MAXSOUND

User's Manual

<<< GIMMESOFT >>>

MAXSOUND

Table of Contents

INTRODUCTION

1.0

Congratulations on your purchase of MAXSOUND. MAXSOUND is a hardware/
software high quality audio recording station designed for the new
Color Computer 3 by LUCAS INDUSTRIES 2000.

MAXSOUND will allow the user to store real music and voices in the
Color Computer 3. MAXSOUND also supports a sequencer scanner that
allows the user to take fragments of music and sequence thru them to
produce a complete composition.

Special audio effects such as reverb <echo>, variable playback speed
and reversed audio playback allow the user greater flexibility in
creating custom sounds.

MAXSOUND can be used to produce full length music loops such as those
used on tv ads. Radio stations can use MAXSOUND to edit tapes.
Musicians can use MAXSOUND to produce sequencer loops and program loop
jump points for exotic effects. Whatever your interests in music or
sound, MAXSOUND will provide hours of fun for the whole family.

MAXSOUND will work with the standard 128k or upgraded 512k Color
Computer 3. All this memory and sampling rates to 15,000 per second,
make MAXSOUND the quality recording studio of the 80's.

HOW IT WORKS

1.1

All Color Computers contain a digital to analog converter. This device converts a digital number into a corresponding dc voltage. This conversion process is done with a 6 bit resolution. This 6 bit resolution will translate a 5 volt dc level into 64 discrete voltage levels. Each of these 64 steps will be a multiple of .078 volts dc. Suppose the digital code to the converter is 5, the resultant output voltage will be 5 x .078 = .39 volts dc.

The converter can with appropriate software, analyze and determine the instantaneous voltage present at one of the four joystick inputs. MAXSOUND is tied to the joystick (0) input.

By rapidly changing the dac <digital to analog converter> audio signals are generated. This is how the Color Computer produces it's sound and play functions.

By use of the MAXSOUND interface to convert audio signals into dc voltages, MAXSOUND manipulates the Color Computers dac to record and playback sounds.

MAXSOUND will capture and store in memory, audio at at a rate of up to 15,000 times a second. At this rate the audio quality is very good. The 6 bit dac produces a signal to noise ratio of typ. 36 db.

DISK LOADING PROCEDURES

1.2

Follow these steps to load and start MAXSOUND:

1. Make sure the disk controller is plugged into the Color
   Computer before you turn on the computer.

2. Place the MAXSOUND diskette into drive (0).

3. Type RUN"MAXSOUND" and press the <ENTER> key. The disk drive
   should turn on and in a few seconds the graphics copyright
   notice will appear. Leave the disk in the drive and press any
   key to finish loading and running the MAXSOUND program. When
   the main menu is displayed you may then remove the "MAXSOUND"
   disk if you choose.

4. For your convenience MAXSOUND is not copy protected so
   back-ups are allowed. Use the appropriate back-up procedures
   to create a back-up. The MAXSOUND disk and copies are for the
   purchaser's use only. It is not permitted to make copies for
   resale or distribution.

5. If a replacement disk is required send the original disk along
   with your sales receipt and a check or money order for $8.00
   ($6.00 + $2.00 s/h) to:

                    LUCAS INDUSTRIES 2000
                    14720 CEDAR ST. N.E.
                    ALLIANCE, OHIO 44601

MAXSOUND INTERFACE HOOKUP

1.3

Included with the MAXSOUND package is the interface cable labeled
"MAXSOUND". This adapter cable is what modifies audio signals for use
by the Color Computer 3 to capture sounds.

To hookup the cable to the Color Computer 3 simply plug the connector
into the right joystick socket located in back of the computer next to
the RS-232 printer socket. MAXSOUND is now connected and ready to go.

KEYBOARD COMMANDS

2.0

MAXSOUND makes use of five main keyboard keys. Locate the following
keys on the Color Computer 3 keyboard:

ALT   This key is located at the upper left side of the keyboard.
        This key is used to select one of the four operating menus.

CTRL   This key is located below the ALT key. This key is used to
        select the tag menu to code recordings for use with basic
        and machine language programs.

F1   This key is located at the lower right side of the
        keyboard. This key is used to select a function from the
        viewed menu.

F2   This key is next to key F1. This key is used to execute the
        function selected by the F1 key.

SPACE BAR This is the long bar key at the bottom of the
           keyboard. It is used to terminate sound functions.

MENU SELECTION

3.0

The MAXSOUND program contains four main menus from which various
functions are selected. To select a menu just press the ALT key down
and hold it down until the desired menu is displayed. The menus are
sequential and rotate one after the other.

FUNCTION SELECTION

4.0

After you have selected the appropriate menu, on the left side of the
screen will be a star beside one of the selections. Press and hold
down the F1 key. Note the star moving to the bottom of the screen and
then popping back up to the top of the menu. This cycle continues
until you release the F1 key. When the star is beside the function you
wish to select release the F1 key. That function is ready for
selection.

FUNCTION EXECUTION

5.0

To execute a selected function:

1. Make sure the star is on the left side of the function you want to execute.

2. Press the F2 key. That function will now be executed.

LOOPED FUNCTIONS

6.0

Recording, playback and sequencer functions can be placed in the loop mode by selecting and executing the loop functions from the main and sequencer menus. Pressing the F2 key while the loop function is selected will toggle the loop status from <off to on> and from <on to off>.

