

# INTERFACE<sup>TM</sup>

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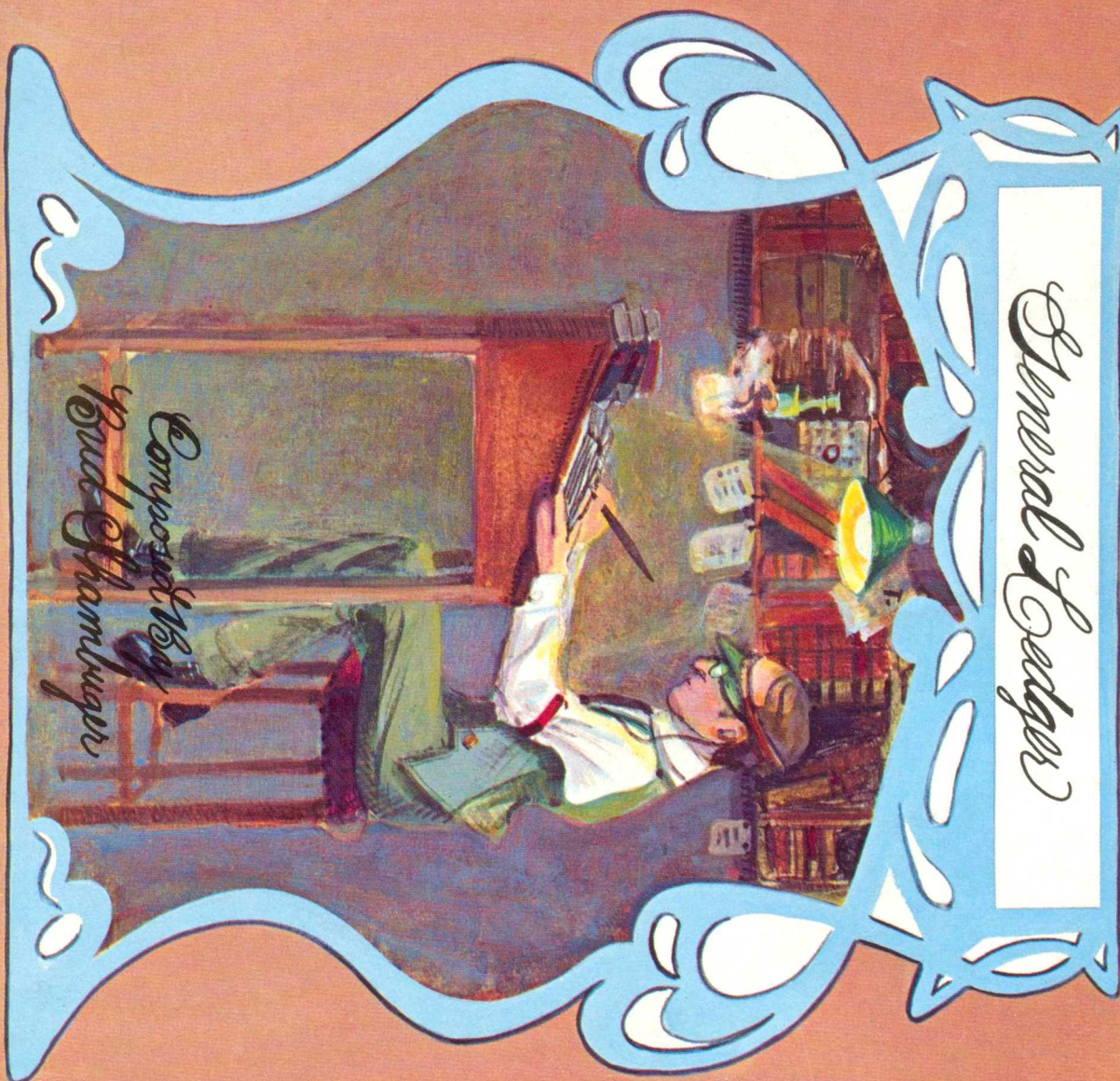
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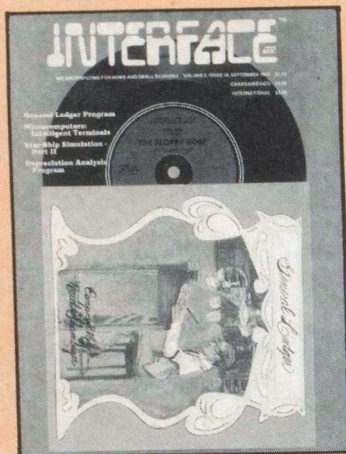
**General Ledger Program**

