UNIQUE, NEW PROJECTS!

* An Audio Time-Delay System
* A Hand-Held Computer Terminal
* A Tone-Signaling Logic Probe

Lab Tests: Car Radio/Tape Models

LOUDNESS   DX

FM   EJECT

ST   LD   FM 88   92   96 100 104   08   MHz
            AM 5⁴ 6   7   8 10 12 1   16   KHz

FILTER   CrO₂/FeC² TP   FM STEREO PRGM.

Also ... Stan Prentiss Looks At Magnavox's
New ... or TV Receiver With
Comb-Futer Technology

BUILD A · BY DARREL LOWERY

LED PENDULUM
for Digital Clocks

### Give your modern clock an old-fashioned look

THE CIRCUIT shown here can be used to give an electronic digital clock the appearance of having a pendulum that swings back and forth just like an old-fashioned clock.

Three inverters within a 7404 hex inverter are used as the clock, with a resistor and capacitor determining clock speed (hence, the pendulum "swing" speed). These elements can be changed in value to increase or decrease the speed of the pendulum.

The clock signal is gated by NAND gates in the 7400 into the up or down count pins of a 74193 synchronous up/down counter. The up or down counting mode is selected by the two remaining gates of the 7400 that are wired as a setreset flip-lop. This flip-flop changes state when the pendulum is at either end of its swing.

The four outputs of the 74193 drive the 7442, a 4-line to 10-line decoder. The 10 outputs of this IC are connected to 10 LEDs. Each of the 10 outputs remains high, with a "low" travelling through them with the input count. As each pin goes low, its associated LED glows as its circuit is completed. The 7442 can sink up to 16 mA. If more current is needed, substitute a 7445. This IC can handle up to 80 mA.

Note that the 10 LEDs are physically arranged so that they appear to be in a pendulum arc. ◇
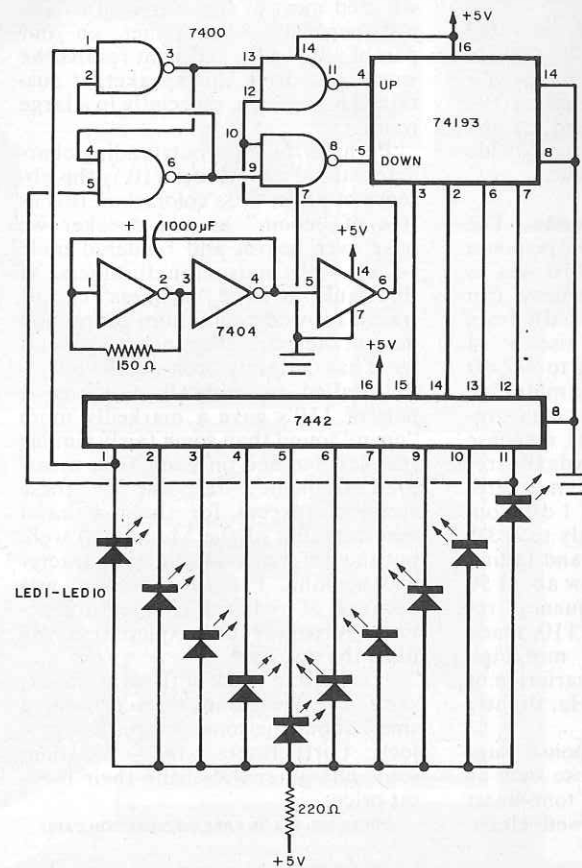

COUPLING TO TTL LOGIC

BY BRUCE CUNNINGHAM

THE MOST common form of IC logic in use today is transistor-transistor logic (TTL). Although a single TTL stage can drive several other TTL stages, its output current is limited to 16 mA. Thus, for a TTL stage to drive a high-power circuit, some interface must be used. Usually, this takes the form of a discrete transistor that can tolerate the current and voltage requirements of the load. Such a circuit is shown here.

To determine $R1$ (which controls the transistor base current), divide the current through the load by the beta of the transistor. The value of $R1$ can then be found by dividing 4.1 V (the +5-volt supply minus the 0.9-volt drop of $Q1$ and $D1$) by the base current, and subtracting the 130 ohms of the IC internal resistor.