With the loop <on> MAXSOUND will continuously loop thru the computer's memory, executing the selected function until canceled by pressing down the SPACE BAR and holding it down until the function is terminated. At that point program control is re-established and operation is normal.

FUNCTION DESCRIPTION AND USAGE

8.0

The following describes all of the MAXSOUND functions and how to operate them:

MAIN MENU FUNCTIONS

8.1

The main menu is the menu displayed after the copyright notice upon power up.

LOOP STATUS

Activates or de-activates looping function of main menu functions. These include: Play, Record and Reverse buffers. Looping is used to keep a function working indefinitely. Looping the RECORD function allows you to monitor a tape to position it properly prior to the actual recording. Looping the play functions will repeat over and over the same sounds, such as a drum beat. When a loop is terminated by holding down the SPACE BAR key, the loop status is automatically set to the off status.

MAIN MENU FUNCTIONS <CON'T>

PLAYBACK DELAY

This function allows the user to set the playback speed of the
recording. This can be used to create sound effects by slowing or
speeding up the recorded sound. The playback delay must be set to the
same value as the sampling delay value used to ensure proper playback
speed. After selecting this option a prompt will appear under the
current play delay value. Type in your value in the range of <0 to
100> and press enter. If you do not wish to change the value, press
the <ENTER> key. This will cause no update in the current value.

SAMPLING DELAY

This function selects the speed at which MAXSOUND records. With a
value of zero, MAXSOUND is recording at the fastest speed possible
<15,000 samples per second>. Increasing the sampling delay value will
lower the sampling rate. This will allow for more recording time but
at the expense of a lower quality recording. This function is altered
in the same maner as the play delay value with it's range being <0 to
80>.

RECORD BUFFER

This function initiates the recording process. The term buffer refers
to the area of memory selected from MENU TWO. Select this function in
the manner described earlier.

PLAY BUFFER

This function will playback the current buffer. Select this function
in the manner described earlier.

DISPLAYED DATA

You will notice that during recording and playback, two windows appear
with two digit numbers in them that change as the sound is played or
recorded. The left window is displaying the block that is being used
at that time. The right window is displaying the countdown of these
blocks until buffer memory is used up. This aids the user in being
able to see the blocks and remaining blocks until termination. The
sequencer and game files routines use this display also.

The sequencer during playback operation will display the current
sequencer input being played as well as which defined block of memory
for that sequence is being used.

MAIN MENU FUNCTIONS <CON'T>

EXIT LOCATOR

The 'EXIT LOCATOR OPTION' is designed to instantly determine where in memory a particular sound or music is located. To use the locator simply use the 'PLAY BUFFER OPTION',<ECHO OFF>, as you are listening to the playback sound, press the <0> key at the exact point you wish to locate. After pressing the <0> key the screen will clear and display the location you just requested. Press any key to return to the main menu. The exit locator position is displayed on MENU 2 and the jump point menu. Use the exit location for modifying memory or setting up the jump points.

JUMP POINTS: FOR SPECIAL EFFECTS <ECHO off>

From MENU 2 the user can define up to seven jump points for use with the 'MAXSOUND' play buffer option. A jump point is a location in memory that the sound or music jumps to when you select it by pressing any one of the keys labeled 1 thru 7 < the 7 jump point keys> while playing the buffer in the 'PLAY BUFFER MODE'. When a jump point is accessed by pressing one of these 7 keys the music or sound instantly jumps to the location defined from MENU 2 JUMP option. The user may press these jump points in sequence to string musical sections together or by rapidly pressing that key to produce a repetitive stuttering effect like those used in many of the new rappin type songs. Upon starting 'MAXSOUND' all 7 jump points are set to location 0, this means that if you record a buffer from say 0 to 70000 and play it back, pressing any one of the 7 keys will make the sound jump to the beginning of the buffer at location 0. Just set any key according to your location. To help in locating where to set the jump points, use the 'EXIT LOCATOR OPTION'.

REVERSE BUFFER

This function will playback the previously recorded buffer in the reverse direction. Select this function in the manner described previously. NOTE:Reverse buffer does not echo.

MODE

MAXSOUND allows the user to compress a recording for maximum memory usage. The MODE option selects normal or compressed modes for playback. Pressing the <M> key will toggle the MODE between NORMAL and COMPRESSED modes. NOTE: Proper mode must be set to ensure proper sound playback. Upon startup MODE is in NORM. mode.

ECHO

Maxsound can add reverb <echo> to a playback function. This function is selected by pressing the <E> key. At the prompt type in a number between 0 and 20. With a value of 0 the echo is <off> numbers between 1 and 20 add a little to a lot of echo.

*MAIN MENU FUNCTIONS <CON'T>

COMPRESS

MAXSOUND allows the user to compress a buffer to maximize memory
usage. Compressing a buffer will slightly degrade sound quality as the
samples are changed from a 6 bit to a 4 bit format. To compress the
current buffer press and hold down the <C> key. A long alternating
sound will be heard to warn the user that a radical buffer change is
about to happen. Continue holding the key down until the sound stops,
then release the key. The buffer will be compressed and the new buffer
end will be updated to reflect the compression. Releasing the <C> key
before the sound stops will abort the compressing process. If you
compress be sure to chande the MODE to COMP for proper playback.

