Thank you for buying 'The SAM Sound Sampler' for your SAM Coupe. You now own an interface which is capable of producing <u>any</u> sound:, that you can hear, with remarkable quality.

1.0 Introduction.

The Sound Sampler is an audio digitiser for the SAM Coupe. The sampler digitally "records" any audio input into the computer's memory (at 18KHz or 18 Kbytes per second) in much the same way as a Compact Disk. Your sound sample can be replayed, and also modified, stored, edited - all under software control.

What you should have.

This manual, a guarantee card, a white plastic box with a connecter on one side, a disk and a microphone.

Connecting to the Coupe.

Switch your computer OFF at the mains. Never connect or disconnect any interface to your computer. with the power on, as this could damage your interface and/or your computer. Plug the Sampler into the Expansion Euroconnecter (see your Coupe User Guide) at the rear of your machine. If you need to have another interface plugged in at the same time as the sampler (eg 1Mb memory upgrade for longer samples), you will need to use the SAMBus. Now switch on your Coupe. You should get the normal start-up message.
Plug the microphone into the socket marked 'Audio In' at the

rear of the case. The sound will come out of your television, monitor or stereo just as the normal sounds from the Coupe.(Alteratively, you can connect directly to a stereo or hi-fi directly from the sampler, see Section 6.) Turn the volume up.

2.0 Getting Started.

Before doing anything else, please copy this disk using your copy of SamDOS and put the master in a safe place. Never use your master disk.

Place the copied sampler disk into the left hand drive (drive 1) and press F9. The disk drive will start to access and, within a few seconds, the title screens should appear. After a short delay, the control screen will appear.

The screen is divided into two main areas, a large information window, and below that, the menu bar. Each of these will now be described.

The Information Window.

This black rectangular area occupies the top half of the screen and displays the amount of memory free in the system, the DOS system present and the current playback settings. It is always visible except in the Monitor mode (see later).

The amount of internal memory should be either 114688 bytes (256K system)or 376832 bytes (512K system).The rest of the memory is used for this program. The DOS is either *normal* or *MasterDOS*. The external memory will only be present if you have one or more 1 Megabyte memory expansions available from SAM Computers Ltd, or your local dealer.

Underneath this information, are the current playback settings, which will be detailed in the section on the Menu Bar, but which are listed here for convenience These are the filename, the

current play speed, the percentage of the sample to play and the current play direction.

The Menu Bar.

Beneath the information window is the menu bar. Several options are displayed here and more may be seen by using the left and right cursor keys. Each title has one letter highlighted to indicate its selection letter on the keyboard. All of the selections either cause a further prompt in the menu bar, or in the information window. We will continue this explanation with a worked example. N.B. If you have the external memory expansion connected, you may have slight differences to the details below. See Section 5 on external memory.

Press 'm' for the Monitor routine. As you speak into the microphone you should see the waveform moving on the screen. This is useful for detecting inputs which are too loud for the sampler, and which, if recorded will sound distorted. When you wish to exit this, press the SPACE bar.

Now lets Record a sample. After exiting the monitor routine, press 'r'. Now speak into the microphone for a few seconds, then press the' SPACE bar. This has been set up so that the microphone will only record sounds very close to the microphone head, to avoid recording any other background sounds. When you have finished recording, press the SPACE bar. If you run out of memory before you finish, the program will return to the main menu. Once you have finished, you will be prompted for a filename for the sample, which will be displayed in the information window.

So we have recorded a sound, now let's hear it. Press 'p' to enter the Play mode. The sample will be replayed. Please note that there is no way to stop this once it is started.

Well, so far we haven't seen anything that you couldn't do with a standard tape recorder. So lets now modify the sound. Press 's' to change the Speed. You will be given a choice of playing at slow, normal or fast speeds. (You just heard the normal one). Make your choice and then press 'p' to play it.

Try the Direction option next by pressing 'd'. You will be given the option (in the menu bar) to play the sample either forwards or backwards. Press 'p' as usual to hear it.

You may only wish to hear the first part of the sample. Simply press 'e' to enter the Edit mode and select how much of the sample that you want to play. Press 'p' to hear it again.

