SYDTRUG NEWS

SYDNEY TRS-80 USERS GROUP NEWSLETTER

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IN THIS ISSUE

This month's newsletter starts off with Darrell Hegarty's Interfacing a TRS-80 RS232 card to a SYSTEM-80 computer.

This article is of considerable length but should be of great interest to those of us using SYSTEM-80's.

I have implemented the article myself and I now have a modem that I can use.

We have an article from Lindsay Douglas called Stop those glitches.

There is also a reference to Video de glitching.

Michael Kuhne asks two questions that he would like some answers for.

Last article is on R.S.M. system monitor.I apologise for not accrediting this article ,but I have forgotten who gave it to me and there is no name on it.

GENERAL

Thanks to those who have supplied articles but keep them coming.

Iam only assisting our Editor whilst he is absent and all HELP is very much appreciated as Iam struggling some what.

You can send me your articles either by:

1. mail to Denis Pagett
   15 Anderson Ave.
   Panania. 2213.
2. ring me on 7734433
   (olease dont lose the number
   as its not listed)
   and we can try to down-load
   via the modem.
3. Pass the articles on to me at the Club meetings.
4. Give them to the Secretary if Iam not around.

Looking for your support.
Your Assisting Editor,
Denis Pagett.

MEETING DATES.

The dates for the forthcoming meetings in March and April appear below.all meetings commence at approximately 1:00pm at the rear of Pattersons Florist, Chegwyn St. BOTANY.

MARCH	APRIL
10th Monthly Meeting	14th Monthly Meeting
17th Special Interest Group	21st Easter Saturday ????

INTERFACING A TANDY RS-232 CARD TO A SYSTEM-80 COMPUTER

By Darrell Hegarty - Phone (02) 624 2824

Firstly, my requirement for an RS-232 came fairly late in the hobby of comouting. I had looked at the interface card at Dick Smith's a number of times, but thought I could spend the $100.00 or so more wisely. It was only after talking to Steve Clague that I 'caught the bug' so to speak.

Alas, it was too late to get a genuine SYSTEM-80 card from Dick Smith as they were no longer importing them. So, armed with Lazywriter, I wrote to EACA (the manufacturer) in Hong Kong. That was about three months ago now, and I still have no reply. Just after writing, I found out that EACA had gone out of business.

A couple of options were left open to me:-

1. Make my own RS-232 interface using wire wrap techniques, or manufacture a PC board (double sided - a big job!).

2. Try other avenues: a) Micro-80 in Adelaide, could only offer a complete interface (LNW) with RS-232, for about $400.00.

b) CPU Peripherals in Sydney, was willing to ADD an RS-232 to my interface for about $300.00. They told me that they used TANDY boards, and installed them in the SYSTEM-80 EI.

3. Purchase a card from another manufacturer and try to adapt it to the SYSTEM-80

I chose to follow the last option and the obvious choice was TANDY Model 1, since the SYSTEM-80 is supposed to be almost a 'clone' of this machine. I duly ordered the card from a TANDY store - catalogue number 26-1145, cost $149.95 - and set about waiting the three days for delivery. I then read an article in 80 MICRO magazine which shocked me!! The article mentioned that the Model 1 RS-232 interface was notoriously unreliable. WHAT HAD I LET MYSELF IN FOR?? However on reading further, the unreliability was due to poor contact at the connector - a well known TANDY problem, and would be overcome by my need to solder all connections.

As it turns out, my choice was a wise one, since the TANDY board has the selection of baud rate, data length and type done by software which means that the EI doesn't need to be opened when a change is required, although changes should be rare.

The RS-232 interface arrived very well packed in a cardboard box about 11" square and 2" deep. Included were the PC card (packed in a conductive plastic envelope), an excellent handbook with full instructions on installation (but ONLY for the TRS-80 of course), a connector cable about 4 feet long to connect to a modem, and a casette tape containing a terminal programme. I then set about sorting which pins on the connector went where - no mean task I can assure you - I have included a diagram of the connector and where to wire each pin on the SYSTEM-80 expansion interface. I chose to use ribbon cable for the connections which requires a bit of very fiddly soldering, as the connections are only 0.05" (1/20th) apart in most cases, but with care, a good job can be achieved.

The SYSTEM-80 interface main board has one 20-pin connector for its own RS-232 card, one 50-pin connector for an S-100 card, and a space for another 50-pin connector, which is not installed.