DELETE

MAXSOUND will allow the user to delete any portion of a recorded
sound, such as a quiet spot. To delete an unwanted sound, modify the
buffer to play only the sound you wish to delete. Then press and hold
down the <D> key. This will start the delete process in the same
manner as the COMPRESS option. After deletion, the remaining data is
moved down so as to close up the deleted area.

CLEAR

MAXSOUND will allow the user to CLEAR any portion of the sound buffer.
This function is similar to the erase function of a tape recorder. To
use the CLEAR function, simply modify the buffer to play only the area
you wish to CLEAR. Then press and hold down the <CLEAR> key. This will
start the clearing process in the same manner as the compress option.
After the clearing process, playing the buffer will give no sounds.

                          MENU TWO FUNCTIONS

7.2

This menu is the dark green menu titled DIGITAL RECORDER MEMORY
STATUS. This menu establishes the area of memory the user wishes to
record or playback. Upon power up the memory area is set to the
maximum area.

STARTING POINT

This function allows the user to determine the location in memory that
recording or playback is to start. To set this location select the
function as described earlier. At the prompt, type in the start value
you desire or press <ENTER> to abort. If the selected start point is
higher than the end point you will get a BUFFER NEGATIVE error
display. Either increase the end value or lower the start point. If
the start point is greater than the SYSTEM SIZE value, an OUT OF RANGE
error will result and the original start point will not be changed.

MENU TWO FUNCTIONS <CON'T>

ENDING POINT

This function is identical to the STARTING POINT function. This
function sets the ending location of the buffer. This is set the same
as the START POINT function and is subject to the same requirements as
the START POINT option. You may also enter <M> at the end point
prompt. This will set the ENDING POINT to the maximum value.

RECORDING SIZE

The displayed value represents the size of the recording buffer and is
the difference between the ending and start points. This value must be
greater than zero or you must readjust the start and end points.

SYSTEM SIZE

The displayed value is the maximum size available to the user. This
value will be 106,212 for the 128k CoCo or 499,380 for the 512k CoCo.
This value also represents the maximum ENDING POINT value.

JUMP EFFECTS

This function is used to set one of the 7 user definable jump
locations. This function is selected by pressing the < J > key. You
will then be asked which key to set. Press the appropriate 1 thru 7
key. You will next be asked to enter the jump location. If you used
the exit locator, press the < J > key. This will set the selected key
to the current exit location. You may enter any value up to the
maximum value allowed on your system. You will then be asked for
another key. Press <ENTER> to return to MENU TWO or continue entering
jump locations.

EXIT LOCATION

The displayed location was set by pressing the <0> key during PLAY
BUFFER, after loading a game file representing the last memory point
used, or after a nametag search indicating the last tag's position.

MENU THREE FUNCTIONS

7.3   This is the DISK ROUTINES menu:

SAVE BUFFER

This function will save the current buffer to disk in either a GAME or
MAXSOUND format.

GAME FORMAT

This format is used in conjunction with the "INTERFAC" program to use
MAXSOUND recordings in basic or machine language programs. The game
format can support a file of 156,000 bytes or the area on one disk.
The game file has the extension "GAM". A filename has a maximum of 8
characters.

MENU THREE FUNCTIONS <CON'T>

MAXSOUND FORMAT

This is the normal format for use with the "MAXSOUND" program. This will save the contents of the current buffer in a format that allows multiple disk indexing to accommodate the huge memory of the Color Computer 3. MAXSOUND allows several disks to be used to save the memory contents. The MAXSOUND program will prompt the user to swap disks when the old disk is full. To reload MAXSOUND disks, the disks must be reloaded in the exact sequence as they were saved. If the disks are reloaded out of sequence the MAXSOUND program will prompt the user to change disks to correct the loading sequence. Upon entry the user is told the number of granules required to save this program and the number of granules on the current disk. The required granules can be larger than the disk granules. A filename has a maximum of 6 characters. When a MAXSOUND file is saved, the SEQUENCER and JUMP POINT data is also saved.

LOAD BUFFER

This function will reload previously saved buffers. GAME format programs will load into the current buffer. If you allowed enough room for the file you will get a "loading complete" as well as the last memory location used. If you did not allow sufficient room in the current buffer you will get an "<error> in loading" message. You will then have to increase the buffer size to allow the file to load. NOTE: if an error in loading occurs, the buffer will contain all the data just loaded into the buffer. You can use this to load just the first section of a long file if desired. This routine is fully prompted and operates in the reverse of the save routines. MAXSOUND format disks will be prompted to load in the same order as saved. This will also load any previous SEQUENCER and JUMP POINT data.

GRANULES FREE

This function will display the number of granules in disk drive <0>.

DIRECTORY

This function will display the disk contents of drive <0>. The directory is displayed in two rows from left to right.

KILL FILE

This function will kill disk drive <0> files. Use the MAXSOUND option to kill MAXSOUND files. Use normal to kill GAME or other files. NOTE: MAXSOUND format utilizes multiple files. This function kills all of the files generated. Normal files require the entry of the file's extension.

MENU FOUR FUNCTIONS

7.4

This is the SEQUENCER MENU.