When you have finished modifying the sample and are happy with it, we need to store it on the disk. The Save, option allows the user to save the current sample, with the current playback settings, to disk. A directory listing appears in the information window and a filename is requested. Pressing RETURN allows an exit to the main menu without saving the file. The files are very big, and so we suggest that you put a blank formatted disk into drive 1.

Eject all of the disks now and press the RESET button at the rear of the computer. Now put the sampler disk back in, and press F9 again. The program will load as before, and now lets load the sample that we recorded earlier. Pressing 'l' will invoke the Load option, which allows you to load files from the disk. A directory listing is shown in the information window and a filename is requested. Pressing RETURN allows an exit to the main menu without loading.

These can be repeated as many times as you like, but when you have finished using the program, please insert the sampler disk and press 'q' to Quit the program.

This ends your first experience of the sampler. If anything different to that above has occurred then first see Section 7 on typical problems, but if there is still a problem, ring us on 0792-310865 between 2 and 4pm weekdays.

3.0 Memory Requirements.

At this point, you should have a recorded sample on a disk. Now you probably want to use it in your programs. If you do not have any external memory, then type this in.

```
10 INPUT "Filename : ";f$
20 LOAD f$ CODE
30 CALL 65536
```

This will load the sample name that you type in and then play it. This is the way that you will load samples into your own program. The samples normally start at 65536. To play a sample, then CALL 65536.

The sampler program that has been described thus far, sets itself up to use every available byte of memory that the computer has available. Of course, if you are writing bigger programs and OPENing pages or screens, then you need to tell the sampler not to use this memory. To allow this, you should leave incorporating the sounds into one's program until the very end. You should edit the "Auto2" program (on the disk) to include any OPEN commands that you have used in your BASIC, and adjust the variable 'Code_Base' on line number 120 accordingly. This will cause the sampler to record each sound only into those areas of memory that are free when the BASIC program is loaded. eg if the BASIC program requires that the command OPEN TO 6 is entered, then it should also be entered at the beginning of the "Auto2" program, and line 120 of the "Auto2" program changed to :

LET code_base = 16384 * 6

This will cause the sample to start at page 7. Don't forget to CALL the new code_base address when you want to hear the sample!

When the sample is saved from "Auto2", it will be found on the disk as a CODE file, or as several CODE files if external memory is present.

4.0 Loading a sample from BASIC.

Provided that the precautions listed above have been taken into consideration when saving the sample, one can just load the sample as a CODE file from BASIC. The sample MUST be loaded at the same address as that at which it was saved.

If one has used external memory in the sample, then one should use the "Loader" program which may be found on the sampler disk. This will load each of the subsequent files (a file in external memory must use at least 2 files) prompting each time a new disk s needed. N.B. The first file has to be loaded twice, once at the start and again after all of the other files are loaded.

Once the sample is loaded, it may be played by simply typing CALL xxxx, where xxxx is the start of the first CODE file loaded (in the case of the unmodified Auto2 program, this is CALL 65536). The sample will be played with the options chosen before saving.

4.1 Modifying samples from BASIC.

Once a pre-recorded sample has been loaded, one can force the computer to modify the sample in the same ways as from the main program, via the POKE command in BASIC. These pokes should be performed after the sample has been loaded. The value of code_base will be that used at sample save time. A summary of these follows.

Mnemonic	Address	Use
Freq	code_base + 32767	0 = Slow, 1 = Fast, 2 = Normal (Only on play)
Operation	code_base + 32766	1 = Record, 2 = Play, 3 = BackPlay, 4 = Monitor
st_a_hi	code_base + 32765	Hi byte of 16 bit start address in start page
st_a_lo	code_base + 32764	Lo byte of 16 bit start address in start page
endp	code_base + 32763	End page marker in free pages
enda_hi	code_base + 32762	Hi byte of 16 bit end address in end page
enda_lo	code_base + 32761	Lo byte of 16 bit end address in end page
page	code_base + 32760	List of free pages progressing downwards in memory, terminated with a 00 byte.

For example, if your sample (and hence the CODE file on the disk) starts at 65536 (code_base), then after loading the sample, call 65536. This will play the sample. Now :

POKE 65536+32767,1: CALL 65536

This will play the sample at the fast speed. You can modify any of the variables listed in this section in this manner. An advanced technical manual containing the machine source code and specific hardware details will be available from May 1991 for those of you further interested.

