



50 Golden Years Of Practical Electronics PART 1

by Alan Winstanley

A brave new world

The November 2014 issue of *Everyday Practical Electronics* marks a very special milestone in the evolution of our title: we are proud to celebrate the 50th anniversary of Britain's *Practical Electronics* magazine, a title launched half a century ago in 1964 and which has evolved into today's modern *EPE Magazine*.

Practical Electronics was a new addition to the emerging family of 'Practical' home and hobby magazines published by George Newnes in London, joining the radio journal *Practical Wireless*, which first appeared in 1932 and became the largest selling publication of its kind, peaking at 120,000 printed copies a month. *Practical Electronics* would be designed to offer a broader appeal in the world of hobby electronics and was committed, in the words of its editor Fred Bennett, 'to explore, unreservedly, all its practical possibilities'.

The team at *Practical Wireless* had suggested the new magazine and in 1962 Fred Bennett officially went to work for 'PW' – or so he thought. The truth dawned as Fred was eventually tasked with preparing a new title, to be called (probably at his suggestion) *Practical Electronics*, and his close personal involvement with the development of *Practical Electronics* was in reality pre-ordained by Newnes. The gestation period of *Practical Electronics* was surprisingly long, explained Fred in 1989, as more than a year passed while Newnes chewed over some mock-ups for the proposed magazine.

First issue

Finally, after receiving the go-ahead at the end of 1963, the first issue of *Practical Electronics* was eventually published the following year in October 1964, less than 20 years after the end of the war when the need for thrift,



make-do and resourcefulness rubbed shoulders with highly skilled engineers, ex-military types, keen amateurs and talented professionals alike – all potential readers (and contributors) for the new magazine.

Such was the intense interest in the subject that about 115,000 copies of the first edition were sold. As Fred explained, the November 1964 Vol. 1 Issue 1 of *Practical Electronics* was launched in a post-war era that heralded the dawn of a 'white-hot technological revolution,' as Britain's then Prime Minister Harold Wilson put it. With the Space Race beckoning, there was no doubt that electronics would have a pivotal role to play in the technological revolution that lay just over the horizon. Many exciting discoveries and advances were promised, with *Practical Electronics* playing a key role in enthralling, enthusing and educating its dedicated new readership.



The very first issue of *Practical Electronics* arrived in 1964. It was packed with features and mail order advertisements

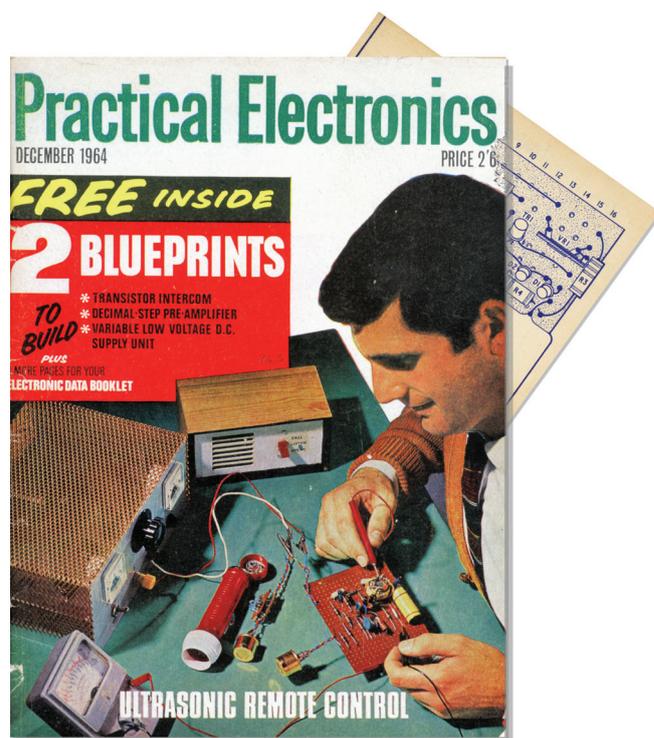
Limitless talent

Editor Fred Bennett was worried that there would be insufficient material contributed each month, but at no time did this prove to be the case and he soon realised that he had 'begun to tap an inexhaustible source of talent'. He said that 'scores of amateurs and professionals were swift to offer their projects,' and he would often have to make difficult choices about what to publish, and what to reject.

