****
* RXB MANUAL *
****
* (C) 1 JAN 1991 *
* by *
* Richard Lynn Gilbertson *
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************************************************************
```

This is a copy of the RXB title screen:

```
           FIRMWARE  CONTROL
________________________________

       ******************
       * VERSION =  2000 *
       ******************
       *      R X B      *
       *                 *
       *     creator     *
       *                 *
       * Rich Gilbertson *
       ******************

>> press ============= result <<

    ANY KEY = DSK#.LOAD

    ENTER   = DSK#.UTIL1

  (COMMA) , = DSK#.BATCH

  SPACE BAR = RXB COMMAND MODE

 (PERIOD) . = EDITOR ASSEMBLER
```

This is a explaination of the keys of the title screen:

ANY KEY = DSK#.LOAD

This asks for which drive number the LOAD program is on. Any key means just what it says. The flashing # symbol indicates this option is waiting for a response. If after 5 seconds no key is pressed a search for LOAD begins.
Drives 1 to 9 are searched for the XB LOAD program. If the LOAD program can not be found, like old XB it goes to the XB command mode eventually after many searches.

ENTER = DSK#.UTIL1

After pressing ENTER the number symbol flashes indicating this option has been selected. Any key will then select the Drive to load the UTIL1 program from. If ater 5 seconds no key is pressed a search for UTIL1 begins. Drives 1 to 9 are searched for the UTIL1 program. This will only load a EA5 program image file named UTIL1.

(COMMA) , = DSK#.BATCH

After pressing the , (COMMA) key the number symbol flashes indicating this option has been selected. Any key will then select the Drive to load the BATCH control file from. If after 5 seconds no key is pressed a search for DSK1.BATCH begins. If the control file BATCH can not be found on Drive 1 it defualts to XB command mode. See CALL USER for more information on BATCH CONTROL FILES.

SPACE BAR = RXB COMMAND MODE

Pressing the SPACE BAR results in XB command mode.

(PERIOD) . = EDITOR ASSEMBLER

Pressing the . (PERIOD) key will switch to EDITOR ASSEMBLER menu. Pressing the . (PERIOD) key while in EDITOR ASSEMBLER will switch back to RXB.

DISK AND HARD DRIVE ACCESS

CALL CAT catalog disk or hard drives.
CALL DIR catalog disk or hard drives. (Requested duplicate of CAT)
CALL FILES same as disk controller version but executes new after.
CALL FCOPY copy's a file from device to device.
CALL PROTECT protects or unprotects a file.
CALL RENAME renames a file or directory.
CALL MKDIR makes a directory on hard drives or names disks.
CALL RMDIR deletes a directory on hard drive.
CALL CUTDIR deletes a directory and all sub-directories.
CALL SECTOR reads or writes disk or hard drive sectors.
CALL XBPGM not only runs XB propgrams but does a CALL FILES first.
CALL SCSI retrieves the scuzzy device ID codes. The info will contain the device company name, version number, revision number and size.

BATCH FILE SYSTEM:

CALL USER overides the normal edit mode by allowing a DV80 file to take control. This allows coversions from DV80 to XB program or DV80 to XB MERGE format or loading files, resequencing them, and saving or merging or adding lines through another DV80 file. All variables used through CALL USER are not affected so from a running program more lines or variables can be added to the size of the program without losing anything. Of course the RUN command will as always clear all variables before the program is run, this feature can be turned off with a CALL LOAD. (PRESCAN OFF)
As the USER subprogram can overide the editor many features can be bypassed. Example:

```
NEW                        cr
OLD DSK1.XBPROGRAM         cr
RES 11,3                   cr
MERGE "DSK1.MERGEPGM"      cr
SAVE "DSK1.NEWPROGRAM"     cr
RUN                        cr
```

The above is a good example of a DV80 Batch file for RXB. Note that there must be a CHR$(13) or Carriage Return after every input line. If not then RXB assumes the it is the same line. But even that is not much of a problem as RXB allows 21 lines of input per program line. You can make them even longer if you want.

INPUT/OUTPUT ACCESS:

CALL IO controls the 9901 CRU chip. Sound lists can be played independently of current status. (i.e. type in a program while playing music from VDP/GROM.) Control Register Unit can turn on/off single bits of CRU address bus. (i.e. cards/chips) Cassette direct bus control. (i.e. no menu input/output,verify)

REDO KEY ELIMINATED:

The REDO (FCTN 8) no longer exists in RXB. USER needed a buffer that would not be molested or modified by CALL LINK, CALL LOAD or routines that need a buffer and usually use the same area that USER previously used. So to update and eliminate questions of compatibility the USER buffer was installed in place of the Edit reall buffer (REDO). The REDO key was not considered to be of much use anyway as the Crunch Buffer is 163 tokens long and in non-tokenized form the Edit recall buffer is only 152 bytes long. That is why when REDO is pressed only part of the line last typed in was recalled to screen. Additionally COPY lines, and MOVE lines commands can do the samething as REDO could, so not much of anything is lost becuase it is assumed a TEXT EDITOR will be used to create programs in RXB then use CALL USER.

PROGRAM DEVICE NAMES ACCESS:

New access names established as devices are now availiable. By using any TRUE DSR (Device Service Routine) you may now access the Editor Assembler main menu by typing 'EA' within Basic or RXB. Example: RUN "EA" or OLD EA or DELETE "EA"
You may also access RXB from Editor Assembler or Basic or even another cartidge. Example: OLD XB or DELETE "XB" from Basic.
At any Editor Assembler device prompt type 'XB' then enter.

FOR ASSEMBLY LANGUAGE PROGRAMMERS:

CALL MOVES is a new command that is a GPL command converted and added to RXB to give total control over every type of memory with in the TI-99/4A. MOVES works with address or strings to copy, over-write or move blocks of memory of any type of memory. Create a program within a string and run it. See EXECUTE below.

RXB TO ASSEMBLY DIRECT ACCESS BY ADDRESS:

EXECUTE is much faster then the traditional LINK routine built into XB. The main problem with LINK is it checks everything and pushes everything onto the VDP stack. After getting to Assembly it pops everything off the stack for use or pushes what is to be passed to XB onto the stack. EXECUTE on the other hand just passes a address to a 12 byte Assembly program in Fast RAM and RTWP ends the users program. A LINK will use up 6 bytes for the name, 2 bytes for the address and wastes time checking things. The advantage to EXECUTE is you use LOAD or MOVE or MOVES to place the values needed directly into the registers then do it. EXECUTE uses less space, is faster, and is easy to debug.

AMS SUPPORT ROUTINES:

The AMS now has support routines built into RXB. CALL AMSMAP will turn the AMS mapper on. CALL AMSPASS will turn the AMS mapper back to pass mode. CALL AMSON will turn on the read/write lines of the mapper. CALL AMSOFF will turn off the read/write lines. With these commands pages of memory can be written with a CALL LOAD or read with a CALL PEEK. Also little known by users is the fact that if a RXB program is smaller then 10K it can be run from VDP not the upper 24K. So paging the upper or lower memory of the AMS is possible from RXB programs. RXB AMS SUPPORT USES NO ASSEMBLY OR CALL LINKs. That means up to 1meg of lower 8K pages or upper 24K pages from RXB. That is impossible to do from XB as you have to load your normal support somewhere.

GPL is where all the support routines are stored in RXB so not one byte is wasted on assembly support. That also means not one byte of AMS memory in wasted on control routines.

Speaking of control CALL AMSINIT intializes the mappers and switches the AMS to map mode. CALL AMSBANK switches 4K pages in the lower half and upper half of the lower 8K. You can now load a SCREEN DUMP, STAR, WINDYXB, XB-RAMDISK, XB PACKER, MOUSE support, and that only used 40K. With a 128K card you still have 56K unused. With a 256K card you would have 184K unused.

Keep in mind that all the above software can be run from one XB program. That is not even mentioning other RXB commands allow you MOVE or COPY any memory to any memory.

INTERUPT SERVICE ROUTINE CONTROL:

ISR (Interupt Service Routine) like MOUSE or Screen dumps or any special program like XB Packer use a ISR. The problem with these programs is unless they are written to work with new devices, a lock-up occurs. EXAMPLE: running a mouse routine and XB Packer. They were never made to work together. RXB now has a handle on this. CALL ISROFF turns off the interupt and saves the address for turning it back on. CALL ISRON restarts the interupt. As several pages of the AMS can be used with interupts a whole new world of programming is now possible.
NO ASSEMBLY IS USED OR CALL LINKs. Absolute compatibility.

LOWER 8K PROGRAM IMAGE FILE LOADER AND SAVER

Hidden loaders were created to overcome the slow loading speed of CALL LOAD. The disadvantage of a hidden loader is it can only load one assembly support program at a time. BLOAD loads program image files of the lower 8K, and BLOAD can load as many times as needed within one RXB program. BSAVE is the opposite and creates the program image files of the lower 8K support routines. Lastly loading 200K into the AMS card is easy with BLOAD and AMSBANK.

Format CALL AMSBANK(page-number,page-number)

CALL AMSBANK(numeric-variable,numeric-variable)

Description

The AMSBANK command will only work with a AMS memory card. AMSBANK turns on the read/write lines of AMS mapper registers stores the first value into the mapper register that sets low half of lower 8K, then stores the second value into the mapper register that sets high half of lower 8K. If the page-number is less then 0 or larger then 239 a BAD VALUE error results. If page-number is larger then the AMS card size allows * AMS BANK NUMBER ERROR * results. Neither error will affect previously loaded pages. No lock-up will result.

AMSBANK breaks the lower 8K into two halves of 4K. The lower 4K is Hex >2000 to >2FFF and the upper is Hex >3000 to >3FFF so switching lower 8K requires two 4K pages to be used. This is the only disadvantage to AMSBANK, but flexability does result. Less wasted pages results in more memory available.

AMSBANK values range from 0 to 239 if you have 1Meg, 0 to 111 if you have 512K, 0 to 47 if you have 256K, and 0 to 15 if you have 128K AMS. The formula is: SIZE/4-16=pages.

EXAMPLE: 256/4-16 is 48 pages.

In other words 0 to 15 pages would be 16 pages for use. The odd ball numbering scheme of AMSBANK results from pages 0 to 15 not being used in MAP mode. AMSBANK creates it's own numbers of pages 0 to 239 by starting actually at page 16 of the AMS. That would be page 0 of AMSBANK. This lay out leaves open 8 4K pages for PASS mode, and 8 4K pages for future use. See docs MANUAL-AMS for examples of memory maps. Also run AMS-TEST or AMS-SAVE or AMS-LOAD programs.

Programs

```
This sets up & starts map mode| >100 CALL AMSINIT
This reads low half 8K page.  | >110 CALL PEEK(16388,L)
This reads high half 8K page. | >120 CALL PEEK(16390,H)
This shows pages used.        | >130 PRINT "LOW";L;"HIGH";H
This loads a assembly program.| >140 CALL LOAD("DSK1.CHAR")
This changes low/high 8K pages| >150 CALL AMSBANK(16,17)
This loads a assembly program.| >160 CALL LOAD("DSK1.DUMP")
This changes low/high back.   | >170 CALL AMSBANK(L,H)
This uses a routine in CHAR.  | >180 CALL LINK("CHAR")
This changes low/high again.  | >190 CALL AMSBANK(16,17)
This uses a routine in DUMP.  | >200 CALL LINK("DUMP")
                              |
```

The above example program shows one RXB program using two assembly programs with links for both. Thus only 16K of the AMS was used for support. 256K would be 47 assembly support programs. Compatability of most software assured.

Options

See AMSINIT, ISROFF, ISRON, BLOAD, BSAVE, EXECUTE, and MOVES.

Format CALL AMSINIT

Description

The AMSINIT command will only work with a AMS memory card. AMSINIT turns on the read/write lines of AMS mapper registers stores pages 0 to 15 into mapper registers, then turns on MAP mode. Essentially PASS mode and MAP mode are the same in that the mapper registers are exactly the same in both modes. That means in both modes the same memory is used. This would make the AMS of little use so LOAD is used to change mapper registers and switch pages. But if upper memory is switched from a XB program the page that just did this is switched out and a lock-up occurs. On the other hand switching pages in the lower 8K presents very few problems. So see AMSBANK. AMSINIT can also be used like AMSPASS but stays in MAP mode. See docs MANUAL-AMS for examples of memory maps. Also run AMS-TEST or AMS-SAVE or AMS-LOAD programs.

Programs

```
This sets up & starts map mode| >100 CALL AMSINIT
This reads low half 8K page.  | >110 CALL PEEK(16388,L)
This reads high half 8K page. | >120 CALL PEEK(16390,H)
This shows pages used.        | >130 PRINT "LOW";L;"HIGH";H
This changes low half 8K page.| >140 CALL LOAD(16388,16)
This changes high half 8K page| >150 CALL LOAD(16390,17)

This sets up & starts map mode| >200 CALL AMSINT
This reads low half 8K page.  | >210 CALL PEEK(16388,L)
This reads high half 8K page. | >220 CALL PEEK(16390,H)
This shows pages used.        | >230 PRINT "LOW";L;"HIGH";H
This changes low/high 8K pages| >240 CALL AMSBANK(16,17)
                              |
```

In the above program 100 to 150 and 200 to 240 do the same thing.

Options

Dependent on other AMS commands. Also insure that ISR hooks are off if in use or lock-up will occur. See AMSBANK, ISROFF, ISRON, BLOAD, BSAVE, EXECUTE, and MOVES.

Format CALL AMSMAP

Description

The AMSMAP command will only work with a AMS memory card. MAP MODE on the AMS card means the mapper registers are turned on so they can be changed. But even with the mapper on unless the read/write lines are on no mappers will appear to be at the DSR address. AMSON turns on read/write mapper registers. Then a LOAD or AMSBANK can change the memory pages.
See docs MANUAL-AMS for examples of memory maps. Also run AMS-TEST or AMS-SAVE or AMS-LOAD programs.

Programs

