

Electronics & **MUSIC Maker**

MARCH 1983 95p

THE NO. 1 MONTHLY FOR THE MODERN MUSICIAN



REVIEWS Include:

Casio's new keyboards, BGW 7000 amplifier, Tokai Flying V Guitar, Eko Ponymsynth & RSF Kobol synths, Oric micro, Ibanez effects and the latest from KORG.

CHRIS FRANKE on Sequencers
KLAUS SCHULZE on Composing
MONKMAN AND XOLOTL on Synclavier
MICHAEL KAROLI on Guitar Improvisation

- ★ How to write a rock song
- ★ Studio tape techniques
- ★ Make the Shaper, Amdek Rhythm Machine & ElectroMix 842 Meter Bridge
- ★ The Electronic Keyboard

FREE COMPETITION
WIN a Texas Micro





The Roland Generation

Until now, the first time piano buyer has had problems which could easily inhibit any purchase at all: the need to buy an acoustic piano probably in excess of £1,000, maintain the correct temperature and humidity, keep it tuned – not to mention the fact that it really is quite large and heavy.

And yet the desire and need to own a keyboard for yourself or your family is still there.

Roland now provides an answer to these problems with its range of Contemporary Keyboards. Keyboards that are compatible with the modern home and lifestyle.

Consider a range of Contemporary Keyboards – for the serious player the HP-70,

a 75 note touch responsive keyboard complete with sustain pedal and harpsichord sounds. For the economy minded – the HP-60 and HP-30, which have 3 piano voices plus harpsichord. And just for fun – the EP-11 with automatic rhythm, automatic accompaniment, automatic arpeggio with memory plus the ability to transpose instantly into another key!

At a fraction of the cost of a conventional piano these keyboards are lightweight and portable, have no-fail electronic tuning, digital electronic tone generation – and you don't need an expensive specialist delivery team.

What is most exciting is the sound. Full, rich piano tones through self-contained speakers

– or if you like, through external amplifiers, or your home stereo system, or if you are still practicing – headphones.

For more information contact the Roland Contemporary Keyboard dealer of your choice or write direct to us, quoting "Next":

**Roland Contemporary Keyboard Division
Roland (UK) Ltd, Great West Trading Estate
983 Great West Road, Brentford, Middx, UK**

Roland
WE DESIGN THE FUTURE

CRUMAR at CHASE

CRUMAR STRATUS POLYPHONIC SYNTH

SYNFUL SOUND

The Crumar Stratus is the first polyphonic synthesiser 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 synthesisers are limited by their 5 or 6 voice capability. Go beyond that and notes drop out.

The Stratus also features unique trigger modes (both Multiple and Mono) which allows you to turn on the Oscillator Glide, reset the LFO delay the alternate between the sawtooth and the 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. With most other polysynths you can only play one sound at a time, but with the Stratus you can play 3 separate sounds simultaneously from the polysynth section, organ section and string section for multi layering effects. There are other noteworthy qualities to the Stratus, like two independent oscillators, continuously variable and invertible envelopes and polyphonic resonances. But we suggest you experience this 'synful' sound for yourself at Chase. At a price under £500, it's a devilishly exciting way to burn up a stage.



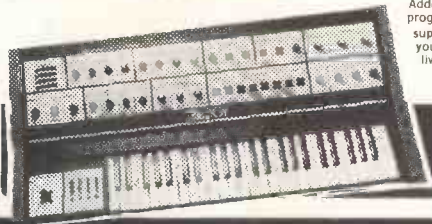
RRP £900
CHASE PRICE £499

CRUMAR TRILOGY POLYPHONIC SYNTH

TRILOGY

Crumar's Trilogy combines polyphonic synthesiser, strings and organ sounds in one instrument. Then let's 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, Crumar have created the most complete polyphonic synthesiser 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 programmable presets together with two super String sections, and an organ section, and you have all the ingredients to make the TRILOGY live up to our highest expectations.



RRP £1300
CHASE PRICE £849

CRUMAR COMPOSER POLYPHONIC SYNTH

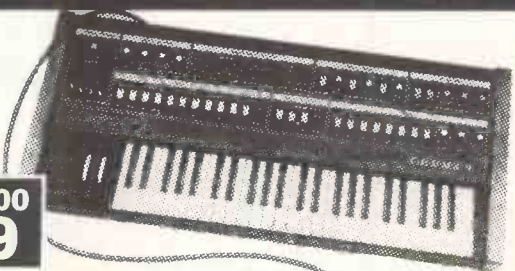
The Crumar Composer polyphonic synthesiser has four separate sections which can be used at the same time (1) The lead line solo synth section. (2) The polyphonic synthesiser section (3) The organ section and (4) The String section. All the sounds in these sections can be varied, mixed and played at the same time to give multi-layering of sound effects. THE LEAD LINE SOLO SYNTH section has facilities to create your own sounds together with seven presets which can be altered. The Free Section includes an envelope generator, Attack - Decay - Sustain - Release, Filter, Envelope Amount - Cut off - Resonance. This section also has a split keyboard facility and a lower or upper note parity together with a pitch wheel to bend notes up or down. Other facilities include pitch tuning, footages range from 32 to 4 - five separate wave forms, saw tooth - Triangle - Portamento - Touch sensitive keyboard - Solo breath control allowing the player to control the envelope and the filter by blowing technique.

THE ORGAN SECTION has four separate organ sounds. Separate volume and decay controls for percussion on 4 foot and/or 2 1/2 foot. Separate sustain length control. Also has a built in Rotary Sound System with slow or fast selector.

THE POLYPHONIC SYNTH SECTION: Fully polyphonic programmable synthesiser, which includes preset sections and free sections. Free sections include Envelope generator, Attack - Decay - Sustain - Release Filter, Envelope Amount - Cut off - Resonance, Oscillator 1 Transpose (1 octave down), Wave form selector (saw tooth - square), Oscillator 2, Transpose (1 octave down), Wave-form selector (saw tooth - square), Detune, CANCEL Poly Modulation controllable by wheel, Poly Breath Control, Allows the player to control the Envelope and filter by blowing technique.

THE STRING SECTION has 16 feet and 8 feet sound which can be played individually or mixed. Tone of strings can be varied from Timbre controls. Separate variable controls for Crescendo and Sustain for phasing in effects. OTHER FEATURES include separate outputs for each of the four sections. A voice mixer section consisting of separate volume controls for Solo synth, Poly synth, Strings and Organ sections together with a Master Volume control. Instrument comes complete with carrying case.

RRP £1100
CHASE PRICE £799



CRUMAR DP/50 PIANO

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. 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 synthesiser 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.

RRP £1300
CHASE PRICE £749



CRUMAR BABY GRAND PIANO



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.

RRP £2000 CHASE PRICE £1499

CRUMAR ROADRUNNER PIANO

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.



RRP £300 CHASE PRICE £249

CRUMAR ROADY PIANO

The Crumar Roady is destined to become the electric piano of the 80's. Five full octave of Pianos Vibes and a punchy Bass provide the player with a pool of possibilities that include a 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 past is played out. Get your hands on the Crumar Roady today!

RRP £400

CHASE PRICE £299



CRUMAR PERFORMER

MORE STRINGS, MORE BRASS, MORE GIGS!

Violins, violas and cellos. Trumpets, trombones and French Horns. Synthesiser 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. Crumar's completely new Performer is a professional quality strings and bass synthesiser at a not so professional price.

RRP £500

CHASE PRICE £399



CRUMAR MULTIMAN S/2

One master console on Crumar's versatile Multimann S/2 controls string, bass, brass and piano sounds with a bass 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 20kg professional instrument.



RRP £700 CHASE PRICE £649

CRUMAR SYNTHEPHONE

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

NEW
JUST
ARRIVED



RRP £250 CHASE PRICE £199

CRUMAR TOCCATA ORGAN

SPECIFICATIONS

Four octaves (49 notes)
Voices:
8 organ presets which represent 8 most often used drawbar configurations.
Percussion:
4 and 2 footages plus special percussion effect K (which add a key-click sound)
Two modes of triggering the percussion:
Monophonic or polyphonic.
Variable Volume and Decay rotary controls.
Rotating Sound System:
Controls: On/Off switch - Vibrato - Vibrato Fast - Slow Chorale - Fast Tremolo.



RRP £500 CHASE PRICE £399

CHASE

Opening hours Tues. to Sat. (inc.) 10.00am-5.30pm
Please note our stores are closed on Suns & Mons.

LONDON: 22 Charlton Street, off Euston Road, London NW1. Telephone: 01-387 7626/7449.

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MANCHESTER: 58 Oldham Street, off Piccadilly, Manchester M4 1LE. Telephone: 061-236 6794/5.

BIRMINGHAM: 10 Priory Queensway, Birmingham B4 6BS. Telephone: 021-236 8146.

KEYBOARDS

★ **ROLAND:** JUPITER 8, JUNO 60, JUNO 6 polyphonic synthesizers. SH-101, SH-09, SH-2, mono synths. 100M modular synth system. EP 6060 and piano plus el. Piano range. Microcomposer MC4B, digital sequencers, TB-303 bass line. Plus all the latest goodies detailed opposite.

★ **SEQUENTIAL CIRCUITS:** The amazing new PROPHET 600 will be on demo from April onwards. This incredible 2 VCO per note, 6-voice polysynth features a built-in polyphonic sequencer and midi interface. PROPHET 5 (rev 3.3) and PRO-ONE still going strong!

★ **KORG:** Latest from Korg is the new POLY 61 polysynth with 2 VCO per note and 64 memories. Modern design with digital control, chord memory, unison, arpeggiator. POLYSIX and MONO-POLY available from stock.

★ **CASIOMAGIC:** Casio never cease to amaze with their wide range of keyboards. The latest model, CT-7000 actually features multi-layer, polyphonic digital recording! PT-30, MT-11, MT-41, MT-45, MT-65, MT-70, CT-101, CT-202, CT-405, CT-501, CT-1000P all on display.

Plus: Rhodes, JVC, Yamaha, Memorymoog, Moog 'Rogue', Korg pianos. Please send 25p in stamps for colour brochures of our keyboard range.

Roland

★ **LONDON'S LARGEST ROLAND STOCKIST — IF ROLAND MAKE IT, WE SELL IT!**

★ The very latest models revealed at the Frankfurt International Music Trade Fair in February:

JUPITER 6: 6-voice polysynth with midi interface £2,000
 JX-3P: Programmable, preset and polyphonic synth! £850
 PG-200: Synthesiser programmer for JX-3P £200
 MC-202: Baby microcomposer: 2 voice with SH-101 miniature synth built-in £325

NEW MODULES FOR 100M MODULAR SYNTH: Portamento controller, 4-band parametric EQ, 4 x signal gate. £49

CUBE 40CH, 60CH: Cube combos with built-in chorus.
 SST 40, 60, 80: Full range loudspeaker cabinets.
 BOSS TU-12: Chromatic tuner with digital processing..... £49

★ These new goodies complement the staggering amount of keyboards, amps, guitar synthesizers, Boss effects and Amdek computer peripherals from the Roland range.

★ The London Rock Shop will give you 'sound advice at a better price' but also professional demonstrations of the very latest technology.

01-267 5381
 01-267 7851

London Rock Shop

Open 7 days
 a week.

26, Chalk Farm Road, London NW1.

AMPS, CABS + COMBOS

★ **TRACE ELLIOTT:** The Rolls-Royce of bass amplification. We are recently appointed sole London agents for this great bass gear. Our stock includes preamp, power amp, combo (1 x 15" and 8 x 10") set-ups to choose from (subject to availability).

★ **AMPEG SVT BASS STACK:** 300 watts of pure valve power. Sole London agents for this recently updated tower of power.

★ **SESSIONETTE:** The boogie man's back relief! At last, a British made combo that packs a real punch with soft overdrive at low volumes and wails when you wind it up. 75 watt output with a Celestion 12" speaker that can handle the sting in its tail. At only £225 you've got to give a try. Optional footswitch available for clean/dirty channel change. STOP PRESS: New 'SESSION' back-relieving bass combo due soon!

★ **ROLAND:** Cube 20, 40, 60, 100, 60B Cube 40k, 60 keyboard, 40ch, 60ch chorus Jazz Chorus JC 50, JC 120 Spirit 10, 15B, 30, 50, 30B, 50B Bolt 30, 60, 100 E/V Boss MA-1, MA-5, MA-15, MS-100

★ **OHM:** 'PUKKA' 60 watt bass combo with compression, 'TRAMP' bass and guitar practice combos under £100. New 125 watt keyboard mixer combo and 125 watt bass combo.

Plus: Gallien-Krueger, Carlsbro keyboard combos, V-amp, Bose, Hiwatt, Yamaha, Fender, Vox, Electro-Voice.....

Fostex

★ **LONDON'S MUSICAL MULTITRACK CENTRE:**

250: Cassette multitracker with Dolby C noise reduction.
 A-8: 8-track 1/4" tape recorder with Dolby C.

A-2: 2-track 1/4" tape recorder for master mix-down.

350: 8/4/2 multitrack mixer plus 3060 meter bridge.

3050: Digital delay (270ms) with modulation/flanging/chorus.

3030: Dual 10-band stereo graphic equaliser.

2050: 8 + 2 line mixer for sub-mix or monitor mix.

6301: 10 watt self-powered, portable mini monitors.

3180: NEW stereo reverb with 24ms pre-delay.

3070: NEW stereo compressor/limiter expander.

★ Simply turn up at our door and we will give you a full demo of how, why and what for... musical multitracking with Fostex may be easier than you think. For an outlay of around £700 (which includes Accessit accessories) the results are staggering with up to 10 sounds layered together. Why not let us show you how?

GUITARS AND BASSES

★ **TOKAI REPLICAS:** You can't keep a good copy down! Mid-fifties and early sixties vintage guitars in original (Flamingo Pink, Sunburst) and new (Metallic Red and Blue) colours. Fretted and fretless jazz basses in Black, White and Metallic Red with Rosewood fingerboards. Prices start at around £200, tweed cases £59 extra. Why buy a copy when you can buy a lovingly reproduced replica?

★ **ROLAND GUITAR SYNTHESISERS:** GR-300 blue floor unit features switchable pitch changing (over 1 octave +), automatic Minimoog type vibrato, filter sweeps with variable attack/decay, built-in compressor for added susmin. Choice of four guitar controllers: G-202: with humbuckers (white, blue or red). G-303: Fitted neck, humbuckers (left-handed available). G-505: U.S.A. type with trem. (Metallic Blue, Metallic Red, Sunburst). G-808: Neck through body, humbucking pickups.

★ **IBANEZ:** 'Musician' and 'Roadster' active basses and 'Artist' guitars.

★ **ARIA:** New series SB bass and 'Cardinal' guitar.
 Plus: Steinberger (when available), Fender Squier, Fender U.S.A., Gibson, Westone... selected models only.

RECORDING EQUIPMENT

KORG: SDD 3000: Digital Delay-1023 MS, 9 program memories.
ROLAND: SDE 2000: Digital Delay-670 MS, delay/flanger/chorus.
CUTEC: 1024 MS, Digital Delay with extra Sub Delay — new!

MXR: Dual limiter/compressor, pitch shift doubler.

VESTA FIRE: Rack-mount spring reverb.

ACCESSIT: Stereo spring reverb + controller.

ACCESSIT: Compressor/Noise gate/Dual sweep equaliser

ACCESSIT: Patch bay/Headphone splitter/Dual 15w power amp.

YAMAHA: Analog echo, chorus, flanger: E 1005, E 1010.

YAMAHA: Producer Series: Stereo mixer 6/2, Headphone amp.

BEYER, SENNHEISER: Range of studio headphones.

AKG: D80, D190, D310, D320, D330 microphones.

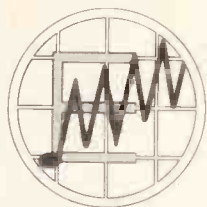
SHURE: Complete range of new PE series microphones.

SHURE: Undyne 517, Unisphere 588, SM57, SM58 mikes.

SENNHEISER: MD421-U + **AUDIO TECHNICA:** Microphones.

AMPEX: Grand Master 1/4" tape + **TDK:** cassette tapes.

D.I. BOXES: Lead testers: Whirlwind cables: Switchcraft plugs.
DRUM UNITS: Roland, 'The Kit', Mattel Synsonics.



Electronics & Music Maker

March 1983

Volume 3

Number 1

contents

E&MM ENTERS ITS THIRD YEAR!

SPECIAL FEATURES

Klaus Schulze 10
Rated as the world's top solo synth performer, Klaus explains how he composes on stage and in the studio.



Michael Karoli 15
We interview the legendary improvising guitarist from German rock band Can.



Francis Monkman 42
From *Curved Air* to *Sky*, and beyond with the *Synclavier II*.

Bernard Xolotl 46
This French-born synthesist describes his experiences with the *Synclavier* and other digital instruments.

Chris Franke 49
Tangerine Dream's rhythm man describes his sequencer set-up.

Frankfurt 74
A look at some of the new products revealed at the *Musik Messe '83*.

Music and the Micro Competition 22
Win a Texas microcomputer for music making.

REGULAR FEATURES

Music to Play 20
'Bandit Rock' by Mike Beecher.

Talking Shop 37
Don Larking.

Organ Talk 54
Portable keyboards and their applications.

Concert Review 66
Stanley Clarke & George Duke, Pat Benatar and AMM.

NEW The Electronic Keyboard 68
Part 1 looks at early keyboard instruments.

Music Maker Equipment Scene 70,107,108,110
Electronics & Computing, Music, new products from Yamaha and Roland.

America 90
New keyboards, guitars and effects in the US.

Fact File 92
Richard Burgess, Roland Orzabal and David Lloyd.

WORKSHOPS

Micromusic 28
Rhythm Sequencer for the MZ80K.

NEW How to write a Rock Song 80
Part 1. *Melodies.*

Studio Sound Techniques 82
Tape machines.

INSTRUMENT REVIEWS

Keyboards
Jen Piano 73 24
New Casio Model 26
Eko Ponsynth 89

Synthesisers
RSF Kobil Expander 40
Korg Poly 61 62



Microphones
New Aria Range 32

Amplifier
BGW 7000 36

Effects
Ibanez Pedals 38

Guitar
Tokai Flying V 58

Microcomputer
Oric-1 84

PROJECTS

The Shaper 94
Contour your instrument envelopes with this versatile effect unit.



842 Meter Bridge 98
Optional Meter Bridge for the *Elec-troMix 842.*

Amdek Rhythm Machine Kit 78
Programmable Rhythm unit with 16 Rhythms and 4 Voices.

Have You Built? 101
A guide to some popular E&MM projects.

NEWS

News & Events 6
Readers' Letters 8
E&MM Demo Cassettes 44
Videomusic 53
Record Review 102
Back Issues & Subscriptions ..104
Equipment Update 106
Classified 111
Advertisement Index 111
Crossword Competition 112

Publisher Terry Day

Editorial & Production

Editor Mike Beecher
Assistant Editor (Electronics) Ken McAlpine
Assistant Editor (Music) Mark Jenkins
Art Editor Pat Haylock
Editorial Assistant Toni Markwick
Secretary Lin Barkass
Administration Pauline Straker
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Consultants

Electro-Music Keith Emerson
Robert Moog
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Microprocessors Glenn Rogers
Hi-Fi
Studio Technician

Editorial Offices 282 London Road
Westcliff-on-Sea, Essex SS0 7JG
Tel: (0702) 338878/338015

Advertisement Manager Tony Halliday
Tel: 01-527 3376

Advertisement Offices Electronics & Music
Maker, Hillcroft House, 16 The Avenue
Highams Park, London E4 9LD
Tel: 01-527 3376

Publishers Glidecastle Publishing Ltd
282 London Road, Westcliff-on-Sea
Essex SS0 7JG

Distributors Spotlight International
Spotlight House, near 1 Benwell Road
London N7 7AX
Tel: 01-607 6411

Printers Thomas Reed Printers Ltd
(Sunderland and London)

Typesetters Quillset (Southend)

Subscriptions Rates for 12 issues:
UK £15.50; Europe & Overseas (Surface)
£16.20; Airmail (Europe) £23.50;
Airmail (outside Europe) £37.50.

Binders £3.95 inc p&p. Overseas add 11p extra
covered by bankers draft in pounds sterling.

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EDITORIAL

After two successful years we have seen E&MM mature into an original format so unique we had to invent our own name for its coverage - 'ElectroMusic'!

Keith Emerson joins our expert team of consultants worldwide. If you have a particular question to put to any of them, please write to me and I'll pass them on. Don't ask for long dissertations for replies because you won't get them! But we'd like to have a working 'think tank' for our readers with questions and answers that interest us all.

Frankfurt '83 is covered in this and forthcoming issues and provides a host of interesting products. Needless to say, the focus of attention is keyboards, although you'll find guitars, drums, mixers, and PA amongst the pages too. Micros continue to play an increasingly important part in instrument design and expansion through a computer link-up is becoming more accepted.

This month we've given you five special interviews with respected musicians who discuss a range of topics. There's two new series, with the first covering the development of the electronic keyboard. The author, Alan Douglas, is well known for his authoritative writings in this field. We're always interested in practical music articles and the second series should get you on the road to rock song success.

Finally, we regret the increase in price, but we've held it off as long as possible. Nevertheless, we've also increased the number of pages from 64 to 116, so you're getting still more for your money.

STOP PRESS

A complete kit for E&MM's Synblo is available, less PCB and case at £16.35 including VAT and P&P from BI-PAK, P.O. Box 6, 63A High Street, Ware, Herts SG12 9AD. Tel. Ware (0920) 3442-3182. PCB and case are still available from E&MM, see page 101.

**A message from
Mr Kakehashi
President of the
Roland Corporation**

Music, painting and sculpture are all art forms. In the case of sculpture and painting you can buy materials and tools to create this art, so why not music? We are missing the tools to create.

In the music industry at the moment hardware, the equipment, is very advanced but lacks software development. Music is just the opposite, over the last three or four hundred years man has created so much software, the music, but very little hardware to shape it.

Our intention is to supply the tools required to create and shape music.

Thirty years ago I wanted to have an organ in my home, but after the war there were none available, so I had to build one. Then I started my company, so a hobby became a business. I therefore looked for another hobby, in computing. After I realised all the possibilities there I developed the micro-composer. This was our first instrument for compumusic. When first introduced, the MC8 was very expensive. Now we've released the MC202 with more capacity than the original MC8 and costing less. I want to make music creation available to anyone.

Computers do not take away creativity, they are just honest slaves, tools to be used. How creative they are depends on the user. For example, Mr Tomita, a good friend of mine, never plays on the keyboard, he can, but he prefers to enter his music by numbers to be played by machine. He is an amazing person.

The Amdek Compumusic system allows the musician to use computers and the computer enthusiast to make music. The aim is the same. It is a complete melody, bass, chord and rhythm unit. We have also developed the XY plotter which is intended to print out music.

People seem to be looking for digital synthesisers, creating sounds by all digital means, I don't think that's right. If analogue synthesisers can make good sounds, we should use analogue. If digital makes a good sound, we should use digital. Equally if we can create good sounds without electronics we should. The sound is the main aim.

Compatibility is also an important area. We have made our technical data available to other people because we must have a standard, like MIDI. Then everyone will benefit, not just one company.

We claim that we are designing the future. I believe in the future of electronic music.



Corrigenda

Synbal Feb '83

In Figure 2 P.79 the base of TR1 is shown connected to the +6V rail, it should in fact be shown connected to OV.

Parts List - R5 should be 680R not 68R and RV9 which should be 10k, was omitted.



BOOTLEG MUSIC

5-7, SOUTH STREET, EPSOM, SURREY.

TEL:EPSOM 24528

OPEN MON-SAT 10am-5.30pm. THURSDAY 7.00pm

THIS MONTH'S AMAZING BACK DOOR DEALS!!

Roland

KEYBOARDS

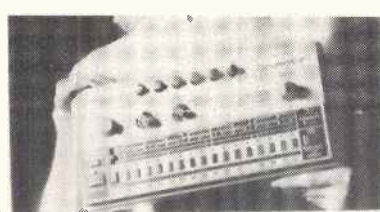
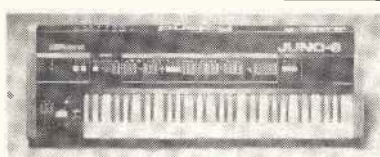
- SH 101 New portable model with arpeggio, sequencer, optional handgrip
- SH 09 1 1/2 Osc. Demo model £199.00
- EP 11 Piano with rhythm and chord coupler. Demo model £289.00
- EP 09 Touch sensitive piano, s/h £195.00
- VK 09 Drawbar organ. Demo model £365.00
- SA 09 Saturn organ 3 piano Demo model £299.00
- RS 09 Organ/string machine. Demo model £299.00
- JUNO 6 The incredibly versatile polyphonic
- Juno 60 New programmable version of JUNO 6
- JUPITER 8 The 'Guv'

Sequencers and keyboard accessories always in stock

RHYTHM UNITS

- DR 55 Dr Rhythm
- TR 606 Drumatix compurhythm
- TB 303 Bassline autobass sequencer
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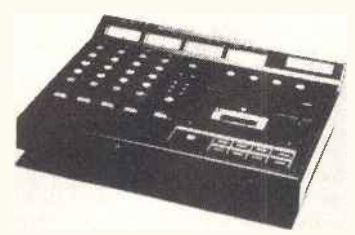
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News & Events

Business

Electronics hardware manufacturers **Epson UK** have appointed Spiro Omalos, previously Technical Training Manager with Commodore, as Technical Services Manager. He'll be responsible for the service of all Epson products; his other previous experience includes work with Ventek Computers. **Rose-Morris**, UK distributors of Korg and other popular lines, intend to move to new premises in 1983. Their warehouse in Gordon House Road, London, has for some time been regarded as unsuitable for the current volume of business, and once it is sold or sub-let the company will move to a more modern and efficient location. **Hayden Labs** have announced the termination of their agency agreement with speaker manufacturers Isophon-Werke and future enquiries should go direct to Isophon-Werke, Eresburgstrasse 22-23, D-1000 Berlin 753051. Hayden's new telephone number is Gerrards Cross (0753) 888447/889221. After eight years with H.H., Clive Bradbury has become the new Sales and Marketing Director of **Carlsbro**. He hopes to collect market feedback to enable their development team to produce a wider range of products and to fully exploit the market potential of their existing range of amps and speakers. Tel. 0623 753902. Ken Atterbury has been appointed as an executive director of Courtney, Pope (Holdings) PLC and becomes Managing Director of the **Lighting Maintenance Com-**

pany Ltd. Micro manufacturers **Epson UK** have announced an arrangement with the Miss World organisation for future promotional activities. The company's HX20 desktop micro and the current holder of the title will be jointly promoted under the slogan 'two world beaters'.

Epson staff will feature on the judging panels of the competition, and entrants will be expected to display a certain knowledge of business matters and technological facts.



The picture shows John Patterson, National Sales Marketing Manager of

Epson, with the HX20 and the current Miss World, Mariasela Alvarez Lebron. Electronics distributors **Dialogue** have won a £100,000 order to supply Hitachi custom LCDs to Speedyplain, developers of the popular Prelude battery-powered 'chord computer'.

Music

The new **Klaus Schulze** album, premiered at his London concert reviewed in E&MM November '82, is to be a double album titled **Audentity**. Release in Germany was due for early February, and a UK deal is expected shortly. Schulze has embarked on a European tour which may include UK dates; see elsewhere in E&MM or contact Inkeys cassette magazine, 50, Durell Road, Dagenham, Essex, for further details. **Robert Schroder's** new album **Paradise** is due for simultaneous release. E&MM reviewers are doing well nationally; ex-Tape of the Month band **Urno Vogue** are at the time of writing about to take part in the semi-finals of **Battle of the Bands**, finals to be transmitted on BBC's **Nationwide** in April. **Paul Klein**, known as **The Toy Shop** and now accompanied by Phil Walsh (reviewed November '82), has been playing Sheffield Lyceum after winning £1,000 in a national pop contest, while **Incantation**, whose music was described in E&MM December '82 as 'almost maddeningly catchy' have stormed up the charts with a single and an album. **Salisbury Arts Centre** is to hold the first **Southern Keyboard Festival** on Saturday and Sunday 12th and 13th March. A keyboard fair from 10 a.m. to 5.30 p.m. on Saturday will include displays, demonstrations and workshops; at 8 p.m. Patrick Moraz of **The Moody Blues** will perform. On Sunday afternoon a series of concerts on organ and synthesiser lead up to the climax of the show late on Sunday

night. For further details send an SAE to Richard Hayward, St. Edmunds Arts Centre, Bedwin St, Salisbury, Wilts, or telephone 0722 4299. **Tim Souster** is embarking on another Arts Council sponsored tour, this time together with trumpeter John Wallace and under the working title **Electronic Music Now**. Live music played on a Serge Modular system will be supplemented with works for 4-channel tape using various instruments including the Fairlight CMI. Dates are February 27, London Round House 7.30; 28th, Leicester Polytechnic Scraftoft 7.30; March 1, Manchester College of Music, 7.30; 2nd, Leeds University 7.30; 3rd, Keele University 7.30; 4th, Liverpool Bluecoat 7.30; 5th, Darlington Arts Centre 8.00; 6th, Durham Trevelyan College 7.30; 7th, Sheffield Leadmill 7.30; 9th, Nottingham Midland Group 8.00; 11th, Wells Town Hall, 7.30; 12th, Bristol Arnolfini 8.00; 13th, Cardiff University College, 8.00. Further details from William Randles, Contemporary Music Network Publicity, Arts Council of GB, 9 Long Acre, London WC2E. Tel. 01-379 7717.

Instruments

Computer Music Studios have become dealers for the Californian alpha Syntauri Apple-based computer instrument. Accessories available include the Metatrak 16-track digital recording system and the Composer's Assistant, which scans real time performance of the keyboard, displays a finished score and allows editing and hard copying. Further details from Terry Lloyd, 62 Blenheim Crescent, Ladbroke Grove, London W11 1N2. Tel. 01-229 2597.

Computing

Xitan Systems of Southampton have become authorised dealers for the IBM Personal Computer. Demo models are already in their showroom; prices from £2,000 to £3,500 cover systems ranging from single drive 64K models to dual drive high capacity systems. Xitan promise full software support; further details tel. 0703 334711. **The Byteshop Ltd.** have also been appointed IBM dealers for their London, Birmingham, Nottingham, Manchester and Glasgow shops. Bob Robinson, MD of their London branch, believes "IBM's participation in the personal desktop field will now significantly expand the total UK microcomputer market." Tel. 01 387 0505. Cambridgeshire based micro distributor **Comart** have signed an exclusive marketing agreement with Tecmar Ltd. to distribute in the UK the PC-Mate range of peripherals for the IBM. These include Winchester hard disc subsystems, exchangeable cartridge discs, memory and communication interfaces, high resolution colour graphics, analogue/digital converters and other industrial control modules. For details tel. 0480 215005. Comart have just appointed Kenneth Goddard, ex of Data 100 and Systime, as sales manager for their PC products.

Dates

Feb. 22-25 Information Technology Office Automation Exhibition & Conference — **INFO**, Barbican Exhibition Centre — details 01 647 1001. Feb. 23-25 **Microsystems Exhibition**, West Centre Hotel — details 01 643 8040. Mar. 8-10 On-line Process & Environmental Analytical Instrumentation Exhibition — **Procanex**, Bloomsbury Crest Hotel — details 01 998 4684. Mar. 21-24 **Audio Visual Exhibition** Wembley Conference Centre — details 01 688 7788. Apr. 18-20 **Circuit Technology Exhibition**, Kensington Exhibition Centre — details 0892 39664. Apr. 19-21 **All Electronics ECIF Show**, Barbican Centre — details 0799 22612.

IN BRIEF

Aura Sounds Ltd., sole importers of Wersi organs and pianos in the UK, suffered a burglary on Saturday 5th February when several valuable items were stolen. Included among these was the Wersimatic CX-1 micro-controlled rhythm machine, reviewed in E&MM February 1983. Director Mr Arthur Griffiths said "the thieves could not have stolen a more easily traceable item! This CX-1 is one of only ten prototypes, and the only one of its kind in the UK. It is essential that we recover this item, and a reward of £1,000 is offered for information leading to the return of the CX-1 and the apprehension of the thieves".

If anyone tries to sell you a cheap microprocessor-controlled rhythm and auto accompaniment unit in a pub, information should be passed on in confidence to Aura Sounds, 14-15 Royal Oak Centre, Brighton Road, Purley, Surrey. Tel. 01-668 9733. **Music Sales Ltd** have a range of Casio music books including bar codes available; contact MSL at Newmarket Road, Bury St Edmunds, Suffolk. Tel. 0284 702 600. **SIEL**, The International Trade Fair for Leisure and Entertainment Centres, takes place in Paris from April 10th to 14th. Further details from Bernard Becker Promotion, 60-62 avenue de Verdun, 92320

Chatillon, France. Tel. (1) 656 52 32 (collective number). Total display area is 10,000 square metres including sound reproduction, disco, Video, PA, broadcast, electronic games and music. First three days reserved for retailers. **10 CC** are on tour again, supported by Locomotiv GT featuring synthesist Gabor Presser. Dates include Aberdeen Capitol 1st March, London Hammersmith Odeon 16th and 17th March, and Birmingham Odeon 29th and 30th March. Full list from EMI Press Office, Tel. 01-486 4488. The **BAFTA Awards for Video Promos** will be presented on March 15, 16 and 17. Further details from Music Week Promotion Department, Tel. 01-836 1522. **David Bowie** is to move from RCA records to EMI and a tour and album are forthcoming. **Music Vision** cable TV is expected to start in Autumn 1983 and have 4 million subscribers by mid-1984. It will show a repeating three hour block of music videos with adverts, using computer-generated graphics and electronic captioning. Meanwhile the **BBC** have outlined plans for a satellite network to beam live music, ballet and opera to the UK and Europe by 1986. **Eric Clapton's** new album **Money and Cigarettes** is to be promoted by an insert sheet giving a chance to win an £800 Fender Stratocaster guitar. **Nautilus** entertainment in the USA is to release a series of Betamax video cassettes recorded in sound only and intended for the Sony Hi-Fi Beta machine. First releases include albums by Steppenwolf and Victor Feldman, retailing at about 20 dollars (£12). **Cavendish Organs** join Premier drums and other prestigious music companies who have already moved their operations to Milton Keynes. New offices and

warehouses at 30 Clarke Road, Mount Farm Industrial Estate, Bletchley, Milton Keynes MK1 1LG. Tel. 0908 642255. **Middlesex Polytechnic** has a new head for the School of Music. He's Michael Bridger, a specialist in electronic music who previously taught at Crewe and Alsager College of Higher Education. Information on music courses at Middlesex is available from The Admissions Office, Middlesex Polytechnic, 114 Chase Side, London N14 5PN, Tel. 01-886 6599. **The Human League** release a 3-track 'video single' on Virgin this month, featuring 'Mirror Man', 'Love Action' and 'Don't You Want Me' and selling at £10.99.

Making Waves have a new trade catalogue of electronic, progressive, folk, jazz and country music on record and cassette: further details 10, Southwick Mews, London W2 1JG. Tel. 01-262 7377/8/9. **Gunton Hall** and Country Club is to host an Electronic & Pipe Organ Convention and Holiday (Epoch) over the weekend starting Friday, 22nd April: details GH & CC at Pleasurewood Hill, Lowestoft, Suffolk. Tel. 0502 730288. **Washburn UK** is a new company formed to distribute exclusively the range of Washburn guitars in the UK & Ireland; further details 20, Victoria Road, New Barnet, Herts EN4 9PF. Tel. 01 449 4044. **Alligator** have a new 30W combo amp available designed for bass, keyboard, guitar or drum machines. Further details and brochure from Musicians Direct Supply Co. 176B Field End Road, Eastcote, Middlesex. Tel. 01 866 7414. **Roy Neal** presents a programme of music for organ on Hereward Radio in the Anglia region; called 'The Magic of the Organ' it begins at 6.30 p.m. on Saturdays.

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Roland Juno 60.....P.O.A.
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Korg Trident.....£1,350
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Yamaha SK15.....£495
Yamaha CS01.....£139
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The Great Debate

Dear Sirs,
I feel compelled to reply to the letter of comrade Lambert in your February issue. His argument seems to be that only rich synthesists who can afford a Fairlight/Synclavier/Chroma (etc) will make a reasonable living. The poor struggling mere mortal with Transcendent 2000/MS10 has no chance.

Is this true? No doubt Mr Lambert has sufficient historical knowledge of synthesised music to have heard the early Tangerine Dream and K. Schulze albums, surely some of the most enjoyable and innovative works ever produced by electronic means. Inspection of the covers of these albums will reveal, however, that TD/Schulze (etc) had no CMIs, Synclaviers etc, not even a Prophet-V. Or even a polysynth. This early music was recorded using perhaps one or two monosynths — examination of the snaps in the excellent K.S. "X" album will reveal the state of his "wonderful gadgets you see on TV" in 1972 — hardly CMI standards.

Mr Lambert would seem to argue that innovation and sheer musical talent don't matter any more. One would tend to agree having watched TOTP recently, but perhaps the old values still do prevail. Has Mr Lambert ever considered his methods or his musical ability? It seems to me (a humble, non-musical undergraduate electrical engineer) that Mr Lambert's cheap Les Paul copy has now become a cheap synth; far too many people CAN afford a basic synth, and expect the cash to come flowing in as soon as the instrument is connected to the PA. Does Mr Lambert realise that synthesists (and musicians in general) have to really work to gain recognition? That the record producers don't go round listening at bedroom doors in the hope of signing new musical talent, or that publication of a tape in E&MM doesn't guarantee instant fame?

To delve into history again, does he realise how TD suffered initially; how the Beatles suffered initially? In short, could it be that Mr Lambert either is no good at innovative musical synthesis, or that he doesn't sell himself. Because this is what it's really all about.

Maybe if Mr Lambert spent more time at his synth instead of writing long, quasi-political letters to a magazine which really should know better, he might improve his keyboard skills?

P. McGrath
Manchester

It's precisely because E&MM does know better that Mr Lambert's comments were published as a letter rather than as an article. It's up to the individual musician to make the best use of whatever electro-musical equipment he has at hand, or to build or modify equipment himself, and to use his imagination and musical creativity to overcome the limitations of his instruments. If this is done well enough he can be 'spotted' and become commercially successful, and in fact move up into the Fairlight class.

Even if he doesn't do this its possible to make a living using Transcendent 2000 and MS10 type equipment — see our article on Richard Mitchell's film music in January '82.

But even Mr McGrath's comments don't tell the whole story. The early T. Dream and Schulze albums were highly innovative in their time, and are still enjoyable today. However, if an album on the same technical level were to be submitted to any self-respecting record label nowadays, it would gain a rejection slip and encouraging comments. Technical standards have undoubtedly risen, and while 'Picture Music' or 'Inventions for Electric Guitar' or 'Chronolyse' could make a success of a two or four-track master recording, nowadays 16 tracks and a professional mixdown are the norm. There are no simple answers; any further comments gratefully received.

Electronics Education

Dear Sirs,
Could you let me know how I can get into the music business as a recording technician? I have studied maths and physics at 'A' level and have done home recording using cassette decks and old reel-to-reels.

Iain Dunn
Dyfed

Dear Sirs,
Upon leaving the sixth form, I wish to pursue courses leading up to a career in a recording studio. I would be very grateful if you could give me some advice on education in this field.

Alastair Johnson
Berkshire

Dear Sirs,
I am a percussionist/sound engineer, and have become a moderately accomplished project constructor using the minimal knowledge of electronics gained from an 'A' level in physics. I frequently make minor modifications to constructional projects, but I lack the theoretical background to design, modify and service group gear and other equipment. Many courses seem to be cost ineffective as half or two-thirds of the course is spent gaining 'A' level knowledge.

Do you know of any courses or self-teach manuals which would fill in the gaps in my knowledge?

P. W. Yendle
Bedford

Sound engineering as a profession is extremely competitive, particularly if you have in mind the BBC or commercial radio. The former organisation runs yearly training courses, usually taking on about a dozen trainees from over a thousand applicants; contact BBC TV Personnel Dept, Television Centre, Wood Lane, London W12 7RJ. Commercial TV and Radio do not run training courses as such and appoint engineers as vacancies arise. Addresses for local centres are available from any careers office. Much the same applies to recording studios; in this case the situation is even more competitive, with some experience usually being required before a job is

offered. A few studios will train employees who have been taken on for more general unskilled work; studios are listed in the Music & Video Week Yearbook, available this month from Music Week Ltd, 40 Long Acre, Covent Garden, London WC2E 9JT. Tel. 01-836 1522.

University courses in Electrical or Electronic Engineering are usually good qualifications for sound engineering. Some universities and polytechnics, such as Keele University, offer more specific qualifications in audio engineering. Details in the UCCA handbook available from careers offices, and in the individual prospectuses of the universities and colleges listed there.

Any information received on courses or books regarding sound engineering or construction techniques will be gladly passed on by E&MM.

Performing Rights

Dear Sirs,
I run a youth organisation and the young people do shows and concerts for charity. However, we are always having problems with live music groups and therefore I was wondering if there is any law against the use of recorded music for public performance.

I would like to be able to record suitable backing music using my own synthesisers and then use a tape recorder for the live performances of my show group. Would this be possible without breaking any laws?

S. G. Wilson
Manchester

The Performing Rights Society tells us that any music registered with them — which would certainly include all copyrighted chart and popular music — is subject to payment of a fee if performed in public, whether live or from a tape. Additionally, the publisher of a piece of music should be contacted in advance if an arrangement of a piece is to be authorised.

In theory the owners of a concert venue should fill in a PRS return to include each piece performed so that the appropriate fee can be levied. Whether this happens in practice will depend on the individual venue; none of this, of course, applies to a performer's own music or music to which he holds the copyright, and in making arrangements there is a fine line to be trodden between using an existing piece and coming up with something totally original.

Synchronisation

Dear Sirs,
I am having extreme difficulty in synchronising my Boss Dr Rhythm drum machine with my Casio CT-1000P when used as a sequencer. With little technical know-how I have had to resort to a 'trial and error' method but with no success.

I should be extremely grateful if you would advise me of any device available to synchronise the two units. If this is not possible, perhaps you could advise me of any sequencers which would be compatible with a Yamaha CS5 synthesiser?

Kevin Lark
Sutton

As demonstrated at the Hands On Show in December, E&MM is working on modifications to interface Casio equipment with rhythm units and other instruments. We hope to publish details shortly; additionally we hope to produce an octave/volt to hertz/volt convertor to accompany the Universal Trigger Interface (July '82), which together will make any synthesiser and sequencer compatible. The Yamaha CS5 works on a Hertz/volt law; the only commercial unit readily available and capable of interfacing a sequencer to this system is the Korg MS-02 Interface.

Music Appreciation

Dear Sirs,
Just a note to say I've been very impressed recently with several aspects of E&MM — for instance, that there's little differentiation between art music, classical, serious music or whatever, and rock/pop. Personally I find difficulty in finding terms to describe music satisfactorily, especially the music of characters such as Stockhausen, Cage and so on whose music, as far as I can see, is neither classical nor always serious.

I was also impressed that you reviewed Daavid Allen's recent release — and favourably! — not that this in itself is a sure sign of quality. I am continually impressed by your workshops, articles and reviews, especially those related to the low-budget home electro-musician. May your power never fail!

Tim Hall

Dear Sirs,
I would just like to thank you for giving me some space on Sampler Cassette No. 1. The tape has been well worth waiting for and it was very interesting flicking through the E&MM back issues and reading the reviews again after actually hearing the music. It did help me pick up some of the finer points that the reviewer mentioned and for most of the time I actually agreed with his comments!

Mike Beecher's 'Panorama' was easily the most musically interesting piece on the tape — it must be great to be able to write music fluently like that — but you didn't tell us what you used on the recording! Still, it's nice to know there's so much good home grown music around.

Jordan Heal
Bristol

Mike Beecher's electro-music studio is based around a Fostex 8-track tape recorder and 350 mixer. Keyboards include a Yamaha SK-50 D organ/polysynth, Roland, Korg and other synthesisers and a selection of micro-computers for control functions.

Our policy in music criticism is intentionally to avoid differentiating between 'popular' and 'serious' artists. Whether discussing professional albums or home cassettes, it's not the exact category or content that counts; whether it's rock, pop, classical, folk, avant-garde or whatever, what's important is the creative use of electro-music techniques.

Mark Jenkins

Dear Sirs,
I am having difficulty in obtaining a headset microphone for singing live. Can you give any details of where I could obtain one and the range of prices I could expect to pay?

Michael Willis
Norfolk

A range of headset microphones and headphone/microphone combinations starting at about £30 are available from Shure Electronics, Ecclestone Road, Maidstone, ME15 6AU. Tel. 0622 59881 and Sennheiser, Hayden House, Chiltern Hill, Chalfont St. Peter, Gerrards Cross, Bucks SL9 9UG. Tel. 0753 888447/889221.

Amplification

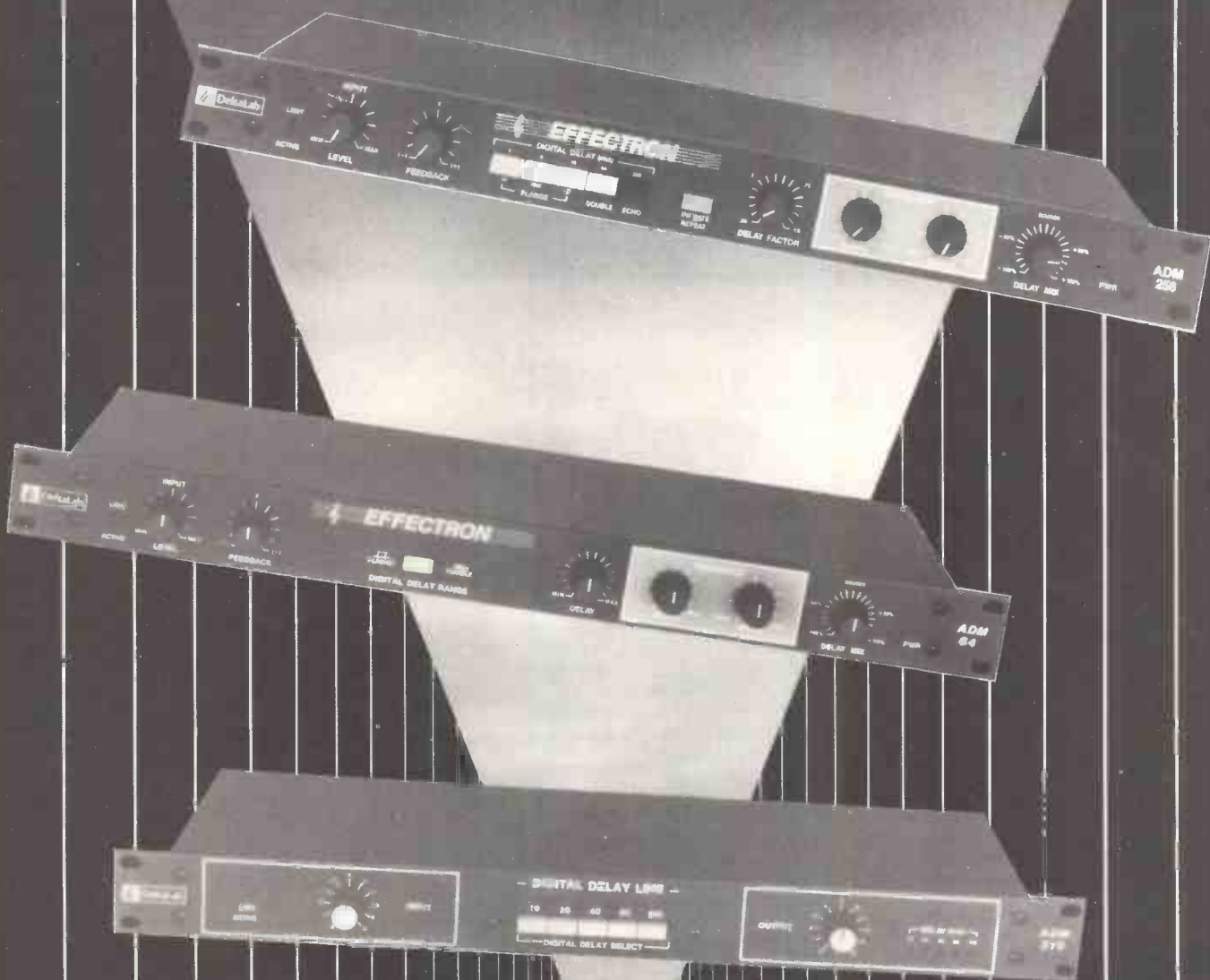
Dear Sirs,
Could you please advise me on a suitable amplifier that I could use with my 'Synsonics' drum machine and 'Kit'?

T. Read
HMS Sultan

Drum machines require a full-range amplifier and speaker combination to reproduce the bass frequencies and transient sounds involved. If a full-scale bass cabinet (for bass guitar) is too bulky, a keyboard combo such as the Roland Keyboard Cube would be suitable.

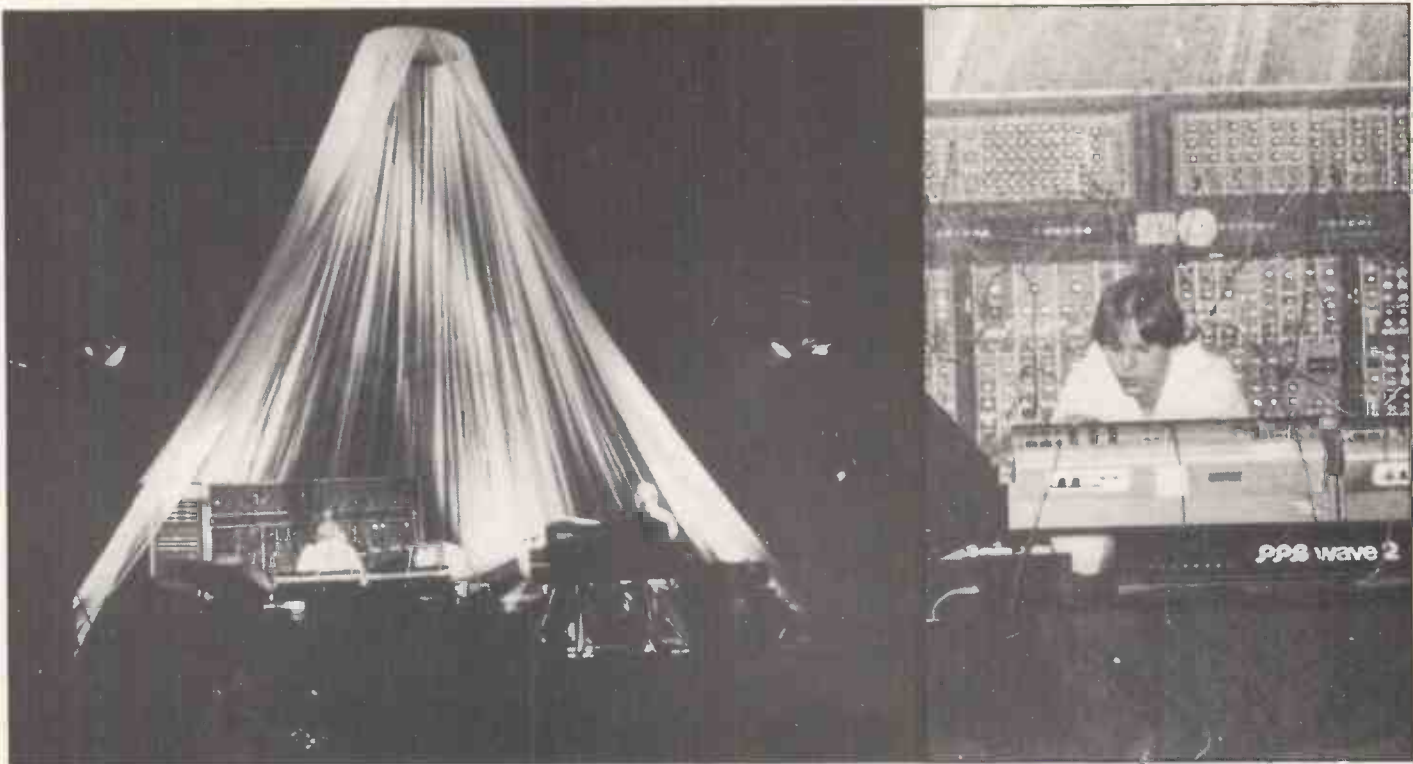
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Klaus Schulze

on Composing

Tapes, digital memory and floppy disks are the manuscripts for this successful German performer.

Composing in the studio

“I have two studios - one is for my record company (IC Records) and is a normal recording studio, and my own studio is a purely electronic studio without mics and so on; it is digital and has all my instruments set up more or less as I play them on stage. By digital I mean I have the Sony 1600 PCM digital recorder for mastering. To start my composing, I just sit at the instruments and first play around them until I find some nice basic tracks to work on top of. Or I may have to get a specific piece for a sound track, or an idea I would like to express. Generally, I start improvising for several hours and tape it all. I then take out the best parts and put them into a composition that lasts about twenty minutes or so.

In fact, that's a very traditional way, but instead of writing down the music, I use the recorder to find the right ideas for the piece in mind.

It's interesting that you can write in this way, because your music always flows along.

But the thing is, when you're in a certain mood they will fit, somehow. If not, I'll build a bridge passage in between or add a suitable intro to a new sequence. That's what we do in performance too - we have certain blocks which we can call upon. Composing is very hard work in fact, because out of many hours may only come one minute of music. But this one minute is so inspiring that it may trigger another twenty minutes of music as I work with it.

I think it's always a reaction between the tape improvisations, what you did before, and what you think now. That creates the new idea which finally gets on tape and eventually makes the LP. It is also important to come back to the music because my opinion of an extract can be the complete opposite the next day. This distance between hearings is necessary.

Your structuring of a piece is almost classical in concept. Has your background brought this about?

You see, in Germany most people grow up with a background of classical music, including myself. I also experimented with composition quite early on and was influenced by a lot of classical music. I don't like short pieces because just when you are in to the music it stops. I like to be carried away by it instead of just jumping from one mood to another. American jazz rock is like that and can have new ideas from one bar to the next - but that's like American TV where they can't stand one minute of silence!

The subtlety of your music is that progressive development which you have to listen very carefully for, and each time you may hear a different process taking place.

Yes, your own mind situation may make you hear the music in a new way the next time you hear it. I also leave a lot of the music without a strong melody, so the listener subconsciously adds his own melodies - I think that is very important. So by listening, you are creatively using your own fantasies. *Your own lifestyle must affect the way you compose. Are you totally immersed in your music these days?*

No, no - that's a difficulty really, for I also run the record company (but do delegate a lot of the work apart from the producing side). Still, for five or six hours a day I just play and experiment to find new things. Studying computer programming is something that I'll never stop having to do as well.

Crumar GDS

Your main concern here is presumably the Crumar General Development System (GDS) with VDU alphanumeric keyboard terminal, plus dual 8" floppy disk drives and special keyboard using 32 digital oscillators?

Yes, but I've had it modified by an American guy to have a straight 'musician-friendly' language. So if I want a flute I can just type it in from 'menus', very much like the Fairlight. I prefer it because it has less noise and, of course, it uses a 16-bit micro unlike the Fairlight's 8-bit systems. From a sound point of view, it's crystal clear, and I like it on stage because I just have the recording and voice files to refer to whilst still being able to change tempo, pitch, add new links and so on in real-time. I can, therefore, prepare and continually modify a full background for my performance so that I can really lay back on it and start to be, let's say, very emotional in front.

