Application Note

Ensuring Success with 6APLG-S6A Tool-Free Plug Terminations

(Revision 2: 12/18/2024)

Introduction

Application Note ID:
NS-AN-24-010-11-15-24

Date:
11/15/2024

Product Line:
Category 6A Plugs

Part Numbers Affected:
6APLG-S6A

The Leviton 6APLG-S6A is a Category 6A Tool-free Plug. Tool-free means that while wire preparation tools are used to prepare the cable, there are no tools used to Terminate the cable's conductors to the plug's IDCs. The plug can be used on Category 6 or Category 6A cables (solid or stranded conductors) and may be used in Shielded or Unshielded Applications.

To ensure successful termination of the 6APLG, installers should review the instruction sheet that comes with the product. If the instruction sheet is missing, the user may find one at https://leviton.com/products/network-solutions Search for 6APLG, then navigate the product page to find the instruction sheet. Additionally, a product termination video may be found at https://leviton.com/support/resources/product-support/network-solutions/ns-videos

If the Installation is Shielded

The plug works with all constructions of shielded cables. Since there are many shielded cable constructions, installation teams should carefully study the shielded cable construction for the particular cable to be used on the job.

The installation team should:

- Identify each element present in the shielded cable
- Identify how each cable element will be handled during termination
- Try out the proposed termination method
- Test the plug assembly to verify that the proposed termination method yields the expected results
- Train all installation personnel to the same (proven) termination method

USA
Network Solutions Headquarters
+1 (800) 722 2082
infoUSA@leviton.com

Leviton Cable (formerly Berk-Tek)
+1 (800) 237 5835 | infoUSA@leviton.com

Asia Pacific
+852 3620 2602
infoAPAC@leviton.com

Canada
+1 (800) 461 2002
infoCanada@leviton.com

Europe
+44 (0) 1592 772124
infoEurope@leviton.com

Latin America
MX: +52 (55) 2128 6286
LATAM: +52 (55) 2333 5963
infoLATAM@leviton.com

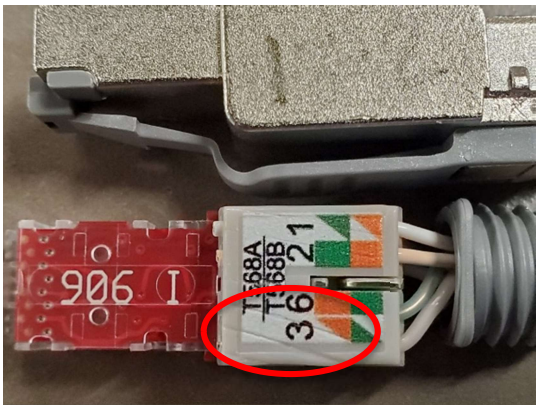
Middle East & Africa
+971 (4) 247 9800
infoMEA@leviton.com

Successful Termination of the 6APLG Plug

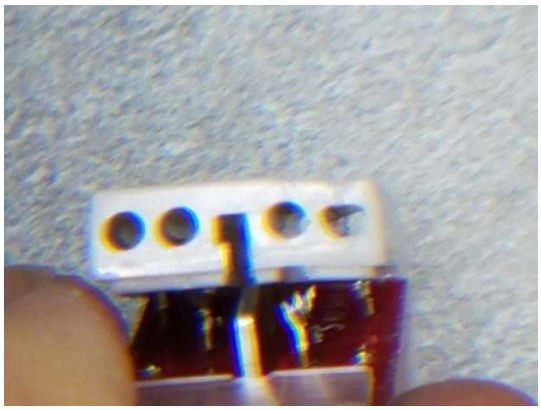
Thousands of the 6APLG plugs are successfully terminated every month by installers worldwide. Nonetheless, Leviton technical support occasionally receives a call from an installer or installation group who are having trouble successfully terminating the product. The root cause of installer issues with the part almost always goes back to a failure to accurately follow the steps in the instruction sheet and the installation video.