```
This turns on map mode.        | >100 CALL AMSMAP
This turns on read/write.      | >110 CALL AMSON
This fetches map register 2.   | >120 CALL PEEK(16388,BYTE)
This turns off read/write.     | >130 CALL AMSOFF
This turns on pass mode.       | >140 CALL AMSPASS
This prints the page from map  | >150 PRINT "Register 2 PAGE#"
 mode in register 2.           |  ;BYTE
                               |
```

Options
Dependent on other AMS commands. Also insure that ISR hooks are off if in use or lock-up will occur.

Format CALL AMSOFF

Description

The AMSOFF command will only work with a AMS memory card. The read/write lines to the AMS mapper registers are turned off so they will not be changed. Any PEEK or LOAD to the DSR space will be zero after the AMSOFF command. They can't be read/written to. See docs MANUAL-AMS for examples of memory maps. Also run AMS-TEST or AMS-SAVE or AMS-LOAD programs.

Programs

```
This sets up & starts map mode| >100 CALL AMSINIT
This turns on read/write.     | >110 CALL AMSON
This fetches map register 2.  | >120 CALL PEEK(16388,BYTE)
This turns off read/write.    | >130 CALL AMSOFF
This turns on pass mode.      | >140 CALL AMSPASS
This prints the page from map | >150 PRINT "Register 2 PAGE#"
 mode in register 2.          |  ;BYTE
                              |
```

Options
Dependent on other AMS commands. Also insure that ISR hooks are off if in use or lock-up will occur.

Format CALL AMSON

Description

The AMSON command will only work with a AMS memory card. The read/write lines to the AMS mapper registers are turned on so they can be changed. Any PEEK or LOAD to the DSR space can then be used to change the mapper registers or read them. See docs MANUAL-AMS for examples of memory maps. Also run AMS-TEST or AMS-SAVE or AMS-LOAD programs.

Programs

```
This sets up & starts map mode| >100 CALL AMSINIT
This turns on read/write.     | >110 CALL AMSON
This loads 9 in map register 2| >120 CALL PEEK(16388,9)
This turns off read/write.    | >130 CALL AMSOFF
This loads values in lower 8K.| >140 CALL LOAD(8192,1,2,3,4)
This turns on pass mode.      | >150 CALL AMSPASS
This peeks values in lower 8K.| >160 CALL PEEK(8192,A,B,C,D)
This prints values.           | >170 PRINT A;B;C;D
This turns on map mode.       | >180 CALL AMSMAP
This turns on read/write.     | >190 CALL AMSON
This loads 2 in map register 2| >200 CALL LOAD(16388,2)
This turns off read/write.    | >210 CALL AMSOFF
This peeks values in low page.| >220 CALL PEEK(8192,A,B,C,D)
This prints values.           | >230 PRINT A;B;C;D
                              |
```

Options
Dependent on other AMS commands. Also insure that ISR hooks are off if in use or lock-up will occur.

Format CALL AMSPASS

Description

The AMSPASS command will only work with a AMS memory card. PASS MODE on the AMS card means the mapper registers are not on. This is the normal mode of the AMS. No extra memory is is available or used. This renders the AMS like a normal 32K card. See docs MANUAL-AMS for examples of memory maps. Also run AMS-TEST or AMS-SAVE or AMS-LOAD programs.

Programs

```
This sets up & starts map mode| >100 CALL AMSINIT
This turns on read/write.     | >110 CALL AMSON
Load 22 into map register 2.  | >120 CALL LOAD(16388,22)
This turns off read/write.    | >130 CALL AMSOFF
This turns on pass mode.      | >140 CALL AMSPASS
                              |
```

Options
Dependent on other AMS commands. Also insure that ISR hooks are off if in use or lock-up will occur.

Format RUN "BASIC"

DELETE "BASIC"

CALL XBPGM("BASIC")

CALL CAT("BASIC")

OLD BASIC

SAVE BASIC -(Must have a program within
- memory to work at all)

CALL LOAD("BASIC") -(CALL INIT must proceed it)

Description

The BASIC DSR (Device Service Routine) allows access to the TI BASIC . The access will work only if the DSR is the GPLDSR or LINK DSR. In other words, a DSR that acknowledges any type of DSR in RAM, ROM, GROM, GRAM, or VDP. Most DSR's only accept DSK or PIO. Others like the SAVE or LIST commands will only work with a program in the memory first. Still others like CALL LOAD("EA") must have the CALL INIT command used first.
Keep in mind that if it does not work, the problem is the DSR your using. Almost all DSR's today only acknowledge the ROM or RAM DSR's. As the BASIC DSR is in GROM/GRAM it seems a bit short sighted on the part of most programmers to use cut down versions of a DSR. Please discourage this practice as it is a diservice to us all.

Programs

```
The program at the right will | >100 CALL XBPGM("BASIC")
go to the BASIC prompt.       |
                              |
This line asks for a string.  | >100 INPUT A$
This line uses the string and | >110 DELETE A$
if you type BASIC then enter  |
will switch to BASIC.         |
                              |
This line will switch to the  | >CALL CAT("BASIC")
BASIC.                        |
                              |
This line shows even lower    | >CALL EAPGM("basic")
case works also.              |
```

Options
CALL EA or CALL XB is also availiable.

Format CALL BEEP

Description

The BEEP command produces the same sound as the ACCEPT or BEEP as in DISPLAY options. See EXTENDED BASIC MANUAL pages 47, 48, 49, 77, 78.

Programs

The program to the right will will produce a beep sound.

```
>100 CALL BEEP
```

Options
NONE.

Format CALL BIAS(numeric-variable,string-variable [,...])

Description

The BIAS command adds 96 to all characters in the string or subtracts 96 from all characters in the string. If numeric variable is 0 then it subtracts the XB screen bias of 96 from the characters, if the numeric variable is not 0 then it adds the XB screen bias of 96 to all the characters in the string.
The XB screen bias only affects charactes read or written to the screen. See PEEKV, and POKEV.

Programs

The program to the right will load V$ with 255 characters off the screen. But will not be readable as they have a bias. The bias is now subtracted from the string printed.

```
>100 CALL MOVES("V$",255,0,V$
 )
>110 CALL BIAS(0,V$)
>120 PRINT V$
```

Options
NONE.

Format CALL BLOAD("access-name")

CALL BLOAD(string-variable)

Description

The BLOAD subprogram loads ONLY program image files created by BSAVE. BLOAD is the opposite of BSAVE. BLOAD is a faster version of CALL LOAD. BLOAD has the speed of a hidden loader and is much easier to use. BLOAD only loads into lower 8K. Unlike CALL LOAD the BLOAD and BSAVE subprogram will work without CALL INIT being used first. Remember to turn on the interupts if the program has them. Or the program support will not work. See ISROFF and ISRON.
NOTE: 8K of VDP memory MUST be free for BLOAD to function or a memory full error will result. Always place the BLOAD command at the top of the RXB program.

Programs

```
This line loads a previously | >100 CALL BLOAD("DSK2.MOUSE")
saved program image file.    |
This line turns on the mouse | >110 CALL LINK("MSON")
(program would continue here)|
                             |
This line load a previously  | >100 CALL BLOAD("DSK1.DUMP")
saved program image file.    |
This line turns on interupt  | >110 CALL ISRON(16384)
within program.              |
This line links to support.  | >120 CALL LINK("DUMP")
                             |
```

Options
AMS users will find this a easy way to load RXB AMS support.
EXAMPLE:

```
        >100 CALL AMSINIT
        >110 FOR L=0 TO 15 STEP 2
        >120 CALL AMSBANK(L,L+1)
        >130 CALL BLOAD("DSK1.BANK"&STR$(L/2))
        >140 NEXT L
```

The above program would load RXB AMSBANK banks 0 to 15 into AMS memory from files named BANK0 to BANK7 on disk 1.
See AMSINIT, AMSBANK, ISROFF, ISRON, EXECUTE, and MOVES.

Format CALL BSAVE("access-name")

CALL BSAVE(string-variable)

Description

The BSAVE subprogram saves ONLY program image files to be used for BLOAD. BSAVE is the opposite of BLOAD. BSAVE has the speed of a hidden loader without the hassle. BSAVE saves ONLY lower 8K program image files for ONLY BLOAD to use.
Unlike CALL LOAD the BLOAD and BSAVE subprogram will work without CALL INIT being used first.
To save a program with hidden loaders just break program after loading is complete and type CALL BSAVE("DSK#.NAME") Remember to check for interupts or the program will not work after loading with BLOAD. See ISRON and ISROFF.
NOTE: 8K of VDP memory MUST be free for BSAVE to function or a memory full error will result. Always place the BSAVE command at the top of the RXB program.

Programs

```
Initialize lower 8K.          | >100 CALL INIT
Load the assembly support.    | >110 CALL LOAD("DSK1.MSETUPO")
Load the assembly support.    | >120 CALL LOAD("DSK1.HDSR")
Turn on the mouse setup.      | >130 CALL LINK("MSETUP")
BSAVE the whole thing.        | >140 CALL BSAVE("DSK2.MOUSE")
                              |
Procedure for hidden loaders.|
Loads program on disk 1       | >CALL XBPGM("DSK1.LOAD")
Break program.                | PRESS FCTN 4 to break program.
Get address of interupts.     | >CALL ISROFF(I)
See if they are on.           | >PRINT I
Save the program to disk.     | >CALL BSAVE("DSK2.EXAMPLE")
                              |
```

Options
AMS users will find this a easy way to save RXB AMS support.
EXAMPLE:

```
        >100 CALL AMSINIT
        >110 FOR L=0 TO 15 STEP 2
        >120 CALL AMSBANK(L,L+1)
        >130 CALL BSAVE("DSK1.BANK"&STR$(L/2))
        >140 NEXT L
```

The above program would save RXB AMSBANK banks 0 to 15 into 8 program image files named BANK0 to BANK7 on disk 1.
See AMSINIT, AMSBANK, ISROFF, ISRON, EXECUTE, and MOVES.

Format BYE

CALL BYE

Description

The BYE command is the same as the BYE command in the EXTENDED BASIC MANUAL page 54. The BYE command ends the program and returns the system to a reset. BYE will close all open files before exiting to a reset.

Command

May only be used from command mode. | >BYE

Programs

May only be used in program mode.	>100 CALL BYE
The INPUT asks for a Y to go on, if not the loop forever. Must be a Y so reset system.	>110 INPUT "END PROGRAM":A$ >120 IF A$<>"Y" THEN 110 >130 CALL BYE

Options
NONE.

CALL BYE

CALL CLSALL

CALL CHAR(ALL,pattern-identifier)

CALL COINC(#sprite,#sprite,tolerance,numeric-variable[,...])

CALL COLOR(ALL,foreground,background[,...])

CALL DISTANCE(#sprite,#sprite,numeric-variable[,...])

CALL FILES(number)

CALL GCHAR(row,column,numeric-variable[,...])

CALL HCHAR(row,column,character-code,repetition[,...])

CALL JOYST(key-unit,x-return,y-return[,...])

CALL KEY(key-unit,return-variable,status-variable[,...])

CALL KEY(string,key-unit,return-variable,status-variable[,...])

CALL MOTION(ALL,row-velocity,column-velocity[,...])

CALL NEW

CALL SIZE

CALL VCHAR(row,column,character-code,repetition[,...])

CALL VERSION(numeric-variable)

CALL XBPGM(path-filename,number)

Format CALL CAT("#"[,...])

CALL CAT("DSK#."[,...])

CALL CAT("DSK.DISKNAME."[,...])

CALL CAT(string-variable[,...])

CALL CAT(number[,...])

CALL CAT(numeric-variable[,...])

CALL CAT(ASC II value[,...])

Description

The CAT command catalogs the disk drive indicated by the # which can be 1 to z or by path name. The path name may be up to 30 characters long. A numeric variable or number can be used for drives 1 to 9 or if higher then it is assummed that the numeric-variable or number is a ASCII value between 30 to 255. This allows a catalog of a RAM-DISK designated by letters or control characters.

RXB CAT can be used from program mode or command mode. Also CAT can catalog up to 32 drives in one command.

The SPACE BAR will pause the catalog routine, then when the pressed again continues the catalog listing.
ANY OTHER KEY WILL ABORT THE CATALOG.

Programs

```
This line puts the pathname in| >100 A$="DSK.ADISKNAME"
 the string A$                |
This line uses A$ for the name| >110 CALL CAT(A$)
 of the device to catalog.    |
                              |
This line will catalog RAMDISK| >100 CALL CAT("A")
 designated DSKA.             |
                              |
This line will catalog drive 4| >100 CALL CAT(N)
 if N=4                       |
                              |
This line will catalog drive C| >100 CALL CAT(X)
 if X=67  (ASCII 67 is C)     |
                              |
This line is path name.       | >10 V$="WDS1.VOLUME.SUB-DIR."
This line will catalog device | >20 CALL CAT(V$)
 WDS1 for directory VOLUME and|
 catalog SUB-DIR              |
                              |
This line catalogs drives 1   | >100 CALL CAT(1,2,3,"WDS1.")
 then 2 then 3 then WDS1      |
```

Options
See DIR, FCOPY, MKDIR, PROTECT and RENAME for the same access.

Format CALL CHAR(character-code,pattern-identifier [,...])

CALL CHAR(ALL,pattern-identifier[,...])

Description

See EXTENDED BASIC MANUAL page 56 for more data. The only difference is the addition of the ALL command allows all the characters from 32 to 127 to be redefined at once.

Programs

```
This line will define all the | >100 CALL CHAR(ALL,"")
 characters as a empty string.|
                              |
This line sets variable A$ up.| >100 A$="FF818181818181FF"
                              |
This line will define all the | >100 CALL CHAR(ALL,A$)
 characters as a box.         |
```

Options
NONE.

Format CALL CHARSETALL

Description

The CHARSETALL command is just like the CHARSET command, but it resets characters from 32 to 127 thus resetting characters 95 to 127 unlike CHARSET.
Exactly like CHARSET it also resets colors to original mode.

Programs

```
This resets all characters and| >100 CALL CHARSETALL
 colors to original.          |
Set all characters the same.  | >100 CALL CHAR(ALL,"4")
Set all colors the same.      | >110 CALL COLOR(ALL,14,10)
Reset characters and colors.  | >120 CALL CHARSETALL
Go start over.                | >130 GOTO 100
```

Options
NONE.

Format CALL CLSALL

Description

The CLSALL command will find and close all open files.
This allows programmers to save time and program space.

Programs

```
The program to the right will | >100 CALL CLSALL
CLOSE all open files.         |
                              |
This opens the printer.       | >100 OPEN #9:"PIO",OUTPUT
This opens a disk file JUNK.  | >110 OPEN #2:"DSK1.JUNK",INPUT
This closes both files.       | >120 CALL CLSALL
```

Options
NONE.

Format

```
CALL COINC(#sprite-number,#sprite-number,
tolerance,numeric-variable[,...])

