

NOTES ON DIAL LAMPS

By Ludwell Sibley

Dial and pilot lamps are a "background issue" in radio restoration: anyone who can spell "No. 47" has a grasp on 90% of the problem. However, it may be handy to have some reference information on (1) selecting a replacement bulb for a particular radio, or (2) figuring out the potential uses of junk-box or flea-market bulbs. New bulbs of the common types are still available from the usual antique-radio sources, yet are not as available commercially as they were before the appearance of today's LEDs and "chatty" LCD displays.

Radio makers of the '20s-'30s were rather close-mouthed in their service data about which bulb to use in their sets. The type number rarely appears on the schematic. Parts lists usually disguised the "industry" generic type number behind a proprietary stock number. So the restorer often has to figure out what the replacement should be.

For identifying the bulbs traditionally found in radios, Table 1 provides a way to determine the type, based on the size and shape of the old bulb, its base style, and the color of the glass bead holding the filament wires. It will help on bulbs where the type number is absent or lost against a blackened base, or where the only identifier is the voltage. The table includes particular brand names that favored a particular type [1].

Bulb styles in the table are the industry designations of "T-3½" (tubular, 3½ eighths of an inch in diameter), "G-3¼" (globe, 3¼ eighths dia.), and "G-4¼" (globe, 4¼ eighths dia.). ["3½ eighths" - ughh! - and it's been decided the U. S. doesn't need the metric system . . .]

In early radio bulbs, the bead color generally designates bulb voltage and current, as follows:

Pink: 2.0 V @ 60 mA
White: 2.5 V @ 500 mA
Green: 3.2 V @ 350 mA
Brown: 6.3 V @ 150 mA
Blue: 6.3 V @ 250 mA

However, color is no sure guide: despite the confident attitude taken in radio-service data from

the old days [2, 3], the color can vary from maker to maker, and even between bulbs made by a given maker. Symbolizing this uncertainty, present-day bulb catalogs do not list bead color. A lot of modern Japanese and Hong Kong-ese bulbs use clear beads. Fortunately, knowing the basic heater voltage in the radio (2.5 vs. 6.3) greatly eases the problem.

Radio-repair lore from the old days included the story of the set with the annoying buzzing noise on all stations. Conventional troubleshooting failed to locate the problem. The trouble turned out to be a dial bulb with an arcing break in the filament . . . a story worth remembering today!

One subtlety applied to bulbs used in "shadow-graph" tuning meters of the early '30s: the bulb should have a straight-line (horizontal coil) filament so that images of the filament reflected from the bulb walls will not act as extra sources of light and smear the shadow display. By contrast, the more normal arched form of filament gives a diffuse light source which is desirable for general shadowless lighting of dials. Trouble is, it's not known what bulb type(s) offered straight-line filaments. As far as can be determined, all those listed in Table I have regular filaments. So replacements today are catch-as-catch-can: it may be necessary to try several bulbs of a given type, or several types, in search of a crisp shadow.

Bulbs in postwar "All-American Five" AC-DC radios are almost always the workhorse No. 47. In earlier sets the types varied; some early AC-DC receivers used a 2.5-V 500-mA bulb (No. 41 or 43) in series with a 300-mA heater string. Others occasionally used the No. 51. In an All-American Five, always replace an open or blackened ("about to fail") dial light to save the rectifier tube: the bulb is bridged across the six-volt section of the rectifier (35Z5, 35W4, 35Y4). It shares the total current, which is the 150 mA of the heater string, plus an additional 60 mA or so representing B+ current to the rectifier plate. An open bulb badly overloads the tube heater.

Screw-base bulbs tend to shake loose under vibration from the speaker. Do not try to crimp the bulb base or socket, to avoid stress on the glass; instead use wax, cement, or a bit of tape to lock the bulb in the socket. Along this line, the filament in the Nos. 40 and 47 is shorter and stiffer, that is, more vibration-resistant, than in the No. 50 or 51.

Bulbs of 6.3-V types were also commonly listed as "6-8" volt units, based on frequent use in autos where the battery voltage varied widely.

The life expectancy of any incandescent bulb varies widely with the applied voltage. Operation at 110% of rating cuts life to about 25% of nominal life, whereas cutting the voltage to 90% extends life to about 400%. Hence the value of using a 3.2-volt bulb in a "2.5-volt" radio, particularly with today's high line voltages. A No. 13 flashlight bulb rated for 15 hours at 3.7 volts should last, when used in a radio at 2.7 volts, about 1100 hours. For the occasional piece of test equipment that runs continuously, replacing a six-volt pilot bulb with a 12-volt type will give "eternal" life expectancy. There are other ways to extend lamp life: I once tired of replacing, every month, the No. 313 (500-hour) pilot lamps in a continuously operating transmitter. Because the bulbs ran from a DC supply, replacement was easy: it involved making up a couple of LED-and-resistor units epoxied onto lamp bases. That was the end of replacing bulbs! Frosted-glass versions of these bulbs ("47F") occasionally turn up.

