

Nixalite of America Inc

# Installation Guide

## ShockTape Electric Bird Deterrent System



10/20/2009



This document provides concepts, capabilities, installation and operation of the ShockTape Electronic bird deterrent system. Nixalite is a registered trademark of Nixalite of America Inc, 2009.

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## Introduction

The ShockTape bird deterrent system is 100% effective against all birds and will deter birds for years to come. ShockTape offers incredible performance and durability.

**READ THIS DOCUMENT THOROUGHLY BEFORE STARTING.** ShockTape is an electronic system. It requires that the installer follow rules and guidelines. **!WARNING! - NEVER CONNECT SHOCKTAPE TO ANY POWER SOURCE EXCEPT THOSE PROVIDED BY NIXALITE OF AMERICA OR AUTHORIZED RESELLERS.** If you have any questions about the system, contact Nixalite directly.

## Tools and Supplies

ShockTape was designed to simplify the electric bird shock solution. The tools and supplies shown below are required to install a ShockTape system. Familiarize yourself with Items as they will be described throughout the document.

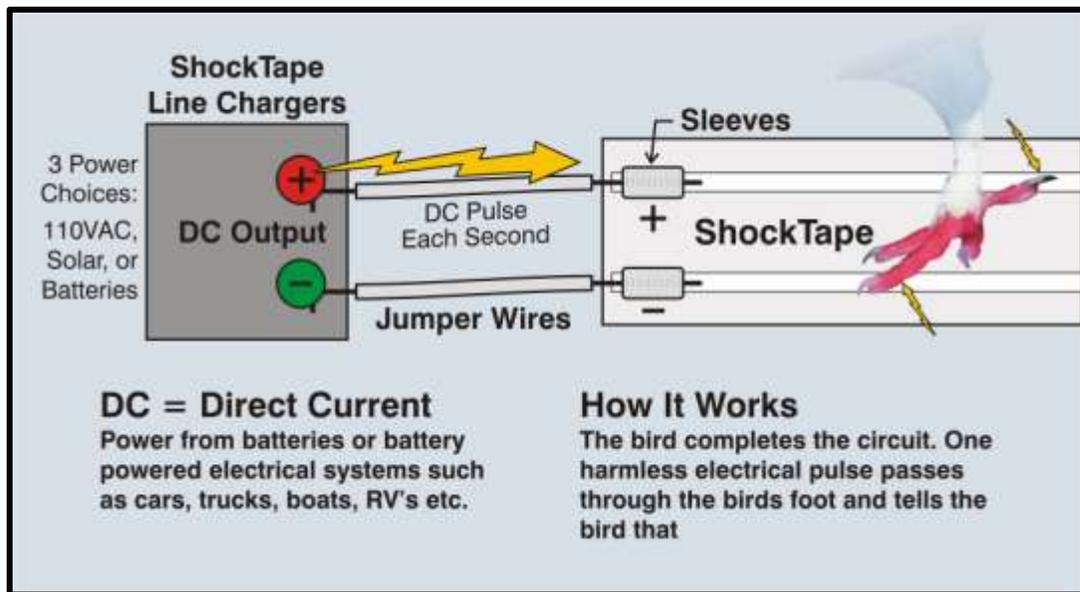


## ShockTape Line Chargers

ShockTape line chargers produce a very brief pulse of high voltage electricity of very low current. A long off-time of at least 1 second comes next. Due to the off-time duration, even constant arcing cannot ignite combustible materials. In cattle ranching where electric fences have been operating for 50 years, weeds and grasses resting on the electric fence wires do not ignite.

**CONNECTIONS TO POWER SOURCES OTHER THAN SHOCKTAPE CHARGERS ARE NOT SUPPORTED NOR RECOMMENDED.**

**ALWAYS AVOID AREAS WHERE FLAMMABLE MATERIALS AND GASSES COULD IGNITE WITH A SPARK.**



ShockTape offers 110 VAC plug-in, solar and battery powered units, featuring all weather casings. Overhead protection is optional and constructed on-site. Line chargers are carefully chosen to attain electrical and performance goals.

Energy level outputs meet UL standards for human safety. By producing a brief pulse of electricity followed by a long off-time, 'latching on' is not possible. ShockTape 'teaches' the birds to fear the sting of the ShockTape. The bird has a small body mass and is easily disturbed by the sting of the pulse passing through its foot.

ShockTape line chargers are "Capacitive Discharge" units. Capacitors "store" electricity and discharge it when the two tape wires are crossed by a conductive material. The outputs terminals are DC, Direct Current; + and -; just like a battery. One wire is DC positive and the other DC ground / DC Negative, creating a simple 2 wire system. Power controllers are engineered to discharge continuously without damage.

## Line Charger Mounting and Connections

### 110 VAC controller with Storm Guard Module



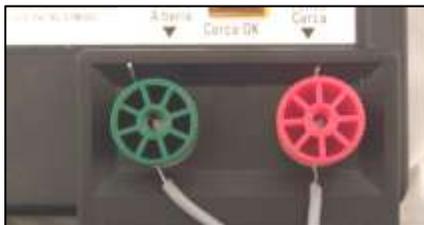
Place Storm Guard over terminal posts.