CALL COINC(#sprite-number,dot-row,dot-column,
tolerance,numeric-variable[,...])

CALL COINC(ALL,numeric-variable[,...])
```

Description

See EXTENDED BASIC MANUAL PAGE 64 for more data. The only difference is the use the comma has been added for auto-repeat.

Programs

* See EXTENDED BASIC MANUAL.

The program to the right will will set up 3 sprites to be on the same vertical plane, and COINC will scan for which ones collide. You will notice that ALL has never been very good at detecting collisions. The other 3 scans are much better.

```
>100 CALL CLEAR :: X=190
>110 CALL SPRITE(#1,65,2,9,X,
 20,0,#2,66,2,9,X,30,0,#3,67,
 2,9,X,-20,0)
>120 CALL COINC(ALL,A,#1,#2,1
 2,B,#1,#3,12,C,#2,#3,12,D)
>130 PRINT A;B;C;D
>140 GOTO 120
```

Options

While characters 144 to 159 are being used, you can not use sprites. Notice the ALL option must always be first as it was given highest priority to increase the detection rate. Though the ALL option does not improve much,the others do.

Format CALL COLOR(#sprite-number,foreground-color[,...])

CALL COLOR(character-set,foreground-color,
background-color[,...])

CALL COLOR(ALL,foreground-color,background-color
[,...])

Description

See EXTENDED BASIC MANUAL page 66 for more data. Presently modifications to the COLOR subprogram is ALL that will change all character sets from 0 to 14 the same foreground and background colors. Also sets 0 to 16 can be changed.

Programs

```
This line sets all character  | >100 CALL COLOR(ALL,2,11)
 sets to foreground 2 and the |
 background 11                |
                              |
Sets all to transparent, then | >100 CALL COLOR(ALL,1,2,ALL,2
 all to black on transparent. |  1)
Go start over.                | >110 GOTO 100
```

Options

While characters 144 to 159 are being used, you can not use sprites.

Format COPY start line-end line,new start line,increment

Description

The COPY command is used to copy a program line or block of program lines to any other location in the program. The COPY does not affect the original lines and leaves them intact.
The block to be copied is defined by start line and end line. If either of these numbers are ommited, the defaults are the first program line and the last program line. However, at least one number and a dash must be entered (both can't be ommitted), and there must be at least one valid program line between start line and end line. To copy one line enter it as both the start line and end line number. If any of the above conditions are not met, a Bad Line Number Error will result.
The new start line number defines the new line number of the first line in the block to be copied. This number must be entered. There is no default. The increment defines the line number spacing of the copied lines and may be ommited. The default is 10.
There must be suffficient space in the program for the copied segment to fit between new start line number and the next program line following the location where the block will be moved. If not, a Bad Line Number Error message is reported. This problem can be corrected by using a smaller increment, or by using RES to open up space for the segment. A Bad Line Number Error also results if the copying process would result in a line number higher then 32767.
The COPY routine does not change any program references to the copied lines. It is an exact copy of the source lines with new line numbers. A check for sufficient memory space is made before each line is copied. If space is not available the copying process is halted and a Memory Full Error is reported.
Before the first line is copied, any open files are closed and all variables are lost.

Description Addendum

PLEASE NOTE: The COPY command copies the lines in reverse order. If the copying process is halted due to insufficent memory space, any uncopied lines will be at the beginning of the block.

Commands

Lines 100 to 150 are copied to line 9000 and incremented by 5	>COPY 100-150,9000,5
Line 10 is copied to line 25	>COPY 10-10,25
Line 5 to last line are copied to 99 and incremented by 10 (Defualt).	>COPY 5-,99

Options
NONE.

Format CALL CUTDIR(pathname,directory-name[,...])

CALL CUTDIR(string-varialbe,string-variable [,...])

Description

The CUTDIR subprogram removes directorys and subdirectorys on hard drives. The pathname determines the device used and the pathname can be up to 255 chracters in length. The pathname must end with a period and the directory may only be 10 characters in length. Only a SCSI controller supports this command. CUTDIR will remove a directory and all its sub-directorys at once. BE CARFULL WITH THIS COMMAND!

Programs

This line removes a directory named TEST on hard drive 1.	>CALL CUTDIR("WDS1.","TEST")
This line removes directory ONE and all sub-directorys that within it.	>100 CALL CUTDIR("WDS1.","ONE ")
This line would remove every thing off WDS1 if WOW had all main directorys in it.	>100 CALL CUTDIR("WDS1.","WOW ")

Options
This command requires a updated SCSI EPROM.

Format DEL start line-end line

Description

The DEL command is used to delete a line or block of lines from a program. Start line number and end line number define the lines to be deleted. If start line number is ommited, line deletion will begin at the first line of the program. In this case, end line number must be preceeded by a dash. If end line number is ommited, line deletion will end at the last line of the program. If start line number and end line number are ommited, then the first line number of the program to the last line number of the program is deleted. At least one valid program line must exist between start line number and end line number or a Bad Line Number Error will be reported. If only one line number is given without a dash, then that one line will be deleted.

After the DEL command has executed any open files are closed and all variables are lost.

Commands

Lines 100 to 150 are deleted.	>DEL 100-150
Line 10 is deleted.	>DEL 10
Line 5 to last line are deleted.	>DEL 5-
First line to 80 are deleted.	>DEL -80

Options

NONE.

Format CALL DIR("#"[,...])

CALL DIR("DSK#."[,...])

CALL DIR("DSK.DISKNAME."[,...])

CALL DIR(string-variable[,...])

CALL DIR(number[,...])

CALL DIR(numeric-variable[,...])

CALL DIR(ASC II value[,...])

Description

The DIR command catalogs the disk drive indicated by the # which can be 1 to z or by path name. The path name may be up to 30 characters long. A numeric variable or number can be used for drives 1 to 9 or if higher then it is assummed that the numeric-variable or number is a ASCII value between 30 to 255. This allows a catalog of a RAM-DISK designated by letters or control characters.

RXB DIR can be used from program mode or command mode. Also DIR can catalog up to 32 drives in one command.

The SPACE BAR will pause the catalog routine, then when the pressed again continues the catalog listing.
ANY OTHER KEY WILL ABORT THE CATALOG.

Programs

```
This line puts the pathname in| >100 A$="DSK.ADISKNAME"
 the string A$                |
This line uses A$ for the name| >110 CALL DIR(A$)
 of the device to catalog.    |
                              |
This line will catalog RAMDISK| >100 CALL DIR("A")
 designated DSKA.             |
                              |
This line will catalog drive 4| >100 CALL DIR(N)
 if N=4                       |
                              |
This line will catalog drive C| >100 CALL DIR(X)
 if X=67  (ASCII 67 is C)     |
                              |
This line is path name.       | >10 V$="WDS1.VOLUME.SUB-DIR."
This line will catalog device | >20 CALL DIR(V$)
 WDS1 for directory VOLUME and|
 catalog SUB-DIR              |
                              |
This line catalogs drives 1   | >100 CALL DIR(1,2,3,"WDS1.")
 then 2 then 3 then WDS1      |
```

Options
See CAT, FCOPY, MKDIR, PROTECT and RENAME for the same access.

Format CALL DISTANCE(#sprite-number,#sprite-number, numeric-variable,[,...])

CALL DISTANCE(#sprite-number,dot-row, dot-column,numeric-variable[,...])

Description

The only thing added by RXB to DISTANCE is the autorepeat. See EXTENDED BASIC MANUAL page 80 for more data.

Program

The program at the right will set up 3 sprites on screen and start them moving.

Scans three sprites locations and returns the distance from each other squared.

Rstart loop

```
>100 CALL CLEAR
>110 CALL SPRITE(#1,65,7,99,9
 9,0,10,#2,66,4,99,99,10,0,#3
 ,67,2,1,2,-50,-50)
>120 CALL DISTANCE(#1,#2,D,#1
 ,#3,E,#2,#3,F)
>130 DISPLAY AT(1,1):"#1/#2";
 D:"#1/#3";E:"#2/#3";F
>140 GOTO 120
```

Options

While characters 144 to 159 are being used, you can not use sprites. The DISTANCE subprogram does get more accurate if you have more then one to check at a time.

Format CALL DUPCHAR(character-code,character-code [,...])

Description

The DUPCHAR subprogram allows you to duplicate character definitions. You can duplicate character-codes from 30 to 159 The first character-code specifies the character-code to be duplicated, and the second character-code specifies the destination character-code.

Program

The program at the right will duplicate the character definition of character-code 65 into character definition of character-code 66.

```
>100 CALL DUPCHAR(65,66)
```

The program at the right will blank out all character-code definitions from 33 to 159. Line 110 is just to show what the character was before the DUPCHAR subprogram blanked it.

```
>100 FOR C=32 TO 158
>110 PRINT CHR$(C);
>120 CALL DUPCHAR(C,C+1)
>130 NEXT C
```

Options
NONE.

Format CALL DUPCOLOR(character-set,character-set [,...])

CALL DUPCOLOR(#sprite-number,#sprite-number, [,...])

Description

The DUPCOLOR subprogram duplicates foreground and background colors of the first set into the second set. Or the first sprite-number color into the second sprite-number color. The character-set numbers are given below:

set-number		character-codes
0		30 to 31
1		32 to 39
2		40 to 47
3		48 to 55
4		56 to 63
5		64 to 71
6		72 to 79
7		80 to 87
8		88 to 95
9		96 to 103
10		104 to 111
11		112 to 119
12		120 to 127
13		128 to 135
14		136 to 143
(also sprite table) 15		144 to 151
(also sprite table) 16		152 to 159

Programs

The program to the right will will duplicate set 6 colors in to set 9.

```
>100 CALL DUPCOLOR(6,9)
```

Line 100 sets up two sprites on screen.
Line 110 duplicates the color from sprite-number 1 into sprite-number 2.

```
>100 CALL SPRITE(#1,65,2,99,9
 9,#2,66,16,88,88)
>110 CALL DUPCOLOR(#1,#2)
>120 GOTO 120
```

Options
NONE.

Format RUN "EA"

DELETE "EA"

CALL XBPGM("EA")

CALL CAT("EA")

OLD EA

SAVE EA -(Must have a program within
- memory to work at all)

CALL LOAD("EA") -(CALL INIT must proceed it)

Description

The EA DSR (Device Service Routine) allows access to the Editor Assembler section of RXB. The access will work only if the DSR is the GPLDSR or LINK DSR. In other words, a DSR that acknowledges any type of DSR in RAM, ROM, GROM, GRAM, or VDP. Most DSR's only accept DSK or PIO. Others like the SAVE or LIST commands will only work with a program in the memory first. Still others like CALL LOAD("EA") must have the CALL INIT command used first.
Keep in mind that if it does not work, the problem is the DSR your using. Almost all DSR's today only acknowledge the ROM or RAM DSR's. As the EA DSR is in GROM/GRAM it seems a bit short sighted on the part of most programmers to use cut down versions of a DSR. Please discourage this practice as it is a diservice to us all.

Programs

```
The program at the right will | >100 CALL XBPGM("EA")
go to the Editor Assembler.   |
                              |
This line asks for a string.  | >100 INPUT A$
This line uses the string and | >110 DELETE A$
if you type EA then enter will|
switch to the Editor Assembler|
                              |
This line will switch to the  | >CALL CAT("EA")
Editor Assembler.             |
                              |
This line shows lower case can| >call ea
be used.                      |
                              |
This line will have a strange | >CALL EAPGM("EA")
looping effect.               |
```

Options
BASIC and XB are also availiable.

Format CALL EALR("access-name")

Description

The EALR subprogram is used to switch to the Editor Assembler Load and Run menu screen prompt. EALR will only load and run Editor Assembler DISPLAY FIXED OBJECT FILES created by the Editor Assembler for the Editor Assembler environment, not the EXTENDED BASIC DISPLAY FIXED OBJECT FILES. They've never been compatible, hence one of RXB's reasons for existing. The access-name is moved into the Editor Assembler and the name is loaded onto the screen so you can see it. This gives you a chance to change the disk if needed, or to see what is wrong if it does not load. After the DISPLAY FIXED OBJECT FILE is loaded, you will receive the normal `Program Name?' prompt. This name would be the same as the link name from Editor Assembler BASIC. You can ABORT the loader by holding the FCTN BACK (9) key while the name is being placed onto the screen. If an error occurs the code will be returned onto screen and you must press ENTER to restart the loader.

Description Addendum

EALR only works from EXTENDED BASIC, not BASIC.

Programs

```
The program at the right will | >100 CALL EALR("DSK3.SAVE")
load a Display/Fixed 80 file  |
named SAVE from disk drive 3. |
                              |
This program loads a Display/ | >100 CALL EALR("DSK.DNAME.FNA
Fixed Object file named FNAME |  ME")
after searching all disk      |
drives and RAMDISKs for the   |
disk named DNAME.             |
                              |
```

Options
None.

Format CALL EAPGM("access-name")

Description

The EAPGM subprogram is used to switch to the Editor Assembler `Run Program file?'screen prompt. It will not run EXTENDED programs or BASIC programs for that see XBPGM.
The access-name is moved into the Editor Assembler and the name is loaded onto screen so you can see it. This gives you a chance to change the disk if needed, or to see what is wrong if it does not load. After the Program Image file is loaded, it executes the program normally.
You can ABORT the loader by holding down the FCTN BACK (9) key while the name is being placed onto the screen. If an error occurs the error code will be returned onto the screen and you must press ENTER to restart the loader.
If a empty string is used then the search routine is evoked and a search for UTIL1 is executed. Drives 1 to 9 will then be searched for UTIL1 file.

Description Addendum

EAPGM only works from EXTENDED BASIC, not BASIC.

Programs

The program at the right will load a Program Image file named FW from disk drive 2.	>100 CALL EAPGM("DSK2.FW")
This program loads a Program Image file named MG after searching all disk drives and and RAMDISKS for a disk named FW.	>100 CALL EAPGM("DSK.FW.MG")
This program causes a search for UTIL1 to be started.	>100 T$="" >110 CALL EAPGM(T$)

Options
NONE.

Format CALL EXECUTE(cpu-address[,...])

CALL EXECUTE(numeric-variable[,...])

Description

The EXECUTE subprogram directly goes to the cpu-address and expects to find 4 bytes to be present. The bytes are 1 and 2 define the workspace register address. Bytes 3 and 4 define the address to start execution at in cpu memory. Programmers can see this is a BLWP at a cpu-address. The programmer is responsible for keeping track of the workspace and program space he is using. Also for any registers while doing a BL or another context switch. A RTWP will end either a BL or a BLWP as long as registers set are not changed. By using CALL LOAD or CALL MOVE or CALL MOVES the programmer can set up a BLWP routine in the lower 8K by filling the registers with values first, then using CALL EXECUTE to directly complete these commands. This is faster then CALL LINK as no interpetation of the access or values are checked.

EXECUTE runs a XML link from GPL by moving 12 bytes from the Fast RAM at HEX 8300 to VDP at HEX 03C0 then moving the value in FAC passed from XB to HEX 8304 and does a GPL XML >F0 After a RTWP by the Assembly program, it returns VDP HEX 03C0 to Fast RAM HEX 8300 so the 12 bytes are restored. Thus this allows programmers use of FAC and ARG areas in Fast RAM.

Here is the program loaded into Fast RAM by EXECUTE:

```
                  AORG   >8300
 CPUPGM           DATA   >8302        First address.
                  BLWP   @>834A       Switch context
                                      with FAC as dummy.
                  CLR    @>837C       Clear for GPL return.
                  RT                  Return to GPL.
                  END
```

If a programmer absolutly must use Fast RAM for his program I suggest he set up a buffer for saving HEX 8300 to HEX 83FF if only so it will not mess up any GPL pointers and don't go and mess up the 12 bytes at VDP HEX 03C0. Then the only thing to worry about is messing up something else.

Programs

```
Line 100 initilizes lower 8k  | >100 CALL INIT
Line 110 loads the assembly   | >110 CALL LOAD(9838,47,0,38,1
program shown below. VMBR     |  14,4,32,32,44,3,128)
Line 120 loads registars with | >120 CALL LOAD(12032,0,0,48,0
VDP address, Buffer, Length.  |  ,2,255)
Line 130 runs line 110 program| >130 CALL EXECUTE(9838)
Line 140 loads the assembly   | >140 CALL LOAD(9838,47,0,38,1
program shown below. VMBW     |  14,4,32,32,36,3,128)
Line 150 loads registars with | >150 CALL LOAD(12032,0,0,48,0
VDP address, Buffer, Length.  |  ,2,255)
Line 160 runs line 140 program| >160 CALL EXECUTE(9838)
Line 170 put a command in here| >170 CALL CLEAR
Line 180 loops to line 160    | >180 GOTO 160
```

HEX ADDRESS	HEX VALUE	ASSEMBLY COMMAND EQUIVILENT
>266E	>2F00	DATA >2F00 (workspace area address)
>2670	>2672	DATA >2672 (start execution address)
>2672	>0420	BLWP (first executed command)
>2674	>202C	@VMBR (or >2024 VMBW)
>2676	>0380	RTWP
>2F00	>0000	REGISTER 0 (VDP address)
>2F02	>3000	REGISTER 1 (RAM buffer address)
>2F04	>02FF	REGISTER 2 (length of text)

Options.
Dependent on Programmers use.

Format CALL FCOPY(master-pathname,filename,
copy-pathname,filename[,...])

CALL FCOPY(string-variable,string-variable,
string-variable,string-variable[,...])

CALL FCOPY(number,filename,number,filename
[,...])

Description

The FCOPY subprogram copies files from drive to drive. The pathname determines the device used and the pathname can be up to 255 characters in length. The Myarc HFDC can only support 29 character pathnames plus the filename of 10, so that would add up to 39 characters total. The pathname must end with a period and the filename may only be 10 characters in length. FCOPY can copy up to 12 files from 12 drives to 12 drives and 12 different filenames all in one command.
NOTE:
FCOPY does have a cost for existing in the TI, and the price is 4K of VDP must be available for use. A *STACK OVERFLOW* or *MEMORY FULL* error will result if not enough VDP memory is available. Using FCOPY leaves 8K available for programs. USE RUN TO RESET MEMORY FOR FEWER CRASHES!

Programs

```
This line will copy the file  | >CALL FCOPY(1,"TESTER",2,"
TESTER from drive 1 to drive  |  TESTED")
2 and rename the file TESTED. |
                              |
This line will copy the file  | >CALL FCOPY("DSK.FWB.","FW","
FW from the disk named FWB to |  DSK.FWB.","UTIL1")
the same disk and name a copy |
file UTIL1. (Neat trick HUH!) |
                              |
This next program will copy any directory to any directory.
Or any disk to any disk, all the files on the disk.
                             |
Name of program.             | >100 ! COPY DIR TO DIR
Clear the screen.            | >110 CALL CLEAR
Get master path of device.   | >120 INPUT "MASTER PATH:":M$
Get copy path of device.     | >130 INPUT "COPY   PATH:":C$
Open a Catalog of device.    | >140 OPEN #1:M$,INTERNAL,INPU
                             | >T,FIXED 38
Get a filename.              | >150 INPUT #1:A$,B,C,D
If first name, ignore diskname| >160 X=X+1 :: IF X=1 THEN 150
If filename empty end program,| >170 IF LEN(A$)=0 THEN  CALL
close files and restart.     | >CLSALL :: RUN
Count files and show pathname.| >180 PRINT X-1: :C$&A$
Copy files.                  | >190 CALL FCOPY(M$,A$,C$,A$)
Continue endlessly.          | >200 GOTO 150
```

Options
See CAT or DIR for number or ASCII access to disk options.

Format CALL FILES(number)

CALL FILES(numeric-variable)

Description

The FILES subprogram differs from the Disk Controller FILES on the CorComp, TI, Myarc or Parcom versions. All of these require a NEW after CALL FILES. NEW is executed after the FILES subprogram in RXB, so there is no need to use NEW. Also RXB FILES accepts values from 1 to 15 unlike the other FILES routines that can only accept 1 to 9. Each open file reduces VDP by 534 bytes, plus each file opened will use 518 bytes more.

Programs

FILES opens ussual buffers.	>CALL FILES(3)
FILES ends the program and executes NEW.	>100 CALL FILES(1)

Options
See XBPGM for even more powerful aplications made easy.

Format CALL GCHAR(row,column,numeric-variable[,...])

Description

See EXTENDED BASIC MANUAL page 88 for more data. The only change to GCHAR is the auto-repeat function.

Programs

```
This line stores the character| >100 CALL GCHAR(4,5,A,4,6,B)
 at row 4 column 5 in A, then |
 stores character at row 4    |
 column 6 in B.               |
Gets row 9 column 3 in Q and  | >100 CALL GCHAR(9,3,Q,9,4,R)
 row 9 column 4 in R.         |
Put R at row 9 column 3 and   | >110 CALL HCHAR(9,3,R,1,9,4,Q
 Q at row 9 column 4          |  ,1)
Continue loop.                | >120 GOTO 100
```

Options
NONE.

Format CALL GMOTION(#sprite-number,row-velocity, column-velocity[,...])

Description

The GMOTION subprogram returns the row-velocity and column-velocity as numbers from -128 to 127. If the sprite is not defined, row-velocity and column-velocity is set to zero. The sprite continues to move after its motion is returned, so this must be allowed for. See EXTENDED BASIC MANUAL MOTION subprogram for more data.

Program

```
GMOTION returns the row-      | >100 CALL GMOTION(#1,X,Y)
velocity into X and the       |
column-velocity into Y.       |
                              |
Set up screen and up,down     | >100 A(0)=1::A(1)=1::CALL CLE
,left,right variables         |  AR::CALL MAGNIFY(2)::CALL SC
A(0) and A(1)                 |  REEN(15)
Loop for 28 sprites.          | >110 FOR S=1 TO 28
Set up 28 random sprites            | >120 CALL SPRITE(#S,64+S,INT(
with random colors and        |  RND*16)+1,20+S,50+S,INT(A(RN
motion.                       |  D*1))*INT(RND*127),INT(A(RND
                              |  *1))*INT(RND*127))
Loop counter.                 | >130 NEXT S
Random sprite selector,       | >140 S=INT(RND*28)+1::CALL GM
get that sprites motion,      |  OTION(#S,X,Y)::CALL HPUT(24,
put the values on screen.     |  3,"CALL GMOTION(#"&STR$(S)&"
                              |  ,"&STR$(X)&","&STR$(Y)&")"
Delay loop.                   | >150 FOR L=1 TO 1000::NEXT L
Give sprite motion values.    | >160 CALL MOTION(#S,Y,X)::Z=Z
 Loop till Z>8                |  +1::IF Z<8 THEN 140
```

Options

While characters 144 to 159 are being used, you can not use sprites.

Format CALL HCHAR(row,column,character-code)

CALL HCHAR(row,column,character-code,
repetition[,...])

Description

See EXTENDED BASIC MANUAL page 92 for more data. The only change to HCHAR is the auto-repeat function. Notice the new auto-repeat must have the repetitions used or it gets row confused with repetitions.

Programs

This line puts character 38 at row 1 column 1 99 times, then puts character code 87 at row 9 column 1	>100 CALL HCHAR(1,1,38,99,9,1 ,87)
Fills screen with characters.	>100 CALL HCHAR(1,1,32,768,1, 1,65,768,1,1,97,768,1,1,30,7 68) :: GOTO 100

Options
NONE.

Format CALL HEX(string-variable,numeric-variable[,...])

CALL HEX(numeric-variable,string-variable[,...])

Description

The HEX subprogram converts Decimal to Hexidecimal or from Hexidecimal to Decimal. If a number or numeric-variable is first, HEX will convert the Decimal floating point value (Rounded off) to a four character sting and puts the string into the string-variable. If a string or string-varialbe is first, HEX will convert the String into a Decimal integer and put it into the numeric-variable. A numeric-variable or number ranges from -32768 to 32767 or the Hexidecimal equivelent of >8000 to >7FFF. The > is not used in HEX.

When a string or string-variable is null (length of zero) the numeric-variable will contain 0. The opposite is if a number or numeric-variable is 0 then the string-variable will contain a length of four and a value of >0000. Any time a string-variable is second it will be cleared before being assigned a new string value. All strings in HEX must be right justified or are returned as right justified, thus each string will be padded with zeros.

HEX will only use the first four characters of a string to convert the value, it will ignore the rest of the string.

Errors will result if a string contains characters other then 0-9 and A-F or a-f. Errors will result if a number is less then -32768 or larger then 32767.

Programs

```
From command mode.            |
Upper case                    | >CALL HEX("F",V)
or lower case                 | >CALL HEX("f",V)
will both return same result. | >PRINT V
V=16                          |
                              |
Line 100 sets address counter.| >100 FOR D=-32768 TO 32767
Line 110 converts it to HEX.  | >110 CALL HEX(D,H$)
Line 120 shows DEC to HEX.    | >120 PRINT D,H$
Line 130 continues loop count.| >130 NEXT D
                              |
Line 100 asks for HEX number. | >100 INPUT "HEX=":H$
Line 110 converts HEX to DEC. | >110 CALL HEX(H$,D)
Line 120 shows DEC equivilent.| >120 PRINT D: :
Line 130 starts program over. | >130 GOTO 100
                              |
Line 100 list of numbers.     | >100 DATA 200,124,97,249,140,
It takes 8 bytes to store any |  77,81,173,254,78,93,12,38,65
number in XB.                 |  ,55,6,0
Line 110 read list into N.    | >110 READ N
Line 120 convert to HEX.      | >120 CALL HEX(N,N$)
Line 130 Save into a string as| >130 S$=S$&N$
it takes 4 bytes per number.  |
Line 140 check for end of list| >140 IF N<>0 THEN 110
Line 150 show number of bytes | >150 PRINT LEN(S$)+1
used to store numbers.        |
Line 160 show number of bytes |
it would have used.           | >160 PRINT 8*16
```

Options
NONE.

Format CALL HGET(row,column,length,string-variable [,...])

Description

The HGET subprogram returns into a string-variable from the screen at row and column. Length determines how many characters to put into the string-variable. Row numbers from 1 to 24 and column numbers from 1 to 32. Length may number from 1 to 255. If HGET comes to the edge of the screen then it wraps to the other side.

Programs

The program to the right will put into string-variable E$ the 11 characters at row 5 and column 9.

```
>100 CALL HGET(5,9,11,E$)
```

The program to the right will put into string-variable M$ the 5 characters at row 1 and column 3, then put into string-variable Q$ the 1 character at row 9 and column 3, then put into string-varialbe N$ the 32 characters at row 24 and column 1.

```
>100 CALL HGET(1,3,5,M$,9,3,1
  ,Q$,24,1,32,N$)
```

Options
NONE.

Format CALL HONK

Description

The HONK command produces the same sound as the ACCEPT or in INPUT or if a error occurs.

Programs

The program to the right will will produce a honk sound.

```
>100 CALL HONK
```

Options
NONE.

Format CALL HPUT(row,column,string[,...])

CALL HPUT(row,column,string-variable[,...])

CALL HPUT(row,column,number[,...])

CALL HPUT(row,column,numeric-variable[,...])

Description

The HPUT subprogram puts a string, string-variable, number, or numeric-variable onto the screen at row and column. The The row numbers from 1 to 24 and column numbers for 1 to 32. If the string, string-variable, number, or numeric-variable being put onto screen goes to an edge it wraps to the other side. Unlike the EXTENDED BASIC DISPLAY AT the HPUT subprogram will not scroll the screen.

Programs

Line 100 puts string "THIS" on the screen at row 10 and column 4.	>100 CALL HPUT(10,4,"THIS")
Line 110 sets string-variabe A$ equal to string "HPUT"	>110 A$="HPUT"
Line 120 puts string "is" at row 12 and column 5, then puts string-variable A$ at row 14 and column 4.	>120 CALL HPUT(12,5,"is",14,4 ,A$)
Line 100 puts number 97 at row 16 and column 5.	>100 CALL HPUT(16,5,97)

Options
NONE.

Format CALL INIT

Description

The INIT command is the same as the EXTENDED BASIC MANUAL page 101. Originally INIT loaded more data then actually existed, this has been fixed. The other correction is that you no longer have to use INIT before LINK, or LOAD. They will function if INIT has been called first or not.

Programs

The program to the right will initialize the lower 8K by loading support routines for assembly.

