

# GTI

## Zone Network Setup Manual

2nd. Ed.

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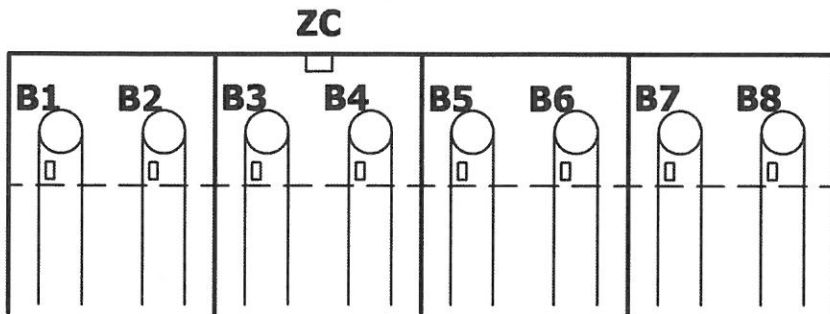
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# Wiring

## The Big Picture

Here is a simplified top-down view of a few bays with the walkway and Boomerang controls at the bay ends:



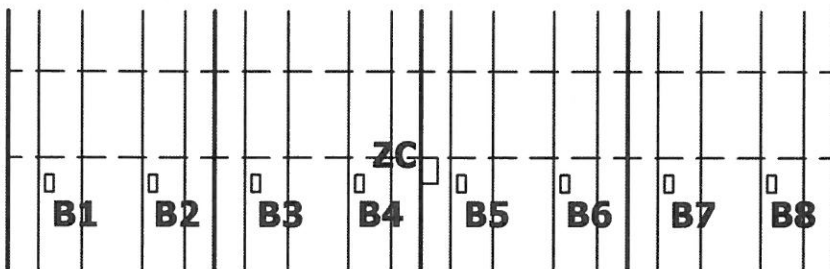
ZC = Zone Controller

B1 = Boomerang 1

B2 = Boomerang 2

Etc.

Here's a few bays with the walkway and boomerang controls near the middle:



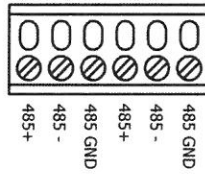
Regardless of where everything is within the bay, the wiring is basically the same. This is schematic of how your network should look from above:



--- = 22- or 18- gauge two-conductor wire with shield & shield drain  
(Three leads - Black, White, and Bare, wrapped in foil)

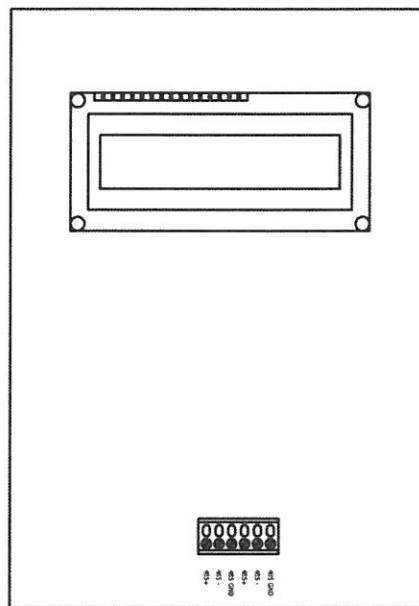
# The Network RIA

In both the Zone Controller and Boomerang boards, the wire has the same kind of connection, a 6-pin RIA connector:

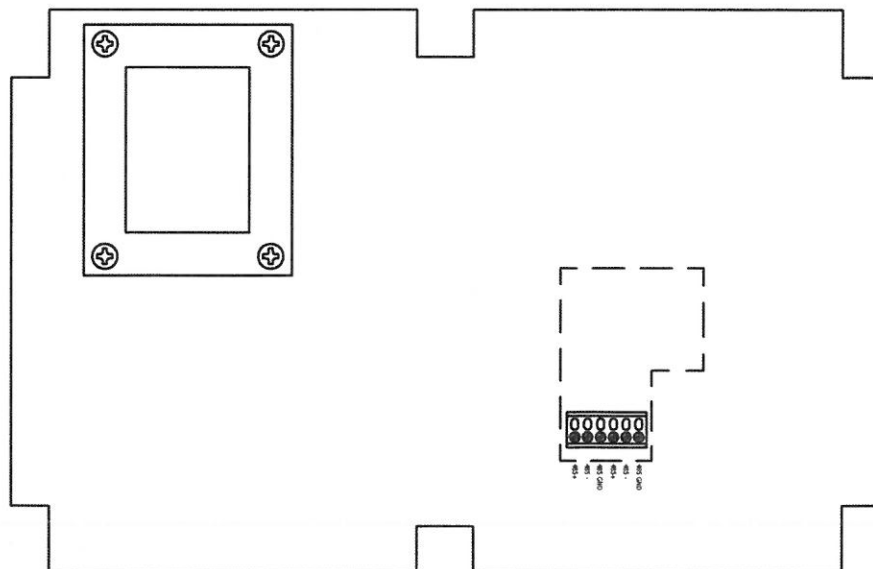


## How to find the network RIA connector

Here it is on the Zone Controller Circuit Board:

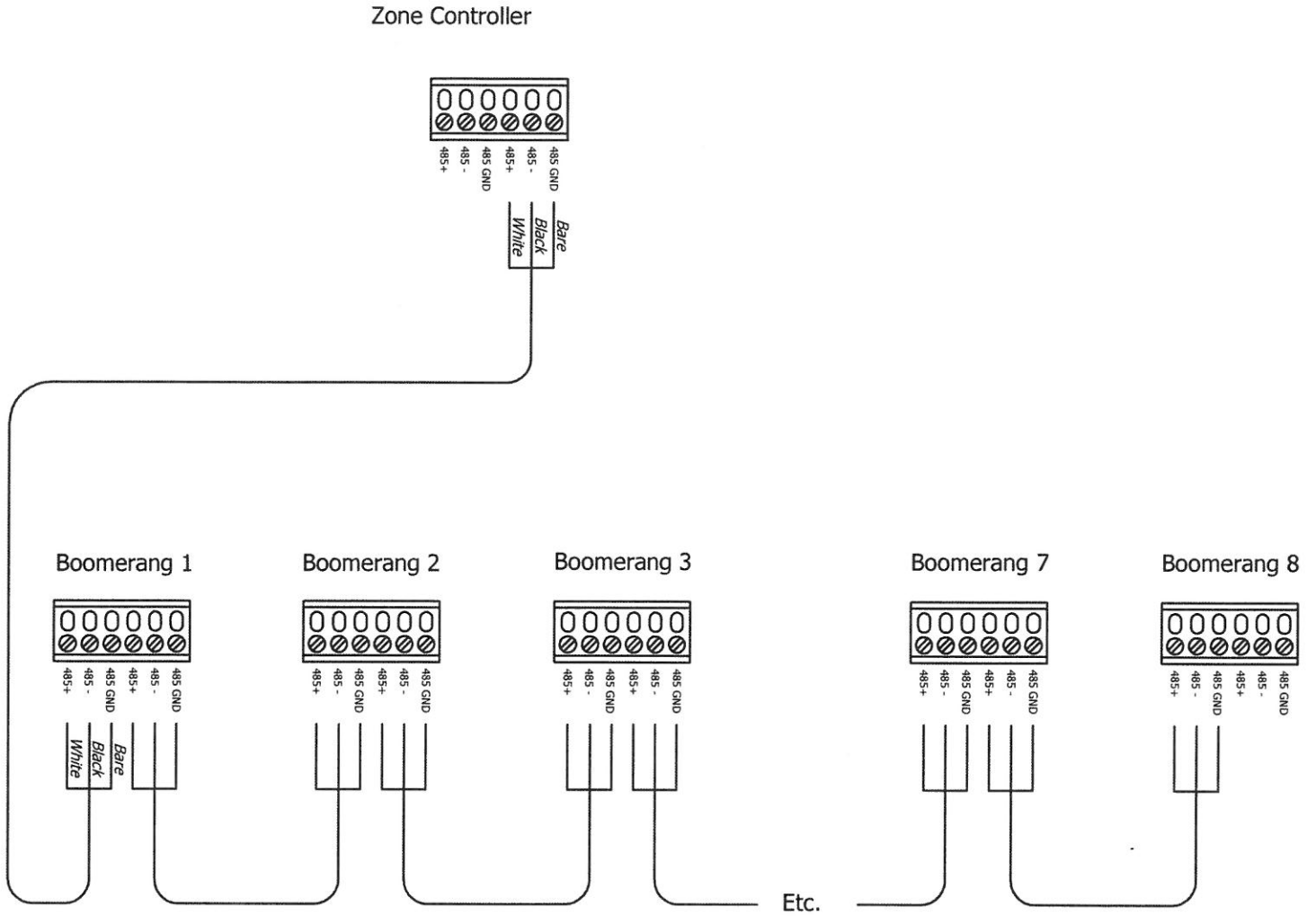


And on the Boomerang Circuit Board:



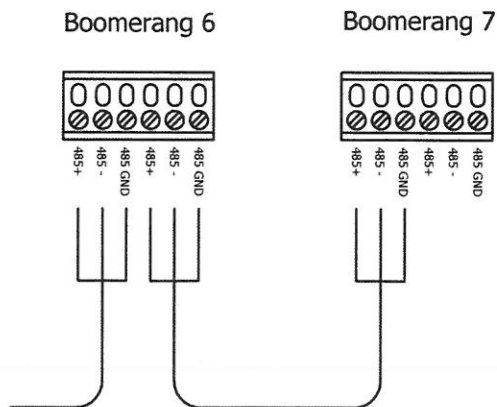
# Wiring Detail

Here's how to wire your zone network:



*Make sure the white wire plugs into 485+, the black wire into 485-, and the bare wire into 485 GND on **all** connectors.*

If you have only Seven boomerangs on the network, then the diagram would end at Boomerang 7, and so on:



# Network Jumpers

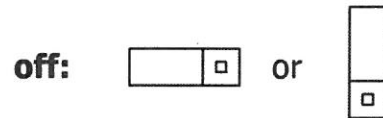
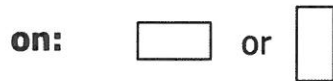
## What are Jumpers?

Jumpers are tiny pieces of plastic with an embedded metal plate; from above, they look like this, only smaller:



(Actual Size:  )

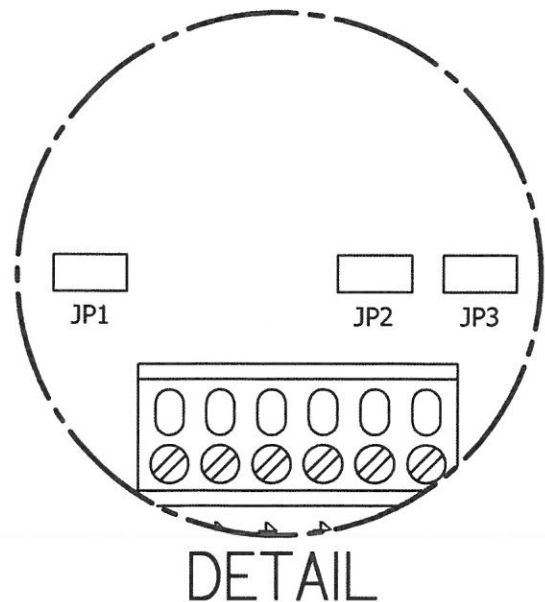
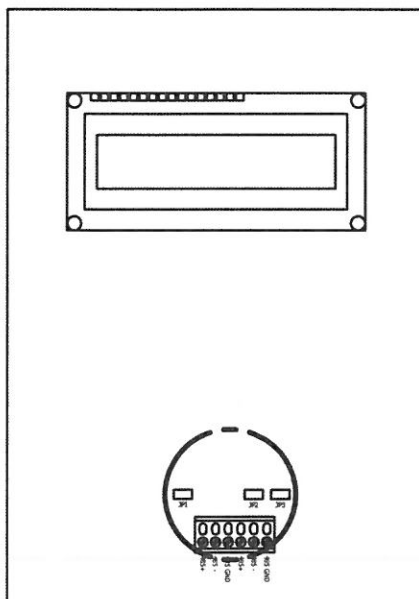
They are placed on pairs of pins on the circuit board and are either on both pins ('on') or on only one pin ('off'). To keep things simple, they are shown like this:



To change a jumper, pull it away from the board and then place it back on one or both pins.

