

## More ZoneMaster Boosters From CVP

### Single-Zone ZoneMaster without Autoreverse. . . . . SZB7

This version of the Single-zone ZoneMaster booster is a standard booster without autoreverse. It has a full 7 Amp rating making it suitable for almost any railroad or layout configuration. The high power rating also makes it suitable for large yards, industrial areas or staging tracks. It is an ideal companion to the ZoneShare booster. All of the same connections and capabilities are included and it has the same powerful output drivers and built in protection. And no programming is needed.

### Dual-Zone ZoneMaster . . . . . DZB7

This ZoneMaster booster features two independent and short circuit protected outputs. One output can be configured as an autoreversing booster and has a front panel control for the reverse loop sensitivity.

Other selectable features include the selection of long or short time delays as well as the ability to shut off the short circuit alarm sound.

A full 7 Amps of output power is available.

Has both optoisolated and EasyDCC control bus inputs.

Absolutely no programming is necessary to set up and use all of the Dual-Zone ZoneMaster booster.

### ZoneShare . . . . . ZS4

The ZoneShare booster features four independent and short circuit protected outputs and are a low cost, yet powerful alternative to additional ZoneMaster Boosters.

No external power supply is necessary. ZoneShare derives its power from the source booster. It is a perfect mate to the Single-Zone ZoneMaster allowing four independent and circuit breaker protected track drivers.

Other selectable features include the selection of long or short time delays as well as the ability to shut off the short circuit alarm sound.

Absolutely no programming is necessary to set up and use the ZoneShare and it may be used with boosters from a variety of different manufacturers.

#### Warning

**The SZB7 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.**

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## Autoreversing Single Zone Booster - 7 Amp Instruction and Installation Booklet



### Connections, Adjustment and Indicators - Quick Start Guide

**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 (about 1 Amp). Full clockwise equals highest trip current (about 7A).

**Track Output:** This is where the track connects. Short circuit or overload current trip current is variable between about 1 Amp and 7 Amps using the Trip Current adjustment control.

**GP:** On when DCC data present  
**FT:** On when there is a short circuit or overload on the track output. Once tripped, the unit will automatically reset in about 3 seconds.

#### Caution - DO NOT USE UNREGULATED POWER SUPPLIES

The SZB7 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 setting is 15 Volts. 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.

#### WARNING

Never apply AC voltage to the SZB7 power input jack. Doing so will damage the SZB7 which will not be covered by the warranty.

#### Caution

Short circuit and overload protection of the SZB7 requires proper wiring techniques and suitable wire. Be sure to use the recommended wire size.

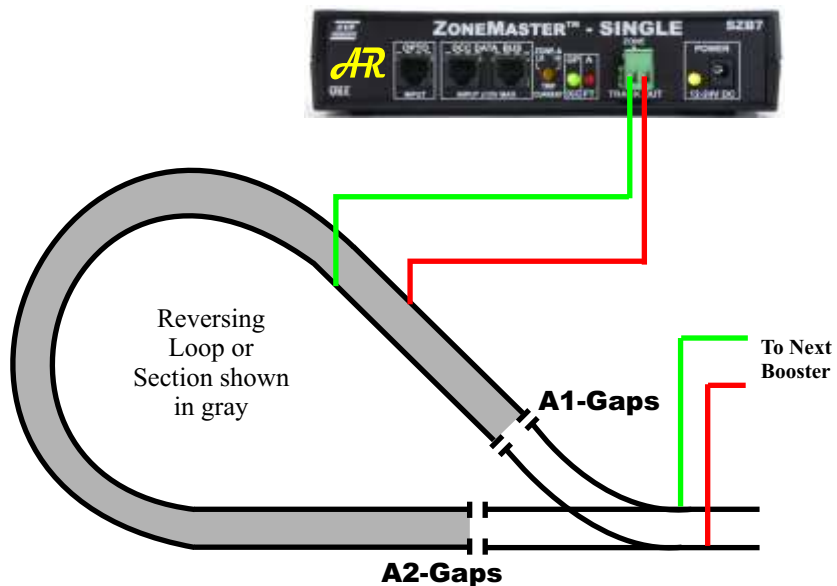
**A Smart Person Reads The Entire Manual**

**A Genius Follows The Manual's Instructions**

## Reverse Loop Hookup And Operation

Autoreversing is a simple concept. The moment the leading pair of METAL wheels enters the reversing areas and bridges the A1-Gaps, a short circuit is created. The ZoneMaster senses this short and instantly reverses the reversing loop's track polarity so that it matches the track polarity from the previous zone. The duration of the short circuit is very short so there is no hesitation as the locomotive crosses the gaps into the section. As the train continues around the loop, the turnout is thrown to allow the train to exit the loop. When the train comes to A2-Gaps, the short is sensed again, the polarity is flipped and the train continues on without hesitation.

