

DOX CONTROL FOR A YAESU FT-847

◇ I enjoy operating PSK31 with my FT-847, but I need the two serial ports on my PC for a packet modem and computer-control of the receiver, so I don't have a spare RTS or DTR line to key the transmitter, as is common with most PSK31 interfaces. The FT-847 does not have VOX, but it does have a data AFSK port that can be used to key the transmitter by pulling the transmit line low with a 22 kΩ (or lesser value) resistor. Keying the data port also disables the mike, an ideal situation for simple data-mode operations. To interface the PC to transceiver, I designed the *DOX* (data-operated transmit control, similar to VOX—*Ed.*), a minimum-component-count interface that keys the transmitter from the AFSK signal produced by the PC audio card. Although I have tried the interface only for PSK31, it should also work with other modes that use sound-card AFSK modulation.

Audio from one PC speaker output is stepped up by a reverse-connected speaker output transformer (T2, RS #273-1380) to approximately 30 V (P-P) and peak rectified by D1, D3, C2 and C3. The rectified positive voltage is applied to the gate of a 2N7000 MOSFET (Q1), which then appears as a low resistance to ground. The peak detection is very effective because the FET gate impedance is nearly an open circuit. Peak detection with a long discharge time constant is required because PSK31 data goes through a null with each phase reversal. The discharge time constant (C3-R5, approximately 0.1 second) is long enough to smooth ripple in the rectified voltage. The Zener diode (D2) provides protection for the 2N7000 gate in the event the input voltage is too high; as a bonus, the LED (DS1) in series with the Zener indicates that data is detected and the transmitter is keyed.

The combination of R1 and R2 reduces the 30-V audio to the approximately 30 mV (P-P) required by the transceiver data input. To adjust the transmit level, I connect the transmitter to a dummy load, set the PC software to the transmit mode and adjust the PC sound card software sliders so that the LED just lights. Then, adjust R2 so that the ALC meter barely indicates.

All component values are relatively noncritical. Diodes D1 and

D3 may be any small-signal silicon diodes. Zener D2 may be any 18-24 V, 500 mW device. The LED may be omitted if desired. The time constant (C3-R5) may be varied; the values I use do not produce any relay chattering in the FT-847. This interface has no hysteresis (snap action)—as would be required in a VOX circuit—because the input data signal has constant amplitude while transmitting.

On the receive side, the center-tap of a 1:1 transformer (RS #273-1374) provides a 2:1 voltage step-up to the sound-card line input. This interface was constructed in a small metal enclosure and only the transceiver side of the circuit is grounded to the case. *The leads on the PC side are shielded and the shields grounded to the case only at the PC;* this is important to prevent any possibility of line-frequency hum being introduced into the low-level signals. I constructed the cables by cutting a shielded stereo patch cord (RS #42-2387) in half.—David Smoler, AD6KI, 19982 Charters Ct, Saratoga, CA 95070-4458; ad6ki@earthlink.net

SWEEP-TUBE REPLACEMENTS

◇ Here are a few thoughts regarding "A New Life for your FT-101," (May 1999, pp 68-69). I've done a fair amount of thinking and research about ways to solve the problem of the once common-and-cheap, but now scarce-and-expensive sweep tubes in HF transceivers and linear amplifiers. There are two categories of sweep tubes: small (about 18 W dissipation and 1.25 A heaters), and large (30+ W dissipation and 2.5 A heaters). The former include the 6DQ6B/6LQ6, 6JB6 and such (used in Drake equipment) and the latter 6JE6/6LQ6, 6JS6, 6KD6 and so on. Except for their bases, the 6146, 6146A (20 W CCS dissipation) or the 6146B (27 W CCS dissipation) match up closely to the smaller sweep tubes. The higher dissipation of the 6146B would be an obvious bonus. I would only use new-old-stock (NOS) 6146Bs; according to RF Parts, the current Chinese-made 6146Bs must be derated to 75% of published specifications.

