SPECTRE

PRELIMINARY INTRODUCTION TO THE OPERATION OF THE MACHINE

CONNECTIONS TO THE BACK PANEL

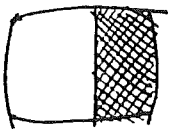
Connect the aerial socket of a broadcast television reciever to the U H F output with the coaxial lead provided; or if you have a RED GREEN BLUE monitor connect this to the monitor socket or the RED GREEN BLUE sockets. The link between the COMPOSIT VIDEO OUT and the MOD IN should be made with the lead provided.Similarly for SYNC IN and SYNC OUT;the sync switch should be ON. Plug in the INPUT MAINS LEAD (also the INPUT MAINS LEAD to the E H S monitor if you have one((and why havent you got one))).

THE FRONT PANEL

Switch on both the T V and SPECTRE. On the left hand side there are two grey perforated boards. These are the Patch Boards designated the D S M andthe A C M .Patch boards are used to route signals ,patch pins are the means by which this routing is achieved. There are three types of pin. The small blue (diode) pinand the small . white (shorting) pin are only insertable (patchable) into the D S M and the large white (resistor) pin inti the A S M.

X AND Y COUNTERS , LUMINANCE AND COLOUR

Take a blue pin and patch it into the hole in the D S M where row (X0) meets the column (Output A luminance 0). The T V if it has been tuned in , will now show,



One side is darker because the signal (X0) is controlling thebrightness ,the luminance,of the picture. Now move the blue pin horizontally to (Output A ,colourI,0). Also patch a blue pin from (GROUND) to(Output A , luminance 0). The picture now experiences a colour rather than a luminance change. Notice that the three sliders in the VIDEO OUT section can control the overall luminance and colour. Remove all pins.

With a blue pin ,patch (X0) to (Output A, luminance 0). Notice the effect of moving the pin downwards through all holes to (X8, Y0 to Y8).These rows and columns are the basis of the square patterns. Ifthe X and Y outputs were patched into the colour control then the patterns could also be coloured.Remove all pins.

With a blue pin patch (Y5) to column (Output A, luminance 0) and with a second blue pin investigate the effect of patching this pin into any other position of X and Y inthis column. With pins in both X and Y , grid patterns are produced.With only X and Y , columns and rows. Remove all pins.

With one blue pin patch (X0) to (Output A, luminance ,holes 0,I,2,3,) in turn.Notice that the size of the brilliance change is dependant on the column number.Similarly for the colour inputs. Remove all pins.

With three blue pins patch (X0,I,2) to (Output A , luminance 0,I,2) respectively. The result is known as a grey scale.If these pins are patched into (colour I,0,I,2) colour bars are produced. Remove all pins.

SHAPE-GENERATORS--:--OSCILLATORS AND RANDOM

Now from lines and squares to shapes; firstly a circle. With a blue pin , patch on the D S M (shape I,A) to (Output A, luminance 0). In the SHAPE I section of the panel, make sure that the slider A is at 0 and then repeatedly press the push button above it until all the little red lights are out. The circle is one of four basic shapes that the machine produces. Press the push button sixteen more times and this will reveal the full range. Now, push the slider A slowly upwards. The shapes will automatically change, changing more rapidly as the slider setting is increased. There are two of these shape generators, which both function the same way. Their outputs appear on the D.S.M., but their size and position can be modified on the A.C.M. Press the push button so that the circle is selected on Shape 1 A, and then using a large white pin, patch (Control slider D) to (Shape Generator 1 ●).