Strip 2" of wire insulation.

Form complete clockwise loops around posts.



Place star washers over wire loops.



**Carefully** tighten plastic nuts.

Wire insulation **never** goes under the plastic nuts.

### Solar units – roof stands or attached



Stand made from a 6 foot long x 5/4" x 6" deck board.



Attached with concrete screws



## Electrical Component Design

The ShockTape system was modeled after the public electric utility systems which use 100% aluminum in the jumper wires, crimp sleeves and ShockTape flat wires. Aluminum is highly conductive and has excellent corrosion resistance.

Oxidation is an electrical connection problem to avoid. In the public electric utility systems, every connection is protected with an anti-oxidant paste. The crimp sleeves are treated with anti-oxidant paste that forms a permanent oxidation free connection.

### **USE OF NON SHOCKTAPE LEAD-IN WIRE (JUMPER WIRE) OR CONNECTORS IS NOT RECOMMENDED.**

Dissimilar metals in an electrical connection eventually suffer from galvanic corrosion, deteriorating connections that lead to system failure.

## ShockTape Durability

The adhesive base of ShockTape is a pressure sensitive adhesive. The acrylic film tape (the ShockTape ribbon) is laminated over the top of the pressure sensitive adhesive. On top of the ShockTape ribbon, more pressure sensitive adhesive holds the 2 aluminum flat wires in place.

Acrylics have had years of success in automobile and house paints. Actual sun deck tests have shown this film showed no signs of aging over a 6 year period.

## Surface Prep

Surfaces must be **DRY**.

Surfaces must be **OIL FREE**. The best surface preparation solution is to use a 50:50 mixture of isopropyl alcohol and water. Isopropyl alcohol is the rubbing alcohol purchased in drug stores. Glass cleaning and oil based cleaning solutions are NOT acceptable. For cleaning heavily oiled surfaces, a citrus based degreasing agent should be used. Follow up immediately with Isopropyl alcohol and water mixture.

Surfaces must be **DUST FREE**. Remnants of bird manure must be thoroughly removed.

Surfaces must be **STABLE or UNIFIED**. **Be wary of:** sandstone, poured concrete, rusted or oxidized metals and bare wood.

### WILL BOND TO:

### WILL NOT BOND TO:

METAL (may affect color of unsealed copper)	RUBBER
PAINTS (test)	EPDM
CLAY TILE	TAR PAPER
ASPHALT SHINGLES <u>WITH</u> MINERAL SURFACE	UNSEALED CONCRETE
MARBLE	BARE WOOD
GLASS	ROUGH SURFACES

**Test adhesion with small strips of tape to insure compatibility.** For difficult surfaces, an sealer/adhesive can be used. NOTE: the spread of the adhesive sealer can be seen through the ShockTape and in a high profile area this could be objectionable.

## Applying ShockTape

Minimum surface temperatures of 45 degrees Fahrenheit are required during application. The warmer the surface temp, the greater the adhesive “flow”. Cold surfaces inhibit adhesion and will result in an uncertain bond. Infra-red digital thermometers (see picture) record surface temps for cold weather installations.

**You can “sense” ShockTape adhesion as soon as it goes on. If you sense a poor bond when applying ShockTape – STOP and CORRECT the reason(s) before proceeding.**

To start:

- Peel back several inches of the polyethylene liner
- Firmly press and smooth the exposed adhesive to the surface
- With ample hand pressure, straighten / smooth / shape the tape
- Hold unattached tape firmly in place
- Pull polyethylene liner away from tape at 90 degrees
- Smooth tape with firm hand pressure.
- Irregular surfaces require more hand pressure to increase the amount of adhesive contact area.
- Insure outside edges of tape are well bonded to prevent debris from collecting underneath
- **DO NOT tear ShockTape acrylic film top when applying to metal surfaces.** The electrical insulation value of the film is necessary to prevent the electricity from arcing through to the metal.
- **DO NOT use stainless steel staples, nails or screws to fasten tape.**



Infra-red digital thermometer



Applying ShockTape should be a “hands on” process. You will get a sense of how well the ShockTape is bonding or sticking to the surface. If it is not bonding well, stop the installation and correct the problem before continuing the installation.