5.0 External Memory.

Those of you with the external memory will be able to store very long samples via the sampler. However, as your disks will only hold 780K, these files are stored in sections on the disk. You should therefore limit your filenames to 7 characters, to allow the program to add files. eg   If   you   save   a   file   called 'me',   then   files   will   be   stored   called   'me',   'me.1',   'me.2'   etc until   the   whole   sample   is   stored.   These   may   be   distributed   over

any disks.

To reload a sample, you should use the "Loader" program on the ampler disk, and incorporate these routines into your BASIC programs. The same restrictions as before apply for memory considerations (Section 3.0). Please note that after saving a file with external memory, the sample is corrupted and must be reloaded. The file is automatically reloaded in the order (for out previous example) the file called me, me.1, me.2 etc and at the end 'me' is reloaded.

One modification that may be of interest is that as the external memory is not directly accessible from BASIC, one could force the sampler to put the whole sample into external memory, thus not taking up any room which could be used for BASIC, except or the driver. To do this, the computer has to be 'fooled' into thinking that it does not have any available free memory internally. This can be done by simply adding the line 371 GOTO 40 to the "Auto2" program.

6.0 Adjusting for Other Inputs.

The sampler has primarily been set up for the microphone provided, but other inputs can be used, eq. the headphone output from a tape deck or other amplifier. You will need a lead for his with a 1/4 inch jack plug on one end (for the sampler) and whatever connector you need for your stereo on the other. You may also need to make adjustments to cater for these inputs, should any modification be required. If you are in any doubt as to whether an adjustment is necessary, or how to set about it, ring our technical support line between 2 - 4pm weekdays.

The computer should be switched off and the sampler is disconnected. The two socket retaining nuts should be removed from the rear of the case and the two silver screws removed. The

board may now be removed, but be careful not to damage the wires on the underside or the components on top. The board may be a little stiff to remove, but do not use any undue force. Place the board with the two mono sockets facing you. There should be three potentiometers on the board. The one on the extreme right (marked 1K0) is the sample frequency control and is factory aligned. You can speed the samples slightly by turning this clockwise. Only small adjustments should be made.

The potentiometer in between the two sockets (100K) is the input bias for the microphone (± 5 Volts) and the other potentiometer (also 100K) is the input bias for the ADC chip. There are no guidelines for adjusting these, it will just be trial and error for your system.

7.0 What to do if things go wrong.

This section details common problems that can be encountered and their solution. If after trying these you still feel that you have a fault, then please ring us on 0792-310865 on weekdays between 2 to 4pm.

Symptom	Solution
No Sound	Check that the volume is up, try typing ZOOM in BASIC to see if you can hear that.
No Monitor Waveform	Check that the input (microphone etc) are correctly connected in the correct socket (Audio In)
Corrupt Samples in BASIC	Reset and then boot the computer and load the sample (either directly or with "Loader"). CALL the start address. If this works, then you have not allocated the computers memory in a suitable manner for your BASIC.
Reduced Quality	Adjust the frequency pot (Section 6 slightly clockwise).

