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STABILANT 22
Number 45

APPLICATION NOTE

Use of Stabilants on Contacts in TV, HDTV, Computers & Audio

Several types of connectors are in general use:

1) Composite Video
2) VGA - A single cable with fifteen pins in three rows
3) RGB + H/V - Five cables with BNC connectors
4) Component Video - Three RCA Type connector
5) DVI - Special connector
6) Firewire - or (SB1394 - Soundblaster - Audigy Platinum etc.)
7) S-video - A special video cable -
8) USB 2
9) Fiber Optical Cable

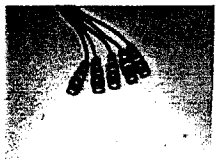
The first type - Composite video

An older standard - major problems in differentiating color as well as allowing 'line crawl"..

The second type - VGA

This is the usual video connector used on most computer video cards

The third type- RGB + H/V - Five cables with BNC connectors



This type of connector was used for many years in CAD/CAM applications where high resolution was needed. It is also used in many projectors where long runs of cable are employed.

The fourth type -Component Video -Three wires with RCA - type connectors.

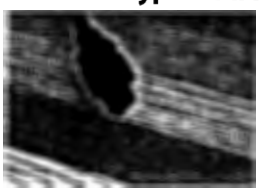
1) Green marking on shell - Y
2) Blue marking on shell - B-Y
3) Red marking on shell - R-Y

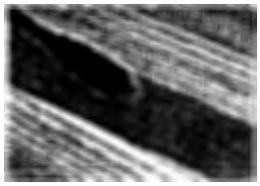
This is used on many HDTV and line doubling sets.
It is also used on DVD players.

The fifth type DVI - Special connector

This finds increasing use in flat screen TV's as well as in high resolution monitors. At one time, the connector was designed to carrry audio in various configurations.

The sixth type - Firewire

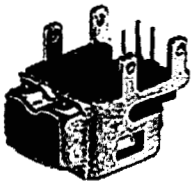


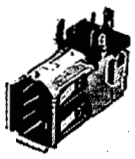


Can Firewire-equipped devices be added to and removed from a (Sound Blaster Audigy or Audigy 2 via the Firewire / 1394 / SB1394 connection without turning off a computer?

Yes. All Firewire-equipped devices are hot-swappable. They can be added to and removed from a system without turning it off.

Firewire contacts as mounted on any PC boards.





Two examples are shown, the first one is generally used on cameras where space is at a premium, and the larger size, that is used on a PC board in a computer They generaly have a high speed transfer rate; from 25 Mbytes to 60 Mbytes a second in the future. They are limited to a cable length of about 4.5 Meters and limited to 65 devices.

They have to be connected to a Firewire compatible device; such as a Burner, a Hard drive, or for example, a camera.

The seventh type - S-video

A special video cable - S-Video - Better than "Composite video", as it separates the luminance (white level) and chrominance (color information).

The eighth type – USB

The PC Host USB - Limited (in USB 2) to 127 devices, cable length of 5 Meters and a speed of 1.5 Mbytes a second

The ninth type - Fiber Optical cable

It has squared outer housing with optical cable inside.
Caution - do not attempt to bend the cable into a small radius as it might fracture.

We have to add a tenth type of connector HDMI

This connector has mixed support. Initially it did not support Dolby 5.1. Other prospective consumers regarded it as another attempt by the RIAA to control the use of computers to handle play media.

Then consider audio:

This can be Stereo with two cables, usually with RCA Type connectors, or the very high priced 'collet-type' coax connectors. This can be expanded to,

5.1 Channel surround sound - Left, Center and Right; all at the front + Left rear and Right rear, or

6.1 Channel surround sound - Left, Center and Right; all at the front + Left side, Right side, Center rear ,or

7.1 Channel surround sound - Left, Center and Right; all at the front + Left side and Right side + Left rear, Right rear.

The type of matrix that works best is somewhat dependant on what the mix was employed when the recording was made. There are some recordings that use some of the extra unused 'bits' to make sixteen bit 'words' sound like 'twenty four bit' words. Some audiophiles do not understand, that 'digital' recording leaves a lot of redundant 'bits' available.

Digital Audio:

Special connector or internal from drive 2 wire connector, or
Optical (Digital via a fiber optical cable - square outer housing with optical cable inside.

