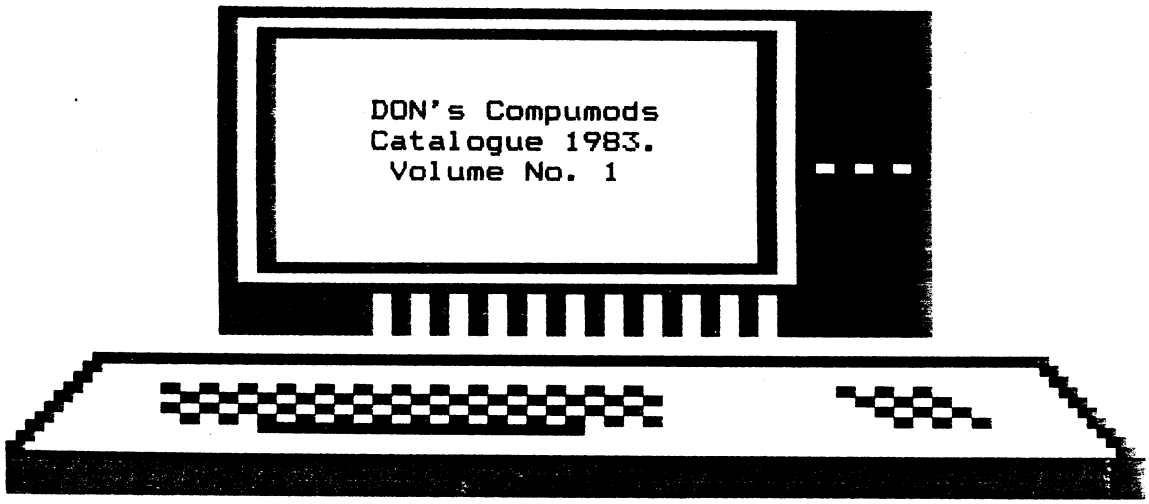
Modifications for SYSTEM 80, TRS 80 Model 1 Level 2, VIDEO GENIE,

P.M.C. 80, TRZ 80 and all other similar type computers.

# DONMODS




FINAL WARNING .....

IN MY CATALOGUE AND INSTRUCTIONS, YOU WILL FIND WARNINGS ABOUT WORKING ON A COMPUTER WITHOUT PRIOR ELECTRONICS EXPERIENCE.
I HAVE DONE THIS FOR A REASON.
LET ME TELL YOU A STORY ABOUT A MAN IN SYDNEY, WHO ATTEMPTED TO INSTALL MY 48K MOD., WITHOUT THE REQUIRED EXPERIENCE. HE ENDED UP PAYING $275 TO GET IT WORKING. A PROFESSIONAL COMPUTER SERVICEMAN SPENT 50 HOURS REPAIRING THE MACHINE.
THIS IS NOT A FAIRY TALE !!!!!!!!!!!!!!!
ONCE AGAIN ..... MY INSTALLATION INSTRUCTIONS ARE DESIGNED FOR EXPERIENCED TECHNICIANS AND HOBBYISTS. I STRONGLY RECOMMEND THAT NON-TECHNICAL PERSONS SEEK ASSISTANCE IF FITTING ANY OF MY MODIFICATIONS.
YOU CAN SAVE YOURSELF UNDUE EXPENSE.
IF YOU WISH TO, SEEK OUT ONE OF MY AUTHORIZED MODIFIERS. AT LEAST YOU WILL KNOW WHAT THE END COST WILL BE.
I WILL HELP OUT WITH ANY MIS-UNDERSTANDING OF WIRING INSTRUCTIONS, BUT I CANT FIX A COMPUTER OVER THE PHONE.

# ADELAIDE MICRO-USER News

Registered by Australia Post -- Publication number SBH 2386

MARCH 1983
**********

**NEXT ISSUE'S DEADLINE** 20th Mar

POSTAL ADDRESS ----- 36 STURT ST. ADELAIDE 5000

This newsletter is a monthly circular produced by the members of the ADELAIDE MICRO USER Group who are interested in 6809 or Z80 microprocessor based hardware. This includes the TRS-80, SYSTEM-80 (PMC-80) and 6809 Color Computers but we also cater for those with homebrewed equipment and other areas of special interest.

**EXPIRED ???** ANNUAL SUBSCRIPTION IS $10...CHECK LABEL FOR YOUR EXPIRY DATE *****

NEXT GENERAL MEETING.....********** 7.30 pm THURSDAY 3rd MARCH **** SENIOR CITIZEN CNTR ****
Pre-meeting drinks & 'counter tea' ..... 5.45 pm WAVERLEY HOTEL (25 Unley Rd) **** 18 ARTHUR ST. UNLEY ****

COLOR COMPUTER ..... 4th TUESDAY each month at 7.30 pm meetings at ----==>> **** SERVICE CLUB CENTRE ****
BASIC PROGRAMMING GROUP ... 3rd WEDNESDAY each month at 7.30 pm Organiser Rod Stevenson..... **** 49 OXFORD AVE. UNLEY ****
Z80 M/L & ASSEMBLY GROUP .. 1st WEDNESDAY each month at 7.30 pm Organiser Rod Stevenson ..... (at above address)
6809 M/L & ASSEMBLY GROUP . 2nd MONDAY each month at 7.30 pm Ken Wagnitz or Richard Newcombe.. (at above address)
'TECH TALK' (m/l,hardware). 3rd THURSDAY each month at 7.30 pm Organiser Richard Newcombe..... (at above address)

## committee

| | | |
|---|---|---|
| Rod Stevenson (secretary) | a.h. | 337-6682 |
| | bus. | 51-5241 |
| Richard Newcombe (editor) | a.h. | 272-3081 |
| Dennis Morath | a.h. | 271-7618 |
| Geoff Lane (treasurer) | a.h. | 79-3627 |
| Ian Robertson | a.h. | 263-0653 |
| EDUCATION ..... Greg Sharp | a.h. | 297-1722 |
| SERIOUS GAMERS Ed Grigonis | bus. | 25-9813 |

## groups & information

| | | |
|---|---|---|
| Z80 HARDWARE ..... Allan Dent | a.h. | 276-7233 |
| 6809 HARDWARE ..... Ken Wagnitz | a.h. | 47-7481 |
| SYSTEM-80 USERS ..... John Ross | a.h. | 261-8689 |
| TRS-80 MODEL II ..... Bob Lesiw | a.h. | 46-4102 |
| MODEMS & SOFTWARE ..... Richard Newcombe | a.h. | 272-3081 |
| SUPER-80 USERS ..... Rob Gillespie | a.h. | 382-1909 |
| RADIO HAMS ..... Garry Herden | a.h. | 297-4950 |
| COLOR COMPUTER ..... Steven Eisenberg | a.h. | 250-6214 |
| BUSINESS APPLICATIONS .. Geoff Lane | a.h | 79-3627 |

Mr. Don McKenzie,
29 Ellesmere Crescent,
TULLAMARINE. 3043

Dear Don,

I am pleased that you are happy with our coverage of your hardware and there will be further comment about what John Ross had to say at our last meeting in our next newsletter. I feel most were quite interested not only in the extent of John's modifications to his System 80 but also found the concept of DONMON to be quite an attraction.

