

## ZoneMaster Boosters From CVP

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

This version of the Single-zone ZoneMaster booster is a standard booster without autoreverse. It has a continuous 7 Amp rating and a 30 Amp surge capacity 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.

### ZoneMaster-Single With Autoreverse . . . . . SZB7-AR

Same features as above except autoreverse is built in. All of the same connections and capabilities are included and it has the same powerful output drivers and built in protection found in all ZoneMaster boosters.

### ZoneMaster-Dual . . . . . 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. It has a continuous current rating of 7 Amps plus a surge capacity of 30 Amps.

### ZoneMaster Power Supply . . . . . DCPS120

This is the companion power supply used to power all of the ZoneMaster boosters. It is one of the few power supplies that is available with a Universal AC Input. The DCPS120 will work with any common household AC line voltage from 100 to 240 Volts, making it suitable for almost any country in the world. The 120 Watt output provides a huge reserve of current to satisfy the surge current requirements of any ZoneMaster booster.

## Warranty Information

This warranty covers substantial defects in materials and workmanship of the ZoneShare.

**What This Warranty Does Not Cover:** This warranty does not cover any problems which result from improper installation, modifications, improper use of output power, improper operation, excessive voltages, excessive current draw, abuse, accidents, or acts of God such as excessive heat, floods, damage caused by exposure to moisture and rain, lightning or hurricanes. It also does not cover any equipment that is connected or powered by this unit.

**How Long The Warranty Lasts:** The coverage of this warranty lasts for 90 days from date of purchase. After this period, standard repair rates apply.

**30 Day Money Back Guarantee:** ZoneShare comes with a 30 day money back (from date of purchase) guarantee provided it has not been installed, modified, damaged or in any way changed from its original condition. Should you decide you do not want ZoneShare, it may be returned, at your expense, for a full refund (less shipping).

**Repair:** Do not return items for repair without first obtaining authorization. In many cases, problems are easily solved via phone or email. If you return an item, be sure to mark the "Return Material Authorization" (RMA) code number on the outside of the box. The RMA is provided when you call. You are responsible for all shipping charges. UPS Street Address: CVP Products 563 Sterling Drive, Richardson, TX 75081.

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rev r4a

# ZONESHARE™

by CVP Products



Fully Enclosed Version-Z4SE



Board Only Version-Z4SX

## External Booster Required

Best performance, maximum continuous power and the highest surge capacity is available from the **ZoneMaster™** Booster series. However ZoneShare is compatible with all brands of DCC boosters.

All power and the DCC signal is derived from the external booster.

The maximum current available from the External Booster sets how much current can be obtained from a ZoneShare output.

**A Smart Person Reads The Entire Manual**

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

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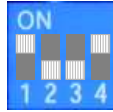
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# Quick Start Guide

**Step 1:** Connect the ZoneShare to the external booster. Any standard DCC track booster may be used. This is referred to as the source booster and it supplies both DCC signal and operating power for the ZoneShare. Maximum output current from the ZoneShare can be no greater than the maximum that can be supplied by the source booster. Use heavy duty wiring between the source booster and the ZoneShare. For best results, and maximum power, use a ZoneMaster booster as the source.



**Step 2:** The small slide switches, labeled SETUP, select the various options. For most installations that means that the buzzer is turned on, switch #1 up. If you are using the autoreverse feature of output A, then turn on that feature with switch #4 up. The hookup diagram shows the ZoneShare with these two options enabled. For now, switch number 3 and 4, D1 and D2, can remain off. Use a pencil to move the small white actuators.



**Step 3:** Set the overload trip current level controls. Use a small screwdriver to reach through the front panel to the small orange wheel. The small plastic wheel rotates from about the 7 o'clock position (LO) to about the 4 o'clock position (HI). The left control sets the trip current for the A output only. This also sets the trip level at which the ZoneShare flips the A output track polarity during autoreverse. The right control is shared by the B, C and D outputs. Set the wheels to about the 2 o'clock position. These controls can always be changed later if necessary.



**Step 4:** Connect the outputs to the track blocks. Track blocks are created by gapping both sets of rails. Make sure the gaps are parallel to each other. DO NOT USE STAGGERED GAPS. The output track voltage is about the same as the input DCC track voltage.



**Step 5:** Turn on the source booster. If your system requires the DCC track signal to be enabled, do so now. When power and DCC signal are sensed by the ZoneShare, the green PW indicator turns on and the outputs are enabled. If there is power but no DCC signal, the PW indicator stays on but the outputs are disabled.