Digital Signal Matrix

OUTPUTS:

X (0-8)
Y (0-8)
Overlay
Inverts
Edge
Delay
Flip-Flop
Slow Counter
Shapes 1&2
Video Input - Comparator outs
2 Spare rows
Ground

INPUTS:

Invert X (0-8)
Invert Y (0-8)
Overlay gates
Invert inputs
Edge input
Flip-Flop
To Output A (Y-B-R)
To Output B (Y-B-R)
Colour Swap

Analog Control Matrix

OUTPUTS:

Oscillator 1, square and sine
Oscillator 2, square and sine
Audio Input Signal, treble, bass and composite
Output of Signal Matrix, high and low
Control Slider, voltage levels A-D
Ext Input Signal (From back panel)

INPUTS:

Shape Generator 1
Shape Generator 2
Video Input (Y;B-Y;P-Y)
Input Comparator Levels

Analog Slider Controls

Control Sliders A-D (fixed voltages)
Oscillators 1&2
Shape Selectors
Random Voltage
Audio Input
Video Input - Comparator Level
Video Output Levels

All patching of functions in the Video Synthesizer is done by means of pin board matrix connections. Function outputs appear at horizontal position (rows) and inputs to functions (as well as to the final output) are at vertical positions (columns). Outputs are labeld at the left side of the pin matrix, inputs on the top.

In order to produce an image on the monitor screen, signals must eventually reach the input columns of either Output A or Output B on the DIGITAL SIGNAL MATRIX. Signals may be processed by either digital or analog functions. Analog functions (Oscillators, Random voltage, Control Sliders, Audio Input Signals) are controlled by means of sliders on the right hand side of the face panel, and their outputs appear on the rows of the ANALOG CONTROL MATRIX. Digital control signals will appear at the rows labelled From Signal Matrix, if patched on the DIGITAL SIGNAL MATRIX into the column labelled To Control Matrix. Other analog signals (such as those from an audio synthesizer) may be patched in through the back panel, and their output will appear on the control matrix at the row labelled Ext Input.

Functions which may be controlled by analog signals are: Shape Generators, Video Output, and Video Input Comparator Levels. Of these, the last two are also controlled by sliders on the face panel. Shapes can be controlled at their inputs on the ANALOG CONTROL MATRIX, but their output, which appears on the DIGITAL SIGNAL MATRIX, is determined by the Shape Select function.

Shape Select allows the user to call up any of 16 outputs, ~~each of which is~~ array of the four indicators indicated by a particular combination of the four panel lights above the ADVANCE button. It is also possible to clock through these outputs at a rate determined by the slider directly below. Any control signal directed to Shape Generator 1 on the ANALOG CONTROL MATRIX will affect both outputs 1A and 1B, and likewise with Shape Generator 2, but the outputs appear separately on the DIGITAL SIGNAL MATRIX as 1A, 1B, 2A, and 2B.

Shapes indicated by panel graphics on the top of the ANALOG CONTROL MATRIX are: vertical position, horizontal position, circle, frizz, lantern, gear, vertical 'zoom', horizontal 'zoom'. The first two of these are not associated with Shape Select, but control the position of shapes as they appear on the monitor screen. The others may be chosen, separately or in combination, by calling up the proper output on the Shape Select (for instance, with all panel light off - 0000 - the circle output is present.)

The levels of the three types of Video Output - brilliance, hue 1 (blue) and hue 2 (red) - can be controlled by the sliders on the face panel, or voltage controlled at the inputs on the ANALOG CONTROL MATRIX. These together control the overall level of the final output of the syntheisizer to the monitor, but the configuration of the various levels of luminance and colour as they appear on the screen is determined by the signals present at their inputs on the DIGITAL SIGNAL MATRIX, where there are four levels of luminance, and three levels for each colour.

The Video Input (available on the back panel) sends black and white video signals to a comparator which divides the luminance (black and white intensity) of the video signal into seven levels. The slider labelled Comparator Level Spacing allows the user to determine the range of luminance which is directed to the comparator. At maximum the entire range will be divided, while at minimum only the ~~lightest~~ darkest areas of the input signal will be divided into different levels. In either case, these levels correspond to lighter and darker areas of the black and white image used as input, and appear as signal outputs on the DIGITAL SIGNAL MATRIX.