For example, assume a transistor with a beta of 75, a 40-ohm load, and a +20-volt supply. The TTL IC, of course, is operated at its conventional +5 V. The load current is found from 20 V/40 ohms, or 500 mA. Base current is approximately 500 mA/75 or 6.67 mA. The total resistance in series with the base is 4.1 V/6.67 mA or 615 ohms. Subtracting the 130 ohms of IC internal resistance leaves 485 ohms as the value of $R1$. However, to insure full saturation of the transistor, make $R1$ 10 to 20% less than the calculated value. ◇
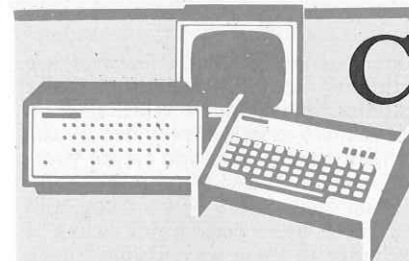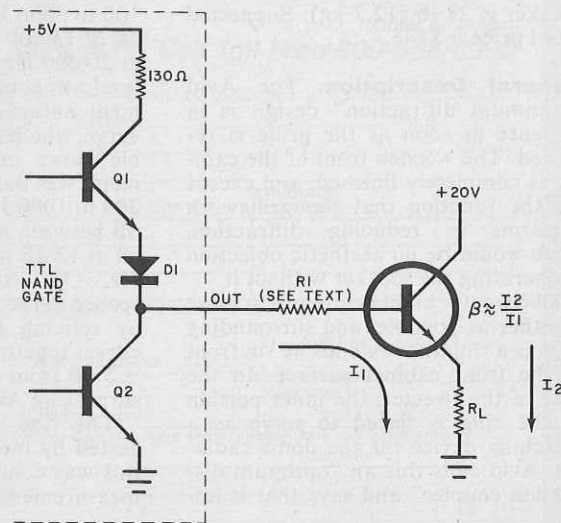

Computer Bits

By Carl Warren

Rounding Out a System

DURING the past few months, a number of new items have become available to increase the usability of your personal computer system. Possibly one of the most exciting, at least to me, is the new printer offered by Centronics.

The printer, Model 737, looks like the company's Model 730 with a face lift. However, there is really more to it than that. The Model 737, which is priced at $995, still features a low profile, but introduces letter-quality printing using a dot matrix head.
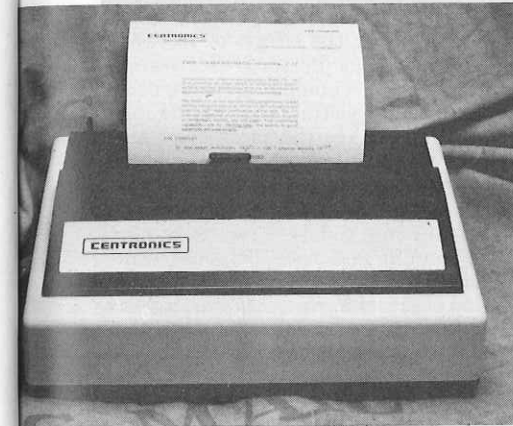
Centronics Model 737 Printer.

Other features of the new printer include:
☐ True proportional spacing, making the printer ideal for use in low-volume word-processing applications.
☐ Printing formats ranging up to 132 columns in the expanded print mode.
☐ Forward and reverse line-feeds, which make it possible to enter super- and subscripts in the printed text.
☐ Underlining, and expanded characters to enhance copy.
The printer comes equipped with a parallel interface. An RS-232 serial interface is also available as an option. The machine can use either roll paper, fan fold or single sheets. Like the Model 730, the 737 can handle multiple copies such as invoices (five plus an original). A summary of the specifications for this new printer is given in the table.
Centronics is not abandoning the Model 730, but has, instead, made it even more accessible to users who want hard copy at a low price. As of February of this year, the Model 730 was reduced by $200, to $795.