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.



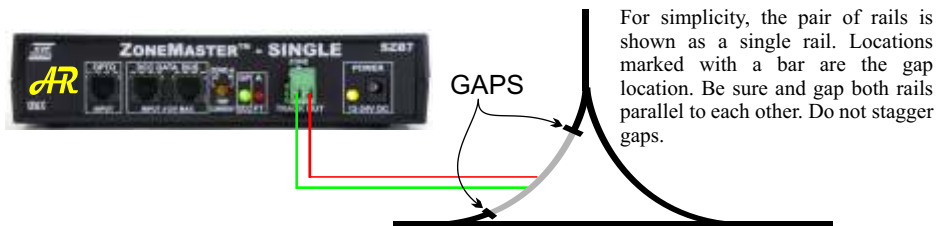
**Warning: Autoreverse requires DCC-decoder equipped locomotives.** Do not use the autoreverse feature with standard DC locomotives - it will not work.

**Warning: The Autoreversing section of loop MUST contain the entire train.** It 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: Proper wiring is mandatory.** Light duty wire may not allow the autoreverse circuitry to work properly. If the wiring is not heavy duty, the autoreverse trip current must be set to a much lower level if it is to work correctly

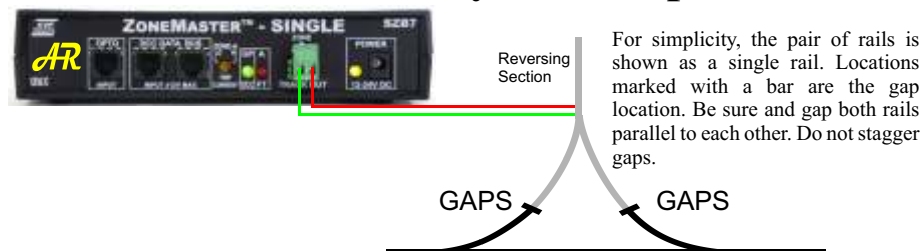
**Warning: Never stagger the gaps.** Gaps must be parallel to each other for the autoreverse feature to work reliably. Autoreverse operation requires the two gaps to be bridged nearly simultaneously for fast and spark-free operation. If not, the train may hesitate or, worse, the internal locomotive wiring could be subjected to the full 7 Amp current load resulting in ruined wiring.

## Junction Wye Hookup



In these simple diagrams, the light-colored section is the reversing section and connects to the Zone A output. 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



**Warning: The autoreverse feature will not correct for poor trackwork, bad wiring or short circuits caused by improperly wired turnouts and switch machines.**

## Maximum Output Power Limitations

The track output can supply up to 7 Amps of output current.

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.

**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 other than approved CVP devices.** 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 a different type of ZoneMaster Booster that provides the same capability at a much lower price. Conventional block detectors, used for signaling, are OK for the ZoneMaster Boosters. Use of the OPTO input is required.

**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.

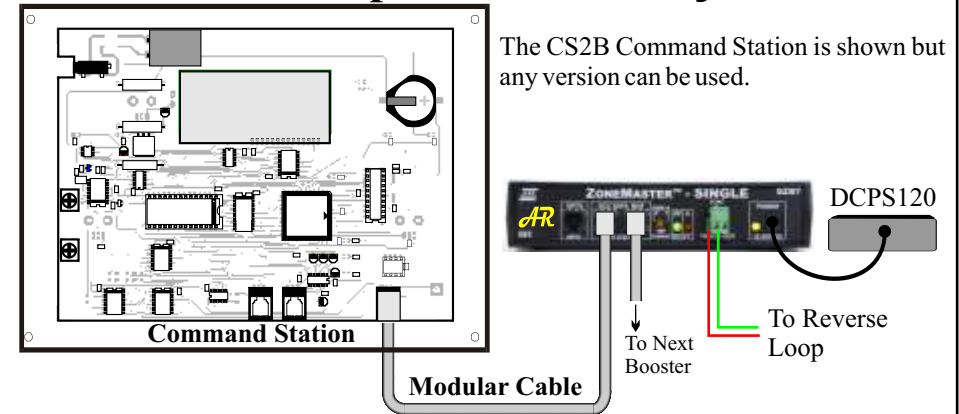
**Do not use the ZoneMaster with the Analog Channel 0 feature.** Some systems allow a locomotive without a decoder to operate. This feature is not supported by the ZoneMaster.