CLEAR MEMORY

This option is used to clear both the SEQUENCER DATA and the BLOCK
MEMORY. This function asks for the user to clear either the block or
sequencer memory. These functions are described below. The user
selects the option desired and will proceed to the appropriate menu.
There the user can clear all memory or specific portions of memory.

INPUT A SEQUENCE BLOCK

This function allows the user to define up to 15 blocks of memory.
These blocks represent specific passages within the main memory
buffer. Each block consists of a start and end point. These points are
determined by altering the memory from MENU TWO and adjusting it until
only the sound you wish to hear is played. Looping the sound is a good
way to determine the sequencer usage of the sound. Enter these points
into the sequencer block options. The end result of these blocks is to
splice them together to create a whole composition based on playing
data entered in the sequencer data. If the CURRENT BUFFER, as selected
from MENU TWO, represents the block you wish to define, then simply at
the START POINT prompt type in <CB> enter. This will set the block to
the current buffer area.

INPUT SEQUENCER DATA

This option allows the user to string together the previous blocks as
well as the speed of the sound, number of times the sound is to be
played, the direction of the sound (forward or backward),amount of
echo, and the mode to use. 35 of these data inputs are allowed. A lot
of music and sound is repetitive, these block and data input options
allow maximum flexibility in composition production.

PLAY SEQUENCER

This function plays the above sequencer data.

SEQUENCER LOOP

This function toggles the sequencer loop status. With the loop "ON",
the sequencer will start over after the last sequencer data is played.

BLOCK LOOKUP

This function allows the user to quickly review previously entered
block data. Block playback is automaticly looped. Hold the <SPACEBAR>
down to terminate loop. Speed of the playback as well as the mode is
selected from the MAIN MENU.

MENU FOUR FUNCTIONS <CON'T>
HARDCOPY

The SEQUENCER menu offers the user a <HARDCOPY> of the current
SEQUENCER data. This is used to provide easy viewing of the SEQUENCER
information. Hardcopy will dump the BLOCK and SEQUENCER data to the
viewing screen as well as to the printer if selected.

Press the <H> key to access the HARDCOPY option. You will be asked if
you wish a printer dump. Press <Y> if desired, making sure the baud
rate is correct for your printer. Press the <B> key to toggle between
600,1200,2400,4800, and 9600 baud. The SEQUENCER data will now be
dumped to the screen and the printer <if selected>. The HARDCOPY
printout can be used to clear SEQUENCER data and reinput the data with
alterations if desired.

SEQUENCER OPERATION

Menu 4 is the 'MAXSOUND' sequencer menu. This is a powerful feature of
the 'MAXSOUND' program. The sequencer can take blocks of memory plus
playback instructions to string portions of recorded sounds or music
to produce long compositions or to add effects such as a sound slowing
down or speeding up. To use this option you will need to break down
specific areas of sound by using the EXIT LOCATOR to determine the
start and end points of the particular sound you need. Then you simply
enter these blocks into the 'INPUT A SEQUENCE BLOCK'. You must
remember which block plays what sound. When you enter a block, at the
top of the screen is the block you are inputing. If you wish to define
another block press <@> and <ENTER> to advance to the next block. This
block number is used by the SEQUENCER INPUT to determine which sound
block is to be played. Use the INPUT SEQUENCER DATA option to play the
blocks you defined and set the play back speed, number of loop times
for that block, the direction of the sound either Forward or Backward,
amount of echo and mode. When all the data is loaded, go to the PLAY
SEQUENCER OPTION to play the inputed sequencer data. You may also loop
the sequencer for continuous play. Press the SPACE BAR to break out of
the loop or playback. If you want to save the completed sequence and
buffer simply save the entire buffer with the disk 'SAVE BUFFER ' with
MAXSOUND format, this will automatically save the sequencer data and
jump points and reload it when loaded from disk.

SEQUENCER DEMONSTRATION

Power up the computer and load and run 'MAXSOUND' as normal. Next
remove the 'MAXSOUND' disk and put the 'DEMO' disk in drive <0>. Next
go to the 'DISK ROUTINES' menu and select the 'LOAD BUFFER' option. At
the prompts you will be loading a 'MAXSOUND FORMAT DISK WITH THE
FILENAME "DEMO2"'. The disk will load. Go to MENU 2 and modify the
buffer with a start of 0 and an ending of 85000. Now go to the MAIN
MENU, set the playback delay to 10 and play the buffer to hear the
music as it exists in a buffer form. Now go to the 'SEQUENCER' menu
and 'PLAY SEQUENCER'. The music has been broken down into three blocks
of memory and are played back as one continuous composition. This is
an example of how the sequencer can work for you. Use the BLOCK LOOKUP
table to see how we defined these three blocks. You can loop this
composition by looping the sequencer.

TAG BUFFER OPTION <CTRL KEY>

7.5

MAXSOUND allows the user to tag the current buffer with a nametag that can be used as a locator in the INTERFAC program. To use the nametag option the current buffer should contain only the sound wishing to be tagged. If the buffer is correct then enter <1> at the prompt. The user will be asked for the nametag, this can be any name or numbers with a maximum of 8 characters. You must remember these nametags to use them with the INTERFAC program. When you playback a tagged buffer with the MAXSOUND program you will notice a slight click in the sound, this is due to the tags being played. TAGGED buffers must not overlap, each buffer must be in its own area of memory. TAG BUFFER option <2> allows the user to view nametags that are residing in the current buffer. This is a nice feature in that it will give you the nametag as well as it's location in the buffer. If you forget a nametag, use option (2) to refresh your memory. Option (3) returns you to the current menu.