SPECIFICATIONS
Centronics Model 737 Printer

Speed: 22 lines/min. at 80 char./line or 60 lines/min. at 20 char./line, justify left
Characters/Line: 80 max. (10 cpi); 132 max. (16.7 cpi)
Print Width: 8 in.
Character Structure: N×9 dot matrix (proportionally spaced) or 7×8 dot matrix (monospaced)
Line Feed Buffer: Capacity for 255 pending line feed
Line Feed Repeat Rate: 12 line feeds/sec
Vertical Spacing: 6 lines/inch
Horizontal Spacing: Monospaced: 10 or 16.7 char./in. Proportional: 8.2 to 24.6 cpi depending on text; 13 to 14.5 cpi avg. density. Numerics monospaced at 12.5 cpi for tabulating data.
Character Sets: Primary: 96 US ASCII proportionally spaced characters Secondary: 96 US ASCII monospaced characters
Input Data Format: 7 parallel data bits
Input Data Rate: Up to 2200 char./second
Size: 14½"W × 11"D × 5"H
Weight: 12 lb

Hard-disk Technology is on everyone's mind right now, especially with the availability of the new 8-in. hard-disk Winchester type drives. The most popular drive seems to be the one manufactured by International Memories Inc. (IMI). This particular drive has been picked up by a number of Original Equipment Manufacturers (OEMs) for incorporation into either complete computer systems or as subsystems for the more popular microcomputers.

One of the newest entrants to the subsystem market place is the LOBO Model 7710 hard-disk memory system. It incorporates the IMI drive, a controller, and related software.

The LOBO drive is designed to be used with a Radio Shack TRS-80, Apple, or any S-100 bus microcomputer. According to the company, the 7710 is *completely* compatible with the disk operating systems used by these computers for floppy drives, with little or no modification. The new unit, which is available now, is priced at $4995, and fits in approximately the same space as a standard 8-in. floppy drive.
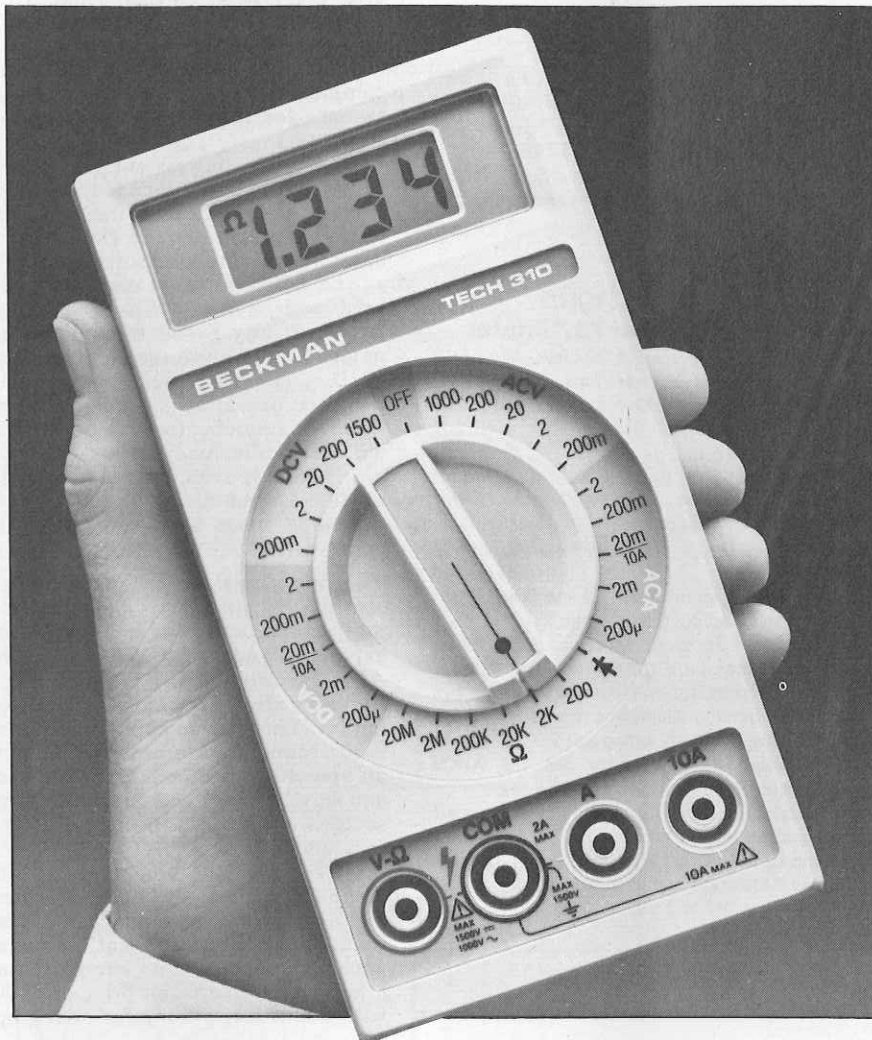
The Imagination Machine. When considering your first machine, you may want to start out small and then expand. Should this be the case, then APF Electronics IM-1 Imagination Machine might be what you are looking for. This microcomputer system is built around the Motorola 6800 and is an upward-growth machine. The user can buy it as a game and add items such as a keyboard, printer disk system, and a modem.