**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.

## Basic Hookup - EASYDCC System



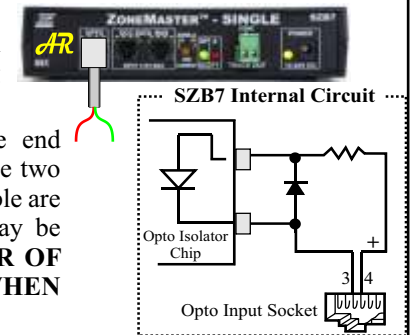
The SZB7-AR ZoneMaster connects to either the Command Station booster output or to the DCC output of another booster. For multiple ZoneMaster installations, use the 2nd DCC Data Bus jack to make connection to the next booster in the series.

Modular "data" cable should be used for the connection although TELCO cable is OK. Telco cable obtained from CVP is usually gray. Data cable from CVP is usually black. 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.

## Connection To Other Systems

Almost any foreign DCC system can use a SZB7-AR. You must use the Opto input jack for all foreign DCC systems as well as any system which is using block detectors.

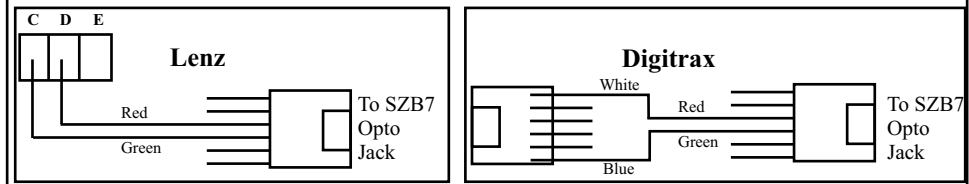
Use any 6 conductor modular cable. Strip the end opposite of the plug, exposing the wires. Only the two middle wires, red and green, of the 6 conductor cable are used. The remaining wires are not used and may be trimmed and discarded. **DO NOT USE EITHER OF THE ZoneMaster DCC DATA BUS JACKS WHEN USING 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.

If the foreign system has only track outputs, then connect the ZoneMaster-Single OPTO input jack to the track output connections. Polarity doesn't matter.

The two diagrams below show how to connect the red and green wires to either the Lenz terminal block or to the Digitrax modular connector.



## 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.

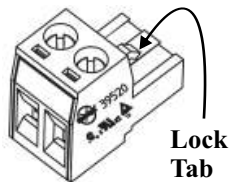


## Using The Pluggable Terminal Strips

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.



## SZB7-AR Not Compatible with CVP's Booster3

The SZB7-AR can not be used when the Booster3 is powering the zone or district adjacent to the SZB7-AR. There is the possibility that a locomotive will not cross the gaps between the units without activating the overload protection even when the polarity is correct.

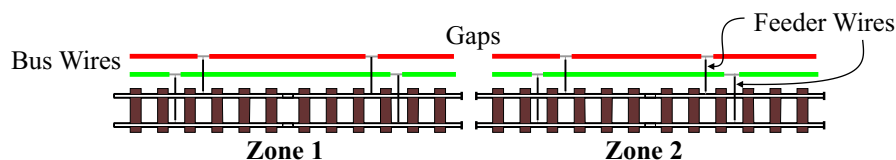
For best operation of the SZB7-AR, the adjacent zone should be powered by something other than the Booster3.

## Compatibility with Booster5 and Booster10

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

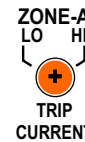
## Heavy Duty Track Wiring Is A Must

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.



## Autoreverse Trip Current Control

The amount of short circuit current flow that is required before the autoreverse occurs is set by the front panel control labeled 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). This control also sets the absolute amount of current that will be permitted before the overload protection is activated.



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 Amp.

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

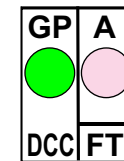
The trip current control sets the point at which the autoreverse is activated. Select a trip current that allows your longest multi-unit consist or your old and favorite high-current locomotive to start and run normally without tripping the overload protection circuit. However, if the trip current is set too high, it is possible for autoreverse not to activate correctly 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 or internal locomotive wiring failure. If you see this occurring, the simple solution is to rotate the control clockwise, which selects a higher value for the trip current.

Be sure to understand and observe the warnings on page 2 about autoreverse operation.

## SZB7-AR 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 FT 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**, the FT indicator turns 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 FT indicator will turn off. If there is no DCC signal, the GP indicator stays off and the FT indicator stays on. Check your cables if this occurs.

**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.