```
>100 CALL INIT
```

Options
NONE.

Format CALL INVERSE(character-code[,...])

CALL INVERSE(ALL[,...])

Description

The INVERSE subprogram finds the character definition of the character-code and inverts all the bytes in the character definition. That means it just reverses the foreground and background. The ALL feature inverts characters 30 to 143 thus not affecting characters 144 to 159 as this would destory sprites.

Programs

```
The program to the right will | >100 CALL INVERSE(65)
INVERSE all character-code (A)|
in the character definition   |
table in memory.              |
                              |
The program to the right will | >100 CALL INVERSE(ALL)
INVERSE all character-codes   |
from 30 to 143.               |
                              |
Line 100 will ask for a string| >100 INPUT A$
of characters terminated by   |
the ENTER key.                |
Line 110 is a loop to counter.| >110 FOR L=1 TO LEN(A$)
Line 120 singles each one of  | >120 C=ASC(SEG$(A$,L,1))
the characters in A$.         |
Line 130 INVERSEs each one.   | >130 CALL INVERSE(C)
Line 140 completes the loop.  | >140 NEXT L
Line 150 restarts the program.| >150 GOTO 100
(Be sure and not enter any blank characters in this program)
```

Options
NONE.

Format CALL IO(type,address[,...])

CALL IO(type,bits,cru-base,variable,variable [,...])

CALL IO(type,length,vdp-address[,...])

Description

The IO subprogram allows access to and control of any chip in the console or perpherial cards. The type refers to different access methods like playing sound from GROM or VDP memory automatically. The type can also specify reading or writting directly to a Control Registar Unit (CRU) address. Thereby allowing direct chip control, or direct chip bypass if the user wishes.

The IO subprogram is a Graphics Programming Language (GPL) command. So the function is exactly like GPL despite being run from the XB enviorment. As most of XB is written in GPL the user gains greater GPL like control. After all the Operating System is written in GPL for a good reason. *Note these docs are from GPL Manuals or Docs mostly.

type		address specifications
0	----------	GROM sound list address.
1	----------	VDP sound list address.
2	----------	CRU input.
3	----------	CRU output.
4	----------	VDP address of Cassette write list.
5	----------	VDP address of Cassette read list.
6	----------	VDP address of Cassette verify list.

The length specifies the number of bytes. The length can be from -32768 to 32767 depending on the amount of VDP memory that is availiable. Of course a value of -32768 is HEX >8000 and 32767 is HEX >7FFF and VDP normally in a TI is only 16384 or HEX >4000 of VDP. So be careful or lock-up will result. The cru-base is the CRU address divided by 2 in decimal form as the command automatically doubles the value input. The cru -base ranges from 0 to 8191 or HEX >0000 to >1FFF with a EVEN address for 8 bits or more being scanned. That means that a value of 8191 will lock-up the system as it is looking for a bit in 8192 that does not exist.
The variable can input or output values ranging from 0 to 255 as that is equivilent to a single byte value. As there are two variables 16 bits can be represented in the two 8 bit variables. If CRU input reads less then 8 bits, the unusd bits in the byte are reset to zero. If CRU input reads less then 16 but more then 8 bits, the unused bits in the word will be reset to zero. The bits range from 1 to 16 for input or output.

AUTO-SOUND INSTRUCTION GROM/GRAM/VDP

Format CALL IO(type,address[,...])

Control of the Sound Generator Chip (SGC) in the system console is through a pre-defined table in GROM/GRAM or VDP memory. Sound output is controlled by the table and the VDP Interrupt Service Routine (ISR). A control byte at the end of the table can cause control to loop back up in the table to continue, or end sound output. The format of the table is the same regardless of where it resides. The table consists of a series of blocks, each of which contains a series of bytes which are directly output to the SGC.

Since the VDP generates 60 interupts per second, the interupt count is expressed in units of one-sixtieth of a second.

When the IO command is called, upon the next occurring VDP interupt, the first block of bytes is output to the SGC. The interpreter (Operating System) waits the requested number of interrupts (for example, if interupt counts are 1, every interrupt causes the next block to be output). Remember that interpretation of XB continues normally while the SGC control is enabled.

The sound control can be terminated by using an interrupt count of 0 in the last block of the table. Alternatively, a primitive looping control is provided by using a block whose first byte is 0, and the next 2 bytes indicate an address in the same memory space of the next sound block to use. (That means one block points to another block only in the same type of memory).

If the first byte is hex FF or decimal 255, the next two bytes indicate an address in the other memory space. (That means one block points to another block but in another type of memory.) These allow switching sound lists from GROM/GRAM to VDP or VDP to GRAM/GROM. By making this the beginning of the entire table, the sound sequence can be made to repeat indefinitely.

The type 0 indicates sound lists in GROM or GRAM and type 1 indicates sound lists in VDP.

Executing a sound list while table-driven sound control is already in progress (from a previous sound list) causes the old sound control to be totally supplanted by the new sound instruction. (That means any sound chip command will over-ride old sound chip commands).

The SGC has 3 tone (square wave) generators - 0, 1, and 2 all of which can be working simultaneously or in combination. The frequency (pitch) and attenuation (volume) of each generator can be independently controlled. In addition, there is a noise generator which can output white or periodic noise.

For more information on controlling the SGC, see the TSM9919 SGC specification.

ATTENUATION CONTROL (for generators 0, 1, 2 or 3)

One byte must be trasmitted to the SGC:

Binary 1-REG#-1-Attenuation

REG# = registar number (0,1,2,3)
Attenuation = Attenuation/2
(e.g. A=0000 0 db = highest volume;
A=1000 16 db = medium volume;
A=1111 30 db = off.)

EXAMPLE: 1 10 1 0000 : turn on gen. #2 highest volume.
1 01 1 0100 : turn on gen. #1 mediam high volume.
1 11 1 1111 | turn off gen. #3 (noise generator).

FREQUENCY CONTROL (for generators 0, 1, 2)

Two bytes must be transmitted to the SGC for a given registar and to compute the number of counts from the frequency F use: N = 111860 / F

Binary 1-REG#-N(1s 4 bits)-00-N(ms 6 bits)
Note that N must be split up into its least significant 4 bits and most significant 6 bits (10 bits total).

The lowest frequency possible is 110 Hz and the highest is 55938 Hz.

NOISE CONTROL |

One byte must be transmitted to the SGC:

Binary 1-1-1-0-0-T-S

T = 0 for white noise, 1 for periodic noise;
S = Shift rate (0,1,2,3) = frequency center of noise.
S=3=frequency dependent on the frequency of tone generator #3.

Programs

```
Line 100 clears screen.       | >100 CALL CLEAR ! Chimes
Line 110 to ...               | >110 DATA 5,159,191,223,255,2
                              |  27,1,9,142,1,164,2,197,1,144
                              |  ,182,211,6,3,145,183,212,5,3
                              |  ,146,184,213,4
                              | >120 DATA 5,167,4,147,176,214
                              |  ,5,3,148,177,215,6,3,149,178
                              |  ,216,7
                              | >130 DATA 5,202,2,150,179,208
                              |  ,6,3,151,180,209,5,3,152,181
                              |  ,210,4
                              | >140 DATA 5,133,3,144,182,211
                              |  ,5,3,145,183,212,6,3,146,184
                              |  ,213,7
                              | >150 DATA 5,164,2,147,176,214
                              |  ,6,3,148,177,215,5,3,149,178
                              |  ,216,4
Line 160 ends sound list.     | >160 DATA 5,197,1,150,179,208
                              |  ,5,3,151,180,209,6,3,152,181
                              |  ,210,7,3,159,191,223,0
Line 170 reads list and saves | >170 READ B :: S$=S$&CHR$(B)::
bytes into a string S$        |  IF B THEN 170
Line 180 L is the length of S$| >180 L=LEN(S$):: CALL MOVES(1,
and moves the sting into RAM  |  L,S$,8192):: CALL MOVE(3,L,81
so move can move it to VDP for|  92,8192):: CALL IO(1,8192)
the IO command.               | >190 PRINT "TYPE:": :"CALL IO(
Prints out suggestion.        |  1,8192)"
```

The above program used the lower 8K as a temporary buffer area. So you must have a 32K expansion to run it.

Programs

```
Line 100 clears the screen.   | >100 CALL CLEAR ! CRASH
Line 110 to ...               | >110 DATA 2,228,242,5
                              | >120 DATA 2,228,240,18
                              | >130 DATA 2,228,241,16
                              | >140 DATA 2,228,242,14
                              | >150 DATA 2,228,243,12
                              | >160 DATA 2,228,244,10
                              | >170 DATA 2,229,245,9
                              | >180 DATA 2,229,246,8
                              | >190 DATA 2,229,247,7
                              | >200 DATA 2,229,248,6
                              | >210 DATA 2,229,249,5
                              | >220 DATA 2,230,250,4
                              | >230 DATA 2,230,251,3
                              | >240 DATA 2,230,252,2
                              | >250 DATA 2,230,253,1
                              | >260 DATA 2,230,254,1
Line 270 ends sound list.     | >270 DATA 1,255,0,0
Line 280 AD is VDP address to | >280 FOR AD=4096 TO 4160 STE
start with and ends with.     |  P 4
Line 290 reads list.          | >290 READ V1,V2,V3,V4
Line 300 moves them into VDP. | >300 CALL POKEV(AD,V1,V2,V3,
                              |  V4)
Line 310 continues AD loop.   | >310 NEXT AD
Line 320 executes sound list. | >320 CALL IO(1,4096)
Line 330 prints out suggestion| >330 PRINT "CRASH": :"TYPE:"
on how to test IO.            |  :"CALL IO(1,4096)"
```

All data values must coverted to Binary in order so see what is going on. You now have all the data that I have as to this phase of IO types 0 and 1. See Editor Assembler Manual also for more data on sound lists and sound chip.

CRU ACCESS INSTRUCTION

Format CALL IO(type,bits,cru-base,variable,variable [,...])

The IO types 2 and 3 can be used to control a variety of input-output devices including Speech, or CRU. IO always must be the CRU address divided by 2 as any value above 8192 will be out of range. The cru-base must be divided by 2 as the 9901 chip ignores the least significant bits of the base registar it uses. See Editor Assembler Manual page 61.
The CRU data to be written should be right justified in the byte or word. The least significant bit will output to or input from the CRU address specified by the CRU base address. Subsquent bits will come from or go to sequentially higher CRU addresses. If the CRU input reads less than 8 bits, the unused bits in the byte are reset to zero. If the CRU input reads less then 16 bits but more than 8 bits, the unused bits in the full two 8 bit bytes will be reset to zero.

Programs

Line 100 explains program.	>100 ! TURNS OFF/ON/OFF EACH CARD FROM >1000 TO >1F00 BUT WILL LOCKUP WITH CERTAIN CARDS.
Line 110 cru address from >1000 to >1F00	>110 FOR CRU=2048 TO 3968 STEP 128
Line 120 turn off card, turn on card, delay for 2 seconds, turn off card.	>120 CALL IO(3,8,CRU,0,3,8,CRU,255)::FOR A=1 TO 200::NEXT A::CALL IO(3,8,CRU,0)
Line 140 loop till done.	>140 NEXT CRU
Line 100 display what it does for you.	>100 DISPLAY AT(1,1)ERASE ALL :"THIS PROGRAM CHECKS FOR UNUSUAL KEYS BEING PRESSED , EVEN IF MORE THEN FOUR KEY ARE BEING PRESSED AT ONCE"
Line 110 scans CRU at >0006 and reports keys pressed.	>110 CALL IO(2,16,3,A,B):: IF A=18 AND B=255 THEN 110 ELSE CALL HPUT(24,3,RPT$(" ",30),24,24,STR$(A)&" "&STR$(B))
Line 120 more reports.	>120 IF A=146 THEN CALL HPUT(24,3,"FUNCTION KEY")ELSE IF B=191 THEN CALL HPUT(24,3,"CONTROL KEY")ELSE IF B=223 THEN CALL HPUT(24,3,"SHIFT KEY")
Line 130 still more reports.	>130 IF B=251 THEN CALL HPUT(24,3,"ENTER KEY")ELSE IF B=253 THEN CALL HPUT(24,3,"SPACE BAR")ELSE IF B=254 THEN CALL HPUT(24,3,"PLUS/EQUAL KEY")
Line start over scan of keys.	>140 GOTO 110

Programs

```
Line 100 clears screen.       | >100 CALL CLEAR
Line 110 explains program.    | >110 CALL HPUT(4,7,"This is a
                              |   demo of the",6,7,"CALL IO(3
                              |  ,8,2176,B)",8,7,"3 = TYPE(CR
                              |  U output)",10,7,"8 = NUMBER
                              |  OF BITS",12,7,"2176=address/
                              |  2")
Line 120 turn off card, show  | >120 CALL IO(3,8,2176,0):: FO
the present byte value being  |  R B=0 TO 255 :: CALL HPUT(14
sent.                         |  ,7,"B=byte (value "&STR$(B)&
                              |  ")")
Line 130 diplay block to get  | >130 CALL HPUT(18,5,"********
attention.                    |  ******************",19,5,"WA
                              |  TCH THE DRIVE LIGHTS",20,5,"
                              |  **************************")
Line 140 send byte to card and| >140 CALL IO(3,8,2176,B):: NE
when done with loop, clear for|  XT B :: CALL HCHAR(14,24,32,
starting over program.        |  7):: GOTO 110
```

Options

Some CRU address are used by the Operating System or XB and any attempt to redefine them will create problems. Also some of the address areas will return incorrect values as they have changed since IO has accessed them. These problems will never become completly apparent at first, so take care. Additionally some cards have the same problem, if the card has a program that has a interupt or CRU links turned on as you access it, a complete lock up will result as a fight for control ensues. So with that happy thought, a alternate way is to use EXECUTE or LINK instead.

CASSETTE INPUT/OUTPUT/VERIFY INSTUCTION

Format CALL IO(type,length,vdp-address[,...])

The three different cassette I/O instuctions use the same format. The write and read instructions physically perform Input/Output to the cassette. The verify instuction will read a tape and compare it, byte by byte, against what is in the specified vdp area. All will report an I/O error if one is detected.
No prompts are present with these three formats. These three types control the cassette directly so no prompt will tell the user to turn on or off the cassette record/play buttons. The programmer must inform the user with his own prompt.

Programs

Presently I have no cassette to write programs with.

AUDIO GATE

CRU bit 24 is the audio gate which allows data being read to be heard. If the bit is set to 1, the data being read is heard, and if the bit is set to 0, the data is not heard. Setting the bit to a 0 or 1 is done with an IO instuction, or a Assembly instruction.

MOTOR CONTROL

There are two CRU bits (22 and 23) used to control cassettes 1 and 2, respectively. When there is no Cassette IO being done, both motors remain on. When Cassette IO is specified, the DSR (Device Service Routine) will control the data being read. If there are two motor units connected, the data will be read simultaneously, or you may have the option of reading data from one motor unit and playing the recorded voice from another motor unit through the TV (Monitor) speaker.

*NOTE:
Compatibility with or without 32K or other devices is not a concern as IO needs no RAM to work with. Therefore from just a console all IO comands will work fine. If you only have a Cassette and RXB you can quickly load/save/verify without menus, or just make up your own.

Format CALL ISROFF(numeric-variable)

Description

The Interupt Service Routine (ISR) is a routine that executes during timed intervals. The operating system of the TI is set up for these. Mouse or Screen dumps or Hot Key programs bring to mind the common uses of a ISR hook. The ISROFF routine in RXB does as it suggests and turns the ISR hook off. But the numeric-variable is used to store the address of where this ISR hook came from. Of course ISRON is the opposite and will turn it back on. Extreme care must be used when turning on or off the ISR. A PEEK at hex >83C4 (decimal -31804 and -31805) will be 0 when there is no ISR. Otherwise any other value will mean that a ISR is being used.

Programs

