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# APPLICATION NOTE

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## Stabilant 22 Uses in TV/HDTV/Audio/Computing

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### Introducing Stabilant 22

Stabilant 22 is an initially nonconductive block polymer which when used in a thin film between metal contacts becomes conductive under the effect of an electrical field. This occurs at an electric field gradient such that the material will remain nonconductive between adjacent contacts in a multiple pin environment. In addition, Stabilant 22 exhibits surfactant action as well as lubrication ability, providing a single component resident solution to virtually all contact problems.

*When applied to electromechanical contacts, Stabilant 22 provides the connection reliability of a soldered joint without bonding the contact surfaces together.*

In this Application Note, we illustrate the use of Stabilant 22 and our isopropanol diluted product, Stabilant 22A, to improve the reliability of connectors that are used for audio, video and computing devices. Please also see Application Note #1, which answers many questions about the product.

Here we review a list of plugs, cables, etc. from the 1970's to present (2023, this revision). Connectors have one common weakness: corroded or damaged contacts can make them fail or become intermittent ("flaky") in service. Repair or replacement can be expensive in terms of service time as well as parts cost.

### Popular Video/Multimedia Connection Types

- Composite Video - Single cable with RCA type connectors
  - Component Video - Three RCA type connectors
- S-video - Single cable, uses mini-DIN connectors, almost like component video
- RGB + HN - Five cables with BNC connectors
- VGA (Video Graphics Array) - Single cable with 15 pin 'D' connectors
- DVI (Digital Video Interface) - Special
- HDMI - successor to DVI for video + audio and more
- Digital Audio including Fiber Optic Cable - EIAJ (TosLink™) types
- USB (Universal Serial Bus) - Versions up to USB 3, various connectors
- Firewire / IEEE 1394 - Data and A/V, custom connector types
- Proprietary types - Apple's Lightning, Thunderbolt, etc.

### **Composite video – single cable, RCA-type plug**

An older standard that combined video components similar to what was used in standard TV broadcasting. Quality problems include poor synchronization and color differentiation. Use Stabilant 22 on the pins and grounding shells of these types, as well as the RCA jacks.



### **Component Video – 3 cables, RCA-type plugs**

The component video encoding was an improvement over composite video, allowing higher resolution and colour quality. The following colour code was used:

Green - Y (luminance signal)

Blue - B-Y

Red - R-Y

This was used on many HDTV and line doubling sets, also to connect DVD players.



### **S-Video – Single cable, mini-DIN connector**

S-Video, used for some time in the TV and DVD market, is an improvement over composite video; it separates the luminance (white level) and chrominance (color information). Use Stabilant 22 on all contacts. Stabilant 22A can be used to penetrate to socket pins.



### **RGB + HV - Five cables with BNC connectors**

This type of connector was used for many years in CAD/CAM applications where high resolution was needed. Horizontal and Vertical sync signals are separated from video red, green and blue channels. It is also used in many projectors where long runs of cable are employed.



### **VGA – Single cable, 15-line ‘D’ type connector**

This was a standard video connector used on most computer video cards and monitors. It offered significant improvements over composite or component video connection methods by separating RGB and H/V sync signals. Stabilant 22A is effective to treat plugs and sockets.



## DVI – Single cable, special connector

This was developed specifically for digital video, but also included backward-compatibility with VGA in the DVI-I incarnation. It found widespread use in flat screen TV's as well as in high resolution computer monitors. DVI was designed to carry audio as well as video in various configurations. Again, Stabilant 22A is convenient for use on contacts in both plugs and sockets.



## HDMI – Single cable, special connector

Since its development in 2002, HDMI has appeared on nearly every brand of TV, DVD player, computers and monitors. The more user-friendly plug style (compared to DVI and VGA) may have helped, not to mention support for high-quality video and sound and the introduction of some device control capabilities.



## Digital audio and Fiber Optic Cable - TosLink™ type

This interconnect has no electrical connection, so this is NOT an application for Stabilant products!

It is one of the options for digital audio with the S/PDIF system -Sony/Philips Digital Interface. (Note: S/PDIF equipment can also use a coaxial cable with RCA type plugs).

It was developed along with the AES3 standard starting in 1985 and gained popularity for high-end computer sound cards and consumer audio. The cables have plug-in connectors with a squared outer housing and contain a thin silica-glass (usually) optical fiber inside the protective sheath.



## Speaker Connections

On the speaker end of audio technology, surround sound systems have become widely available to consumers. While stereo is still popular (2 speakers or headphones using 1/4" or 1/8" jacks/plugs), the following are common:

5.1 surround: Left, Center, Right at the front and Left, Right rear

6.1 surround: as with 5.1 + Center rear

7.1 surround: as with 5.1 + Left/Right middle

The “.1” refers to the use of a sub-woofer in addition to those named above.

Home theatre type systems may use anything from RCA connectors to some more expensive types. Some speaker connections use pin connectors with spring terminals, others spade lugs and screw terminals, many to be installed on speaker wires once they are cut to length. Stabilant 22 should be used for all of these, especially when installing pin connectors on freshly stripped speaker wires. Even factory-made cables can benefit from treatment of the connectors. Reliable connections will keep the installation sounding as good as new.

## USB – Single cable, various connector types

Stabilant 22A is an ideal treatment for all of the plugs and jacks used with all USB versions.