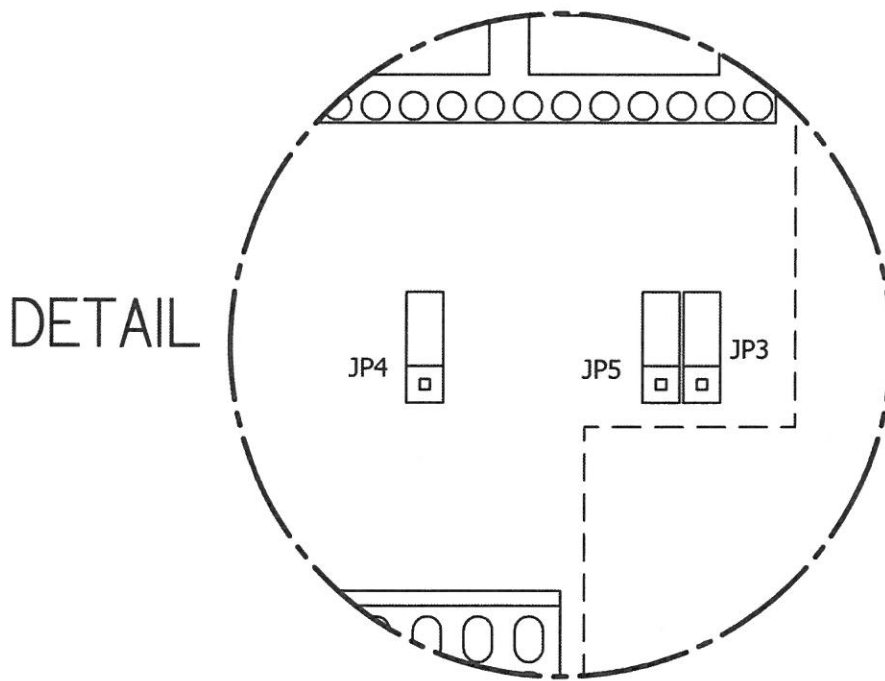
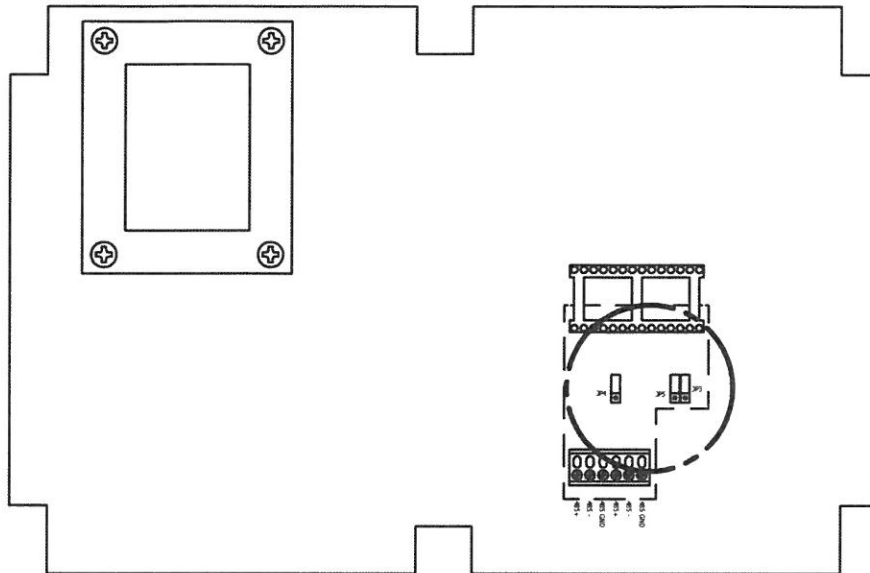
## How to Find the Network Jumpers:

Here they are on the Zone Controller Circuit Board:



DETAIL

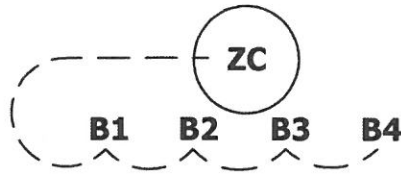
And here they are on the Boomerang Circuit Board:



Note: There are other jumpers on the Boomerang Circuit Board, but only these are 'network jumpers'; do not rearrange the other jumpers!

# How to arrange the Network Jumpers:

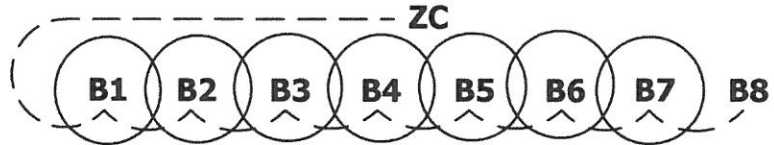
Zone Controller



Put all jumpers in the on position:



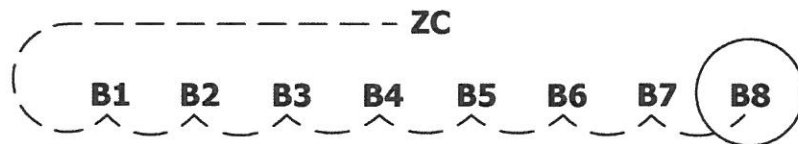
Middle Boomerangs:



Put all jumpers in the off position:



Last Boomerang:



Put JP5 in the on position, and JP3 and JP4 in the off position.



Note: If your zone network has only 7 boomerangs, then B7 is the 'Last boomerang', and B1 - B6 are the middle boomerangs.