**Step 6:** Run the train through each of the 4 outputs as well as cross the block gaps. If you discover that you can not cross a gap and you trip the short circuit detector, and the fault indicators turn on, it is likely that you have the zone or block feed wires reversed. Reverse them and try again.

The fault indicators tell you which output has a fault and has been shut down. The indicator stays on and the buzzer sounds until the fault is fixed. Each of the 4 outputs have a unique buzzer sound.

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**Fully enclosed and board only versions of ZoneShare work exactly the same**

# Myth Busting

Over the years, some myths have evolved to the point where they are accepted as fact.

**Myth # 1: A DCC layout is more prone to short circuits.** That just simply is not true - it is a myth. There are no more shorts in DCC controlled layout than a power pack controlled layout.

What made this myth seem to be a fact is that momentary short circuits caused an almost instant shutdown of a DCC powered block. A common cause of momentary short circuits is the back of a metal wheel contacting the point rail on a turnout.

On a layout powered by an old power pack, it simply doesn't shutdown for momentary shorts - some of which last only a fraction of a second. Once the train's momentum carried through the shorted area, power appeared and the train continued on its way. If you watch closely, maybe the train slowed slightly but normally, this was never noticed.

However, with the amount of power available from a DCC booster or ZoneShare, it must shutdown very quickly to protect its internal circuitry. Once shutdown, it stays down for about 3 seconds before it restores power. Thus, any momentary short circuit becomes obvious since the train has ceased running.

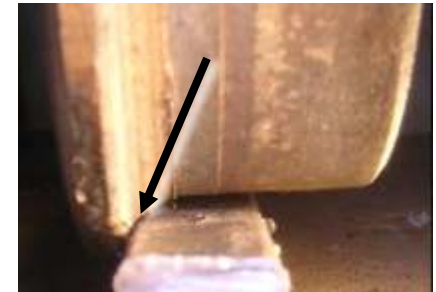
**Myth #2: Only DCC friendly turnouts can be used.** Some turnouts are labeled as "DCC-Friendly" somehow implying they work better with DCC power. Again, this is a myth. Properly gauged and wired turnouts are all DCC friendly.

Momentary and intermittent short circuits happen on a layout due to a variety of reasons. Let's take a look at some of them. This is not an exhaustive list but these are probably the most common.

- ▶ **Metal wheels out of gauge.** This is very common. Use a wheel gauge and check all metal wheels.
- ▶ **Turnouts out of gauge.** This is another very common issue. Use your track gauge to check and adjust all of the turnouts critical areas. These include guard rails and points. Insulated frogs may also cause a problem. Wide wheels can bridge the two rails right at the tip of the V formed by the two rails. Apply a small amount of nail polish to insulate the rails where a wheel can bridge across the insulation at the V.
- ▶ **Back of metal wheels contacting the turnout guard rails or point rails.** This is usually caused by out of gauge metal wheels. But in some cases, the turnout itself is out of gauge.
- ▶ **Kinked or poor track alignment at turnouts.** This is easy to fix - correct the bad alignment until the trains no longer short out in that area.
- ▶ **Slow motion switch machines that power frogs.** In some cases, the point rail contacts the fixed rail before the frog polarity has been switched. One solution is to adjust the switch machine such that the polarity is switched before the points contact the rail. Sometimes a little judicious point filing can make all the difference.

**Myth # 3: DCC powered rail never needs cleaning.** Quite simply, this is not true. In fact, DCC decoders need better continuity of track signal than a locomotive controlled by a power pack.

The reason for this is that decoders are small computers. If power is interrupted, they must reboot or reinitialize. This results in the locomotive stopping while the decoder initializes itself. After reboot, the decoder decodes its signal, finds the speed value and the locomotive resumes its prior speed value. The amount of time to reinitialize is very noticeable; this time is even longer for sound decoders.



Keeping the track clean is only half the job. You must also keep the locomotive wheels clean. Most of the dirt is located on the inside of the wheel where the flange extends below the wheel. It is here and along the inside of the rail where the dirt collects. Simply rubbing the top of the rail doesn't get to where the dirt collects. Don't forget that your rolling stock collects and stores lots of dirt for future distribution around the layout. A schedule of regular cleaning is recommend for all rolling stock and locomotives.

## Tips, Hints, Considerations - continued

**Cutting Gaps** Cut gaps with a Dremel motor tool with an abrasive cutting disk. Cut gaps in both rails and directly across from each other. Do not stagger gaps.