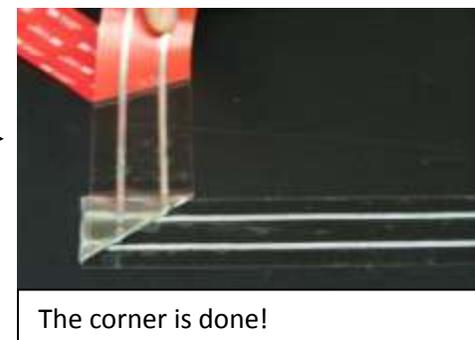
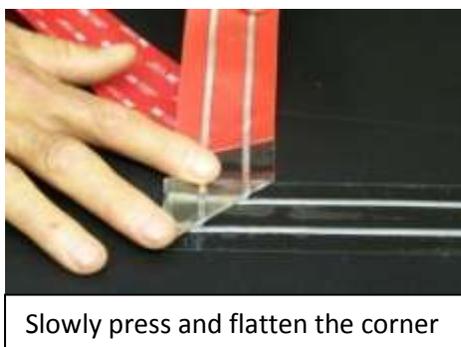
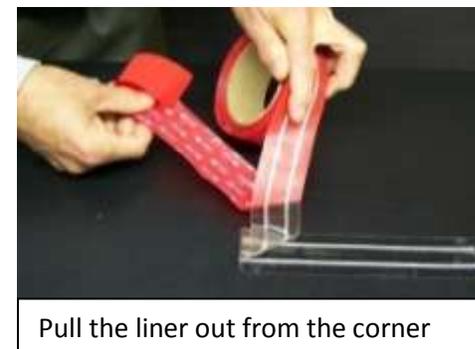
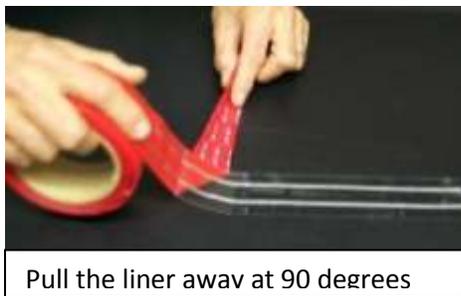
## Making Corners

You make corners by folding the tape in one continuous piece. You will not need to cut the tape. Corners are made very quickly and can be crafted to angles of 0–120 degrees.



In the photos above, the polyethylene liner remains on to show how the wires are double insulated from each other when they do cross.

### Step-by-step cornering



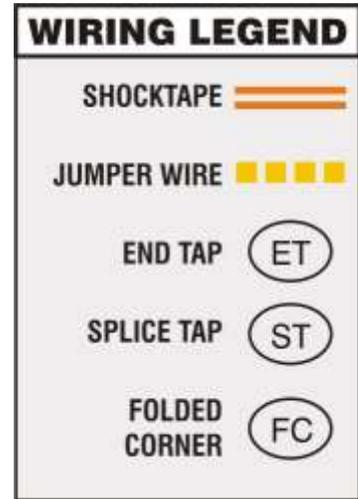
## Wiring plans

There are many possible ways to connect the system together. Having a wiring plan on paper is essential to the installation. Take pictures, print and mark them up or sketch the plan. It's easier to correct mistakes on paper.

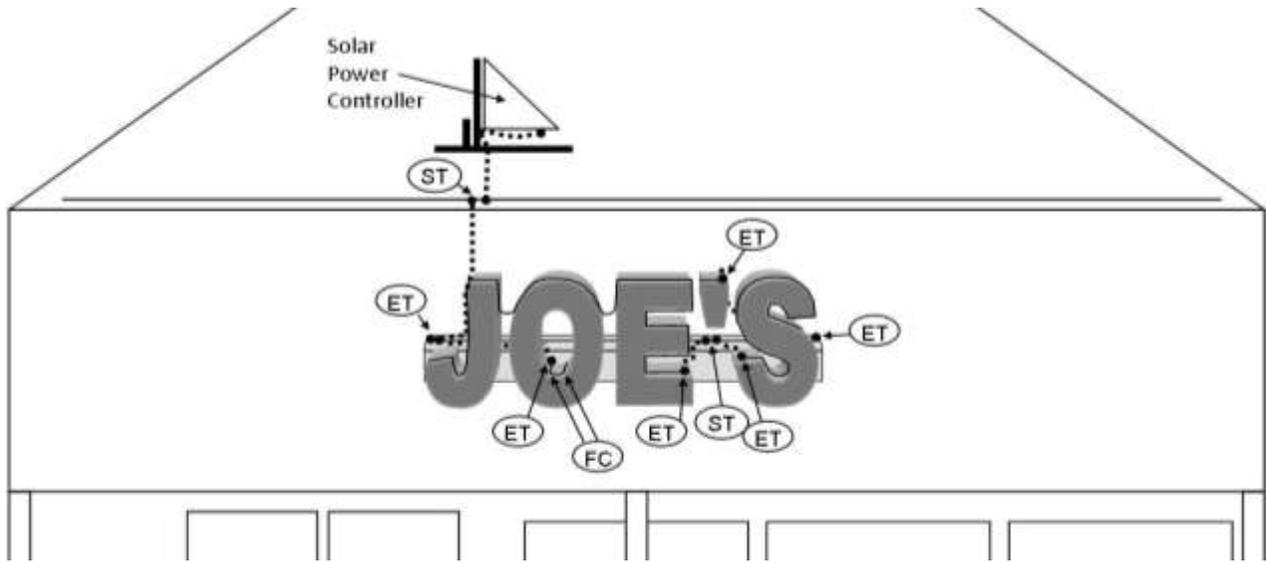
With the ShockTape system, it does not matter if the tape strips are in series or parallel or a mix of both. **The line chargers can be connected into the tape at any point.** This flexibility makes the entire wiring plan easy.