For the larger sweep tubes, the current Svetlana EL-509/6KG6 is—

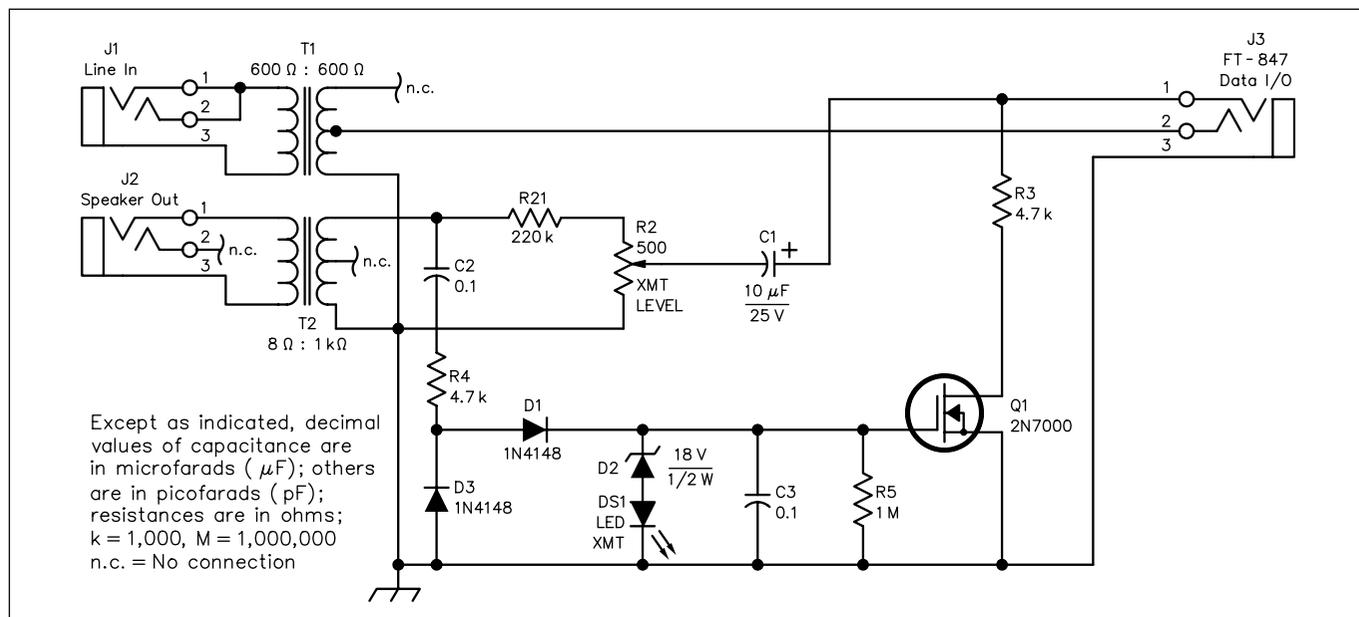


Fig 1—Schematic of AD6KI's DOX interface.

except for its base—a close match in heater current, dissipation and interelectrode capacitances. According to Svetlana, it has a hard glass envelope, many other features of a transmitting tube and is usable at full ratings to 30 MHz. Svetlana Technical Bulletin 32 gives detailed instructions for conversion from 6KD6s to EL-509/6KG6s. “Evaluating the Svetlana EL/509/6KG6 Tube” (*Electric Radio*, Mar 1999; Svetlana Technical Bulletin 49) gives results of test-jig comparisons of an EL/509/6KG6 with a 6146B. (See References and <http://www.svetlana.com/docs/TechBulletins/> for these articles.—Ed.)

I own two sweep-tube SSB rigs, a Drake T4XB and an EICO 753. There are many Drake rigs out there, and the conversion would also apply to TR-series transceivers, which use three 6JB6 tubes. Unfortunately, I don’t own any rigs that use the large sweep tubes. There are probably many sweep-tube SSB rigs and linears out of service due only to the cost and availability of the tubes.

Here are a few additional thoughts: The Chinese-made 6146B tubes, marketed under the Penta (and possibly other) brand names by several vendors, are priced substantially lower than NOS 6146Bs. Assuming the recommended 75% derating factor, their effective dissipation ($27\text{ W} \times 0.75 = 20.25\text{ W}$) is still sufficient to directly replace American-made 6146 and 6146A (but not the “B”) tubes and the smaller sweep tubes, with accommodation of the base differences. In addition to base changes, differences in interelectrode capacitances may require changes in tank and neutralization circuits.

You can expect reasonably close tube-to-tube uniformity between different Svetlana EL-509 tubes or among American-made 6146A/B/W-series tubes from the same manufacturer and with similar date codes. This may not be true for Chinese 6146B tubes.

Although the 6146W is a rugged variant of the 6146A, some vendors have claimed that their 6146W tubes were selected out of regular production runs of 6146B tubes. This may have been true of late-production tubes, but experimental evidence would be needed to confirm or deny this claim. If true, this suggests that sometime after the introduction of the 6146B (circa 1963) production was consolidated into one tube that had the increased dissipation and 1.125 A dark heater of the “B” variant as well as the “W” variant’s ability to meet military specifications for vibration and shock. Such a tube could conceivably have been labeled as A, B or W.—Bill Tipton, *K5JRI*, 1332 Pinewood Rd, Jacksonville Beach, FL 32250-2941