Caution - Again, do not attempt to bend the cable into a small radius as it might fracture.

Note: The connectors used in mixers, patch bays or microphones are not listed here!

All of these problems (except for the fiber optical cable) can be treated by the use of Stabilants:

There is no need to flood the connector, just apply it with a soft brush so that the contact surface is barely wet.

That is why we suggest that you start with a diluted form, such as Stabilant 22A or Stabilant 22E.

- ***What is Stabilant 22?***

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

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

- ***Where can Stabilant 22 be used?***

  Stabilant 22 can be used in all types of connectors, at frequencies from to DC to several Gigahertz, on faders or potentiometers, or in non-inductive (non-arcing power-interrupt switches. The number of uses are almost limitless.

- ***Is Stabilant 22 just another contact cleaner?***

  No, **Stabilant 22** is a resident potentially electrically active material which through synergistic combination of effects enhances conductivity within a contact without causing leakage between adjacent contacts. Thus, large quantities of the material does not have to be "hosed" on, as is the case with cleaners.

- ***Is Stabilant 22 cost effective?***

  As **Stabilant 22** can be quickly applied to all contacts and connectors in a system the often difficult diagnostic determination as to which one of many contacts are erratic, can often be eliminated.

This can significantly reduce service time in the field and in many cases eliminates the need to return boards for shop service or re-manufacturing. As any service manager knows, the diagnosis of electronic problems especially where intermittent failures are concerned, is often much more difficult than the actual part replacement; as well as requiring service personnel of exception caliber. In many cases the use of Stabilants can thus increase the efficiency of existing staff as well as allowing many connector harness related problems to be handled at a much lower cost .

- ***How can Stabilants correct electrical contact problems?***

  In many electronic applications demodulation (detection) of RF signals in connectors exhibiting thin-film rectification effects can either reduce the signal-to-noise ratio or introduce artifacts which can disrupt data flow. Stabilants can cure these.

  While **Stabilants** have demonstrated that they can cut the cost of both shop and field maintenance; their use in the manufacturing of electronic systems can speed up production as well as reducing rejections.

- ***How does Stabilant 22 work?***

  Contact failure is rarely caused by a single factor. Thus, treatments that solve only one problem don't necessarily offer a reliable long term solution. For example, cleaners do not prevent the re-entry of contaminants or the reformation of contaminant films; nor do they offer any lubrication. They must be used each time a connector gets dirty. Lubricants, in themselves, are rarely cleaners.

  Corrosion inhibitors are neither cleaners nor lubricants and are often specific to one type of metal or plating. Unsaturated oils used as contact treatments can cross-link under the influence of elastomer or thermoset plastic curing agents and accelerants.

  While resident in the connector, **Stabilant 22** performs several concurrent functions. Its very presence in the contact gap will prevent the entry of outside contaminants. It has sufficient surfactant action to lift surface contaminants and hold them in suspension.

  In cases where corrosion products are present **Stabilant 22** will penetrate them and prevent rectification effects. Due to its high dielectric constant it will act to form a capactive layer which is in parallel with whatever residual resistance exists in the contact increasing the passage of AC signals. Given sufficient DC bias within the gaps of the contact the thin film of Stabilant will "switch", conducting by quantum tunneling and thus limit the resistance of the contact to a serviceable level.

- ***In what forms is Stabilant available?***

  The Stabilants are available in several forms; as a concentrate (Stabilant 22) and as an isopropyl alcohol-diluted form (**Stabilant 22A**). In a similar fashion, we produce **Stabilant 22E**.

- ***What is the difference in use of these materials?***

  Stabilant 22 is most useful where the connections are out in the open - such as card-edge connectors or where the lubricating properties of the material are useful such as an aid to installing microprocessor IC's or on switches. Where the connections are not too easy to get at or where the user wishes to apply the material to something such as a socketed IC (without removing the IC from its socket) it is easier to use the alcohol diluted form (**Stabilant 22A** or **Stabilant 22E**). The isopropyl alcohol diluant serves ONLY to carry the concentrate into the connector.

  The **Stabilants** have proven to be very effective in improving the reliability of connectors in general and are developing a reputation for ease and speed of use under field conditions. Not only are many OEM's pre-treating sensor connectors during manufacture, many are providing the Stabilants to their service technicians either as Standard-Store items, or recommending them for field procurement.

