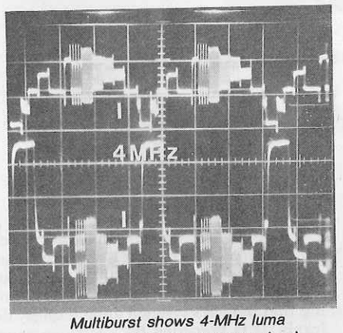
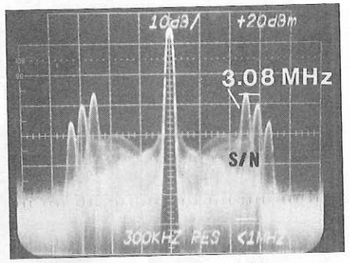
MAGNAVOX 19″ MODEL BB4242WA01 LABORATORY DATA

Parameter	Measurement
Tuner/receiver sensitivity (before snow):	vhf (Ch. 3): −8 dBmV uhf (Ch. 20): −3 dBmV
Voltage regulation (with signal applied and ac varied between 105 and 130V):	Low voltage: 12-V supply—98.6% 110-V supply—97% High voltage: 25-kV supply—96.2%
S/N ratio at CRT:	42 dB
Dc restoration:	83%
Luminance bandpass at video detector:	4 MHz
Luminance bandpass at CRT:	4 MHz
Agc swing from saturation to cutoff:	63 dB
CRT color temperature:	7400°K
Horizontal overscan:	11%
Convergence:	98%
Power requirements (signal applied):	100 W (avg.)

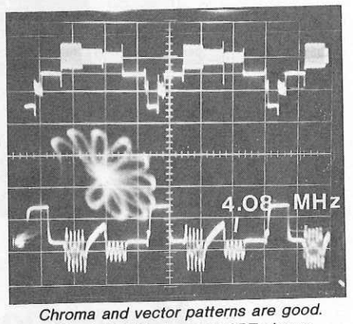
Note: Instruments used in these measurements are: Tektronix 7L12/7L5 spectrum analyzers; Telequipment D66, D67A oscilloscopes; Sadelco FS-3D VU f/s meter; Winegard DX-300 amplifier; Data Precision 245, 258, 1750 multimeters; B & K-Precision 1250 and 3020 NTSC and sweep/function generators and PR57 power supply; Tektronix C-5A and Minolta XD-11 cameras; and Gossen Luna-Pro light meter.



Multiburst shows 4-MHz luma response at video detector (top) and at CRT (bottom).



Spectrum analysis of video at the cathode ray tube shows an excellent S/N.



Chroma and vector patterns are good. The 4.08-MHz trace at CRT shows some loss of signal strength.

tial for horizontal driver kickoff and then a switch-mode power supply with SCR regulator takes over as soon as flyback operation begins at 15,734 Hz. A three-transistor comparator, latch, and shutdown circuit protects the receiver from excess high-voltage runaway. On this board there are no ICs.

Comments. Totally modular (including the removable U/V/CATV tuners and tuner controls), this receiver is equally serviceable in the home or shop, and features highly identifiable stenciled test points. Its well-regulated voltages, sharp convergences, full agc swing, good tuner sensitivity, color temperature, and signal-to-noise measurements allow us to confidently applaud the design and performance of this set.

If we had any criticism, it would be in the 4.08-MHz chroma roll-off, and somewhat wide vector petals. You won't notice it in the video pictures, however. The waveform photos show some degradation at the higher chroma frequencies, but the vector indicates nothing more than a slightly extended chroma bandpass. This results in rise and fall times that are a bit longer than optimum. Otherwise, as both oscilloscope and spectrum analyzer illustrate, luma and chroma, including a full 4-MHz bandwidth at the CRT, are considerably better than most high-end competition, and represent a real improvement over just about any set in this price range.

