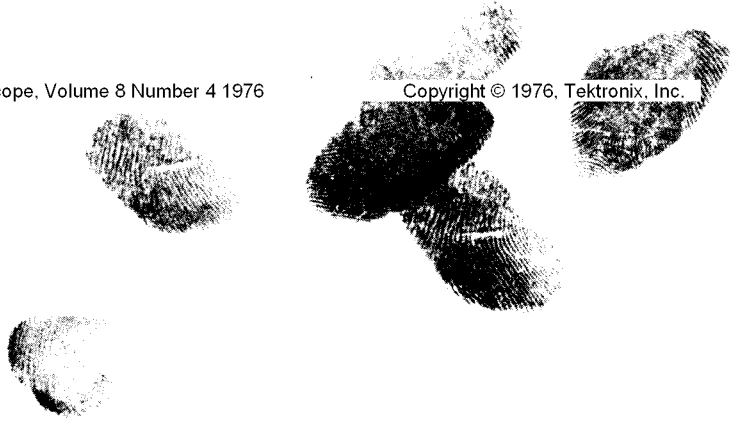




Charles Phillips



Part I Wet-Washing

Have you ever noticed how much better your car seems to run when it has just been washed or polished? This is a psychological reaction of course, but the improved appearance does cause us to value our car more highly and take better care of it until the next rain storm messes it up again.

Service SCOPE

Tektronix products get dirty, too!

Not as rapidly as our car, perhaps, but with a more detrimental effect on its operation. Thorough cleaning of a dirty instrument not only improves its appearance, but improves its performance and reliability as well.

Many of you are aware that Tektronix people have, for many years, been washing instruments sent to our service centers for repair and calibration. Some customers with large numbers of instruments have installed their own wash facilities as an aid in keeping their instruments in top shape.

With the use of printed circuit boards and solid state devices in instruments comes the question, "Is it still necessary to wash instruments and, if so, what precautions do I need to observe?" While it is true that solid state instruments do not usually get dirty as quickly as their vacuum tube counterparts, they too, can benefit from a periodic cleaning. We find they are easy to wash and no particular precautions, other than those applying to vacuum-tube type instruments, need be observed.

Equipment Needed

There are several items you will need to do an effective job. They are as follows:

- (a) Liquid silver cleaner used to remove tarnish from connectors.
- (b) Brushes used to clean knobs and connectors.
- (c) Paint brush used for dry method of cleaning, etc. Ajax cleaner, or equivalent, for wiping off front panel, etc.
- (d) Sponge for applying cleaner to remove marks on aluminum.
- (e) Non-sterile cotton-tip applicators used for miscellaneous cleaning chores.
- (f) Piece of plastic light filter or graticule used to remove labels and adhesive after soaking them with solvent.
- (g) WD-40 or furniture polish, applied sparingly to pots and switches as needed (before wash).
- (h) Kimwipes, or equivalent, for wiping off front panel, etc.
- (i) Spray paint used to touch up cabinets and side panels.
- (j) Screwdriver for removing slotted screws.
- (k) Screwdriver for removing Phillips screws.
- (l) Glass and plastic cleaner.



The other items needed in the wash area are:

(a) A source of compressed air with approximately ten feet of hose.

(b) A spray gun with eight feet of hose (Devilbiss Type GDV Series 510 or equivalent).

(c) A rubber siphon hose three to four feet in length.

(d) Hot and cold water.

(e) Detergent (Kelite or equivalent, mixed approximately 1 part detergent to 20 parts water).

(f) A drying oven. There are a number of commercially available ovens suitable for this purpose. The primary considerations in selecting one are size and the capability of providing circulating air at a temperature of 125°F to 150°F.

Steps Prior to Cleaning (for wet washing only)

(1) Check for water-soluble lacquer. Some early Tektronix instruments used water soluble ink for chassis markings. The chassis have a shiny appearance as compared to those with permanent markings. If you suspect you are washing such an instrument use very little detergent and cold water.

(2) Paper covers on electrolytic capacitors should be replaced with plastic covers or sprayed with a water repellent such as WD-40.

(3) Leather handles should be sprayed with WD-40 or other type water repellent to prevent cracking.

(4) Capacitors leaking oil should be tagged for replacement.

(5) Labels and adhesive should be removed unless specified otherwise. If stubborn, soak with Flux Remover during wash.

(6) Use liquid silver cleaner (available at hardware and grocery stores) with a Q Tip or tooth brush to remove tarnish from silver anodized VHF-BNC and other connectors. After cleaning connectors be sure to protect them by washing with detergent and water or using WD-40—otherwise you will develop a small potential from the connector to ground and it will appear as grid or input leakage.

(7) Aluminum graticule covers and panels can be made to look like new by using a wet sponge and a little Ajax and rubbing the scratches or marks until clean.