<u>Sound Sampler Basic.</u>

```
 10 REM
 20 REM
 30 REM              Audio Digitiser Software.
 40 REM            Blue Alpha Electronics © 1991
 50 REM               Start  A.Parker  17-01-91
 60 REM             Completed  A.Parker  12-03-91
 70 REM        Intro and Control Screen by GM Software
 80 REM           Title Screen by Patrick Griffiths
 90 REM
100 REM
110 MODE 4: CLS #: SCROLL CLEAR
120 POKE DVAR 0,0           : REM Stop border flashing with disk.
130 POKE SVAR 618,0         : REM Force keyboard to lower case.
140 OUT 32639,193           : REM Setup the Hardware.
150 LET sig = (IN 32383) BAND 248
160 LET sad=((IN 252 BAND 31)+1)*16384 : REM Screen Address.
170 IF sig <>160 THEN PRINT "No Sampler Connected.": STOP
180 REM
190 REM        Animation Intro featuring 'Blue Alph'
200 REM           by Patrick Griffiths.   13-03-91
210 REM
220 LOAD "Blue.Alph1"SCREEN$
230 FOR i = 2 TO 5
240 LOAD "Blue.Alph"+STR$ (i) CODE
250 NEXT i: LET i = 40
260 POKE sad,MEM$(114688 TO 139315): FOR j = 1 TO i: NEXT j
270 POKE sad,MEM$(139316 TO 163943): FOR j = 1 TO i: NEXT j
280 POKE sad,MEM$(163943 TO 188570): FOR j = 1 TO i: NEXT j
290 POKE sad,MEM$(188570 TO 213197): FOR j = 1 TO i: NEXT j
300 REM
310 REM      Variable Initialisation.
320 REM
340 LET MDOS = ( PEEK DVAR 7 ) > 29  : REM 1 IF MasterDOS preset
350 LOAD "Scrn"CODE 114688          : REM Screen
370 LOAD "Name" DATA Name$          : REM Blue Alpha Electronics
380 LOAD "Name2" DATA Name2$        : REM Blue
390 LOAD "Name3" DATA Name3$        : REM Alpha
400 LOAD "Name4" DATA Name4$        : REM Electronics
410 LET option$="  Record  Play  Mon.  Load  Save  Speed  Direc
Quit "
420 REM
430 REM                        Screen Introduction.
440 REM                       by GM Software 26-02-91
450 REM
460 MODE 4: CLS #
470 PUT 17,160,Name2$
480 PUT 64,100,Name3$
490 PUT 122,40,Name4$
500 LET up=0
510 FOR down=160 TO 100 STEP -1
520 PUT 17,down,Name2$
530 PUT 122,40+up,Name4$
540 LET up=up+(up<60)
550 NEXT down
560 FOR f=100 TO 57 STEP -1
570 PUT 17,f,Name$
580 NEXT F
590 PAUSE 50: BORDER 5
600 POKE sad,MEM$(114688 TO 139315)
610 LOAD "Auto2" LINE 10
```
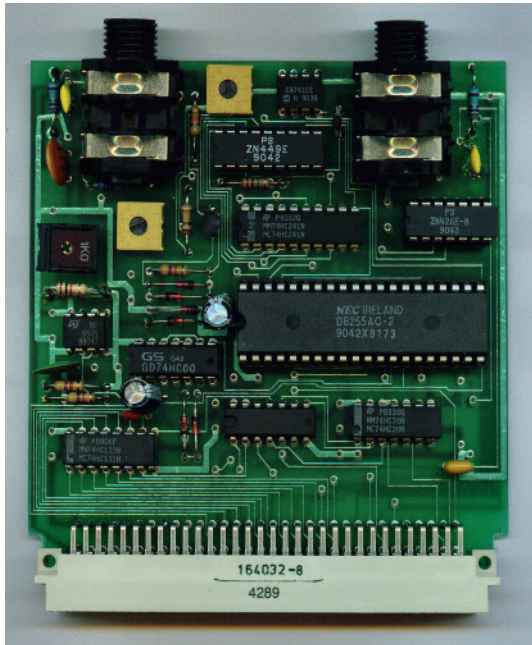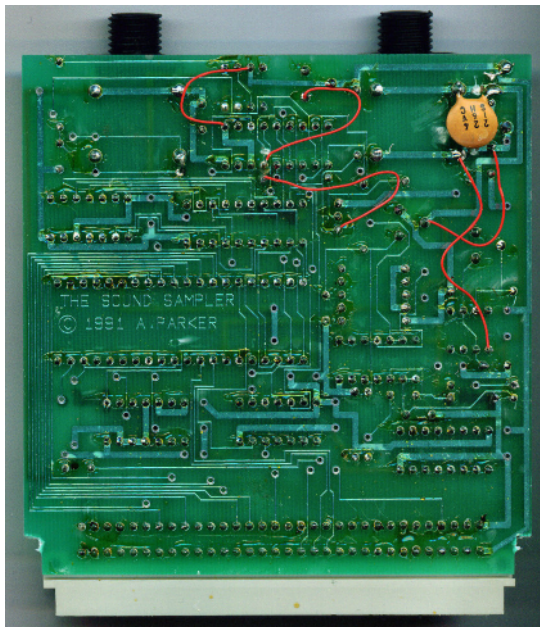
Screens Dumps

Sound sampler software running on Sim Coupe.