So far, digital signal outputs which we have discussed are the shapes and video comparator levels only. These two, plus the X and Y outputs, are the only signals which will produce an image when patched directly to the Output A or B. Of the other outputs, overlay, invert, edge, delay, flip-flop are all signals processors; that is, they have no output unless there is a signal present at their input. The Slow Counter is a controller only, effectively producing on-off signals of six different frequencies, which is most useful when applied to an input such as the Colour Swap, or to disenable a signal at an overlay gate.

X positions produce vertical bands, Y horizontal bands. The different levels, 0-8, produce bands of different widths, each level being twice the frequency (half the width) of the level above it. When two different levels are patched to the same column of video output they are added together; the visual effect is that the positive bands produced by the level of higher frequency appear only where the band of the lower frequency is negative. This is true for any two signals patched into the same column, but is most clearly demonstrated with the X-Y signals.

Now, by moving Control Slider D up and down, the size of the circle can be changed. Remove the large white pin, and patch it into (Osc 2∿), in the same column. Push up all the sliders of oscillator 2, put the range switch to high, the mode switch to 'sync'. Note the effects of the 'fine', 'coarse', and 'level' sliders on the image. Now, push up the coarse and level slider, and adjust the fine slider so that a slowly moving picture is produced. Switch the 'mode' switch to +; now the deviation slider has an effect. Switch the mode switch to -, and the deviation slider will have the opposite effect. Oscillator 2 has a square wave (⊓) output; try patching this instead of the sine wave (∿). Also, the range switch has a low range; this being used to give slow moving effects. Oscillators 2 and 1 are both the same in function. Remove the white pin, and with it patch (Random 1) to (Shape Generator 1 0). Set the Random level slider to 0, and select the shape on the T.V. to be a circle. Set the Random Rate and Slew rate controls to 5, and push up the level slider. The circle will wobble randomly in size. See what effect the Random Sliders have on the variation. With the Random Switch set to Continuous the wobble is completely random, with the switch set to Recycle, the wobble repeats the last sixteen positions of the Continuous cycle. There are two different Random outputs on the A.C.M. Try patching (Random 2) to (Video inputs, Y,R,B) in turn with one large white pin. Using the video inputs it in possible to effect the overall colour and luminance on the T.V.

AUDIO SECTION

Remove all pins in the A.C.M. Select a circle on the T.V. and plug in an audio signal (approx 1v p.p.) into the audio socket on the SPECTRE back panel. Using a large white pin, patch (Audio input B) to (Shape generator 1 0). Set the Audio In level slider to 10 and the 'Split' slider to 5. The circle size will now be controlled by the bass content of the input signal. The split slider varies the frequency at which the Treble output takes over from the Bass output. This will be about 100Hz with the split slider at 0, up to about 3kHz with the split slider at 10. Try using combinations of control from the B,T,and Sig.Remove all pins. Now back to the D S H.

INVERTERS X AND Y

With blue pins patch (X5) to (Output A luminance.0). Select shape I A to be a circle by pressing the correct push buttons until all the lights are out, and then patch(shape I A) to (invert X,5). Notice that the circle transposes the order of the verticle lines.However it only inverts the (X5) lines because it is patched to (X5). Try the effect of inverting the other numbers of X and Y not forgetting to patch the same value of X and Y to (Output A, luminance 0). Remove all pins.

SLOW COUNTER

With a blue pin , patch (Y4) to(Output A , luminance 0) and with another blue pin patch (slow counter 6Hz) to (invert Y4).

Note the effect of patching the second blue pin into the other holes ofthe slow counter. Remove all pins.

OVERLAY GATES

Now to investigate the effects of the overlay gates. These are primarily intended to give the effect of objects behind other objects.Select shape I A and Shape 2A to be circles, by pressing the relevant push button until all the lights are out. Patch using blue pins (shape I A) to (overlay gate I sig.) and (shape 2A) to (overlay gate I dis.). Patch , using blue pins (shape 2 A) to (Output A , luminance 2) and (overlay I) to (Output A , luminance 0).Now on the ACM ,using a large white pin , patch (control slider A) to (shape generator I,↔). Now by moving control slider A it is possible to move shape IA behind shape 2A. This is different than if the two shapes had deen added in the luminance column. Remove all pins.

