

Electronics & **MUSIC Maker** DECEMBER 1982 75p

**CLIFF
RICHARD**

THE
TRANSPOZER
Unique Music
Project!

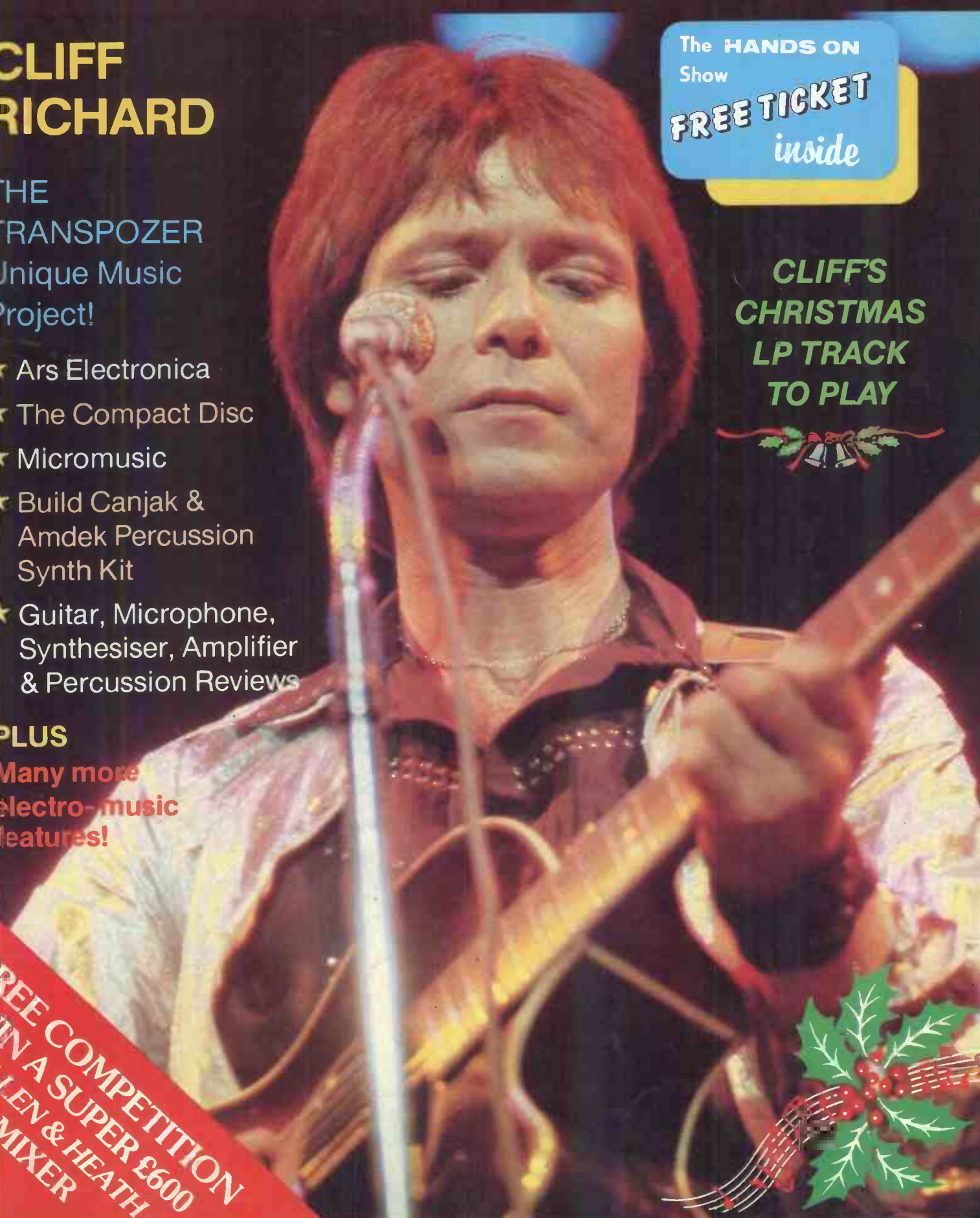
- Ars Electronica
- The Compact Disc
- Micromusic
- Build Canjak & Amdek Percussion Synth Kit
- Guitar, Microphone, Synthesiser, Amplifier & Percussion Reviews

PLUS
Many more
electro-music
features!

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MIXER & HEATH

The **HANDS ON**
Show
FREE TICKET
inside

**CLIFFS
CHRISTMAS
LP TRACK
TO PLAY**



JUNO

JUNO-6

6 VOICE POLYPHONIC SYNTHESIZER

- 5 Octave ● 6 Voice
- 6 VCF/6VCA/6ENV'S
- Digitally Controlled Oscillators
- High Pass Filter ● Chorus
- Arpeggio – Hold and External Clock Trigger
- Key Transpose ● Sustain Hold
- Octave Response (Down/Normal/Up) can give up to 7 octaves
- Bender ● Mono/Stereo Output

Optional Extras:

- KS2 Stand ● CB-Juno hard case
- FV 200 stereo keyboard pedal for VCF control
- RH10 Stereo Phones ● DP2 pedal for hold



Roland (UK) Ltd., Great West Trading Estate,
983 Great West Road, Brentford, Middx. TW8 9DN.
Telephone: 01-568 4578

 Roland

Exclusively at CHASE

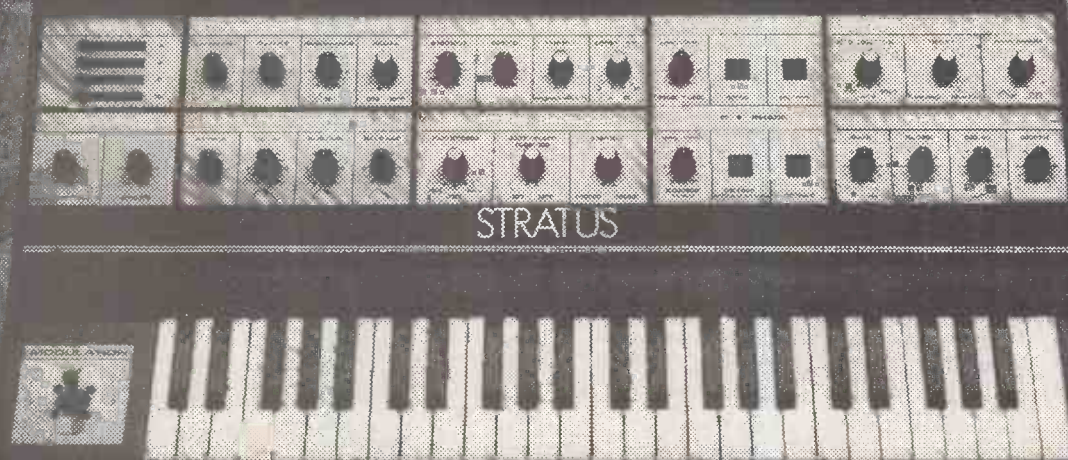
Synful Sound!

The Crumar Stratus is the first polyphonic synthesizer that satisfies the needs of both the creative synthesist and the multi-keyboard player. It offers a powerful array of sound, from the explosive to the expressive, and yet the majority of control comes from the keys you play, not the dials you turn.

The heart of this outstanding versatility is found in the six actively engaged Filters and Envelopes that span the keyboard. These generate true polyphonic capability, letting you depress as many keys simultaneously as you want. Most polyphonic synthesizers are limited by their 4 or 5 voice capability. Go beyond that and notes drop out.

The Stratus also features unique trigger modes (both Multiple and Mono) which allow you to turn on the Oscillator Glide, reset the LFO delay, and alternate between the sawtooth and square waves all directly from the keyboard. You can retrigger a particular effect whenever a new note is played, even though other keys are depressed.

There are other noteworthy qualities to the Stratus, like two independent oscillators, continuously variable and invertable envelopes and polyphonic resonances. But, we suggest you experience this "synful" sound for yourself at your local Crumar dealer. At a price under £550 it's a devilishly exciting way to burn up a stage.



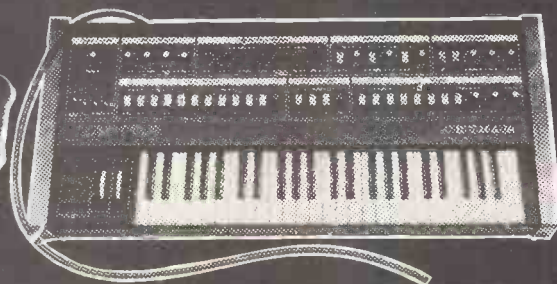
TOMORROW'S SOUND



12 MONTHS INTEREST FREE CREDIT A.R.R. 0%

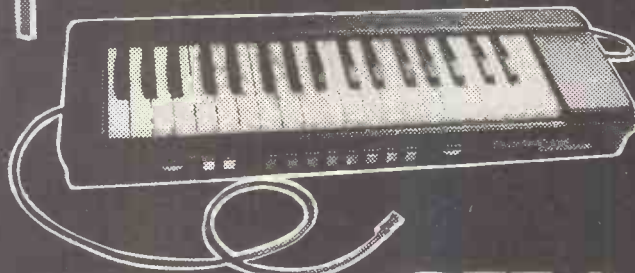
CRUMAR BABY GRAND

This is destined to be the best selling grand piano in the world. If you are looking for a professional grand piano, well it's here at last. The latest in piano technology. You'll believe us when you try one at any one of our branches.



CRUMAR COMPOSER

Solo synthesiser, Poly synthesiser, Strings and Organ all in one instrument. Even includes the very latest breath control facilities and touch sensitive keyboard. Amazing instrument at an amazing price.



CRUMAR SYNTEPHONE

The latest synthesiser from Crumar which includes breath control facilities. The instrument of the future. Play the synthePhone at any one of our branches now.

CRUMAR SALE PRICE LIST

	R.R.P.	CHASE SALE PRICE		R.R.P.	CHASE SALE PRICE
Professional Keyboards:			Trilogy	1,300.00	795.00
CRUMAR SynthePhone	250.00	195.00	Toccata	500.00	345.00
CRUMAR Roadrunner	300.00	225.00	T1 Organ	800.00	575.00
CRUMAR Roady	400.00	295.00	T3 Organ	1,150.00	945.00
CRUMAR DP/50 Piano	1,300.00	795.00	T3 Orban & NCS0 Rhythm	1,550.00	1,295.00
CRUMAR DP/80	1,400.00	895.00	Bass Pedals for T3	200.00	145.00
CRUMAR Baby Grand Piano	2,000.00	1,495.00	Bass Pedals for T2		95.00
CRUMAR Performer	500.00	395.00	Home Organs:		
CRUMAR Multiman S/2	700.00	595.00	Model 915	1,275.00	1,095.00
CRUMAR Stratus	900.00	545.00	Model 920	1,799.00	1,495.00
CRUMAR Composer	1,100.00	695.00	Model 2001	2,500.00	1,995.00
			Model 2003/R	3,500.00	2,995.00

CHASE

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22 Chalton Street, off Euston Road, London NW1.
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58 Oldham Street, off Piccadilly, Manchester M4 1LE. Telephone: 061-236 6794/5.

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Opening hours Tues. to Sat. (inc.) 10.00 a.m. to 5.30 p.m. Please note our stores are closed on Sundays and Mondays.

Roland

We are London's specialist Roland dealer with almost every item that Roland make on display. The JUPITER 8 Polyphonic Synthesizer is now the leading 8 note Poly-Synth on the market; it interfaces with the MC4B MICRO-COMPOSER for incredible composing abilities and tape syncing. The 100M MODULAR SYNTH system gives you versatility at a sensible price with interfaces to MC-4B, CSQ100-600 sequencers and SH 101.

To celebrate their tenth anniversary Roland have produced two amazing new synthesizers, both of them world-beaters. Firstly, the incredible **JUNO 60** polyphonic synthesiser; it has all the features of the **JUNO 6** plus 56 memories, footswitchable patch shift, programmable VCA levels, tape dump/load facility and built-in interface to the Roland MC-4B microcomposer multi-channel sequencer. Prices are: **JUNO 60 £995 (R.R.P.)**, **JUNO 6 £695 (R.R.P.)**. The Juno 6 is the best-selling, true polyphonic synthesiser ever, so we think you'll like the Juno 60 even more. At the monophonic end of the scale Roland have also produced a winner with the **SH-101** synthesiser. Designed to replace the best-selling SH-09 synth, the SH-101 is equally at home strapped around your neck with the optional modulation grip or in a studio synth set-up. Battery or mains-operated, the Roland SH-101 has mixable waveforms, sub-oscillator, noise generator, arpeggiator and built-in 100 step digital sequencer. The SH-101 sequencer can be controlled by an external clock source such as Boss DR. Rhythm, Roland TR-606 Drumatix or Compurhythm Composers; individual CV and Gate input/outputs are also provided; all these features for only **£249**. Superb value! Good stocks of the Juno 60, Juno 6 and SH-101 will be available at the London Rock Shop from November onwards, but hurry because prices are due to rise on all Roland products in December.

For guitarists, **BOSS** (made by Roland) have designed a sensational sound control centre **SCC-700** pedal board which takes 7 effects pedals and can be programmed to memorise 32 patch combinations; fortunately, as the SCC-700 will put a large hole in your pocket, Boss have also produced a **BCB-6** pedal board to take 5 effects and Multiway PSM-5 power supply/master switch for under £100. However, for a limited period only, we are giving away a carrying case absolutely free with every Boss pedal to get your pedal board started. This offer is open to all purchasers, including mail order, while stocks last (first 500 customers only)!

If you're handy with a soldering iron then don't forget you can build your own effects pedals with



AMDEK kits. The new percussion synthesizer and programmable rhythm machine are the latest addition to the AMDEK range. Please send 25p in stamps for AMDEK Colour Brochure. Boss and AMDEK are Roland Corporation Products that are imported and serviced by Roland (U.K.) Ltd. The London Rock Shop is a Roland main agent. We have the largest selection of Roland, Boss and AMDEK products in the U.K. In short, we consider ourselves specialists in the electro-music field — we are open seven days a week, including Sundays, for sound advice at a better price!

Our current stock includes the following:

RECORDING EQUIPMENT

FOSTEX: 250 Multitracker cassette
FOSTEX: A-8 8-track reel-to-reel
FOSTEX: A-Z 2-track reel-to-reel
FOSTEX: 350 8/4/2 mixer/meter bridge
FOSTEX: Line mixer
FOSTEX: Digital delay
FOSTEX: Dual-band graphic eq.
FOSTEX: 10 watt personal monitors
VESTA-FIRE: Rack-mount reverb
FURMAN: Rack-mount reverb
ACCESSIT: Reverb, noise gate, compressor
ACCESSIT: Compander, dual sweep eq.
R.S.D.: Mixers and power amps
MXR: New mini digital delay
MXR: New
MXR: Dual limiter/compressor
YAMAHA: Analog delays
BOSS: Analog delay/reverb
ROLAND: SDE 2000 digital delay
ROLAND: Rack units, echoes
SENNHEISER: Headphones/microphones
SHURE: New PE series microphones
Pls AKG, Audio Technica, Whirlwind cables, adaptors, Ampex, TDK, Tapes and much, much more...

KEYBOARDS

MOOG, CASIO, YAMAHA, RHODES, ROLAND, HÖHNER, JVC, KORG
New: JVC KB-500 stereo keyboard
MEMORYMOOG polysynth
CASIO MT 60/MT 70

GUITARS

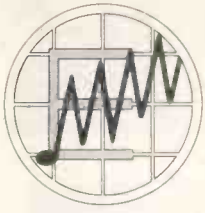
FENDER, ARIA, SQUIER, PANGBOURN, JADEE, OVATION, TOKAI, GIBSON, WASHBURN, IBANEZ, KRAMER, STEINBERGER, ROLAND, WESTONE

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**WATCH OUT FOR OUR JANUARY SALE!
AND A HAPPY XMAS FROM ROCKY**



Electronics & Music Maker

contents

December 1982

Volume 2

Number 10

SPECIAL FEATURES



Cliff Richard 44

With nearly 25 years in the music business, Cliff puts his music making into perspective.

Little Town..... 50

Cliff Richard's latest single for you to play.



Patrick Moraz 40

We analyse his 'Future Memories Live' LP.

Ars Electronica..... 12

A big Austrian event that focuses on electronic music.

Digital Recording

Part 2 8

The Compact Disc.

Industry Profile..... 68

Allen & Heath Brenell.

Regular Features

Videotech..... 20

Thomas Dolby at TV South.

Talking Shop 32

Gigsounds

Micromusic..... 65

Soundmaking for the Sinclair Micro with the Zon X-81.



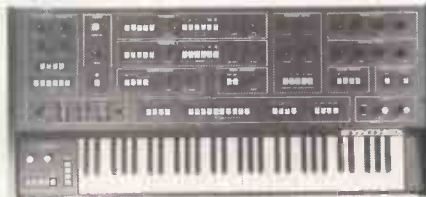
Music Maker Equipment Scene 76

Korg's latest instruments and more.

America 38

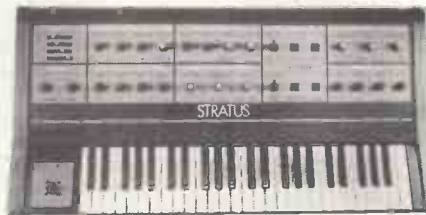
Hamer, Gibson and Boss in the States.

Instrument Reviews Synthesisers



Elka Synthex..... 22

Crumar Stratus..... 30



Guitar

Tokai Basses..... 18



Microphones

Shure PE Series 28

Percussion

The Kit..... 66

Projects



The Transpozer 56

You've heard of harmonisers costing thousands, but we've scooped the first ever kit project that does it all for under £200!

Amdek Percussion Synth

..... 70

Bring your percussion to life with this easy to build kit.



Canjak 74

One of the smallest and cheapest practice amps ever - plus its own distortion effect for guitarists.

News

News & Events 6

Christmas Bazaar 16

Synthesiser Update 26

Videomusic..... 35

A&HB Mixer Competition..... 36

Record Reviews..... 42

Concert Review: Phillip Glass 72

E&MM Demonstration Cassettes, Back Issues and Subscriptions. 78

Classified 79

Next Month..... 80

Christmas SALE

OCTAVE KITTEN
RRP £579
CHASE PRICE £245



24dB filter for bigger, fatter sound ● 4 function envelope generator ● noise generator ● auto repeater or keyboard repeat ● sample and hold circuit ● 5 selectable waveforms ● 3 octave keyboard with transpose switch for 8 octave capability ● interfaced with most variable synthesizers

The Kitten and Cat are two of the few synthesizers which offer what has got to be in our experience an essential feature in any good synthesiser. What is that, you might ask? Very simple but important, a 3 octave keyboard. A feature you will hardly miss when, you are buying a synthesiser. The limitations of most synthesizers which have 2½ octave keyboards hit you when you start to play one. You soon run out of keys to play on the keyboard. Make sure that the synthesiser you buy has at least a 3 octave keyboard in addition at all the features that are available on the Kitten and the Cat. They have all the features you need on a synthesiser and are the best value for money, because we import them directly from the manufacturers. Try one now, available exclusively at any one of our branches.

OCTAVE CAT
RRP £950
CHASE PRICE £395



Duophonic synthesizer ● will play 4 notes at a time ● upper and lower voice memories ● 2 oscillators with combinable waveforms ● 24dB filter for bigger, fatter sound ● sample and hold circuit ● noise generator ● interfaced with most variable synthesizers

THE SX2000 RRP £300 Chase Price £145



3½ octave keyboard ● 3 waveforms ● 7 presets octave selector ● VCF ● VCA ● Vibrato ● Portamento

THE SX1000 RRP £300 Chase Price £145

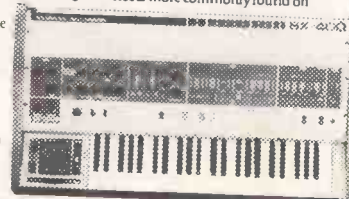


3 octave keyboard ● octave selector ● waveform selector ● pulse width modulation ● portamento ● vibrato ● low frequency oscillator ● pink and white noise generator ● VCF and VCA envelope generator ● Great value at £149!

TEISCO SX-400 POLYPHONIC SYNTH
RRP £1,690 CHASE PRICE £895

The Teisco SX 400 synthesizer is the top model in the Teisco range. It features a 49 note polyphonic keyboard with a memory incorporating 8 pre-set functions, as well as the facility to programme and memory-bank up to 8 of the user's own voicings. The synthesizer has a wide range of effects more commonly found on higher priced keyboards.

The player can see at a glance which pre-sets and effects are switched on by red and green LED indicators which are built into the keyboard. The synthesizer has a tough metal chassis ergonomically designed front panel. The construction for the demanding road use which a keyboard of this type is likely to receive.



OBERHEIM

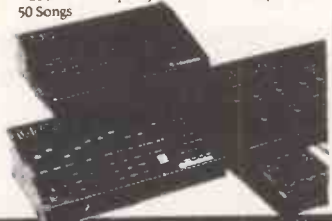
THE SYSTEM CHASE ARE THE SOLE U.K. AGENTS AUTHORISED BY OBERHEIM TO SELL AND SERVICE THE PRODUCTS IN THE U.K.

THE OBERHEIM SYNTHESIZER PERFORMANCE SYSTEM consists of either the Oberheim OB-Xa or the OB-SX Polyphonic Synthesizer, plus the DSX Digital Polyphonic Sequencer and the DMX Programmable Digital Drum Machine. You can record notes, patches and drum beats, then play them on stage or in the studio in a dazzling performance that would take a dozen musicians or a dozen tracks to pull off conventionally. THE OBERHEIM SYNTHESIZER PERFORMANCE SYSTEM makes getting your ideas down faster and easier than ever before.

Program the multi-track DSX directly from the Synthesizer keyboard - record different sections and Merge them together to make the song as long as you want. The DSX can store up to 6000 notes plus patch changes, splits, tempos and transpositions in any of 10 different sequences; each with 10 tracks. In addition to driving all of the voices in the Synthesizer, the DSX also has eight external CV and Gate outputs.

which can be used with other synthesizers for up to sixteen voice polyphony. The DSX also syncs up with the DMX for sound you wouldn't believe could come out of a box. Program your drum beats, combine the individual parts into a complete song, then let the whole SYSTEM loose with the touch of a single button! THE SYSTEM has cassette interface and battery backup too, so you don't lose your recordings when you lose power.

The Oberheim Performance System: products that work together to expand your creativity as never before.
THE OB-Xa POLYPHONIC SYNTHESIZER
4, 6 or 8 Voice Synthesizer 120 Patch Programs
5 Octave Programmable Split/Double Keyboard
Stereo/Mono Outputs
THE OB-SX POLYPHONIC SYNTHESIZER
4, 5 or 6 Voice Synthesizer 56 Patch Programs
4 Octave Keyboard
THE DSX DIGITAL POLYPHONIC SEQUENCER
6000 Note Capacity 16 Voice Polyphony 10 Sequences, each with 10 tracks 10 Merges Loop and Transpose
THE DMX PROGRAMMABLE DIGITAL DRUM MACHINE Real Sounds Recorded Digitally 2000 Event Capacity 24 Drums 100 Sequences 50 Songs

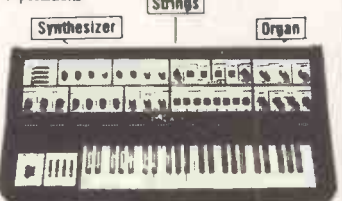


CRUMAR TRILOGY POLYPHONIC SYNTH
RRP £1300 CHASE PRICE £795

TRILOGY
Crumar's Trilogy combines polyphonic synthesizer, orchestra, strings, and cathedral organ in one instrument, then lets you combine them in any proportion for limitless creative potential.

Usually we do not think one single instrument should do everything or be everything to the professional musician, but with the TRILOGY natural events "led" us to betraying this ideal. Accordingly we have created the most complete polyphonic synthesizer the musician would wish to have. Big, fat, aggressive, today's sounds combined with some unique features such as alternating waveform keyboard trigger and invertible envelopes in a polyphonic format. Added to these a comprehensive, easy to use, bank of presets which may also be internally altered to your own

taste, a super String Section and you have all the ingredients to make the TRILOGY live up to our highest expectations



CRUMAR MULTIMAN S/2 RRP £700 Chase Price £595



One master console on Crumar's versatile Multiman S/2 controls string, bass, brass and piano sounds with a brass range of 2 full octaves. All sounds can be played simultaneously to provide orchestral effects. A split keyboard permits separation of each sound quality on either lower or upper registers. Compactness, flexibility and a redesigned new look, characterise all aspects of this 20Kgs professional instrument.

STOP PRESS!



Chase are the sole UK agents for the SYNERGY

CRUMAR DP/50 PIANO
RRP £1300 CHASE PRICE £795

12 incredible Piano Voices, the ability to create your own and a keyboard response you can tailor to your touch

THE VOICES Sit down at the Crumar DP-50 and you'll discover the world's most popular pianos are at your fingertips. Six presets function in two modes, the first six being more traditional acoustic and electric piano sounds, the second six offering more brilliantly defined sounds not normally associated with acoustically oriented instruments.

FREE SECTION. The seventh preset enables you to control our very special Free Filter Section. This section lets you create your own piano sounds, plus many expressive synthesizer voices individually coloured by the energy you direct into the keyboard.

THE FEEL. There are several electronic pianos claiming to be dynamic, but they still dictate what your playing style and touch should be. Not so with the DP-50. In the back of the piano is a Keyboard Response Control. You can use this to tailor the DP-50 to your style and touch. If your technique is very forceful, you can adjust the DP-50 to let you whisper, when you want.

If you play with a delicate touch, the DP-50 can still give you powerful emphasis when you need it. Simply put, you don't conform to the DP-50, the DP-50 conforms to you.



TOCCATA ORGAN
RRP £500 CHASE PRICE £395



8 preset draw bar configurations ● variable percussion volume and decay ● key click feature ● built in rotary sound system including vibrato and chorale fast and slow sounds.

at CHASE

12 MONTHS INTEREST FREE CREDIT A.P.R. 0%

CRUMAR ROADY PIANO

RRP £400
CHASE PRICE £295

The Crumar Roady is destined to become the electric piano of the 80s. Five full octave of Piano Vibes and a punchy Bass provide the player with a pool of possibilities that include: mellow Vibes with variable tremolo depth and rate. Percussion that can duplicate a mallet sound, produce the accentuation of popular electric pianos (those classic bell like tones) or add that biting edge for Jazz solos. 3 distinctive piano sounds that can be mixed in any combination and can be played on either the left side, the right or across the entire keyboard. Bass that can be played percussively or simultaneously sustained with the Vibes. The blending of all the Roady's distinct voices in a wide range of proportions (Vibes over Pianos, Pianos over Bass, etc.) as well as the spacious separations possible with three discreet signal outputs. The past is played out. Get your hands on the Crumar Roady today!



CRUMAR ROADRUNNER PIANO

RRP £300 CHASE PRICE £225

The ROADRUNNER 2 has been designed for a colourful new look and positive electronic and mechanical reliability. The features include a new variable 'chorus' effect, and accessible pitch control and rainbow tab controls for bass and 3 different piano sounds. Still included is the two octave bass extension that can be fed through a separate amplifier to give a 'stereo' effect. For the ultimate in portable pianos, play CRUMAR's new ROADRUNNER 2 - the first and foremost of its kind.



THE CRUMAR PERFORMER Strings and Brass

RRP £500 CHASE PRICE £395

MORE STRINGS, MORE BRASS, MORE GIGS!

Violins, violas and cellos, Trumpets, trombones and French Horns. Synthesizer effects. You can have them all at your fingertips with the Crumar Performer. This incredible range of sounds that you can mix and overlap in any proportion you choose, make the Performer the most gig producing keyboard on the market. Whether you do cover tunes or originals, the ability to add a true to life string and brass section tremendously expands your musical versatility. The Performer is priced just right for the working musician. Get your hands on one today.

Crumar's completely new Performer is a professional quality strings and bass synthesizer at a not so professional price. You could pay much more and still not get all the features the Performer offers: two distinct 8- and 16-foot string voices, an on-board graphic equaliser, variable crescendo, full brass filter and envelope controls, delay modulation, a 4-octave range keyboard and trouble-free LED switching.



ARP PIANO RRP £1,700 Chase Price £845

Fully polyphonic electronic piano. 4 separate voices selected by quick touch switches. Touch responsive wood keyboard for piano realism. Soft or vibrato. Lightweight multipurpose electronic piano now selling at half its normal price.

ARP'S SOLINA RRP £800 Chase Price £345

4 octave fully polyphonic keyboard with violas, violins, trumpets and brass. All mixable to produce unlimited range of sounds including organ, electric piano, etc. Separate bass section. Attack and crescendo control, interface cable with other synthesizers to produce polyphonic synthesizer sounds. Reduced from over £800 to £299. Carrying case also available for only £20 extra. This is the best bargain we have ever had on offer!



CHASE COMPACT PIANO

- Self-amplified
- 73 Note Keyboard (1-1)
- Polyphonic
- Voices: Piano - upright
- Adjustable Pitch
- Output for headphones, external amplifier
- expression pedal and sustain pedal
- Sustain pedal
- Amplification incorporated
- 4 Watt R.M.S.
- Wooden cabinet
- Play/Stop Music stand

R.R.P. £399
OUR PRICE £275



CRUMAR'S PORTABLE ORGAN RRP £1750 CHASE PRICE £1445



2 x 49 manuals • 13 note pedal board • Servo Centre SR Rhythm unit • 12 R. MARK II 8 preset flute settings • Percussion 4-24 • LOW R MANUAL R/S (4-24) • Flutes • Rotating sound system built in which duplicates the variable speed and timbre characteristics of the largest organ sound cabinets • 3 pianos on upper or lower manual. Separate 16' and 8' strings in upper

or lower manual. The special steel masher which can be used independently with the piano and string sections. • Outputs: Main flute, piano & strings, bass constant level. Fill in signal. • Includes: legs, swell pedal fill in pedal, rotating sound system, external pedal, rhythm units with incredible realistic drum sounds. • 16 rhythms each with fill-in. • Automatic piano and guitar chords. • Automatic bass.

ARP QUARTET

£345 (RRP £650)



A compact Polyphonic keyboard offering four independent sections: BRASS Two footages with the option of mixing with the other sections, independent attack and sustain and a delayed vibrato option. STRINGS Cello and Violin voicings, percussion and solo settings, and independent attack and sustain. ORGAN Two preset voices which can be combined to give a full rich tone unparalleled in the Quartet's price range. PIANO A choice between piano and honky tonk, mixable to produce both four foot and Grand Harpsichord with variable sustain.



Hohner Duo

RRP £495
Chase Price £295

This unique combination of two popular sounds, the renowned Clavier, coupled with the distinctive Pianet, gives the performer another dimension of music in which to create, record and perform. The Hohner Pianet Clavier Duo is a portable electro-mechanical keyboard with 60 standard size piano keys, and a tonal range extending over five full octaves. Its keyboard 'splits' to provide a variety of combinations of Clavier and Pianet sounds.



Hohner Clavier E7

RRP £325 Chase Price £225

The Clavier is one of the real legends of the keyboard world. The Clavier has been played by so many and featured on countless recordings that its distinctive sound has become synonymous with all types of music: Pop, Motown, Rock and Funk. The six tone colour rocker switches and the variable damper offer an amazing range of Clavier sounds. Now available at a bargain price of £225.

Hagstrom

1. Hagstrom is the only guitar maker to support the neck with a rail. Everybody else uses a rod.

2. The Hagstrom rail stops twisting in its tracks. A simple idea. As most great ideas are.

The best deals in town with strings attached. SUPERWEDE

SWEDEN The Hagstrom Swede is one of the most coveted guitars in the world. It is so compact and comfortable, it seems almost too small for the magnificent sound it produces. The two Hagstrom pickups - humbucking, sensitive and efficient - are both activated by separate volume and tone controls.

The SUPERWEDE maintains many of the features incorporated in the Swede but offers players several important alternatives.

RRP £400 CHASE PRICE £195

RRP £460 CHASE PRICE £225

VIKING Semi-acoustic, 'slim body' guitar. Arched top and back. Body and neck made from carefully selected laminated birch. Polyester finish. Patented H-rood neck construction.

JIMMY Professional, semi-acoustic guitar designed by one of the world's finest custom guitar makers, James L. D'Amico, USA. The JIMMY is available in F-Hole and oval hole versions. Venetian cutaway design-body. Laminated birch arched top, arched back and matching sides.

Jacaranda fingerboard, with pealoid inlays. Scale length 24 1/2"-628mm. Two high quality Hagstrom humbucking pickups, 3-position tone switch.

RRP £ 500 CHASE PRICE £ 245

RRP £500 CHASE PRICE £ 245

GUITAR AMPLIFIERS acoustic

G20110

60 Watts RMS at 5% THD into 4 or 8 ohms.

1-12" Speaker in an open back cabinet.

1/2" Interlocked dado construction. FEATURES: Two input jacks, dual volume controls with LED indicators for lead and rhythm settings. Treble mid-range and bass control.

RRP £225 CHASE PRICE £ 145

G60112

(Solid State) 20 Watts RMS at 5% THD into 8 ohms. 1-10" Speaker in an open back cabinet.

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News & Events

Fender Copies

Fender musical instruments continue to clamp down on unauthorised copies of their Stratocaster, Telecaster and related guitars.

In late September U.S. Customs agents in the Port of San Francisco seized a consignment of Japanese copy guitars, which were not released until the distinctive Fender-style headstocks had been sawn off. This follows Fender's successful attempts to register their headstock design in the U.S.

Further measures to stop infringe-

ment of Fender trademarks are promised (threatened?) for the near future.

TSB Rock School

The third TSB Rock School Competition is underway, with the Finals being set for March 1983. Every secondary school in the country has been sent details, and entrants must submit a cassette tape of two or more songs, of which at least one must be an original composition.

Both the previous Finals have featured on BBC's 'Nationwide', the winners receiving prizes to a value of £2,000 together with £1,000 worth of Yamaha equipment for their school. Closing date for entries is 31st December 1982. For further details contact Tony Slaughter, Trustee Savings Banks. Tel. 01-588 9292 or Roger Davies, The Syston Publishing Company. Tel. 01-940 5668.

Pirate Freefone

Warner Home Video continue to operate their Freefone service for members of the public to report instances of illegal video cassette copies being made or retailed.

All information given is treated in confidence and need not relate only to Warner tapes. Dial the operator and ask for Freefone 2681 to get through to Warners London unit.

Streety Electronics

The prestigious manufacturer of the Mellotron/Novatron keyboard instruments are extending their field of operation and have now become agents for the Synergy synthesiser by arrangement with Syco Systems of London. The Synergy is a powerful digital keyboard which has the advantage of programming software from Crumar's state-of-the-art GDS computer synthesiser, as used by

Editorial

**RICK WAKEMAN
ULTRAVOX
PATRICK MORAZ
LANDSCAPE
JON LORD... Meet top
electro-musicians at the
Hands On Show!**



Now that the festive season is here again, we're pleased that we'll have the chance to meet many of our readers at the Hands On Show on December 4th & 5th at the Clive Hotel, Primrose Hill, London.

We've put together a special Christmas package for the show that should entice every electro-musician along!

For a start our Editor, Mike Beecher, will be doing Electro-Music lectures that will feature E&MM projects as well as introducing some of the latest instruments from major music companies - there'll be Roland's new computer system with MC-4 and Juno 60 amidst Amdek VDUs, Korg's Trident Mk II, Rhodes Chroma from CBS, Yamaha's CS-01 and CE-20, the Elka Synthex, Alpha Syntauri, latest Casio keyboards, and some specials from Syco Systems including the Emulator. The 1½ hour lectures will be at 10.30 a.m., 1 p.m., 3.30 p.m., 6 p.m. and 8.30 p.m. on both days.

Then we've invited several of E&MM's featured top musicians to appear at individual lectures over the two days: Rick Wakeman, Patrick Moraz, Warren Cann & Midge Ure of Ultravox, Richard Burgess & John Walters of Landscape, Jon Lord, Dave Bristow, Alan Townsend and Richard Elen. We're also hoping that Edgar Froese of Tangerine Dream and our special friend Kate Bush might pay us a visit. No doubt this will create a tremendous demand for the lectures - you can reserve your place and, if your copy of E&MM did not have a free ticket, you can obtain one from Turnkey, 8, East Barnet Road, New Barnet, Herts EN4 8RW. Tel. 01-440 9221.

It promises to be a great opportunity for musicians to get together in a friendly informal atmosphere - we'll see you there!

E&MM SAMPLER CASSETTES
We apologise for an error on last month's **Cassette Review** page; the correct price for **Sampler Cassette No. 1** is £2.45 including P&P (add 19p overseas).

Klaus Schulze and Tangerine Dream.

Further details are available from company directors Leslie or Norman Bradley, 338, Aldridge Road, Streety, Sutton Coldfield, West Midlands B74 2DT. Tel. 021-353 3171.

In Brief...

Peter John Vettesse of Jethro Tull will be demonstrating the new Rhodes Chroma polyphonic at local venues throughout November and December... **Syntauri Corporation** have announced new tape sync. and Linn/Oberheim/Roland drum machine interface facilities for their alphaSyntauri digital synthesiser... **Warren Cann** and **Hans Zimmer** have chosen January 11 for their London Planetarium concert. Promoted by Syco Systems of London, the concert will feature tracks heavily orchestrated on three Fairlight CMI's from Ultravox's 'Quartet' album and from the duo's recent release 'Helden'... **Tandy** have introduced their 1982/1983 catalogue heavily featuring hi-fi and CB equipment and electronic components... The **Frankfurt Music Fair** in February 1983 looks like being a big success despite the recession, with 700 exhibitors from 32 countries booked...

E&MM

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COMPACT disc DIGITAL AUDIO

Early next year we will witness the dawn of an exciting new era in audio production - the Compact Disc.

The disc is 120mm in diameter, plays up to 60 minutes of uninterrupted music, has a frequency range of 20Hz-20kHz, a dynamic range, signal to noise ratio and channel separation of greater than 90dB, total harmonic distortion of less than 0.005% and an unmeasurable amount of wow and flutter!

So how are these impressive specifications achieved? The answer - Digitally.

Digital Sound Reproduction

Sound is a variation of air pressure detectable by the ear. Until now, audio systems have worked on the analogue principle of converting air pressure variations into electrical voltage or current variations, processing them as necessary in the analogue state and then reproducing the sound waves through loudspeakers. This system, at its present state of development, works pretty well. But it is practically at its final performance limits. The waveforms can hardly be made more accurate, the levels of noise and interference can hardly be further reduced at reasonable cost, in analogue audio equipment. Still, it is not possible to reproduce the original sound both exactly and consistently. This is very largely because inescapable factors such as nonlinearities, noise, power supply and temperature variations affect the actual shape of

the analogue waveforms in the conversion processes.

With digitalisation, however, the road to substantial performance improvement is wide open. The audio waveform is sampled at high speed, and the value of each sample is measured, see Figure 2. Each value is then converted to a digital number, in binary code (in digital terms this is known as a word or symbol). The string of successive binary numbers is the exact digital equivalent of the audio waveform. As long as the numbers maintain their true values, the waveform is expressed with an accuracy that depends only on the sampling speed and the resolution of the binary number. The advantage of the binary code in this respect is that it has only two conditions, 0 and 1. These can easily be represented by electrical circuits being switched on and off. As long as the digital circuits can detect the difference between these widely different conditions,

the string of numbers will be perfectly preserved. Noise in the ordinary sense can be high, yet has no effect, see Figure 1. Each unit of binary code is known as a bit (binary digit).