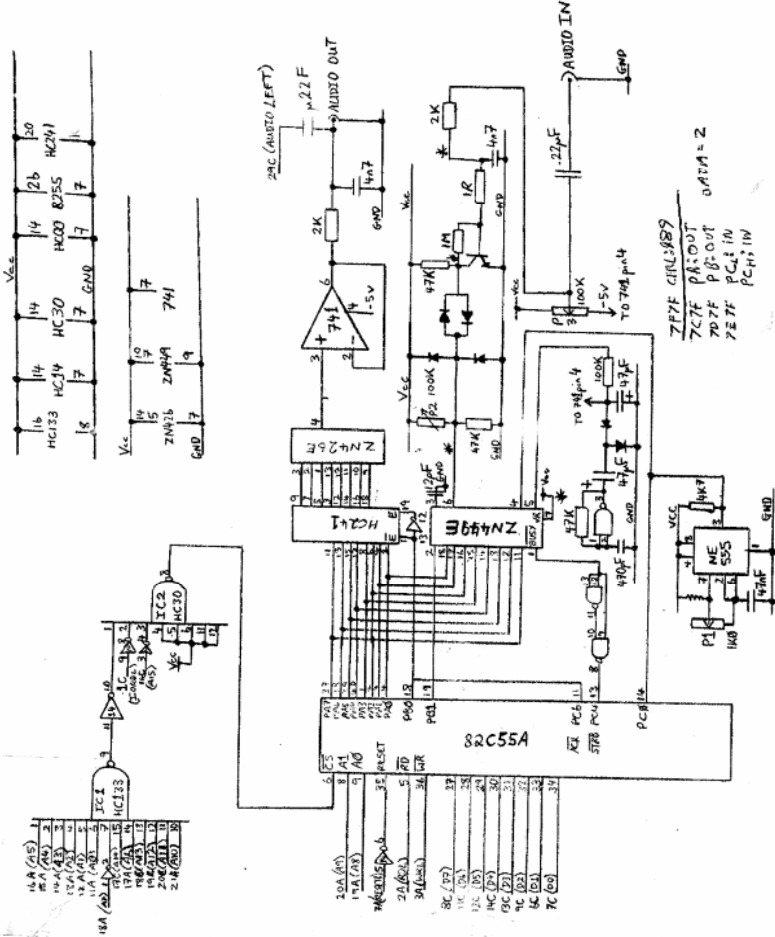## Circuit Board Scans

Circuit Board Scans

Sound Sampler schematics diagram

[thanks to Edwin Blink for this]

Digitiser Control

[thanks to Edwin Blink for this info]

Port Address	Port Name	Description.
7F7F h	Control port	Must be sent 193 decimal before any other command.
7E7F h	Port C	Clock on bit 0, other bits handshaking.
7D7F h	Port B	Sampler control, bit 0 low - DAC enabled. bit 1 low - ADC enabled.
7C7F h	Port A	Bidirectional data.

Do not enable DAC and ADC simultaneously incorrect reading / conversion occurs.

Top & Bottom Box scans

Out / In put jacks.

Packaging & Reg Card.

GUARANTEE REGISTRATION CARD

Thank you for buying a Blue Alpha
product. Please return this card to us
within 28days of purchase, to ensure
your 1 year guarantee against faults
caused by defective workmanship or
materials.

Blue Alpha ELECTRONICS

Should this item fail at any time, please telephone us on (0792) 310865 before
taking further action. We may be able to help you over the telephone. If not,
you will be issued with authorisation number for returning the product to us.

Your Name / Address

| | Telephone | Age |

Product Name | Serial No.

Date Purchased | Purchased From

Where did you hear about this product ?

What product would you like to see produced.

AFFIX
STAMP
HERE

BLUE ALPHA ELECTRONICS
YNYSFORGAN FARM,
MORRISTON,
SWANSEA.
SA6 6QL

Blue Alpha ELECTRONICS

Ynysforgan Farm
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Telephone
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SAM Sound Sampler
Requires ROM 3.0

Blue Alpha Electronics

YNYSFORGAN FARM, MORRISTON, SWANSEA, SA6 6QL
TELEPHONE (0792) 310865

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1.0 Introduction.

The Sound Sampler is an audio digitiser for the
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Blue Alpha ELECTRONICS

SAM interface