The following examples are provided to illustrate some of the errors we have seen in 6APLG plug terminations, along with an explanation of the problems these actions might cause during testing of the plug.

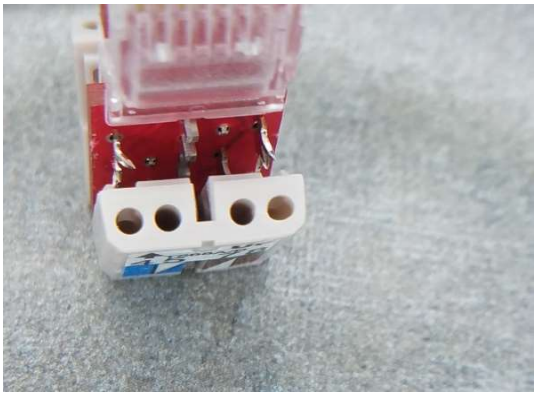
1. The most common error seen in terminating the plug is the use of a tool (like pliers) to squeeze the wire manager down flat. This practice will, in fact, damage the plug. Here are a few pictures of plug damage from the use of pliers:



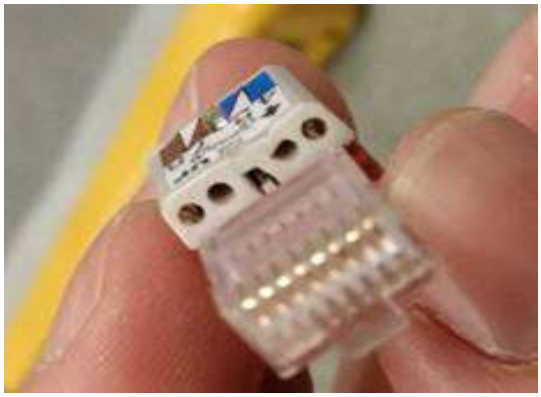
A



B



C



D

USA
Network Solutions Headquarters
+1 (800) 722 2082
infoUSA@leviton.com

Leviton Cable (formerly Berk-Tek)
+1 (800) 237 5835 | infoUSA@leviton.com

Asia Pacific
+852 3620 2602
infoAPAC@leviton.com

Canada
+1 (800) 461 2002
infoCanada@leviton.com

Europe
+44 (0) 1592 772124
infoEurope@leviton.com

Latin America
MX: +52 (55) 2128 6286
LATAM: +52 (55) 2333 5963
infoLATAM@leviton.com

Middle East & Africa
+971 (4) 247 9800
infoMEA@leviton.com

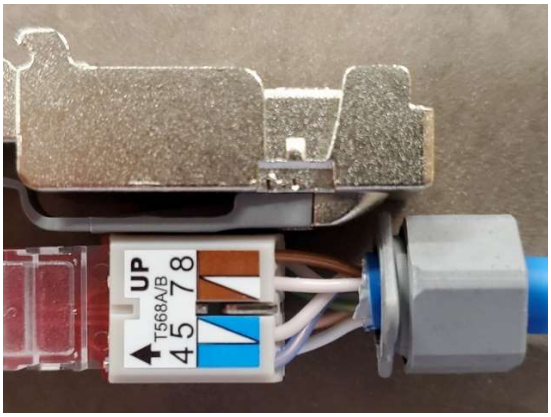
NETWORK SOLUTIONS PRODUCTS ARE AVAILABLE WORLDWIDE IN OVER 100 COUNTRIES. VISIT US ONLINE AT LEVITON.COM/NS TO LEARN MORE.

The photo (A) shows pliers witness marks on the wire manager. The result of using pliers is shown in the other three photos (B, C, & D), where wire manager deformity, flattening of wire holes, and bent/twisted IDCs may be observed. The typical test result will be a Wire Map failure.