Further advantages of a digital recording and reproduction system are extremely low distortion, both harmonic distortion and intermodulation, and elimination of wow and flutter.

The low distortion figures are achieved by the high accuracy of the applied analogue to digital and digital to analogue converters, whereas wow and flutter is eliminated by a Quartz crystal controlled operation.

Because the digital-coded signal consists of a sequence of finite numbers, rather than the continuous and infinitely varying analogue, it is easy to insert extra information or to manipulate the sequence to gain extra advantage, without affecting the main (sound) information at all.

In this way, as in many advanced digital systems, automatic error correction is introduced. This error correction compensates for quite substantial marks on the disc or even temporary lapses in the electronic circuits. So if there are flaws in the system, perfect results are still obtained, because lost information in the system will be automatically restored.

CD encoding

In the CD-system each measured sample of the audio waveform is represented in 16 bits. This offers an extremely high resolution. Each bit in fact, adds a theoretical 6 dB to the signal-to-noise ratio to produce a dynamic range much bigger than any previous system has been able to offer.

The audio frequency range that can be covered depends upon the sampling rate. This must be at least double the highest frequency that is to be preserved. At 44.1 kHz the Compact Disc covers easily the full audible range up to 20 kHz. Separation between stereo channels is practically infinite, since the 16 bit audio samples are derived independently for the left and the right channel. The resulting bits are combined ('time multiplexed') into one audio bit stream of $2 \times 16 \times 44.1 = 1.4112$ Mbit/s without any interference between the original audio samples.

The audio bit stream is not recorded directly on CD. First the extremely powerful CIRC (Cross Interleave Reed Solomon Code) is employed to enable correction of all signal drop-outs that may occur later on. Theoretically it will correct an error burst of up to about 4,000 bits, equivalent to a track length of up to about 2.5mm. Even beyond that, it will



Sony Compact Disc player.

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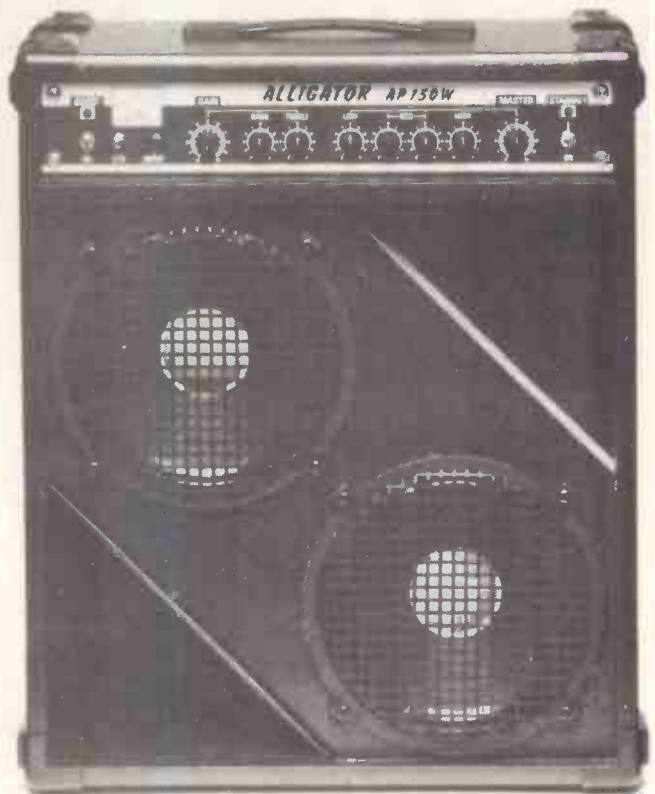
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COMPACT disc DIGITAL AUDIO

Continued from page 8

conceal, by interpolation, for an error burst up to about 12,300 bits, occupying a track length of up to about 7.7mm. This is a very important factor in the CD system, providing a wide margin of tolerance, not only for disc manufacturing, but also for scratches and marks that are practically inevitable with continued use.

Other information that is added to the audio bit stream is concerned with synchronisation and tracking search and find facilities (including random track selection) and can include special symbols for visual display of supporting information such as titles, composers, score or script.

Still, all this is only part of the CD encoding, which is also aimed at increasing the amount of information that can be stored while ensuring accurate timing and eliminating low frequency components, which could upset the operation of the player servo system.

To these ends a process known as EFM (Eight-to-Fourteen modulation) is applied and finally merging bits are added for a further increase of LF-suppression. After this a stream of so-called channel bits at 4.3218 Mbit/s is obtained that is actually recorded on CD.

To accommodate all the features and the processing mentioned, the channel bit stream consists of subsequent groups of bits called frames, each comprising 588 channel bits. Each frame is composed in the following way. Starting point is the stereo information of six audio sampling intervals, i.e. $2 \times 6 \times 16$ audio bits.

These are split in 24 audio symbols of 8 bits, to which 8 parity symbols of 8 bits are added for error correction according to CIRC. Next, one 8 bit control and display symbol is added to yield a total of thirty-three 8 bit symbols.

Each of these is converted to 14 channel bits by the EFM and extended with 3 more channel bits for merging. Finally, a synchronisation pattern of 27 channel bits (including 3 bits for merging) completes the frame.

In summary one frame contains: a synchronisation pattern of 24 + 3 channel bits; a control and display symbol of 14 + 3 channel bits; two blocks of 12 audio symbols: $2 \times 12 \times (14 + 3)$ channel bits; two blocks of 4 parity symbols: $2 \times 4 \times (14 + 3)$ channel bits = 588 bits.

Optical Read-Out

Apart from digitalisation Compact Disc Digital Audio introduces another very significant innovation - optical readout - using a laser beam. The system is shown in Figure 3.

In essence, a laser is a special light source, producing highly concentrated light. The word 'Laser', in fact, stands for Light Amplification by Stimulated Emission of Radiation, and because of the precise nature

of the beam, the laser principle has already found many applications in science and industry.

The Compact Disc laser is a small, low-power semi-conductor (aluminium gallium arsenide) unit, emitting invisible infra-red light. Its essential feature is a capacity for ultra-sharp focus, capable of reading a track with pits, only 0.5 μm wide, 0.1 μm deep, approx. 1 to 3 μm long at a track pitch of 1.6 μm . The beam focus point, in fact, is less than 1 μm in diameter (measured between the half-intensity points).

The laser beam is directed through the transparent side of the disc and on to the disc track by the optical system. This is carried on a servo-controlled arm, which tracks radially from the inside to the outside of the disc. To keep the constant linear velocity of 1.3 metres per second the rotation of the disc changes progressively from 500 to 200 rpm.

A second servo controls the position of the objective lens, to maintain ultra-sharp focus regardless of disc warp or any other unevenness in disc rotation.

The recording in the disc is a pattern of pits in a brightly reflective surface. When the beam falls on the flat surface, it is reflected back along the same path as it came. In this path is a semi-reflective prism. On its journey to the disc, 50% of the beam passes straight through the prism. On the way back, 25% is reflected away from the original path to be detected by an array of photodiodes. This is to prevent any light from the laser falling in the photodiode array directly and causing interference.

If, however, the beam falls into a pit on the disc, it is scattered. Very little light returns to the semi-reflective prism and the photodetector. The sequence of flats and pits on the recorded track, therefore, produces a sequence of 'on' and 'off' impulses in the photodetector, thus generating the data stream of channel bits in the player electronics. If the light spot falling on the disc moves off the correct track, the reflected beam is tilted; this causes a balance detector to generate an error correction signal for the tracking servo system.

Because the read-out is optical, the 'pick-up' causes no more wear to the recording than reading causes to the words printed on this page. In fact, the reflective track surface is covered with a transparent plastic seal, which affords permanent protection. Scratches, dust and dirt on the outer surface have little effect; the very high opening angle of the objective lens keeps these irregularities well out of focus, and only larger deviations are detected by the photodetector. Furthermore, the CIRC error correction system increases the capability to cope with severe optical distortion arising from dirt or damage.

The optical read-out system of Compact Disc Digital Audio ensures a read-out accuracy, from an extremely high-density digital recording, that no mechanical system could ever hope to attain.

CD Decoding

The signal picked up by the photodetector is a frame structured data stream containing a great deal of information in EFM (eight-to-fourteen modulation) format. The first stage of decoding is to establish clocking (timing), and to retrieve the 8-bit format from the EFM format.

For this purpose, the synchronisation pattern is separated from the control and display symbol and the (audio) data symbols.

Clocking will eliminate small timing errors (jitter) in the data stream, caused e.g. by disc speed variations.

The second stage of decoding is application of error correction and interpolation to the data symbols.

In the third stage, left and right channel data words are demultiplexed (split apart) and separately converted back to analogue to provide normal style stereo pre-amplifier input signals.

Meanwhile, the derived clocking signal is compared with a quartz crystal controlled oscillator reference frequency. Any discrepancy generates an immediate correction signal for the disc motor speed servo system. This servo system, together with the above-mentioned clocking operation of the data stream, makes wow and flutter completely inaudible.

It can be seen that before the signal is returned to its analogue state it is subjected to considerable processing in digital form. Digital processing is entirely a switching operation, with the necessary timing and synchronisation. For the Compact Disc player, with 588 channel bits per frame and a channel bit rate of well over four million bits per second, thousands of instantaneous switching circuits are needed. Only with the development in the last few years, of large scale integrated circuits (LSI's), has it become possible to produce such circuitry within the small dimensions and economics necessary to make Compact Disc Digital Audio a practical proposition.

Disc production

Like the conventional record, the disc is compression or injection moulded. It goes through the same stages of pre-mastering, mastering and replication, but the production process is different in many respects, because the final product is of a much higher technological level. Several of these steps even have to be performed under clean room conditions. Similar to those required for Integrated Circuit production.

Mastering

The audio recording and sub-coding, of course, must be encoded into the characteristic CD frame format, including synchronisation and error correction.

From an approved CD-Tape Master, the CD-Disc Master is produced by the disc mastering process. A glass disc, optically ground, polished and spotlessly clean is coated with about 0.1 μm photoresist evenly distributed by a spin-coating technique. This forms the Resist-Master Disc (comparable with a photographic film) for the recording process.

The encoded digital information is recorded (cut) on a CD-Disc Master Recording System. The high power recording laser, modulated by the signal from the CD-Tape Master, writes a pattern of pits in the photoresist. The exposed parts are etched away (developed) to generate the final pit structure. After a silvering process, the CD-Disc Master results, carrying the actual pit structure required in the finished discs.

At this stage, the CD-Disc Master can be transferred to the replication facilities (disc production plant).

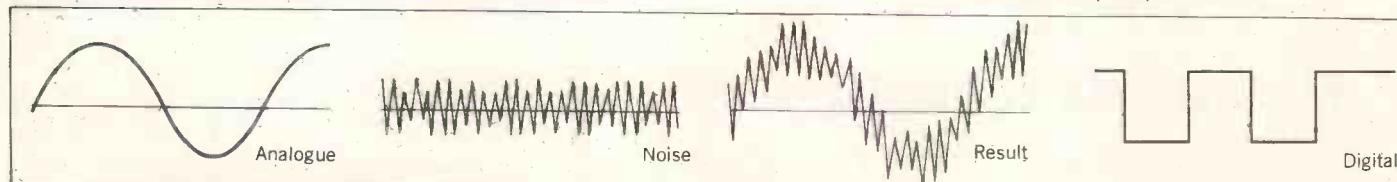


Figure 1. Noise behaviour in analogue and digital systems.

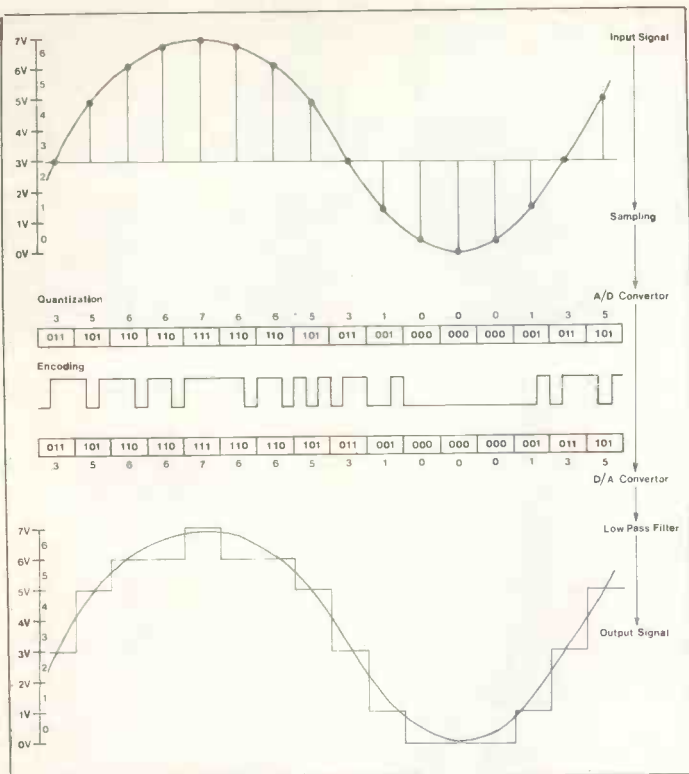


Figure 2. Pulse Code Modulation.

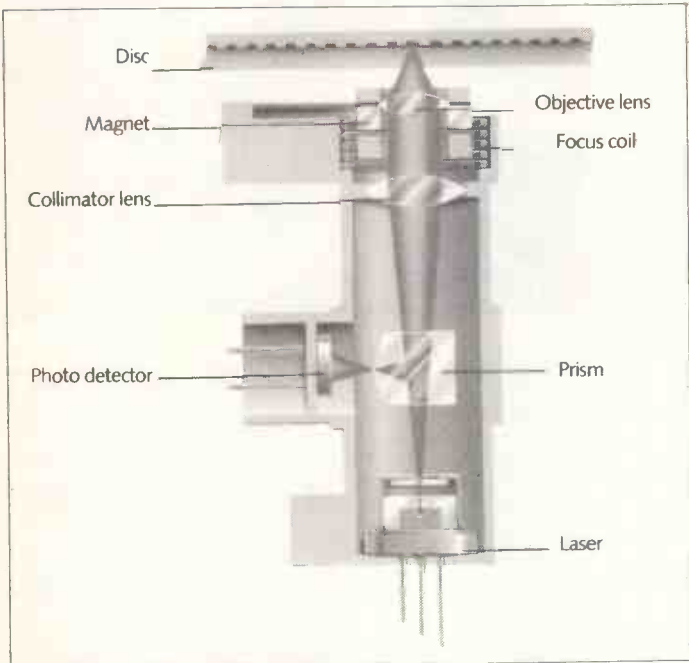
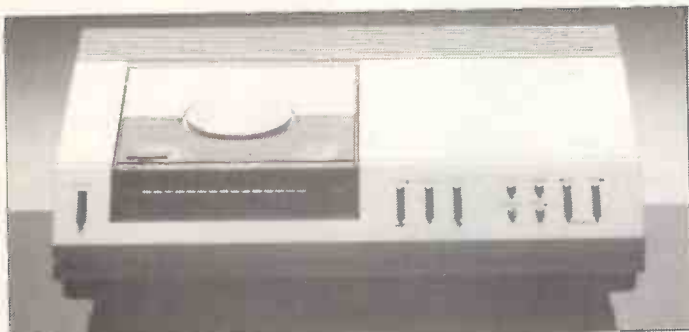
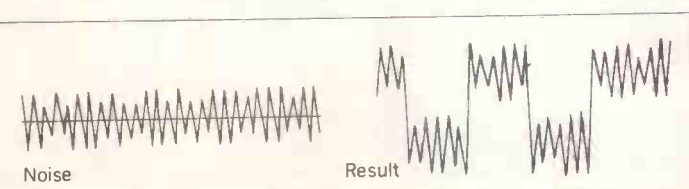


Figure 3. CD optical readout system.



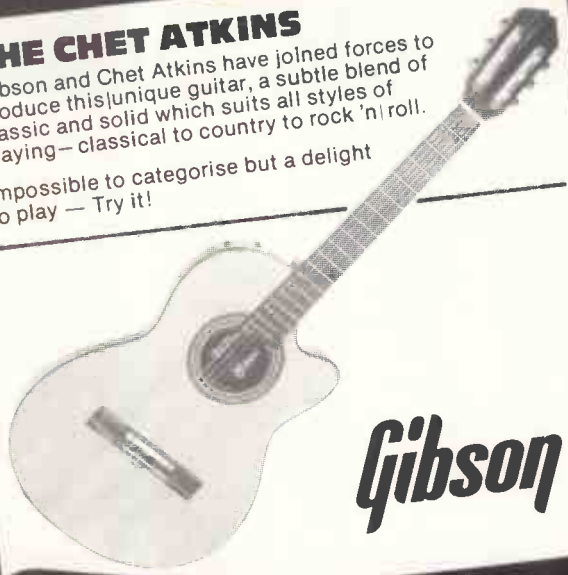
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ars electronica

82



Dr Hannes Leopoldseder organiser of the A.E.

ARS ELECTRONICA began on September 24, 1982 - that is, 6,308 days before the year 2000 - and lasted for a week as part of the International Bruckner Festival at Linz, Austria. The previous festivals took place in 1979 and 1980 when it was conceived as a forum for electronics and new technology in the different fields the arts, from electronic music to industry. The focus of the artistic elements - concerts, symposia, workshops and outdoor events - aims to be electronic music and in the past has involved such music people as Wendy Carlos, Robert Moog, Jean-Michel Jarre, and Klaus Schulze as well as larger organisations like the Massachusetts Institute of Technology.

Ars Electronica is now a biennial event organised by the Linz municipality (LIVA) and the Austrian Radio (ORF), under the direction of Dr Horst Stadlmayr and Dr Hannes Leopold-

seder. With the promise of performances that included Isao Tomita, Robert Schröder and a laser-opera 'Icarus', E&MM was keen to investigate the whole event.

The main events for 1982 were centred in and around the large Brucknerhaus concert hall on the outskirts of the industrial town of Linz, amongst the scenic views of the river Donau and Austrian mountains. Others took place at the ORF Studios in Linz itself. Not only does the festival include eight premières, but it also offers a 'Grand Prize' for the most ingenious and future-orientated new development in the field of electronic sound production. Previous winners have been Bruno Spoerri with the Lyricon wind synthesiser and Nyle Steiner playing his 'electronic trumpet' as well as notable entries from Jurgen Schmitz's Variophon, Wolfgang Palm's PPG Wave Computer and Peter Vogel's Fairlight CMI.



Ivan Tcherepnin.

The musical events were surrounded by other artistic programs - in particular, the Sky Art Conference '82 which linked its outdoor sky events to the laser-opera Icarus, the Linz Sound Cloud, Science Fiction workshops and a conference on Industrial Robots.

Although this year's event from the musician's point of view was sadly lacking in live music concerts, Ars Electronica did bring together a host of musicians from Europe, America and Japan. E&MM received a collaboration with many of the important composers, performers and electro-music engineers that was overwhelming and, to be honest, unexpected in these early days. As a result, we shall be publishing the discussions and interviews that took place in future issues, and will only very briefly survey the music and musicians of Ars Electronica in this issue.



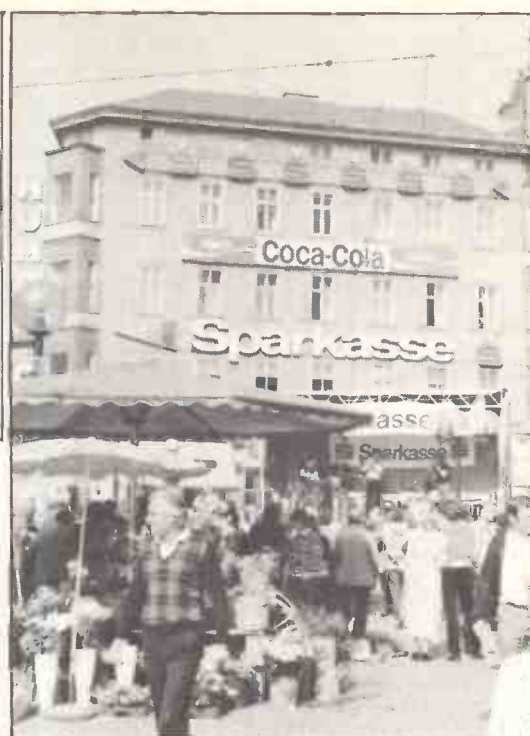
An unusual picture from Galaxy Cygnus



Michael Weisser.



Robert Schröder.



The Brucknerhaus by the River Donau.

ORF Studio.

The main street of Linz.



Isao Tomita and his engineer, Masafumi Hayashi, mixing the sounds for the Bermuda Triangle.



Bermuda Triangle visual by Ron Hays.



Icarus



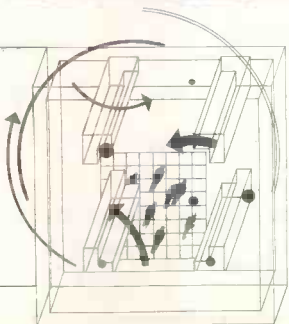
Ellen Lapham, President of Alpha Syntauri.



Bruno Spoerri.



Bernard Leitner.



Musical Events Linz Steel Opera by Giorgio Battistelli

This involved the participation of steel workers, musicians and factory machines in the Linz Town Square. Not an electronic production, but a composition with rather simple melodies and impressive but primitive rhythms made by machines and people using work tools. The sound-field was constantly modulated and experimental, yet controlled, and the mixture of noise, murmurs and real sounds was careful and sometimes surprising. Visually, the production was unimaginative considering its possibilities.

Icarus

Paul Earls, an American composer, conceived and wrote the music for this so-called laser-opera which was an indoor production in the Brucknerhaus concert hall. Its laser projections by Paul Earls and Otto Piene and '2001' style projections by Ron Hays were used to give the feeling of outdoor space - the sky and the sun.

The programme comments called the music eclectic, with electronic processing of voices to jazz and folk music, non-pitched electronic music, the use of analogue and digital synths etc. Although the conductor, Richard Pitman, co-ordinated well the children's choir and whistles, the brass ensemble with percussion, stereo taped electronic music and Margaret Ulmer's Alpha Syntauri and grand piano playing, the use of complex technology effects and the huge Minotaur and Icarus red inflated figures was entertaining but not exciting. The use of the laser was too limited and unfortunately all the electronic music was on tape - as Paul Earls said himself, "It's a collection of computer and synthesised pieces of music over some ten years." The Alpha Syntauri merely provided organ style fill-ins and would have been better omitted. The one act piece had a few interesting moments with fine singing from soloists and choir as well as orchestral and percussive flourishes, but the piece ended abruptly with hardly any sense of climax.

Sound Square

Some thirty people at a time can sit in the centre of Mr Leitner's Sound Square, surrounded totally by tall screens concealing 16 loudspeakers a few feet off the floor - including 4 corner 'towers' that hold suspended speakers at top and bottom to complete the 3-dimensional sound stage.

The sounds were controlled by a computer system with interaction by the composer producing panned sounds in vertical, diagonal and horizontal planes. Lighting was subdued to focus concentration on the sounds, which included Fairlight CMI sampled cellos, wooden, percussive, thunder, pitched, click tones and other musique concrète. The effect was certainly interesting and since the sound output was quite low, the audience's breathing, coughs and shuffles all contributed to fine tune one's aural perception.

Galaxy Cygnus - A

The work was conceived by Michael Weisser for performance at the ORF Studio using his own slide pictures with a musical interpretation by Robert Schröder. Using its starting point as white noise from the constellation Cygnus, 1050 million light years away, the music then proceeded to be sequencer-based patterns that did more than hint at Schulze's influence. Once again, many who attended were disappointed to find themselves at a slide show with only taped music, and after a poorly synchronised start, the slides portrayed images of fine quality but were too much related to earth considering the subject.

Bermuda Triangle

Despite the fact that Isao Tomita did no more than control tape levels, this master of synthesised classical music managed to create an impressive aural soundscape that enveloped the audience using its 'pyramid' sound system. The latter consisted of five PA stacks positioned at the four corners of the auditorium ground floor with a fifth speaker placed near the ceiling to portray overhead UFOs and other sounds. The music played was based on Tomita's *Bermuda Triangle* LP plus some new music for

the occasion. High levels of orchestral sound, combined with the fast moving space/computer image projections by Ron Hays made an exciting 'supercinema' event, that was best enjoyed in the centre of the auditorium.

Erdenklang

This was the only live electronic performance besides the 'Musical Electronics For Everybody' workshops in the Brucknerhaus' corridors, and was the first event with real atmosphere that brought tumultuous applause. The work was conceived by Hubert Bognermayr and Harald Zschradler as an attempt to fuse together visual and acoustical experiences of our environment. In our forthcoming interview with Herr Bognermayr, we'll be discussing his pioneering use of the Fairlight CMI in which he has sampled over 4000 acoustic sounds for use in compositions. This performance was visually realised through dancers on stage. The musicians were five music synthesiser/computers, including 3 Fairlight CMIs performed by Bruno Spoerri, Robert Moog, Serge Blenner and S. W. Gyan Nishabda. The computer/conductors were Herr Bognermayr and Herr Zschradler. Exciting solos came from Bruno Spoerri playing the Lyricon and Robert Moog using his exotic synthesiser controllers.

Linz Sound Cloud

In spite of 50,000 watts, only 30,000 visitors attended this open air performance by the River Donau. It was the fourth Sound Cloud, so the novelty of the event had probably worn off. The performance was Mahler's Symphony No. 5 played by the Vienna Philharmonic Orchestra.

The Grand Prize of 1982 was won by Ivan Tcherepnin and we'll be

looking at his use of the Persian Dulcimer with electronics along with the runners up next month. We'll also have a look at some of the original synthesiser inventions by members of the Information Circle of Musical Electronics (IME).

In summing up this brief appraisal of the musical side of Ars Electronica, I think it is fair to say that most musicians would have liked to see much more live music. A truly international event should also encourage musicians from many countries to attend as performers and listeners, whilst the workshops should be organised to promote audience discussion and participation. Even the well publicised (as all the artists certainly were in the comprehensive colour brochure of A.E.) Joe Zawinul and Wolf Dauner were absent for their jazz and electronic workshops (some say not even informed!). Yet the fact that this event can exist on such a potentially grand scale should encourage the A.E. organisers to strive to bring together music and the other arts to its rightful level of importance alongside the technological achievements of today. And as Hubert Bognermayr, founder organiser of the A.E. programme, says: "Electro-music represents a logical centrepiece with its link to the new electronic and computer developments as well as the visual arts."

E&MM

E&MM wishes to thank the organisers of Ars Electronica and the many musicians from different countries who showed their interest in the magazine by their generous help; in particular: Hannes Leopoldsdeder, Isao Tomita, Hubert Bognermayr, Bruno Spoerri, Robert Moog, Paul Earls, Ellen Lapham, Robert Schroder, Michael Weisser, Markus Aigner, and the press office team.



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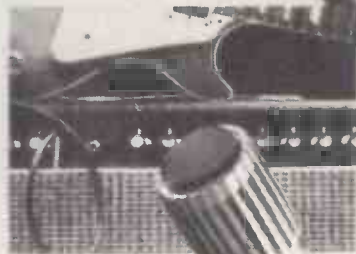
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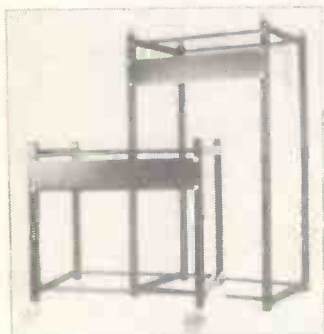
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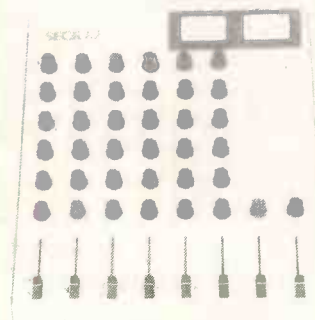
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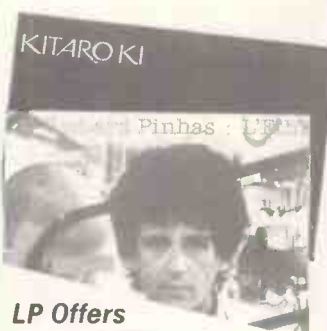
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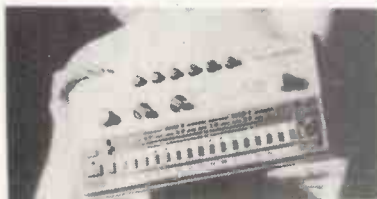
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Tokai Basses

Tokai's factory in Hamamatsu, just down the road from that of Yamaha, has been turning out some fine guitars just lately, and if you're interested in electric stringed instruments it's unlikely that the name Tokai will have escaped your attention.

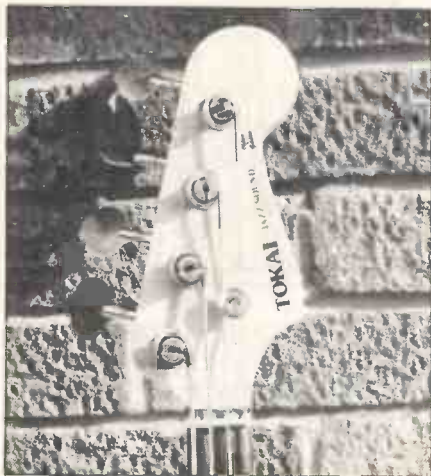
Perhaps one reason you'll have come across the name is that quite a few successful bassists and guitarists are using Tokais as stand-ins for their treasured American guitars. You can understand a musician being wary of taking that lovely '55 Strat out on the road where it will be subjected to the rigours of roadies, airlines and trucking companies, not to mention the rather more delicate but equally deadly fingers of the guitar thief.

Two players off the top of my head (a painless exercise, I assure you) whom I've recently met and are practising the Tokai stand-in routine are Jerry Harrison (Talking Heads) and Ron Wood (Stones). Sensible chaps, really - and it does indicate that Tokai must be getting close to the originals.

Here we reach the other area of excitement surrounding Tokai - they are rather good at (and we have to be oh so careful with the terminology here, it seems) *emulating*, shall we say, the looks and sounds of these aforementioned American guitars. There we'll have to leave this fascinating topic for now, as a court hearing is set for October 1983 concerning all the ins and outs of just when a copy is not a copy.

Confused? You won't be when I tell you that the two bass guitars from Tokai that we're looking at this month are closely modelled on the Fender Jazz Bass - and what bass guitar maker is there in the world, and primarily in Tokai's homeland, who has not drawn massive inspiration from Fender's bass guitars? Whether it be the Precision, which first saw the end of a jack lead in 1951, or the Jazz Bass, unleashed in 1960, Fender, as the inventor of the damned thing, has naturally enough provided the pattern that most designers follow.

We've actually got two rather different models from Tokai's JB series to meddle with, and it would seem as well to start with the more straightforward of the two.



Tokai headstock.



The JB45

This is the JB45, although the headstock informs a little more with the news that this is part of the 'Jazz Sound Electric Bass' series, while what seems like a pointed afterthought next to it reads: 'Oldies But Goldies'. What is old about it is, as we've discussed, the inspiration of the design. Brand spanking new, however, is this bass guitar, and the finish on the body of this particular sample is a blinding metallic red which is, I suppose, quite attractive, although rather flashy for my taste. I like bold primaries, but you may love this Tokai.

This finish hides a body made from 'castor arabia'. This is evidently wood, and not accidental sugar. Just what kind of wood I don't know. Certainly the bass is not light in weight, so Tokai haven't just come up with an obscure name for balsa wood. More likely, this arabian stuff is probably from a family of hardwoods similar to that used for guitar bodies anyway - ash, alder, and so on.

The neck is of a comfortable cross-section, and looks as if it's maple. Back down on the body the finish is contrasted by a white plastic scratchplate, and further down sits a chrome plate on which is situated the three control knobs. All these design constituents will be familiar to anyone who's seen a Jazz Bass (that presumably includes you all), and indeed the controls on the JB45 work in the traditional Jazz Bass manner: the front two, slightly larger black plastic 'radio' knobs with a white line marker on top, control the individual volume of the two pickups, while the rear knob, a slightly smaller and higher-mounted version of the volumes, controls overall tone.

To me, the stark white of the scratchplate and the harsh chromes of the bridge and control plate look a bit cheap compared to the rest of the bass, but this is only a personal quibble. The two pickups are apparently 'JB Super' types - two polepiece per string Jazz-like 'Strip' pickups, you'll be surprised to hear. The sound is good and full from these, and the controls enable you to wrest a reasonable racket from the thing: the tone control isn't spectacularly effective, but then we can't all be active, can we? It does its job.

The bridge on the JB45 is not large, and while its overall mass would not make you inclined to describe it as 'chunky', it didn't actually pose any problems while on review. It gives the sort of adjustments you'd expect from a bass like this: four individual saddles, each adjustable at either side for saddle (i.e. action) height, and a cross-head bolt passing through from the back of the bridge for intonation setting. The saddles themselves are ridged, which allows for more stable minor adjustments to string spacing - which of course is fairly generous on Jazz Bass-type instruments of this sort.

The truss rod adjuster is of the cross-head-at-body-end type, and wasn't tested. Playing the thing is fine. As I've said, the neck is agreeably narrow, although the strongly tapered line of the neck (down to about 1 1/2 in at the nut) may unsettle you initially if you're more used to Precision-type necks. You'll soon get over it.

The fingerboard itself looked like rosewood, and with the action set as supplied the

only noticeable buzz was at the Ab on the A-string. Machines are standard-looking models all of which worked accurately and reliably while on test. One slightly unusual item up at the headstock was what I can only assume is a strap-button, on the back of the head, roughly between and below the E and A machine heads. You can affix a strap here if you want, though it'll have to be longer than average. I prefer to use the usual button on the top horn, and with that hooked up it felt well balanced once on.

The JB85FL

The other Tokai for review this month is the JB85FL, a slightly better-looking version than the 45, and using more expensive materials here and there. But it's essentially much the same in looks and feel. This one is a fretless version, hence the FL suffix (it does not, of course, stand for Fender's Lament).

The Tokai's neck is maple, again with that good old narrow cross-section similar to that of the 45. The fretless fingerboard is rosewood, and has fret markings applied as reasonably neat inlays, slightly darker in colour than the dot inlays nearby.

The hardware is very similar to that of the 45 in physical make-up and arrangement, although there is of course no scratch-plate (to show off the sunburst), and the colour of the metal plating used for the control plate, knobs and bridge is of a rather less offensively cheap-looking chrome than its (admittedly) cheaper compatriot. Also, the pickups are apparently 'JB Vintage' types, and the machines are more allied to Kluson's design and are actually reverse-gear mechanisms.

I must say I found this really annoying, and kept sharpening when I wanted to flatten, and vice versa. I realise this is down to being so used to normal types where you



Jazz Bass controls.

turn the machines away from you to tighten the string and towards you to loosen. Doesn't this seem logical? Anyway, the 85 most definitely has reverse-gear machines, so owners will just have to get used to them. They still do their job well, of course, it's just a matter of being confronted with a change in something you rarely actually think about. Nonetheless, one is still forced to ask; why reverse-gears?

The control knobs are domed metal types, and while these add to the good looks of the 85, they don't actually have any marker, save the rather invisible grub screw holding the knob to the shaft (a painless exercise, I assure you). The bass plays very smoothly and warmly, with all the curious inflections of the fretless type, and indeed the Jazz-type control set-up does seem to suit the fretless sound very much. The 'Vintage' pickups sound like they chuck out a little more treble than their counterparts on the 45.

Conclusions

A slightly tricky area occurs when we try

GUITAR REVIEW



to talk prices - a fundamental requirement, I'm sure you'll agree. Eric Dixon from Tokai's UK distributor, Blue Suede Music of Lancaster, tells me that the JB45 'will not be advertised at less than £195', and that the JB85FL will not appear in ads for under £295. But he encourages you to haggle with your friendly local Tokai dealer, and suggests that you may well be able to pick them up cheaper than these advertised prices. It's up to you, it seems.

Assuming that you're keen on the Jazz-type style of bass in the first place, I reckon the JB45 would be a good choice in that it's electronically sound and, I would guess from the review period, constructionally sound, too. On an aesthetic note, you'll want to check out the colour options (Mr Dixon says they'll come in almost any colour you want).

The JB85FL is a pleasing fretless with character, and if you can stand a little haggling you could well land yourself a bargain.

Tony Bacon

E&MM

Tokai Basses are distributed in the UK by Blue Suede Music, 19, Thornfield, Ashton Road, Lancaster. Tel. 0524 36227.

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VIDEO TECH Thomas Dolby at TVS

The first article in a new series on the ever-expanding field of video looks at how the professionals relate the performance of live music to the video medium.

Modern musicians are increasingly finding that musical skill alone is not enough. Effective visual presentation, and a performance style angled toward the video medium, are now indispensable (for commercial if not for artistic

reasons) in putting across a musical message. There are those who argue that good videos are often being used to bolster up bad music, but at its best the interaction between music and vision can be exciting and genuinely creative.

An ideal example of such an interaction took place at the studios of TV South in Gillingham in October. The last episode of the concert series 'Off the Record' featured a new band led by synthesist Thomas Dolby, and an appraisal of the ways in which live electronic music performance could be captured in a modern TV studio seemed an obvious starting point for this series.

Group work is something of a novelty for Dolby. (See Fact File E&MM Jan '82). Although he's been a successful session musician with Foreigner and Joan Armatrading, and played with Bruce Wooley and the Camera Club and Lene Lovich, he's remained very much his own man. On his first tour earlier this year he was accompanied only by a few keyboards, a computer, a selection of slide projectors and screens and a video machine. He retains control of his own record label, Venice in Peril, which donates funds towards the sinking Italian city.

The first VIP single, 'Europa and the Pirate Twins', entered the UK Top 50 and created widespread interest, partly because of the advanced computer sequencer techniques used. The other major factor was, of course, that it was catchy — not danceable, perhaps, but catchy. Nitrate Films helped Thomas produce a promotional video for 'Europa' and the follow-up single 'Airwaves', and his one-man stage show was premiered in Madrid and Barcelona last January.

During this time Thomas was working on an album, which was finally released as 'The Golden Age of Wireless' in May this year. In addition to the first two singles it also included 'Radio Silence' and 'Windpower', the latter having gained some exposure from a slightly bizarre appearance on the David Essex TV Show.

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With Science', Thomas has assembled a band consisting of Matthew Seligman (ex of The Thompson Twins) and Keith Armstrong (ex of Spizz), who between them take over the guitar, vocoder and some keyboard parts. Additionally on the single Dr. Magnus Pyke can be heard, and for live appearances there's an onstage mixing engineer.

On the stage of the TV South studio, the equipment was set up in a rough horseshoe containing all the musicians, with the mixing engineer facing the background of projection screens. Stage left, a Moog Source, which was used for bass lines or to drive a rack-mounted vocoder from the player's headset mike, and a Micromoog. Centre stage, a Simmons 7-pad suitcase kit played by hand, the PPG 340/380 computer and terminal, and Dolby's Jupiter 8. Stage Right, the Jupiter 4, Solina string ensemble, and at the rear of the stage a Roland Compurhythm, mixing desk and tape machine. Behind the stage, three projection screens matched with carousel slide projectors mounted at the front of the stage.

The PA system consisted of a large selection of cabinets with an emphasis on bass reflex ports, the necessity for which became obvious later as the highly rhythmic content of the music was revealed.