APF views the Imagination Machine as a home entertainment center, and has developed a number of educational and entertainment software packages to go with it. The IM-1 has a base suggested retail price of $500, with additional pricing for added op-

APF Electronics IM-1 Imagination Machine with peripherals.

tions. Among its many features are both hi- and low-resolution color graphics, and a sound synthesizer to add realism to games provided by the company or the ones you create yourself using APF BASIC.

Should education be your bag, and you have been considering using a computer in some way, Radio Shack is willing to lend a hand. It has recently made available a 27-page booklet that briefly describes a microcomputer in the classroom, and provides some guidelines for selecting a system. Although the booklet carries a price tag of $1.00, it is available free from most Radio Shack retail stores.

Using Your Computer. When you bought your personal computer, and perhaps tried justifying it to your spouse, the first question that probably popped up was: "Now that you have it, what will you do with it?" When the personal computer industry got started, the only answer was to learn about computers. But that has changed a great deal. This is most likely owing to the efforts of software makers such as Personal Software®. The goal of this company, whose president is Dan Fylstra, is to provide software that makes the microcomputer really worthwhile to own, in the home and the office.

One of the first things that Dan and his company did was to determine who bought and used personal computers, and for what. Basically, they found that the microcomputer was bought as an entertainment system and for learning purposes.

Among the company's many software offerings are: A backgammon-type of game called "Gammon Gambler" at $19.95 for either the Apple or Commodore PET. This one's a hard one to beat because it thinks along with you and learns with every move. Also in the game field is "Checker King" for the Apple, TRS-80, and Commodore PET. This game is really a challenge, and for $19.95 will keep you busy for hours.

Although there are more games than the foregoing, Personal Software has other types of offerings. Specifically, it has either developed or acquired software packages that are designed for the professional. These include VisiCalc®, which stands for visual calculator. This package, priced at $150, is for the Apple, TRS-80, PET, and, by the time you read this, the Atari 800 personal computers.

VisiCalc is a dynamic program that allows you to build tables of virtually any type of data important to you. Further, you can take some form of action on the data by specifying, through user-defined formulas, how each data item is to act with or react to another data item. For example, the total of columns or rows can be

generated or percentages taken of various items and placed into separated data fields, without user intervention.

This software package is only the tip of the iceberg since the company is making all the business-type software inter-compatible. For instance, one of the newly acquired packages is the CCA Data Management system for the Apple ($99.50) which features Index Sequential Access Method (ISAM) files. This data manager can be used with VisiCalc-created files to allow you to pull various types of data from the individual records. Personal Software has made this package available for the Radio Shack TRS-80 ($74.50), but without the ISAM feature.

Following the same line is Desktop Plan® ($99.50) for the Apple computer. This package, like the data base manager, can use the file created by VisiCalc and is intended for financial analysts who want to create models for complex business problems.

According to company spokesman Bill Langenes, two other software systems geared for the professional will be available later this year. These new systems are called TrendCalc®, for statistical analysis, and VisiPlot®, to create graphs of data in various for-

VisiCalc being used on an Apple II.

mats on the CRT or printer. These packages will be for the Apple computer at first, with similar packages for the TRS-80, Atari-800, and PET to be made available at a later date. All the professional programs are geared to work in tandem and give the businessman the flexibility he or she

may be looking for with his microcomputer.

Although most of the programs being developed by Personal Software are for either the Apple or TRS-80, the company does have plans to develop similar packages for the Heath/Zenith H-89 microcomputer. As you read this, VisiCalc is being made available for users of this machine.