Aided by the advent of the germanium diode and transistor, a procession of constructional projects was eagerly devoured by readers hungry to challenge their skills in building their own electronic circuits. Issue 1 offered a taste of things to come, with a 5W integrated amplifier (all-transistor), a Geiger-Muller ratemeter, a VHF receiver and a Morse practice oscillator. A feature on 'Semiconductors for Automobiles' highlighted offerings by Lucas in electronic ignition systems for (positive earth) cars.

PCBs and Veroboard from day one

Printed circuit board foils were offered right from the start, with cellulose paint recommended as etch resist and a fearsome cocktail of ferric chloride and hydrochloric acid suggested for etching boards at home. Mercifully, stripboard assembly quickly followed in *Practical Electronics*, with December 1964's issue already having a pull-out blueprint featuring two projects using the new 0.15-inch pitch 'Veroboard System'. This SRBP circuit panel of milled copper strips and a precision matrix of punched holes was a truly brilliant invention, which had launched earlier in 1961, and Veroboard was destined to put home electronics construction within easy reach of hobbyists for decades to come. Readers faithfully followed the magazine's skilfully drawn assembly diagrams and soldered everything together with gusto.



The December 1964 edition encouraged hobbyists to use the new British-designed 'Veroboard System' to assemble circuits

There was plenty for the electronics enthusiast to see and do in this exciting new hobby, and the reader response to early issues of the magazine was immensely gratifying. Clearly, *Practical Electronics* was a magazine just right for its time, and its resourceful and focussed readers devoured its contents every month. The title was also keen to welcome newcomers and much attention was given to explaining the principles and physics of electronics to readers using easily digestible articles and tutorial series, starting with *Beginners Start Here* in Issue 1. Eagerness to educate would become a core value of the magazine and is still with us today.

Advertising

Practical Electronics also carried many fascinating advertisements that formed the critical backbone of the hobbyist's supply line. In Issue 1, an embryonic Sinclair Radionics Ltd advertised a 10W amplifier (the Sinclair X-10) and the Sinclair Micro-6 ('the smallest radio set in the world'), whilst Heathkit had a British catalogue of test, audio and radio equipment that were sold in kit or assembled form – £18. 18 shillings

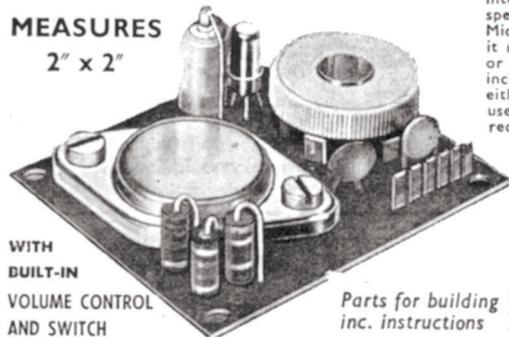


SINCLAIR TR750 AMPLIFIER

Designed for use with the Micro-6 or Slimline Receivers

MEASURES

2" x 2"



WITH
BUILT-IN
VOLUME CONTROL
AND SWITCH

This highly original design is primarily intended to provide powerful loud-speaker reproduction from the Sinclair Micro-6 and Slimline Receivers. As such, it makes an ideal car-radio or portable or domestic loudspeaker set. A plug is included for connecting the TR750 to either set. The amplifier can also be used in many other ways including record player, intercom or baby alarm.

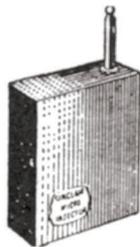
- **OUTPUT** — 750 milliwatts into any standard 25-30 ohm loudspeaker
- **INPUT** — 10 mV into 10K-ohms
- **RESPONSE** — 30-20,000 c/s \pm 1dB

Parts for building inc. instructions **39/6** **READY BUILT AND TESTED 45/-**

SINCLAIR MICRO-INJECTOR

Invaluable to constructors for fault tracing

Two Sinclair Micro-Alloy Transistors (M.A.Ts) are used in a special circuit to generate and inject a test signal into any part of the equipment at any frequency from 1 kc/s to 30 Mc/s so that faults can be rapidly located in any radio or audio apparatus. This is the smallest, most efficient probe of its kind ever offered to constructors and the lowest priced too. The standard 6d. battery required to power the Sinclair Micro Injector will easily give 6 months' service. Full instructions are included with every instrument, complete or in parts. Building is very easy.