References

- G. Badger, B. Alper, and E. Barbour, *Technical Bulletin*, 32 (Huntsville, Alabama: Svetlana Electron Devices, 1997) “Save your Dentron GLA-1000 with the Svetlana EL-509.”
- Receiving Tube Manual* (Harrison, New Jersey: RCA Corporation, 1973).
- RCA-6146B/8298A Beam Power Tube* (Lancaster, Pennsylvania: Radio Corporation of America, 1963).
- Svetlana Technical Data: EL-509 Beam Tetrode* (Huntsville: Svetlana Electronic Devices, 1997).
- R. D. Straw, N6BV, Ed. *The ARRL Handbook* (Newington: ARRL, 1999) Order No 1832, \$32. ARRL publications are available from your local ARRL dealer or directly from the ARRL. See the [ARRL Bookcase](http://www.arrl.org/bookcase) elsewhere in this issue or check out the full ARRL publications line at <http://www.arrl.org/catalog>. See the Chapter 24 data tables for “Tetrode and Pentode Transmitting Tubes” and “TV Deflection Tubes.”

DECAL LABELS MADE EASY

◇ Labeling home-built equipment has always been a challenge for me. Until now, all of the labels on my equipment *looked* homemade. Here’s a technique I’ve found to remedy that situation.

1. Typewrite or print the labels on paper.
2. Photocopy the labels onto a transparency.
3. Trim the labels from the transparency.
4. Glue the labels to the equipment panel. (Be careful not to smear the letters)
5. Coat the panel and labels with clear spray varnish.

The finished panel has proper letter alignment and spacing, as if professionally printed.—John Bandy, *W0UT*, 2810 Euclid, Wichita, KS 67217-1927; john.bandy@twsubbs.twsu.edu

◇ There are more options. Some computer applications can print a mirror image of a document. By doing so, you can print a reversed image onto acetate or photocopy one from paper onto acetate. This places the printing on the rear of the plastic sheet to protect the printing and present a nice, finished appearance.

With a little planning, one could properly position all labels for a panel on a sheet of paper or acetate so that a single smooth plastic sheet would cover the whole panel. To add some color, use a sheet of colored paper or contact paper behind the plastic and affix the whole assembly to the project.

At a local model train show last spring, I saw blank decal paper for sale. It’s available from Walthers (www.walthers.com) and other suppliers at hobby shops. According to the [rec.models.scale FAQ](http://www.rec.models.scale.com/FAQ/rmsfaq.13.htm), part 13 (<http://www.1250fleets.com/FAQ/rmsfaq.13.htm>), modelers have had a little trouble using ink-jet printers directly on the decal paper, but they’ve had good results with laser printers and copying onto decal paper at local photocopy shops.—Bob Schetgen, *KU7G*

STARTING SCREWS IN TIGHT PLACES

◇ Often I need to replace a screw that is in between components and not readily accessible. I have a straight-blade screwdriver with a retaining device that works well, but nothing similar to that for use with Phillips screws. Sometimes it is necessary to place a lock washer with the screw, as well.

By securing the screw (and lock washer, if needed) to the end of the screwdriver with a small piece of adhesive tape, it’s easy to start the screw on the first try. The tape gives a little, which makes a slight misalignment unimportant. After driving the screw, the tape breaks and comes away with the screwdriver. The same trick works with slotted screws and nuts on panels and in nutdrivers.—Hugh Inness-Brown, *WZ1B*, 5351 State Hwy 37, Ogdensburg, NY 13669

Hints and Kinks items have not been tested by *QST* or the ARRL unless otherwise stated. Although we can’t guarantee that a given hint will work for your situation, we make every effort to screen out harmful information. Send technical questions directly to the hint’s author.

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NEW PRODUCTS

BATTERY PACKS

◇ Maha Communications now offers two new external battery power packs.

Primarily intended for use with digital cameras, the 7.2-V/1400 mAh MH-DPB140LI lithium ion pack and the 6-V/1800-mAh MH-DPB180M nickel metal hydride pack should also be attractive choices for other portable electronics applications.

Both versions feature compact dimensions and lightweight construction. A carry case with a belt clip, a cigarette lighter cord, a wall transformer charger and a “universal” power cable is provided. The cable includes three plug adapters that fit the power connectors found on several of the current digital cameras.

A built-in four-stage indicator makes it easy to keep track of the charge state. Charging time for the lithium ion pack is approximately 3 hours; for the nickel metal hydride pack, about 4 hours.

The suggested retail price for the MH-DPB140LI lithium ion pack is \$69.95. The MH-DPB180M nickel metal hydride pack is \$59.95. For additional information visit your favorite Maha products dealer or contact Maha Communications, 545-C W Lambert Rd, Brea, CA 92821; tel 800-376-9992 or 714-990-4557, fax 714-990-1325; sales@mahacomm.com; <http://www.mahacomm.com>. 

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