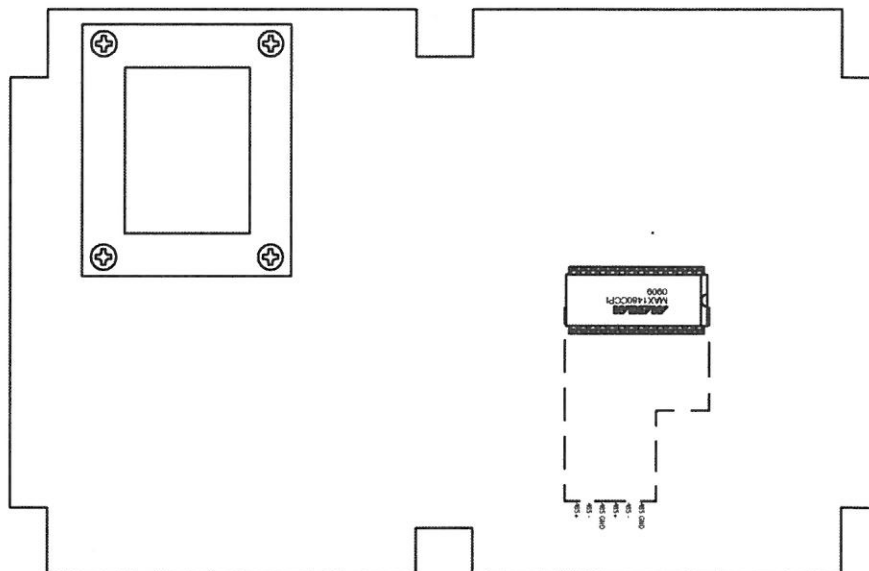
# Network Chip

This is a network chip:



Only Boomerangs have it; the Zone Controller doesn't need one.

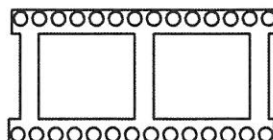
You can find the network chip on the Boomerang board here:



Notice that the lettering is 'upside down' in both illustrations. It is *absolutely necessary* for the chip to be placed on the board like this. If the chip is placed on the board with the lettering 'right side up', then powering the board up might damage some board components.

Note: If for some reason the chip is installed incorrectly (writing right-side-up) then you need to remove it (see Appendix A). **Do not power up the Boomerang before or during this process.**

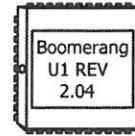
Instead of a network chip, you may see an empty chip socket:



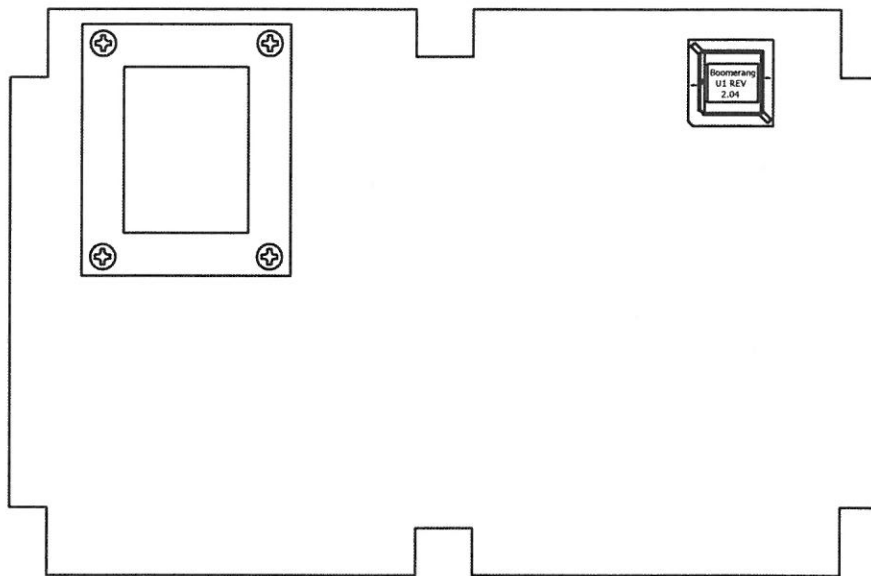
If so, you need to install a network chip (see Appendix B)

# Program Chip

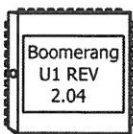
Your Boomerang basket system has a program chip, where the operating program is stored.



You can find it here:



Your Boomerang basket system needs to have a 'ZB' chip, like this one, to work on the zone network.

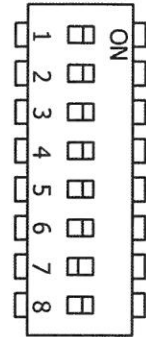


If it has this chip or some other chip, you will need to remove the chip (Appendix C) and replace it with a ZB chip (Appendix D)