Parts inc. M.A.Ts and case come to

27/6

Ready built and tested **32/6**

SINCLAIR MICRO-AMPLIFIER

Designed to laboratory standards



Thousands of these fantastically small amplifiers have been built by constructors, modellers, experimenters, laboratories, commercial firms, etc. Frequency response from 30 to 50,000 c/s \pm 1 dB.

Power gain 60 dB (1,000,000 times!). Instructions show you how to make an F.M. transmitter, broadband R.F. or sub-miniature hi-fi amplifier with an output suitable for any earpiece or even loud-speaker. A fascinating unit to build and use. It is no bigger than a three-penny piece!

Parts and instructions come to **28/6**

SINCLAIR X-10

For details of this revolutionary new 10 watt combined hi-fi amplifier and pre-amp see our preceding pages.

Salute to a new Journal

Now that transistors are so freely available to everyone, we feel that *Practical Electronics* had to come. We are confident that this exciting new journal is going to meet the needs of an ever-increasing band of constructors whose interests are taking them into fascinatingly new fields, and who will want more varied and ambitious activities as electronics progress. So good luck to *Practical Electronics*. As a forward looking team ourselves, we wish you every success.

SINCLAIR TRANSISTORS

MAT 100	High gain, low level ...	7/9
MAT 101	Extra high gain, low level	8/6
MAT 120	High gain, medium and high level ...	7/9
MAT 121	Extra high gain, medium and high level ...	8/6
ADT 140	For FM, TV, VHF and UHF	15/-
"Magnagain"	Power Output up to 30 watts ...	18/-

BOOKS FOR CONSTRUCTORS

- ★ "22 Tested Circuits Using Micro Alloy Transistors" Post free **5/6**
 - ★ "Tested Short Wave Receivers Using MATs" Post free **5/6**
 - ★ "Tested Superhet Circuits for Short Wave and Communication Receivers, using MATs" Post free **6/6**
- All three ordered together, **16/6**

If you do not wish to cut the coupon from this page, please mention "Practical Electronics," November, when ordering

To SINCLAIR RADIONICS LTD., COMBERTON, CAMBRIDGE

Please send items detailed below:— £ s. d.

NAME.....

ADDRESS.....

TOTAL £

For which I enclose CASH/CHEQUE/MONEY ORDER

Pre. 11

The first advert in Issue 1 from Sinclair Radionics, whose DIY kits were already moving towards miniaturisation

bought a 'deluxe valve voltmeter' kit. Many home constructors sent for a Henry's Radio catalogue, the London-based mail-order component supplier being a lifeline for many constructors in these, the glory days of the hobby. Henry's advertisement graced the back cover for many years, while inside the magazine, the pages were crammed with myriad advertisers whose tantalising merchandise was just a phone call or mail-order coupon away. E-commerce was thirty years distant and so everything was handled by post or (if you were lucky) a local electronics or radio surplus shop might meet your needs. At one point, such was the terrific demand for magazine space in *Practical Electronics* that advertisers were actually being turned away!

The February 1965 *Practical Electronics* carried a competition called 'Magic Boxes' and, with a two-guineas prize on offer, inquisitive readers were invited to reverse-engineer an electronic

puzzle and write in with their solutions. Such was the enthusiasm that more than 500 submissions arrived in the following week's mail. Something else appeared for the first time in that issue: a throwaway line under the Magic Boxes heading exclaimed 'Ingenuity Unlimited!' and readers queued up to submit their own answers to the Magic Boxes conundrum. The title stuck, and *Practical Electronics* eventually adopted it for a column of readers' own circuit ideas. In fact, it was 'IU' that first sparked this writer's own interest in hobby electronics back in 1975, the December issue. Reader interaction, as far as there was any, was conducted strictly by letter post, which meant a two-month lead-time on the *Readout* letters page.

Sounds of the Sixties

Readers would have to wait until the October 1967 issue to see their first integrated circuit project. It used a four-pin



linear amplifier from Mullard as the heart of a record player audio system. Integrated circuits like these heralded (or maybe threatened, depending on your point of view) another revolution in electronics design and assembly. Just as there had been much rivalry between the thermionic valve and transistor camps of the electronics fraternity, the dawn of the IC era promised to challenge them further still. In the closing years of the 1960s, more IC designs appeared, this time using devices from Plessey. Engineers who worked for major British manufacturers such as Plessey, Mullard and Lucas, as well as lecturers and professionals all regularly submitted articles of the finest quality and their work often graced the pages of *Practical Electronics*, which helped the magazine to maintain its quality feel with an authoritative and dependable tone.

