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Crystal Ball

As most of you probably have heard by now, Radio Shack has announced a larger computer, the TRS-80 model II. I'd like to start out this month with some commentary on it (caution: I have not seen it, it is probably still in the design phase, and I have no "inside data" from Radio Shack).

The first comment is a complaint. We already have a TRS-80 level II, why in the world name the new one the TRS-80 model II? Instant confusion. Why not the TRS-85? The TRS-800 or 8000? The TRS-80 III? Or the TRS-80P (for Professional - also rhymes with ADP for Automated Data Processing)? From a marketing standpoint, it is important for the name to change only enough to indicate an upgraded design (many coins went into making TRS-80 synonymous with "friendly computer"), but I can only imagine the upcoming thousands of sales hours which are going to be spent unravelling confusion resulting from comparing a TRS-80 level II with a TRS-80 model II. End of complaint.

Now let's back up to March of 1978, when yours truly talked of the hazards of setting up a TRS-80 (level II 16K cassette - based system) with tasks normally reserved for the larger mainframes. At the time, I was rather cool on the idea, based on the inability of the computer to handle large amounts of data (absolutely imperative for business use). The problems at the time were that the computer hardware was well designed and well built, but had little applications software (an example of applications software would be an accounts receivable program - as opposed to systems software like BASIC or TRSDOS). The cost of the hardware was exceptionally low compared to its abilities, but the cost of custom software would eliminate any price advantage obtained here. It all added up to "not recommended at this time".

Now let's step forward a year. The TRS-80 has sprouted disks and has enough software to make it a useful tool, and the market has been fairly well defined. The full - blown TRS-80 has a configuration consisting of a maximum memory size of 48K, a maximum on-line disk storage of 350 K (about 300K for user programs and data), a 1.7 MHz clock, and a 3/4 second average disk access time. This is not bad at all, and it is still the best hardware deal around for anything in its size. It is (personal opinion here) not large enough for a business to use for general recordkeeping. And the market includes a lot of people who need to do just that, and are willing to part with some long green to help get it done.

The TRS-II (that's what I call it, anyway) has been brought out to fill this market, and coincidentally to collect some of that long green. The basic configuration of the TRS-II will include one 512K (8") disk drive and 32K of RAM, expandable to a full 64K (do it). There are a couple of serial ports and a Centronics parallel port built in, so just about any printer will do (if you're serious about computing, hard copy is not really an option). There is a disk expansion port which will feed up to 3 more disk drives, for a total of about 2 megabytes. That's 2,000 kilobytes, or about six times as much space (once reasonable system overhead is allowed for) as the TRS-80 large system. The system clock is set at 4 MHz, so it will "think" about twice as fast. The disk access time has not been specified, but a typical modern 8" disk drive averages in at 1/3 second, or a bit over twice as fast. This allows, among other things, a more

extensive use of "overlays" in the operating system software. This is the technique of putting rarely used commands in a library on the disk, and loading them in only when they are needed. This frees up more room in RAM for the user, and also allows a sophisticated user to invent and implement new commands (e.g. Halt and Catch Fire).

There are several other niceties such as a 24-line-by-80-character screen, upper and lower case letters, a phantom bootstrap ROM, a detachable keyboard and (presumably) a bus oriented mainframe (giving more flexibility to the inevitable additions and accessories by Radio Shack and others). Your local jive salesman at your local store has some more data on these, as well as a few pictures.

The $4000 question for all you business types out there is this: should I retire my current computer and get the big guy, or is this upgrade business a never-ending process designed to run me into digital insolvency? The answer depends a lot on the degree your current computer is used. If you don't relate to your current computer, never "got the hang" of BASIC, or never analyzed your business operation with "computerization" in mind, the best bet is to keep programming until you can see how all this folderol can actually be useful. A more powerful computer is more muscular, but it is not inherently any smarter, so you (or a very, very trustworthy employee) will still have to understand what's happening. If you feel the price is a bit steep, I will certainly concede that a couple of thousand dollars will still buy an awful lot of beer. It has been my observation, however, that I've never once bought a tool which didn't earn its keep, and that although four grand is a serious investment, it is not prohibitive for most businesses.