Create "zones" for large layouts. Zones allow rapid troubleshooting should there be a power issue down the road. By disconnecting a zone at a time the problem area is quickly identified. All zones can converge at the line charger or other common location.

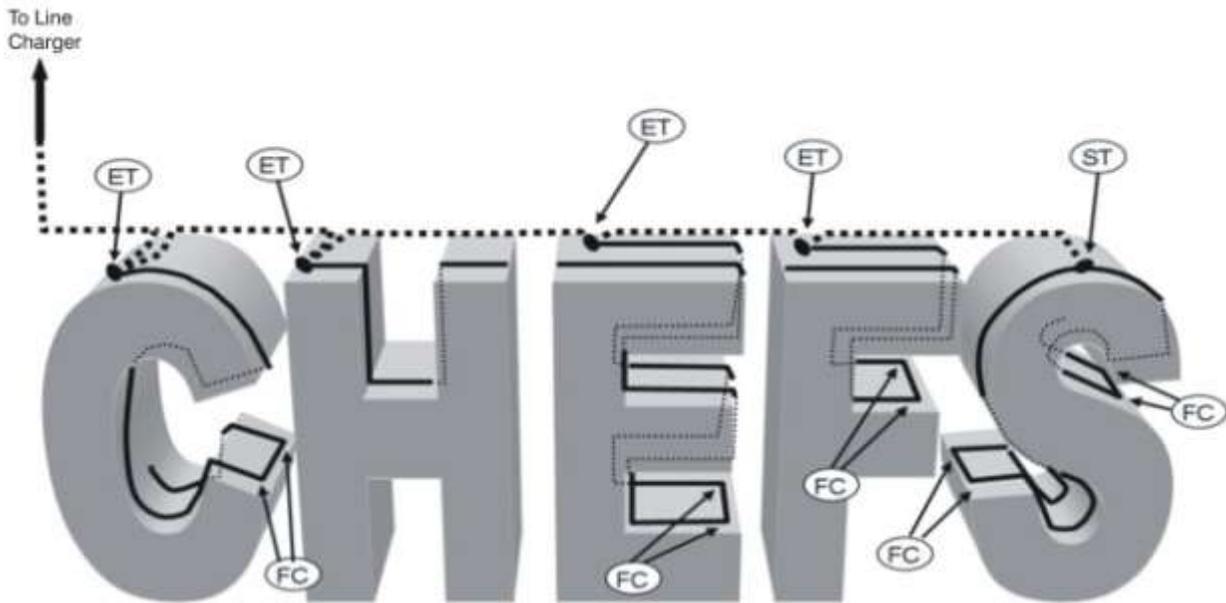
The ONLY connections required are the SPLICE TAP and END TAP. A "TAP" denotes a connection where the lead-in / jumper wire is connected to the tape. TAPS must be on the hardcopy plan. (see WIRING LEGEND)



Example of a Wiring Plan



Example of a Wiring Plan

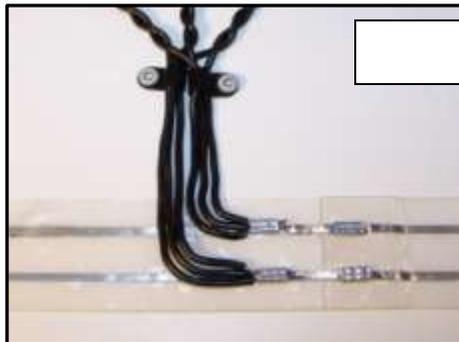


Example of a Wiring Plan

## Jumper Wire

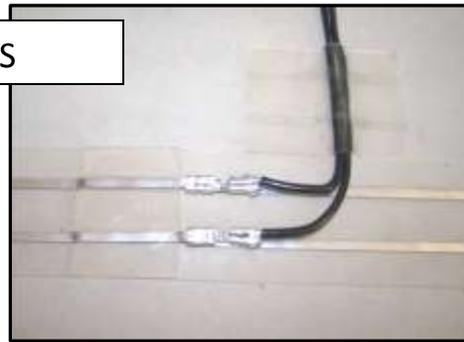
Heavily insulated wire connects all pieces of ShockTape and Line Chargers together. The wire will connect into the tape at a Splice Tap or End Tap. Connections are to be made with care.