We have no objection to your reproduction of any of the content of our newsletters and as a fair proportion of our subscribers (approximately 30%) are interstate and we have gained quite pleasing feedback from readers around Australia. We would like to encourage this and would be quite happy if by any means that you have at hand can spread the good word about our newsletter!! Hopefully Australian groups will begin to interact as much as they do in the U.S.A. for the benefit of all.

Regards,

WHAT THE AIRLINE MICRO USER MAG HAD TO SAY ABOUT DON IN DECEMBER 1982

# SYSTEM 80'ers (From John Ross)

My System 80 is now running under the control of DONMON 2.2 & GENDON 3 lowercase chr. generator. The 3 line descenders look good & is certainly an improvement, there is also several special characters. which could prove useful & it is possible to program the whole 12 rows of the character matrix. Installing the Donmon took about 3 1/2 hours & worked first time. After switching on, I was presented with a menu & it's from here that complete control is taken over. Each time the RESET is pressed, the menu is presented again, allowing me to edit, inspect, jump or return to any point in memory. Under normal operation, if the RESET is hit, the disk reboots & important information is lost. Under the control of Donmon, I have the choice of rebooting or not, or returning to DOS READY. It is also compatible with a number of DOS systems including LDOS

I haven't had time to put it through all of it's paces yet but first impressions of it are good & it solves the keyboard lockup when your program crashes, so that you can retrieve information which would have otherwise been inaccessible. It will certainly be a permanent fixture in my Sys 80 & I will be demonstrating its capabilities at the next meeting. It can be fitted to any TRS 80 Mod 1 or SYS 80

# next meeting

**Richard's "quickie" will be the FIX function.**
**Applied Data Control will be supplying a demonstration of their "little big board".**

**John Ross will be demonstrating his much-modified System 80, and in particular the "DonMon" hardware mods mentioned in the last two Newsletters. He is An Approved Installer, so has some inside information for those of us who suspect the mods are too cheap & believe one never gets more than one pays for - i.e., "greed doesn't pay". Of course well-known is John's expertise with the necessary mods (hardware & software) to make the System 80 compatible with the vast support of the TRS; he'll be willing to divert to this topic if the need arises.**

# SYSTEM 80'ers

**This modification was provided by Don McKenzie who swears by it as being the only correct modification for the SYSTEM-80 32 character mode, apparently as yet unpublished.**

## 32-CHARACTER MODE IN THE SYSTEM-80

Well Rick, It did take a bit longer than promised, but thanks.

As a System-80 owner myself, I was not aware for a long time that the "PRINT CHR$(23);" on my machine produced a less impressive result than on the Tandy Model 1. On a System-80, what you get is normal-sized characters that are double-spaced on the screen, whereas on a Model 1 you get double-sized characters. The double-sized characters on the System-80 are not accessible under software control. Way back in the August and September, 1980 issues, we published a hardware modification developed by Eddy Paay that would allow software to access double-sized characters. However, this did not make the two compatible with respect to the 32-character mode.

The following hardware modification, contributed by Don McKenzie, produces the TRS-80 type 32-character mode on the System-80.

Components required: NIL

All wiring is done on interface card.

1. Cut Z29/11 — Connect Z29/11 to GND.
2. Cut Z29/2 — Connect Z29/2 to Z29/3
3. Cut Z29/14 — Connect Z29/14 to Z29/13
4. Cut Z29/5 — Connect Z29/5 to Z29/6
5. Cut Z37/14 — Connect Z37/14 to Z37/13
6. Cut Z37/11 — Connect Z37/11 to Z37/10

Remove R3 4.7K Resistor (near Q10)
Remove R29 4.7K Resistor (near Z7)

MODSEL SIGNAL

..... Connect Z6/6 to Z7/4
Connect Z7/4 to Z37/1
Connect Z6/5 to Z5/7 (To Z12/11 on boards that have 2114 Video Ram. e.g. Mark 2.)

OPTIONAL

..... Isolate S1 (video-cut switch) and page switch.
This will give you two spare switches.
These switches are not fitted in the later Mark 2. Blue label type computers.

# HARDWARE DON'S INSIDE RUNDOWN ON DONMON.....and other goodies. (from Don Nikolic)

When I came up with the basic concept of DONMON some eight months ago, I made four main rules that I wanted to stick to.

(1) The memory used must be the maximum allowed in the empty 3000 hex. area.

(2) A jump to and from DONMON must be achieved by the press of a single button or key, and any return to a main program must be done without destroying that program.

(3) DONMON must be completely invisible to any operating software regardless of system configuration and be compatible with System 80 type computers as well as TRS 80 Model I level 2 computers.

(4) Get the best possible use out of the allowable memory map by sensible field testing with experienced programmers and users.

Rule (1) wasn't all that easy to define. I had to find out how high in memory I could go before running into problems with disks, clocks, RS-232 interfaces etc. After several hot-line phone calls I was able to convince TANDY that their RS-232 interface was really port addressed, not memory mapped at 37DE, 37DF, as DICK SMITH suggested. Thanks to both organizations for their assistance, but please, can't all that type of information be put on a disk file.

BELIEVE ME... 3000 TO 37DF HEX. IS THE USABLE MEMORY MAP...

Rule (2) at one stage looked like bringing my project to a complete halt. The ZILOG Z80 data sheets told me that a NMI (reset) will store the program counter on the stack. This meant that with a couple of simple register save and restore routines, I could interrupt any program, jump to DONMON using the reset button, execute the DONMON commands, and return to the still running program. The theory was good but it didn't work in practice. After many nights of watching the sun come up, re-writing routines, and looking at the pretty pictures on my C.R.O., I had to accept the fact that I had a bad case of reset button bounce on my TRS-80. I then had to design a small circuit to overcome this problem. Using a flip-flop, I was able to set the NMI line, and reset it using a timing loop in DONMON via the IORQ signal with an OUT instruction. If this sounds like mumbo jumbo to you, then you have been spared from the influence of the dreaded "HARDWARE BUG".

In English, if your computer has reset button bounce, then DONMON will not work correctly until the additional circuit as shown in the manual is wired in. Generally speaking, System 80's do not need the debounce circuit, TRS 80's do.

A jump rom is used to intercept the power up and reset routines. There are three types of jump roms:-

(a) For TRS 80 three chip set (MEMORY SIZE ?)
(b) For TRS 80 two chip set (MEM SIZE ?); and
(c) For System 80 and all other similar type computers.

DONMON

Rule (3) meant that I couldn't "muck about" with ram too much, as any resident program would be destroyed. I have used ram bytes in DONMON that correspond with the same ram usage in basic. My stack has been set to coincide with the input/output buffer. SUPA-UTILITY is the only program found to date, that DONMON will not return to correctly. SUPA-UTILITY will run perfectly with DONMON resident.