# Dip Switches

## The Big Picture

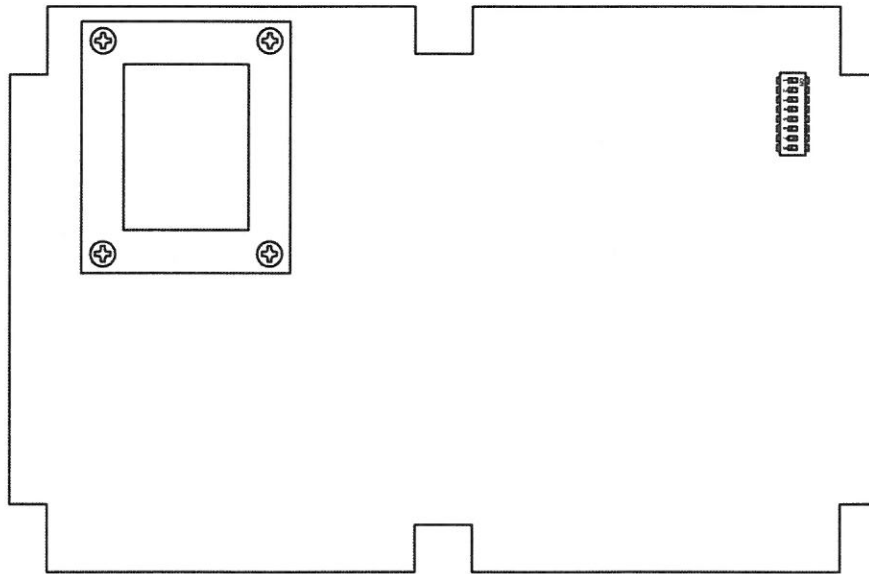
Dip switches are on the Boomerang boards only - your Zone controller doesn't have any. There are 8 of them, little white switches, arranged in a column on a little black block that looks like this:



except it's a little smaller.



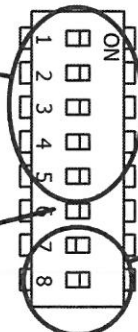
You can find it on your boomerang board:



## What do they do?

1-5 set the address of the Boomerang.

6 isn't used right now.



7-8 let the Boomerang know how many layers it has (or if it has funnels).

# Dip Switch Configuration

If you look closely at these dip switches,

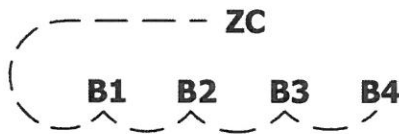


You can see that dip switches 1,2,7, and 8 are on and the rest are off.

Another way to represent this is as the 'dip switch configuration' 1 2 - - - - 7 8 .

## Set Each Boomerang's Dip Switches

Below is a table with a dip switch configuration for each boomerang in your Zone Network no matter what its layer/funnel setup is:

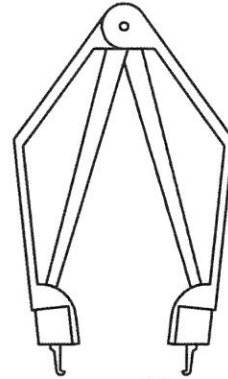


	One Layer	Two Layers	Three Layers	Funnels
B1	- - - - -	- - - - - 7 -	- - - - - 8	- - - - - 7 8
B2	1 - - - - -	1 - - - - - 7 -	1 - - - - - 8	1 - - - - - 7 8
B3	- 2 - - - - -	- 2 - - - - - 7 -	- 2 - - - - - 8	- 2 - - - - - 7 8
B4	1 2 - - - - -	1 2 - - - - - 7 -	1 2 - - - - - 8	1 2 - - - - - 7 8
B5	- - 3 - - - - -	- - 3 - - - - - 7 -	- - 3 - - - - - 8	- - 3 - - - - - 7 8
B6	1 - 3 - - - - -	1 - 3 - - - - - 7 -	1 - 3 - - - - - 8	1 - 3 - - - - - 7 8
B7	- 2 3 - - - - -	- 2 3 - - - - - 7 -	- 2 3 - - - - - 8	- 2 3 - - - - - 7 8
B8	1 2 3 - - - - -	1 2 3 - - - - - 7 -	1 2 3 - - - - - 8	1 2 3 - - - - - 7 8

# (Appendices)

# Appendix A: How to Remove a Network Chip

You will need a chip extractor:



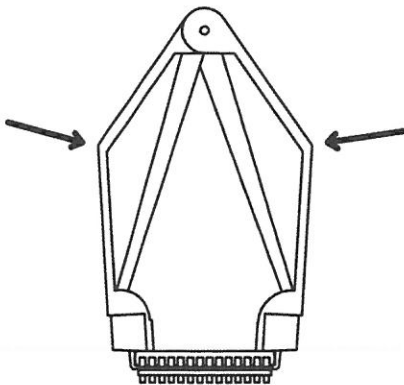
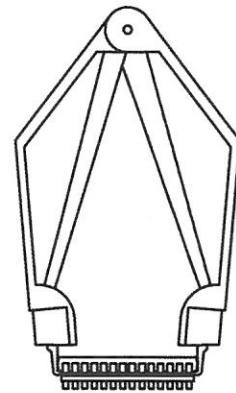
Here are the claws



