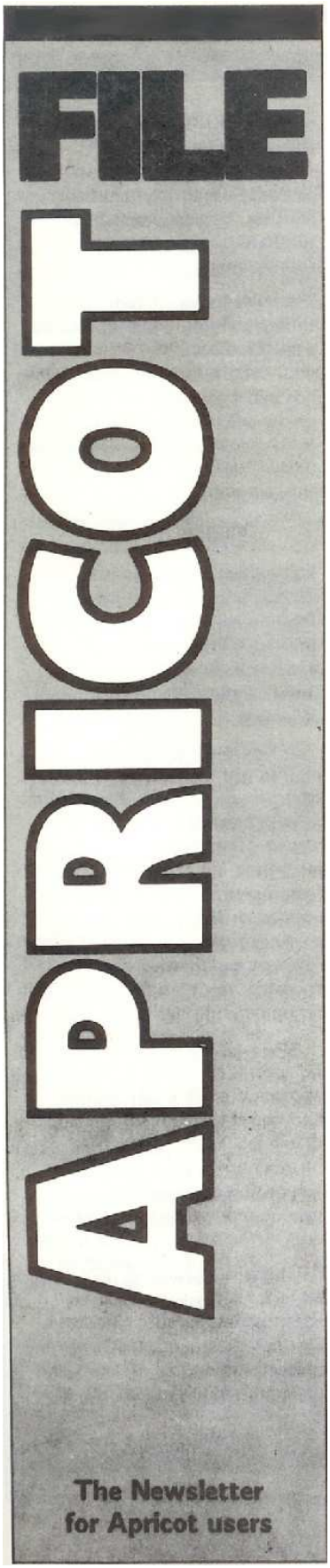
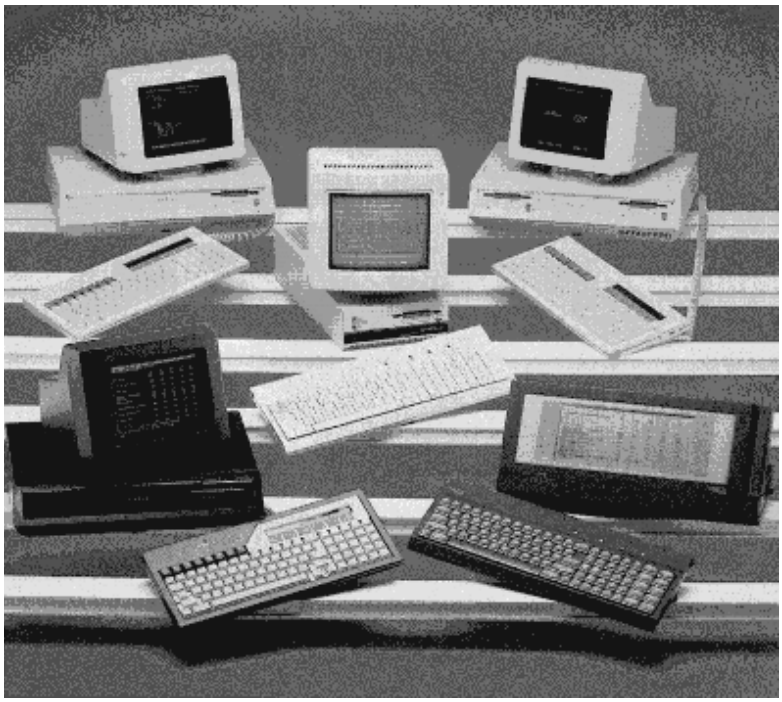



# Apricot File 2_6



Scans courtesy of [www.actapricot.org](http://www.actapricot.org)

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Release 2.6

FILE

APRICOT

The Newsletter for Apricot users



# Seen at the Show

## The Which Computer Show: Boom times for the business?

**By the Editorial Staff**

The Which Computer Show last month was one of the best for a long while. 'Best' in this context means 'best for the visitor', with lots to see — around a hundred new-product launches, for instance — and decent product demos becoming the norm (at last).

It was also best for the organisers, with the 61,000 or so visitors representing a 43 per cent increase in attendance over last year's somewhat drab event. It looks as though the computer business is going into another boom cycle, probably as a result of the massive expenditures we've been seeing over the last few months on advertising and PR. Amstrad probably deserves a vote of thanks from all microcomputer vendors ...

And it was good for us APRICOT FILE folks — putting faces to familiar names, lots of new contacts, spreading the word about the old-style Aporicots. And since our part of Islington Council's corner stand didn't permit too many people to operate simultaneously on the stand, we had ample opportunity to browse around the Show.

Actually, there wasn't too much of direct interest to Apricot owners. The spacious **Apricot plc** stand sprawled around the entrance, as is Apricot's wont; the area was of course filled with IBM-compatible 286 and 386 machines (still no sign of the promised PostScript-compatible printer for desktop publishing, though). We did bump into someone from **Pegasus**, who told us that Apricot still represents the majority of its accounts package sales despite the availability of a version for IBM-compatibles. Apart from that, we saw a lot of interesting printers that might be of relevance.

### More matrix

The packed **Amstrad** stand didn't have much to offer — except the promised el cheapo printer, the **DMP-4000** at **£349**. This does buy a good-looking 220cps spec on this wide-carriage printer — Epson-compatible, of course, and some £180 cheaper than the Epson equivalent. It looks and feels a bit lightweight, though that won't stop Amstrad meeting a projected manufacturing target (in Hong Kong) of 40,000 machines a month by the autumn.

**Brother** is one of those matrix printer manufacturers who we've always felt could do better. It probably leads the daisywheel market, but dot-matrix NLQ improvements and the growth of noiseless typesetter-quality laser printing are constricting that business. Maybe the new Brother matrix printers at either end of the scale will help.

The **HR-40** is a neat, cheap 40cps unit, but the interest probably comes from the **4018**; this is a fast dual-mode printer (480cps in draft mode, 100cps NLQ) that claims to be the swiftest such animal to use a single print-head. There's a decent-sized buffer — 48KB — and a colour upgrade option.

▶ CONTINUED ON PAGE 2

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Brother doesn't go in for price-competition, however; these printers aren't the most expensive you can buy, but they aren't the cheapest either. What's more, Brother's fairly restricted line of distributors don't go in for the kind of RRP discounting you'll find on other brands. That also applies to the other attractive new printers we looked at, the **Mannesmann Tally MT87/MT88** covered elsewhere in this issue by Bob Smith.

## More lasers

There is a booming market for laser printers — the UK alone is expected to buy 38,000 units this year, with an estimated value of some £60 million. So the market heavies are stirring into action.

**Citizen**, which regards itself as Epson's fastest-growing competitor in matrix printers, has just produced its first laser printer. The **Overture 110** should be available next month with an RRP of **£1,995**; its engine hails from one of the up-and-coming OEM suppliers, **Mita**. The Overture runs at ten pages per minute, has six resident fonts, and takes a paper tray with a capacity of 250 sheets.

Deficiencies suggested in the published spec include an absence of ready-to-go laser printer emulation (no PostScript page description language, no HP-compatibility) and a limitation for graphics (a font memory of 512KB is rarely big enough for that). Still, the printer does have one user-friendly extra — unlike most of its competitors, the Overture's output can be face-down so that sheets are collated automatically. And Citizen claims it to be "the most cost-effective printer in its class".

It's been something of a surprise that **Epson** has been late in getting into this business: Epson is the world's largest maker of dot-matrix printers, claiming 46 per cent of the world's market (and in 1987 it will open a new factory in Telford to turn out 8,000 FX series printers each month for the UK market). While the technologies are very different, Epson certainly has the clout to be a major player in lasers. Besides, it's part of the multi-tentacled Seiko corporation which includes photocopier and camera developments.

Now we hear there's a **GQ3500** scheduled for a Spring launch as part of a plan to grab fully 25 per cent of the laser printer market within 18 months; described as "a generic mass-market page printer", the machine is expected to be competitively priced — which these days must mean **under £2,000**, with distributors given the opportunity to discount heavily.

The spec looks distinctly unremarkable, however — seven internal fonts and 42 options on plug-in cartridge (which sounds a lot, but different 'fonts' may be just variations in size and emphasis on the same typeface), output at six pages a minute (Canons can do eight, other engines claim 10ppm and more), a very modest 150-sheet feeder bin as standard with 250 as an option.

Another recent entrant is **C Itoh**, with an upgrade to its existing LIPS 10 model — one that you don't see around very much. The new LIPS 10+ emulates the HP LaserJet Plus, which means its internal memory has been upped to 2MB for bit-mapped graphics. This 10ppm printer has both Centronics and RS-232 interfaces, which isn't the case on all; it also claims 'exceptional reliability'.

But there's no PostScript compatibility here, either. PostScript is required by some of the fancier desktop publishing packages, notably PageMaker; and Canon-engined printers can't utilise them ... unless you pay **Pragma** a whopping **£2,800** for its new **PS Jet** conversion. It's a hardware upgrade that replaces the top cover of Canon-based printers (Canons and HPs, NCR, QMS) and comprises 2.5MB of additional memory driven by a Motorola 68000 32-bit processor. As well as PostScript, you get 13 typefaces in the same fonts as used on the Apple LaserWriter; 279KB of the memory is used as a font cache, there's 264KB of download space, and the balance is available for bit-mapping an A4 page at 300 dots per inch.

It sounds pricey, but it will provide full PostScript compatibility and do everything the LaserWriter can — at a total cost about two-thirds of the Apple price.

## Educating RITA

It's not clear just how seriously anyone should take RITA. The Recognition of Information Technology Awards were devised in the early days of the Which Computer Show by the then organiser at least in part as a press gimmick — different computer-industry publications 'sponser' different awards and are responsible for the nominations (which gets the Show some free publicity in those journals). The nomination process varies from one mag to another, in some cases apparently comprising no more than the editor's own preferences. A panel of appointees consider the names offered, and in some years have reportedly been hard put to find worthy recipients (or, just occasionally, any recipients at all).

Given that the selection and the judgement is less than consistent and certainly not objective, the *raison d'être* for the Award lies primarily in the PR value for the show oraniser and the recipient. And in general, the Awards go to people who don't exactly *need* publicity.

For instance, **Apple** got **Business Computer System of the Year** for desktop publishing — just what Apple (and the computer industry) needs. The Apricot Xen Multi-User System was a runner-up. **Peripheral Product of the Year** was a colour dot matrix printer from **Honeywell**: big deal. **User of the Year** was a Dundee jeweller with a multiuser Texas Instruments system ... and funnily enough, that installation just happened to feature the week before in BBC TV's tendentious *Micro Live* program as a possible winner. **The Instruction Set**, a London organisation which specialises in training and consultancy on Unix and Xenix, was **Newcomer of the Year** — an award that supposedly recognises a contribution in terms of new jobs and services. For **Software of the Year**, the judges couldn't separate the Automator mi program generator from **Direct Technology** and the Paradox database by **Ansa Software** — the latter is clever but overpriced, Automator is probably the most meritworthy member of the whole RITA list.

Anyhow, the weekly magazine *PC Business World* probably had the right idea, with a spoof set of awards called Arthurs. Best Pre-Announced Product, for instance, went to Borland for the Sprint word processor (available late 1987), narrowly beating Microsoft's DOS-286 and DOS-386 which instead got Best Delayed Product. Best Non-Existent Product was won by IBM's 386 machine. How about a category for Least Loved Supplier? ◆

Show Report

# My Day Out ...

## The Which Computer? Show '87

**By Bob Smith**

Well, they went and did the dirty on me, their favourite user! Didn't tell me that they were going to introduce two new printers at the Which Computer Show. In the nick of time, I find out just before going up to Brum myself; so I ring Mannesman Tally and announce my intention to pay their stand a visit. Acting the professional journalist, I remind them that I have written a recent review of their products and would welcome their co-operation to get the low-down on the new printers. Fine, they say, just turn up. Of course, I would be there on the Tuesday, with the other hacks? Er, can't make it till the Friday, actually. Bit late, they say, but never mind — *someone* will be expecting you.

## Getting there

When the car began to cough and splutter just short of Bristol, I should have guessed that it wasn't going to be my day. I'd already started later than I'd meant to; then great stretches of my usual shortcut were being hacked up by diggers, forcing long waits at those hateful temporary traffic signals that are so slow to change that they almost beg you to take your chance anyway.

I limped into Gordano services to find the workshop staff all out on a police call. No matter, the RAC girl there phoned for a mechanic. They were both really super, but they couldn't do anything: carburettor problem, you see. Can't touch. Emission regulations. Only authorised dealers allowed to service them.

Luckily, it was a hired car: and another vehicle was eventually brought out from Bristol. After three frustrating hours, I was on my way again. Fifty miles further on, the flashing blue lights appeared coming up fast on the outside lane. I groaned loudly: what rotten luck!

The police car sped by and flashed its 'STOP' sign at the BMW I'd been tailing for the last few miles. Ah well, *c'est la vie.*

At the NEC I was ushered into the North Car Park. Though many times a visitor, this was the first time I'd been directed to this particular park — and now I know why it's used only when the others are full. It's on a hill, severely exposed to the February chill; and judging by the churned mud, it's probably used for Army tank training on other days.

Normally, I delight in going to the NEC as the facilities are so good, right from the moment you get there, with free buses scooting back and forth all the time from the car parks to the main entrance. You guessed it — I had to walk. But, never mind: here at last. Hooray!

## How to succeed ...

Being an old hand at exhibition visiting, there's a few simple rules experience has taught me to follow.

Wear stout shoes, heavier the better. Take as little baggage as possible. It's always hot and stuffy at the NEC, so shed outer garments at cloakrooms. Make out a reminder list of what you want to see. Carry a stands plan marked with a highlighter for those you want to visit.

And if there over lunchtime, get a decent sit-down meal. It being seven hours since breakfast I shot up to the Pendigo, a carvery restaurant on the 4th floor. I really recommend it: for an exhibition hall, £9.50 isn't too bad for a three-course meal with several choices and coffee included.

## Smart print

Subsequently I seek out the **Mannesmann Tally** stand, puffing my chest, drawing in the stomach, and trying to work out a really incisive opening utterance. Waste of time. No blondes. Never heard of me. You talked to who? Afraid he's ill. Where's my press card, then? Oh, freelance. Really?

When I saw the new printers, the MT87 and MT88, I began to think maybe it was worth coming after all. Could these be the solution to the latest headache I'd given myself?

I'm trying at the moment to persuade Bandage & Plaster to adopt word processing for departmental secretaries. It would be a valid, justifiable and fairly straightforward introduction to microcomputers. Consistency throughout the company is essential — the same micros, same printers, same software. OK so far, but some departments could use a micro to do more then just WP — spreadsheet work, project planning, drawing, linking to our main computer, and so on. Their hardware has to be chosen so that the equipment they get now will serve these future needs as well.

Now, I *know* that some departments will end up doing as much data processing as word processing; ideally, they need two types of printer. For DP and maybe WP drafts they could use fast matrix printers handling continuous stationery: for final-copy WP, they would normally need NLQ (occasionally true letter-quality) and a facility to handle single A4 sheets.

## Wasting paper

What I really wanted then was a printer that could satisfy both needs without unloading one type of paper in order to use the other. The only cheapish printer I'd seen that could do this was the IBM ProPrinter. And I wasn't too happy about that: when single sheets are inserted, the continuous paper underneath is also moved forward by the friction action of the ProPrinter's rollers. In other words, a page of listing paper is wasted for every single sheet printed.

The MT87/88 printers use a similar mechanism, but it has been engineered much more effectively. Continuous paper is inserted from the rear and pulled through, as normal, with tractors: single sheets are inserted from the front, as on the ProPrinter. (Front loading is an important feature for the office user, since it can make it possible to load single sheets without rising from your chair — much more efficient for the human involved.) If continuous stationery is loaded and you want to insert a single sheet, you press a control panel button to move the listing paper *backwards* until it is out of the way. You then insert a sheet from the front and hit another button; this sheet is grabbed and positioned automatically at the top of form.

Now it's ready to print that sheet — and as many others as you may need, until you want to go back to the continuous paper. When you do, another button feeds the continuous paper forward until it gets to top of form.

So you never have to unload the continuous stuff to print single sheets. Further, all the paper positioning is automatic — you neither manually wind nor keep a button depressed to move the paper backwards or forwards. If you go one step further and get a sheet feeder, you don't even have to move your chair to load the single sheets. Now that's what I call a *smart* printer.

On NLQ printing, I thought the new printers weren't quite up to the MT290 standard; but the difference is arguable and such judgments are subjective. Another point that's important for office use is the noise they make. The brochures say 'less than 60dBa', but you can't judge that at an exhibition. I'll know better if I can get my hands on one in an ordinary office.

Finally, what about the size? They're about the same depth and width as other printers, but that fancy paper-handling mechanism makes them quite a bit taller than the competition. Might be a problem — especially if one wanted to use them with acoustic hoods.