  The **Stabilants** are presently used in applications ranging from Avionics through Process control, including such critical fields as Bio-medical electronics, Air Traffic Control, Police & Emergencies (such as communications and the like).

- ***How are the Stabilants applied?***

  The application of the **Stabilants** is exceptionally easy. Just use a drop of **Stabilant 22A** on one of the electrical or electronic sensor connectors, including another in-signal-path connector in the wiring harness, and reconnect the system.

- ***What packaging is available?***

  We can supply the concentrate (Stabilant 22) in 5 mL, 15mL, 5OmL, lOOmL, 250m 5OOmL and 1 Liter bottles. The dilute (Stabilant 22A) is available in 5OmL, 100m 25OmL and 5OOmL containers. We do not have a 1 liter container of the dilute as 500 mL is the largest size bottle that can be shipped by air (in single or multiple packages) without additional restrictions. We maintain our stock in depth, and ship most orders the same day they are received. The 15 mL and 50 mL sizes are in dropper bottles and these are available on request for the) 0.5 mL sizes as well.

- ***Is it available in a spray can?***

  No. Why waste the material? We would like to think we are environmentally responsible and safety conscious. We use no CFCs, HCFC's or any other ODC (Ozone Depleting Chemical) either in or in the manufacture of **Stabilants.**

  In addition even **Stabilant 22A** has only about 1/200th the solvent impact as conventional contact cleaning solvents over a three year time span. As Stabilant 22 contains no solvent it has absolutely minimal environmental impact and is, therefor is becoming the treatment of choice for many service organizations!

- ***Just how much should be used?***

  Normally, a final film thickness of from 0.5 mils to 1 mils of the concentrate is all that is necessary. In other words, you want just enough to fill up the interstices between the contact's faces. When using **Stabilant 22A**, use enough so that once the alcohol evaporates the desired 1/2 to 1 mil film of **Stabilant 22** remains.

  In applications to moving surfaces, such as in slip-rings or potentiometers, film thickness should be minimized to the point where "hydroplaning" won't occur.

- ***What is the 15mL service kit?***

  This was made up at the request of several manufacturers who wanted a standard kit that they could issue to their service personnel. It consists of a 15mL dropper bottle of **Stabilant 22A** and some applicators, all in a small capped cardboard tube that can be tossed into a tool box without damage.

  In a similar manner, on special orders, we produce a 5mL service kit for use in the field. Because of the extra handling and packaging costs, this is more expensive per drop, than the larger sizes.

- ***Does the action of Stabilant deteriorate with age?***

  In some field trial applications lasting over ten years, **Stabilant 22** has shown no sign of reduced effectiveness. With a high molecular weight and a very low vapor pressure, almost none of the material will be lost by evaporation. Unlike some other contact protection oils, Stabilant 22 will not cross-link when exposed to free-machining materials such as high sulfur brass, or when used on contacts where agents used to promote cross-linking of thermosets or elastomers are present in the environment or in the actual connector components.

  Thus **Stabilant 22** does not form a scum or "varnish".

Revision 3

Stabilants are a product of Dayton Wright research & development and are made in Canada

NSCM/Cage Code - NATO Supply Code 38948

15 mL of S22A has NATO Part # 5999-21-900-6937

The Stabilants are patented in Canada - 1987; US Patent number 4696832. World-wide patents pending. Because the patents cover contacts treated with the material, a Point-of-sale License is granted with each sale of the material.

MATERIAL SAFETY DATA SHEETS ARE AVAILABLE ON REQUEST.

NOTICE:
This Application Note is based on customer-supplied information, and D.W. Electrochemicals is publishing it for information purposes only. In the event of a conflict between the instructions supplied by the manufacturer of the equipment on which the Stabilant material was used, and the service procedure employed by our customer, we recommend that the manufacturer be contacted to make sure that warranties will not be voided by the procedures.

While to our knowledge the information is accurate, prospective users of the material should determine the suitability of the Stabilant materials for their application by running their own tests. Neither D.W. Electrochemicals Ltd., their distributors, or their dealers assume any responsibility or liability for damages to equipment and/or any consequent damages, howsoever caused, based on the use of this information.

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