

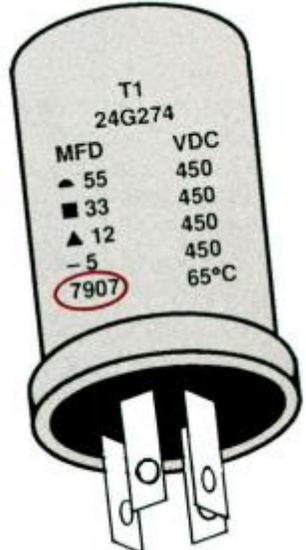
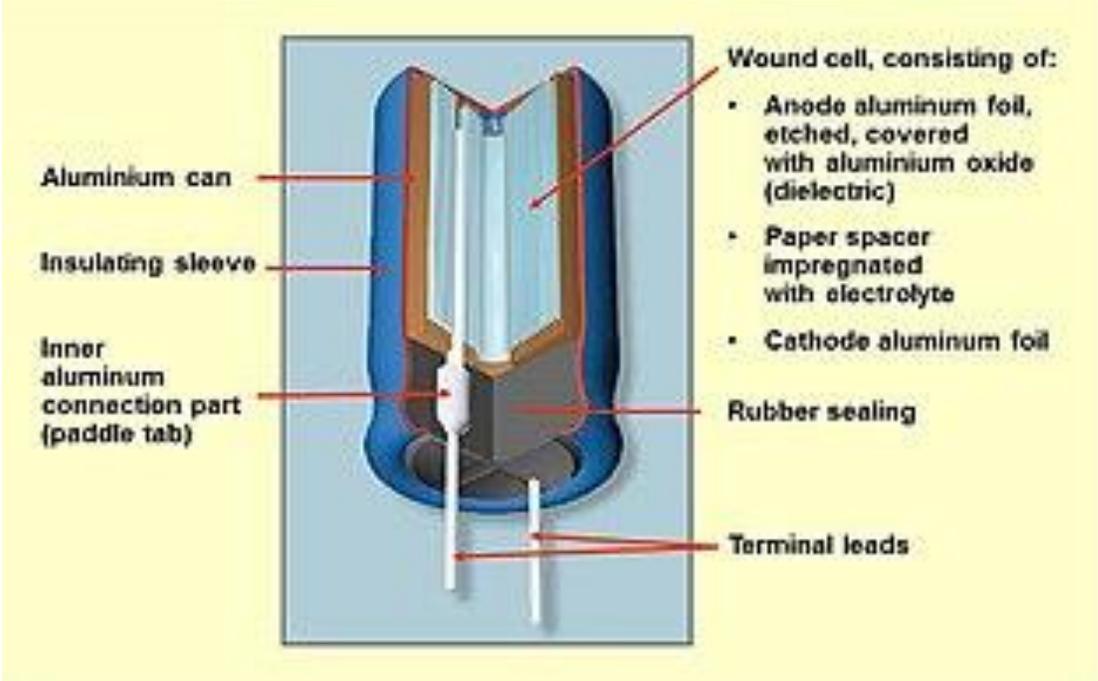
Why Reform a Capacitor:

- **Many old electrolytic capacitors maybe still be good, they just don't hold up to being sat on a shelf**
 - **(keep in mind this applies to NOS caps as much or even more so than in gear)**
- **Some old values are hard to replace in the same container or with the same look as new caps, I.e. keeping it all original**
- **Looking to invest as little as possible in the restoration (save \$\$\$)**