In 1968, a young Mike Kenward joined the team as a technical sub-editor, following a successful interview with Fred Bennett. The magazine's editorial masthead was very restrained in the early days; only the name of the editor, 'F.E. Bennett' appeared. Mike was soon contributing heavily to *Practical Electronics* and indeed was the subject photographed for the July 1969 cover promoting an Optical Remote Controller, a device that was supposedly wired directly to a TV chassis!

The publisher George Newnes was a part of the International Publishing Corporation, founded in 1963 along with Odhams Press and Fleetway Publications. In 1968 IPC Magazines was created, its name appearing discretely under the Editorial of *Practical Electronics* from that moment on. Since IPC claimed to trace its roots back to 1853, it seemed to bode well for a magazine title's longevity!



A young member of *Practical Electronics*' Editorial staff – Mike Kenward – on the July 1969 cover, promoting an optical remote control system for TVs

Digital electronics and the 1970s

Into the new decade of the 1970s, and what lay in store for the electronics hobbyist? The answer came in the December 1970 issue with the title's first digital IC project – the *Digi-Clock* by RW Coles. This complex design used no less than 20 TTL logic chips and four cold-cathode tubes for a digital display. 1971 saw some highly significant designs being published, including the *PE Aurora* (April 1971) sound-to-light system, a design at last made feasible by semiconductor mains switching, and the *PE XEE* (June 1971), a sensory buggy which was hailed by BBC TV's *Tomorrow's World* as a sign of things to come in the technology world. Not every project turned out to be viable, though; a long-running DIY desktop digital calculator – the *PE Digi-Cal* (July 1972 onwards) was built with TTL logic and took no less than eleven monthly articles to complete. Unfortunately, it was obsolete almost before constructors turned off their soldering irons because single-chip calculators came onto the market around that time.

Another milestone was reached in June 1973 when a small new Signetics integrated circuit was announced to the *Practical Electronics* readership: the NE555V timer. This deceptively simple little 8-pin marvel became a staple item in every hobbyist's tool chest – and 40 years on it still is.

The advances in linear and digital dual-in-line ICs were unstoppable, with data sheets and application notes from Texas Instruments, National Semiconductor, Motorola and many more signposting the way that the industry was headed. Hobbyists followed hard on their heels, and interest in hobby electronics showed little sign of abating, helping *Practical Electronics*' circulation settle at a healthy 95,000 copies a month.

Success and the rapid pace of change could be a headache. Projects, tutorials and adverts all jostled for space, as ever-more advanced designs of astonishing complexity (for a hobby magazine) appeared, including CCTV cameras, electric organs and pianos, analogue computers, music synthesisers, electronic ignitions and a plethora of technically ambitious projects. There are far too many projects to mention, but the *PE Scorpio* ignition system and *PE Gemini* stereo amplifier are just two of many much-loved, outstanding efforts by their freelance contributors and the advanced hobbyist was spoiled for choice. Many of these key projects are remembered with fondness by their constructors to this day.

An everyday answer

There were so many new and exciting developments in microelectronics to explore in the 1970s, plus ever-more challenging projects put into print that competition for column inches was unrelenting. It became clear that it would be hard for *Practical Electronics* to continue to cater for all abilities and the journal risked spreading itself too thinly. Interest also came from the education sector, as schoolteachers and lecturers welcomed the support and value that *Practical Electronics* offered to their classes of budding electronics hobbyists and trainee engineers.

It was realised that even a simple two or three-transistor circuit could be very challenging for a beginner to tackle successfully. Often, transistor pinouts and diode orientations were a great mystery for novices, and there was no World Wide Web to provide technical data. In fact, suppliers' mail order catalogues were much prized for the component data that they (hopefully) contained. The desire to satisfy the needs of the higher end of the scale of abilities, while also endeavouring to cater for beginners and newcomers undoubtedly put pressure on editorial resources.





