:** Under maximum continuous load, the power supply will become hot. Keep the unit free of anything that will obstruct air flow around the unit. Do not embed the power supply inside a sealed container. It must have airflow to achieve maximum power.

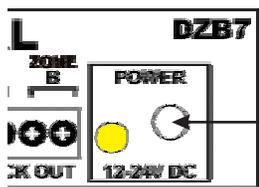
**Protection:** The power supply is protected against overloading, short circuits and overheating. The output will shut down should any of these faults occur and automatically reset when the fault is cleared.

**Power Indicator:** There is a small green LED on the front of the unit. When AC power is applied, it will turn on.

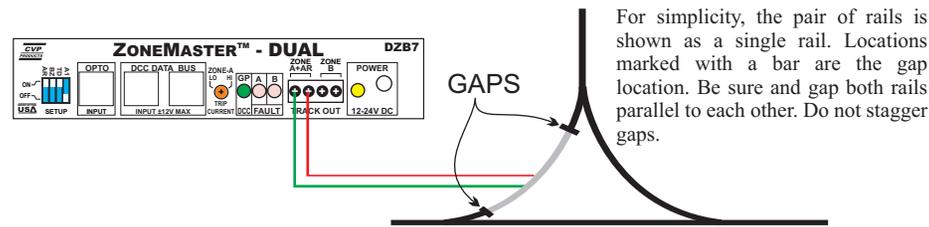
**DC Power Cord and Plug:** The heavy duty plug fits directly into the ZoneMaster's DC input jack. Since the cord and plug can exert a large amount of up/down and sideways force on the jack, support the cord to keep to a minimum and forces on the jack.

**Connecting Power Supply To ZoneMaster:** This is the easy part. Simply insert the plug and push it in completely.

Support the cord to minimize the forces placed on the jack.

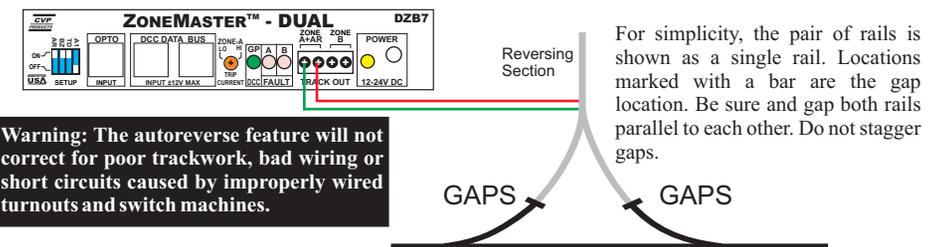


## Junction Wye Hookup



In these simple diagrams, the light-colored section is the reversing section and connects to the Zone A output. The AR switch must be up or ON to use the auto-reverse option. The two wires connect to the two rails on the reversing section. Please see the warnings on page 6 about keeping the train completely inside the reversing section for autoreverse to work properly.

## Deadend Wye Hookup



## Compatibility with CVP's Booster3

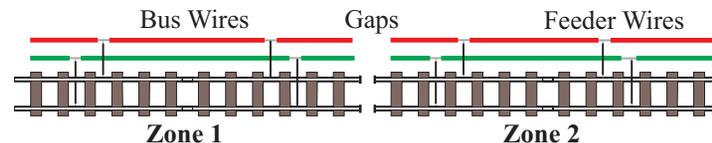
The Booster3 requires the addition of a small capacitor to allow trains to cross between it and a ZoneMaster Booster. With the addition of the capacitor, a Booster3 will work with the ZoneMaster. However, the Booster3 may not be 100% reliable when it feeds a ZoneMaster autoreverse loop. However, it works well with ZoneMaster output A when autoreverse is OFF. Contact CVP Products to obtain the capacitor and instructions for adding the capacitor.

## Compatibility with Booster5 and Booster10

The ZoneMaster is compatible with the Booster5 and the Booster 10 without any changes.