Consider adding spikes at each end of the rail to hold it in place and to keep the rails in alignment.

Use a small piece of styrene to serve as a gap filler. This keeps the gaps from closing up as the seasons change. File and trim styrene to fit and then glue it in place.

Test roll a car through the gap. It should not bump up and down or catch the wheel's flange.

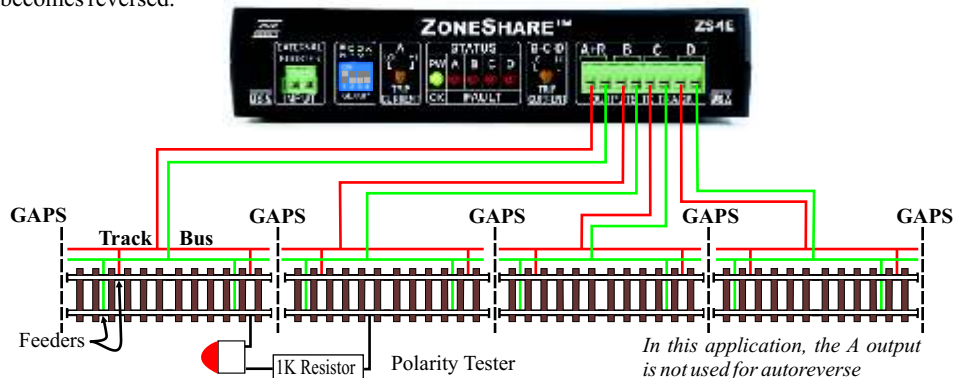
**Where to gap** Imagine centers-of operation when considering where to divide the layout. These can be a town, a yard or a branch line. These can each be fed by a ZoneMaster or a ZoneShare. The deciding factor is how much power, or numbers of locomotives, will be in the center of operation. If there will be a large number of locomotives, especially sound-equipped locomotives, a dedicated ZoneMaster is best. But if no more than a couple of trains will be operating, then the ZoneShare may be appropriate.

**Gaps can always be moved if you change your mind.** Remember you can always decide later to move the zone boundaries or gaps, combine zones or split zones. There is no hard and fast rule other than inconvenience. For example, if one operator derails in a town on one side of a scenery divider, his problem should not inconvenience a second operator on the opposite side of the divider. Neither will know who is causing the problem. It would be best to split the area into two separate power zones. By dividing a layout into power zones and using a combination of ZoneMasters and ZoneShares, you can economically provide power to your entire layout, regardless of size.

**Use heavy wires between ZoneShare and trackwork** - proper operation of the short circuit and overload protection of ZoneShare requires robust wiring. Use #14 bus wires and #16 or #18 feeder wires. Keep feeders short.

**Test each ZoneShare block for proper wiring.** Go to the end of each block and place a metal object or coin across the rails. If your wiring is OK, the appropriate short circuit beeper will sound immediately. Blocks that interact with each other usually indicate a crossed feeder someplace or a closed gap or a missing gap.

**Verify correct polarity for feeders and bus wires** - use the simple LED polarity tester to confirm that the polarity is correct at each gap. Place tester across the gaps. If the LED is dark, polarity is the same. However, if the LED lights up, the polarity is reversed. Correct the polarity at the location where it becomes reversed.

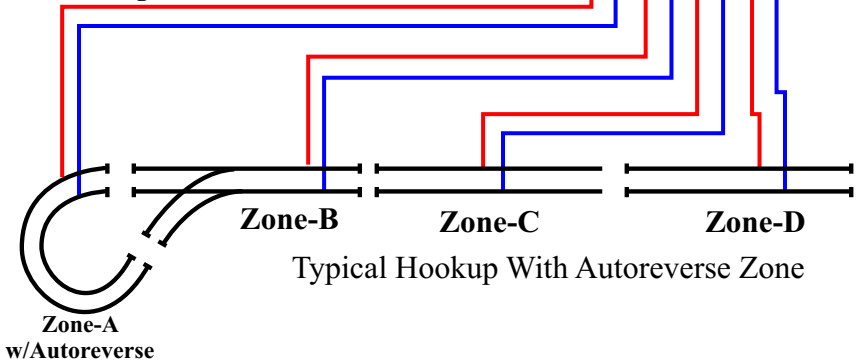


## Basic Hookup Guide

Shown with autoreverse and buzzer enabled



From External Booster  
Track Output



**Using ZoneShare** - When you first built your layout, you may have initially used a single booster, like a ZoneMaster, to power the entire layout. But, eventually you'll want to divide your layout into power zones, each having an independent circuit breaker. Isolation is done by gapping both rails at each end of the power zone. For example, if a derailment and short circuit occurs, only those trains running in the affected power zone where the problem occurred will stop. The affected zone shuts down, the buzzer sounds and the appropriate fault indicator lights and stays that way until the problem is fixed. All other power zones are unaffected.