—Stan Prentiss

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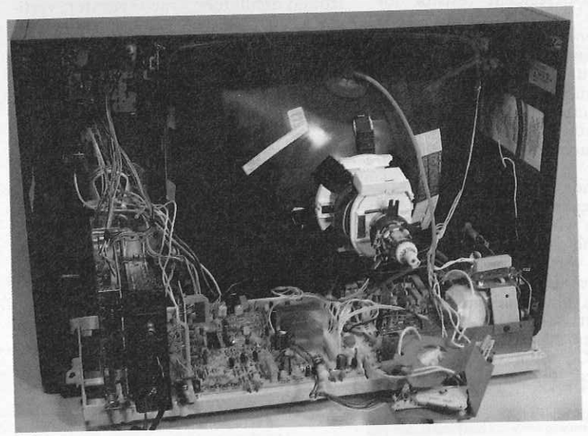
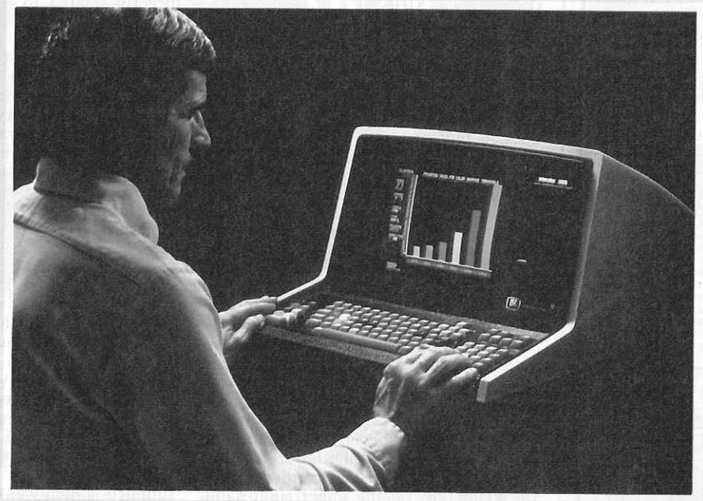


The modular chassis construction is easily serviceable at home or in the shop with well-identified test points.

Popular Electronics Tests



Intelligent Systems Model 3651 Microcomputer System

FITTING into a unique class of equipment called intelligent terminals, the Model 3651 desktop microcomputer system from Intelligent Systems Corp. features an 8080 microprocessor, 5048 CRT controller, built-in single-density 5.25-in. floppy disk, RS-232 serial port, and expansion port. Typical pricing for the Model 3651 with a 72-to-117 incremental keyboard, 32K bytes for RAM, and a single-density disk drive is $2355. For software such as FORTRAN, Editors, Assemblers, and games, expect to pay from $20 to $300. You can use any soft-sectored 5.25-in. diskettes with the system, but ISC charges only $4 for formatted diskettes. Buy them directly and save up to $20.

The 13-in. diagonal CRT can display eight foreground and eight background colors: red, green, blue, yellow, magenta, cyan, black, and white. The display format is 64 ASCII characters arranged in a 5 by 7 matrix using a 6 by 8 character cell. There are 64 characters per line and 32 lines per screen (or when operating with double-sized characters, 16 lines per screen). In addition, the unit displays 64 special graphics characters in a 6 by 8 matrix and offers a resolution of 128 by 128 for vector-style graphics. Although the unit has the ability to display upper/lower case, as configured only upper case is supported. You can either write your own PROM or order a full upper/lower case character generator from ISC.

The 8080 microprocessor operates at 2 MHz and can address up to 64K bytes of RAM, however, the unit under evaluation had only 32K bytes. In addition to RAM, the unit sports 16K bytes of ROM that contains the operating system and BASIC. An additional 8K bytes of ROM can be added for plot-function keys which was the case in the unit tested.

The Model 3651 arranges memory with 4K bytes of RAM used for CRT screen refresh, 4K bytes for disk buffer, and up to 32K bytes for user programs. Although the latter memory space may appear as a restriction, it isn't since the system is designed to work in concert with a larger system as a graphics display and input terminal.

To support the function as a terminal and to work as a stand-alone unit, the Model 3651 has a user-programmable RS-232 serial port for connection either to a printer or modem and can operate from 110 to 9600 baud. The 50-pin extension bus permits interfacing to a variety of equipment including an STDZ80 bus.

Software Features. The Intelligent Systems computer has a number of built-in software features that make it an exciting machine. Editing functions, for example, include a page-roll mode which permits paging of large listings, and the ability to erase a line or a page (insert/delete).

Included in the ROM code is an extended disk BASIC that uses 27 statements. Because the Model 3651 is designed to handle graphics, 18-math functions are included, as well as nine string functions.

Not CP/M. Although the ISC system does support disk I/O, the control program isn't CP/M. For this model, ISC elected to employ a file control system that permits twelve functions: COPY, DELETE, DEVICE, DIRECTORY, EXECUTIVE, INITIALIZE, LOAD, READ, RENAME, RUN, SAVE, and WRITE. It will backup, duplicate, merge, print, and file files, and it also has the unique ability to save or load a graphics screen. This latter attribute makes it possible to call a graphics screen off the disk in a background operation, and have it displayed instantly rather than redrawing it.

Should you be more comfortable with CP/M, ISC offers other intelligent terminals that use this popular operating system.