- Always secure wire with ShockTape wire loops or suitable mechanical fastener
- Always install a mechanical fastener (wire loop) within 8 inches of the crimp sleeve connection
- Always separate side by side wire before the connection
- Always straighten and form the individual wires from the loop into the connection at the tape
- Strip off a ½" of insulation
- Insert bare wire completely through the crimp sleeve
- When inserting 3 wires into one crimp sleeve, insert the last wire between the first 2 wires
- Crimp the sleeves 2-3 times and position AND press the connection down to the tape
- **KEEP area free of the crimp sleeve anti-oxidant paste. WIPE excess with the supplied rag**
- Finally, always secure the position of the 2 wires immediately next to the tape. Use a scrap piece of ShockTape with wires removed. Bond ½ the scrap piece - tuck the wires in - form the scrap piece over the wires and bond well



A three pair Splice Tap with wires held securely by loops.

### SPLICE TAPS



A single pair Splice Tap with wires secured by scrap tape.



End Tap with wires dressed to the outside, secured by scrap tape.

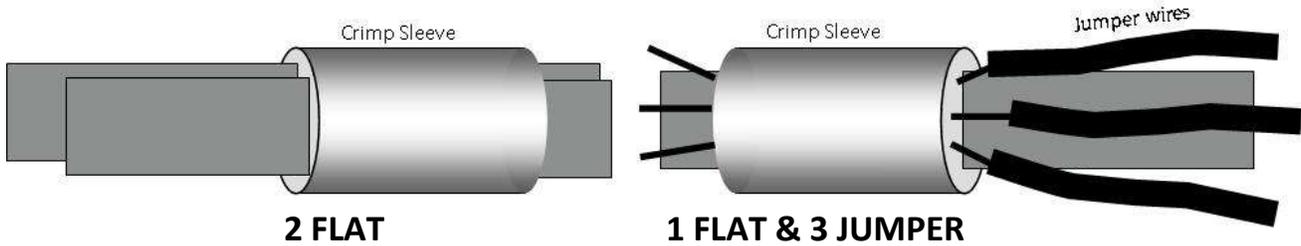
### END TAPS



End Tap with wires dressed to the inside, secured by scrap tape.