Actually, the GDS isn't the ideal system for stage use. If you want to change a voice, for example, the concert will probably be over by the time you've got it! The GDS was really made for studio work where there would be time for setting up.

Did you consider using the Synergy, which was an extension of the Crumar GDS?

I remember when I bought the GDS, they were saying about bringing out the Synergy. I thought they would have it disk-compatible which would be great because it would let me use sounds I'd created on the GDS with the more portable (and performance oriented) Synergy on stage. But it turned out to be cartridge-based and, although Crumar will take your disk voice files and put them on this, I was disappointed there was no direct link through disk storage.

So I now spend a lot of time programming the GDS as part of my composing work. Still, that's the basic thing for us now - you have to synthesise a piano before you can play it. People often think that computers replace the musician, but of course you still have to put the ideas into the computer before it can play - that's where the musician's skill lies. It's quite a chore at times too! A large part of my time is spent deciding which voice to use for a particular line -

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whether one from my GDS 'menu' or other synthesiser preset voices, or whether it should be something totally new for me. You know, it takes much longer to find the voice than the melody!

Do you relate more to orchestral instruments or not?

Sometimes, it depends on the background, which might be strings and so on. I'm going more and more to things that sound a bit like an orchestra without ever actually becoming traditional sounds - if you want those, then why bother with a synthesiser? I think synthesisers are not made to copy existing instruments. What makes computers so interesting for me is that it can take you beyond your own thinking - it can generate music that you would not even conceive in your fantasies! You have to be careful that it does not get too far away from your original ideas too, but on the whole it can make your music much more alive by making changes in performance from one bar to the next - unlike the early electronic music using sequencers that repeated the same 8-note phrase over and over.

Do you go out and listen to other people's music, say, to jazz?

No, I don't particularly like jazz. Anyway, I live in the countryside and would have to drive 150 kilometres to the nearest venue. So I don't normally listen to others playing live. To be true, I'm not really interested - if I want to hear something, I'll get a record instead. But occasionally, I'll pick up on a sound that interests me and the only way will be to go and hear the performance.

There is also the danger that if you've been making music for a long time, you'll keep coming back to the same chords, the same progressions and wonder whether you need a new source of inspiration.

Yes, but I think that I definitely don't get it from other people - the inspiration has to come somewhere from myself, in my own situation. If I try and adapt someone else's ideas it nearly always sounds unlike my own music in the end. My music also needs a lot of sensitivity and I'm simply too proud to take my ideas from somebody else!

I notice that for your performance you have a music chart that consists of numbers and various instructions.

With two people - that's myself and Rainer Bloss - you have to have something to keep track of the changes in harmony and so on.

Choosing instruments

Let's go back to the point where you have sounds on tape, you're in your environment and you're now beginning to relate specific sounds to passages. Do you turn to your newest instruments or find older ones still play their part?

I still like the EMS Synthi - it was my first synthesiser and gives me some special sounds, although I would never use it for harmonic scales but for bridges. I know it so well that I find I can get a lot from it.

Do you regard some as solo and some as harmony instruments?

Exactly. I have the ARP Odyssey for very 'fragile' sounds. I have pedals to control modulation - I manipulate two of these with my knees as I sit cross-legged on stage. My instruments are all on a raised platform so that I sit on this level with them. My movements as I play are part of my controlling the pedals and they do give me filter modulation whilst having both hands free to play. The pedals I use are normal ones, except that my engineer has fixed car tyre rubber strips on to them so that they always return to the off position. One pedal is for the ARP to control filter and pulse width modulation, and the other is controlling the Moog filter.

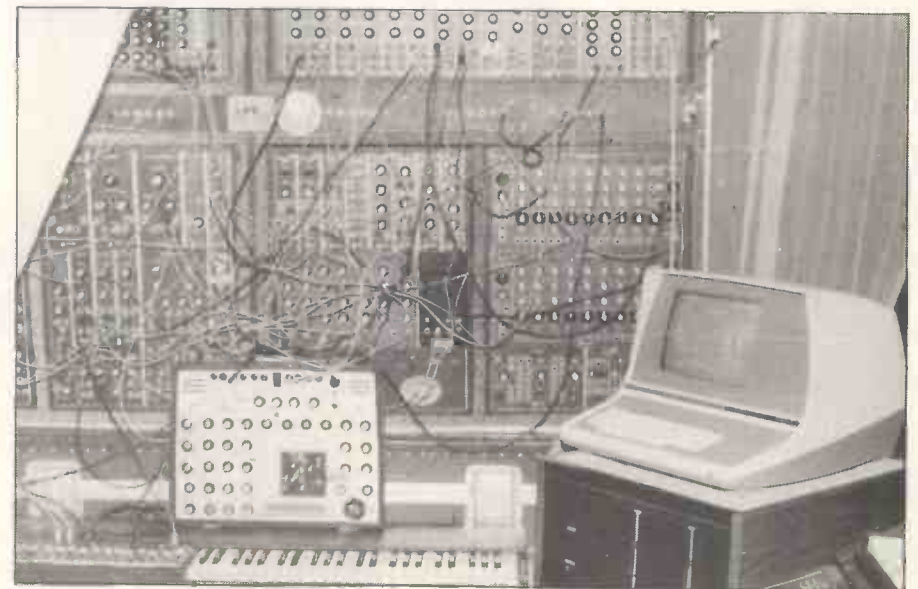
Underneath these instruments I have an



Klaus' keyboard set-up.



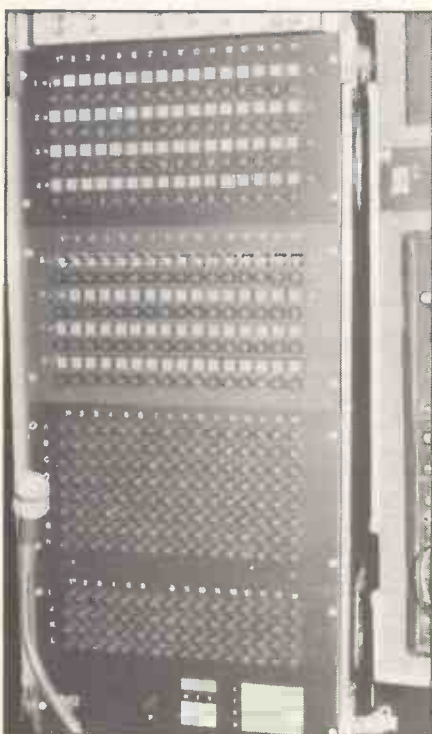
Yamaha mixer, Odyssey and pedals.



Modular system, EMS synth, custom sequencer keyboard and GDS terminal.



GDS and CS80 controls.



Custom-built rhythm sequencer.

Eventide Harmonizer (to improve strings, etc.) and below this the Publison Harmoniser. I use the Publison on stage for delay mainly, and for occasional up and down harmonies or backward sounds. I use one of the two Minimoogs for bass lines, and the other for solo melodies (with oscillators tuned in parallel fifths). Underneath these is the PPG Wave 2 computer synth.

I really like the Wave because it's very flexible with its partial waves - you can do so many changes. Its sound is very characteristic and you'd never get, say, the sound of a Yamaha CS80 with it. The CS80 is another amazing instrument I use because it can be equally good for solos or harmonies - it must be one of the greatest stage instruments and I can't understand why they ever stopped building it.

Above the CS80 is the GDS keyboard linked to its VDU terminal, and behind me I have a Yamaha 32-channel mixer. Most of the channels are used because things like the Simmons drums controlled by the computer need six tracks, the Moog needs four and Rainer uses a lot for his Yamaha electric grand, Emulator, Jupiter 4, Minimoog and Korg Vocoder.

The instrument racks behind me start with one complete rack on the left for the drum computer. At the top I have indicator lights for the programs, in 8 rows to show each drum line. This is very useful as it always shows me a particular drum sequence I have done - I can see that I've put bass drum on beats 1 and 4 and so on.

The other reason for having this kind of display is that during my performance I use a small remote control keypad for entering new sequences. I have this with me where I am sitting and it lets me enter, for example, 'Program 1' and shows data address, length and program number. I can then enter 5 times sequence 4 followed by 3 times sequence 2, then back to sequence 4 20 times and stop. You don't even have to watch when they change because it all follows automatically on the first beat of the bar. So I can enter new data when I want and it will always play after the last entered data. If I press the 'C' key on the pad, I get a visual readout of the countdown to a sequence change. That helps me lead up to the change nicely.

By the way, this stuff is all custom made - the people who built it say they won't do it again because it's all analogue control using digital memory. So a lot of conversion with DACs and ADCs was needed. (DAC=Digital to Analogue converter. ADC=Analogue to Digital converter). The system was built by the same guys who did a rhythm machine for Tangerine Dream.

What is interesting is that people I spoke to at your U.K. performance last year actually thought that you were hardly playing and were using the computer to play complete sections of the music.

(Laughs) Then I'd need to fill the hall with memory chips!

Coming back to the visual control system on the rack, this does not just control the Simmons drums but also can be used for the melodic lines. Another twelve rows give voltage control of oscillators or whatever I want and these can also be changed in real-time. The keypad also allows me to override a current program and then 'extrude' it to another memory location for future use. This is how I hold sequence routines for complete pieces.

So the GDS VDU display does not change during the performance?

That's right, it just indicates the current menu for voices and sequences etc. I also remove the floppy disks once I've booted the information in case a mains transient or some other power disturbance destroys its data.

The centre rack section houses Moog modules, but I've inserted PPG filters inside. It's also got two sequencers, 3 oscillators, random generator, noise generator, and envelopes. I use one sequencer to sequence others which only need be short as the controlling sequencers can make the necessary harmonic changes.

That's the reason I have my sheet with numbers on, so that on bar 950 the harmony goes to Eb or whatever. It just makes our performance so much more individual and we have to be aware of everything that is happening to make our playing fit the changes musically. It would be very bad to have to do the same concert many times with exactly the same programmes each time - I can always edit bars as we play to create the excitement, the emotion in the music as if it were completely played live.

I always perform in stereo and I don't like to play at high volume levels. The whole quality of good filters is destroyed by distorting the system or the ears. The peaks have to be there of course because there's no white without black. So I like to have dynamic changes as long as they are not too abrupt. I must admit I love using the CS80 pressure sensitivity for letting myself go on stage!

Can you tell me about your involvement with other musicians in your concerts?

The very first time I used another musician was with Arthur Brown for vocals and then I had Manuel in the old days from Ashra Tempel on guitar. But somehow the guitar was too limiting for me. And the development of pieces is much quicker for me now. I met Rainer by chance and we found that our ideas about music were similar. He's classically trained and takes to synthesizers as if they were just pianos. When he's playing it gives me the opportunity to program something on the Wave or CS80, and the freedom to lean back a bit and start again at the right point. We agree on a basic plan for each piece, but if one of Rainer's solos were going well, I would never interfere with it but let him extend it as he wanted. When I'm doing a solo, it gives Rainer time to reload the Emulator from disk.

Rainer's Jupiter 4 arpeggios and Minimoog triggered bass are controlled from a Boss Dr Rhythm that's sync'd to my main system to keep all the pulses in time. Of course, it's important not to overdo these things, and the Korg Vocoder was only used for a few special effects too.

We use the Emulator to give a 'closing door' between changing harmonies. There's 'breaking glass' for the end of a piece, and other sound effects like car driving, whistling people, hand-clapping, fire-crackers exploding. They actually fit into the composition as if they are part of the sound orchestra from the conductor. The only musical sample was a flute.

Does Rainer prepare basic pieces with you?

No, I do this on my own and then bring in Rainer to contribute further ideas.

Composing the performance

To start the music I use my remote control box. All the sequences I am to use have been prepared at home in the studio. These are held on floppy disk or in the memory banks of the various equipment. (They've got battery back-up). Things can go wrong and sometimes I've found that a sequence will just stop for no apparent reason.

Having programmed a piece ready to start, I will often first play alone on the instruments until I reach a point to start the sequences and drums. Another method I use is to start everything running and fade them in gently after I've played something (keeping an eye on the number of bars that

are passing so I know the harmonies and rhythms I'll get). Since parts are on different channels of the mixer, I can fade drums and melodic lines individually — this is interesting when, for example, I don't bring in the bass drum until last, to hold back the feeling of the main beat.

By using the remote control I can locate a channel and start it in the next bar, and this saves me moving around unnecessarily.

Do you play several instruments at once?

Yes, although it's more likely that I'll be using both hands to play one instrument's keyboard and performance controls.

As your performance continues, I hear you playing short melodic ideas, ones that don't really develop in the true classical sense.

Yes, but I like to give just a rough idea and then leave it. We both have to concentrate hard on the harmonies generated by the sequences in the computer. It's harder for Rainer at the moment and I'm having a large display built so he can see the countdown of the sequence changes. That's much easier than counting bars all the time because a quick glance tells you there's so many bars to go. The U.K. concert we did was the first time we've played together and I think we shall be doing a lot more now.

Do you play complete pieces without using sequencers?

Yes I do. I have a piece based on the classical 'Moldau' work we sometimes play as an encore.

I like whatever piece I am doing to have its highlights and I like the bass to be felt as well as heard. The music builds up slowly so you can have a chance to hear what is taking place — otherwise it's not a Klaus Schulze concert, it's a concert on the run!

The other point about using the computers is that although the sequences are always ready to be called up, there's always this element of 'back-and-forward' manipulation to make the piece right. And many people don't really listen — they haven't been taught the process of listening. This was a problem with students who attended my synthesiser school I used to do. Still, I am probably demanding a high sustained level of listening from my audiences, who are used to much shorter 'chorus & verse' numbers.

We also take a lot of trouble to improve sounds — for example, the strings. This came from the Jupiter 4 treated by two Harmonizers. These detune the pitch and add delays to thicken the sound — just like adding more string players to an ensemble.



Do pieces have a set length?

It depends. We sometimes say a piece should last 20 minutes. Then we'll use a bridge to go straight into another piece. A bridge can turn out so interesting that we'll develop that without going further. I am not too concerned about making a virtuoso performance myself as my technique would not allow that — it's about 40% as good as Rainer's! Nevertheless, my technique is improving with the demand of my musical ideas. I don't play piano at all, having always stayed with organ and synthesiser which never require as much physical control in the fingers.

In some ways I regard the musical partnership of Rainer and myself like a marriage. It's not like a band, because we have to complement each other. I've also stopped playing to huge audiences as I used to do on the continent because the tapes of them afterwards always seem to lose the atmosphere of the music as I wanted it to be. I enjoyed The Venue in London as it was totally informal with people seated right up to front of the stage.

People sometimes think that I don't bother about the audience because a lot of the time I have my eyes shut! But I always know how they are reacting.

Looking ahead, I want to continue performing. The record side never offers me the same thing and I never play what I do on record on stage. I could never play 'Mirage' in



Rainer Bloss with Yamaha and Roland keyboards.

front of an audience. There is a thrill about playing live — somehow it's like the way sexual attraction works, with you never knowing what will happen, how the audience will react and so on. From my point of view, the audience applause is like a petrol station filling me up until the next concert!

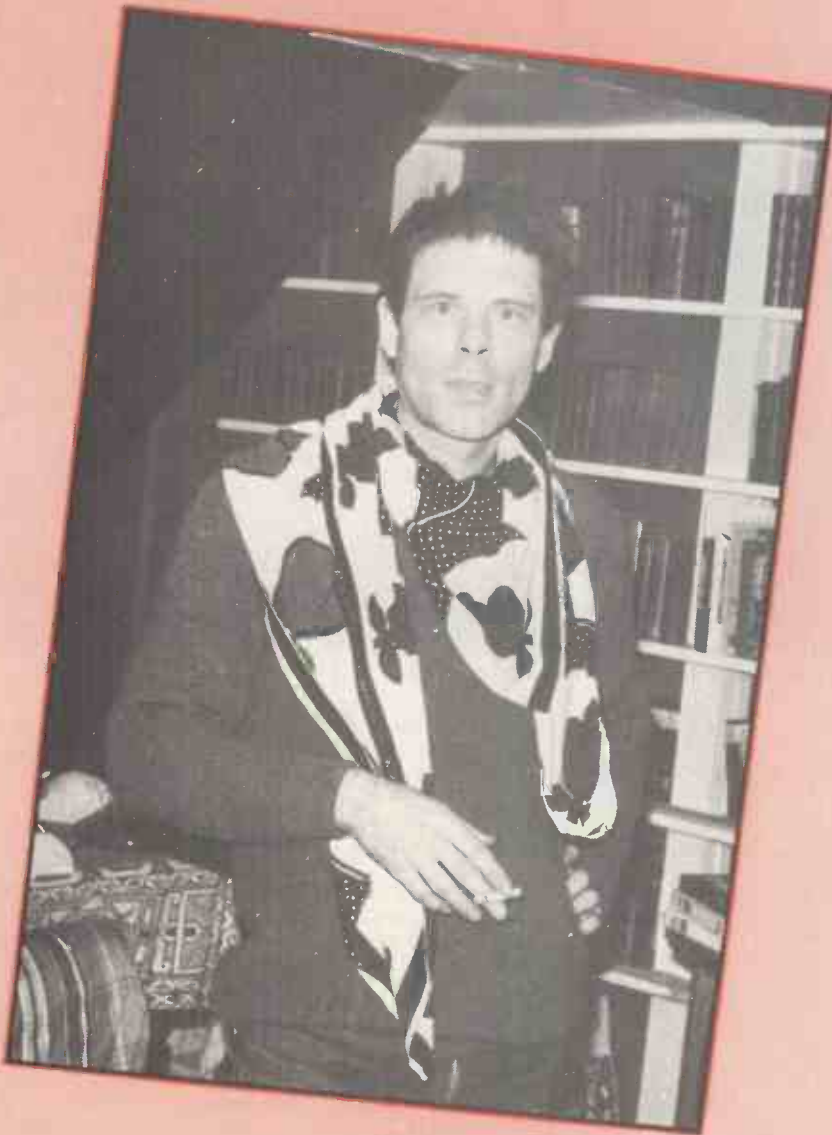
One thing I always now do is to store a back-up copy of my floppy disks in the bank, since I lost some important ones recently. It is very difficult for me to get software disks from Crumar if something gets damaged and I would advise any musician using micros to keep back-up copies.

My family are not musical — my mother was a ballet dancer and my father was a writer and I took on the music against the will of my parents. But the struggle to succeed is always necessary for a musician — if things go easily you'll never have that dedication of a true musician. At the start, I had a small van and did everything on my own — you have to go through that — it's part of the musician's education. We do have tremendous opportunities now to make music — if Bach was here, I'm sure he would freak out with sequencers and be one of the new electro-musicians! There again, I'm sure he would never try to make out of a violin a guitar sound — that is not the way to use a synthesiser creatively.

The last ten years have been important to me and people are now acknowledging my music. I've done a computer album for IBM just to show that the computer is not 'bad' — a lot of people are still afraid of them, you know. Your kind of magazine should be in every school — in Germany it's already started with synthesisers in the music room. I think we are standing in front of a really musical universe now on a scale we've never had before and the new techniques available offer musicians a power to control a complete symphony with two hands." **E&MM**



Rainer's keyboard set-up.



Michael Karoli of Can on Guitar Improvisation

Michael Karoli was born in Straubing, in Lower Bavaria, on 29 April 1948. As a child he took violin lessons for six years, then took up the banjo at eleven and guitar at thirteen or fourteen. He went to Lausanne University in Switzerland, returning after 4½ years at Holger Czukay's invitation to join Can.

"At the time I was playing what was going then — Dixieland! That was the popular music of those days, and the step from violin to tenor banjo had been very small — the left hand is practically the same. I hadn't studied guitar much — I'd studied a little law! I was into jazz and before the Stones I was actually totally uninterested in rock. In the sixties it seemed to be getting more interesting, and nowadays I hear the older stuff with greater pleasure, but then I was really into jazz. The next step after jazz was actually Can! I made practically only jazz music before then, and I'd met Holger and we stayed in touch because we were both very interested in avant-garde jazz.

"Holger was a music teacher at the time, and although I never had

regular music lessons with him I asked him to show me some tricks on the guitar. I wanted to form an avant-garde jazz group with him, and then Irmin Schmidt apparently rang him up to say he was forming a rock group so I went along. Otherwise I had been thinking of becoming a dance musician playing in bars because I couldn't get on with law."

"I liked the Stones really for the energy in their music. . ."

The early days of Can are captured on the recent Spoon release, *Delay 1968*. I asked Michael how much preparation had gone into the pieces, and whether there was any unreleased material prior to this, since the band's sound already seems well established on the album.

"These were the very first things that Can ever did. The four of us had done a film soundtrack, then Desi (Malcolm Mooney) came along — Hildegard (Schmidt, Irmin Schmidt's wife and manager of the band) had

met him singing in Paris and invited him to come to Cologne, and the first day he came we did *Nineteenth Century Man* and *Father Cannot Yell*. That was the original version, not the one on *Monster Movie*, we played it again because it was too chaotic the first time and the sound was very bad — I probably still prefer the first version although I haven't heard it for ages. All the pieces were done in one take, with the exception of *Star of Bethlehem* which had one overdub. We didn't even put chords together in advance, although *Thief* was for a film and it's almost Holger's song — most of what I play on that is what Holger sang to me first. Malcolm put the words on as he felt."

After getting used to the idea that all the early Can music was improvised, the next important concept is the technical level at which the albums were produced. The studio in the Castle Norvenich was equipped only with two Revox 2-tracks, with Holger Czukay acting as highly imaginative recording engineer. Surely 'Soon Over Babaluma', with its multiple layers of drums, string

The influence of Germany's legendary improvising rock group Can on progressive music as a whole has been incalculable. From their foundation in 1968 to their temporary suspension ten years later, the band showed how a conventional-sounding line-up of guitar, bass, drums, keyboards and vocals could be made to produce amazingly innovative and emotive music. During this time their guitarist Michael Karoli contributed greatly to the energy and expression of the band's music, and in the recent past he's been working on solo projects which promise to be equally interesting.

With the release of a new album of material from the very early Can archives and these solo projects in mind, Mark Jenkins interviewed Michael in London on the history of Can, his guitar techniques, and his future plans.

effects and sequencer-like percussion patterns needed at least a 16-track studio?

"No, 'Landed' was the first album done on 16-track after we moved the studio to a converted cinema. We did 'Soundtracks', 'Tago Mago' and 'Babaluma' in 2-track, as well as 'Monster Movie'. 'Monster Movie' is much more serious and refined than 'Delay 1968', there's much more work during the making of the music although it was done with the same equipment, in the same place, and in fact at the same time — parts of 'Delay' were made in between sessions for 'Monster Movie'. Work for film soundtracks was more or less keeping the band going, Irmin already worked in this field and got us a lot of jobs. But however refined the music became on 2-track the problem was always with balance. For me to play well I needed the guitar to be a little softer than what would be good on the record, so most of the guitars on 'Babaluma' are too soft because we had no way to make a different mix afterwards — it was all recorded as we did it."



I asked if the band ever felt limited by their unsophisticated equipment. "No, because the limitation is the most creative thing; Holger would probably have done less well with better equipment at that early time. That's why there are still people who think that the 2-track work of Can is better than the 16-track; it was through limitation that the strong atmosphere came."

Interestingly enough the incredible effects of tracks like 'Vernal Equinox' and 'Chain Reaction' were achieved without using synthesisers. "We never used synths until the very last records. 'Vernal Equinox' uses a ring modulator applied to Irmin's piano and organ; a synthesiser allows you to get a very large number of sounds from which you can choose, but Irmin's idea and everyone else's was to take an instrument with a certain sound and to change that sound into something else. That's more creative, again because of limitations; using a synth is too easy, you just turn a switch and you get a completely different sound. The Alpha 77 unit we used wasn't a synthesiser, it was a sound modification unit built to Irmin's specification. We used its ring modulators on the guitar and bass, and it also produced flanging which was really a fault in the machine; it used a tape under tension for echoes and it tended to slip a little. Many of the effects in Can music came about that way, which is still for me more interesting and more creative than intentional things."

"Can music was always a war between musicians. . ."

By this stage Can were used to playing and improvising live, having made their first radio broadcast on WDR Cologne as early as 1969 and their first TV appearance at the Beat Club, Bremen in 1970. "We never went out to play pieces exactly. For a while we played 'Paper House' or 'Mushroom', but although the themes



"Pity about the chord symbols." "Actually they're quite useful to me!"

strategy between the musicians, that's why it remains very true music. It was what you might call composition by action and reaction, and with all the emotions. It doesn't just use violent noises because we wanted to make violent noises, but because somebody *felt* so violent that he made those noises, and somebody else would react to it." Michael's guitar style, then, had to feed off the other musicians' styles as they were feeding off him, both live and in the studio. "My guitar sound is defined by a kind of feedback system. It's all very subjective, but I find interesting music works best if it's based on this kind of system, that's why I don't like pre-arranged music. On stage there is the musician and the instrument, the public and the other musicians. The direct chain would go equipment, ear of the musician, brain of the musician, hand of the musician, instrument, and back to the equipment. The best music for my taste is when the brain is short-circuited and what goes into the ears is automatically put, transformed again, into impulses from the hand into the instrument, without thinking about it.

"If there are other musicians involved the only difference is that the signal that comes back is multiple. If there's a new tone — and Holger has a habit of playing new tones in a completely different harmony — what do I do? It's very quickly realised by the ear and the hands if the sound's any good or not, and how long I should keep holding a particular note. If the public is there you have to listen to them as well. They also form a sound, and if there is a jet plane flying over that forms a sound to which I have to react. If I don't react it means I haven't heard it, which means it's a limitation of my capability."

"I haven't really ever practised in my life. . ."

If Michael never used pre-arranged music with Can and avoided rehearsal, I wondered how he had gone about learning keyboard technique for his more recent projects. Had he sat down at the piano learning chords and scales? "No, never like that. As a musical concept I tend to play only what is easy for me to play anyway, also on guitar I've never tried to play anything which forced me to

practise. I haven't really ever practised in my life — I think generally people do practise guitar a lot, but I've always found it's dangerous to do that and I see the proof everywhere. Rising technique usually means originality sinks — I've never seen a case where that isn't so. The only solution is to let your style come from within yourself naturally, but if you do that you never want to practise. Practising what you can't play is exactly the wrong thing to do."

Michael's style is certainly well-defined, and is probably displayed at its best on the epic 'Oh Yeah' from 'Tago Mago'. On this track his guitar alternates between glassy rhythm chords and screaming lead lines without a moment's hesitation. "That was the distortion pedals, exactly the same ones I'm using now. There's a very old Schaller Wah-Wah, and a Big Muff distortion box. I've never used any special amplification, I think it is very important for a musician of quality to be able to play on whatever equipment is at hand. If you play with your ears any instrument will do. I'm getting even more radical in these beliefs because I've found that people have to play their special instrument

and if asked to play another one they have a problem. Having said that I did have a very special guitar once, a Stratocaster; I bought it because Jimi Hendrix used one, although he wasn't a great musical influence, and I liked the longer neck because it gave a more 'twangy' sound somehow. It was stolen after a gig in '72 or '73; before that I had a Framus and a few others, which like the Gibson Les Paul I found less powerful because it had a shorter neck.

"It seems to me that in my playing I have always done two things — one that gradually builds up, like a plane running up, and then when it's really moving the other, which is stepping on the distortion pedal and taking off. But when it did take off it wouldn't go into a solo as such — I don't believe in solos! With Can instead of it being collective improvisation it became collective composing, because the composition took place during the playing in all cases, including on stage. Pieces were newly composed each night around the same theme; I never got tired of this because one could do anything. If, for instance, we played 'Paper House', what was fixed was the rhythm and the key and



were the same the pieces actually weren't. There was never any 'head arrangement'. 'Head arrangement' is a jazz thing, all rock music has always used it but we didn't. We have never said, OK, we'll make two choruses with singing and then up comes a guitar solo and then the next solo. The idea of solos was out. All of us have kept this old concept, which is definitely valid, that firstly one doesn't do the same things twice, and secondly that every moment makes its own music, and it's still only the music of the moment that interests me."

With such a demanding form of creating music, some tension was inevitable. This partly contributed to the splitting up of the band in 1978. "Can music was always a war between musicians, a musical war. It was



Can in 1968.

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Michael Karoli and Polly Eltes.

nothing else, and the real happenings like an acceleration or some climax either happened because we felt like that, or they didn't happen.

"My main influences come from piano players such as stride players, or from whole bands. I've never really been into 'guitar playing', more into the guitar as a means to make music generally. I was very much into polyphonic playing, so I never used to use a plectrum except on banjo."

"Can music was a very good mirror to life — you were very dependent on luck. . ."

I asked whether the increasing need for musical and technical sophistication had begun to signal the end for the band from the days of the later Virgin albums to their final offering, 'Can'. Was this intended as a farewell album? "Yes, that was actually the breaking up of Can. On 'Saw Delight' Holger was taking more of a back seat, there was a new bass player (Rosko Gee of Traffic) who he'd brought along and Holger was happy to do a lot of other things he wanted to do. Everybody enjoyed playing with Rosko and because he didn't play

anything else we had him play bass. But the next album 'Out of Reach' was different, it was very uncomfortable. The whole thing had changed, Rosko's experience as a musician in English studios was one factor. It wasn't because of technical things that we felt the band was changing, we were always quite happy to use any technology at all. It was group dynamics that had changed."

"By the time of the last LP the group had new members who came from a world where a piece is written by one person and the person who



Michael and Desi.

has written it gets the credits and the money. Can when it was really Can has always rejected that idea totally. Single characters making their own music was all that was left, and on the last album everybody went their own way, everybody opened up and did things that possibly they wouldn't otherwise have done. I'm just talking about a general feeling, not specific pieces. For instance, on one track I put a short wave radio sound which was later vocoded by the voice — or which later vocoded the voice, whichever you say! — and the whole thing became really personal and all ideas of being commercial were dropped. It was clear by then, Holger having left, that somehow the band didn't exist any more."

After the breakup of Can Michael went to live in a remote valley, where he has a recording studio in his house, and occasionally flew to Cologne or Switzerland to help on Irmin Schmidt's film soundtrack music. Over the last few months he's been working on a solo album, with lyrics and vocals provided by an English girl who as Polly Eltes appeared in The Moodies, a musical/theatrical review group of the mid-70's.

"The solo album represents a new musical style for me, although if compared to Can it'll probably be most like 'Tago Mago'. It will probably have seven tracks, each based on a one-off improvisation, so later comes the moment when each idea has to be clarified and made apparent. The weight is equally on guitars, keyboards, saxophone and drums, so everything's new to me except the guitars. I'm not using any synths now except for the Wasp; I had a Prophet for some time and I did a lot with it, but I find an atmosphere is a delicate thing, and if you have a machine where you turn one control and everything changes, you can't really create an atmosphere. You can't match an acoustic sound like a splash of water on synthesisers anyway.

"I'm only very reluctantly using digital delays in mixing the album such as the AMS. I'm used to tape echoes, which are more alive because of the distortion. In order to perceive an echo you have to have deterioration in the sound, otherwise it's simple repetition, and if necessary you have to put it in artificially. I use the valley for natural echo; all the saxophones are played outside, even in the deepest winter so my fingers and the keys started freezing. Towards the end of the piece there are more and more wrong notes, but that's good! I prefer that.

"Limitation is the most creative thing. . ."

"I have a nice 16-track recorder and desk, but I don't have a dead sound in the studio so it's no good for mixing. It has a strong ambience and if you play back in the same atmosphere you make mistakes. I mixed once with virtually no drums, for instance; we've remixed everything in London and hope to obtain a UK release — otherwise the album may come out on Spoon as an import. I think times are hard over here, especially for music that is a little unusual. It's a question of timing — it's very clear that people will get tired of rhythm machines! I'm using them partly, a very old German 'army surplus' model, very nice sound. In the Can style I've used everything from electric violin to saxophone and frying pans, anything that produced a sound of some sort. I'm not good at writing words; I make music because I cannot convey my ideas other than by music, I cannot put into words the way I see the world. I can only put it into music; words are very one-dimensional unless you're a poet, they can only state facts. That's why I'm working with Polly; we haven't decided yet what name the LP will be under though."

Michael explained that working for twelve hours a day for twelve years with Can was extremely tiring, and that the band produced at times more suffering than enjoyment for all its members. Finally, I asked him in the light of this comment whether his solo projects were intended to express ideas that wouldn't fit in with the Can concept?

"No, it's quite different. I've gone away from the city and I've done something totally by myself, with perhaps some influence from the pop world but with as unorthodox an approach as my own concept of Can. By the end of Can the spirit of the group had left and died, or rather it had gone underground because it couldn't 'happen' any more. I guess we'll bring out something again, that there will be a new Can. We all just needed space to work apart for a couple of years."

Discography

Can			
Delay 1968	—	1982	Spoon 012
Monster Movie	UAS 29094	1969	Spoon 004
Soundtracks	UAS 29283	1970	Spoon 005
Tago Mago	UAD 60010	1971	Spoon 006/7
Ege Bamyasi	UAS 29414	1972	Spoon 008
Future Days	UAS 29505	1973	Spoon 009
Limited Edition	UST P103	1974	—
Soon Over Babaluma	UAG 29673	1974	Spoon 010
Landed	V2041	1975	—
Unlimited Edition	CAD 3001	1976	—
Flow Motion	V2071	1976	—
Saw Delight	V2079	1977	—
Out of Reach	LIP 4	1978	—
Can	LASL 2	1979	—
Cannibalism	UDM 105/6	—	Spoon 001/2
Can Opener	SLS 50400	—	—
Irmin Schmidt		Jaki Liebezeit	
Toy Planet	Spoon 011	Phantom Band	SKY 048
Film Musik	Spoon 003	Freedom of Speech	SKY 065
Film Musik 2	Spoon 013		
Holger Czukay		Michael Karoli	
Movies	EMI EMC 3319	Appears on all Can albums	
On the Way to the Peak of Normal	EMI EMC 3394	Guests on several solo albums	
Canaxis 5	Scheisshaus SRS 002/Spoon 015	Own solo album forthcoming	
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4. The first programmable analogue synthesiser was the Prophet, made by Sequential Circuits in 1977.
5. The Musicians Union National Executive is calling for a total ban on computer instruments such as the Linn drum machine.
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Jen Piano 73



As the name suggests, the Jen Piano 73 is a 73-note electronic piano with a 6-octave F-F keyboard. There must be an enormous number of Jen effects, string machines and pianos in use today, as their relative cheapness makes them ideal for the first-time buyer. The 73 is a no-nonsense unit which keeps up this tradition while at the same time offering a reasonable sound which could be expanded or adapted for semi-professional use.

Three important points make the 73 ideal as a rehearsal instrument; it's relatively light, with a carrying handle screwed to the underneath of the body; it has a removable aluminium cover over the keyboard itself, and it has a built-in amplifier with two double-cone speakers and a stated output of 20W RMS. It also comes supplied with a set of chrome legs, and so it's completely ready for use from the word go.

The construction of the body is fairly basic, with a plywood base and wood-finish contiboard elsewhere. The top panel is aluminium with a black brushed finish, and chrome fittings for the music stand supplied. If this isn't used there's just enough space to think about stacking another keyboard — about 4 inches of flat surface.

The keyboard itself is quite pleasant to use, firm enough to give a little response but

light enough to play very fast; it's not touch sensitive, of course. The keys are very fractionally thinner and longer than standard size.

The controls are a little odd, although don't present any major difficulties. The voice selectors are marbled tablets rather more typical of organ controls, and all have legends above them, but have to be pushed downwards to operate. The central pair switch on Clavichord and/or Spinnet; the right-hand pair activate the Vibrato and built-in Phaser; and the left-hand pair switch on the Piano sound, and select filtering for Bright or Mellow.

In addition there are three rotary controls labelled Vibrato, Phasing and Volume. The Vibrato control is for Depth, the Phasing control for Speed, and the Volume control for overall volume as the sounds can be combined but not individually adjusted in level. It wouldn't have cost any more to label these controls more informatively; the final feature of the top panel is a small mains neon On/Off switch.

A small recessed rear panel contains a fuse holder and three jack sockets, completely unlabelled on the model examined. This seems rather odd as they're not individually identified in the manual either and have quite different functions. One is for the

foot sustain switch supplied; one is for 8 ohm headphones, and the third is a line level output, use of which (as for headphones) disconnects the internal amplifier. A tuning preset gives a range of plus or minus one semitone.

The sounds of the piano are more or less as you'd expect. Mellow piano is probably the best of the lot, not suffering too badly from wooliness at the bottom end but becoming a little weak in the upper octave and a half. Bright piano is less like an upright piano than a typical electric sound; Clavichord is a reedy pulse wave sound, and Spinnet a thinner version of the same thing.

Combining sounds, using the sustain pedal, and switching in the Vibrato or Phaser, make a big difference, of course. The range of Vibrato depths obtainable is sensible, stopping just at the point where a sort of corny pop sound is produced. Phasing is more effective on the thinner sounds, and resembles a combined light phase and filter sweep effect (typical of the inexpensive Jen phase pedal in fact) which turns into an acceptable tremolo at the highest speed.

Internal construction is reasonably neat, considering the necessary duplication of circuitry involved for all 73 envelope shapers. Voice generation is by dividing down from a master oscillator using TMS 3615's; filtering is by fairly standard organ-type circuits to obtain the different voicings.

Naturally enough the overall sound can be beefed up using an external amp and/or effects, although it's not lacking in bass in its untreated form. Whatever your opinion of the overall sound quality and construction, there's no denying that you're getting a lot of keyboard for your money; there aren't many six octave machines around for the sort of shop prices at which the Jen Piano 73 should appear.

Mark Jenkins

E&MM

The Jen Piano 73 is marketed by British Music Strings at £299 including VAT. Further details from BMS, Pontygwindy Industrial Estate, Caerphilly, South Wales. Tel. 0222 883904.



PIANO 73

The fabulous new Electric PIANO 73 from Jen sets new standards in contemporary keyboard design and brings modern electronic technology to a full piano keyboard layout.



Features include:—

★ 6-Octave Keyboard

★ 4 Realistic Voices:

Piano Bright — Piano Mellow —
Clavichord — Spinnet

★ Vibrato with variable depth

★ Built-in Phaser with variable speed

★ Powerful 20W Amplifier

★ Headphone Output

★ Sustain Pedal

SYNTHETONE SX-1000

Reviewed in the September 1982 issue of E&MM



THE SYNTHETONE SX-100 is the result of an extensive research programme aimed at producing a light, compact and simple to operate synthesiser with the latest LSI technology at an amazingly low price.

It has all the main features of the most sophisticated professional synthesisers and its controls are logically arranged and colour-coded for easy identification and playing simplicity.

The digital technology used provide the SYNTHETONE SX-1000 with a dependable accuracy, high tune stability and reliability under the most demanding circumstances.

It also means the combination of new standards of performance with minimum and easy servicing.

Specification:

37-note KEYBOARD C to C.

TUNE: Master tuning for setting pitch to other instruments. Adjustable + ½ tone.

OCTAVE SELECTOR: For setting range of the keyboard at 32', 16', 8' or 4'.

WAVEFORM SELECTOR: For choosing the sound waveform among Sawtooth, Square and Pulse Width adjustable from 5% to 50%.

PWM (Pulse Width Modulation): It gives you automatic modulation on the pulse width and creates chorus, phasing and many other fabulous effects.

GLIDE: For automatic glissando between any two keys depressed. Adjustable speed.

Other VCO (Voltage Controlled Oscillator) include Output Level and Vibrato Intensity.

LFO (Low Frequency Oscillator) used to control VCO,

VCF and PWM, creates tremolo, vibrato, trill and repeated effects. Adjustable rate.

NOISE GENERATOR with white/pink switch and level control. It enables you to obtain wind, thunder, surf and other exciting effects.

VCF (Voltage Controlled Filter) changes the timbre of the sound by adding, subtracting or enhancing harmonics. Rotary controls adjust Frequency, Resonance, LFO Intensity and Envelope Level. The ADSR (Attack, Decay, Sustain and Release) controls will enable you to obtain the exact effect you are seeking.

VCA (Voltage Controlled Amplifier) with ADSR (Attack, Sustain, Decay and Release) controls will allow you to shape the volume of the note for percussive or any other effect which you require. Additional rotary control (Output Volume) adjusts the overall volume.

Jen Products are
available from
all good music
shops and stores

British
Music
Strings Ltd

Pontygwindy Industrial Estate, Caerphilly, Wales CF8 3HU.

Telephone: Caerphilly (0222) 883904 all lines.

New Casio Keyboards



Last month's Music Maker Equipment Scene introduced a new range of Casio keyboards intended, on the whole, to replace their existing popular products. Now we can take a more detailed look at five of these - the PT-20, PT-30, MT-65, CT-405, and the CT-501.

While these models largely offer new combinations of already existing Casio facilities, there are some new features to be seen, including some changes in the variety of sounds available, a new memory storage facility, and a new keyboard size standard.

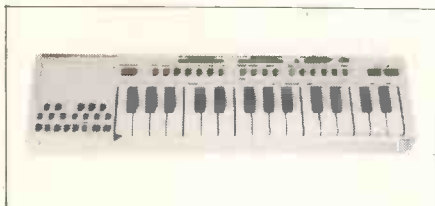
Casio PT-20

Taking the new instruments in order of size, the smallest and cheapest is the PT-20. Similar in size to the original VL-1, it uses a new type of keyboard with the white keys about 1½ inches long and ½ inch wide. Because these are genuine sprung keys as opposed to calculator-type buttons, the PT-20 is easier to play than the VL-tone and is again monophonic, with 7 sounds available.

On the left of the keyboard, beneath the built-in speaker, are three rows of small buttons, comprising a single octave of notes to produce single finger chords and an additional row to give diminished, suspended 4th, minor 6th, 6th, major 7th, minor 7th, minor and 7th chords.

The sound produced by the chord buttons is a surprisingly powerful church organ effect, which is particularly impressive when amplified using the minijack output. This output is also capable of driving mono headphones with a suitable adapter.

The rhythm section of the PT-20 is an

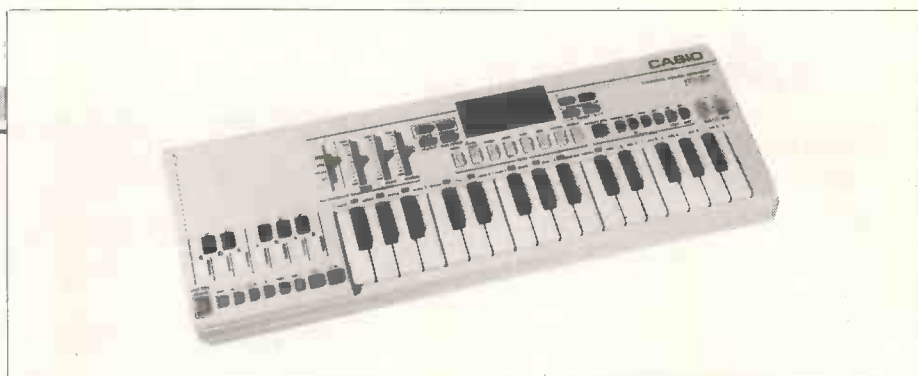


Casio PT-20.

improved version of that on the VL-1. There are 12 patterns available including 16 Beat, Disco 1 and 2 and Enka, with a splash of white noise for snare/cymbals and a much lower tone than before to represent the bass/toms.

There is also a selection of arpeggios, of which arp. 3 is a 6-beat rhythm and arp. 4 is a 3-beat rhythm. These produce different arpeggio accompaniments to the rhythms, as an alternative to the repeated chord accompaniments on rhythms 1-12.

The PT-20 includes a 508 step memory for chords and melody. A melody note uses a single step, whereas a chord uses 1½ steps; after these are put into the memory, they can be re-timed to coincide with a rhythm pattern using the One Key Play buttons. The memory will only play through once on Auto; the PT-20 is also capable of assigning chords to memorised melodies by itself, and these can be changed if they are found to be unsuitable. The machine decides the key from the first and last melody notes, and



Casio PT-30.

selects chords according to the intermediate notes. The PT-20 will provide 3 alternative chords before returning to its original choice.

The basic voices are fairly typical, 'Mellow' being an interesting addition with a gentle tremolo which speeds up as the note decays. A preset underneath the instrument allows it to be tuned by plus or minus 1½ semitones.

Recommended retail price including VAT is £59.95.



TA-1 Interface ready for installation in MT-65.

Casio PT-30

The PT-30 features 2½ octaves of the new small standard keys, and again is a monophonic instrument with 8 basic tones and a set of single finger chord keys. Somehow the chord sound is not as biting as that of the PT-20, but this model has the advantage of an LCD display of the keyboard which indicates with a small spot which notes are being played, and with a set of letters and words which chord is held.

There are 12 rhythms with identical voicing to the PT-20, and 6 arpeggio rhythms ranging from simple octaves to rapid double-speed patterns. Otherwise the accompaniment is a repeated chord pattern; again the PT-30 can compose its own chord accompaniment for a melody, which can be altered if desired. Chords and rhythms are individually mixable on small sliders next to the overall volume slider.

The keyboard has a small tuning preset beneath it, alternatively it can be transposed 9 semitones down or 3 semitones up using the Transpose Up and Down push-buttons. Tempo is similarly adjustable from minus 9 to plus 9. There are outputs at line level (¼" socket) and for the tape recorder memory interface described below.

The TA-1 interface is an optional accessory installed inside the PT-30. It enables the contents of the 508-step memory to be digitally encoded on tape, and is easily installed under a sliding plastic cover which opens to reveal a compartment with 7 bus contacts at its base. Tape dump and reload

takes about 45 seconds; since the TA-1 contains CMOS circuitry the user is advised to remove it carefully from the PT-30 when not in use.

The keys of the PT-30, numbered 1 to 31, can assign a 'file number' to individual songs when loading onto tape, so that the song to be re-loaded can be easily selected at a later date. Any others will be skipped over, with a dot appearing on the LCD display corresponding to the relevant numbered key indicating which song has been loaded.

Although the LCD display is useful, it has limitations. To be visible it has to be viewed vertically, hardly a typical playing position, and if this is not done the dots on the black notes are not seen. Additionally, the degree of transposition which is displayed is lost if a chord is played, in favour of the chord symbol. These points notwithstanding, the PT-30 can be seen as a useful compositional tool and the cassette dump facility as an invaluable method of storing ideas for later recall.

Recommended retail price including VAT is £79.00.

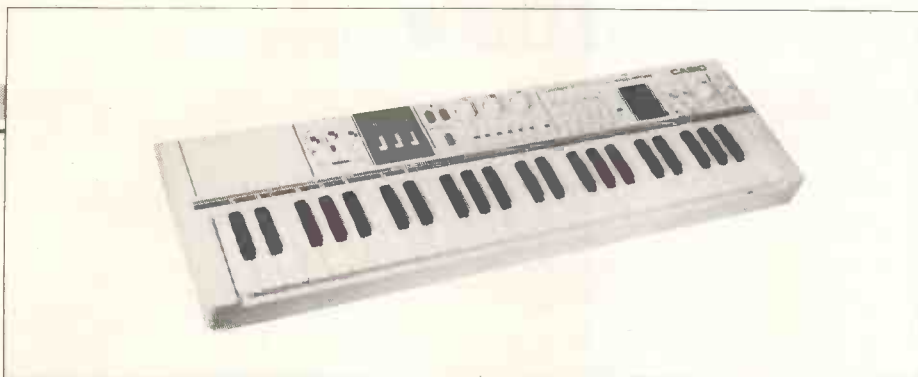
Casio MT-65

The MT-65 is a more straightforward performance instrument, without the memory functions of the other models but with a versatile accompaniment section and some new ideas in the voicing facilities.

It's an 8-note polyphonic instrument with 4 octaves of miniature keys (the MT-31 standard, with white keys about 3 inches long and ¾ inches wide), a single built-in speaker and headphone and line level outputs. There are twenty instrumental voices, selected by ten pushbuttons and a 'Select' control, and the sounds range from organ and violin to harpsichord, funny and cosmic tone. Additionally, a voice modulation feature can expand the range of sounds available, as described below.

Accompaniment sections comprise rhythms, bass, chords and arpeggio. There are 12 rhythms with excellent percussion voicings including bass, snare, toms, claves and cymbals; the high-hat and crash/ride cymbals are at least better than a burst of white noise with a ring-modulator type of metallic effect, and the bass drum is full and driving. There's a fill in button which activates a variation running parallel to the rhythms; that is, it always fills in the correct amount to take you to the end of a bar regardless of when it is pressed.

There's a synchro start facility for the accompaniment sections, which are mixable against the rhythms and keyboard sounds. The Casio Chord facility gives single



Casio MT-65.

finger or fully fingered chords on the lower 1½ octaves of the keyboard, with a choice of four sounds varying according to the rhythm selected. Basically these are reed, flute, organ and brass, and if the rhythm section is started these repeat in different patterns, hold on, or play on offbeats.

The Bass section acts in a similar way, with four alternative bass sounds from bass guitar to organ pedal playing different patterns according to the rhythm used. The bass sounds can be played as a manual bass if the accompaniments aren't running.

The arpeggios again offer four options in terms of sounds and of melodies on each rhythm. Arpeggios, Bass and Chords all drop out when a Fill In is selected. The upper part of the keyboard is four-note polyphonic when the accompaniments are running.

The new voicing facilities are worth looking at in more detail. As most people know, Casio voices are made up of two components, known for convenience as a vowel and a consonant. These are digitally defined sounds with their own timbre, pitch and envelope, which combine to produce an overall sound with a certain degree of internal movement and interest. Hence the superiority of Casio voicings to those of expensive electronic organs, and the capability of the Casio 1000-P to produce a wide range of sounds by combining various vowel and consonant shapes in different ways.

The new voicing technique on the MT-65 is known as Modulation, but in fact has more to do with Envelope Shaping. The first control divides the preset sound into its component parts and adds a slow attack to the shorter component, effectively changing percussive sounds like harpsichord and piano into softer effects. Conversely, slower sounds are given a percussive element by shortening the attack of one component, so Cosmic Tone (a sort of clavinet sound) becomes a passable key-click organ.

The second modulation control gives an overall slow attack to percussive sounds and an overall fast attack to softer sounds. Both controls can be used together, and if this is done the sound is effectively completely changed. The effects are fairly unpredictable, but some of the results are quite impressive. A slow reedy attack can give way to a sudden thump in a quite different voice; sounds fade in and out at odd times and the first comparison that comes to mind is the PPG Wave's digital effects. Obviously the same degree of control over the effects doesn't exist, but the unusual envelopes and internal movement of the sounds bear some resemblance to a machine which costs about 20 times the price of the MT-65, and that can't be bad.

There are two more sound treatments available. One is Vibrato/Delayed Vibrato, which is fairly standard. The other is Sustain/Reverb, the latter part being another new idea which is simple but effective. Reverb is simulated internally by activating the sustain, but reducing it in level about five times. If the note is released, the appearance of a natural reverb is given. If it is held, of course, this simulated reverb can't function; still, a useful effect on percussive sounds or when playing staccato.

Overall the MT-65 is a no-nonsense machine with good percussion voicings and some useful new ideas. With a recommended price of £175 including VAT it's certainly the cheapest way to get some way towards those advanced digital voicings.



Casio CT-405.

Casio CT-405

The CT-405 is a full size keyboard with a specification almost identical to the MT-65. It has a simulated wood finish and is mains powered, as opposed to the battery/transformer options of the smaller models. It has four octaves of full-size keys with a pleasant firm action, and although the control layout is quite different, its features and voicings are as for the MT-65, including the Modulation and simulated reverb.

There are two additions which make the CT-405 more practical for home use. The first is a 3-position Transpose switch, marked Off (C Scale), Transpose and Set. Any key may be pressed while the switch is at Set; on returning to Transpose from the Off or Set positions, the whole keyboard including chords, bass and arpeggios, is transposed as required. The degree of transposition is forgotten during switch-off, but this doesn't alter the fact that it's a useful feature for learning or accompanying singers or instrumentalists.

The other feature is Octave Down, which can lower the pitch of the keyboard while the accompaniment sections are running so that the melody needn't necessarily be too high-pitched. The rear panel has Headphone, Line Out, Foot Volume and Sustain

¼" jack sockets, together with a tuning control and Euro mains socket.

Recommended Retail Price including VAT is £325.

Casio CT-501

Lastly the CT-501, another full-size keyboard similar in styling to the 405 but with a slightly wider specification. It's a four-octave version of the CT-701 and is a bar-code reading machine with 20 polyphonic presets and an LCD display.

In fact the specification of the 501 is identical to that of the MT-70, reviewed in detail in the Mini Synth Supplement in E&MM October 1982. The 501 can be regarded as a luxury domestic version; briefly its specification is as follows.

There are twenty presets, ranging from Organ and Flute to Synth Bells and Chimes, and ten rhythms, with matched Chord and Arpeggio patterns. Chords can be fully fingered or one-finger; there are Synchro Start facilities and indicator lights above each of the top 3 octaves of keys to show which note is playing.

Tunes can be programmed by the user, entering a chord at a time and a melody note at a time, or by using the light pen supplied and passing it over sheets of bar codes corresponding to different songs. Editing of the memory is possible, and chord patterns can be repeated and chained. The user can follow the melody using the indicator lights, or step through it using the two One Key Play buttons supplied for re-timing against a rhythm.

The advantage of the 701/501 design is that tunes supplied in bar code form or the user's own compositions can both be programmed, giving a wide range of learning and performance options. Although the 501 is relatively sophisticated, it won't look out of place in the domestic environment.



Casio CT-501.

Recommended Retail Price including VAT is £375.

The new Casios go some way towards increasing the voicing options and memory facilities of the range. As usual there are difficult choices to be made as to their exact application. The MT-65, for instance, might be interesting for stage use, but as it switches itself off after about 5 minutes of disuse you may find yourself leaping onto a completely silenced keyboard. The Modulation effects of the MT-65 and CT-405 voices are interesting, but don't produce any sounds which cannot be obtained on the CT-1000P or which are basically un-Casio like. As always, price and facilities will be the deciding factor for the individual purchaser.

Mark Jenkins

E&MM

Micromusic

Rhythm Sequencer for Sharp MZ80K *by John Perra*

This month we are returning to the Sharp MZ80K with a program which can create 'Kraftwerk' type rhythm tracks.

Nine 'instruments' are provided representing Bass drum, 2 Side drums, 2 Toms and 4 Wood blocks. These are produced by the Sharp's internal speaker.

The listing, shown in Figure 1, is intended for Standard Basic on the Sharp, but the program breakdown provided should make conversion to other Basics a fairly simple matter.

Rhythms can be entered in two ways; either preprogrammed from DATA statements or step by step from the keyboard. When the latter method is used a moving pointer indicates the type of instrument selected.

Tempo changes can be made while the rhythm is playing, with a visual update on the display.

An editing option allows single steps to be changed and rhythms up to 200 steps in length can be accommodated.

Program breakdown

Initialisation

Line 1: Variables which are to be used are set. These are:

S = 4514 (11A2H) High byte of note frequency.

H = 523248 (D000H) Start of video RAM.

V = 4466 (1172H) Vertical cursor position.

L = 4465 (1171H) Horizontal cursor position.

T = 250 Initial Tempo setting

P = 1 First programmable step

Z = 338 Screen displacement

V (255) Note frequency array

I (255) Screen pointer array

Q (200) Rhythm array

RH = 3 No. of preprogrammed rhythms.

Line 2: The first set of data is read from lines 44 and 45, variable B being used as the subscript to load values into the two arrays V and I.

Lines 3-7: A header, 'Rhythm Sequencer' and selection menu is printed on the screen using a combination of poke and prints.

Read/Write

Line 10: 'Automatic or Programmable mode?' is printed on the screen.