If you are currently using your TRS-80 and are frustrated by its lack of memory size, speed, or (most importantly) disk storage space, I'd definitely recommend the TRS-II. If you do much writing, there is a thing that computers do called "text editing". Instead of typing onto a sheet of paper, you type into the computer's memory and save the text on disk. The fact that it is in memory allows unlimited capabilities to alter, delete, move and generally have fun with your text. The two disadvantages of text editing are 1) you need a computer with an upper and lower case screen and a very good keyboard, and 2) you will never be able to put up with a typewriter again. The TRS-II is perfect for this use, even without the extra 32K (although it's still recommended).

How powerful is it? The Radio Shack flyer pegs it to be roughly as powerful as the low-end IBM machine, the 5110. What they don't mention is that IBM gives no software support whatever to the 5110. Based on this alone, I'd rather share a TRS-II with three other people than have a 5110 of my own, price notwithstanding (and the 5110 is by no means a shabby machine). I would prefer to compare it to a completely full-blown S-100 system that had adequate software to the task at hand. Even then it's a deal - a fully assembled and debugged S-100 disk system easily costs six to ten thousand dollars.

Announcement: the announcement column has been pre-empted this month to allow more room for the hardware column.

Hardware: this month let's talk a bit on relays and describe how to get a TTL level (which our interface has) to control a switch contact which can in turn control an electrical device. The first order of business is to introduce the concept of electrical current. Electricity has two aspects which must both be

specified to describe the stuff. One is voltage, measured in (strangely enough) volts. The other is current, measured in amps or milliamps. A milliamp is a thousandth of an amp, and an amp is 6,241,800,000,000,000,000 electrons per second. An electron is a fuzzy little ball that few people believe in anyway, but we won't get into that. If you imagine electrical flow in a wire as water flow in a hose, voltage would correspond to the water pressure and current would correspond to the rate at which water is moving, in liters per second (or gallons per minute). Clear as mud, but it covers the ground. Let's get back to relays. As we mentioned last month, a relay is basically a switch that is turned on and off by an electromagnet. The nice thing about them is that a small current (a few milliamps) flowing in the coil is all it takes to control the associated switch contacts which can control several amps. Figure 1 shows a preferred way of doing this. Now that we are experts on current, let's look at the current that flows from the +12 volt supply through R and thence to either Q (the transistor) or IC (the IC). If the IC is on (input hi) then the output is dragged low by providing a good current path to ground, and the current through R will head through the IC. If the input to the IC is low, the output current path is shut off, and the current through R flows through the not-so-good current path through Q. This causes the transistor to turn on and allow current to flow from the +12 volt supply through the relay coil (line with 4 lumps). This current creates a magnetic field which pulls the switch contacts toward the coil, switching the contacts from the right path to the left path. With no current flowing through the input of the transistor, the output current path is shut off and current no longer flows through the coil. A spring in the relay returns the switch contacts to the right hand path. Well, not right away. The coil is an example of an inductor, and current in an inductor gets all huffy about getting shut off. That's the purpose of the diode - to provide a relief valve for this "inductive kick". Omit it and the transistor will fry. If you only need a single switching contact, and are switching a load of less than half an amp or so, the circuit of figure 2 is more appropriate. It needs no transistor driver because the coil is small enough to be controlled directly by the IC. Inputs to the computer next month.