### MT87/MT88 in summary

■■■ Specification:

| | |
|---|---|
| Columns | 80 (MT87)<br>136 (MT88) |
| Speed — draft | 200cps |
| Speed — NLQ | 50cps |
| Character spacing | 5, 6, 8, 10, 12, 17cpi |
| Print matrix — draft | 9x9 draft |
| Print matrix — NLQ | 24x18 |

■■■ Other features:

- various font cartridges
- emulation of IBM ProPrinter and Epson FX
- Graphics
- film ribbon cartridge (optional)
- integral tear bar
- programmable from front panel (or from computer)

■■■ Prices:

| | |
|---|---|
| Printer | £440 (MT87)<br>£535 (MT88) |
| parallel interface | £30 |
| RS-232 interface | £30 |
| single-bin sheet feeder | £195 (MT87)<br>£220 (MT88) |

By the way, notice the compatibility with the IBM ProPrinter. The designers of this kit knew who they were gunning for! I ought to add that the ProPrinter equivalents are a bit cheaper, best current prices being £364 and £435 for the narrow- and wide-carriage models respectively. And the print quality is certainly as good as from the new MTs. But as I've already said, that's got to be a subjective comment.

## Apricots galore

You couldn't miss the **Apricot** stand. It was right in front of the main entrance, enormous in size and mostly in virgin white. I approached with some trepidation. I wanted to ask a technical query, and past experience has taught me never to go to exhibitions with technical queries. In fact, I'm sure the most frequent question Apricot stand people ask is "Is there a technical person about?" It usually comes out in a sort of low-pitched wail.

I never learn. Squinting at the familiar brazen yellow lettering saying '386' all over the stand, I asked "What's the difference between a Xen-i and a Xen-Xi?" "Er, one's faster than the other" was the hesitating reply. "Do you mean the clock rate?" I demanded. "Actually, I'm not really all that technical" he said; "I'm just here selling an employment agency package — would you be interested in an employ ..."

## More mags

I sidled off to the information desk in the centre of the stand. I asked if they had the new *Apricot Systems* magazine. After a couple of furrowed brows and quick exchanges amongst themselves, a

package was dragged out. It was shrink-wrapped and tied with nylon string; they couldn't get it open. I'm sure none of the three young ladies actually swore, but I did hear one muttering about how Boy Scouts were never around when you wanted one. Eventually, they managed with a nail file.

Just the front cover gave immediate feelings of *déjà vu.* Looking inside confirmed it. Articles, presentation, even typestyle all have connotations of *Apricot User* — same publisher, you see (*same editor too — Ed*). If it's always to be a freebie, I'll take it: but even though the first issue was packed full of articles, they were mainly familiar themes with a tendency to overlap.

I earnestly hope that it's better than its predecessor. In *Apricot User*, there was often as much flashy artwork as writing: and technical articles, such as Sidney Harrod's MS-DOS series, were rare indeed. For me, the best regular features were the 'Clinic' pages (sometimes), Apricot-related news, and the adverts. (*We understand that* Apricot Systems *was a one-off that may be published "occasionally" in future if the advertising warrants it — Ed*).

Looking around the stand gave me a pang of regret over the passing of the earlier Apricots. Everything was so uniform! It was impossible to distinguish one model from another unless you got really close to read the tiny yellow lettering set against a creamy grey background. Could this be yet another marketing trick to get the inquisitive visitor right up close to the machines, thus allowing a salesman a more than even chance of successful capture?

## Into the fray

The rest of the show went by in something of a blur but I managed to get through eight out of my dozen planned visits.

We have a **Siemens** dot-matrix printer in our factory so I've been keeping an eye on their products. They've been quietly producing ink-jets for some time now, but the models at the Show were very new. The young sales assistant said they had been "going like a bomb for two to three weeks". Irrestible retort: "Blow up, do they?'

There are two models, the PT88S (narrow carriage) and the PT89S (wide, up to 15.75in), with speeds of 66 to 114 cps in NLQ and 200 to 343 cps in draft. The NLQ is impressive — but so are the prices, £735 and £835. These printers also feature a hex-dump facility, just like my MT290, whereby text and control codes can be printed in hex form without interpretation.

**Sagesoft** had a rolling demo of a PC-compatible program called DeskSet that I couldn't resist. DeskSet is a memory-resident program like SideKick, but with more functions — 'Pop-Up Voice', for instance. No it doesn't speak to you, it buzzes; it seems to be meant for ringing you up from your office to give you an early-morning alarm call. At least, that's what the demo showed.

The rest of the package seemed more useful, with a text editor, calculator with financial functions, calendar with appointments diary, address and phone book, alarm clock, PopDOS (access to MS-DOS commands) and the most intriguing of all, Pop-up Anything — intriguing because it said you could use it to make your own programs pop up, and then left the topic at just that with no more information or examples.

Spotting David Goldman, the MD of SageSoft, lurking in the inner depths of the stand, I started to go towards him to renew our acquaintance and to see if he could elucidate on the subject. Less hopefully, I wanted to persuade him to put the software on the Apricot. Just then, an enormous figure pushed in front with a white piece of stiff paper in one hand, the size of a postcard. It had 'PRESS' in big red letters on it. For some reason, I lost all interest ...

I spent longest at the **Computer Bookshop** stand. When you live in the outback like me, you just don't get decent computer books in the local bookshop. I had dozens to check out and it always amazes me just how many books they seem to get on to their stand. Seems to be nearly their complete range. Unfortunately Computer Bookshop gets dozens of people wanting to do the same as me: so if you're afraid of being trampled, keep away.

The usual leave-me-alone ploy of "Just browsing, thanks" failed completely at the SSI stand, when given a detailed, robotic account of WordPerfect's virtues while being gently propelled towards an inner sanctum where the last show of the day was about to dazzle another captivated (do I mean captured?) audience. With sales lines such as "People are going Wilde about WordPerfect Library" and "... but what the Dickens will WordPerfect Library do for me?" I figured I knew already and left.

## Homeward bound

There were loud cheers and relieved sobbing from the stands as the loudspeaker announced the end of the 1987 Show. Time to go. It was all over, wasn't it? Well, not entirely. Do not go to the NEC on a Friday: and do not leave your exit to the last minute. I can tell you that 4pm on a Friday *is* the last minute.

It took 40 minutes to clear the car park and get on to the M42; then a further 60 minutes to get to the M5. Then there was no M5, not for traffic travelling south — roadworks, you see ...

Arrived home at 10.30pm. My wife couldn't understand my glowering when she asked "Had a nice day, dear?" ◆

Doodles by David

# Tips and Tricks

By David St.John Wallis

## A Mini-Drama in Two Acts

**Act I:** *Daytime. An office in Surrey. Birds singing happily etc. Enter DW stage left all full of honest endeavour. He picks up phone and dials.*

DW: Is that Apricot?

Apricot: No. *[Long pause]* Sorry. Yes.

DW: Please put me through to someone who knows all about desktop publishing.

Apricot: *[Long pause]*

DW: Are you there?

Apricot: *[click]*

*DW dials another number. Birds singing off-key.*

DW: Could I talk to someone about desktop publishing?

Apricot: You need 021-456 1234. *[Click]*

*DW dials a third number. Birds faltering a bit.*

DW: Could I talk to someone about desktop publishing?

Apricot: Of course. Hold on ... *[New voice]* Can I help you?

DW: Indeed you may be able to, my friend. Could I talk to you about desktop publishing?

Apricot: Say no more. I'm your man. It's £8,000 and jolly good.

DW: Can I order one?

Apricot: Not from us, squire. Call 01-839 1781. *[Click]*

*DW picks up the phone and dials. Birds definitely a semi-tone out.*

DW: Could I talk to someone about desktop publishing?

Apricot: Yes. You can talk to me. I know all about it. It costs £6,999.

DW: Can I order one?

Apricot: Oh no. Not from us. We're Apricot. We don't sell to ordinary people. You need Henry Puddle. Call Clifton Mead at 0932 59255. *[Click]*

*DW picks up phone and dials. Birds reduced to very faint chirping.*

DW: Could I talk to Henry Puddle about desktop publishing?

Puddle: *[Gung ho]* Yes, you can. Henry Puddle — that's me. I'm your chap and I can do it. It costs £6,999.

DW: Have you got it now?

Puddle: *[Uncertainly]* We'll have the Beta-tester by the middle of March.

DW: Goody. But I hear that the system doesn't support the page description language on the Kyocera printer or the PostScript language on other printers, that the £6,999 doesn't include any support, and that the components are cheaper if bought separately.

Puddle: *[Very uncertainly]* Well, it's been very nice talking to you. Bye. *[Click]*

**Act II:** *The following day. Birds coughing. DW picks up phone and dials.*

DW: Is that Apple?

*Curtains and a great rush for the bar.*

## Books

I get asked for books sometimes, mostly by plaintive fellows in Switzerland or Canada. Well, I will be in Singapore by the time you read this and propose to buy *every* pirated manual on MS-DOS and application programs — like the MS-DOS 3.1 *Technical Reference Manual*, about £3. As the man said: "Having lost sight of our objectives, we redoubled our efforts".

Meanwhile ... *Using 1-2-3* by the ubiquitous Que Corp is very nice; so is the *MS-DOS User's Guide*, also by fabled Que. *(Regular readers will know that we also recommended wholeheartedly Van Wolverton's* Running MS-DOS *— Ed.)*

Not so good books are three by Sybex, *viz* that publisher's *Introduction to WordStar*, *Doing Business with SuperCalc* and *1-2-3 Macro Library*. The last inspires little confidence because the writer doesn't seem to distinguish between rows and columns.

By the way, copyright is known to be a subject dear to the hearts of some people. So what do you make of one of these books which costs £19.95 and warns you ferociously that "no part of this book shall be ... stored in any kind of ... retrieval system" — and then on page 5 tells you to copy into your micro huge bits of the text like {HOME}{RIGHT}{DOWN19} *ad nauseam*?

Our next version of ScannerS is going to have a *very* intimidating notice right up at the front end somewhere to the effect that "each OMRC product is not licensed by OMRC to the original purchaser and if you copy it and give it to all your friend we cannot afford to sue. Because you bought the product we reckon it's yours. So you haven't bought a licence to use it, you have bought it outright. None of our documentation is copyright, no rights are reserved and you can copy it to your heart's content. OMRC warrants that the software will always perform exactly as specified if not a whole lot better. All parts of this may be stored in any retrieval system you can possibly imagine". Match that, Lotus Corp.

## By Jingo

In case you missed it, David Langford's great thought that you should have COUNTRY = 33 in your CONFIG.SYS (rather than COUNTRY = 44) is a good one. (Help! Is the thought copyright?) If you change it you get DIRectory entries like ...

```
DDD     6121 16/02/87 15:00
```

Instead of ...

```
DDD     6121 16-02-87 15:00
```

So we're country 44, are we? What a cheek! We invented computers, we invented the postal system and international phone calls — and we're rated 44. How does Thatcher put up with idiocies like this? Write to your Euro MP *immediately*! ◆

The Workshop: Inside MS-DOS

# A Batch File Cookbook

## Part One — Batch File Basics

By Simon Potter

Over the years (well, over the year and a half) APRICOT FILE has carried a lot of articles about creating and using batch files. And they *are* useful — with batch files you can genuinely make your Apricot easier to use, safer, less time-consuming ...

But what exactly are batch files anyway? It's time for a beginner's intro to the subject.

The commands that MS-DOS can execute come in a variety of different flavours. For a start, there are the 'internal' commands — things like DIR and TYPE, or CD (or CHDIR) to change directories, or even A: to switch to a different disk drive (drive A in this case). These are part of MS-DOS itself, and the operating system includes the instructions required to execute them.

Then there are files with the .EXE and .COM suffixes. These will appear in a DIRectory listing, because they are separate programs containing their own instructions. Some of the MS-DOS functions are included in this group — CHKDSK and the MORE filters, for instance. So are some of the standard utilities and extras provided with the operating system; EDLIN and DEBUG are both .COM files, GWBASIC is an .EXE file. And, importantly, there's a COMMAND.COM file which MS-DOS will run automatically on start-up — it's COMMAND.COM which (among other things) deciphers what you're typing at the keyboard, what programs and commands you want MS-DOS to run.

The operating system will try to execute the internal commands when you type the name and press Return. It will also try to run a .COM or .EXE file — an external program — if you key in the name without the suffix.

There's a third type of file which can be run from the MS-DOS prompt, however — those with a .BAT suffix. These too can be executed just by typing the name without the extension: and they're wonderfully useful.

Most experienced MS-DOS users will by now have discovered that for themselves. Batch files consist of a sequence of MS-DOS commands — a batch of them, you might say — and those commands can be anything you'd ordinarily type in one by one at the MS-DOS prompt.

So whenever the same series of MS-DOS commands is to be entered more than once, you should always consider creating a batch file to do it. And that also applies for commands which take a long time to run but can be performed without supervision.

This was going to be a single article, but as it turns out there is quite a lot to say about batch files. So this will become a series, and we'll get the Cookbook under way with some of the basics of batching.

### Writing a batch file

It's easy enough to create a batch file. You can use EDLIN, the COPY CON procedure, or any word processor that produces straight ASCII files.

For anything longer than a few lines, the last option is recommended. But be warned that some word processors, like WordStar and SuperWriter, save files in their own idiosyncratic format unless you tell them to use ASCII format — for WordStar that means specifying a 'non-document' file, for SuperWriter it's a 'system' file, for SpellBinder you use the '/1' suffix when you save. Most other wp packages that don't default to ASCII have some kind of option similar to these.

COPY CON is the quick way to create a short batch file. This procedure, for instance, will produce a file called COPYALL.BAT that copies all files from the currently-selected directory on to a disk in drive B:

```
A> COPY CON COPYALL.BAT [Return]
  COPY *.* B:/V
  ^Z
A>
```

You type precisely that, including the CTRL-Z that terminates the file (hold down the CTRL key and press Z). Then when you subsequently enter 'COPYALL' at the DOS prompt, the COPY *.* command will be executed.

To do the same thing with EDLIN, the procedure goes as follows:

```
A> EDLIN COPYALL.BAT [Return]
  New file
  *I
        1:*COPY *.* B:/V [Return]
        2:*^C [Return]
  *E
A>
```

Whatever you use to create the batch file, you just type in the commands — on separate lines terminated by Return — exactly as you would have entered them individually at a DOS prompt. That means paying attention to invalid characters and significant spaces.

Thereafter you can run it by typing the name at the prompt (minus the .BAT suffix) and the commands in the file will be executed in sequence.

To interrupt a batch file you can press CTRL-C. You'll be asked to confirm whether you do indeed want to terminate things. Responding 'Y' or 'y' will return you to the DOS prompt. If you changed your mind and type 'N' or 'n', the batch file will resume — but curiously it will skip one command; instead of executing the statement following the one being processed when CTRL-C was pressed, MS-DOS will go to the one *after* that.

Into the batch file you can put anything that would normally be executed at the DOS prompt. There are also some special batch-file commands: and there's the facility to use parameters so that

the batch file can operate on a variety of different inputs.

## Talking to the user

Let's start with some of the simpler but most useful of batch file commands. MS-DOS habitually prints on the screen all commands you type, and it will do the same for all commands it executes in a batch file. This can clutter up the screen; and, more important, it can get be pretty confusing for the user. But including the line ECHO OFF in your batch file will suppress this effect, so that only the information and instructions you want to be displayed will actually appear.

If you also start the batch file with a CLS command the screen will be cleared before things start happening. As a matter of course, all my batch files have as their first two lines ...

```
ECHO OFF
CLS
```

The ECHO OFF will appear momentarily, because the 'echo' still applies until MS-DOS executes the command. CLS appears as the second line since it too would be ECHOed unless the ECHO was OFF.

But even if you have specified ECHO OFF for your batch files, some DOS messages still show up. For example, the COPY command displays the number of files copied. You can suppress these messages too: just terminate the command line in the batch file with '> NUL'. For instance:

```
COPY FILES.ONE FILES.TWO > NUL
```

The 'greater than' arrow is a redirection symbol and it means the output from whatever command precedes it will be 'redirected' to whatever file or device name follows it; and 'NUL' is an MS-DOS filename signifying a notional and non-existent device. So the output is redirected into oblivion — and it doesn't appear on the screen. (This won't work problem if you are using the speed-up programs FAST (DEALS FOR READERS disk AS001), HARE (on Ansible's ACOLYTE disk, DEALS FOR READERS no AS045) or the QUIK utility on OmrC's SCANNERS disk. All these kill the redirection facility stone dead.)

ECHO ON will restore the normal effect of echoed commands, and in any case an ECHO OFF will last only while that batch file is running — as soon as it terminates the norm is restored.

You can also use ECHO followed by some text to display a message on the screen. If you have ECHO OFF already in effect, the 'ECHO' command itself won't appear:

```
ECHO OFF
CLS
ECHO Now copying all these files to drive B:
COPY *.* B:
```

This will clear the screen and tell the user what's happening. The COPY command will list the files as they're passed over, because that automatically happens when a wildcard is used.

A useful trick with this method of displaying messages: the CTRL-G combination (which appears in the batch file as ^G — hold down the CTRL key and press G) sounds a beep, so you can incorporate it into an ECHO message to grab the user's attention. For example:

```
ECHO OFF
CLS
ECHO  ^G*** WARNING — copying in progress ***
ECHO
COPY *.* B:
```

The message is given some extra prominence by those asterisks, which will put it somewhere near the top centre of the screen. The following ECHO on its own will display a blank line after the message and before the list of files starts appearing.

## Automatic answers

The DEL command asks you to confirm with 'Y' or 'N' before proceeding if you're using any wildcards with it. When you're trying to automate things, you might not want the user to have to respond — and putting a 'Y' in the batch file doesn't work.

