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maintained a regular schedule on 5.85 MHz this spring, GMT Sat. and/or Sun. between 0400 and 0500. The wild-sounding announcers loved to play old, old records. Each time they broadcast a different phone number for listeners to call, and rewarded them with hand-made QSL sheets. Several other pirates have been operating just above 6.20 MHz.

Cuban Clandestines, Too. Most likely using ham equipment, Radio Abdala and Radio Rebelde have both been heard around 7.08 MHz with anti-Castro speeches. Another one bearing the same name as a Cuban government network is La Voz de Cuba, heard in Argentina on 6.100 MHz.

Buzz, Buzz. It seems the FCC does not require private U.S. shortwave broadcasters to monitor their own signals on an ordinary receiver. As a result, for well over a year, WYFR has been broadcasting a "ripple," "hum," or "buzz" on many frequencies, making their signal a pain to listen to. The synthesizer problem cannot be detected on the FCC type-approved direct demodulation monitors they are required to use! Also, their old Scituate plant barely survived an ice storm in February, making them more eager to move to Florida.

HF Happiness. The rapid upswing in the sunspot count this year has led to much improved propagation above 15 MHz. More and more flea-powered harmonics can be heard on a good day in the 23-25- and 30-31-MHz ranges. The 15- and 17-MHz bands stay open all night between Europe and North America. The 21-MHz band is open at very unusual times, such as from Pakistan at 0230-0245, heard in North America on 21.59 with dictation-speed English news. A few more stations are likely to venture into the 25-MHz band, besides Israel on 25.605, Radio Liberty on 25.69 and VOA Greenville on 26.04. During the last sunspot peak, 25 MHz provided excellent reception from the few countries using it. This time, however, we must cope with CB interference. And as in every solar activity peak, while conditions can be excellent, there are also more blackouts in store rather than the generally mediocre reception of the past few years. Various estimates place the peak of Cycle 21 in late 1979 or early 1980 at a maximum of about 150 sunspots. ◇

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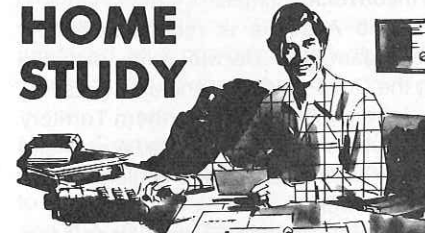
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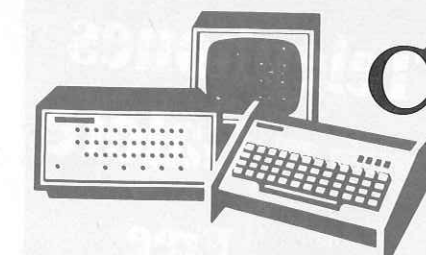
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Computer Bits

By Leslie Solomon

DIRECT-WIRE REMOTE CONTROL

AT VARIOUS times, POPULAR ELECTRONICS has introduced ideas and circuits for using a computer as a remote-control device. Published circuits used the ac power line as the interface between the computer and the remote electrical appliance being controlled. This approach was taken because we assumed that most users would not wish to rewire their homes to accept direct remote control.

Now we find that many readers do wish to direct-wire their systems. This way, any possible signal malfunction due to power-line noise and other unwanted signals on the ac line will not affect the program being transmitted. Moreover, the "bill of materials" would be lower doing it this way. Many readers have also told us that they were either building a new house or renovating an old one, so that direct wiring could easily be included. Here is information on some direct-wire control systems to assist these readers.

Direct-Wiring Accessories. Gimix, Inc. (1337 West 37 Pl., Chicago, IL 60609; Tel: 312-927-5510) has such a system and had, in fact, built a computer-controlled house in the Chicago area. The Gimix system is based on a Driver Relay board that can be obtained directly from the company or a local computer store. The board is designed to drive up to 31 GE RR8 power relays, each of which can handle up to 20 amperes at 250 volts ac. Since this mechanically latched relay requires a 1/120-second (8.33-ms) pulse to turn on or off, standby current is negligible.