## Quick Reference

### CRIMP SLEEVE MAXIMUM CAPACITIES



### PREVENT ARCING TO METAL SURFACE AT TAPE ENDS

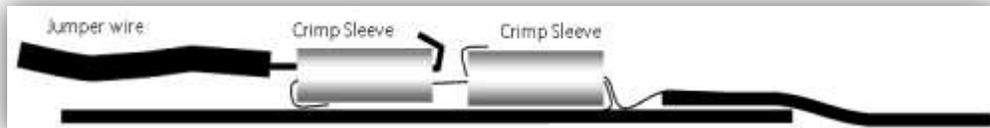


## CONNECTIONS

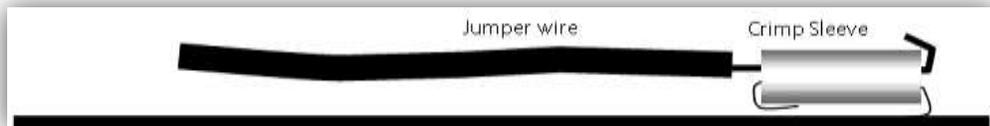
### SPLICE



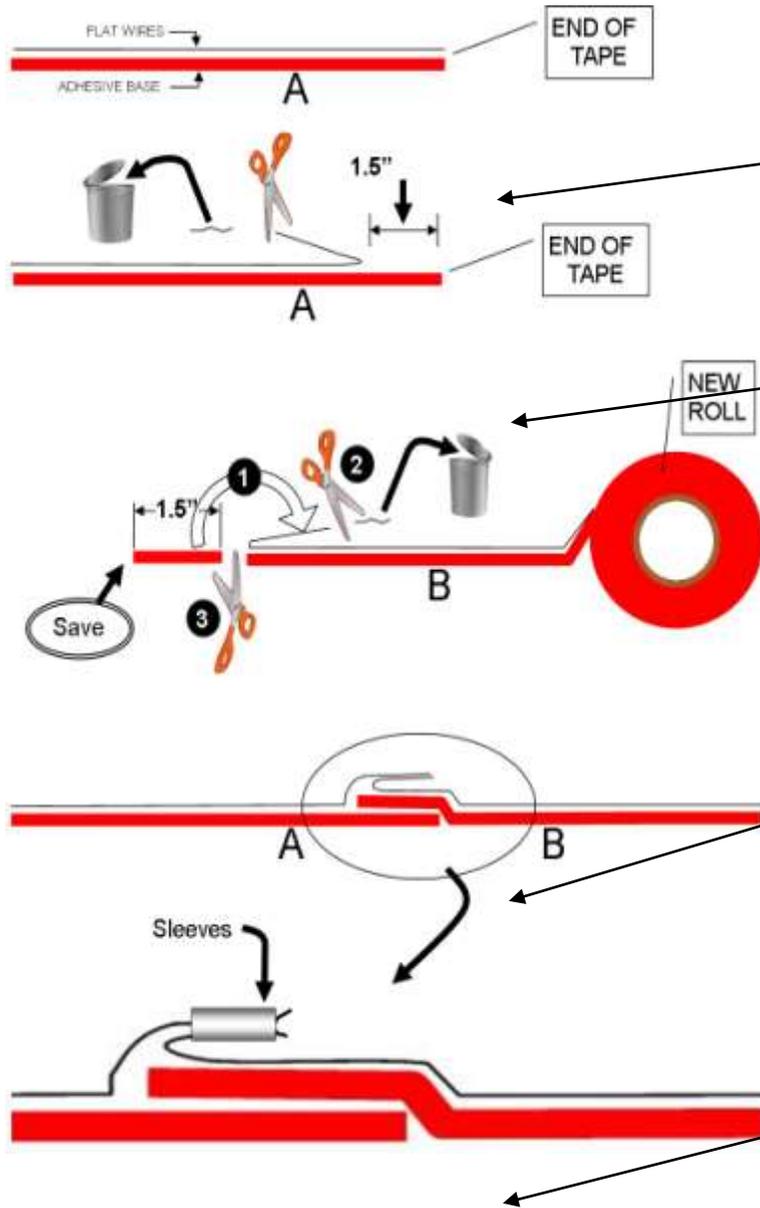
### SPLICE TAP



### END TAP



### Splice Construction (Join 2 pieces of tape)



Splicing is done frequently to join pieces of tape.

STEP 1 - Peel the 2 wires off the tape and pull them straight back. Cut off any distortion of the wire ends.

STEP 2 – For a new roll, (1) peel the 2 wires off the tape and pull them straight back. (2) Cut off any distortion of the wire ends. (3) Cut off 1.5” and Save this piece.

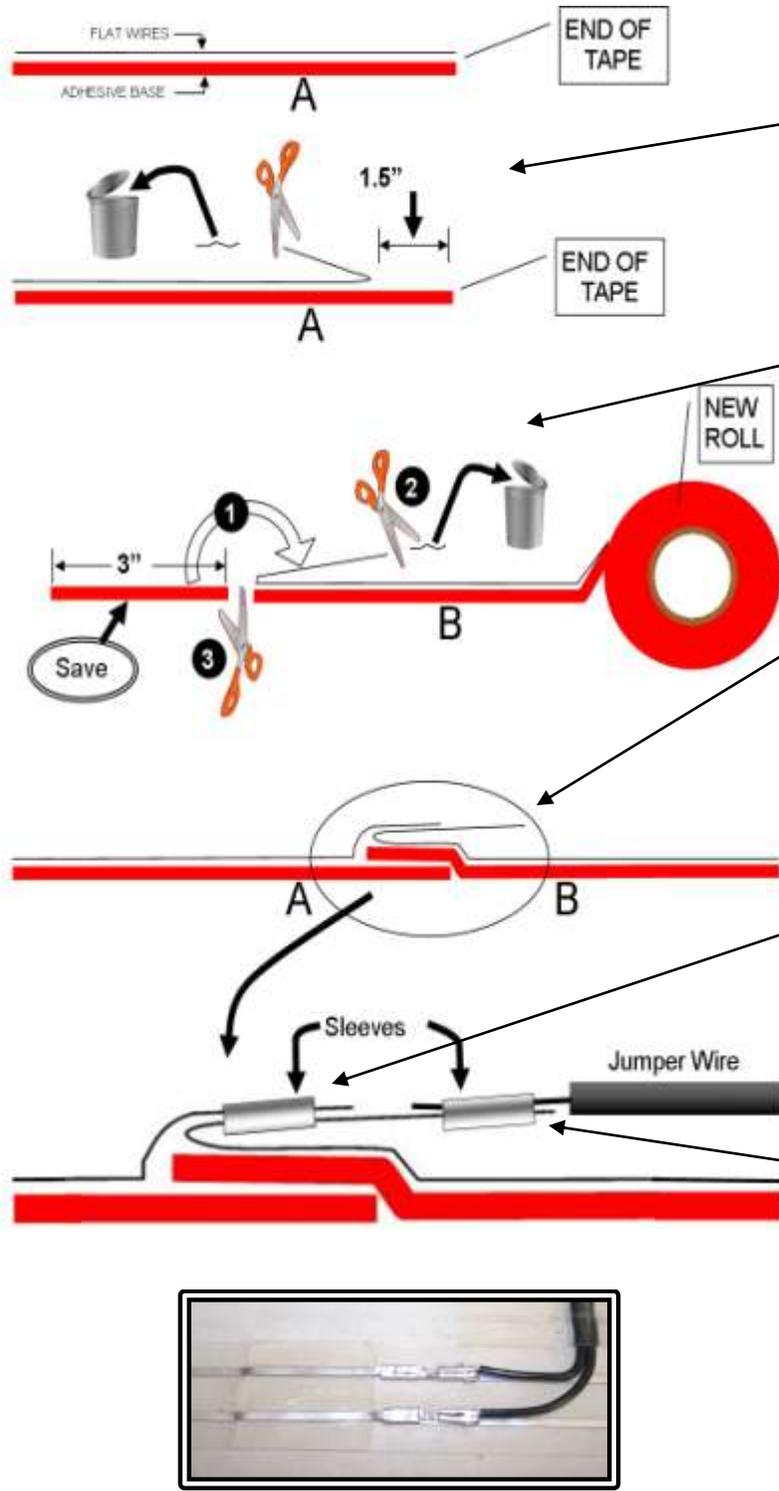
STEP 3 - Overlap new roll onto piece A. Fold the wires from piece A directly over the wires of piece B. The wires will be tacky with glue – align them with your fingers. Good alignment results in sleeves sliding on easily.