GETTING STARTED: MAKING A RECORDING

8.0

Hook up the MAXSOUND interface as described earlier. At this point it is assumed the user is using a tape recorder as the audio source. With the MAXSOUND program loaded and running, select MENU ONE. Set the loop status to on. Start playing a tape in the recorder. Select the RECORD BUFFER function. Adjust your tape recorder output level for the best sound coming from the tv or monitor speaker. [At this point do not overdrive the input. The sound you are hearing is the digitizing process, playback will be much better. Also try lower volume settings,this will make the recording process sound like static,but the playback will be very good.] You are now recording into the computers memory. Set the tape recorder to the exact position you wish to save into memory. Pause the tape at this location. Hold down the SPACE BAR until the loop status returns to OFF. You are now ready to make an actual recording. You will still be at the RECORD BUFFER location, press the F2 key while at the same instant un-pausing the recorder. The sound should come on and stay on until the computer memory is used up, then the sound will turn off at completion.

To play back this recording select the PLAY BUFFER function. The recorded sound should now be playing. After the playing stops, turn the loop ON and play the buffer again. This time the recording will play over and over until terminated by holding the SPACE BAR down. You can also modify the buffer from menu two to play only that portion of memory you wish to hear. If you want to save this sound to disk use the disk routines menu. By finding specific blocks of memory you can splice these together to create new compositions using the sequencer options or adjusting the play jump points.

THE INTERFAC PROGRAM

9.0

Included on the MAXSOUND disk is a machine language program called
"INTERFAC" and is used to access "MAXSOUND" game files from within a
basic program. This powerful program allows files saved in the 'GAME
FORMAT' to be used to create games and programs with realistic sounds
and sound effects.

INTERFAC PARAMETERS: HOW TO USE IT

9.1

'INTERFAC' is a powerful machine language program that uses simple
'USR' commands . A 'USR' command allows a basic program to pass
information from a basic program to machine language programs. The
INTERFAC program is 1,500 bytes in length. Be sure to allow enough
room in your programs. 'INTERFAC' has three routines that perform
three functions that are:

    1. LOAD A GAME FILE TO USER DEFINABLE 8K BLOCKS.
    2. RESET TABLE - USED TO RESET PLAY TABLE FOR DIFFERENT
       LOADS.
    3. PLAY GAME FILE SOUND

These three locations are at 7000, 7003 and 7006 respectfully. Since
INTERFAC is relocatable,it can be loaded anywhere in the first 31k of
memory.The INTERFAC program is 1,500 bytes long. Any offset loads will
reset these 'USR' locations accordingly.

        EXAMPLE: LOADM"INTERFAC",10000
        This loads 'INTERFAC' at location 17000 <7000+10000>
        The new 'USR' locations would be:
        17000,17003 and 17006 respectfully.

1. LOADING A GAME FILE: To load a game file created from the
'MAXSOUND' program, determine which 8k blocks you wish to load the
sound into and remember that you must allocate enough 8k blocks to
hold the entire file. All blocks are 8191 bytes in length except block
63 which has 7919 bytes.

    EXAMPLE: A FILE THAT IS 48,000 BYTES LONG WOULD REQUIRE 6 BLOCKS
            <8191 X 6 = 49,146   <ALLOCATED>

Lets assume we have a game file called 'EFFECTS' whose file length is
45,000 bytes long. That means you need to allocate six 8k blocks. Lets
say we have a 128k CoCo 3 and the program is a graphics game that uses
the standard pmodes. This means that we can use the alternate 64k bank
of ram from blocks 48 to 55. We only need six of these eight blocks ,
so we will use blocks 48,49,50,51,52,53.

To load this file you must put the blocks into a string and locate
that string for the 'INTERFAC' program with a VARPTR statement and
then exec the 'USR' function.

Here is a basic line that will load the file.

```
100 DEFUSR2=7000:OPEN"I",#1,"EFFECTS/GAM":A$="48,49,50,51,52,53":
    A=VARPTR(A$):B=USR2(A):CLOSE
```

This one line not only loaded the file but loaded it in the exact blocks we defined. The DEFUSR2=7000 command tells the computer where we want to go when we issue the B=USR2(A) COMMAND. B is a dummy variable used to execute the function. USR2(A) tells the computer to execute the machine language program at location 7000 and transfer the location of A$ which is held in the variable 'A'. You must open the file and the file extension for 'GAME' files is 'GAM'. Always close the file after loading.

2. RESET TABLE: The reset table option allows the user to redefine the location of a file for a search. This is used when multiple 'GAME' files are loaded into memory. In our previous example the search table is 48,49,50,51,52,53 and if we had loaded another file at blocks 63,62,61,60 and if we tried to play the sound in block 48 the sound cannot be found because it is searching only blocks 63,62,61,60. To locate this sound and play it we must reset the table to 48,49,50,51,52,53.

```
        A$="48,49,50,51,52,53":DEFUSR1=7003:A=VARPTR(A$):B=USR1(A)
```

This one line has reset the table to 48,49,50,51,52,53. Remember 7003 is the reset table 'USR' location.