The Relay Driver board measures a large 24" x 5" (61 x 12.7 cm). Relays are mounted on a separate bracket. Both the pc board assembly and metal relay bracket can be housed in a conventional 30" x 12" x 6" (76.2 x 30.5 x 15.9 cm) electrical case. The only other item required is a low-current 24-volt transformer to supply relay power.

The system is driven from a conventional 20-mA current-loop serial port. Up

to four of these boards can be driven in series, and each board is assigned its own specific port number.

A board-generated relay status signal allows the processor to detect faulty relays and permits the use of manual-override switches. Since the data rate can be up to 1200 baud, up to 120 relays can be activated in one second.

The board operates in either the active or the scan mode, as specified by the computer. In the active mode, the board interprets the 8-bit data received as a command to turn on or off a particular relay. Following a brief interval to allow the selected relay to operate, the board senses that relay's status (on or off). If the status is other than expected, the computer takes appropriate action, as determined by the program.

A command received in the scan mode has the same results, except for relay activation. This allows the mode to check relay status at any time.

If the on-board UART detects a transmission error, such as in framing, parity, or overrun, no relays are activated and no status scan occurs.

The Gimix catalog contains listings for a number of other interesting remote-control items. Among them is an Opto-Board, which is a general-purpose interface between 34 switches and the computer. The switches can be from a keyboard, an intrusion alarm system, fire-alarm devices, clocks, timers, thermostats, lighting circuits, etc. Each switch input is through an optical isolator that has a rated 1500-volt isolation.

All switch ports are constantly scanned by an on-board circuit (no processor time required), with 0.9 ms required to scan all ports. A built-in memory buffer saves up to 64 closed-switch signals, permitting the processor to complete lengthy tasks between interruptions. The board connects to any 8-bit parallel port.

Another remote-control Gimix board is its Tone Receiver Board, which converts standard DTMF (telephone) tones into binary signals. This allows the use of

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conventional Touch-Tone telephones for remote control. The board also uses an 8-bit parallel port. A 16-button remote-control keypad that can work at distances of up to a mile from the computer is also available.

Z80 Controller. Manufactured by Dynabyte (4020 Fabian, Palo Alto, CA 94303; Tel: 415-494-7817) the Z80-based Basic Controller sells for \$750 assembled and tested. The Controller features a variation of BASIC, called ZIBL, which is a proprietary language specifically written for control applications. This single board divides the world into six categories: sense inputs, flag outputs, lights, relays, A/D conversions, and D/A conversions. ZIBL implements 64 channels of each in such a way that the user need know nothing about them, other than their names.

The file structure allows multiple programs to be written into RAM, and each program can be individually loaded, re-named, and run. Any program can access another program as a subroutine while still retaining its own line numbers and variables. Listing, printing, and inputting can be from either the serial or the parallel I/O channel or the built-in CRT I/O. Interaction with the controller is via the user's keyboard and video monitor that can be "plugged" into a board connector.

On-board hardware includes a Z80 microprocessor that operates at 2.5 MHz, 4K of RAM (expandable to 16K), 4K of EPROM with programmer, two RS-232 I/O ports configurable via software with one port having a 20-mA current loop, one parallel input and one parallel output port, 300-baud cassette interface with file handling and motor control, and a keyboard-input port.

The internal video interface generates 16 lines of 64 characters and has standard video output. There are also 32 individual memory-mapped flag outputs, 32 individual memory-mapped sense inputs, and eight relays, four of which handle 0.75 amperes and four of which handle 5 amperes. Other visual outputs include eight individual memory-mapped LED's and one 8-bit light port for displaying the data.

Floppy Update. Southwest Technical Products Corp. (219 West Rhapsody, San Antonio, TX 78216; Tel: 512-344-0241) has announced availability of its Model DMAF1 dual-drive, single-density, double-sided 8" (20.3-cm) floppy-disk system. It sells for \$2095 as-

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Electronic Flash Unit Guide no. 28 ASA 25. These were to be installed in cases but the final assembly was never completed. You get a complete working flash unit. Operates on 2 AA, penlight batteries. You need only supply a shutter cord, battery holder & batteries, & if desired, some sort of case. Approx. overall size of circuit board, reflector & capacitor: 3" x 2 1/2" x 1 1/2". \$3.95

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sembled and tested or \$2000 in kit form. The hardware consists of an SS-50 bus-compatible DMA controller that is capable of handling up to four drives, two CalComp 143M double-density rated disk drives, both enclosed in a 20 1/2" D x 17 1/8" W x 5 3/8" H (52.1 x 43.5 x 13.7 cm) aluminum chassis that also contains a regulated power supply, drive-motor control board, cooling fan, diskette, etc.