Radios powered by batteries posed a special problem as to dial and pilot lights, due to the limited power available. The Nos. 48 and 49 bulbs were suited to use in 2.0-V farm sets, but were not used all that commonly. The Silvertone Models 1923 and 1933 used two separate flashlight cells to run the dial light - pushing the volume knob down turned it on.

Neon pilot lamps sometimes show up in battery sets. The Silvertone Models 1712, 1713, 1714, and 1856 used a neon pilot operating continuously from the B-battery; the Port-O-Matic (!) BE27 also used a neon. The Hallicrafters S-29 and S-39 took this idea farther, using a neon tube wired as a resistor-capacitor flasher to save current. The

Silvertone 1722 used a NE-48 style bulb as a tuning flasher.

The dial light in some pre- and postwar AC-DC sets was a 7½-watt 117-V bulb of the "C7" Christmas-tree style. This was not a particularly, er, bright idea, as most C7-style bulbs are rated at only 500 hours. In a radio used five hours a day, the bulb would be "gone" just after the 90-day warranty expired. A good replacement would be a 6-watt "S6" tapered-bulb lamp, Type 6S6. These are made in ratings of 120, 125, 130, 135, and 145 volts; a 130-volt bulb should last indefinitely. Otherwise, adding a diode in series, or a two-watt 330-ohm resistor, should fix the problem.

As suggested earlier, the other problem that we have with light bulbs is figuring out possible uses for miscellaneous types that turn up. Table 2 lists a number of types (out of the several hundred that exist) that seem to show up frequently. The bead colors listed are the result of examining a group of bulbs, and are not from any published reference. Other colors may exist for a given type. The table gives some possible helpful hints: the 13 and 1490 are good candidates for 2.5-volt radios, the 432 will be useful to your friend who fixes "tinplate" trains, the 1847 is a long-life replacement for the 47, etc.

REFERENCES

1. *Tube Complement Book with I-F Peaks and Panel Lamp Data* (Emporium, PA: Sylvania Electric Products, Inc., 1944).
2. A. A. Ghirardi, *Radio Troubleshooter's Handbook* (New York: Radio & Technical Pub. Co., 1941), p. 605.
3. "Pilot Lamp Data," *Allied's Radio Data Handbook* (Chicago: Allied Radio Corp., 1943), p. 33.
4. *General Electric Miniature and Subminiature Lamp Catalog*, G. E. Co., 1981.
5. *Sylvania Miniature Lighting Products Handbook & Catalog*, Cat. 202, GTE Sylvania Inc., 1977.
6. "Miniature Lamps," *Catalog CMD-3*, Chicago Miniature Lamp Works, n. d.

[See Tables, next two pages]



TABLE 1 - DECODER FOR TRADITIONAL "RADIO" BULBS

Base	Bead	Type	Volts & mA	Hours*	Typical User
T-3¼ tubular bulb					
Bayonet	Brown	47#	6.3 @ 150	3000	Dials in most All-American Fives, many AC sets
Bayonet	White	43	2.5 @ 500	3000	Dials, tuning meters; Coronado 715B, National 2.5-V HRO and HRO Jr.
Bayonet	Blue	44	6.3 @ 250	3000	Dials and tuning meters; many AC sets, many '30s Emersons
Bayonet	White ⁺	45	3.2 @ 350**	3000	None known
Bayonet	White	292A	2.9 @ 170	3000	Dials in 2.5-V sets with high line voltage; some '30s Zenith AC-DCs
Bayonet	Pink	49	2.0 @ 60	1000	2-V farm sets; Marine Corps TBY xcvr; Aircastle QT
Bayonet	Unknown	49A	2.1 @ 120	-	Dials; repl. w/ 49.
Screw	Brown	40	6.3 @ 150	3000	Radiola 18, 50; most '30s Colonials and Detrolas, many '30s Fadas and Trav-Lers
Screw	White	41	2.5 @ 500	3000	All 2.5-V Zeniths, RME 9D, Hammarlund Comet Pro, some Colonials, many Dewalds, several '30s, Knights Stromberg-Carlson 641 & 642
Screw	White	292	2.9 @ 170	3000	Dials in 2.5-V sets with high line voltage
Screw	White	- (!)	2.1 @ 120	-	Dials; repl. w/ 48.
Screw	Blue	46	6.3 @ 250	3000	Dials and tuning meters; many '30s Knights and Fadas, some Admirals and GEs
Screw	Green	42	3.2 @ 350**	3000	Dials; most '30s Champions, some Midwests and Remlers
Screw	Pink	48	2.0 @ 60	1000	2-V farm sets; some '30s Admirals, Airline 62-654 family
G-3½ globe bulb					
Bayonet	White or Brown [@]	51	7.5 @ 200	1000	Car-radio dials; car instruments; Scott All-Wave 23, most '30s Air Kings and Wells-Gardners, some All-American Fives
Screw	White	50	7.5 @ 200	1000	Car-radio dials; flashlights; some '30s Crosleys
G-4½ globe bulb					
Screw	White	-	6.5 @ 400	500	Car-radio dials; flashlights
Bayonet	White or Blue	55	6.5 @ 400	500	Car-radio dials; parking lights; some late-'30s RCA AC sets






* At rated voltage.