Crushing the wire manager of the part flat, with pliers, imparts uneven side-to-side force on the IDC pins, causing them to roll across the wire insulation. Sometimes (most of the time) IDC contact with conductor is established but occasionally, the IDC will completely miss the conductor or make a poor connection with the conductor. When crushed with pliers the IDCs do not go straight into the insulation, resulting in the severely bent IDCs seen above. A part damaged in this fashion will be unavailable for re-termination.

The proper method of termination is to press both sides of the wire manager together with the fingers (it is a tool-free plug). They will not lay as flat as they do with pliers, but the IDCs will properly pierce the wire insulation, making reliable contact with all conductors and not distorting the IDCs. Final “flatness” of wire manager against the printed circuit board is accomplished by the even pressure applied when the cover is latched into the jack body and pressed into place. When terminated in this fashion, the IDCs can be expected to continue to make good contact, even after several re-terminations of the plug.

The photos below (E & F) illustrate both sides of the properly prepared wire manager. No tool marks and no distortion of the wire manager will occur when the part is properly pressed down with the fingers.
Note: final flattening of the wire manager to the circuit board occurs when the plug door is closed.



E

F

USA
Network Solutions Headquarters
+1 (800) 722 2082
infoUSA@leviton.com
Leviton Cable (formerly Berk-Tek)
+1 (800) 237 5835 | infoUSA@leviton.com

Asia Pacific
+852 3620 2602
infoAPAC@leviton.com

Canada
+1 (800) 461 2002
infoCanada@leviton.com

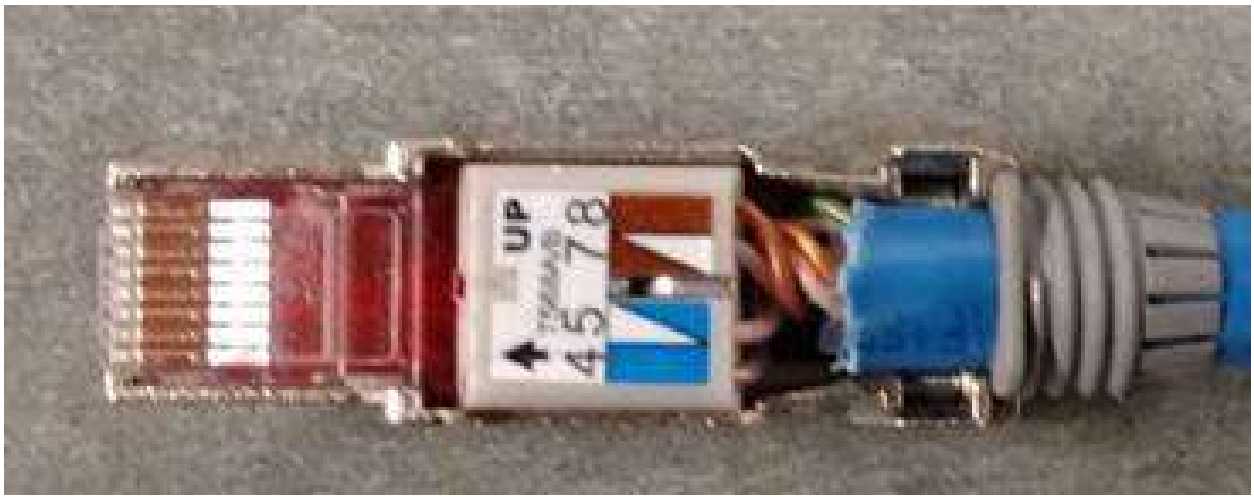
Europe
+44 (0) 1592 772124
infoEurope@leviton.com

Latin America
MX: +52 (55) 2128 6286
LATAM: +52 (55) 2333 5963
infoLATAM@leviton.com

Middle East & Africa
+971 (4) 247 9800
infoMEA@leviton.com

NETWORK SOLUTIONS PRODUCTS ARE AVAILABLE WORLDWIDE IN OVER 100 COUNTRIES. VISIT US ONLINE AT LEVITON.COM/NS TO LEARN MORE.