Software includes a DOS, 8K BASIC with disk file and string function capability. Each diskette holds approximately 600K. Hence, with dual disks, more than one megabyte is provided.

Video News. TDL (Research Park, Blag. H, 1101 State Rd., Princeton, NJ 08540; Tel: 609-921-0321) has released its VDB at \$369 assembled and tested. Consisting of two board assemblies, one piggybacked on the other, only one S-100 connector is used.

The VDB contains its own display buffer with two pages of 25 80-character lines. Since the display memory does not employ a memory address, the entire computer memory is left intact for user programs. In addition to the 96 upper- and lower-case ASCII characters (with descenders), 64 unique display symbols are provided to permit graphic resolution with 160 horizontal and 75 vertical elements. The display can accept data at a 400,000-character/second rate. The blinking cursor is addressable, and a mode register allows any combination of characters to blink, insert, or do both simultaneously.

Ohio Scientific (1333 S. Chillicothe Rd., Aurora, OH 44202; Tel: 216-562-3101) has introduced a Model 540 video display board for the company's Challenger III line. Costing \$249, this display features a 32-row by 64-column display of the standard 64-character ASCII display font in a 5 x 7 dot-matrix form. Standard features include programmable 32 x 32 or 32 x 64 formatting. The board also has a keyboard port. The Model 540 also supports a graphics character generator that features lower-case and about 170 special characters for plotting and gaming.

Z80 Board. The company to take up the "standard" for putting a Z80 into every S-100 bus computer is Vector Graphic Inc. (790 Hampshire Rd., Westlake Village, CA 91361; Tel: 805-497-6853) with its Z-80 CPU board that sells for \$175 in kit form or \$215 assembled. This new board offers fully blocked design with on-board wait-state

AUGUST 1978

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Software Sources

8080 Inventory Package. Inventory-1 is an interactive inventory control system for S-100 bus computers. It is designed to run on Shugart Mini-Floppy drives. The program provides three-second access to any item in the inventory file. "HELP" and "EXPLAIN" commands are available to prompt the firsttime user. The system includes a set of "skeleton" programs which can be used to implement special, user-defined commands; using these "skeleton" programs, the system is claimed to make it possible to produce the software necessary to generate a special report within 5 minutes. \$99.95. Write: The Software Works, Inc., Box 4386, Mountain View, CA 94040.

1802 Cosmac Elf Music and Games. This 44-page book includes music programming instructions and several "scores," utility subroutines, random numbers, Tic-Tac-Toe, and others. \$2.50 (Connecticut residents add 7% tax). Paul C. Mowes, 39 Mansfield Apts., Storrs, CT 06268.

6502 Assembler/Text Editor & Relocating Loader. The Assembler/Editor portion of this program produces relocatable object code on tape (with checksum) and can store executable code in memory during assembly. It can assemble source programs from tape or memory, and has 17 user commands (including tape control and one user-definable command) and 16 pseudops. Labels may be up to 10 characters in length. Lines are automatically numbered, and there are 18 error codes. A manuscript feature allows the program to generate letters and other text. The Relocating Loader can reload relocatable object code at practically any location. The program resides in less than 4K of RAM or ROM (specify hex starting addresses of 0200, 0400, 1000 or 2000), and support up to two tape decks. It is pre-configured for TIM-based systems, but information is supplied on modifying it for other systems. Hex listing and operators manual, \$25. C.W. Moser, 3239 Linda Dr., Winston-Salem, NC 27106.

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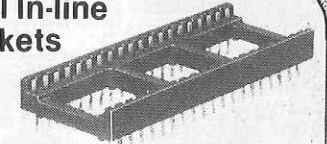
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