Word-processing is another important application for microcomputers. Several different types of editors and formatters are available on the market today. Among the most useful is a formatter named "Textwriter." This software system was developed by Organic Software for systems of the CP/M and Northstar type. However, Lifeboat Assoc. has modified it for a number of systems, including Heath and Radio Shack.

Although this formatter is designed to be used with your system editor (or one of the editors available from Lifeboat), it offers more power than the so-called integrated packages. With the Textwriter system, you can format text in just about any way you want. This includes specifying footnotes. The footnoting is very important because the note goes at the proper loca-

BASIC PROGRAMMER'S SHEET

Program Name: ASCII HANDLER   Page 1 of 2
Programmer: CARL WARREN   Date: 4-9-80   Project no/name: DEMO
Program length in lines: 12   Bytes: ___   Version of BASIC: TRS-80 1.1
Cross reference: ___

LINE #	BASIC STATEMENT	REMARKS
10	CLEAR 800: CLS	CLEAR SOME SPACE IN MEMORY AND CLEAR THE SCREEN
20	OPEN "I", 1, FN$	OPEN FOR INPUT ONLY ON CHANNEL NO.1. THE FILE NAME POINTED TO BY THE VARIABLE FN$. THIS IS USED SO THE CALLING PROGRAM CAN NAME FILES.
30	FOR I=1 TO 15	COUNT LINES
40	IF EOF(1) THEN 120	IF FILE POINTER IS AT END GO TO ENDING ROUTINE
50	LINE INPUT #1, M$	GET THE MESSAGE FROM FILE
60	M$ = MID$(M$, 5, 255)	ADJUST THE VARIABLE M$ TO BEGIN AT 5TH POSITION (ALLOWS FOR SPACES)

BASIC PROGRAMMER'S SHEET

Program Name: ASCII HANDLER   Page 2 of 2
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Cross reference: ___

LINE #	BASIC STATEMENT	REMARKS
70	IF I=15 THEN 100	GET READY TO PAGE IF TEST IS TRUE
80	PRINT M$	OUTPUT THE MESSAGE
90	NEXT I	NOT AT END KEEP GOING
100	LINE INPUT "DEPRESS ENTER TO CONTINUE"; CC$	PAGE COMMAND
110	GO TO 30	GO BACK AND RESET COUNTER I
120	CLOSE; END	SEVERAL DIRECTIONS CAN BE HERE INCLUDING A RETURN IF USED AS A SUB-ROUTINE

A program such as this can be used to call up data stored in a TRS-80.

tion on the page without causing an overflow on the page. Also, should the footnote be larger than the space available on the page, the remainder of the note is passed onto the page buffer for the next page so it appears at the bottom as it should.

The Textwriter package is patterned after larger mainframe-type processors and, consequently, is made for professional use. This, naturally, has two connotations. Yes, there are a number of commands required to make the package work correctly. So it is not intended for use by the average, unskilled worker. Second, the formatter allows the professional bookwriter, researcher, et al, to format his or her copy in a manner that is most suitable for publication.

Features of the system include: chaptering, where the system allows you to name a chapter and provides running heads and title pages; indexing as the text is being built, or at any convenient time (key words or phrases can be identified to be included in an index). Textwriter will not only form the index, but alphabetize it with correct page numbers. These are only a few of the functions in the package, but by themselves they make it worth the $125.

File Programs. Along the software line, here is a helpful hint for the month.

You may not be aware that you can handle some of your data files in an efficient manner to assist you in the creation of messages, typing letters, etc. You can do this by developing your files with either a program written in BASIC or with your text editor, saving the information in ASCII (so that the information is in the same form in which it was written, without compressing it in anyway).

Files that are saved in ASCII format can then be read using a BASIC program sheet like the one shown here, and manipulated in almost any manner that you want. The program that is shown assumes that you have data saved in a file, in this case on a Radio Shack TRS-80, and want to call it up for some kind of help.

This routine can be incorporated into any one of your programs. With a little imagination, the calling routine can specify parameters to be passed to open different information files. A programming worksheet such as that shown is a valuable item, and is designed by you. Its use will save you moves when designing a program from scratch. ◇