This space makes an ideal connection point for the cable from the new card. The diagram shows which pins of this spare connector position should be connected to the RS-232 card pins. The ribbon cable should be soldered to these pins.

The only exception is the +5 volt supply pin, which should be soldered to a point somewhere on the +5 volt line in the interface. Note that the 50-pin connector does NOT have a +5 volt supply - only +8 volts, which would damage the RS-232 card. Note also that the TRS-80 signals OUT* and IN* are replaced by the SYSTEM-80 signals WR* and RD* respectively. This does not affect the operation of the unit, as the SYSTEM-80 signal 'FX' has the CPU IORQ signal included in its 'formula' to activate this line ONLY during an I/O cycle.

The pins of the RS-232 card which are marked on the diagram as going to the modem DB-25 connector are soldered next. The ribbon cable with two connectors attached, should be cut (with a pair of scissors) close to the card-edge connector and this connector put into the 'junk box' for possible later use. I chose also to remove the DB-25 connector and replace it so that every wire is connected. The main reason for this is that the AVTEK modem has features which I may decide to use in the future. As supplied, only some wires are connected to the DB-25 connector and then in somewhat of a jumble and probably a bit of trouble to work out which goes where. Removal of the DB-25 connector requires a sharp-pointed tool to carefully prize out the four clips from the main body of the connector - be VERY careful not to break these clips. Note the numbering of the DB-25 connector in the diagram, and note also the way in which the ribbon cable now connects to the connector.

The wire (pin) numbering from one side is as follows:
1,14,2,15,3,16, ... 24,12,25,13. I have arranged my cable with the red stripe along the wire connecting to pin 13, and a blue stripe along every 5th wire.

You will need to separate these wires at the RS-232 card end and cut all those which are NOT needed, back about 1", leaving only those which are required as shown in the diagram. Carefully solder the required wires to the card pins after feeding the ribbon cable through the hole in the case lid near the power supply.

The RS-232 card may be left sitting on the bottom of the EI case or bolted to a suitably sized piece of laminate board and slid into one of the S-100 slots built into the case.

You should now be ALMOST (but not quite) ready for a test !

DIRECT SOFTWARE MODIFICATIONS (First method).

You'll need to modify MODEM80/CMD to work with the SYSTEM-80 interface as you have fitted it. You can either modify the software yourself, or obtain a copy from a friend who can access the OMEN or SYDTRUG bb. I have downloaded this file under the name of MODEM/S80. This file has the 'slow' mod (as discussed later in this article).

To modify the software yourself, either follow the following steps VERY CAREFULLY, or follow the steps outlined in 'DIRECT SOFTWARE MODIFICATIONS (Second method)'.

1. You'll need a copy of MODEM80/CMD AS WRITTEN FOR THE TRS-80 MODEL I or III (preferably Model I). Do NOT use one which has been modified in ANY WAY for the SYSTEM-80 !!!!!

2. You'll need a copy of SUPERZAP/CMD and the NEWDOS/80 operating system.

3. Operate SUPERZAP, and enter the command 'DFS' (display file's sector). At the prompt for filename, type MODEM80/CMD. At the prompt for relative sector, type '4'.

4. SUPERZAP will now display sector 4 of MODEM80/CMD.

The following table gives ALL the changes necessary to MODEM80/CMD as written for the TRS-80 Model I/III, to allow it to work with a SYSTEM-80 modified as described in this article.

Enter the 'modify mode' by typing M followed by the relative byte as shown in the table. Check the bytes after the flashing cursor, and change them to the values shown in the table. WARNING!!!! If the bytes displayed after the flashing cursor are NOT as shown in the 'change' column. DO NOT CHANGE THEM UNDER ANY CIRCUMSTANCES !!! Go and check that you have the correct file or program. If you do have the correct file and sector, but still have no match, you'll probably have to use the second method below to modify the file.

When you want to get to another sector of the file, press 'K' and you will be prompted for the new sector number.