STEP 4 – Slide a sleeve onto each wire pair all the way down to the tape. Crimp the sleeves 2-3 times with the 22-14 crimp jaw. Press and flatten the sleeves to the tape.



SPLICE example

## Splice Tap Construction (Connect jumper wire to tape)



SPICE TAP example

Splice Taps take a little more time to construct. Its' location has to be planned because the tape has to be cut and spliced.

STEP 1 – Peel the 2 wires off the tape and pull them straight back. Cut off distorted wire ends.

STEP 2 – For the new roll, (1) Peel the two wires off the tape and pull them straight back. (2) Cut off distorted wire ends. (3) Cut off 3" and save this piece. Use this piece of tape later to secure jumper wires position, etc..

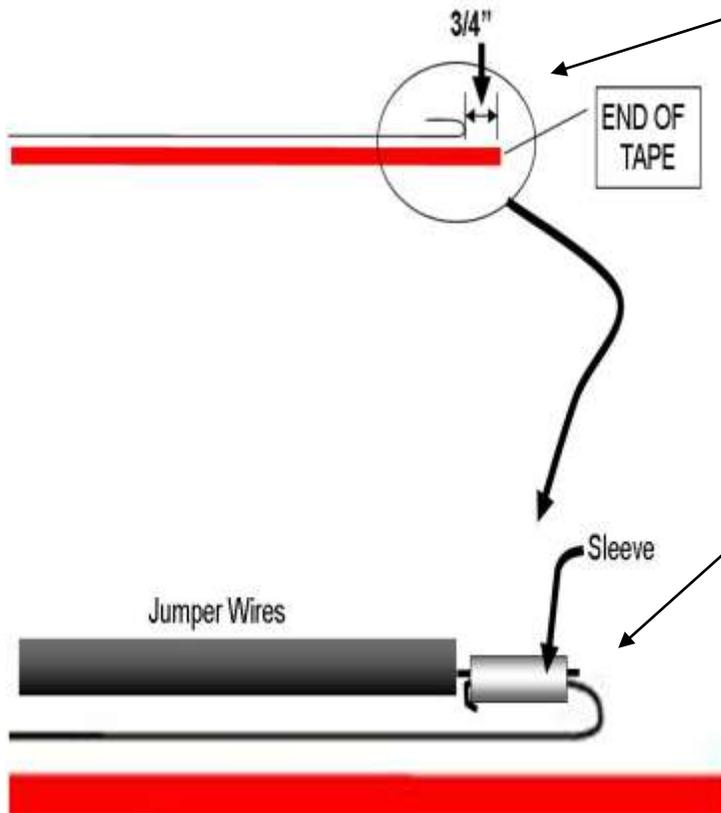
STEP 3 – Overlap the new roll onto piece A. Fold the wires from piece A directly over the wires of piece B. The wires will be tacky with glue – align them with your fingers. Good alignment results in sleeves sliding on easily.

STEP 4 – Slide one sleeve onto each wire pair all the way down to the tape. Crimp the sleeves 2-3 times with the 22-14 crimp jaw.

STEP 5 – Slide 2 more sleeves onto the flat wires and bend the flat wire so the sleeve cannot come off. Insert the jumper wires into the sleeves and crimp with the 22-14 crimp jaw 2-3 times.

STEP 6 – (not shown) secure jumper wire with scrap ShockTape tape.

### End Tap Construction (Connects jumper wire to tape)



End Taps are made quickly and used often. The jumper wires can be inserted from either end of the sleeve.

STEP 1 - Peel the 2 wires off the tape and pull them straight back.

STEP 2 – Slide one sleeve on each wire and bend the flat wire so the sleeve cannot come off. Insert the jumper wires into the sleeves and crimp with the 22-14 crimp jaw 2-3 times to insure a sound connection.

STEP 3 – (not shown) secure jumper wire with scrap ShockTape tape.



END TAP, wires dressed to outside



END TAP, wires dressed to inside

## Testing and Acceptance

**Special Line Testers are required for measuring high voltage DC pulses. The standard voltmeter will not work.** Either a digital readout or neon light tester is mandatory to read DC pulse voltage.

Once everything has been wired together, disconnect the jumper wires from the line charger terminals. Turn the line charger on and measure the voltage on the terminals. With the digital fence tester, place the single brass spike on the ground terminal (- or green) and the double prong on the fence terminal (+ or red). A reading of 3-10KV is acceptable.



Reading voltage of the line charger while disconnected from the system.