Line 11: Keyboard is continuously scanned until a character W\$ is entered.

Line 12: Variable C is set as the ASCII equivalent of the character read.

The remaining data in line 45 is read and poked into locations 24553

to 24560. This machine code routine calls the monitor's keyboard scanning routine at 001BH, transfers the result from the accumulator to location 24560 and then returns from the call. This provides a quicker keyboard read than 'GET', which allows rhythms to run faster.

Line 13: If C = 65 (ASCII 'A') then the program jumps to line 39, the automatic mode; if C = 80 (ASCII 'P') then the program jumps to line 14; anything else and the program is started again.

Line 14: Variable O is set to 1 (used in the play mode). The main program loop is entered and message 'Enter voice for step R' printed.

Line 15: USR (24553) calls the machine code routine at location 24553. Variable K is set with the result and used as the subscript for array V. Its value will be 0 if the key pressed was not 0-9 or E, and the keyboard will be continually scanned until a valid key is pressed.

Line 16: An arrow is used to indicate which type of instrument has been selected by pointing to the relevant menu statement. This is accomplished by poking 196 to a location in the video memory pointed to by H plus displacement Z, read from pointer array I with subscript K.

N is set as R-1, or number of steps. Line 17: If K=69 or key pressed is 'E' then the program jumps to line 22, playback.

Line 18: Rhythm array Q, step R, is loaded with a value from the note array V, pointed to by K. The sound variable, S, is also loaded with the value of V and the monitor sound routine is called, USR (68). Loading S with 0 and calling USR (68) again clears the note. 'CH' > 0 Then Return is used in the edit mode.

Line 19: Continue round the loop until R=300.

Playback

Lines 22-25: Print playback menu options with 'Step' and 'Tempo'.

Line 26: Main play loop entered, the cursor is moved to the position after the word 'Step' and step number printed. The sound variable, S, is loaded with the value of array Q at step P and the sound routine called. Line 27: USR (71) called which silences the note emitted from the speaker after which a random element is added to the lower byte of the sound variable, S.

The machine code keyboard scan is called to check if any keys are pressed, if so, then the program jumps to line 29.

```
1 S=4514:H=523248:V=4466:L=4465:T=250:P=1:Z=338:D[MU(255),I(255),Q(200):RH=3
2 FORA=0TO10:READB,V(B),I(B):NEXT
3 PRINT"R":FORB=1TO21STEP2:POKEV,B:PRINT"#####":NEXT
4 FORA=0TO39:POKEH+A,155:POKEH+199-A,155:POKEH+A+800,155:POKEH+999-A,155:NEXT
5 PRINT"##### Rhythm Sequencer #####":PRINT"1 to 4 Wood blocks"
6 PRINT"05 to 6 Toms":PRINT"07 to 6 Side drums":PRINT"09 is a Bass drum"
7 PRINT"00 is a Rest":PRINT"0A Approximations | 0B + 0":PRINT"0E to end sequence"
8 REM
9 REM READ/WRITE
10 PRINT"##### Automatic or Programmable mode ? ":
11 GETW$:IFW$=""THEN11
12 C=ASC(W$):PRINT"#####":SPC(37):FORA=24553TO24560:READB:POKEA,B:NEXTA
13 IFC=65GOTO39:IFC=80GOTO14:GOTO1
14 O=1:FORR=PTO300:POKEV,22:PRINT"Enter voice for Step ####":R
15 USR(24553):K=PEEK(24560):IFV(K)=0THEN15
16 POKEV,22:PRINT"##":SPC(30):PRINT:POKEH+Z,0:POKEH+I(K),196:Z=I(K):N=R-1
17 IFK=69THEN22
18 Q(R)=V(K):POKEV,K:USR(68):POKEV,0:USR(68):IFCH>0THENRETURN
19 NEXTR
20 REM PLAYBACK
21 REM
22 PRINT"#####":TAB(21):"Control keys##### start/reset#####";
23 PRINT"##### 1 step/fast | ##### C change step | 0 0";
24 PRINT"##### [ re program ##### + tempo control#####";
25 PRINT"##### Step Tempo":T
26 FORP=1TON:POKEV,18:POKEV,28:PRINT"####":P:POKEV,Q(P):USR(68):USR(68)
27 USR(71):POKEV,50*RND(8):USR(24553):A=PEEK(24560):IFA=0THEN29
28 DL=50:IFC=0THENFORM=1TO500-T:NEXTM:NEXTP:GOTO26
29 IFA=45THENIFT>001THENT=T-1:GOSUB38
30 IFA=43THENIFT<500THENT=T+1:GOSUB38
31 IFA=83THEN0=0:GOTO26
32 IFA=79THEN0=1:FORB=1TODL:NEXTB:DL=0:NEXTP:GOTO26
33 IFA=67THENR=P:O=N:CH=1:GOSUB14:N=D
34 IFA=91THENRUN
```

Figure 1a. Rhythm Sequencer Listing.


```

35 GOTO27
36 POKEV,13:POKEL,35:PRINTT:RETURN
39 PRINT"#####select rhythm number ( 1 to";RH;" ) ";
40 GETW#:IFW#=""THEN49
41 A=ASC(W#)-48
42 PRINT"#####":SPC(37):FORB=1TOA:READM#,N,T:FORC=1TON:READO(C):NEXTC,B
43 PRINT"#####The sequence prepared is :";A;M#:O=1:GOTO21
44 DATA 69,255,739,48,255,579,49,1,259,50,2,259,51,3,259,52,4,259,53,7,339,54
45 DATA9,339,55,12,419,56,14,419,57,25,499,285,27,0,50,240,95,201,0
46 REM
47 REM PREPROGRAMMED RHYTHMS
48 REM
49 REM NAME,LENGTH,TEMPO,SEC
50 REM
51 DATA AAAA,8,420,30,30,0,5,30,30,5,0
52 DATA BBBB,128,490,30,0,0,0,9,0,30,30,0,0,0,0,9,0,0,0,30,0,0,0,9,0,30,30,0,0
53 DATA 0,0,9,0,0,0,30,0,0,0,9,0,30,30,0,0,0,0,9,0,0,0,30,0,0,0,9,0,30,30,0,0
54 DATA 0,0,9,9,0,9,30,0,0,0,9,0,30,30,0,0,0,0,9,0,0,0,30,0,0,0,9,0,30,30,0
55 DATA 0,0,0,9,0,0,0,30,0,0,0,9,0,30,30,0,0,0,0,9,0,0,0,30,0,0,0,9,0,30,30,0
56 DATA 0,30,30,9,30,0,30,0000,32,440,30,0,10,30,30,0,10,0,30,0,10,30,30,0,10
57 DATA 0,30,0,10,30,30,0,10,0,30,0,10,30,30,0,10,10
    
```

Figure 1b. Rhythm Sequencer Listing (contd.).

Line 28: DL is set to 50 and if O is 0, a delay loop entered. The delay time is varied by the value of T (initially 250). The loop repeats until P=N, then restarts at P=1 to repeat sequence.
 Line 29: If A=45 or key pressed is '-' then the value of T is decreased to a minimum of 1. Subroutine at line 38 is called.
 Line 30: If A=43 or key pressed is '+' then the value of T is increased to a maximum of 500. Subroutine at line 38 is called.
 Line 31: If A=83 or key pressed is 'S' then O is set to 0 and play mode re-

entered from the start.
 Line 32: If A=79 or key pressed is 'O' then O is set to 1 and a delay loop entered. DL is set to 0 and a return made for the next step which repeats until P=N.
 Line 33: If A=67 or key pressed is 'C' then R is set to the same value as P, that is write step to current play step; D is set to same value as N, as a temporary store of the current number of steps; CH is set to 1 a 'change' flag which allows a return from subroutine call at line 14. After the return N is reset with value of D.

Line 34: If A=91 or key pressed is '[' then run again.
 Line 35: Jump to line 27 (rescan) if none of the above.
 Line 38: Position cursor after 'Tempo' on screen and print new value of T. Return from subroutine call.
 Line 39: Print 'Select rhythm number 1 to 3'.
 Line 40: Scan keyboard for character W\$.
 Line 41: Set A to ASCII value of W\$ less 48 to obtain number selected from keyboard.

Line 42: Read data in lines 51-57. M\$ is the name of the selection; N, the number of steps; T, the tempo and C the note values.
 Line 43: Print 'The sequence prepared is'; number A; name M\$. O is set to 1 and the program jumps to line 21, the play mode.
 Lines 44-45: Array and machine code routine data.
 Lines 51-57: Preprogrammed rhythm data.

Kenneth McAlpine E&MM

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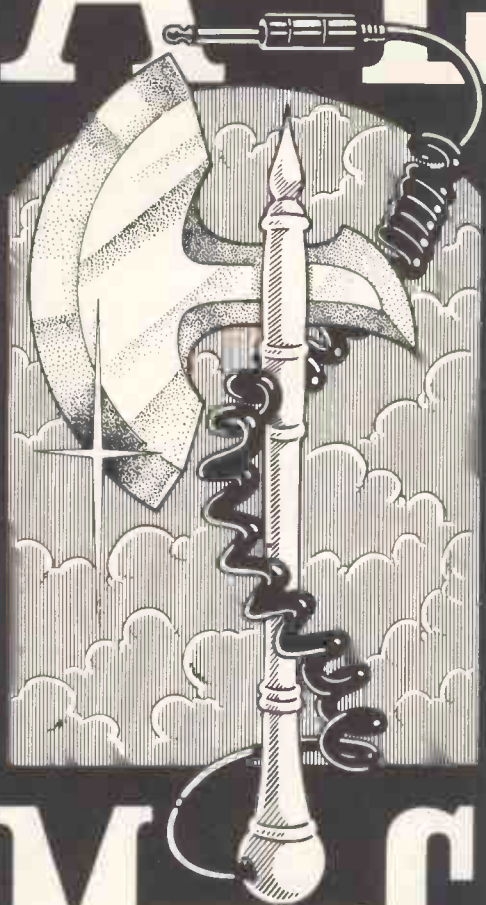
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Aria Professional Microphones

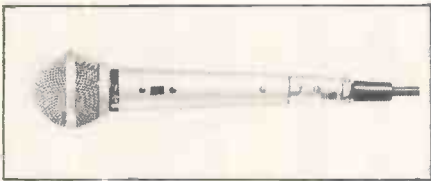


Aria have provided us with their newly imported range of cardioid microphones, 6 moving coil and 1 electret capacitor, with prices ranging from around £35 to £64.

All of the mics are supplied complete with cable, clip and case. The cables consist of 5m of decent non-tangling lead with Cannon type plugs for the mic connection and standard 1/4" jacks for the equipment end. Mic stand clips come complete with adaptors to fit the three common screw thread pitches and diameters. Incidentally, do you realise that one type supplied, the famous Whitworth 5/8" thread is extinct in British industry and is only found on imported mic fittings from the Far East? Metri-cation has some way to go yet!

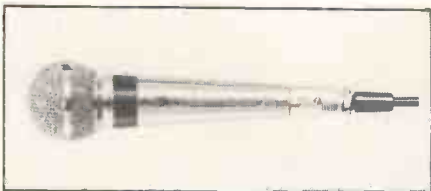
Although the mics are supplied with unbalanced leads their outputs are balanced. A suitable lead can therefore be connected to make use of this feature.

The output impedance of each mic is either 600R or 250R (depending on the model) which is suitable for connection to most equipment. Otherwise the AT-1 and AT-6 matching transformers can be used.



ARIA AM-20D

A silver finished model intended for vocal use. The published frequency curve is less extended at both the high and low ends compared with the rest of the range. This is borne out in use, although it can, particularly at the low end, be an advantage to have an early roll-off in rooms with no bass trap treatments, or where close-up use produces more bass due to the proximity effect. Overall, the mic produces a likeable balanced sound, not particularly prone to p-blast 'popping' but with handling noise above average and rather hollow in nature.



ARIA AM-30D

Another silver finished model, bright plating this time with a black sleeve under the ball mesh head.

All the Aria moving coil dynamic models have tapered bodies with a conveniently placed on/off switch. Like the AM-20D this mic has an above average output into typical loads as its source impedance is around 600R. It has a sound which is very similar to the AM-20D, balanced but obviously a bit more extended at either end of the spectrum. The cardioid directional characteristic, in common with other Aria mics seems

neatly smooth and free from feedback producing irregularity lobes. The published curves show a good uniformity of pattern for 300Hz, 1kHz and 4kHz but do not show the patterns for the higher frequencies where troubles usually occur.



ARIA AM-40DG

The AM-40DG has a dark grey body and a bright gold finish mesh head. At around £10 less there is the otherwise similar AM-40D model with an ordinary coloured mesh head. Aria state that thick low range sounds are its forte. This feature shows up in use, especially on vocals, but also characterising instrumental sounds with fundamentals in this part of the spectrum.

It will depend on the characteristics of the particular PA bins being used, along with the sound that one is aiming for which will dictate whether the AM-40D or DG suits. Aria's publicity material indicates vocal and instrumental use, as opposed to the vocal only applications of the last two models. There are no rules on this] if it's the sound one is after then any mic for any purpose in my opinion, with the proviso that for vocal use p-blast popping should be catered for, as indeed this and others in the Aria range do, better than average.

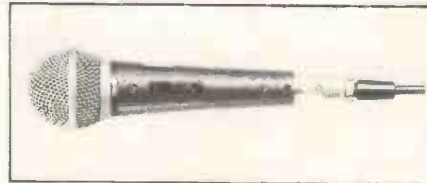


ARIA AM-50E

The AM-50E is the electret model of the range. Power is supplied to the condenser by an internal battery, hence the elongated casing.

A bass-cut switch is provided for vocal use along with an on/off switch to prolong battery life.

Despite having a fairly flat frequency response the mic seems to produce more noise than is usual for an electret.



ARIA AM-60D

The AM-60D has the distinction of having a black speckled grey body - interesting how the whole range are visually different as well as having differing acoustic properties.

This one sounds very nasal in immediate comparison with others in the line up.

Directional qualities seem particularly pronounced in a male voice application, but this could be of particular advantage in relation to some PA situations. The published frequency response curve shows a higher presence peak than others in the range which can assist in getting clarity in a complex mix when used with instruments with substantial output in the boost area.

Both this and the AM-70D have the additional feature of a screw locking on/off switch.



ARIA AM-70D

The AM-70D and the AM-30D are my favourites in the Aria range. They have a similar attractive sound that suits a wide range of instrumental and vocal uses.

But what does one get for the extra £20 of the AM-70D? It seems subtly smoother and more secure with a better transient response - just as well as this is one point made in the Aria brochure.

The listed applications include recording as well as vocal and instrumental use. Suffice to say that there is something extra in this top of the range model to justify the higher price.

AT-1 and AT-6 Matching Transformers

These, like the mics, are well made and very helpfully have their circuit diagrams printed on the bodies.

Model AT-1 is for low to high unbalanced applications with 1/4" jack inputs and outputs.

Model AT-6 has Cannon type plug in, low to high out on 1/4" jack, again unbalanced.

There is a bypass switch which can be used to switch the low impedance straight through.

Conclusions

The Aria range, being well constructed and attractive in both looks and price, is certainly well worth considering when buying a mic.

If possible they should be tried out in your own particular situation since it is that which will determine the most suitable.

Handling noise, which can sometimes be a problem, is not pronounced on the higher priced ones and p-blast popping is below average across the range.

Mike Skeet

Prices		E&MM
AM-20D	£34.89	AM-50E £50.36
AM-30D	£41.32	AM-60D £52.12
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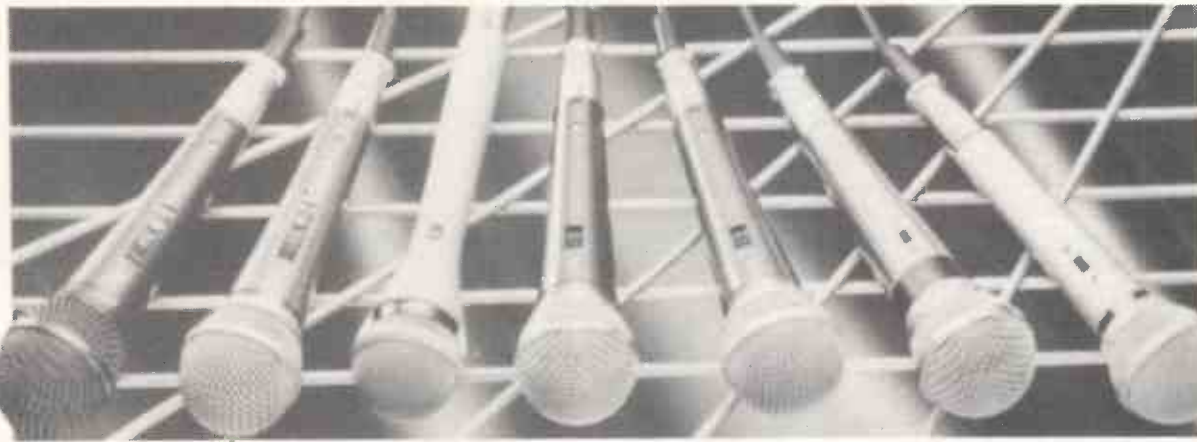
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(For Vocal & Instrumental Use)
A really good all-round microphone. Making use of proximity effect and aluminium voice coil, this model produces thick low range sounds to clear high range sounds.

AM-40DG

(For Vocal & Instrumental Use)
This is an up-market version of the AM-40D. A high quality microphone featuring black metal finish body assembly and gold finish mesh screen.

AM-60D

(For Vocal & Instrumental Use)
Lightweight aluminium voice coil gives this microphone superior transient response. Soft touch on-off switch with lock.

AM-30D

(For Vocal Use)
Easy-to-use microphone providing well balanced sound throughout the range of low, mid and high frequencies. Compatible to all kinds of PA systems.

AM-50E

(For Vocal, Instrumental & Recording Use)
Electret condenser microphone with flat frequency response and superior characteristics to prevent overloading and pop noise. Built-in tone selector switch (music/voice) makes this a very versatile microphone.

AM-20D

(For Vocal Use)
Compact design, modest priced microphone with high-quality performance. Clear and natural sound without distortion. Metallic silver finish.

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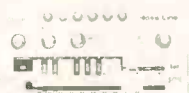
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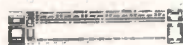
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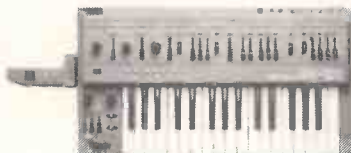


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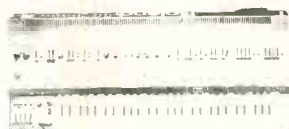


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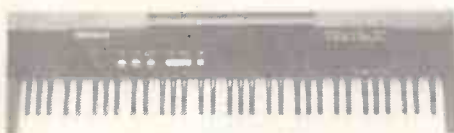


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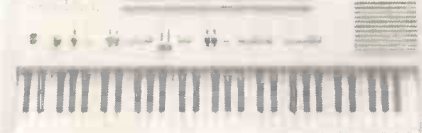


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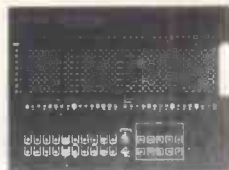
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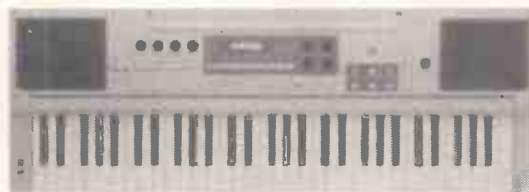
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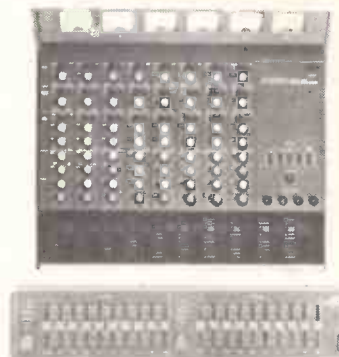
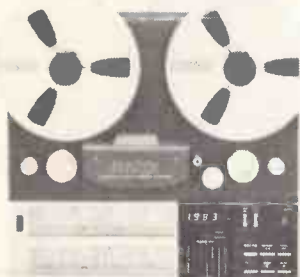
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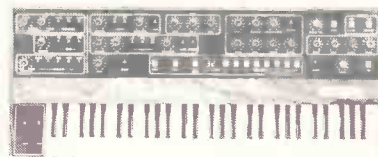
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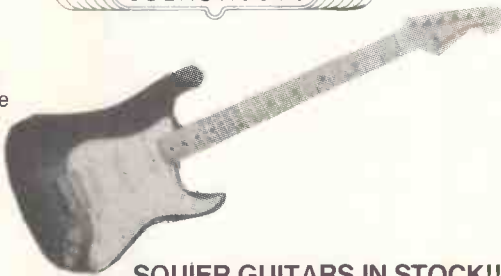
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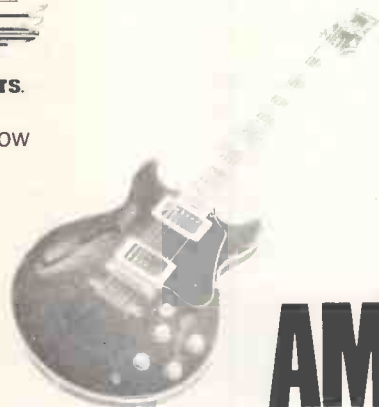
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BGW 7000 Power Amplifier

Under review this month is another power amplifier from the BGW stables in California. The 7000 is a solid state stereo amplifier with the ability to supply 200W continuous average power output from each channel into an 8 ohm load from 20Hz to 20kHz.

The amplifier can also be connected in a bridge configuration to provide a monaural output of 650W into 8 ohms.

The circuitry is packaged in an all-steel enclosure with a 19" x 5 1/4" front panel. This allows the unit to be rack mounted with suitable supports for the 15 1/2" deep casing.

Weighing around 19kg, the amplifier is fairly heavy, but can be moved around with the aid of the two handles bolted to the front panel.

The casing is finished in an attractive off-white colour with light blue legending.

Being a 'no-nonsense' power amplifier the front panel has only 3 controls; two click-stop pots for channel volume controls and a rocker power switch. Mains supply is indicated by a red LED above the switch. To the left of the controls is a large ventilation grill allowing air to be sucked in, across the heatsink module, by a fan mounted on the rear panel.

The input and output connections are situated to the left of the fan. An unbalanced input signal is connected via standard 1/4" mono jack sockets. Channel outputs are obtained via four five-way binding posts which can be used with banana plugs or tinned wires.

Stereo/mono selection is made with a push-button switch fitted next to channel A's input socket.

A circuit breaker mounted above the mains input on the back panel will trip and break the supply, should an overload occur. This is a more accurate and convenient means of protection than fusing, as the breaker can be reset from the panel once the fault has been cleared.

Circuitry

The mains input passes through three switches before connection to the transformer: the circuit breaker, to protect from overloads; the power switch, mounted on the front panel; and lastly a thermal switch which breaks the supply if the temperature of the output transistors rises above 90°C.

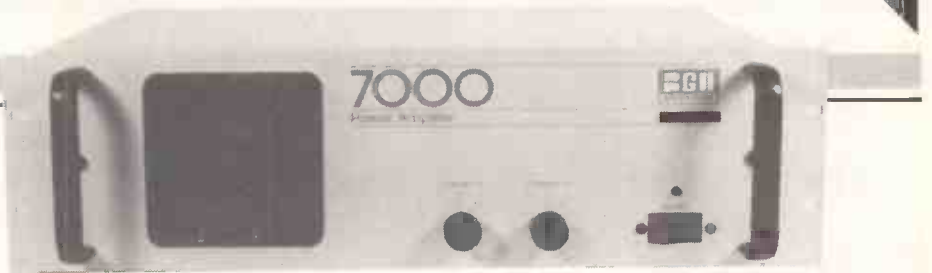
The transformer has several tapings to allow a variety of supply voltages to be connected, however, these can only be changed by resoldering the leads as no switch is provided. A 120V tapping is used to power the internal fan.

Outputs from the transformer secondary are connected to a bridge rectifier which provides the $\pm 75V$ rails, required by the amplifier circuitry, via two large smoothing capacitors.

The primary windings of the transformer have a built-in thermal switch to protect the secondary from overloading.

Inputs from the channel sockets are first attenuated by the two level controls before passing to the input circuitry.

The first stage is a filter network which



presents a high impedance to the amplifier, blocks any DC components and radio frequency interference.

A dual low-noise transistor package is connected as a differential input stage. The output is passed through various stages: to remove distortion; provide constant bias current, independent of temperature; and finally drive the output stage, which consists of eight 150W power transistors.

The output appears across two flyback clipping diodes, is fed through load compensation networks and then to the output sockets.

Negative feedback is used throughout to maintain amplifier stability, linearity and low distortion.

Construction

All steel cabinet construction provides a rigid framework for all of the internal components which apart from the power supply are mounted on one large resist-coated PCB (see photograph).

The massive heatsink assembly fills almost half of the case providing a thermal path for all of the power devices. The smaller plastic-package transistors are also mounted to maintain bias stability. Thermal cutouts are mounted on two of the power transistors.

Operation

Since this is an American machine the moulded, parallel blade, U-ground mains plug, supplied with the unit, must be removed for operation in this country.

Chassis and circuit grounds are connected internally, but can be disconnected by moving the earth wire onto a blank pin on the PCB, this can help eliminate ground loops if such problems occur.

Also, since no internal fuses are fitted, speaker protection fuses should be connected in line with the outputs.

If the amplifier is to be used in a mono situation then a bridge configuration is required. Switching to mono mode grounds the 'B' input and connects the 'B' amplifier to the inverted 'A' output. The signal input is connected only to channel 'A' and output taken across the two positive output posts. The channels now work in opposition to each other effectively providing twice the normal voltage across their outputs.



Internal view of the BGW 7000.

Conclusions

The amplifier supplied for review provided test results even higher than those claimed by the manufacturer's specification.

At clipping levels into 8 ohms the amplifier output 238W per channel stereo and 744W in mono. The noise at these levels was -92dB, with distortion 0.05% at 20kHz.

For most PA or studio situations where a 'no-fuss' high quality powerhouse is required this amplifier would probably be ideal. With the overload and thermal cutouts, coupled with ample cooling measures taken, reliability should be assured, provided that the user complies with the operating conditions.

The model 7000 is priced at £550 + VAT, although this unit can be hired from Soundhire.

Kenneth McAlpine

E&MM

For further details contact Nikki Antoniou at Theatre Projects Services Ltd, 10 Long Acre, London WC2E 9LN. Tel: 01-403 3838 or 01-240 5411 for Soundhire. Please mention E&MM when doing so.

Specifications

Intermodulation Distortion:	Less than 0.02% from 250 milliwatts to rated power.
Small Signal:	+0, -3dB, 1Hz to 100kHz.
Frequency Response:	+0, -0.25dB, 20Hz, to 20kHz.
Hum and Noise Level:	Better than 96dB below 200 watts (unweighted, 20Hz to 20kHz).
Input Sensitivity:	1.23 volt for maximum power output. Voltage gain.
Input Impedance:	15k ohms.
Damping Factor:	Greater than 100 to 1 at 8 ohms.
Output Impedance:	Designed for any load impedance equal to or greater than 2 ohms.

Talking

SHOP

DON LARKING



Not so much a shop, more a complete studio service. Don Larking, situated in the centre of Luton (surprisingly only an hour by train from London) specialises in studio hardware and, more to the point, has all this hardware on permanent display for the customer to come to his own conclusions.

Not surprisingly a large amount of space is required to store such a vast range of equipment, from giant Tannoy monitors to custom-built mixing consoles, and the Don Larking premises cover three floors and extend far back from the anonymous facades of Luton's Cheapside. The ground floor includes a reception area and a small annexe for tape machines and mixers, together with the main demonstration area.

This area reflects its beginnings as a working 8-track recording studio; Don's experience in this field gives him the ideal outlook as a salesman, in that he can appreciate the needs of the working musician rather than only having a knowledge of the technical side of recording. The demo area remains acoustically and electronically isolated from the rest of the building, and so could be converted back into a studio at any time; at present it houses a Concorde 28 channel mixer together with a 3M 24 track tape machine. These are used to demonstrate any of a wide selection of studio effects unit, including the Lexicon 224 digital reverb.



Home recording.

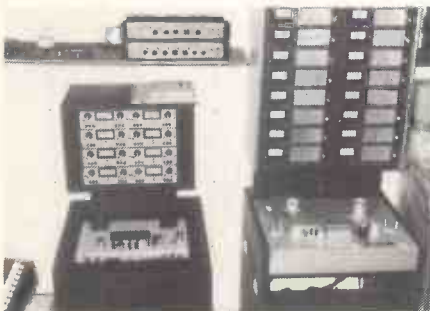
Fostex are also well represented: their 3070 Compressor Limiter also acts as a noise gate or as a de-esser (removing sibilance from vocals), and although it's designed for the -10dB home recording standard it can also work at the +4dB studio standard. There are even more effects units, including many second-hand models which have come in through part-exchange deals, in the largest demo area.

Here, while every inch of floor space is taken up by mixing consoles and tape machines, the walls are stacked with shelves full of effects and accessories. A new Fostex

amplifier, cheaper and more powerful than the Crown DC300, is in constant use, and the room is dominated by a huge horseshoe shaped Allotrope mixer, custom built for John Paul Jones. The Allotrope's getting on a bit in years now, but is still worth every penny of the £8,000 asking price. All the circuitry is discrete, on removable cards and easily serviced, and while more modern IC-based designs may be more compact, older models have the advantage of causing only a little compression at high signal levels rather than going straight into distortion.

Also on sale are a selection of Brenell Mini-8 multitrack machines, and Tubular Bells producer Tom Newman's Ampex 8-track, now fitted with Soundcraft electronics and Bel noise reduction on each channel.

Other equipment available at bargain prices includes a complete set of Melquist auto faders and the Allison Research 65K programmer, direct from the Manor studio and ready to computerise your mixing desk at a moment's notice. The Rebis mini rack effects include an EQ unit, Dual VCA and Auto Panner, at about £80 per unit, and there's also a good selection of Drawmer and MXR units.



8 and 16-track room.

Don Larking doesn't specialise in instruments, but there are usually a few lying around for demonstrations or as a result of part exchange deals. These include a Polymoog, and an acoustic guitar which once belonged to Charles Manson and still comes complete with carved poems and designs and a good share of 'bad vibes'. Upstairs there are more instruments: Jeff Wayne's Baldwin electric harpsichord, an ARP 3800 and some Roland and Oberheim modules.

This first floor area contains the smaller mixers, including models by Trident, Seck and Bel. Bel started with a popular range of flangers and noise reduction units, and now occupy part of the same building as Don Larking. Their 24:16 mixer is exclusive to Larking, as are Soundtracs mixers including the Omni, which has a link to expand the basic 16 channel design to 32 channels using another identical mixer. The Trident

16.8 at around £1,000 is another top seller.

A small room for 'home recording' has the Fostex A8 8-track and the Tascam 80-8 on constant comparison, together with various designs of multitrack cassette and budget effects such as the Fostex DDL. The next development along these lines is expected to be a Fostex 16 track machine; this should make purchasing decisions even more strenuous, but it's facilities like those offered by Don Larking which make such decisions easier.

Plans for the future inevitably include expansion and diversification. The second floor is in the process of being wired up for comparative speaker checks: the advantage of working in an ex-studio building is that multicore wiring from floor to floor is already in place, and so connection of any tape machine and mixer to any pair of speakers will be quite simple. There are always new products; Dearden Davies Associates have a new fully modular ultra low noise portable mixer, with sound quality high enough to make digital recording an ideal application, and Trident are marketing via Larking the new Studiomix, derived from the Trimix series and featuring 28 input 16 group frame with 4 way echo return module and 308-jack patchfield.

Don Larking will also market the Movement Audio Mimic, a sort of monophonic Emulator, and hopes to be able to persuade other dealers (such as those in the North of England) who don't have demo facilities, to take advantage of his proximity to the capital.

Details of new products available from Larking and second-hand equipment in stock are given on an occasional newsletter, now with a circulation of about 2,500, which is available to anyone genuinely interested. About fifty per cent of customers just drop in, and if an appointment is made any combination of tape machine, mixer, effects and speakers can be set up and working by the time you arrive.

A look around Don Larking's premises in Luton is quite an experience, although one likely to provoke severe attacks of covetousness. For those who feel the sight of all that desirable equipment may be too much, Don intends to exhibit again in parallel with this year's APRS exhibition in June, when there'll be a slightly smaller amount of equipment on show, but an equal chance to get some of the hands-on experience and helpful advice upon which Don Larking's reputation is based.

Mark Jenkins

E&MM

Further details are available from Don Larking Audio Sales, 29, Guildford Street, Luton, Bedfordshire. Tel. 0582 450066.

Ibanez Pedals



The new range of Ibanez pedals are being endorsed by studio guitarist John Tropea, among others, but are mostly suitable for keyboards, guitar, or indeed vocals and any other instrument. Similar in conception to the popular Boss pedals, the Ibanez -9 series of effects will become instantly popular due to their reasonable retail prices.

TS9 Tube Screamer

The TS9 is clearly an exception to the above generalisation in that it's primarily designed for guitar. It's a distortion unit intended to simulate an overdriven valve sound, and makes a neat and well-constructed package. Like the other pedals received, it measures 124 x 74 x 53 mm, weighs a little under 600g (1.3 lbs) and has a die-cast zinc body with a silky paint job. The TS9 itself comes in an apple green colour.

Power can be supplied by a 9V PP3 cell, installed by pushing a spring clip underneath the unit and removing part of the bottom panel. This is a quick and easy method of changing batteries which is infinitely better than having to unscrew a battery compartment cover. On the other hand, the cover comes away completely and so could be lost - it seems that the increasing compactness of effects has made the good old integral sliding cover a thing of the past.

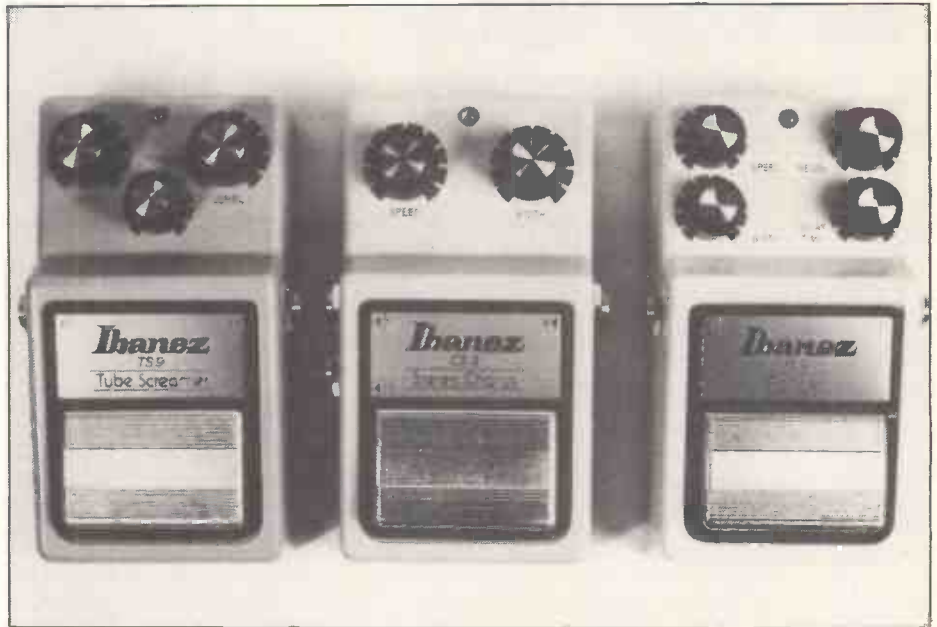
The inside of the battery compartment is foam padded and the unit can be taken apart by removing four crosshead screws. All other parts are in chromed metal, the 1/4" jack In and Out sockets being heavy-duty and positive in use, and the on-off footswitch being satisfyingly heavily sprung, silver in colour and about two inches wide. The DC power connector has a matt black plastic surround which matches the silver-capped controls, Drive, Tone and Level.

These controls act in a fairly conventional manner. Drive selects the degree of input to the internal preamp and therefore the degree of overload distortion produced. Tone is a simple active filter circuit which can remove the harsher upper harmonics to give a smoother fuzz. Level sets the degree of boost so that it's possible to exactly match the guitar volume with the effect on and off, or to amplify it if the Tube Screamer is to be switched in only for lead breaks.

After a little use it becomes clear that the TS-9 is a pleasant little unit, but not particularly well named. It does its job in delivering the sort of warm, tube-type overdrive obtainable on valve amps, but even with drive and tone fully open this doesn't constitute a scream in any sense of the word. Perhaps WF-9 for Warm Fuzz would have been more appropriate.

Internally the construction is up to the typical Japanese standard, similar to the Amdek effects kit in fact. The design is based around a dual op-amp with all components soldered directly to the circuit board. Component polarities and wire colour codes are marked on the board, and miniature pots are used for the controls.

An interesting feature common to all the



effects is the LED indicator. This shows when the unit is switched on, its brightness giving an indication of battery state. It's mounted on a tiny circuit board of its own, and is quite transparent until switched on, when it glows red. The PCB is well insulated and the TS9 gives every indication of being a reliable unit.

Recommended Retail Price including VAT is £40.59.

FL9 Flanger

The Flanger is similar in design to the Tube Screamer, but has four control pots and comes in a bright yellow finish. The controls are Speed, Regeneration, Width and Delay Time. Power is again from a single battery or 9V DC power supply, and the footswitch is a very quiet FET design.

The design is an analogue BBD circuit, with flanging rate set by the speed control. This ranges from one cycle every 30 seconds to about 10 cycles per second, a very respectable range for a small unit.

Regeneration controls the amount of feedback of the signal into the flanging circuit, and thus the degree of colouration or resonance given to the sound. This ranges from very plain to just below the point where the circuit oscillates itself. Again a good range for an inexpensive unit.

Width controls the degree of flanging in terms of the magnitude of the delay used. In conjunction with the Regeneration control this determines the quality of the flanging effect. The final control is Delay Time, which doesn't affect the flange itself so much as the frequencies it acts upon. Delay Time in fact positions the centre frequency of the sweep, so turning clockwise makes the flange act on higher frequencies, while turning anticlockwise makes it concentrate on lower frequencies. This is a useful effect which, in conjunction with other pedals, opens up the possibility of having two very different sounds emerging simultaneously from one

guitar or keyboard. If the Width control is full up, the Delay Time control doesn't have any effect.

The flanging sounds available are smooth and clear, but not unusually powerful or suggestive of, as the booklet hints, a studio quality unit. Internally the construction is as good as that on the TS-9; the FET footswitch and LED have their own circuit boards, and the main PCB design is based on a voltage controlled clock, a pair of op-amps and a single IC delay line.

Recommended Retail Price including VAT is £59.60.

CS9 Chorus

The Chorus unit is a sort of cut-down version of the Flanger, offering Speed and Width controls only and with a light purple finish. Unlike the Flanger it's totally silent when switched on, until a note is played into it. This would seem to indicate some kind of noise gating, which is reflected in the higher price.

The Speed and Width controls combine to give a good selection of effects from slow sweep to reasonably fast vibrato, and on guitar go some way towards giving 12-string richness from only six strings. It's pretty effective on Casio-type keyboards as well, giving a richer sound with more movement and interest than the untreated version.

The design uses 6 ICs including a 741 op-amp, and the delay circuitry is configured to give a stereo output. Working in mono, either of the two output jacks can be used, the normal output giving a slightly brighter effect than the Inverted output presumably because of different cancellation patterns relative to the sound input.

If both the outputs are used, a stereo shifting chorus is obtained, which is quite a desirable effect if you're lucky enough to have two amps or two mixer channels spare. The speed control then becomes a sort of

auto-pan control as well, so the input sound is improved in not one but two different ways.

Recommended Retail Price including VAT is £76.57.

AD-9 Analog Delay

The AD-9 is one of the most interesting of the pedal-sized Ibanez effects, and is a development from the older AD-80 pedal. We examined the AD-80, and are assured that the differences are mainly cosmetic, with a change of footswitch, control knobs and top panel design to bring it into line with the rest of the -9 range.

The delay has three controls for Delay Time, Blend and Repeat. The usual silent FET footswitching brings in the effect, with the mix between effect and straight sound being set by the Blend control.

Stated delay times are 10 to 300 mS, and in fact the longest delays make these figures seem conservative. In addition the echo is very clean, with almost no hiss and only a small amount of treble loss. Compressor circuitry is clearly in operation here, and is effective over the whole range of delay times.

At very short delay times the repeat control acts to colour the effect, although this is always too metallic to give a pleasant reverb. At longer delay times the repeat control gives from one 'slap-back' repeat to an infinite number, going into feedback at the highest setting. This is typical of a range which seems designed to avoid undesirable 'over-the-top' effects.

Power supply (on the AD-80 at least) is by two 9V batteries or an 18V adaptor, a jack socket being fitted to avoid confusion with the 9V supplies of the other pedals.

Internal construction is good again with individual PCBs for footswitch and LED indicator. The circuit is based on an MN 3005 for a BBD type echo, and this chip is socket

mounted. Compression and expansion is by an NEC 571, and there are presets to alter the clock speed, balance and delay properties. Fitting all this into a small pedal is quite a design achievement.

Overall an excellent unit for guitars, keyboards, or in fact vocals. The recommended price of £114 may seem a little high, but again the shop price will be a lot lower than this.

SD-9 Sonic Distortion

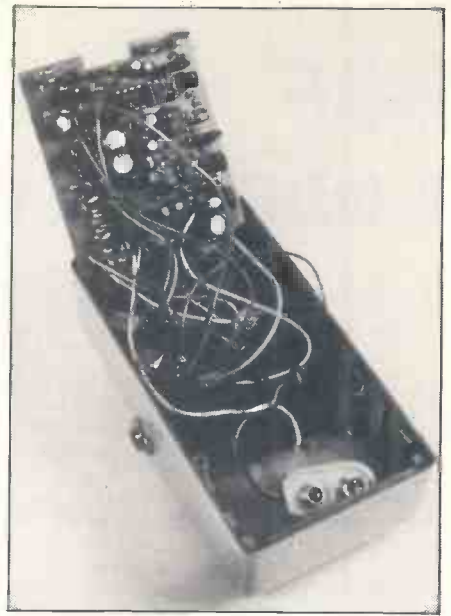
Another guitar effects box, and a less subtle counterpart to the Tube Screamer. In fact it gives much more of a 'scream' effect than the latter, producing a thin harsh fuzz which will cut through anything.

The three controls are Distortion, Level and Tone, and again Level is used to balance the output volume while the effect is in or out, and Tone cuts down the upper harmonics to give a smoother sound. In fact the Tone control effectively boosts bass as well, so a wide range of fuzz textures can be produced.

The highest levels of distortion are quite satisfying heavy, while low levels give a subtle overall fuzz to each note. The only problem is that turning up the Distortion control increases the overall volume quite significantly as well.

Power is from a 9V battery and the circuitry is based on a 4558 dual op-amp. Construction is up to the usual standard, and the SD-9 could well become the central effect in any guitarist's setup. *Recommended retail price including VAT is £40.59.*

The Ibanez effects are ruggedly constructed units which should give long service. All the controls and levels work over a sensible range, so there's no danger of



Flanger internal construction.

accidentally getting some over-the-top effect. The noise gated chorus is particularly interesting when compared to older and very noisy designs, and as the shop prices are considerably below the RRP's they should be financially attractive.

The full range includes the PT9 Phaser (£48.53) GE9 Graphic EQ (£61.57) PQ9 Parametric EQ (£61.57) CP9 Compressor/Limiter (£43.53) AF9 Auto Filter (£70.10) and a selection of more expensive rack mounting studio effects.

Mark Jenkins

E&MM

The TS9, FL9 and CS9 pedals were kindly loaned by Honky-Tonk Music, 300-302 London Road, Haddenham, Essex SS7 2DD. Tel. 0702 553647.



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RSF Kobol Expander



Anyone who read the article on Depeche Mode in the May 1982 issue of E&MM will no doubt be familiar with the item under review this month. The RSF Kobol is a synthesiser expander and is meant to accompany another synth that has a keyboard. Alternatively it could be used with a pitch-to-voltage converter for use with, say, a guitar, or it could be used with a sequencer or computer controller. It has the usual complement of oscillators and filters found on commonly available synthesisers, but the feature that puts this particular item into a class of its own is the fact that practically every control on the front panel can be regulated by an external control voltage.

There are two rows of standard jack sockets at the top and bottom of the unit; these are inputs and outputs to and from the various control functions. These were originally intended so that sounds could be stored by a programmer made by RSF to accompany the Expander. This programmer unit stores preset control voltages in its computer memory and these can be recalled by selection of a particular memory, in much the same way as sounds are stored in a Prophet 5 or Jupiter 8. There is a space on the rear of the unit presumably to house a multipin socket to interface these functions to the programmer. These jack sockets also serve a double purpose in that they transform the Expander into a very versatile mini modular synthesiser.

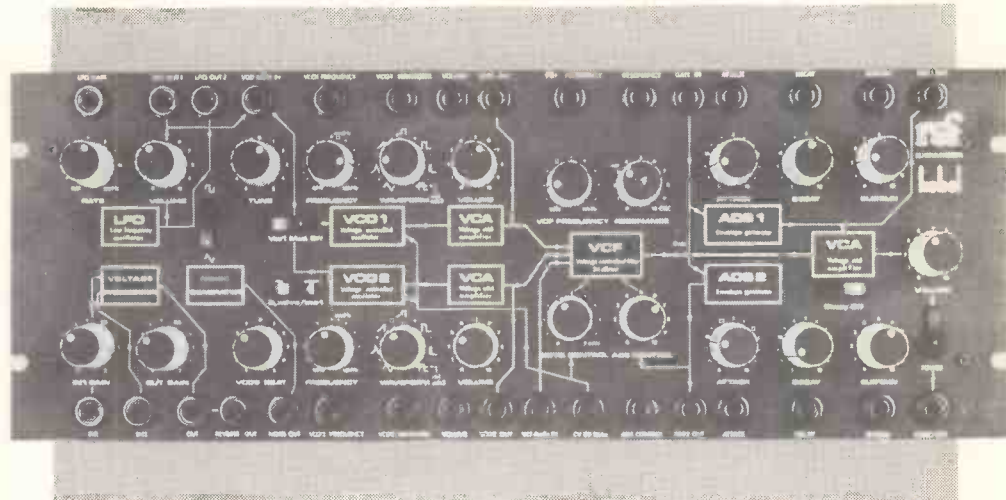
Voltage Controlled Oscillators

The RSF has two VCO's which range from 10Hz to 10kHz (expandable by voltage control). There are control voltage inputs for external control of pitch and VCO level, and also separate outputs from each VCO. What makes the VCO's unusual is the waveform selection control; instead of the usual switched waveform selector found on most synths the controls on the RSF are totally variable between the waveforms. The waveforms provided are, rotating the control clockwise, triangle, rising sawtooth, square and pulse. By setting the control midway between any two waveforms shown on the panel interesting mixtures can be obtained and many unusual sounds are available. This control is also voltage controllable which means that you can automatically sweep through the waveforms by applying the output from one of the envelope generators or the low frequency oscillator to the waveform control input.

The two VCO's are identical and provide a wide range of sounds even without the aid of filtering. The volume of the individual oscillators is controlled by a voltage controlled amplifier (VCA) for separate voltage control of the level of each VCO and there is also a switched hard sync. facility so, as you can see, there are endless possibilities for the creation of unique waveforms — far more than any other analogue synthesiser currently available.

Voltage Controlled Filter

This is a standard 24dB octave voltage



controlled lowpass filter. There are four controls associated with the filter which are Cut-off Frequency, Resonance, ADS 2 Amount and Keyboard Amount. There are also inputs for external voltage control of each of these controls and also an audio input for processing an external signal. A versatile but fairly straightforward filter.

Envelope Generators

There are two envelope generators on the RSF, one for the filter and one for the final VCA. They require a positive going V-trigger to gate them on and off. This makes them compatible with ARP, Roland, Sequential Circuits and other synths but you will have trouble interfacing the RSF with Moog, Korg and Yamaha because they use different triggering systems. The envelope generators operate in much the same way as Moog contour generators in that the final release time is linked to the initial decay control and is switched in or out. Those of you who have a Minimoog or Prodigy will be familiar with this mode of operation. The range of control with the attack and decay/release times is very wide, from 1ms to over 20 seconds. Once again, there are control inputs which allow you to vary the attack and decay/release times and sustain level with an external CV. By applying the keyboard CV to, say, the decay input, low notes will have a shorter decay than high notes. By routing the keyboard CV via the inverter in the voltage processor, low notes will have a long decay which will become progressively shorter the higher up the keyboard you play thereby simulating acoustic instruments more closely. Of course, it is possible to control all these parameters for an even wider range of articulations.

Low Frequency Oscillator etc.

These modules are fairly straightforward. The LFO has triangle and square wave outputs for vibrato effects, trills, sweeps, and so on, but this can be slightly limiting, and it would be better to have made a wider range of control waveforms available, preferably via a variable control like on the VCO's. The

rate of modulation is very wide indeed, ranging from 0.01Hz to 100Hz and this rate is also voltage controllable. The noise generator outputs white or pink noise which is selectable by an internal switch — again, a variable control would be better. The output is very high and can also be used as a control source.

Finally, we come to the voltage processor. This is a really useful device which is capable of boosting voltages by up to $\times 4$, and there are normal and inverted outputs.

Conclusion

The RSF Kobol is a pleasure to use, requiring only two interface leads for basic operation; one for CV which is internally routed to both VCO's and the VCF, and one for the envelope gating. It is ideally suited for use, for example, with an ARP 2600 and it also works well with Roland equipment. The module measures 19" \times 7" \times 4" and so could be mounted in a 19" rack mount along with other units if so required. At a cost of only £350 plus VAT it will open up the exciting world of modular synthesis to musicians without a vast capital outlay. For the more adventurous, the possibilities of using the RSF (or a few of them) with a computer controller such as the Roland MC4 are very exciting as you could assign the computer's multiple control voltage outputs to the various inputs on the module(s) and program some fascinating patterns wherein the structure of the sound could vary with the music. As previously mentioned, RSF also make a programmer, and also another expander module all of which could be used together to create a very versatile system indeed.

It is a great pleasure to use a high quality product that doesn't originate in the Orient but just across the water in France. The RSF is capable of producing some unique and powerful sounds and is sure to appeal to anyone interested in the more creative aspects of synthesis.

Steve Howell

E&MM

The RSF Kobol Expander Module is available from Syco Systems, 20 Conduit Place, London W2. Tel: 01-723 3824/44.

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mix, stored in memory for instant recall.

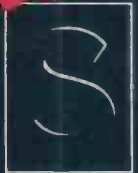
For flexibility in live performance, the Drumulator allows you to define sections within each song that can be programmed to repeat until cued to continue by the press of a footswitch. This allows you to change the length of a song each time it's performed, shortening or lengthening solos, or repeating choruses as many times as you like.

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FRANCIS

Monkman road to musical self-awareness: Sky. "It all came about as a result of an album John Williams did called 'Travelling'. Stanley Myers was producing and arranging the album and asked me whether I'd like to take an arrangement of a piece of Bach — the Gigue from the G major French Suite — from where he'd reached and turn it into a 6-minute track. Though I wasn't quite sure how to do it, eventually an idea came to me, and that became the title track of the 'Travelling' album released in the winter of '77. We tried to take it one stage above the easy listening of the earlier album, 'Changes', and I think John was quick to see the possibility of a band. The beginnings of Sky were terrific; we started off by spending about six months at John's house talking about what we were going to do. But after we had achieved success I felt it all became a bit static. There's a terrible temptation once you've reached a certain level to try and erect a kind of platform and say we're now there and that one can't afford to slip back. That's nonsense."

It was in Sky that Francis's compositional abilities really came to the fore and he in fact wrote more than half the music on the first album: "The whole of the second side of the first album was a five-movement piece called 'Where Opposites Meet'. This was one of the pieces that I really felt pleased with and felt worked. One of the inherent problems with instrumental music is that you can turn the volume down and use it for background music. It's a shame the way instrumental music has been treated this century; it has really tended to end up controlled by visual elements, and so it's hardly surprising that so many good instrumental composers have ended up writing for films."

A feature that separated Francis from other multi-keyboard merchants was the inclusion of a harpsichord: "I had all the keys linked to the Prophet so that I could play the Prophet from the harpsichord. The great thing about this was the way you got the attack from the harpsichord and the sustaining quality from the synthesiser. It seemed like a new thing when I did it, but then I remembered that there was an instrument in the past called the Clavier-Organum, or Piano-Organ. I also used a grand piano, a Clavinet and the OB1. After the interval, I had to come out and do my Scarlatti solo, or whatever, on the harpsichord. I really enjoyed playing to a crowd of kids at the Glasgow Apollo — much better than playing on the South Bank where you know they're going to clap — even though there was always a 50% chance they'd throw a bottle at you!"

The inevitable question of why Francis left Sky halfway through the third album came up: "There were lots of reasons, really. I felt that there was a danger of Sky becoming a totally innocuous middle-of-the-road band and, having spent a month on the road with The Shadows and getting a taste of the Northern clubs, I became very sensitive to what I thought were moves in the direction of 'safe' music."

Film Music

Francis has been applying his creative muse in two directions recently: firstly, in writing the score for the film, 'The Long Good Friday'; and secondly, in recording a solo album. The film work was his first exposure to the discipline of sitting in front of an editing machine, and, judging by the results,

Curved Air had a considerable influence on many musicians seeking ways of breaking down barriers and moving freely between the traditions of classical and rock music. Their first album, 'Air Conditioning', opened up an era, albeit short-lived, of real experimentation in music in this country, and this was due in no small way to the work of their keyboard player, Francis Monkman. After the demise of Curved Air in 1972, Francis worked for several years as a session musician, and then, in 1978, joined Sky. He left Sky at the end of 1981 in order to concentrate on his own work, and David Ellis spoke to him just as he was completing the final mix on his first solo album at Abbey Road Studios.

Francis had a thoroughly classical grounding in music, which undoubtedly accounts for his remarkably fluent keyboard technique, but the training was never quite finished owing to other attractions: "Curved Air started in about 1969; that dove-tailed with the end of studies at the Royal Academy of Music. I had to decide between the second half of my B.Mus and going on the road. It wasn't a very hard decision! The first keyboard I started using in Curved Air was a Hohner piano, but by the second album I was using a VCS3 with the Cricklewood keyboard. The first album, 'Air Conditioning', also used the VCS3, but just for a few sweeps and effects, including a crazy violin solo through a ring modulator."

After Curved Air came a lean period for Francis when he found that if certain session 'fixers' say "I've got so much work for you" it meant that they weren't going to phone you for the next six months: "I was okay, I didn't actually starve. I went around on a bicycle and did whatever came in, but by about '76 I was working practically around the clock as a session man. About half the sessions I did were with synthesisers, though I didn't actually own one at that time. The first synthesiser I bought was the Oberheim OB1 in about '77. Sky owned the Prophet, so that of course went back, and then I bought the Synclavier. I've really been waiting for digital synthesisers to come along and I'm rather glad I have."

Other bits of playing were mixed in with session work, including a month's tour with The Shadows in 1977 and a brief flight with a

new band called 801, fronted by Brian Eno and Phil Manzanera, which resulted in three gigs and a live album in 1976. At this time, however, Francis hadn't started doing much in the way of writing: "I was really trying to absorb rather than generate. I actually found fulfillment in not creating — being as empty as possible. I think one's need to create should be examined and I think one's motivation to create should be examined. I really feel the days of the composer being several decades out of step with the rest of the world are probably over, considering the crossroads the world stands at. It's certainly rather dodgy to consider appealing to the listener of fifty years hence. So, I think anyone who has got something to say has to make sure that he has sufficient identification with tastes as they stand."