Relative sector	Byte	Change from	To
4	40	D3 E8 3A	D3 F8 3A
4	45	D3 EA 3A	D3 FA 3A
4	4A	D3 E9 C9	D3 F9 C9
4	6D	DB EB DB EB	DB FB DB FB
5	88	DB EA E6	DB FA E6
5	94	DB EA E6	DB FA E6
5	99	DB E8 E6	DB F8 E6
5	A0	DB EB C9	DB FB C9
5	A3	DB EA E6	DB FA E6
5	AE	DB EB E6	DB FB E6
5	F1	DB EA E6	DB FA E6
5	F8	D3 EB C9	D3 FB C9

6	0C	D3 EA 32	D3 FA 32
6	1D	DB E8 CB	DB F8 CB
6	EB	D3 EA 32	D3 FA 32
6	F8	DB E8 CB	DB F8 CB
10	D6	D3 EA CD	D3 FA CD
10	DE	D3 EA C3	D3 FA C3
32	58	DB E9 E6	DB F9 E6
35	D3	D3 E8 3E	D3 F8 3E
35	(see note 1)	D5 3E 6C	D3 3E 6C D3
35	D7	D3 EA 3A	D3 FA 3A
35	DC	D3 E9 FE	D3 F9 FE
38	FC	DB EB DB EB	DB FB DB FB
39	0B	DB EA E6	DB FA E6
39	23	DB EB D1	DB FB E1
39	35	DB EA E6	DB FA E6
39	3F	D3 EB C9	D3 FB C9

Note 1:
If the 'middle' byte is already 6C, then leave it as such. If it is NOT 6C then change it to 6C. This will prevent the modem being 'switched off' during the start of a file transfer, and thus disconnecting the phone line.

The above changes alter to I/O port numbering from E8 - EB to F8 - FB to allow the interface board as installed to work correctly.

Some or all of the following changes may already be done, depending whether you have a Model I or a Model III version of the software. The format is the same as the previous table. These changes are necessary, because the Model III uses memory location 4411 hex as its storage for 'top of memory' pointer, whereas the Model I and SYSTEM-80 both use location 4049 hex for the 'top of memory' pointer.

Relative sector	Byte	Change from	To
3	(see note 2) 1E	0E 0F	00 00
4	3D	55 6D	55 6C
6	0A	CB 87	CB C7
6	E9	CB C7	CB 87
12	32	2A 11 44 22	2A 49 40 22
12	3B	22 11 44 21	22 49 40 21
12	91	22 11 44 3A	22 49 40 3A
40	C1	21 11 44 22	21 49 40 22
41	02	2A 11 44 E5	2A 49 40 E5

Note 2:

This modification is required to filter out the TRS-80 control codes for 'cursor on' and 'cursor off' from reaching your printer and causing strange effects.

DIRECT SOFTWARE MODIFICATIONS (second method).

This method is slower, but you may have to use it if the file you have is NOT a direct copy of MODEM80, but a 'memory dump' file created by the DOS command 'DUMP'.

1. You'll need a copy of MODEM80/CMD AS WRITTEN FOR THE TRS-80 MODEL I or III (preferably Model I). Do NOT use one which has been modified in ANY WAY for the SYSTEM-80 !!!!!

2. You'll need a copy of SUPERZAP/CMD and the NEWDOS/80 operating system.

3. Operate SUPERZAP, and enter the command 'DFS' (display file's sector). At the prompt for filename, type MODEM80/CMD. At the prompt for relative sector, type '0'.

4. SUPERZAP will now display sector 0 of MODEM80/CMD.

5. Enter the command:
L,D3,E8<enter> This instructs SUPERZAP to find the first occurence of the two bytes D3 E8 & to ignore any 'loader bytes' in between. D3 E8 is the Z80 instruction for OUT (E8),A.

6. Alter the E8 byte ONLY to F8 by entering the instruction MODxx where xx is the relative position in the sector display of the byte which you are to alter. After the alteration, press enter, answer 'Y' to the prompt, and press enter again at the prompt.

7. Repeat this command by entering only L,<enter> - SUPERZAP 'remembers' the rest and at each 'find', modify the E8 to F8. Eventually you'll get a prompt saying 'no match' and asking for relative sector again. Type 0 and enter to go back to sector 0.

8. The above steps 5,6 and 7 must then be repeated SEVEN more times using the following sets of bytes to find. In each case, change the Ex byte to read Fx.

```
D3,E9  instruction for OUT (E9),A
D3,EA  instruction for OUT (EA),A
D3,EB  instruction for OUT (EB),A
DB,E8  instruction for IN  A,(E8)
DB,E9  instruction for IN  A,(E9)
DB,EA  instruction for IN  A,(EA)
DB,EB  instruction for IN  A,(EB)
```

Note that you should change ALL occurences found by SUPERZAP but NOT any other E8 ... EB bytes that you may see in the SUPERZAP display.