** 350 mA for GE and Sylvania; 500 mA for National Union, Raytheon and Tung-Sol.

[@] White for Sylvania, Westinghouse and Tung-Sol; brown for GE.

47 was also known as 40A.

⁺ White for GE and Sylvania; green for National Union, Raytheon and Tung-Sol.

Maximum Size					
Type No.	T-3¼	T-3¼	G-3½	G-3½	G-4½
Base	Screw (Miniature)	Bayonet (Miniature)	Screw (Miniature)	Bayonet (Miniature)	Bayonet (Miniature)
Bulb	Tubular	Tubular	Small Round	Small Round	Large Round

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TABLE 2 - MISCELLANEOUS COMMON BULBS

Type	Bulb	Base	Bead Color	Volts & mA	Hours ⁺	Original and Possible Uses
12	G-3½	Bipin	None	6.3 @ 150	5000	H-P '60s test gear
13	G-3½	Screw	Green	3.7 @ 300	15	3-cell flashlights; Coronado 822
14	G-3½	Screw	Blue	2.47 @ 300	15	2-cell flashlights; Silvertone 6359
53	G-3½	Bayonet	White or pink	14.4 @ 120	1000	Auto and indicator
113	GTL-3	Screw	-	1.3 @ 220	15	Penlights; some Kadette AC-DCs
233	G-3½	screw	-	2.33 @ 270	10	Flashlights; Coronado 675A, 850
313	T-3¼	Bayonet	White	28 @ 170	500	Aircraft, indicators
327	T-1¾	Flange	Clear	28 @ 40	4000	Aircraft, prof. audio eqpt.
328	T-1¾	Flange	White or green	6.0 @ 200	1000	Aircraft; prof. audio eqpt.; mil. gear including R-390A/URR
331	T-1¾	Mid-groove	Clear	1.35 @ 60	5000	Indicator
344	T-1¾	Flange	Brown or blue	10.0 @ 14	50,000	Indicator
428	G-4½	Screw	Pink	12.5 @ 250	250	Toy trains
431	G-4½	Bayonet	Blue	14.0 @ 250	250	Toy trains
432	G-4½	Screw	Blue	18.0 @ 250	250	Toy trains
656	T-3¼	Wedge	White	28.0 @ 60	2500	Indicator
1445	G-3½	Bayonet	Blue	18.0 @ 150	250	Auto, toy trains
1446	G-3½	Screw	Blue	12.0 @ 200	250	Toy trains
1447	G-3½	Screw	Clear	18.0 @ 150	250	Toy trains
1490	T-3¼	Bayonet	White or green	3.2 @ 160	3000	Radio (postwar)
1455	G-5	Screw	Brown	18.0 @ 250	-	Coin machines*
1455A	G-5	Bayonet	Brown	18.0 @ 250	-	Coin machines*
1815	T-3¼	Bayonet	White	14.0 @ 200	3000	Indicator
1816	T-3¼	Bayonet	White	13.0 @ 330	1000	Aircraft
1819	T-3¼	Bayonet	Black or white	28.0 @ 40	1000	Indicator
1820	T-3¼	Bayonet	White, blue, or green	28.0 @ 100	1000	Indicator
1847	T-3¼	Bayonet	White or brown	6.3 @ 150	5000	Radio replacement (postwar)
1881	T-3¼	Bayonet	White	15.5 @ 240	500	Auto radio
1893	T-3¼	Bayonet	Brown	14.0 @ 330	7500	Auto
1895	G-4½	Bayonet	White or green	14.0 @ 270	2000	Auto

⁺ At rated voltage.

* These appear in old-time tabulations of "radio" bulbs. Were they perhaps used in early AC sets using the Arcturus 15-volt AC tubes?

INTERNATIONAL AL JOLSON SOCIETY SEEKS INFO

Ms Cathy Rivera, Southern California representative of the International Al Jolson Society, was referred to MAARC by Baltimore's Golden Radio Buffs of Maryland, Inc. She seeks a rare radio show script.

WANTED: Information that might lead The International Al Jolson Society to the *Bing Crosby Chesterfield Show* script files. We are looking for the script or any script remnants for the program that was scheduled to be recorded October 24, 1950, which would have featured Al Jolson, who had died October 23, 1950. Any lead, no matter how slim, will be appreciated. Contact Edgar Bullington, 905 Paseo Grande Circle, Duarte, CA 91010-2316. Or reach Edgar via e-mail: eb2@rocketmail.com

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