2. Another issue that can occur is a failure to push the straightened wires as far as possible into the wire manager. The strip point if the cable should be as close to the back end of the plug as possible, before pressing the wire manager down. The example in the photo (G) below shows that the installer straightened the pairs and then slid them into the wire manager, but failed to push the wires all the way in.



G

The resulting “slack” was absorbed by twisting the extra length around and around, so that the cable would fit inside the connector body. This practice causes the straightened individual conductors of all four pairs to be placed in unacceptably close proximity to each other. The test result will assuredly be a Near-End Crosstalk (NEXT) failure.

USA
Network Solutions Headquarters
+1 (800) 722 2082
infoUSA@leviton.com

Leviton Cable (formerly Berk-Tek)
+1 (800) 237 5835 | infoUSA@leviton.com

Asia Pacific
+852 3620 2602
infoAPAC@leviton.com

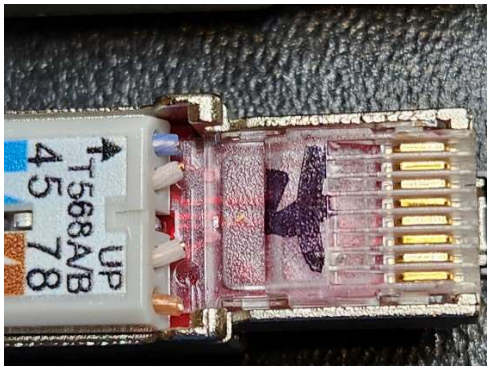
Canada
+1 (800) 461 2002
infoCanada@leviton.com

Europe
+44 (0) 1592 772124
infoEurope@leviton.com

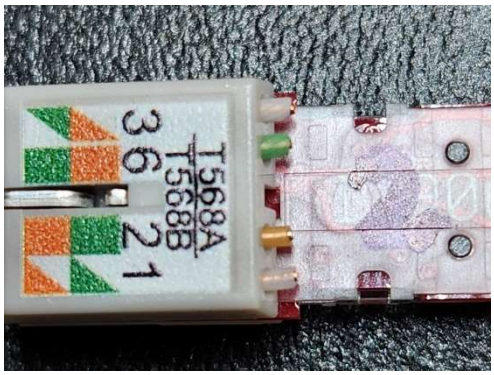
Latin America
MX: +52 (55) 2128 6286
LATAM: +52 (55) 2333 5963
infoLATAM@leviton.com

Middle East & Africa
+971 (4) 247 9800
infoMEA@leviton.com

3. Failure to flush-cut the wire ends after insertion into the wire manager is another common problem. A flush cutter must be used. Side Cutters or Electrician's Scissors will not achieve the required flush cut.



H



I

The photos above (H & I) show two parts where the flush cuts were not properly performed. Note the proximity of the wire ends on the blue pair and the green pair. The test results for these plugs will be likely be a Return Loss failure (or at least a severe reduction in Return Loss headroom).

4. For shielded applications, the foil should be pulled back, metal-side outward, and trimmed at 0.2 inches. The drain wire (or braid strands) should be wrapped around the cable, on top of the foil. It is important to treat these elements of the shielded cable exactly as directed in the product instruction sheet, and in the product termination video, to achieve an effective bond between the cable shield and the plug body.

   One common error is to completely cut off (or tear off) the foil. Even though the drain wire can still be wrapped, there is no assurance that it will make contact with the plug body when the termination is completed.