So far, a fairly conventional concert arrangement, and to the credit of TVS the television equipment was unobtrusive. The major unavoidable factor was the sea of lighting on a matrix of braces and supports across the ceiling, an area of perhaps 10,000 square feet.

TV lighting remains a rather specialised development from theatre lighting, although its application to rock concerts where light levels are conventionally low and rapid colour changes are common is an art in itself. Basic technique is the use of spots and fills, powerful tungsten lights for emphasising

the major features of the desired pictures, and softer fluorescent lamps to equalise the sharp edges and soften shadows.

In this case the 'decorative' lighting was in the form of a 6 x 4 bank of spots, each fronted by a differently coloured 'gel' sheet, on each side of the stage. The projector screens tended to become rather washed out by the other lighting, and the overall levels were obviously a little higher than would be usual at a straightforward concert. The amount of light needed by a video camera and particularly by the cheaper Vidicon tube typically found in home camera systems can be very high, if a reasonable colour balance is required.

The audience was 'warmed up' by one of the two stage managers, who in addition to rehearsing a few 'cheers, enthusiastic cheers and hysterical cheers' pointed out a few basic TV studio laws. No smoking — learn where the fire exits are — and no stiletto heels on the studio floor. A simple black mark on the perfectly smooth floor can stand out like a sore thumb in any TV production.

In addition there are a few other points of TV etiquette to be learned. Don't crowd forward to the edge of the stage, the cameras and still photographers need room to move. Don't look at the cameras, look at the stage, and above all, don't touch anything. The audience seemed to have most of this off by heart from previous recording sessions, and so with a minimum of tuning up the band launched into 'Radio Silence'.

About 150 members of the audience chose to stand on the studio floor, while those seated towards the back of the studio had the benefit of two overhead colour TV monitors attached to slings suspended from the ceiling, and four 5 x 8 monitor speaker columns which, however, didn't appear to be necessary on this occasion. The TV monitors

were useful in that they showed the TX (transmitted or videotaped) picture including all visual effects, and the first interesting point of note was that by carefully framing the picture, an audience of 150 can be made to seem several times larger!

The hour-long performance will be cut down to 30 minutes for showing on TVS on Monday, December 20th. Watching the monitors, it was often clear which songs would have to be cut because of a wipe to a blank projector screen, a late cut or a few flat notes from stage. But the whole wonder of video recording is in its potential selectiveness, its ability to use creative editing and effects to form a fluid, professional-looking product which can stand on its own or help to express a musical message.

Next month we'll be describing the live recording of the show, the problems involved and the technical organisation necessary.

Mark Jenkins

E&MM



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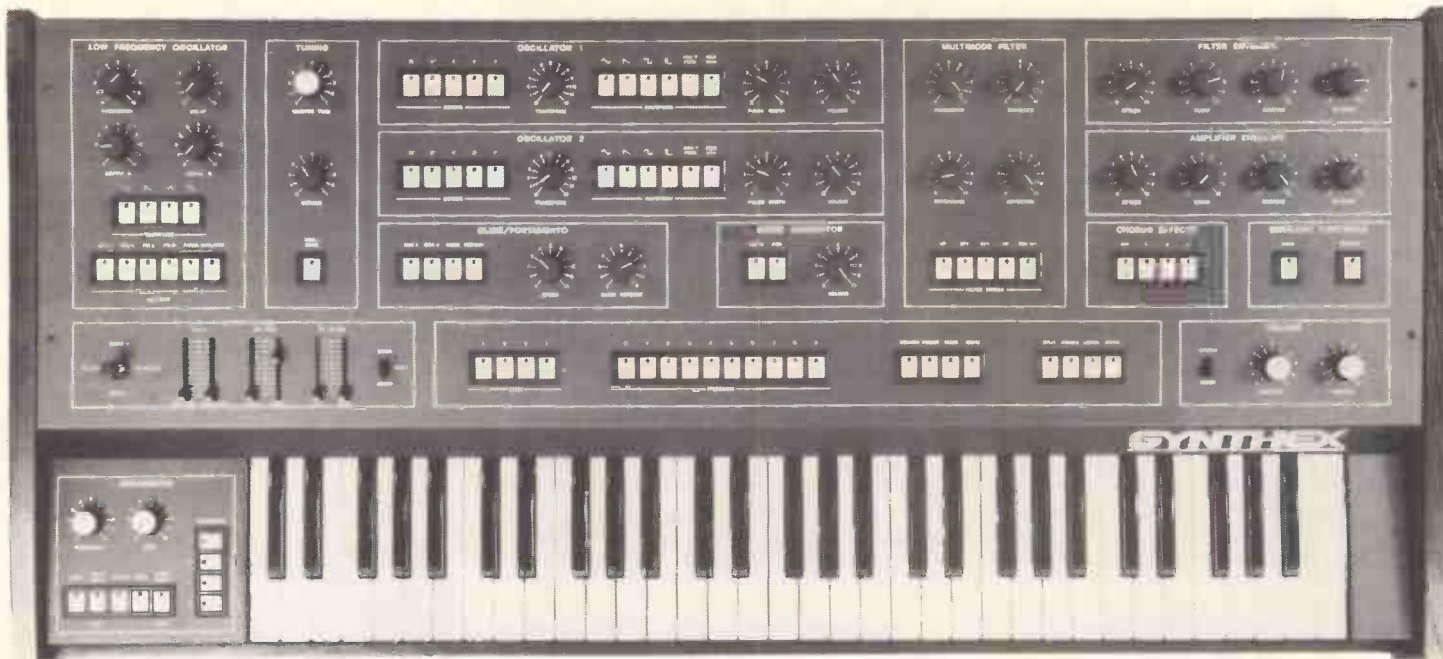
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Elka Synthex



The Synthex was first introduced to the music public in prototype form at the Frankfurt Musik Messe in 1981. It represented a radical departure for the well established Elka-Orla company in Italy, who are well known for their large range of home and portable organs, rotary speakers, amplifiers, string and preset instruments and drum machines.

The design of the Synthex was initiated as a complex synthesiser rather than a development of an Elka organ and was done by a local engineer who now works full time with the Elka research team at their Italian factory. At its launch it generated a lot of excitement, utilising the best of the TTL/CMOS circuit designs available. Nevertheless, its venture was such an important one for Elka that they were anxious to get their first polyphonic synth full of the features that would benefit musicians. More research and development resulted in the substantially improved instrument appearing at Frankfurt in 1982, with additions that included the sequencer.

There is no doubt that the features and quality of the Synthex as a true polyphonic synthesiser put this Elka product well in the running alongside current, higher-priced

instruments.

The Synthex is an 8-voice digital polyphonic synthesiser - that means it has 8 complete synth 'voice' circuits available, each with 2 oscillators, noise generator selection, multimode filter, filter EG and amplifier EG for individual triggering from each note played in one of 3 different modes. Extensive LFO, joystick, ring modulation, glide/portamento, detuning and transposition effects are available as well as different chorus options. The whole instrument is entirely programmable and will store 40 of your own programmed sounds as well as 40 factory-made presets. At any time a program can be updated and reprogrammed. The instrument has a 2-channel output with footswitch options and standard mono cassette interfacing for storage of your programs.

In addition it features a versatile 4-track sequencer capable of recording four monophonic lines that can be looped, edited, transposed, synchronised with external instruments such as drum machines, and allocated to a portion of the keyboard so you can play along with the sequence in real-time. The sequence can then be dumped on to cassette tape through the interface.

Construction

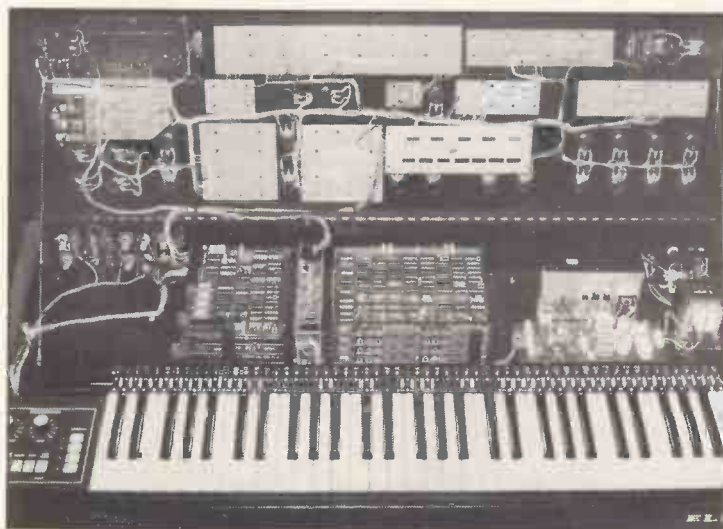
The instrument is supplied with a strong chrome stand that allows you to set your playing angle, as well as a flight case for transportation. The control panel areas are built on a black metal chassis that fits into a dark wooden case measuring 20x43x6 (W,L,H) inches, and weighing approx. 90lbs.

The whole layout of the controls is logically presented, with left to right placement of synthesis sections across the upper main panels as you'd expect: LFO, Tuning, Oscillator 1 & 2, Glide/Portamento, Noise, Filter, EGs and Envelope Control, and chorus effects.

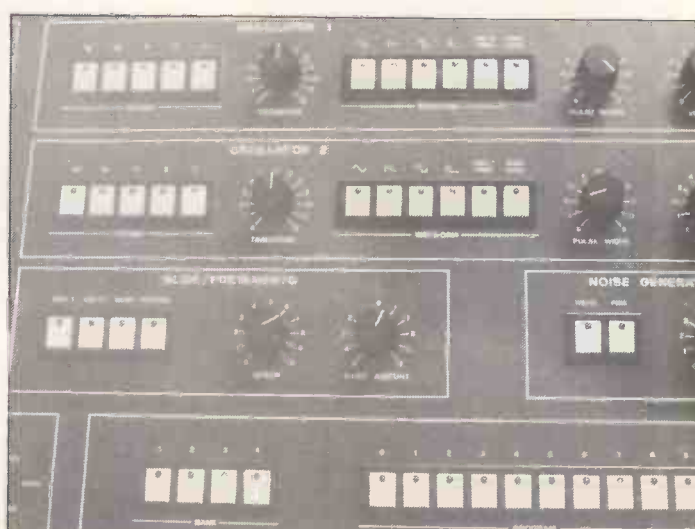
Directly above the 61 note C to C keyboard are the joystick, program selection buttons and volume controls. To the left of the keyboard is the sequencer section and although it's more usual to find performance controllers here, it does make you want to 'play' it in performance.

Access to the internal circuitry is made by removing 4 screws and lifting the hinged front panel. Actual construction and wiring is extremely creditable as the photographs show.

The analogue style digital controls have



Synthex opened up.



Part of the main panel.

their individual circuit boards mounted directly behind the panel, whilst the main processor, EPROM (2516) storage of factory presets, and logic control boards are mounted in the instrument base to the left of the 4 voice cards containing dual synth voices. Incidentally, these each consist of no less than 109 TTL/CMOS ICs! With this high chip count, the designers have wisely incorporated a fan in the base right hand corner next to the power supply.

The whole system runs extremely quietly (including the fan), with presumably straight interchanging of most boards for quick servicing being essential since the ICs are mainly direct-soldered onto PCBs.

Playing Modes

Since the synthesiser is a programmable preset polyphonic, it is provided with a control panel that always gives visually an indication of what's going on. Then at any time you can instantly modify any control by simply adjusting it. All the white selection buttons have built-in red LEDs to show their selection for a particular sound - whether factory preset, your program memory preset or panel. The 26 black rotary controls are also programmable and Tuning, Volume, Balance and Sequencer rotary pots are white to indicate non-program types.

Once the instrument is connected (to a stereo system for best effect) via 'Upper' and 'Lower' jack sockets and switched on at the rear, playing can immediately commence by selecting Preset, Bank and Program buttons to give one of the 40 factory preset sounds.

Three playing modes are available: Normal, Split and Double. The default mode is always Normal, which puts the last chosen sound over the entire keyboard. Playing in stereo is enhanced by notes being allocated to left and right (i.e. upper and lower outputs) in apparent random fashion as you play.

Pressing the Split button along with your chosen split-point note on the keyboard puts different sounds at lower and upper ends. The upper sound selected is shown by the display LEDs (including an Upper button) and can be further modified via the panel or completely reprogrammed by choosing a new user memory or preset sound. Similarly, depressing the Lower button shows the setting for the lower part of the keyboard which can then be further edited also.

The third mode is Double and puts lower/upper presets on each note played (but of course, reduces the number of notes available to four). That offers the possibility of big sounds using four oscillators per note and complex synthesising from two presets combining together.

In the volume section there's Balance (between upper and lower presets), Output

Volume and a Stereo/Mono switch to complete the basic setting up.

Memorising a Sound

The programming section contains four groups of switch buttons: Banks 1-4, Programs, 0-9, Memory/Preset/Panel/Write buttons and Split/Double/Upper/Lower buttons.

A combination of Bank and Program buttons allows you to select either 40 factory presets or 40 of your own 'Memory' presets. A sound can be put into a memory allocation by simply choosing Preset or Panel, and then pressing down Memory and Write buttons, whose LEDs flash 4 times to indicate it's entered.

You can't swop directly, say Preset 4 Bank 1 with Preset 3 Bank 2, but you can take Preset 1 Bank 1 and put it into Memory 1 Bank 1. If you do need to use a sound in a different location, you can take a preset program and copy it on the panel (by following LED settings and trimming pots) and enter that instead.

Writing in the sounds is therefore straightforward and a 'Write Enable' switch at the rear protects your memories during performances. A useful footswitch function is 'Program Advance' which steps round the 0-9 program buttons, making quick changes of performance easy (once you've selected the right Bank).

Synth controls

In the tuning section, a Master Tune control gives ± 1 tone adjustment to other instruments. Programmed controls are Detune ± 1 semitone and Oscillator 2 Sync button, which locks the pitch of Osc. 2 to Osc. 1.

Two comprehensive oscillators are provided with virtually the same controls. Five octave switches select 16,8,4,2,1 pitch footages and there's a Transpose switch for each that gives rotary switching 0-12 semitones (up to 1 octave).

The six waveforms available are triangle, sawtooth, square, pulse, Osc. 2 (or 1) pulse width modulation and ring modulation. A pulse width control sets pulse shape between 0 and 100% (in other words you'll lose it at both ends). The Oscillator Modulation button simply utilises the other oscillator as its modulation source (the only difference between the oscillators). The effect is more related to the buzzing you get from fast LFO modulation of pitch. The digital Ring Modulator also relies on the use of both oscillators as inputs to produce sum and difference frequencies. The advantage overall of both these settings is that they enable complex ringing sounds of the bells, cymbals, gongs variety - especially coupled with the use of the two Transpose switches for

creating musically precise timbres. In fact, the Transpose switches make good performance controls in themselves for instant 5 1/3, 2 2/3 and other mixture settings.

Volume control for each oscillator is also provided so that your sound programs can all be set at the right level. A Glide/Portamento section offers these pitch effects for either or both Osc. 1 and 2. Portamento gives fastest slide effect at '0' (but not off) and 5 seconds slide at maximum speed setting. The effect always occurs at the rate set independent of position. An interesting Glide effect can be made some 32 semitones up or down to the notes(s) played, although the bottom note of the keyboard is its lowest note available. White and Pink noise can also be chosen in the noise generator section plus volume adjustment.

Multimode Filter. This particular section offers more filter control than you'll find on most synths, with 24dB/Oct Low Pass (standard filter for sharp, dramatic synth tone changes), 6 dB/Oct Band Pass (for gentle selective filtering), 12 dB/Oct Band Pass (for fat brassy sounds), and 12 dB/Oct High Pass (for thin, stringy, ethereal effects).

The normal Frequency Cutoff, Resonance, Keyboard Filter Follow (0-100%) and filter Envelope Depth controls are given, with Resonance going smoothly into oscillation at its halfway point. This produces good definition of harmonics (as you'll hear on Demo Cassette No. 8). There's also inversion of the envelope which is always interesting to use when you can add a positive envelope with it (as in Double mode).

Separate Filter and Amplifier envelopes have Attack, Decay, Sustain and Release controls with maximum times of Attack at 8 seconds and Decay/Release at 30 seconds. Two extra Envelope Controls put the VCA into Hold (continuously on) and select Release, the latter making quick changes to 'organ' style keying possible.

In keeping with other polysynths, chorus circuitry can be added at the end of the signal chain, with 3 types of effect available. These give varying degrees of chorus by inserting one to three free-phase BBDs in parallel - ideal for rich orchestral ensembles or more bizarre effects. One unusual occur-



Sequencer section.



LFO and Tuning sections.



Rear connections.

Elka Synthex Synthesiser

rence was that during switching of the Chorus buttons, the sounds playing during release of a note switched off abruptly.

Modulation

The LFO section is another special for the Synthex, quite separate from Joystick modulation which employs its own separate LFO. There are four waveforms to choose: Triangle, Sawtooth, Inverted Sawtooth and Square. Besides a Frequency Control (from a fast 30 cycles or so to slow 1 cycle every 12 secs), there's routing paths with individual depth adjustment for Osc. 1/Osc. 2, Pulse Width 1 & 2 and Filter/Amp modulations (this with delayed switch-on up to 10 secs).

Joystick. It's quite a luxury even today to have an extra LFO, so this performance controller offers 4-way modulation effects of Bend up and down, Oscillator and Filter. Both Oscillator and Filter have modulation controls for Bend and LFO on Upper, Lower or both sound programs in use. The frequency of this LFO 2 is set by two sliders that together give a wide range of Initial and Delta modulation effects. Pitchbend is ± 5 th interval and slight glitching was noticeable on upward bend towards its maximum position.

Sequencer

The advantages of the sequencer should be obvious to most synth players and in-built systems are equally attractive provided they're easy to use in performance. This sequencer is able to record and playback at variable speed (set by the Frequency control or an external clock 'Sync In') up to four monophonic tracks. Recording of each track can be either in realtime with automatic error correction (i.e. tidying up of extra sequences to the first sequence), or step by step up to 128 notes per track.

Since no manual is available in English to date, here's how the sequencer functions. Two groups of buttons, some with multi-functions, operate the Sequencer. The first has Write, Beats/Rests/Split, Delete, Loop, Stop/Ready/Reset, with the second selecting the four tracks. There's also a Gate control that adjusts the size of the pulse in step mode to enable staccato/legato playback.

Writing a Sequence. For Realtime mode: Press Write, Sequence 1,2,3 or 4, then press Ready. Set Frequency to centre position or

higher (otherwise it won't catch fast notes). Press Play and the sequence starts from the first key played. The sequence LED flashes at the frequency selected, and goes out when you press Stop, or it's run out of memory, or you've added Loop to keep it repeating.

For Step Mode: Press Write, Sequence number, then play note required followed by Beats button until you've finished - then press Stop. The Beats LED flashes to show it's taken the note and if you want a rest you simply press the button without playing a note in between. You can specify a 'sustain on' by making sure you hold down the note during Beats press.

To playback in either mode: Press Ready, any of the sequence tracks you require, then press any key to start - the actual key pressed will set the pitch of the replayed sequence. Choosing new keys during playback will immediately change the pitch of the whole sequence on the next pulse (or note in real time). To finish press Stop or use Loop for continuous repeats.

There's also a Sync Out socket at the rear for sending the clock pulse to control other sequencers or drum machines, although it's more likely in practice that you'll use Sync In from a tape code track or drum machine.

If you add another sequence - I tried one in Step mode starting on an off-beat, this plays back as it should until you put it with Sequence 1 when it pulls itself onto the beat to synchronise itself - quite inventive for a micro!

Whilst you're adding further sequences, the previously recorded ones can be played to get correct multitracking. It's done by pressing Write, the sequence track numbers to be recorded, then Ready. Now the playback sequences are selected and the recording starts as soon as a note is played. If your first note is a rest, you simply play any note first and then start the sequence from its number button.

Starts always take place from the beginning and can be initiated if you prefer by pressing a key, then the Seq. button, but each time you add another track you always have to bring it in right at the start to make musical sense of multitracked lines.

Playback with normal mode gives centre mono on chosen memory/preset/panel sound. Then you can use Split for using

sequencer on lower, with you playing on upper keyboard along with it. In Double mode, the top 2 octaves are available to play while the sequencer uses the lower notes for pitch access - but 4 sequences will take all 8 voices leaving you with none!

Editing is reasonably easy and facilitates deletion of notes in several ways. For example, when the sequence is running, pressing the Write button enables stepping through the sequence by tapping the Sequence button until the wrong note is reached. The note is then deleted by pressing the Delete button and one or more notes can be inserted as before using the Beats button. To set the split position for the sequencer (i.e. how many lower notes are used for pitch change) you press Write once, hold Split and then play the split-point keynote at the same time as tapping the Write button again.

In realtime the sequencer length is quite short and each sequence memory cannot be shared to make one longer sequence. However, it does allow 12-bar riffs to be composed and then transposed - a lot depends on the clock speed set during record to catch the fastest notes played. Step mode is ideal for the familiar Tangerine Dream, Klaus Schulze type of sequencing and with 80 sound programs available at the touch of a button at any time during playback, makes an exciting instrument feature to use - especially as it can be saved on cassette.

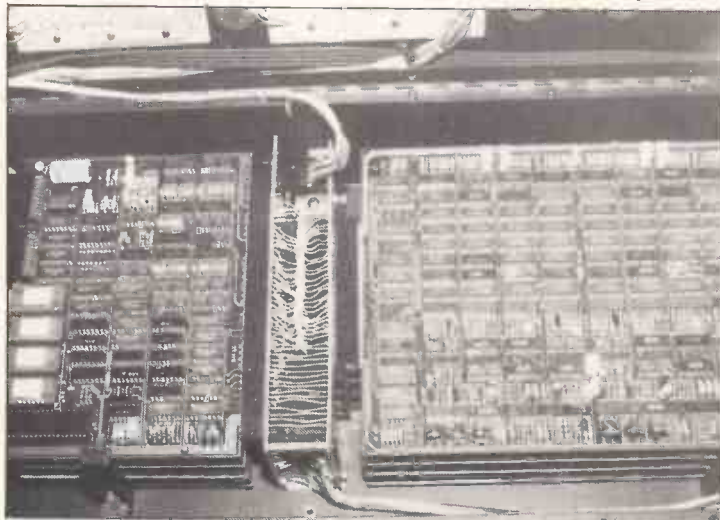
Finally, as well as Sequencer Sync In/Out switchable rear sockets, there are footswitch make/break sockets for Program Advance, Glide, Portamento, Hold and Release; external pedal control of either or both upper/lower sound filters, output sockets, and cassette interface sockets enabling storage of your 40 programs and sequences.

Conclusions

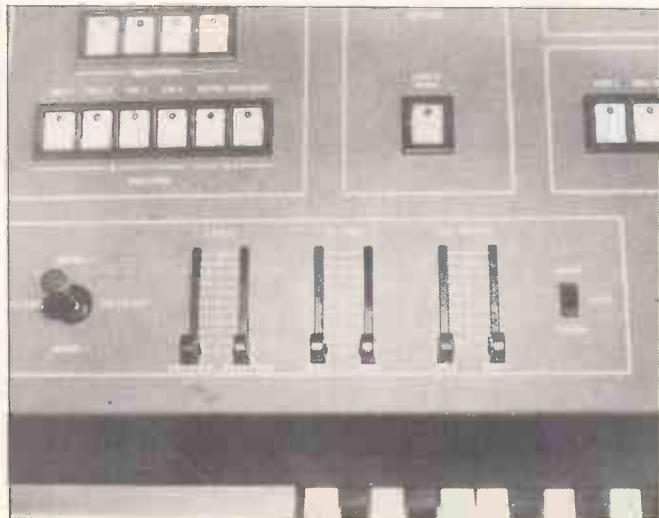
The quality of the pre-programmed sounds is good although it's quite likely that the production instruments will have a greater range of more representative sounds, including plenty of brass, wind, string, piano and percussion. The Synthex has all the clarity and feel of a top line digital instrument. It's challenging to use as every parameter offers immediate exploratory synthesis from your chosen sound program. You won't find any touch or pressure sensitivity but you will find that you can go on creating original sounds and effects. At a price of £2,500 including VAT, it's very competitive, considering the memory, extra features, full programming and built-in sequencer.

E&MM

The Elka Synthex is distributed in the UK by Elka-Orla (UK) Ltd, 3/5 Fourth Avenue, Bluebridge Industrial Estate, Halstead, Essex CO9 2SY. Tel. 0787 475325.



Close-up of processor and voice boards.



Joystick section.



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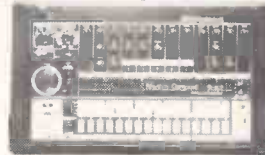
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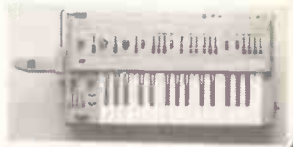
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Synthesiser Update

Roland Juno 60
Roland SH-101
Korg Trident II

Roland's Juno 60 is the expected follow-up to their popular Juno 6, adding a bank of programmable memories to the highly suggestive blank panel which was the cause of so much speculation after the release of the earlier model. To say that Roland have done exactly as predicted is no criticism - the Juno 60 performs just as you might imagine, and costs about the same (around £300 more than the Juno 6).

Since no major changes have been made to the voicing, the 60 can sound effectively the same as the 6, which was comprehensively reviewed in E&MM July '82 and included on Demo cassette No. 7. The factory presets present at first switch-on represent a good selection, but can all be altered to suit individual requirements.

The only front panel changes are to the HPF (now is four settings of 0, 350 Hz, 1kHz and 5 kHz rather than on a continuous scale) and the VCA (now with a sliding volume control as one of the programmable parameters). The chorus and octave transpose controls are also programmable.



Juno 60 Memory bank.

Some very realistic sounds are possible, such as those in Bank 1 of the memory. There are 56 memories altogether, in 7 banks selected by 5 grey tablet buttons (press 1 and 5 for bank 6, or 2 and 5 for bank 7) where each bank contains 8 settings (selected by 8 white tablet buttons). Bank 1 contains useful string, brass and key-click organ sounds which are quite likely to be retained by many musicians; Bank 2 contains pianos and harpsichords, Bank 3 funk sounds and clavinet, Bank 4 traditional instrument sounds such as flute, trumpet and an excellent trombone and cor anglais.

Bank 5 has a selection of wah and plucked synth sounds, which are likely to be changed to suit personal taste. Bank 6 has more twangy and slowly decaying synth sounds, and Bank 7 has some excellent special effects including raindrops, wind, surf, glass and whistles.

An optional footswitch can step through the memories on any one bank, the setting being indicated on a two digit LED display. This is a useful facility for mid-number setting changes when you don't have a spare hand. The memories can all be overwritten,



Roland Juno 60.

the control panel being in constant edit mode so that as soon as any control is moved it jumps to its manual rather than programmed setting.

The memory contents can be dumped onto cassette in about 30 seconds, with an 'Er' message being given on the LED display if levels are too high or too low. Reloading is equally simple, and so a library of settings (including the factory presets if you don't want to leave them is the memory) can easily be built up and called upon between sets.

In addition to VCF control, Arpeggiator Clock In and so on, the back panel now has a DCB (Digital Communication Bus) socket which can interface with an MC4 Micro-composer via an OP-8 interface. The power of this combination can be imagined, and the Juno 60 is obviously going to be a big seller over the next few months.

Roland's other new product is the SH-101, which is in many ways an update of their SH-09 with the addition of several unique features.

Although the specification resembles that of the SH-09, the physical presentation is quite different. The body is metallic grey plastic, extremely shallow and slightly wedge-shaped, with the back panel controls lifted over onto a recessed ridge on top of the instrument. The keyboard is still 2½ octaves, with a left to right pitch bend lever next to it together with other performance controls. Almost all other controls are sliders or slide switches, with the exception of VCO footage, LFO waveform, portamento amount, tune and volume.

The single oscillator gives the usual selection of powerful pulse width modulated bass and piercing high frequency sounds, and there's now a single memory built-in digital sequencer permanently linked to it. Programming is from the keyboard, and spaces, alternative note lengths and key transpositions can easily be obtained.

The optional MSG-1 modulation grip connects to the side of the keyboard and gives control over pitch bend or filter opening (in an upward direction only) by a sprung fingerwheel, and modulation control

by a thumb pushbutton. This introduces vibrato or trill with a very slight built-in delay to compensate for the fact that any such modulation always goes to the full depth as set.

The same system applies to the pitch bend lever, which now has a microswitch activated by a slight forward pressure to introduce modulation. With all these modulation options the synth becomes very expressive: a guitar-style strap is included, and with the MSG-1 the whole package becomes capable of enormous versatility and portability. We can expect to see the SH-101 turning up in very large numbers in bands and home studios in the near future.



SH-101 and MSG-1.

Korg have updated their popular all-purpose keyboard to give even greater versatility and sound quality. The basic sections of the Trident are strings, brass, and programmable polysynth, and there's also a powerful built-in flanger which can be used to treat any of these sections.

The polysynth now has two VCO's for each of its eight voices with the facility to detune each pair for a much thicker sound. The VCF is now a 24dB/octave type, with five options relating to keyboard tracking (0, 25%, 50%, 100% and 150%) and there are two independent ADSR envelope generators for VCA and VCF. The VCA also has a programmable attenuator for +10dB or -10dB.

The three preset sounds (pianos and clavinet) have been removed in favour of an expanded memory section, now 32 memories in four banks of eight rather than 16 on the old Trident. Memories can be dumped onto tape in around seven seconds and the cassette supplied contains the 32 factory memories present at first switch-on and another 32 sounds.

Programme saving is now much more flexible, with the facility of partial loading to any degree. During loading the LED's associated with the memory selectors indicate the order of loading, and Verify and Error/Cancel facilities exist to ensure reliable loading.

All the controls are in constant edit mode to facilitate easy updating of programmes. There are a variety of input and output sockets for switches and footpedals on the back panel; these help to produce a highly expressive and powerful instrument which will now be found to be capable of providing every basic facility for the multi-keyboard player.

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Korg Trident II.

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The PE Series

A New Microphone Range from Shure



Shure have introduced a new range of moving coil mics, designated the PE series, standing for Professional Entertainer. All are coloured dark grey and with the exception of an omnidirectional one, all are cardioid directional types. They are priced between £53 and £147, with four specifically intended for vocal applications with the mesh heads and five primarily for instrumental use, with accessory 'wind-shields' for the latter on vocals. Some microphones are produced in high impedance form, carrying the suffix H instead of L. Some are supplied with or without cable and all except the lowest priced PE9 have XLR connectors at the microphone.

We will survey the range from the manufacturer's brochure and then report on three of the range selected at the UK press launch. This took place recently on board a Thames riverboat during which dealers and press were entertained by Kenny Ball and his Jazz Band, performing superbly as usual and employing a PA derived from various mics in the PE series. The prices quoted are nominal list prices including VAT for the cableless versions, where this applies.

PE9 At £53 the PE9 is available in low and high impedance form. A locking on/off switch is provided and the microphone comes with a 6 metre cable. The high impedance version has a ¼" jack plug fitted and the low version an XLR type. A swivel adaptor and a Gig Bag — nice term! — protects in transit. The list of uses covers mainly instruments without a lot of low frequencies in their output, and also vocals when windshielded.

PE15 The lowest priced of the four mics specifically for vocal use in the range. Available with or without cable and at high or low impedance, the PE15 is listed at £58. There is a lockable on/off switch and as with all the mics in the series there is a zip-up Gig Bag. Shure claim in their literature that its minor presence peak is ideal for reducing harshness with female voices.

PE25 This is the omnidirectional model and the listing indicates its suitability for acoustic instruments. It does not have the increased bass proximity effect of directional mics and so it should maintain a 'natural sound'. It's best used when leakage from other instruments or possible feedback problems are less likely to occur. It's only available in low impedance form, but an impedance raising transformer is available. This model is £75.

PE35 Another of the specified mics for vocal use with high or low impedance, supplied with or without cable. The basic model is priced at £82. The published curve shows a more extended bass end and a very pronounced presence peak. There is also a degree of internal shock isolation.

PE45 The claim here is of a mic with an ability to 'lift' instruments through in a complicated mix. Certainly it is obvious to anyone who has done a deal of recording, that a lot of clarity masking can easily occur. Take a drum kit sound for instance — very clean on its



The complete Professional Entertainer Range.

own yet when guitar and keyboard amps are added one wonders where all the clarity has gone. However, you cannot just keep peaking everything in the mix, but it does help if a mic has a presence characteristic. Certainly, in my experience it is more effective if the mic has the characteristic rather than try and put it in from the mixing desk. So the PE45 at £89, in low impedance form only, with or without cable, would be useful for amps and drums. Curiously, the on/off switch has no movable locking plate but is nevertheless low profile. Internal shock mounting is also provided.

PE47 On the subject of mic response characteristics, here is one with switchable bass cut and treble boost. Intended for instrumental and vocal use, it's available in low impedance form only. There is a recessed on/off switch without locking plate. Basic price of the cableless version is £105.

PE65 The published curve shows a more extended top with more rounded presence lift. It will sound subtly, yet usefully different to other mics in the series. The PE65 is in low impedance form and without cable and is priced at £95. The lockable on/off switch makes use of a magnetic reed to reduce considerably the operating noise.

PE75 Claimed to suit one's lead vocalist, this has the best features of others in the PE series: internal anti-shock mounting, locking magnetic reed on/off switch, presence peak and low end proximity bass lift,

rounded off with a Gig Bag, all at £104.

PE85 The final product in the range is more a mic 'kit' as the £148 price includes 6 metres of cable with XLR, separate low to high matching transformer, Shock Stopper swivel adaptor and Gig Bag. As the brochure says, 'it's more than a microphone, it's an entire vocal performance system'!

Sampling the Range

As I have discussed before there are two particularly distinct areas of microphone design. On the one hand there are the flat response, accurate, natural sound mics usually used in 'classical' music recording. Then there are the tailored response 'pop' mics for close-up use, in multicam situations, for amplification and recording. The PE series is very much in the latter camp and in fact the Shure name is very much associated with this area. However, Shure do have a top flight example of a mic intended for the former field of use — the SM81 capacitor model.

Three PE series mics were submitted for review. These were the PE35, 45 and 85. Obviously Shure's extensive experience of microphones for 'pop' amplification and recording is much to the fore. The mics are reassuringly heavy and have the tapered body familiar in their legendary SM58. The physical ruggedness is backed up with a technical ruggedness in that they take high sound levels. Some useful features have

been included — the magnetic reed switch in the PE85 does reduce click noise and its Shock Stopper mount is most effective. This is a circular pneumatic mic clip in which the mic sits nicely balanced with plug and lead acting as counter-weights. Handling noises were similar to many other mics as was susceptibility to close up 'popping', but acceptable in most situations.

To summarize, the new Professional Entertainer range from Shure is certainly an extensive one. The brief use of some of the models and the descriptions in the full colour 16 page catalogue show that the range has variety in sound, application and price. It is not uncommon for a particular 'reviewer' to state that this or that mic is the one for a particular application, but the variations in room/studio acoustics, the tonal quality of the amplifier cabinets and PA stacks or the monitoring set-up at recording sessions are extensive, as is personal preference. It's therefore worth trying out the PE series — at least one should find a place in your equipment considering their wide range of applications and cost.

Mike Skeet

E&MM

Full details including PE Microphone Placement & Selection Guide are obtainable from Shure Electronics Ltd., Eccleston Road, Maidstone, Kent ME15 6AU. Tel: 0622 59881.

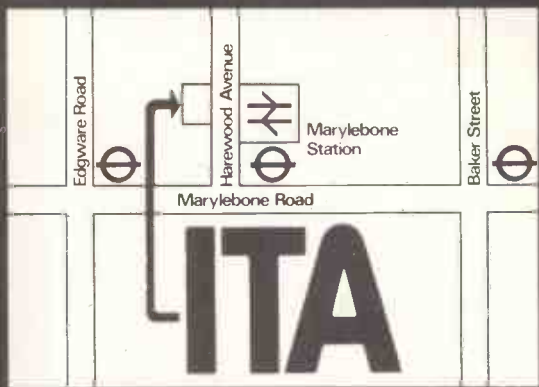
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Crumar Stratus



Crumar's all-purpose keyboard, and its larger brother the Trilogy, have been available for a couple of years now, but are still being pushed hard as the sort of instrument which can take the place of two or three others in the standard electro-musician's line-up. The Trilogy offers organ, strings and preset polysynth, while the Stratus has organ and variable polysynth only, but is of course a good deal cheaper.

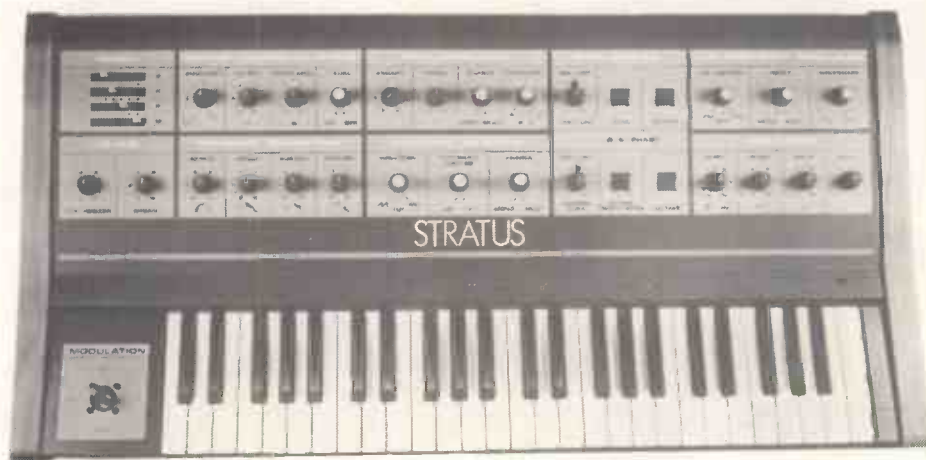
In a sense the Stratus is a hybrid keyboard, like Roland's SA-09 Saturn, and has a battery of sounds of its own which belong neither to the world of the conventional organ nor to that of an expensive and complex polyphonic synth. The hybridisation has been achieved in an imaginative if unusual fashion, described below.

Basic Design

The Stratus is very smartly styled in grey, white and black, and is reminiscent of the Oberheim polyphonics. It's a little more compact than these, however, with a four octave C-C keyboard and wooden end cheeks. The control panel is light grey with 17 rotary controls in black, 9 rotary switches in grey and four horizontal sliders for the mixable organ footages.

The very thorough familiarisation/instruction book begins with the organ section, as this is the simplest to control. Its audio output can be taken separately from a 1/4 inch jack socket on the back panel, or from the socket marked 'Polysynth' which in fact gives a mix of synth and organ if used alone.

If the latter socket is used, the relative volumes of the sections are balanced by two rotary controls to the left of the control panel. Above these are the organ footage sliders, marked 16', 8', 4' and 2'. These work from left to right, and each has a slightly different tone; in each case the tone becomes slightly sharper as the slider is opened up. The sliders can give a wide range of tones, although these concentrate mainly on powerful church organ effects; there are no 5 1/2' or other intermediate harmonics, and no simple way of introducing a key-click or Leslie



effect, so Hammond-type sounds are out.