INVERTERS

Using a blue pin patch (XO) to (Output A , luminance 0)- Note the result. Also patch a blue pin (XO) to the(invert A) column.Now remove the first pin and patch it into row (invert A) to (Output A , luminance 0). Note the result is inverted. Remove all pins.

EDGE

Select a circle (all lights out) on shape I A.With a blue pin patch (Shape IA) to (Edge). With a second blue pin,patch

(Edge Thin +) to (Output A Luminance 0). Investigate the effects of patching the other edge outputs, (i.e. thin wide + and -) to Output A. Remove all pins.

DELAY

With blue pins, patch the (Delay) row to the (Invert A) column. Also patch the (Delay) row to (Output A Luminance 0). Now patch the (Invert A) row to the (Delay) column. The stripes that appear on the TV are caused by the "Delay" oscillating. Now, note what happens when Shape IA,selected to be a circle, is patched, (Shape IA) to (Delay). Note the effect of selecting the other shapes of of Shape IA, by pressing the relevant push-button. Remove all pins.

Flip Flop.

Take three blue pins. Select Shape IA to be a circle. Patch (Shape IA) to both (Flip +) and (Flop -). Also, patch with the third pin, row (Flip Flop +) to (Output A Luminance 0). Note that the back edge of the circle is shown smeared across the screen. Remove the third pin and patch it from (Flip Flop-) to (Output A Luminance 0). Now the front edge of the circle is smeared. Remove all pins.

OUTPUTS A & B.

On the DSM there are two outputs, Output A and Output B The patching that has occurred in Output A, could equally have been done to Output B with the same results. The reason for having two outputs is that one output can be used to affect the other. With blue pins, patch (Y7) to (Output A Luminance 0) and patch (Shape IA),selected to be a circle, to (Output B Luminance 0). Note the effect. Now move the second along one hole to (Output B Luminance I). Note the difference, in the first instance the pins interacted with each other, in the second they merely added. Remove all pins.

COLOUR SWAP.

Using blue pins, patch (X0,I,2) to (Output A Colour 2,0,I,2) (three pins), and patch (Ground) to (Output A Luminance 0). Note the order of the colour bars. Now, take another blue pin and patch (Ground) to (Colour Swap).The colours are now 'swapped' in order. The colour swap reverses the Colour I and 2 columns in both Output A and Output B. Remove all pins.

VIDEO INPUT.

Plug in a black and white TV camera to the Sony camera input at the back of Spectre. Patch, using blue pins,(Video input0) to (Output A Luminance 0). Set the Video In slider to 7.

With the TV camera, choose a suitable object and focus on it. Adjust the apperture and note the effect on the TV. Patch in three more pins from(Video Input 2,4,6) all to (Output A Luminance 0). Note the effect of varying the the Comparator Level Spacing slider. Now, with three more pins,patch (Video Input 2,4,6) to (Output A Colour I,0,I,2) repectively. Note the coloured picture. Experiment with different Video Inputs and colours.(It is not possible to colour a Video Input level that doesn't have luminance patched in). Try poiting the camera at the TV. Remove all pins.

CONNECTING THE DSM TO THE ACM.

On the DSM there are two columns marked To ACM FAST & SLOW. This is a route enabling the DSM to affect the ACM. Select Shape IA to be a circle and patch,with two blue pins, (Shape IA) to (To ACM Fast) and (Output A Luminance 0) respectively. Next on the ACM,using large white pins,patch (From DSM High) and (Control Slider A), both to (I Shape Generator ●). Note the effect of moving Control Slider A. What in fact is happening is that the circle is going to the DSM and coming back to the ACM and controlling its own size. Remove all pins.