Reading voltage with the entire ShockTape system connected.

Reconnect the jumper wires to the terminals and read the voltage. It should be lower than before. **Voltage levels need to be at least 1.5KV to give a decent shock to a birds' foot.**

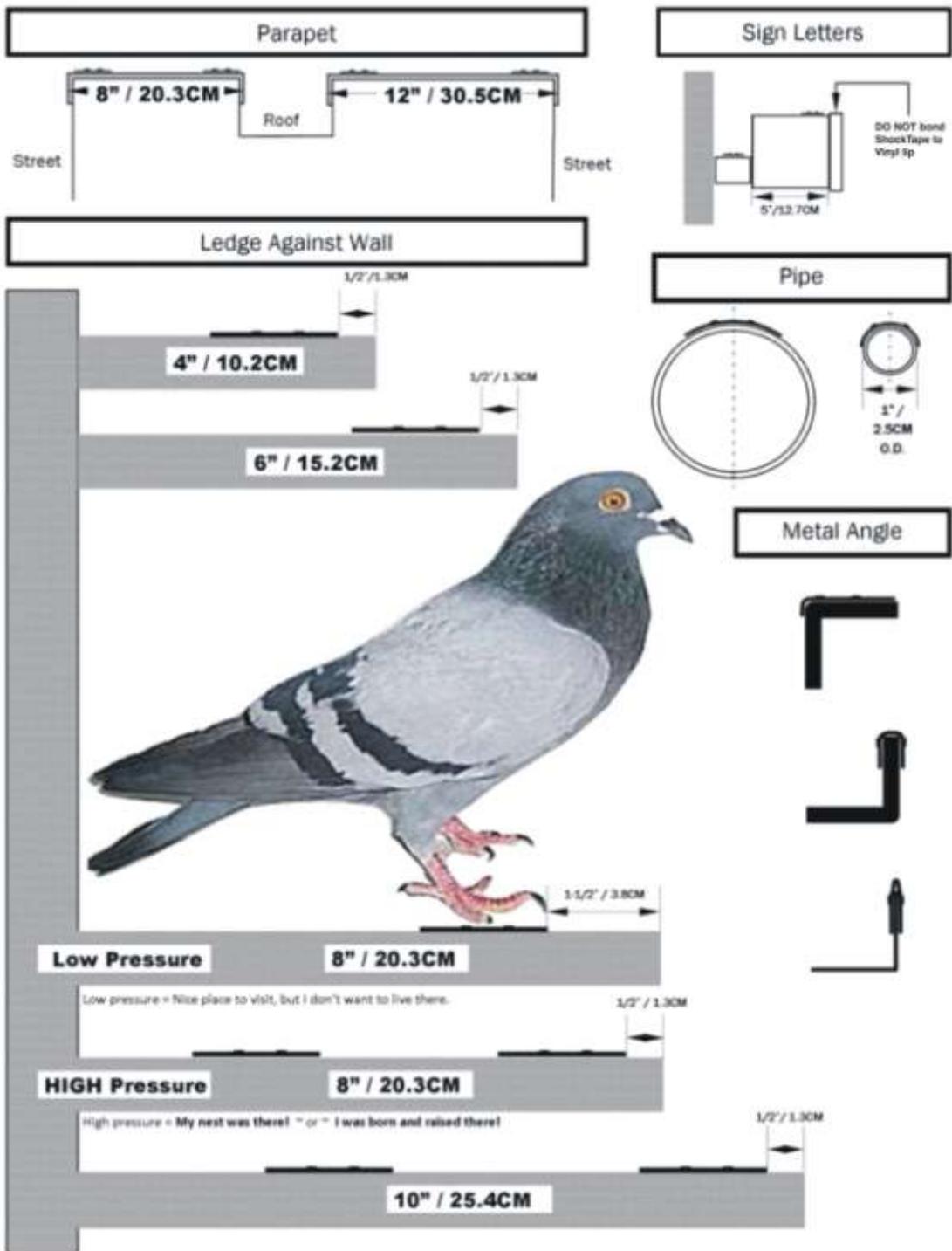
Check for voltage on all ShockTape runs. Voltage readings on the ShockTape should be identical to the voltage on the line charger terminals. If the voltage is much higher than what was measured on the line charger terminals, swap the tester leads on the tapes flat wires. The lower voltage reading is the correct reading.

For low voltage situations:

**Remember you DO NOT make a complete loop by connecting the DC Positive to the DC Ground / DC Negative wire. The birds' foot makes that connection. If the two wires were wired together forming a dead short, the voltage will be 0. For all other low voltage situations, check for the following conditions:**

- Check for wire trimmings of flat wire or jumper wire laying across the ShockTape wires
- Check for crimp sleeves touching one another
- Check for jumper wire splicing ( these splices must be offset by a minimum of 1 inch)
- Check for the ends of ShockTape on metal surfaces where the flat wire ends had not been trimmed back ½" inch

### ShockTape Placement for Pigeons



### ShockTape Placement for Sparrows