3. PLAY SOUND: We have now loaded our sounds into memory at blocks 48,49,50,51,52,53 . Lets assume we tagged the buffer or at least a portion of the buffer file as "SOUND1" and that the recording was made at a sampling value of 20. We want to play 'SOUND1' one time in the forward (NORMAL) DIRECTION with an echo of 5 and a normal mode.

```
    A$="SOUND1,48,20,00,05,0,0":DEFUSR0=7006:A=VARPTR(A$):B=USR0(A)
```

This one line has gone thru the blocks in it's table and found the tag 'SOUND1', played the sound with a delay of 20 ,one time,with an echo value of 5,in the normal mode, in the forward direction. A$ is set up in this fashion:

```
A$="NAMETAG,STARTING SEARCH BLOCK,PLAYBACK DELAY <2 DIGIT
NUMBER>,NUMBER OF TIMES TO LOOP SOUND <TWO DIGIT NUMBER-0=ONE TIME
1=TWO TIMES ETC> ,ECHO VALUE <2 DIGIT NUMBER>,MODE <0=NORMAL
1=COMPRESSED>,DIRECTION OF SOUND <0=FORWARD  1=REVERSE>"
```

To play 'SOUND1' in reverse simply change the last digit in A$ to a
one

    A$="SOUND1,48,20,00,05,0,1"

Or to play 'SOUND1' two times in the forward direction

    A$="SOUND1,48,20,01,05,0,0"

If several nametags are in the file you may increase the search block
into the table to more rapidly find the sound.

        EXAMPLE: A sound tagged 'SOUND2' may lie in block 51. To get to
'SOUND2' 'INTERFAC' must search blocks 48,49,50 before finding
'SOUND2' in block 51. So lets move the search closer to the actual
sound

        A$="SOUND2,51,20,00,05,0,0"

If you over shoot the actual block the sound won't be found and no
sound will be played.

This concludes the operation of the 'INTERFAC' program. As you can
see, adding real sound effects and voices to basic programs is easy
with 'INTERFAC'. If you dont understand these procedures, go back and
re-read this section. Later in the manual we will be looking at actual
programs and this will also help in your understanding of 'INTERFAC'.

                  SHOWTIME: INTERFAC IN OPERATION

10.0

Locate and insert into DRIVE(0) the disk labeled 'DEMO'. This is a
demonstration disk and is designed to help you use 'MAXSOUND' to it's
full potential. Power up the CoCo 3 and:

        TYPE RUN"SHOW" AND PRESS <ENTER>

The disk drive should come on and in a few seconds the screen should
display 'LOADING INTERFACT'. A few seconds later the screen will
display 'LOADING SOUND EFFECTS".

This program will draw a space scene with the 'USS ENTERPRISE' in
orbit around a planet. The CAPTAIN will ask to beam up and the
transporter will beam him up. This program uses real recordings to
demonstrate Interfac in action. The program is heavily documented,
just list it and follow the rem statements. Lines of interest are:

  LINE5- CHECK IF INTERFAC IS LOADED. FIRST BYTE VALUE IS 22. THIS WILL
         TELL THE PROGRAM NOT TO RELOAD INTERFAC AND GAME FILE IF YOU
         BREAK THE PROGRAM AND TRY TO RERUN IT.
  LINE15-CLEARS MEMORY AND KEEPS BASIC AWAY FROM 'INTERFAC'
  LINE25-OFFSET LOADING INTERFAC-GIVES MORE BASIC ROOM
  LINE55-LOADING THE GAME FILE 'DEMO1'
  LINE110- KIRK TALKS-LOOK FAMILIAR?
  LINE135- TRANSPORTER SOUND

Looking at this program, answer these questions:

    1. What is 'KIRK TALKING ' NAMETAG?
    2. What is 'TRANSPORTER' NAMETAG?
    3. In what blocks are these sounds located?
    4. What is the playback value of 'KIRK TALKING' ?
    5. WHAT is the echo value of 'KIRK TALKING'

     ANSWERS: 1. "KIRK"
              2. "BEAMUP"
              3. 55,54,53,52,51,50
              4. 13
              5. 5

If you answered these questions correctly, then you do indeed know how
INTERFAC works. If you missed any of these answers, re-read and
re-examine the program. To stop the program "SHOW" just press the
<BREAK> key.

COCO 3 MEMORY ORGANIZATION

11.0

The COLOR COMPUTER 3 is basically a 64K computer, with the ability to swap external memory into it's 64K operating environment. This swapping is done in 8K blocks, with 8 blocks making up the 64K environment. The COLOR COMPUTER 3 can be expanded to a maximum of 512K with the optional expansion board. Therefore the COLOR COMPUTER 3 has the capability of holding 64 blocks , with each block holding 8K of memory. This gives the user access to blocks 0 to 63. When the COLOR COMPUTER 3 is turned on, blocks 56 to 63 constitute the 64K of memory. Blocks 48 to 55 are in the alternate external memory. In fact these alternate blocks are used for the new high resolution graphics and 40/80 text screens. Without the 512K expansion card you only have access to 16 blocks which are 48 to 63 , but with the 512K expansion you will have access to blocks 48 to 63 and also blocks 0 to 47. These blocks are what the program 'INTERFAC' uses to determine where in memory you want sounds stored. Below is a brief block layout of the COCO 3. Blocks 60-63 contain the new Super Extended Basic functions, so if a program is using these new functions then do not use blocks 60 to 63 to store sound data.