Francis is a staunch believer in all music having a common denominator: "Something I've always been keen to do since I was about thirteen is to write music that took in everything I like. The trouble is that though I like both Scarlatti and Messiaen, and they use the same keyboard and notes, I can't tie the two together. Why is it that they are so similar and yet so different?" Now, there's a 64,000-dollar question for you! Actually, to the music theorist, that difference can be explained fairly satisfactorily in terms of tonal structures, or, more generally, what the tonal flow of a piece of music leads the listener to expect.

Expectation in music is obviously something that fascinates Francis, as he explains: "The quality of unexpectedness is for me the most important thing. I don't think you should get as trapped as I feel Stockhausen has in the past into supplanting expectation with surprise. Obviously, if you have a certain section of the orchestra doing nothing and then come in with a big crash you're going to surprise people. On the other hand, they might not get anything more from that experience than a tree falling down in front of them. My feeling is that if you want to create an element of unexpectedness then you've also got to establish a situation of expectedness."

Sky

Qualities of expectedness segue fairly logically into the next station along the

MONKMAN

it was obviously something that he took to well: "I enjoyed watching the film with no sound and a synthesiser at the side with which to play along. Something I've noticed very much with certain scenes — especially the swimming pool scenes — is a kind of pace or flow of movement between people and splashes and sounds. There's something very spacey about it which encourages you to find an overall rhythm for the music which may have nothing to do with the central action.

At the start, I wasn't sure about doing the music until Harold Chan's tune flashed into my mind. I often find influences in retrospect — a snatch from the Liszt B Minor Sonata, for instance, in one of the long Sky pieces — but when I'm writing it's all totally intuitive. A good thing about the film was the use of a live background soundtrack — something that's often used in documentaries but very rarely in feature films. Unfortunately, in production they decided to try and improve on Nature by adding a lot of effects — seagulls, for instance — on top, which just tended to destroy the gut reality of the live sound. It didn't help the music, either! The attitude of film companies to the composer is something that'll always be complained about because music is always the lowest budget and done when everything else is finished. There are a few films made now where the music is taken more seriously — even to the extent of cutting the film to the music — and they certainly work much better."

Francis then went on to describe some of the tracks: "Well, 'The Dweller' really introduces the whole thing and says what it's all about. Then we come to The Glammers. 'The Glamour of Fear' is almost like a take-off of the headache pill commercials where they actually play on your fear — almost like adverts for horror movies. In 'The Glamour of Love' there are a couple of elements: one is a kind of crooning over a piano in a night club, and the other is a sort of Sixties expression of affection — what used to be called 'free love'. The whole thing builds up into a crash and then there's a track called 'Breathe Out' which is really all about letting go of things. After that there's a track called 'Give' and then 'The Glamour of Nations'. The next side starts with 'Learning to Live' which really says that Hell is wherever you care to make it — this is the track that starts off with a pneumatic drill — and if you get past that then everything can't be that bad! Then there's 'The Glamour of Material Possession' and 'The Glamour of Magnetic Attraction' — which is about as many Glammers as I could squeeze onto the album. After that, there's a big instrumental track called 'The Angel' done solely on the Synclavier. The album ends with a version of the 23rd Psalm — not from any churchified religiosity or anything — which reflects the real spirit that I feel lies inside everybody."

Moving on to the technical side of things, the album shows a number of rather interesting features. Unusually, there isn't a single sign of phasing or flanging — apart

However, if you look for striking sounds you'll find them, and the frequency-modulated 'drainpipe' sound on 'The Dweller' is a case in point and attributable to the Synclavier: "I was very worried when it came to overdubbing these digital synthesisers that one might run into the same problem as with the old analogue polysynthesisers — namely that sounds get muddier and muddier the more you pile tracks on top until in the end you just get a blob of undefinable wave-shapes in the middle of the track which does absolutely nothing. Fortunately, I was proved wrong, and found that digital overdubs seem to create their own perspective within the inherent transparency of the sound."

"My interest in sound generation veers much more towards the building up of original sounds rather than sampling existing sounds, which seems to me what the Fairlight is best at. Admittedly, the Fairlight is rather more pleasing as a whole package: the software is very workable and it looks good running. The Synclavier isn't nearly as outwardly impressive as a computer, but when you begin to realise what's in there, just in terms of raw computing power, you find that the processor speed is something like 50 to 100 times that of the Fairlight. The 6800 used in the Fairlight has no on-chip multiplier, so an 8-bit multiply would take something of the order of 30 us. The Synclavier, on the other hand, will do a 16-bit multiply in better than 2 us, so you're talking about a totally different world of speed. Now, one of the slight grouses I've got about the Synclavier is that having this powerful 16-bit machine at your fingertips, as it were, they've implemented the voices themselves in 8-bit wavetables. So, they haven't got the maximum definition that could be achieved. If they'd gone just a couple of years ahead of themselves with 12-bit or 8-bit companding then you'd have 20dB better dynamic range. There's an instruction in XPL, the language they're using, that allows you to pack 2 bytes into one 16-bit word, so presumably all the data needed by the voice boards is packed in twos.

Francis is now on the verge of designing his own digital synthesiser: "I've got all sorts of ideas about what I would like to see in a digital machine, and I feel that I'm now in the sort of position to do it rather than waiting for somebody else to come up with the goods. I'm hoping that Chris Quayle, the guy responsible for doing the key scan system for the HH digital piano, will be helping me with the design and implementation of the machine. When I was with Sky in Australia I went to Rushcutters Bay, the home of the Fairlight, and the guy there showed me all the sounds it was capable of. I asked him whether he could make it sound like a synthesiser and he admitted that they hadn't really thought of that. Now, I happen to like synthesisers, and I don't see that you can get anything out of the Fairlight which sounds like a filter sweep or an equivalent parameter changing over 20 or so seconds, and I think some slowly changing sounds are very important. It's facilities like that that I want to make sure are included in my digital synthesiser."

Onwards, the digital revolution — and look out for Francis Monkman's remarkable solo album!

E&M



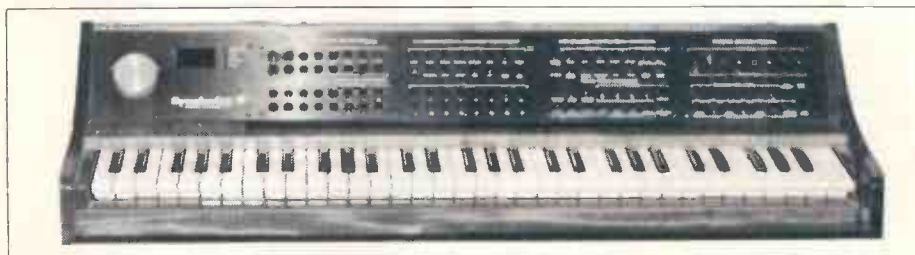
Francis' home studio.

Dweller on the Threshold

Francis's first solo album, 'Dweller on the Threshold', is obviously much more of a personal statement than the restricted musical environment of a film score and speaks of a man with a very definite philosophy: "The Dweller on the Threshold is the astral form representing all the past experiences of the world — the 'thought-form'. I know that sounds dangerously quirky, but I do believe that all personal experiences — fear, emotion, glamour, or whatever — coalesce at an astral level, the Threshold, and, given the crossroads we're undoubtedly standing at, it has to be forged past. It seems to me that all these qualities have been brought into much closer perspective with the nuclear threat. I mean, if you look at a movie from the '40s — Brief Encounter, for instance — the glammers associated with everyday life — even like meeting and having a cup of tea in a station buffet — have drastically changed. There really is a different energy at work in the world now."

from a flanged percolating coffeepot buried somewhere in the mix! What really stands out is the clarity of sound and continuity of effect: "The first side is done to a click so that it has one tempo throughout, and I think that gives it the right sort of continuity. Actually, my original intention was to show what the Synclavier was capable of, but, in retrospect, it seems to have just formed part of the album's overall fabric."

The careful way in which he uses effects makes a welcome change, and Francis is a strong advocate of the Roland Dimension D.



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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 Demestos, 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 Omnichord. 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:

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Bernard Xolotl on Synclavier II and Music

This respected Californian-based composer talks frankly as his new LP is released.

You've been using the Synclavier II for some time now. What was your first reaction to it?

"I thought it was a perfect tool for the next generation of electronic musicians, which in my opinion will be more composers than people who go on the stage for three or four hours and make some sort of a strange noise to dazzle an audience which is totally taken as if by magic by the illusion of technology.

"A perfect tool for the next generation of electro-musicians"

Does your own background include a lot of experience with micros?

No it does not, but it does include a lot of experience with mathematics and geometry. The Synclavier with its additive synthesis allows the use of numbers in a very geometrical and very rational - and I would say almost Pythagorean way to create waveforms that you can relate to as a visual experience, as well as musical. A very important feature of the Synclavier is that it can really bring you in the position of seeing as well as hearing what you do in real time.

Does this mean that you have had strong interest in Webern, Stockhausen kind of music in the past - with serial music and tone rows the link is there, isn't it?

Believe it or not, I have no interest whatsoever (laughs) in this kind of music and so forth, but I've focussed a lot more on the music of Bach - to me, this is a lot more geometrical!

How did you find settling down to using the Synclavier?

It was very straightforward - that's what I mean when I said that it's made for

composers. You know, the industry is so geared towards live performance (I'm not talking against this in any way). People throw in a couple of sequencers with a couple of tunes, and go on stage and play them over and over, which is the very simplest thing to do. With the Synclavier you can compose with a 16-track recorder and you totally record polyphonically, erase and bounce tracks and so forth. And with the option of the terminal and monitor, you can really compose in the style of Bach and other classical musicians of the past. *No doubt someone like Wendy Carlos with her 'Switched On Bach' would have liked this machine?*

Definitely. And Patrick Gleeson has recently recorded Vivaldi's Four Seasons with it - I think it was a very simple-minded sort of thing to do because he used mostly presets from the timbre banks of the Synclavier, like the beautiful bell sounds which he used without tuning. Literally, they are out of tune with the tonality of the piece and people think it is a very far out sort of effect!

Were there any limitations apparent as you used the keyboard instrument?

I really don't like the fact that its single main control knob is spring operated. If you want to find a particular number, as is often the case when doing additive synthesis, it can take some time to locate it. The Chroma people used this same idea with their slider panel controller.

Nevertheless, the Synclavier is a very powerful machine with its 16-bit processor and tremendous potential. Of course, it does not have the bubble memory system of the Prism synthesiser, but nobody has even bought this yet as it costs so much money. It's quadrasonic and almost multi-dimensional in concept - you can target any parameter from any other parameters. Not only do you have frequency modulation, but you also have waveform blending. This allows you to have different FM simultaneously. The Synclavier makes only one FM ratio for a given set of partials at a time, although you may be able to program your way around that - but you are still limited to 4 partials.

Do you find yourself altering your approach with a totally digital system?

You see, there are a lot of different illusions about all these digital musical instruments. With the Synclavier you should be able to generate any musical sound. I have recordings that show its ability to make sounds that would have come from an analogue synth. *Do you think 4 partials are enough for full synthesis?*

Nothing is ever enough - I mean, if we had 200 I'm sure there would be people who needed more.

"A different approach from analogue instruments"

Can you think of a sound and go to the Synclavier and try and get it?

It's a different approach from analogue instruments - we have been so used to in the last ten years to tweaking knobs to make sounds that to approach it from a different way by building up harmonics and so forth might appear at first to be a less straightforward thing. But it's all a matter really of habit and expectation. *So what's your procedure - do you find yourself building up one partial for a basic sound, say, on the fundamental and then taking the second partial to get the bright harmonics, going round the partials until you've got the timbre you want?*

Well, there are so many different ways I use, I don't limit myself to any one procedure. I do whatever feels a good approach.

I have an advantage with additive synthesis because I did a demo for a guitar synthesiser that was built as a prototype for a Berkeley (California) based factory in 1977. I was able to experiment with this extensively, much more than most people at the time. It had a stereo two channel output with twelve harmonics per string which allowed you to do additive synthesis in a very sophisticated way and produce any sort of sound - I have sounds of flute done with the guitar, I mean real classical flute where I could simulate the breath with my fingers. In some ways it was more realistic than on the Synclavier because the FM in a guitar synthesiser is 'natural' - it's created by the right hand and modulated by the left hand on the strings. Of course the disadvantage is that you don't have the Prism's or Synclavier's FM LED

Consistent with Fairlight's policy of always offering the musician a choice, the CMI offers no less than three compositional programs – a real-time multitrack sequencer (Page 9), a non-real time music composition language (MCL) and the revolutionary Rhythm Sequencer. Each specifically designed to suit different styles and methods of composition. Together they are probably the most complete compositional package available today.

The Real Time Multitrack Sequencer records performances from the CMI's six octave dynamic keyboards together with all expressive nuances from either the keys or the six real time controllers. The recorder is organised in such a way that there is no limit to the number of tracks that may be laid down or overdubbed, and total storage capacity is in excess of 50 000 notes. After recording, each track may be easily 'patched' to any of the CMI's voice channels, allowing orchestration and arrangements, even while the music is replaying.

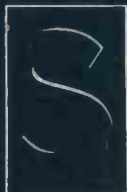
MCL is a non-real time composition language that allows all the parameters of a composition to be specified from the alphanumeric keyboard. Designed primarily to allow non-keyboard players to record music within the CMI, great attention has been paid to the expressive control of each sound. Powerful editing facilities allow any part of the score to be located and changed as necessary. MCL incorporates an error detection program that assists the composer by pinpointing any error he might have made while entering the music.

The Rhythm Sequencer, which has caused more excitement amongst CMI users than any other single development, allows real-time composition of complex rhythmic phrases which may then be combined to form complete songs. After specifying a phrase length eight separate channels of sound may be combined while that phrase is looping. The interactive program displays notes on the screen as they are played. All pitch, timing and dynamic information is recorded and an adjustable time correction facility will correct any playing inaccuracies. The Rhythm Sequencer may also be used in non-real time using a combination of the keyboard and the lightpen.

Each channel in the CMI benefits from a separate audio output allowing it to be independently equalised and echoed: the complete composition may then be recorded onto tape in one take. With the use of the analog interface, a hardware/software peripheral for the CMI, that musical information may be extracted as voltages and used to control up to eight analog synthesisers simultaneously.

If you are a composer you will find the CMI one of the most creative tools you have ever used. If you're not, we have a feeling that very soon you will be.

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Bernard Xolotl

ratio index that you can come back to at any time. We are not yet at the point where such a complex sort of FM ratio can really be analysed in the multi-dimensional way, but I'm sure with computers we'll be able to do that.

"Machines could be outdated without FM"

I also find that you come back to listening carefully despite all the VDU facilities and graphics - the ear is still very important when you are using these FM ratios and so on.

Yes, and I think the FM ratio is so important, unlike the Alpha Syntauri, the Soundchaser, and others which use pure additive synthesis - these machines could be outdated in a few years without FM. To me, the sound seems empty without it, with an organic feel.

It's really hard to find people who know what FM is all about, because for example, on the Prophet 5 you have frequency modulation but this is created just by the use of the low frequency oscillator for vibrato effects.

On the Synclavier, FM is more than just a second oscillator sound - you can create very complex frequency modulation, with several voices modulating several other voices.

So the partials are used to derive extra harmonics for FM?

Exactly, but it's doing that in a rational way so that you retain control of the 'Index' and that I think is marvellous - to me it's the key to everything.

It's fascinating to whisk the wheel through the FM ratio - you are conceiving a new sort of 'sound dimension'. The VDU display makes the parameter coefficients much quicker to access too, although I wonder if you use both real time memory calling as well as the SCRIPT listening formats?

Definitely, they are both useful depending on what you are trying to achieve. Some pieces will need a precision of scoring that needs the SCRIPT codes while others require the freer style of your keyboard playing.

"The Art of Fugue from XPL and MAX"

My experience of SCRIPT has been very much under the wing of my friend, Don Robertson, who's using the Synclavier's high level languages, XPL and MAX, to create a kind of universal counterpoint software that he has called BACH - Binary Asynchronous Compositional Handling - allowing you to do the 'Art of Fugue'. Any line or sequence will be mirrored, reversed, inverted in question and answer style of Bach's fugues and that sort of thing. It also helps you develop the melody and the harmony.

Do you think this kind of composing tool will help musicians who use sequencers a lot?

It's very tricky because until now there have been two main trends in that sort of music which is the academic trend of Wendy Carlos, Tomita and so on, who have limited themselves to either copying the music of other composers of the past or doing their own music that is strongly influenced by Classical, Baroque and traditional styles - this misleads people into thinking that electronic music has been some sort of imitation.

Then the other trend is a sort of totally random improvisational style. Fortunately,

what we are trying to do (my friends in California with Synclaviers, including the Greek composer Iasos - who takes three years to do a half hour piece!) is use a new method of composition that's an almost 'scientific' way of recording like that of Wendy Carlos', but at the same time using your own feelings and ideas.

Have you used the sampling system?

Yes, I have tried it with Denis Jager, distributor and designer of many of the Synclavier's programs.

Their new multisampling is so sophisticated (and expensive) - just to give you an idea, the sample time can be up to 54 minutes! This is done with the Winchester drive, with its disc you can never remove, but it costs some \$10,000. You know, the Emulator also has multisampling. Sampling without multisampling is nothing! Vangelis, for example, has put all his drums on the Emulator by multisampling sounds. Of course, by multisampling I mean that sound samples are taken at different pitch ranges to avoid the 'ringing' or 'glitching' that occurs from one or two samples alone as you reach a certain point up or down the keyboard.

Publiston are soon going to be bringing out this type of instrument with a 72-note keyboard that has 72 samples - one sample per note! This allows you to take ANY sound across its whole spectrum or make one sound fuse into another. You could have double bass followed by cello, viola and violin for a real string quartet, or even a grand piano. This French instrument will have presets to begin with to save on cost.

Coming back to the Synclavier, do you find any problem with memory storage?

Actually, when you have two 5" diskettes in separate drives, it can be even faster than having one 8".

During my recording of almost all of the timbre examples supplied on diskettes, I did notice its 'piece de resistance' was some superb bell sounds.

Yes, they are beautiful, but still quite hard to tune.

"Digital guitar interface"

A friend of mine visited the Synclavier factory in Vermont recently and saw the prototype of the digital guitar that will go with the system. There have been quite a few rumours about this being the Roland Guitar Synth (GR-300). There are actually four big machines likely to have control from the Roland instrument - Con Brio, GDS and one other as well as the Synclavier.

How did you get on with the keyboard itself?

Well, it's incredible with all these American manufacturers - you cannot trust them! Many of them put things on the market before they are ready. Many musicians I know are waiting for the things that should be available for the Synclavier (and the Chroma) according to the manual. For me, these extras, like the PPG Wave 2.2's pressure sensitivity are exceedingly important.

There are two kinds of pressure sensitivity - Yamaha's kind is really more than that, it's more touch response and everybody has been using it as a solo instrument (the CS80 series), Klaus Schulze for one. Even Terry Riley cannot get rid of his old YC45 Yamaha organ because of it! But while this is monophonic, it is polyphonic sensitivity on the PPG Wave 2.2.

Now you might think polyphonic control is so much better, but there's a dilemma about that. If you are holding a chord, for example, while playing an expressive solo line on top, then your chord is going to jump up with the changing

dynamics (or timbre) too. The answer to that can only be to have the choice.

I've found the Synclavier totally reliable and we've had no problem getting software in California. And it really is 'open-ended' for future developments.

Are you a pianist basically?

Guitar and piano - more guitar. I'm planning to get a PPG Wave 2.2 so that I can operate it in sync with Don Robertson's Synclavier using the interface my engineers have built. We live near each other and have basically the same record systems so that we can exchange multitracked tapes and so on. That's what we hope to do - it's the way forward for us. I am totally against this tremendously limiting idea that there should be either one system or another, or that there should be analogue or digital - that's why I like the expandable system.

You don't want to lose the years of experience you've had in using analogue?

It's not even that - I don't mind going back to zero. It's more that sound is a whole and for certain things you use additive synthesis because it gives more control (like for bells), and for other things you use subtractive synthesis (for filtering white noise etc.).

"We need a closer relationship between engineers and musicians"

Another interesting point is that you can link up two Synclaviers to multiply the partials or give you total stereo control. But I believe there will be a stereo option soon available to convert the present mono output. I do like the stereo loudness tracking on the PPG and the GDS.

Can you do this on the Synclavier so that each track can have dynamic changes during a piece?

You can do anything you want - provided you can devise your own very sophisticated programs. This has been a problem, I think, with all synthesisers. That's why they invented that 'split keyboard' thing. On most instruments, no matter how expensive, there seem to be drawbacks, whether it's to do with volume, filtering or the envelope - the envelopes are not that congruent on the Synclavier either. It always seems that in the future we must have a closer relationship between engineers and musicians to get the best parameters, the right controls and so on. I think that the best advisers on the music side are not necessarily the big rock stars to endorse their products, but people who are knowledgeable about many synthesisers.

Xolotl music

How would you describe your style of music that you've been developing over the years?

I would describe it by saying that in the late '60s and so forth, through Terry Riley who was one of many influences on me, Western music had a period of complete disintegration where music became synonymous with sound, and where there was no longer any rhythmic, harmonic or melodic structure, or even interest in music - as in some of John Cage where it became just anything. Through Terry Riley and the oriental influences coming into the West people made a return to modal music.

I did not become addicted to this style like many others, but it did lead me on after a few years to the harmonic language of Western music. I was able to go through the entire process of music from the Greeks to Richard Wagner and Stravinsky in terms of understanding and developing an original

(Continued on Page 53.)



Chris Franke on Sequencers

Tangerine Dream last visited UK in November '82 as one of their regular yearly appearances, receiving a wider audience appeal especially for younger electro-music fans. This last concert was reviewed in our January '83 issue and used new compositions that were improvisations on themes, some for possible new albums. Much more keyboard work is involved, still with importance to sequencer lines, and significant equipment changes include the digital recording of natural sounds via a sample-to-disc system claimed to exceed the quality of the Fairlight's 8-bit system. Real drum events are sampled, as well as original 'voice' effects, which are triggered by sequencers.

Chris Franke has been doing his own solo work and hopes to release an album by the summer. Tangerine Dream have produced several film scores, including three American movies (*Soldier*, *Wavelengths* and *Deathbite*) and a German TV crime series (the theme music reached the Top 10 of the German charts).

'White Eagle' and 'Logos' were the last Tangerine Dream albums to be released (both in '82) and the band are enjoying their success and their ability to produce albums and scores very quickly from their own high quality studios.

Chris Franke is one of the world's most experienced users of the sequencer and in this article reveals some of his knowledge of this important musical instrument.

There are two ways I can approach using sequencers — first, the one I have in the studio which is an electronic composition machine. Its operation is similar to systems like Synclavier II's SCRIPT, the Fairlight Compositional Program, or the Roland Microcomposer machines. With this system I compose straight into the computer instead of writing down the music. I can be quite subtle and put in a large number of parameters and more detail, with immediate feedback — that's very important for a composer. I'm not interested to say that this is 'electronic music' — this is just a composition played by electronic instruments. If I wish to play it with violins or brass that's also fine — it's just a compositional machine.

Early days

In 1973 I was using one of Moog's sequencer modules which were the first available for stage use. I liked its access to triggering notes that let me 'improvise' with it — it wasn't just a little pre-recorded 'cell' of music. There were also sub-programs so that rhythms could be varied. I used this for two years although its main difficulty was the

tuning, done by rotary knobs for every note in the sequence. This made pitch changes impractical for real-time performance because it was stepless.

At the end of 1974 my first idea was to make this quantized — both for the pitch and the timing, so we invented a system with little switches, one switch for 1-12 semitones and another for 1-8 octave selection. There were also two more rows of knobs (1-12) for fractional selection of control voltages to use with VCF and VCA modules.

Then we did the 'Programmer' because we were not satisfied with sequencers that lasted just 8 or 16 events. Because we had a lot of the Moog sequencers by this time in a rack, we built the programmer to control these. Different sequences could be played in a selected order, let's say, 4 times the first sequence, 8 times the second and so on. The programmer used electronic switches and various dividing circuits for allowing a number of events (or pulses) to be counted before triggering a new sequence of events (i.e. by switch to another control voltage channel).

The Moog system, as I've said, was nice because it had three CV channels so that you could control the cut-off frequency of a filter or the VCA volume in live performance.

During '74 and '75 before going to America, we tried to improve the stability of the oscillators by making our first digital oscillator, which was not voltage-controlled but used a switch matrix that couldn't drift out of tune. Since the switches were also digital this made the pitch very stable.

We moved on to thinking about compositional machines and I bought the MC-8 microcomposer from Roland when it first came out. I tried different products from



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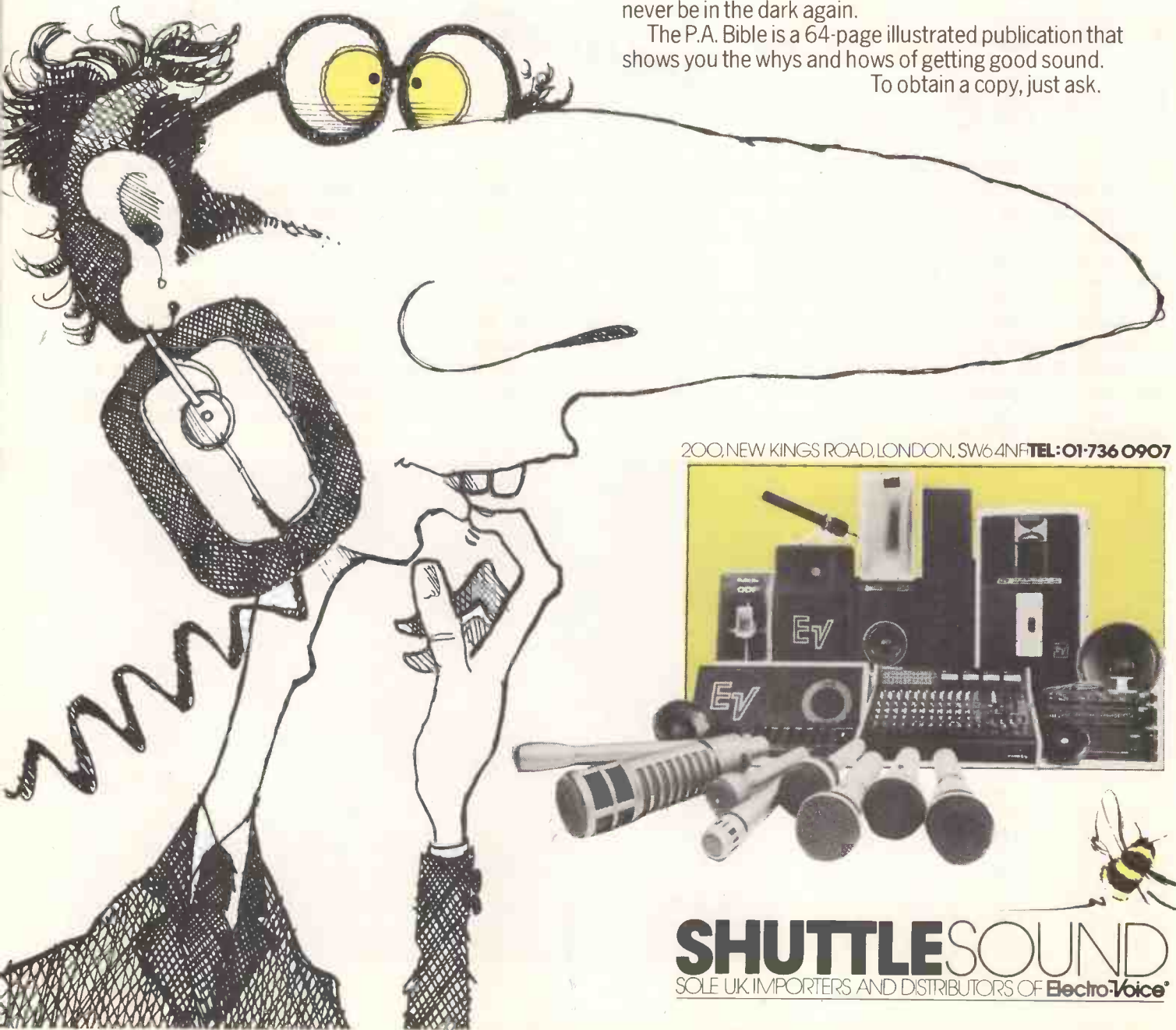
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companies that were putting out so-called 'digital sequencers'. One from EMS, for example, had a lot of notes, and there was also the ARP 'graphic' style sequencer.

A little later there were some German digital sequencers that recorded very well in real-time. I like to change my sequencers, you know, and like to modify them, but my main aim was always to look for a 'live' sequencer.

The Present

Now we are building two very large machines, one is a composition machine which can play 32 voices for polyphonic music. It has three different screens for reading separate pages of the music score and you can see the information for 4 different voices at once out of the 32.

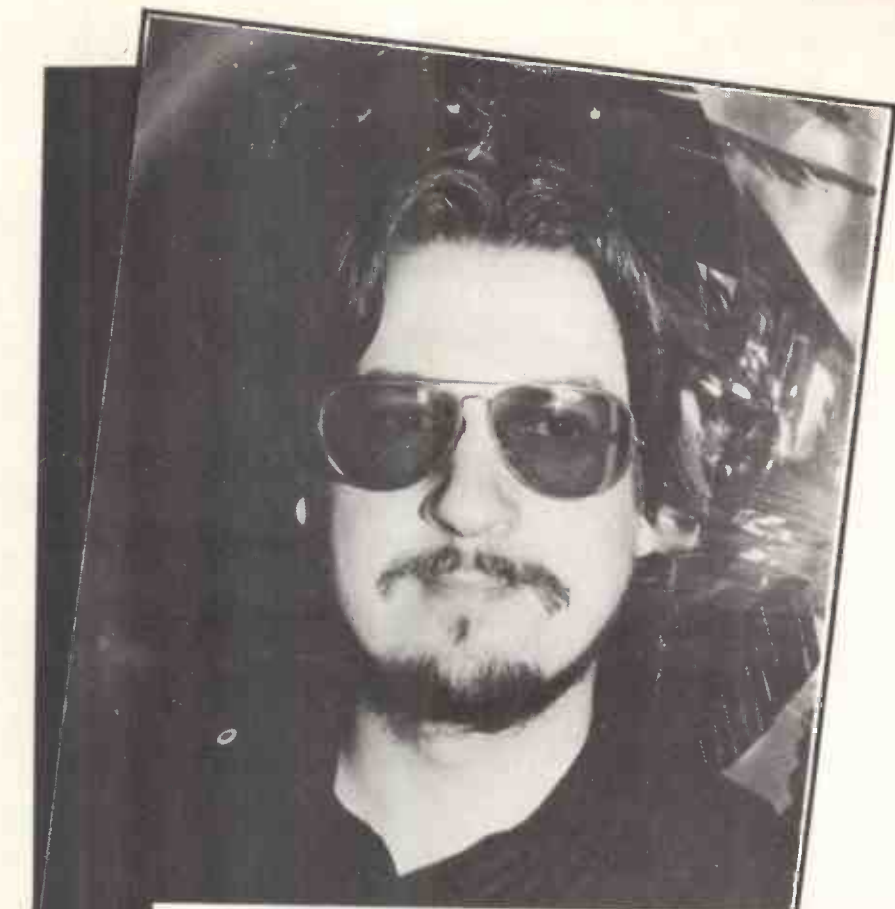
The TV screen is maybe a transition to a new kind of interface — I don't like them too much because it looks very 'office-type' for a musician and is not very practical. Other kinds of display will come very soon.

We have succeeded to build my new sequencer without a screen for the stage, because we have little 'graphs' where we can display words and information. The displays actually consist of very little squares with LEDs underneath. You can show words and numbers that move across for you to read an instruction sentence. The LEDs are the smallest square type you get in the most modern equipment now — it looks very good! They're nicer than the PPG liquid crystal display in the Wave synthesisers because they're illuminated.

So to play sequences on our next machine will be a big panel where you don't use any rotary switches any more, but for every note you have a whole row of switches for semitone and octave pitch adjustment plus three types of trigger selection. Even though it's a big panel, it's easy to enter notes.

I much prefer mechanical switches to touch sensors by the way — I also hate touch keyboards — I think they're too abstract. Even if switches beep or have an LED (like the Moog Source), I need the physical feedback of the switch as I play. Many people think it's futuristic to make switches smaller and less mechanical, but that's wrong. Next year I think people will be wearing old-style watches because they're much more fun than digits (but still with the electronics inside).

Our sequencer is designed so that you don't enter any rhythmic value any more — I call it a 'trigger selection' sequencer because if you want a full note you just use up a whole page of 16 rows of buttons. That means every page uses rows of knobs to represent one bar of 16 x 16th notes, although you can change page lengths and double it to have 32 rows of 32nd notes. There are all kinds of copy functions, including transpose. A quarter note (crotchet) uses up 4 rows, a sixteenth note (semiquaver) uses only 1 row. And so you don't enter a value but just change part of the machine. Rests automatically take place if you don't enter a trigger and note lengths and times can be also set. Sequences can be then recalled in any order and there can never be a rhythmic error, because the bar lengths are preset. Anytime signatures can be used from 3/8 to 15/16 — 7/4 is my favourite at the moment. I don't have a very jazzy feeling but still use odd time bars a lot — it's not just that I've played drums, but also piano, violin and trumpet for



a long time.

When I tried out strange rhythmical bars they didn't swing enough for me, but now I've found a lot of consolation by using 2 different pulse-structured bars playing against each other. I'm influenced too by Indian and African rhythmical events because they are using not only one measure at the same time. Somehow they make a polyphonic pattern structure. So now I'm experimenting a lot with accents.

So the basic difference between composing and live performance sequencers is that for the composing, you are going to the machine for an idea in your mind and you just programme it. And then, when you've almost worked it out, you do one or two changes to continue your composing.

The 'live' created sequence is different — you go to the machine and have nothing in mind maybe and just start to try one out — even though it is a very well known trial and error system, it can be a most unique thing because you will occasionally invent melodies and rhythms which you hadn't thought of before. Normally, I play sounds on the piano or sing them and I get sequences so strange and interesting coming to me in a random way, like a spiritual thing, through an

aerial on the top of my head! (laughs) — I get a gift, it's very strange.

I work for a long time in this way — people do it in science with analogue computers, and there's still good results from this fiddling with knobs in a creative way.

When composing with sequencers, it is very easy to construct a piece that may become very boring because it hardly ever changes. There are pieces we play where nothing has happened for a while and we still like it, but when the other parts with the sequence, the mood, the structure or just the feel is not right, it's like a 'cracked record'! But we now have enough sequencers to allow the music to be changing all the time.

Changing the Sequence

There comes a point where you have to decide what things to change as the sequence plays. Oscillator pitch is the obvious thing to consider, and next might be the filter cut-off to vary the tone. Various kinds of trigger — on, off (for rests), legato, or accent (by varying the VCA control voltage). We use 8 accent levels — we thought about 64, but 8 is just fine.

The latest fantastic parameters which nobody else has done yet is the 'sound colour'. I can change the whole program for every note.

It's very complicated to make it work musically because it's not easy to find sound colours that fit together. If you take a trumpet followed by strings and brass sound it will sound like rubbish, so you must find sounds that fit together.

I am trying to have every note with exactly the programmed sound colours I require — something like using a program preset 'advance' button on, say, the Chroma or Memorymoog. This is becoming much easier to do since IC components are now cheaper and Winchester hard disks can be used for memory storage which are very reliable, 'roadproof', temperature stable — and small as well. The disks can store an amazing amount of information.

Another decision to make is how many notes to play together, whether from 8 to 32 polyphonic events. Many of the parts are used for drums with often just 4 lines for melodies — never using 32 at once (unless you play a Wagner piece!). By 32, I mean 32 voices with six different parameters. There are 16 trigger lines to the drum machine to play 16 different percussion sounds.

Sampling Sounds

The drum machine we first used to play sampled sounds had an 8-bit memory length of just 400 milliseconds, which was basically okay. This was the one we used for the 'Choronzon' piece and so on. Now we've moved on to a 12-bit digital memory, which is much better for cymbals and snare drums — it's much cleaner. Cymbal crashes and other longer length sounds are no problem since we do them with a repeating loop around a short sample. This new unit can store 12 different events, each lasting up to 2 seconds.

Our biggest project yet, which should be completed by 1984, will have 16-bit resolution sampling, with 8 second maximum sample time for every note and every key will be able to have a different programmed sound. I think that sampling a different sound on every note of the keyboard will be a very important development, because you can use it as a drum machine, or play natural or synthesised sounds. We can modify the sound within with various filter and loop processing.

I do a lot of the sample sounds myself and tried at the beginning to use only real drums, but really my intention was not to have these — it was just an exercise, and I use it as a reference. If the real drum is as good as I know it then the system's fine. But now I'm starting to use very crazy sounds in it — the 'fun' part is just beginning! It is possible to get a very good snare drum sound now, although if you've only got 8-bits, you should use something else — it's much more original anyhow and I don't care for real drums at the moment.

One of my most interesting 'new' drum sounds I've used is almost indescribable — it's a mixture of voice, xylophone and other instruments for the one event. I don't use cymbals at all — I never have done, because cymbal sounds are too traditional for me. When I started to use drums with our music I took out all cymbal-type sounds. I did have one real cymbal sample made and I recorded it for 8 seconds, with a repeat loop in the middle of the sound plus a VCA

envelope for decaying the sound — then you have a perfect cymbal (but it's too real for me).

Structuring

The structure of a whole piece must be arranged first, otherwise you can get trapped easily as you hear things over and over until you lose the sense of how long a sequence lasts. Normally, we don't play the same thing more than 50 times. This is where the 'sound colour' type of sequencer capability can be fantastic. If you don't put the same sound colour on the same pitched note, then the same melody becomes quite different each time you hear it.

It's interesting that people hear more than one melody, even though the pitch is the same — there's a sound colour melody and a pitch melody.

It is very easy to keep repeating the same sequence for longer than necessary and we had this problem in the early days as the whole group had to decide together how long to play a sequence when we added other things to create a development. We did this by listening and watching on stage during the performance, but now we have more fixed and disciplined structuring that's prepared beforehand in our rehearsals. I'm almost counting bars again!

One problem that still exists for us is how often to use the sequencer and we have to make sure there's not too much repetition in a concert lasting some 3 hours.

The 'master clock' for running the sequencer comes from a real-time unit I have — it's basically a fast running oscillator that's programmable, because we may perform a concert that has individual pieces with at least 9 different tempos. My engineer designed the clock with an output socket and number selection as on a metronome, so 120 represents 120 beats to the minute and so on. All my drum machines, modulation effects and sequencers can be controlled from this to synchronise everything together.

Program Storage

We do not have a Winchester disk system for storage yet, so we use CMOS RAM memory with battery back-up. If I have a power failure or even a transient that causes loss of memory, I will reload the information via a tape interface, but that hardly ever happens. In the last 3 years, the Prophet has lost its programs only 3 times even though we've travelled extensively to many countries.

With the sequencers we are now using the Jupiter 8 and the Wave 2 (we also have the Wave 2.2, the Memorymoog and the Emulator in the studio). I am not particularly interested in instruments with built-in sequencers, although I think they are a very good idea for many people. Some of these instruments will tidy up your sequence recording and pull ragged notes onto the beats. I can also do this with a single sequence. I can enter by numbers all the rhythmical events, all the chords and things; and then I can add a lead melody for one voice from the keyboard. Then the computer can shift notes which are a bit off the beat onto the beat. Normally, I don't use this facility because I like these little shifts that happen by accident.

I always need to 'feel' the music line — it can be loose, it can be late or early. If I'm composing a melody line by numbers I would shift the note to get that feel and give them slight delay or anticipation of the beat — that's the freedom music needs.

We are now finding that our pieces are



getting both longer and shorter! We do pieces that last 2 minutes and 50 minutes — that's surprising really. You might think that when we use sequencers, the music will last longer, but it depends on the type of piece. If it's rock or disco style, then it's short. Others will be more meditative or minimal music with a longer development.

I don't find it that hard to relate my developments to classical music — I've done quite a lot of 'classical' music sequencing in the past, but instead of using *rallentando*, *crescendo* and *rubato*, it's more a matter of 'dynamics' which I do at the mixing desk. This gives a real fine touch of 'classically-adjusted' music of the 16th Century for choir and orchestra.

I also find myself using more and more foot pedals — the GDS which I play has a programmable foot pedal. This means it stores not only fixed parameters but also real-time curves like a sequencer. This is something that a sequencer maybe needs in the future, with the pedal acting like a fader on a computer mixer. As I play the GDS sequencer, I can then programme the volume at the same time (or other things like the filter cut-off). This would be interesting because it would enable much more control of a sequence as it plays, because your hand would still be free for the keyboard and so on.

Looking ahead

I have new units on the racks behind me containing a polyphonic sequencer that has real-time analogue access even though it's digital, and in '83, we hope to use the new system we've been developing over the last three years. The present sequencers that we have on stage are prototypes for this. With more complex music being performed and the need for more programmable sound colours, the demands on the computer require real-time setting within one 16th note of all the parameters of the sound colour program in use. So the sequencer has to know in advance when to change sound colours — that means it's not really real-time.

The whole concert could now be put on computer and just played back, but that's not ever Tangerine Dream's intention. We aim to have everything eventually with real-time control as well as the possibility of editing at any stage many different parameters. So far we've used only one voice in this way and look forward to the new developments which should add another dimension to our playing with sequencers".

E&MM

Bernard Xoloti

(Continued from Page 48.)

style (if there is such a thing) in the language of music as a whole.

Of course music becomes more and more sophisticated as you learn the evolution of music.

"It's like being a sculptor of space and time"

Your music, with its strong sequential developments, does require a good sense of orchestration.

I'm only really beginning with that - to me it's infinite. Imagine it that way. You know, orchestration (for example in Richard Wagner's 'Tristan and Isolde') reached incredible complexity in which there were the full range of traditional orchestral instruments to create a simultaneous multi-dimensional texture that was never cluttered. And now, with the infinite temporal possibilities of synthesisers, the field of orchestration is wide open. New temporal values need defining - height and stereo placement and different things. It's not only like orchestration - it's like being a sculptor of space and time.

At the moment, secular pop music for entertainment has totally invaded the world because of its commercial financial rewards and so forth, and I don't know whether the magical or sacred part of the music has gone when you see musicians who are really basically doing a job to order - down to a 30th of a second. No matter how poor or rich, how famous or not I become, I'm not ever going to do that sort of thing. I'm only interested in carrying on the sacred, religious tradition of art, no matter how esoteric.

Blending sounds together seems to be the important aspect of your music.

Orchestral, timbral, harmonic sort of

structuring, yes, where there is colour, melody and rhythm.

Do people look on your music as 'meditative'?

This is a very complicated sort of question because there is this 'New Age' music scene in America, especially in California. It's represented by people like George Deuter, Peter Hamel (two Germans now in California) and Kitaro. It's funny that the Europeans think that what I do and what some other musicians do is meditative, because in America they think my music is European! That just shows we are not yet at the point where we can categorise - anyway, it's not necessary except for the music 'merchants'.

What plans do you have for releasing your compositions on the Synclavier?

I'm still working on the material at present, but I've been mixing Don Robertson's 'Star Music' recently using it. (Part of this is on Demo Cassette No. 9). Don, with lasos, Don Slepian and myself are working together, but from our own studios and doing our own music - none of which is like any German or French sort of pop music. Do you do any of the electronics yourself?

I don't - I have too many other things I do, like painting and video - but I understand what I need and can communicate my problems to engineers. I do believe that ultimately I shall have to develop some sort of ability in electronics and I think this will become easier to do as the digital future is moving more and more into using simple building blocks.

I'm now a full-time composer (I'm 31), married to an artist. We live just outside the Bay area in a nice wooded part, twenty minutes from San Francisco. I've just been over to Europe, mainly to supervise the mastering and disc cutting of my new

album 'Procession' in Paris. The LP is now due for release by Pulse Records.

"A new transcultural and international music"

There's something I'd like to say about music now - computer music, I mean in particular, and that is I've noticed the tremendous open way people share their programs. There are many people making music in their home studios in America. The best music no longer comes just on the stage or the radio, and it's transcultural and international. I always stress that the artist is not concerned with means and categories but simply to create art: poetry, dance, music and other arts are all being integrated into the cosmic opera of the future - some sort of succession to what Wagner with his music dramas was doing. I have my own multi-media set-up at my house for developing these ideas.

I'd like to make one final point about the Synclavier and my other instruments - for me, the reverb unit that I've filtered and equalised has become one of the most important aspects now, and obviously the final sound of these instruments depends on my processing. I am looking forward to getting the new Lexicon Digital Reverb 224X, which has a whole series of digital 'plates' for situation effects (like cathedral, concert hall and so on) that can be mixed as you want. And of course, I equalise reverb with 31-band EQ per channel!

Maybe one day I can afford my own Synclavier II to go with it!

Mike Beecher

E&MM

Bernard Xoloti's LP 'Procession' can be obtained on mail order from Pulse Records, 74 High Street, Old Leigh, Leigh-on-Sea, Essex. Send cheque to Pulse Records for £5.50 (this includes p&p and VAT), enclosing your name and address.

VIDEO MUSIC

Grace Jones

A One Man Show

Island Pictures IPV 005 SV

Described as 'A Contemporary Musical Entertainment for Television', Jean-Paul Goude's film of Grace Jones' distinctive performances lives very much up to its title. Grace is on screen for almost all the fifty-odd minutes running time, and if her arrogantly robotic antics aren't to your taste the film can seem a little lacking in variation.

Visually, it's highly imaginative however with a combination of live footage, studio scenes and still inserts from various fashion shows and photo sessions from Grace's career. One of the basic techniques is to multiply her stark, masculine image not by digital manipulation or split screen but simply by having two or four or six Jones lookalikes on stage simultaneously.

Several interesting techniques are applied by video editors Greg Griffiths and Roy Wolfe; pictures are sped up or slowed down while mysteriously keeping pace with the music, and the old Clockwork Orange 'Time Steps' idea - cutting out short sections of movement to make a figure progress in a jerky, disconnected way - is used to good effect.

Another interesting idea is to break the first rule of film editing and splice together two only slightly different scenes. This gives a subtle

feeling of unease perfectly in keeping with Grace's music; famed reggae duo Sly Dunbar and Robbie Shakespeare provide drums and bass to produce a driving disco/reggae rhythm on tracks such as 'My Jamaican Guy' and 'Living My Life', which also features subtly powerful polysynth work which is provided by Wally Badaron and Richard Reid.

There are several cover versions - Daniel Miller's doomy electronic pop classic 'Warm Leatherette' is taken apart and put together again as a slow funk rap, and Chrissie Hynde's 'Private Life' is given a romantic yet chilling treatment with visuals cen-

tered on Grace's impenetrable expressions. The co-ordination of high points in the music to the visuals - both in terms of stage lighting and video editing - is close and interesting, although the same can't always be said for the vocal sync.

Sound quality is good, even without Dolby it's quite listenable, and stereo separation is everything you'd expect from the people who produce Island Records. Altogether an excellent production, but since none of the backing musicians involved is seen on screen, very much a One Man Show.

Mark Jenkins

E&MM



Videomusic Chart

- | | |
|------------------|--------------------|
| 1 Gary Numan | New Man |
| 2 Jam | Live; Bingley Hall |
| 3 OMD | Live |
| 4 Sex Pistols | R&R Swindle |
| 5 Stranglers | Collection |
| 6 Genesis | 3 Sides Live |
| 7 Queen | Greatest Flix |
| 8 ELO | Live |
| 9 Toyah | Good Morning |
| 10 Toyah | Live |
| 11 Gary Numan | Micromusic |
| 12 Imagination | Hits |
| 13 Deep Purple | California |
| 14 Sheena Easton | Live |
| 15 Madness | Take It... |
| 16 Count Basie | Live |
| 17 James Last | In Concert |
| 18 Madness | Complete |
| 19 Abba | Music Show |
| 20 Chas & Dave | Live |
| 21 Grace Jones | A One Man Show |
| 22 Kid Creole | Live, NY |
| 23 Adam & Ants | Prince Charming |
| 24 John Martyn | In Concert |
| 25 Wings | Rock show |
| 26 Pink Floyd | Pompeii |
| 27 Various | Stiff Visuals |
| 28 Dave Brubeck | Portrait |
| 29 Mike Oldfield | Essential |
| 30 Cliff Richard | Thank U... |

Compiled by Adrians Video, 36 High Street, Wickford, Essex. Tel. 03744 3318.

Organ Talk

A look at Casio's portable keyboards and their applications for the home organist

by Ken Lenton-Smith

If anyone ever tells you that running a Bar Code Reader over the end of a packet of PG Tips will produce 'Tea for Two', forget it! Nine distinct instructions are coded into binary for each block of information for pitch, length and chords in Casio bar code music. Only one of these is actually concerned with data, the others covering instructions for headers, line numbers, start and end marks etc. So you won't crack the code that easily!

The Editor reviewed Casio's CT-701 keyboard in January 1982 when that model was the top of their keyboard range. I tried it out at the time to see how it sounded through an organ system — with External Tone Cabinet and Leslie 145. I found the results most encouraging, many of the voices being indistinguishable from organ tones when treated to the Doppler effect.

Casio have come a long way in a short time in the electronic music field and since the review of CT-701 was published new keyboards have been introduced: indeed, a week before writing this article details of 1983 models were released.

Ten years ago, many of us were beaver-ing on monophonic synthesiser projects — most of which will now be gathering dust. Polyphonic keyboards of various types have taken over and those based on digital circuitry have the great advantage that they stay in tune to a degree that can be tolerated.

Third manual

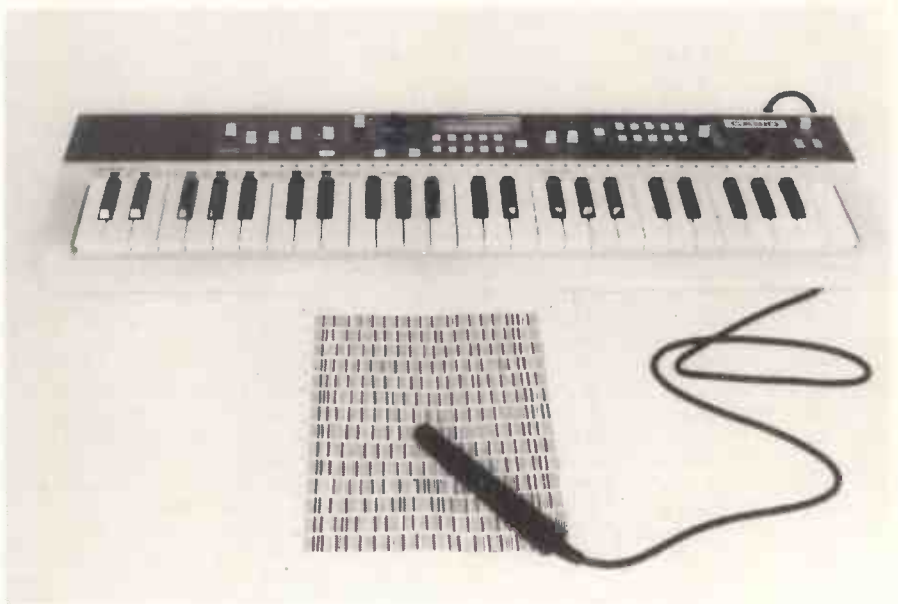
Among the recent models, two Casio keyboards offer interesting possibilities to those who are looking for a 'third manual' to place on top of the organ console. Models CT-501 and MT-70 share similar specifications and are scaled down versions of the CT-701, but are far less expensive despite retaining nearly all of the larger keyboard's facilities.

CT-501 has four octaves of full sized keys, is mains-operated and has provision for external control of volume and sustain. MT-70 is a four-octave mini keyboard and can be used with internal batteries or with a mains adaptor but volume and sustain can only be controlled from the top panel. As batteries are required to keep the RAMs alive when not in use, the MT-70 is best used with a mains adaptor. Both instruments are supplied with music in both manuscript and bar code, an operation manual and Bar Code Reader.

I find the MT series of mini keyboards completely playable despite being a little smaller than usual: though shallower, they are not unlike those on a piano accordion. An octave of the MT-70 keys (C to C inclusive) measures 6½", against 7-3¾" for a full size keyboard. Thus this model is extremely compact (just 25" long) and sits neatly on top of the organ.

Tutor

The Editor has described the programmable keyboard as a valuable teaching aid — and I agree with his comments wholeheartedly. The household musician often wishes to involve the family in learning to play so that the keyboard may have a dual function in due course.



Casio MT-70.

CT-501 and MT-70 have their controls divided into four groups:

Auto Accompaniment:

- Off, fingered, Casio Chords.
- Rhythmic, Arpeggio accompaniment.
- Chord Memory on.
- Octave down.

Auto Rhythm:

- 10 Rhythm patterns.
- Start/stop.
- Synchro start.
- Fill in.
- Tempo.
- Accompaniment Volume.

Presets/effects:

- 20 Preset voices indicated by LCD.
- Vibrato off, on, delayed.
- Sustain off, on.

Memory Play:

- Mode Selection switch.
- Memory Play.
- Back, Forward, Delete, Reset, Repeat.
- Return 1, Return 2, Accomp. Start (with LEDs).
- Rest, End (with LEDs).
- One Key Play.
- LCD of chord symbols and memory steps.

The back panel has sockets for headphone, line out, Bar Code Reader and a rotary control for fine tuning (+/- 50 cents or 1/4 tone). MT-70 has an input socket for +7.5V and CT-501 connections for volume and sustain.

Output voltage is 1V maximum - affected by an overall volume control - so some attenuation may be necessary when fed into an organ or hi-fi system. Output impedance is 3k (MT-70) and 4.7k (CT-501) and power consumption 4W and 26W.

The Organist

If it is intended to amplify the keyboard through the organ's circuitry, it is best to avoid including reverberation as the keyboard's sustain is sufficient in itself and its rhythm unit would not benefit.

The MT-70 is best used with a PSU to provide +7.5V as, despite 5 D-size cells, the unit consumes some 350mA. The required power might be found from within the organ,

dropping and regulating to the required voltage by power transistor and Zener or variable voltage regulator. Batteries will still be required, of course, to maintain memory while not in use.

Having set up the keyboard, there are several ways it can be used with the organ. With both Casio Chord and Mode Selection switches off, the complete four octave compass is available for use with one of the 20 voices with Vibrato and Sustain variations. In this mode it becomes the 'third manual' and its own rhythm unit may be used independently; Synchro Start is still operative when any key of the lower 1½ octaves is pressed. Piano and Vibraphone (with Sustain) complement organ tones admirably, and Chorus, Funky and Jazz Organ are good additions to the line-up.

The experienced player can also use the keyboard as the *second man*. Music can be entered into memory via the keyboard, where storage capacity is 345 melody steps and 100 bars of chords: notes are stored first, then chords and finally the note durations. The memory can then be played back complete, melody only or as accompaniment only.

Replay of the complete memory might be accompanied on the organ's lower manual with interjections on the upper. With partial replay, the organ could supply the missing part. There is plenty of scope for experiment as programming can include tacit periods and lead-in notes. First and second repeats can be programmed into the melody line, but chord sequences must be entered in full.