You'll also need to change the pointers to 'HIMEM'. To do this, use the same method, but look for the pair of bytes 11 44 and change each occurence of this pair to 49 40 (there should be about five). Some or all of these changes may already be done - depending which version of MODEM80 you have.

Now - the mods for control of the modem. Use SUPERZAP as before, and enter F,55,6D<enter>. This should come up with sector 4 about byte 3D or so. Change the 6D byte to 6C.

Enter the command F,CB,C7<enter>. This should come up with a match in sector 6 (at about byte E9 or so). Change the C7 to 87.

Return to sector 0, and enter the command F,CB,87<enter>. This should find a match in sector 6 (at about byte 0A or so). Chance the 87 to C7.

If in doubt about the use of SUPERZAP in this way, I would suggest that you read the instructions very carefully in the NEWDOS/80 manual before proceeding, and also modify a BACKUP copy of MODEM80 so that if anything goes wrong, as Murphy's law says it will, you'll still have a good copy to start all over from again.

MODEM80/CMD should now finally be ready for testing, together with your RS-232 interface. The first test should be to CAREFULLY short pins 2 and 3 of the DB-25 connector, using an 'alligator' clip or similar. These pins are TXD and RXD and will result in everything you type, being echoed back to your screen. Run MODEM80 and try typing something in the terminal mode and it should appear on the screen. Remove the short from pins 2 and 3, and nothing should be printed as you type.

Next, plug the connector into the modem, and try communicating with a bulletin board or a friend - if successful, you are away and running !!!

One further thing - to leave a message on the OMEN bb using the 'file transfer' method, you'll need the SLOW mod to MODEM80. To install the SLOW mod, follow the following steps.

1. Load (and run) MODEM80/CMD as modified above.

2. From the MAIN menu, enter the command 'c' (for DOS commands).

3. Type SLOW as a DOS command - you must have SLOW/CMD on one of your disks. This file is part of the MODEM80 package.

4. Go to the 'local options' menu and select '6' (for send slowly), and then 'g' (for receive graphics).

5. You are now ready to operate correctly. If you want, you can save the program as modified for slow operation by now exiting to DOS ('x' from the main menu), and then enter the following command:

DUMP,Filename/CMD:dn,8D00H,B7E7H,B50AH<enter>

Where 'Filename/CMD' is a name which you have chosen to give the program e.g. MODEM/CMD:0.

When you save a new file as above, the locations within the sectors as shown in the tables for method 1 will NOT be the same - they will be offset by about 6 bytes in ! 'NEGATIVE' direction.

All of this may sound a bit daunting - but don't despair, as it will save you about $150.00 compared with the cheapest alternative that I have found.

Good luck and happy communicating - it's great fun! ....

Darrell Hegarty.

STOP THOSE GLITCHES

Lindsay Douglas. VK2 ON

Does your electronic memory misbehave when you switch on the printer or the tape recorder ?.

The popular MX80 printer has a large capacitor across the 240v. input with no series resistor.

Remove it and replace it with a smaller one,a 0.01uf (750v. working) and place a 20 ohm (1/4 or 1/2 watt) resistor in series.

I have found that these two components placed in series across the 240v. input to the transformers or each piece of electronic gear, removes glitches.

I can then switch any of these items on or off without affecting the computer memory. Dynamic memories are rather sensitive to voltage spikes.

If you do not have a capacitor 0.01uf 750v. working then use 3 x 0.03uf 250v.working in **series**. The capacitor value is not critical but the voltage rating must not be less.

The best type of capacitor is a mica or polystyrene,small in physical size and low in inductance. It is not necessary to place capacitors from the 240v. primary to earth.

Earthing of the chassis of an apparatus (through a 0.03uf capacitor) can be helpful.

SYSTEM-80,TRS-80 VIDEO DE GLITCHER.

The aim of the modification;

To eliminate the black streaks across the white characters during rapid video changes.