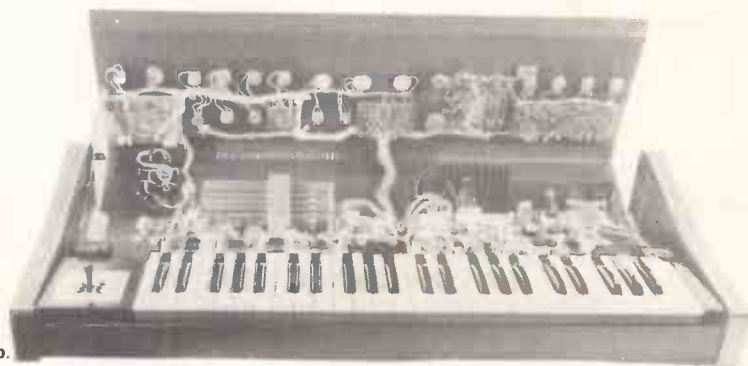
On the other hand, the Stratus organ section can produce many sounds of which a more conventional instrument would not be capable. Its tone oscillators are also those of the polysynth section, and as such come under a limited form of voltage control which makes several useful effects available. There are two banks of oscillators, which can be tuned apart or synchronised together; in the former mode, any effects apply only to the upper oscillator bank.

Effects available include vibrato or trill, with a variable delay, depth, speed and slope (rapidity of onset of vibrato). There are also two forms of glide — not a true polyphonic

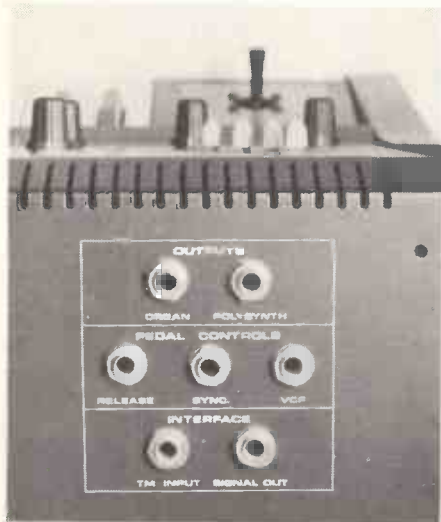
portamento, but a bend up to or down to the notes played from a variable interval and at a variable speed. This is intended to act as a substitute for pitchbending if you don't have a spare hand while playing.

Polysynth

All these effects also apply to the polysynth, which again has a left-hand volume mix control, and additionally there are three main sections which apply only to the polysynth. These are the Voltage Controlled Filters, Envelope Generators, and Waveform Selection. The polysynth uses the same oscillator bank tuning and sync controls, and additionally there are two



Stratus opened up.



Rear connections.



Voice and VCA-VCF boards.

Octave pushbuttons with integral LED's, and an Octave Modulation button. The former lower the pitch of each bank by an octave, and the latter produces alternation between the lower and higher octave settings (accompanied by flashing LED's) at a rate determined by the modulation section speed control.

The VCF section has low pass cutoff, resonance and envelope depth/polarity rotaries, and a pedal on/off switch which activates the filter foot pedal. The filter gives a reasonable 'twang' and the quick selection of the reverse configuration is very useful; full resonance can almost be achieved, giving a good selection of abstract sound effects over the synth chords.

The VCA section is perfectly conventional, with a good slow attack and reasonable decay and release. The Waveform Selection section gives Sawtooth or Square wave on the polysynth, with a mix position which also enables the Alternate switch. This automatically switches between sawtooth and square in Mono or Multi mode — that is, on every key depression, or only after all the keys have been released and one is depressed again.

This choice of reset modes also applies to the slow oscillator in delay mode, allowing some quite expressive playing through the use of different fingering techniques. Crumar take pride in the fact that most of the expression of the instrument comes from playing technique rather than from panel controls, and so although it isn't touch-sensitive as such, the Stratus can produce quite expressive effects without too much difficulty.

If you do have a spare hand, there's a joystick to the left of the keyboard which produces a tone of pitchbend up or down on organ and polysynth, and VCF or VCA modulation on the polysynth alone. This is pleasant to use and lightly sprung, rather like the keyboard itself.

There are one or two features missing from the Stratus — pulse width modulation would have been more useful than the Sawtooth/Square Alternate facility, and a chorus unit would do a lot to make softer and more mobile tones available. On the other hand, there are a couple of unique features, such as the facility for connecting a wind controller to the rear panel.

Master Touch

Steiner's Master Touch unit uses two air tubes to control VCF and VCA, which are fed from a high level unprocessed Signal Out jack. There's also a modulation touch pad which can take over the 'Stratus' vibrato section.

In normal use, the Stratus is fully polyphonic, but with a limited number of VCF-VCA chains. In fact there are six, and every note in each octave together with its tritone (augmented fourth) shares a channel. This means that sometimes a lower note which is still held will re-articulate when a higher note is played; the handbook points out that you will discover new musical uses for this restrike capability and incorporate it into your playing technique.

The Stratus is a reasonably compact and smartly-designed keyboard hybrid capable of some very powerful clustered chords and with the useful feature of total polyphony in some form. As such, it will probably find itself being used in a wide range of studio and stage applications.

E&MM
The Crumar Stratus is available from Chase Musicians, 22 Chalton Street, off Euston Road, London NW1 1JH. Tel. 01-387 7626

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Talking Gigsound SHOP

The first of a new occasional series looking at some of the most up-to-date music stores in the country.

Mitcham Lane, Streatham, a few miles out from London's city centre, may seem an unlikely spot for a music store, but it's one which has its share of advantages. Over the last few years Gigsound has collected an impressive list of franchises and dealerships, partly due to its relative geographical isolation, and partly due to the excellent reputation it has achieved over the last five years or so of trading.

The present premises have been in use for around a year, and before this Gigsound operated a general music store on a much smaller site a few yards up the road, together with a specialist drum shop nearby. Now there's no lack of space, despite the huge amount of gear in stock, and yet the shop still gives the impression of being divided into small specialist areas.



Amplification.

Owner Eric Lindsay explains that this is intentional and he's proud of the degree of specialised service that this arrangement makes possible. The drum shop is still almost a separate entity, with its own display window, the keyboards have an ante-room to themselves, and the guitars, amps and accessories occupy the main floor area. Tucked away in the basement is a powerful 16-track studio, which as we shall see is just part of the all-round Gigsound service.

Eric Lindsay deals largely with the guitars and amps. The first obvious feature on entering the shop is a huge stack of Marshall valve amps in all shapes and sizes, and in fact Gigsound used to subtitle itself 'The London Marshall Supercentre'. On further inspection there's a very wide range of amplification, much of which comes from British manufacturers. Although Gigsound maintains good relationships with all the American and Japanese manufacturers, there's nothing quite like the personal service of having a company's owner or chief designer coming around on the van to deliver!

Gigsound have a franchise for Ohm amplification and also deal in amps from Session, another English company. In addition there's Solton PA equipment from Germany, and Fender, Peavey (such as the Peavey Heritage reviewed in E&MM July 82), H&H and many others. Fender's range of guitars is also widely stocked, and these are

displayed on a veritable forest of stands and all along one wall of the shop.

Together with the Fenders there is of course a wide selection of Gibsons, and several other makes such as the excellent Westones. Westone basses continue to create a lot of interest, as do the Wal range often hailed as the best conventional bass in the world. The Wal franchise is one of only two in Greater London, and Eric Lindsay is particularly proud of it since Wal chose Gigsound about three years ago largely on their reputation. Schechter gear is also stocked both on the guitar side and as part of a large range of custom parts and accessories.

The Keyboard department shares a large window display with the guitars and amps, featuring the smaller synthesisers and polyphonics by Yamaha, Casio, EDP and Korg. Inside the store is different — centrepieces of the keyboard display are the powerful Yamaha GS2 and CS70M keyboards, surrounded by smaller synthesisers on floor and wall stands.



Wal Basses.

Again Gigsound have captured dealerships or franchises for many prestigious lines, including Roland and Moog, the latter being particularly hard to come by. Moog are represented by the Source, and Roland by some of the fastest-selling keyboards on the market including the Juno 6, the Juno 60 and the SH101. In addition to the Yamaha GS2 there's the smaller CE20, which sells at a considerable discount below its recommended thousand pounds or so. Both instruments work by the digital FM tone generation system, and so the sounds are sparkling and lifelike, although necessarily the instruments only appeal to the more well-heeled end of the market.

For the average musician there's the Moog Rogue, Korg MS10 and MS20, a selection of electric pianos, the smaller Yamahas such as the CS5 and a wide range of effects and instruments. One recent big seller has been The Kit, together with its add-on accessories such as The Timp and syndrum effects. Keyboard specialist Jonathan Cole is also in charge of Gigsound's recording studio.

In the drum section there's a wide range of complete kits, individual drums and cymbals, and accessories. One colourful window display consists largely of the popular Melanie FanToms, and again there's a drum specialist in attendance at all times.



Overall the shop seems to combine a wide range of stock and low prices with a genuine interest in giving the musician a complete service. To this end a 16-track studio has been opened in the last year, which isn't widely advertised but is available for bookings primarily by Gigsound's customers.

Jonathan Cole does most of the engineering work, occasionally booking outside engineers. He's also responsible for the installation of new equipment, and has brought the studio up to a very high standard. The mixing desk is Soundcraft with a total potential of 46 inputs if the equalised monitor channels are used, and the main tape machine is a Soundcraft 16 track.

The effects rack is well up to date, although the digital delay was temporarily missing — a customer needed one the same evening so it had to be sold! The increasingly popular range of Drawer studio effects are represented by the Multi Tracker and Dual Noise Gate, which for around £250 gives excellent results — up to minus 80dB for keeping noise down, tightening up bass drums and so on.



Gigsound's studio

Cassette copies can be run off on a JVC machine, and the whole control room area gives an impression of compactness and efficiency. The studio floor, on the other hand, was in a state of chaos — simply an indication of the amount of work that's done there! The main vocal mike is the expensive Neumann U87, and there's a selection of Beyers, AKGs and Shures. Connection to the control room is by two 16-way stage boxes, with additional connections if needed.

The studio has the advantage of the 'passing trade' from the shop itself, and the benefits are obviously mutual as the studio generates additional interest and business for the shop. The whole organisation is completed by an engineering service run by Terry McDonald, who is qualified to service all the electronic equipment stocked and also manufactures some small accessories.

Overall, Gigsound gives the impression of an efficient and comprehensive service which has the added advantage of being totally up-to-date. Check out their adverts and consider making the journey — it may be well worth the effort.

E&MM

POWER PLUS PERFORMANCE

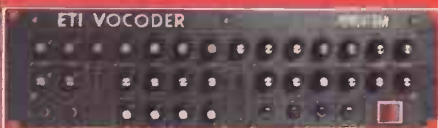
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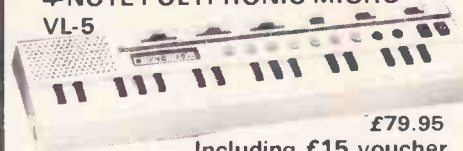
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E&MM

VIDEOMUSIC

The arrival of stereo video machines in the UK has opened up new possibilities, for the music industry in terms of reproducing stereo music, and for the music listener to enjoy stereo live performances or dedicated video productions. Like all new things, the promotional blurb may sound that a new step in the video era has been reached, and whilst the potential is obviously there, only a few enterprising groups and companies are currently exploiting the media. Thorn EMI are one of the few major distributors who recognise the value of the stereo music video and who are eager to have their tapes reviewed. No doubt other companies will get round to promoting this important part of the video scene — after all, one of the first ideas put across with video was 'it'll be great to see as well as hear musicians performing'.

Another question being asked is how well the stereo machine reproduces music. We do our reviewing on the JVC HR7650EK with its stereo capability and Dolby noise reduction. This is certainly as good as any of the currently available VHS systems. Nevertheless, in general use the Dolby system is always left in to reduce hiss and, having recently changed video hire shops, I must admit that a lot of hums and clicks that I used to get have disappeared — and there's consistent quality in the picture too. (How do you get anyone to admit that they're copies done on two earthed machines with a nasty hum loop between?). What of the actual sound quality? If you try a stereo 'film' as opposed to 'music video', you'll find that you've nine times out of ten got an obvious background hiss.

Two current videos in this type are 'Venom' and 'Halloween II'. The latter is particularly worth a listen (if you can stomach the action) because it's all electronic music by John Carpenter (who's also the producer) and the creaks and atmospheric sounds almost make you feel it's happening in your house. Of the music videos available, we received a copy of *Hot Gossip* (Thorn EMI TVE 90 05322), which was immediately snatched up by the men in the office. (We all say we have to sit close to the screen to get the best stereo effect!) There's another point here — nearly everyone I know has their hi-fi speakers (which you need to playback the video in stereo) centred round the lounge fireplace, so a drastic rearrangement of TV and hi-fi is usually required. Having sorted that part out, the video experience is undoubtedly much improved. The quality of 'Hot Gossip', a dedicated video production was acceptable, although some background hiss was apparent and this is why the video medium has a long way to go before it reaches the hi-fi quality. Don't forget, the actual tape width used by each track for music reproduction is well below the size used on standard music cassettes. Dolby is the lifesaver here, although it's a pity it's not Dolby C which certainly could have been considered. Nevertheless, the music for Arlene Phillips' visually entertaining dance troupe is well worth a listen and includes the Human League/Heaven 17 standards, 'Circus of Death', 'Geisha Boys and Temple Girls' and 'I Don't Depend on You', along with several excellent new songs.

Our stereo music video of the month must be *Genesis' Three Sides Live* (Thorn EMI TVE 90 0982 2). This was recorded live during recent tours in Europe and America. The sound

quality is good, probably because the pieces performed are always at a reasonable sound level. This video is a concert performance type rather than a dedicated video, with the usual dominance of bright colours, and dark backgrounds in the stage shots. The whole tape last 90 mins (if you buy it it'll cost around £27) and gives virtually complete performances of some 13 songs played by the Genesis trio: Phil Collins (vocals and occasional drums), Mike Rutherford (guitar and backing vocals), Tony Banks (keyboards and backing vocals), plus Daryl Stuermer (bass guitar) and Chester Thompson (drums). Songs featured are Behind the Lines, Duchess, Misunderstanding, Dodo, Abacab, No Reply at all, Who Dunnit, In the Cage (medley), Afterglow, Me and Sarah Jane, Man on the Corner, and Turn It On Again.

The stage performances obviously focus on the vocals of Phil Collins, with occasional solos from Tony Banks (using mainly ARP Quadra, Yamaha Electric grand and Prophet with sequencer), and from Mike and Chester. Stereo effect is quite good, especially during drum solos.

Between the numbers, there's clips of the bands in dressing rooms, at interviews in America, during setting-up, on the road, and informal chats about the music. These are more fillers than positively giving you a good insight to the band — a lot more could have been done using narration so that, for example, a shot of the Prophet being serviced from an oscilloscope was clarified (do they still go out of tune?). Also, the discussion of a piece would have been better placed before its performance and not just anywhere.

Concert multitracking was by Le Mobile and the music was mixed at The Farm by Geoff Callingham. Overall it's an interesting film, with some interesting playing techniques made more apparent — take Tony Banks' frequent holding of the lowest root keynote as he plays the Prophet with both hands.

E&MM

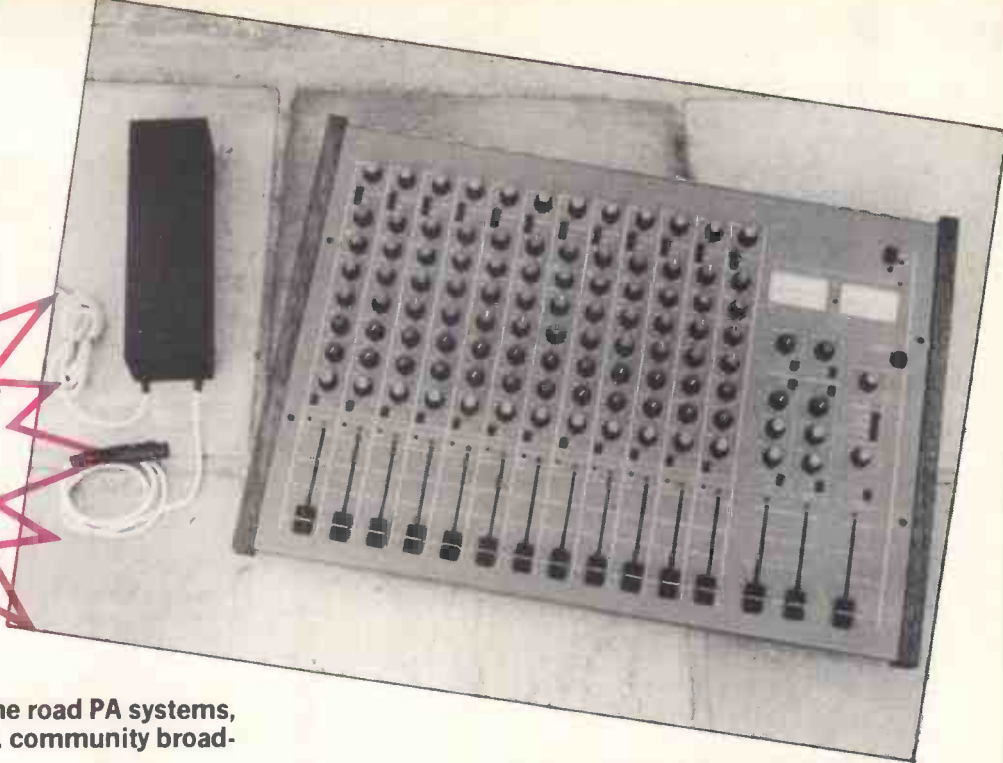
Videomusic chart produced by Adrians Video Club who also can supply all listed videos through their mail order service. Contact Adrians Video Club, 36 High Street, Wickford Essex. Tel: 03744 3318, mentioning E&MM of course!

Videomusic Chart

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|----|---------------|-----------------|
| 1 | OMD | Live |
| 2 | Deep Purple | California '74 |
| 3 | ELO | Live |
| 4 | Gary Numan | Micromusic |
| 5 | Various | Picture Music |
| 6 | Queen | Greatest Flix |
| 7 | Toyah | Live |
| 8 | Abba | Music Show |
| 9 | Black Sabbath | Never Say Die |
| 10 | Mike Oldfield | Essential |
| 11 | Pink Floyd | Pompeii |
| 12 | Hot Gossip | Same |
| 13 | Thin Lizzy | Live |
| 14 | Cliff Richard | Thank You ... |
| 15 | Santana | In Concert |
| 16 | Count Basie | Live |
| 17 | Kate Bush | Live |
| 18 | Wings | Roadshow |
| 19 | AWB | Shine |
| 20 | Queen | Flash Gordon |
| 21 | Various | Video Stars |
| 22 | War | In Concert |
| 23 | 10 C.C. | Live |
| 24 | Brubeck | Portrait |
| 25 | Alan Price | In Concert |
| 26 | Various | Fillmore |
| 27 | America | Live |
| 28 | Various | Stamping Ground |
| 29 | Various | Urg! |
| 30 | Wakeman | White Rock |

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Then write a description, in not more than one hundred words, of your music studio, band or other musical activities and the way in which the mixer would be used if you became the winner of the competition.

Complete the entry coupon with your full name and address, enclosing your description, and send to 'E&MM' Mixer Competition, 282 London Road, Westcliff-on-Sea, Essex SS0 7JG, to arrive no later than the closing date of **Friday, 31st December, 1982.**

Important - before posting, copy out the eight key letters on the outside back of your envelope in the same order as they appear on your completed coupon. **IF THIS IS NOT DONE, YOUR ENTRY CANNOT BE CONSIDERED.**

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RULES

There is no entry fee but each attempt must be on an entry coupon cut from E&MM and must bear the entrant's own name and address.

All accepted entries will be examined and the first prize awarded to the entrant who, in the judge's opinion, has correctly placed in order the features of a mixer by merit, and who has described in the most interesting and worthy manner the uses to which the first prize would be put. Remaining prizes will be awarded for the next best attempts in order of merit: no entrant may win more than one prize.

Entries received after the closing date or received incomplete, illegible, mutilated or altered in any way will be disqualified. No responsibility can be accepted for entries lost or delayed in the post. Judging will be by members of the staff of AHB and Glidecastle Publishing, whose decisions in all matters relating to the competition will be final and legally binding.

Winners will be notified and results published as soon as possible in E&MM. The competition is open to all readers in Great Britain, Northern Island, Eire, the Channel Islands and the Isle of Man, other than employees of AHB Ltd. and Glidecastle Publishing.

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Since last February Andy Summers has been playing two distinctive new guitars with The Police, guitars with specially designed body styles and pickups. Summers and Hamer Guitars have been developing the instruments together and, although there have been positive reactions from the start, the first of the two won't be commercially available until early 1983, according to Paul Hamer.

"People keep calling up, asking for the instruments, because they see him play them every night and we just have to keep telling them, 'Hey, they're just an experiment; they're not in production yet,'" Hamer said. When the guitars become available, Hamer expects them to do well in England because of the clean sound produced by the new pickup design. "I think that's where most of the English music is moving now - towards a cleaner sound, a richer sound without so much distortion," said the Chicago area rock guitarist turned custom guitar maker who took his instruments on his first trip to England in early 1982.

Hamer has worked with Rick Nielsen of Cheap Trick, Ian Anderson of Jethro Tull, Mick Ralphs of Bad Company, and others when developing some of the 11 guitars and basses his company now has in production, which can also be found in the hands of the likes of Keith Richard, Pete Townshend, John Entwistle and Johnny Ramone. Hamer began working with Andy Summers five years ago and so when he had some new guitar sounds in mind he again came to Paul

Hamer to get a guitar that would produce them.

"Everything about the new guitars are his ideas - the longer horn, the deeper cutaway and especially the changes in the pickups," Hamer admitted. "There's a new pickup in the bass position on the neck that's quite striking. It brings up the bass part of the guitar without distorting it at high volume which is quite an accomplishment for a pickup in the position this one is in."

"We also came up with a new way to wind the coil with a new wire and Andy's been critiquing it for us," continued Hamer. "We've been moving towards a cleaner sound. All sorts of variables contribute to that - the type of wire, the number of windings, the magnetic structure." The other significant design changes relate to the body style, he pointed out. "We changed the place where the strap fixes on the body," Hamer said. "It's got a longer horn. It's got a deeper cutaway for greater access to the fret. It fits on your body different than any of our other guitars."

Of the two guitars Andy Summers has been trying out, one is a tremolo or vibrato model and the other a non-tremolo. But it is the non-tremolo model that will be put on the market first. "We have yet to perfect a vibrato model that we're happy with," explained Hamer, who made his first guitar in 1974. "It's still a good unit but we're looking to take it a step further and until we perfect it we're

not going to release anything."

Hamer and his partner, bassist Jol Dantzig, built their first instruments for their own use but when those instruments attracted more attention than did the music they were playing on them, and after they got more calls asking for the instruments than they got asking them to play more gigs, they soon were running their own custom guitar house. Initially they operated from the back room of Hamer's musical instrument store. But in 1976 they moved to their first factory building, moved to a larger location in 1979 and then expanded that space in 1981.

When Hamer began from the backroom, his store was the first warranty repair shop authorised by Gibson, a company that continues to introduce new models, models that Hamer still feels are among those that are good for musicians to learn instrumental mastery on before developing specific ideas of the sounds they want and then finding the right custom guitar. Gibson's latest models are the Spirit and Special in its Epiphone USA series.

Gibson guitars

Both are 22 fret, double cutaway guitars that are available with a choice of one or two high output humbucking pickups. The double pickup versions feature two volume controls and one master tone control as well as a three position pickup selector switch which allows players to choose either the single or humbucking pickup sound or to utilise both pickups at once. The single pickup versions feature individual volume and tone controls. Each guitar also features a 24 $\frac{3}{4}$ inch scale length and has pegheads pitched at 17 degrees for increased string down pressure. The Epiphone USA Spirit has a body 16 $\frac{1}{2}$ inches long, 13 inches wide and 1 $\frac{3}{4}$ deep while the Special measures 15 39/64 inches by 13 5/32 inches by 1 5/16 inches.

Ibanez guitars

Another well established guitar manufacturer, Ibanez, has introduced two new



Ibanez Lee Ritenour.



Ibanez Joe Pass



Gibson Epiphone USA Special



Gibson Epiphone USA Spirit



Mesa Boogie Amp

jazz guitars and two new basses. The semi-acoustic Lee Ritenour features humbucking pickups and a bridge assembly that were designed by Ritenour. It also features an asymmetrical three-piece mahogany and maple neck, a finely grained Brazilian rosewood fingerboard and super hard Jim Dunlop frets. After working with another famous guitarist, Ibanez has produced the Joe Pass JP20 guitar. It features an ivory and black bound spruce top with maple back and sides, a 25½-inch maple neck, solid ebony bridge and tailpiece assemblies, an ebony fingerboard with small size frets, and a single Ibanez Super 58 humbucking pickup positioned for balance and clarity.

Ibanez's new basses are the Musician 924 and the Roadster 721. The lightweight, medium scale Roaster 721 was designed for greater mobility on the stage as well as on the fingerboard and features a 32-inch scale maple neck, a solid ash body, an Ibanez B1 brass bridge and tailpiece assembly and two Ibanez Super P4 pickups.

The Musician 924 offers the extended playability of a 24 fret maple and mahogany neck which runs the entire length of the contoured ash body. Steel tone bars are embedded in the neck to eliminate both dead and hot spots. A boost and cut control is available in three distinct frequency bands to provide numerous sound variations while the new pickup balancer allows blending of the Super P5 and J5 pickups with a turn of a knob.

Other new electric basses have been introduced by Alembic and the Original Musical Instrument Co.

Electric basses

The Alembic Spoiler bass has a double cutaway solid koa body, a three piece maple neck and an ebony fingerboard with oval inlays. There's a mono output with two large impedance pickups and a four-position pickup selector - bass, treble, both and standby - and separate volume and tone controls and two position 'Q' switches. The Alembic Spoiler bass is available with 24 frets or fretless, and lefthanded by special order. It carries a list price of \$1,050.

The Dobro Portable ElectroAcoustic Upright Bass from the Original Musical Instrument Co. provides a choice between the rich sounds of an acoustic bass and the punch of an electric bass. The bridge is adjustable for string style and action and the instrument is adaptable for gut, nylon or metal strings. Yet it collapses to fit a case that measures only 44 inches by 22½ inches by 7 inches with the entire package weighing less than 50 pounds.

The electronics include piezoelectric pickup for fast response and full range bass; Bi-FET input preamplifier circuitry for low distortion, fast response and low noise; active controls with Bi-FET circuitry to further lower distortion; medium impedance out (1250 ohms maximum) for no hum; low

impedance balanced output; virtually no feedback; and the capability of driving electronic effects.

Meanwhile, Ovation Instruments has added a series of cutaway guitars to its Adamas lines. They utilise the same materials and options as the Adamas and Adamas II models but with cutaway, round-back bodies.

Amplifiers

To amplify the new Ibanez, Alembic, Dobro or other basses, Roland has expanded its popular line of Spirit amplifiers with the addition of the compact (16 inches by 17½ inches by 9 inches and only 20 pounds) yet powerful (15 watts RMS through a 12-inch speaker) Spirit Bass 15.

Controls are provided for volume, bass, middle and treble. A built-in parametric equaliser enables the player to modify the instrument's tone and to attain the popular funk-bass sounds without having to change bass guitars. Parametric Eq controls are frequency select, level and 'Q' select, which gives two different equalisation slopes. Other features include dual inputs for hi or low input signals, footswitch jack for parametric eq on/off, pre-amp out and headphones jack for silent practising. The list price for the Spirit Bass 15 amp is \$225.

For rock guitarists, Mesa Engineering recently reissued as Son of Boogie (or S.O.B.) its famous original Mark I Boogie design. Son, which is recommended especially for rock, is a 60-watt combo amp that features two cascaded input channels and the Black Shadow 150 watt 12-inch speaker. Refinements have been made in the classic Boogie three volume control overdrive system which, say the folks at Mesa, enables the Son to adjust easily from the guitar for crisp solid rhythm or blistering lead sustain.

Sound devices

New sound devices come from Ibanez and Unicord.

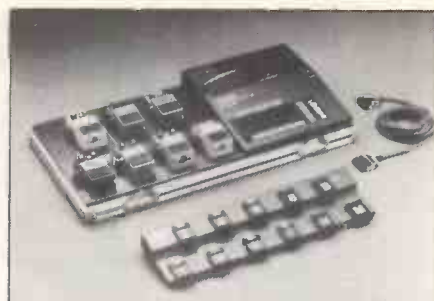
Ibanez's SD9 Sonic Distortion Effect produces a wide range of distortion effects from soft and gentle to hard and driving. The sonic distortion overdrives the signal and then adds fuzz to duplicate a solid state type distortion. Powered by a 9-volt battery or optional AC adaptor, it features active tone control, LED indicator, Q-1 FET noiseless electronic switch and a rugged zinc die-cast case.

Unicord's Vertical Reverberation System VRS 23 is a fully electronic stereo echo/reverb system that goes up to 400 milliseconds. Quick switching from echo to reverb makes it especially well suited to both on-stage and studio work. Echo chorus also is adjustable in intensity and speed.

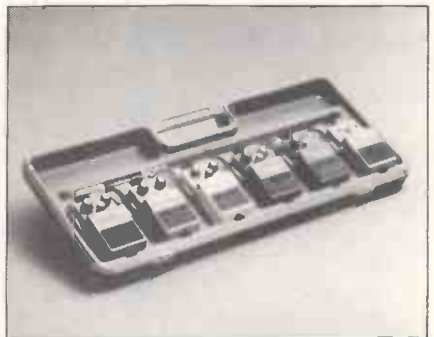
Unicord's Dynacord Digital Delay Line DDL12 features 0.5 to 500 millisecond delay range (1,000 Ms with expander module with no change in specifications), 96dB dynamic range, balanced and unbalanced inputs and outputs, built-in VCO with three waveforms for flanging and chorusing, Quasi 14 bit AD/DA, 20Hz-12KHz frequency response at all delay settings and virtually noise free operation with inaudible companding.

To help guitarists, keyboardists and other musicians transport and use effects devices Roland has come up with a carrying box, a power supply switching system and a sound control centre.

The Boss BCB-6 carrying box holds six effects pedals or five pedals and the new Boss PSM-5 power supply, and transforms into an effects board simply by removing the lid. It comes complete with five short cords and one long loop cord, and features hidden wiring channels so that when used with the PSM-5 power supply virtually all the connection cords are hidden for a clean, or-



Boss SCC-700



Boss BCB-6

ganised, tangle-free system.

The Boss PSM-5 Power Supply/Master Switch is a regulated power supply, capable of powering up to five 9-volt Boss or similarly designed effects. Normal connection to the PSM-5 yields two distinct loops, one running through the effects, and one going from the guitar directly to the amp, bypassing the effects completely. A push of the footswitch selects one of the two loops. The PSM-5 lists for \$89.50.

Roland's Boss SCC-700 Sound Control Centre is a computer-controlled effect programmer, designed to program up to seven different effects devices in as many as 32 patch combinations for use by guitarists, keyboardists and other musicians as well as offering many studio uses. Each patch program controls the on/off status, the order of the effects in the chain, the output level, and a sub-output for routing to a separate amp or PA.

The SCC-700, which carries a suggested price of \$695, can control any kind of effects from any manufacturer, programming them to turn on and off in any combination. The switches on the centre are simply touched in the order in which the effects are to be played. A computer memorises the patch program and a monitor indicates what has been programmed before that program is engaged. The programmer can be disengaged for manual operation.

E&MM

Manufacturers and companies mentioned:

Alembic Inc., 45 Foley St., Santa Rosa CA 95401.

Gibson, Rosetti & Co., 138, Old Street, London EC2.

Hamer Guitars, 835 W. University Drive, Arlington Heights IL 60004.

Ibanez, P.O. Box 866, 1761 Winchester Road, Bensalem PA 19020.

Mesa Engineering Inc., 1317 Ross St., Petaluma CA 94952.

Original Musical Instrument Co. Inc., 18108 Redondo Circle, Huntington Beach CA 92648-1398.

Ovation Instruments Inc., P.O. Box 4, Blue Hills Ave. Ext., Bloomfield CT 06002-0004.

Roland, Brodr Jorgensen Ltd, Great West Trading Estate, 983 Great West Road, Brentford, Middx.

Unicord, 89 Frost St., Westbury NY 11590.



PATRICK MORAZ

FUTURE MEMORIES LIVE

Last month we looked briefly at Patrick's career with Refugee, Yes and The Moody Blues. Now he has his own studio in Geneva, where he performed a set of live improvisations for Swiss TV which are captured on the 'Future Memories' album. This month we look in detail at the musical content of this fascinating LP, and part of the musical philosophy which went into its production.

Future Memories represents a set of metamorphoses for keyboards, an inter-related series of pieces designed to display the possibilities of high musical technology and its relations to more traditional styles of music-making.

Each of the three major pieces is an 'instant composition', an improvisation based on different musical ideas and using different musical forces. The overall concept is realised when the common factors become clear to the listener; 'the album constitutes a whole, in terms of musical and technological progression. All the music was instantaneously composed and performed in front of the TV cameras.'

That Patrick Moraz would turn to live improvisation was perhaps inevitable. His early background was less in the field of popular or rock music than in that of ethnic or jazz music. In each area the improvisatory tradition is strong; whether in the Brazilian percussion rhythms which dominate the narrative sections of 'The Story of i', or in the jazzy piano solos of Future Memories, spontaneous composition provides a driving force, a certain life and fire denied to more conventional music.

Jazz piano improvisation has a long tradition and a catalogue of styles - blues, boogie-woogie, stride - which give a choice of techniques, what Moraz would call 'musical dialects', denied to modern instruments. Future Memories is an attempt to develop a series of dialects for electronic instruments as well, and appropriately enough the context is that of electronic communication, the

TV studio.

The acoustic/electronic and musical/visual relationships are parallel; the visuals are synchronised by the music, and yet the content of the music is partly determined by the visual context. 'In the piano pieces, one can hear some weird little noises in the background; these are the TV cables and the cameras being manoeuvred during the performance, and although we tried to 'noise-gate them' we could not completely eliminate the feel of their presence... it will give the listener the assurance that he is hearing exactly what was recorded that day and that the performance was really done live on TV.'

The LP version of Future Memories invents the running order of the TV show. Originally the pieces represented a sort of musical history, with increasing complexity of instrumentation. Under this format, the running order would be as follows;

Black Silk Part 1 Part 2

Instant piano composition: Bosendorfer Imperial.

Eastern Sundays Part 1 Part 2

Instant piano, percussion and synthesisers composition. Bosendorfer Imperial, glass bells, Paiste gong and cymbals. Jupiter 4, Clavitar, Oberheim 4 Voice, Minimoog, Micromoog, Roland space echo, flangers and compunoise.

Metamorphoses Movement 1 Movement 2 Movement 3

Instant electronic composition. Yamaha CS80, Minimoog, Moog Taurus, Mellotron Mk IV, Oberheim 8 voice, Hammond C3, Clavinet, Micromoog, ARP Pro Soloist, Custom Double Minimoog, Yamaha CP70 piano, Obie Sequencer, Roland Vocoder, Roland Compurhythm, Mellotron Mk II, Jupiter 4, Oberheim 4 voice, Clavitar and pedals. All instruments direct injected through studio mixing desk to monitor system, except Leslie speakers and Clavinet.

The album then becomes a sort of competition, a contest to establish whether the 'themes, melodies and harmonies' produced by the electronic instruments can match those of the acoustic piano and percussion for delicacy, subtlety and expression.

Black Silk, the piano piece, opens with slow chords under a rapidly repeated tritone in a minor mood. After a rapid right-hand arpeggio there is a repeated interval which returns to the repeated tritone. A brief major excursion with jazz phrasing is followed by an ascending series of chords in which the left hand repeats the material played by the right.

The bass figure starts to repeat under a modulating series of chords and the use of jazz phrasing and broken notes increases until a fully-fledged boogie-woogie section begins. These two sections are repeated, with the right-hand material becoming increasingly complex with sections of chromatic scales, occasionally interrupted by heavy repeated chords.

After a rallentando and mild discords the piece breaks up to isolated individual notes and ends on a gentle trill.

Eastern Sundays Pt. 1 opens with clock-like repeated piano notes over gentle metallic rustlings, with the introduction of a fluid eastern-flavoured solo line.

Heavy piano chords and a phased gong introduce a slow up/down arpeggio sequence and more of the solo line which uses pitch bending and long, slow filter 'twangs'.

In Part II the arpeggio speeds up and the metallic tinkling percussion is contrasted with electronic percussion. Piano chords build to a detuned sequencer, churning white noise effects and the re-introduction of the solo lead sound, which draws together the two halves of the composition. The steam engine-like rhythm continues before fading out in abstract synthesiser sounds, white noise and birdsong effects.

Metamorphoses Movement 1 begins with an electronic high-hat and sequencer pattern which is randomised in terms of pitch, phrasing and tone. Phased chiffs of white noise and a bass drum beat are introduced and heavy flanging and sample and hold effects appear. Every pattern is heavily accented and randomised rather than regular and mechanical; as the sequence re-emerges heavy Mellotron male choir sounds and a deep Moog bass are introduced.

An electric piano solo over the rhythm leads back into a heavier section with very unusual staccato Mellotron effects.

Movement II fades in a sequence with sample and hold treatment followed by a similarly treated polyphonic string sound. A fluid solo begins to dominate until Mellotron voices and strings fade back in.

Movement III sees the re-emergence of the rhythm and randomised sequence. A phased lead solo using filter modulation and pitch bending becomes more rapid and the heavy vocal sounds are repeated.

The piece is filled out by strings and polyphonic synthesiser 'twangs', then brassy chords. Abstract sounds begin to take over until the strings are re-introduced, bending upwards before a final restatement of the voice theme. There is a slow fade, leaving almost inaudible birdsong effects.

It is for the listener to decide whether the competition has a winner or whether no resolution is achieved. Moraz will go on to integrate acoustics and electronics either way; they achieve a form of co-existence in his music, a state chosen for the title of his collaborative album with panflute player Syrinx.

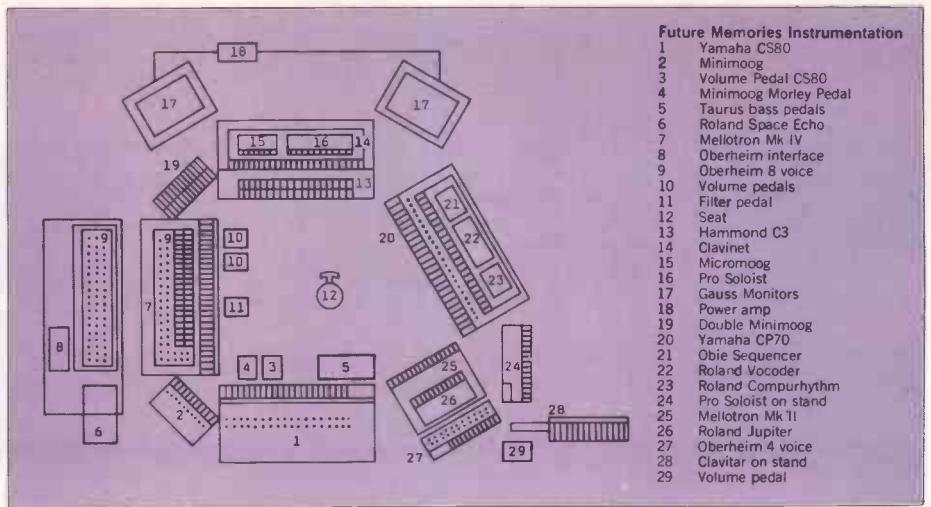
On Coexistence, the orchestral arrangements of the synthesisers back the expressive tones of the panpipes on five short tracks, and one longer piece in four movements. Again the contrast is between the traditional in the form of the wooden pipes and the modern in the form of the synthesisers and Aphex processors used; the similarity is in the expressiveness wrought from each.