**ZoneShare works best in lightly loaded power zones or areas** - those areas that don't see lots of trains running through them under the control of more than one operator. However, for busy areas with lots of active locomotives, a yard for example, a dedicated high power booster, like a ZoneMaster-Single or ZoneMaster-Dual is best. But for smaller areas that don't need that much power, it is more economical to take a high-power booster and use the ZoneShare to divide its output into 4 separate and independent outputs. See pages 6 and 7 for two examples.

**ZoneShare** uses an existing booster, called the source booster, for both its power and its DCC signal. The source booster should only feed the ZoneShare and no other track or accessories. A fault on the source booster will shut down all of the zones powered by the ZoneShare.

**Peak track voltage is set by the source booster.** In other words, the ZoneShare output track voltage will be about the same as the source booster. It will never be higher.

**Maximum available current is set by the source booster.** For example, if the source booster is a 7 Amp ZoneMaster-Single, the ZoneShare can supply up to 7 Amps among all 4 outputs before the source booster trips.

**Trip Current A adjustment** also sets the sensitivity for the autoreverse feature. Autoreverse is for A output only.

**Trip Current B-C-D adjustment** sets the maximum allowed current for outputs, B, C and D.



## Setup Switch Details

### Buzzer Control

#### Switch # 1 = BZ

This switch enables or disables the fault buzzers. The setting affects all buzzers. The shading over the other switches means their settings do not affect this switch's function. Each output has its own unique buzzer sound.



All Buzzers Off



All Buzzers On

### Fault Delay Time

#### Switch # 2,3 = D1, D2

The fault delay sets the time for how long a short circuit or overload must be present before the ZoneShare output is shut down and the fault buzzer sounds. For some external boosters, the 40ms may be too long and it trips before ZoneShare. Select a shorter time so that ZoneShare trips first, before the external booster.



Delay 40ms  
Longest



Delay 30ms



Delay 20ms



Delay 10ms  
Shortest

### Autoreverse On/Off for Output-A

#### Switch # 4 = X1

This switches turns on the autoreverse feature for the A output. When on, a momentary short circuit will first cause the output to flip polarity. If this results in clearing the short, then everything is OK and no fault buzzer will sound. However, if the short doesn't clear after the flip, then the output will be shutdown and the fault buzzer sounds. Once the short is cleared, normal operation resumes.



Autoreverse Off



Autoreverse On

*With autoreverse off, the A block becomes just another block.*

## Status Indicators

**PWOK** Indicates that power is being received from the source booster. It does not indicate that a DCC signal is being received. If there is power but no DCC signal, then the outputs will be disabled and the trains will not run. Be sure to enable the external booster if it has that feature.

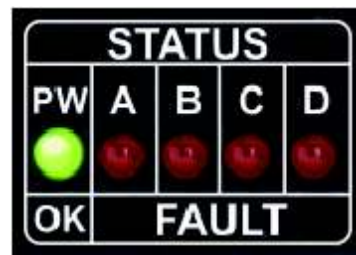
**A-Fault** Turns on whenever an overload or short circuit is sensed. If this occurs, the buzzer is sounded and the indicator turns on.

If the A trip current is set towards the low side, but the autoreverse is turned off, then this indicator may flicker as a train crosses the gaps. In many cases, the buzzer will not sound. If this occurs, then increase the A trip current until the indicator no longer flickers when a train crosses the gap. This only happens with the A-Fault indicator.

**B-Fault** Turns on whenever an overload or short circuit is sensed on the B output. If this occurs, the buzzer is sounded and the B indicator turns on.

**C-Fault** Turns on whenever an overload or short circuit is sensed on the C output. If this occurs, the buzzer is sounded and the C indicator turns on.

**D-Fault** Turns on whenever an overload or short circuit is sensed on the D output. If this occurs, the buzzer is sounded and the D indicator turns on.



## Junction Wye Hookup



GAPS

For simplicity, the pair of rails is shown as a single rail. Locations marked with a bar are the gap location. Be sure and gap both rails parallel to each other. Do not stagger gaps.

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 8 about keeping the train completely inside the reversing section for autoreverse to work properly.