## Heavy Duty Track Wiring Is A Must

Use #16 AWG wire or larger. Stranded or solid does not matter although stranded bus wire is a little easier to use. Feeders between bus and track should be #18 or #20 AWG and attached every few feet. Each zone, or power district must have both the bus wires and the rail gapped. Inadequate wiring will not allow the short circuit sensor to work correctly and can pose a safety hazard.

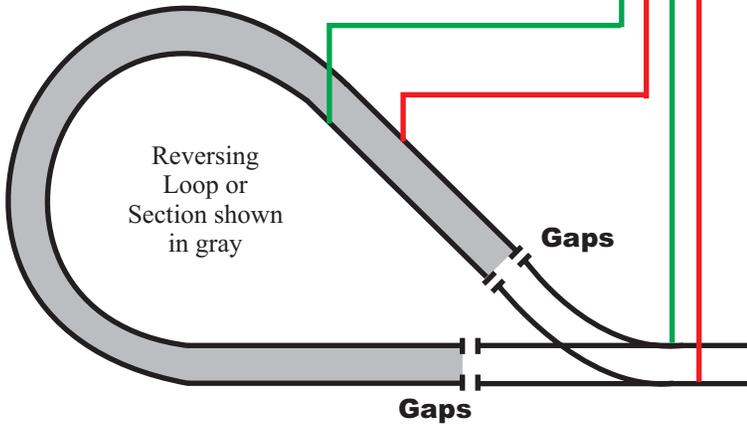
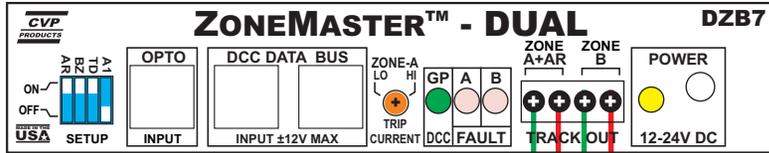


# Reverse Loop Hookup

The Zone-A output has a built in automatic reverse loop control. The moment the first wheel of the locomotive or a metal car wheel crosses the reverse loop gap, the loop track polarity is automatically reversed and the train continues running without hesitation. The AR switch must be ON to enable this feature.

Your longest train must fit entirely inside the reverse loop. Only one train at a time can cross and occupy the gaps into the reversing section no matter how complex the trackwork is within the reversing section. The autoreverse feature only works with DCC decoder equipped locomotives.

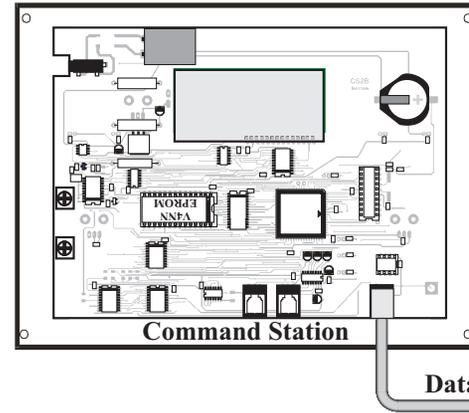
The trip current can be set using the ZA Trip Current Control. See page 5 for details.



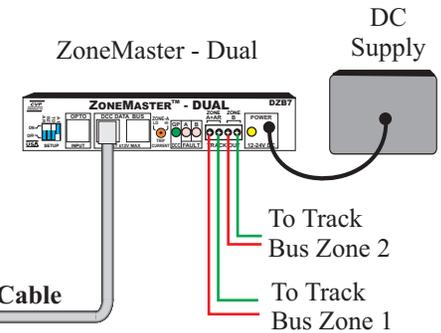
**Warning:** the reversing section must be at least as long as your longest powered train. Short sections will be a problem if you have a lighted caboose or lighted passenger trains. If you are using multi-unit consists or pusher-locomotives, all must fit inside the reversing section. If this is not possible, redesign your trackwork. Failure to observe this basic limitation of reversing sections will result in a short circuit when the train crosses the gaps.

**Warning:** When Zone-A is used as an autoreverse booster, it must only be used to feed a single reversing section or reversing loop. Use either the Zone-B output or a another, separate booster to feed the track leading to the isolated and separately fed reversing loop or section.