Rule (4) I have called the CONTROVERSIAL rule....
You can please some of the people some of the time, but not all of the people all of the time. I have attempted to squeeze as much as possible into a 2K EPROM.

"HEY DON, HOW ABOUT A RENUMBER ROUTINE IN DONMON?"That's the type of question I get quite often, and it's also the reason that I decoded 3900 to 39FF HEX. If people need other routines, then I can give them these routines without destroying my standard DONMON.

DONMON has been written for both code-hackers and basic programmers, and cassette or disk users, and 4K, 16K, 32K, or 48K users, and upper or upper/lower case computers.
(Hey, that's a lot of ands and ors, Don !)

I like to look at DONMON as a "software window", that is, even at powerup, you can take a walk through memory and examine every byte in ascii and hex., or change any memory byte. For those of you not familiar with the DONMON feature, here is a quick rundown:-

Display character set, screen print facility, keyboard driver with shift lock, flashing cursor with control, keyboard beeper, control characters, auto repeat on all keys, lower case video driver, rom and ram check, ascii and hex display of memory, edit memory, deposit data byte in full block of memory, goto hex address, move blocks of memory, reset memory size without destroying basic text, overwrite a new command, write a system tape, etc.

Thanks to Technical Officer Nick Gulovsen, Police Sergeant Terry Stephens, and numerous other members of The Northern and Western Suburbs Computer Users Group, DONMON has been kicked into shape.

The first person who wanted to buy DONMON when it was first demonstrated at a users' group meeting came up with this question. "Hey Don, I have a stringy floppy, can you help me?"
OH NO !!!.... More developement, and I hadn't started.
(Of course the stringy version is now available for F800 Hex.)

The DONMON SHORT FORM KIT includes 2 EPROMS, a bare printed circuit board, manual, and all fitting instructions, and is available at $45 The fitting instructions are designed for experienced hobbyists and technicians. I strongly recommend that non-technical persons seek assistance if fitting any of my modifications.

I have that much faith in DONMON that any customer (including authorized modifiers) can return THE SHORT FORM KIT within 90 days for a full refund, if not completely satisfied.

OTHER GOODIES..... All $12.90 including postage, and full wiring instructions.
Just to straighten out any misunderstandings with my other goodies, the price of PRINDON 779 (was $21) and GENDON 3 (was $10.60) are both $12.90. This has been done to level out the prices of my programmed 2716 EPROMS to a standard $12.90

GENDON 3..... A three line descender character generator for System 80 and TRS 80 type computers.
The original character generators in these computers was mapped out 5 bits wide by 7 bits high. (8 bits high with a one line descender.) By addressing the generator with an extra address and data line, I was able to map out 6 bits wide by 12 bits high, which is the full available space of one character.
This allowed me to output 3 line descender characters. The latest model System 80's now have 3 line descenders.

PRINDON 779..... A lower case character generator for TANDY LINE PRINTER ONE and CENTRONICS 779 printers.

Having used my old upper case only line printer for some time, I became envious of the new super Japanese plastic printers and their capabilities. I had noticed an ad. in a U.S. mag. for a small kit that added lower case to this type of printer for $95. At this point of time I was a little cheesed off with U.S. mail order companies, so I decided to have a crack at it myself. I wish I had never undertaken this task, even for myself, as it developed into a real game of adventure. I'm sure CENTONICS mapped their original rom just to put me off the trail to lower case success. After investing many, many hours into this project, I was able to come up with the full 128 ascii character set, and all those up and down arrows etc. that I had been missing.
NOTE $$$ PRINDON 779 will not give you descenders, as this type of printer was built with seven print pins only.

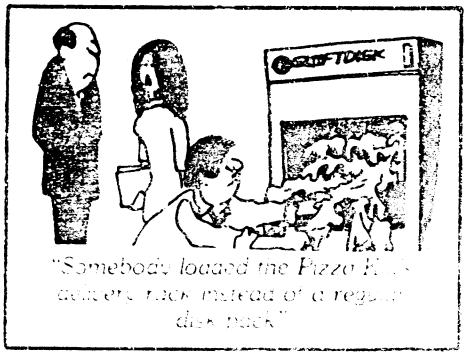
INSTALLATION OF OTHER GOODIES.....
All of my other EPROMS have to be installed in a 24 pin socket, which has previously been mounted on a small matrix board with I.C. solder pads. The matrix board must be jumpered to the main CPU board with two lengths of multi-coloured flat ribbon twelve conductor cable.

For further information on any of my products contact:-

Don McKENZIE
29 Ellesmere Cres., Tullamarine 3043.

or in the Adelaide area:-

John Ross
12 Lindley Rd., Greenacres S.A. 5086 Phone (08) 261 8689




DONMON

FORMERLY 80-U.S.

# Basic Computing

The TRS-80 User Journal

TRS-80 is a trademark of the Tandy Corp

Vol. VI, No. 8 — August, 1983

## Letters

I believe that the article "Lowercase and more", June 1983, unnecessarily complicated the process of adding lowercase to a Model I TRS-80. I have installed, with success every time, the lowercase modification in several machines and I do not consider myself a hardware hacker. The easiest lowercase modification involves only one I.C., which sells for less than $1.00 from many outlets, and a couple of pieces of wire.

The one I.C. is a 21L02, available from Radio Shack and other outlets. To use it, pins 11 and 12 must be bent out and then the chip is piggy-backed onto Z45. All pins except 11 and 12 are soldered to the corresponding pins of Z45 below. So far, that follows the procedure outlined in the article. However, instead of making the remaining connections as outlined in the article, simply connect pin 12 of the added 21L02 to pin 13 of Z27 (directly above Z45 on the main circuit board). Then connect pin 11 of the added 21L02 to pin 13 of Z44 (directly to the left of Z45 - it is more convenient to use the plated-through hole adjacent to pin 13 to make the connection). Finally, cut the thin trace that comes out from underneath Z29 and runs between pins 5 and 6 of Z30. That's it for the simple modification. If you have a late Model I, you may be lucky enough to already have the lowercase character generator chip installed. You do if the cursor [illegible]ester and the tails of the comma and semicolon extend a bit below the baseline of the other characters. If that's the case, you can consider yourself lucky; you're all finished.

If you are using Level II BASIC or some DOS's like TRSDOS, you will see strange graphics characters instead of the uppercase letters you're accustomed to seeing. There are several solutions to this, including the installation of a SPDT switch similar to that described in the article. To accomplish this, disconnect the wire from the added 21L02, pin 12, to Z27, pin 13. Connect the 21L02 pin 12 to the center terminal of the SPDT switch. Connect Z27, pin 13, to one end of the SPDT switch, run a wire from the other end of the switch to Z30, pin 13. Now you may switch back and forth between normal and lowercase operation.

