Xerox 820-1 Compendium—Part 6

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In this final installment of the Xerox 820-1 Compendium, I discuss my design of a composite video board for the Xerox 820.[36] The design originated with my wanting the Xerox computer to be capable of feeding a signal to both a TTL-video monitor and a composite monitor. R. Dunbar, WØPN, originally suggested such a modification, but his method could not be used here. Fig 8 shows the schematic of my small sync-and-video mixer.

The unmodified Xerox board supplies V drive, H drive and video at pins J7-3, 4 and 5, respectively. On my composite video board, the positive-going horizontal drive is first inverted and then fed to a half-monostable circuit. The 33-kΩ resistor holds the gate input high. The negative-edge pulse turns the gate off for a time determined by the 220-pF/33-kΩ RC time constant, after which the gate returns to its high input state.

Similarly, the negative-going vertical drive is fed to another gate that has a longer time constant. Both vertical- and horizontal-derived pulses are fed to an OR gate and then mixed with the positive-going video signal from the Xerox board. The resulting composite video signal is finally connected to the video monitor through an emitter follower. No output capacitor is required and the output is short-circuit proof.

My Xerox-based computer is portable with a built-in 5-inch TTL monitor. Since V drive, H drive, video and 12-V dc are available at the monitor connector, I have built my composite video circuit on a small, 2-inch square board epoxied to the rear of the monitor connector. The on-board 7805 regulator is used to produce the +5-V bus line. The composite video output is connected to a Sanyo DM2212N 12-inch amber monitor which displays a rock-steady picture. Incidentally, adjusting the value of the 33-kΩ resistor in the H-drive circuit allows for some horizontal centering. Although I used a 4001 from my junk box, a 74LS02 would have done just as well.

Conclusion

From time to time, the surplus market offers the experimenter a real workhorse (remember the BC-221 frequency meter or the family of AN/ARC-5 "Command Set" equipment?). The Xerox 820-1 is of the same breed: well built and low priced. The Xerox appears to be an ideal computer for the amateur who wants to be a bit more adventurous (technically) without risking a lot of money. The board, cables, power supply and one monitor will enable you to see the famous Xerox "turn on" message for about $125. When that much works, add a keyboard and check your memory banks. Then, add one disk drive. When everything operates properly, complete your system with a second disk drive, a cabinet, double-density daughter boards, real-time clocks[37], packet state machines, EPROM burners, modems, speech synthesizers, 16-bit co-processors, RAM disks, 4-MHz upgrade[38], reverse video cursor, and a host of other peripherals.

Literally thousands of the 820-1 boards have been sold to experimenters. Thus, you may expect a steady stream of add ons, smart improvements and clever modifications. If you need to be in touch with the latest developments, you may want to check these two 24-hour bulletin boards. Both run on 300 and 1200 baud.

[1]Notes appear on page 13.

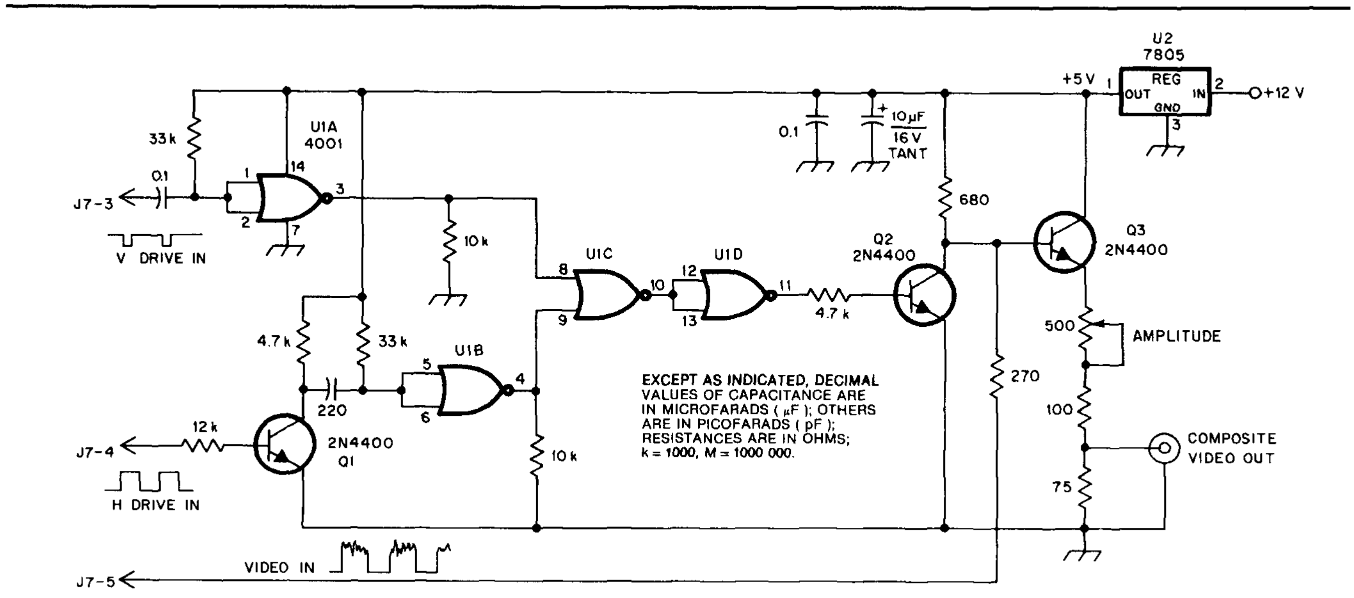

Fig 8—N4ICK's small sync-and-video mixer. The circuit enables the Xerox board to feed a signal to both a TTL- and a composite-video monitor.
Q1, Q2, Q3—2N4400 NPN transistor. **U1—CD4001BC quad 2-input NOR gate.**

• Americare (Connecticut): 203-232-3180
• Stu Anthony (California): 714-599-2109

Most packet-radio bulletin boards presently operating on the East Coast use a Xerox 820-1 board and the WØRLI software.[39] If you have an 8-inch disk drive, the *MicroCornucopia*[40] has a wealth of good public-domain software. (Xerox 8-inch disks are initialized in the IBM 3740 format.) If, on the other hand, you opt for 5¼-inch diskettes, the original Xerox single density format is compatible with Cromemco and at least one of the double-density boards (from Emerald Microware[41]) will read most Kaypro software.

