

# SPECTRE

## COLOUR VIDEO SYNTHESIZER

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### Color synthesizer animates TV screen

Heard of switched-on Bach? How about switched-on Fellini? Production will begin soon on a color-video synthesizer, which may do for the video synthesizer what the audio synthesizer does for sound. Developed by Electronic Music Studios Ltd., the synthesizer, called Spectre, allows a wide variety of moving or static patterns and shapes.

The intended market encompasses visual effects for commercial graphics, and the specialist movie studios. Or it could function for the visually oriented person who can afford Spectre can show self-generated images in 16 levels of monochrome-TV cameras, and film.

And, to give a wide electronic palette, the system can be adapted to images or designs on previously recorded tapes in a form of video multitrack recording similar to what is done in studios. Moreover, sound can be plugged into the unit so the machines, respond by color, shape or pulsing to music at the desire of the user. The basic system consists of the valve-sized synthesizer, small monochrome-TV camera, and a color-TV set.

**EMS go video**  
EMS, INTERNATIONALLY known for its range of music synthesizers, has introduced the world's first video equivalent. It is possible that their video synthesizer, known as Spectre, may do for colour TV graphics what the electronic music synthesizer has done for sound. The designer of Spectre is Richard Monkhouse, a development engineer with EMS. The potential uses of the synthesizer are graphic design, special effects for video recording and TV broadcasting, and kinetic art.

Spectre controls the interaction between colour and brightness of an image that has been generated internally, or externally from a black and white camera or video tape recorder. The result is displayed on a colour TV monitor. The graphics are derived either directly from logic signals or from analogue function generators controlled by logic. This enables the synthesizer functions to be controlled by digital signals on a patch board with digital signals, over a problem of noise and signal interaction. To generate patterns, the output from binary dividers are added together through AND gates which have their inputs brought out to a matrix pin board on the front panel. This produces a chequerboard pattern which may have outputs from the analogue generator superimposed upon it. The bars of the chequerboard can have a variable mark/space ratio and a variable

distance between them, depending on which outputs from the binary dividers have been patched in. The colour of the image can be dependent on the luminance level; there are 64 different combinations programmed by digital 'words' set up on the patch board. The luminance is controlled by 16 digital combinations. To create spheroids and triangles, dual ramp generators are used, with the intersection of two voltages producing a visible locus. These function generators have characteristics defined by dc control voltages allowing modulation by internal oscillators or external music to create random or pseudorandom pattern changes.

An input from an external video signal source may be processed by analysing the amplitude of the individual picture elements. The video amplitude is split into seven levels by a seven-stage converter, each level having a assigned colour. On addition of the luminance signal to the frame, a separated coloured image is created. This facet of Spectre may find an application in X-ray recognition. Also, it is possible to create the equivalent of acoustic feedback by focussing the camera on the screen of the monitor, resulting in a moving pattern; every time that the signal travels around the loop, it modifies the image.

The EMS video synthesizer can be produced to any video standard and is capable of operating from internal or external sync. The recommended package consists of Spectre, a Sony camera and a

### TV debut for electronic synthesis...

Television could soon be invaded by electronic art, following the example of music. Electronically synthesised music has fought its way to respectability. Now Electronic Music Studios (EMS), one of the companies involved in the synthetic music business, has built a machine which, it says, will "do for colour images what the electronic music synthesiser has done for sounds."

Previously, moving TV patterns (video graphics is the "buzz word") could only be produced with computers. EMS has developed a synthesiser which uses a relatively simple logic system instead. The "Spectre" synthesiser, with a TV monitor, and a black and white TV camera, will sell for £4000.

Spectre produces digital signals which control colour, luminance on the TV screen. There are 16 brightness levels and 64 different colours. It also generates signals which decide where the colour and brightness occur on the screen, on an X-Y coordinate basis. The signals are selected on a patchboard (a matrix of sockets which allows various cross-connections to be made). For example, patching X2 to zero luminance produces three light vertical stripes on the screen (the video signal is on, off, on, off, and on). By patching to both X and Y positions, checkerboard patterns with different colours can be created.

Other shapes, such as circles, triangles and curves, are also generated with Spectre. In addition to these geometric functions, an input from a TV camera can be fed into the synthesiser. The black and white image is electronically analysed into seven levels of brightness and each level translated into a digital signal which is then ascribed a colour. The result is that different grey shades in the black and white image assume "spectre colours".

EMS foresee a wide range of applications for Spectre. The most obvious are in the graphic arts—posters, textile and wallpaper design, film titles, and complete programmes. And academics have expressed interest in the machine for teaching the principles of design, the nature of images and colour, and even Boolean algebra.