The preferred solution is to replace Z29, the character generator I.C. When this is done, no switch is required because the oddball, and inaccessible, graphics characters are replaced by normal uppercase characters. It is possible to purchase the character generator from Radio Shack, but that is expensive. Other vendors also sell replacement character generators of various types. The best I have seen so far comes from Australia. It provides full three-line descenders (the Radio Shack replacement chip provides single-line descenders). It sells for $12.90 Australian funds, plus $4.00 additional for an optional printed circuit board. If ordering from North America, and paying in U.S. dollars, add $3.50 for postage and bank exchange fees.

What you are buying is a pre-programmed 24 pin EPROM, and adequate instructions for those who are somewhat familiar with the insides of a TRS-80. The unit is not designed for installation by beginners, but experienced hardware hackers should have no difficulty. To obtain it, order model "JACKGEN 3" from Don McKenzie, 29 Ellesmere Crescent, Tullamarine 3043, Australia. Don normally provides same day turn-around. In my case it works perfectly and I am very pleased with the result.

**Jack Decker**
**Sault Ste. Marie, MI**

Thanks again Jack. A couple of corrections :- U.S. residents should add $4.45, and the cost of the P.C. board is $6.00

DON BRINGS THE COST OF PROGRAMMED EPROMS DOWN TO AN AFFORDABLE LEVEL FOR COMPUTER AND ELECTRONIC HOBBYISTS.....

There is not much sense in purchasing expensive Eprom Burners and erasers for a few odd burns that you may need.
I will supply, burn, and post to you anywhere in Australia, a 2716 EPROM for an all inclusive cost of $12.90
**********
A 2716 is known as a 2K EPROM. It has 800 HEX. locations or 2048 DECIMAL locations.
I can copy from one 2716 EPROM to another, or If you wish to, you can send a TRS 80, or SYSTEM 80 "SYSTEM FORMAT TAPE" which I can also copy from.

I can copy from a system tape that starts at any address.

All tapes and eproms posted to me will be returned.
The popular memory map for custom programs are 3000 to 37DF Hex. and F800 to FFFF Hex. for the above computers. I have also worked out a decode circuit for 3900 to 3BFF Hex. This is normally used for the keyboard matrix, but with the addition of two TTL chips, an extra 300 Hex. or 768 decimal bytes can be used for extra rom or ram usage.
With the addition of a resistor and one switch, a rom can be mapped for two groups of 300 Hex bytes, giving 600 Hex bytes in all.
I will provide circuits for these address decodes with any order if requested.
BE WARNED..... These circuits are designed for experienced technicians and hobbyists. Chips can be piggy-backed, or built up on a small matrix board. The circuits have only gate logic and chip types, not constructional details. I strongly recommend that non-technical persons seek assistance if fitting extra EPROMS.
I intend to build up a library of popular EPROM burns.
THIS WILL BE KNOWN AS DON'S FIRMWARE LIBRARY.....
See attached list for my firmware library.
By the time you read this, I may have the program that you need in my library.

Remember, when writting your ROM based programs, that you can't alter Rom locations, so don't do things like
```
LD     (3320H),A
```

Please specify TRS 80 or SYSTEM 80 when requesting an address decode circuit.

CUSTOM PROGRAMMERS.....
Please let me know your assembly parameters. eg:- start, end, entry points. This will assist me in overcoming any burning problems, and allow me to check the last burn address. With 3900 burns, I have to start 100 Hex. bytes from the 2K boundry of 3800 Hex., so I must know if you have assembled at 3900 Hex. To use the "PHANTOM" 300 Hex. bytes, I have to start at 500 Hex. bytes into the EPROM.

Your custom program remains your property. I will add it to my firmware library only with your written consent. Sorry, at the prices I charge for programmed EPROMS, I can't pay royalties, but I can put your name in the credits.

## BLUDNERS

Geoff Lohere has written to us in reference to a letter published in 'Communications' in the August issue of *APC*. We reprint his letter:
"In reference to the 48k System 80 article, Communications Volume 4, No 8, August *APC*. Russel Wild elaborated on my memory expansion article Volume 4, No 8 of *APC*. Mr Wild states, after reading the article, he found it easy going from 16k to 32k, but 'found the article very vague about going to the full 48k'.

As I stated in my article, it was primarily intended for people upgrading to 32k, as using this method for upgrading to 48k is outdated and puts an excess strain on parts of the System 80's logic, especially the 12 volt regulator next to diodes 2 and 3 on the CPU Board. There is a strong possibility that upgrading to 48k will burn out this regulator, and possibly do severe damage to the System 80.

There are new ICs now available which can replace the existing 4116 memory ICs, along with the appropriate hardware mod, to take the System 80 to the full 48k with less strain on the power supply than the existing 4116 RAMs.

For going to 32k, the method I described is cheapest and best, but for 48k, the new memory ICs should be used. These should be fitted by a qualified computer technician to avoid doing severe damage to your computer.

Anyone who has already fitted 48k Piggyback style, must heavily heatsink the 12 volt regulator.

Myself or Don McKenzie is qualified to fit the new 64k memory ICs. People in states other than Victoria should contact Don. My phone number is (03) 543 1485 and Don's is (03) 338 6288."

DON'S FIRMWARE LIBRARY.....ALL THE FOLLOWING 2716 EPROMS ARE $12.90 INCLUDING POSTAGE...

TC-8 Cassette operating software:-
Initialised by SYSTEM, ENTER, /64000, ENTER.
Memory Size doesn't need to be set. This is a universal version that checks to see if a DONMON is resident at address 3000 Hex. and configures itself to operate using normal Level 2 basic, or patches itself for the DONMON keyboard and video drivers. The F800 to FFFF Hex. decode circuit must be used. For System 80 and TRS 80 users. Includes circuit.

PRINDON 779 EPROM to convert TANDY line printer one, or Centronics 779 model printer to lower case. Includes circuit. Hardware and software by Don McKENZIE.

GENDON 3 STANDARD .....
3 line descender character generator to suit TRS 80, and System 80 type computers, with block cursor.
Hardware and software by Don McKENZIE.