Patrick Moraz' music remains a collection of ideas and enigmas which only the individual listener can resolve.

E&MM

Future Memories, Coexistence and an additional single were the subject of last month's special offer and are still available from E&MM price £6.99 (inc. p&p, add 90p overseas).

Next month Patrick explains his approach to improvisation for the Future Memories LP.



RECORD REVIEWS



Peter Gabriel 4
Peter Gabriel
Charisma PG4

Gabriel's latest in his magazine-like series of solo albums continues to express his interest in combining rock and ethnic music with the highest modern technology. As usual there's an impressive cast of musicians involved — apart from Gabriel himself there's bassist Tony Levin of King Crimson, synthesist Larry Fast (Synergy), session drummer Morris Pert, vocalist Peter Hammill and many others.

Gabriel's interest in and respect for technology is reflected in his careful listing of instrumentation and equipment. The album was mixed digitally on the versatile Sony PCM 1610 system, and recorded with the help of Mobile One, spotlighted in last month's Industry Profile. Digital delay and reverb was provided by equipment from Advanced Music Systems, a British company rapidly making a name for itself in the studio effects field. Apart from piano, Prophet and Fast's Moogs, extensive use was made of the Fairlight CMI.

Gabriel's involvement with the CMI goes back some way, and here he even takes the trouble to list individual settings used on it by himself, Stephen Paine of Syco Systems and David Lord. 'San Jacinto' for instance, opens with quick, high-pitched trills of 'Marimba', while the successful single 'Shock The Monkey' uses 'Marimba' 'Clav', 'Saxy' and 'Trump'. There are more exotic settings, such as 'blown drainpipe' and 'scraped exhaust pipe', but the overall tendency is towards short, precise, plucked and typically digital sounds.

The powerful backing of acoustic and Linn drums and Levin's 10-string stick bass often produce an African feeling dating back to 'Biko' on an earlier PG album. As usual, the vocals weave over the backing clear, impassioned, sometimes expressing great pain. Often the mood is sombre, as on the gentle 'Lay Your Hands On Me', but the sense of power is barely suppressed. Certainly the album comprises a versatile set, and must represent the state of the art in combining electronics with popular rock music. The whole mixture is carried along by its powerful primal beat; Gabriel sings, and it's easy to believe him, that 'The Rhythm has his soul'.

On the Wing of a Condor
Incantation
Beggar's Banquet BEGA 39

Following our continuing discussion of keyboard player Patrick Moraz's involvement with the Rumanian pan-

Return of the Golden Mean
Fortuna Tapes
Procession
Xolotl Productions
Bernard Xolotl

Xolotl's modesty in contacting E&MM and sending a selection of his cassette albums (see letters, October '82) belies his growing reputation as the producer of the most outstanding cosmic meditative music heard in recent years.

Recently he has collaborated with Cyrille Verdeaux, founder of Clearlight, on a set of tapes for the Californian 'new age music' label Fortuna, and the two have produced such interesting items as 'Prophecy', recorded solely on a Teac 4-track using Prophet 5 and guitar synthesiser.

'Golden Mean' and 'Procession' represent Xolotl's solo contributions, although he is helped out on some tracks by Verdeaux, by Daniel Kobialka or Jonathan Kramer (cello) and by Irene Gostnell (violin). Other instrumentation on 'Procession' is Prophet V, Pro-One, Vocoder and Guitar Synth, in this case a polyphonic design supplied by Zeta Systems of California.

The title track is icily beautiful, with the 'cello taking a sombre lead over floating voice-like chords in a texture reminiscent of Klaus Schulze's work with 'cellist Wolfgang Tiepold. Fast arpeggios and swoops alternate with long legato notes and gothic chords, which are picked up on the following track (fifteen minutes of 'Mirador') and indeed remain a motif throughout the album. 'Procession' represents an hour of intensely bitter-sweet music.

'Golden Mean', on the other hand, has a little more animation, although it's emphasised on the insert that 'All

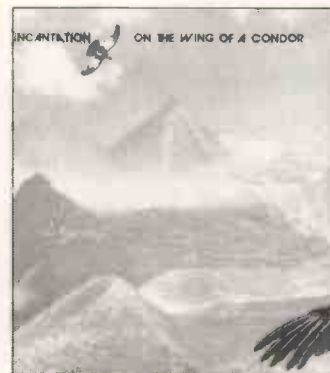


music is recorded in real time — there are no sequences on this tape, all notes played by hand'. The instrumentation is cut down to guitar synth, violin and 'cello, and synthesiser on two of the eight tracks only.

The titles are quintessentially cosmic, the opener being 'Nearing the Gates of Eleusis' and the closer 'L'Eternal Retour'. A concept album? Perhaps not, but Xolotl's Pythagorean leanings are clear without knowledge of his self-description as a 'musical philosopher'. Certainly the music suggests a certain pattern of numerical relationship, with guitar arpeggios echoing and repeating a la Gunter Schickert and the predominant sound being short, sharp and easily quantified rather than chordal.

The presentation of the Fortuna tapes is most luxurious, with gold labels and richly coloured cover illustrations. The music? Perhaps a little sparse for some tastes, perhaps a little lacking in variation, but it achieves what it sets out to achieve, and does it with conviction.

Fortuna tapes are available from *Mirage, 614 Southmead Drive, Filton, Bristol.*



pipe player Syrinx, a look at an album of music for panpipes seemed an interesting diversion.

In contrast to the music of Syrinx or Gheorghe Zamfir, this music comes from the South American tradition, although played by a British septet with emphatically non-ethnic names such as Nick, Andy and Tony. There's little concession to Western taste, however, and the music of the Andes Indians is reproduced here faithfully on genuine examples of the Anata (wood flute) Bombo (goat skin drum) Charango (double stringed guitar) and many other instruments each of which are carefully illustrated.

The whole exercise isn't stuffy or inaccessible, however. Some tracks such as the opening 'On the Wing of a Condor' or the single 'Cacharpaya', are almost maddeningly catchy, with

a tendency to accelerate towards the end of a track and a thumping beat would make almost anyone's foot start tapping. The basic rich, breathy sound of the panpipes is effective here because it isn't over-used. Full marks to Incantation, and to Beggar's Banquet, for imagination and open-mindedness.

Quartet
Ultravox
Chrysalis CDL 1394

The new LP from Britain's most popular electro-music group presents very much the mixture as before — the same combination of rhythm and symphonic grandeur which made 'Vienna' such a success.

The difference here lies largely in George Martin's production, which contrasts markedly with that of Conny Plank. There's a certain feeling of space, of very careful separation and stereo placement of each instrument, which makes the total sound even clearer and perhaps a little sparser than before.

Percussionist Warren Cann assures us that working with George Martin, famed for his production work with the Beatles, was something of an experience. Certainly the music is as disciplined as ever, with the percussion and bass locked tightly together to form the typical Ultravox disco rhythm.

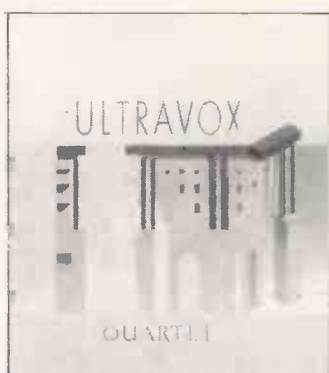
Happy Families
Blancmange
London SH 8552

Blancmange fall exactly half-way between *Orchestral Manoeuvres* and *Depeche Mode*. After a couple of experimental singles using an old Italian *Bunny One* organ rather in the style of the former, they ended up supporting the latter on tour, after having the track 'Sad Day' on the 'Some Bizarre' compilation along with *Depeche Mode* and *Soft Cell*.

In a move to become more commercially accessible the duo (Neil Arthur on voice, electronics and occasional guitar and Stephen Luscombe on keyboards) added a good deal of electronic percussion to their singles 'God's Kitchen/I've Seen the Word' and 'Feel Me'. All three tracks are here, along with a revamped version of the melancholy 'Sad Day' which now has so much percussion on it that it sounds rather jolly.

The openers 'I Can't Explain', 'Feel Me' and 'I've Seen the Word' rely heavily on rhythm rather than melody. 'Wasted' is better, with a delicate slide guitar backing and heavily-accented McCluskey-style vocals, while 'Living on the Ceiling' has an exotic backing of sitar and tabla.

On side two 'Waves' features another archetypal vocal style, the throaty Bryan Ferry/Dave Sylvian take-off, which is quite effective with a backing of gospel singers and swooshes of white noise. On this side again the mix is between the percussion, sustained tones and impassioned vocals of OMD and the poppy melodies and drive of *Depeche Mode*. There's a touch of funk and soul, however, which gives *Blancmange* an identity of their own.



The opener, 'Reap the Wild Wind', was reviewed in last month's E&MM, and is typical of the album. There are moods distinct from the pumping pop rhythms, however; 'Visions of Blue' begins with a gently crooned vocal over melancholy organ-like chords, and throughout the album the string/organ sounds of Yamaha keyboards treated with a slow, light vibrato conjure up melancholy images.

The sound isn't totally electronic, retaining some acoustic piano and woodblock-like percussion sounds, and perhaps it's touches like these which maintain the popularity of *Ultravox* by avoiding a coldly clinical sound. The vocal messages are, as ever, obscure — vignettes of pleasure and pain, love and hate. As ever, the music has the power to push them across.

E&MM

PATRICK MORAZ

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CLIFF RICHARD

Born Harry Rodger Webb in Lucknow, India on October 14, 1940. Moved to England aged 8 and picked up his first guitar in mid-teens. Joined a local skiffle group and then formed his own band The Drifters. Gave up his job as a credit control clerk and moved to work in London. Norrie Paramor put them in a studio in '58 and soon after Cliff and The Shadows (with name changed to avoid confusion with the American Drifters) signed to EMI. Their first single 'Move It' reached No. 2 in the charts.

In '59, Cliff made No. 1 with 'Living Doll' and in the 5 years that followed became the world's top male record seller. Turned to films and had great success with musicals including 'The Young Ones' and 'Summer Holiday'.

An international star right through the '70's, Cliff's Christianity became an important part of his life and he contributed to the Tear Fund through charity concerts in many countries.

In '75 released 'Miss You Nights' and in '76 'Devil Woman' became his first American top ten hit. In same year he was the first Western R&R artist to play behind the Iron Curtain. His best selling album '40 Golden Greats' came out in '77. Re-united for a sell-out concert with The Shadows in '78 and gained his tenth No. 1 UK single 'We Don't Talk Anymore', selling 2½ million copies worldwide.

Awarded the O.B.E. in January 1980 and continued to release hits like 'Carrie' and the 'I'm No Hero' album. In '81 Cliff toured N. America and the UK and releases included 'Love Songs', 'Wired For Sound' albums.

Earlier this year he made a world tour followed by his latest album 'Now You See Me... Now You Don't'. Cliff is currently doing a series of gigs in Europe and then a UK gospel tour. During his career he has made over 40 albums with numerous gold and silver discs and more than 70 British hit singles!

mean it will sell any records. For me the instinct has come more and more to the front as opposed to the technique.

During your musical career you've gone through a lot of influences, from early Skiffle in '58, then to Rock & Roll, Blues and Ballads, and more. With that range of styles it must be difficult for you to choose the way you now select and perform your music.

No, I think it's easier, but that varied background could well be the reason why I am a confusion for many reviewers. My audiences are fantastic, probably some of the best in the world, because they also have wide tastes. I can go on stage and sing 'Living Doll' and they will scream, then sing 'Devil Woman' and they'll go ape. I'll do 'Miss You Nights' and they'll go aah! And you couldn't get three more diverse types of songs that demand different things from me vocally, different things from my band and demand a different reaction from the audience each time.

So all my albums are diverse and it stems from having been through all that area — including all those straight ballads with Norrie Paramor. And all the skiffle stuff gave me a hint of country in my life. I even had a No. 1 here with a country record ('Minute You're Gone') and a No. 3 ('Wind Me Up'). So now when a writer tells me "I'm going to send you something that I've written just for you", I always say: don't bother sending me that, because inevitably it's usually wrong. How stupid to say that to me? How do they know what I'm into at that moment or what I can or cannot do? If they've heard 'Congratulations', that's all they'll send me. That's what happens to a lot of artists and it happened to me for nearly 10 years — I was labelled with 'Congratulations' and that's all the kind of music I was sent until I found 'Devil Woman'. Then every one exclaimed: is that really Cliff Richard — but I'd been singing like that all my life.

Do you put your songs into categories such as Rock or Gospel since you perform different types of concerts?

Cliff Richard

As Cliff approaches his 25th year in the music business, he puts his own music making into perspective around his latest LP 'Now You See Me... Now You Don't'

Cliff: There is a difference between being musical and being a musician. Over the years I've had to have a certain amount of musical knowledge but it's mostly all intuitive, all instinctive stuff.

It's like when I do harmonies for my own backing vocals on an album. Experienced musicians often do have that instinctive feeling. By saying that does it mean you have had no real training?

None at all. I've had ndrie whatsoever.

Sometimes I think maybe I should have done, but then I think that the spontaneity of my career might not have happened. I don't think it would have spoilt me but it would have made me something different. But my career has gone from strength to strength recently and I think this is mostly because the music industry isn't so bothered now whether you can play 500 notes on a guitar in 10 seconds flat — which is technique — some people can do it and it's wonderful and you sit there aghast but it doesn't necessarily

I think the Rock & Roll world is much wider than people say and again it makes me anathema to many people in the musical industry — mostly the writers. I do not fit their stupid little blinkered images, whereas Rock & Roll is bigger than me or them and it's bigger than Led Zeppelin or the Beatles because it covers all of those people and we all have a right to be there. So that for me, as one of the pioneers in European Rock — The Shadows, Marty Wilde, Billy Fury, myself — there was no one before us. We began it over here, so it's no good people saying to me that I don't sing Rock & Roll. Maybe they've lost the vision of what Rock & Roll really was — for me it will always be the three minute song. Elvis' 'Heartbreak Hotel' was a great bit of 3-minute blues and that was the beginning of Rock & Roll. It was inevitable that it would change and I'm glad it did, otherwise I could never have done 'Now You See Me Now You Don't'.

Rock & Roll has now come of age — it's no longer truly R&R but I really believe it should be treated as an art form. I treat my albums in the way artists would treat their paintings, so when I layer a sound, if it doesn't sound right, I erase it, and I find the sound that fits. Obviously the results are objective — if I sell one million records it just means that 49 million people *didn't* like them either!

How do you go about getting new songs since you don't write yourself?

I have composed. I've done about 30-35 songs in my time and I've sung a few of them. 'B' sides mostly. And in the Gospel set I've done things like 'Yesterday, Today, Forever' which is my favourite song out of the ones I've written. But we never worked on it as a record. It was always a live spontaneous thing. We did it once on a live album but I didn't like that version of it.

Sometimes when you write something, it's so spontaneous that even recording it detracts. I've written things like 'Love On Shine On' on the 'B' side of 'Devil Woman'. There's been a few 'B' sides and incidentally, I've just written two songs with my keyboard player, Dave Cook. Although Craig Pruess is co-producer on the new album and played most of the keyboards for it, Dave is really my keyboard player. Craig played because it was convenient and when you are producing, it saves time telling someone else what you want.

What guitars are you using these days?

I'm a non-musician who has sixteen guitars at the moment!

I brought the original, first ever Fender Stratocaster into the country — white, with gold fittings. I bought it for Hank (Marvin) to play for me, but everyone thought I'd bought it for him so he kept it! It's a wonderful guitar.

One instrument I now use on stage is an electric, the Aria Pro. I love the look of them and they've a great sound since they've



Cliff with the Adamas guitar.

eradicated all that Strat. buzzing and humming that you can get through the amps with those pickups.

I also use two Washburn acoustics — one flat-bodied one and another with a large body. I've got a Martin D28 acoustic, and a wonderful Jumbo Gibson J200. It's really old now, and although I've got a pickup on it, I don't use it. I've got a Gibson J45, also with a pickup. The Washburns have built-in pickups, a nice feature so you don't have to ruin the body work.

My latest guitar is the Ovation Adamas, which has a very attractive finish. Last year I had four guitars stolen in Los Angeles, so rather than get four guitars again I used all the money to buy the Ovation.

Do you have any preference for pick-ups?

Those ones we tried years ago were the small Barcus Berry types which I never really enjoyed — I prefer them set in the bridge, as on the Ovation and the Washburn. The Adamas by the way, is a 12-string.

Yes, I hear that quality in the music although it could have been de-tuning with a chorus box.

That's how we do it mostly — we haven't used a 12-string on the latest album at all. Of course the de-tuning trick is as old as the hills now, first used as many as 10 years ago maybe.

Do you like to use effects pedals?

No, although I might have done if my career hadn't gone in the direction it did. I became very conscious of acting and singing, as opposed to playing. I consider

myself a singer/performer, as opposed to a singer/musician. So I threw the guitar away for years and didn't play it at all. When I became a Christian I had to do little gigs by myself and I dug my guitar out again. The actual playing of the guitar was not as important to me as discovering that I could use my voice as an instrument and be part of the sound. In fact, in Rock & Roll it's the most important part of the sound — it is the song. *That brings us back to the music writing side, because a lot of people these days are trying to make the voice an equal 'instrument' with the others.*

And they do succeed! I have to admit they do it very well, because a lot of the voices mean nothing. The vocal lyrics don't have to say something deep, but they ought to be at least listenable and to get a lyric that says more than people expect is terrific for me. Right in my 'middle-of-the-road' career (the 10-year section when I was an extremely middle-of-the-road artist), I recorded some songs which seem to have been completely ignored by the musical press — one of them was called 'Throw Down A Line', written by Hank Marvin which we performed together. It was a real heavy number for those days (15 years ago) with two drum kits and a very heavy lyric too, so when people write me off I want to scream with agony!

Moving back to song writing, I'm enjoying this new collaboration with Dave Cook. In rehearsals we find some chords and melodies that go well together and I'll tape the chords and work with them. But unfor-



Cliff rehearsing with his band at Shepperton Studios.

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Cliff Richard

tunately, I don't have time to develop my piano playing, although I'm sure I could learn enough to write and spread chords around the place!

I don't want to be a 'musician' now, I want to be a 'musical personality' who is able to perform songs that others don't even attempt anymore. I want to make records that keep the lyrics important.

How do you go about getting hold of a song?

It's easy actually — I hate to say this, but everyone knows that generally I don't write and that I'm likely to sell a minimum of ¼ million albums. So everybody wants to be in on it and I get sent thousands of songs. I can only do ten on an album so I can afford to be absolutely choosy. But it's all very subjective and I could easily miss a No. 1. It's also impossible for me to listen personally to all the songs. I've got a publishing company run by Stuart Ongley and he makes selections — even there is a danger because it's his opinion. And only recently I found a song at the office by chance that was so good it'll be on my next album which I'm doing live with the London Philharmonic Orchestra — that's going to be an interesting evening at the Albert Hall on November 23rd. We are going to re-arrange things like 'Carrie', 'Devil Woman', 'Miss You Nights', 'Green Light' — all the rocky things.

Is this the first time you've done anything like this?

I did four songs with the LSO last year which prompted an offer to do this concert with the LPO. I'm going to approach it as a totally commercial venture. Artistically it is going to be a treat. But although we've tried and tested songs like 'Devil Woman', it's going to be interesting to hear the LPO take the place of the guitars. I'm using my drummer Graham Jarvis, Dave Cook on synths, a bass player and my three vocalists with the 80-piece orchestra.

Working from the Demo

Let's come back to this point of choosing a song.

Sometimes a demo tape sent in is quite good so you can build up from it, while others may simply be, for example, just guitar and vocals. Then on the LP 'Every Face Tells a Story' is a beautiful ballad called 'When Two Worlds Drift Apart' which is a magnificent song, but it took a lot of listening to recognise its potential.

Generally I might pick ten songs for an album that have struck me instantly to a lesser or greater degree. 'The Only Way Out' sounded a hit the minute I heard it. 'Now You See Me Now You Don't' had the feel of a good album track, and this is how I go about choosing tracks. Once I've picked a range of songs I won't bother listening to any more.

I started on this latest album 'Now You See Me...' last September 1981 and we finished in June this year. We left the actual decision of which tracks to use on the album until we'd finished all the recording, so we ended up with seventeen basic tracks and hacked seven away. I always tell guys whose music I use that although I'm recording their song, I can't guarantee it will eventually be on the album because of this. That's one of the reasons why I very rarely have my songs on the album because I always hear things that are better than mine!

It's only recently as I said that I've got the taste for writing songs and I think I've written two fairly good songs, (with Dave's help of course), but I'm still going to put them in

alongside the others as possibilities. Sometimes I choose different titles for songs, and the LP title is just instinct again. 'Now You See Me... Now You Don't' has the meaning that just when you think you know all about me I shall do something else. Why be surprised? Why be upset and why be angry with me if I change? I had all those thoughts when I chose that title.

Isn't 'O Little Town of Bethlehem' out of place with the other tracks on the LP?

It is the first time I've ever recorded a song aimed at the Christmas market. I've always been against it, but a new writer I've signed called Chris Eaton wrote two songs on the 'Wired for Sound' LP and three on this one, including 'Little Town'. Obviously the lyrics are the old carol, but he changed the melody and sent me the demo a year and a half ago. He wanted me to do it last Christmas! But again I felt it wasn't going to fit on that album — not dreaming that 'Now You See Me...' would eventually have nine tracks with Gospel content!

I liked the harmonium in the song 'Be in my Head' and was also surprised you used the Mike Sammes Singers on that track.

Now I thought that was daring! This is what annoys me, for if I was listening to it, I would think 'harmonium'; okay, what's he trying to do, and told Craig the feeling I want to give is that you are walking through a wood with the church in the distance. The door is opening and you can just hear the sound coming through — that's the harmonium. Then I wanted a real church choir sound and both Craig and I thought it was a great idea to use the Mike Sammes Singers. Now the Press look at it and say 'yuck'. They can't see that we are trying to communicate that this is a song that is religious and if you want people to understand this you have to give them little hints. Overall the song really is quite modern, using a great mass of synths, but to have that little bit just indicates that this actually is traditional — something that will never change.

Producing the songs

How do you go about producing your songs?

Obviously we get the keys first, selecting what seems comfortable for my vocals. Then we spread the keys around the album so that no two keys come together. Usually I sing in three or four keys.

So you and Craig work out the format of the song?

Yes, we discuss how the songs should go together next.

Is this the first time he has worked with you as a producer?

It's the first time Craig has done production for me. I'd heard of a budget production he'd done that still sounded expensive and thought if he can do that with £10 thousand, what will he do with £30 thousand. He's also got his own single out called 'Too Beautiful To Cry' on which I did some backing vocals for him. He's very talented.

Another point here is that if my career is to continue the way it has, I have to face new challenges all the time and I can't afford to stagnate. Not even working with the same producer. I've worked with Bruce, Alan Tarney and Terry Britton and Craig knows that we'll probably do one more album together before I'll need to work with somebody else — and he'll want the change too. The demands made upon me by different producers make a real challenge. It



also results in different combinations of instruments on song tracks.

Although Craig was very much into the 'Wired For Sound' album, I wanted to break away from that sound. He agreed and suggested using more synthesizers. We'd previously only used the Polymoog for 'I'm No Hero' and 'Wired For Sound', (with a few snatches of Prophet here and there), along with guitars, drums and bass, of course. He then wanted to add sequencers (which I'd never used before) as they were his forte. It all sounded great to me!

The sequencer was used for bass lines and fast melodic runs. Craig uses the Sequential Circuits Poly-Sequencer into the Prophet.

Do you use drum machines at all?

The bass drum is the Linn Drum on the whole album. We program our routine into the Linn Drum and start recording by laying that with the code on one track.

That's very interesting because your whole music retains its flexibility by also using live drums.

Absolutely. We have to do it this way now because of the sequencer. We need the code and a positive line going so we can then make changes, adding and deleting parts. After laying the drum track, Craig then puts a couple of keyboards and a bass sequencer on. We then bring the rest of the drums in. *You still seem to retain the live band feel.*

I call that enthusiasm! When the drums go absolutely strictly it could be clinical and that's why I think it's vital that the Linn doesn't take over, because in the end people have said to me you won't even know the difference. But it can be too precise — so when you get that drummer in and he puts his own feeling to a solid beat it gives it a freedom and fluidity you'll only get from the live drummer.

Vocals

My vocals don't take long to record and we do it as we work through the tracks.

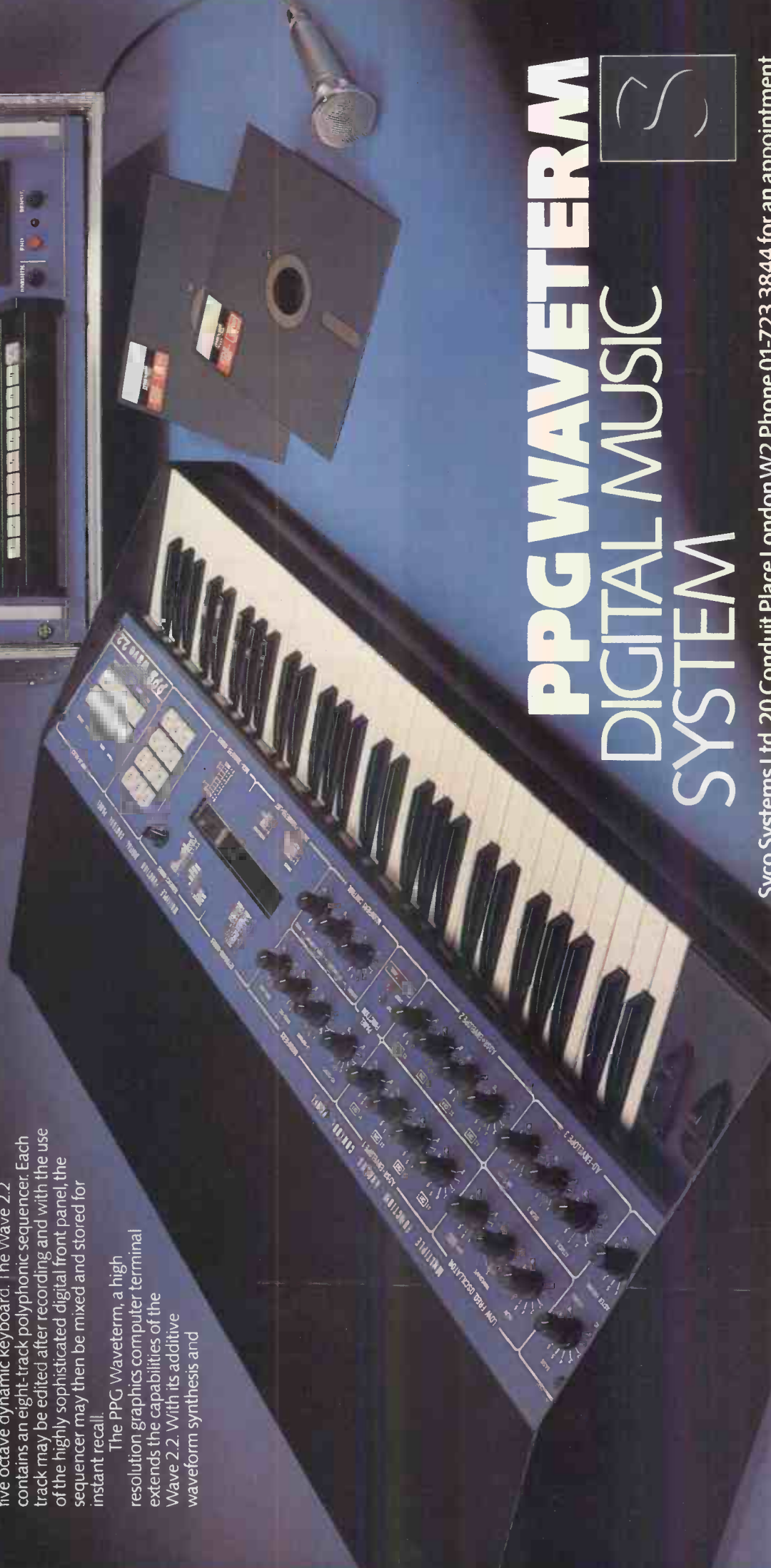
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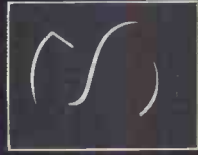
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Cliff Richard

But the actual recording of the tracks with the instruments takes quite a long time. We get one song virtually done — obviously we don't get the drummer in until we've at least four tracks done for him. This probably takes at least a week to get ready. We don't write the music down, except that Craig likes to jot his own sketches to show entries of instruments and the musicians sometimes use bar charts. We'll make each track almost complete, apart from the extras like runs or brass flourishes. In the case of 'Little Town' we left the brass off completely and this was added separately as the last thing. We all contribute to the make up of the piece, so if one of the band suggests we should have a bit of flanging on a certain part of a track we'll try it out. It has to be this way nowadays — the times have gone by when the guy says "you will play it this way" — certainly for up-front R&R.

Do you ever get aural imaginings like hearing riffs on guitars or songs with trumpet backings?

I don't but Craig does. We are producing a girl called Sheila Walsh at the moment and we've already set a pattern for a song from Craig's 'visions' about it.

I notice that you multitracked most of the vocals yourself on the LP.

All but 'Little Town', that's the only one I used other people on.

It must be a natural thing for you to work out the harmonies.

Yes, it's one of my great joys — I've always been a frustrated vocal group! I'm an instinctive singer and sometimes that catches me out. I'll do a couple of lines, one a third above, and then I'll start to do another harmony and find I keep hitting on a unison, and can't fathom this one out. But it's because I've maybe started on the wrong line. I can't explain it because I'm not that up on theory. Sometimes it's taken ages to figure out what it is and then all I've done is changed the first line and it's come together perfectly after that. I also used falsetto (singing in a high pitched voice) on stage long before I did on record. I find it particularly useful on vocal harmonies since it gets you right up to the high notes. The thing about a male singing falsetto is that you can control the vibrato. Women seem to have to give a lot of vib. and it's a sound I don't find too attractive.

I multitrack the harmonies above or below as needed — the classic way to do it is one above and one below. Once we have the basic track down, even if we haven't finished all the sweetenings, we'll try and get the vocal on. It does not take me too long. I'm blessed with the fact that I can hear when I sing out of tune, so I just record the track again. Quite often there are two or three tracks on the album that were first takes. Often I try it again on another track and think, what's the point, it felt better the first time. So having got that I go back into the box and get the tracks played back a few times while I think of ways of adding group vocals. I really enjoy that part of the work — it's great fun thinking of 'hoops' and 'woops' and 'ooh-aahs'. 'Now You See Me...' has got a lot of 'hoop hoop hoo-oo chukka chuck', which is an old R&R way of doing things where you use the syncopation in terms of vocals.

I notice you centre your voice most of the time in the stereo field, with vocal backing stretching left to right, and then there's your trick of adding a lot of presence to the voice.

Always. But I don't know what it is, except

that we work with a brilliant engineer called Keith Bessey and he knows how to get the best sounds for my voice. Sometimes he just uses a regular plate echo to add to the vocal and my voice does have a natural 'edge' or presence to it. We don't use any specially rigged mics or EQ on the mixer. The mics we use are Neumann's in EMI and on stage they are Electrovoice DS35's. We quite often use a compressor on vocals to even it all out, but on things like 'On Water is Wide' I know we used an echo on the voice and the echo was echoed as well. It sounds like a great big room, and yet the voice is right up front.

So you don't use a lot of reverb?

No, I like it dry, but if we do use reverb we stick it back. If we are singing together, I tend not to sing the S's and T's. We've also used chorus effects on 'Thief in the Night' and 'Son of Thunder' — done on the AMS Digital Echo. In particular 'Thief in the Night' is very dramatic, with a daring Christian lyric so I wanted the voice to sound truly dominant. The chorus effect makes it strong and still ethereal too.

Do you decide the placing of instruments with the engineer?

I get involved in that the engineer always asks how I like to hear it, but they always seem to know what sounds best on the left or on the right. Keith Bessey does vary them and I know for instance, that each of the eleven tracks has a different drum layout. On 'Sons of Thunder' you've added white noise.

Yes — and a lot of times we put white noise behind the snare anyway. On 'Little Town', Tony Rivers did the vocal arrangements — apart from the ending which was my idea. He can do Beach Boy kind of harmonies easily, which was the way they turned out to be, with the 24-piece brass adding a traditional flavour.

How do you see yourself following the new trends in modern music?

I shan't be doing this singing/speaking kind of thing — I believe there is a role for us R&R singers who sing and I'm going to stick to that. I can be influenced by the good bits from everybody else without plagiarizing, but there's a line that you can step over and steal and I certainly don't want to do that. 'Now You See Me' is a direct influence of what is happening in our synthesiser age.

I'm not going to stop here, that's for

certain, but where it will lead to I don't know because everything I've ever done has been instinctive. As long as my voice stays intact I'll keep on singing!

Mike Beecher

E&MM

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Alan Park Keyboards

Oberheim OBXa 8-voice using 120 programs. Rhodes 88. Roland Vocoder 330 Plus (as string machine only). Direct injected to mixer. Tambourine.

Dave Cook Keyboards

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John Clark Dual lead

Gibson Les Paul. Manson Sitar Guitar. Mesa Boogie Amp miked up. Effects include Roland Analog Chorus Echo, Memory Man Delay, Boss Chorus, Electro-Harmonix Mistress (Flanger) and MXR Distortion II, Dynacomp Compressor, Coloursound Tone Bender (All in custom patch foot box by Peter Cornish).

Mark Jenner Dual lead

Maton (Australian) hand made guitar with 2 double pickups. Collection of old Fenders custom left-hand. All Boss effects. Music Man Amp 210.

Graham Jarvis Drums

Sonor incl. 4 concert toms, 2 floor toms, Zildjian cymbals, Pearl 14 x 10 snare and 2 Roto toms tuned as timps.

Tony Withers, Stuart Calber, John Perry Vocals

Colin Norfield, John James Sound Engineers

Soundcraft Series 800B out front, used as 32 into 2 stereo (especially for Rhodes). Foldback on custom mixer by John and only echo used (no reverb) from AMS DMX 15-80S, Lexicon Prime Time, Roland Chorus Echo SRE-555, Harmonizer 910. All mikes Electrovoice DS35's. Special monitoring for 3 backing singers with individual gain, bass, treble controls. PA from Complex Sounds at least 10k output using 5-way stack with Hill Amps, 6 RCA bass bins, 4 2 x 10 Electrovoice mid bins, 4 2482 JBL mid horns and 10 2402 JBL high frequency horns.



Keyboard section: Alan Park and Dave Cook (r).



Band personnel: (l to r) Mark Griffiths, John Clark, Graham Jarvis and Mart Jenner.

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Little Town

A Carol for Christmas

Sung by Cliff Richard

From his latest LP "Now You See Me... Now You Don't"

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Timp.

(A) (Centre stereo)

O li-ttle town of Be- - - th-le- hem how still we see thee lie.

mf

mf

Piano (detuned) with reverb

B \flat F E \flat B \flat F

A-bove thy deep and dre- - - am less sleep the si- lent years go by.

Voice

Horn

mp

B \flat F E \flat B \flat F

D. Basses

Little Town

(B) +2nd voice

Yet in the dark streets shineth the ev-er last-ing light the hopes and fears of all the years

Bell

Voices (ooh)

Harpisichord

E_b maj7

mf

are met in thee to- night. to-nigh to-nigh

f *ff*

Horn

+ DRUMS

HH
SD
BD

©

Side Drum Rimshot (with plate reverb)

(C) *mf*

How si- lent-ly, how si- - - lent- ly the won- drous gift is

Voice 2

mf Trpt.

+ Sleigh Bells
x x x etc.

HH x x x x etc.

F E_b

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Little Town

gi- v'n. So God im-parts to hu - - - man hearts the

+ 2nd Voice

(Chorus Voice L/R)

+ Trpts. (divide) Tpt.

ble- ssings of his hea - - - v'n. We hear the Christmas a-ngels the great glad ti-dings tell

Trp. Bell

Voices (ooh)

+ Sleigh Bells

F Eb Bb F Eb Cm Eb F

Drums tacet

O come to us a-bide with us our Lord E-mma - nu - el.

Voices

f Synth

Harp. sych.

f Bb Tpt. Horn

Cm Eb F7

+ Timp Drums

Little Town

where meek souls will receive him still the dear Christ en- ters in.

(words) Twinkle twinkle li-ttle star

en- ters in. Here's to why

Harpisichord

Bell

fff

F

Bb

Timp roll

©

Twin-kle twin-kle li- ttle star

Now I know just what you are. li- ttle star Now I know just what you are.

Twin-kle twin-kle li- ttle star

Here's to why

trombones

Bb

timp. roll Drums ad lib.

Twin-kle twin-kle li- ttle star

li- ttle star

Now I know just what you are.

Here's to why

© timp Drums ad lib.

Fade out to end



**RECORDED
ON
EMI**

**"Now You See Me...
Now You Don't."
(EMC 3415)**

**and now released as a
single.**

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SIMMONS S.D.S.V.

The Simmons electric drum kit is the first full scale kit to be commercially available anywhere in the world. It has been designed to replace conventional drums and to expand the sounds available to the modern drummer. The drums consist of visually exciting perspex surfaces which are mounted on two stands with a free-standing bass drum. The whole kit will pack away into next to no space. The drums are wired to a central control unit, which programs the sounds and dynamics for each drum individually. The response of these drums is fantastic, surpassed only by the mind-shattering sounds produced by the kit itself.

SYNERGY

A totally digital polyphonic synthesiser with 48 voices and over 1,000 sounds available on interchangeable cartridges. The instrument features a 6 octave dynamic keyboard which controls volume, timbre and modulation. Also incorporated is a 4 channel polyphonic sequencer which memorises all phrasing, pitch bends, nuances and key velocity. Stereo outputs and various keyboard assign modes are available, making this an extremely versatile preset synthesiser.

CASIOTONE

CASIOTONE CT 1000P SPECIAL PRICE
CASIOTONE CT 202 SPECIAL PRICE
CASIOTONE MT 70 SPECIAL PRICE
CASIOTONE MT 60 SPECIAL PRICE

We have selected the best of Casiotone's great range of instruments and are offering them at fantastic prices whilst stocks last. Please phone for prices on the entire Casiotone range.

KORG

Korg Trident - this amazing polysynth with separate brass and string voicings, split keyboard, layered sounds and many other unique features, is now available at Argent's Keyboards for the incredible price of only £1,575.

Korg Polysix - if you've always wanted a Prophet Five but couldn't afford one this is the instrument for you. Plentiful stocks and change from a Grand - how do we do it?

MOOG MEMORYMOOG

Moog's fantastic new 6-voice polyphonic programmable is known as the Memorymoog. Each of its voices is comparable to that of a Minimoog, with 3 x VCOs, the patented Moog low pass VCF, 2 x ADSR envelopes, and VCA. A numeric keypad is provided to load programs, and the Memorymoog also has the facility whereby 20 sequences of programs can be stored then recalled with the aid of a footswitch. Also available on this instrument are polyphonic and monophonic glide, Moog's famous pitch and modulation wheels, and two programmable footpedals. The Memorymoog can produce an amazing spectrum of full bodied, exciting sounds.

ROLAND

Argent's Keyboards are Britain's largest Roland dealer and can at all times offer the latest product from this incredible organisation. Come to us first for the most competent demonstrations, and the best prices, of all the Roland range.