You can get round it, however, by using redirection again; MS-DOS commands can be told to accept input from some other source than the keyboard. Create a file called YES that contains the single line 'Y'; then the batch file can include a statement like ...

```
DEL A:*.* < A:YES
```

The less-than arrow redirects input to come from the specified source — which in this case is your file YES on drive A. So what you'll see (assuming you have ECHO ON) is this:

```
C> DEL A:*.* < A:YES
   Are you sure (Y/N)? Y
```

... just as if you'd typed it in at the keyboard.

You can use this trick for just about anything, even those commands involving 'Press a key to continue' messages. Use EDLIN to create a single-line file called (say) SPACE and comprising one tap of the space bar followed by Return. Then redirect input to the command from the file SPACE.

Obviously you've got to be *very* careful. It's all too easy to delete a top-level directory using this method ...

## REMarks

The REM statement is used to insert REMarks into a batch file. If you don't have ECHO OFF in the file, a REM line will be displayed when the batch file is run — meaning that any text on the line will appear on the screen preceded by 'REM'. So it's very similar in operation to the use of ECHO.

A REM can include parameters. For example:

```
REM  Do you really want to copy from filename %1
     to %2?
REM  If not press CTRL-C. Otherwise
PAUSE
```

When this batch file is run, the parameters '%1' and '%2' will be replaced with the text you entered

after typing the file name, thus making the comment more meaningful.

PAUSE is a somewhat crude command specific to batch files. It simply does what it says — execution of the batch file stops, a message appears on the screen inviting you to press any key to continue, and when you do that the execution will indeed proceed. That's all it does, but even this can be useful.

PAUSE can be followed by some text which will appear before its own 'Press any key' message *provided* that ECHO is OFF. It's an alternative to REM for telling the user something, but again ECHO is the preferable method of doing that.

Because PAUSE puts its own message on to the screen the example above will appear as ...

```
C> REM  Do you really want to copy from filename
        %1 to %2 ?
C> REM  If not press CTRL-C. Otherwise
C> PAUSE
   Press any key to continue ...
```

The main value of PAUSE is that it gives the user a chance to stop and think — and to kill the batch file with CTRL-C if necessary, which is why it's a good idea to precede a PAUSE with a message via a REM or an ECHO.

However it is used, the REM statement can be replaced by a full stop. This is quicker to type, obviously, but it also suppresses double spacing on the display. The dot must appear in the leftmost column of the line (otherwise it won't be treated as a synonym for REM).

REMs provide one way of telling the user what's going on, though ECHO is much neater. They can also be useful if you want the batch file to include some internal explanation of what's happening, particularly if it's a long and complicated piece of work that you (or someone else) might want to revise later. Then you won't want to ECHO the remark.

And REMs can be handy if you're writing what may turn out to be a whole series of vaguely similar batch files. Set up a sequence of commonly-used commands in a kind of 'master' file; rather than deleting statements from it to create your individual .BAT files, you can then just comment out the commands you do not wish to invoke by preceding the relevant lines with a full stop. That turns them into REMarks and they won't be executed. For example, in this case only the second and fourth lines will be executed:

```
. PRINT FILE1.DAT
PRINT FILE2.DAT
. PRINT FILE3.DAT
PRINT FILE4.DAT
```

## Different data

Many MS-DOS commands use parameters — COPY, for instance, requires at least the name of the 'copy from' file or files and can also have a 'copy to' parameter. These parameters can be included in a batch file, of course, but you can also use what the MS-DOS manual calls 'replaceable' parameters.

These are used in place of the conventional parameters in a batch file command, and they are identified by a percentage sign followed by a numeric digit in the range 1 to 9 and 0. The batch file itself is run with one or more explicit parameters following the file's name; what happens is that when a statement with the percent signs is executed, the %1 in the command is replaced by the first parameter, %2 is replaced by the second, and so on.

For instance, here's a batch file called BULKCOPY:

```
ECHO OFF
CLS
COPY *.%1 B:/V
```

The file is run by typing 'BULKCOPY' followed by a parameter which will be used in place of the %1. So the command ...

```
BULKCOPY BAS
```

... would be executed as ...

```
BULKCOPY *.BAS B:/V
```

... and all files with the extension BAS would be copied to drive B.

Here's another one, this time using two parameters:

```
ECHO OFF
CLS
COPY %1.* B:%2.* /V
```

This time the run command might be ...

```
BULKCOPY LETTER BACKUP
```

... and it would be executed as ...

```
BULKCOPY LETTER.* B:BACKUP.* /V
```

... so that files with the name LETTER would be copied to drive B with the same suffix but a new name BACKUP.

## Jumps and labels

Version 2 of MS-DOS added a number of new features, including several for batch files — among them a GOTO facility. This works like GOTO in Basic and equivalent facilities in other programming languages; the sequence of execution is switched to the nominated point in the batch file, which is identified by a 'label'.

A label is a line in the batch file that starts with a colon (the colon must be in the leftmost position) and is immediately followed by a string of text: the label itself isn't a command to be executed, it just identifies the start of a group of commands. The GOTO is used with the label name. In short:

```
GOTO NEXT
REM The command here will never be executed
:NEXT
REM This command will be executed
```

It's clear that GOTO on its own isn't particularly useful. It's most often used with the IF command, another of the batch-file specials.

Again, IF works rather like the conditional tests in programming languages. It is used with three parameters:

```
IF <NOT> <condition> <command>
```

The command here can be any valid MS-DOS command, including the batch-file specials like GOTO. IF the condition applies, the command is processed — unless the form is IF NOT, in which case the command is executed if the condition doesn't apply. The command in question could be GOTO, and that would switch processing to the named label.

You don't get much in the way of logical operators to build complex conditional tests. In fact, all you do get is an 'equal to' test for string text; IF one string is the same as another, the command following is executed. The two strings have to be *absolutely* identical. IBM's documentation includes the less than illuminating example ...

```
IF %1 == DOUG ECHO DOUG WAS HERE!
```

... meaning that if the first or only parameter given with the command to run the batch file was the text 'DOUG', the screen will echo the message about the eponymous gent's presence.

This makes the string-comparison version of IF sound a bit feeble, and in general it is. You might discover some uses for it, though. For instance, it could test for dangerous or invalid procedures with parameters. Say you have a subdirectory called SYSTEM that you don't want cluttered by any extraneous files; you also have a parameterised batch file for making backups that allows the user to specify source and destination subdirectories. The batch file is called BAKUP.BAT and the business end consists of two lines ...

```
IF %2 == SYSTEM GOTO DENIED
COPY \%1\*.* \%2
GOTO END
:DENIED
ECHO  Sorry, you can't copy into this directory.
:END
```

Before the copy starts there's a verification line that checks the name of what will be the 'copy-to' directory. If that happens to be 'SYSTEM', the copying doesn't even start.

The 'condition' element can be the word EXIST. In that case it's used with a filename to check whether the specified file exists, and the command following is executed IF (or IF NOT) it does. This is one of the commoner uses of IF — it's handy to test for the presence of a backup file before you make a copy or do some deleting, for instance.

```
IF NOT EXIST B:*.BAK COPY *.BAK B:
```

This statement copies all .BAK files on to drive B only if there aren't any on that disk already. Similarly, this one would delete a specified file if a .BAK backup was present:

```
IF EXIST B:%1.BAK DEL %1.BAK B:
```

There's another condition called ERRORLEVEL. This refers to a 'flag' or indicator set by MS-DOS in a memory location (and it doesn't necessarily have anything to do with errors). The IF ERRORLEVEL construction checks this indicator and compares it with a specified value.

This is only useful if you have a way of setting the ERRORLEVEL indicator yourself. To do that requires some programming, and a batch file would only include an IF ERRORLEVEL statement if some other program had indeed affected ERRORLEVEL. Later in the Cookbook series we'll be discussing some public domain utilities useful for batch files, one of which — the ASK.COM utility — does indeed allow you to alter and subsequently check on the ERRORLEVEL flag. But for now, just forget it ...

For all versions of IF, when the evaluation results in a *negative* answer the command on the IF line is skipped and the next statement in sequence is executed. This is one of the restrictions of IF — it only works as an IF ... THEN test, not as an IF ... THEN ... ELSE construction.

The other major drawbacks are that IF can't cope with redirection and subdirectories; the former isn't so important, but IF can be very handy when you're copying or deleting files after checking on the presence of backups — and that could involve looking into subdirectories.

## SHIFTing parameters

There's another command specific to batch files — SHIFT. It's used with parameters, and it allows you to specify more than one variable for a parameterised command in the batch file.

Take a situation where you'd like to copy a number of specified files (provided a backup didn't already exist). You could do it by modifying an earlier example:

```
ECHO OFF
CLS
IF NOT EXIST B:%1.BAK COPY %1.BAK B:
IF NOT EXIST B:%2.BAK COPY %2.BAK B:
IF NOT EXIST B:%3.BAK COPY %3.BAK B:
```

If we called this file TESTBAK.BAT, it could be run by ...

```
TESTBAK FILES1 FILES2 FILES3
```

... and each of the three file names in turn would be used by the three successive COPY statements. The problem is that we're restricted to three file names, because the batch file specifies three parameters. SHIFT provides a lot more flexibility; when the command is encountered, the parameter numbers are reduced by one — so the second parameter (%2) becomes the first (%1).

To make things a bit clearer, here's a new version of TESTBAK.BAT:

```
ECHO OFF
CLS
:DOCOPY
IF %1 == END GOTO FINISH
ECHO Working on %1
IF NOT EXIST B:%1.BAK COPY %1.BAK B:
SHIFT
GOTO DOCOPY
:FINISH
ECHO All done — returning to DOS
```

Now the TESTBAK command can be used with up to ten file names following it, with the list terminated by 'END'. For instance:

```
TESTBAK FILES1 FILES2 END
```

The first IF statement checks to see whether the name currently being worked on *is* 'END', and the batch file terminates with that final ECHOed message. Otherwise FILES1, the first parameter, is treated as %1: the 'Working on ...' message confirms that, and the second IF performs the copy provided there's no FILES1.BAK on drive B.

So far so good. Then the SHIFT statement is reached — and this makes the batch file use the *second* parameter as %1. So when things loop back to the start (GOTO DOCOPY), it will be FILES2 that's used in the parameterised commands.

SHIFT then takes the *next* parameter as %1 — and since this is 'END', the first IF test will terminate the routine.

## Repeating commands

There's another way of carrying out a command more than once. It can get really complicated, and it's easy for non-programmers to find themselves in a quicksand of logic that could easily lead to the funny farm. But for the sake of completeness (which translates into "this is something of which I am really scared and about which I am less than confident") we should consider the FOR command.

FOR works with three groups of parameters, and looks like this:

```
FOR parameter IN list DO command
```

The parameter is any alphabetic character preceded by two percent signs. The command is applied to each item in the list, and in most uses of FOR the command itself includes the parameter as well. Here's a less than useful illustration, a batch file called FORTEST that also utilises the standard replaceable parameters:

```
ECHO OFF
FOR %%a IN (%1 %2 %3) DO ECHO %%a
```

The result of running this would come out like this:

```
A> FORTEST Roger Terry Fiona
Roger
Terry
Fiona
A>
```

When FORTEST is run, the parameters supplied with the command replace the three parameters in the list section. Then each parameter is assigned in turn to %%a and the ECHO %%a prints the list of names.

If FORTEST hadn't included an ECHO OFF statement, what you'd get is this:

```
A> FORTEST Roger Terry Fiona
A> FOR %a IN (Roger Terry Fiona) DO ECHO %a
A> ECHO Roger
Roger
A> ECHO Terry
Terry
A> ECHO Fiona
Fiona
A>
```

That shows how FOR works. The FOR command itself appears first, with one of the two percent signs in the %%a parameter dropped and the list parameters now replaced with the variables provided in the command. Then each of the variables appears in an ECHO command before they are actually displayed.

## Practicalities

Here's an illustration of how several batch file techniques can be used in one example.

An important use for batch files is to guarantee some safety in day-to-day operations. It's all too easy inadvertently to delete or copy over files. So you might create a file called (say) CCOPY.BAT which looks like this:

```
IF NOT EXIST %2 GOTO DOCOPY
REM Copy not performed
GOTO DONE
:DOCOPY
COPY %1 %2
:DONE
```

This would be used by giving the command ...

```
CCOPY FILEONE FILETWO
```

The second filename (FILETWO) is checked to see if it already exists. If it does, the COPY operation is not permitted. Otherwise the COPYing proceeds.

This is a simple check for COPYing within the same directory; but it could easily be modified to handle wildcards, paths to different subdirectories, and the like. Even as it stands, it could be improved a bit:

```
ECHO OFF
CLS
IF NOT EXIST %2 GOTO DOCOPY
ECHO  A file of the same name already exists!
      Copy not performed
GOTO DONE
:DOCOPY
COPY %1 %2
ECHO  File %1 has been copied as filename %2
:DONE
```

Now there's an ECHO OFF and a CLS command to tidy up the screen plus a couple of messages that will be ECHOed when one or other of the options has been taken.

## Last word

When a batch file has finished, you'll usually get *two* prompts from MS-DOS. Don't worry about this — it happens because the operating system automatically adds a Return code to a batch file when you save it, so if your final keystroke in writing the batch file was *also* a Return you'll find that MS-DOS reacts to two Returns.

To suppress the extra DOS prompt, just don't press the Enter key at the end of the last line in the file when you come to save it. On the other hand, if your last line is a label as shown above this trick does not work. ◆

Reflections on AI

# Artificial Intelligence and Expert Systems

## Manna for the many or merely food for the few?

By Mark Whitehorn

'Artificial Intelligence' and 'Expert Systems' are trendy terms that have been much bandied around of late. What do they mean? And, more important, do you need to be the first kid on your block to have them?

This article is intended simply to define these expressions in user-friendly terms. I'm aware that this may result in over-simplification; but the exposition given here will be applicable to most cases.

## Expert Systems

A human expert is someone who knows a great deal about a specific subject. To provide a working example, a mortgage consultant has access to a large store of general information (both in the head and on file) from which he or she can select information relevant to your particular case. The consultant is able to take in information — your salary, marital status, and the like — and then give advice as to the best way, "all things considered", for you to borrow money to buy a house.

Suppose the expert was prepared to break down that knowledge into simple discrete pieces and thus formalise all the facts and rules that he or she uses to come to a decision. In the case of our mortgage consultant these might be facts like "Acme Building Society favours first time buyers" or "Antarctic Home Loans favours loans to Penguins": and rules like "Acme favour first-time buyers if they are married" (Acme is a very moral company) and "Antarctic Loans will accept fish in payment, but only from Penguins".

Now, a computer program which could apply all of these facts and rules should be able to replace the expert. And the advantages of replacing experts are obvious: humans can be charming or unsympathetic. They can have good days and bad days. They can make expensive mistakes, or get drunk the night before and not care a damn about your mortgage.

A badly-written program can of course do most of these things (except perhaps get drunk — though some programs do indeed behave in a somewhat inebriated fashion at times). But the appeal of programs like this is that a well-written one is consistently excellent and may be much faster than a human expert.

In addition, the expert's expertise is available to *anyone* who has a computer and the program; and even a complete moron (an estate agent?) would be able to use the program to provide the customer with the best mortgage deal.

A program of this type is described as an Expert System.

## Producing Expert Systems

As might be imagined, the greatest difficulty — particularly with a large Expert System — does not lie in *writing* the actual program. Rather it lies in extracting the expert's information and formalising it into a workable set of facts and rules.

This is because of the complexity of a true expert's 'data base'. To a large extent experts often have little idea of the cognitive path that they follow to reach a decision. Ask a racing driver, for example, why he will elect to start braking at a particular point on the approach to a corner: you may well get the reply "because it is the correct place". Efforts to extract more information may produce further helpful gems like "well, any later would be too late".

It isn't that they're unhelpful; human beings are good at being experts and poor at explaining exactly how they reach a decision. In fact the driver is taking in a mass of data about speed, heat of brakes (in turn estimated by experience), condition of road surface, wind speed, wind direction and so on. This in turn is processed — and the braking is begun at the correct place.

## Artificial Intelligence

Artificial Intelligence — AI — is slightly more tricky; any definition which I give is open to attack simply because people have different ideas about what constitutes Artificial Intelligence. Nevertheless, a few generalisations may give the flavour ...

- AI concerns computational methods of providing examples of behaviour that are characteristic of human intelligence. To put this less formally, if a program behaves as a human would it's exhibiting AI.
- AI often involves the use of heuristics. Heuristics are computational methods which may not finally solve a particular problem but will probably help towards a solution. To give

an example, any program written to play chess cannot guarantee a win since it cannot know in advance how the opponent will play. It *can* however suggest moves which are likely to produce an advantageous position from which a win can be achieved.

- AI systems often have the capacity to learn from experience, to remember situations they have met before, and the way in which the situations were resolved.
- AI systems often have very large databases.

## The Turing Machine

As many readers will be aware, the British computer pioneer Alan Turing proposed a well-known test to determine when a computer might be considered to be thinking. This goes as follows. A human, let's say yourself, is installed in a room with two identical lines of communication (the actual means of communication are unimportant, but for the sake of comprehensibility each line could be connected to a keyboard-display combination). At the end of one line is a woman, at the other is a man. You can communicate with both. Each tries to convince you that they are the woman; you try to decide which is which.