COLOR COMPUTER 3 BLOCK LAYOUT

```
     BLOCKS 00-47 <512K EXPANSION ONLY> NOT USED- GOOD PLACE FOR SOUND
                  FILES
     BLOCKS 48-51 HIRES GRAPHIC SCREENS-SOUNDS HERE IF HIRES NOT USED
     BLOCKS 52-53 HIRES GET PUT BUFFERS-SOUNDS HERE IF HIRES NOT USED
     BLOCKS 54-55 HIRES TEXT SCREEN-SOUND HERE IF HIRES TEXT NOT USED
     BLOCK  56    DO NOT USE, ALWAYS USED BY COMPUTER
     BLOCKS 57-59 REGULAR 32K RAM AREA
     BLOCKS 60-61 BASIC ROM-CAN BE USED FOR SOUNDS-RAM GOES TO ROM
     BLOCKS 62-63 SUPER EXTENDED BASIC-CAN USE IF NO SUPER BASIC USED
```

INTERFAC: FOR MACHINE LANGUAGE PROGRAMMERS

12.0

For those of you who like to program in machine language, a program
called 'INTERML' is included to support all machine code programs.
This program is used exactly as the 'INTERFAC' program, with the
following entry data.

    1.To load a file the same execution point is 7000 and is
relocatable. When you execute this program you should have REGISTER X
pointing to the memory location for the start of the FCC formed string
with the same data as the regular 'INTERFAC' program would use. Also
the FCC string must be terminated with an asterisk.

```
    EXAMPLE: OPEN FILE HERE
             LEAX      STRING,PCR
             JSR       7000
             CLOSE FILE HERE
             BRA       NEXT
    STRING   FCC       /48,49,50,51*/
```

Use this same technique to reset the table, JSR would be 7003.

To play a file use the same format as above and JSR 7006. No asterisk
is required to terminate the sting.

```
    EXAMPLE: PLAY     LEAX      SOUND1,PCR
                      JSR       7006
                      BRA       NEXT
             SOUND1   FCC       /SOUND1,48,10,00,00,0,0/
```

These simple lines will allow any machine language programer to take
full advantage of 'MAXSOUND' game files.

SAVING MUSIC AND SOUNDS TO AUDIO TAPE

13.0

All sounds played thru the speaker of the monitor or tv are available
at both the audio output jack on the back of the CoCo and at the aux
output plug that goes to the tape recorder to normally record programs
to tape. Just plug the aux plug into the recorder as usual but do not
connect the ear or rem plugs. With a blank tape in the recorder simply
set the recorder to the record mode and play the MAXSOUND audio. The
recorder will record the sounds until you stop the recorder and
MAXSOUND. You can also use the audio output jack on the back of the
COCO 3 to supply the audio source. You can set your home stereo to the

mono mode or get a Y-cable to patch the audio into a home stereo
system and use the tone controls to compensate for long sampling delay
recordings.

A graphic equilizer can help in tailoring a recorded playback audio.

HELPFUL HINTS

14.0

Here are some helpful hints and suggestions to get the most from your
'MAXSOUND' system.

1. Always keep a scratch pad and pencil handy to write down memory
    location numbers when setting up the sequencer and dividing
    memory locations. Also write down NAMETAGS.
2. Keep a few blank disks ready for saving long 'MAXSOUND' files.
3. Properly label disks for easy reloading.
4. If you are using the jump points, make one of these points to a
    quiet section of the recording. This will allow you to pause
    audio output by tapping this quiet spot until sound is required.
    This is particularly important when doing voice effects.
5. Always use the best possible audio quality sources for
    digitizing.
6. See page 24 for an easy way to determine proper audio input
    levels for recording in the MAXSOUND program.

BASIC ERRORS

15.0

When running MAXSOUND you may encounter an ERROR and break out of the
program. If this should occur just type:

    RUN and press <ENTER>

This will restart the program. All values and locations will not be
effected, you will simply start where you left off. If you must
restart the program flip thru all 4 menus to reset some vectors.

DIGITAL OSCILLOSCOPE PROGRAM

16.0

Included on your 'MAXSOUND' disk is an extra bonus program called
'SCOPE'. This program uses the 'MAXSOUND' INTERFACE to capture sound
waves and display them on your monitor or tv in a manner similar to an
oscilloscope. This program will display sound waves and store the
display in memory for 'FREEZE FRAME' and to allow storage of the
display to disk for later viewing. Insert the 'MAXSOUND' disk into
drive <0> and type:
                    RUN"SCOPE" and press <ENTER>

The program will load and in a few seconds the COPYRIGHT screen will
appear. Press any key to go to the main menu. This menu has 5 options.

            1. SINGLE SCAN
            2. AUTO SCAN
            3. END PROGRAM
            4. DISK ROUTINES
            5. VIEW SCAN

SINGLE SCAN

This selection allows the user to snap a scope display one at a time.
After you enter this mode by pressing <1>, a graphics screen will be
displayed with the previous scope pattern on it. Press the <S> key to
capture a wave form or press break to return to the main menu. The
left and right arrow keys allow the user to adjust the sampling rate.
As these keys are used a small vertical line will appear below the
graticle. A beep will sound out if the line is at the extreme left or
right edges. With the vertical line to the left is the fast sampling
speed <15,000 SAMPLES PER SECOND>, as the line moves to the right the
sampling rate is slower. Use this feature to simulate horizontal
sweep. Normally the line is at the far left.