The 3651 can support up to three 5.25-in. drives and four 8-in. drives. The former is single-density with 92,160 bytes per drive or 184,320 bytes for the double-density version. The 8-in. models

handle 295,680 bytes single-density and 591,360 bytes in double-density.

The 3651 is housed in a plastic package that measures 13.75 in. high by 19.75 in. wide by 27 in. deep including the built-in keyboard. Total weight of the system is 51 lb.

Evaluation. The Model 3651 under test came with a printed warning that it has not been tested for compliance with FCC rules for RFI or EMI emissions, and may cause interference. The system does in fact generate interference that was found to cover a broad spectrum of channels, including 2, 3, 4, 7, 13, and 32. On opening the unit, we found no serious attempt at shielding or adequate signal grounding. Interestingly, though, we found no ringing on the bus while the processor was active, nor any interference to the integrated disk drive. However, we did notice some slight ballooning of the display on disk access.

At turn-on (rear-apron switch), the system immediately comes up in BASIC. The manual warns that the cap lock key must be down to enter upper-case characters. In the lower-case mode, you get the 64 special characters—as previously mentioned, no lower case.

Reset is accomplished by depressing the RESET key on the upper right-hand corner. Doing so results in a green-and-cyan display in normal-height characters saying: CRT MODE V9.80. When first turned on, however, the system comes up in BASIC giving the version (in this case 9.80) and the number of unused bytes available (32,094). You can achieve the same result by holding down the COMMAND key on the left-hand auxiliary keypad and depressing RESET.

The CONTROL, or COMMAND, key on the auxiliary keypad is used to switch the foreground and background colors. This is accomplished by depressing either key and the appropriate color key. To select a black background, for example, tap either of the previously mentioned keys and either the black key on the auxiliary keypad or the P key. To select a foreground color, tap the FLG ON/FLG OFF function key on the top row and again depress CONTROL or COMMAND and the desired color key.

We employ a single-speed test to show the power of a microsystem. This test is designed to push the contents of memory onto the system stack until memory limits are reached, pointers are lost (a condition that occurs in many two-level BASIC implementations), or an error is produced.

The test consists of entering one BASIC statement—10 GOSUB 10—running it, and noting the time elapsed before an error or out-of-memory condition is produced. In the case of the ISC unit we tested, 1.9 seconds were required for the out-of-memory error to display. Although neither the system, nor its BASIC can be considered fast, this creates no problem since the machine isn't intended to be used as a number cruncher or a speed demon.

Surprisingly, this speed limitation is least critical for graphics display. Most of the high-speed calculations are done on a host with the ISC system serving as an output device. The plotting speed is directly related to the stack operation and (as such) is slow—but with very good resolution.

Normally, we test a unit's file-handling capability using specialized programs that check the read/write channels, error capability of the machine, and so forth. We ran these programs and found the disk handling to be slow but accurate. We also discovered that ISC likes to rely on memory-resident data for display, and treats disk systems almost as very slow virtual memory.

Conclusion. The 3651 shouldn't be confused with systems designed specifically for business. It should, however, be looked on favorably as a graphics input/output terminal device for use in special applications.

The unit we reviewed reminded us of the CompuColor Imagination Machine, which was discontinued because of RFI problems. The 3651 appears to be the Imagination Machine repackaged in a unitized enclosure. And the software supplied is identical to that made available with the previous design.

We are intrigued that ISC chose the mature and extremely economical 8080 microprocessor for the 3651's CPU, and that the 3651 contains a low-level file management system when the trend is toward more powerful operating systems—even for "intelligent" graphics terminals. However, we felt that upper/lower case should have been standard, and it would be nice to have an LED display on the disk drive so activity can be observed.

We did like the way the keyboard was laid out and the use of special keys to handle mundane tasks like resetting, booting, clearing the screen and so forth. Here, improvement over the Imagination Machine was quite noticeable. Furthermore, we really liked the 3651's ability to rapidly change foreground/background colors, to set up nine scrolling windows, and to generate well over 4000 color shades.

The 3651 is a powerful color graphics system with exceptionally good video presentation for data. Its NTSC raster scan was exceptionally tight and sharp and free of flicker. ISC offers a full range of options to make the machine even more powerful, including a CP/M update, and a host of user-oriented applications such as a full-featured word-processor package.

Should you be interested in computer graphics, approach the buying decision carefully. If color capability is really important then you can't go too far wrong with the ISC Model 3651. Be aware, though, that ISC offers many options and it's up to you to specify the correct mixture.—*Carl Warren*

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