We can assume that you will be correct on some occasions and incorrect on others. Now, if the man is replaced by a computer, would you be better able to distinguish between the two? If not, then the computer is thinking. And if it is thinking, it certainly is displaying Artificial Intelligence.

I'm not suggesting that Turing's test must be met in order for a system to be called AI by today's standards. But it illustrates rather neatly the necessity for generalisations.

- The computer must, in general, behave like a human being otherwise you could spot it instantly.
- It must be able to learn. You could ask the question "Who won the World cup in 1972?" A reply of "Sorry, I know very little about football" is not decisive; but the same answer given ten times over to the repeated question would indicate either a *very* boring conversationalist or the computer. To pass the test the computer must remember its previous responses in order to modify future responses. In addition of course it must learn any information which it is given.
- The computer would need many heuristics. For example, I suggested above that it should remember any information which you give to it; but do humans remember everything? Speaking for myself, the answer is er ... what was the question? A better strategy might be to remember *most* of what it is told. This slightly defective memory would not convince you immediately, but it could well increase the computer's chances of fooling you.
- The large database would also be essential. Ignorance of football would be perfectly acceptable; but you'd get suspicious if whatever was at the other end of the line knew nothing about a whole range of basic human interests such as food, transport, money, weather, clothes, shopping and so on (let's not bring sex into a serious article).

## How can you tell AI from ES?

At first sight these two may seem to be inextricably interwoven, and it's true that they will often go together. But it is demonstrably possible that an Expert System can exist *without* AI.

Consider the leukaemia diagnosis system reported in December last year by Alvery and Greaves. It can diagnose this complex condition with a high degree of accuracy — but it is not by any stretch of the imagination *intelligent*. It asks for the results of a large number of tests and produces the most likely diagnosis.

In short, it mimics an expert; but it does not display Artificial Intelligence.

Is it possible to have AI without Expertise? Well, you could envisage a program which imitated a human very closely but was not actually particularly good at anything. But I think that any sensible system built to display intelligence will also contain at least one Expert System (and possible a multitude of them).

The fundamental difference between Expert Systems and AI is that the former are built with specific applications in mind. Artificial Intelligence is a more general attribute whose use will not be specific but general.

Despite this both AI and Expert System have many characteristics in common, and for that reason they are often written in the same programming languages. Why these languages are better suited to develop these systems is the excuse for my next article.

Finally, should you rush out and buy one — or rather, should you buy a suitable language with which to write an Expert System? The answer will depend on the application you have in mind. But the world has not been slow to find uses for Expert Systems; they have been used for such diverse applications as medical image interpretation, taxation and brickwork design. And such systems are great fun to construct; I can only encourage you to have a go. ◆

The Workshop

# Deep Stuff and Sexy Solids

## More on GSX

by Lindsay Doyle

Would you like to be able to duplicate those sexy solids that we see illustrating the ads for plotters and high-resolution screens? The Apricot Xi and its ilk are well-suited to the purpose with their 800x400 dot resolution; and if you have stockpiled last year's series about using GSX, you have the necessary arsenal of weapons available — including how to put alpha characters on the MicroScreen with graphics on the monitor.

There are two ways to proceed. The easy one is the cookbook method: skip the rest of the article, transcribe the accompanying program, and serve up. The other way is to take the time to understand what you are doing: read the article, perhaps more than once, and then transcribe the program with the satisfaction of knowing what it is all about.

Besides, the article describes two useful batch files: one calls a graphics program from bootup with one command, the other is for use if you write your Basic programs with SuperWriter. Let's look at these first.

### The short way to a graphics display

In the GSX series, we recommended creating a batch file GSXLOAD.BAT which reads as follows:

```
GSXBAS
GRAPHICS
MSBASIC
```

Simply by typing 'GSXLOAD' you can avoid wasteful and time-consuming effort entering all three commands in the proper sequence. But it's not good enough! Arriving in MSBASIC, you still had to type something like RUN "B:PICTURE2". Eleventeen correspondents wrote in to point out that this can be avoided if you simply change the batch file by adding %1 as shown:

```
GSXBAS
GRAPHICS
MSBASIC %1
```

Now the command GSXLOAD <filename> will do the whole job, and you can sit back and admire yourself as all the intermediate doohickeys flash on the screen.

### Flip between Basic and graphics

If you write your Basic programs using GWBASIC, you have a full-screen editor and the best of all possible worlds (except that no one can tell me how to access the escape codes, so how do I control the MicroScreen and operate other necessary bells and whistles?). But if you use MSBASIC or CBASIC you're at a certain disadvantage in the editing department; and all good men and true have long since realised that the way to go is to write the program using SuperWriter (or whatever other word processor you use).

When developing a program it may happen that you load it into Basic and find that it doesn't work the first time, or the second, or the third; and each time this happens you have to get out of Basic, call SuperWriter, and load the program again before you can edit it. When the editing job is complete, you have to get out of SuperWriter and into Basic and load the program again.

Batch file to the rescue! This one is called FLIP.BAT, and the command is 'FLIP <filename>'.

**FLIP.BAT**

```
CD SW           I keep all my SuperWriter files
                in a subdirectory on hard disk
                and the working files on a floppy
SW B:%1         Load SuperWriter and a filename
CD ..           When you have quit SuperWriter,
                go to the main directory
PAUSE           Option to break the loop
MSBASIC B:%1    Load Basic and run a filename. A
                line with the command SYSTEM
                might be included in the program
                to break out of Basic: you don't
                have to enter "SYSTEM" in command
                mode as some believe
ECHO ^[E ^[(    Clear screen and set high
                intensity. Escape-E is achieved
                in SuperWriter by CONTROL Q 2 ^ E
FLIP B:%1       Back to SuperWriter, and so on
                till tea
```

Don't be tempted to replace Escape-E with CONTROL-Z: it zaps everything including the batch function. You may want to adapt my drive assignments to your own requirements.

### Sexy solids

The type of plot that we would all secretly like to generate is a two-dimensional projection of a three-dimensional solid of revolution like Figure 1, which is fully described by a two-dimensional graph such as Figure 2. Just take Figure 2 and rotate it about the Y axis, and you will have the solid of Figure 1.

Note that the X axis is measured in radians and the Y axis in units. This is because the curve we will use as an example (you can replace it with your own favourite) is defined in trigonometric terms as a function of angle, to wit:

```
760 Y = SIN(X) + .4 * SIN(3 * X)
```

### Adjustable constants

As we all know that the maximum value of the sine of an angle is 1, we can determine by observation of this function from a discreet distance that Y.MAX, the maximum possible value of Y, is 1.4.

The maximum value of X depends on how far out we want to go. Two pi radians is usually enough, although some curves are exciting even further out. In this case I have selected seven pi over four radians as X.MAX so as to get an edge which curls down all around for better effect. The reason for determining X.MAX and Y.MAX before going further is that we will need to know their values in order to scale the picture to the screen properly.

In Figure 3 the curve in question is shown within a projected cylindrical volume which is defined by X.MAX and Y.MAX, and because of which I need not belabour the point that Z.MAX = X.MAX. The angle alpha used in isometric projections to define the Y-Z plane is 60 degrees, or pi over three radians; I have chosen to continue this grand tradition, although you may experiment with other values if you wish.

## Slicing

The solid will be defined by lines on its surface which, if you examine Figure 1 carefully, you will see are parallel to the X-Y plane. We have to choose how many of these slices are needed, and a reasonable selection for a starter is Z.DIVS = 50. With this value, the slices are spaced at intervals Z.INC (Z-increment) of 2 * Z.MAX / 50.

The plane A-A in Figure 3 is a typical slice; it is shown again in Figure 4, a view of the X-Z plane looking down along the Y axis.

## Sampling the function

In order to generate the surface line corresponding to slice A-A, we must sample at equal intervals along A-A. What should these intervals be?

Well, one approach is to make the line as solid as possible — which is to say at one-dot intervals, or perhaps even closer so as to delineate steep slopes clearly. As each dot is going to have to be drawn individually, however, the fewer dots we can get away with the better as far as time taken to complete the entire plot is concerned — and it will take some time, I assure you.

Since the selection of these intervals involves first scaling the plot to the screen, we will abandon it for the moment and return to it when scaling is further considered.

## The Z axis

The solid is to be delineated by a family of Z.DIVS slices, and the isometric perspective effect is to be produced by having the Z axis extend down and to the right at an angle alpha to the horizontal. In practical terms this means that each subsequent slice must be plotted with its origin displaced from the origin of the previous slice by ...

```
DELTA.X = Z.INC * COS(ALPHA)
```

... and ...

```
DELTA.Y = Z.INC * SIN(ALPHA).
```

No problem — this will do the trick:

```
FOR Z = - Z.MAX TO + Z.MAX STEP Z.INC
X.ORIGIN = X.ORIGIN + DELTA.X
Y.ORIGIN = Y.ORIGIN + DELTA.Y
NEXT Z
```

Note, however, that all these terms must be enumerated in Normalized Device Units (NDU, the things there are 32768 of in each direction), so that GSX may convert them to actual positions on the screen or other device. Hence scale factors are required.

## Scaling considerations

You will recall from previous articles that GSX gives a computation field with a display width DW and a display height DH each of 32768 (0 to 32767), with the origin at the lower left. In use, GSX automatically scales this to fit the selected 'device' (in this case device no 1, the screen, which is 800 by 400 dots).

The scale factor in X should spread the display over a good portion of the screen — let's say X.COVER = .5, although you can change this to taste. The plot width PW is 2 X.MAX, and the scale factor X.SCALE is X.COVER * DW / PW. Let us further say that the scale factor in Y should spread the display over Y.COVER = .75 of the height of the screen (or your preferred value).

The plot height, PH, is ...

```
Y.MAX + 2 * X.MAX * TAN(ALPHA)
```

— a fact which can be confirmed by study of Figure 3 or by writing to the Editor for a full explanation *(you'll be lucky — Ed)*. This allows us to evaluate a scale factor Y.SCALE defined as

```
Y.COVER * DH / PH
```

Now, if you are still with me, we can derive the value of any X dimension in NDU by multiplying the X dimension from the function by X.SCALE; and similarly for Y, remembering however that Z offsets must be added.

## Origin

We should get a balanced plot if we place the X, Y, Z origin at the centre of the screen from left to right and top to bottom —

```
(X.ORIGIN = DW / 2, Y.ORIGIN = DW / 2)
```

If this doesn't work out, we can adjust it later. This is called the pragmatic or centre-out approach.

## Samples in X

Let us return to the question of deciding on the density of the X samples. The number of NDUs per dot in the X direction is the same as the minimum line width (one dot) in NDU, and this

value is automatically loaded into G5%(5) immediately after opening a GSX graphics workstation. So you can read it out from there to make the program universal for any device (good), or you can divide 32768 by 800 for the specific case of the Apricot Xi screen (poor). In either case you will get 41, to the nearest whole number. If you care but don't know what G5%(5) is, by the way, go back and re-read the GSX series in APRICOT FILE Release 1. Or buy the disk — DEALS FOR READERS AP005 — which tells all.

If the spacing between samples in X is set to this constant, hereby named U.PERDOT, you will get a good dense continuous trace where the trace is horizontal. Using a lower density is not advisable as it runs the chance that the hidden line erasure process (see below) will get out of sync.

Up to this point we have discussed a set of adjustable constants, terms which retain their value for the duration of one plot but which could be changed for another plot. Now we must consider the variables, the terms which take a series of values during one plot.

## Variables

Comes now a slightly tricky bit. Looking at Figure 4, which you will remember is a view of the X-Z plane looking down along the Y axis, you'll see a radial line marked 'Fig.2'. Think of it as the edge view of Figure 2 and you will get the idea.

What is the Y value of the point where this line intersects with the slice A-A? To find out, we simply solve the equation Y = f(X) for a given X. But what is the value of X? It is the length of line *n*, not *m*. True, we have decided to take a slice in the plane A-A; but the function exists in a plane defined by 'Fig. 2' which is rotating about the origin. We know the value of *m* because it is the sum of the increments X.INC, and we know the value of *z* because it is the sum of the increments Z.INC. It remains to ask Pythagoras what value of XB should be installed in Y = f(X):

```
750 X = SQR((XI / X.SCALE)^2 + Z^2)
```

The other variables are the counting variables ZI for scanning in Z (step to next slice) and XI for scanning in X (draw trace across top of slice).

## Ye Olde Algorythme

Having all these constants and variables in hand, the task becomes simple:

- Define the slices by scanning in Z from -DVS/2 to +DVS/2 (line 720).
- For each slice, first offset the origin in the Z direction and then define the Y coordinate by scanning in X from -PW.NDU/2 to +PW.NDU/2 where PW.NDU is PW * X.SCALE, the plot width in NDU (lines 790, 740).
- For each point, plot the point and erase any portion of the plot which may be hidden as a result of that point (lines 900 to 990).

## Hidden lines

Whole books have been written about the hidden line problem — how to determine which lines become invisible when plotting a projection of a solid object. In the present case, though, the solution is very simple.

Plotting from the back of the figure to the front, any dot which is above a previous dot corresponds to a piece of a slice which will hide the previous dot. Any dot which is below a previous dot corresponds to a piece of a slice which will not hide the previous dot. So don't do any complex calculations; throw away your tensors, flexors, and inverse matrices; and simply print a 'black' or erasure line vertically down to the bottom of the screen from just below each dot. Fructitious, wot?

## Other goodies

Flag F1 if set in line 485 will cause the plot to have a rectangular base. Flag F2, line 495, simply draws a frame around the picture. It is best not to use this if you are going to dump the picture to a dot-matrix printer, as it may make page alignment difficult. I use MXDUMP, but I wish that the author had included an option for 8.5x11 paper as well as A4. If you want to stop the program part way through its task, use CONTROL-C and then type GOTO 800 and Return (this will show on the MicroScreen) followed by any key.

## Printing to the MicroScreen

The trick is to open graphics first (lines 520, 530) and then open the MicroScreen with ESC "W" (line 560). Anything sent with a PRINT command thereafter will appear on the MicroScreen only, and can be erased by scrolling upward with an extra PRINT.

At the end, reset the MicroScreen to date-display mode by ESC "S" and then close graphics (line 830).

## Other functions to play with

If you like what you see when you run the program, you can try replacing line 760 with ...

```
Z = - 1 / (X^2 + Y^2)
```

Or this:

```
Z = (E^ - ALPHA * (X^2 + Y^2)) * COS(BETA * (X^2 + Y^2))
```

In the latter case, start with ALPHA = 1, BETA = 1, and X and Y both in the range -10 to +10; then just play around.

If you want to save any pattern for subsequent quick display, the technique was described in APRICOT FILE Release 1.7, the April 1986 issue. ◆