## Deadend Wye Hookup



Reversing Section

GAPS

For simplicity, the pair of rails is shown as a single rail. Locations marked with a bar are the gap location. Be sure and gap both rails parallel to each other. Do not stagger gaps.

GAPS

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

## Tips, Hints, Considerations

**Maximum output power is limited by the source booster.** If the combination of all the trains in the ZoneShare blocks causes the source booster to shutdown, then the source booster can not supply sufficient power for the ZoneShare trip current settings. Your choices include, substituting a higher power booster, or limiting the number of active trains in the ZoneShare. You can also change to a lower trip current but that is not a solution. The problem is insufficient power. This problem usually occurs when multiple ZoneShares are fed by a single booster. If this is your situation, the easiest remedy is to add another source booster.

**ZoneShare must shutdown a shorted output before the source booster.** If the source booster continuously trips before the ZoneShare, change the delay time to a shorter delay using setup switches number 2 and 3.

**Do not attach any external devices to the output of the ZoneShare.** For best performance and maximum safety, don't use any external devices such as shields or circuit breakers between the ZoneShare and the layout. They are not needed.

**ZoneShare outputs are not optoisolated.** If this is a requirement, usually because of your track detection system, then ZoneShare can not be used. A ZoneMaster-Single is recommended which has complete optoisolation.

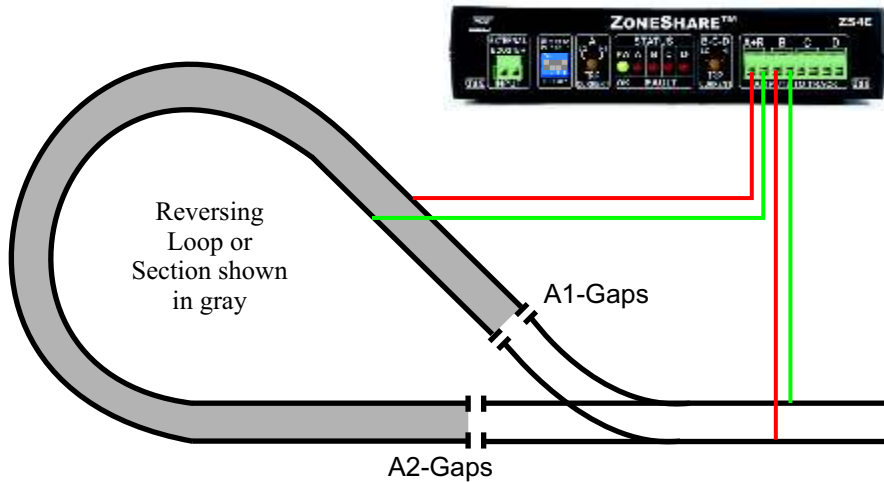
*continued on page 10*

## Reverse Loop Hookup And Operation

Only the A output features autoreverse and it must be enabled with Setup switch #4. Move the small white actuator up to turn on autoreverse.

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 A output of the ZoneShare 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.

See page 5 for tips on setting the reverse loop trip current adjustment.

## Trip Current Controls

The ZoneShare offers an adjustment for selecting the amount of overload current that results in a fault. The A-Trip Current adjustment and the B-C-D Trip Current adjustment work the same and have the same ratings.

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

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

Use a small screwdriver to reach through the front panel to the small orange wheel. The small plastic wheel rotates from about the 7 o'clock position (LO) to about the 4 o'clock position (HI).

As delivered, the adjustment is about the 12 o'clock position which sets the trip current to about 1 Amp.

The adjustment can be changed at any time and the change takes effect immediately.

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.



## Reverse Loop Trip Current Settings - Additional Tips

The amount of short circuit current flow required before the autoreverse occurs is set by the front panel control labeled A TRIP CURRENT. This control also sets the absolute amount of current that will be permitted before the track polarity reverses.

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 setting is too high, it is possible for autoreverse not to activate correctly and the locomotive will stall at the reversing loop gaps and trip both fault indicators. 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 trip current value.

## Source Booster Setup Recommendations

**Trip Current Settings For the Source Booster** should be set to the maximum possible current allowed. For example, if a ZoneMaster is used, this means turn the trip current control fully clockwise for maximum output current.

**Wiring Between Source Booster and ZoneShare** - For best results, use heavy duty #12 or #14 gauge wire. All of the power for all of the trains connected to the ZoneShare must flow through these two wires - larger is better.