**Microcomputers:  
Intelligent Terminals**

**Star-Ship Simulation -  
Part II**

**Depreciation Analysis  
Program**





## COVER STORY

In this month's cover our artist Marilyn Joyce salutes a hundred years of bookkeeping represented by the Dickens-esque figure at his high desk with sleeve protectors and green eyeshade and Bud Shamburger with his micro-bookmaker, the Altair™ 8800B and its floppy disc peripherals.

Last year so much was heard about the scientific milestones on our nation's 200-year journey. Most of them make us famous; some make us notorious, and many have added to our everyday convenience in a quiet manner. The development in the mechanics of accountancy are one such milestone. Double entry bookkeeping has been with us since the Renaissance in Italy. Since then the tedium of the work has never seriously been questioned when weighed against the advantages to both citizen and State. Now much of the tedium is relegated to the computer and the advantages of evaluating wealth remain for the owner and his taxman. You've come a long way, Cratchit!

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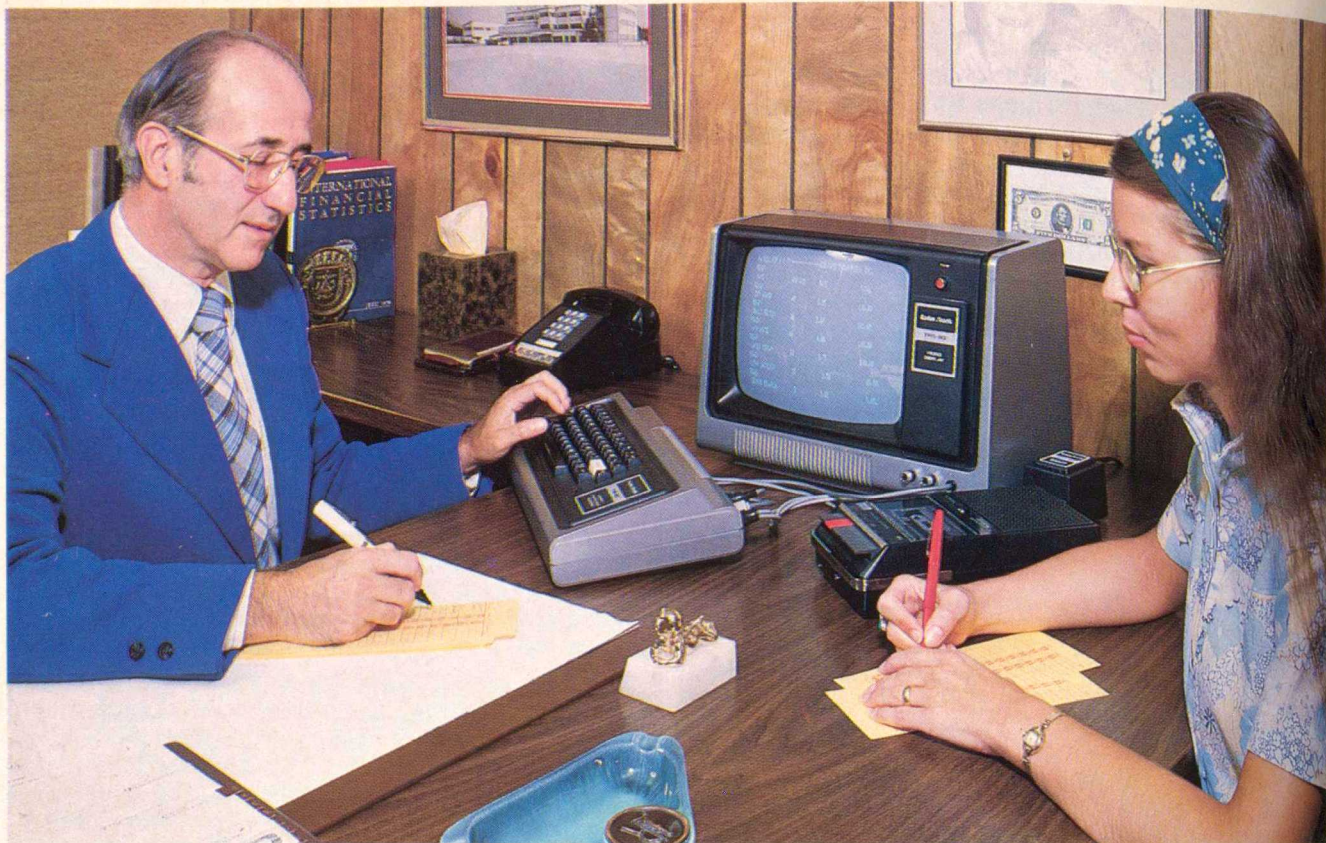
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time GL2 is run contains only the monthly actual figures which were extracted from the ledger. The ledger balance forwards are used for the Y.T.D. actual figures. Therefore this program actually works with two different data files, depending on whether you are running the monthly or Y.T.D. run. The same holds true for the statistical reports. The statistical reports extend the budget one step further and break down all the figures on a per-unit basis. In my case it is motel rooms occupied and available whether occupied or not. You can modify this portion to suit your own needs.