The Family

Anyone new to music will find one of these keyboards a great asset. The starting point may well be to set the instrument as a single manual keyboard for practice of slow and steady sight-reading. Here is where the headphone facility will be useful - and possibly the PSU for a long practice session.

(Continued on Page 73.)

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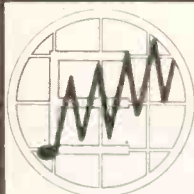


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Tokai Flying V

sharp screwdriver whilst making the necessary intonation adjustments. When they're the right way around, each bridge saddle offers individual adjustment for length on each string.

The unfortunate thing with both of these instruments, is the use of a Tune-O-Matic bridge which moves all six strings to some degree, when making an adjustment to any one single saddle. However this is an original feature, and now I feel I'm giving the Tokai V a hard time, which I am!

Good news comes with the pickups which are a pair of humbuckers (not claimed to be PAF's - and very wise too), with gold covers. The gold covers are irrelevant, the pickups are not. Too many manufacturers are claiming their PAF (which was in fact the original Gibson humbucking pickup) sounds just like the original and they don't. Tokai make no such claims, but their sound is a reasonable approximation. What they do have is a sparkle, which in fact all Flying V's have, and a certain amount of ZING in the upper reaches of the treble department, which is only found in the oldies. What the Tokai pickups lack, is warmth in the rhythm



The Tokai Flying V.

position which would have rounded out the pickups nicely. Since pickups have become the major disaster area for let downs in the Japanese copy market, the Tokai V fares quite well here. The tone control works, and since the variables obtainable within the pickup parameters are extremely suited to the instrument, I'd say the sound is a very good one for the money.

Now just in case you think I hate this guitar, you're wrong. I do like it, cosmetic

faults apart except for the fretting, a departmental Tokai need to take a long hard look at. For your £395, you will receive no case with your Tokai V, however, you will be able to afford one with the £3,605 you've just saved.

Max Kay

E&MM

The Tokai Flying V was kindly loaned by Blue Suede Music, 19, Thornfield, Ashton Road, Lancaster, LA1 5AG.

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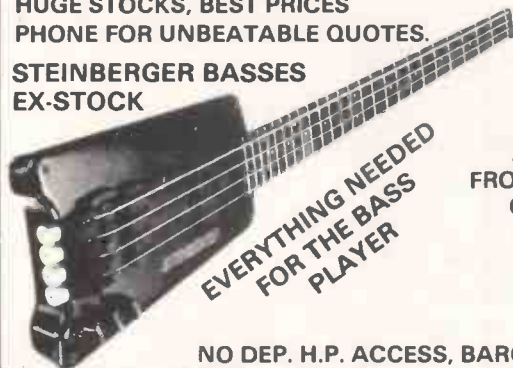
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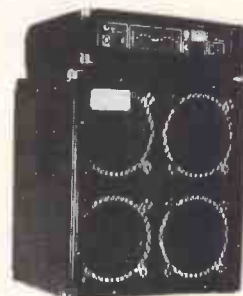
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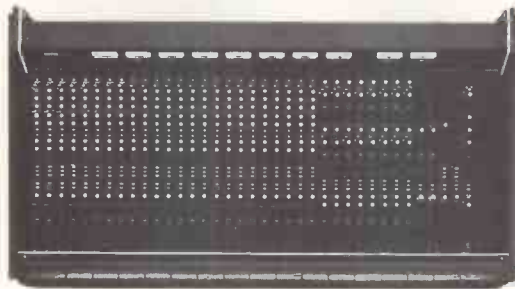
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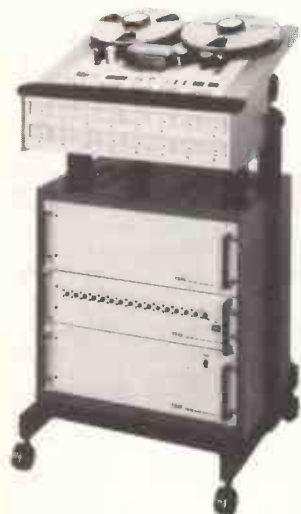
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Korg Poly-61



There is no doubt that Korg synthesisers from the Japanese Keio Corporation have reached a turning point which is marked by the appearance of the Poly-61. Nearly two years have elapsed since the production of the Polysix, although it is still a comparatively new instrument to the U.K., and the change has been from this analogue machine to virtually total digital control on the new Poly-61.

The Poly-61 is a 6-voice programmable polyphonic synthesiser that stores 64 program settings and uses 2 oscillators for each voice. It also features fast 8 second tape interface for creating your 'sound library', chord memory, arpeggiator and a new style of 'digital access control' that is easy to use and dramatically reduces the number of controls required. At first glance, the Poly-61 may look rather limited, but it does in fact offer as much control as its analogue counterpart — with all programs and parameters set from three dual-digit displays using up/down and numbered pushbuttons.

Before proceeding, it is worth noting the low cost of this instrument as a result of the transition and reduced number of controls — the Poly-61 is £995 inc VAT, a saving of more than £200 over the Polysix, and a comparison of its facilities with other polyphonic will show it's very competitively priced indeed.

Presentation

Here's another change to the Korg line, with an overall light blue/grey satin-toned appearance. The cabinet is of wooden construction with plastic material covering ends and base. To the left of the standard 61-note (C to C) keyboard is a dark grey plastic panel housing the joystick. A slight rough edge at the front was noticeable here compared with the good finish elsewhere. The joystick is a new type for Korg — smaller than usual but perfectly usable.

The sloping rear panel in medium satin grey contains rear sockets (labelled conveniently on front panel top), power switch and cable winder. The rear panel and main front panel are made in one folded metal piece.

On the front panel, controls are neatly sectioned from left to right, with the current Korg knobs in grey/off-white two-tone finish and new momentary 'click' pushbutton switches (apart from 3 ordinary 2/3 way slide switches at far right), as follows: Volume, Joystick, Tune, Indicator Value, Programmer, Key Assign Mode, and Arpeggiator.

Above these sections are 'Program No.', 'Parameter No.' (both 2 digit 1/2" red LED displays), and 'Value' i.e. Indicator Value for parameter selected (2 digit 1/2" green display). To the right of these displays is printed the information for selecting the different parameters available (in red) and the value settings available (in green). The main legending is in soft blue with 'Tron' style square grids around the controls.

The instrument measures 110 (H) x 350 (D) x

985 (W) and weighs 12Kg. Supplied accessories are data cassette (64 factory-programmed sounds) and connection cord for tape recorder. Optional extras are hard case, stand, volume pedal, footswitch and stereo headphones.

Rear Panel

From the performer's viewpoint, these are from left to right: Mono Output (with high or low switch), Stereo phones (8 ohms), Arpeggio Trigger In (for external control from drum machine, computer or sequencers etc — Korg's negative going pulse-to-ground required, although the E&MM Trigger Interface box or Korg MS-02 interface unit will match up any trigger), Release (gives release parameter only when inserted momentary footswitch is pressed to add piano-like sustain pedal effect), Program Up (advances program number

one step via momentary footswitch). Tape Interface switches are also located here for 'Tape Enable' and 'Write Enable', along with Tape 'To' and 'From' sockets. All sockets are standard jack types.

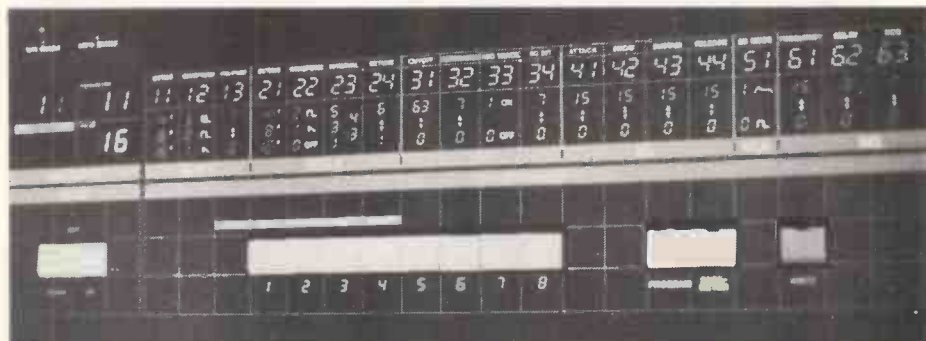
Circuitry

The main panel swings back for quick servicing, although full access to the PCB's requires removal of keyboard section. There are 3 main PCB's on the base, with left board containing dual 8049 micro processors, 8255 x 3 peripheral interface, 8253 x 4 etc. plus battery back-up. The centre voice board features 6 SSM 2056 IC's and the right board contains +/-5V, +15V power supply. Extra boards are provided for joystick and modulation as well as the 3 panel-mounted PCB's holding pots and switches. Rear panel jacks are sealed PCB mounted types.

Programming

Once you've connected the Poly-61 output to your mixer/amplifier set-up and powered up, the display reads PS61 (!) followed by Program No. 11, Parameter 11 and an arbitrary Value No. A volume control lets you match output level to your system, and both Write and Tape rear switches are set to 'disable'.

The Programmer section allows 64 different sounds to be stored in the instrument's memory and at any time these can be saved as a complete set on standard mono cassette recorder. Programs are dialled up using 8 switches numbered 1-8. Since the instrument controls are either for



Parameter and Program section.

Joystick and left hand panel.



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The new Korg Poly 61 Programmable Polyphonic Synthesizer

- Digital Control ● 6 Voices and 64 Programmes ● 2 Digital Oscillators per voice ● Tape Interface ● Easy to read digital display of information ● Chord Memory and Arpeggiator

Far from resting on their laurels since the phenomenal success of the Polysix, Korg have been busy producing a stable mate – the new Poly 61 – a breakthrough in technology and price. The 64 programmes can be altered whilst playing and can be advanced by foot switch. The Chord Memory can memorise harmonies and produce thick Unison soloing and bass sounds. A Joystick controls pitch bend, vibrato and wah-wah. DCO-2 can be programmed at different pitch intervals above DCO-1 for even more special effects.

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Korg Poly-61



Rear connections.

changes to programs or parameters, two switches to the right of these select either Program or Parameter, followed by a red Write switch which enters new programs you've created.

So to get Program 21 you press 2, then 1 and this will be displayed in the Program No. display. If you get it wrong, you can easily change the number around. Programs are grouped in 8's, so you'll only get 11-18, 21-28, through to 81-88 for the total 64 programs. The Poly-61 comes with factory-loaded sounds that are fully listed in the large instruction manual. These contain a good selection of sounds and you'll hear samples on E&MM Demo Cassette 9. In performance the instrument offers quick switching from one program to the next and, since you can arrange sounds in the required order for each piece easily (without losing any existing programs), a touch of a button (or footswitch in Program Up socket) will call these up instantly. Changeover is very smooth and can be done whilst playing.

Editing

To create a new sound of your own, you select a program near to the sound you want (or any suitable program number). All editing is 'temporary' until you actually 'Write' it into a program. The actual number you select this to be does not have to be the location you're working at, e.g. Program 21 can be edited and then stored in Program 31, leaving the original Program 21 intact. This is a very useful procedure in practice.

Editing is carried out by selecting 'Parameter' mode and choosing one of the 20 parameters available using the 8 numbered buttons (in the same way as locating a Program number). The Indicator Value Display will then show your setting as you use the down or up buttons below it. An interesting feature here is the red 'Edit' LED that glows only when you've changed an existing value, so it's easy to find original settings. Pressing both Up and Down buttons together restores the original parameter value.

This 'digital access control' can be carried out for all 20 parameters one at a time and takes only a second or so to make a parameter edit — there lies

the big difference between analogue and digital control and may take some time to get used to. You'll also have to wait for the up/down switches to reach the required value. Like Korg's new digital delay, they run slow at first then more quickly when held on.

Since all parameters, except one, cover a maximum 15 values, it's quickly done. The exception is Frequency Cutoff, which takes some 5 seconds to go from 0 to 63!

Writing a program to memory is probably as quick and easy as you'll get. With rear Write switch enabled, pressing the Write button and selecting a program number is all you have to do.

Even though battery back-up (with power off) can hold your 64 programs (provided you use the instrument for a few hours each year), another most useful feature is to be able to store your sounds on cassette. Tape transfer is a very fast 8 seconds with little possibility of error. The displays show TAPE, LOAD, SAVE and VRFY to indicate load, save and verify functions. An error is shown by ERR and correct transfer by GOOD.

Parameters

Using the digital access control system as explained, the following parameter sections allow you to synthesise your sound (or make changes to existing programs): DC01, DC02, VCF, EG, VCA, and MG.

Unlike the Polysix and Mono/Poly, the Poly-61 uses new digital controlled oscillators (DCOs). These are very stable in use and the circuitry does not give any pitch drift. Since 12-DCOs are used (2 for each note played normally), any detuning between oscillators is held constant, unlike other VCO type instruments (Memorymoog, Chroma, etc).

Incidentally, parameters are logically numbered in tens, from 11, 21, to 61 for each section. As sections have one or more parameters available, you can't dial a wrong number — the system ignores you! It'll take a few hours to get to know the numbers, but after that VCA is always 51 and so on! Korg have scored here by putting clearly marked parameter labelling in full on the panel in case you forget.

DC01 has 3 parameters available: Octave 4', 8', or 16'; Waveform — Sawtooth, Square and variable pulsewidth; PW/PWM which alters square wave to pulse or depth of pulsewidth modulation from 0 to 7 values.

DC02 has Octave 4', 8', 16'; Waveform — off, sawtooth and square; Interval — this offsets DC02 pitch from DC01 to give minor 3rd, Major 3rd, perfect 4th and 5th intervals as well as unison; Detune — gives fine pitch adjustment between the 2 oscillators (that you play on each note) for honky-tonk, chorus-like fat sounds. Incidentally, no zero setting is given (there's always phase shift present) and the range is up to 50 cents (¼ tone).

The VCF uses new voltage controlled filters that are 24 dB/oct low pass types. Controllable parameters are Cutoff (0-63); Resonance (0-7) which does not go into oscillation; Keyboard track (on/off); and EG Intensity (or depth).

Only one EG is available to modify filter and amplifier sections. This has the standard ADSR parameters (0-15 value setting). Maximum times are Attack 10 seconds, Decay 23 seconds and Release 20 seconds which are adequate for most synthesis.

The VCA section has a value change for either EG or on/off (organ touch) selection. Finally the MG (Modulation Generator/LFO) has frequency (0-15) from 1 cycle every 3 seconds to 20Hz approx., and Delay (0-3) settings that modulate DCO pitch, DCO1 PWM and VCF Cutoff Frequency (with DCO and VCF (0-7) depth values). Pitch vibrato and tonal wah-wah etc. can be obtained with the MG.

Performance Controls

The Poly-61 has plenty of polysynth features to make your performance more enjoyable. The joystick is an established favourite with Korg and offers four way control for pitch +/-7 semitones (horizontally) and vibrato depth or filter depth (vertically). Joystick rotary pots set Bend limit and Frequency rate (independent of MG) with LED indication from 1 cycle every 8 seconds to 10Hz approx. A Tune control sets overall pitch +/- 1 semitone. Three Key Assign modes are available: Poly, Chord Memory/Unison, and Hold. In Poly mode, six independent notes can be played on the keyboard, with last note priority as you play more notes. Chord memory unison lets up to 6 notes be 'memorised' and then played from any one key at the correct transposition — great for parallel tones jazz or drawbar style. Unison makes big fat 'six voices to one note' playing (mono). The Hold switch keeps notes playing after release — particularly useful in Arpeggio mode.

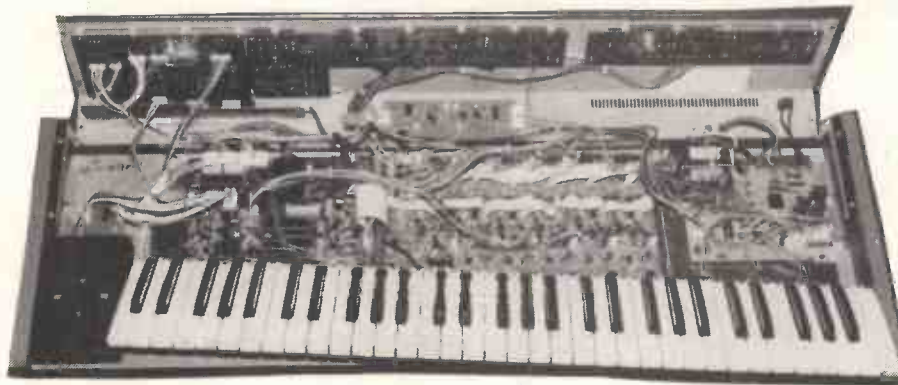
The Arpeggiator is now a standard feature on poly machines and this one triggers notes held (either chords or unison) once every 26 seconds to fast 6 notes runs every ⅓ second or so. The range of the Arpeggio will be the same as the keyboard span for the current DCO pitch setting, so 'C' has 6 notes to use — other's have what's left! Arpeggios run up, up/down or down over full keyboard, 2 octaves or 1 octave. You can add notes to your arpeggio provided you don't make a 'fresh' key press, and use external triggers as mentioned.

Conclusions

If you make comparisons between the Poly-61 and the Polysix (and other polysynths), you'll find it's a winner for its price. Sound making possibilities are plentiful, especially through the use of two oscillators per note, although you'll have to decide whether one EG is enough. There is no noise generator — an important omission if this is going to be your first polysynth, but its light weight, good looks, wide-ranging sounds plus unlimited program storage and low cost should make it a very popular 'new look' instrument.

Mike Beecher

E&MM



Poly-61 opened up.

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Concert Review



Stanley Clarke, George Duke and band.

Photo Ken McAlpine.

George Duke-Stanley Clarke Hammersmith Odeon 29th January 1983

A one-off occasion featuring two of the giants of jazz-rock, this concert inevitably provoked a reaction as great as the reputation of the musicians involved. A packed and enthusiastic hall welcomed Stanley Clarke, rated one of the top two bassists in the world since his time in Return to Forever with Chick Corea, and George Duke, showman and keyboardist supreme and in the recent past a popular singer as well.

These long-time friends have played together before, notably in the Clarke-Duke Project, and Stanley's solo albums such as 'School Days' and the recent 'Let Me Know You' have not been able entirely to keep them apart. As they tuned up there was electricity in the air - literally in Clarke's case, since his custom-built active bass features tiny LEDs as fret markers all along the fingerboard. Not to be outdone, Duke's primary instrument is a glossy white Clavitar, slung around the neck with easy familiarity and interfaced with a Prophet 5.

The opening track heavily featured the Clavitar producing long sustained lead guitar sounds, with Duke's control over pitch bend being shown to the full. Rather than over-using vibrato modulation Duke prefers to insert excessively complex ornamentation to gain similar effects - it's certainly more impressive than turning a modulation control and had the audience breathless with appreciation.

Clarke's solo on the same track quickly shot up the fretboard, leaving the bass part to be taken by Denzel Miller on Minimoog. Clarke's control at the highest registers of the bass is unequalled, and the degree of expression he forces from the instrument is

even more amazing when it's learned that he uses no effects other than a Roland Space Echo.

Eddie Martinez on guitar and Warren Peak on drums played precisely and powerfully, but were eclipsed by the headlining duo's showmanship. Duke rolled on his famous perspex Clavinet, equipped with what looks like a piece of bicycle but is in fact a large sprung pitch-bend lever, and strolled through a solo which had the audience cheering every two or three notes - predictably, since he stopped playing and pointed with glee at the instrument to give them a chance to do just that.

Very much a soloist's concert, the technique of producing a sudden silence and waiting for the applause was a little over-used. However, there was plenty of variation; Duke provided a scat-singing solo which imitated every drum in Warren Peak's Yamaha Kit and a few more besides, and then gave a thunderous build-up on Yamaha electric grand for one of his songs. His voice is rich and clear enough, but for real power Jeffrey Osbourne was introduced, whose driving vocals perfectly matched the funkier disco beat of his single 'On The Wings Of Love'.

During the songs Clarke showed himself capable of becoming part of a band as well, playing a gentle glissando up to each note to match Miller's fuzzy Oberheim strings and Duke's Prophet hook lines. Given a chance to solo however, he turned on a subtle but convincing display using voice box and echo that had the bass 'talking' fluently. This led, after an intentionally clichéd blues duet between Clarke and Duke, into 'School Days', which featured Clarke's amazing flamenco chordal bass playing and neck-bending techniques, not to be recommended on a cheap copy.

As the volume rose Duke's piano sound tended to distort a little, but

Clarke's 8 Electro-Voice cabinets performed well. A final jam session over a five-chord progression saw Duke lending his Clavitar to members of the audience while the encore 'Louie Louie' had half the audience dancing on the stage singing along, trying

to touch Clarke's bass and generally letting go. During the course of Clarke's solo someone from the circle suggested (loudly) that he must be E.T. - from the performance that night it's certain he's got magic fingers.

Pat Benatar Hammersmith Odeon 21st January 1983

Pat Benatar is gaining an increasingly large following in this country for her particular brand of heavy vocal work. The band's overall sound now is a sort of heavy metal/pop which sells in vast quantities in the States, but perhaps lacks the originality of Judie Tzuke or Kate Bush's bands. Still, the audience seemed receptive and the first two segued numbers gained an enthusiastic response. Pat's voice is nothing if not powerful, able even to rise over husband Neil Geraldo's crashing guitar chords; the sound quality was excellent; the bass drum being particularly forceful, although the bass guitar was mixed much too low.

The accent was on power even for the slower numbers, the drummer having to stand up to get the last bit of volume out of his crash cymbals and Geraldo keeping up an almost constant string vibrato to obtain increased sustain. Over these Pat's

show through more often. Although the power of the songs is adequate the degree of variation isn't; a constant choppy organ sound used on several songs turned out to be produced by an Oberheim OBXa, which is capable of much more interesting things.

In fact the keyboards - Oberheim, Jupiter 8 and Yamaha electric grand - were only allowed to come to the fore once or twice, notably on 'Promises in the Dark' and the encore 'Hell is for Children'. The piano sound was rich and reverberant lower down but weak in the higher registers, leading to the impression that much more care had been taken with the drum and guitar sounds. 'Heart-breaker' opened with a highly resonant sweeping chord, but that's about all that was on display along the lines of imaginative synthesis.

Geraldo's guitar playing was quite versatile, with various arpeggio, slide and feedback tricks on show, and occasional use of Space Echo. Pat's voice was also treated with echo at the



Pat Benatar and band.

Photo Ken McAlpine.

voice soared on numbers like 'Get Nervous' (the title track of her current album) and 'Running with the Shadows' (the new single) occasionally taking on a fetching high-pitched vibrato reminiscent of no-one more than Geddy Lee of Rush.

Pat has a background in operatic singing, and could make her performances more varied if she let this

end of some vocal lines, a useful effect on some of the darker songs. Lighting was spectacular but under-used, the most impressive trick being a sudden burst on two banks of 8 miniature spots pointing into the audience from the front of the lighting gantry. Foldback monitoring looked more than healthy, with very large cabs flown above the stage area.

As the set progressed the climaxes became more and more spectacular, with hammered-on guitar harmonics, a giant gong and Mellotron-like keyboard effects all being put to good use. Pat yelled 'Thank You!' between each number with ear-splitting sincerity and her efforts

seemed to be appreciated by the enthusiastic audience. There's no denying, though, that the older material, from 'Precious Time' and 'Crimes of Passion', was the more enjoyable and imaginative, and that a greater diversity of vocal techniques would have been a bonus.

**AMM
Purcell Rooms
30th January 1982**

Founded in 1965 and joined a year later by Marxist avant-garde composer Cornelius Cardew, AMM is one of the longest-running classical electronic ensembles and one of the first to wholly embrace the improvisational ethic.

Consisting now of John Tilbury on piano, Keith Rowe on guitar, cello and electronics and Eddie Prevost on percussion, the group made a rare appearance in the Royal Festival Halls complex to coincide with the release of their album 'Generative Themes'. The group's belief is that "music development arises out of dialogue and the constant interaction of aesthetic, moral and social considerations. The improvisational method leads not to inert solutions but to an enquiring attitude - an awareness of vital themes."

This seems reasonable enough, but what is difficult to comprehend is the apparent total divorce between classical and rock music which leads to any current belief in the need to make the sort of statement which was being made by Tangerine Dream, Amon Duul and Can twelve years ago. The closest comparison for AMM's music is in fact Tangerine Dream's 1970 album 'Reise durch ein Brennendes Gehirn' - 'Journey Through a Burning Brain', or 'Electronic Meditation' in this country.

Rowe's acoustic guitar, fitted with two pickups and laid flat on a table, was bowed and struck in such a way as to produce electronically treated sounds reminiscent of Conny Schnitzler's cello work on the Dream album. Tilbury's piano, 'prepared' in the John Cage tradition with pads, wedges and miniature electric fans attached to the strings, produced a selection of vibrant, dead or deeply resonant sounds via an HH amplifier resting inside the piano on the soundboard. Eddie Prevost's percussion techniques included bowing the edges of cowbells and cymbals as well as using the rock-style Tama kit in a more conventional, though stubbornly non-rhythmic style.

The overall sound texture ranged from restful to faintly disturbing. The guitar sound, passing through a Morley pedal, MXR Mini EQ, Big Muff fuzzbox, Polytone pedalboard and Dod and Soundmaster minimixers, varied from gentle to grinding and distorted, and was accompanied by

random sounds from a transistor radio which Rowe re-tuned occasionally. These two provided a constant background against which piano and percussion came to a series of climaxes, sometimes together but more often quite independently; although John Tilbury seemed to be following some kind of score or block plan, and his playing was precise and varied, any interaction between the players seemed to be left very much to chance.

After the interval a second piece was started by re-tuning the radio and a series of marimba-like notes on the piano. Shortly afterwards a young lady in stiletto heels, returning late, clicked her way across the auditorium and almost succeeded in drowning out the musicians. Far from being annoyed they appeared quite pleased; a little ambient sound, presumably, can easily become part of the music.

It soon became clear that AMM music isn't entirely without humour; the musicians kicked table tennis balls towards each other across the floor and when one rolled down a set of steps off the stage the regular clicking for a moment provided a rhythm against which they could play. Even thumps off the effects pedals became part of the music; a church service picked up on the transistor radio gave a vague sacred air to the proceedings.

Several members of the audience sat doodling during the concert - some kind of game? - and occasionally it was tempting to see a rhythmic connection between the radio noises, the regular ululation of an electric motor on the guitar strings after steel strips had been pushed under them, the dull thump of soft-headed beaters on the drum kit or the high resonant repeated piano notes. Whether the end came by mutual agreement, or was dictated by one of the two alarm clocks on Keith Rowe's table, is unclear - but one minute the music was there, and the next minute it had gone.

AMM aren't due to perform again until the Almeida festival in June, so anyone who's interested in this unusual but rather inaccessible (at least at a single hearing) form of music, would be well advised to get hold of a copy of 'Generative Themes' (recorded just before Christmas) from Matchless Records, 2 Shetlock's Cottages, Matching Tye, nr. Harlow, Essex CM17 0QS. Tel. 0279 731 517.

Mark Jenkins E&MM



Rowe and Prevost of AMM.

Photo Mark Jenkins.

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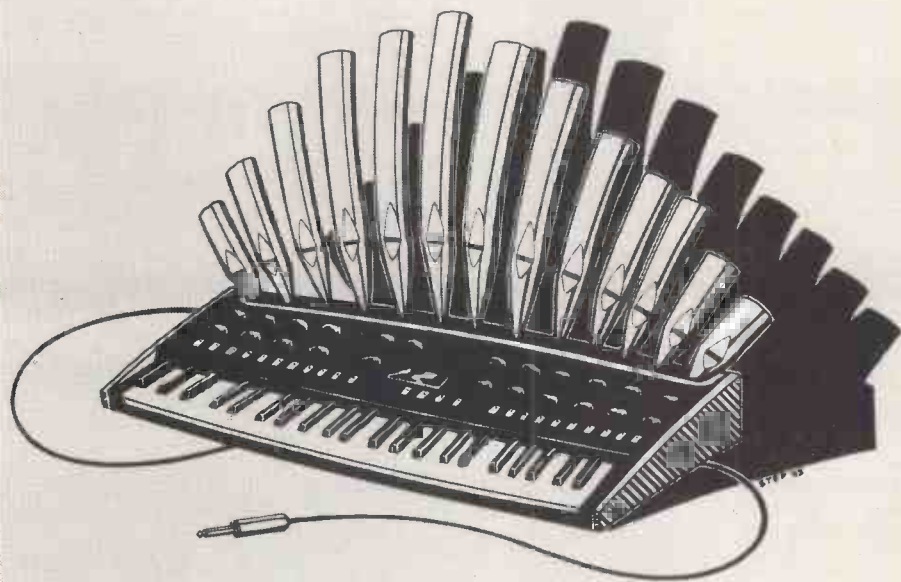
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THE ELECTRONIC



KEYBOARD

Part 1

by Alan Douglas

An historical and technical survey of the development of the electronic keyboard from its origins to the present day. This informative series will be of interest to anyone who has played an electronic keyboard instrument, whether an organ, electric piano or synthesiser, and its practical examples give the electro-music engineer a valuable insight into early music technology.

No one knows when man first discovered he could make pleasing sounds by blowing into a thin tube. Certainly an assembly of such pipes was in use by 900 AD. Pythagoras was the first investigator to suggest an orderly succession of notes, which he found to be 'eight' before he arrived at the original note but one octave higher - hence the derivation of the word octave. By the year 1000, organs with several sets of pipes were in use, even though at this time there was no concept of harmony - all notes sounding in unison. As in many other walks of life, steady improvements in control and tonal quality came from the monasteries. By 1600, quite modern organs were in use, but as they became larger, so it was harder physically to play them; organists were known as 'organ beaters', the clenched fist being used to strike the keys!

19th Century Onwards

Inventors have always thought far ahead of the means to realise their inventions, so it was not until the early 19th century that electricity was applied to ease the touch - although pneumatic assistance was much older. From this period, advances were rapid and by 1851, the year of the Great Exhibition, extremely modern organs were shown with all pipework used today incorporated.

But a new line of research was opening up, for in 1837 C. E. J. Delezenne in France produced musical sounds by rotating a toothed iron wheel in front of an elec-

tromagnet. The American Thaddeus Cahill soon followed with the Telharmonium, an ingenious if massive series of alternators each delivering a sine wave at the intervals of the tempered musical scale. The output was hundreds of watts, but losses in the controls and the very crude telephone receivers employed consumed much of the power. Following on the work of Fourier and Helmholtz, attempts were made to synthesise complex sounds (e.g. clarinet) by mixing sines in a transformer. This bold concept was doomed to failure, but all who heard it commented on the purity of tone - no one had ever heard a sine wave before!

The valve organ

Although Duddell did produce controllable sounds from his 'singing arc', it was the invention of the grid in the valve by de Forest in 1907 that really started the ball rolling. Yet it was only in terms of radio that everyone was thinking and consequently this resulted in circuits of vital importance to the electronic organ being completely overlooked. For example, the Hartley oscillator of 1917; Abrahams & Bloch's multivibrator of 1918; and the Eccles-Jordan frequency divider of 1919. One must allow for economic recovery after the 1914-18 war, but in fact there was a hiatus in organ development then; new valves, gas tubes, better capacitors and resistors, etc. were, in fact all due to the war efforts. The device which was

NEW SERIES

to notably make all organs acceptable then and now was the invention of the free cone moving coil loudspeaker by Rice and Kellogg in 1925. It is true that Wehner von Siemens invented a moving coil speaker in 1878, Sir Oliver Lodge also patented one in 1879 and the Magnavox company had one on the market in 1910; but all of these were for telegraph reception and used horns that had stiff diaphragms with no frequency response over any significant range.

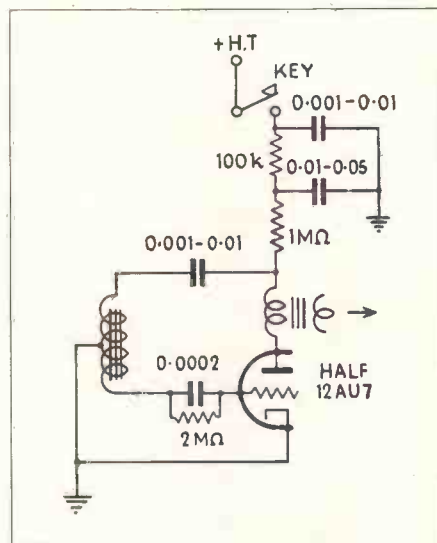


Figure 1. Hartley oscillator.

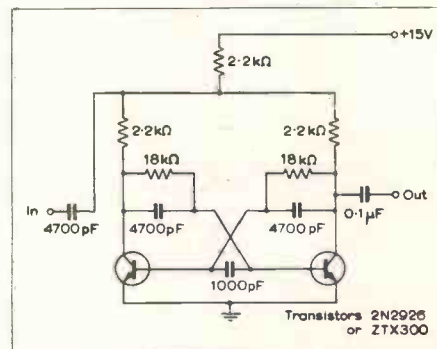


Figure 2. Bistable frequency divider (or flip-flop).

Although some attempts were made to foster simple musical instruments like the Theremin, it was left to the French organ builder Coupleux and Givélet to launch a full-scale valve instrument in 1927. At the same time Oskar Vierling produced a quite reasonable organ using gas tubes as relaxation oscillators in 1927-28. The process of tone forming was not then understood but during this period Maurice Martenot was at work in France on several attributes of the organ not so far used. Although he never built a full size organ, he was responsible for introducing vibrato, touch-sensitive keys, and a means of producing gliding tones from a keyboard.

Electro-Mechanical organs

It may surprise some readers to learn that the photo-electric cell was invented in the early 1800's. Several attempts were made to rotate or move masks or stencils in front of

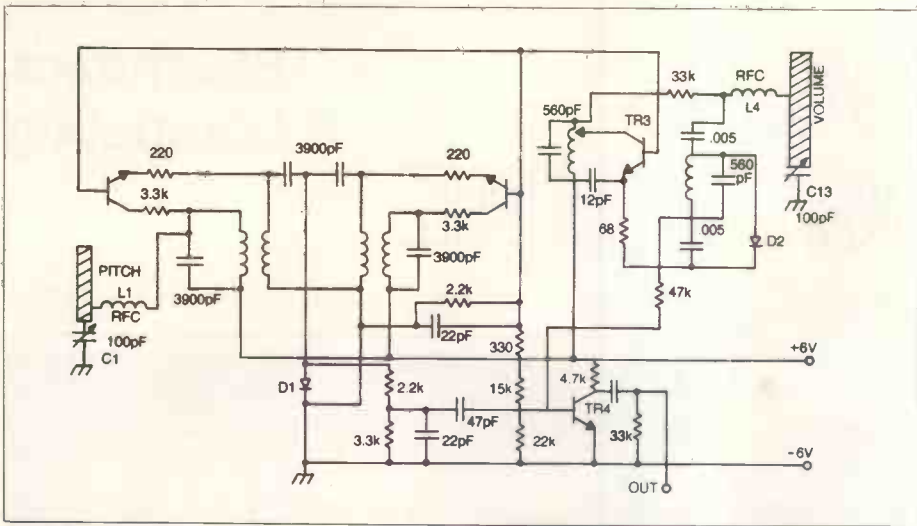


Figure 3. A Theremin circuit, with control obtained by body proximity to either or both rods.

such cells to produce musical sounds, but mechanical problems always defeated investigators until the Welte organ of 1928. However, we are running ahead too fast, for it was only too evident to all these experimenters that all the components used were basically unstable, meaning that organs would not stay in tune. By this time, of course, electric motors and general mechanical details were quite refined, so attention was given to electro-mechanical organ generators. The first successful design was that of Leslie Bourne, assigned to the John Compton organ company in 1932. A series of 12 stationary discs, each engraved with waveforms in octave relationship (i.e. a disc would carry all the C's of various tone qualities) was scanned by a spider-like array of pickup elements driven by an endless belt through pulleys, so proportioned as to give the intervals of the tempered scale. By applying a DC potential to the stators, this induced a charge on the scanners proportional to the area scanned; since this consisted of waveform tracks, the charge repre-

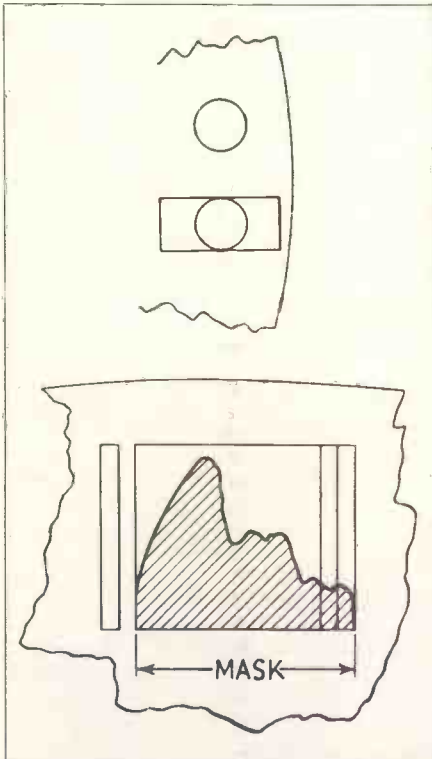
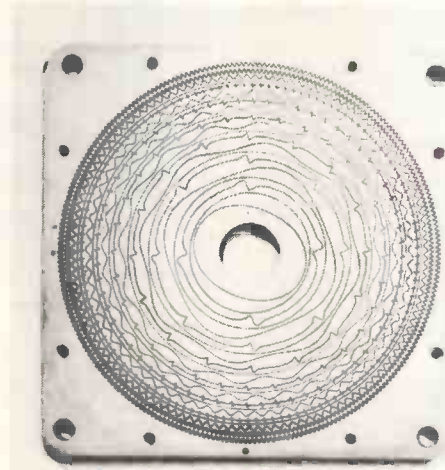


Figure 4. Rotating masks in front of photoelectric cells.

sented the changes in waveform. A valuable feature of Bourne's system was that since only DC was keyed, RC delay networks could be introduced to eliminate clicks, the bane of all early electronic organs. Since this



organ was made in the same factory as the company's pipe organs, a good measure of tonal fidelity was obtained; indeed, the first 'electrones' as they were called, were fitted to Compton theatre pipe organs.

The popular Hammond

Meanwhile an American maker of alarm clocks was working on an up-dated version of Cahill's system, and by now there were good amplifiers and indirectly-heated valves; Western Electric had been using thoriated tungsten filaments since 1915.

Thus the Hammond organ made its appearance in 1934 - two years after Bourne. At one time this was the best known organ in the world and certainly the most reliable. The method is well known; small soft iron discs having a contoured edge are driven by trains of gears in front of permanent magnets, each bearing a pickup coil. The voltage induced in these coils is keyed, controlled, in volume level by draw-

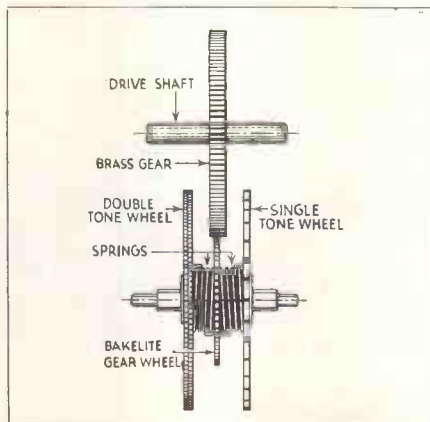


Figure 6a. Hammond tone wheel system.

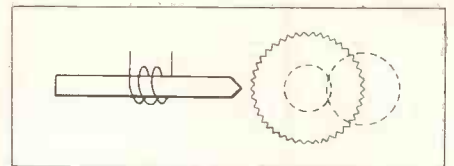


Figure 6b. Hammond chisel-shaped permanent magnet pickup.

bars, mixed in transformer (or resistor) networks and amplified. The system relied entirely on the very ingenious gear drive. The iron discs idle on their spindle, to which is fixed (in the centre) a bakelite gearwheel. On either side of this wheel are compression springs having ground ends. These press on a disc each side and the gear wheel in the centre. Sufficient power is transmitted through the springs to drive the discs, but any small ripple due to the gear wheels is absorbed by the springs; which also allow the discs to slip should a particle of dirt become wedged between the magnet tip and

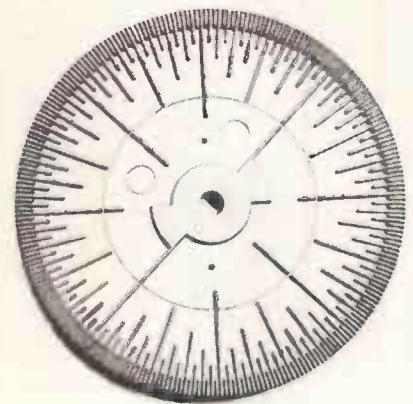


Figure 5. Compton generator, with stator on left and rotor on right.

the edge of the disc.

The waveform is not quite sinusoidal and this is largely corrected by filters on each pickup coil; the tuning is permanent but not quite exact between semitones, since it is impossible to generate the true intervals with only two gearwheels. The attack on keying is very abrupt as all the wheels run continuously and, whilst the original concept of this organ was for the church, it was soon found to be admirable for rhythmic playing!

Vibrating reed organ

The success of these electro-mechanical organs stimulated others, the most important of which was the vibrating reed organ of Hoschke. Many years of manufacture in the U.S.A. had brought the acoustic reed organ to a high pitch of mechanical excellence. Hoschke polarised the reed bases and placed pickup screws above selected portions of the reed tongues. So long as the wind pressure (really suction) was constant, the screws could not touch the tongues; a charge was therefore induced in the screw, easily converted to an audio signal. Hoschke sold his patents to the Everitt Piano company and many examples of the Everitt Organon reached these shores - some are still playing. Later Everitt sold out to Wurliitzer who made a remarkably fine job in developing this type of instrument.

So you can see that here we have three organs, all keeping in tune, all reliable, and all capable of voicing to produce acceptable imitations of pipe organ sounds. Every other system or method failed commercially because of component instability; there was no competition until after the Second World War.

MUSIC MAKER EQUIPMENT SCENE

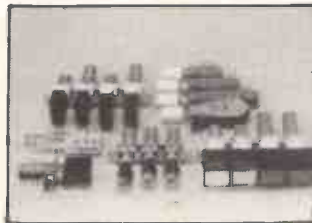
Electronics & Computing

Solenoid Operated Cassette Mechanisms

A range of cassette mechanisms, suitable for home computers and professional data logging equipment, has been launched by Ambit.

The illustrated mechanism, the AMBTN-3600, can be supplied with a variety of heads to suit the user's application. The standard version is equipped with a stereo record/playback and erase head, although a wide range of combined record/replay heads are also available.

Motor operation is from 12V DC, with less than 0.08% RMS wow and flutter, with the record and playback specification largely determined by the heads selected and the drive circuitry provided.



F Series Switches

The entire range of TOKO F series push switches is now available from Ambit.

Basic building-block modules are available from 2 to 10 pole, with optional gold contact versions for instrument and small signal applications. Standard modules are rated up to 100V DC, and a full range of BS approved mains switches is also available from stock that fit into the overall 'bracket' system, and combine mains with DC switching capability.

Caps, including types with lamp illumination, LED indicators, and the no-power fluorescent reflective indicators can also be supplied.



Versatile Knob System

Ambit now stock the Ritel range of knobs which allow over 10,000 possible combinations. The range choice includes colour, size, style, caps, skirts and other accessories.

Several novel concepts are featured in their range of push fit brass collet fixing knobs, with spline shaft types, 1/4" D shaft adaptors and a system for coaxial dual controls.

Prices range from 6p to 60p depending on style and fittings.

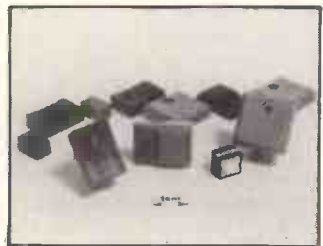
For further details contact: Ambit International, 200, North Service Road, Brentwood, Essex, CM14 4SG. Tel. (0277) 230909.

Complete Keyswitch System

A low-cost range of keyswitches from TOKO has now been joined by a complete family of multi-colour caps and an LED indicator system.

The basic element is the R7000 miniature keyswitch, which is an elastomeric switch using gold plated contact faces, for a minimum life expectancy of 100,000 operations. The switch manages to convey an exceptional sense of snap action for a rubber contact keyswitch.

The optional molded clip that holds the LED in position may be fitted to any of the basic R7000 elements, and is suitable for use with all the caps shown.



Intelligent LEDs

Two new Litronix intelligent alphanumeric LEDs, designated DL3422 and DL3416 are now available from Norbain Displays Limited.

The DL 3422 is a four digit, 22 segment device offering upper and lower case display characters. Character heights are 0.17 inch and 0.1 inch with a 50 degree viewing angle.

The DL3416 is a four digit, 16 segment plus decimal device giving a character height of 0.225 inch with a viewing angle of 40 degrees.

Both devices have built-in memory, ASCII ROM decoder, character

generator, multiplex and LED drive circuitry. Each digit is independently addressed and will continue to display the character last stored until replaced by another. Data entry is asynchronous and can be random.

Both displays are TTL compatible, operate on a five volt power supply and have a fast, 500 nanosecond access time, although a faster, 300 nanosecond version of the DL3416 is also available.

For further details contact: Norbain Displays Ltd., Norbain House, Boulton Road, Reading, Berkshire RG2 0LT. Tel. (0734) 864411.



Wow and Flutter Meter

A new Wow and Flutter Meter, model WM 1A from Bang and Olufsen, has a high stability crystal-controlled 3.15kHz oscillator for very accurate measurements. The WM 1A is intended to be used by sound recording and broadcasting studios and by suppliers of audio products.

Featuring a wide choice of filters and detector characteristics, it is capable of servicing and testing high quality sound recording and broadcasting studios and by suppliers of audio products.

and turntables. For professional equipment, it measures wow and flutter down to $\pm 0.003\%$.

Drift, or speed deviation, are measured from $\pm 0.03\%$ to $\pm 20\%$ on the driftmeter relative to a reference 3.15kHz crystal-controlled signal.

Wow, or very low frequency changes from 0.2Hz to 10Hz, flutter from 10Hz to 300Hz, or wow plus flutter from 0.2Hz to 300Hz can all be measured linearly or weighted.

For further details contact: David Bisset Ltd., 52 Luton Lane, Redbourn, Herts. AL3 7PY. Tel. (058285) 2637.

Software for Musical Applications

In co-operation with electronic music studios and professional musicians, Epsilon have created a music-oriented program language, known as CDL2.

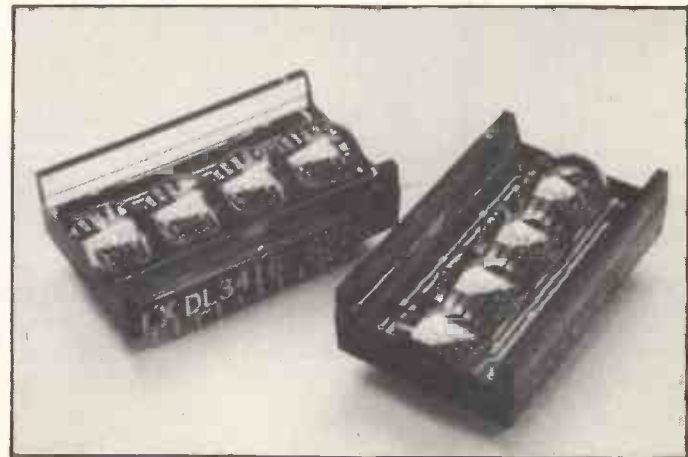
Computer programs written for real-time musical applications must meet the requirements of high runtime performance speed. This seems to forbid the usage of a high level programming language. Also, high level languages tend to conceal hardware structure and give little possibility for local optimizations on the machine instruction level.

The programming language CDL2 combines the advantages of a high level language with the run-time per-

formance of a machine oriented one. In addition, CDL2 offers special features for modular designing, structuring, and verbalising of programs. Also important are the open-ended characteristics of CDL2 which allow for adaptability to the hardware features of virtually any machine.

Epsilon also produce a micro-computer system, EPSI 09, based on the M6809 microprocessor and compatible with the MDOS operating system. The EPSI 09 provides for several interface modules dedicated to musical applications, including synthesizers, keyboards and equipment control.

For further details contact: Epsilon, Otto-Suhr-Allee 22, 1000 Berlin 10, Germany. Tel. (030) 3419008.



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TRANSCENDENT 2000 — Although only a 3 octave keyboard the '2000' features the same design ingenuity, careful engineering and quality components of its larger brethren. The kit is well within the scope of the first time builder — buy it, build it — play it! You will know you have made the right choice. Complete kit **£165.00 + VAT**



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This versatile modular mixer, featured as a constructional article in Practical Electronics can be built up to a maximum of 24 inputs, 4 outputs and an auxiliary channel. Each input channel has Mic and Line inputs, variable gain, bass and treble controls and a parametric middle frequency equalizer. There are send and return jacks, auxiliary, pan and meter controls and output and group switching. The output channels have PPM displays for record and studio outputs. The auxiliary channel also has a PPM display and there is a headphone monitor jack and a built-in talk-back microphone. The mixer modules plug into base units each of which takes up to 6 channels. To eliminate hum, the power supply is in a separate cabinet.

Digital Delay Line — With its ability to give delay times from 1.6 mSecs to up to 1.6 secs. Many powerful effects including phasing, flanging, A.D.T., chorus, echo &



vibrato are obtained. The basic kit is extended in 400 mS steps up to 1.6 secs. Simply by adding more parts to the PCB. Compare with units costing over £1,000! Complete kit (400 mS delay) **£130 + VAT**
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experienced professionals, not commission-hungry salesmen.

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Organ Talk (Continued from Page 54.)



Casio CT-501.

Progressing to the Automatic features calls for a decision on the part of the musical 'boss'. Should the beginner use Fingered or Casio chords? Three Casio chords can be produced - Major, Minor and Dominant Seventh. However, seven types of Fingered chords will be recognised and indicated on the LCD - Major, Major Seventh, Augmented, Minor, Minor Seventh, Dominant Seventh and Diminished Seventh.

When the Keyboard is split (by setting to Fingered or Casio Chord) the chord symbol is indicated and the beginner will see if the fingered chord is correct or not. This valuable aid will soon enable the beginner to memorise commonly used chords - all of which are shown in the music book. In this mode, the upper 2½ octaves of 'solo manual' may be shifted by the Octave Down slider.

Bar Code scores can be entered into

memory (or the matching manuscript music entered from the keyboard) and used to improve sight reading. Auto-Play allows the music to be followed visually (at any speed and rhythm). The Melody Guide feature shows the player which keys to press by means of LEDs above the playing keys. Alternatively, One Key Play allows the recall of each note of the manuscript score with rhythmic accompaniment. As 8-note polyphonic instruments, these keyboards still leave one or two notes to spare when Auto-Playing so that the beginner can attempt to harmonise - perhaps by playing along in thirds.

Each time a new composition is put into the memory, the previous one is erased. Owners of home-computers will realise that there should be a way of storing on tape. Well, Casio have thought of this aspect and it is a feature of their new PT-30 programmable keyboard: no doubt it will be added to higher priced models in due course.

Although I have suggested using the programmable keyboard with an organ, its compact nature makes it an admirable proposition where space does not allow for a piano in the home.

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Covering this year's Frankfurt Music Message was a demanding but nevertheless enjoyable task. Armed with cameras and tape recorder, E&MM visited each of the huge exhibition halls in turn, and in the few days available collected a treasure trove of information on what are likely to become the top selling musical products of 1983.

Our three-page feature in this issue is intended just to give a taste of what was there. Apart from new polyphonic synthesisers from Korg, Yamaha, Roland and Jen, there were new digital keyboards from Publison and Realton, organs from Yamaha, Solton, Crumar and many others, a vast range of amps and accessories from British manufacturers and new ranges of guitars from both sides of the Atlantic. Drum machines are still popular, with models from Yamaha, Simmons, MXR Innovations and more, and as usual there were a selection of novelties, prototypes and one-offs on display. These included a guitar synth and wind synth from the Synsonics people at Mattel.

We'll be covering many of the items featured here in greater depth in the coming months. In the meantime, telephone numbers are given if you want to obtain further information, and it will usually help to mention E&MM when doing so.

1. The Synx 508, a new polyphonic synthesiser from Jen featuring memories, built-in sequencer, several keyboard modes and joystick modulation. Tel. 085 52 145 (Italy).

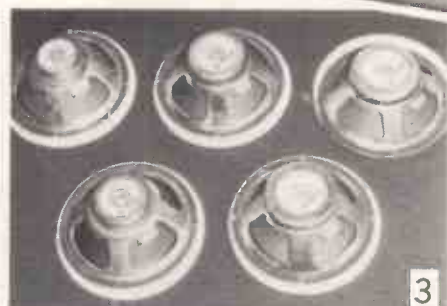
2. E-mu Systems Drumulator, offering 12 sampled percussion sounds, complex chaining, cassette dump, external sync, timing correction and programmable dynamics for 995 dollars. Tel. (408) 476 4424 (USA).

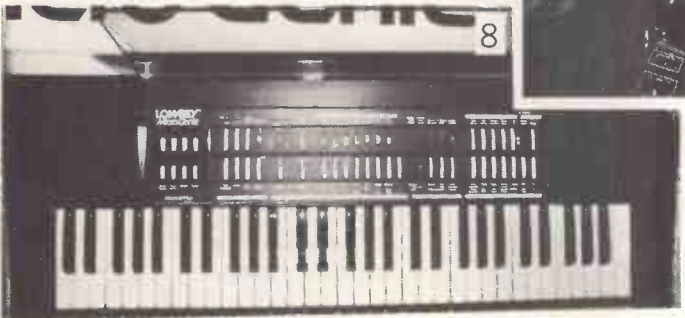
3. Celestion speakers on display; G12H-100, G12K-85, G125-50, G12M-70, G12L-35, "the raw material of Rock & Roll for over 20 years". Tel. (0473) 73131.

4. Wersi MD Reinhard Franz with the Comet organ, Wersi accompaniment unit and PA system, just part of a huge range of ready-built and kit instruments on show. Tel. Wersi Organs, 01 668 9733.

5. Oberheim's new OB8. Cheaper Cheaper than the OBXa although outwardly similar, with completely redesigned electronics and an additional 'Page Two' function for almost every control. New facilities include a versatile arpeggiator. Also shown, the matching DMX digital drum machine and DSX sequencer. Tel. Chase, 01 387 7449.

6. Crumar's Spirit synth and DP-30 Dynamic Piano. The DP-30 has 73 weighted keys, digital tuning circuitry, 4 presets, touch responsive filter, Chorus, Bass and Treble controls and comes complete with pedals, legs and bag. Tel. 071 79 033/34 (Italy).





7. Roy Goudie and Lia Vandermark of Moog Europe, with Moog Rogue, Source, Memorymoog, Opus 3 and Taurus Pedals. The Source and Taurus are to be sold as a new interfaceable package aimed at guitarists.

8. Lowrey's Micro Genie prototype, offering stereo split keyboard functions and a range of top-flight organ facilities in a compact single-keyboard design. Tel. 0376 21911.

9. New from Siel, the Opera 6 and Piano Quattro. The Opera 6 is a 6 voice X 2 VCO, 61 key, 100 memory polysynth with 2 LFOs, arpeggiator and an erasable state for programme names. The Piano Quattro offers 4 presets plus bass, 5 band EQ, Chorus, Flanger, Sustain, Transpose, Attack and Dynamic Response. Tel. 39735 60744 (Italy).

10. Carlsbro's new Hornet range, the 45W keyboard and 45W Bass being particularly interesting. Carlsbro are concentrating on the continuing market for small, colourful and portable amplifiers, and are also extending the Cobra range. Tel. 0623 75 39 02.