FLIGHT CASES

We have permanently in stock a range of C.P. Professional and Rainbow Flightcases. We can also have cases built to order for anything you may require. These cases are simply the best - protect your investment with a Flightcase.

SERVICE DEPARTMENT

Our Service Department exists for the benefit of all our customers. When you purchase an instrument from us you have the security of knowing that our fully staffed Engineering Department will at all times service and maintain your equipment in perfect order. We are an authorised service centre for most leading Synth manufacturers and also specialise in modifications to Moog, Oberheim and Sequential Circuits products.

OVERHEIM

The Oberheim OB-Xa programmable polyphonic features eight voices, a five octave keyboard, 120 memory locations, 8 patch memories, variably split and program layering, a comprehensive array of performance controls, high speed auto-tone, mono and stereo output, cassette and computer interfaces, and many useful rear panel inlets/outlets. Each voice has 2 x VCOs, noise, low pass VCF - switchable between 2- and 4-pole modes, 2 x ADSR envelopes, LFO and VCA, and in addition there is an extra LFO associated with the performance controls. The OB-Xa is housed in a smart case with solid wooden end panels. And recently released by Oberheim is the DSX digital polyphonic sequencer, and DMX programmable drum machine which can be linked up to the OB-Xa to provide a complete music generation system.

YAMAHA

GS1 DIGITAL SYNTHESISER
GS2 DIGITAL SYNTHESISER
CE20 DIGITAL SYNTHESISER
CS01 DIGITAL SYNTHESISER
CP80 ELECTRIC GRAND
CP70B ELECTRIC GRAND

Come and check out Yamaha's great new range of Digital Synthesizers. We stock them all, from the amazing CS01 monosynth at £150 to the mighty GS1 at £10,000.

All prices on application

Phone for prices of products not listed

RHODES CHROMA

A digital analogue hybrid eight voice polysynth with a weighted wooden keyboard for control of amplitude and timbre. Fully programmable on all parameters, this instrument is unique in the facilities and sound available to the user.

ROLAND JUPITER 8

The flagship of Roland's synthesiser fleet is the Jupiter 8 (JP-8). This is an eight voice polyphonic instrument offering 64 user programmable memories and a superb five octave keyboard, which can be split into two polyphonic sections, operated as a single keyboard with up to eight fully independent voices; or played in Dual mode whereby two patches, layered on top of one another, are assigned to each key. A Patch Preset programmer enables the layering, split, and program assignments to be stored in eight different memory locations. Each voice features dual VCOs, low pass VCF, HPF, 2 x envelope generators, LFO and VCA. The Jupiter 8 also provides arpeggio, polyphonic portamento, cassette interface, and a comprehensive array of performance controls.

ROLAND JUNO 6

This incredible new six-voice polyphonic from Roland is the most significant product to come on to the market this year. Polyphonic Sounds only previously available on instruments costing five and six times as much are now available for the same price as many monophonic. We now have plentiful stocks of this amazing new instrument, so come down and check it out now. R.R.P. £699.

ROLAND JUNO 60

Same specification as the Juno 6 but with a built-in programmer for storage of all front panel settings, together with micro-composer interface and program advance footswitching capability. R.R.P. £995.

ROLAND PIANOS

Roland's Piano Plus 70 and Piano Plus 60 are two new touch sensitive compact electronic pianos. Both offer four preset piano and harpsichord voicings that set new standards in piano tone generation. The Piano Plus 70 has a large 75 note keyboard, and stereo chorusing, whilst both instruments incorporate amplification and twin loudspeakers that do more than justice to the instruments' crisp clear sound. The Piano Plus 11 (EP-11) also forms part of this new Roland Range; it features a five octave keyboard, five preset voicings, auto rhythm, auto bass, auto chords, and auto arpeggio, so it is an automatic choice for those who want an 'easy-play' machine without spending a fortune.

AMPLIFICATION

We would be happy to discuss with you all your amplification needs and can demonstrate systems from the following stocks - Roland Keyboard Cubes, Roland Jazz Chorus Amplifiers, Boss Keyboard Mixers, Studiomaster Mixers, Power Amps by Amrcron and Roland, and our own keyboard cabinet designed and built by Mega exclusively for us.

SEQUENTIAL CIRCUITS SEQUENTIAL CIRCUITS SEQUENTIAL CIRCUITS SEQUENTIAL CIRCUITS SEQUENTIAL CIRCUITS SEQUENTIAL CIR

SEQUENTIAL CIRCUITS

The SCI Prophet 5 is a programmable polyphonic that has become the standard against which other instruments are judged. Each of the Prophet's five voices boast: 2 x VCOs, noise, low pass VCF, 2 x ADSR envelopes, a comprehensive LFO and polymodulation section, and VCA. This Poly-Mod facility enables the Prophet 5 to create unique modulation effects, and helps to add that extra dimension to the sound for which the Prophet has become famous. Other features include a five octave keyboard, new 120 bank program memory, voice defeat, cassette interface, user determinable scale tempering, and much much more. The Prophet's uncoloured sound quality gives it an astounding imitative capacity, which makes the Prophet a particularly impressive studio tool. Sequential Circuits have recently announced two new products which are designed to work alongside the Prophet - the Remote Prophet is a portable keyboard weighing less than ten pounds, and can be worn, like a guitar, so that you can walk around stage whilst playing your Prophet. It features a four octave keyboard, program select switches, and performance controls. The new Poly-Sequencer, now with 10,000 note storage, is a comprehensive polyphonic digital sequencer with an integral cassette recorder for sequence and program storage. So, with such performance qualities, and these extra control devices, it isn't surprising that the Prophet 5 is the current market leader.

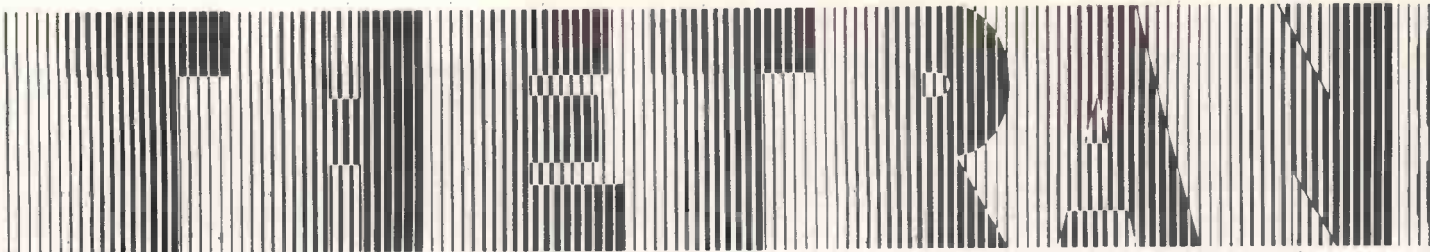
PROPHET TEN	P.O.A.
PROPHET FIVE	£2,600
POLY-SEQUENCER	£895
REMOTE KEYBOARD	£595
PRO-ONE	£339

EXCLUSIVE LONDON DEALER

The Pro-One is a high performance monophonic synthesiser from the Prophet people. The Pro-One has all the facilities that you will ever need in a monophonic - a three octave keyboard 2 x VCOs, a noise source, a low pass VCF, 2 x ADSR envelope generators, VCA, an extremely versatile modulation section, arpeggiator, and a 40-note sequencer. The Pro-One can be interfaced with most makes of ancillary equipment, and the audio inlet enables you to trigger the envelopes from an external source, and simultaneously process that signal with the synthesiser's VCF and VCA. What more could you want from a monophonic?

SPECIAL PRICE £339

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- * Wide Range of Studio Effects
- * Pitch Transpose ± 1 Octave
- * External Control Input
- * Pitch Ratio Display Option
- * Delay and Freeze Facilities
- * Rack Mounting Case



The Harmoniser must be one of the most fascinating and versatile electro-music effects units available today. Unfortunately, harmonisers are traditionally expensive; prohibitively so to all but the more wealthy musicians and groups. The E&MM TRANSPOZER breaks the price barrier, bringing harmonising power within the reach of the average electro-musician or group. No facilities have been sacrificed to achieve a reasonable cost, and the specifications are by no means modest.

The prime function of the TRANSPOZER is to shift the pitch of the input signal by an adjustable musical interval, allowing for instance a vocalist to have his or her own automatic harmony accompaniment. The harmony voice will faithfully reproduce all the tonal and dynamic characteristics of the singer's voice, and word perfect!

The basic principle of harmonising is to write digital representations of the analogue input signal at a constant rate into a store, then to read this digital data from the store at a variable rate, converting it back to its original analogue form to produce a pitch shifted output. Thus if the data is read at twice the write rate, then all the frequencies present in the input signal will be doubled, or in other words raised in pitch by one octave. This process is analogous to playing a tape on a tape recorder at twice the speed that the tape was recorded at. The big difference is that the tape recorder cannot perform this process in real time. Also the harmoniser, unlike the tape recorder, maintains the original tempo. The E&MM TRANSPOZER provides pitch shifts of up to one octave up or down, and any musical (or non musical) interval in between, all in real time. Setting the interval is made easy since apart from



the main shift control, a fine shift control provides a trim capability of half a semitone up or down for very precise setting.

The TRANSPOZER is capable of changing pitch in real time since it can effectively "record" and "play" at the same time, but at different speeds. It only works on short sections of the input signal at a time, storing a section, using it for reading for a while, then storing the next section in its place and so on. Obviously if the data is read at twice the rate that it is being written, then sooner or later the data is going to run out. In this case each section of data is read twice. Similarly during downward shifts not all the data is read, so excess data is simply discarded.

The storage capability is used to full advantage by the incorporation of a selectable delay mode, where the data is read at the same speed as it is written, but after a delay. This mode allows many delay related effects such as echo, reverb, ADT (automatic double tracking) etc to be achieved. The delay time is switchable from 6 milliseconds to 200 milliseconds. The delay time switch also controls the section length used

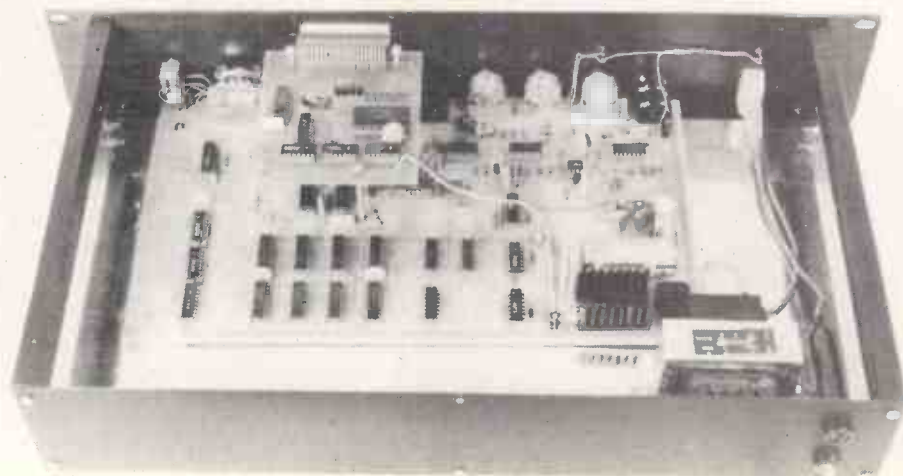
in the shift mode, which can be optimised for the sound source being used.

The TRANSPOZER is by no means limited to just guitars and vocals. It produces excellent results when used with any musical instrument or sound source, mono or polyphonic.

Architecture

As in any digitally based audio processing equipment, the heart of the unit is the analogue-to-digital converter (ADC) and complementary digital-to-analogue converter (DAC). The number of digital bits necessary to represent the audio signal is usually considered to be at least 12 to achieve a useful dynamic range. However, a special DAC has been used in the E&MM TRANSPOZER to squeeze a very useful 72dB dynamic range into just 8 bits. The DAC has companding characteristics providing much finer resolution at low signal levels than at high signal levels, where the resolution is less critical. The companding characteristics are achieved by the use of a piecewise approximation to a logarithmic response. One of two modes can be selected; encode or the complementary anti-log decode. Having only 8 bits means that an 8 bit data bus and more importantly an 8 bit wide memory can be used, which reduces the cost of the project.

The block schematic diagram, Figure 1, reveals that there is no ADC as such. The DAC is used in conjunction with a few other devices to perform analogue-to-digital conversion using a technique called 'Successive Approximation'. This involves building up the digital word, bit by bit in a Successive Approximation Register (SAR) and after each bit, comparing the resulting DAC output with the signal input voltage using a fast comparator to decide whether the next bit should be set or not. The binary word is thus assembled in 8 cycles. The data is clocked through the register at a cycle rate of 600kHz, each cycle making the binary word more closely resemble the input voltage.



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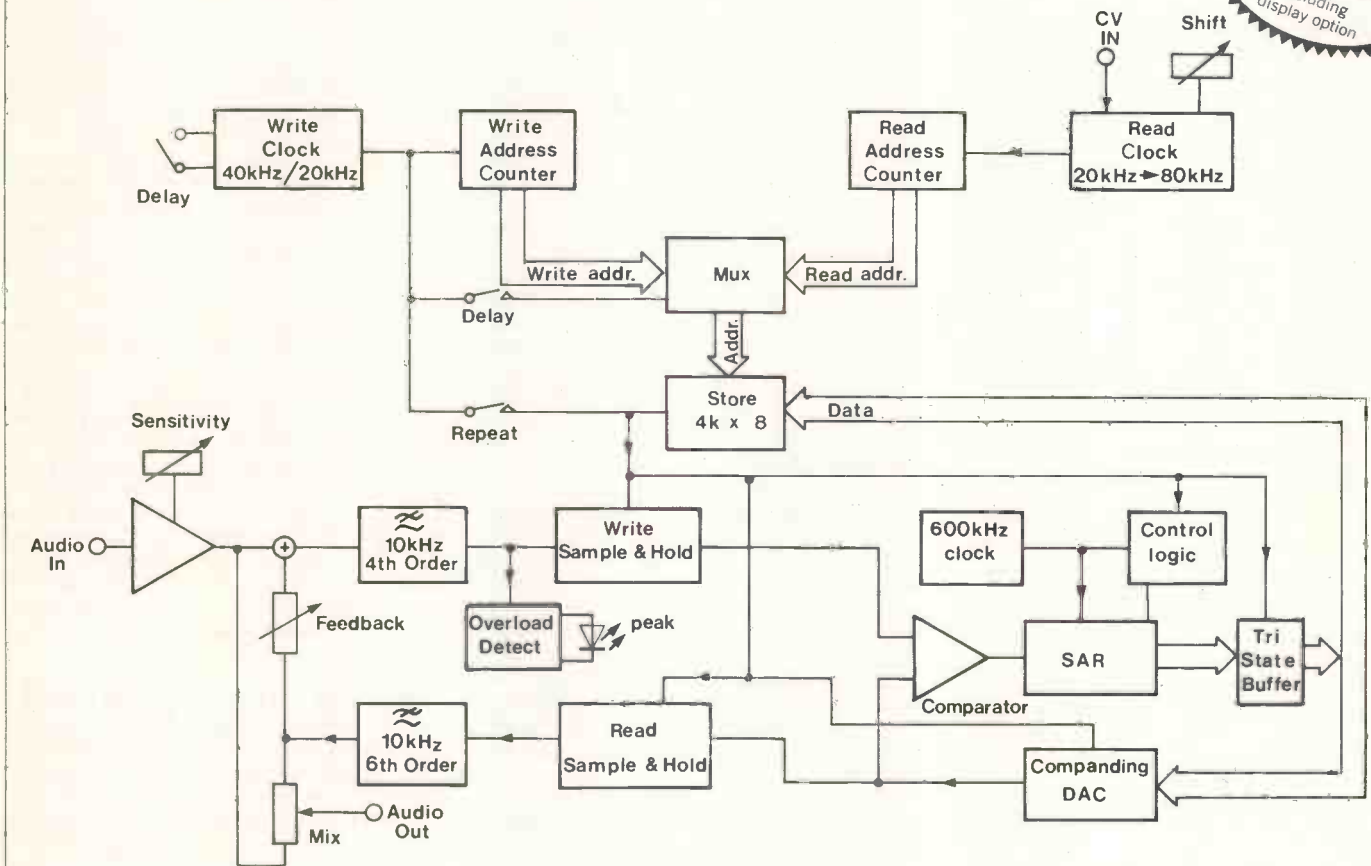


Figure 1. Block schematic diagram.

When an analogue-to-digital conversion is complete, the data assembled in the SAR is placed on the data bus ready to be written into the store.

The write sample and hold freezes the input voltage, presenting a steady voltage to the ADC during the conversion time under the control of the write clock. The write clock is responsible for sequencing many actions within the TRANSPOZER, such as starting conversion, store control and read control. The sample and hold captures snatches of voltage from the DAC, converted from data in the store in between write conversions, holding the voltage steady until the next snatch is received. The read filter then reconstitutes this stepped analogue signal to a smooth clean form, free from clock frequency. The input filter is an anti-aliasing filter which is required to attenuate any high frequency harmonics on the input which could otherwise cause intermodulation with the clock frequency.

An overload detection circuit is provided

giving LED indication of signal peaks so that the input sensitivity can be adjusted for maximum dynamic range. The treated signal can be re-circulated and hence re-treated by mixing it with the amplified input signal, the composite signal being passed to the anti-aliasing filter. The treated signal is also separately mixed with the amplified input signal to produce a variable dry/treated output mix.

The memory address in which the write data is placed is determined by the write address counter, which is incremented by the write clock once for every write conversion. The write clock runs at a little over 20kHz in the delay mode. This is derived from sampling theory which tells us that the audio signal must be re-evaluated at a rate which is at least twice the signal bandwidth. To allow for filter roll-offs and component tolerances, the signal bandwidth is in fact somewhat less than 10kHz. In the shift mode however, the write clock is changed to about 40kHz to allow for a one octave down shift

which, during reading effectively halves the sample rate. Similarly, the read address is determined by the read address counter, which is incremented by the read clock. The read clock can be varied between 20kHz and 80kHz either using the pitch controls or by applying an external CV.

Reading and writing are performed alternately, the address source being selected by the address multiplexer. In the delay mode however, the write address is permanently selected so that reading is done at the same location as writing. However, reading is done before writing in each new location so that the oldest data is read, resulting in a delay equal to the time taken to access every store location. It is possible to "freeze" the contents of the store at any time by using an external repeat footswitch. This locks the store in the read mode, preventing any of the data from being changed. Short passages can thus be played and repeated indefinitely until the footswitch is released.

Construction

Construction is very straightforward since almost all components are mounted on a single, double sided PCB, which virtually eliminates wiring errors. The component overlay is shown in Figure 2.

The main requirement for construction is an ability for fine soldering, particularly in the area of digital IC's on the PCB. We recommend a soldering iron with a bit of about 1mm and the use of high grade 22swg solder (the latter being supplied in the kit). Remember when using a fine bit to leave it in contact with the component lead a fraction longer than normal to ensure proper melting when the solder is applied to the lead (not the bit!). This is particularly important where there is a large area of foil which acts as a heatsink.

Construction should proceed as follows —

Step 1. To reduce cost the double sided PCB utilises 'track pins' to connect tracks on the two sides. This method is very simple and saves soldering components on both sides as well as eliminating wire links. Place the PCB component side uppermost (E&MM TRANSPOZER in top right hand corner) onto the smooth side of some corrugated cardboard somewhat larger than the PCB. The track pins are in lengths of about 50 pins and the procedure is simply to push the next exposed pin into a hole and gently bend the stick of pins which will cause the inserted pin to snap apart. Now press the pin firmly into the hole with a convenient implement (e.g., the tip of a small pair of pliers) so that it will not jump out when other pins are inserted. It is best to insert about twenty pins before soldering them on the exposed top side. When soldering, ensure that the pin is soldered to the track. Track pins are inserted into every hole in the tinned tracks which are on the component side. When all are soldered into place then turn the PCB over and solder the pins protruding through the board. Next carefully inspect, preferably with a magnifying glass, the top side of the PCB to ensure that joins have been properly made and that no solder bridges have been formed between tracks. If you are in the habit of removing excess solder flux from PCB's, which is good practice for all projects as well as greatly aiding inspection, then the top side of the PCB should be cleaned at this time.

Step 2. Now proceed with insertion of components in the normal manner, that is, mount components in order of increasing height which will more easily allow them to be held in place while being soldered on the reverse side. In the few instances where axial components cross over the foil tracks on the top side ensure that their leads do not touch the tracks. The only real risk is with diode, D1, but this is easily avoided by bending the leads such that the body of the diode is over the tracks. Double check the placement of every component prior to soldering and be particularly careful with the orientation of the bridge rectifier, transistors, regulators, diodes and electrolytic capacitors. Note that there are five 'Veropins' to be installed at positions marked PR1 to PR5 on the component overlay. These pins are primarily intended for connecting the 'Pitch Ratio' display, designed for this project, which is to be published next month.

Step 3. When installing the +5V regulator, IC31, bend its leads carefully to conform with the holes for the leads as well as the mounting hole. During this step slide the heatsink under the IC to ensure that holes are lined up correctly. The regulator need not be insulated from the heatsink but a little heatsink compound would be worthwhile, if available. Bolt the heatsink and regulator to the PCB (nut to be applied from the

component side) prior to soldering the IC since this will avoid undue stress on the leads.

Step 4. A PCB mounting rotary switch is used for SW2. Its rotating shaft and wafer securing rods should preferably be shortened prior to attaching the wafer — check length before cutting! Do this carefully and leave the nuts on the rods below the cutting point since they will clean up the thread after sawing. The PCB of the switch faces towards the rear of the main PCB and the order of assembly is: brass spacers, wafer, plastic spacers against the switch PCB, and then the securing nuts. Position the end stop such that the shaft will only rotate through the six positions required and secure with the extra nut provided. Now install it on the PCB and having made sure that it is properly seated solder in place. The latter check also applies to the potentiometers and jack sockets since if they are not properly seated they will not align with the panel holes.

Step 5. All components, except IC's which are later installed into DIL sockets, should now be in place. Close crop (max length 2mms) all leads on the underside of the PCB, remove excess solder flux if possible, and then rigorously check for solder bridges, poor joins and solder splashes. It is usually better to use a desoldering aid to clean up solder bridges and splashes and then re-make the join. Next assemble the case in accordance with the instructions provided and then mount the following components on the front panel: switches SW1 and 3; two 3.5mm jack sockets, J3 and 4; and the two LED's. Tighten the extra nut provided for each of the five potentiometers and offer up the PCB assembly to the panel and lightly secure. Judge the length of wire required to connect up the non-PCB mounted panel components — refer to Figure 3. It will be found easier to remove the panel in order to solder the wires to the PCB although it is not essential. The 0V wires to the centre tap of RV4 and RV5 may be made at this stage. Re-assemble and secure panel to PCB with the nuts and shakeproof washers and wire up the panel components by reference to Figure 5. Keep the wires neat and as short as practical.

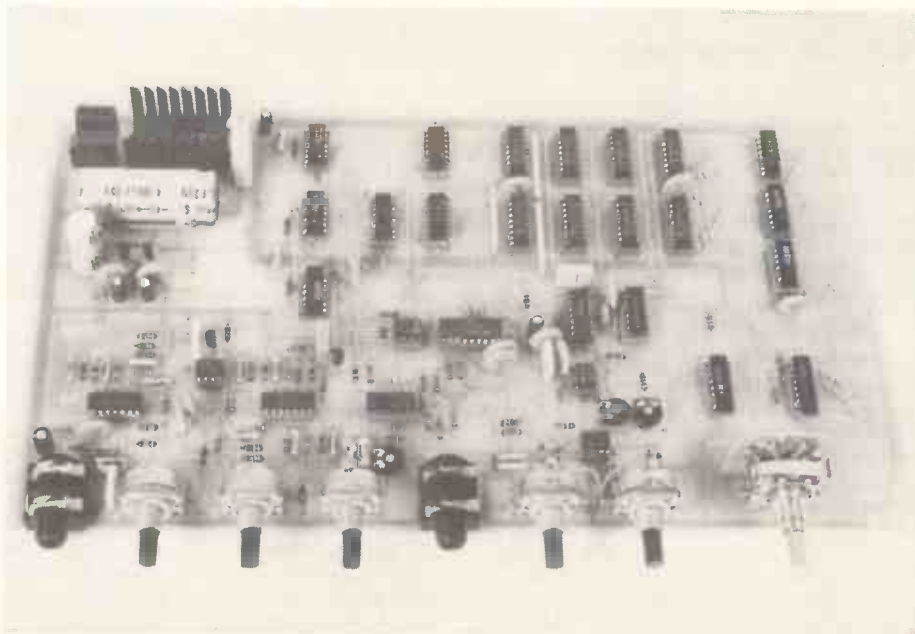
Step 6. Offer the panel to the case and rest the PCB on the chassis plate. When properly aligned mark the position of the three support holes. Also locate the position of the transformer at the rear of the power supply area and also mark the position for its

mounting holes. Drill the chassis plate — 3.5mm for the PCB mounting holes which allows for slight error and 4mms for the transformer. Note that there are two holes near IC20 and IC21 which are for the pitch ratio indicator option. If it is to be installed later then it is advisable to mark these holes on the chassis at the same time as the main PCB mounting holes are marked. If holes of between 9 and 13mms are drilled into the chassis plate at these points it will allow the pitch ratio option to be installed without dismantling the unit. After drilling ensure that all swarf is removed. To mount the PCB insert the 3mm bolts provided from the underside of the chassis plate and secure with two nuts which also act as spacers. Place the PCB, combined with the panel, over the bolts and adjust the spacing nuts, if necessary, in order to make the PCB parallel with the chassis plate while at the same time the panel holes are lined up with the holes in the side frames. Bolt down the PCB and check that no component leads are touching the chassis plate. Now fit the bezel and mains switch to the panel.

Step 7. The mains wiring is the last step. Ensure that the insulators provided (terminal cover for transformer; insulating boot for fuseholder; and terminal covers for mains switch) are used and remember that wires have to be threaded through these protectors prior to soldering. No mains leads must be left exposed. Keep wiring as short as practical. Connect the secondaries of the transformer as shown in Figure 3 and leave just enough wire to reach the screw connector at the top left hand corner of the PCB. Apply solder to the stripped ends of these wires to keep the individual strands together. Now mount the transformer and connect mains earth to the solder tag fitted to one of the securing bolts. Connect the primaries to the PCB connector taking particular note of the 0V input. The base of the box may now be secured and the unit readily accessed from the top ready for checking and final setting up.

Testing and Adjustment

The only equipment needed for testing and setting up is a multimeter and a pair of musical ears! There are only three presets to adjust, none of which are critical to the performance of the unit. When you are sure that the power supply wiring is correct and safe, connect the unit to the mains and switch on. Note that no IC's should be in the DIL sockets at this stage. The +5V LED



Transpozer PCB completed.

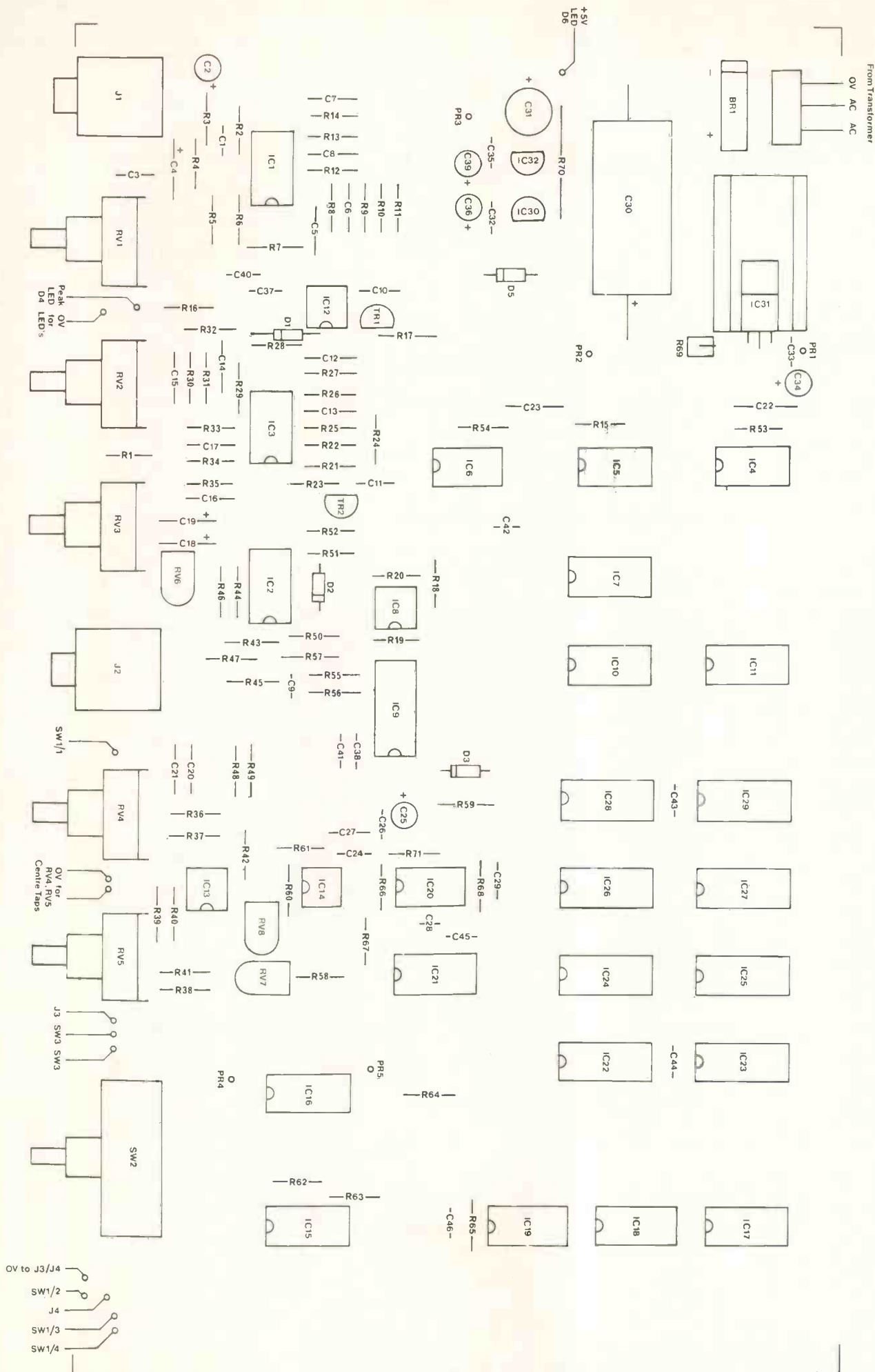


Figure 2. Component overlay of the PCB.

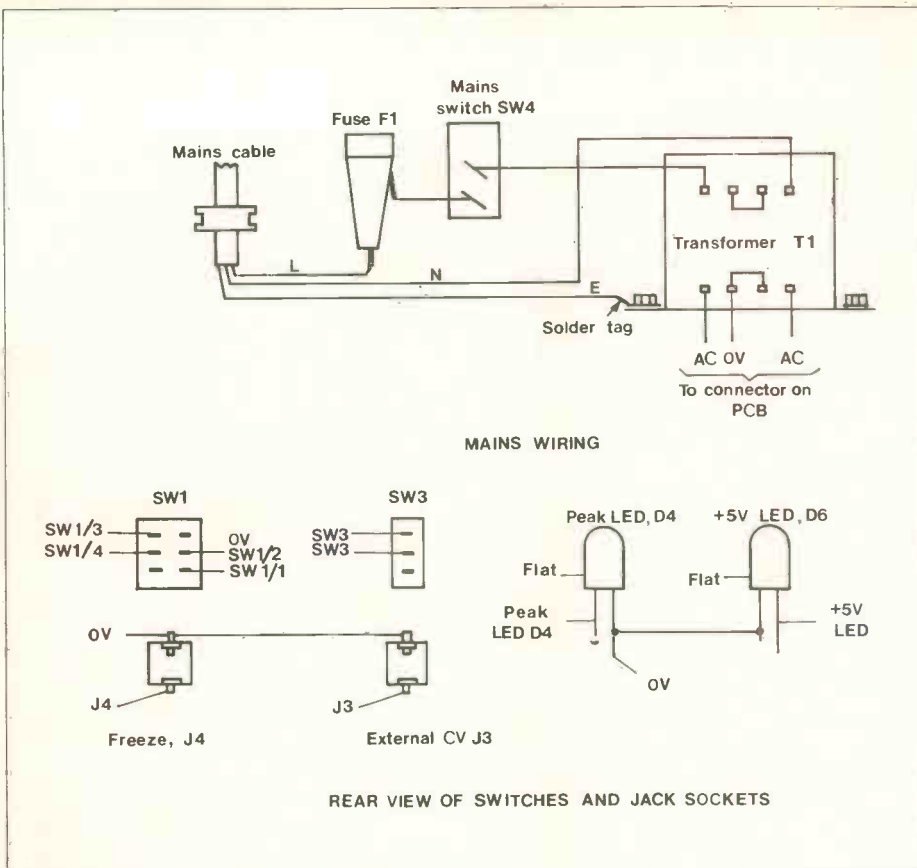


Figure 3. Connection of components off the PCB.

should come on but check all voltages; a convenient ground is available at the pin PR1 while +5V and -12V are available at PR2 and PR3 respectively. The +12V may be checked at diode D5 or else the top side track adjacent to C36. If there is failure at this stage then check whether regulators are hot which may point to a short on the appropriate power line and also whether there is a voltage into the regulator.

If power supplies are correct then switch off and install the IC's into the DIL sockets. Take the usual precautions with the MOS IC's 15, 16 and 22 to 29. Double check the IC's for location; for pins bent under or outwards and, not least, orientation. As regards the latter all IC's operating from +5V have pin 1 (notch, band, dot, etc.) facing towards the front of the PCB while those powered from +/-12V have pin 1 facing to the right (with the panel towards you). Switch on and if the +5V LED does not illuminate then switch off immediately. As soon as possible check all the voltages again and if they are not close to specified then switch off. Should you need to switch off then quickly run a finger over the IC's (after switching off!) to determine whether any are unduly hot which may pin-point the problem area. If there is a failure then you will have to re-check what should have been done thoroughly before, namely, orientation of IC's or a short circuit between power pins and adjacent pins.

If the above is satisfactory then plug in your musical instrument, or other sound source, to the input of the E&MM TRANS-POZER and its output to your amplifier. Set feedback and mix controls fully anticlockwise; pitch controls to centre off; rotary switch to '1' and put SW1 in the delay mode. Adjust the level control such that the loudest input just causes the peak LED to flicker slightly. The sound from your instrument should now be heard from your amplifier as it is passing along the 'dry' signal path. Now turn the mix control fully clockwise and the signal passes through the ADC/DAC filter system and should be reproduced albeit

with slightly reduced treble due to filtering.

Next put the rotary switch in position 6 and mix control anticlockwise. Advancing the mix control to its central position should produce a signal comprising the original sound followed by a similar but delayed signal. If the feedback control is advanced an echo effect should be produced. Oscillation may occur as the feedback is rotated but do not worry about this and set the control to a point free from such an effect. Changing the delay setting will affect the repeat speed, ie, the amount of delay. The feedback adjustment may now be made. Put rotary switch in position 4, mix central and feedback fully clockwise and then adjust RV6 (located at rear of feedback pot) until the feedback starts to reduce in level. Continue turning back very slowly until the

feedback decays to zero without any adjustment. This ensures that 'runaway feedback' will not occur at any control setting. If, however, you feel that runaway feedback may be a useful effect then adjust RV6 so that it just starts with the feedback control fully clockwise.

Now switch to the harmony (shift) mode with the feedback control anti-clockwise, mix central and delay set at 5. Your instrument should now be accompanied by a signal similar in nature but with a different pitch, the latter being varied by the pitch controls. Set the pitch controls to their mechanical/electrical centre off position and adjust RV8 such that the input pitch is unchanged at the output. With the Pitch Ratio Indicator fitted this would be a reading of 1.000. Next turn the wide (coarse) pitch control fully clockwise and adjust RV7 until the input pitch is doubled, or one octave up, at the output (pitch ratio reading 2.000). Return to centre off and if necessary repeat these latter steps. Due to non-linearity of the control it may be found that when the wide pitch control is fully anti-clockwise the pitch input may not be quite halved, or one octave down, (0.500 pitch ratio reading). Turning the narrow (fine) control anti-clockwise should bring the unit into range but if not then repeat the setting up steps but set RV7 to give halving of input pitch when the coarse control is fully anti-clockwise.

During the above adjustments switch, SW3, above the external control input should be put off. With the pitch controls at centre off the effect of putting the switch on is to set the initial pitch to about -1 octave such that a 0 to +5V external control voltage will sweep the pitch up two octaves. With the switch off and pitch controls central then a +/-2V5 input voltage will swing the pitch approximately +/-1 octave. The latter is ideal for some synthesisers with keyboards operating from a centre zero and also for use with simple low frequency oscillators. The pitch controls are still effective when an external control voltage is being used and may, therefore, be used to set the sweep into different ranges. Irrespective of the combined level of control voltages the pitch change will not go significantly outside the range of +/-1 octave and excessive voltages to IC14 are avoided by saturation of IC13.

The final check is the freeze (repeat) footswitch. Connect the footswitch (latching push to make type) to the freeze input socket, J4, and select delay mode with delay

Control Settings for possible Effects.

Control Effect	Pitch Coarse	Pitch Fine	Delay	Feedback	Mix	Mode
Pitch Shift	A/R	A/R	4-6	CCW	CW	Shift
Harmony	A/R	A/R	4-6	CCW	Mid	Shift
Chords	A/R	A/R	4-6	CW	Mid	Shift
Delay	—	—	A/R	CCW	CW	Delay
Doubling	—	—	5-6	CCW	Mid	Delay
ADT	—	—	3-4	CCW	Mid	Delay
Echo	—	—	5-6	A/R	A/R	Delay
Reverb	—	—	3-4	A/R	A/R	Delay
\$ Repeat	A/R	A/R	6	A/R	A/R	A/R
Pitch rise or fall	Mid	Slightly + or -	5-6	CW	CW	Shift
Chorus/De-Tuning	Mid	Slightly -	4-6	CCW	Mid	Shift
Constant Flanging	—	—	1-3	CCW	Mid	Delay
Constant Tunnel Flanging	—	—	1-3	CCW	Mid	Delay

A/R — As Required
\$ — Using Footswitch

MAN-MADE
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SEE OUR GREAT
SYNTHESISERS
ON PAGE
33



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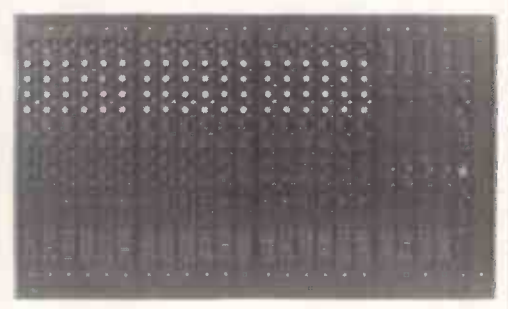
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All prices are VAT exclusive	

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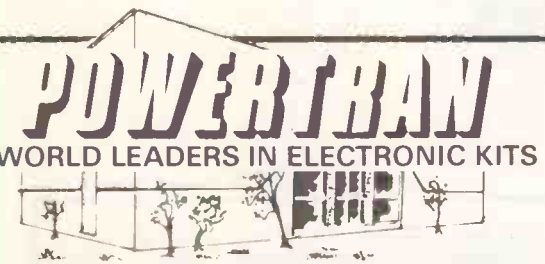
EXPANDER – A new matching 4 voice expander to team up with your polysynth for even a greater range and capability. Complete kit £249.00 plus VAT

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PARTS LIST FOR THE TRANSPOZER

Resistors — all 1/4W, 5% carbon film, unless stated.