**Figure 1: The 3-D solid**

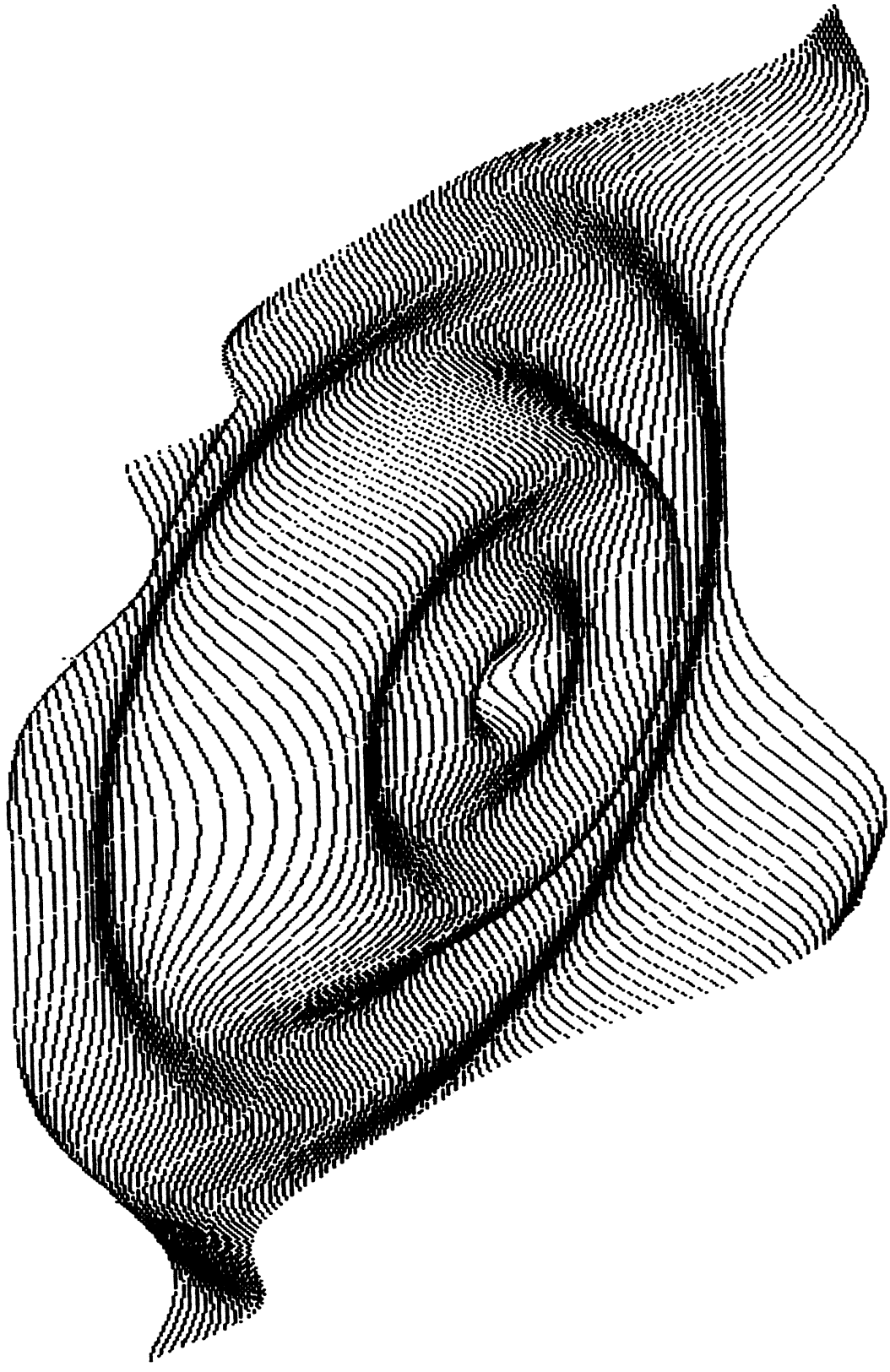


**Figure 2: The 2-D graph — Y = SIN(X) + .4 SIN(3X)**

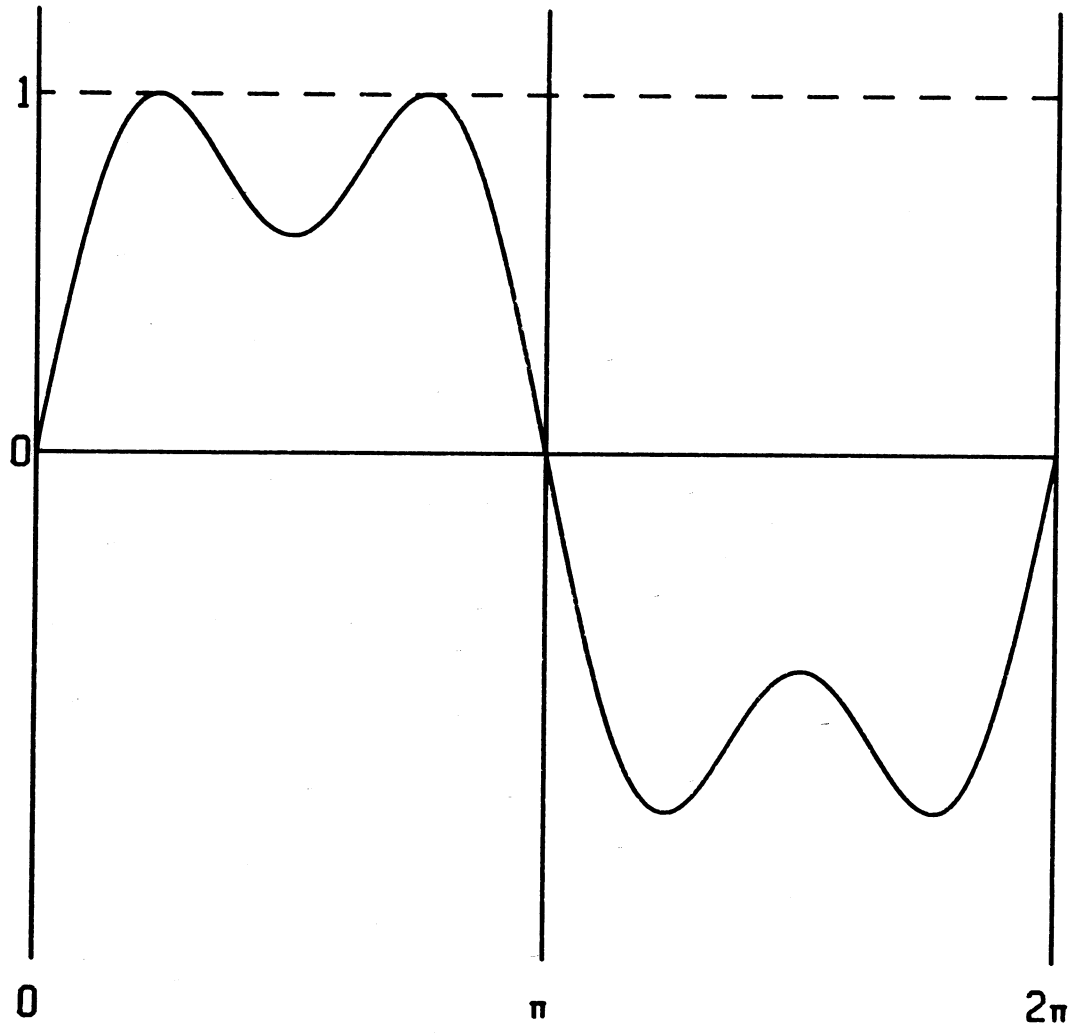



**Figure 3: Co-ordinates**

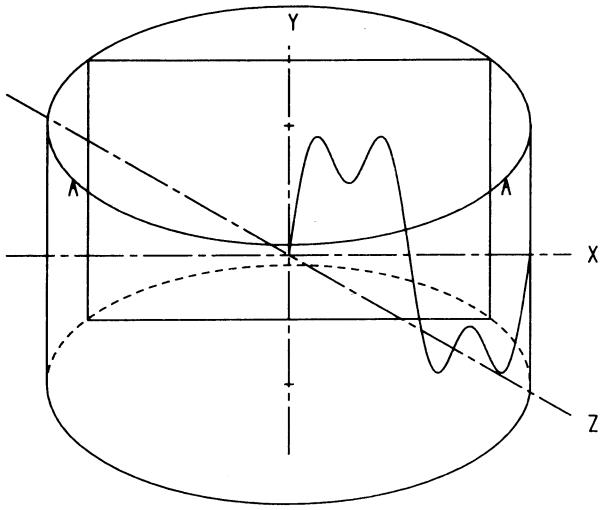
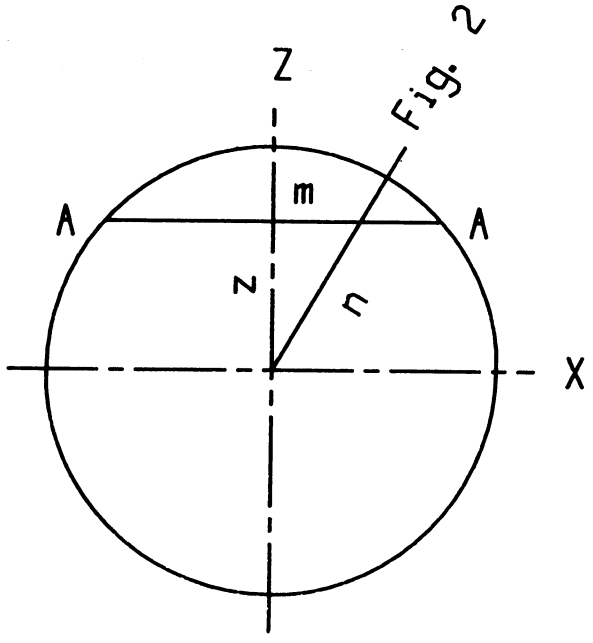



**Figure 4: View in the X-Y plane**



## 3DSOLIDS.BAS

```
10      REM:  PLOTS THE FUNCTION GIVEN IN LINE 760,
              WHICH MAY BE CHANGED.
20      REM:  BY LINDSAY DOYLE 11/2/87
30      REM:  MSBASIC FOR APRICOT Xi
100     REM:  CONSTANTS
110     C$ = CHR$(27): REM: ESCAPE CODE
120     PI = 355 / 113: REM: 4 * ATN(1)
130     ALPHA = PI / 3: REM: 60 DEGREES
140     X.MAX = 7 * PI / 4: REM: UNSCALED
150     Y.MAX = 1.4: REM: FROM EXAMINATION OF
        FUNCTION IN LINE 760, UNSCALED
160     Z.MAX = X.MAX: REM: UNSCALED
170     DV = 1: DW = 32767: DH = 32767: REM: DEVICE
        NO., DEVICE WIDTH AND HEIGHT, NDU
180     X.ORIGIN = INT(DW * .5): Y.ORIGIN = INT(DH *
        .5): REM: ORIGIN, NDU
190     Z.DIVS = 100: REM: NUMBER OF SLICES: CHANGE
        TO TASTE
200     Z.INC = 2 * Z.MAX / Z.DIVS: REM: UNITS PER
        SLICE, UNSCALED
210     DELTA.X = Z.INC * COS(ALPHA): REM: OFFSET IN
        X PER SLICE, UNSCALED
220     DELTA.Y = Z.INC * SIN(ALPHA): REM OFFSET IN Y
        PER SLICE, UNSCALED
230     PW = 2 * X.MAX: REM: PLOT WIDTH, UNSCALED
240     PH = Y.MAX + X.MAX * TAN(ALPHA): REM: PLOT
        HEIGHT, UNSCALED
250     X.COVER = .5: REM: AMOUNT OF SCREEN TO BE
        COVERED IN X
260     Y.COVER = .75: REM: AMOUNT OF SCREEN TO BE
        COVERED IN Y
270     X.SCALE = INT(X.COVER * DW / PW): REM: SCALE
        FACTOR IN X, NDU PER UNIT
280     Y.SCALE = INT(Y.COVER * DH / PH): REM: SCALE
        FACTOR IN Y, NDU PER UNIT
290     PW.NDU = INT(PW * X.SCALE): REM: PLOT WIDTH,
        NDU
300     DELTA.X = INT(DELTA.X * X.SCALE)
310     DELTA.Y = INT(DELTA.Y * Y.SCALE)

320     REM:  FLAGS
330     REM:  F1 = DRAW SQUARE BASE RATHER THAN
              CIRCULAR
340     REM:  F2 = DRAW FRAME (DON'T USE FOR SCREEN
              DUMP)

400     REM:  VARIABLES
410     REM:  WM = WRITING MODE; 1 = REPLACE, 4 =
              ERASE
420     REM:  XI = COUNTING VARIABLE FOR SCAN FROM
              LEFT TO RIGHT
430     REM:  X, Y = POINT COORDINATES, UNSCALED
440     REM:  X1, Y1 = POINT COORDINATES, NDU
450     REM:  Z = COUNTING VARIABLE IN GSX
              SUBROUTINES
460     REM:  ZI = COUNTING VARIABLE FOR SCAN FROM
              REAR TO FRONT

470     REM:  OPTIONS
480     PRINT C$; "E": INPUT "CORNERS (Y OR N)"; I$
485     IF I$ = "Y" OR I$ = "y" THEN F1 = 1
490     PRINT: INPUT "FRAME (Y OR N)"; I$
495     IF I$ = "Y" OR I$ = "y" THEN F2 = 1

500     REM:  INITIALIZE
510     PRINT C$; "E"; C$; "(": REM CLEAR ALPHA
        SCREEN, HIGH INTENSITY
520     GOSUB 50000: REM: DIMENSION THE GSX ARRAYS
530     GOSUB 50100: REM: OPEN GRAPHICS
540     U.PERDOT = G5%(5) + 1: REM: WIDTH OF ONE DOT,
        NDU (42)
550     X.INC = U.PERDOT: REM: DISTANCE BETWEEN DOTS
        IN X, NDU
560     PRINT C$; "W": REM: OPEN MICROSCREEN
570     REM:  PRINT "PLOT IN PROCESS"

600     REM:  DRAW FRAME
610     IF NOT F2 THEN GOTO 700
620     N = 5: X1 = 0: Y1 = 0: X2 = 0: Y2 = DH: X3 =
        DW: Y3 = DH: X4 = DW:
Y4 = 0
630     GOSUB 50600

700     REM: PLOT THE FUNCTION
710     Z = - Z.MAX: REM: NDU
720     FOR ZI = - Z.DIVS / 2 TO + Z.DIVS / 2 - 1
730     PRINT: PRINT "PLOT IN PROCESS: SLICE"; 1 + ZI
        + Z.DIVS / 2 "OF"; Z.DIVS; "."
740       FOR XI = - PW.NDU / 2 TO + PW.NDU / 2 STEP
          X.INC: REM: NDU
750         X = SQR((XI / X.SCALE) ^ 2 + Z ^ 2): REM:
            UNSCALED
754         IF F1 THEN GOTO 760
755         IF X > X.MAX THEN GOTO 780: REM: RESTRICT
            TO CIRCULAR PLOT
756         REM: IF LINE 755 IS SKIPPED, PLOT WILL
            HAVE SQUARE CORNERS
760         Y = SIN(X) + .4 * SIN(3 * X): REM: THE
            FUNCTION BEING PLOTTED
770         GOSUB 900: REM: SCALE AND PLOT ONE POINT
780       NEXT XI
790     Z = Z + Z.INC: NEXT ZI

800     REM:  END ROUTINES
810     PRINT: PRINT "PLOT COMPLETED"
820     IF INKEY$ = "" THEN GOTO 820: REM WAIT FOR
        ANY KEY
830     PRINT C$; "s": GOSUB 50200: REM: RESET
        MICROSCREEN, CLOSE GRAPHICS
840     SYSTEM: END

900     REM:  PLOT / ERASE SUBROUTINE
910     N = 2: WM = 1: GOSUB 53200: REM WRITING MODE
        = REPLACE
920     REM:  PLOT ZERO-LENGTH LINE
930     X1 = X.ORIGIN + XI + ZI * DELTA.X: X2 = X1:
        REM: NDU
940     Y1 = Y.ORIGIN + Y * Y.SCALE - ZI * DELTA.Y:
        Y2 = Y1: REM: NDU
950     GOSUB 50600: REM: PLOT POINT
960     WM = 4: GOSUB 53200: REM: WRITING MODE =
        ERASE
970     X1 = X1: Y1 = Y1 - 2 * X.INC: X2 = X1: Y2 = 3
        * U.PERDOT
980     GOSUB 50600: REM: DRAW LINE
990     RETURN

49999   REM:  SELECTED GSX SUBROUTINES
50000   REM:  GSX ARRAYS: CAN BE DIMENSIONED
              DIFFERENTLY TO SUIT APPLICATION
50010   DIM G1%(10), G2%(80), G3%(16), G4%(45),
        G5%(12): RETURN

50100   REM:  OPEN WORKSTATION
50110   G1%(1) = 1: G1%(2) = 0: G1%(4) = 10: G2%(1) =
        DV
50120   FOR Z = 2 TO 10: G2%(Z) = 1: NEXT Z: GOSUB
        54000: RETURN

50200   REM:  CLOSE WORKSTATION
50210   G1%(1) = 2: G1%(2) = 0: GOSUB 54000: RETURN

50600   REM:  DRAW UP TO FOUR LINES [CAN BE EXPANDED]
50610   G1%(1) = 6: G1%(2) = N: G3%(1) = X1: G3%(2) =
        Y1: G3%(3) = X2
50620   G3%(4) = Y2: G3%(5) = X3: G3%(6) = Y3: G3%(7)
        = X4: G3%(8) = Y4
50630   G3%(9) = X1: G3%(10) = Y1: GOSUB 54000:
        RETURN

53200   REM:  SET WRITING MODE
53210   G1%(1) = 32: G1%(2) = 0: G2%(1) = WM: GOSUB
        54000: RETURN

54000   REM:  CALL GSX ASSEMBLY SUBROUTINE
54010   DEF SEG = &H61: GSX% = 0: REM ASSIGN SEGMENT
        ADDRESS AND OFFSET
54020   CALL GSX%(G1%(1), G2%(1), G3%(1), G4%(1),
        G5%(1))
54030   DEF SEG: RETURN
```

## New Newsletter

# COMMS FILE is coming

### The next newsletter from TP Group ...

**The inaugural issue of COMMS FILE appears this month. COMMS FILE is the new monthly newsletter from TP Group, the first British newsletter publisher to use desktop publishing (and no typewriters). We are also heavy users of electronic mail and bulletin boards; and it makes sense to put that experience to work.**

**Existing subscribers to our newsletters will know the style and general approach that we try for in all our publications. COMMS FILE is designed to help the microcomputer user make more of the possibilities in communications — to explain what's available, to review the equipment and services on offer, to provide advice and ideas for cutting costs and getting the most from comms.**

**The normal subscription rate for 12 monthly issues of COMMS FILE will be £75pa for UK subscribers, £85 in Europe, £100 elsewhere. But existing subscribers to APRICOT FILE can take advantage of our Charter Rate discount offer — £25 off the normal price. Our usual try-before-you-buy sample copy is also available on request.**

## What will COMMS FILE cover?

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| | |
|---|---|
| Apricot PC, Xi, F series | Apricot Xen |
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| Apple II | Apple Mac |

### Services include:

| | |
|---|---|
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| One to One | COMET |
| Compuserve | The Source |
| UK Bulletin Boards | Prestel |

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### How to communicate

- ☐ Beginner's Guide to Comms
- ☐ Up at the Sharp End — a column by Dermod Quirke
- ☐ Phone line problems — what you can do about them
- ☐ Security in data transmission
- ☐ The Data Protection Act for electronic mail users
- ☐ All about Hayes compatibility
- ☐ All about RS-232
- ☐ Dial-up database services

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- ☐ Complete Compatibility Crosscheck of modems, computers, software, services: what's available, which will work
- ☐ Setting up the comms port for your computer
- ☐ RS-232 cable wiring for common requirements
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- ☐ Null modems and file transfer
- ☐ What is BABT approval

### Electronic mail

- ☐ Electronic mail services compared
- ☐ MicroLink — a cheap way into Telecom Gold
- ☐ Understanding the charges — and how to cut costs
- ☐ Typesetting via electronic mail — what, how, how much

### Reviews

- ☐ Modems
- ☐ Comms packages for different computers
- ☐ Telex via electronic mail
- ☐ Internal modems
- ☐ Freebie comms packages
- ☐ Comms via cellular radio

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- ☐ Directory of bulletin boards — a critical reference with access info
- ☐ How to set up your own bulletin board
- ☐ Free software on bulletin boards — what's available

In addition we're putting together a small but relevant DEALS FOR READERS list of mail-order goodies — public domain software for comms, RS-232 extras like a cable make-up service and multi-way adapters, a couple of commercially-available comms packages, and the like. We are also looking for discount prices on a recommendable all-purpose modem — and frankly we think we can provide better support for purchasers than the average retailer.