```
This line checks ISR hook.    | >100 CALL ISROFF(J)
This shows if ISR is in use.  | >110 IF J THEN PRINT "ISROFF"
This line loads another file. | >120 CALL LOAD("DSK1.HOT")
This starts another ISR.      | >130 CALL LINK("START")
This line checks ISR hook.    | >140 CALL ISROFF(K)
This shows if ISR is in use.  | >150 IF K THEN PRINT "ISROFF"
This turns first ISR back on. | >160 CALL ISRON(J)
This turns second ISR back on.| >170 CALL ISRON(K)
  The program continues...
```

Options
See AMS example RXB programs, also AMSINIT, AMSBANK, BLOAD, BSAVE, EXECUTE, and MOVES.

Format CALL ISRON(numeric-variable)

Description

The Interupt Service Routine (ISR) is a routine that executes during timed intervals. The operating system of the TI is set up for these. Mouse or Screen dumps or Hot Key programs bring to mind the common uses of a ISR hook. The ISRON routine in RXB does as it suggests and turns the ISR hook on. But the numeric-variable is used to load the address of where this ISR hook came from. Of course ISROFF is the opposite and will turn it back off. Extreme care must be used when turning on or off the ISR. A PEEK at hex >83C4 (decimal -31804 and -31805) will be 0 when there is no ISR. Otherwise any other value will mean that a ISR is being used.

Programs

```
This line peeks ISR hook.      | >100 CALL PEEK(-31804,I,J)
This checks if ISR is in use,  | >110 IF I+J THEN CALL ISROFF(
 and if not 0 turn off ISR.    |  ADDRESS1)
This line loads another file.  | >120 CALL LOAD("DSK1.HOT")
This starts another ISR.       | >130 CALL LINK("START")
This turns off ISR.            | >140 CALL ISROFF(ADDRESS2)
This checks if old ISR is ok,  | >150 IF I+J THEN CALL ISRON(A
 if yes turn it on.            |  DDRESS1)
  The program continues...
```

Options
See AMS example RXB programs, also AMSINIT, AMSBANK, BLOAD, BSAVE, BSAVE, EXECUTE, and MOVES.

Format CALL JOYST(key-unit,x-return,y-return[,...])

Description

See EXTENDED BASIC MANUAL. Except for adding autorepeat there is no changes.

Programs

The program on the right will illustrate a use of JOYST subprogram. It creates two sprites and then moves them around according to the input from the joysticks. Two players with the same input speed and motion.

```
>100 CALL CLEAR
>110 CALL SPRITE(#1,33,5,96,1
 28,#2,42,2,96,128)
>120 CALL JOYST(1,X1,Y1,2,X2,
 Y2)
>130 CALL MOTION(#1,-Y1,X1,#2
 -Y2,X2)
>140 GOTO 120
```

Options
NONE.

Format

```
CALL KEY(key-unit,return-variable,
status-variable[,...])

CALL KEY(string,key-unit,return-variable,
status-variable[,...])

CALL KEY(string-variable,key-unit,return-
variable,status-variable[,...])
```

Description

See EXTENDED BASIC MANUAL. RXB has added autorepeat features. Strings or string variables can now be added to KEY to lock out any other keys. The strings can be empty or up to 255 in length. The string function stops program execution unlike a normal key routine.

Programs

```
This line scans both joysticks| >100 CALL JOYST(1,X,Y,2,XX,YY)
This line scans both of the   | >110 CALL KEY(1,F,S,2,FF,SS)
fire buttons & split keyboard.|
                              |
Try this for fun.             | >CALL KEY(CHR$(2),0,K,S)
 (HINT: FCNT 4)               |
                              |
Add this line to programs.    | >100 CALL KEY("YNyn",0,K,S)
                              |
Suspendes program until key is| >100 CALL KEY("",0,K,S)
pressed. (any key)            |
                              |
Suspendes program until ENTER | >100 CALL KEY(CHR$(13),0,K,S)
is pressed.                   |
                              |
Suspendes program until the   | >100 A$="123"
key from string A$ is used.   | >110 CALL KEY(A$,0,KV,STATUS)
                              |
Suspendes program until YES is| >100 CALL KEY("Y",0,K1,S1,"E"
typed in.                     |  ,0,K2,S2,"S",0,K3,S3)
                              |
```

Options

NONE.

Format CALL LDIAG(row,column,character-code)

CALL LDIAG(row,column,character-code,
repetition[,...])

Description

The LDIAG subprogram places character-code per the number of times specified in repetition at row and column. It will wrap off from one side of the screen and restart on the opposite side. LDIAG moves to the left and down. The row numbers from 1 to 24, column numbers from 1 to 32, character-code numbers from 0 to 32768, and repetition numbers from 0 to 32767.
Notice the auto-repeat must have repetition or it gets row confused with repetition.
See GCHAR, HCHAR, RDIAG, and VCHAR for more data.

Programs

The program to the right will place character-code 35 at row 3 and column 5, then places character-code 35 at row 4 and column 4, then places character-code 35 at row 5 and column 3. Then places character-code 42 at row 9 and column 8.

```
>100 CALL LDIAG(3,5,35,3,9,8,
 42)
```

Options
NONE.

Format LIST

LIST "device name"

LIST "device name":line length:line number-
line number

Description

The LIST command is the same as per Extended Basic Manual page 114. The LIST routine has been modified to allow the line length to be output to a device. The line length can only be used if a device is specified. A colon (:) must follow the line lenght. If not included in the LIST command, the line length is set to the default of the specified output device. The line length can range from 1 to 255. If the length specified is outside this range, a Bad Line Number Error is reported.

Command

```
This line outputs to a device.| >LIST "PIO":80:100-120
                              |
This a dummy line.            | >100 ! TEST OF LIST
Another dummy line.           | >110 ! TEST OF LIST
                              |
```

Options
NONE.

Format CALL LOAD("access-name"[,address,byte][,...]
[,file-field,...])

CALL LOAD(address,byte[,...])

Description

See EXTENDED BASIC MANUAL page 115 for more data. The only change is to allow a CALL LOAD to an address without having to use CALL INIT first.

Program

```
This line will load address   | >100 CALL LOAD(8192,128)
8192 with 128
```

Options
NONE.

Format CALL MKDIR(pathname,directory-name[,...])

CALL MKDIR(string-varialbe,string-variable [,...])

CALL MKDIR(number,disk-volume-name[,...])

Description

The MKDIR subprogram MaKes DIRectorys on hard drives or will name a disk. The pathname determines the device used and the pathname can be up to 255 characters in length. The Myarc HFDC can only support 29 characters pathnames plus the filename of 10, so that would add up to 39 characters total. The pathname must end with a period and the filename may only be 10 characters in length. MKDIR can create up to 24 directorys in 24 different drives in one command. MKDIR can also create directorys then sub-directorys in the same command.

Programs

```
This line names disk 1 NONE   | >CALL MKDIR("DSK1.","NONE")
                              |
This line creates  a directory| >CALL MKDIR("WDS1.","TEST")
named TEST on hard drive 1.   |
                              |
This line creates a directory | >100 CALL MKDIR("WDS1.","ONE"
on hard drive 1 named ONE     |  ,"WDS1.ONE.","TWO","WDS1.ONE
then creates a sub-directory  |  .TWO.","THREE")
named TWO of directory ONE    |
then creates a sub-directory  |
named THREE of directory ONE  |
of sub-directory TWO          |
```

Options
See CAT or DIR for number or ASCII access to disk options.

Format

```
CALL MOTION(#sprite-number,row-velocity,
column-velocity[,...])

CALL MOTION(ALL,row-velocity,column-velocity
[,...])

CALL MOTION(STOP[,...])

CALL MOTION(GO[,...])
```

Description

See EXTENDED BASIC MANUAL PAGE 125 for more data.

Programs

* See EXTENDED BASIC MANUAL.

The program to the right will will set up 3 sprites to be on the same vertical plane, and MOTION will stop all sprites. GO turns on sprite motion. This is a delay loop. STOP turns off sprite motion. This is a delay loop. Change #3 motion direction,GO. This is a delay loop Continue program.

```
>100 CALL CLEAR :: X=190
>110 CALL SPRITE(#1,65,2,9,X,
 20,0,#2,66,2,9,X,30,0,#3,67,
 2,9,X,-20,0)
>120 CALL MOTION(GO)
>140 FOR D=1 TO 2000::NEXT D
>150 CALL MOTION(STOP)
>160 FOR D=1 TO 2000::NEXT D
>170 CALL MOTION(#3,10,10,GO)
>180 FOR D=1 TO 2000::NEXT D
>190 GOTO 120
```

Clear screen and set up the variables A(0) and A(1)

```
>100 CALL CLEAR::A(0)=-127 ::
  A(1)=127
```

Loop to create sprites.

```
>110 FOR L=1 TO 28::CALL SPRI
 TE(#L,L+65,2,L,L,-L,L) ::
 NEXT L
```

Use MOTION ALL to change the sprite velocitys.

```
>120 CALL MOTION(ALL,A(RND)*R
 ND,A(RND)*RND)::GOTO 120
```

Options

While characters 144 to 159 are being used, you can not use sprites. Notice that GO or STOP can be followed by other motion commands i.e. CALL MOTION(STOP,#1,44,-87) is valid.

Format MOVE start line-end line,new start line,increment

Description

The MOVE command is used to move a progra line or block of program lines to another location in the program. The block of lines to be moved is defined by start line number and end line number. If either of these numbers are ommited, the defaults are the first program line and the last program line. However, at least one number and a dash must be entered (both can not be ommited), and there must be at least one valid program line between start line number and end line number. To move one both the start line number and end line number are the same. If any of the above conditions are not met, a Bad Line Number Error will be reported.

The new start line number defines the new line number of the first line in the moved segment. When the block is moved it will be moved. If not, a Bad Line Number Error message is reported. This problem can be corrected by using a smaller increment, or by using RES to open up space for the segment. A Bad Line Number Error also results if the renumbering process would result in a line number higher then 32767.

Although moving lines within the program does not increase the size of the program, this command does require 4 bytes of the program space for line moved. This memory use is temporary, but it must be available in order to move the block. If sufficient memory is not available a Memory Full Error results and no lines are moved. This problem can ussually be worked around by moving the block a few lines at a time.

Before the block of lines is moved any open files are closed and any variables are lost.

Commands

This line moves lines 100 thru 180 to line 1000, and then increment by 5.	>MOVE 100-180,1000,5
This line moves lines 40 thru last line to line 120, and increment by 10. (Default)	>MOVE 40-,120,
This line moves line 150 to line 1110	>MOVE 150-150,1110
This line moves first program line thru line 800 to line 32220, and increment by 2.	>MOVE -800,32220,2

Options

Not to be confused with MOVES of memory.

Format

```
CALL MOVES(type$,bytes,string-variable,string-
variable[,...])

CALL MOVES(type$,bytes,from-address,to-address
[,...])

CALL MOVES(type$,bytes,from-address,string-
variable[,...])

CALL MOVES(type$,bytes,string-variable,to-
address[,...])