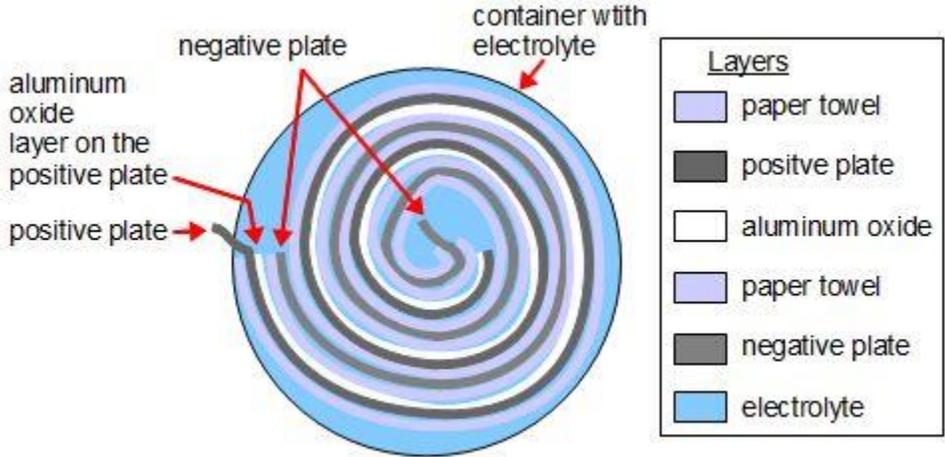
While reforming can and often does provide good results, I would put it secondary to replacing a cap

What is an Electrolytic Capacitor?

Remember these are electrochemical devices, similar to a battery. They do dry out with age and at some point reach a point, they can't be reformed effectively



Made 7th week of 1979



The number of turns may vary.

Other Options Besides Reforming

1. Buy new can caps designed to fit your gear
2. Cut can cap connections but leave in place, wire in newer (often smaller) caps under the chassis
3. Restuff old can caps (remove guts and put smaller caps inside)



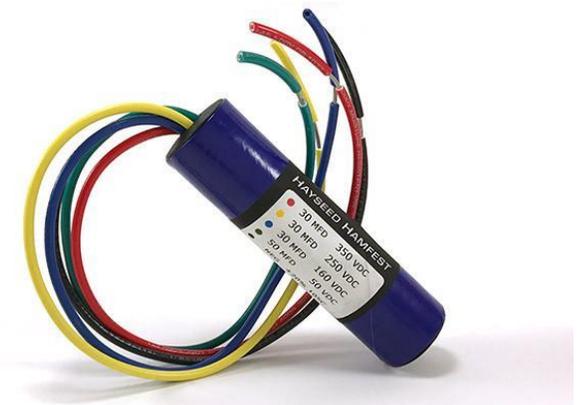
2. Replacing with independent caps under chassis



3. Restuffing Old Cans



1. Antique Electronic Supply, Hayseed Hamfest, & C-Tech(eBay) Electronics carry a wide variety

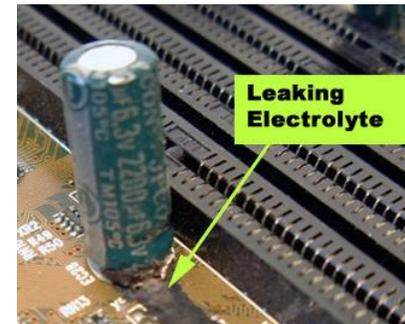


Warning Reforming A Capacitor Involves High Voltages that can be LETHAL

**If you aren't comfortable around high voltages and
have a basic understanding of electronics, please
seek professional help**

If reforming is something you want to undergo, then follow these three possible methods after performing the following physical inspection:

1. Look for capacitor leaking electrolytic
2. Look for disformed shape of the can or bulging of the can top or bottoms
3. Look for corrosion around the leads (sign of leaking)
4. If any of these exist, do not attempt reforming, replace instead



If reforming is something you want to undergo, then follow these three possible methods:

Method 1 – High Voltage Capacitor Tester (best method)

You will need:

1. To either remove capacitor from circuit or disconnect any connections to it for testing
2. A high voltage Capacitor Tester capable of going up to the level of the capacitor rating. Examples:
 1. Sprague Tel-Ohmike
 2. Heathkit C3
 3. Other capacitor testers (Eico, Paco, etc.) that go up to 400 or 600v, or other HV variable power supplies.
3. Digital ESR meter (optional)