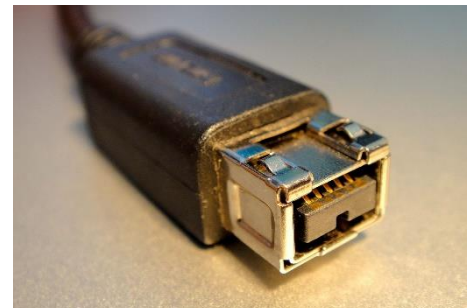
USB has been used to interface computers to any imaginable peripheral device. The old standard was followed by USB 2 and USB 3, each offering improved speed and other capabilities. The connectors are of one type for the computer end of a cable ('A' plug) and several types for the 'B' plug. Standard 'B' was followed by mini and micro versions for physically smaller devices (e.g. smart-phone charging). After the adoption of USB 3, a new standard connector, USB-C was introduced. Newer computers and most new smart phones have USB-C and some compatibility adapters exist. USB expansion hubs (connecting a computer to several devices) have emerged for all USB versions.

As shown (lower right) the USB-C is comparable in size to the micro-B connector (top right), but with the convenience that it can be inserted either way – there is no “upside-down”.



## IEEE 1394 aka Firewire™

This is a serial bus type that connects the same wide variety of devices that use USB, but the two have many technical differences – including 1394 being peer-to-peer (not having the requirement USB has for a Host unit at the computer end). The Apple brand name “Firewire” is used conversationally to describe most IEEE-1394 hardware and cables. Since the 1980’s, the 1394 standard has evolved in speed and other capabilities, the latest being Firewire S3200.



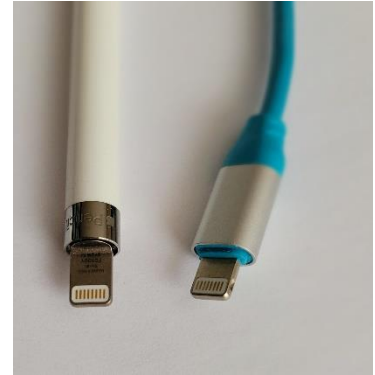
The S800 level was said to be competitive with USB 3.0; Firewire was typically a more expensive and often more capable choice over USB for high-speed data transfer.

Firewire-equipped devices can be added to and removed from an interface card without turning off a computer, so most are hot-swappable. The use of Firewire for external disk drives was popular, along with CD/DVD “burners”, cameras and later digital cable TV. A typical computer setup would use a PCI plug-in card with 4 Firewire ports. As with USB, Stabilant 22A is ideal for all of the firewire connectors.

## Lightning™ - Apple charge/data interconnect

Lightning cables were introduced by Apple™ for iPhone, etc. as their competitor for USB in the phone-charging and data arena. iPads and numerous accessories can also be connected with Lightning. The At right: the Lightning connector on an Apple Pencil™ and the plug on a charging cable. These plugs are reversible, as are USB-C plugs.

The exposed gold plated connector pins are an ideal candidate for Stabilant treatment, along with the sockets.



## Thunderbolt™ – high speed video and other data

Thunderbolt was introduced in 2011 on MacBook (based on Intel's Light Peak concept). It was used for high speed data and notably, for connecting computer monitors and external disk systems through the following years. Intel made the Thunderbolt 3 standard (which uses the same plug type as USB-C) available royalty-free in 2017. A typical Thunderbolt 1 or 2 connector is shown (right) – similar in style to USB-C plugs.



As of 2023, Thunderbolt is still found on most Apple devices, but many other manufacturers have introduced new tablets, motherboards, external drives, hubs and docks, ethernet adapters, and more.

Use Stabilant 22 or 22A to keep their electrical reliability “as new”.

## Where else is Stabilant 22 used?

As mentioned above, connectors can be made more reliable by treatment with Stabilant 22/22A. Many other applications of Stabilant products in audio/video and computing have not been covered here (e.g., connectors, switches, etc. used in mixers, patch bays or microphones and various internal uses in computers). Since the first commercial use in It has been used in industries from automotive to biomedical to military.

## How can I be sure that Stabilant works?

The best way to find out just how well it works is to try it out - that's why we provide samples (available on request). Almost every service shop or manufacturer has equipment avail- able where the switches or connectors have become erratic over the years. Use Stabilant 22/22A/22E on them and satisfy yourself. A word of caution. Don't try to evaluate Stabilant 22's performance on brand new connectors. Instead, use it on connectors that are corroded, or dirty or just plain unreliable. We are sure that any organization dealing with electronics will have at least one piece of unreliable equipment on which the Stabilants can be tested.

NATO CAGE/Supplier Code 38948

5mL Stabilant 22 (Concentrate), NATO Stock Number 5999-20-002-1112

15mL Stabilant 22 (Concentrate), NATO Stock Number 5999-21-909-9981

15mL Stabilant 22A (Isopropanol Diluted), NATO Stock Number 5999-21-900-6937

15mL Stabilant 22E (Ethanol Diluted), NATO Stock Number 5999-21-909-9984

Stabilant products are patented. Because the patents cover contacts treated with the material a Point-of-Sale license is granted with each sale of the material.

**SAFETY DATA SHEETS ARE AVAILABLE ON REQUEST**

**NOTICE**

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