Ralph

TTL level to switch contact converter

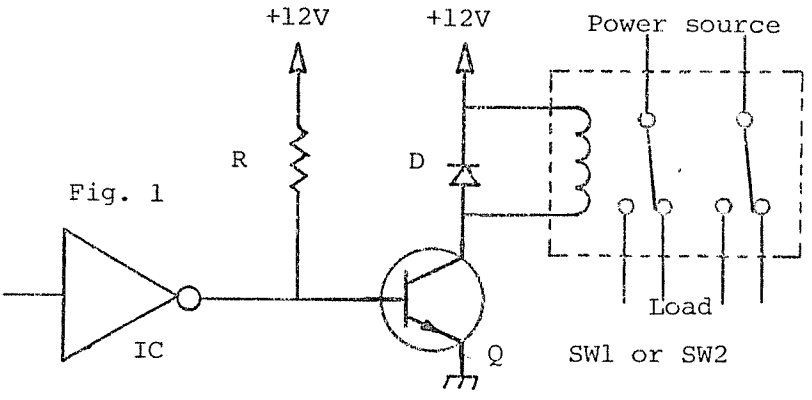

Fig. 1

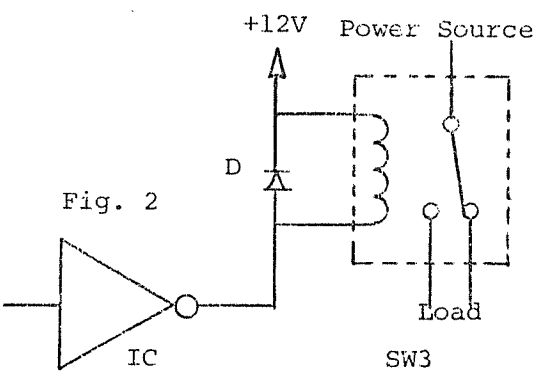

Fig. 2

IC	276-1821	7406 Inverting buffer (open collector)
R	271-023	1000 Ohm, 1/2 Watt carbon resistor
D	276-1101	50 Volt, 1 Amp silicon diode
Q	276-2009	Silicon switching transistor
SW1	275-208	DPDT Relay, 10 Amp contacts, 126 ma coil
SW2	275-206	DPDT Relay, 3 Amp contacts, 50 ma coil
SW3	275-003	SPDT Relay, 1 Amp contacts, 10 ma coil

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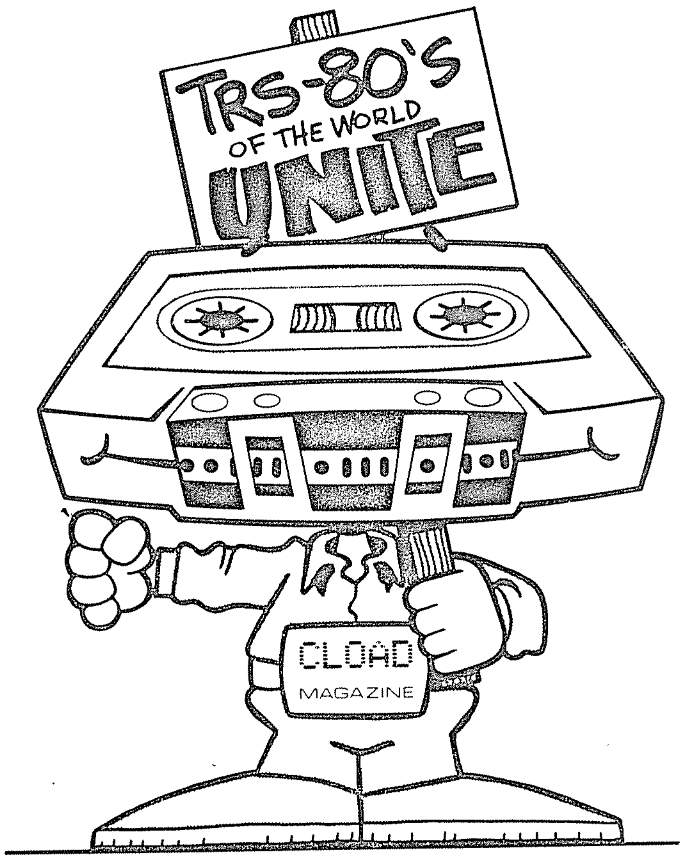

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