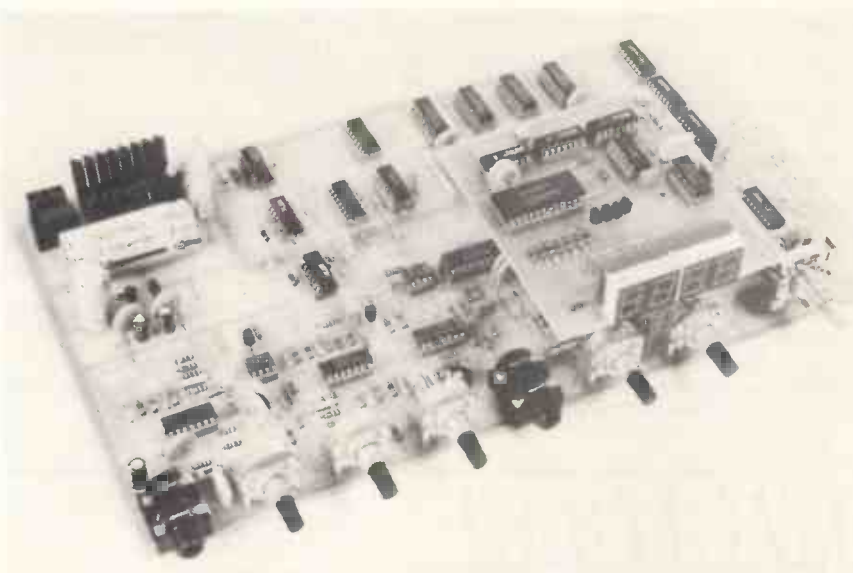
R1,15,16,71	1k0	4 off	C23	3n3 polystyrene	
R2,34,36,39,47	220k	5 off	C25,34,36,39	10u PCB electrolytic	4 off
R3	470R		C27	330p polycarbonate	
R4,30,51,56	27k	4 off	C30	4700u axial electrolytic	
R5	22k		C31	470u electrolytic	
R6	68k				
R7,8,11,12,24,25,28,29,32,33	91k	10 off			
R9	12k		Semiconductors		
R10,14,27,31,35	15k	5 off	IC1,3	TL074	2 off
R13	100k		IC2	LM3302	
R17,23,38,63,64	47k	5 off	IC4,20	74LS132	2 off
R18,19	2k7 1%	2 off	IC5	74LS74	
R20	1k5		IC6	74LS86	
R21,22	91R 1%	2 off	IC7	AM2502	
R26,52,66	10k	3 off	IC8	LM311	
R37	4M7		IC9	DAC76 or AM6070	2 off
R40,41,42	180k	3 off	IC10,11	74LS365	
R43,54	820k	2 off	IC12	TL081	
R44	33k		IC13	LM1458	
R45	3k3		IC14	NE555	
R46	270k		IC15,16	4040B	2 off
R48,49,50,61,62	4k7	5 off	IC17,18,19	74LS157	3 off
R53	560R		IC21	74LS42	
R55	8k2		IC22,23,24,25,26,27,28,29	2114L	8 off
R57,58	18k	2 off	IC30	78L12	
R59	47R		IC31	7805	
R60	56k		IC32	79L12	
R65	2k2		TR1,2	2N3819	2 off
R67,68	680R	2 off	D1,2,3,5	1N4148	4 off
R69	4R7 7W		D4,6	5mm red LED	2 off
R70	180R		BR1	2A in-line bridge	
RV1	47k log pot PCB mounting				
RV2,3	47k7 lin pot PCB mounting	2 off	Miscellaneous		
RV4,5	47k lin pot C.T. PCB mtg	2 off	J1,2	1/4" mono jack socket, PCB mtg.	2 off
RV6	2k2 min horizontal preset		J3,4	3.5mm jack sockets	2 off
RV7	10k min horizontal preset		SW1	DPDT sub. min. toggle switch	
RV8	47k min horizontal preset		SW2	2p6w rotary switch, PCB mtg.	
			SW3	SPDT sub. min. toggle switch	
			SW4	SPST mains switch	
Capacitors			T1	20VA 12-0-12 transformer + terminal cover	
C1,24,26,32,33,35,37,38,40,41,42,43,44,45,46	100n ceramic disc	15 off	F1	500mA 20mm fuse and panel fuseholder	
C2	47u PCB electrolytic			TO 220 heatsink	
C3	100p polycarbonate			8-pin DIL sockets	4 off
C4,18,19	10u axial electrolytic	3 off		14-pin DIL sockets	7 off
C5,6,7,8,12,13,14,15,16,17	180p polystyrene	10 off		16-pin DIL sockets	9 off
C9,28	100n polyester	2 off		18-pin DIL sockets	9 off
C10,29	1n0 polycarbonate	2 off		Knobs	6 off
C11	10n polycarbonate			Footswitch with case	
C20	270p polystyrene			Case and hardware	
C21	330p polystyrene			Veropins	5 off
C22	2n2 polystyrene			Mains lead, plug and grommet	
				Track pins, incl. spares	approx 250
				Connecting wire, solder and insulators	
				Display bezel	
				PCB	

'6'. It should now be possible to 'freeze' a short passage from your instrument by operating the footswitch immediately after the note is played. The frozen signal will repeat over and over indefinitely until the footswitch is released.

If you are unable to reproduce any of the above effects then check that there are no signs of overheating — the memory IC's will run quite warm. If all seems in order then proceed with any remaining steps and make a careful record of any steps which do not appear to work. The design is such that failure is unlikely so long as the soldering has been carefully done. If you are not familiar with the operation of such circuits then limit your troubleshooting to inspection of component placement and orientation as well as further thorough examination of soldering. Do not poke about in the hope of finding a fault since one can do more harm than good. The most likely outcome is that the above procedure will check out satisfactorily and so the lid may now be fitted to the case.

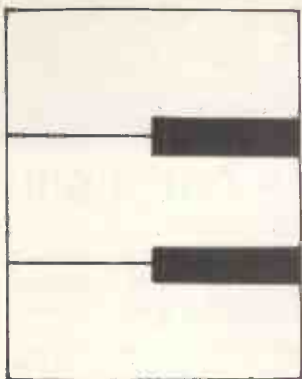
Next month we will continue with the circuit diagram, circuit description, details of the Pitch Ratio option and practical uses for the Transpozer.

E&MM



Transpozer PCB with Pitch Ratio Display fitted.

A complete kit for parts for the Transpozer including the case, front panel, PCB and all components is available from E&MM, 282, London Road, Westcliff-on-Sea, Essex, SS0 7JG at £159.95 including postage, packing and VAT. Please order as Transpozer kit. The Pitch Ratio Display board kit is also available at £32.95 including postage, packing and VAT. Please order as Transpozer Display Kit. These units are supplied with the kind co-operation of Digisound Ltd.



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ST 50, 1964 oldie, rosewood, trem, white
TE 50, 1950's vintage style, metallic red
TE 50, 1950's vintage style, metallic black
TE 50, 1960's vintage style, white
TE 50, 1960's vintage style, black
JB 45, jazz bass, vintage style, metallic blue
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JB 45, jazz bass, vintage style, white
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Micromusic

ZonX-81 Programmable Sound Generator



The ZonX-81 is a programmable sound generator designed to plug directly into the back of a ZX81. It is completely self-contained, being powered from the ZX81, and having its own internal amplifier and speaker. The unit also has an extension PCB which extends the edge connector to allow a 16k ram pack or printer to be used.

A General Instruments AY-3-8912 integrated circuit is used for sound generation. This device contains 3 digital oscillators and a noise generator with programmable pitch, any combination of which can be passed through 3 sound channels with independent volume or overall envelope control.

Registers

To programme the ZonX-81, the data required to set up the desired sound is written into the internal registers of the AY-3-8912. There are 13 registers in all:

Register D0	Channel A	Fine Tuning	0-255
Register D1	Channel A	Coarse Tuning	0-15
Register D2	Channel B	Fine Tuning	0-255
Register D3	Channel B	Coarse Tuning	0-15
Register D4	Channel C	Fine Tuning	0-255
Register D5	Channel C	Coarse Tuning	0-15
Register D6	Period of Noise Generator		1-31
Register D7	Enable/Disable Noise and Tones		
Register D8	Channel A	Volume/Envelope	0-15/16
Register D9	Channel B	Volume/Envelope	0-15/16
Register D10	Channel C	Volume/Envelope	0-15/16
Register D11	Envelope Period	Fine	0-255
Register D12	Envelope Period	Coarse	0-255
Register D13	Envelope Shape		

Sample Program

The simple program, shown in Figure 1, demonstrates some of the possibilities of the Programmable Sound Generator (PSG). It uses the numerical keys on the ZX81 to select the sounds.

The selections are:

- 1 - Low pitched noise.
- 2 - High pitched noise.
- 3 - Single tone 'C'.
- 4 - Two tones 'C,E'.
- 5 - Three tones 'C,E,G'.
- 6 - Single envelope, short decay.
- 7 - Single envelope, long decay.
- 8 - Continuous slow rise and fall in amplitude.
- 9 - Continuous sawtooth envelope.
- 0 - Clear sound.

By selecting a sound source, 1-5, then the envelope type, 6-9, a wide variety of sounds can be created. You can include more of your own sounds by simply changing the data string A\$.
Program Breakdown

Lines 1-9 are required to output the data to the registers of the PSG. The first line is actually in machine code which makes access to the PSG much quicker.
E&MM DECEMBER 1982

```

1 REM YYPEEK TO YYPEEK ?TAN
2 GOTO 7
3 POKE A,D
4 POKE B,C
5 LET X=USR E
6 RETURN
7 LET A=16515
8 LET B=16519
9 LET E=16514
10 IF INKEY$="" THEN GOTO 10
11 LET K$=INKEY$
12 IF K$="0" THEN LET K$="10"
13 GOTO VAL K$*100
14 LET Y=LEN A$
15 FOR N=1 TO Y-4 STEP 5
16 LET D=VAL A$(N TO N+1)
17 LET C=VAL A$(N+2 TO N+4)
18 GOSUB 3
19 NEXT N
20 RETURN
21 LET A$="0603107007050160901
22 GOSUB 40
23 GOTO 10
24 LET A$="0600507007080160901
25 GOSUB 40
26 GOTO 10
300 LET A$="0013201001070560801
310 GOSUB 40
320 GOTO 10
330 LET A$="0013201001020520300
340 GOSUB 40
350 LET A$="0013201001020520300
360 GOSUB 40
370 LET A$="0013201001020520300
380 GOSUB 40
390 LET A$="0013201001020520300
400 GOSUB 40
410 LET A$="1201013000"
420 GOSUB 40
430 GOTO 10
440 LET A$="1205613000"
450 GOSUB 40
460 GOTO 10
470 LET A$="1205613014"
480 GOSUB 40
490 GOTO 10
500 LET A$="1200113000"
510 GOSUB 40
520 GOTO 10
530 LET A$="0000009000100001300
540 GOSUB 40
550 GOTO 10

```

Figure 1. ZonX-81 performance program.

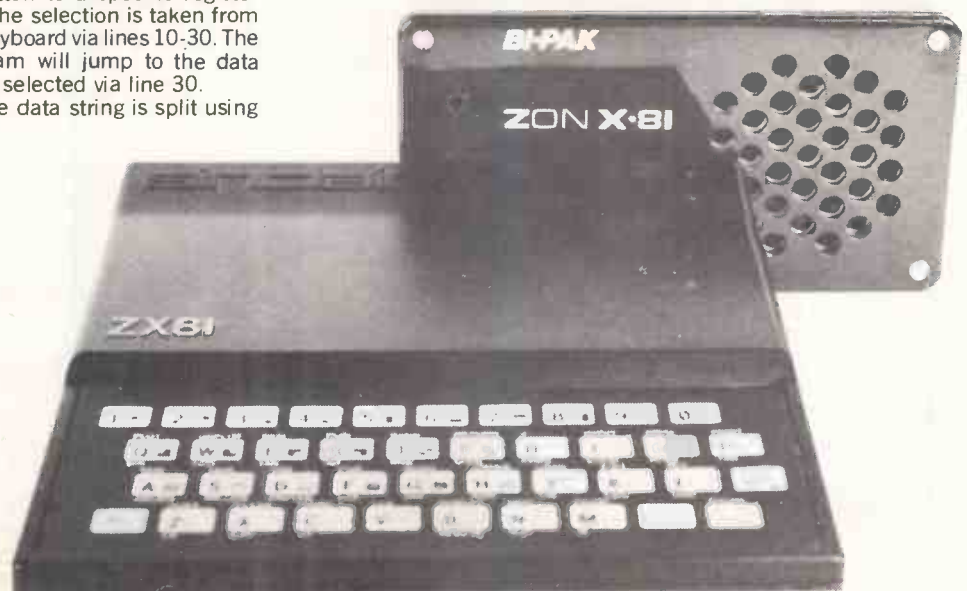
the second subroutine contained in lines 40-95. This extracts the register number (D) and data (C) from the string then calls the machine code subroutine which writes into the selected registers. When this is complete the program returns to line 10 to await another key selection.

Kenneth McAlpine E&MM

The ZonX-81 is supplied by BI-PAK PO Box 6, Ware, Herts, complete with detailed instruction booklet at £25.95 inc. VAT and p&p.

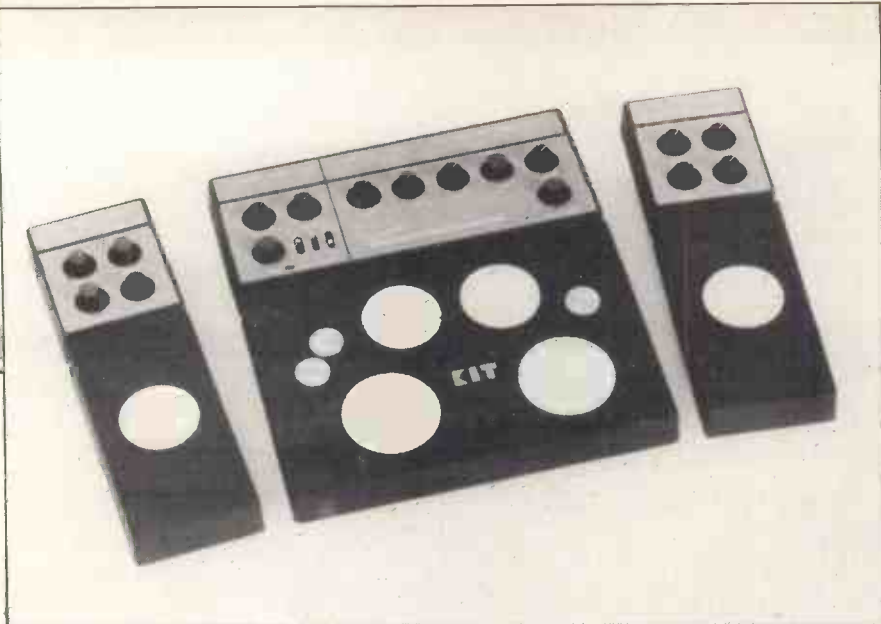
Lines 3-6 make up a subroutine which is used each time data (C) is written to a specific register (D). The selection is taken from the keyboard via lines 10-30. The program will jump to the data string selected via line 30.

The data string is split using





The Kit



MPC Electronics have produced a stylish, compact and probably highly popular update of the much older original Kit design, which has attracted a lot of attention over the last couple of months. Whether it will be capable of replacing a full-scale electronic or acoustic drum kit, or whether conventional rhythm machines will remain more popular, has yet to be seen. To MPC's credit they are not resting on their laurels, and have now brought out a range of additions to the basic Kit design.

The machine is a response to complaints that conventional rhythm boxes, whether preset or programmable, lack variation and the 'human touch'. The kit, then, is played by hand, or more specifically with the fingertips of one or both hands. The playing surfaces are small fablon-covered circles, of 7½cm diameter (bass drum and snare) or 6cm diameter (high and low toms), or polished golden metal buttons of 2cm diameter (crash/ride cymbal, open and closed high-hat).

The larger pads are mounted over piezo pickups which produce a voltage when struck, the edge of which triggers the sound generating oscillators with a degree of force-to-volume sensitivity. The cymbals are on micro-switches which aren't force sensitive, and have quite a different feel requiring a different playing technique. Like any other instrument this is a matter of practice, the predictable penalty for the extra expressiveness of which the Kit is capable.

The high-hat can be set to play automatically. Three very small toggle switches control stop/start, 4:4/3:4 and 8 beat/4 beat/disco beat. There's a 6-position rotary

switch giving a total of 36 high-hat patterns, most of which use only the closed setting with a rare open high-hat thrown in. How easy it is to follow these patterns is open to question — in a live situation the sound may be quite lost, although there's always the possibility of taking a headphone monitor from the high-hat only socket on the back panel. A programmed bass drum might have been more useful.

The sounds are individually mixable using front panel controls, and there's a tone control for the crash/ride cymbal. Each instrument has a ¼ inch individual output on the back panel, and the mix output acts as the power on/off switch. The back panel also carries a mini-jack for external 9V power supply, an alternative to an internal PP3 cell which can give 50 hours of operation.

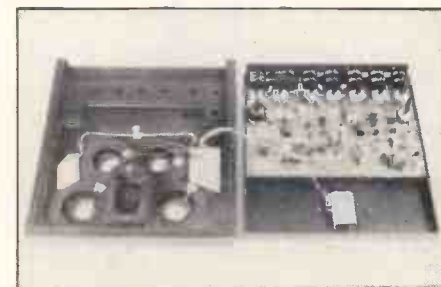
Also on the rear panel are two mini-jack Trigger Out sockets, operating on the high and low toms to activate additional units, and a footswitch socket. The optional footswitch acts as an on/off control for the automatic high-hat and a bass drum pedal which works in addition to the panel mounted pad.

Underneath there are eleven preset resistors which alter pad sensitivity and drum ring/decay for the bass, toms and snare, cymbal pitch and decay, and snare noise. These allow the user to perfect his imitation of a conventional kit, or to tailor the sound to his own requirements. The toms can be adjusted to a point just short of oscillation, and the cymbal pitch can be adjusted from crash to ride or well beyond either.

The sound can be very authentic given a wide-range amplification system, but cert-



Internal circuitry.



Piezo pickups & circuitry.

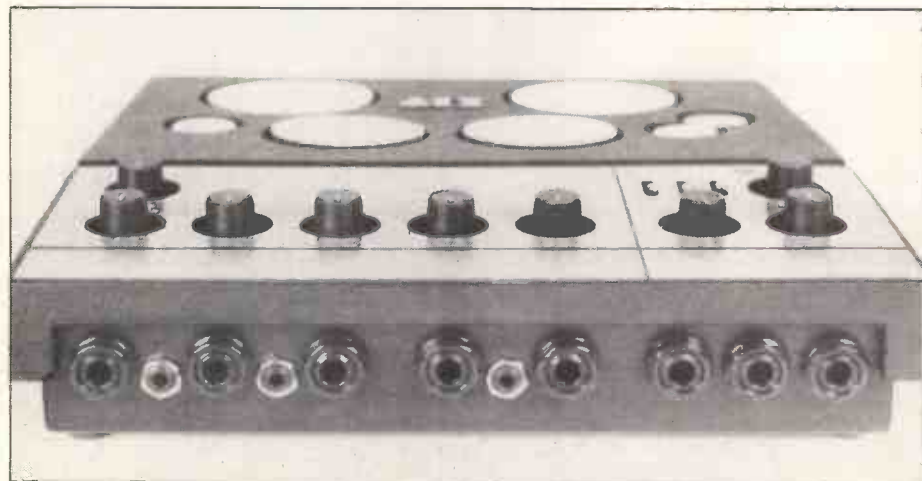
ainly isn't consistent. The bass drum is fine, with a good choice from a tight thump to quite a loose sound, although it's just a basic low-pitched oscillator thump. The cymbal is excellent, with six detuned oscillators providing a metallic ring-modulator noise, but the toms are fairly ordinary. The high-hat does its job but hasn't had as much effort put into it as the cymbal — it's basically just a chuff or a sustained burst of pink noise.

In use, the Kit can be quite versatile or slightly frustrating. Despite the beat indicator LED it takes some time to learn to follow the auto high-hat, and although anybody can produce a few authentic drumbeats it takes a degree of co-ordination to turn out a professional rhythm track.

In some ways it's more comfortable to use the machine with a pair of ball-point pens or chopsticks (drumsticks being much too heavy) although in this case it's very difficult to use the cymbal pads as they're too small to hit. The instruction book has some useful hints for playing style, and without doubt it is possible to become quite skilled with the machine, but it's all a matter of time and practice.

In addition to the footpedal there are three matching units also available, 'The Synkit' (with volume, decay, pitch and sweep controls for syndrum sounds) 'The Clap' (for white noise effects from gunshots to hand-claps) and 'The Tymp' (for tuned timpani sounds). Each of these units has a single 6cm pad and can be used independently or triggered from The Kit.

As 'a new concept in drumming' The Kit may have some way to go, but it's a brave concept and one which, to its credit, is infinitely expandable and adaptable.



Rear panel.

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INDUSTRY PROFILE

Allen & Heath Brenell is the result of the combination of two respected British manufacturers, Brenell, who have been producing tape machines since the 1940's, and Allen & Heath, whose long pedigree in the manufacture of modular mixers made a marriage between the two companies a logical extension of their marketing activities.

Around this time a basic decision regarding design philosophy had to be made. Digital technology appeared to be the vogue, yet A&HB's reputation had largely been made in supplying high-quality, low-cost 'workhorse' mixers at the middle and budget end of the market. The solution was, to some extent, a compromise which has paid off handsomely over the last few years. A&HB continue to manufacture their cost-effective 'workhorse' mixers, but have entered the higher end of the market with the fully modular Syncon system. This system can be expanded at the user's discretion, so the initial outlay need not be excessive, and can be retro-fitted with computer automation features if and when required to bring it into line with the highest technology currently available.

Brenell's tape machine side of the business has similarly kept in line with modern trends. Their Mini 8 1 inch 8-track caused a stir when first introduced, and was widely used by Genesis, Andrew Lloyd Webber and many others as a semi-portable machine for the demo or small professional studio. Now the Mini 8 has been upgraded, and features logic switching along with three head operation and various mechanical innovations designed to make it vibration-free, reliable and easily maintained.

To match the top of the range Syncon mixers, Brenell produce the Masterclass

series 2 inch multitrack unit. This is a pinchless 16 or 24 track machine with speeds of 15 or 30 inches per second, which gives a 65dB signal to noise ratio before any noise reduction is used. Again the emphasis is on logical modular construction for ease of use and maintenance. The headblocks can be changed from 16 to 24 track in a matter of seconds, and optical sensors feed information on reel diameter to a microprocessor which calculates the required tape tension. Since this tension is automatically minimised, the capstan motor itself has very little work to do, acting largely as a highly accurate quartz-locked speed control, and so a pinchwheel is not necessary.

The Syncon M's control unit uses a multi-colour LED matrix together with an eight-digit numeric display to give information on tape time, tape speed and local tape time, and available system memories, in a form which is visually appealing and easily assimilated.

Syncon Mixers

The matching Syncon B mixing console also uses LED indicators and modular design, the basic building block being the SB12 input/output module with an EQ section developed from the Syncon A series. There are two sweep equalisers covering a total range of six octaves with an octave overlap at midrange, and a low-cut filter which can reach from sub-audio to lower midrange. The basic design is post fader, which allows cue mixing while the microphone input or track is muted, and there's a solo function allowing highly flexible options in muting microphone and group inputs during recording, or of tracks and effects during mixing.

Other modules include the SB21 Auxiliary Master and SB31 Monitor Master units. All the modules are fully self contained in terms of wiring, electronics and connections, and servicing is therefore extremely



Penrhyn factory.

straightforward. Automated modules from the Allison Fadex range can be supplied, or any other automated system can be retro-fitted.

A&HB claim that cost-saving has been achieved by streamlined production, design and purchasing rather than by cutbacks on quality control. Although A&HB don't usually manufacture their own components, they exhaustively test samples from component manufacturers and carefully select each slider, resistor and IC. The company has always kept an unusually large R & D staff, which is currently managed by Ted Rook. A typical day might see him carrying out ballistics tests on a selection of VU meters, using for instance the TR808 drum machine to provide the rapid transients needed for this kind of testing.

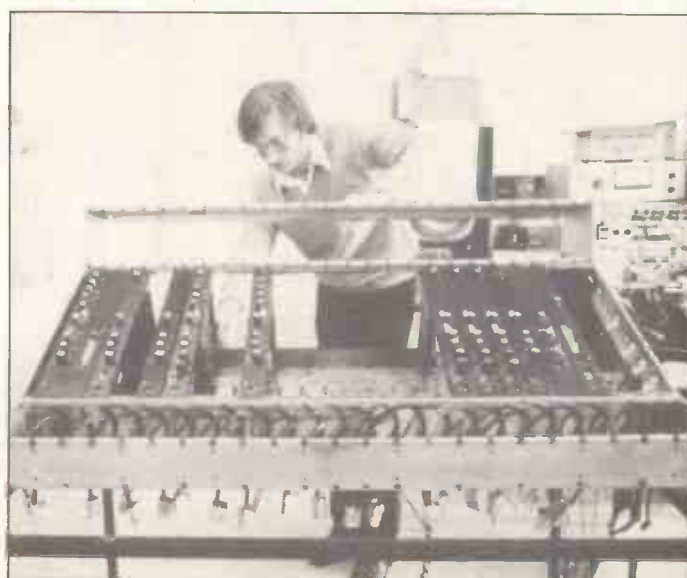
The same sort of care and quality control goes into the production of A&HB's other ranges of mixers. Their products can largely be divided into three categories, with the Syncon series ranging from £17,000 to £40,000, various professional and semi-professional studio and broadcast mixers in the middle price ranges, and budget price mixers such as the re-introduced Minimax 6:2 starting at £165 plus VAT.

Midrange mixers

The small studio mixers include the Modular 3, developed from the popular Modular 2 as a workhorse mixer with basic EQ controls. Its main attractions are reliability, price and good reputation, and if a graphic equaliser is felt to be necessary it can be connected very easily. A reliable and simple VU system of metering is retained despite the trend towards PPM's, which can



Factory interior.



MBI 24A in testing.



input, an output, or a subgroup.

A&HB's latest product is the 2:1 series, suggested by their American subsidiary and ideal for studio use or stage use, as in addition to a stereo PA mix it can also derive a mono foldback mix. First advertised in E&MM, the 12:2:1 is the subject of this month's competition.

The mono mix is equally suitable for foldback, cable radio transmission, or video sound channels, and is a facility rarely offered by any UK manufacturer. In addition the mixers use a tie line or bus extension system which allows them to be interconnected in virtually limitless series, as their power supplies (also capable of phantom powering) are external. Recording levels can be matched to the major international standards at the user's discretion.

Now A&HB are turning their attention to the five models of the System 8 series, which are designed to incorporate every feature likely to make life easier in the 4-, 8- or 16-track studio. The top of the range 1616 costs around £1400, and includes two independent mono auxiliary sends, headphone/foldback monitoring and 16 channel monitoring and VU metering. The range includes the EX8 expander which can be used with any of the mixers, and the entire range should be available before Christmas.

Allen & Heath Brenell's future looks bright. In a time of recession, it's good to see a British firm in a position to expand while maintaining the high standards which have given them a world-wide reputation.



Syncon M24.

E&MM

be added if required for mastering.

The Modular 3 still uses discrete components, and has an optional as opposed to the earlier integral patchbay for economy. If a patchbay is required this can be fitted into a 19 inch rack; although almost five years old, the Modular 3 is still very widely used in many home and professional studios, and is privately referred to as the 'Morris Minor' of the mixer business - it just keeps on running!

A&HB have an affiliated company known as MBI, which makes broadcast mixers for radio stations and provides a complete interior design, acoustic engineering and installation service. One recent job was the construction of the studios of Centre Radio, Leicester's new independent station.

Budget mixers

The final range of mixers is the budget range, comprising the Minimixer, the 4:2 range and the new 2:1 range which falls somewhere between the two.

The Minimixer is a 6:2 design with continuously variable gain from microphone to line level, bass, treble and midlift controls, post-fader echo send and pre-fader cue send, pan and sliding fader controls. Two auxiliary line level inputs, intended for stereo echo return or linking mixers together, also have individual level, bass and treble controls, and so the specification is very flexible. Power supply is external and the styling is clean and functional, with symbols rather than full legends below each control and unusual flanged rotary controls which are very easy to grip.

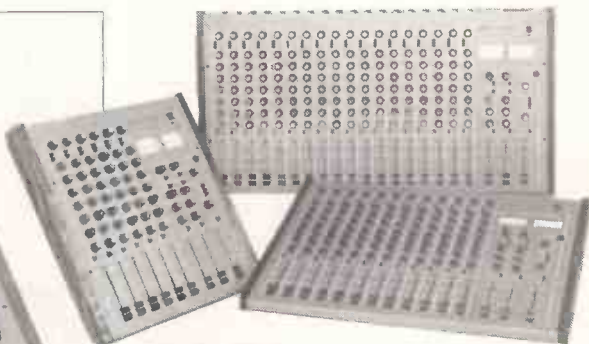
The 4:2 mixers can have a wooden trim for studio use or an integral flightcase for mobile use. Each is designed using an in-line concept, so that any channel can be an



Syncon B36 desk.

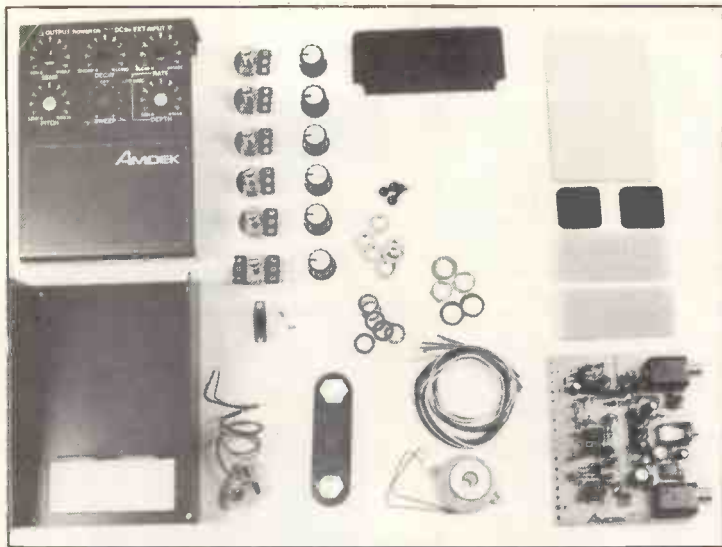


System 8 desk.



The 2:1 Series.

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All the parts laid out ready for checking.



AMDEK

Percussion Synthesizer

This month's Amdek Kit is the Percussion Synthesizer, a versatile drum synth which can, like all the other Amdek units, be built and customised with the minimum of technical difficulty and E&MM's research department has again provided details of a modification which extends the facilities available on this exciting project.

- ★ Variable decay time
- ★ Sweep up or down
- ★ Pitch and Sensitivity controls
- ★ Modulation speed and depth
- ★ Pre-assembled circuit board
- ★ Complete kit with detailed instructions

The 'syndrum sound' became popular a few years ago on a host of disco records, but since that time the real potential and versatility of manual electronic percussion has become much clearer. Bands such as Ultravox, Talk Talk and Depeche Mode use Pearl, Simmons and other electronic percussion to provide a powerful, yet clear rhythm sound which can give your music a touch of technological sophistication.

The Amdek Percussion Synthesizer is versatile enough to provide conventional acoustic-type sounds such as tom-toms and woodblocks, ultra-modern disco ornamentation or abstract special effects and ring modulator type sounds. In addition its external trigger input gives it the potential of interfacing with a sequencer, computer, E&MM Synclock or even a guitar.

The Kit

The Percussion Synthesizer Kit is available in a bubble pack complete with all parts, wire, a spanner for tightening nuts and a detailed description and assembly sheet. The only extra tools required are a soldering iron (a 15 watt model with a small bit is quite sufficient), wire cutters and/or stripper, a small cross-head screwdriver and possibly a small pair of pliers.

The unit can be powered by a 9 volt PP3 battery or an external 9 volt 70

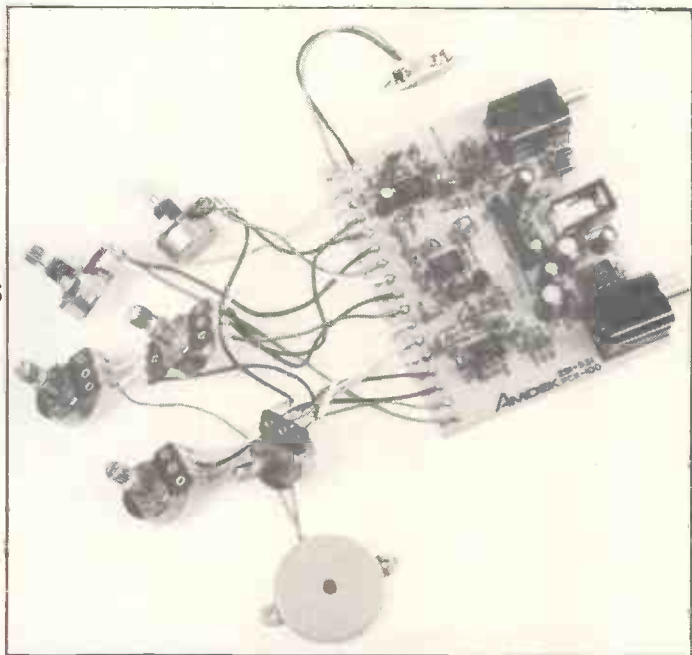
power supply such as Roland's own model or the E&MM Synpac.

The very clear line drawings make identification of all the parts quite straightforward; as usual the PCB is ready-assembled, and so the first task of laying out and checking off all the components is quickly done.

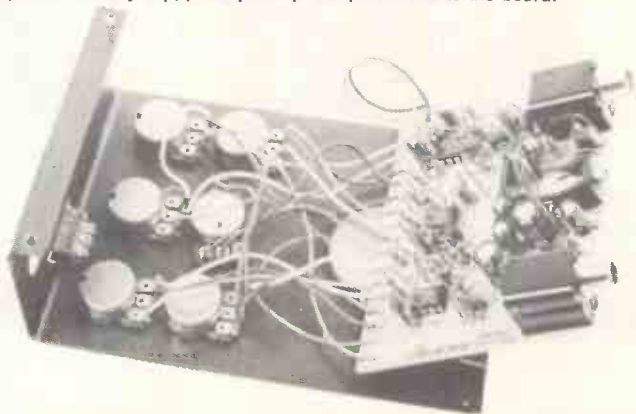
Assembly begins with the preparation of lengths of connecting wire for the pots and the battery connector. The piezoelectric pickup which activates the percussion synth when struck has wires ready connected, and this together with the six control pots can be soldered to the PCB and fitted onto the case (Steps 2-9).

The PCB is already fitted with input/output sockets, and is ready for installation in the case. The piezo pickup is stuck in place using a double-sided adhesive insulating pad, then the rear panel 'user' switch is screwed into place. The function of this switch can be decided according to a number of possible options (Steps 10-11).

After the PCB is fitted it is isolated from the case using a self adhesive transparent insulator and a foam pad. Another foam pad is installed to cushion the battery. There are self adhesive rubber pads which are attached to the base of the case to prevent slipping on a flat surface or damage to other equipment. Once the battery and the knobs have been fitted the large self adhesive rubber



Steps 2-7. Battery clip, piezo pick-up and pots wired to the board.



Steps 9-11. User switch, pots and pick-up fitted to the case.

pad can be fitted to prevent damage to the case when struck with a drumstick, or striking implement! (Steps 12-19).

The Circuit

The circuit diagram is shown in Figure 1. The trigger signal is derived from a Piezo pickup or external source if connected. This signal is amplified and used to charge a capacitor which discharges through the Decay control. This 'sweep' voltage is used to control a VCO and VCA. The VCO, based around IC4 and half IC5, can be swept up or down via the Sweep control. The VCA is a transconductance amplifier based around IC2. Modulation is provided for the VCO by a triangle/square wave oscillator built around half of IC1 and half of IC5.

Operation

The Percussion Synthesizer was assembled and worked first time with no significant difficulties. If you do have any trouble, Roland UK have a 'Hot Line' at their factory on 01-847 1671, and can lend a hand if necessary.

The unit produces a very wide range of sounds from powerful bass drum to unusual ring modulator-like effects achieved with very fast modulation, several sample settings being given in the construction leaflet.

E&MM have expanded the range of effects available with some modifications, which can be made at the reader's own risk as neither E&MM nor Amdek can provide a guarantee against any possible circuit damage.

Modifications

Mod 1. Both the VCO and modulation oscillator provide square or triangle output waveforms but the kit comes with triangle VCO output and square wave modulation selected. The 'user' switch supplied can be used to select between square and triangle for the VCO or modulation, by attaching leads to the track side of the PCB (details on the Amdek sheet).

Mod 2. To give the sound a 'bite' to the attack a short pulse from the sweep voltage is mixed into the VCA. This can be disconnected if required by breaking a pad on the track side of the PCB.

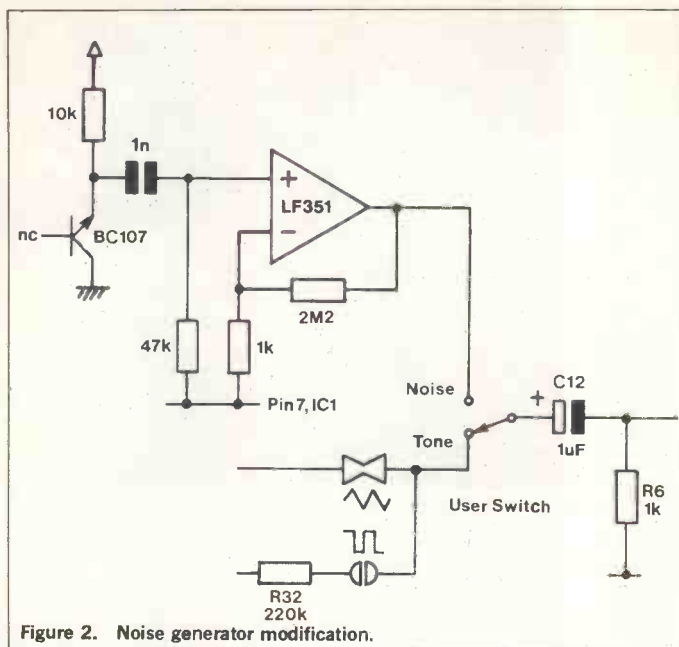


Figure 2. Noise generator modification.



Steps 18-19. Knobs and protective pad fitted to complete the unit.