11. CBS Rhodes have introduced an expander for the Chroma, which more than doubles its capability. Pictured here are the Expander, the Chroma itself and the Rhodes 88 piano. Tel. 714 879 8080 (USA).

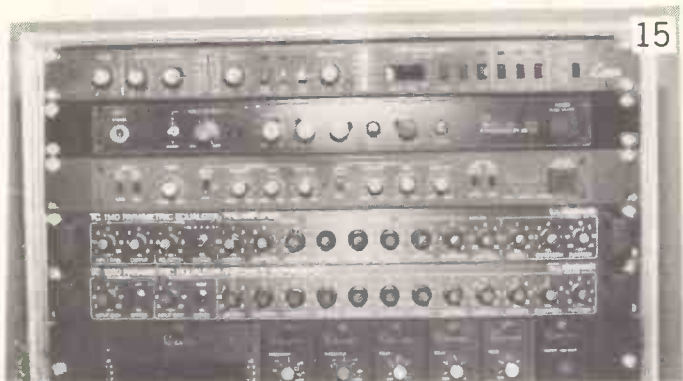
12. From Realton, the SAPP ZERO, giving Selective Stimulation of Acoustic Perception by synthesis of partials. The instrument stores 8 sounds, expandable to 120, with 8 digital sound generators and 4 complex ADSR per voice. Additions which can be fitted on the front panel include a more conventional synthesiser unit, a programme chain sequencer, and a modulation unit compatible with Variphon wind transducer. Tel. 02251 62044 (Germany).

13. Gibson research manager Bruce Bolan with the L5 and Moog-designed Lab series combo. New Gibson models include the wedge-shaped Futura, the Challenger series, reintroduced Epiphones and an Adagio acoustic. Tel. 01 253 7294.

14. Adam Hall supplies with a new range of extrusions, handles, Musiflex mic cables, flightcase components, rack systems, panels and much more. Most of their range can now be supplied coated black to order. Tel. 0702 613922.



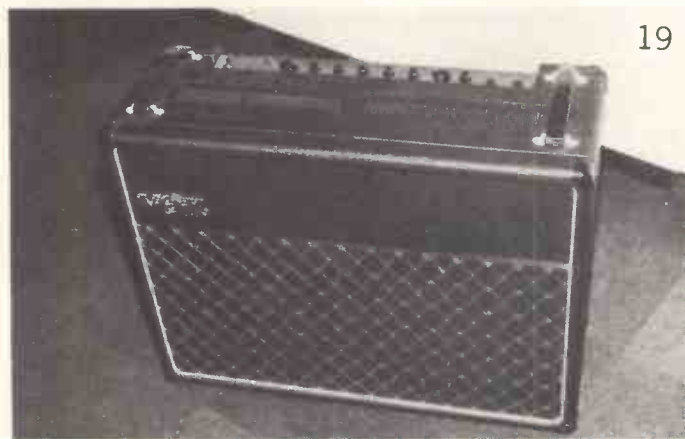
MUSIK MESSE FRANKFURT



15. The Cutec CD 424 Digital Delay (top), seen with Vesta Fire and t.c. units. The Cutec is a 14-bit design with 4 sub-delays, total 1024 mS, and retailing at £336 plus VAT. Tel. 0923 34050.

16. Welson's new Prosynth, with mixable footages, built-in amplifier, battery power option, 18 presets and 3-octave keyboard.

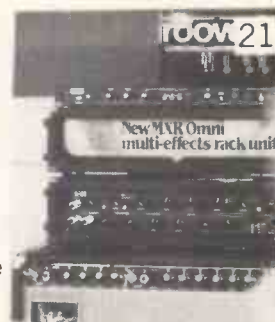
17. Dave Simmons with German demonstrator showing off the SDS5 kit and new electronic cymbal. Tel. 0727 54601.



18. Yamaha's top-of-the-range Electone organ features a digital music recorder. Tel. 04101 303-1 (Germany).

19. Vox V125 2x12" valve combo from Rose-Morris. Tel. 01 267 5151.

20. Custom Sound's 725 combo offers 150W of power for guitar with hi/lo inputs and channel select control.



21. The new MXR Omni programmable multi-effects unit, offering 5 effects in one package.

MXR Innovations have also introduced the Rooverb, a short spring reverb designed for a guitar amp. It has S/N of 65dB and variable gain in and gain out so you can choose whether or not to overdrive the spring. Retail price about £50.

Also on the way is the Kit II, with 9 drum sounds, tuning on all toms, decay, micro controlled pattern storage for 99 rhythms and dump to ZX81. Linked to a ZX81 micro it will store 99 songs each consisting of 99 bars from a choice of 99 sequences; these can then be dumped back on to the onboard memory before a gig so the computer need not be taken along.

The interface package to the ZX81 fits on the back of the Kit II; a 12 key pad controls programming functions, which can be step or real time, and programming display uses a Compumusic-style moving cursor. Sounds include a realistic clap and a ring modulator-produced cymbal. Presentation of the 8-pad unit is excellent, retail prices will be announced soon.

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- ★ Complete kit with detailed instructions

PARTS COST GUIDE
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Amdek's RMK-100 provides the musician with a versatile DIY unit capable of storing 16 programmable rhythms, each 16 steps in length. Rhythms are arranged as two banks of 8; A and B, which can be used together to create fills and chains.

These patterns trigger up to four instrument voices; Bass drum, Snare, Open Hi-hat and Closed Hi-hat with programmable Accent and auto Hi-hat features available.

Extensive 'user' options have also been provided allowing custom modifications to be made.

The Kit

All the parts required to complete the unit are supplied including case, components, connecting wire, solder and an Amdek spanner.

The only other tools you require are: a 15-30W soldering iron, cutters, pliers and both crosshead and slot-head screwdrivers.

When all of the components have been identified and marked off on the list assembly can commence.

The first stage is to fit the four pots and two push button switches into the subchassis. Twelve leads can then be cut, stripped and tinned before being connected to the pots. LED leads can be cut and tinned next, along with those of the battery snap.

Four more leads are then cut, tinned and soldered to the output and DC supply jacks (Steps 1-6).

The PCB supplied separates into two parts: The logic board, containing the control circuitry and the source board which houses the voicing circuitry. This action should be carried out with care along a straight edge such as a table or desk.

Once this has been done, three threaded spacers (or long nuts as Amdek call them) are screwed to the logic board, and the battery snap threaded through the hole provided. A knot should be made in its lead to prevent any connections being broken when the batteries are changed.

Leads can now be soldered to the logic board after the usual cutting, stripping and tinning procedure. Once the LEDs have been pushed into the subchassis their leads, along with those of the pots and power jack, can also be connected.

The logic board is then offered up to the subchassis and secured using the hexnuts of the rotary switch and pots, along with the slide switch screws. All the loose wires still to be connected should be kept outside the assembly to ensure that they are not trapped.

A jumper lead should be prepared and connected to the pushbutton switches along with 3 leads from the logic board.

The remaining loose wires can

now be connected to their respective points on the source board to complete the wiring (Steps 7-14).

Masks are then fitted over the slide switches and a piece of sponge pushed into the battery box. When this is complete the finished subchassis can be slid into the top half of the case and secured using 4 screws - making sure that the LEDs and pots are aligned correctly.

All that remains now is to attach the jacks to the rear of the case, secure the source board to the logic board via the threaded spacers, screw on the bottom of the case and add the cosmetic touches; rubber feet, knobs and switch keytops (Steps 15-20).

Four HP7 batteries are fitted into the battery holder which slides into the battery box and is secured using the cover plate.

The Circuit

The complete circuit diagram for the RMK-100 is shown in Figure 1, the circuitry being divided in two parts: logic and source.

The logic side is built round IC3 which is a 256 x 4 bit CMOS RAM, data outputs being connected to the respective instruments on the source circuit.

A clock is generated using two schmitt triggers from IC5, the rest of the package being used to buffer and shape the 'Write' and Start/Stop controls. The clock output is fed to a

buffer, Q7, and then via SW5 to one of the two counters contained in IC4. The four outputs from this counter provide the address for the 16 locations in memory which represent the rhythm. Rhythm selection is provided by SW6 which is encoded into binary format by the diodes D20-27 to produce the lower 3 bits on the address lines. Fill control is provided by the second counter in IC4, selecting bank B on the 2nd, 4th, 8th or 16th pattern.

Chaining options 1-4, 5-8 and 1-8 are also provided by this counter which overrides the 1-8 selection on SW6.

Voices are generated using analogue circuitry. Transistor Q15 and its surrounding circuitry produces a damped oscillation when triggered via D31 to simulate a Bass drum.

Noise is produced by the circuitry around Q12/Q13. When triggered it is gated by Q10, at the same time as a damped oscillation is produced by Q14 and associated circuitry thus allowing a Snare to be simulated.

Six oscillators, based around IC6, are mixed and filtered by half of IC7 to provide the metallic quality of the Hi-hat, which is gated using long and short envelopes to represent open and closed modes.

All of the voices are mixed and fed through the 'Accent' stage which normally attenuates the signal unless triggered via D30 which lets more signal through.

Operation

Programming can be accomplished easily in beat/rest fashion. The rhythm (1-8), bank (A or B) and instrument (Bass drum, Snare, Open Hi-hat or Closed Hi-hat) are selected and the 'Write' mode entered.

The orange, or start, button is pressed for a beat and white, or stop, for a rest. Each depression causes the unit to step to the next location. Rhythms are built up in this fashion for each instrument.

During playing, fills can be introduced which bring in the 'B' selection on the 2nd, 4th, 8th or 16th 'A' pattern. Complete chains can also be constructed of up to 8 rhythms played sequentially.

Accents are programmed as Closed Hi-hat and can be played with or without auto Hi-hat.

If you have any problems with construction or operation contact the Amdek 'Hotline' at Roland UK (tel. 01-847 1671).

Modifications

Amdek have thoughtfully provided the user with an extra socket which can be used for several different mods:

- 1) **Foot Switch:** Connect the socket to pad 23. A footswitch control can be connected to provide remote start/

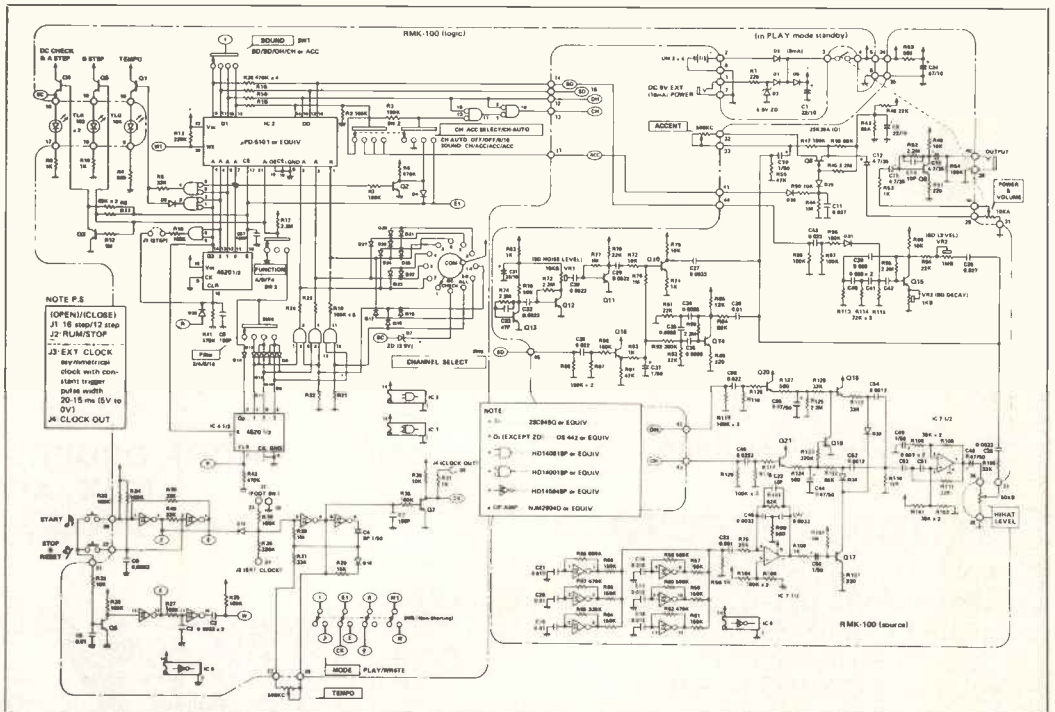
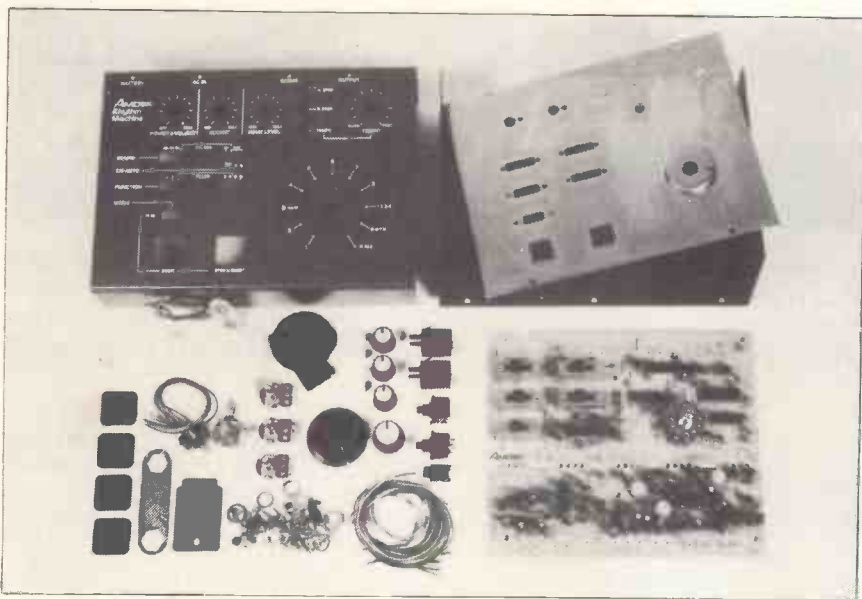
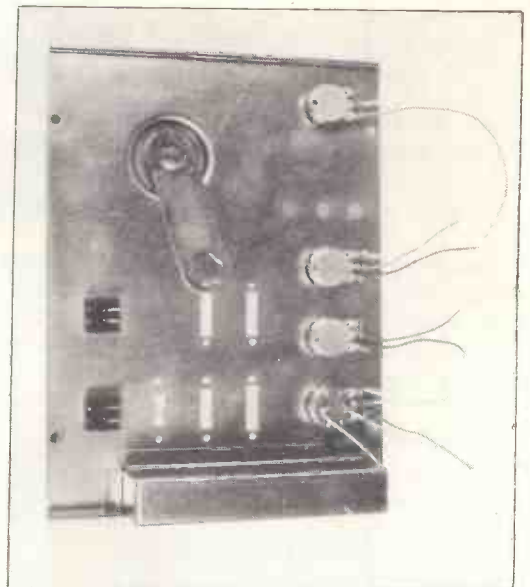


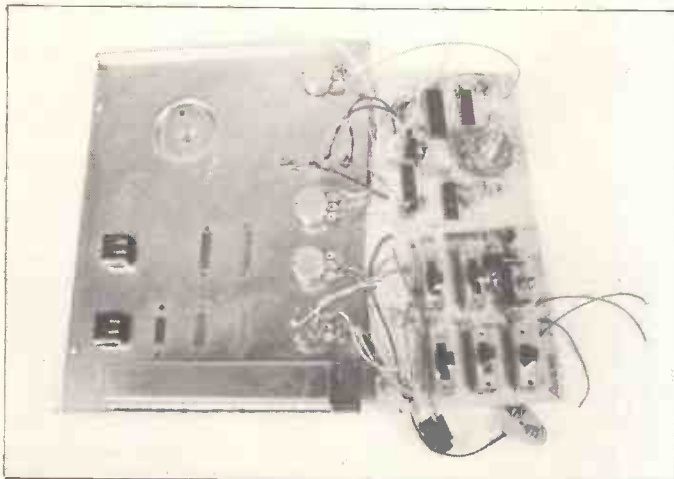
Figure 1. Circuit diagram of the Rhythm Machine.



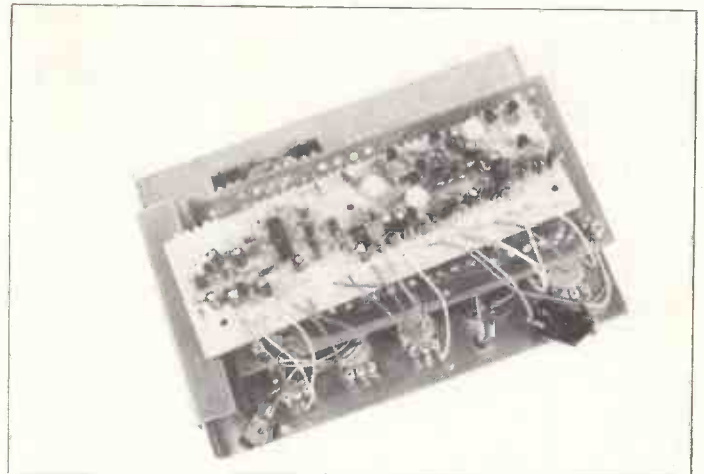
All the parts ready to be checked off.



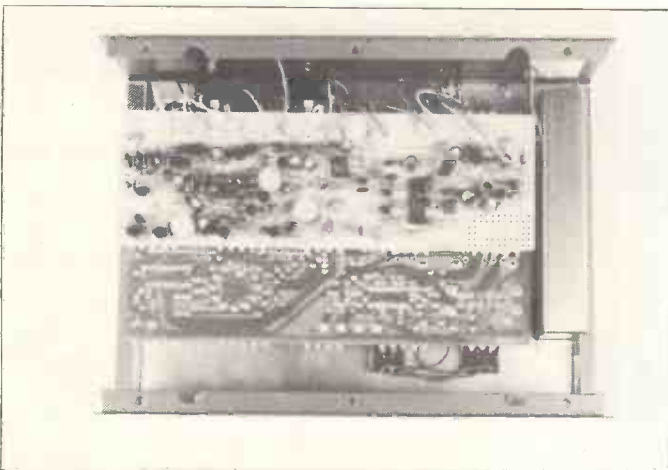
Pots and push button switches mounted to the subchassis (Steps 1-3).



Logic board with battery snap, pots and LED's connected (Steps 4-11).



Logic board mounted and source board connected (Steps 12-14).



Internal construction complete (Steps 15-18).



The completed Rhythm unit with knobs and switch tops added (Steps 19-22).

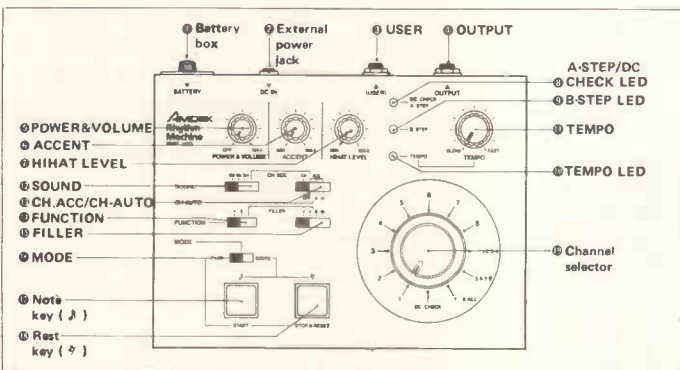


Figure 2. Panel description.

stop operation.

- 2) External Clock:** Connect the socket to pad 24. A 0-5V trigger pulse can be connected and used to drive the internal circuitry. This can be useful to 'sync' off a click track.
- 3) Clock Out:** Connect the socket to pad 26. The internal clock can be accessed and used to trigger external circuitry or to produce a click track when connected to a suitable interface.
- 4) Step Length:** By connecting a switch across the two pads on the logic board (J1) the step length can be altered from 16 to 12.
- 5) External Voicing:** All four of the instrument triggers (pads 12-15) can be connected via extra switched jack sockets (drill holes in rear panel). Therefore internal voicing is triggered until a jack plug is inserted. Circuits such as the E&MM Syntom and Synbal can then be connected turning the Rhythm Machine into an even more creative music-making instrument.

E&MM

E&MM's special offer price for the Amdek Rhythm Machine is £74.00 inc. VAT and P&P. Please order as: Amdek RMK-100 Kit.

Six articles showing you how to write a song (or instrumental) from scratch, explaining the idea of rhythm and the use of syncopation, melody writing, how to fit words to a melody, how to build appropriate harmonic structures, the use of form, how to devise such common devices as riffs and how to use the instruments you have available to play the music you have written. Month by month the lessons you have learned and the exercises you have written will enable you to write a complete piece of your own.

Part 1 Writing a Melody

This month, in the first of these articles, we look at the rhythmic and harmonic implications of writing a rock melody — the use of syncopation to give the correct feel, how to choose the notes for the melody — with exercises to give the necessary practice.

Writing music can be seen as arranging sounds in time to produce a satisfactory effect. Our culture uses the concept of rhythm to decide the relative duration of sound (and silence) and of the distribution of accent. This works by having a steady pulse or beat against which the sounds can be measured and a regular pattern of accented beats. In our notational system this is brought about by use of a time signature and barlines.



Figure 1a.



Figure 1b.

Tap the pulse of Figure 1a with your foot. Use a steady tempo and count time aloud as shown. With your hands clap the rhythm in time with the pulse. Do this several times and then repeat the process for Figure 1b. You should feel the difference between dividing the pulse into groups of three and groups of four. Also, in 1a most of the notes occur on the beat, and those that don't belong to a group of notes starting on a beat. This creates a very different effect to that of 1b where the opposite is true.

This latter effect is called syncopation and its use in varying degrees is mainly responsible for the difference in style between blues, jazz, rock, pop and 'straight' music, where most of the important things happen on the beat.

In a melody, in general, the important notes are the ones belonging to the prevailing harmony. For our purpose, this means a note belonging to the chord being used to accompany the melody at that point, or one belonging to the mode or scale from which the melody is taken.



Figure 2a.



Figure 2b.

Figures 2a and 2b show melodies harmonised by the chord of C7. Careful examination will show that the notes belonging to that chord (C,E,G,Bb) occur mostly on the beat and any 'foreign' notes occur off the beat. Again, counting time aloud, sing or play the melodies whilst tapping the pulse with your foot.

Now repeat this procedure for Figures 3a and 3b.



Figure 3a.



Figure 3b.

A comparison of 2a and 3a will show that the melody of 2a has simply been pushed forward by half a beat to give the melody of 3a. This results in the harmony notes being on the off beat giving a syncopated effect.

Comparing 2b with 3b will show that the first five notes of 2b have been brought forward in 3b and that the rhythm for the last two notes has been altered to place both of them off the beat. Thus, syncopation can be achieved by placing the important harmony notes either before or after the beat.

There are ways of writing melodies other than by simply stringing together a mixture of harmony notes and 'foreign' notes over a chord sequence. A very common one in rock music is to let all of the notes in the melody belong to a pentatonic scale regardless of the chord sequence being used to support the melody.

A pentatonic scale is one consisting of five notes and is usually built using the first, second, third, fifth and sixth degrees of the major scale. Figure 4 shows the pentatonic scales in the keys of C, F and Bb major. In theory, any pentatonic scale can be used against any chord (examine the improvisations of Joe Sample, Wayne Shorter, etc.) but in practice it is usual to use one belonging to a scale which is fairly close to the key of the chord sequence.

Figure 5 shows a syncopated melody using the pentatonic scale of Eb over a blues sequence in the key of C. Examine it carefully and then play the melody, keeping a steady pulse. If you are playing this on a polyphonic keyboard, play the chords in the rhythm of the pulse. If you have no means of playing the melody and the chords simultaneously, try pre-recording the chord accompaniment and playing the melody along with the tape. (It is important to keep the accompaniment on the beat at this stage to maximise the syncopation of the melody.)

I cannot over-emphasise the necessity of being able to play these syncopated rhythms and melodies whilst counting time and keeping the pulse. I know many adequate players who cannot read music and, although they play syncopated phrases, could not actually keep the pulse against them. The knowledge of syncopation and the ability to write and play syncopated phrases gives access to an endless supply of totally authentic rock phrases, not available to musicians who prefer the learning methods of blind parrots. When practising syncopated melodies, you might find it necessary to practise clapping the rhythm only against the pulse to start with and then add the complete melody when the rhythmic part is satisfactory.

Exercises

1. Write some rhythms similar to Figure 1a, where most of the notes occur on the beat.
2. Syncopate these rhythms. Experiment until a satisfactory result is achieved.

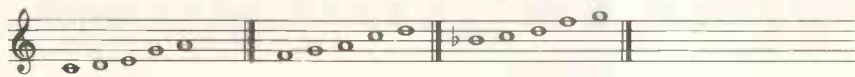


Figure 4. C Major F Major Bb Major

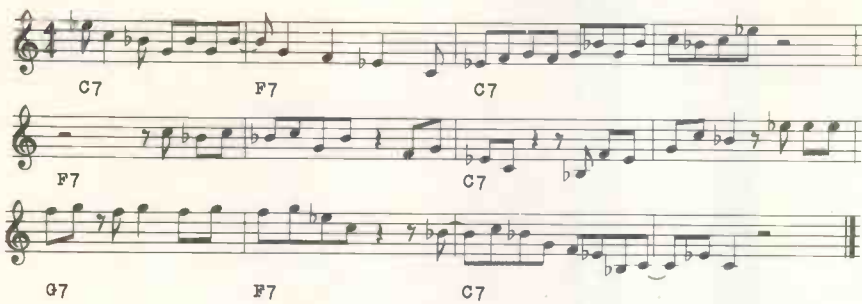


Figure 5.

3. Repeat this process by writing simple one bar melodies using the harmony notes of one chord only. Use harmony notes on the beat at first and then rewrite using syncopation. This process can be expanded to the use of two, three four bar chord sequences, etc.

4. Write syncopated pentatonic melo-

dies of various lengths. Try playing them against various chord accompaniments.

Next month we will look at the problems posed by adding words to a melody. Happy syncopating!

Martin Glover

E&MM



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STUDIO SOUND TECHNIQUES

Tape Machines

Nearly all studios use analogue tape machines of one sort or another. The fact that many of them are more than ten years old and still in working order shows that with proper maintenance they are basically reliable.

While digital recorders have many advantages over their analogue counterparts, cost is not one of them. In fact, the price of these machines with editing facilities puts them well out of reach of all but a handful of top studios, let alone home studios. Still, it probably won't be that long before they become commonplace. Until then we will have to continue trying to get the best out of our analogue machines.

Because the magnetic information on the tape is directly related to the instantaneous level and frequency of the input signal, any deviation from the correct path of the tape past the heads will result in poor reproduction. It follows then that maintenance falls into two main areas — mechanical and electrical. These are often closely connected insofar as the mechanical shortcomings may only manifest themselves on an electrical meter or as an audible disturbance on the output. Conversely, an electrical fault may manifest itself in poor tape handling.

One of the first points to note about magnetic information on tape is that the record head impresses the majority of the signal on the full depth of oxide (magnetic material); whereas the playback process is largely a surface phenomena, particularly at high frequencies. This is why hybrid tapes can use chromium dioxide for the high frequencies and ferric oxide for low frequencies. In practice this means that the reproduce (playback) side of things will generally be more sensitive than the record side. This is good news from the viewpoint that prompt action on hearing degraded playback performance can save fruitless recording attempts.

It is often tricky to ascertain whether loss of signal is due to a failure in the record or playback circuits. This leads us to a syndrome known as: What's on the tape? Putting faults to one side for a moment, a good machine will have many preset adjustments accessible from the front so that the frequency response of the machine can be optimised for a particular tape. Make no mistake that different reels of the same



make and type of tape will possibly require different settings of bias and high frequency equalisation which are closely related. Some types of tape are more stable in this respect than others; Ampex 406 and 454 are, from experience, very good. So if your machine has inaccessible bias or high frequency record equalisation controls you would be better off paying more for a higher quality tape. On the other hand if you are running your studio commercially, you will be required to handle tapes recorded elsewhere, in which case convenient adjustments to equalisation and bias are mandatory. There are several equalisation standards for recorders; notably NAB and AES in the States for 15 ips and 30 ips respectively, plus IEC and CCIR in Europe, both for 7½ ips and 15 ips. It is important to know which type your machine is and obtain a calibrated alignment tape. Some have switchable equalisation which is very useful.

Storage Of Tapes

Alignment tapes or any master tapes are best stored having been played through so

that you would normally place them on the take up reel and rewind them. This is common practice because the tape is protected from several potential sources of trouble when stored 'tail out'.

Edge Damage

If the tape has been fast wound onto a reel, you will notice that some tape edges appear to be 'leafy' or sticking up. In the normal course of handling, these edges can get bent over which will result in poor tape to head contact when that portion of the tape passes the heads. These type of drop outs can be eliminated by playing the tape through at normal speed and obtaining a flat wind.

Print Through

People often ask why print through should be better by leaving the tape tail out rather than head out. After all, at first sight there appears little difference. The reason is coupled to two facts. Firstly, as mentioned before, the magnetic information is recorded into the full depth of oxide, whereas playback information is mainly picked up from the surface. Secondly, pre-echo is more upsetting psycho-acoustically because dramatic entrances are given away losing the effect altogether. Remember that a pause in music, where the full dynamic is perceived, is often crucial to evoke the right feeling. On the other hand we are well used to hearing post echo as provided by any normal environment or enclosed space.

Thus, when tapes are stored tail out, the magnetic corruption to create pre-echo has to take place through the thickness of polymer backing and oxide (which tends to form a magnetic barrier) to get to the surface of the previous turn. When stored head out the magnetic corruption has only to pass through the polymer backing to reach the playing surface. See Figure 9.

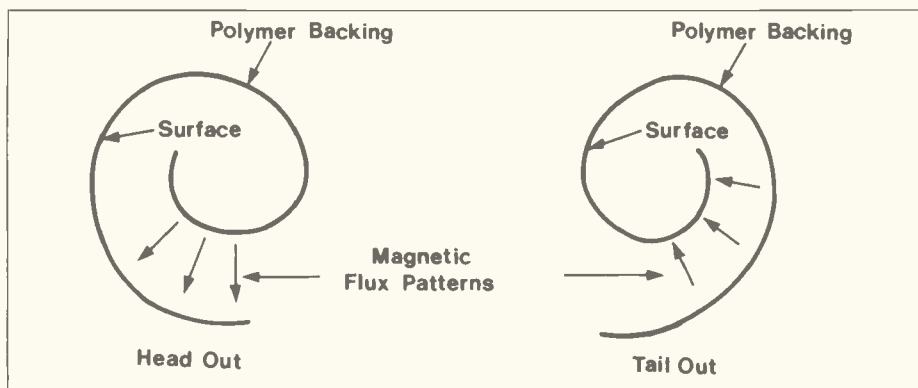


Figure 9. Alternative tape storage.

Symptom

1. Leafy Wind/Rewind
2. Slow Wind/Rewind
3. Slow Start In Play Mode
4. Tape Throws A Loop On Right Hand Side Of Pinch Roller
5. Intermittent High Frequency Performance (Drop Outs)
6. Flutter Sounds
7. Poor Speed Stability (Wow)
8. Tape Creeps Out Of Pinch Roller/ Capstan Or Weaves Across Heads
9. Loss Of High Frequencies
10. End Of Tape Cutout Fails

Cause

Insufficient Back Tension
Too Much Back Tension
Too Much Back Tension On Supply Reel

Insufficient Play — Take Up Tension

Overall Supply/Take Up Tension Too Low
Worn Pinch Roller Or Capstan Bearing
Stuck Roller Guide

- a) Pinch Roller Pressure Too Low
- b) Pinch Roller Worn
- c) Pinch Roller Dirty
- d) Pinch Roller Smooth And Shiny

- a) Unevenly Worn Pinch Roller
- b) Too Much Pinch Roller Pressure
- c) Poor Tape Slitting

- a) Dirty Heads
 - b) Heads Off Azimuth
 - c) Incorrect Bias
- Dirty Actuator

Table 1. Common mechanical faults.

Although this analysis is only looking at pre-echo print through, by reversing the direction of the arrows in Figure 9 a similar argument can be constructed to show that post-echo print through will be worse when storing tapes tail out. Of course in practice both take place simultaneously and they are both reduced by using noise reduction systems which we will come to later.

Aligning The Machine

Mechanical: The main points of interest on the mechanical side involve how the machine handles the tape in the various modes of operation. There should be no sudden snatching of the tape when changing modes. The specific procedure for adjusting the tensions on the take up and supply reels in the different modes on your machine, should be in the manual supplied with it. If you don't have a manual and you intend keeping the machine it is worth trying to get one, otherwise here are a few checks you can carry out.

With equal amounts of tape on each reel, slip a loop of string over the pinch roller stem (Fig. 10). Press the 'play' button and pull on the string so that the pinch roller does not

meet the tape. If the tensions are equal the tape will remain stationary which is best, or creep very slowly one way or the other. If it moves moderately in either direction the chances are that the tape speed will vary evenly over the length of a reel. This means that songs recorded at the beginning of a reel will run at a different speed if spliced to the end of a reel.

Another way of checking this is to record a tone at the beginning of a reel, splice it to the end and compare it with the original frequency of the oscillator. If you find a difference but no way of adjusting the 'play' tensions, make a mental note to try to keep recorded material in the same relative position (i.e. beginning, middle or end) on the reel. That way at least you will get back from the machine songs at the same tempo and tuning. Though they may well sound quite different on another machine!

A crude but useful way of checking how much back tension there is in a given mode involves displacing the tape between the reel and tension arm or guide using your index finger. See Figure 10. Although you cannot make a measurement like this at least it gives you a feel of how much tension there is. After some experience of using this method

you can make a fair assessment of normal tensions. Take care in the fast winding modes not to upset the tape path too much or get your fingers caught on the reels! Table 1 lists some common faults and their possible causes.

Electrical: The following description is a generalised one so various points may not apply in your specific case. However, you will need:

1. Cotton buds and head cleaner.
2. Demagnetiser.
3. Assorted screwdrivers and spanners.
4. Audio oscillator.
5. Alignment tape.
6. Some way of metering the input and output.

Firstly, clean all the heads and guides so that they are bright and shiny. Check the heads for the first signs of uneven wear (see Figure 11). Figure 11a shows a normal wear pattern i.e. equal amounts of flat either side of the gap down the centre of the head.

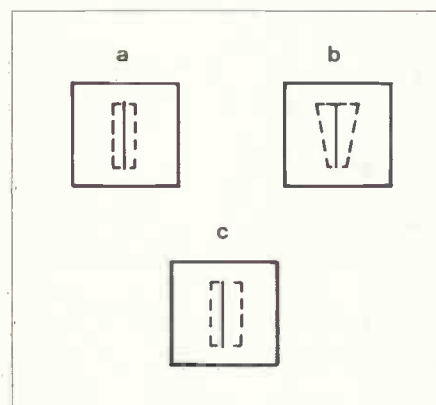


Figure 11. Head wear patterns.

Under most circumstances this should be less than half of one centimetre altogether. Any more than this may result in poor tape to head contact at the gap which is vital for correct operation. Any dust or oxide stuck in the gap will impair the frequency response. Oxide is a particular nuisance since it acts as an alternative route for the magnetic information, preventing the magnetic flux appearing across the gap. If the heads are badly worn Figure 11b and c there are several companies who will relapp them, giving the machine a new lease of life. This is especially useful on old multitrack machines where the cost of relapping is marginal compared to replacing heads.

Next demagnetise all the parts in the tape path (heads, guides and rollers). Make sure to switch the demagnetiser on at least three feet from the machine and any master tapes. Failure to observe this precaution can result in transient magnetic fields adversely affecting these objects. As a general rule it is worth trying to take the demagnetiser through the machine following the tape path; from the supply reel, past the heads, to the take up reel, taking care not to stop in one spot or go back over any section. This is done with the power to the machine switched off.

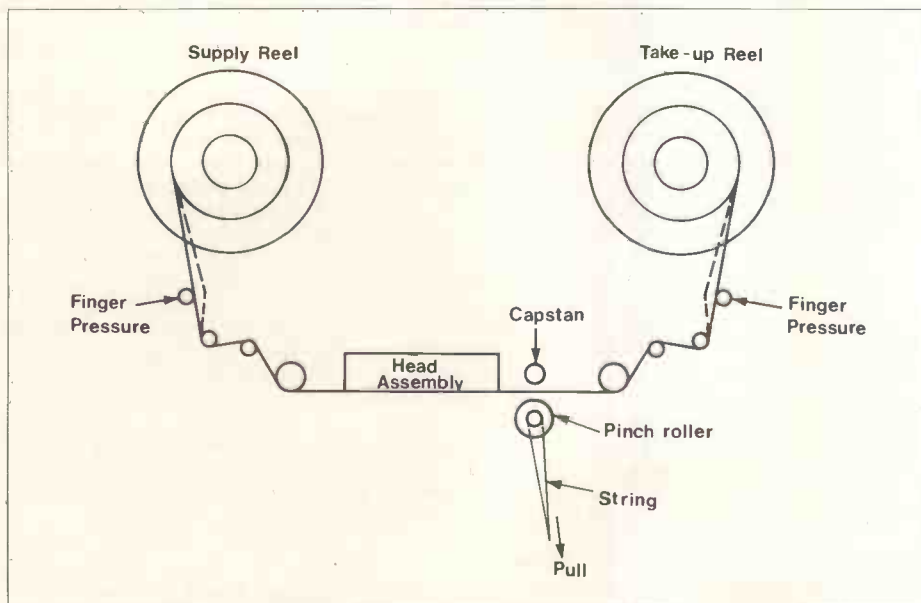
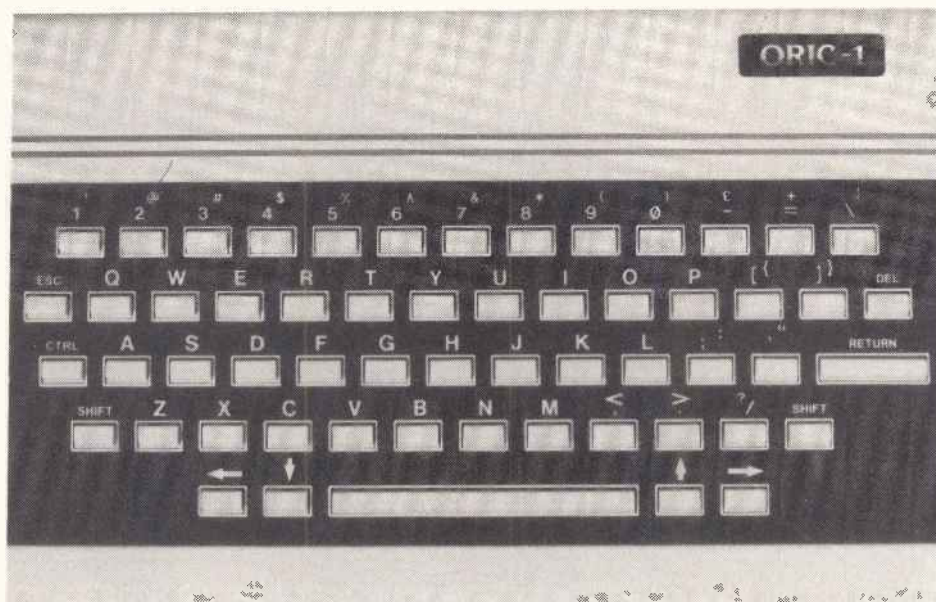
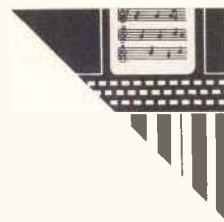


Figure 10. Checking the tape tension.

Oric-1



Oric-1 is the latest of a new breed of colour micros vying for space in the personal computer market. Priced at £99.95 for the 16K, £169.95 for the 48K version, featuring 8 colours, built-in sound and printer interface, it is very much in direct competition with Sinclair's Spectrum.

This article is intended as a review of the features which would make the Oric a good choice for music making, namely: Graphics, Sound, Machine code programing and external interfacing.

Construction

The computer is very attractively styled in a sturdy, moulded grey plastic case. All the circuitry is enclosed in the lower section of the case which is angled, sloping the upper section; the keyboard, towards the user.

Keys are arranged in standard QWERTY format with clear, uncluttered labeling above each key. The keyboard is constructed from separate plastic tabs placed over a sheet of silicon rubber with conductive rubber dimples which, when pressed, bridge gold-plated contacts on a PCB. The 'snap effect' produced by the dimples gives the keyboard a nice 'positive' feel.

Internally, the quality of construction is very high. A second, resist coated, PCB sits above the keyboard containing all of the main circuitry.

The 6502 CPU, I/O Ports and AY-3-8912 sound generator are situated below two ROMs containing the 16K Oric Basic (right of the speaker).

Left of the speaker are: the dynamic RAM, 48K in this case; ULA (Uncommitted Logic Array); Address decoding; Audio amp and Video circuitry.

All the connections to the board are made with sockets, alleviating the problems associated with direct edge connections. From left to right (in the internal photo) these are: phono for UHF TV; 5-pin DIN for RG&B colour monitor signals; 7-pin DIN for cassette interface and sound output; 20-way 0.1" connector for printer connection (Centronics compatible); 34-way 0.1" connector for system expansion and a DC power socket.

Graphics

When power is applied to the machine it replies with a black and white display of the number of bytes free and 'Ready' — commands can now be entered.

There are 4 graphics modes available: TEXT — which prints ASCII characters in black on a white background; LORES 0 — which prints ASCII characters in white on a black background; LORES 1 which prints the alternative graphics set, used for Teletext/Viewdata; and HIRES which provides a 240 x 200 pixel window for plotting and 3 lines of text for commands.

Foreground and background colours are accessed using INK and PAPER commands each with 8 possible colours: Black, Red, Green, Yellow, Blue, Magenta, Cyan and White. Characters can also be printed in HIRES mode.

Sound

The built-in generator is capable of producing 3 channels of sound, comprising of 3 tones and/or noise with versatile envelope control. Signals from the chip are amplified by an LM386, audio power-amp, which produces about 1/2W into the speaker. This is certainly loud enough for most applications but an output is also available from the cassette DIN socket, for connections to an external amplifier, if required.

Sounds are generated in normal use with high or low frequency 'pips' for ASCII or control key depressions. These can, however, be disabled by typing CNTL F. Also, a high frequency 'ping' is produced when a line containing over 76 characters is entered.

Several sound commands have been provided for use in Basic programs. Three of these produce sounds suggested by their names: ZAP — short falling frequency sweep; SHOOT — short burst of noise and EXPLODE — long decaying envelope of noise. Obviously these are intended to be used in games but they do demonstrate some of the possibilities available.

Three more interesting commands are SOUND, MUSIC and PLAY. These allow the user to create his, or her, own effects within a program.

SOUND (Channel, Period, Volume)

The three parameters shown in brackets must be numeric but can be variables. *Channel*: selects tone or tone and noise in any of the 3 channels. *Period*: sets the frequency of the tone. *Volume*: sets volume level or if 0 passes control to the envelope set in the play command.

MUSIC (Channel, Octave, Note, Volume)

Similar to the SOUND command with with the pitch set in musical intervals.

Octave: Values range from 0 to 6 with 0 giving the lowest tone. *Note*: Numbers from 1 to 12 representing semitone intervals from C to B. *Channel and Volume*: Set as in the Sound command.

PLAY (Tone Enable, Noise Enable, Envelope Mode, Envelope Period)

Tone Enable: Numbers from 0 to 7 select the 8 tone combinations possible with 3 channels. *Noise Enable*: Numbers from 0 to 7 select which of the 8 tone combinations noise is added to. *Envelope Mode*: Seven modes are available — Single envelope with short attack and set decay; Single envelope with set attack and decay; Continuous rising and falling envelope with set attack and decay; Reverse single envelope with set decay from maximum to minimum volume and short attack to maximum again; Continuous rising envelope with set attack and short decay and reverse single envelope with short decay and set attack to maximum volume. *Envelope Period*: Sets the value of the attack or decay period.

Using these commands it is possible within a program to produce a large range of musical and non-musical effects.

It must be said, however, that the output is almost too loud and cannot be set when using the PLAY command.

Machine Code

As BASIC is really too slow a language to use for direct sound generation or control applications, the ease in which machine code programs can be generated is very important.

With no assembler or machine code monitor, instructions must be poked into a section of memory reserved for MC programs.

Hex instruction codes can be entered directly, however, when preceded with a '#' character.

The command CALL followed by the address can be used to transfer control from BASIC to a MC routine, a return being made with the instruction RTS.

Another way of calling a MC routine is to define the address with DEF USR = Address then PRINT USR (0) whenever required.

Locations from 0400H to 0420H are reserved for MC programs but more memory can be reserved by limiting the amount allowed for BASIC using HIMEM address.

Two commands DEEK and DOKE are also provided which allow decimal numbers, up to 65535, to be PEEKed or POKEd into two consecutive locations.

Writing or reading to or from the screen is a simple matter using either MC or BASIC programs as the Video locations are memory mapped and with the expansion bus provided at the back of the unit, external circuitry such as ADCs and DACs can be connected and decoded to be used in music production.

MC programs, or blocks of memory, can be saved on tape by specifying the start and finish addresses, data transfer being accomplished at 2400 baud. This allows 16K to be loaded or saved in approximately 2 minutes. Data can be transferred at 300 baud but the normal speed works adequately with good quality tapes.

Conclusions

Overall, the ORIC is well engineered, both internally and externally, with a very 'clean' appearance.

The Basic has most of the commands found in Standard Microsoft, with additional sound and graphic commands but without logical operators: AND, OR, NOT and tape VERIFY, which seem a strange omission.

Every command must be typed in full, rather than single key entry as on the Sinclair's, but this can be faster and more precise than constantly using shift functions.

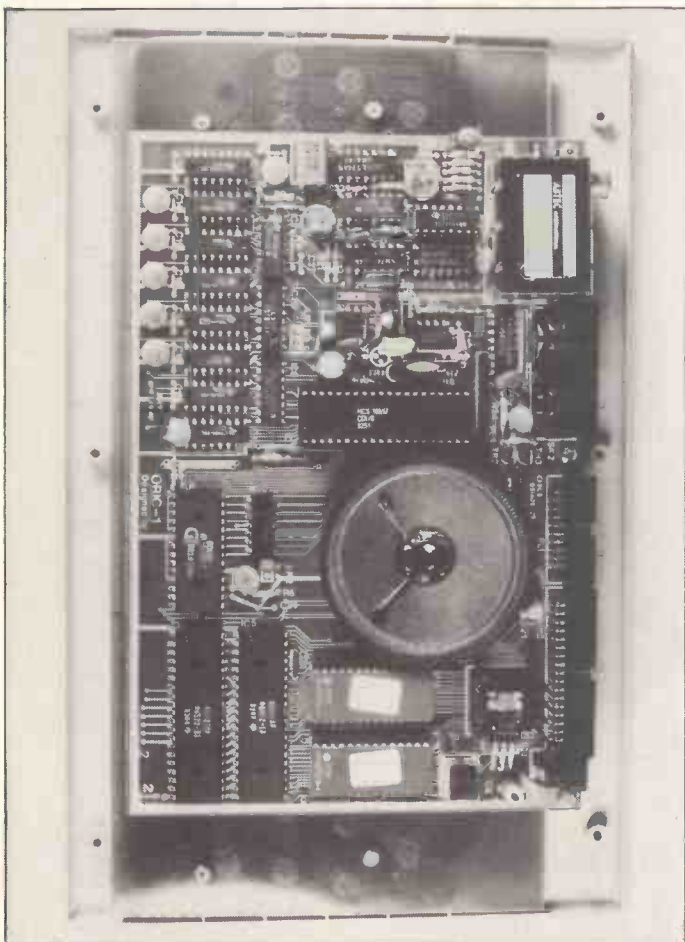
The manual supplied does seem to lack detail in some areas but no doubt 'user' literature will soon start pouring onto the computer bookshelves, as it has done for so many other machines.

Whether you are looking for a computer which can be used as a creative music-making tool, generating it's own sounds or controlling external instruments, or as a general purpose machine for use in the home, the Oric would be a good choice.

When the Oric Modem is available the machine will be able to provide access to Prestel information and electronic mail communications as well as 101 other applications.

Kenneth McAlpine

E&MM

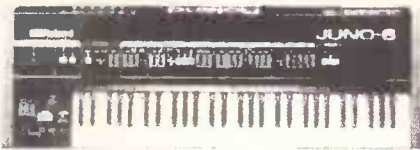


Internal view of the ORIC-1.

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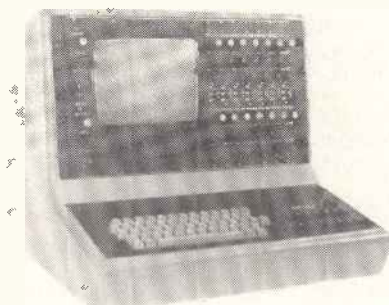
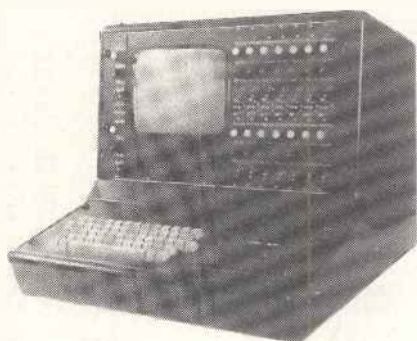


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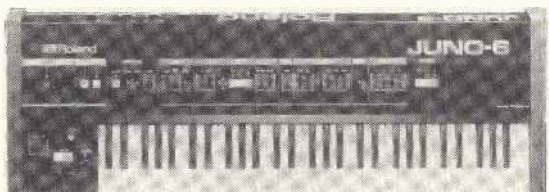
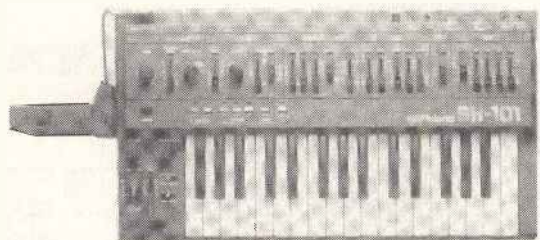
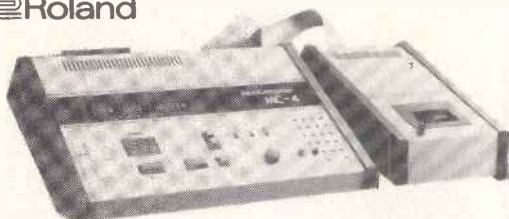
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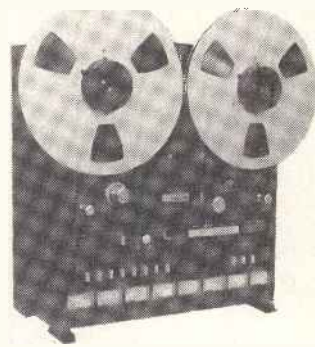
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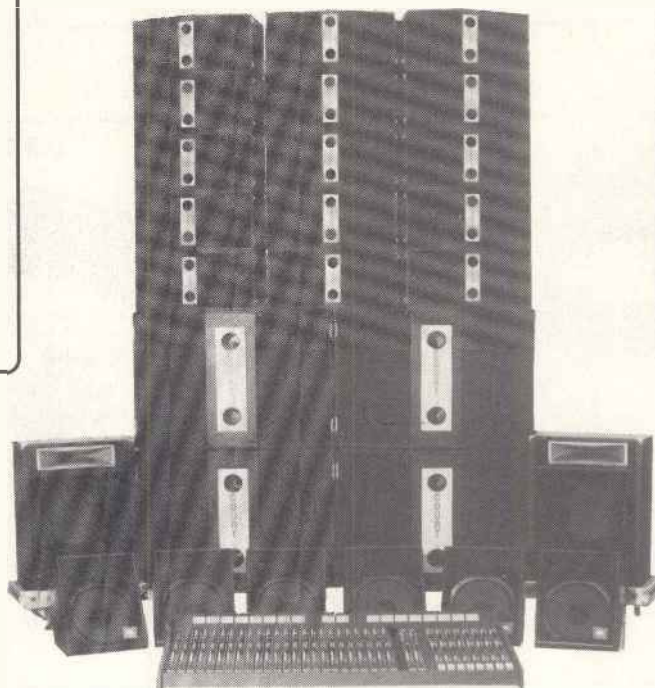
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Eko Pony Synth



Eko's Pony Synth is a portable keyboard similar in concept to several of those reviewed in the November 1982 issue. Although it doesn't have the facility of battery power, it is compact and portable, and includes its own amplifier and speaker in addition to outputs for external amps; therefore it's suitable for use in many applications from the front room to the small stage.

Although the ergonomics are good, its basic presentation doesn't make an immediate impact. It's finished in a matt brownish-black with yellow and orange tablet controls, and yellow sliders and lettering. The keyboard is a full-size four octave C-C design with an action which is pretty standard while not being unpleasant — suitable both for learners and for the more experienced musician. The single speaker is situated to the left of the modern-looking sloping control panel.

Roughly, the controls are divided into four sections, which will be dealt with from left to right. First, the sliding Master Volume control and below that a set of five Orchestra tabs, giving Flute 16 foot, Flute 8 foot, Flute 4 foot, and Strings. These are fully polyphonic sounds typical of an inexpensive home organ.

The next section is marked Synth, with two sliders for Glide and Synth Volume above and five tabs below. The tabs are Brass 1, Brass 2 and Piccolo, together with Poly and Vibrato.

In the Poly mode the three sounds available are fully polyphonic, with the brasses having a pronounced filter 'wah' and the piccolo a more subtle envelope effect. These sounds are quite useful, certainly not what would be expected on an inexpensive organ, and surprisingly powerful in combination. The envelopes don't re-trigger if any note is held down, but that's only to be expected.

Switching the Poly mode off gives the same sounds but in a monophonic high-note priority mode. On this setting the glide control comes into operation, giving a quite spectacular effect over the whole four octaves of the keyboard and making some



interesting Moog-like effects possible (primarily by holding down a low note and quickly repeating a higher one). Unfortunately the Synth section does not cancel out the Orchestra section and so both sounds will appear on any note played, giving some problems in balancing lead and chordal lines.

The final tab is vibrato, which gives a delayed vibrato to both Synth and Orchestra sections, the delay re-setting whenever no keys are held down.

The next section is Automatic, with a Synchro Start facility labelled Key, a Memory to sustain the selected chord after the key is released, and tablets for Bass Accompaniment and Auto Magic Chord (AMC). The AMC section gives single finger chords and the Bass Accompaniment gives a bass pedal sound; alternatively when the rhythm section is started, rhythmic chord accompaniment and a walking bass are produced.

Like the Accompaniment section the Rhythm section has an individual volume

slider. There are eight rhythms, Waltz, Tango, March, Rock 'n' Roll, Slow Rock, Disco, Bossanova and Samba. Although no variations or fills are available, these are well composed and the voicings are clear and sharp, the high-hat's simulated opening and closing being particularly good. Rhythms can be mixed, although this also produces mixing of the bass accompaniment patterns which is usually fairly unharmonious.

The Accompaniment section works on the lower octave and a quarter of the keyboard, and two small buttons on the front of the machine change any chord played by it to the Minor or 7th form. The notes are numbered all along the keyboard, and the single finger chords lettered for learning purposes.

Internally the Pony Synth is well constructed, with most of the electronics on a single board running beneath the control. Voice generation and microprocessor control are by 28-pin Texas chips TMS 3630 and TMS 1000, with most of the rest of the electronics being standard CMOS and clocks such as 555's. Wiring harnesses are neat and connected with multi-way plugs, but since all the wires to the keyboard are white, problems may arise if a single note needs servicing.