(8) Knobs can be restored to like new by using a stiff bristle brush and detergent with water (from sprayer) and scrubbing them.

We no longer consider it necessary to remove the CRT, shields, vacuum tubes, etc. to do a thorough cleaning job. Experience has shown that warm water and detergent under pressure penetrates these areas adequately without completely exposing them.

The cabinet sides and bottom are removed and washed separately. They can be put back on the instrument before placing the instrument in the oven for

drying, if desired. The 7000-Series plug-ins are washed with the side panels in place. This saves time and prevents a mix-up in panels.

Washing Procedure

After preparation, place the instrument in the wash booth and spray lightly with detergent and warm water. (Do not spray detergent directly on power transformers or paper items.)

Rinse thoroughly with warm water.

Remove excess water from the instrument (especially the front panel) with air.

Place the instrument (with washed plug-ins installed) in the oven and dry for at least 24 hours. (Oven makes good storage place until item is needed to be worked on. More drying time is o.k.)

The graticule and light filter are cleaned at the work bench using a glass or plastic cleaner.

After Washing and Drying

It is well to take a few minutes to apply lubricant to the switches, motors, etc., particularly on the older instruments. A lubrication kit designed specifically for this purpose is available under Tektronix Part No. 003-0342-01.

Switches—Lube detents with a light grease and contacts with No-noise.

Motors—Apply 1-2 drops of thin oil. (WD-40 is suitable).

Potentiometers—Apply 1-2 drops of No-noise or WD-40 to the shaft, contacts and open spots around the cover. Use a hypo and needle, or spray can with nozzle. Cover removal is neither necessary nor desirable. Rotate rapidly if necessary to eliminate noise.

Painting* Panels and Related Items

(a) Be sure panels are clean and dry.

(b) Use proper color paint. Available locally or from Tektronix.

(c) Use long sweeping strokes when spraying (short strokes will cause blotches) and stay several inches away from item to be sprayed.

*Local paint shops also do this type work for a moderate fee.


Waxing and Polishing

The appearance of the instrument can be enhanced by applying WD-40 or furniture polish.

Front panels—spray WD-40 on an absorbent towel, not directly on the panel, and wipe. Also use a soft 1" paint brush sprayed with WD-40 and get in around and on the knobs and switches.

Side panels and handles—treat the same as front panel, knobs and switches—combination of towel and brush.

Summary

You will find that the time spent in properly cleaning an instrument will result in fewer calibration problems, a longer period between calibrations and greater operator satisfaction with both the instrument and the service center. 



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Service

Tektronix products get dirty, too!



Part II—Dry cleaning

In Part I of this article we described the tools and techniques used to give your Tektronix instrument a bath, or perhaps "shower" would be a more appropriate term. There are times when the customer needs quick turn around on an instrument and can't tolerate the 24-hour drying time needed for a wet wash. In this instance, dry cleaning may serve as a reasonable alternative.

The wash booth makes a convenient place to perform the dry cleaning operation. With the side and bottom panels removed, compressed air and a small paint brush will remove most of the interior dust, unless the instrument has been in a greasy environment.

To clean the front panel you should reinstall the side covers and lightly spray the front panel only, using the 5% Kelite solution and rinsing with water. Be careful not to get excess water in the instrument. Just a little spray applied on an angle works best.

Use a toothbrush and detergent to clean the knobs and connectors, and rinse with warm water. The side covers can be removed and, along with the bottom panel, be washed separately after removing the instrument from the booth. They should be placed in the oven to dry. Compressed air is used to remove as much water as practicable from the front panel area, and the instrument is then placed in the oven for 15 to 20 minutes, or until you're ready to work on it.

The graticule and graticule cover may be cleaned as described in Part I. A word of caution regarding the use of glass cleaner—some leave a static charge on the graticule, which will distort the crt trace until it bleeds off. Soap and water is the best solution.

Air filters can be cleaned easily with detergent and hot water. A cleansing powder, such as Ajax, sprinkled on a wet filter and allowed to soak a minute or two, will help on extra greasy ones. We recommend not using oil or filter coat on any filters as there is the possibility of oil getting inside the instrument.

Cleansing cam switches

Unless you are having problems with the cam switches in the instrument, we do not recommend removing the switch covers during the cleaning procedure. You should also take care not to spray detergent into the switches.


If a cam switch needs cleaning, this can best be accomplished by removing the switch cover and spraying the switch with a 5% solution of Kelite spray white with an equal amount of ammonia (non-sudsing, non-soapy type). The switch should then be thoroughly rinsed with soft or distilled water. The switch contacts should then be sprayed with isopropyl alcohol, let set for 60 seconds, and blown out with compressed air. Occasionally operate the switch in all positions while the alcohol is still on the contact area, and while blowing out the instrument. Oven dry in the usual manner.