### Zinovieff team develops colour-image synthesizer

By Pearce Wright  
Science Correspondent

A group of specialists who amalgamated the skills of the electronic engineer and the talents of the composer to develop the so-called electronic music synthesizer have created a new instrument. It is designed to do for colour images what the electronic music synthesizer has done for sound.

The machine consists of a television camera and a control unit which can create an infinite variety of colour images from within its own circuitry. Pictures of people or objects can be added to a continually changing display.

This is the latest creation of a small team who work in a studio in Oxford. Peter Zinovieff, the former geologist, pioneered electronic music in the 1950s. Mr Zinovieff is now working on the project with other members of the first opera to be performed on the music synthesizer, planned for Glyndebourne in two years.

The designers of the instrument, Mr Richard Monkhouse and Miss Jennifer Dunn, say that the only other machine which can create colour images could be built in a comparable fashion, but is unwieldy and expensive. Computer systems, their argument is, are equivalent in size to a fiddly record player.

modified Sony monitor. The cost of the basic synthesizer is £3,000, the complete package £4,000. Electronic Music Studios (London) Ltd, 277 Putney Bridge Road, London SW15 2PT. Phone: 01-788 3491/2.

# EMS COLOUR VIDEO SYNTHESIZER

(The instrument seen on display at the Palais des Expositions is the original prototype of SPECTRE. The production model now being manufactured will be available in December.)

## THE EMS SPECTRE COLOUR VIDEO SYNTHESIZER

A completely unique and revolutionary development in video hardware, SPECTRE is an instrument capable of creating exciting graphic images on an ordinary television screen. It can be used to process and manipulate images fed to it from a TV camera or VTR, or to create dramatic and evocative abstract images without the need for an external signal source.

The complete SPECTRE package consists of the synthesizer itself, a Sony Trinitron colour monitor, and Sony black and white TV camera.

### HOW DOES IT WORK?

SPECTRE is similar in concept to the now familiar audio synthesizer. It incorporates a number of separate functions which can be selected and combined by the user by means of a patch board on the front face panel. The number of possible combinations is virtually infinite, allowing an unlimited variety of images, colours and patterns to be produced.

Some of SPECTRE's special features are:

**VIDEO INPUT COMPARATOR:** divides the grey scale of a black and white TV image into 7 levels, each of which can be individually colourized or patterned. Voltage controllable.

**X-Y GENERATORS:** divide the screen horizontally and vertically. Can be used to create simple and complex geometric pattern, to mask off an area of the screen with any colour.

**SHAPE GENERATORS:** provide sixteen different signals at any of four outputs. Each signal is a basic 'shape' which can be altered by voltage control to produce a variety of forms, moving or static, related to the original 'shape'. Size and positions of the forms are also continuously variable by manual or voltage control.

**AUDIO INPUT:** produces an amplitude contour of the treble and bass ranges of any audio signal. Can be used to affect any voltage controllable function in SPECTRE, allowing direct synchronization of music and image.

**EDGE GENERATOR:** generates a border around any image. Can be used to produce just the outline of the original image, or to create an illusion of depth with a two-dimensional image.

But this suggest only a few of the things SPECTRE is capable of. Even those most familiar with its operation are constantly finding new applications and possibilities for the various functions. SPECTRE is creating new frontiers for video graphics, and a new world of visual experience to be explored.

### FOR FURTHER INFORMATION ON SPECTRE:

We are happy to answer any inquiries, or to arrange further demonstrations of SPECTRE. Please write or telephone:

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Electronic Music Studios (London) Ltd. is pleased to introduce SPECTRE, a colour video synthesizer that is compact, portable, and revolutionary in its simplicity and versatility. Video graphic production has, up until this time, required the use of a variety of equipment - colourizers, special effects generators, etc. SPECTRE incorporates these same functions, as well as many unique to its design, some of which would only otherwise be possible with the aid of complicated computer programs and digital interface.

All of SPECTRE's functions are readily available to the user on one face panel (18" x 30"). Patching of signals and signal processors is accomplished through the pin board matrices, and the number of possible combinations of these allow a virtually infinite variety of colours, patterns and images to be produced. SPECTRE has the advantage of being easily accessible to those with no prior experience with video graphics, while even those most familiar with its capabilities find the potential for new discoveries in no way reduced. SPECTRE is limited only by the imagination of the user.