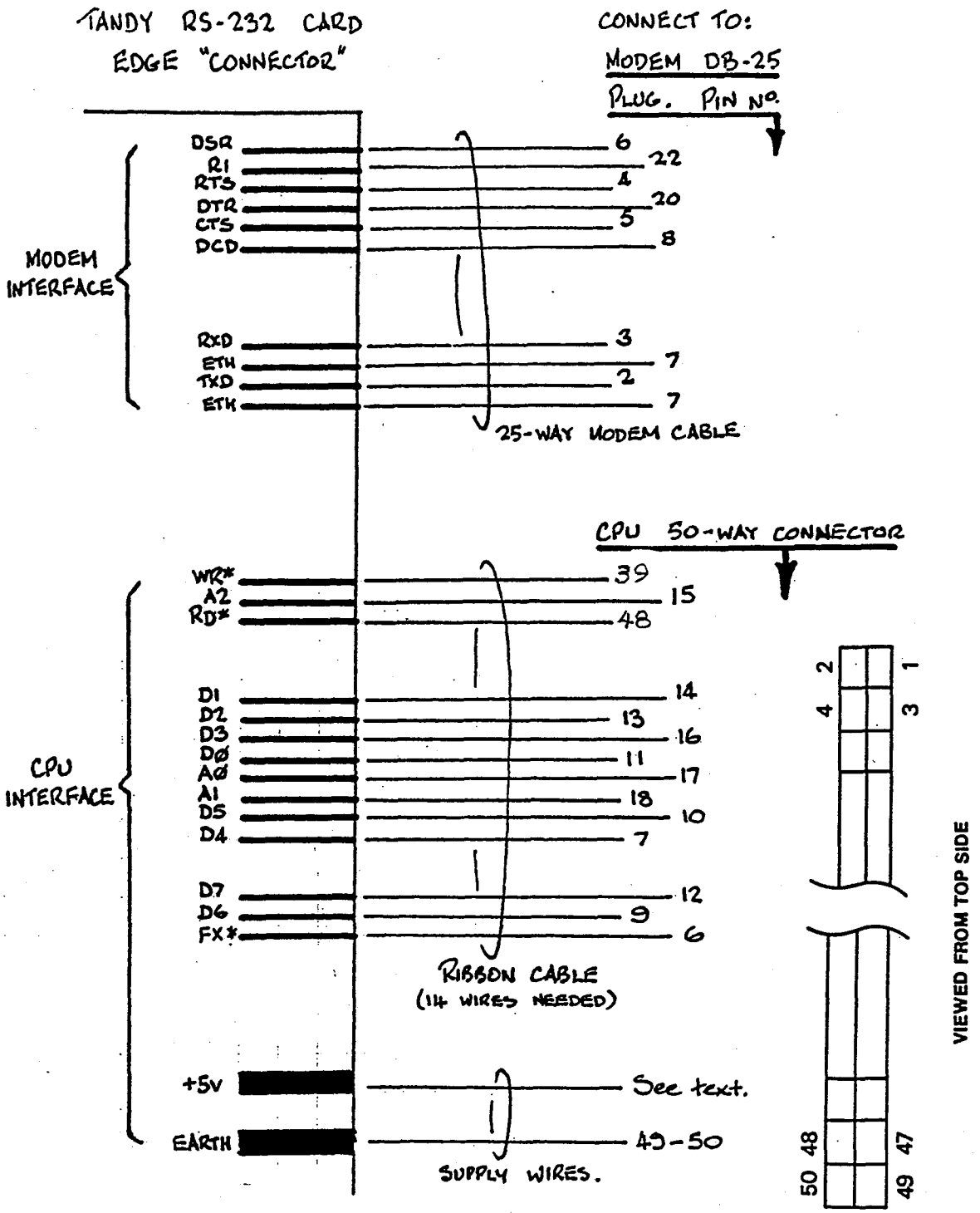
Reference: 80 Microcomputing March 1982.

QUESTION:Re Tape and Disk basic programs.

1.What are the differences between Tape and Disk basic.

2.What is involved to change tape programs to disk programs,especially when sound routines are called up via the usr statement.

M. KUHNE. (02) 217-2073 (BUS.)



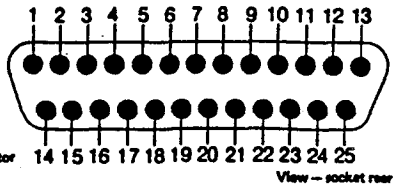
THE RS-232C INTERFACE

The basic RS-232C electrical specifications

Communication rate	0-20,000 bits per second
Driver output voltage levels, maximum no load.	−25V logic 1, +25V logic 0
Driver output voltage ranges for loads between 3k and 7k ohms.	logic 1: −15V (7k) and −5V (3k) logic 0: +15V (7k) and +5V (3k)
Driver output current, short circuit.	500mA maximum
Driver output impedence with power off.	300 ohms minimum
Maximum driver output slew rate.	30 volts per microsecond
Receiver input resistance.	7k ohms maximum, 3k ohms minimum
Effective receiver input capacitance.	2500pF maximum
Maximum receiver input voltage range.	−25V to +25V

RS232C CABLE PLUG CONNECTIONS

Pin No	Signal
1.	Protective Ground
2.	Transmit Data
3.	Received Data
4.	Request to Send
5.	Clear to Send
6.	Data Set Ready
7.	Signal Ground
8.	Received Line Signal Detector
20.	Data Terminal Ready



View — socket rear

R.S.M. SYSTEM MONITOR.