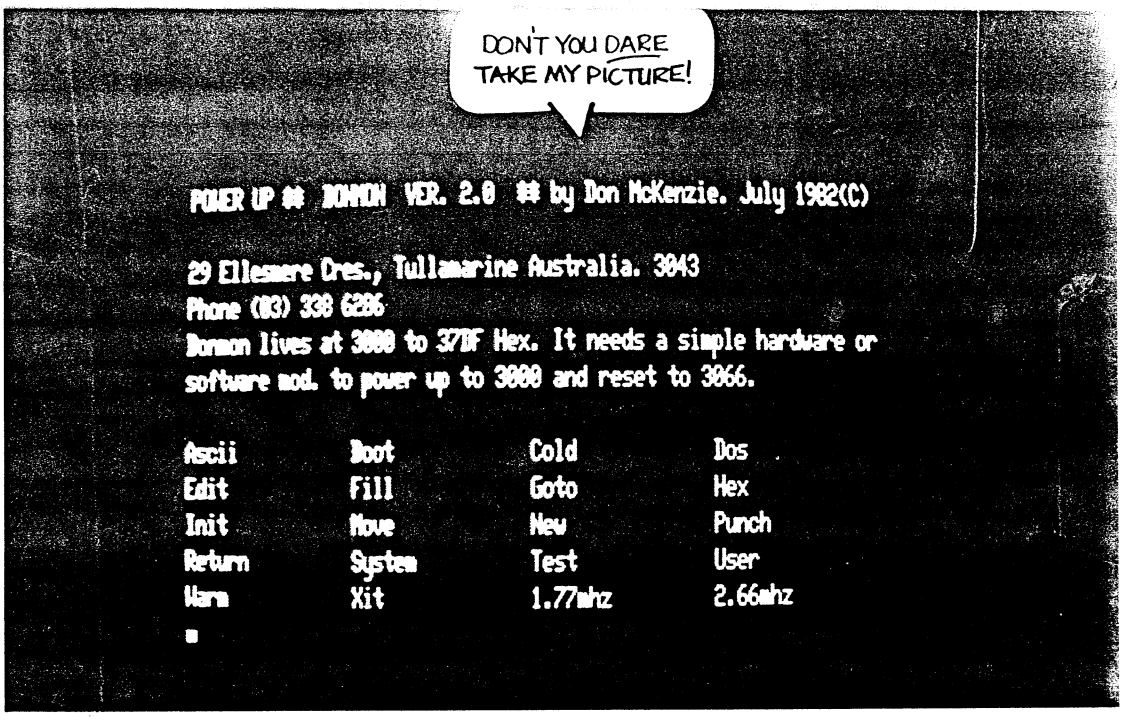
GENDON 3 DASH .....
As above, but with an underline cursor on the eighth line down, and six dots wide.

Jack Decker, of 1884 West 18th Street Lot # 155 Sault Ste. Marie, Michigan 49783, is the editor of the Northern Bytes Newsletter, published by Microcomputer Users International. He also writes frequently for the Alternative Source. Jack has kindly allowed me to include in my firmware library, the following items:-

OS83000.....
An improved operating system for the JPC Products TC-8 High Speed Cassette system. It is strongly recommended that you add lowercase capability to your computer for this firmware, as lowercase will be incorrectly echoed to the video display. Jack has written a small manual on the improved, and extended functions of his OS8 system. The manual is too large to reproduce here, so I will list only some of the features.
Shift Lock using Shift Zero for upper/lower case, Auto key repeat, Keyboard Debounce, Shift down arrow for Control characters, Screen Print function, Lowercase video driver, User definable Blinking Block Cursor, Protection of up to eight video lines from scrolling off the screen, New Line Printer functions, Tab Statement Fix, and numerous improvements to the TC-8 operating system itself.
A hardware hackers circuit is included for installation of this EPROM at 3000 to 37DF Hex.

OS8F000.....
As above, but assembled at F800 Hex.
A hardware hackers circuit is included for installation of this EPROM at F800 to FFDF Hex.

The "Decker" version JACKGEN 3 .....
Jack's re-hash of my GENDON 3. Rather than attempt to explain this, I will quote from one of Jack's letters.
"QUOTE" 1) The "@" character has been redefined to look a bit less "boxy" and more like the character used on the MODEL III. 2) The "_" (underline) character has been changed to a full-length underline, so that printing a series of them forms a continuous solid line rather than a series of broken dashes. Again, this follows the pattern of the MODEL III. 3) The "`" (grave accent) character used by most printers for ASCII character 60H has been restored, but modified so that it is the mirror image of the apostrophe ("'") character. 4) The "|" (rule) character has been restored. 5) The "~" (sine wave ??) character has been restored. I moved it up one line after publication of the newsletter article when I found it actually did sit up there in the original character set. 6) I changed the 7FH character to a +/- symbol, to match the MODEL III character at that position (this one I wavered on. I was very tempted to restore the "polka-dot" graphics character originally found there, because my printer considers 7FH as a "no-op" character. However, I decided to go for MOD III compatibility here, even though I didn't change the arrow characters. I'll just claim personal preference on this one. 7) After a comment from an interested friend, I removed one dot from the lowercase "p" and "q" characters so that they no longer look like a circle laying next to a stick (the description used by my friend). I also changed the lowercase "g" to conform to this same pattern. Finally, I retained your design for the lowercase "j" but moved it over one dot so that it appears more nearly centered.
You may think that some of the above changes a bit picky and admittedly, some of them probably are. Nevertheless, I now have a pattern I am satisfied with. "UNQUOTE".




How would you like this menu on the screen of your TRS 80 Model 1, or SYSTEM 80 from power up?

How would you like to be able to hit the reset button while running any basic or machine language program, jump to this menu, execute the DONMON commands, then return to the program at exactly the point that it was interupted?

DONMON also has a screen print facility, keyboard driver with shift-lock, flashing cursor with control, keyboard beeper, control characters, auto repeat on all keys, lower case video driver, Rom and Ram check, and even a Stringy Floppy version at address F800 HEX.

It can't be done in a 2K rom!! RUBBISH !!!!!!!!!

I have only just started. It also has..... SORRY, not every thing about DONMON can be explained in a one page ad.

INTERESTED? Ring me at home (after hours only) for a short tour of DONMON, or send $2 to help cover the cost of the DONMON manual and postage, which will be deducted from the total cost of the DONMON SHORT FORM KIT if purchased later on.

The DONMON SHORT FORM KIT consists of :-

Two eproms and a bare printed circuit board, with full wiring instructions, and is available at $45 including postage.

You supply all other parts and labour. Current cost of other parts is approx. $15

BE WARNED.... Fitting DONMON is not an easy job. The installation instructions are designed for experienced technicians and hobbyists. I strongly recommend that non-technical persons seek assistance if fitting any of my modifications.

I have that much faith in DONMON that any customer (including authorized modifiers) can return the SHORT FORM KIT within 90 days for a full refund, if not completely satisfied.

My authorized modifiers are currently fitting DONMON in TRS 80's and System 80's for an all inclusive cost of $90

# DONMON

DON'S NOTES AND ERRATA:-

SYSTEM 80 type computers.....
A new version of this board has appeared on the market recently. Some later model VIDEO GENIES, SYSTEM 80's, and PMC 80's have been fitted with two 2114 video ram chips, instead of the old seven 2102's. They may also have an extra rom decoded at 3000 to 35FF hex. The fitting of the 2114 chips, is a trick that the Japanese produced TRS 80 Model one also utilized. If you encounter one of these boards, then a few minor alterations to my wiring instructions need to be done.

Fitting of extra ROM's.....
EG:- DONMON, 3900 keyboard decode, F800 TC8 etc. All references to Z21 pins 12 and 13 are to be reversed. ie. Z21/12 becomes Z21/13. Z21/13 becomes Z21/12.