First, position the extractor's claws under the short edges of the chip:

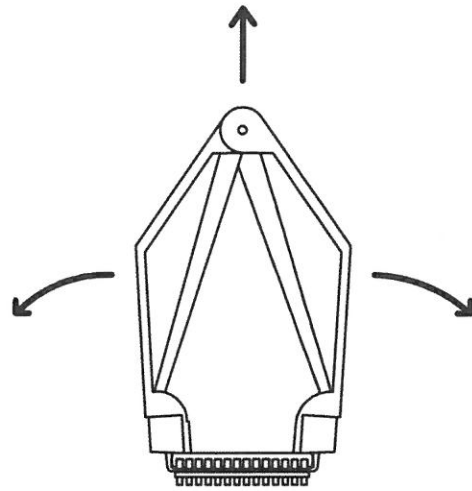
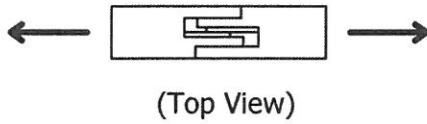


side view:

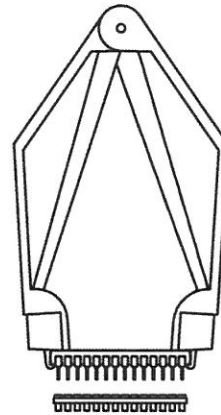


Squeeze the extractor to firmly grip the network chip.

Keep a firm grip on the chip,  
and start rocking it back and forth as  
you gently pull:



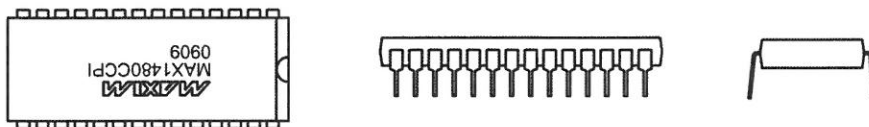
The chip should pop out fairly quickly.



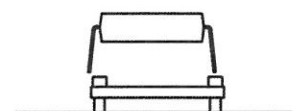
Place the chip pins-up on a static-free (pink bubble wrap or static-free foam) or static-neutral (wood, cardboard) surface, to protect it from static damage.

# Appendix B: How to Install a Network Chip

Network Chips are usually packed in a tube. They look like this:



The pins are angled outward, so it's difficult to fit the chip in the socket:



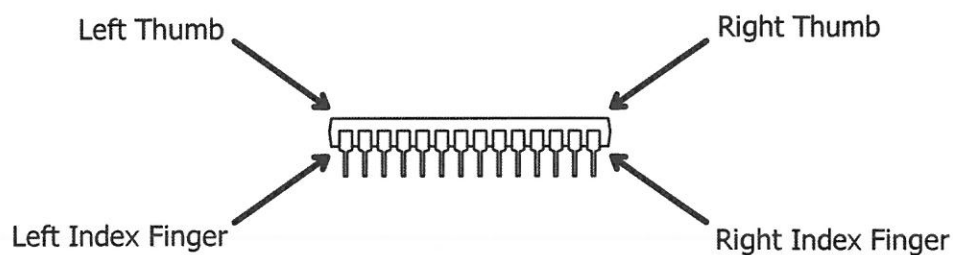
The pins have to be bent inward until they're nearly square in order for the chip to fit.

## Adjust the Pins

To bend the pins, hold the chip on each end,

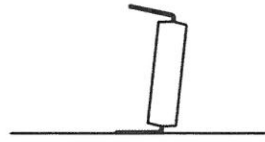


Like this:

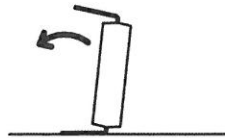




Next, hold the chip with the pins pointing away from you, with one row of pins flat on a static-neutral surface (wood or cardboard is best).



Roll the chip away from you as evenly as you can:



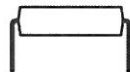
(You are over here)

Stop when this angle



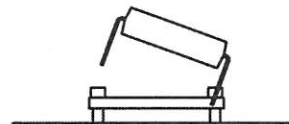
is about 90 degrees.

Repeat this process with the other row of pins. When you are done, the chip should look like this:

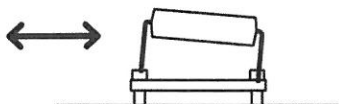


## Install the Chip

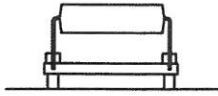
Partially seat one row of pins in the socket:



(see-through view)

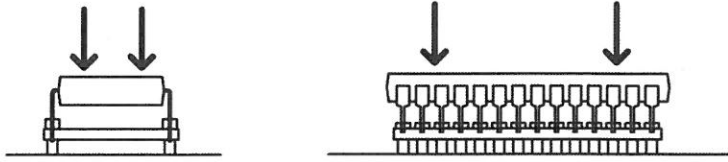


Lower the other row of pins in the socket, pushing and pulling against the first row as necessary to make the fit.