The concept of the Pony Synth — adding synthesiser functions to an inexpensive instrument and introducing microprocessor control — is potentially a fruitful one, and while it provides some useful effects on the Pony Synth which raise it above the level of a beginner's machine, it will be interesting to see what else can be done along the same lines in the future.

Mark Jenkins

E&MM



Internal view.

The Pony Synth comes complete with music stand and with expression pedal and legs as optional extras. Retail price including VAT is £259 and distribution in the UK is by John Hornby Skewes & Co. Ltd., Salem House, Garforth, Leeds LS25 1PX. Tel. (0532) 865381.

America

Jerry De Muth

Synthesizers, especially polyphonic synthesizers, have been costly investments for musicians who are just getting started or who want to add a synthesizer to the multitude of instruments used by their bands in order to increase the voices and colours.

But as with everything else electronic or computerised, prices have been falling and among the latest synthesizers are instruments that range in price from Star Instruments' electronic wind synthesizer, Starwind, priced at \$195, to Korg's six-voice polyphonic PS-61 synthesizer at about \$1500. In between are instruments from Synthauri and Roland.

Starwind, which responds to both touch and breath intensity, features a five octave range. Two left hand operated keys transpose the instrument by one or two octaves while internal tuning can transpose the Starwind an additional two octaves. A third key is used to select the pitch source and the two remaining keys are used to brighten the sound by breath controlling the synthesizer's filter or oscillator waveform.

Trombone slides are available using a glide control, breath can produce staccato notes or swelling passages and pitches can be bent. Options include an FM transmitter for \$19 and a custom case and recharger, also available for \$19, for use instead of the 9 volt battery.

Korg Synthesiser

Korg's PS-61 is a six-voice, two oscillator per voice, programmable polyphonic synthesizer that features a 64 program memory with full edit and program move capabilities, polyphonic and chord memory/unison playing modes, high speed tape interface with interactive display, and a versatile arpeggiator with memory latch mode.

The PS-61's 12 digital controlled oscillators combine the full sonic capabilities of regular oscillators with the superior pitch stability of digital control. The arpeggiator automatically memorises and sequentially plays note and chord sequences in three different patterns and ranges and can also be synced to external devices such as rhythm machines, sequencers, footswitches and other synthesizers.

In addition, a four-way joystick controls pitch bends, vibrato and filter tremolo effects; poly, chord memory/unison and hold key assign modes provide parallel harmonies and monophonic bass and solo-



Pearl Effects.

ing sounds; and release and program up footswitch jacks offer foot controlled sustaining and program change capabilities. Yet the synthesizer weighs only 24 pounds.

Effects

New effects devices have been introduced by Pearl International and Roland Corp, while MCI has introduced a new Sanox unit that provides power for up to four effects devices.

Pearl's new Sound Choice series consists of a chorus ensemble, an analogue delay and a phaser. The CE-22 Chorus Ensemble features, dual-programmability with stereo output, user-variable chorus rates and delayed vibrato which can be varied in rate, depth and delay time.

The AD-33 Analogue Delay is a complete electronic delay device that uses BBD (Bucket Brigade Device), provides stereo output and a wide range of time variation effects such as delay, echo, reverberation and voice doubling, and reduces poor transient response.

The PH-44 Phaser offers slow phasing rates (0.3 to 0.8Hz), fast phasing rates (6 to 8Hz) and rotating speaker effect. The rate change of the rotating speaker effect is not instantaneous, but winds up and winds down.

Roland's Boss DM-300 Delay Machine is an analogue echo delay unit for chorus and echo effects that produces its delay effect by means of a noise-reduced BBD circuit while a frequency controlled filter creates natural reverberation decays. The DM-300 can also be switched to create a chorus effect that has its own set of controls independent of the echo section to facilitate switching during a performance. The unit features two inputs, one strictly for microphone and the other for

either microphone or instrument, each with its own input volume control.

MCI's Sanox 98SX Pedal Driver provides power supply for up to four 9 volt effects devices which have AC adaptor jacks and features an LED indicator. The unit provides a maximum of 200mA current with less than 50mV ripple. One connecting cable comes with the 98SX which has a suggested retail price of \$45.

Roland's Boss J-44 Multiple Jack is designed to simplify the interface between professional musical equipment and home audio equipment. The J-44 has two channels, each of which contains four jack connections (two phone, one RCA and one mini-phone), making possible almost any kind of connection. With the J-44, a monaural instrument signal is easily converted into two channels for connection to a stereo cassette deck, or other two channel pieces of equipment.

Guitars

Meanwhile, Fender, Pedulla, Hamer and Melobar haven't forgotten that instrument that is so basic to rock, the guitar, and have introduced new models.

Fender has added three new guitars to its Bullet line, and redesigned two earlier Bullet models. They also now have two Bullet basses. All are aimed at the younger player or semi-professional who, according to marketing director Dan Smith, "probably covet a Telecaster or Stratocaster or Precision Bass, but can't quite afford one". Suggested retail prices range from \$259 to \$349.

New are the Bullet H-1 which features one humbucking pickup with a coil splitter switch and a one-piece high-strength powder coated aluminium bridge and pickguard; the Bullet S-3 which features three single-coil pickups, a 5-position pickup switch, Stratocaster-style bridge and laminated pickguard; the Bullet H-2 which features two humbucking pickups, a 3-position pickup selector switch, two coil-splitter switches, Stratocaster-style bridge and laminated pickguard.

Redesigned were the Bullet, which features two single-coil pickups and a one-piece high-strength powder coated aluminium bridge and pickguard, and the Bullet S-2, which features two single-coil pickups, chrome-plated Stratocaster-style bridge and laminated pickguard.

The new Bullet Bass B-34 offers a 34-inch scale length and full-size body while the



Korg Poly 61.

new Bullet Bass B-30 utilises a shorter 30-inch scale and slightly smaller body.

Pedulla's new MVP Rock guitar features a harmonically positioned Bartolini LC humbucker with silicon steel laminations, high-powered ceramic magnets and special winding techniques for added resonance. The pickup also has a unique four-position rotary switch which allows the player to choose the series or parallel mode, or to use either of the coils individually. The MVP Rock also features a single-piece neck design and body of select maple, an easily accessible 24-fret ebony fingerboard, brass nut, and Schaller bridge and tailpiece. Suggested price is \$825.

Melobar Guitars' new SB-10 model line features an innovation that has nothing to do with the pickup, bridge, or neck construction. Rather, they offer a soft, flexible body that will conform to the contours of the player's body, rather than force the player's body to conform to it. Coverings for the soft body guitars range from conservative leather and crushed velvet to dramatic tiger and zebra designs.

Finally, Hamer has introduced the Phantom A5, one of two guitars Andy Summers has been trying out, and Paul Hamer has been redesigning, since early 1982. The Phantom A5 — the "5" comes from the fact it was the fifth prototype designed, built and tested by the two while working together — features a new nut, the Lubritrak Nut, which is made of a highly resonant material permanently impregnated with a lubricant which, Hamer says, eliminates nut friction, a major cause of tuning problems. Designed for both studio and stage performing, the Phantom A5 permits sounds to be changed quickly while performing.

E&MM



Fender Bullet guitars.

Manufacturers and companies mentioned:
 CBS Fender, Fender House, Centenary Estate, Jeffreys Road, Brimsdown, Enfield, Middlesex.
 Hamer Guitars, 835 W. University, Arlington Heights, IL 60004.
 Korg/Rose Morris, 32 Gordon House Road, Kentish Town, London NW5.
 MCI, Inc., Box 8053, 7400 Imperial Drive, Waco, TX 76710.
 Melobar Guitars Inc., Box 707, Weiser, ID 83672.
 Pearl International Inc., P.O. Box 111240, 408 Harding Industrial Drive, Nashville, TN 37211.
 M. V. Pedulla Guitars, 541 Main Street, South Weymouth, MA 02190.
 Star Instruments Inc., Spring Street, Stafford Springs, CT 06076.



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Korg Sigma KP30	Roland SH101
Korg MS-10	Roland SH101 Grip
Korg SQ10 Seq	Roland Jupiter 8
Korg KR55	Roland Jupiter 4
Korg KR33	Roland SH-2
Korg SE500	Roland SA-09
Fender Rhodes	Roland TR808
Teisco S110F	Roland CSQ600
Yamaha PS-10	Roland CSQ100
Yamaha PS-20	Micro-Moog
Yamaha PS-30	Jen SX1000
Yamaha CS5	ARP Pro-Soloist
Yamaha SK15	Multivox Synth
Yamaha SS30	Korg Delta
Casio 202	Hohner P100
Casio 701	Yamaha CS01
Casio 602	Gnat Special
Casio 402	Wasp Spider
Casio 101	Wasp Special
Casio VL5	EKO P15 Synth
Roland HP70 Piano	Casio UL-5
Korg SP80 Piano	Korg CX3 Organ
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FACT FILE

Richard Burgess *Landscape*



"I think there's still room in modern music for computerised instruments such as the Linn or the Simmons percussion sequencer, and I use a full size acoustic drum kit. I don't use the Linn myself, because being a drummer if I want the sound of real drums I'd just as soon play them, because I think programming is a pretty tedious process. Although we've used the MC4 a lot, I'm getting back into truly acoustic things again, like utilising the natural sound of a room to create a sort of super-acoustic sound. I think it's going to be another 25 years before we have machines that can actually create music."

History

"Landscape was never actually a jazz band. We started out as a group who wanted to reject a certain number of the clichés that were present in mid 70s rock music, and about a year later we discovered there were a lot of other bands trying to do the same thing in a different way. So we sort of became allied with the punk scene, but what we were trying to do was to make music that was sophisticated in the same way that jazz is sophisticated."

"I'm not ashamed of the jazz tag, although I don't believe it's justified, because I feel that in the long run people want to hear musicianship."

Instruments

"I had a hand in the design of the Simmons electronic kit and we've used the SDS 3 and SDS 5 quite extensively, in conjunction with the MC4. Originally we used an MC8 connected to an ARP 2600 or a Roland 100M modular system, and created each percussion sound from scratch. I really felt the need of a full-sized kit though, and that's how the SDS 5 came about."

FX

Compression and noise gating on individual drum sounds to suit each piece.

Studios

"On the last album we worked in two studios, starting off in a 16 track called Alvec because I really liked the sound quality of 16 track. We started all the tracks there and then moved on to Utopia and did the final overdubs. In some cases we used a 16 and a 24 track machine and worked with both until we were ready to mix down."

Roland Orzabal *Tears for Fears*



"As I'm primarily a guitarist all my songs are written using the guitar and translated to keyboards. I use synthesisers for orchestration, dynamics and general experimentation. I also believe that the future of popular music will rely heavily on electronics and digitally sampled sounds, as used in the Emulator and Linn drum machine. Synthesisers have yet to realise their full potential as extremely emotive instruments and not the 'cold' inhuman instruments they are often labelled."

History

Roland met Curt Smith, the other half of Tears for Fears, in their home town of Bath at the age of 13. After some success (including a Spanish hit) with Graduate, they secured a deal with Phonogram as Tears for Fears with a demo version of 'Suffer the Children'.

After radio sessions for Peter Powell and John Peel, their second single 'Pale Shelter' became an American club hit, and their third 'Mad World' did well in the UK charts. Their live performances are supplemented by keyboard players Ian Stanley and Andy Davies and drummer Manny Elias.

Keyboards

Roland Jupiter 8, Roland Modular System 100M, Sequential Circuits Prophet 5, Korg Poly Six. "The Jupiter 8 gives me the automatic delayed vibrato that I prefer to the modulation wheel type, for instance on the Prophet. The Poly Six's chorus, on ensemble setting, beefs up the effects and gives a nice fat sound, particularly on chords. The System 100M is useful for discovering unique sounds."

Sequencers

"The Roland MC4 is useful for multi-layered sequences. The Sequential Circuits Poly Sequencer is the only one compatible with the Prophet 5."

FX

None in live situation.

Amplification

Directly injected.

Studio/Engineer

The Sleep Exchange, Bath. Engineer: Ross Cullum, with producer Chris Hughes.

David Lloyd *Uropa Lula*



"I like to work on an instrument for days on end and really get to know it. When I'm composing I generally go for a rhythm pattern first and work around that, so I use the Sequential Circuits polysequencer and a Roland CR 5000 rhythm machine, for its lifelike sound, as composing devices. One of our singles has a sequence 5 minutes long on it; I use a click track to drive the Sequential Circuits Pro-One more than using an MC4."

History

Uropa Lula was formed in March 1981 by David Lloyd with Alan Dias (bass) and Hilde Swendgaard (business co-ordination). Andrew Edge joined on drums in January 1982, and 'floating members' include Claudia Martin (vocals) and Paul Fromm (vocals and keyboards).

The band's first performance was at The Venue in London in May 1981, and this was followed by a session on Capital Radio and further appearances at the Moonlight Club, Heaven, and the Embassy. A contract with Arista resulted in their first single 'Our Love Has Just Begun'.

Keyboards

Roland Jupiter 8, Prophet 5. "I've used most of the polysynths with cassette interface, and I've filled cassettes with programmes for the Prophet 5 and Jupiter 8. Eventually I'd like to build up a complete library including tapes for the Oberheim polyphonics."

Sequencers

Roland CSQ 600 triggering ARP Analogue Sequencer driving ARP Odyssey. Analogue sequencer gives a 16 step pattern while CSQ 600 programmes volume for each step.

Studio

Trident, for "feel and atmosphere".

FX

Electro-Harmonix Memory Man and guitar effects for home use, although too noisy for the studio. "You can get bogged down with a lot of effects — the simplest things work best."

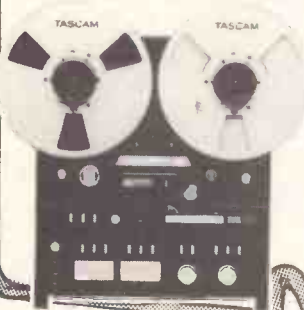
Home Recording

Teac 4-track, a TR808 for conga and tom sounds with the Clap used as a snare, "The best I've found on any drum machine".

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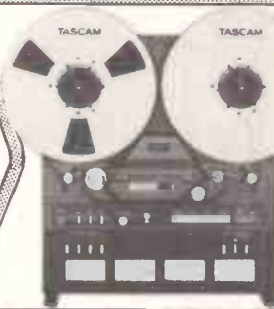
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TAPE MACHINES



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34. Replacing the most famous 4 track ever, the 3440, must have been a difficult task — but Tascam have done it with the 34. New lower noise electronics, a digital counter, and compact size.



38. Sensational! The new 8 track hits an incredible low price level without sacrificing performance or facilities. Low noise electronics, highly stable transport. DC reel motors, digital counter, pitch control — totally unbeatable!



M244 Portastudio



Successor to the world's first integrated mixer/4 channel cassette recorder, the M244 offers still more facilities, improved EQ and DBX noise reduction for quietest ever demos.

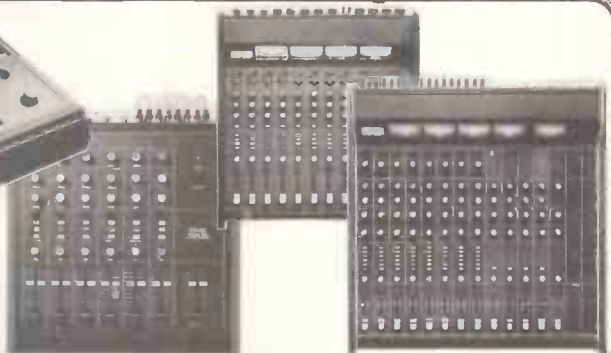
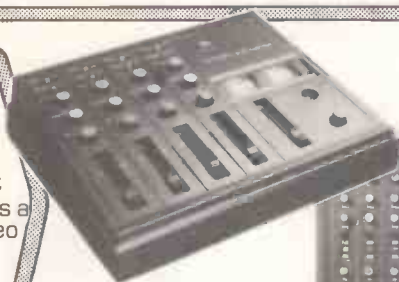
Noise reduction



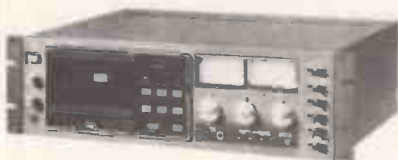
To supplement their tape machines, the DX40 has been introduced. A 4-channel simultaneous system, this can be doubled up to provide 8 channels of NR at a highly competitive price. DBX noise reduction boosts the signal to noise ratio by 30dB.

MIXERS

Tascam's big mixer range starts with the new M-09, a 4 in 2 out recording/PA mixer. The well-known Model 2A is available with a meter bridge, and offers budget mixing for the 4 track user. The new Model 30 is a remarkable economical 8 x 4 which has a stereo submix section, 4 channel routing and remix facility. On the Model 35, there are improved facilities for 8 track mixing and is modular in construction.



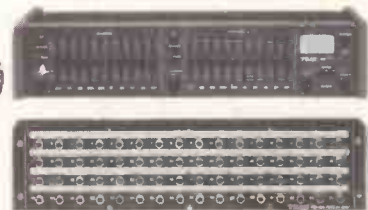
CASSETTE DECKS



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Signal processing & accessories

The GE20 is a 2 channel graphic equalizer with 10 bands per channel giving ± 12 dB at one octave intervals. The PB-64 patchbay has 64 phono connectors for easy routing. PE40 is a 4 band 4 channel parametric equalizer.



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THE SHAPER THE SHAPER THE SHAPER

by Paul Williams

- ★ Exciting Effect For Guitar, Keyboards And Even Drums
- ★ Control Over Attack And Decay Regardless Of Original Instrument Envelope
- ★ Unique Punch Control For Really Percussive Sounds
- ★ Powered From The E&MM Twinpak, Or From Batteries



No, this is not just another envelope shaper project! The Shaper is an exciting new effect for the experimenting electro-musician who doesn't want to sound like all the rest. It allows the musician to gain complete control over an instrument's envelope shape, regardless of its natural envelope. Not only can the attack and decay characteristics be controlled, but the aptly named punch control also provides the musician access to an exciting range of percussive sounds normally only associated with expensive synthesisers.

Apart from the obvious application for guitars and organs, the Shaper will add new life to a synthesiser that has limited envelope shaping facilities. The recording drummer could find the shaper invaluable, where the punch control can provide plenty of slap. Cymbals, too, can be cleaned up with The Shaper. Guitarists will find The Shaper useful as a super-sustain unit, but without all the noise problems normally associated with sustain compressors.

Although the E&MM Twinpak (September '82) is recommended as the source of DC power, a pair of PP3 batteries will provide quite respectable operation.

Circuit

Figure 1 shows the complete circuit diagram for The Shaper. After being buffered by IC1a, and amplified by the variable gain stage IC1b, the input signal applied to JK1 eventually reaches a very tight compressor formed by IC1c, IC2a&b and TR1. When the input signal level is very low, the gain of IC1c is very high, determined by R4. As the input signal level increases, the signal at pin 10 of IC1c will increase in level until a point is reached where the base to emitter junctions of IC2b start to conduct, causing current to pass through R9 into C4. The current now flowing through R10 into the emitter of TR1 will cause it to conduct current via R11 into half of the operational transconductance amplifier, IC2a. The increased negative feedback around IC1c caused by the increased transconductance of IC2a now reduces the gain of IC1c such that regardless of the input signal level, the signal appearing at pin 10 of IC1c is always kept at an essentially constant level.

IC1d acts as a threshold level detector, monitoring the current flowing through R11. If the signal presented to the compressor section is within the compression range of the unit, then IC1d pin 12 will switch negatively, signifying the start of the attack period. C6 will now charge via D1, R15 and RV3, the attack control. When the signal level



falls below the threshold, signifying the start of the decay period, IC1d pin 12 switches positively, discharging C6 through D2, R17 and RV2, the decay control. The envelope voltage thus generated on C6 is converted into a control current by TR2. This current is used to determine the gain of the current controlled amplifier IC2c. The control envelope generated on C6 is thus impressed on the constant level signal at IC1c pin 10.

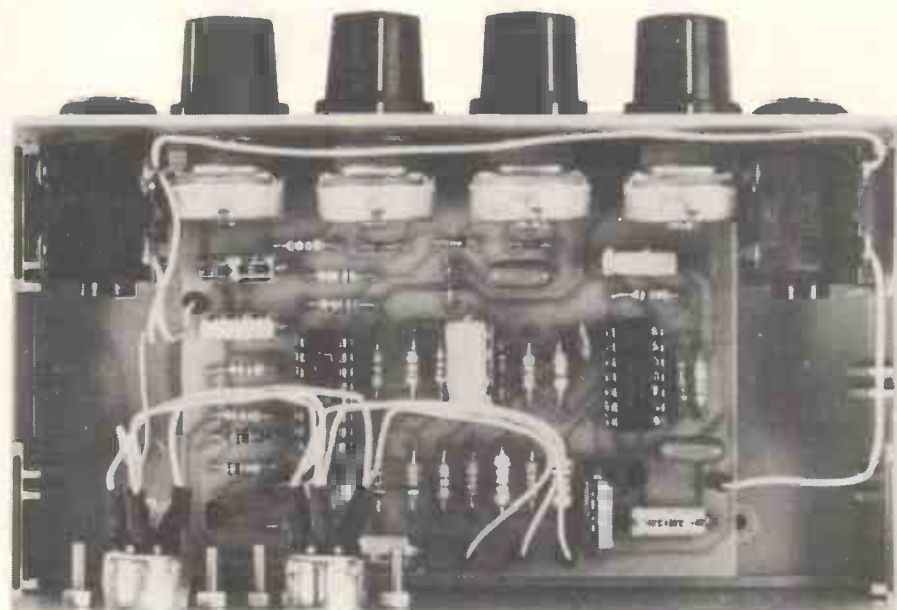
When IC1d pin 12 switches positively at the start of the attack period, a voltage pulse from C5 is developed across RV4, the punch control. A controllable portion of this pulse is added to the start of the envelope voltage via D4. During the decay period, D3 ensures that C5 is fully discharged, ready for the next punch pulse. The input signal level required to reach the threshold point is adjusted by means of RV1. The threshold detector exhibits some switching hysteresis determined by R14. This prevents erratic switching, which could otherwise lead to multiple punch pulses, or punching during the decay of the input signal.

Construction

Construction begins with the PCB assembly since most of the parts including the potentiometers are mounted on the board, there is very little wiring to be done. The PCB

should be populated according to the component overlay, shown in Figure 2, in discrete stages as follows: The first stage is to insert from the track side, and solder, the five Veropins. Next insert all the resistors, bend the leads out at 45 degrees to secure and after soldering, trim the leads flush with the joints. The next stage is to insert, solder and crop the capacitors in a similar manner. Take care with the orientation of the electrolytic types. The IC sockets can now be inserted and soldered, but don't put the IC's in yet. Now insert, solder and crop the transistors and diodes, again being careful with orientation.

After preparing the aluminium panels as shown in Figure 3, insert the pots loosely into the PCB, but don't solder them at this point. Offer the pot bushes into the front panel and secure with nuts. After ensuring that the pots are square to the PCB, solder them in place. In this way, no strain is put on the joints. This completes the PCB assembly, so it is now time to check it thoroughly; firstly on the component side for completeness and orientation and, preferably with an eyeglass, on the track side for any dry joints or bridged tracks. If all is well, load the IC's into their sockets, taking the usual care with orientation. After mounting all the DIN and jack sockets on the two panels, they can be



Internal construction of The Shaper.

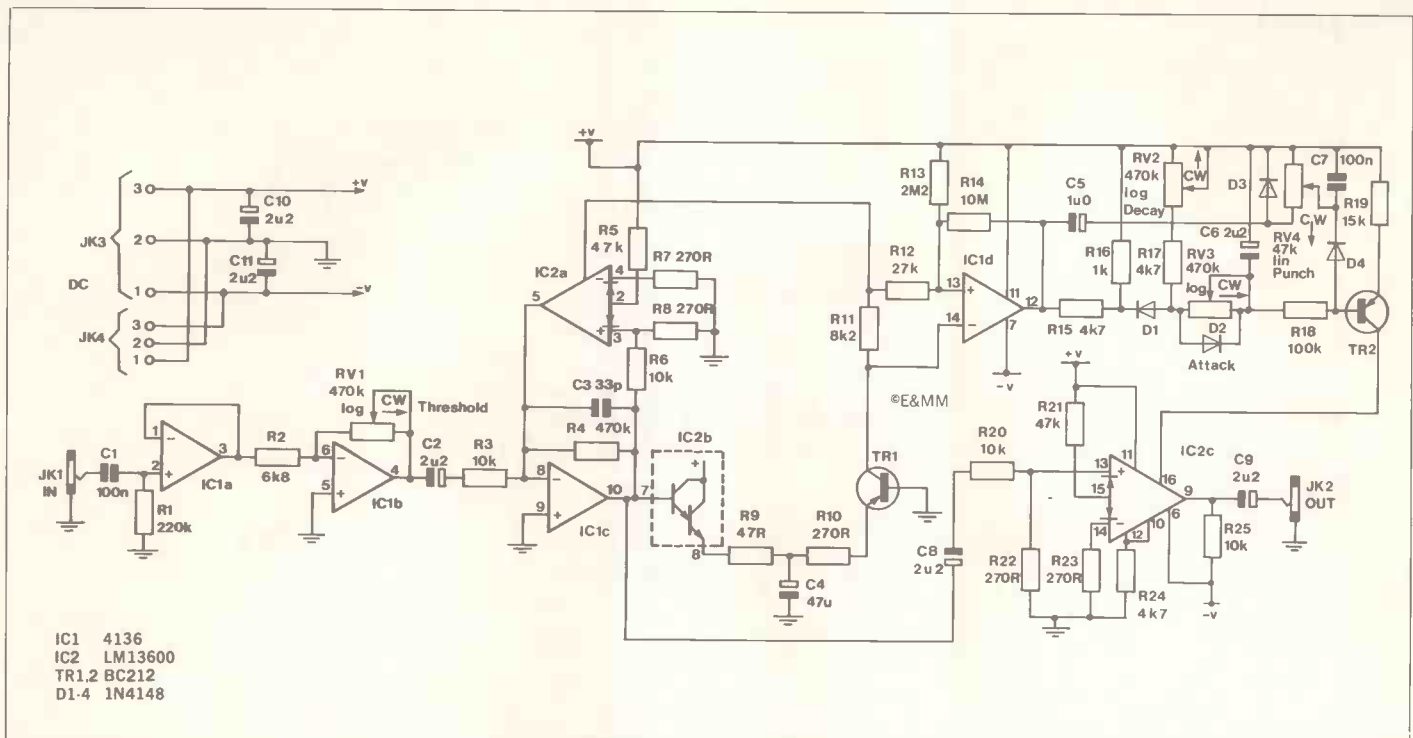


Figure 1. The Shaper circuit diagram.

slotted into the case base. It is now quite a simple matter to complete the interwiring as shown in Figure 4.

The project as described here is intended for use with the E&MM Twinpak as its source of DC power. The Shaper will, however, perform adequately when used with a pair of PP3 batteries. To allow the unit to be battery operated, omit the two DIN sockets and instead install a double pole on-off switch into the rear panel. Two PP3 battery clips can now be connected as follows: the red wire of one clip is routed via one pole of the switch to the +pin on the PCB. The black wire of the other clip is routed via the other pole of the switch to the -pin on the PCB. The other two clip wires connect directly to the 0 pin on the PCB. The batteries should now locate neatly on either side of the PCB.

Shaping Up

If you are using the E&MM Twinpak, connect it to one of the DIN sockets on The Shaper. The other socket can be used to extend the DC power on to another audio processor. The Shaper consumes about 15mA from a twin 15v supply. Now switch on, plug your instrument into the input, and feed the output to your amplifier. The Shaper's output will be in the region of 200mV regardless of the output level of your instrument, so the high level input of your amplifier should be used. If The Shaper's output level is found to be conveniently high, then R24 can be reduced in value as required. Another modification may be found necessary if The Shaper is to be used with a bass instrument: increasing C4 to 100uF will prevent the low frequencies from causing a second punch pulse to be produced as the signal decays through the threshold point.

The Attack and Decay controls alone provide a very wide range of effects, from reverse playing when the Attack is clockwise and Decay anticlockwise, through violin bowing effects with both controls clockwise, to sharp on-off sounds when both controls are anticlockwise. The punch control introduces varying degrees of percussiveness to the sound, ranging from string picking to a full blooded 'slap' when the control is fully clockwise.

For a punch to occur, the signal must first decay through the threshold level, so careful setting of the threshold control is required if punch is used on fast runs. Although the

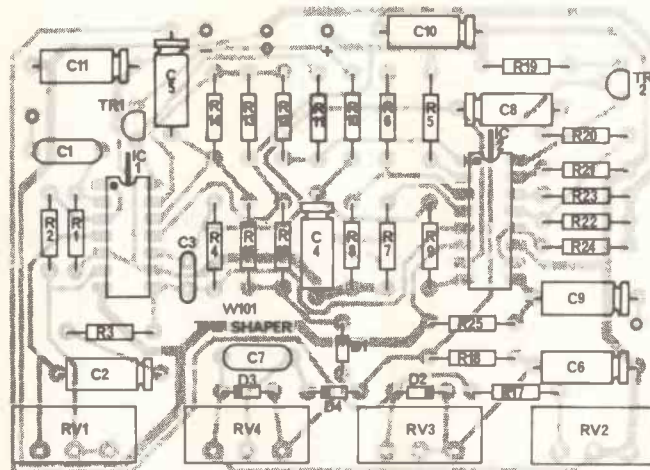


Figure 2. Component overlay for The Shaper.

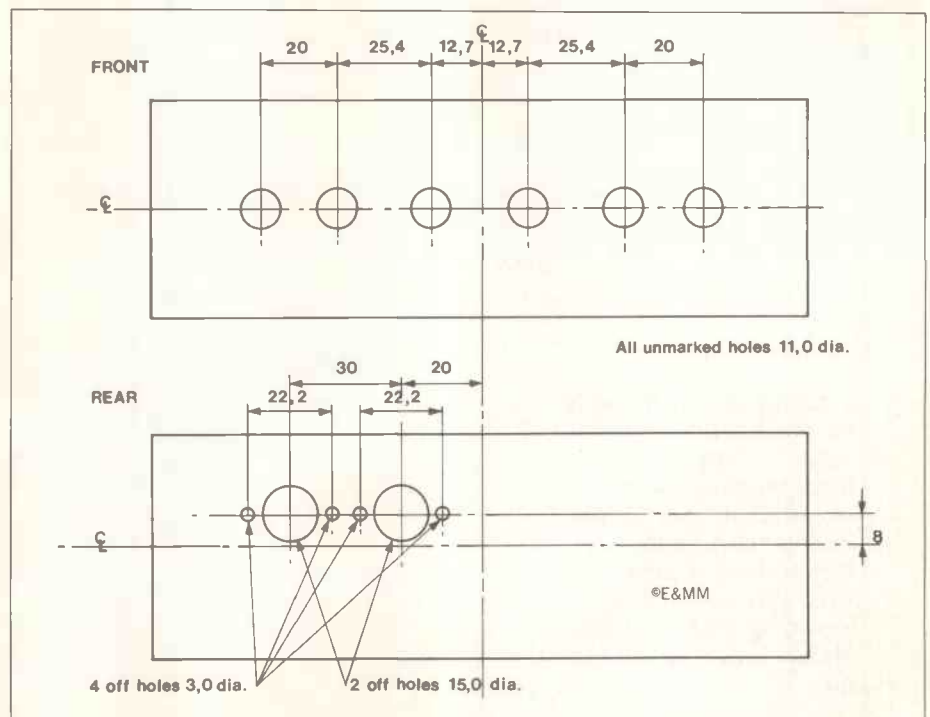


Figure 3. Panel drilling details.

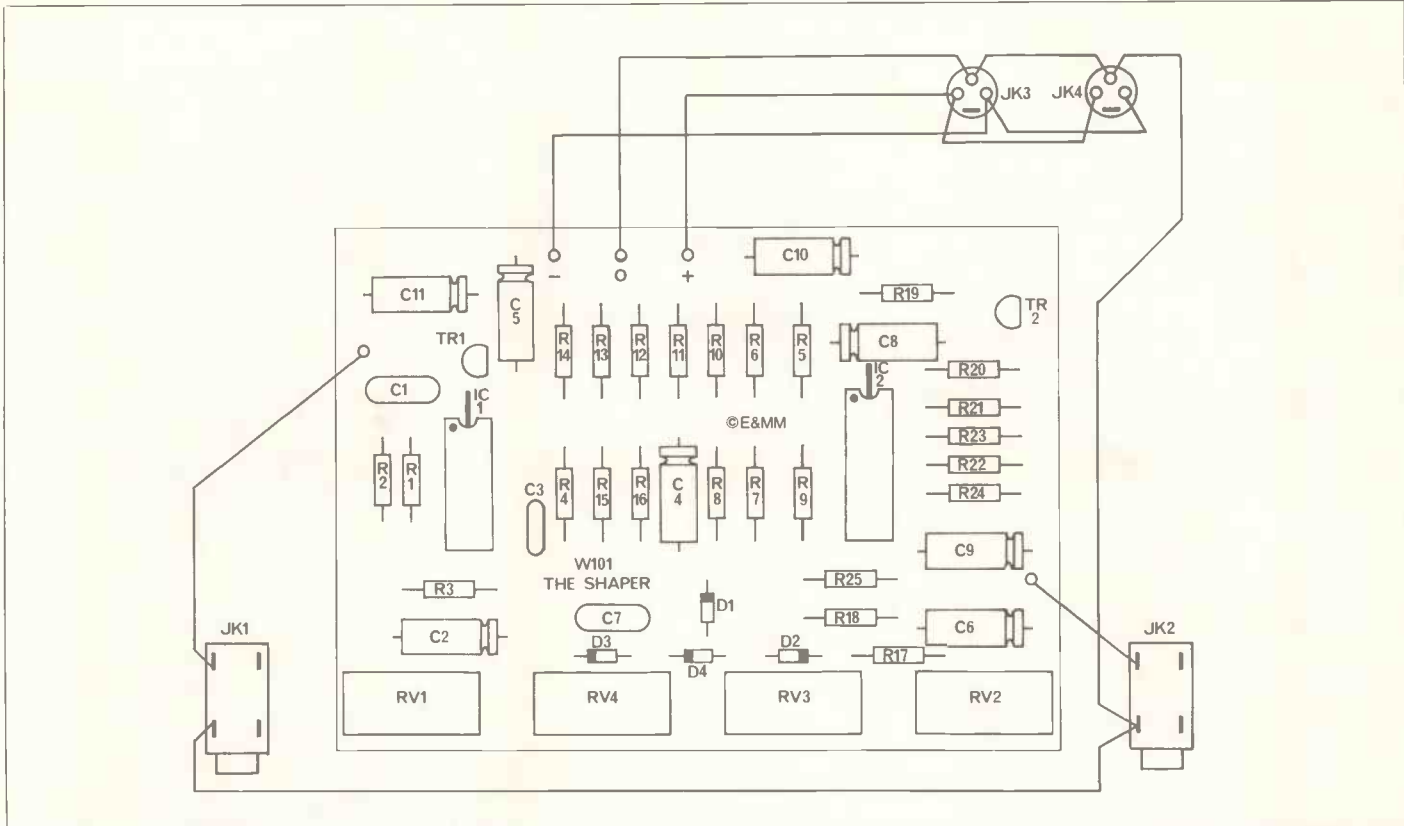


Figure 4. Connections to the PCB.

Threshold pot controls the gain of the input stages, its real function has very little to do with signal levels. This control determines the point at which The Shaper starts its decay cycle. It will also have a significant effect on the sustain time. If a very long sustain time is required, then the Threshold control will need a high setting. Too high a setting, though can lead to distortion so some care is needed. Also, it should be obvious that The Shaper is not capable of providing a long sustain and decay on an input signal that has a very abrupt decay. The shaper is, however, capable of considerably extending the decay time, and of providing a long, steady sustain that guitarists will love, particularly considering the absence of any noise problems when a supposed silent period is reached.

The recording drummer will find that The Shaper can transform drum tracks, the punch control being very useful for providing that extra kick. Bear in mind though that unless you use more than one Shaper, predictable results can only be obtained when one drum is shaped up at a time; on the other hand where is your spirit of adventure?

E&MM

A complete set of parts for The Shaper including case, screen printed front panel and hardware is available from E&MM, 282 London Road, West-cliff-on-Sea, Essex SS0 7JG, at a cost of £24.95, including P&P and VAT. Please order as: Shaper Kit.

SHAPER PARTS LIST

Resistors — all 1/4W, 5%, carbon film

R1	220K	
R2	6K8	
R3,6,20,25	10K	4 off
R4	470K	
R5,21	47K	2 off
R7,8,10,22,23	270	5 off
R9	47	
R11	8K2	
R12	27K	
R13	2M2	
R14	10M	
R15,17,24	4K7	3 off
R16	1K	
R18	100K	
R19	15K	
RV1,2,3	470K log pot	3 off
RV4	47K lin pot	

Capacitors

C1,7	100n polyester	2 off
C2,6,8,9,10,11	2u2 63v electrolytic	6 off
C3	33p ceramic	
C4	47u 10v electrolytic (see text)	
C5	1u 63v electrolytic	

Semiconductors

IC1	4136	
IC2	LM13600	
TR1,2	BC212 (T092a)	2 off
D1-4	1N4148	4 off

Miscellaneous

JK1,2	Jack socket	2 off
JK3,4	3 pin DIN socket	2 off
	Verobox 212	
	Knob	4 off
	Knob cap	4 off
	14 way DIL socket	
	16 way DIL socket	
	3 pin DIN plug	2 off
	Veropins	
	3 core cable	
	Wire	
	PCB	

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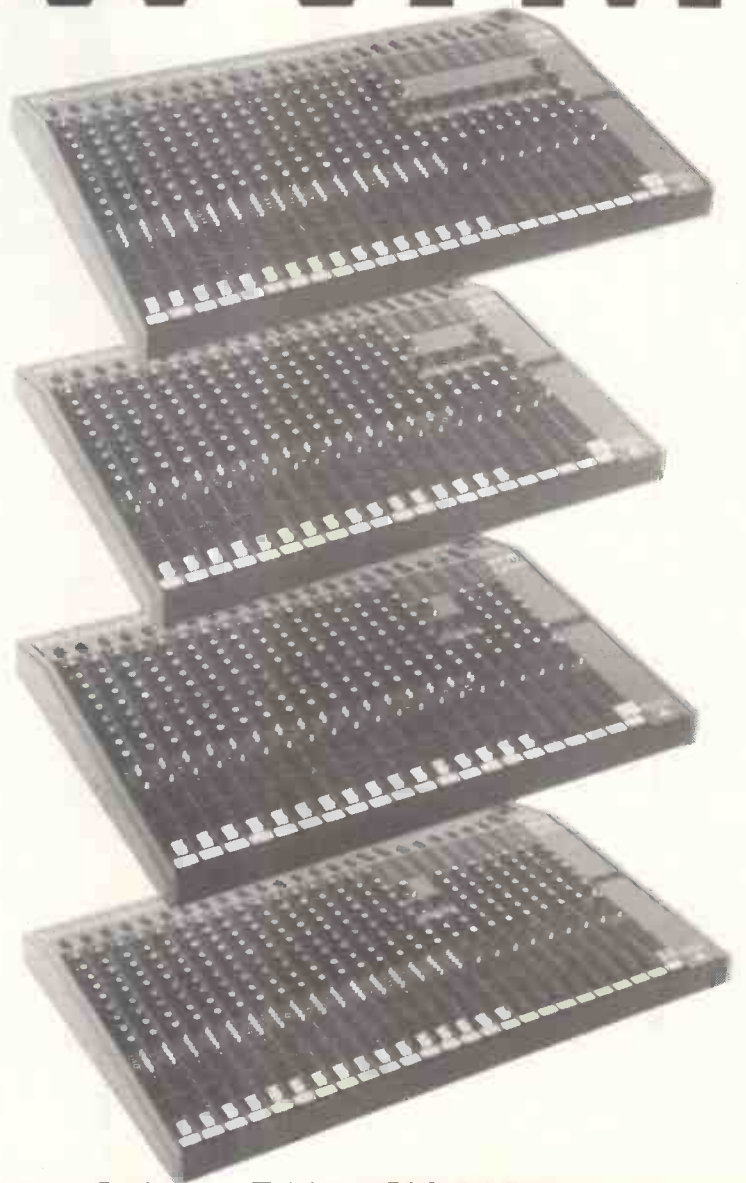
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electromix 842

Meter Bridge Option

by Paul Bird

In most studio set-ups tape recorders are mounted remote from the mixer, so metering on the mixer is essential. When correctly calibrated these act as Record level meters for the tape machine. The unit described here was designed as an option for the Electro-Mix 842 with five VU type meters; four to monitor the group outputs and one which is switchable between Aux 1 and 2. The meters are mounted on a 19" panel which can be rack mounted with the mixer. High input impedance and adjustable sensitivity should make the circuit usable in other audio set-ups.

Circuit description

The meter drive circuitry is shown in Figure 1. Since the five meter drive circuits are identical only one is shown, along with the calibration circuitry.

IC 1 is a non-inverting amplifier with a gain set by

$$\frac{R4 + R5 + RV1}{R5 + RV1}$$

With the component values shown and R1 in circuit, 0VU reading corresponds to 775mV rms (0dBm). If R1 is replaced with a link the 0VU reading is for 330mV rms (-10dBV). C2 blocks any DC at the output of IC1 which would offset the meter. The signal is rectified by D1 and D2, providing the meter with positive going signals. Reading positive signals only is common amongst most equipment and appears to be adequate. The meters used do not have a very linear movement but this characteristic is fairly constant for each meter. R6 and R7 help to linearise the meter to give a useful and reasonably accurate range on the VU scale.

Provision is made on the PCB for a simple calibration circuit. This relies on



Meter bridge fitted with The ElectroMix 842.

the forward voltage drop across a particular type of diode being the same - in this case the 1N4148.

In the calibration circuit D3-6 clip the incoming 15V AC to approximately 1.2V peak to peak. R8 limits the current through the diodes but its value ensures the diodes are fully biased on. The potential divider R9 and R10 gives the required output. For -10dBV, R9 is 18k + 2k7 and 3k9 for 0dBm, R10 is 10k in both cases. Note the output of the calibrate circuit is not exactly -10dB or 0dB but slightly higher level to compensate for the lower sensitivity of the meters at 50Hz.

Construction

Construction is very straightforward as each meter drive circuit is identical (see overlay in Figure 2). Check if R1 is to be used or linked out (earlier text - signal levels). If the calibrate circuit is not required leave out R8-10 and D3-6, C4 and C5 should be included to provide supply decoupling. The meter polarity is marked just above the solder tags at the mixer end. This is to prevent earth loops which could cause hum. A return 0V path is made via the power supply. Cut back the screen and insulate with sleeving before connecting to the mixer sockets. Note the 15V AC to the calibrate circuit is temporary and is disconnected after calibration to avoid possible hum pick-up.

Screened wire is used to connect the meter PCB to the output sockets of Groups 1-4 and Aux 1-2 on the mixer. Connect both screen and conductor (the screens for the Aux meter can be commoned on a spare tag of S1) at the meter PCB, but only the conductor at the mixer end. This is to prevent earth loops which could cause hum. A return 0V path is made via the power supply. Cut back the screen and insulate with sleeving before connecting to the mixer sockets. Note the 15V AC to the calibrate circuit is temporary and is disconnected after calibration to avoid possible hum pick-up.

If the meter bridge is likely to be separated from the mixer at a later date, it can be connected via a 9-pin multi-way connector, as shown in the photo.

The meters can be fixed to the panel using Super Glue or an epoxy type adhesive. It is best to first position the meter and then run a small amount of

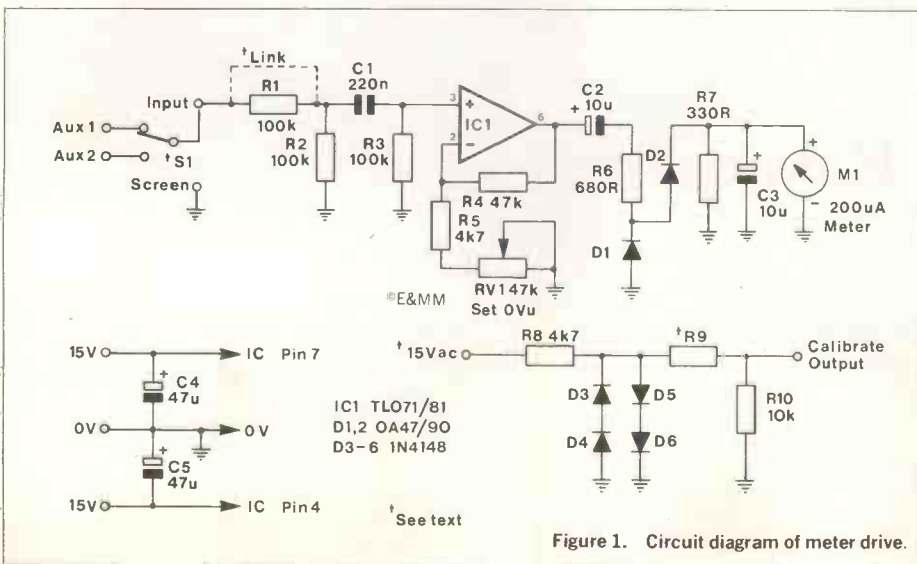


Figure 1. Circuit diagram of meter drive.

Parts
Cost Guide
£28

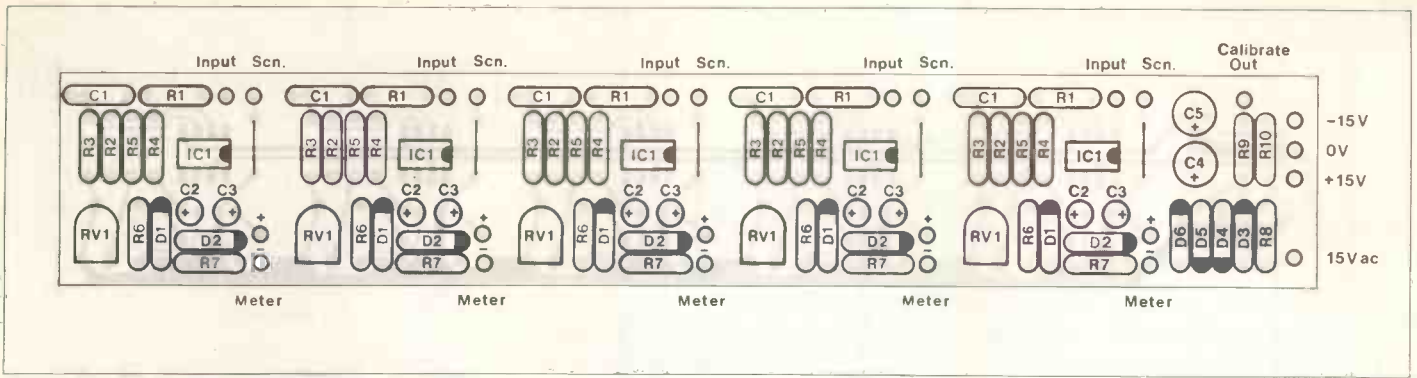


Figure 2. Component overlay of the PCB.

glue around it. This ensures that you don't get glue on the meter face.

Dimensions for the meter panel are given in Figure 3 although a panel is available through E&MM. The scale of the meter is semi-transparent and therefore ideal for back lighting. Alternatively, an LES type bulb can be fixed to the top edge of the meter, which is clear. It is advisable to power these bulbs from a DC supply to minimise the chances of hum pick-up. Always run bulbs at less than their rated voltage as they don't need to be very bright and they will last a lot longer.

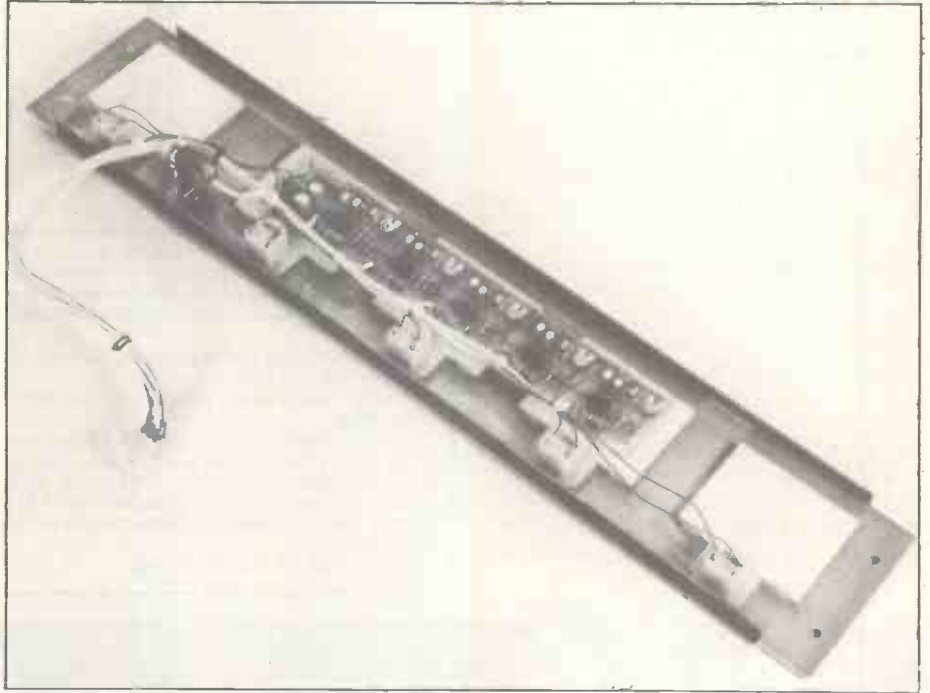
S1 is mounted on a bracket which needs to be spaced off the panel. This can be done with long bolts using nuts for spacers.

Calibration

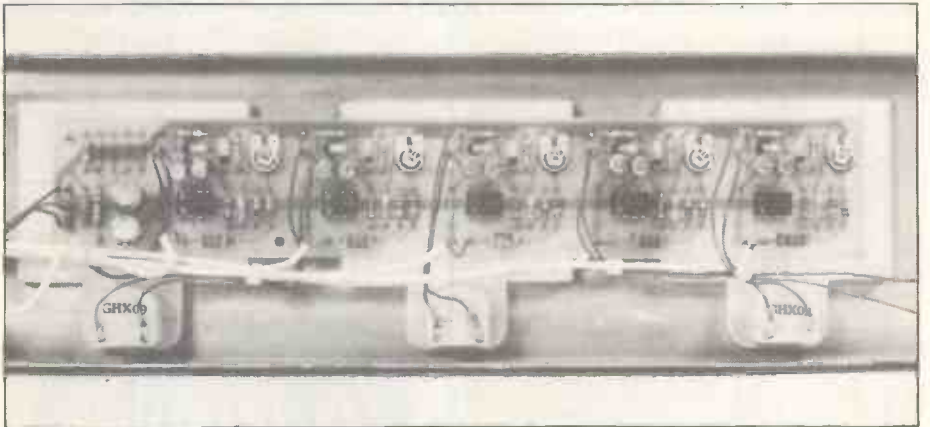
Calibration is done before connecting the unit to the mixer. If using the on board calibrate circuit, single un-screened wire is sufficient to feed each meter drive circuit in turn. When using the power supply described in November '82 issue the 15V AC can be taken off the power supply PCB. If an external transformer is to be used one side of the secondary is connected to 0V and the other to 15V AC input on the meter PCB.

Alternatively an oscilloscope and oscillator (set at 1kHz) can be used, in which case a signal level of 2.2V peak to peak on the scope will give 0VU at 0dBm and 880mV peak to peak for -10dBV (see table in November '82 for other signal levels).

If the mixer/meter unit is to be used with a tape recorder of unknown input sensitivity set up as follows: Firstly, build the calibrate circuit with $R9 = 18k + 2k7$ then feed this signal to a line input on the recorder and using the

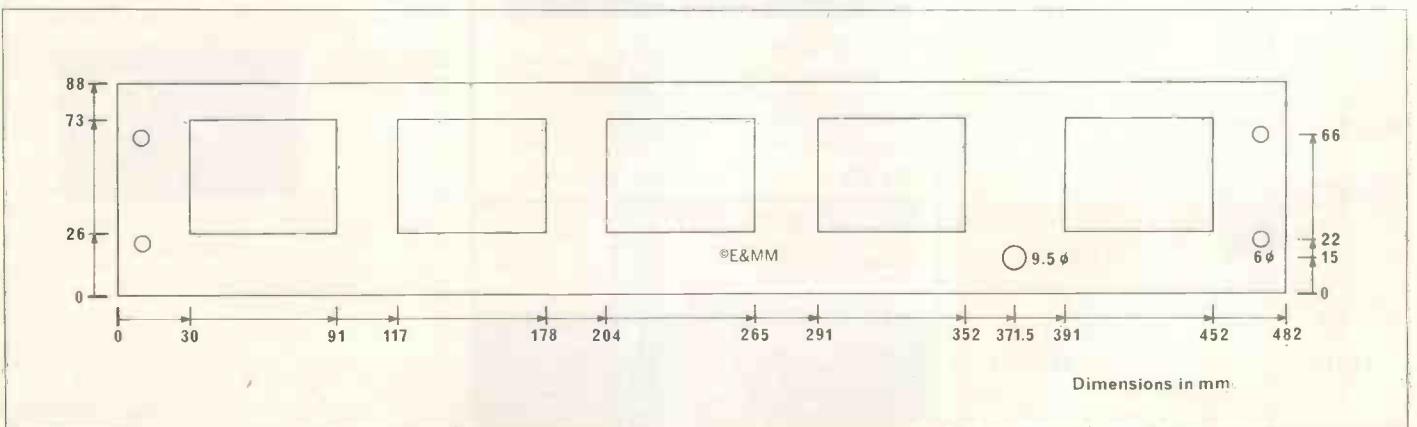


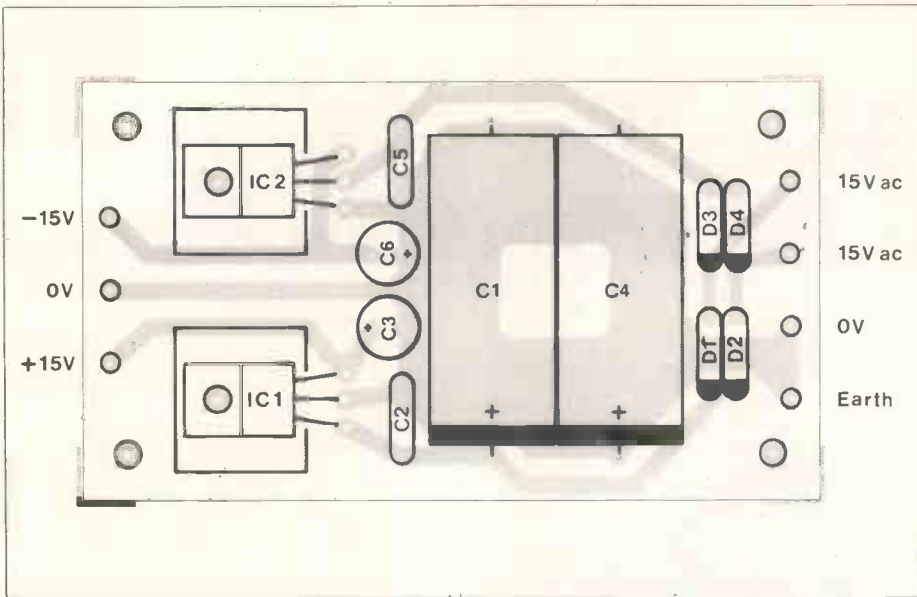
Completed Meter Bridge module.