Mod 3. To simulate many percussion sounds the sound source required is noise, not a pure tone. So the noise generator circuit shown in Figure 2 was added. The 'user' switch is used this time to select between

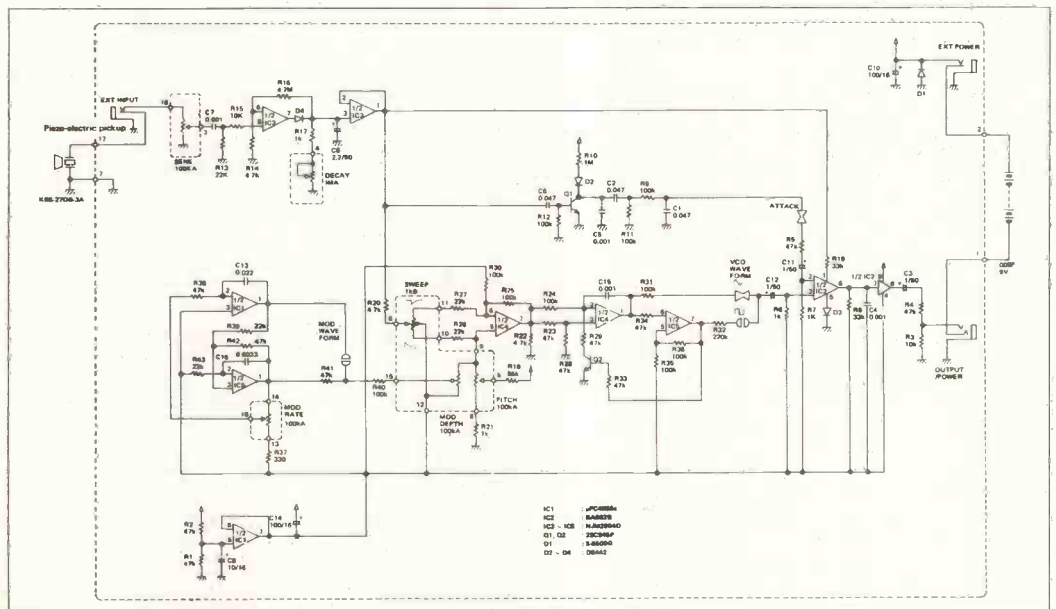
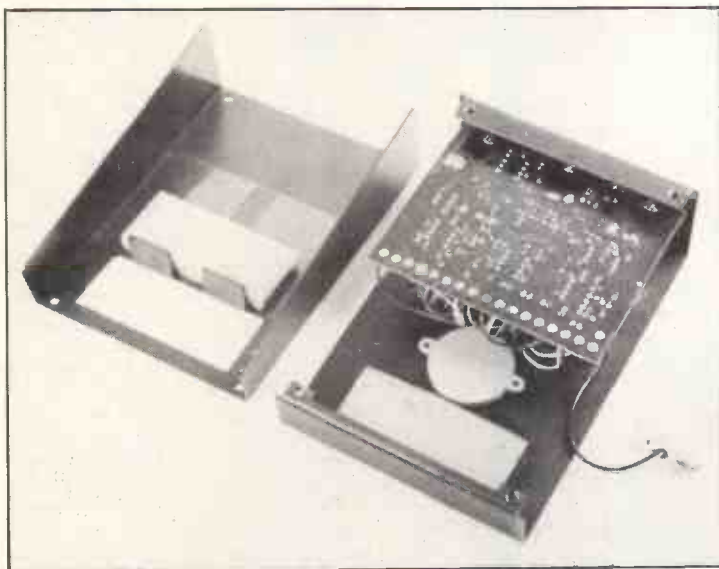


Figure 1. Percussion Synthesizer circuit diagram.



Steps 12-14. Completed case halves with insulation added.

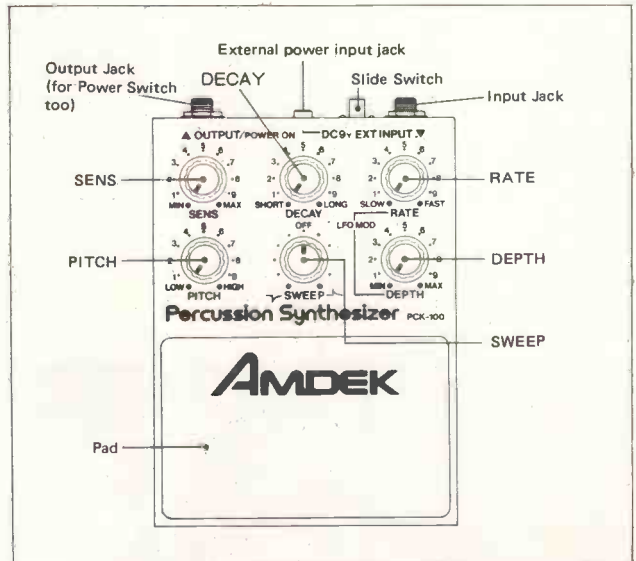


Figure 3. Panel description.

E&MM's special offer price for the Amdek Percussion Synthesizer Kit is £51.00 inc. VAT and P&P. Please order as: Amdek PCK-100 kit.



Noise and Tone. The noise is derived from a Zener breakdown by reverse biasing the transistor (note that the base is not connected). This is decoupled and amplified around 1V. This output goes to the switch.

E&MM

Philip Glass Sadlers Wells, London, 24th October, 1982

Electronic music must be getting popular in Britain. Something's definitely going on — first we get Klaus Schulze for the first time in five years, then, of all people, Philip Glass (and ensemble) for the first time, period. Things are looking up.

It's not that Schulze and Glass have the same background, or even necessarily the same following. The Glass Ensemble's performance was firmly placed in the context of the Almeida Theatre's New York performance season, which has also featured Meredith Monk and Robert Ashley over the past couple of months. Glass was born in Baltimore, entered the University of Chicago and studied at the Juilliard School of Music, where he began to progress beyond the conventional serial composition of modern classical music.

In 1964 he won a Fulbright award which allowed him to study in Paris with Nadia Boulanger, during which time he became interested in Indian music and worked with sitarist Ravi Shankar. After trips to Morocco and India, he returned to New York with the additive principles of Eastern rhythms firmly in his mind, and began to compose highly repetitive, modular pieces based on tonal principles and regular, rhythmic pulses. Despite criticism that his music was static and over-minimal, Glass received enough attention to enable him to form a regular ensemble in 1968, and begin to release music on his own Chatham Square label in 1971.

The earlier pieces, such as 'Music with Changing Parts', 'Music in Similar Motion' and 'Music in Fifths', resembled that of other American minimalists such as Steve Reich and Terry Riley. Glass had worked with Steve Reich on 'Four Organs/Phase Patterns', and Reich's ensemble members, Steve Chambers and Jon Gibson left to join the Glass Ensemble.

The music of these closely interlinked ensembles differed subtly from that of solo performer Terry Riley. The latter, after composing the pioneering minimalist work 'In C' (which gives each musician a selection of musical phrases to play but leaves the choice of how often to play them to the individual), had gone on to produce gentle and sparse keyboard improvisations. These contrasted markedly with the extremely disciplined compositional style of Reich and Glass, in which every phrase, repetition and arpeggio is strictly notated.

In 1974, Virgin records released two



sections of Glass' 'Music in 12 parts', which included some illuminating sleeve notes on the Glass style of composition. In each part a simple melodic figure on flute, organ or voice is repeated, added to, subtracted from or inverted, with an almost fugue-like method of picking up melodies from one instrument by another. Glass comments that "It may happen that some listeners, missing the usual musical structures (or landmarks) by which they are used to orientating themselves, may experience some initial difficulties in actually perceiving the music. However, when it becomes apparent that nothing 'happens' in the usual sense, but that instead the gradual accretion of musical material can and does serve as the basis of the listeners' attention, then he can discover another mode of listening. It is hoped that one would then be able to perceive the music as a 'presence', freed of dramatic structure, a pure medium of sound."

By 1976 Glass was experimenting with dramatic structures in a literal sense with the Mahou Mines experimental theatre company. This work culminated in the monumental 'Einstein on the Beach', an epic musical/poetic/operatic drama about the famed scientist and amateur violinist which toured all over Europe.

Branching out further, Glass composed film music for 'North Star' again released on Virgin, and dance music for Lucinda Childs' company released as 'Dance Parts 1 & 3'. 'North Star' saw him moving away from long, repetitive compositions to a more accessible and commercial style, which had the result of catching the attention of Mike Oldfield and the subsequent inclusion of the North Star finale on Oldfield's 'Platinum'. The connection here was probably via Kurt Munkacsi who engineered both albums and has been working with Glass for the last 10 years.

'Dance Parts 1 & 3' was a more 'traditional' Glass composition, in which the pulses and rhythms of bodily movement were closely reflected in the music. After some success with the performances of 'Dance', Glass went on to opera with 'Satyagraha', based on the early life of Mahatma Gandhi, and after signing a

recording contract with CBS, to 'Glassworks' received with enthusiastic acclaim by classical reviewers the world over.

Rather than concentrating on his latest work, however, the Sadler's Wells concert was something of a retrospective. The opener was 'Music in Similar Motion' (1969) followed by 'Dance pt 5' (1979, substituted for pt. 3 listed in the programme).

Composer Michael Riesman sat stage right, with a Bechstein grand piano, electric organ and bass synthesiser, and took most of the rapid arpeggio parts. On a dais at the back of the stage sat Jon Gibson (flute and soprano saxophone) Jack Kripl (flute, piccolo and saxophones) and Richard Peck (flute and saxophones). Stage left, Glass himself on Prophet 5, swaying violently during the more frantic passages, and next to him the glamorous figure of Dora Ohrenstein whose largely wordless vocals merged cleverly with the instrumental sounds.

Kurt Munkacsi sat with the mixing desk upstage, controlling the PA mix as the wind players listened to a foldback on large 2 x 18 wedge monitors. As an 'integral part of the performance', a film cameraman flitted about on stage taking what appeared to be largely close-ups of the performers' faces, while a vast Louma crane boom based in the orchestra pit swayed back and forth across the whole stage area, carrying lenses for Peter Greenaway's channel 4 team who will transmit four one-hour documentaries on the New York concert series in the New Year.

After the interval the ensemble played four sections from 'Glassworks', and ended with the mighty 'Train/Spaceship' from 'Einstein on the Beach'. Here the musicians individually and collectively were seen at their full power. The winds were deft and light-footed, following the rapid arpeggios and deep bass of the organ as, for instance, a sequence of notes changed into a sequence of arpeggios of notes, which in turn changed into a sequence of chords. Glass' Prophet produced short 'wah' sounds often merging with Ohrenstein's vocals, which in turn skipped from one syllable to another on consecutive notes or even during the course of one note.

During a violent 'storm at sea' section every instrument, in total synchronisation, was required to produce a 2 octave chromatic scale, repeated several times before a sudden break to a completely different set of patterns. The standing ovation after a brief restatement of the piece's major theme was well deserved, and a hall which had every inch of seating and floor space full, resounded with applause as the musicians took their bows.

Perhaps Philip Glass will never be a million-seller like Mike Oldfield, but his influence over the years on large numbers of composers is becoming clearer. It is sure to grow after this show is televised if only a tenth of the sheer technique and atmosphere has been captured on film. **E&MM**



Riesman, Ohrenstein, Munkacsi and wind players take a bow.

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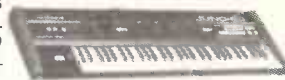
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by Paul Williams

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- * Plugs Directly Into Instrument

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- * Selectable Fuzz
- * Long Life From A PP3 Battery
- * Easy Construction

Canjak is a unique self contained headphone amplifier designed to plug directly into the guitar jack socket for personal practice. For those learning to play the electric guitar, a canjak is a must to keep on good terms with the family and neighbours! The professional guitarist will find the canjak invaluable for developing technique, practising numbers, and writing new ones. With a canjak and a pair of cans, you can practise your electric guitar anywhere; in the middle of a park, on a beach, in a coach or even on a plane. The canjak is by no means limited to guitars; any electric or electronic instrument with an adjustable output level can be used.

A switchable fuzz circuit is included for additional flexibility. For simplicity and ease of use, the battery is switched on by the insertion of the phones plug, rather than using an extra switch. The complete circuit, along with the battery, connectors and switch are enclosed in a tiny plastic case which can be slipped into a pocket when not in use. When plugged into the guitar, it is completely unobtrusive, the only cable in use being the phones lead. To ease construction, as many parts as possible have been mounted on a single PCB, including the switch and phones socket.

Circuit

The circuit, shown in Figure 1, is based on the LM386 monolithic amplifier, IC1. This device contains all the necessary active components for the Canjak. C1 couples the input signal from the input jack plug, JK1, to the non-inverting input of IC1. C7 couples the amplified output signal from IC1 to the phones jack socket, JK2, via R4 and R5. These resistors serve several purposes; they limit the output power, protect the output stage of IC1, and reduce the size of C7 needed for good bass response.

With SW1 in the fuzz position, the

germanium diodes, D1 and D2 apply non-linear negative feedback via R3 to produce the familiar soft-limiting distortion. R1 increases the initial gain of the amplifier so that the fuzz diodes have more effect. When fuzz is not selected, R2 provides linear negative feedback to produce clean, distortion free operation. C4 and C5 are required to prevent upsetting the DC bias conditions. C2 and C3 prevent HF oscillation while C6 decouples the battery supply. A make switch contact in the sleeve connection of JK2 acts as a battery on-off switch when the phones jack plug is inserted and withdrawn.

Construction and Testing

To achieve the compactness of this project, naturally everything has to be packed in quite tightly, so follow these construction notes very carefully otherwise you may find assembly difficult. Don't be over-generous with the solder since it will be necessary for the soldered joints on the PCB to have a low profile.



The Canjak (shown full size).

Assemble the PCB according to the component overlay, Figure 2, starting with the diodes and IC1. There is no room for luxuries like IC sockets, but with a little care, no problems will be encountered in soldering IC1; don't be frightened of it, though. Crop all the leads as close as possible to the PCB. Now insert all the resistors, then solder and crop. Note that all except R2 are mounted vertically. For the wire-ended components, it will be found helpful to bend the leads out at 45 degrees to the PCB after insertion to hold the components in place while soldering. The capacitors can now be inserted, soldered and cropped. Now insert

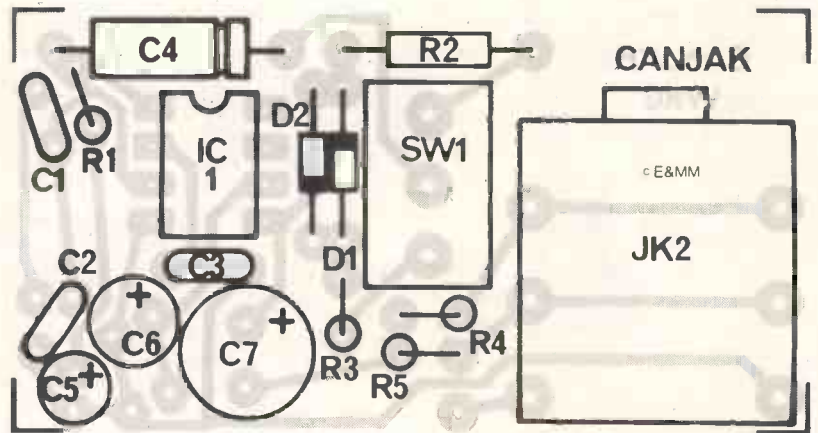


Figure 2. PCB component overlay.

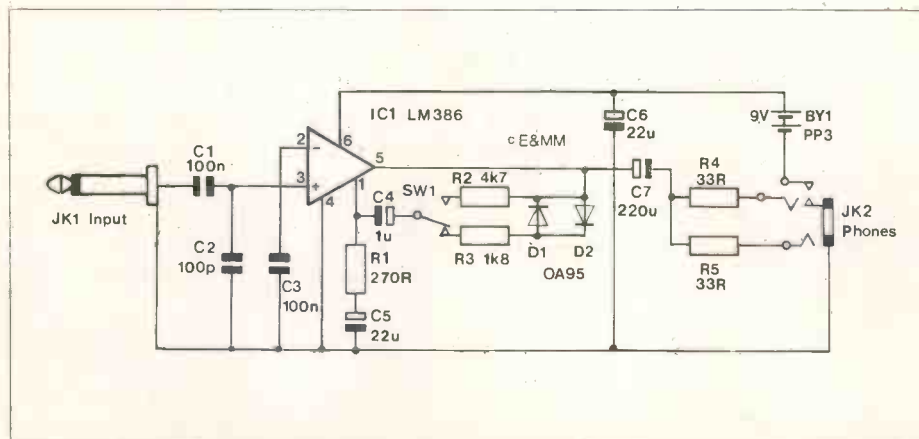


Figure 1. Circuit diagram of the Canjak.

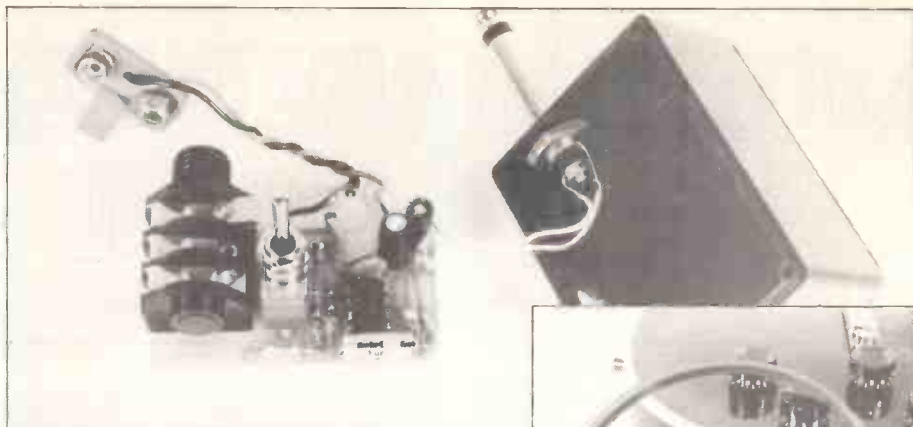
the socket, JK2 and push it firmly down onto the PCB while it is being soldered. Again crop the terminals close to the PCB. Insert SW1 and lightly tack the connections with solder so that the assembly can be tested; it will have to be removed again later. The battery clip wires can now be connected to the PCB, after trimming them to a length of 10 cm.

Prepare the plastic box as shown in Figure 3, remembering to cut and file the ribs flush as shown. Cut the screen tag of the jack plug so that it is the same length as the inner tag. Solder a pair of 6 cm long insulated wires onto the two tags. Now fit the plug into the end hole of the case and secure it by means of a nut. Terminate the two wires to

the PCB. The wiring connections are shown in Figure 4.

Before installing the PCB it must be tested, since fault rectification will be much more difficult after installation. First though inspect the assembly, checking particularly component orientation. Check the soldered joints with an eyeglass, watching out for bridged tracks. Now connect a PP3 battery, plug in a pair of phones, and connect the jack plug into your instrument. The signal should now appear in your cans loud and clear, the level being adjusted by means of your instrument volume control. Check that the fuzz switch operates correctly. If all is well, disconnect the plugs, sockets and battery. Remove the fuzz switch from the PCB, making sure that the PCB holes are left unobstructed.

Fit the switch into the small hole of the case. Adjust the rear nut such that the bush will be flush with the front nut. Slacken the front nut for now, so that the switch can be moved. Offer the PCB assembly into the case with the battery leads folded back underneath into the battery compartment. Manoeuvre the PCB into position, guiding C7 under the jack plug terminals, and move SW1 as necessary to avoid other components, such that the jack socket can be located into the remaining case hole. It will now be possible to swing the PCB towards



Internal view of the Canjak.

SW1 so that the switch terminals can be located into the PCB. After ensuring that the PCB is straight in the case, the jack socket can be secured with its nut; similarly for SW1. The switch terminals can now be soldered, taking care not to melt the case edge. Trim off the excess terminal length if necessary.

To complete the assembly, place a strip of insulating material over the track side of the PCB, and secure with adhesive. This will prevent the metal case of the battery from



The Canjak ready for use.

shorting together any of the joints. Finally, fit the battery and screw on the lid.

You can use your Canjak with any electric or electronic instrument, using the instrument's volume control to set the listening level. The phones you use should be of the common low to medium impedance type. If you wish to use your Canjak with bass instruments, make sure you use high quality phones with adequate bass extension. Although the Canjak has built in fuzz, other effects can be used by plugging the instrument into the external effect unit in the normal way. Your Canjak can then be plugged into the output of the effect unit.

Now plug in your cans and play; but don't forget to unplug them when the Canjak is not in use, otherwise you will soon have a flat battery!

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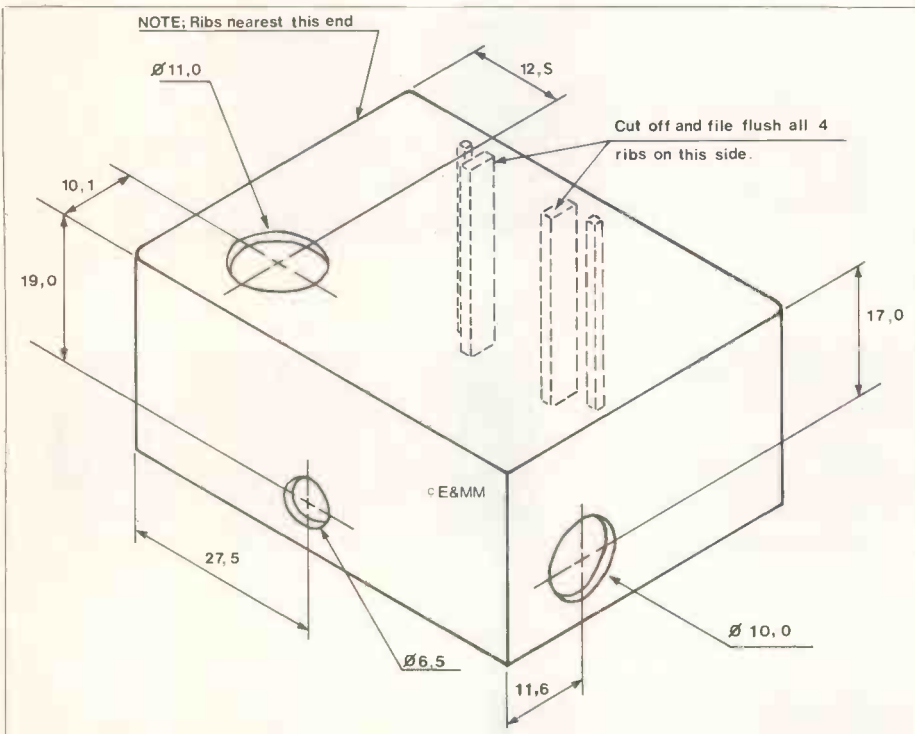


Figure 3. Case preparation details.

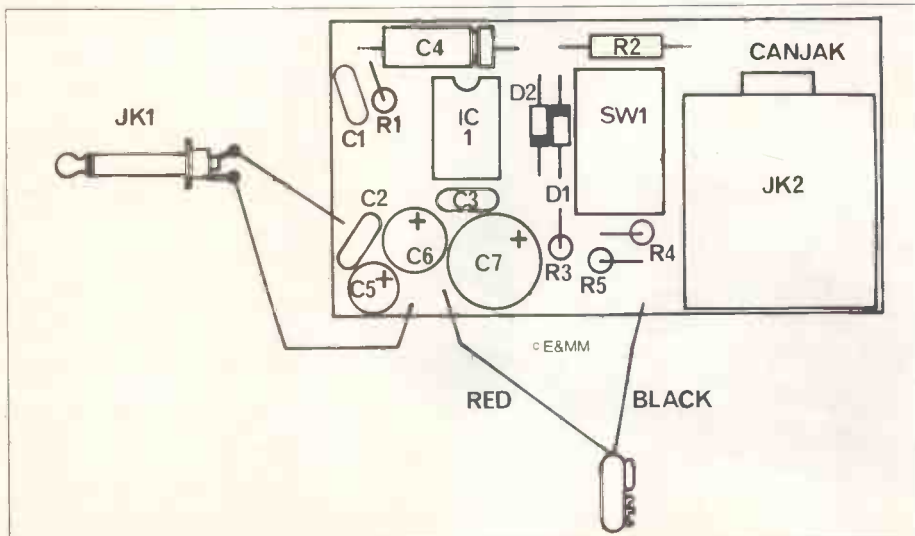


Figure 4. Connection diagram.

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PARTS LIST FOR CANJAK

Resistors - all $\frac{1}{4}W$ 5% carbon.

R1	270
R2	4k7
R3	1k8
R4,5	2 off 33

Capacitors

C1,3	2 off 100nF min ceramic
C2	100pF min ceramic
C4	1uF 63v electrolytic
C5,6	2 off 22uF 16v radial electrolytic
C7	220uF 16v radial electrolytic

Semiconductors

IC1	LM386
D1,2	2 off OA95

Miscellaneous

Jk1	Jack plug probe & nut
Jk2	Stereo PC mtg jack socket with make contact
Sw1	SPDT PC mtg min toggle switch
	PP3 battery clip
	Nylon box
	PCB
	Wire
	Insulating strip

A complete set of parts for the Canjak, including PCB and case, is available from E&MM, 282 London Road, Westcliff-on-Sea, Essex SS0 7JG, at a cost of £9.95, including postage, packing and VAT. Please order as: Canjak kit.

MUSIC MAKER EQUIPMENT SCENE

Several new products from Korg this month, together with interesting developments on the professional PA amp scene from BGW systems.

First the **Korg EPS-1**, an electronic piano and string machine related to but smaller than the 80S Symphonic Piano. The EPS-1 has a 6¼ octave keyboard and an impressive specification first revealed at the opening of the new Rose-Morris Capital Keyboard Centre in Shaftesbury Avenue, London, during late October.

From left to right the angled control panel features the following: Master Volume, for headphones and Line Out. Three Band Equaliser for Piano. Presence Control (pull on). Piano I & II, Electronic Piano I & II, Clavinet I & II, Off. Stereo Chorus or Tremolo with Speed and Intensity. Key Dynamics control to adjust keyboard action to personal taste. Key Transpose control for entire keyboard. Strings Attack/Key Dynamics and Release. Two Band Equaliser for Strings, Strings On/Off and Volume.

The keyboard will be available early in 1983.

Korg's **Rhythm 55B** is an updated version of their popular KR55 preset rhythm box. The same superb voicings, including Rimshot, Cowbell and Clave, are now combined with two alternative patterns on each of the 48 rhythms, Intro/Fill In facility and a variable Swing Beat on the Jazz Rhythms. As before, the individual volumes of the instruments are adjustable and there's a trigger output for sequencers giving a wide variety of options.

The **Korg Programmable Digital Delay SDD-3000** offers a wide range of delay times, modulation waveforms and attenuation options.

The input has alternative levels of -30dBm, -10dBm or +4dBm together with a wide-ranging level control, and frequency response is 20Hz to 17kHz. Low Cut and High Cut Filters are included and delay times available are 0 to 1023 msec. in one msec. steps.

Regeneration and Hold are available, together with Triangle, Square, Random and Envelope modulation. The unit comes in a standard 19 inch rack and will be available early in 1983.

Also on its way is Korg's first programmable rhythm machine, the **KPR-77**. Programme chaining, multiple memories, individual instrument mixing, illuminated LCD status display, beat length selection, tape dump of programmes, individual trigger outputs and sync. are just some of the advanced features available. Instrument voices and effects include Cymbal, open and closed High-Hat, High and Low Toms, Claps, Tom flam and Accent. There's also a headphone socket for private programming and checking.

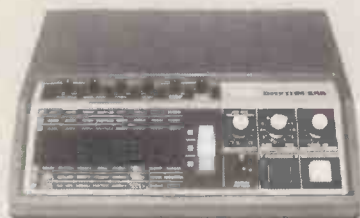
Further details from Rose-Morris, 32, Gordon House Road, Kentish Town, London, NW5. Tel. 01-267 5151.



Korg EPS-1.



Korg 3000 Delay.



Korg Rhythm 55B.



BGW 750C.



BGW 7000.



Korg KPR-77.

Californian electronics company BGW systems have a range of power amps available including the **Pro-Line 7000**, the **750B** and the **750C**.

The 7000 is a solid state quasi-complementary bridgeable design featuring Forced Air Cooling (by an internal fan), internal circuit breaker and ¼ inch connectors. The front panel has two input level controls, a rocker power switch and green LED power indicator, and the rear panel a mono/stereo switch to convert the amp to fully bridged mono operation. Sixteen 150W power transistors in each output stage give a total mono output of around 750W with generous headroom.

The 750C with clipping indicator LED's and the 750B with dual solid state VU meters each produce around 930W mono, or 285W per channel stereo. Each includes facilities for balanced XLR or unbalanced ¼ inch connectors, complementary output stage, error-sensing op-amp input stage and extensive circuit protection. THD is typically around 0.008% at 1kHz.

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The Casiotone 701 has received a great deal of critical acclaim from the music press. Music World, for example, from whom we took our headline, also called it 'the most talked about new instrument of the year.'

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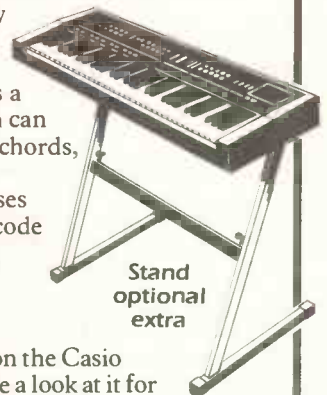
sound any of the 20 voicings, which don't have to be the same as that of the melody line 'so a nice split function here' (Music World).

The CT701 also features a Memory Play function which can store up to 345 notes and 201 chords, to play back along with you.

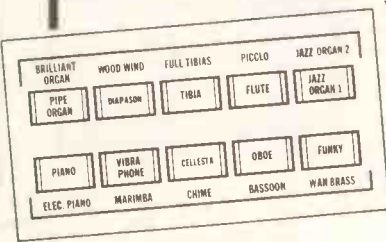
One more feature that uses the memory is the MS-1 bar code scanner which actually reads bar coded music and stores it in the memory to play whenever you want.

In fact, there's so much on the Casio CT701, that you'll have to take a look at it for yourself to discover just how much it can do. But for now, let's leave the last words to the music press. 'I can think of no better all round keyboard' Music World. 'A tremendous addition to the range of Casio Keyboards . . . it will lead the way' Organ Player.

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MAY Holger Czukay ★ Depeche Mode ★ Keyboard Buyers Guide ★ The Peak Programme Meter ★ Reviews: Moog Source and Rogue Synthesisers, Suzuki Omnicord, Acom Atom Synthesiser, Calrec Soundfield Microphone ★ Projects: Soft Distortion Pedal, Quadramix.

JUNE Jean-Michel Jarre ★ Classix Nouveaux ★ Studio Sound Techniques ★ Making Music with the Microtan 65 ★ Reviews: Carlsbro Minifex and E-mu Systems Emulator ★ Projects: Panolo and Multisplit.

JULY Ronny with Warren Cann and Hans Zimmer ★ Drum Machines Buyers Guide ★ Jean-Michel Jarre Music Supplement ★ Reviews: Roland Juno 6 Synthesiser, Peavey Heritage Amplifier, Steinberger Bass Guitar, TI-99/4 Music Maker

Software ★ Projects: Universal Trigger Interface, Electric Drummer **AUGUST** Kitaro ★ Spectro Sound Studio ★ Jon Lord Interview & 'Before I Forget' music to play ★ Reviews: The Synergy, Korg Polysix, Tascam M244 Portastudio, Shergold Modulator 12-String Guitar, Yamaha Professional System Effectors ★ Warren Cann's Electro-Drum Column ★ Projects: 8201 Line Mixer, Guitar Buddy practice amplifier.

SEPTEMBER Richard Pinhas ★ Non-Concordant Tone Generation ★ Yamaha CS-01 Breath Controller ★ Reviews: Jen SX1000, Casio 1000P Synthesisers, Fender Squier Guitar, Carlsbro Stingray Electro-Acoustic Amplifier, Pearl Effectors, Delta Lab DL-5 Harmoniccomputer ★ Projects: Comp-Lim, Twinpak ±15V PSU.

OCTOBER Kate Bush interview and 'The Dreaming' music to play ★ Digital Recording, A New Landmark ★ Ken Freeman ★ Spectrum Micromusic ★ Reviews: Rhodes Chroma, Fender Squier guitars, Kay drum machine, Carlsbro Power Amp ★ Projects: ElectroMix 842 Mixer, Amdek Distortion Kit.

NOVEMBER Patrick Moraz interview and 'Adagio For A Hostage' music to play ★ Robert Moog ★ Bill Nelson ★ K. Schulze and K. Crimson in Concert ★ Reviews: Yamaha PC-100, Technics SX-K200, Casio MT-70, Hohner P100 and JVC KB-500 MiniSynth Supplement, Gibson Firebird 2 Guitar, Alligator AT150 Amplifier, Allen & Heath 1221 Mixer, Eko Ritmo 20 ★ Projects: ElectroMix 842 Mixer, Amdek Chorus.

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1. Tim Souster. 2. Adrian Wagner plays Wasp & Spider. 3. Lowrey MX-1 Organ. 4. Apple Music System. 5. E&MM Word Synthesiser. 6. Fairlight Computer Musical Instrument. 7. Sharp Composer program. 8. Yamaha PS20 keyboard. 9. Vero musical projects. 10. David Vorhaus LP "White Noise" excerpt.

Demo Cassette No. 3 (July/August issues) contains:

1. PPG Wave 2 Synthesiser. 2. Syn-wave project. 3. Wersi Pianostar played by Hady Wolff. 4. Alphasadac 16 music. 5. Atari 400/800 music. 6. Duncan Mackay. 7. Hexadrum project. 8. MTU music. 9. Casio VL-Tone.

10. Irmin Schmidt's Toy Planet LP extracts.

Demo Cassette No. 4 (Sept./Oct./Nov. issues) contains:

1. Linn Drum Computer. 2. E&MM Harmony Generator project. 3. City University music. 4. Casio MT-30. 5. Roland instruments: Jupiter 8, TR808, MC-4, & GR300. 6. Steve Howell piece. 7. 'Ecstasy' LP by Georg Deuter excerpt.

Demo Cassette No. 5 (Dec./Jan. issues) contains:

1. Teisco SX-400 Synth. 2. Poly ZX81 music. 3. Study Music 1: Synth backing for you to play solo of Dec. '1984' Rick Wakeman music. 4. Casiotone 701. 5. Yamaha CS70M. 6. Roland CR8000. 7. E&MM Synclock project. 8. Study Music 2: 'Exit' music from Jan. issue minus theme for you to solo with. 9. Alpha Syntauri Computer pieces. 10. Elka X-50 Organ. 11. Soundchaser. 12. Ian Boddy music. 13. Richard Mitchell's electronic music for film.

Demo Cassette No. 6 (February/March 1982 issues) contains:

1. Yamaha GS1 played by Dave Bristow. 2. Korg Trident Polysynth. 3. Roland Drumatix sounds. 4. Study Music 3: Ike Isaacs performs his 'After Hours' music in Feb. issue. 5. Firstman Sequencer. 6. Wersi Comet played by Mark Shakespeare. 7. Sequential Circuits Pro-One Synth. 8. Study Music 4: Kraftwerk's Ralph Hutter at the E&MM interview. 9. Home Electro-Musicians: Johnny Demestros, Gerry Taylor. 10. Digital

Delay Line Effects Project. 11. Percussion Sound Generator Project. 12. E&MM Spectrum Synth sounds.

Demo Cassette No. 7 (April to September 1982 issues) contains:

1. Roland Juno 6. 2. Cardiff University computer music. 3. The Omnicord. 4. E&MM Soft Distortion Pedal project. 5. Warren Cann's Drum Column examples in Parts 1 & 2. 6. Casiotone 1000P. 7. Emu Emulator. 8. Delta Lab DL-5 Harmoniccomputer. 9. Yamaha CS-01 Breath Control Synth. 10. E&MM Panolo project. 11. The Synergy.

New Demo Cassette No. 8 (October to December 1982 issues) contains:

1. Rhodes Chroma; 2. Amdex Distortion, Chorus and Percussion Synth. 3.



Warren Cann's Drum Column Parts 3 & 4; 4. Yamaha PC-100. 5. Technics SX-K200; 6. Casio MT-70; 7. Hohner P100; 8. JVC KB-500. 9. Eko Ritmo 20; 10. ZX Spectrum Synth Controller. 11. Elka Synthex; 12. E&MM Transpозer project; 13. The Kit. 14. ZON X81; 15. Crumar Stratus. 16. Paul Nagle music.

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- ★ Tangerine Dream in concert.
- ★ Find out about MACROMUSIC!
- ★ Projects include Amdek's Compressor Kit and complete details of the Pitch Readout for the E&MM Transpozer.
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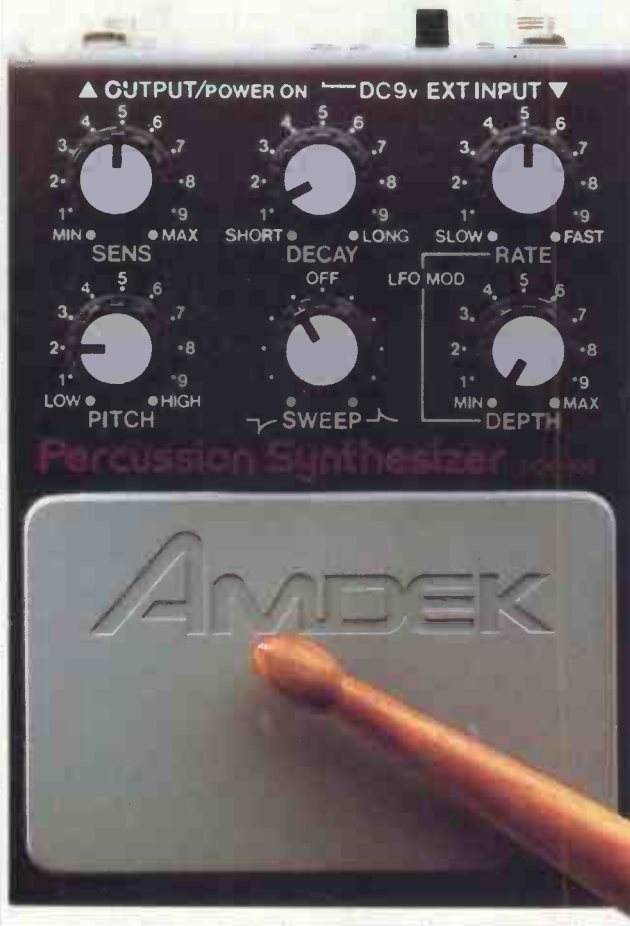
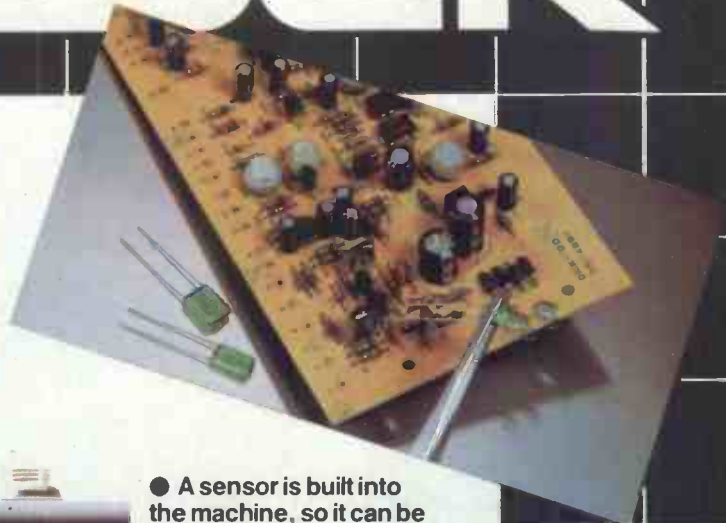
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