As always, the newsletter format and the fact that we don't depend on advertising revenue means that we can react to whatever the subscribers want. We'll be carrying a SoapBox reader response form in each issue, we'll be inviting comments via our electronic mailboxes and bulletin boards (the idea of us running our own bulletin board has been mooted too) and we're keen to receive suggestions for specific articles.

We are also interested in hearing from would-be writers — reviewers, writers of Workshop-style articles, and anyone with any comms-related tips or experiences to pass on.

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Report from Bandage & Plaster

# Getting Your Number

## Telephone Directories via SuperCalc

By Bob Smith

We employ some 700 people at Bandage & Plaster in several factories and two separate administration buildings. It's a business that makes products to customers' requirements — as opposed to standard products — and our work involves a fairly high degree of detailed technical specification. Getting this detail right requires efficient communication.

Three years ago we invested in a £30,000 switchboard. It has 135 extensions and 15 outside lines; even so, we currently use 130 of those extensions and some afternoons it's extremely hard to get an outside line!

As the number of extensions and people with access to phones has increased, so has the problem of keeping the internal directory in order. We used to have a list organised by department that fitted neatly on to one A4 sheet; the only problem was the usual one of keeping it up to date. But these days we have more people (about 200 now) who need to be on the list; and as well as updates for joiners and leavers, we also seem to have more movement from one department to another.

To keep the list in manageable order, I decided to computerise it. The objectives were clear — the final result should be on one piece of paper and in a definite order. (As it turned out, we produced a choice of two formats and three orders!) The only program on the Apricot we have with sorting capability and easy manipulation of format is SuperCalc 3 (SuperCalc 2 will also do, but not SuperCalc 1). This turned out to be just dandy for the job.

We created a spreadsheet to hold the phone numbers, names and departments, and used a combination of BAT and XQT files to automate the entire production from entering the numbers to printing the desired formats.

## Creating the directory

The details of the phone directory are held in NUMBERS.CAL. As spreadsheets go, this must be one of the simplest — and certainly one of the few that does no calculation of any kind!

It consists of four columns of which column B holds the extension numbers, column C the names, and column D the sections or departments (column A simply provides a printing margin). So there is room for up to 254 entries (the maximum number of rows) and therefore the phone list could hold up to 254 people. Sorting the appropriate column rearranges the list in any of three sequences — by number, name or department.

Practically speaking, there are some variations to the above which give some useful flexibility at the cost of reducing the number of people entries. First, special numbers that are always needed can be manoeuvred to the top by using characters that will always sort to the front — hence the starting asterisk in each of columns B, C and D for the emergency-number entries. Since SuperCalc will sort '*' in front of both numbers and letters, this trick ensures the emergency number will always top the list no matter which column is sorted.

Second, up to 26 entries are used simply for the letters of the alphabet. That way the names are neatly separated into alphabetic groups on the printout. I use these divider letters only in the names column C, but if you wanted you could put them in column D for departments as well.

By popular demand, our usual list is produced in surname order. This sequence is ok when you know most people. On occasion you forget someone's surname but you know where they work; or you just want to ring a certain section to get the foreman or manager in charge. To save referring to a different directory ordered by column D, we put into the names column some of the more commonly-needed department titles like Sales, Reception, Credit Control, Despatch, Social Club, Sauna, Swimming Pool, Health Spa ... (wake up, Bob, you're dreaming again!). We really do have a Social Club though and it's on the list.

## Printing the lists

It's when you go to print the spreadsheet that this system starts to show its real sophistication and speed. As you can see from the main menu, there is one command for each of the three print sequences. Further, each may have a parameter which determines the format of what is printed.

### The List-Printing Menu

```
          **********************
          * BANDAGE & PLASTER *
          *  PHONE DIRECTORY  *
          **********************

   ED......Edit Phone Directory
 * PS......Print Directory in SURNAME Order
 * PN......Print Directory in NUMBER Order
 * PD......Print Directory in DEPT Order
 * Parm....none=NLQ      C=Condensed (20cpi)
           D=Draft       W=Wide (4 cols at 20cpi)
   MM......MAIN MENU
```

There are actually only two different printed layouts — a straightforward one-entry-per-line list, or the same with four entries across. The single-entry directory is produced in NLQ if no parameter is specified, or at condensed (20 characters per inch) or draft (12 cpi) for parameter values C and D respectively.

The latter two choices are mainly for checking layouts after adding and deleting directory entries; but some users, for instance the mail room, want a normal type-size list on their wall to refer to when sorting the mail for delivery to departments.

The four-entries-across format can only be produced by printing at 20 cpi on our Mannesmann Tally MT290 (see APRICOT FILE Release 2.4 for the review) and is invoked by entering parameter value W. As you'll see from the

description of the XQT file involved, there is a slight squeezing of the original spreadsheet columns to get it all in.

If you don't have 20 cpi on your printer, you will either have to make do with three entries across or squeeze the original columns a bit more. The final result is on wide (13.5in) listing paper which is then reduced by photocopier to A4.

Note that the print commands PS, PN and PD make use of the PFU command also described in APRICOT FILE Release 2.4 — the lines containing 'PFU' can be substituted with ECHOs that contain the relevant printer control sequences if preferred. The final PFU sets a left margin of 7, then finishes the sequence of print controls with a form feed; sending the form feed last is important because each separate print control transmitted to the printer will shift the paper up a line. The final form feed gets the paper to the right position at the top of a page for the following print.

Next a piece of trickery with the DATE command to redirect its output to the printer. CR.DAT supplies the necessary carriage Return to avoid the usual pause and keep the ball (or do I mean the BAT?) rolling. The following ECHO prints and underlines the title of the phone directory, then sets the left margin to zero (since the spreadsheet print includes its own left margin).

SuperCalc is then started up, and the appropriate XQT file (depending on parameter %1) takes command. From this point, you can sit back and let the XQT do the work.

## The Data Protection Act

It's fairly obvious that any comparative list could use the sorting and printing methods described here — your own private phone list, for instance, or membership list of a sports or hobbyist club. There are two main restrictions. One is the number of persons that are possible, bearing in mind the overall limit of 254 rows allowed by SuperCalc and discussed above.

The second is the Data Protection Act. If you keep records on your computer that involve personal details of other people, you are required to register the fact with the Data Protection Registrar. Names of people are personal details and telephone lists held on a computer, even of one's own employees, are considered liable for registration. (All the names in the example here are fictitious, by the way.)

The scope of the Act is quite amazing. I won't go into detail of what we had to register, but one surprising example was the log-on system on our minicomputer. Users sign on with both an identity and a password. The identity is usually their first or last name and the password is, of course, secret (and not displayed when keyed in). Because we used the real names of users for their sign-on identities, and because those names therefore had to be stored in a computer file (a well-protected and encrypted file) for the log-on software to check the legitimacy of persons attempting access, we had to register the system and describe the 'personal' data held! ◆

## The Menu commands

| | |
|---|---|
| ED | Loads SuperCalc and starts up ED.XQT which itself loads the NUMBERS spreadsheet ready for editing. |
| PS | Prints single-entry-per-line format of phone directory in surname order and in NLQ mode. Confirmation is requested just to make sure the right command was picked; then PFU sets up the printer for 12 cpi and a left margin of 7, followed by a form feed. Today's date and a heading line is then printed before loading SuperCalc and invoking execution of PS.XQT — which itself loads NUMBERS.CAL, sorts it, prints it, then Returns to the menu. |
| PS D | As PS above, except the output is in draft mode at 12 cpi. |
| PS C | As PS above, except the output is in condensed mode at 20 cpi. |
| PS W | As PS C above, but with the directory printed four entries across. |
| PN | All variations as for PS, but directory printed in extension number order. |
| PD | All variations as for PS, but directory printed in departmental order. |
| MM | Dummy command to return you to your main menu. If using a hard disk, replace 'MM' with your own main-menu .BAT command. |
| TEL | [not on the menu] Clears the screen with ESC z and displays the phone directory menu. If you are using a hard-disk Apricot, this .BAT file should also be in your root directory. |

## NUMBERS.CAL

| | A | B | C | D |
|---|---|---|---|---|
| 1 | | *333 | ***** EMERGENCY ********** | |
| 2 | | | A | |
| 3 | | 164 | ACCOUNTS DEPT******* | ACCOUNTS DEPT******* |
| 4 | | 200 | ASHBURY Denton | Invoicing Dept |
| 5 | | 164 | ATTWOOD Sophie | Accounts Dept |
| 6 | | | B | |
| 7 | | 189 | BAKER Percy | Materials |
| 8 | | 154 | BALE Duncan | Transport Dept |
| 9 | | 109 | BALE Henry | Quotations |
| 10 | | 129 | BANDAGE FACTORY***** | BANDAGE FACTORY***** |
| 11 | | 189 | BEECH Bertram | Materials |
| 12 | | 110 | BELL Kenneth | Quotations |
| 13 | | 203 | BIGGLES Chris | Bandage Factory |
| 14 | | 116 | BLACK Tony | Plaster Factory |

... and so on ....

# The Batch and XQT Files

## TEL.BAT

```
ECHO OFF
REM  TEL.BAT
REM  Displays menu for PHONE Directory
     Maintenance
CD\SC3\TEL
REM  *** Following line resets and clears
REM  *** screen with ESC z, then sets
REM  *** high intensity with ESC (
ECHO  ^[z^[(
TYPE TEL.MNU
```

## ED.BAT

```
ECHO OFF
REM  ED.BAT
REM  Edits Phone List
SC3 ED
TEL
```

## PS.BAT

```
ECHO OFF
REM  PS.BAT
REM  Prints Phone List in SURNAME Order
REM  *** Following line resets and clears
REM  *** screen with ESC z, then sets
REM  *** high intensity with ESC (
ECHO  ^[z^[(
REM  *** Following line displays "SURNAME"
REM  *** in reverse video
REM  *** For PN replace "SURNAME" by "NUMBER"
REM  *** For PD replace "SURNAME" by "DEPARTMENT"
ECHO  Prints Phone List in ^[pSURNAME^[q Order
      with Parm=%1
ECHO  ========================================
ECHO
ECHO  Printer on-line and ready to print?
ECHO
ECHO  Press CONTROL-C to cancel, otherwise
PAUSE
ECHO
ECHO  Setting up Printer Controls now.....
COMMAND/C PFU P12 NL MD
IF "%1"=="D" COMMAND/C PFU DR
IF "%1"=="C" COMMAND/C PFU P20
IF "%1"=="W" COMMAND/C PFU P20
COMMAND/C PFU LM7 FF
DATE <\CR.DAT > PRN
REM  *** ESC4m starts underline in following
REM  *** line and ESC0m halts it,
REM  *** then ESC[0s sets the left margin
REM  *** back to zero
REM  *** For PN replace "NAME" by "NUMBER"
REM  *** For PD replace "NAME" by "DEPARTMENT"
ECHO  ^[4mBANDAGE & PLASTER Internal Phone
      Directory^[0m by NAME^[[0s > PRN
IF "%1"=="W" GOTO WIDE
REM  *** Use PN/PD in following line
REM  *** for number/department order
SC3 PS
COMMAND/C PFU DF FF
TEL
:WIDE
REM  *** Use PNWIDE/PDWIDE in following line
REM  *** for number/department order
SC3 PSWIDE
COMMAND/C PFU DF FF
TEL
```

## ED.XQT

```
/ZY~              [clear workspace]
/LNUMBERS,A9~     [load NUMBERS.CAL]
=A1~              [goto top left]
&~                [suspend XQT file to allow user to
                   edit directory]
=A1~              [goto top left]
=C1~              [move to "names" column]
/ACC~             [sort this column by ascending
                   order]
=A1~              [goto top left again]
/SNUMBERS,BA~     [save NUMBERS.CAL — save original
                   as NUMBERS.BAK]
/QY~              [quit SuperCalc]
```

## PS.XQT

```
/ZY~              [clear workspace]
/LNUMBERS,A~      [load NUMBERS.CAL]
=A1~              [goto top left]
=C1~              [move to "names" column]
/ACC~             [sort this column by ascending
                   order]
-----Extra lines for PN.XQT only-----
=B1~              [move to "numbers" column]
/ACB~             [sort this column by ascending
                   order]
-----Extra lines for PD.XQT only-----
=D1~              [move to "departments" column]
/ACD~             [sort this column by ascending
                   order]
-------------------------------------
/GB~              [remove borders]
/ODALL,SL63~      [specify page length of 63 lines]
P~                [print spreadsheet]
/QY~              [quit SuperCalc]
```

## PSWIDE.XQT

```
/ZY~              [clear workspace]
/LNUMBERS,A~      [load NUMBERS.CAL]
=A1~              [goto top left]
=C1~              [move to "names" column]
/ACC~             [sort this column by ascending
                   order]
-----Extra lines for PNWIDE.XQT only-----
=B1~              [move to "numbers" column]
/ACB~             [sort this column by ascending
                   order]
-----Extra lines for PDWIDE.XQT only-----
=D1~              [move to "departments" column]
/ACD~             [sort this column by ascending
                   order]
-----------------------------------------
/FCA,5~           [set column A at 5 wide]
/FCB,6L~          [set column B at 6 wide,
                   justified left numeric]
/FCC,21~          [set column C at 21 wide]
/FCD,25~          [set column D at 25 wide]
=H1~              [goto H1]
=E1~              [back to E1 so you can see
                   formatting of columns EFGH!]
/FCE,13~          [set column E at 13 wide]
/FCF,6L~          [set column F at 6 wide,
                   justified left numeric]
/FCG,21~          [set column G at 21 wide]
/FCH,25~          [set column H at 25 wide]
=F1~              [goto F1]
/CB64:D126,~      [copy 63 entries from
                   rows 64-126 to start at F1]
=L1~              [goto L1]
=I1~              [back to I1 so you can see
                   formatting of columns IJKL!]
/FCI,13~          [set column I at 13 wide]
/FCJ,6L~          [set column J at 6 wide,
                   justified left numeric]
/FCK,21~          [set column K at 21 wide]
/FCL,25~          [set column L at 25 wide]
=J1~              [goto J1]
/CB127:D189,~     [copy 63 entries from rows
                   127-189 to start at J1]
=P1~              [goto P1]
=M1~              [back to M1 so you can see
                   formatting of columns MNOP!]
/FCM,13~          [set column M at 13 wide]
/FCN,6L~          [set column N at 6 wide,
                   justified left numeric]
/FCO,21~          [set column O at 21 wide]
/FCP,25~          [set column P at 25 wide]
=N1~              [goto N1]
/CB190:D252,~     [copy 63 entries from rows
                   190-252 to start at N1]
=B64~             [goto B64]
/BB64:D252~       [blank out all entries
                   below row 63]
=A1~              [goto top left]
/GB~              [remove borders]
/ODA1:P63,P~      [print phone list four entries
                   across]
/QY~              [quit SuperCalc]
```

## Phone List by name

Current date is 12/01/87

BANDAGE & PLASTER Internal Phone Directory by NAME

| | | |
|---|---|---|
| *333 | ***** EMERGENCY ********** | |
| | A | |
| 164 | ACCOUNTS DEPT | ACCOUNTS DEPT |
| 200 | ASHBURY Denton | Invoicing Dept |
| 164 | ATTWOOD Sophie | Accounts Dept |
| | B | |
| 189 | BAKER Percy | Materials |
| 154 | BALE Duncan | Transport Dept |
| 109 | BALE Henry | Quotations |
| 129 | BANDAGE FACTORY | BANDAGE FACTORY |
| 189 | BEECH Bertram | Material |
| 110 | BELL Kenneth | Quotations |
| 203 | BIGGLES Chris | Bandage Factory |
| 116 | BLACK Tony | Plaster Factory |

... and so on ....

## Phone List by department

Current date is 12/01/87

BANDAGE & PLASTER Internal Phone Directory by DEPT

| | | |
|---|---|---|
| *333 | ***** EMERGENCY ********** | |
| 164 | ATTWOOD Sophie | Accounts Dept |
| 195 | MILES Edward | Accounts Dept |
| 164 | OWEN Deborah | Accounts Dept |
| 164 | ACCOUNTS DEPT | ACCOUNTS DEPT |
| 195 | KELLY Auberon | Accounts Manager |
| 195 | HADDOW Ivy | Accounts Dept Sec |
| 203 | BIGGLES Chris | Bandage Factory |
| 138 | FRIMPTON Terry | Bandage Factory |

... and so on ....