Fitting of GENDON 3.....
If your character generator is an MM52116, and is fitted in socket Z25, then GENDON 3 is much easier to fit. Remove the old chip, and install GENDON 3 in the same socket. Cut the tracks from Z25 pins 13,14,15,16, and 17. Connect the following Jumpers:- Z25/9 to Z24/4, Z25/10 to Z24/5, Z25/11 to Z24/10, Z25/13 to Z24/11, Z25/14 to Z24/12, Z25/15 to Z24/14. The original ground still needs to be cut from Z24/14. (under board) Cut the track from Z11/13, and connect the isolated track to ground. This gives a true data bit six.

Fitting 64K memory chips.....
The address decoding has been done slightly differently, and an alteration needs to be done to enable the MEM#, and CAS# signals. Instead of removing the wire link at pins 13 and 4 of X1, cut the track from Z25/11. The track that leads away from this cut is the CAS# and MEM# enable, and Z25/11 is the old 4000 to 7FFF decode. Your new 4000 to FFFF decode from P22/12 will connect to the isolated track. The changeover switch may be wired in at this point, so that you can switch from a 48K to a 16K computer.

Japanese produced TRS 80 Model one.....
I have not completed my full wiring instructions for this type of computer, however if anyone wishes to fit one of my mods., then I will give you my full support to overcome any problems as soon as possible.
NOTE #### Fitting of the 64K chips into this board is a little more difficult, as you must remove the existing soldered in 4116 rams, and install sockets for your new chips.

DONMON 1.77MHZ and 2.66MHZ.....
I will again point out that DONMON is not a speed up kit. It simply controls the setting and clearing of data bit zero, port 254. Additional chips need to be either piggybacked, or built up on a small martix board to make full use of this command. A circuit is available upon request, with any DONMON order.
A speed of 3.54MHZ can be achieved using this circuit, in conjunction with my 48K memory mod., 200ns chips, and a Z80A. Z80A's and Z80B's are pin for pin compatible with Z80's.

WHEN PLACING AN ORDER, PLEASE SPECIFY TYPE OF COMPUTER EG:- TRS-80, SYS-80, TYPE OF BOARD EG:- SYS-80 BLUE LABEL WITH 2114 VIDEO RAM CHIPS, TRS-80 JAPANESE BOARD, TYPE OF ROM SET EG:- TRS-80 2 CHIP SET, 3 CHIP SET, TYPE OF EPROM REQUIRED EG:- GENDON3 STANDARD, DASH, JACKGEN.
THIS WILL SAVE BOTH YOU AND ME TIME AND MONEY EXCHANGING PARTS. I SPEAK TO MANY PEOPLE ON THE PHONE ABOUT A LARGE VARIETY OF MODS. I CAN'T REMEMBER EVERYTHING SAID, SO PLEASE PUT IT DOWN IN WRITING WITH YOUR ORDER, AS A REMINDER TO ME.

CUSTOMER FEEDBACK.....
I need customer feedback on wiring instructions in order to overcome any fitting problems. I don't want people throwing chips aside, and saying "No wonder it didn't work, it was too cheap !". All of my circuits do work, but it can be hard to keep up with all the variables that have been introduced due to new version P.C. boards. This after all, is the main reason that this "NOTES AND ERRATA" article was written.

## DONMON VERSION 2.3 ## Released 1 March 1983(C)

The following offer is for legitimate owners of previous versions DONMON:-

Send $6 for the DONMON 2.3 rom. If you call in for a chat, with your DONMON in your hand, make that $5.
I will then post you the DONMON 2.3 rom. Your Jump rom doesn't need to be changed. When you are satisfied with the changeover, post your old DONMON rom back to me.
If you purchased your DONMON from an authorized modifier, please state modifiers name, and purchase date.

What extra features does DONMON 2.3 offer?

Shift Z :- Zero all ram from 4000 to FFFF hex.
Shift F :- Set all ram to FF, from 4000 to FFFF hex.
In the Hex mode :-
Enter/Newline increments the display rounded off to 1000 hex bytes. eg:- A000, ENTER, B000, ENTER, C000, etc.
Any other key decrements the display rounded off to 1000 hex bytes. eg:- A000, SPACE-BAR, 9000, SPACE-BAR, 8000, SPACE-BAR, 7000, etc. All other Hex commands remain the same.
J :- Jump to 3900 hex. This is my 3900 rom decoded area for custom programs. By using one switch and one resistor, this map can be doubled to 600 hex bytes, in two groups of 300 hex bytes.
Punch Command :- Now has 1 to 6 alpha-numeric digit input for user definable filename. ENTER/NEWLINE will default filename to DONMON, the same as previous versions.

Several minor DONBUGS(C) have also been removed in Version 2.3
These include a clean up of the Edit Command, and the removal of "THE CURSE OF THE DONMON CURSOR".
The DONMON cursor had an annoying habit of upsetting some screen displays under certain conditions. This was due to the interaction of the DONMON keyboard driver and the cursor on/off flag at location 4022H.

OVERSEAS ORDERS . . .

ADDITIONAL OVERSEAS RATES. (AUSTRALIAN DOLLARS.)

| | | | |
|---|---|---|---|
| ZONE ONE. | EG:- NEW ZEALAND, PAPUA NEW GUINEA | ADD | $2.80 |
| ZONE TWO. | EG:- INDONESIA, MALAYSIA | ADD | $3.10 |
| ZONE THREE | EG:- INDIA, JAPAN | ADD | $3.70 |
| ZONE FOUR | EG:- U.S.A., CANADA | ADD | $4.45 |
| ZONE FIVE | EG:- U.K., EUROPE | ADD | $4.70 |

Add up the cost of the items you wish to order in Australian Dollars, then add the ADDITIONAL OVERSEAS RATE for your country. This covers return Air Mail, foreign currency exchange, and stamp duty. As all mail contains my catalogue, and other bits of information, you will find that it becomes a rather bulky package.
With the aid of your local bank, convert the total cost in Australian Dollars to local currency, then send a bank cheque for that amount, payable to DON McKENZIE.
All orders received, I will turnaround within 48 hours. A person sending an Air Mail order from U.S.A. will find that the total turnaround time should be approx. 3 weeks. (depending on the efficiency of your local postal service.)
The only delay that I can introduce is in the problem area of printed circuit boards. Most boards, I have in stock. If I have a run on a particular board, and am out of stock, then a 2 week delay could be expected. I am afraid that I can't order boards in large quantities to gain the benefits of very cheap prices, and stock at all times.
CUSTOM DUTY becomes your problem. All items are marked "PRINTED MATTER ONLY AND COMPUTER PART(S).
Past experience indicates that the duty on these types of items is either very small, or NO DUTY PAYABLE.
Please don't send foreign stamps, as these are not valid with the Australian Post Office.

what John Ross had to say about my Renumber, Packer Rom in the Adelaide MICRO USER NEWS AUGUST 1983 If you have a Donmon Mark 2 board, this rom plugs straight in. If you haven't, then you will have to build up a small circuit to decode 3900 Hex. This program is suitable for any memory size, and Level 2, or disk basic.
Price:- $12.90 including Postage. Please ask for 3900 Hex decode circuit if required.