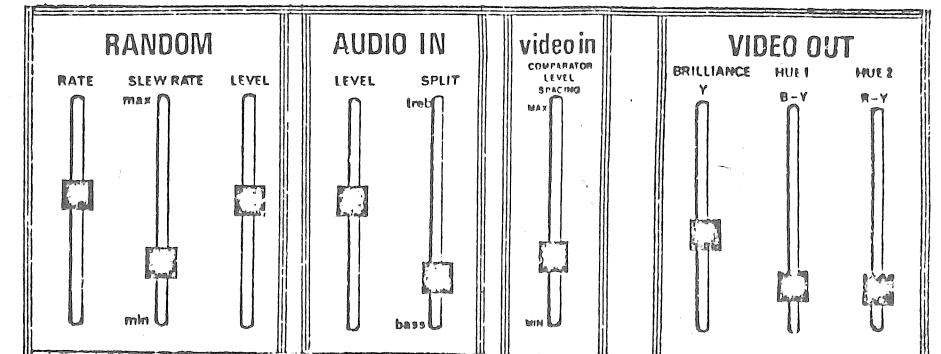
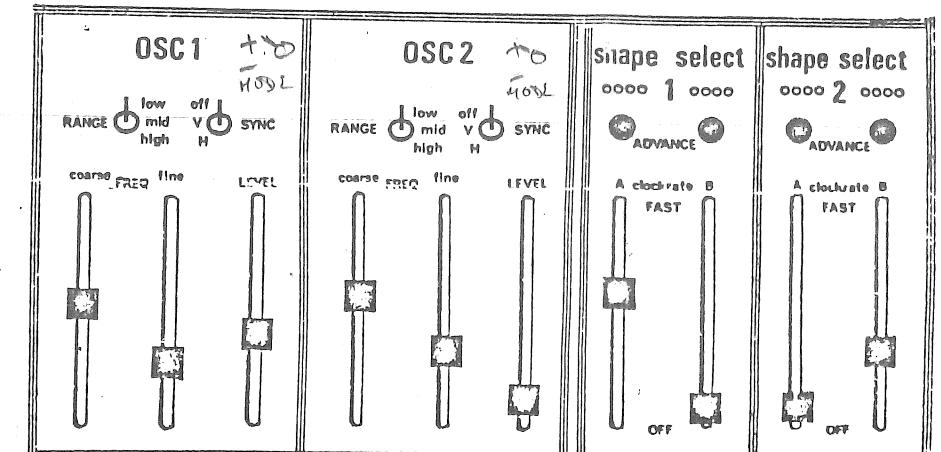
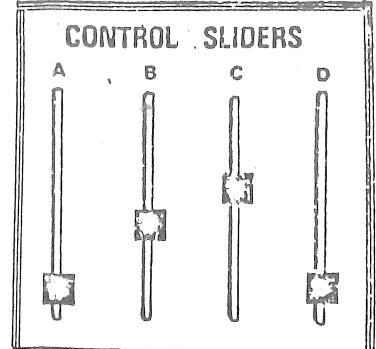
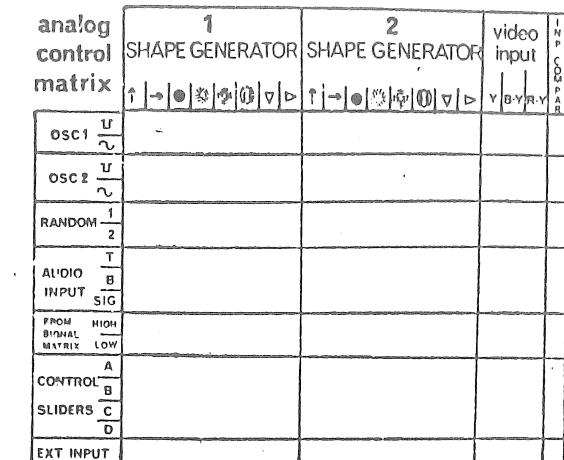
digital  
signal  
matrix

	INVERT X	INVERT Y	overlay gates	INVERT
	1 2 3 4 5 6 7 8	0 1 2 3 4 5 6 7 8	1 2 3 4	b c d
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
OVERLAY	1			
INVERT	2			
INVERT	3			
INVERT	4			
E	a			
D	b			
G	c			
E	d			
DLLAY				
FIP	+/-			
FLOP				
COUNT	0Hz			
SLIDER	0.3Hz			
SLIDER	1.0Hz			
SLIDER	3.0Hz			
SLIDER	10Hz			
WIDE	44Hz			
WIDE	20Hz			
SHAPE A	1			
SHAPE A	2			
SHAPE B	1			
SHAPE B	2			
VIN	1			
VIN	2			
DPF	3			
EUT	4			
OT	5			
OT	6			
OT	7			
OT	8			
OT	9			
OT	0			
SPARE	I			
SPARE	II			
GROUND				

SYNTHI  
COLOUR VIDEO SYNTHESIZER

EMS Rd.

E	D	F	F	T	T	OUTPUT A			OUTPUT B			C	J	S	W
						LUMINANCE	COLOUR1	COLOUR2	LUMINANCE	COLOUR1	COLOUR2				
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16



MAINS