## Phone List by number

Current date is 12/01/87

BANDAGE & PLASTER Internal Phone Directory by NUMBER

| | | |
|---|---|---|
| *333 | ***** EMERGENCY ********** | |
| 0 | PORTER Jenny | Reception |
| 0 | RECEPTION | RECEPTION |
| 100 | COMPUTER DEPT | COMPUTER DEPT |
| 100 | HARRIS Ted | Computer Dept |
| 100 | WILBY Jack | Computer Dept |
| 101 | SMITH Bob | Computer Manager |
| 102 | BUSH Jane | Personnel |
| 102 | GRAHAM Ken | Personnel |

... and so on ....

## Building the Worksheet

■■■ Contents:

```
B1   =  "*333                  emergency number
                               prefixed with
                               asterisk to force
                               to top of every
                               list
C1   =  "***** EMERGENCY *****
D1   =  "**********
C2   =  "A                     alphabetic divider
B3   =  164                    extension number
C3   =  "ACCOUNTS DEPT         for this dept
D3   =  "ACCOUNTS DEPT
B4   =  200                    extension number
C4   =  "ASHBURY Denton        name
D4   =  "Invoicing Dept        department
B5   =  164
C5   =  "ATTWOOD Sophie
D5   =  "Accounts Dept
C6   =  "B                     alphabetic divider
B7   =  189
C7   =  "BAKER Percy
D7   =  "Materials
B8   =  154
C8   =  "BALE Duncan
D8   =  "Transport Dept
B9   =  109
C9   =  "BALE Henry
D9   =  "Quotations
B10  =  129
C10  =  "BANDAGE FACTORY
D10  =  "BANDAGE FACTORY
        ... and so on ....
```

■■■ Formatting:

```
column A    5 wide
column B    12 wide, justified numerical left
column C    21 wide
column D    25 wide
```

## The Easy Way

**If readers would like a copy of this system (including the XQTs for slowing down other XQTs covered in APRICOT FILE Release 2.5), I'd be happy to oblige.**

**Please send a formatted diskette with a self-addressed and stamped (20p) disk mailer to the address below. If you don't have a mailer, just send 26p in stamps and your address — but please enclose your disk in some form of protective padding, at least wrapped in a piece of cardboard.**

**Indicate whether you'd like the printer controls set for the MT290 as described or for the Epson RX80 (also suitable for MX or FX printers). If you would also like last month's Printer Control system, please say so.**

**R.I.Smith**
**13 South View**
**Chaddiford Lane**
**Barnstaple**
**North Devon**
**EX31 1RD**

# Readers' Writes

## Your chance to have a say

### Satisfaction

On the first day of the Which Computer Show I noticed a sign saying 'Don't worry, there *is* help for Apricot users'. I asked someone what help there was for me; he pointed to APRICOT FILE. I sarcastically replied "is that it?" but he offered me a sample copy — which I stuffed into my bag along with all the other leaflets and brochures.

Later I looked more closely at the newsletter. It is a very professional, clear and helpful publication. I have now found some help at last, thanks to APRICOT FILE, and I have willingly sent you my subscription cheque ...

My apologies to the person manning the stand for my rudeness.

*James Robertson*
*Sudbury, Suffolk*

**It's always nice to receive compliments. Actually, a "professional, clear and helpful publication" just about summarises our aims for APRICOT FILE in a nutshell. And since we don't get too many appreciative letters, we thought we might as well let it go to our heads with another one ...**

### Fair shares

Please convey my thanks to Henry Deckhand for the article *Apricot Goes 386* in APRICOT FILE Release 2.5. I allowed my enthusiasm for the Apricot machine to blur my financial judgement about a year ago and purchased a block of shares at 55p. Many times have I been tempted to cut my losses, but the technical assessment of the situation in the article has rekindled my faith in the company. Credit also to the Editor for deciding to include this kind of article in the newsletter.

*Stanley Wrist*
*Kingston, Surrey*

**We asked Henry to commit himself to a forecast. Looking confident, he said "I expect the shares to top 80p in the Summer, assuming the annual results are as good as expected, and within 12 months they should be over 100p". He then gulped down the rest of his Jamesons and added "I think".**

### Fair shares

David St.John Wallis (APRICOT FILE Release 2.5) seems to have suffered the 'undocumented feature' in MS-DOS and PC-DOS whereby attempted deletion of a subdirectory will result in deletion of all the files in that directory after a 'Y' confirmation. I thought that it was pretty well-known; I hesitate to call it a bug, for it is really quite a useful feature.

I don't have an answer to his first problem, but it sounds like something to do with his hidden files. Otherwise, it depends on which version of MS-DOS he is using. Version 3.1, with some of its clever features like MOVE and ATTRIB, is certainly suspect — version 3.2 is much better.

*T G Lamberstock, Oxford*

### SuperWriter Date Prompt

The current date as displayed on the MicroScreen is overwritten once SuperWriter has loaded. But place this prompt at the start of a batch file which loads SuperWriter:

```
PROMPT  $ej$ex1$ey8 $ep
        Today's date $d
        $eq$ey1$ek
```

*(We've printed the PROMPT like this for clarity, but don't enter it on separate lines; use only Return once only, at the end — Ed.)* This executes as follows:

| | |
|---|---|
| $ej | store the current cursor position |
| $ex1$ey8 | jump to 25th screen line |
| [space] | |
| $ep | switch on reverse video |
| [space] | |
| Today's date | [text] |
| $d | display day and date |
| [space] | |
| $eq | switch off reverse video |
| $ey1$ek | return to current cursor position |

That places the day and date below SuperWriter's own status line and thus out of harm's way. It is constantly visible to the user regardless of the main display — handy for those of us who code the date into document names, among other things.

*Steve Rainey*
*Bremmerton Computers, London*

### Olympia funnies

I have an Xi with SuperWriter. I recently got my Olympia dealer to fix a parallel interface on a Supertype 2 daisywheel printer for me; there is no printer definition entry in SuperWriter for this, and so it is currently configured for 'draft'. I cannot get bold print; and in proportional mode on the typewriter, the margin indents (CONTROL H) are also subject to proportioning. There are also some other funnies which do not stop the work but which I would like to eliminate. I am currently chasing Olympia for a manual, but I would be glad to hear from others with similar problems.

*Derek Broome*
*Potters End, Mears Ashby,*
*Northampton NN6 0DZ*

Diary dates

# On with the Shows

## A round-up of potential relevance

### March 1987

**24-26 ASSOCIATION** *London.* New event aimed at those who run trade associations and similar groups. Sponsored by the Society of Association Executives. *Organiser: Interbuild, tel 01-486 1951*

**24-26 Internepcon** *Birmingham.* Well-established manufacturing technology show. *Organiser: Cahners, tel 01-892 5051*

**24-26 CADCAM** *Birmingham.* A classy event last year, with a lot of impressive hardware and software on show for engineers and architects. Another one associated with a 'User'-suffixed magazine from this publisher. *Organiser: EMAP, tel 01-608 1161*

**24-27 Info 87** *London.* Now in its tenth year — information technology and office automation for the business community. The catch-all title indicates the range of products on offer; it's less technical and less computer-specific than most of the similarly long-lived business technology shows. Generally quite useful, rarely exciting. *Organiser: BED Exhibitions, tel 01-647 1001*

**24-27 Electronic Printing and Publishing** *London.* Second time out for this event aimed at the corporate publishing market — some desktop publishing, a lot of 'pre-print' products and services. Same organiser as and held next door to Info 87. *Organiser: BED Exhibitions, tel 01-647 1001*

**25 Data Protection — what you need to do after registration** *London.* With the Data Protection Act still causing massive befuddlement even among registrants, this one looks timely — especially as individuals will be able to request data from registered users after 11 November. The Registrar Eric Howe is among the speakers. *Organiser: NCUF, tel 0602 227990*

**26-29 West Coast Computer Faire** *San Fransisco.* One of the last hangovers of the early days of microcomputing, when it was all the province of long-haired ex-hippies all of whom knew each other. The name's the same, but this event has become just another micro-oriented end-user show. It's still big, and some of the better ideas still come out of California. *Organiser: Interface Group, tel (USA) 617 449-6600*

**31 March — 2 April Scottish Computer Show** *Glasgow.* Promises 100-plus exhibitors. *Organiser: Cahners, tel 01-892 5051*

### April 1987

**6-11 Sicob** *Paris.* The 'office system' half of the enormous French trade show (the computer-specific side has been moved to the Autumn, PC have been abstracted into a separate show). This one has some data processing and telecomms interest but majors on more conventional office equipment. Still, Paris in the Spring can't be bad ... *UK contact: French Trade Exhibitions, tel 01-439 3964*

**13-15 Lotus World** *London.* New show based around add-ons for 1-2-3, Symphony and other Lotus products. Some hardware manufacturers will be among the 90 or so exhibitors. Might not be much here for the Apricot user, though ... *Organiser: Jonathon Horne, tel 0256 83456*

**14-16 Optica 87** *Amsterdam.* Small exhibition plus big conference on one of the potentially hot topics of the next few years — 'optical' publishing, using laser disks and the like to disseminate information. *Organiser: Learned Information, tel 0865 730275*

**28-30 City Communications** *London.* Comms equipment and systems for City institutions. Runs at the Barbican in parallel with this organiser's new **High-Tech Buildings** show and conference on "advanced buildings technology". *Organiser: Online, tel 01-868 4466*

### May 1987

**20-22 European Unix User Show** *London.* Another chance to see what all the fuss is about, though last year's offering was a bit specialised and distinctly aimed at larger users. *Organiser: EMAP Exhibitions, tel 01-608 1161*

**11-17 Flanders Technology International** *Ghent.* Catch-all robotics-to-biotechnology show including computers and comms. First three days are for 'science and industry professionals' only, the last three are open to all. *Organiser: Flanders Expo, tel [Belgium] 91.22.60.31*

**12-14 Infobase** *Frankfurt.* New show promoting on-line databases and information service. *Organiser: Frankfurt Messe, tel [West Germany] 069 7575 477*

**20-23 Microcomputer Buro Transparent** *Frankfurt.* Exhibition for office micros and small business computing generally. *Organiser: Frankfurt Messe, tel [West Germany] 069 7575 477*

**27-29 Computer North** *Manchester.* All-purpose business computer show at the impressive G-Mex centre. *Organiser: Cahners, tel 061-832 4242*

### June 1987

**1-4 Comdex/Spring** *Atlanta.* The smaller (but still enormous) and infinitely more palatable of the two annual US Comdex shows. Las Vegas in the Autumn tends to get more product launches, but as a barometer of the American computer business this too is unmissable. *Organiser: Interface Group, tel (USA) 617 449-6600*

**2-5 Office 87** *London.* Features office furniture and supplies but includes 'office machines' too. *Organiser: BED Exhibitions, tel 01-647 1001*

**16-18 Networks 87** *London.* Network manufacturers and suppliers on show for the sixth year running, primarily looking for a corporate DP and telecomms audience. *Organiser: Online, tel 01-868 4466* ◆

The Workshop

# Multiple Fonts on the PC and Xi

## (and related matters)

By Eddie Bromhead

One of the Apricot's strengths is the facility to display italics, Greek (maths) symbols and the like, as well as normal text. But it's a facility that is underused by software suppliers and under-documented by Apricot plc.

Even when you have achieved the not inconsiderable feat of acquiring or generating the fonts, and followed this by displaying the different characters on the screen, you are faced with the problem of producing a hard copy. I know of only one word processing package for the Apricot that even nods in the direction of multi-font editing (VuWriter) and only one which uses it in a peripheral way (the StarPolish utility for WordStar).

## Why multiple fonts?

But why should you want to use multiple fonts? Certainly not for correspondence: a simple, short, straightforward message that is neatly laid out impresses the recipient far more than fancy effects produced on a nasty dot matrix printer with a worn-out ribbon ...

There are at least two important areas for multi-font printing, however. Technical writing of a mathematical nature is one; the alternate fonts would probably be Greek letters and mathematical symbols in this case. And second, different weights of character (together with italics) for titles and subtitles can provide a better way of suggesting the structure of the document than is possible with a single typestyle — a good example of this being APRICOT FILE itself. Here, the alternate fonts would still be the normal English alphabet.

In this article I shall be looking at the problems of using existing character fonts from programs. I'm leaving out most of the details of generating fonts and producing hard copy, other than as an overview to put material into context.

The methods are applicable to all pre-BIOS 3 releases on the PC and Xi; BIOS 3 introduced a new (and incompatible) method, and the F series Apricots work in a slightly different way.

## How multiple fonts work

The Apricot seems so greedy of memory partly because nearly half the basic 256K bytes are taken up for the system's use.

When you look into this, things aren't quite so bad; some 40KB is reserved for a graphics bit map, and when graphics are not enabled this area can be used for other purposes. Those include alternative character fonts, a user-definable logo, disk caching, and/or the fabled IBM PC emulation (ha!).

This 40KB area begins at address 2800 hex in the base segment (the first 64K bytes). It is contiguous with the default character font, which starts at address 800 hex and is 2000 hex long.

Each of the 256 characters in a font is a 16x16 bit map, arranged as 16 rows of 16-bit words with the most significant bit on the right. In displaying the character, the rightmost six bits are apparently ignored and you get a character cell 10 bits wide by 16 high.

The MANAGER font editor shows the ignored section as somewhat fainter; but it *is* possible to set or reset bits in this area. Any row which has the most significant bit set (that's the extreme rightmost bit) will light up when the 'underline' attribute is selected for the character; the next most significant bit controls the position of the strikethrough bar in a similar way.

It is both feasible and useful to set more than one row to light up when the underline and/or strikethrough modes are requested. On the other hand, most of us won't want strikethrough *per se*; but you might use it as an alternative underline, making possible a single- or double-underscore. And for maths writers it can be used as an 'overline' or bar.

When using the font editor, it is easy to forget the meaning of the dots in the faint area — and to end up with an otherwise good font which doesn't underline nicely. Check that the underline and strikeout bits are consistent for the whole character set.

Other attributes that a character may have when being displayed include bold display and reverse video modes.

The Apricot maintains a map of the screen's 2,000 character positions (80x25) in a 4K block at address F0000 hex, arranged as 2048 locations each of a 16-bit word. The five most significant bits control the attributes of the character, the remaining 11 are a pointer to the character. The use of an 11-bit pointer implies a character set of 2,048 characters, or say eight basic fonts; there isn't room for that many in the 40KB graphics space, however, and there's no means of accessing them even if the space were available — so too bad.

The locations don't correspond precisely with a screen cell; the video circuitry maintains a pointer which indicates which location currently corresponds with the top left of the screen. This facilitates screen scrolling. Experience suggests that there is something special about the location in this map of line 25, or the bottom line of the screen that most software seems to ignore.

## Font files

Font files created by FONTEDIT or the equivalent ACTIVITY utility are 8,320 bytes long. This is a 128-byte header followed by sixteen 16-bit words (ie two bytes) for each of the 256 characters in a character set — 128 + (16 x 2 x 256) = 8320. It is possible to create 'short' fonts, but for simplicity's sake we will assume all fonts have 256 characters.

With my original Apricot PC (BIOS Version 1.4!) I received two extra font files labelled OCR.CHR and

SCRIPT.CHR; there is at least one other font in the system as UTILITY.OV1 and another hidden one called FONT.SYS (if you want to use the latter you can find it via SDIR with the option to show hidden files and then unhide it with CHMOD). Other fonts may be found on Black Hole disks, the APRICOT FILE DEALS FOR READERS disk no. 3, and Ansible's ASD disks. So there's no shortage of fonts for the Apricot (mostly converted from the Sirius) even if you don't use the font editor yourself!

## Loading a master font with FONT

The FONT program is invoked from MS-DOS with a font file name. For example:

```
A> FONT SCRIPT
```

This finds the font file SCRIPT (with extension .CHR), strips off the first 128 bytes, and loads the remaining 8,192 bytes (2000 hex) into the default font area which starts at 800 hex. Every character on the screen at the time reflects the default font, so all displayed characters will change the instant that the new font is loaded.

The old font (minus the 128-byte header, which was lost when the font was originally loaded) is put on disk as FONT.SAV and may be reloaded with the command:

```
A> FONT RESTORE
```

(Presumably you can't have a RESTORE.CHR font file.) On the other hand, loading a second font such as OCR.CHR will cause FONT.EXE to overwrite the previous FONT.SAV with the contents of SCRIPT.CHR. So the proper procedure, for example in a batch file, is:

```
FONT first
.
.
.
FONT restore
FONT second
.
.
.
... etc
```

FONT.EXE operates *only* with the basic font which is kept in memory at 800 hex, and does nothing with the second and third (ie. first and second subsidiary) fonts. It's important to understand this: Apricot has not provided a utility to load the second and third fonts, so that even if you try out the Escape sequences which *should* enable them you'll get silly results. You have to load them yourself.

This is most easily done from Basic, which is available on all Apricots and needs no extra software. One way is to skip past the first 128 bytes, then read the remaining 8,192 bytes one at a time and POKE them to the appropriate memory location. But there has to be a simpler way — and indeed there is.

## Getting a font into the right format

The MS Basic interpreter has two useful commands for saving bit maps from memory to disk, and for reloading them at will: these are BSAVE and BLOAD. These commands are used in conjunction with DEF SEG to define the address of the start of the bit map in the following way:

```
10  DEF SEG=whatever
20  BSAVE  "filename", start offset, length in
           bytes
```

In the context of saving the primary font as a bit map, this would be:

```
10  DEF SEG=0
20  BSAVE "FONTNO1",&H800,8192
25  REM Or BSAVE "FONTNO1",&H800,&H2000
```

On running this, the file FONTNO1 will be found to have had a 128-byte header added to it, giving a total length of 8,320 bytes again.