USA
Network Solutions Headquarters
+1 (800) 722 2082
infoUSA@leviton.com

Leviton Cable (formerly Berk-Tek)
+1 (800) 237 5835 | infoUSA@leviton.com

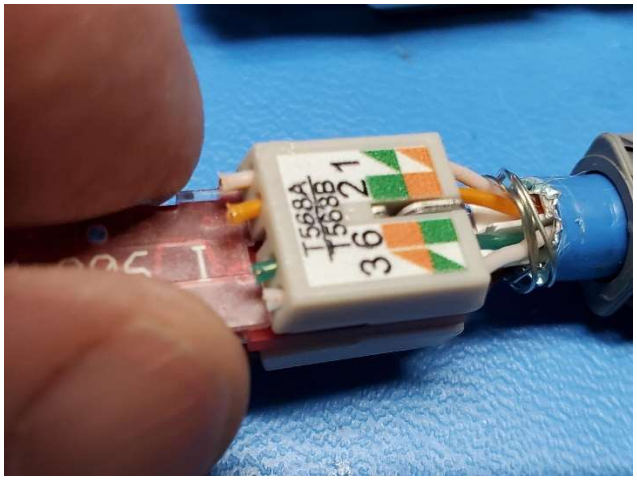
Asia Pacific
+852 3620 2602
infoAPAC@leviton.com

Canada
+1 (800) 461 2002
infoCanada@leviton.com

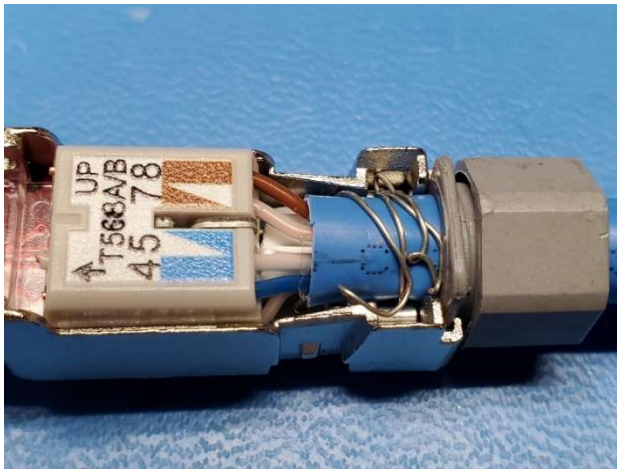
Europe
+44 (0) 1592 772124
infoEurope@leviton.com

Latin America
MX: +52 (55) 2128 6286
LATAM: +52 (55) 2333 5963
infoLATAM@leviton.com

Middle East & Africa
+971 (4) 247 9800
infoMEA@leviton.com



J



K

Test results for plugs terminated as shown in photos (J and K) above (foil is cut off) would be a Wire Map failure for Open Shield.

5. For final compression and closure of the plug, the instructions are to “Engage both cover hinge points and rotate the cover downward…” Failure to engage both hinge points (only one pin engaged with its plug-body hook) puts undue stress on the engaged pin, and it can sometimes be broken off. Failure to engage both hooks also causes uneven pressure on the wire manager, which in turn may cause IDCs to miss connection with conductors, resulting in Wire Map failures when testing is performed. The photo (L) below shows a cover with one pin broken off. The end of the pin should show in the red circle. The photo (M) shows the cover “lifted” on the side with the broken pin. The lifted cover will not properly terminate the wires.

USA
Network Solutions Headquarters
+1 (800) 722 2082
infoUSA@leviton.com

Leviton Cable (formerly Berk-Tek)
+1 (800) 237 5835 | infoUSA@leviton.com

Asia Pacific
+852 3620 2602
infoAPAC@leviton.com

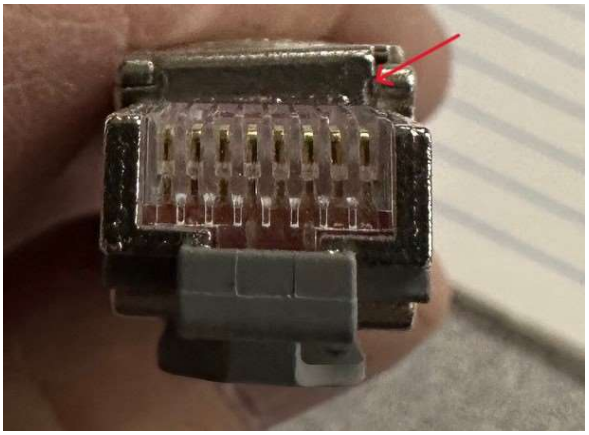
Canada
+1 (800) 461 2002
infoCanada@leviton.com