It is AMRAD's intention that the material in this Compendium appeal to either the old pro, totally at ease with computers, or just a ham wondering how and when to take the first step in computer hardware hacking. We hope this Compendium gives enough information to convince you that the Xerox 820-1 is indeed worthy of consideration.

Notes

[36]Parts 1 through 5 of this Compendium appear in *QEX* issues for Jun, Jul, Aug, Sep and Dec 1986.
[37]Mitchell Mlinar, "Xerox 820 Column," *MicroCornucopia*, No. 20, Oct 1984.
[38]Jim Mayhugh, "Xerox 820 Column," *MicroCornucopia*, No. 19, Aug 1984.
[39]Andre Kesteloot, "A Martian in the Packet World," *AMRAD Newsletter*, Mar 1985.
[40]*MicroCornucopia* is published six times per year. For subscription information write PO Box 223, Bend, OR 97709, tel 503-382-8048.
[41]Emerald Microware, PO Box 6118, Aloha, OR 97007, tel 800-223-EPIC.

RUDAK: A Status Report

Continued from page 11.

on the Ismaning water tower (QRA locator: JN58UF) at DLØISM. The RF equipment necessary for the 24-cm BPSK uplink and the 70-cm BPSK downlink was built and made available by Hermann Hagn, DK8CI, the operator responsible for DLØISM. The 435.614-MHz signal was clearly heard in the Munich area and allowed the software developers to load and test new programs from home.

Conclusion

The ready-to-fly version of RUDAK has since been shipped to Boulder, CO for integration with the rest of Phase 3C. After that, the complete, operational satellite will undergo a thermal vacuum test. In a test such as this, the satellite repeatedly passes through a different temperature range in a vacuum. The environment conditions are set to provoke premature failure of parts and test interactively all components under realistic conditions.

Once this testing is completed, the satellite will again travel to West Germany to pass a vibration test at Garching, near Munich. The vibration test agitates the modules. This test allows the engineers to make any last-minute circuit modifications that may be necessary.

While most of the work on the RUDAK project took place near Munich, Karl Meinzer, DJ4ZC, Werner Haas, DJ5KQ, and their collaborators continue to work on transponder sections. The frame, with cable harness, on-board computer and a few other modules are already in the US.

Notes

[1]AMSAT DL, "AMSAT DL Specifies Mode L Packet System," *AMSAT Satellite Report*, Jun 19, 1985, no. 104. Subscription information for AMSAT Satellite Report is available from Satellite Report, 221 Long Swamp Rd, Wolcott, CT 06716. Annual rates are $22 for US, Canada and Mexico, and $30 Foreign.
†K. Brenndörfer, "RUDAK—Statusinformation," *cq-DL*, Jun 1986, p 341.

Bits

A 903-MHz Beacon On The Air

As of July 1986, The Pack Rats' *Cheese Bits*, the newsletter of the Philadelphia, PA Mt Airy VHF Radio Club, Inc, reported that Dave Hackford, N3CX, has activated a 903.070-MHz beacon. The beacon will be a good signal source for anyone in the Philadelphia area to tweak up their converters with or to follow propagation on that new band. The arrangement is 5 W into a horizontally polarized big-wheel antenna. The ID is N3CX - FN20, Pennsburg, PA. Reception reports are welcome. Send them to Dave Hackford, PO Box 138, RD 2, Pennsburg, PA 18073.

Other news from the club is that member Charles Osborne, WD4MBK, has placed into operation the first known US multiband phase locked beacon. The beacon was put on the air June 1, 1986 and is capable of operating on the following frequencies.

432.0715 MHz	1 W EIRP OMNI
1296.2145 MHz	2 W EIRP OMNI
2304.3575 MHz	100 mW EIRP beamed SW
3456.572 MHz	not operational yet
5760.9295 MHz	8 W EIRP beamed SW
10,369.716 MHz	not operational

All beacons are identified by CW as "de K4MSK/BCN EM85md EM85md".

The beacons are phase locked to a 108.01788-MHz crystal oscillator. Drift will be ±3ppm, 0-60°C per year. Tuning is performed as necessary to maintain a frequency near 432.0715 MHz, the prime frequency. WD4MBK uses an unequal power division method and then triples the resultant frequency to get the 1296-MHz beacon. When transmitting, operation should take place on the 432-MHz beacon's frequency zero beat, then look for the signal on the third harmonic (1296 MHz). The beacon will be exactly on frequency. This procedure reduces tuning time and allows CW filters to be used more effectively to locate signals in a narrow search zone. Future plans include 10-GHz, 902-MHz and 220-MHz operation.

If you are interested in what future issues of *Cheese Bits* have to say, contact Harry B. Stein, W3CL, Mt Airy VHF Radio Club, Inc, 2087 Parkdale Ave, Glenside, PA 19038.—*KA1DYZ*

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