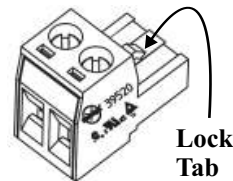
**Don't Use Source Booster To Power Track** - Any derailment or short circuit on the source booster powered track will instantly shut down ZoneShare.

## Using The Pluggable Terminal Strips (Enclosed Version, Z4SE, Only)

The 2-terminal plug and the 8-terminal plug accept 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 tab(s).

Replacement plugs are available from CVP Products.



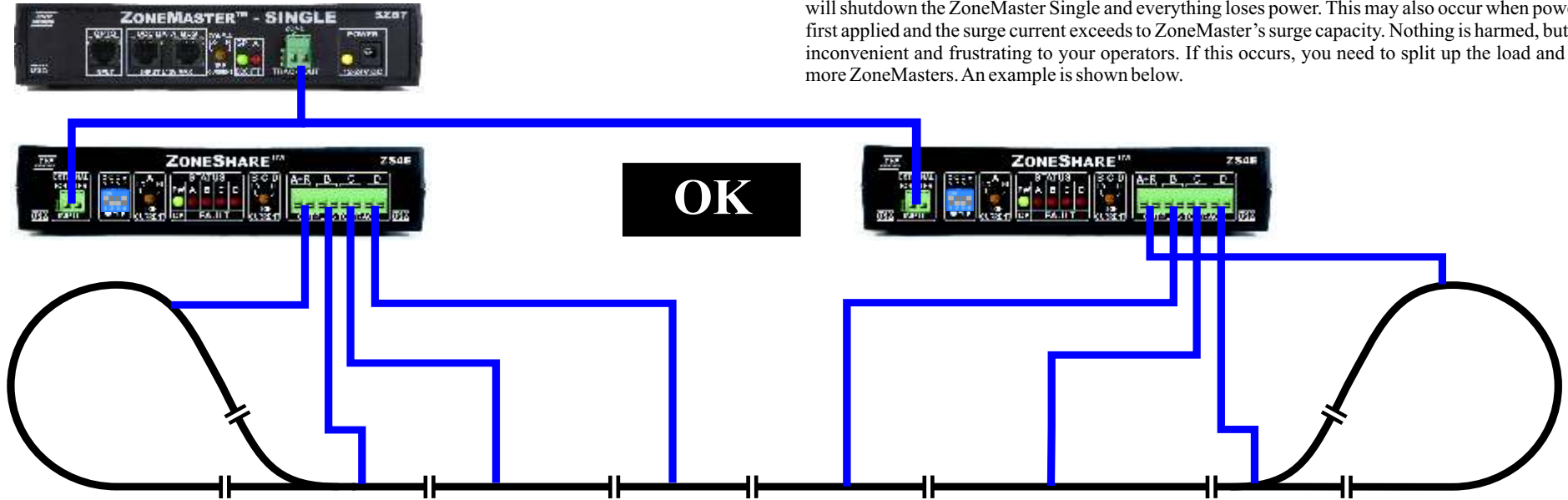
Lock Tab

**On the bare board version, ZS4X, the terminal block IS NOT removable**

## Typical ZoneShare Hookups

A ZoneMaster can drive multiple ZoneShare units. However, it is easy to exceed the available power. Some of the surge current capacity is also lost. The surge current capacity may still be adequate but you'll need to evaluate if it is sufficient.

This arrangement allows a ZoneMaster Single to power two ZoneShares. In fact, you can connect as many ZoneShares as you wish to a single ZoneMaster. However, it is very easy to run out of power as your locomotive fleet grows. Beware that in some cases, a simultaneous demand of more than 7 Amps will shutdown the ZoneMaster Single and everything loses power. This may also occur when power is first applied and the surge current exceeds to ZoneMaster's surge capacity. Nothing is harmed, but it is inconvenient and frustrating to your operators. If this occurs, you need to split up the load and add more ZoneMasters. An example is shown below.



The illustration below is the typical arrangement where two ZoneMaster singles are used to power 8 separate zones, two of which are reversing loops. This arrangement is best when there is little traffic in the zones served by the ZoneShare. The reverse loops could also be dead-end staging tracks. For this application, the autoreverse feature for zone A would be turned off (switch 4 set to OFF).

The best setting for the ZoneShare "Trip Current" adjustments is when the heaviest load (as with a long multiunit consist) doesn't cause the fault indicator to turn on and the fault buzzer to sound. If this occurs, rotate the Trip Current setting clockwise to increase the allowed current. This setting should be checked for each ZoneShare by running the train through each zone. Remember that B,C and D, all share the same trip current setting.