Europe
+44 (0) 1592 772124
infoEurope@leviton.com

Latin America
MX: +52 (55) 2128 6286
LATAM: +52 (55) 2333 5963
infoLATAM@leviton.com

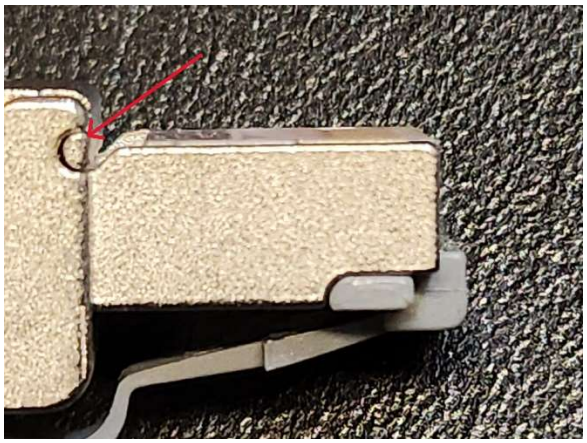
Middle East & Africa
+971 (4) 247 9800
infoMEA@leviton.com

L



M

The photo below (N) shows a (correct) intact cover pin, after plug termination.



N

6. For either T568A or T568B wiring, the IDCs for the white wires are toward the rear of the plug, while the IDCs for the colored wires are toward the front of the plug. If the problem reported is one or more of the colored wires showing an “Open”, the problem may be with the installer executing termination steps in the wrong order.

   After correctly pushing the wires through the wire manager holes, the next step is to squeeze the wire manager (with fingers) down, which engages the IDCs with the conductors, then flush cut the wire ends at the front of the wire manager.

USA
Network Solutions Headquarters
+1 (800) 722 2082
infoUSA@leviton.com

Leviton Cable (formerly Berk-Tek)
+1 (800) 237 5835 | infoUSA@leviton.com

Asia Pacific
+852 3620 2602
infoAPAC@leviton.com

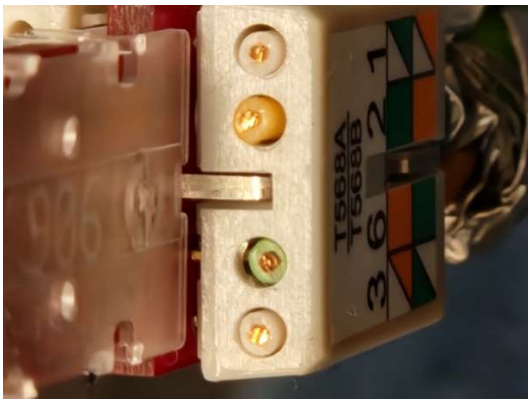
Canada
+1 (800) 461 2002
infoCanada@leviton.com

Europe
+44 (0) 1592 772124
infoEurope@leviton.com

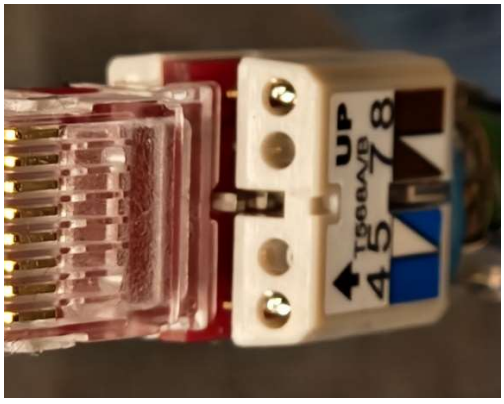
Latin America
MX: +52 (55) 2128 6286
LATAM: +52 (55) 2333 5963
infoLATAM@leviton.com