**Program COPRAN (Figure 30)** — This is a general purpose utility program used throughout the general ledger package. It is used for transferring data from one file to the next, for copying files, for copying portions of files, etc. This version is almost the same as that version included with the Payroll Package in the June issue of INTERFACE AGE. However, this version has been modified to work with the program GLMENU and to support the general ledger package of programs.

**Program GETPUT (Figure 31)** — This is another utility program used for changing data in any of the general ledger random data files. You can insert or delete from 1 to 128 characters to any sector. It dumps

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# The Radio Shack TRS-80 Microcomputer System

by Steven W. Leininger

Engineering Manager, Tandy Advanced Products

The new Radio Shack TRS-80 microcomputer system incorporates many design features which work together, giving users a higher performance/price ratio than has been previously available. The basic \$599.95 system consists of four components: the TRS-80 microcomputer, 12-inch video monitor, power supply, and cassette recorder.

The TRS-80 microcomputer is housed in a rugged ABS plastic case. What at first may appear to be merely an alphanumeric keyboard assembly is in fact an entire microcomputer. Figure 1 shows a block diagram of the contents of the TRS-80 microcomputer.

The Z-80 microprocessor chip was selected for use in the TRS-80 microcomputer. The decision to use the Z-80 CPU was made after careful examination of the available CPUs. After comparing the amount of hardware required to use the various microprocessors, the actual chip cost, the efficiency of the machine's language, and the availability of prototyping equipment, it became apparent that the Z-80 was the hands-down winner.

The Z-80 address, data, and control lines are buffered and routed to the different functional blocks in the TRS-80. The clock input to the Z-80 is derived from the video counter chain and has a period of 563 nanoseconds.

The ROMs contain the Radio Shack Level I BASIC, the

keyboard scanning routines, the video display drivers, and the cassette interface routines. These ROMs are of the mask-programmable (non-erasable) variety, and total 4096 eight bit bytes — up to 12K bytes of ROM can be supported using the jumper selectors internal to the TRS-80.

The TRS-80 uses dynamic RAMs for the main program storage area. By using simple jumper options, 4K, 8K, and 16K RAMs can be used to tailor the internal memory size as required. All dynamic memories require periodic refreshing to prevent loss of their stored memory data.

The TRS-80 microcomputer takes advantage of the automatic refresh capabilities of the Z-80 CPU to reduce the hardware overhead normally associated with dynamic RAMs to just a couple of ICs.

The keyboard is a full size, professional quality 53-key unit. The interface between the keyboard and the microprocessor is elegant in its hardware simplicity. Each switch on the keyboard represents a cross-point on an 8 x 8 matrix. The matrix input is driven by the eight low-order address bits through open collector buffers. The matrix output is sensed by inverting tri-state buffers. Through software manipulation of the address lines, any key enclosures can be sensed and decoded, thus providing complete keyboard encoding at a very low cost.



Radio Shack TRS-80 Microcomputer System