



**Professional
Video & Tape, Inc.** 10340 SW Nimbus Avenue Suite A
Tigard, Oregon 97223 (503) 598-7500
Fax (503) 598-9172

Your Service Professionals!

Capacitors...and equipment life.

Man built it; it will fail. Technology has a *Lifespan*. How long *will* it last; how long *should* it last; how long can we *make* it last; and what is the *useful life* of this equipment?

The bewildering array of goods available, their mind-numbing complexity and the ever narrowing gap between repair versus replacement cost means a person needs to keep an eye on the equation.

Manufacturers generally limit replacement parts to seven years after production ceases (not necessarily when you purchased, an especial factor with pro gear). Within that time frame, they cheat a little. A few, however, exceed our expectations. It pays to ask.

A wild card is the closing of factories in one locale as production goes somewhere else—often to China. It's one thing to get a small run of a discontinued part from a factory already tooled up. That has been a staple in product support for years. It's a whole different animal to get a few dozen of the same part made in a factory that never made it before. In most cases, it aint gonna happen. Unfortunately, these are consequences of decisions made over the heads of our hard working and conscientious factory service reps. They made us promises, which got lost in corporate wheels that turned, regardless.

Ideally, we would like to see gear last as long as its format is viable. That can vary too. We have customers who still need a limited presence in SVHS. Nobody makes a really good deck right now. Some of the old classics are being kept going way beyond their intended span. As time ticks by, one factor to consider is capacitors.

Hum bars in the video? How about moiré patterns? Have the straight lines on your waveform gone wiggly? Servo problems? Is the head-drum jerking, running backwards or changing direction periodically? Or does it just take off at incredible, unheard of speeds? Does your unit have to run a half hour and warm up before it works? When you pop the case open, does it smell like dead fish? These are all capacitor symptoms.

Specifically, electrolytic capacitors. Inexpensive, packing high capacity for volume, and commonly available, they have been near the top of the repair suspect's list for almost a century. They have a lifespan, influenced by time, temperature, usage, and abuse. How many of these ticking bombs does your unit contain? Probably hundreds.

As with all components, they are continuously upgraded, making them better, cheaper, and more reliable. At the same time, they are miniaturized, degrading their specs and limiting their lifespan. The plain truth behind most of our toys is they won't be running a quarter century from now.

In some ways that's good. Some of us already traumatize our kids, sending them to school with last year's cell-phone. A thirty-year-old stereo could have an 8-track in it. The state of the art television purchased a mere decade ago is not ready for digital broadcast. Here's where the pieces are landing, folks! The design engineers are busy every year, and things are getting better (even if they may not last as long).

But back to caps (capacitors). In gear of three years old or more they're a suspect as to why it doesn't work like it used to. Often, if they aren't the prime problem, they contribute. On much equipment, the procedure is to recap first, then troubleshoot any remaining problems. As a downside, we may have over a thousand dollars parts and labor into a unit before we know whether there are other problems. If the unit's value is sufficient, there is no negative, as weak parts were replaced and operation enhanced.

The procedure is always to take the simplest and easiest solutions first. Start with known troublemakers, retest at sensible stages to see what improvement has been made. If the unit has modules, available substitutes save time and money, for the tech can quickly determine which boards do or do not have a problem. (If you have two of the same model available, let your tech know, especially if one works).

Be wary of any module that is not rebuildable. Two things that come to mind are DC/DC packs in Sony DXC series cameras, and the *VCR####* hybrid ICs in Panasonic SVHS decks. Some are available; others are not. A problem here can stop a rebuild cold, or cause a recent repair to go belly up. A good technician will make you aware of such possibilities and help you evaluate them before proceeding. Video heads and maintenance items also merit consideration- price and availability!

As a ballpark figure, in our shop we estimate repair starting at about \$12 per cap replaced. Naturally, when several hundred caps become involved, quantity pricing comes into play, but the bottom line adds up. This also covers cleaning, maintenance, testing, and diagnosing issues that may remain after the caps have been replaced.

A second phase of the repair may begin at this point. For example, it can depend on whether someone tried to align around bad caps in a camera- ouch! Hours added to the repair could have been bypassed had things started and ended with the failing parts. It could be time for a revised estimate.

There's always risk in repairing old equipment. As capacitors age, they leak, and the leakage can eat traces off a circuit board. Sometimes this doesn't cause complete and immediate failure, but makes equipment unreliable. Adhesives degrade and turn conductive. ICs break down and create problems. The circuit board itself can become flaky. Some remain available, and others ... maybe. If you have a fleet of decks or

cameras, it may pay you to play the numbers, perhaps even buying units on Ebay® for parts and to rebuild. But if all your eggs are in one basket, be cautious.

The safest bet, of course, is to buy a nice new piece of gear with a warranty from a solid manufacturer. Within that time frame they replace or repair whatever it takes. Beyond the warranty you usually have a few quiet years before the repair season gets underway. But there we are: cost vs. value. A person needs to run the numbers. And don't forget your dealer. We're here to help.

Gary A Hughes *video service engineer*
July 22, 2008