Close up of the PCB.

Figure 3. Drilling detail of the rack-mounting panel.





Corrected Power Supply component overlay.

Input/Record level control adjust to get an 0V_u reading on its meter. Now feed the calibrate signal to a line input on the mixer and with the tape recorder connected to the appropriate Group output adjust Gain control and Faders on the mixer to achieve an 0V_u reading on the tape recorder's meter. Trim the meter unit to give a similar reading, repeat for each meter and track of tape machine. Remember not to adjust the level controls on the tape machine after setting up.

An aluminium panel, punched, drilled and finished in matt black is available from Electronics and Music Maker, 282 London Road, Westcliff-on-Sea, Essex. The price is £7.95 including VAT and P&P.

The Meter Bridge PCB is also available at £2.75 including VAT and P&P.

Please order as: Meter Bridge Panel and Meter Bridge PCB.

A set of 5 meters for the project is available from Ambit International, 200 North Service Road, Brentwood, Essex CM14 4SG. These are at a special price of £12.10 including VAT and P&P. Order as: Meter Set for E&MM Meter Bridge project (5 off 37-09600).

Please allow 28 days for delivery.

METER BRIDGE PARTS LIST

Resistors — all 1/4W, 5% carbon

R1-3	100k	15 off
R4	47k	5 off
R5	4k7	5 off
R6	680R	5 off
R7	330R	5 off
R8	4k7	1 off
R9	See text	
R10	10k	1 off
RV1	47k min preset.	5 off

Capacitors

C1	220nF Siemens multilayer	5 off
C2,3	10uF 16V PCB Elect.	10 off
C4,5	47uF 25V PCB Elect.	

Semiconductors

IC 1	TL081/71	5 off
D1,2	0A47/90	10 off
D3-6	1N4148	4 off

Miscellaneous

S1	2 pole latch switch with bracket (see text).
M1	200uA DC Vu type meter (Ambit International 37-09600)

Please Note

The component overlay for the power supply PCB given in the November '82 issue — P71, Figure 6 was incorrect, the track layout having been shown from the wrong side.

A corrected component overlay is shown above. This does not affect assembly as the component overlay has not changed.

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by ROLAND

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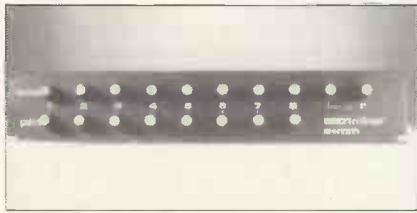


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8201 Line Mixer August '82

A 19" rack mounting 8 into 2 line mixer, the 8201 has 8 input channels each with Level and Pan controls, complete with Foldback output. Ten identical PCBs are used in a modular design, one for each of the 8 channels and 2 for the final mix stages.

The unit is ideal for keyboard or drum machine sub-mixing and foldback applications. The set of 10 PCBs for the project is available from E&MM at £11.50.

A black, 4mm thick, 19" x 2U, aluminium panel is available from West Hyde Developments Ltd, Unit 9, Park Street Industrial Estate, Aylesbury, Bucks HP20 1ET. Order code A6F702. The price is £3.85.



Canjak December '82

Probably one of the most compact and cheapest practice amplifiers available. The Canjak is simply plugged directly into an instrument and a pair of headphones connected. A built-in FUZZ effect can also be switched in at any time. Power is supplied by an internal PP3 battery.

A complete kit of parts, including case, is available from E&MM at £9.95.

Street, Ware, Herts SG12 9AD. The price is £16.35.

The fully finished case and PCB are available from E&MM priced at £7.95 and £2.45 respectively.



ElectroMix 842 October & November '82

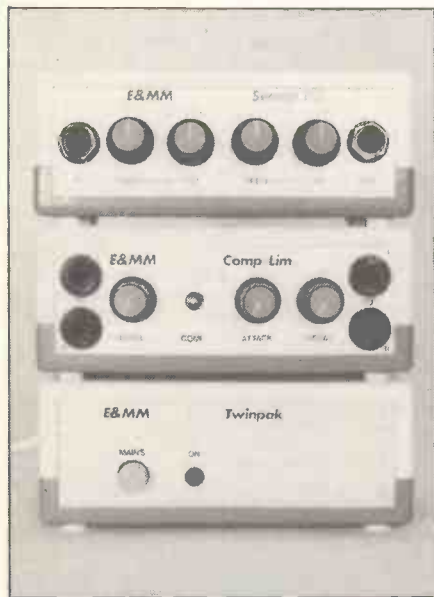
This studio quality mixer features 8 input channels with mic or line inputs, EQ controls, Aux send and Returns, Panning, Stereo monitor, and built-in headphone amplifier. Modular design simplifies the construction of this rack mounting unit.

A drilled, screen printed panel is available from E&MM at £24.95.

The complete set of PCBs for the mixer; 8 input boards, 2 group boards and 1 monitor board, is available at £24.95. The optional power supply PCB is also available at £2.25.

All the parts, excluding panel and PCBs, can be obtained from Digisound Ltd, 14/16 Queen Street, Blackpool, Lancs FY1 1PQ. The price is £115.

Ready-built ElectroMix units can be supplied at the price of £190.



Sweep EQ November '82

This audio processor provides two variable equalisation stages, each with 30dB boost or cut. The low frequency section operates from 50Hz to 700Hz while the high frequency covers the 700Hz to 9kHz range.

A complete kit of parts, including case and hardware, is available from E&MM at £28.95.

Comp-Lim September '82

A useful two channel unit which can be used to compress and limit unpredictable audio signals. The circuitry has ganged Attack and Decay controls and a compression ratio of 6:1. An external control input is provided for special effects.

A complete kit of parts, including case and hardware, is available from E&MM at £29.95. The PCB is also available separately at £2.99.

Twinpak September '82

A self-contained power supply designed to power and complement audio processing units such as the Comp-Lim, Sweep EQ and Shaper.

Regulated $\pm 15V$ rails are provided at 120mA. A complete kit of parts, including a case and hardware, is available from E&MM at £24.95. The PCB is also available separately at £2.25.



Transpozer December '82 & January '83

This exciting unit can transpose the pitch of an instrument over ± 1 octave allowing real-time harmonies to be obtained. Delays of up to 200mS are also available.

An optional Pitch Ratio display can be fitted to allow precise pitch intervals to be set.

A complete kit of parts, including case and hardware, is available from E&MM at £159.95.

The optional display kit is also available at £32.95.



Caltune February '83

Setting up a synthesiser VCO is often a difficult task without an oscilloscope or frequency meter. The Caltune is a portable, battery operated unit which allows this operation to be carried out with no additional equipment.

It can also be used as a tuning aid using the built-in crystal reference oscillator.

A complete kit of parts, excluding the case, knobs and batteries is available from E&MM at £34.95. It can also be supplied without the built-in amplifier and speaker for £29.95.



Synbal January '83

This unit allows Breath Control to be provided for guitar, keyboards or any other electronic instrument. Dynamic expression can, therefore, be added to a static sound using only the player's breath.

Controls on the front panel allow adjustment of breath control over the internal filter and amplifier.

A complete kit of parts, excluding case and PCB, is available from BI-PAK, PO Box 6, 63A, High

Synbal February '83

Complex metallic percussion sounds can be created by this versatile module. The circuit can be triggered from drum pads using mic pick-ups or from a drum machine or computer.

Provision has been made on the PCB to allow pre-set or rotary controls to be used. A stereo output is also provided to allow a bank of modules to be connected together and panned individually.

The PCB is available from E&MM at £3.25.

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earthstar



Jean Philippe Rykiel Musiza 201 895 Blind French keyboardist Rykiel has become known over here for his participation in Tim Blake's all-time classic 'New Jerusalem' album and for his contribution to Steve Hillage's 'Open'. His flowing Minimoog lines are quite distinctive, and a solo album, which finally appeared after a lengthy session with a 16 track mobile unit and mixdown at Ridge Farm in Surrey, became a long-awaited event.

Although the album has some good points, those who were waiting for a cosmic classic are going to be disappointed. Rykiel's influences are much more widespread, from Baroque music to Stevie Wonder. 'Tao' is very much in the style of the latter, a smoochy electric piano exercise (without vocals) over a bossa-nova backing. 'Occitan Rock' combines computers, synthesised tabors and flowing Moog lines in a frenetic near-parody of sixteenth century pop. 'End of a Party' is almost disco, with handclapping TR808, synthesised backing choir and funk basslines.

Side two is equally varied, with 'Mind is Moving' which opens and closes the side being reminiscent of Stevie Winwood's work. There are some powerful sounds and some expressive solos, with Rykiel getting the best out of the Prophet/Moog combination; what's missing seems to be a sense of direction, as the album appears to be more a catalogue of influences than a statement of intent. Pleasant enough keyboard stuff though.

Review copy supplied by Lotus Records.

Neal Schon & Jan Hammer Untold Passion CBS 85355

Many rock musicians seem to enjoy an occasional flirtation with jazz or jazz-rock styles, as represented by Phil Collins' work with Brand X or indeed by Neal Schon's break from his lead guitar role with Journey to accompany veteran jazz-rocker Jan Hammer on this album. Hammer's keyboard work from the days of the rock/jazz/Eastern fusion of the Mahavishnu Orchestra has been highlighted by his development of a devastatingly accurate impersonation of a guitar using Minimoog and Oberheim modules (fools guitarists with surprising consistency) and so it's interesting to listen to him play in close proximity to a highly proficient guitarist.

Unfortunately, Hammer doesn't turn on the guitar impersonation to its full extent, but there are some superb solos and some excellent examples of the differences and similarities between guitar and keyboard expression. With Hammer also providing drums and Colin Hodgkinson ('Bomber' to Whitesnake fans) on bass, the basic format of most of the nine tracks is a fairly simple verse-chorus rock song with solos alternating on guitar and synthesiser.

The instrumentals give a little more space to stretch out, although 'On The Beach' for instance doesn't suggest any obvious connection with the book of the same name or with anything else for that matter. The title track has some nice harpsichord and

flute effects and gives a rather romantic end to a very strong album.

Amon Duul II Hawk Meets Penguin Illuminated Records JAMS 24 IKF distribution. Resurrected from an early 70's session and remixed and overdubbed by two members of the original band, Hawk Meets Penguin is the prelude to a completely new Amon Duul album to be released next month.

The band were at the centre of the German psychedelic rock scene, and like Can worked largely through improvisation. The material here, with an early but imaginative use of synthesisers and analogue sequencers, is doubly interesting in that it hasn't dated at all.

'One Moment's Anger is Two Pints of Blood' opens side one, with cymbal rolls and guitar harmonics underpinned by a long descending synthesiser sequence which randomly changes tempo. Bass guitar brings in a regular drumbeat, over which flanged guitar and wordless vocals compete before the re-introduction of the sequencer, then a composed section with a high-pitched synthesiser lead, reminiscent of 'Im Krater Bluh'n Wiede die Baume' from 'Viva La Trance', builds up and closes the piece with a fade-out of flanged strings.

'Meditative Music from the Third O Before the Producers' opens with exotic percussion, bass synth drones and a dooladen German recitative; it continues on side two with temple bells, more wordless meditative vocals and disembodied synthesiser lines. The band go through a huge variety of sound sources, from tambourine to synthesiser to clarinet, until the tempo increases and a typical Amon Duul jam session ensues. The end is downbeat again however, with synthesised harpsichords fading into the distance.

Earthstar Humans Only SKY 069 If Salterbarty Tales was too sparse, and French Skyline was too rich, and Atomkraft? Nein!, Danke! was too worthy, Humans Only must be too weird. It's really difficult to tell what Craig Wuest is up to. Production is again at Klaus Schulze's studio, in addition to UCA, Aurasound and UTICA in New York. Instrumentation is again Moog modular system, elka, mellotron, biotron and piano, guests this time are Daniel Happ (guitars and composition), Andy Rebscher (bass) and Bob Mishalanie (drums). Recordings were actually made over the last three years, which may account for the fact that there are themes here which occur on one or more of the other albums.

The question is, what is the purpose of re-hashing musical themes in different styles from one album to another? This time the Indian influence is really strong, with sitars and tablas at full belt and synthesiser ragas zooming in and out. That Atomkraft harpsichord theme is back, this time on staccato guitars, lilting flute and elka strings. Some of Daniel Happ's guitar work is incredible, but at points it's so similar to Mike Oldfield's live style it's not true.

The whole of the second side is

intended to be 'funky' in a ponderous sort of way, but the moaning choruses of wordless vocals are so menacing that there's no sense of straightforward enjoyment. The end of the side is quite unexpected, as if we're intended to go straight on to the next LP. Presumably Wuest has already completed it - if there's one term that does apply to him, it's 'committed'. Review copy supplied by Lotus Records.

Deluxe A Boys On TV EMI 5354 12" Many years ago Mandy Davies used to sell me Gary Numan singles in my local record shop, so suffice it to say that she sounds really good on her first published collaboration with keyboardist Laurence Parry.

Reputed to be one of the most expensively-produced singles of recent times, 'Boys' is a bouncy bubblegum pop song with stacks of stereo panning synths, Oberheim chords and twangs and staccato synthetic bass. The B side contains a Dub Version (apparently only one of many) which seems to consist largely of the same thing with the vocals taken off, certainly not an ethnic tape echo in sight.

The closer, 'Friends', is more imaginative, although this time unashamedly Numanesque even to the 'Down in the Park' style hook. Lol's vocals are good here too - a sort of BEF macho tenor voice, multiply recorded and treated with digital echo. Another point of reference could be 'Rinky-Dinky' on Peter Baumann's 'Repeat Repeat' album; on the subject of which, when's the Deluxe A LP due?

Nash the Slash And You Thought You Were Normal Cut-throat Records CUT 6 This is the man who strode into the spotlight at Gary Numan's Hammersmith Odeon 'farewell concert' and blew the entire band off the stage. Nash uses electric violin, electric mandolin, drum machines and synthesisers to create the musical equivalent of the Murders in the Rue Morgue - black comedy at its blackest and most affecting.

On tracks like 'Vincent's Crows', 'Dance After Curfew' and 'Stalker', Nash weaves subtle bass-pedal patterns overlaid by hissing percussion, crashing fuzzed mandolin chords and his distinctively neutral yet menacing vocals. Having returned to his own studio in Canada after the disastrous Bill Nelson-produced 'Modern Romance' single, there's a certain rough edge to the music again; this is definitely an improvement, and while there may be no classics here like the Prokofiev-inspired 'Wolf' or 'Dead Man's Curve' from the 'Children of the Night' album, there is certainly a good deal of raw energy.

Nash produces synthesiser effects without synthesisers (he has one or two hidden away somewhere) sequences without sequencers, and guitar pyrotechnics without guitars. Besides which, 'Dance After Curfew' will remain one of the most sheerly beautiful tracks of electronic music recorded this year. Imagine 'Inventions for Electric Guitar' to a disco beat.

Review copy supplied by Lotus Records.

Fotostat Fotostat 1/2 Sour Grape Records SG112 Fotostat are a pair of identical twins, Glen and Mark Stat, who have made several TV appearances recently with a robot dancing routine for which this single is ideal accompaniment. The identical twins idea isn't new - Stardancer 2, now apparently on ice, did it some time ago and played all the synthesisers too, which Glen and Mark don't.

The brains behind Fotostat's music is actually Stan Shaw, who plays Fairlight, Vocoder Plus, Jupiter, String Machines and Linn drum machine, with a little help from Clive Bunker, late of Jethro Tull on percussion. Stan is a product of Chase Musicians' synthesiser schools of a few years back, and has developed a fluid and imaginative keyboard style with thumping drums, a driving bass sequence and rich strings and harpsichord effects. Another advantage to this single is that you can play 'Spot your favourite Fairlight preset'; that breathtaking orchestral Whoomp! is called 'Symph'!

Thomas Leer All About You Cherry Red Cherry 52 7" Leer has come a long way since the days of 'Private Plane', and in that time some of the raw power and energy have been lost. In their place comes something which takes a few listens to appreciate - a smooth sophistication and a heavy dose of soul music which are unique in the field of electronic pop.

All About You is a mellow, catchy song with stacks of electronic percussion, impassioned vocals and hints of Tamla Motown in the hook line. The flip, Saving Grace, is an up-tempo instrumental version, complete with shimmering synthetic strings, fluid lead line and disco drum breaks. Leer plays everything as well as producing, and shows his complete mastery of imitative synthesis using the most basic of keyboards. Well worth checking out.

Mark Jenkins

Electro-Music Top 20

1	Chromium Echoes	Neuronium
2	1st LP	J.P. Rykiel
3	Logos	T. Dream
4	Galaxy Cygnus A	R. Schroeder
5	Concerto	Pour La Mort
		P. Guerre
6	Planetary	Von Deyen
7	Blackouts	Ash Ra
8	Univers	T. Fervant
9	De Harmonia	P. Langurand
10	Digital Dream	Neuronium
11	Between Flesh	Asia Minor
12	Queen Millennia	Kitaro
13	Eyeless Dreams	W. Duren
14	X	Klaus Schulze
15	Soundtracks	Popol Vuh
16	A Fond Perdu	Intence
17	The Visitor	Neuronium
18	As Falls Wichita	Metheny/ Mays
19	Tales of Fantasy	Bernd Scholl
20	Odes	Vangelis/ Papas

Compiled on Mail Order Sales by Lotus Records, 23 High Street, New-castle-Under-Lyme, Staffordshire, UK.

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RRP £79

Micro Musical Price **£69**

GENERAL:

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Transpose function and liquid crystal display showing notes and chords.

Comprehensive chord section with built-in Bass patterns.



CASIOTONE MT-65

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RRP £175 Micro Musical Price **£149**



CASIOTONE MT-45

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CASIOTONE MT-11

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1981

MARCH Matinée Organ * Spectrum Synthesiser * Hi-Fi Sub-Bass Woofer * Balanced line system * Yamaha SK20 review * BBC Radiophonic Workshop

APRIL Syntom Drum Synthesiser * Workshop Power Supply * Direct Inject Box * Ultravox * Paia 8700 review * Matinée * Spectrum

MAY Noise Reduction Unit * Lowrey MX-1 review * Apple Music System * Matinée * Spectrum

JUNE Wordmaker * Guitar Tuner * Hi-Fi/Group Mosfet amp * Fairlight CMI review * David Vorhaus * Matinée

JULY Alphadac 16 Synthesiser Keyboard Controller * Synwave effects unit * Matinée * Atari Music * Duncan Mackay * PPG Wave 2/Wersi Pianostar reviews

AUGUST PA Signal Processor * Powercomp * Hexadrum * Matinée * Resynator/Casio VL-Tone reviews * Irmin Schmidt

SEPTEMBER Partylite * Tape-Slide Synchroniser * Synpac 9V effects supply * Noise Gate * PA Signal Processor * Digital Keyboard * One-handed Guitar * Chromascope & Linn Drum reviews * Kraftwerk revealed

OCTOBER Harmony Generator * Securigard burglar alarm * Effects Link FX-1 * Music at City University * dbx noise reduction & Blacet Syn-Bow reviews * Micro interfacing * Disco equalisation

NOVEMBER Landscape explored * Casio MT-30, Roland GR-300 Guitar Synthesiser, Roland CPE-800 Compu-Editor reviews * Melody Making on the Apple * Phasing * Auto Swell - Electric Drummer - Soundbooster - Toneboost projects

DECEMBER Rick Wakeman in 1984 * Orchestral Manoeuvres in the Dark * Bio Music * Yamaha CS70M, Vox Custom Bass & Custom 25, Roland CR5000 & CR8000, Alpha Synthauri, Fostex 250 * Synclock project * ZX81 music

1982

JANUARY The New Tangerine Dream * Japan Music Fair * Fact File * Guitar Workshop * Reviews: Casiotone 701, Teisco SX-400, Aria TS-400, M.C.S. Percussion Computer, Soundchaser, Beyer Mics, TC Effects Boxes, Tempo Check * Projects: Spectrum Synthesiser, Electric Drummer, Volume Pedal

FEBRUARY Ike Isaacs * Digital Audio Discs * Yamaha GS1 & 2 * Reviews: Korg Trident, AKG D330BT & D202 Mics, Menta Micro, Roland TR606 Drumatix, JHS C50PM & C20B amps, Fostex A-8 8-track Recorder, Tokai ST50 & PB80 Guitars * Vocal PA * ZX81 Music * Projects: Digital Delay Effects Unit, Spectrum Synth, Percussion Sound Generator * Resonant Filters

MARCH Klaus Schulze * Robert Schröder * Kraftwerk Music to play * Killing CB Interference * Reviews: Firstman SQ-01, SC1 Pro-One, JHS Pro Rhythm Mini Synth, Tascam 124AV, Wersi Comet, Hamer Prototype, Shure 517SA & B * Synth Buyers Guide * Projects: Power 200 Speakers, 1.6 sec Digital Delay Effects Unit

APRIL Martin Rushent, Human League in the Studio * Cardiff University Electronic Music Studio * Reverberation explained * Reviews: Korg Mono/Poly Synthesiser, Fostex 350 Mixer, Roland TB-303 Bass Line Sequencer * Projects: MF1 Sync Unit, Multireverb * Electro-Music Crossword.

MAY Holger Czukay * Depeche Mode * Keyboard Buyers Guide * The Peak Programme Meter * Reviews: Moog Source and Rogue Synthesisers, Suzuki Omnichord, Acorn 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, T1-99/4 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 Harmonic Computer * 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.

DECEMBER Cliff Richard interview and Little Town music * Patrick Moraz * ARS Electronica * Digital Recording Pt II * Reviews: Elka Synthex, Crumar Stratus Synths, Tokai Basses, Shure PE Series Microphone, The Kit Percussion Unit * Projects: The Transpozer, Amdek Percussion Synth, Canjak.

JANUARY Richard Barbieri of Japan * Ultravox Music * Patrick Moraz * Ars Electronics * Reviews: Westone Bass Guitar, BGW 750C Amp, Korg EPS-1 Keyboard, Clef Band Box, Zildjian Cymbals * Projects: Synblo, The Transpozer, Amdek Compressor.

FEBRUARY Isao Tomita * The Human League * The Novatron Revisited * E&MM Index 1981/82 * Reviews: Linn Drum; Godwin Drummaker 32P; Wersimatic CX-1; Mattel Synsonics; Simmons SDS Drum Sequencer; Klone Kit; Movement Drum Computer 2; Korg KPR-77 Programmable; Memory-moog; Synclavier II; Powertran Polysynth; Vigier Guitars, Tokai TA35 Amp; Pearl Mics * Projects: Synbal; Caltune; Amdek 6-2 Mixer.



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HOBS MUSIC

Equipment Update

John Shykun talks about the new Chroma/Apple interface

CBS Musical Instruments have just announced the release of an Apple II computer interface package for their Rhodes Chroma Synthesiser.

The interface kit includes a card which plugs into the Apple I/O Slot 1-7, connecting cables and software disks with sample sequences and program groups.

Communication between the Apple and Chroma is via two interrupt driven 8-bit parallel ports plus associated control signals.

A complete command set is provided allowing the Apple to query or set the status of the Chroma mainframe, control panel or any of the voices.

The interface can also be controlled by user-written programs in Applesoft or assembly language.

At a recent demonstration, E&MM met John Shykun, Director of Marketing for Rhodes Keyboards. Here he talks in detail about the new package and what it offers the Chroma user.

"The Apple II interface is the first of four computer interfaces we'll be releasing this year which also include the new 16-bit IBM, the TRS-80 and the Commodore 64. Our Apple software will be compatible with the Apple IIe.

We chose the Apple II because its possibilities are so wide but the IBM micro should be a very good system for educational and extended use. I think that some computers, however, will turn out to be better suited to music than others, and we have high hopes for music applications with the low cost Commodore."

Pressure Sensor addition

"We've just finished evaluating the pressure sensor. The public have seen it at the Anaheim exhibition, and Herbie Hancock, Ian Underwood, Victor Feldman and a few other well known people played it and were very happy with it. So we're now going into pilot production and should have it available in the next few weeks. The sensor replaces the damper element of the Chroma keyboard. It takes only around 20 minutes to install as there's already a place inside the machine for it, and it gives individual pressure sensing for each key — all independent, so it's not like pitch bend. Now you can bend one note or chord and not the others.

My part in the development of the Chroma has been as 'resident musician' so to speak. — To help with the musical and human part of the machine: where everything's going to go, how it feels, the placement of the knobs and switches, and the input of the software, how friendly it could be or should be. It's something that's a continuing role, not only for the Chroma, but for the instruments that will follow.

The actual touch panels were chosen to save on cost and they were developed before Gulbransen organs used them. I've not had so much to do with the software as with other parts of

the instrument. We have one guy who's head of our applications group, Tony Williams in Holborn, who is writing up the basic application software. Now, as we get more into 'user friendly' software, I'm becoming more involved with the way the manuals should be worded for musicians. We still have a long way to go there. The first micro interfacing software for the Apple II was done in both Applesoft and Assembly code. From now on, however, we're going to do it in Pascal so that we can drop it easily into the different computers.

Now we've got the funding, and now we've seen the pathway to this computer market — the most asked for second request of users being *musical applications* — we want to be able to contribute to that. I went to the Consumer Electronics Show in Las Vegas and there were two systems up and running there, admittedly very primitive, but a beginning. Also, Commodore are showing a peripheral keyboard for their 4-voice system on board. But I think the big advantage we hold in the music business, in addition to the experience we have from micro-based musical instruments and their software, is that the 'sonic' capabilities that we possess on our machines are far superior to the equipment they're showing. So we have a lot of interest, in fact CBS in general has a very great interest in this area now, and they're making funds available to do their own software. So that will speed up the process of making more and more computers available to the Chroma."

Analogue to digital control

"Manipulating the knobs for the new instruments is sort of akin to the solid-state/tube amplifier thing that happened. It's going to be that kind of transition and we're going to be going through a lot of learning processes. On the Chroma a guy, or gal, is going to see one parameter at a time, but the list of parameters is almost endless that he's got control over. If we wanted to put a knob or a slider for every one of those controls, we could have put them there, but there'd be a hundred sliders on the Chroma panel and the cost of the instrument would drive it away from everybody who would want to buy it anyway. So it was a trade-off that we accepted, knowing full well that later on these computer type applications would help us solve some of these problems.

The VDU display will show full parameter functions on the screen, in effect putting the full programming manual on disk. So we feel that this is something we're going to work our way out of. There's been resistance, certainly, to the machine, although it hasn't been as negative a thing as I'd have imagined.

I do think the main slider controller ought to be a wheel, with no polarity at all — just wherever you started, it picks up again. The mechanical thumper doesn't seem to cause problems since normally you're amplifying the mach-



John Shykun using the Chroma/Apple Set-up.

ine and it doesn't come through the amplifier system. There are many more musical functions in the Chroma available than are accessible at the moment. There's also a separate computer inside for the keyboard scanning. It will allow attack or release times to be actuated on both the down stroke and the up stroke or attack structures both up and down. It requires technical procedures that nobody has actually done before, so you have to develop new techniques to play some of these things. In addition to the things you expect velocity sensors to do, which it does quite well, it also does things which keyboards have never done before, so it'll be a matter of how people create with them."

Interfacing Chroma

"Referring to the Apple II specifically, the present software (which is one of several sets we're releasing over the next few months) allows you to do multitrack sequencing. The Chroma is a 16-channel synthesiser with each channel basically a little one oscillator, one filter, one VCA, two envelope synthesiser. The Apple is capable of seeing it that way. It lets you organise not only polyphonic synthesis of any kind, but also multi-timbral synthesis. Basically, you're able to use the Apple as a solid-state 16-track recorder and all performance information, whether it's velocity or pressure, the levers, the pedals, any parameter changes you make during the performance are sent over to the computer. It records the performance in the way that a tape would, so you can actually build any type of multitrack performance sequences, one track at any time, can change volume level independent of others and it's possible to do many editing changes during your performance, including a complete re-mix.

The Apple II 48K model requires an extra 16K RAM card to operate, plus two disk drives. (The Apple IIe is already 64K.) Everything is stored on disk, including your program sounds and sequence information. Some 25

hundred to 3 thousand notes is a good average for the amount of notes available. A 3-minute piece can be accommodated quite easily. The number of tracks you use are not so much a problem as the actual duration of the piece. Memory is assigned initially but then a function will 'scrunch' everything down finding unused memory and moving it to the end of the sequence. An extra memory card will be available to extend memory to 10,000 notes average. If you're really clever and use loop functions a lot, you can do a lot more with the software.

What we're basically selling is hardware — the actual card that goes in, plus a function disk to show you the capabilities. But from this point on, anything we release for the Apple will be basically just 5¼" disks, with free software up-dates and disk exchange. The next one we have coming is a basic programming manual on disk showing the full graphics of programs and entire parameters on the screen.

Triggering for external drum machines is available for the Linn machine, DMX, Oberheim and the new Drumulator from EMU. There's a black box for the back of the Apple that we can supply. We're having some trouble linking basic analogue drums but digital are fine. The IBM micro will extend the multitracking options and give direct-to-disk storage — one of the things with Apple is that when you run out of notes (i.e. RAM), you've got to stop and dump to disk before continuing. Each micro will get its own relevant software, with the other three available by mid-'83.

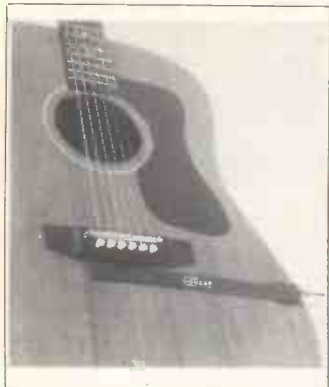
I think we're going to see very much more 'intelligent' Chromas that are brighter and much more friendly, telling you what's going on inside them. The Chroma itself will not become outdated and whether you buy a Mark I or II, you'll be able to extend your instrument indefinitely."

E&MM

For further details contact: CBS Fender Ltd, Fender House, Centenary Estate, Jeffreys Road, Brimsdown, Enfield, Middlesex. Tel: 01-805 8555.

MUSIC MAKER EQUIPMENT SCENE

Music



C-Tape developments have introduced a new version of their popular 8cm and 20cm C-Ducer contact mics. The new mics, which again come complete with a Gigster battery-powered pre-amplifier, are this time styled in brown and designed to blend in more smoothly with the natural colour of an acoustic bass guitar, or violin. Further details Tel. 0252 319171.



Roland recently introduced a new teaching system designed for any musical instrument with a line out or headphone out socket. The TL-12 Teaching Laboratory is expandable to deal with 12 to 48 students, each wearing a headphone/microphone combination connected to an instructor's control unit.

The control unit features a Group Select Switch for Group A (1-4) Group B (5-8) or Group C (9-12), together with a Personal setting for commu-

nication with an individual. Student allows any student to play to all the others; Tape allows input of a recorded piece to the students, and all send and receive levels are variable. Each student requires a TLC-1 connecting box and RHS-100 Headphone/mic set.

Further details from Roland UK, Great West Trading Estate, 983 Great West Road, Brentford, Middlesex TW8 9DN. Tel. 01-568 4578.

Heron Electronics are to distribute the new Ingersoll XK818 lightweight radio cassette player. This slimline design features MW/LW/FM stereo radio, twin speakers, Tone, Volume and Balance controls, telescopic aerial and cue/review. It's available in the shops for around £45 and operates on mains on 5 HP11 batteries.

Trade enquiries to Heron Electronics Ltd., Heron House, 19, Marylebone Road, London NW1. Tel. 01-486 4477.



Hitachi have introduced a new modular hi-fi system compact enough for bookshelf use yet claiming a power output of 60W per channel. The G2 system comprises record deck, cassette/tuner, graphic EQ, power amp, and a pair of 3-unit speakers.

All the operational controls are combined into the cassette/tuner section, which features quartz locked synthesised tuning with digital read-out and fifteen presets, six on FM and nine on AM (LW and MW). The cassette deck has Dolby B and C noise reduction, while the graphic EQ is a 10-band design for further sound modification. It uses wide dynamic

range semiconductors in the oscillation circuit with ICs in the flat amplifiers. Interestingly the top band is switchable to centre on 12kHz, 16kHz or 20kHz.

The turntable is a belt drive design with quoted wow and flutter as 0.05% WRMS, while the speakers feature a 200mm bass unit, 60mm mid range unit and 50mm treble unit with 3-way crossover.

The recommended retail price for the G2 system including VAT is £591.75, but individual components can be purchased separately.

Further details Tel. 01-030 0057.

The IM76 is a percussion mic particularly suited for bass drum and floor toms. The cartridge diaphragm features a high compliance edge and double dome for wide response, and a die cast zinc housing reduces mechanical noise and the risk of physical damage.

The IM80 is a cardioid condenser mic with a very flat response over a range stated as 30-22,000 Hz. This makes it suitable for use on cymbals, high-hat, acoustic guitar, piano and woodwinds. It uses a 9V battery for longer life.

Further details from Ibanez, 1716 Winchester Road, Bensalem, PA. 19020 USA. Tel. (215) 638 8670.

From the beginning of 1983 the Quad 405 acquires a -2 suffix and improved performance into low impedance loads. Since its release in 1975 more than 60,000 Quad 405 current dumping amplifiers have been sold and market surveys have shown the 405 to be the best selling power amplifier in such diverse markets as Canada, France, Holland, Japan and the UK.

The Quad 405-2 incorporates exactly the same 'Current Dumping'

circuitry which has made the Quad 405 such a success, and incorporates a new Quad designed protection circuit.

The new protection circuit enables higher currents to be delivered on music programme without in any way relaxing safety requirements for the transistors. The benefits over the original 405 will be audible when operating at high power levels (near overload) on most loudspeakers, but particularly with loudspeakers which present a more 'difficult' load.

The 'dynamic' protection circuit embodied in a custom thick film integrated circuit senses five variables: voltage, current, phase, temperature and time. The amplifier will deliver 8.5A peak into any load but if the combination of the five variables becomes unfavourable for transistor reliability, the permitted current is automatically and progressively reduced, returning automatically to normal when the excessive demand ceases.

The approximate retail price of the Quad 405-2 in the UK will be £247.00 including VAT. Further details Tel. 0480 55480.



Ibanez have introduced three new microphones specifically for instrumental use. The company feels that the standard vocal mic has been overused in trying to reproduce the sounds of a broad spectrum of instruments.

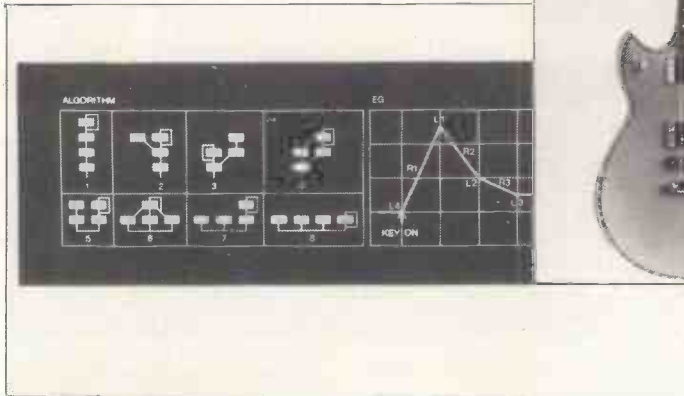
The IM70 is a super cardioid design using a lightweight cartridge diaphragm. Frequency response is stated as 40-16,000 Hz and rapid transient response makes it ideal for use on snare drum, tom-toms and brass instruments.



Yamaha DX-9 FM synth.



Yamaha MT44 multi channel cassette.



DX-9 Algorithm Flow Chart.



Yamaha SG 3000.



Yamaha MR10 drum machine.

MUSIC MAKER EQUIPMENT SCENE

Yamaha have a very wide range of new products for launch at the Frankfurt Music Fair, many of which are technically innovative as well as being commercially significant. Here we look at some of their new keyboards, guitars and studio equipment.

Keyboards

Yamaha seem to be boldly exploring areas that no other manufacturers have even contemplated. They announced seven new keyboard instruments and the terms VCO and VCF were not to be found on any of them. You should all be aware of Yamaha's FM system of sound generation, as utilised by the GS-1, GS-2 and CE-20. Now comes the latest DX range of keyboards which bear the slogan "Programmable Algorithm FM - Digital Synthesis". Essentially these instruments utilise the FM system, however, by enabling the player to control the mode and routing of up to six FM circuits, and to arrange them in a vague kind of algorithmic format, the instruments are now programmable. There are three new DX machines -

DX-1: This is still in its final prototype stages but it will be cheaper than the GS-1 (i.e. less than £10,000). It features a 73 note touch sensitive keyboard that is 32 note polyphonic in mono, 16 note in stereo, has 6 FM generators, 2 x 6 EGs, 1 x pitch EG, and offers 145 sound parameters and 60 operating parameters (the algorithmic bit). It can store 32 sounds and has 8 x 8 performance memories. It will also take two 32 voicing plug-in cartridges.

DX-7: A smaller version of the DX-1,

with a 61 note pressure and velocity sensitive keyboard, 6 FM generators, 6 x EGs, 1 x pitch EG, and 145 Sound Parameters, 26 Operating Parameters. It is 16 note polyphonic and can store 32 sounds, with room for one cartridge. Price unsure.

DX-9: Yamaha hope that the DX-9 will sell for under £1,000. It has 4 FM generators, 4 EGs, 68 Sound Parameters, 20 operating parameters. The 5 octave keyboard is 16 note polyphonic, and it can store 20 sounds, changeable through the cassette interface facility.

All the DX machines utilise Yamaha's new envelope system that has eight rather than four parameters, and all can be used with the BC-1 Breath Controller.

CE-25: This is a follow up to the superb CE-20, but more of a polyphonic instrument than its predecessor, with twenty different polyphonic presets controlled by a four octave touch sensitive keyboard. Yamaha hope that the price of this unit will be similar to that of the CE-20 (under £1,000).

Pianos have always played a large part of Yamaha's business, and we'll see some new models at Frankfurt.

PF-15: Utilises an 88 note balanced and weighted touch sensitive keyboard, which has a particularly nice feel, and is well suited to the traditional pianist.

PF-10: This machine features a smaller 76 note keyboard, which has more of an organ feel to it.

Both PF machines utilise the FM technology again and feature 10 preset voices including the old favourites - Piano (3), Harpsichord (2), Electric Piano (3), Vibraphone and Clavi-

net. Both instruments run in stereo and have twin monitor speakers which exhibit the new ultra-quiet stereo-chorus facility to the full.

CP-7: To complement the more established CP range of electric and electronic pianos, Yamaha add the CP-7 aimed at the beginner. It offers 4 presets and has on board stereo speakers and chorus.

Guitars

Eight new Yamaha guitars will have been seen at Frankfurt for the first time. Prices given should only be taken as a very rough guideline as exchange rates are now fluctuating in an alarming manner.

SG 200: A flat top solid body with glued-in neck, 2 Yamaha Humbuckers with 3-position selector switch. Around £200.

SC 200T: Features include 3 single coil pickups, detachable neck, tremolo unit, 5-way selector switch. Available in various colours, one of which is Pearl Blue - an icy white with just a hint of blue to the sheen.

SC 400T: Similar to the SC-400, but now with Yamaha's new tremolo unit (the 'T'). Roughly £250.

SA-800: At around £400, this is towards the low end of Yamaha's semi-acoustic range. It features an Alder/Spruce sustain block, and 2 Humbuckers.

BB-300: Good value at under £200, this bass is available in either Candy-tone Red, or Black. It offers a split pick-up, a new style bridge, and a detachable neck with thinner profile.

BB-400SF: This is a fretless version of the ever popular BB-400, however the frets are marked on the neck if you are worried that you can't handle a fretless just yet.

BB-3000: For those with a bit more cash, the BB-3000 is well up at the top end. It has new pick-ups with brass surrounds, brass nut, a thinner neck profile, gold plated hardware, and a deep cutaway.

SG-3000: And for around £750 you can have yourself a superb new axe. The SG-3000S has newly redesigned Yamaha humbuckers, various coil tappings, some rather flash cosmetic trimmings, a new low mass bridge, and some new colour finishes to choose from.

Home Studio Equipment

Yamaha will certainly set the cat amongst the pigeons with their entry into the home recording world. The **MT-44** is a 4 channel cassette deck with the ability to record 4 signals individually or simultaneously. It has an improved performance utilising both Dolby 'B' and 'C' systems. One advantage of its slower 1-7/8 ips tape speed is that it can be used to play domestic cassettes, and you can also produce a two track end product cassette that can be played on any other tape machine.

The **MM-30** is the mixing desk that is designed to be used with the MT-44. It facilitates track bouncing recording techniques and it will handle up to 10 different signals simultaneously.

The **MS-10** is a compact monitor speaker that incorporates a 20 Watt amplifier; again designed to form part of the Yamaha home studio. Yamaha aren't able to provide costs for these products yet, but they hope to put together an entire package that would sell for less than the cost of the TEAC Portastudio.

The **MR-10** is a rhythm unit which can also be played in real time. It has 5 pads that can either be used on their own or as an accompaniment to any of the 12 preset rhythm patterns. The pads produce Bass Drum, Snare Drum, Hi-Tom, Lo-Tom, and Cymbal sounds; the snare is tuneable, and an optional 'kick-pedal' is available to trigger the bass drum.

Yamaha also have two new recording mixers. The **RM-804** is an 8 into 4/2 desk, whilst the **RM-1608** offers 16 into 8/2/2/2 (16 input channels with 3-way operation). On the PA side of things there are some new speaker cabinets, stage mixing desks and some rather heavy duty high power amplifiers - for example, the **PC-5002M** (M for meters) handles 1500w into 8 ohms if used in mono mode.

All in all it looks like Yamaha are once again about to confirm their position as one of the most professional of musical equipment manufacturers.

David Crombie

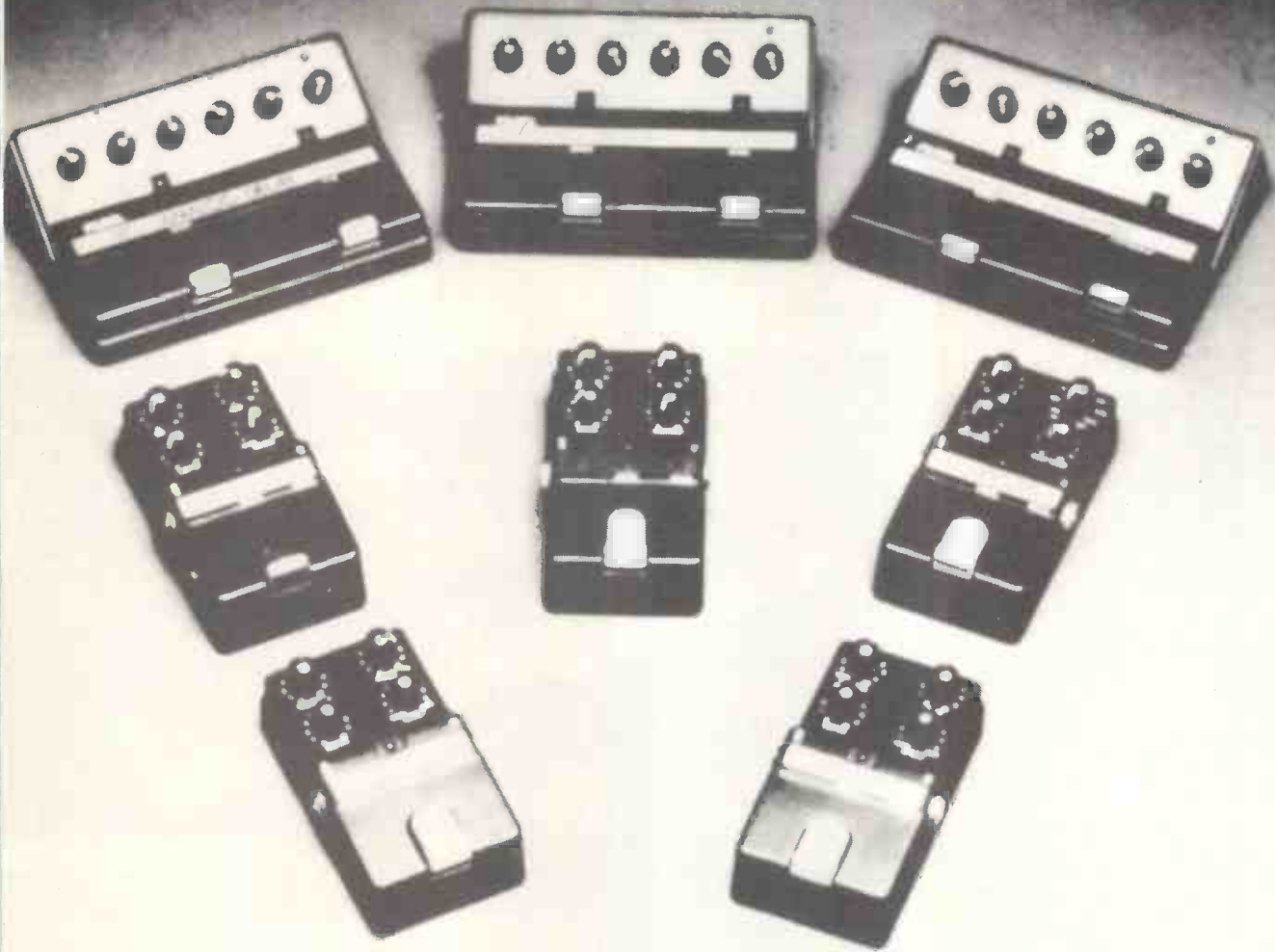
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MUSIC MAKER EQUIPMENT SCENE

Roland
keyboards



Jupiter 6.

Roland have a good selection of new products for unveiling at Frankfurt, including two synthesisers, a programming unit, new synthesiser modules, two combo amps, 3 cabinets, a new microcomposer and a digital chromatic tuner.

The synthesisers are two new polyphonics, the JX-3P and the Jupiter 6. Both are 6 voice models, retailing at £850 and £2,000 respectively.

The **JX-3P** is a preset instrument using 6 pairs of DCOs and having a 5-octave keyboard. Push tablets give 32 preset sounds, and there's a built-in polyphonic sequencer giving up to 128 steps with tape dump; there's also a Stereo Chorus and MIDI bus output, fast becoming a standard for computer interfacing. Presets include Strings, Organs, Electric Pianos, Vibes, Whistles, Brass and Sync Wah.

For an additional £200 it's possible to purchase the **PG-200** Programmer, which clips magnetically onto the JX-3P and allows editing of the presets and addition of another 32 sounds. These are stored in the empty C and D memory banks of the synth.

The other polyphonic is the **Jupiter 6**, selling at around £2,000. In appearance a cross between the Jupiter-8 and Juno 6, it again features a 5-octave keyboard and 6-note polyphony. The keyboard can be split, and there are 2 VCOs, VCF, VCA and two envelope generators for each note. There are 4 Arpeggio modes, 32 memories, tape dump and MIDI interface. Various oscillator assignment modes are available together with tape dump, portamento and glissando, auto tuning and foot-switch patch shifting.



Roland (UK) M.D. Brian Nunney enthusing over their new products.



Demonstrator Ichi and Jupiter 6.

The new Microcomposer, available in April, is the **MC-202**, retailing at £375. It's expected to be a 2-channel digital sequencer with a capacity of around 2,000 notes and a built-in monophonic synthesiser similar to the SH-101. Cassette dump and tape sync facilities will be included.

Additions to the Roland 100m modular system include a Portamento Controller, Signal/Gate Mul-

Roland JX-3P and PG200.

tiply Jack, and 4 band Parametric EQ. The **RM-165** Portamento Controller retails at £150 and gives two controls from 2m sec to 5 sec. The **RM-173** retails at £125 and features 4 signal gates with S/N of over 100dB, together with a multiple jack field for 6 channels with 4 jacks per channel. The **RM-174** Parametric EQ retails at £150 and has frequencies 20-200Hz, 100Hz-1kHz, 500Hz-5kHz and 2kHz-20kHz. Boost and cut is plus or minus 12dB, and there's an LED overload indicator included.

New additions to the Cube range of combo amps include the **C-40 CH** with Chorus and **C-60 CH** with Chorus. Each feature normal and overdrive inputs, 3-band EQ, Chorus and Reverb, foot-switching of effects and headphone sockets. Retail price are £230 and £275 respectively.

The SST cabinet series includes the new **SST-40** at £165, **SST-60** at £205, and **SST-80** at £240. Each features round horn piezo ceramic coated tweeters, 60Hz-20kHz frequency response, standard jack and square push-terminal connectors and particle board/PVC construction.

Lastly, the **TU-12** Chromatic tuner, which retails for £49. Concert pitch can be set from 440-445Hz, and dual displays of a large meter and a pair of LEDs make tuning under stage conditions easier. Guitar and Bass guitar modes are selectable, but the Digital Processing design of the device makes it equally suitable for any other instrument. Accuracy is plus or minus one cent.

E&MM

MARCH 1983 E&MM

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BIGGLES MUSIC	60
BOOTLEG MUSIC	5
BRITISH MUSIC STRINGS	25
CARLSBRO SALES LTD	19
CBS FENDER	56/57/59
CIROCOLEC	111
FREEDMANS	7
FUTURE MUSIC	34/35/39
GIGSOUNDS	59
GIGSVILLE	33
H.H.B.	72
HOBBS MUSIC	105
HONKY TONK MUSIC	29
I.T.A.	93
L&B ELECTRONIC	30
MOVEMENT AUDIO	86/87/88
MUSIC GROUND	23
MUSIC LABS	61
MUSIC MARKET	67
ONE WAY MUSIC	44
PEARL MUSIC LTD	109
PETER NOBLE LTD	39
PHONOSONICS	67
POWERTRAN	71
R.E.W.	77
ROCKBOTTOM	91
ROCK CITY	33
ROSE MORRIS	63/65
SENIC SOUNDS	9
SOHO SOUNDHOUSE	73
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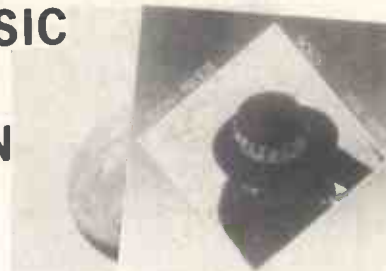
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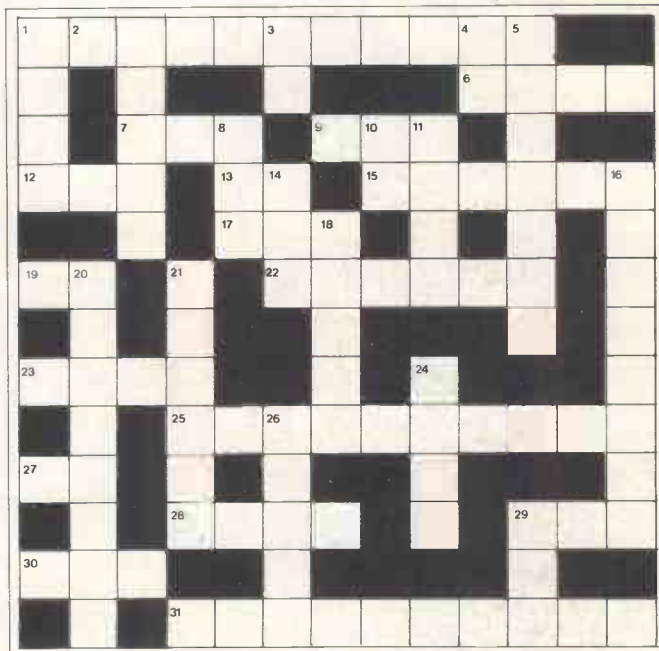


No. 7

This month a chance to win two of the most exciting synthesiser
albums of recent months - Edgar Froese's 'Solo 1974-1979'
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Send your completed crossword, including your name and
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E&MM Crossword

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ACROSS

- Takes the hard work out of arpeggios (11)
- A more precise form of tuning than coarse (4)
- Make of synth developed by Alan Pearlman (1,1,1)
- Artist's nod to the audience; has he more than one string to it? (3)
- If you can't read music, play by this (3)
- In TV terms, outside broadcast (1,1)
- See 5 Down
- A home computer like a dog or cat? (3)
- Envelope shaper (1,1)
- A guitar made like part of a car? (6)
- Rotund David of Soft Cell (4)
- Sound producer in synths (10)
- Noise level indicator of the most common kind (1,1)
- Monarch, bloody in Fripp's old band? (4)
- Noise level indicator of a less common kind; or parts per million? (1,1,1)
- Alison Moyet of Yazoo's male nickname (3)
- Semiconductor device with three electrodes (10)

DOWN

- Cut down with this monosynth (4)
- Make of drum, a treasure of the sea? (5)
- Stomu Yamash'ta's album, or a Chinese board game (2)
- See 21 Down.

- and 15 Across — French musician, late of Heldon, now with his own Ethique (7,6)
- Radio One type of music (3)
- An IC amp, if abbreviated (2)
- Section of the orchestra for blown instruments (4)
- Production team formed from half of the old Human League (1,1,1)
- Colourful home computer (8)
- Many time signatures (5)
- See 21 Down
- and 4 Down and 20 Down — Group of high-fliers, with chart single Wishing (If I Had A Photograph Of You) (1,5,2,8)
- Second highest range; voice above tenor (4)
- Latin American dance sounds like an eel (5)
- Rotary control sounds like a bowl (3)

All answers can be found in back issues of E&MM

January's Answers

Across: 1. Transformers 6. MM 7. Soh 8. Electro 9. Blow 11. Emulator 14. On 15. BS 17. Tapes 19. HRC 20. Moog 21. Reverb 23. Fast 24. String 25. MU 26. Snare
Down: 1. Tweeter 2. Attenuator 3. Scat 4. RPM 5. Slow 6. Mono 7. Sound-chaser 10. Resistor 12. Theremin 13. RB 16. She 18. Agents 20. Minim 22. Bugs.
January's winner:
P. Howard, Wigan

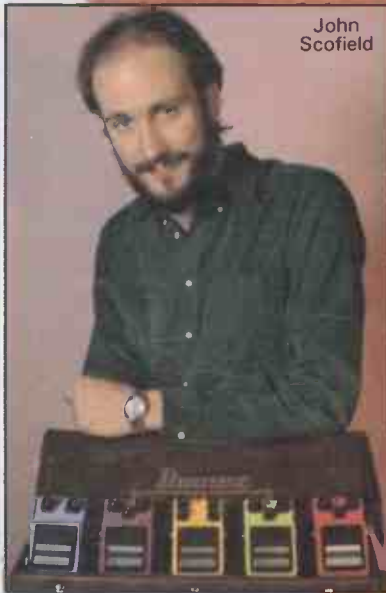
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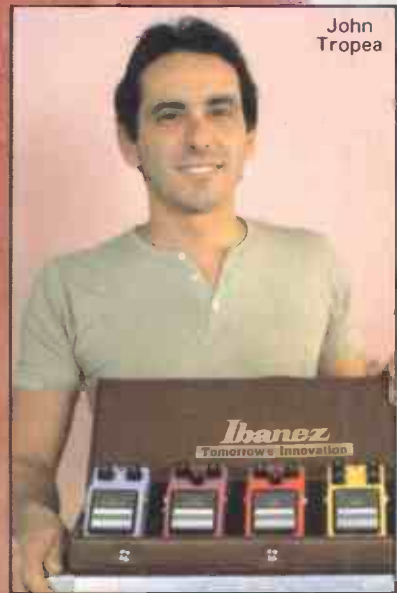
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