AUTO SCAN

This selection allows the user to continuously view the waveform as it
is coming in. To exit this mode press the <BREAK> key. Upon leaving
the last sampled screen is saved.

END PROGRAM

Stops the program. You may restart by typing: RUN and press <ENTER>

DISK ROUTINES

These are the routines to save and load screen displays. These are
fully prompted an should be very easy to use. A filename can have up
to 8 characters.

DIGITAL OSCILLOSCOPE PROGRAM <CON'T>

VIEW SCAN

This displays the current scope picture. Press any key to go to the
main menu.

GETTING STARTED

Hookup the 'MAXSOUND INTERFACE' as you would for making a 'MAXSOUND'
recording. Run the 'SCOPE' program an go to the main menu. Put a tape
of voices in the recorder and play the recorder while you select the
<AUTO SCAN> option. You should now be seeing the voices displayed as
scope waveforms. Adjust the audio source volume control for the best
display.

HINT: You can pull the audio plug at the recorder partially out. This
will let you hear the recorder as it displays the waveform. You may
have to adjust it a bit to get good sound and a display.

DETERMINE PROPER AUDIO INPUT WITH THE OSCILLOSCOPE PROGRAM

The OSCILLOSCOPE program is helpful in determining proper input levels
for recording in the MAXSOUND program. If you are having problems
getting a quality recording in MAXSOUND, run the OSCILLOSCOPE program
and check the display. If you do not have enough audio sound the
waveform will be small. If you have too much, then the waveform will
be large and the peaks will be flattened out. In some cases an
external amplifier may be needed to boost the signal. (Some 'WALKMAN'
like radios do not provide enough signal to drive MAXSOUND).

GRAPHICS AND MAXSOUND

17.0

Included on the "MAXSOUND" disk is a program called "G&M". This is a
basic program that allows easy loading of both graphic pictures and
game file soundtracks. This is a convienient way to display your great
graphics pictures with a great sounding soundtrack. At this time there
is no standard for loading and saving the new HIRES CoCo 3 graphics
screens, and as such the HIRES loading and display routines are not
included in this program. However, the program is fully documented for
those who wish to write there own lines into the program for their
particular HIRES format.

"G&M" requires a file with the graphics picture and a game file
created from the "MAXSOUND" program that has the soundtrack you want
for the graphic picture you are using. The game file buffer must be
tagged with an appropriate nametag. Here is an example:

You have a graphics picture of "SPOCK" from the tv show 'STAR TREK'.
Lets say you have the recording of SPOCK saying "LIVE LONG AND
PROSPER!" and we want to make this our sound track for the graphics.
First you must use 'MAXSOUND' to create the soundtrack "SPOCK" and
then tag the buffer as 'SPOCK'. We used 'SPOCK' for easy reference.
Next we save the file on our graphics disk as 'SPOCK' using the game
format. At this point our graphics disk will contain the files
"SPOCK/BIN' and 'SPOCK/GAM'. I am assuming the graphic picture was
saved as a bianary <bin> file. Insert the 'MAXSOUND' disk into drive
(0) and type: RUN "G&M" and press <ENTER> This will load and run the
'G&M' program. You will see the copyright notice. Press any key except
<BREAK> to go to the main menu. There are three options:

                    1. PMODE4 FILES
                    2. HIRES FILES
                    3. END PROGRAM

The HIRES files will display the HSCREEN2 screen, but cannot load the
file. The user is responsible for the loading and screen display
programing. <RAINBOW> readers can submit specific HIRES additions for
this program for other readers. Select <1> the PMODE4 FILES OPTION.
Insert the graphics disk into drive <0>. You will be loading a graphic
filename: SPOCK with an extension: BIN. This will load our picture of
'SPOCK' and display him after loading. Press any key except <BREAK> to
load the soundtrack. The soundtrack filename is 'SPOCK' the playback
speed is <15> (assumed). We will load the soundtrack into blocks
48,49,50,51,52 <each block is inputed seperately>. The nametag is
SPOCK   we will not loop this sound,no echo and a normal mode. Enter
this data at the prompts. The disk will load the file 'SPOCK', then
display the picture and say 'LIVE LONG AND PROSPER'. Press any key
except <BREAK> to make Spock talk again. If you had looped the
soundtrack, 'SPOCK' would constantly talk. Press <BREAK> to go to the
MAIN MENU to do some more pictures and soundtracks. 'G&M' will tell
you which blocks you cannot use for your setup <128/512k>.

You can copy 'G&M' and 'INTERFAC' onto your graphics disk for easy 'G&M' operation from a single disk. 'G&M' is a very easy to use program to enhance the capabilities of your 'MAXSOUND' package.

****

Thank you for purchasing 'MAXSOUND' and it is LUCAS INDUSTRIES 2000 wish that it brings you many hours of entertainment or real work as in the case of musicians and professionals. This manual should answer all your questions, but if additional information is required, contact LUCAS INDUSTRIES 2000.

LUCAS INDUSTRIES 2000
14720 CEDAR ST. N.E.
ALLIANCE, OHIO 44601
216-823-4221.