**TRS 80 & SYS 80/PMC 80 - Don Mckenzie has released his MK II Ver 2.3 DONMON POWER UP MONITOR.** All I.C's can be mounted on the P.C. board including the 3900H decode & its eprom. Assembly & fitting is more simple than the earlier version & shouldn't present any problems for the average hardware hacker wielding a soldering iron. If you would like more memory, there is also a MEMORY UPGRADE Kit for 48K under the keyboard (NO PIGGY BACKING), switchable to 16K if you wish. If 48K is not enough it can be configured for '60K' or '64K' RAM, which overlays the ROM area. Also speed - up kits for 3.54 Mhz. & Don is currently designing a 5 Mhz. version.

Don has kindly sent me a lev II/disk program in EPROM for the 3900H decoded area for review & demonstration. It is a BASIC RENUMBER & COMPRESSOR / PACKER. I just plugged it into the Donmon board, loaded a 6.5K disk basic program, reset to donmon hit the 'J' (for jump to 3900H). The screen asked for a starting line number, then what increments I would like, 2 seconds later I had a 6.5K program renumbered with relative gosub's & goto's changed as well. Reset to donmon again, switch the bank select switch for the 2nd half of the eprom, hit 'J' and the screen reports program compressed - saved 60 bytes, do you wish to pack?.., 4 seconds later the entire 6.4K+ program was packed and reported 700 bytes had been saved. That's a total of 760 bytes saved in a 6.5K program. The only errors detected in my program were my short cut syntax ie., not using quotation marks at the end of PRINT statements etc., after these were repaired my program executed without error & slightly faster.

## HINTS FOR DONMON USERS

Moving & restoring basic programs :- The hex address 40A4/5 is a pointer, used to store the START of BASIC address. The 2 bytes stored there are in reversed order, ie. 40A4=E9, 40A5=42. These two bytes when reversed, 42E9H, is the start of level II basic. When using DISK BASIC these values will be different, depending on the operating system (DOS) used & how many disk files opened when answering HOW MANY FILES?. Reset to donmon, zero all memory from 4000H - FFFFH, initialise level II basic, (cold start) reset to donmon, boot disk & load disk basic. Load a basic program, reset to donmon & display the 4000H block, note the address at 40A4/5, advance the display to that address, this is the start of your program. Advance the display to the end of the program, (where all the zeros are), include 3 zeros at the end of the program & note the address, (1st 00=end of line, 2nd & 3rd 00=end of program). Move the entire program to say E000H, now display the E000H block & note the end of the program, (don't forget the 3 zero's). Now reboot the disk & load disk basic, type list. No program, right. Wrong, reset to donmon, hit 'N', then list. Since that all works ok, load in a different basic program & list it, now reset to donmon & move the program from E000H to the address stored in 40A4/5, hit 'N', then list. This is just practice in shifting data & shows the importance of using pointers.

BURNDON VERSION 2.3 IS MY MACHINE LANGUAGE EPROM BURNER PROGRAM SUITABLE FOR THE ELECTRONICS AUSTRALIA JULY 1980 PROJECT.

BURNDON calls routines from within DONMON 2.3, so you must have a DONMON 2.3 to use BURNDON.
It is assembled at 3900H, so it is there from power up, and plugs straight into my DONMON Mark II board.
The software drivers are suitable for all common types of EPROMS, that is, from 2716's to 2764's, with the exception of ye old 2708's. I couldn't squeeze it's crazy burn pattern into 300H bytes, and I doubt if too many users would require this facility.
Whilst running DONMON with the BURNDON ROM plugged into the 3900 hole, press "J", and you will be presented with the following menu :-

```
B = BURN  C = CHECK ERASED  E = EDIT  H = HEX  G = GOTO
R = READ  V = VERIFY  X = DONMON
1 = EPROM TYPE  2 = EDIT BUFSTA  3 = EDIT BUFLEN

EPROM TYPE  BUFSTA  BUFLEN
    00      C000    0800
```

SENDER
DON McKENZIE
29 ELLESMERE CRES.
TULLAMARINE 3043

KEYS 1,2 and 3 are used to change the paramaters of the program, as shown on the bottom line of the menu. On entry to BURNDON, these paramaters are set to a 2716 type EPROM. The EPROM type is set to 00. By pressing the 1 key, this flips to EPROM TYPE 01. Pressing the 1 key again will reset it back to 00. The 00 represents a 50 m/s burn, and the 01 is for a 2 m/s burn. Most chips use a 50 m/s burn. Some 2732's, and 2532's can be burnt at 2 m/s. This info can be found in the data sheets for various manafacturers. I have had stand up fights about a 2 m/s burn for some EPROMS, but if you read the fine print in the data sheets, you too may find mention of a 2 m/s burn.
Keys 2, and 3 enable you to edit both the start of the ROM or RAM address that you wish to burn, and the length thereof. If you only have 16K of memory, then the BUFSTA will have to be set to a minimum 7800H, for a 2716. If an exit is made to DONMON at any time, pressing the "J" key will reset these parameters, if however you wish to retain the setting of these parameters, a return to BURNDON can be done by pressing the "U" key.

The following commands are the standard DONMON commands, and if used, a return to DONMON takes place.....
**EDIT**, HEX, GOTO, XIT.
This now only leaves four commands to cover in BURNDON.
BURN.... Pressing "B" will burn the EPROM. To exit back to BURNDON at any time, press the space-bar. During the burning, the address being burnt is displayed in hex, on the top left corner of the screen. Upon completion of the burn, the space-bar must be pressed to get back to the BURNDON menu. During this time, an audible tone is sent to the cassette port to indicate completion of the burn. An audio amp. must be installed to make use of this facility.

CHECK ERASED..... Pressing the "C" key will make the software do a compare of FF hex with every location in the EPROM. One of two messages will be displayed. ERASED or NOT ERASED.

READ.... Press the "R" key, and a read will take place of any EPROM in your burner. This will read it into the RAM buffer, for the specified length, as indicated in your 2, and 3 key parameters. A checksum will also be reported. This checksum is calculated by adding up every location, and ignoring the carry bit.

VERIFY.... Press the "V" key, and a check will take place between the EPROM in your burner, and the specified buffer. Any errors will be reported one line at a time on the screen. To display another line of errors, (if there is more) press the ENTER/NEWLINE key. To exit the error mode, press the space-bar.

This sheet of paper is the ad, the manual, and the fitting instructions for BURNDON 2.3
It's that simple.
How much? Well, $12.90 of course.

USER INSTALLED LOWER CASE VIDEO DRIVER FROM POWER UP IN SYSTEM-80'S, AND TRS-80 MODEL ONE, THREE CHIP SET, WITH NO TRACK CUTTING, NO SOLDERING. JUST PLUG IT IN.