Unfortunately the data in the header for a font created by the font editor is incompatible with the data for a bit map saved in this way. The bit map can however be restored to the primary font area with two further lines:

```
40  DEF SEG=0
50  BLOAD "FONTNO1"
```

This will load it back into the primary font area without more ado. The header contains the &H800 offset information, so it won't go back nicely if the segment has changed (via DEF SEG); but that could be an advantage — with a change of segment you can load the file back somewhere else.

This can also be done by specifying an offset in the BLOAD command, which is *added* to that found in the header. For example, you could load "FONTNO1" into the first additional font area with:

```
90  BLOAD "FONTNO1", &H2000
```

"FONTNO2", which has previously been BSAVEd from the default font area after loading with FONT.EXE, could then be put into the second additional font space with:

```
100 BLOAD "FONTNO2", &H4000
```

(At this stage you could BSAVE the whole set of three fonts, for restoring later from just one file ...)

By the time you get here, all three simple-to-access fonts have been loaded.

## Using all three fonts

Text sent to the screen via the PRINT command will appear in the default font, unless another font has specifically been enabled. This is done by sending the ASCII Shift Out character (SO, code 14 in the ASCII set) to enable the first additional font; the Escape sequence ESC * will enable the second one. Restitution of the default font is with the SI Shift In character, ASCII code 15. Try this, for example:

```
150  S$ = CHR$(14) + "ABC" + CHR$(27) + "*" +
     "DEF" + CHR$(15) + "GHI": PRINT S$
```

Be warned — this doesn't work with BIOS 3, which has disabled SO and SI ... even though the BIOS 3 documentation still lists ESC *.

If for some reason, you wish to display the symbols which represent the control codes, the Escape sequence ESC 8 must prefix each and every one of them:

```
160  E$ = CHR$(27) + "8": T$ = E$ + CHR$(10) +
     E$ + CHR$(27): PRINT T$
```

(This is lengthier than using the VT52 mode with ESC F and ESC G, but to my mind it's better — though if you understand anything of that, you won't need this article!)

There are thus 768 displayable characters in the three character sets. This is enough to display upright text, italics, Greek and maths symbols, and sets of sub- and superscripts for all of them. Since each character may also have one or a combination of the display attributes (underline, strike-through, bold, reversed) there's plenty of scope ...

## Problems in using the three fonts

With 768 characters and only (about) 96 keys, you'd need more than seven alternative modes for each key (for example using combinations of SHIFT and CTRL) to generate the total character set. Obviously that's not on, especially as some of the modes would be needed in a word processing program as controls.

VuWriter overcomes this by using function keys (labelled on the Apricot via line 25 and the MicroScreen) for all editing functions, and with the current keyboard (in normal, SHIFT and CTRL modes) available for display at the touch of the HELP key. Changing font is achieved via a function key — press once, and the next character is in the designated font: press twice, and all following text (up to the next font change) is in the new mode.

Most other WP packages don't even try. Indeed, some positively obstruct the use of the full 256-strong character set of one font, let alone permit all three to be used simultaneously.

WordStar is one of these. Not only has it no facilities for displaying the control characters as their graphic equivalent, but it has pinched ASCII characters 128 to 255 for its own purposes.

SuperWriter is hardly a lot better, but at least it does allow the use of most of the ASCII codes beyond 127. But when SuperWriter is used with a keyboard configured for editing functions, there are no characters left! Those interested in overcoming that problem should try Ansible's ACOLYTE program (available from DEALS FOR READERS at £45): it allows you to generate the character for any ASCII code, or alternatively to make up a file of common characters to include when editing and to use them with 'cut-and-paste' techniques.

(As an aside on the subject of Ansible, its public domain BORDERS utility generates screen borders which don't print sensibly (Ansibly?). You can overcome this by using a main font which matches that on your printer and replacing the border graphic symbols in BORDERS.XQT with the right ones.)

If the screen is under the control of one of your own programs, however, calling up the different character sets is just a matter of sending the right escape sequence.

By defining suitable block graphics characters in the alternative fonts, striking effects can be obtained. Examples of this are the 'ladder' menus in MANAGER, where the large characters are built up from block graphics 'characters'. Simple diagrams can be put on the screen with text and revised very quickly, providing a simple and faster alternative to GSX if the full screen resolution isn't required.

## Hard copy

There are really four ways to output special character sets on a printer. For a start, you can match the screen characters to those the printer uses; then use a word processing program like SuperWriter which displays the upper half of the ASCII set. This could mean italics in ASCII 128 to 255 for an Epson, or Greek letters for an ACT Writer 10 or 12. I've already suggested doing this in respect of the block-graphics border-ruling characters for BORDER.XQT. You are however restricted to the master font.

A second option: store the fonts in the printer, either by using removable font cartridges or by downloading dot patterns from the Apricot. Then use whatever Escape sequences the printer needs to switch fonts at print time.

This really entails using VuWriter and an expensive printer (or reinventing that particular wheel) if you wish to display the characters on the screen as you create the text. On the other hand, all word processing software permits a degree of control over the sending of escape sequences; and so alternate *printer* fonts might be available even though you won't see them *displayed*.

Third, drive the printer in its bit image graphics mode — though this is very slow. Remember that you'll probably have to have the printer's character bit maps in memory too — and these are normally needed as *columns*, not *rows*. This solution can be effective if you are generally happy with the standard printer characters and just want to throw in an odd special.

Finally, you can display the text a screenful at a time and do screen dumps. This gives access to all character attributes, including reverse video. And there's no need for a separate set of bit images, or a special font editor. Reduced to half size in a photocopier, dot size and resolution (dots per inch) approach that of early laser printers.

Provided that some care is taken with layout, this can result in an effective solution. Of course, printing out a 100-page document with several screen dumps per page is enough to drive you dotty ... ◆

Classified

# Free Small Ads

**This Classified Ads section is free to all subscribers of APRICOT FILE. Just let us have a sheet of paper with the words (not too many); ad will run for around three months or until you ask us to delete it.**

**This page is intended as a service to readers, and for that reason we would rather not accept ads from commercial organisations looking to sell products or services.**

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## Apricot Sales

■■■ APRICOT PC — twin drives, monitor, BIOS 2.7 and 3.1, Basic, SuperCalc, SuperWriter, SuperPlanner, Turbo Pascal, many useful public domain utilities. £600 plus VAT ono. Wide-carriage printer also available. Phone 0557 30624 (day) or 06445 244 (evening).

■■■ APRICOT XEN FD needs a good home. Six months old, one careful owner; 512KB memory, dual floppies. Includes all standard software and a copy of A LA CARTE. Price £1,500 ono. Call 01-736 4281 office hours.

■■■ XEN HD with 20MB hard disk, 1MB RAM, paper-white monitor; plus SuperCalc and SuperWriter. Hardly used. Cost £3,500 plus VAT, will accept £2,500 plus VAT. Also available: WordStar 2000 and Epson LQ1500. Contact Mark Wardle on Gloucester 504294 (day) or 411402 (evenings).

## Apricot Add-on Sales

■■■ WORDSTAR 2000 going cheap! Apricot MS-DOS 2.11 version, release 1.01. Never used, still in original packaging with manuals and MicroPro guarantee registration card. Only £100. Telephone Mr Lincoln, 061-434 4513 (day) or 0565 51144 (evenings/weekends).

■■■ LOTUS SYMPHONY for sale, brand new with manuals. Highly recommended if you want to combined a database with spreadsheets and WP and you have a hard disk Apricot with 512KB. Reason for sale. £250 inc delivery anywhere in the British Isles. Telephone Bernard Brandon, 0276 27214 (office) or 0276 74156 (home).

■■■ APRICOT-FORMAT SOFTWARE: MicroModeller and dGRAPH (both unused). Also one lot comprising CBasic compiler, Access Manager, Display Manager and GSX manual. Also Epson MX-80 ribbons and 9in black Xi monitor for sale. Best realistic offer secures. Contact 065 122 667.

■■■ 128KB RAM BOARD — full working order, no longer required. £55. Phone Frank Sendall on 051-425 4811 evenings (keep trying if no reply!)

■■■ F1 INFRA-RED MOUSE with light pipe and software. Low mileage, well-behaved. £50 ono. Contact 0734 732512.

## Other Sales

■■■ TOSHIBA TH-2100H high-quality printer and acoustic hood. Buyer must collect (from Milton Keynes). Any offer considered. Contact Eileen Periss on 0908 310866.

■■■ APRICOT WRITER 22 printer (really the best-selling Epson LX-80 with an Apricot badge). 100cps, 22cps in NLQ mode; twelve typestyles; supported by most WP packages. Ten months old, excellent condition — owner wanted something faster. £160. Tel Don Morrison on 01-235 1609.

■■■ OSBORNE 1 double-density disks, 64K, with SuperCalc, WordStar, MBasic, CBasic, all cables. £250 ono. Tel M Nash, 0742 307692 (home) or 0742 66922 (office).

■■■ COMMODORE 8030 — 32K memory expanded to 96K, twin 8050 disk drives; Pegasus ledgers, Landsoft WP, TLO program generator, CalcResult; all documentation and cables. Good working condition — £500 ono. Tel M Nash, 0742 307692 (home) or 0742 66922 (office).

■■■ WORDPERFECT Ver. 4.1 for use with Xen-i or any IBM-compatible. Unopened and complete. A bargain at £300 ono. Contact I Bryce on 0603 630326 in working hours.

■■■ EPSON RIBBON CARTRIDGES for sale — brand new, boxed, made by Epson and Caribonum. We've found half a dozen that we bought for an Epson we no longer have ... Price £5 including postage, or all six for £25. Phone Roger Gann on 01-833 3501.

■■■ PSION ORGANISER — original program and datapacks, RS232 link-up, documentation. Boxed. £40 ono. Contact Mike Nash on 01-671 8644 (home) or 01-584 5000 x 3545 (office).

## Wants

■■■ WANTED: COMPILERS, MANUALS, etc. Can't find a dealer who will mail overseas. Have Apricot Portable with BIOS 1.6 only — want to upgrade to BIOS 3, NEC V30 chip, MSBASIC compiler, GWBASIC compiler, possibly CBASIC; Tech Reference Manual etc also required ... Ted Webber, Box 6066, Boroko, Papua New Guinea.

■■■ WANTED: Apricot Xi FD or HD with 512K and 9in monitor. Must be in good condition and full working order. Tel M Nash, 0742 307692 (home) or 0742 66922 (office).

■■■ WANTED: Delta 4, TAS, dBASE III or Tomorrow's Office for Xi with 512KB and 10MB. Contact 0379 71246.

■■■ WANTED for Apricot 10Xi: Alpha, Simon or Multicard expansion box. Phone Brian on 0992 468870 evenings.

## Misc

■■■ APRICOT AND SIRIUS DISKS for sale — 5¼in DSDD box of ten £7.50, 3½in DS box of ten £20. Contact Paul Miller on 05435 78926 (day) or 05438 5336 (evenings).

■■■ A0 PLOTTING — time on a Calcomp A0 plotter available for rent: Sirius or Apricot disks plotted on your paper or ours. Terms negotiable, but cheap. Phone James McEvoy on 01-859 4014 or 01-852 7981; or write to 16 Dunvegan Road, London SE19 1SA.

■■■ SIRIUS-APRICOT TRANSFER: any program and/or data transferred from Apricot to Sirius format and vice versa. Just send your disks along with

£5 for the first one and £1 for each disk after that: P&R Miller, 8 Hillside Close, Hednesford, Staffs WS12 4DG.

■■■ COMMODORE CLEAR-OUT — FREEBIES! A Spring-clean has thrown up a few items of stock relating to a previous venture in Commodore home computers. Specifically, we have a dozen or so copies of Dennis Jarrett's Complete Commodore 64 book and many cassette dust-covers. FREE to a good home — ie a non-profit cause like a school. Contact Roger Gann on 01-833 3501.

## Help

■■■ SANYO AND APRICOT: can anyone suggest how I might format 3.5in disks so that both my Sanyo MBC-555 and my Apricot can read me? Also, does anyone know where I can obtain Concurrent CP/M-86? Contact Bob Wilcock on 01-888 8304 (evenings).

■■■ SWITZERLAND: Apricot user would like to contact others, preferably in the Zurich area, to exchange experiences and help each other with problems. Contact John Solomir, Stockenstrasse 67, 8802 Kilchberg.

## Holidays

■■■ HOUSE TO LET in the South of France at Agde, on the Mediterranean coast. Attractively converted 16th Century house with roof terrace: sleeps 4-5. Local British management. Phone 01-352 5925 evenings. ◆

# The SoapBox — Release 2.6

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| Diary | ☐ | ☐ | ☐ | ☐ | ☐ | |
| Free Small Ads | ☐ | ☐ | ☐ | ☐ | ☐ | |

## Any other comments?

## VX up by the Root

Apricot has signed a deal with **Root Computers** for bundled software to be supplied with the Apricot VX, the multi-user Xenix version of the new Apricot 386 line. The VX already looks a decent and very competitive VAR machine for systems houses interested in implementing their own software; but Root is one of the top three British software houses specialising in Unix and Xenix applications for general office management work — the others being Redwood and Sphinx — and the packaging should improve the VX's appeal to off-the-shelf purchasers.

The software involved is a user-friendly front-end called ROOTmap, which Lord knows is the kind of thing that all non-technical users of Xenix and Unix require. The deal also includes Root's office automation products: an e-mail/Telex package, print spooler, word processor, and an appointments diary.

## MicroPro MD

Following the recent death of John Speller, former marketing director **Robin Oliver** has been appointed MD of the company's UK subsidiary.

## CHM update

Long-lived readers will recall an outfit called **Computer Hardware Maintenance**, formerly Sullivan Computer Maintenance, which placed a lot of advertising in 1984 to 1986 promoting cheap hardware maintenance services. In the early days of APRICOT FILE and in our former roles at 16 BIT COMPUTING, we warned against this company and passed on to the relevant authorities the information we received. CHM disappeared under a welter of complaints and legal actions a year ago; and we're now pleased to report that four of the firm's principals, including the egregious **Chris Sullivan** himself, are due to appear at Southwark Crown Court on 1 June to face charges of dishonestly obtaining money via misrepresentation.

## The word on Lotus

One of the best of America's numerous glossy computer magazines is simply called *LOTUS*. It's pricey but big and very full — and it has a circulation of 300,000. Now there's going to be a UK equivalent with the same name, published "independently" of Lotus itself but with the company's "full support and encouragement" — indeed, the announcement appears on Lotus notepaper. The mag will be bi-monthly at first, and if it's anything like the US version the quality of its contents should more than justify its price for **£2 per copy**. Of course, the problem for would-be readers is that Lotus has a variety of products running under a variety of operating systems on different computers: hopefully there will be enough 1-2-3 and Symphony coverage to counterbalance the stuff about Jazz and Freelance for the Apricot owner. We'll let you know.

## Dealers go down

Market researchers **Romtec** reckon a hundred dealers left the computer business for one reason or another in the last quarter of 1986, making the total for the year something over 400.

**MBS** is still the largest dealer operation. Over the year, Romtec says the **average price** per dealer sale dropped from nearly £3,000 to **£2,187**, largely because of the arrival of cheap Amstrads. **Apricot** retains the no 2 spot in the market, with **16 per cent** of sales, behind **IBM** with **38 per cent**. **Amstrad** displaced **Olivetti** from third place, taking **9 per cent**.

## Modem House liquidates

One of the more aggressive purveyors of cheap modems, Exeter-based **Modem House**, has gone into voluntary liquidation. In an interview with a dealers' publication, boss Keith Rose attributed the £200,000-plus deficiency to industrial espionage by a rival and poor quality control by suppliers.

## Cheap Xens

**Tandy** is cutting prices on non-IBM Xens with 20MB hard disk at its four remaining AT **Computerworld** stores (two in London, plus Bristol and Coventry). The 512KB Xen CD is priced at **£2,089**, £210 off RRP; but the bargain is probably the 1MB Xen-HD — which drops £510 to **£2,189**. They're described as 'shop-soiled' ex-display machines.

## Register here

The **Data Protection Registrar** says it has located "a number of organisations which have failed to register" — 3,000 of them. Microfiche copies of the first 77,000-strong registration list are now available in 171 main public libraries, but the Registrar now has over 100,000. The public won't be able to request information from registrants until 11 November.

## More networks

The Paris-based market research organisation **Intelligent Electronics** has just published a report on the local network market in Europe. Seems less that five per cent of users have machines on a LAN: IE says this is due in part to the small size of most vendors ("none have been able to indulge in the high level of promotional and marketing activity which appear necessary to drive the market upwards") and also points out (by the by) that there just hasn't been any suitable software — from operating systems to networkable packages. Still, IE concludes that "the immature phase" of the LAN market is now over — the availability of MS-DOS 3.2 will help — and it expects significant growth over the next few years.

## Mortification

**As an advertiser in *Apricot Systems*, the new one-off glossy mag from VNU Publications, we were naturally sent a sample copy. Here's the address label:**

Denis Ferrett
TP Group
PO BOX 509
London
N1 1BR