# Basic Hookup - EASYDCC System



A CS2B is shown but any version can be used.



The ZoneMaster connects between the Command Station and and boosts the Command Station signal to levels suitable for driving locomotives. The ZoneMaster Dual has two independent bus drivers for two independent power zones, districts, or blocks. In the drawing they are shown as going to Zone 1 and Zone 2 but you can use any naming convention you wish.

Modular “data” cable should be used for the connection. Always plug the cable into the jack labeled Booster on the Command Station and into either one of the DCC Data Bus jacks. Do not use the Opto input jack. There are no cable length restrictions on the modular cable when used with boosters.

## Modular Cables - Telco vs. Data

ZoneMaster Boosters are designed to use standard 6-conductor data cables. These are inexpensive, easy to build yourself and readily available. Daisy chain ZoneMaster units from one to the other using modular data cable. CVP Products can supply any length of data cable terminated with suitable plugs on each end. Contact us for a quotation.

When building your own cables, be sure to polarize the plugs properly. The drawing below shows an easy way to remember the proper orientation – one end up and one end down. The reference item is the tab of the modular plug compared to the molding ridge running down the center of the cable.

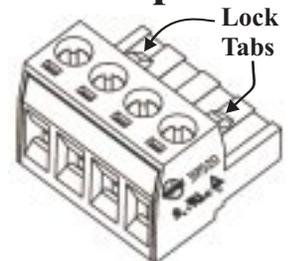


## Using The Pluggable Terminal Strips

The pluggable header accepts wire sizes ranging from 12AWG to 26AWG. If using stranded wire, it must be twisted and tinned. Cut the stripped and tinned wire so that it is completely inside the clamp area and keep the insulated portion outside the clamp for a good connection.

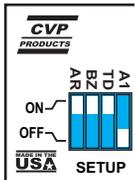
To remove the plug from the socket, gently rock the plug back and forth horizontally to release the locking tabs.

Replacement plugs are available from CVP Products.



# ZoneMaster Setup Options

**AR - Zone-A AutoReverse Feature:** When switch 1 is ON, Zone A will have autoreverse for use with reversing loops and reversing sections. As the wheel crosses a gap between Zone A and another zone driven by another booster, a short circuit is sensed and the polarity of Zone-A is reversed. If the short doesn't clear, Zone-A shuts down, the fault LED turns on, and the alarm buzzer sounds.



When switch 1, AR, is OFF, the autoreverse feature of Zone A is turned off. The drawing shows the white tab for AR in the off position. This is used when no autoreverse is needed and allows Zone A to be used like a separate and independent zone power driver.

**BZ - Alarm Buzzer Feature:** When switch 2, BZ, is ON, the alarm buzzer will sound. Zone A and Zone B have different sounds. Zone-A has a quicker on-off sound than Zone-B. Try a momentary short on each one to hear the difference between each zone's fault buzzer.

When switch 2 is OFF, the both zone buzzer sounds are shut off. Fault protection and the fault LEDs will work normally. The drawing shows the BZ tab in the off position.

**TD - Time Delay Feature:** When switch 3, TD, is ON, the time delay from short circuit sense to track output shutdown is about 50ms. This time delay works well to prevent nuisance tripping due to momentary shorts caused by hot frogs, metal wheels touching hot switch rails and starting up high current locomotives, especially sound decoder equipped locomotives. The time delay applies to both A and B zones.

When switch 3 is OFF, the time delay is about 10ms. Use this setting if the ZoneMaster doesn't shut down, after testing both your motive power and track work. The shorter time offers better protection against wheel and rail pitting at zone boundaries, especially when autoreverse is in use.

**A1 - Auxiliary 1:** This switch is unassigned and not used. Placing the switch in either position has no effect on the ZoneMaster operation.

# Zone-A Trip Current Control

The Zone-A output offers a user selectable trip current. Use a small screwdriver to reach through the front panel to the small orange wheel. The small plastic wheel rotates from about the 7:00 position (LO) to about the 4:00 position (HI).