A lower case character generator must be installed for this mod. (such as GENDON 3)
Note ** TRS-80 three chip set displays "MEMORY SIZE" on power up.

Some 18 months ago, I came up with a changeover ROM, so that non-technical persons could in effect have almost the equivalent to the new TANDY ROMS in their old TRS-80's. The same chip could be fitted into System-80's, with the patches for Sys-80 printer, and cassette ports. I called this ROM "DONPATCH". I discontinued DONPATCH shortly after it's introduction, because the cost of the ROM was far too great for the amount of features that it provided.
ROM prices have fallen dramatically during this time, and DONPATCH has become a proposition again. With some extra routines stolen from my good friend Jack DECKER of Michigan U.S.A., I have put together a new DONPATCH.
If you can open up your computer without wrecking it, locate and remove ROM one, (a 24 pin chip) and insert DONPATCH, then the following features are available to you.
These features are the same for System-80's, and TRS-80's.
Mem Size? message on power up, keyboard debounce, improved cassette load timing, Shift down arrow control characters, lower case on power up, shift zero caps lock, shorter cassette tape leader, (as in the Model III 500 baud cassette write) and a user definable cursor character. The desired character can be poked into RAM location 16419. (4023Hex.)
TRS-80 users must remove the XRX-111 modification if fitted, as it is no longer required, and in fact will not work. To disconnect the XRX-111 mod., remove the six wires from between the two boards. These can be desoldered, or snipped of as near as possible to your CPU board. One jumper wire must be used to connect Z24 pin 9, and Z4 pin 10. Insulated wire must be used to make this soldered connection.

DONPATCH installation instructions :- Locate and remove ROM one. On TRS-80's, this is the ROM next to the header cable in, on the three chip satellite board. On System-80's, it is Z10. This is located under the keyboard on the main CPU board. The bottom left hand chip is Z13. This may not have a ROM fitted in early model System-80's. So Z10 is the fourth ROM up from the front of the keyboard. They run Z13 (possibly not fitted), Z12, Z11, Z10.
One end of ROM one has a notch in it. This indicates the pin one position. DONPATCH has a similar notch in one end of it. Examine borh ROM's so that you can make no mistake about which way you should plug it in before removing ROM one. With a small screwdriver, remove ROM one by wedging the screwdriver between ROM one and it's socket, so that it lifts slightly. Repeat the same procedure at the other end of the chip. By taking small bites at each end of the chip in turn, will enable you to remove ROM one without bending any pins. DON'T, and I repeat DON'T wedge the screwdriver under the socket, or you may lift the socket right out of the board. Then you will be in trouble. You will be able to see how thick the ROM is by examining the DONPATCH ROM. It is approx. the same thickness as ROM one.
All that is left to do is to insert DONPATCH.
Hold the DONPATCH ROM by the ends, and use a table top to bend each row of 12 pins at right angles to the ROM. Insert DONPATCH into the old ROM one position. You may have to apply a small amount of fore finger, and thumb pressure to some of the pins, so that they align correctly with the socket holes. Push the chip fully home when all pins have started into the socket correctly.
You will now have all of the above features from power up.
Could you muck this simple Job up? The answer is yes. I can't see how, but if you do, then my authorized modifiers will assist you, at a fee of course.
Perhaps you have a Sys-80 with a TRS-80 compatible inteface connected, that has the TRS-80 printer address decoded. DONPATCH can be configured for the TRS-80 printer at no additional cost.
How Much is DONPATCH? $19.90 including postage within AUSTRALIA.
This sheet of paper is the ad., the manual, and the fitting instructions for DONPATCH.
It's that simple. Please specify TRS-80, or System-80 when ordering.
** Suitable for cassette users only.

# DONMOD

Don McKENZIE
29 Ellesmere Cres.,
Tullamarine 3043.
Phone (03) 338 6286
(AFTER HOURS)

As I am only interested in writing software, I am not installing any of my mods., but I am making up a list of people who are prepared to carry out this work. I will however give all assistance with any misunderstanding of wiring instructions.

I am a bit short on modifiers.

If you are interested in fitting GENDON 3 or DONMON at my recommended installed price, and are capable of fixing any fault that you may introduce whilst fitting one of my mods.,
please write to me, (or ring) giving a broad outline of your work experience in this area. I will only consider persons I feel are fully qualified either as hardware hobbyists or technicians.

As I am not prepared to let any customer down, my list of authorized modifiers will be amended as necessary.

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DON'S AUTHORIZED MODIFIERS.

| NAME | ADDRESS | PHONE | COMPANY |
|---|---|---|---|
| BARRINGTON RAY | 17 GORDON ST BEGA 2550 | 0649 22267 | SOU'EAST COMPUTER SERVICE |
| BROWN BROD | 201 FORREST ST PALMYRA WA 6157 | 09 3395087 | FORREST DATA SERVICES |
| COOPER MICHAEL | 474 BOURKE ST SURRY HILLS 2010 | NONE | CONTACT SYDTRUG USERS GROUP 1120 BOTANY RD BOTANY |
| GULOYSEN MICK | 14 SUTHERLAND ST GLENROY 3046 | 03 3593559 | |
| LOHRERE GEOFF | 57A STANLEY AVE MT WAVERLEY 3149 | 03 5431485 | Z80 PROGRAMMING |
| MCALLISTER ROB | 24 JACANA AVE LOWER TEMPLESTOWE 3107 | 03 8505229 | |
| MCMINN STUART | 16 CROWLEY CRT PASCOE VALE 3044 | 03 3063464 | |
| MUTIMER DAVE | 57 REID ST SOUTH MORANG 3572 | 03 4041619 | |
| NIELSEN C. | PO BOX 68 ASPLEY QUEENSLAND 4034 | 07 2698573 | COMPUTER CLINIC |
| PAKENHAM KEITH | 20 NICHOLAS ST KEYSBOROUGH 3173 | 03 7986162 | |
| RICH PETER | 5 ARGYLE AVE RYDE 2112 | 02 805493 | |
| ROSS JOHN | 12 LINDLEY RD GREENACRES 5086 | 08 2618689 | SMALL COMPUTER SERVICE |
| STRONACH EWART | 119 ALT ST ASHFIELD NSW 2131 | 02 7979673 | |
| WARMAN BRIAN | P.O. BOX 677 WHYALLA S.A. 5600 | 086 450023 | |
| WESTERN JOHN | 81 GILES AVE PADBURY WA 6025 | 09 4012733 | J.&T. COMPUTER SERVICES |
| WOOD ANDY | G.P.O. BOX 37837 WINNELLIE N.T. 5789 | | SWARBTRONICS |

Special discounts apply to all Authorized Modifiers.
USER GROUPS and BULK BUYERS..... Order six of any one item and get one free.
Sorry, this offer doesn't apply to blank EPROMS, or RAM memory chips.