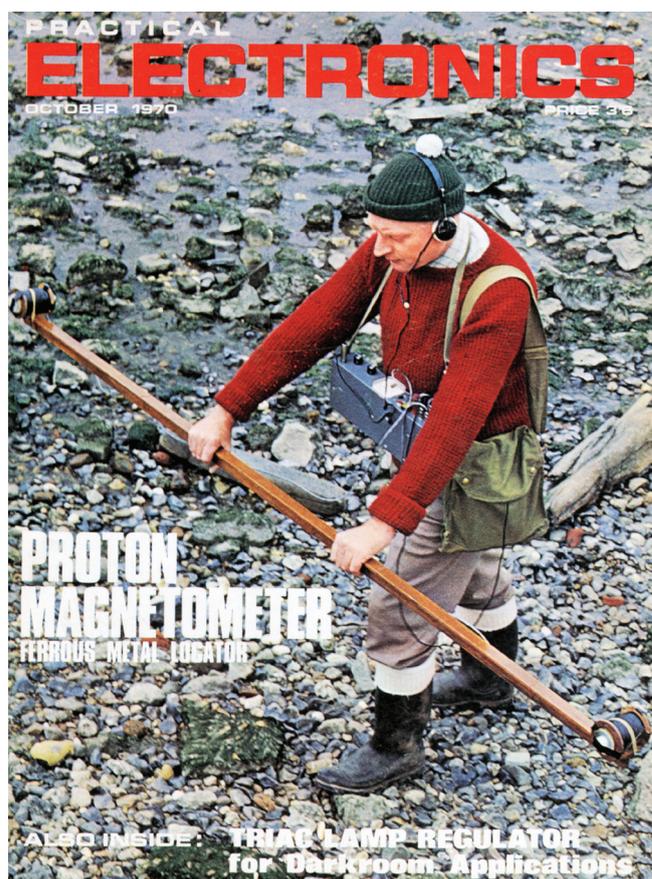
Everyday Electronics was aimed at novice electronics hobbyists when it was launched in 1971. The introductory November issue included a free gift of Veroboard

As a result of this need to cater for a wider scope of readership abilities, in 1971 the team behind *Practical Electronics* decided to spin out the more basic, entry-level content into a new journal to be run by the same team. Thus, *Everyday Electronics* was born, promising 'Projects easy to construct and theory simply explained'. Its first November 1971 issue (price 15p.) offered some simpler home projects for the less-experienced hobbyist to tackle and a small pink paper envelope contained a free piece of Veroboard. The contents of *Everyday Electronics* were deliberately un-intimidating, easily assimilated and well presented, sufficient to encourage the novice to have a go with confidence. A *Windscreen Wipe Control*, *Home Sentinel* opto switch, a *Snap* electronic game and a record player were all on offer. Apart from *Shop Talk* (component buying advice, written by a young Mike Kenward) there also appeared Part One of a ground-breaking electronics educational series called *Teach-In* by Mike Hughes, who started by offering readers some sound soldering advice. From the first issue, *Everyday Electronics* was already finding its feet.

Into the mid-1970s and *Practical Electronics* led the way again, this time with a design for a *Proton Magnetometer* ferrous metal locator. The article was characteristically comprehensive in its coverage of theory and practical assembly, with all diagrams expertly drawn by hand throughout. The issue was also notable for its cover photo of editor Fred Bennett, using the device on the banks of the River Thames.

Pong!

Another revolution was also under way in the 1970s, this time on our TV screens. Television



The founding editor of *Practical Electronics*, Fred Bennett, seen here trying the *PE Proton Magnetometer* on the banks of the River Thames in London

viewers were mesmerised by the sight of a little white square bouncing around a blank screen and darting to and fro, with two users able to bat it back again using a simple control. Television video games had been born, starting with tele-tennis or 'Pong'. There had never been anything like it, and enthusiasts of tele-tennis were soon glued to their screens into the small hours of the night. Dedicated integrated circuits were now being released that dispensed with the need for boards full of logic chips, although some of the IC solutions were buggy and much work was needed to improve the reliability of this latest wave of semiconductor chips.

June 1977's *Practical Electronics* had a *TV Sports Centre* on the cover, showing Production Editor Dave Barrington eagerly playing tele-tennis with, he told me, a secretary borrowed for the photoshoot from IPC staff. July 1978's issue had the more complex *PE TV Game Centre*, which promised 14 games of digital TV entertainment, although none of them looked anything like the motorcyclist or tennis player depicted on the cover! Primitive cartridge-based TV game consoles appeared in the shops for the first time and colour arcade games in pubs (the rest, as they say, is history).

Next month

In the second part, more advances in electronics technology are celebrated starting with the new age of home computing and then the single most significant digital device that changed the face of hobby electronics for ever. We trace *EPE* magazine's heritage over the past 20 years, showing how Britain's last remaining hobbyist electronic magazine has evolved from a number of competing titles. More fascinating cover shots of key issues are included, so be sure not to miss Part Two next month!