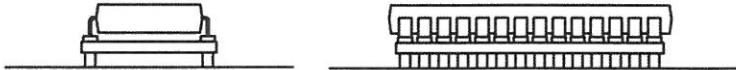


Continue this process until all the pins are just barely seated and the chip is sitting evenly in the socket:

Press down evenly,



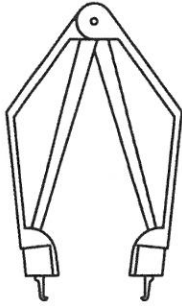
Until the chip is fully seated:



And you're done!

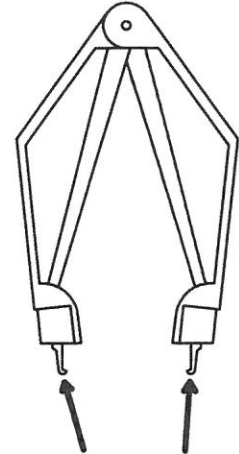


# Appendix C: How to Remove a Program Chip



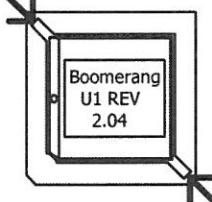
You will need a chip extractor.

First, put the claws



(Here are the claws)

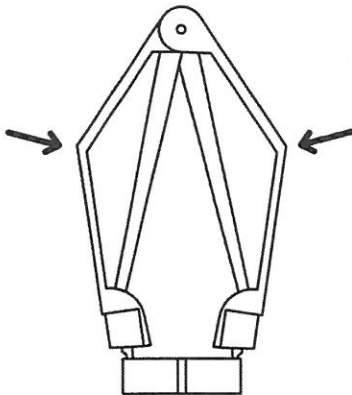
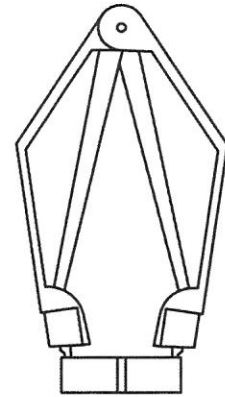
Here



in the diagonal slots in the Chip socket:

Here

As far as they will go:

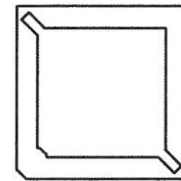


Squeeze the chip extractor, and the chip should pop out, firmly held in the claws.

Place the chip on a static-free (pink bubble wrap) or static neutral (wood, cardboard) surface, to protect it from static damage.

# Appendix D: How to Install a Program Chip

You will need an empty chip socket on a Boomerang circuit board (or a Common Sense 2 main circuit board):

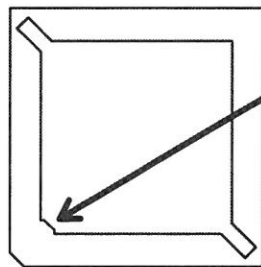


(simplified)

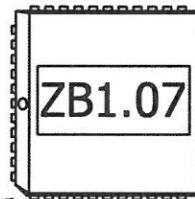
And a Program Chip.



First, align the cut corner on the chip:



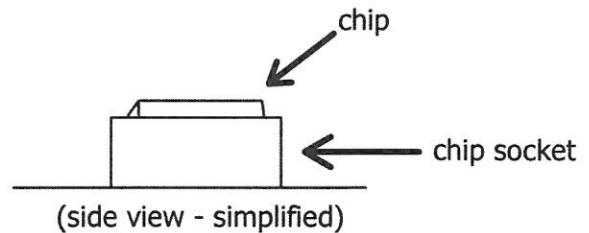
here



here

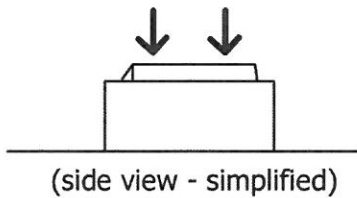
With the cut corner on the chip socket.

Set the chip lightly in the chip socket,



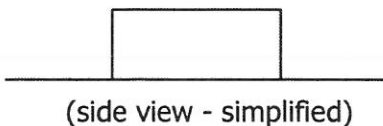
(side view - simplified)

and evenly press the chip into the socket.



(side view - simplified)

and you're done.



(side view - simplified)