Middle East & Africa
+971 (4) 247 9800
infoMEA@leviton.com

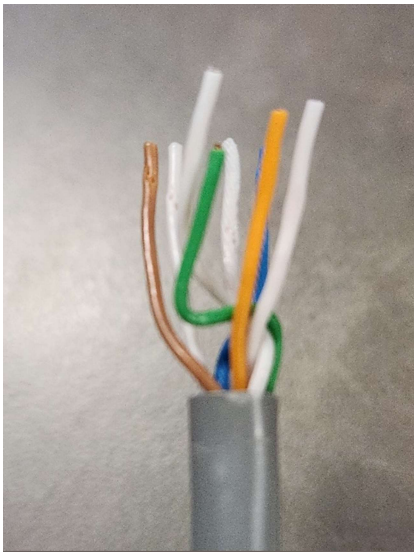
If flush cuts are done before squeezing the wire manager down, then wires (or pairs) may pull back into the wire manager, causing the IDC to “miss” the conductor. It is very important to do these two installation steps in the proper order.



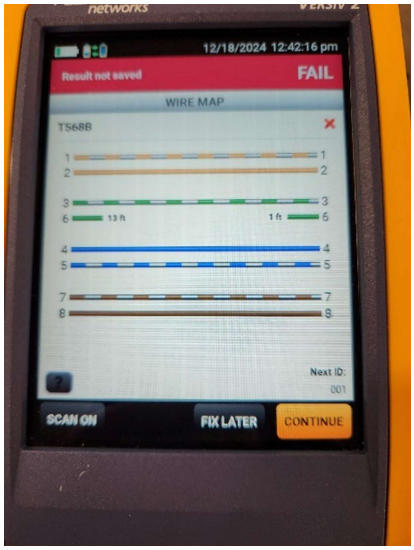
O



P



Q



R

Picture (O) shows wires correctly flush cut after wire manager is squeezed down.
Picture (P) shows the pullback of the blue and brown pairs, where flush cuts were done prior to wire manager closure.
Picture (Q) shows a green wire “miss”, due to the flush-cut operation being performed before wire manager closure. The green wire pulled back beyond the position of its IDC.
Picture (R) is a tester screen, showing the open green wire.

USA
Network Solutions Headquarters
+1 (800) 722 2082
infoUSA@leviton.com

Leviton Cable (formerly Berk-Tek)
+1 (800) 237 5835 | infoUSA@leviton.com

Asia Pacific
+852 3620 2602
infoAPAC@leviton.com

Canada
+1 (800) 461 2002
infoCanada@leviton.com

Europe
+44 (0) 1592 772124
infoEurope@leviton.com

Latin America
MX: +52 (55) 2128 6286
LATAM: +52 (55) 2333 5963
infoLATAM@leviton.com

Middle East & Africa
+971 (4) 247 9800
infoMEA@leviton.com

Carefully following the termination instructions and the termination video will result in a successful termination of the 6APLG Plug. Departure from the product termination instructions can result in testing issues.

The 6APLG Plug is typically used at the device end of a Permanent Link (for example, at a WAP or a camera). The proper test methodology to be used for these links is MPTL (Modular Plug Terminated Link).

USA
Network Solutions Headquarters
+1 (800) 722 2082
infoUSA@leviton.com

Leviton Cable (formerly Berk-Tek)
+1 (800) 237 5835 | infoUSA@leviton.com

Asia Pacific
+852 3620 2602
infoAPAC@leviton.com

Canada
+1 (800) 461 2002
infoCanada@leviton.com

Europe
+44 (0) 1592 772124
infoEurope@leviton.com

Latin America
MX: +52 (55) 2128 6286
LATAM: +52 (55) 2333 5963
infoLATAM@leviton.com

Middle East & Africa
+971 (4) 247 9800
infoMEA@leviton.com