CALL MOVES(string-variable,number,string-
variable,string-variable[,...])
```

Description

The MOVES subprogram moves (copies) from-string to-string the amount of bytes specified using the memory type string. MOVES does not physically move memory but copies it. MOVES can RIPPLE a byte thru memory by the from-address being one byte less then the to address. The type$ b low specifies what type of memory is being moved and to what other type of memory it is moved into.
The bytes are 255 maximum if being moved into a string-variable.
MOVES address range is from -32768 to 0 to 32767.
As MOVES mostly works with string-variables please see the the Extended Basic Manual page 41. MOVES will error out with *BAD VALUE IN ###* with-in a program if the string variable length exceeds 255, or if the number of bytes exceeds 255.

type$		TYPE OF MEMORY
$	----------	STRING-VARIABLE
V	----------	VDP ADDRESS
R	----------	RAM ADDRESS
G	----------	GRAM ADDRESS

Note that you may move memory into RAM but not ROM, and that you may move memory into GRAM but not GROM. You can copy or move memory from ROM or GROM. Also note that any devices that use phoney GRAM will not work with MOVES as these devices don't use the real GRAM/GROM addressing. Vdp address from 0 to 16384 (>0 to >4000).

Programs

```
Line 100 has the type$ string.| >100 X$="VV"
Line 110 thus uses type$ 0 VDP| >110 CALL MOVE(X$,767,1,0)
to VDP. 767 bytes are moved. A|
VDP from-address of 1 and a   |
VDP to-address of 0. Will use |
a ripple effect of moving all |
screen bytes over one address.|
                              |
Line 100 copies entire screen | >100 CALL MOVE("VR",768,0,819
into lower 8K.                |  2)
                              |
Line 110 clears the screen.   | >110 CALL CLEAR
Line 120 copies entire screen | >120 CALL MOVE("VR",768,0,900
into lower 8K.                |  0)
                              |
Line 130 copies from lower 8K | >130 CALL MOVE("RV",768,8192,
to screen, then again. GOTO   |  0,"RV",768,9000,0)::GOTO 130
makes it an endless loop.     |
                              |
Line 100 sets up loop. Counts | >100 FOR GA=-32768 TO 32767
from -32768 to 0 to 32767 or  |
(HEX >8000 to >0000 to >7FFF) |
Line 110 move GRAM/GROM to    | >110 CALL MOVE("GV",8,GA,1024
VDP. 8 bytes to be moved. GA  |  )
is counter. 1024 is decimal   |
address of space character in |
VDP pattern table.            |
Line 120 completes loop.      | >120 NEXT GA
```

Programs

```
Line 100 sets string-variable.| >100 I$=RPT$("I",255)
Line 120 type$ specifies I$   | >110 CALL MOVES("$V",55,I$,0)
to VDP. 55 bytes are moved.   |
Line 120 copies string J$ to  | >120 CALL MOVES("$R",255,J$,8
into lower 8K, then string I$ |  192,"$R",255,I$,8492)
into lower 8K.                |
Line 130 copies string I$ to  | >130 J$=I$ :: PRINT J$ : : I$
into J$. Eliminates old J$.   |
Then prints them.             |
Line 150 copies from lower 8K | >140 CALL MOVES("R$",255,8192
to J$, then from lower 8K at  |  ,J$,5,255,8492,I$) :: PRINT
8492 into I$ thus restoring   |  J$: :I$
both strings and printing them|
thus a way to save stings.    |
Line 100 sets up loop. Counts | >100 FOR GA=-32768 TO 32767
from -32768 to 0 to 32767 or  |
(HEX >8000 to >0000 to >7FFF) |
Line 110 moves type$ GRAM/GROM| >110 CALL MOVES("G$",8,GA,H$)
to VDP. 8 bytes to be moved.  |
GA is counter. H$ is string   |
for storing data found.       |
Line 120 prints H$ on screen. | >120 PRINT H$
```

Options
Dependent on Assembly Language programmers and the RXB programs that are developed. MOVES is good for replacing those CALL LOAD loops. It also provides a means to rewrite XB while running XB instead of rewriting MERGE files then loading them. Future devices benefit from MOVES as it can copy or move different types of memory directly from or to them.
See AMSINIT, AMSBANK, ISROFF, ISRON, EXECUTE, and IO.

Format NEW

CALL NEW

Description

The NEW command is the same as the EXTENDED BASIC MANUAL page 126. NEW can only be used from edit mode. But now CALL NEW can be called from program mode. As expected all values are reset and all defined characters become undefined. Any open files are closed. Characters 32 to 95 are reset to their standard definitions. The TRACE and BREAK commands are canceled. The program is erased from memory.

Command

```
The line to the right will    | >NEW
reset memory for XB.          |
```

Programs

```
The program to the right will | >100 CALL NEW
reset memory for XB.          |
                              |
```

Options
NONE.

Format CALL PEEKG(address,numeric-variable-list[,...])

Description

The PEEKG command reads data from GROM into the variable(s) specified. It functions identical to the regular EXTENDED BASIC PEEK command page 143. Except it reads from GROM/GRAM. GROM or GRAM address above 32767 must be converted to a negative number by subtracting 65536 from the desired address.

Programs

The program to the right will read a byte from GROM.

```
>100 CALL PEEKG(767,B)
```

Options
NONE.

Format CALL PEEKV(address,numeric-variable-list[,...])

Description

The PEEKV command reads data from VDP into the variable(s) specified. It functions identical to the regular EXTENDED BASIC PEEK command page 143. Except it reads from VDP. The VDP address should not exceed 16384 in a TI with a 9918 VDP chip, 9938 or 9958 VDP chips can go the full 32767. VDP addresses above 32767 must be converted to a negative number by subtracting 65536 from the desired address. Also when ever a value is peeked or poked to the screen a screen offset is present. 96 must be subtracted from or added to the value to correct it.

Programs

The program to the right will read a byte from VDP and put it into variable B. This line will print it.

```
>100 CALL PEEKV(767,B)

>110 PRINT B-96
```

Options
NONE.

Format CALL POKEG(address,numeric-variable-list[,...])

Description

The POKEG command writes the data in the numeric variable list to GRAM at the specified address. It functions identical to the EXTENDED BASIC command LOAD page 115. Except that it writes to GRAM. GROM or GRAM addresses above 32767 must be converted to a negative number by subtracting 65536 from the desired address.

Programs

The program to the right will write 128 to GRAM address 1001

```
>100 CALL POKEG(1001,128)
```

Options
NONE.

Format CALL POKER(vdp-number,numeric-variable[,...])

CALL POKER(numeric-variable,number[,...])

Description

The POKER command writes to vdp register a byte value. Only registers 0 to 7 are valid. The byte value ranges 0 to 255.

Programs

```
This sets text mode.          | >100 CALL POKER(7,244,1,240)
This is a delay loop.         | >110 FOR L=1 TO 500 :: NEXT L
This sets multi color mode    | >120 CALL POKER(1,232)
This is a delay loop.         | >130 FOR L=1 TO 500 :: NEXT L
This sets bit map mode.       | >140 CALL POKER(0,2,1,2)
This is a delay loop.         | >150 FOR L=1 TO 500 :: NEXT L
```

Options
POKER works best with POKEV, PEEKV, MOVE, MOVES, and BIAS.

Format CALL POKEV(address,numeric-variable-list[,...])

Description

The POKEV command writes data to VDP into the address specified. It functions identical to the regular EXTENDED BASIC PEEK command page 143. Except it reads from VDP. The VDP address should not exceed 16384 in a TI with a 9918 VDP chip, 9938 or 9958 VDP chips can go the full 32767. VDP addresses above 32767 must be converted to a negative number by subtracting 65536 from the desired address. Also when ever a value is poked or peeked to the screen a screen offset is present. 96 must be subtracted from or added to the value to correct it.

Programs

The program to the right will write A at address 767.

```
>100 CALL POKEV(767,65+96)
```

Options
NONE.

Format CALL PROTECT(pathname,filename,number[,...])

CALL PROTECT(string-variable,string-variable,
numeric-variable[,...])

CALL PROTECT(number,filename,number[,...])

Description

The PROTECT subprogram protects programs or files. Pathname may be up to 255 characters in length. Pathname must end in a period. The Myarc HFDC can only support a 29 character pathname plus a 10 character filename, so that would add up to 39 characters total. The pathname must end with a period and filenames must only be 10 characters in length. The number may be 0 to 255, any number other then 0 (zero) will protect a file. 0 unprotects. Up to 14 files on 14 different drives may be accessed in one command.
File error will be returned if the device is not accessed or the file or program does'nt exist. File error will be ignored when protecting a already protected file or program. File error will be reported if the disk notch is covered.

Programs

This line unprotects a file named A-FILENAME on RAMDISK B.	>CALL PROTECT("DSKB.","A-FILE NAME,0)
Line 100 protects a file named JUNK on disk drive 3	>100 CALL PROTECT(3,"JUNK,255)
Line 100 A$ is drive 2 String-variable O$ and N$ are loaded with filenames.	>100 A$="DSK2." :: O$="LOAD1" :: N$="filename"
Line 110 protects files.	>110 CALL PROTECT(A$,O$,1,N$, 1)
Line 110 unprotects file DIET on hard drive 1 in directory named FAT	>110 CALL PROTECT("WDS1.FAT." ,"DIET",0)

Options
See CAT or DIR for number or ASCII access to disk options.

Format CALL QUITOFF

Description

The QUITOFF command disables the QUIT KEY. The QUIT KEY is already disabled upon entering RXB. See QUITON for more data.

Programs

The program to the right will turn off the QUIT KEY.

```
>100 CALL QUITOFF
```

Options
NONE.

Format CALL QUITON

Description

The QUITON command enables the QUIT KEY. The QUIT KEY is already disabled upon entering RXB. QUITON makes the QUIT once again functional. You may need to use this command before running certain programs that use the QUIT key.

Programs

The program to the right will turn on the QUIT KEY.

```
>100 CALL QUITON
```

Options
NONE.

Format CALL RDIAG(row,column,character-code)

CALL RDIAG(row,column,character-code,
repetition[,...])

Description

The RDIAG subprogram places character-code per the number of times specified in repetition at row and column. It will wrap off from one side of the screen and restart on the opposite side. RDIAG moves to the right and down. The row numbers from 1 to 24, column numbers from 1 to 32, character-code numbers from 0 to 32768, and repettion numbers from 0 to 32767.
Notice the auto-repeat must have repetition or it gets row confused with repetition.
See GCHAR, HCHAR, LDIAG, and VCHAR for more data.

Programs

The program to the right will place character-code 35 at row 3 and column 5, then places character-code 35 at row 4 and column 6, then places character-code 35 at row 5 and column 7. Then places character-code 42 at row 9 and column 8.

```
>100 CALL RDIAG(3,5,35,3,9,8,
 42)
```

Options
NONE.

Format

```
CALL RENAME(pathname,old-filename,new-filename
[,...])

CALL RENAME(pathname,old-directory-name,new-di
rectory-name[,...])

CALL RENAME(string-variable,string-variable,
string-variable[,...])

CALL RENAME(number,old-filename,new-filename
[,...])
```

Description

The RENAME subprogram renames directorys or files. Pathname may be up to 255 characters in length. Pathname must end in a period. The Myarc HFDC can only support a 29 character pathname plus a 10 character filename, so that would add up to 39 characters total. The pathname must end with a period and filenames must only be 10 characters in length. RENAME can rename up to 15 files or directorys on 15 different drives all in one command.
File error will be returned if the device is not accessed or the file or directory does'nt exist. File error will also be reported if renaming a protected file or directory. File error will be reported if the disk notch is covered. File error is also reported if the new-filename is already being used and is protected.

Programs

```
This line renames a file named| >CALL RENAME("DSKC.","A-FILEN
A-FILENAME on RAMDISK C to the|  AME","NEWNAME-1A")
new filename NEWNAME-1A       |
                              |
Line 100 renames a file named | >100 CALL RENAME(2,"JUNK","JU
JUNK to JUNK2 on disk drive 2 |  NK2")
                              |
Line 100 pathname A$          | >100 A$="DSK.TRASH.":: O$="LO
String-variable O$ and N$ are |  AD1" :: N$="load1"
loaded with filenames.        |
                              |
Line 110 rename LOAD1 to      | >110 CALL RENAME(A$,O$,N$)
load1 on disk named TRASH     |
                              |
Line 110 access disk TRASH and| >120 CALL RENAME(A$,N$,O$,A$,
first renames load1 to LOAD1  |  O$,N$)
and renames LOAD1 to load1    |
```

Options
See CAT or DIR for number or ASCII access to disk options.

Format RES (Uses default values)

RES initial line,increment

RES initial line,increment,start line-end line

Description

The RES command is the same as per Extended Basic Manual page 155. The RESEQENCE comand is deleted. The abbreviation RES is the only access name. The RES command now allows a portion of the program to be resequenced. This RES DOES NOT REPLACE any undefined line numbers with 32767. Any undefined line numbers in the program are left as is. This makes it easier to fix if a problem is present.

RES cannot be used to move lines from one location to another inside a program. If the new line numbers generated by the RES command would result in a line being moved, a Bad Line Number Error is generated. A Bad Line Number Error is also reported if there are no valid program lines between start line and end line.

Command

Lines 10 to 50 are renumbered. Line 10 becomes 20, increment is 1.	>RES 20,1,10-50
Lines 700-800 are renumbered. Line 700 becomes 100, incremnt is 5.	>RES ,5,700-800
Lines 50-80 are renumbered. Line 50 becomes 100, increment is 10. (Defualt)	>RES ,,50-80
Lines 1000 to last line are renumbered. Line 750 becomes 1000, increment is 10.	>RES 1000,,750-
Lines to 400 are renumbered. First Line becomes 100 (Defualt), inecrement is 20.	>RES ,20,-400
Line 40 is renumbered 20.	>RES 20,,40

Options
None.

Format CALL RMDIR(pathname,directory-name[,...])

CALL RMDIR(string-varialbe,string-variable [,...])

Description

The RMDIR subprogram ReMoves DIRectorys on hard drives. The pathname determines the device used and the pathname can be up to 255 characters in length. The Myarc HFDC can only support 29 characters pathnames plus the filename of 10, so that would add up to 39 characters total.
The pathname must end with a period and the directory may only be 10 characters in length. RMDIR can remove up to 24 directorys in 24 different drives in one command. RMDIR can also remove sub-directorys then directorys in the same command. Before any directory may be removed it must be empty of all files, or a error will be reported.

Programs

```
This line removes  a directory| >CALL RMDIR("WDS1.","TEST")
named TEST on hard drive 1.   |
                              |
This line removes             | >100 CALL RMDIR("WDS1.ONE.TWO
sub-directory THREE of the    |  .","THREE","WDS1.ONE.","TWO"
sub-directory TWO in main     |  ,"WDS1.","ONE")
direcotry ONE then removes    |
sub-directory TWO of main     |
directory ONE then finally    |
removes directory ONE         |
```

Options
HARD DRIVE ACCESS ONLY!

Format CALL RMOTION(#sprite-number[,...])

CALL RMOTION(ALL[,...])

Description

The RMOTION subprogram reverses the row-velocity and column-velocity as numbers from -127 to 127. This means that RMOTION simply reverses the direction of the sprite specified so it goes in the opposite direction it was going in.
This also means RMOTION ignores 0 and -128, so you can use those to bypass RMOTION if you do not want RMOTION to change the sprite. The fastest and slowest sprite speeds are never affected by RMOTION. This feature adds more power to RMOTION. The ALL feature also allows all sprites on the screen to reverse all at once. ALL may also be called as many times as wanted in a single program line.
See EXTENDED BASIC MANUAL MOTION PAGE 125, SPRITE PAGE 173, DELSPRITE PAGE 75 for more data.

Program

```
RMOTION reverses the row-     | >100 CALL RMOTION(#1)
velocity and the column-      |
velocity in sprite-number 1.  |
                              |
This line reverses the motion | >100 CALL RMOTION(ALL)
of all sprites.               |
                              |
Line 100 sets up a sprite.    | >100 CALL SPRITE(#1,33,2,96,1
                              |  8,99,84)
Line 110 waits for a number   | >110 IF RND<.8 THEN 110
higher then .8 randomly.      |
Line 120 reverses the motion  | >120 CALL RMOTION(#1)
of the sprite.                |
Continues the program.        | >130 GOTO 110
```

Options
While characters 144 to 159 are being used, you can not use sprites.

Format CALL SCSI(pathname,string-variable,...])

Description

The SCSI subprogram fetches a 44 byte package from the SCSI card and puts it into a string variable. This 44 byte package consists of 8 bytes internal, 8 bytes vendor ID, 16 bytes of product ID, 4 bytes revision value, 32 bit number of sectors, and 32 bit sector size. The pathname must end with a period.

Programs

```
This line gets the 44 byte    | >CALL SCSI("SCS1.",A$)
SCSI packet string from SCS1. |
                              |
This line gets the 44 byte    | >100 CALL ("SCS1.",X$,"SCS3."
SCSI packet string from SCS1, |  ,Y$,"SCS4.",Z$)
SCS3, and SCS4.               |
```

Options
SCSI will only access a SCSI controller. See RXB Disk Manager program for use of SCSI subprogram.

Format

```
CALL SECTOR(pathname,read/write-flag,#sectors,
sector-string,[,...])