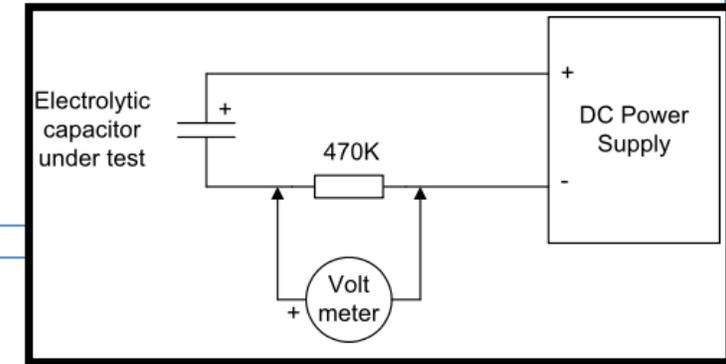
Steps:

1. Connect the capacitor to the tester
2. Slowly raise the voltage on the capacitor to 100v (or max working voltage on the cap, which ever is less)
3. Let it sit a while (hour)
4. Then raise the voltage another 100v (or max working voltage on the cap, which ever is less)
5. Let sit a while (hour)
6. Continue this 100v at a time until you reach maximum working voltage on the cap (I like to let sit overnight)
7. Watch the meter on the tester if it has one, do not use cap if it doesn't settle down below around 50 microamps of leakage current (if your tester doesn't have a current meter, please follow steps in Method 2 to add one in line)
8. If leakage current goes below 50uA then test cap on an ESR meter, if tests good there, you should be good to go. Note – if capacitor is 10,000uf or more, move to 80-100uA as acceptable.
9. If not, replace capacitor
10. Discharge capacitor (100 ohm resistor or more), don't short it. Put it back in circuit or reconnect wires if good.

Method 2 – High Voltage Power Supply (2nd best method)

You will need:

1. To either remove capacitor from circuit or disconnect any connections to it for testing
2. A high voltage power supply (PS) capable of going up to the level of the capacitor rating. Examples:
 1. Heathkit IP-17
 2. Spellman, Fluke, B&K, many others – make sure they can do 400v @ 10ma or more
3. Multimeter (analog preferred but can use digital, they just turn off automatically)
4. 150K-470K ohm resistor (2 watt or more) – prefer 470K
5. Digital ESR meter (optional)



Steps:

1. Connect the power supply to the capacitor, resistor, and multi-meter as shown in the picture.
2. Slowly raise the voltage on the PS to 100v (or max working voltage on the cap, which ever is less)
3. Let it sit a while (hour)
4. Then raise the voltage another 100v (or max working voltage on the cap, which ever is less)
5. Let sit a while (hour)
6. Continue this 100v at a time until you reach maximum working voltage on the cap (I like to let sit overnight once there)
7. Watch the meter across the resistor, do not use cap if it doesn't settle down below around 22v (50 microamps of leakage current) if you use something besides a 470k resistor (just use $I=V/R$ to figure out current and voltage where 22v = 50uA). Note – if capacitor is 10,000uf or more, move to 80-100uA as acceptable.
8. If leakage current goes below 50uA then test cap on an ESR meter, if tests good there, you should be good to go
9. If not, replace capacitor
10. Discharge capacitor (100 ohm resistor or more), don't short it. Put it back in circuit or reconnect wires if good.

Method 3 – In circuit using power supply of device (least preferred and not recommended by blueglow)

You will need:

1. Research various methods listed on the internet – just google capacitor reforming

Reasons why it's not recommended:

1. Many power supply designs at play
2. Much more associated risk to the overall unit
3. Many steps involve removing tube rectifier & replacing with diode equivalent, others involve pulling tubes an or wiring in current limiting resistors into your filament & cathode circuits
4. Risk to your power supply xfmr if a capacitor shorts or has heavy leakage