The RSM SYSTEM MONITOR is based on a machine language program widely used in S-100 computers. RSM system monitors allow you to interact directly with your TRS-80 at the machine language level.You may examine your Basic ROM's,test your RAM, enter and execute machine language programs, read and write machine language tapes and much more.

There are currently 4 RSM monitors,RSM-1, RSM-1S, RSM-2 and RSM-2D. RSM-1/1S for 4k computers, RSM-2 is for 16k tape computers and RSM-2D is for computers with disk systems.

RSM-1/1S/2 will operate in either LEVEL-I or LEVEL-II computers. RSM-2D requires LEVEL-II.

Functionally the four monitors are nearly identical. The advanced versions have more commands. RSM-2/2D contain their own video drivers, keyboard scanners and cassette drivers, thus they do not access BASIC routines. RSM-1/1S interact with BASIC in order to conserve memory. The following table is a memory map of the RSM monitors .

NOTE. There are three (3) versions of RSM-2D on each diskette.

MONITOR	START ADRESS	END ADRESS	USER ADRESS
RSM-1	4200	4880	4880
RSM-1S	4200	4FB0	4FB0
RSM-2	6C00	7EFF	7F80
RSM-2D(16K)	6C00	7EFF	7F80
RSM-2D(32K)	AC00	BEFF	BF80
RSM-2D(48K)	EC00	FEFF	FF80

The USER ADRESS is used in conjunction with the USER COMMAND. the(U) command allows the executive routines of RSM to be used in conjunction with custom commands or programs. When (U) is executed, program control is transferred to the user adress listed above, where the user's program should be located.

COMMAND SUMMARY FOR RSM MONITORS.

RSM-1S commands are listed below. Several commands have dual functions depending upon the number of adress fields following the command letter.RSM-1 commands are identical to RSM-1S except the Symbolic Dump (S) is not included.

	COMMAND	FUNCTION
A-	ASCII DUMP:	Display ASCII equivalent of memory block.
B-	BINARY ARITHMETIC:	Add,subtract in hex and decimal.
C-	CHECK TAPE:	Check cassette tapes for proper checksum.
D-	HEX DUMP:	Display hex equivalent of memory block.
E-	EDIT:	Enter,examine or modify memory in hex code.
F-	FIND 1 BYTE:	Find and display single byte hex codes.
G-	GOTO:	Go to and execute program at specified adress.
H-	HUNT 2 BYTES:	Find and display two- byte adresses.
I-	INITIALIZE/INPUT:	Initialize or input data from port.
K-	KEYBOARD ECHO:	Type directly to screen or terminal.
L-	LOAD AND GO:	Load cassette tape and execute program.
M-	MOVE:	Move any block of memory to specified location.
O-	OUTPUT:	Output hex value to specified location.
Q-	CHECKSUM:	Compute checksum of specified memory block.
R-	READ TAPE:	Read cassette tape (header or standard).
S-	SYMBOLIC DUMP:	Display memory in ZILOG Z-80 mnemonics.
T-	TEST MEMORY:	Test memory block and display errors.
U-	USER:	Allows user to write and execute commands.
V-	VERIFY MEMORY:	Compare any two blocks of memory.
W-	WRITE TAPE:	Write any memory block to cassette tape.
X-	EXCHANGE:	Interchange any two blocks of memory.
Z-	ZERO MEMORY:	Write zero or any hex code into memory.

RSM-2D includes all of the above RSM-1S commands plus the following additional commands (the R and L commands become dual function commands).

@-	BREAKPOINT:	Inserts breakpoint at specified adress.
P-	PUNCH:	Writes tape in LEVEL-II SYSTEM format.
R-	READ:	Read SYSTEM tape,display name, start adress.
L-	LOAD:	Load specified disk sectors into memory block.
$-	SAVE:	Saves memory block into specified disk.
Y-	TRS232:	Set print parameters (baud, etc) for TRS232.
->-	PRINT:	Directs output to printer as well as screen.