Setting the control full clockwise to the 4:00 position sets the current trip value to its highest setting which is about 7 Amps.

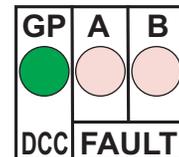
Setting the control full counter-clockwise to the 7:00 position sets the current trip value to its lowest setting which is about 1.5 Amps.

The default setting is mid way which sets the trip current level at about 3 Amps.

The trip current control is typically used to set the point at which the autoreverse feature of Zone-A is activated. Select a trip current that allows your longest multi-unit consist or your old and favorite high-current locomotive to start and run normally without tripping the overload protection circuit. But if the trip current is set to high, it is possible for Zone-A not to autoreverse and the locomotive will stall at the reversing loop gaps or the polarity will switch back and forth as lights or other loads are turned on or off. This won't hurt anything but it can cause decoder problems. The simple solution is to rotate the control clockwise, which selects a higher value for the trip current.

# ZoneMaster Indicators

**The GP LED** turns on bright green when a proper DCC signal is applied to either the DCC Data Bus inputs or the Opto Input. Use it as verification of a good connection between the ZoneMaster and your Command Station, or another ZoneMaster.

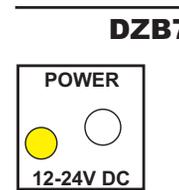


**The A-Fault LED** flashes on and off in time with the fault buzzer whenever an overload has been detected and the built-in circuit breaker has been tripped. The moment the circuit breaker has been tripped, the track output is disabled and remains disabled for about 3 seconds. After the short circuit is cleared, the ZoneMaster automatically resets the circuit breaker and resumes normal operation.

**The B-Fault LED** flashes on and off in time with the fault buzzer whenever an overload has been detected and the built-in circuit breaker has been tripped. The moment the circuit breaker has been tripped, the track output is disabled and remains disabled for about 3 seconds. After the short circuit is cleared, the ZoneMaster automatically resets the circuit breaker and resumes normal operation.

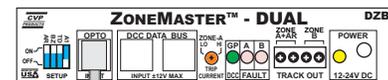
**Upon first application of power**, both the A and B fault lights turn on while the ZoneMaster goes through its own set of internal diagnostics. If the DCC signal is plugged in, the GP light will turn on and the A and B fault lights will turn off. However, if there is no DCC signal present because the cable is unplugged or because of some other fault, then the A and B fault lights will alternately flash until the DCC signal is connected.

**The POWER LED** turns on anytime DC voltage is applied to the ZoneMaster. When the current load supplied by the ZoneMaster is near the limit of 7 Amps from either output, this light may become dim. If some kind of fault causes the external power supply to shut down, the LED will be dark. Determine the cause of the fault and fix it. In rare cases, the external DC supply may need to be unplugged and allowed to cool before it will resume normal operation. If this condition happens on a regular basis, it is a sign that you need to add additional ZoneMasters to your layout.



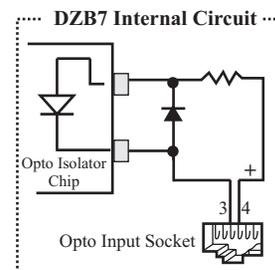
# Using the Opto Input

Almost any foreign DCC system can use a ZoneMaster. We recommend the use of the Opto input jack for all foreign DCC systems as well as any system which is using block detectors.



Use any 6 conductor modular cable. Strip the end opposite of the plug, exposing the wires. Only the two middle wires, red and green, of the 6 conductor cable are used. The remaining wires are not used and may be trimmed and discarded.

Connect these wires to the foreign system control bus or to the DCC System's track output connections. **DO NOT USE EITHER OF THE ZoneMaster DCC DATA BUS JACKS WHEN USING THE OPTO INPUT.**



The minimum input voltage is about 7 volts. The maximum is about 25 volts. Do not exceed these limits or the ZoneMaster will not operate properly.