Cam switches need no lubrication as the switch pads are designed to operate dry for the life of the instrument.

Conclusion

Whether you wet wash or dry clean an instrument will be determined by how dirty the instrument is, and the time available to do the job. Solid state instruments can be washed as easily and safely as vacuum tube types. Precautions against spraying detergent and water directly on power transformers and covered cam switches should be diligently observed. Cleaning agents such as

trichlorethylene, Freon, and others containing halogens, should not be used. They can damage aluminum electrolytic capacitors and some printed circuit board materials used in critical applications.

It takes valuable time to properly clean an instrument. However, the improvement in maintainability and the increase in user satisfaction makes the investment a worthwhile one. 

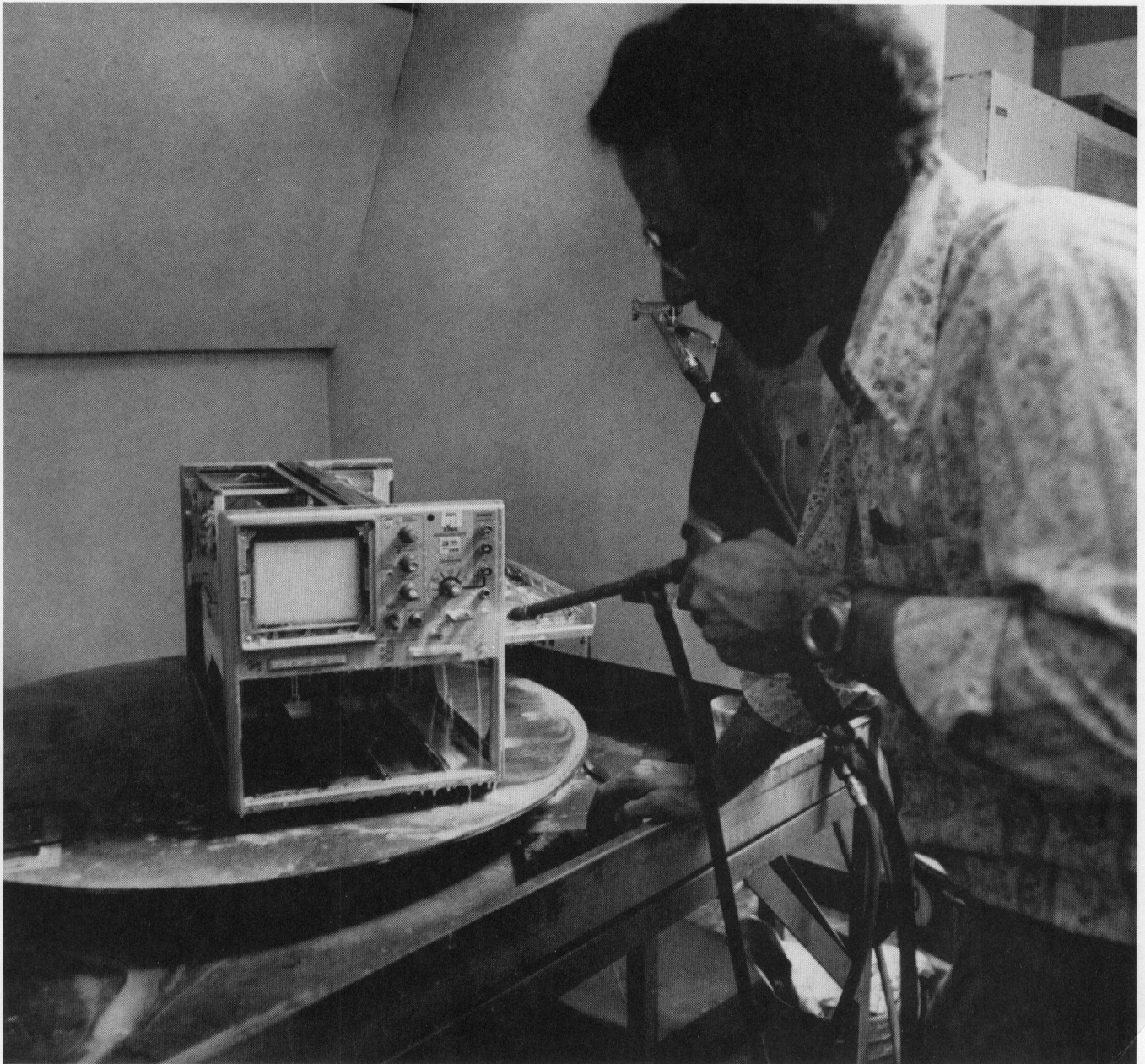


Fig. 1. Dave Phillips, Factory Service Center, washes a 7000-Series Oscilloscope.