CALL SECTOR(number,number,number,string
[,...])

CALL SECTOR(string-variable,numeric-variable,
numeric-variable,string-variable[,....])
```

Description

The SECTOR subprogram reads or writes sectors on disk or hard drives. The pathname determines the device used and the pathname can be up to 255 characters in length. The Myarc HFDC can only support 29 characters pathnames plus the filename of 10, so that would add up to 39 characters total. The pathname must end with a period and the directory may only be 10 characters in length. The read/write-flag may be any number to read sectors and 0 will write sectors. The #sectors ranges from 1 to 32 sectors being read/written at one time. The sector-string is a Hexidecimal string of the sector to read or write. Sector-string may be a "0" or up to "FFFFFFFF" or in other words in decimal form ranges from 0 to 4294967295 sectors.
NOTE: The lower 8K for assembly support is used as a buffer for SECTOR so anything in the lower 8K will be corrupted. That means two things.
1. AMS support can store the sectors for duplication.
2. SECTOR is totally compatable with CORCOMP, MYARC, PARCOM, RAMDISKS, and SCSI drive controllers.

Programs

```
This line writes sector 0 to  | >CALL SECTOR("DSK1.",0,1,"0")
drive 1 from lower 8K.    .   |
                              |
This line reads sector 0 and  | >100 CALL SECTOR(2,1,2,"0")
1 from drive 2 to lower 8K.   |
This line puts the 2 sectors  | >110 CALL MOVE("RV",512,8192,
onto the screen from the lower|  0)
8K. (See MOVES for info)      |
```

Options
Only works when 32K availiable and destorys lower 8K data.

Format SIZE

CALL SIZE

Description

See EXTENDED BASIC MANUAL PAGE 169 for more data.

Command

May only be used from command mode.	>SIZE

Programs

May only be used from program mode.	>100 CALL SIZE
Shows memory used.	>100 CALL SIZE
Set up for Assembly support.	>110 CALL INIT
Shows memory used including Assembly space free.	>120 CALL SIZE
Set up for AMS switching.	>130 CALL AMSINIT
Shows memory used including AMS amount of K and RXB banks.	>140 CALL SIZE

Options

Unless you have a 32K installed Assembly support will not work. Also unless a AMS card is installed CALL AMSINIT will not work.

Format CALL SWAPCHAR(character-code,character-code [,...])

Description

The SWAPCHAR subprogram switches the first character-code character definition with the second character-code character definition. That means they swap definitions. The characters range from 30 to 159.

Programs

```
Line 100 swaps character-code | >100 CALL SWAPCHAR(65,97)
65 with character-code 97.    |
                              |
Line 100 defines character-   | >100 CALL CHAR(128,"F0F0F0F0F
code 128 and character-code   |  0F0F0F0",159,"0F0F0F0F0F0F0F
159.                          |  0")
Line 110 swaps them, then will| >110 CALL SWAPCHAR(128,159,32
swap space with characer 128  |  ,128)
Line 120 continues program.   | >120 GOTO 110
                              |
Try this one on for weird.    | >100 CALL SWAPCHAR(31,32,31,3
                              |  2)
                              | >110 CALL INVERSE(31)
                              | >120 GOTO 100
```

Options
NONE.

Format CALL SWAPCOLOR(character-set,character-set [,...])

CALL SWAPCOLOR(#sprite-number,#sprite-number [,...])

Description

The SWAPCOLOR subprogram swaps foreground and background colors of the first set with the second set. Or swaps the first sprite-number color with the second sprite-number color. The character-set numbers are given below:

set-number		character-codes
0	----------	30 to 31
1	----------	32 to 39
2	----------	40 to 47
3	----------	48 to 55
4	----------	56 to 63
5	----------	64 to 71
6	----------	72 to 79
7	----------	80 to 87
8	----------	88 to 95
9	----------	96 to 103
10	----------	104 to 111
11	----------	112 to 119
12	----------	120 to 127
13	----------	128 to 135
14	----------	136 to 143
(also sprite table) 15	----------	144 to 151
(also sprite table) 16	----------	152 to 159

Programs

The program to the right will swap foreground and background colors of set 15 with set 5.

```
>100 CALL SWAPCOLOR(15,5)
```

Line 100 sets up two sprites on screen.
Line 110 swaps sprite #1 color with sprite #2 color.
Continue program.

```
>100 CALL SPRITE(#1,65,2,99,9
 9,#2,66,16,88,88)
>110 CALL SWAPCOLOR(#1,#2)
>120 GOTO 110
```

Options
NONE.

Format CALL USER(quoted-string)

CALL USER(string-variable)

Description

The USER subprogram overides the normal editor of edit mode of XB and reads a DV80 file into the keyscan routine as if the user was keying it in.

That means Batch Processing is creating XB programs from DV80 files, Editting XB programs, MERGING, Saving, and RUNNING XB programs. Also RESequencing, adding lines, or deleting lines, and re-writting lines from the DV80 file.

Every line to be input from the DV80 file MUST END WITH A CARRIAGE RETURN! A line of input may be up to 588 characters in length. The editor will error out if the crunch buffer is full, reporting a *Line Too Long* error. (Over 163 tokens)

Other errors will be reported but will not stop the proccess of USER continuing to input lines. To find errors in the DV80 file the input lines are shown on screen as they are input into the editor, and errors will be reported. So you must observe the screen for errors to test the DV80 file.

USER will stop after reaching the end of the file. But USER can have it's operation suspended CALL POKEV(2242,0) will halt USER and CALL POKEV(2242,9) will resume USER.

INPUT and ACCEPT will try to read from USER if it is not turned off. On the other hand DV80 files can go directly into a INPUT or ACCEPT prompts. Turn off USER to be safe though.

USER will only report errors upon opening, thus if incorrect device or filename then USER reports * USER ERROR * and just closes the USER file, thus ending operation of USER.

Example files are included with RXB to show and explain the use of USER. The batch processing USER subprogram opens a new world to the RXB programmer. Possibilities are almost endless!

Programs

```
This line starts USER to use  | >CALL USER("DSK1.FILENAME")
Batch processing on a file    |
called FILENAME               |
                              |
Line 100 is same as above.    | >100 CALL USER("DSK1.FILE")
but within a program.         |
                              |
Line 100 variable A$ equals a | >100 A$="DSK.VOLUME.FILE"
String-variable path name.    |
Line 110 starts USER to use   | >110 CALL USER(A$)
Batch processing on A$        |
```

Programs

Save this program as LOAD. | >100 CALL USER("DSK1.BATCH")
|

Here is an example DV80 file you save with the name BATCH.

```
! BATCH file for using       NEW and CALL FILES and RUN. cr
cr
CALL XBPGM("DSK1.A-PROGRAM",#) cr
```

The above DV80 file uses cr to mean Carrige Return. And # is for the number of files you wish open. A-PROGRAM is the name of the XB program that needs a certain number of files open.

Options
To many to list out. See BATCH for demo.

Format CALL VCHAR(row,column,character-code)

CALL VCHAR(row,column,character-code,
repetition[,...])

Description

See EXTENDED BASIC MANUAL page 188 for more data. The only change to VCHAR is the auto-repeat function. Notice the new auto-repeat must have the repetitions used or it gets row confused with repetitions.

Programs

```
This line puts character 38 at| >100 CALL VCHAR(1,1,38,99,9,1
 row 1 column 1 99 times, then|  ,87)
 puts character code 87 at    |
 row 9 column 1               |
                              |
Fills screen with characters. | >100 CALL VCHAR(1,1,32,768,1,
                              |  1,65,768,1,1,97,768,1,1,30,7
                              |  68) :: GOTO 100
```

Options
NONE.

Format CALL VERSION(numeric-variable)

Description

See EXTENDED BASIC MANUAL PAGE 190 for more data. Also see

Programs

```
This line will ask for version| >CALL VERSION(X)
and return current to numeric-|
variable X.                   |
                              |
Line 100 asks for version num.| >100 CALL VERSION(V)
Line 110 checks for version   | >110 IF V>240 THEN INPUT "DSK
to be larger then 240 and if  |  NAME":D$ :: INPUT "FILENAME"
it is will ask for input to   |  :F$ :: CALL XBPGM("DSK."&D$&
use a new routine CALL XBPGM. |  F$) ELSE END
```

Options
Will always return current version of RXB.

Format CALL VGET(row,column,length,string-variable [,...])

Description

The VGET subprogram returns into a string-variable from the screen at row and column. Length determines how many characters to put into the string-variable. Row numbers from 1 to 24 and column numbers from 1 to 32. Length may number from 1 to 255. If VGET comes to the edge of the screen then it wraps to the other side.

Programs

The program to the right will put into string-variable E$ the 11 characters at row 5 and column 9.

```
>100 CALL VGET(5,9,11,E$)
```

The program to the right will put into string-variable M$ the 5 characters at row 1 and column 3, then put into string-varialbe Q$ the 1 character at row 9 and column 3, then put into string-variable N$ the 32 characters at row 24 and column 1.

```
>100 CALL VGET(1,3,5,M$,9,3,1
  ,Q$,24,1,32,N$)
```

Options
NONE.

Format CALL VPUT(row,column,string[,...])

CALL VPUT(row,column,string-variable[,...])

Description

The VPUT subprogram puts a string or string-variable onto the screen at row and column. The row numbers from 1 to 24 and column numbers from 1 to 32. If the string or string-variable being put onto screen goes to an edge it wraps to the other side. Unlike the EXTENDED BASIC DISPLAY AT the VPUT subprogram will not scroll the screen.

Programs

Line 100 puts string "THIS" on the screen at row 10 and column 4.	>100 CALL VPUT(10,4,"THIS")
Line 110 sets string-variable A$ equal to string "VPUT"	>110 A$="VPUT"
Line 120 puts string "is" at row 11 and column 5, then puts string-variable A$ at row 10 and column 6.	>120 CALL VPUT(11,5,"is",10,6 ,A$)

Options
NONE.

Format RUN "XB"

DELETE "XB"

CALL CAT("XB")

OLD XB

SAVE XB -(Must have a program within -memory to work at all)

CALL LOAD("XB") -(CALL INIT must proceed it)

Description

The XB DSR (Device Service Routine) allows access to the RXB title screen. The access will work only if the DSR is in the GPLDSR or LINK DSR. In other words, a DSR that acknowledges any type of DSR in RAM, ROM, GROM, GRAM, or VDP. Most DSR's only accept DSK or PIO. Others like the SAVE or LIST commands will only work with a program in the memory first. Still others like CALL LOAD("XB") must have the CALL INIT command used first.

From EA option 5 you may type XB then enter, or from EA option 3 type XB then enter, then enter again. If the EA option 1 (edit), then 4 (print) type XB. From TI BASIC use OLD XB or DELETE "XB".

Keep in mind that if it does not work, the problem is the DSR your using. Almost all DSR's today only acknowledge the ROM or RAM DSR's. As the XB DSR is in GROM/GRAM it seems a bit short sighted on the part of most programmers to use cut down versions of a DSR. Please discourage this as it is a diservice to us all.

Programs

The program at the right will turn on the AUTO SELECTOR and wait 4 second before switching to the AUTO LOAD.	>100 CALL EAPGM("XB")
This line asks for a string. This line uses the string and if you type XB then enter will switch to the RXB.	>100 INPUT A$ >110 DELETE A$
This line show lower case can be used.	>call xb

Options
BASIC and EA are also availiable.

Format CALL XBPGM("access-name")

CALL XBPGM(string-variable)

CALL XBPGM("access-name",file-number)

CALL XBPGM(string-variable,numeric-variable)

Description

The XBPGM subprogram is like RUN in XB. (XB manual page 161) The RUN subprogram can't run strings so special XB loader programs were written and required. Using RUN A$ results in a error report of * syntax error * in normal XB.
XBPGM uses quotes like RUN or strings unlike RUN. So XBPGM will run XB or BASIC programs.
The file-number or numeric-variable denote the number of files to be open before the XB program is loaded and run. XBPGM first sets the number of files open, uses a NEW and then runs the access string. See FILES for more info.
If a CALL XBPGM can't find the program or disk it will close all files, clear all XB memory (Assembly lower 8K unaffected) and leave you in XB command mode. You will know this by the * Ready * and the cursor flashing below. This allows you to try again with either RUN or CALL XBPGM again.
If an empty string is used XBPGM defualts to restart the RXB title screen. See XB for more info.

Programs

The program at the right will load a XB Program named HOT from disk drive 2 then run it.	>100 CALL XBPGM("DSK2.HOT")
This line loads string GZ$. This line uses the string path name to search all drives and RAMDISKS for a disk named XBGAMES and load a program named FROG then run that program.	>100 GZ$="DSK.XBGAMES.FROG" >110 CALL XBPMG(GZ$)
Line 100 should be added to most RXB program to allow the QUIT key to work for aborting XBPGM loader.	>100 CALL QUITON >110 CALL XBPGM("DSKR.LOAD")
This line could be used to set and run a program named TML after opening only 1 file.	>100 CALL XBPGM("DSK1.TML",1)

Options
XBPGM can access any DSR (Device Service Routine) like OLD, or LOAD or RUN can.